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1964

Surface Water Records of Hawaii and other Pacific Areas

UNITED STATES DEPARTMENT OF THE INTERIOR - GEOLOGICAL SURVEY

Prepared in cooperation with the State of Hawaii, the Government of Guam, the Government of American Samoa, and with other State, county, and Federal Agencies

United States Department of Interior
Geological Survey - Water Resources Division

SURFACE WATER RECORDS OF HAWAII AND OTHER PACIFIC AREAS

1964

Prepared in cooperation with

Hawaii Department of Land and Natural Resources,
Division of Water and Land Development
Government of Guam
Government of American Samoa
City and County of Honolulu
Corps of Engineers, U.S. Army

Copies of this report may be obtained from
District Engineer, Surface Water Branch
U.S. Geological Survey
Room 330, First Insurance Bldg.
1100 Ward Avenue
Honolulu, Hawaii 96814

CALENDAR FOR FISCAL YEAR 1964

JULY 1963

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JUNE 1964

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INTRODUCTION

The surface-water records for the 1964 fiscal year for gaging stations, partial-record stations, and miscellaneous sites within the State of Hawaii and other Pacific areas are given in this report. The records were collected and computed by the Water Resources Division of the U.S. Geological Survey, under the direction of Mearle M. Miller, district engineer, Surface Water Branch.

Through June 30, 1960, the records of discharge and stage of streams and contents and stage of lakes or reservoirs were published in an annual series of U.S. Geological Survey water-supply papers entitled "Surface Water Supply of the United States." Since 1951 there have been 20 volumes in the series; each volume covered an area whose boundaries coincided with those of certain natural drainage areas. The records in Hawaii are contained in the above series as "Surface Water Supply of Hawaii." Records for other Pacific areas are contained in a volume entitled "Surface Water Supply of Mariana, Caroline, and Samoa Islands."

Beginning with the 1961 fiscal year, streamflow records and related data have been released by the Geological Survey in annual reports on a State-boundary basis, except for Hawaii which includes other Pacific areas. Distribution of these basic-data reports is limited and primarily for local needs. Records will be published in Geological Survey water-supply papers at 5-year intervals.

COOPERATION

Cooperative agreements between the U.S. Geological Survey and organizations of the State of Hawaii for the systematic collection of streamflow records began in 1909. Cooperative agreements with the Territory of Guam began in 1953, and with the Territory of American Samoa in 1957. Organizations that supplied data are acknowledged in station descriptions. Organizations that assisted in collecting data through cooperative agreements with the Survey are:

State of Hawaii, Department of Land and Natural Resources.
Government of Guam.
Government of American Samoa.
City and County of Honolulu, Division of Engineering.

Assistance in the form of funds or services was given by the Corps of Engineers, U.S. Army, in collecting records for 26 gaging stations published in this report.

The following organizations aided in collecting records:

Boards of Water Supply of the City and County of Honolulu and Maui County; Lihue Plantation Co., Ltd.; Grove Farm Co., Inc.; McBryde Sugar Co., Ltd.; Waiahole Water Co., Ltd.; East Maui Irrigation Co., Ltd.; B.P. Bishop Estate; Kohala Ditch Co., Ltd.; Hawaiian Irrigation Co., Ltd.; and Pioneer Mill Co., Ltd.

DEFINITION OF TERMS AND ABBREVIATIONS

The terms of streamflow and other hydrologic data, as used in this report, are defined as follows:

Gaging station is a particular site on a stream, canal, lake, or reservoir where systematic observations of gage height or discharge are obtained. When used in connection with a discharge record, the term is applied only to those gaging stations where a continuous record of discharge is obtained.

Partial-record station is a particular site where limited streamflow data are collected systematically over a period of years for use in hydrologic analyses.

Cubic foot per second (cfs) is the rate of discharge of a stream whose channel is 1 square foot in cross-sectional area and whose average velocity is 1 foot per second.

Million gallons per day (mgd) is the rate of discharge of a stream measured in million gallons per day.

Acre-foot (ac-ft) is the quantity of water required to cover an acre to the depth of 1 foot and is equivalent to 43,560 cubic feet.

Cfs-day is the volume of water represented by a flow of 1 cubic foot per second for 24 hours. It is equivalent to 86,400 cubic feet, 1.983471 acre-feet, or 646,317 gallons, and represents a runoff of 0.0372 inch from 1 square mile.

Stage-discharge relation is the relation between gage height and the amount of water flowing in a channel, expressed as volume per unit of time.

Control designates a feature downstream from the gage that determines the stage-discharge relation at the gage. This feature may be a natural constriction of the channel, a long reach of the channel, or an artificial structure.

The drainage area of a stream at a specified location is that area, measured in a horizontal plane, which is so enclosed by a topographic divide that direct surface runoff from precipitation normally would drain by gravity into the river above the specified point. Figures of drainage area given herein include all closed basin, or noncontributing areas, within the area unless otherwise noted.

WSP is used as an abbreviation for "Water-Supply Paper" in reference to previously published reports.

DOWNSTREAM ORDER AND STATION NUMBERS

Stations are listed in the same downstream order used in the water-supply papers. Records are listed in a downstream direction along the main stem with all stations on a tributary entering above a main-stem station listed before that station. If a tributary enters between two main-stem stations, it is listed between them. A similar order is followed listing stations on first rank, second rank, and other ranks of tributaries. To indicate the rank of any tributary on which a gaging station is situated and the stream to which it is immediately tributary, each indention in the listing of gaging stations in the table of contents of this report represents one rank. This downstream order and system of indention shows which gaging stations are on tributaries between any two stations on a main stem and the rank of the tributary on which each gaging station is situated.

As an added means of identification, each gaging station and partial-record station has been assigned a station number. The numbers have been assigned in the same downstream order used in the annual series of water-supply papers. In assigning station numbers, no distinction is made

between partial-record stations and continuous-record gaging stations, so that the station number for a partial-record station indicates downstream order position in a list made up of both types of stations. Gaps are left in the numbers to allow for new stations that may be established; hence the numbers are not consecutive.

The complete number for each station, such as 40-2290.00, includes the district number "40" and a six-digit station number. In this report, only the essential digits of the station number are shown. For example, the complete number 40-2290.00 would appear as 2290, just to the left of the station name. Also, the records are listed in downstream order by islands.

EXPLANATION OF DATA

The base data collected at gaging stations consists of records of stage and measurements of discharge. In addition, observations of factors affecting the stage-discharge relation, weather records, and other information are used to supplement base data in determining the daily flow. Records of stage are obtained from a water-stage recorder that gives either a continuous chart of the fluctuations or, for a digital recorder, a tape punched at 15-minute intervals. Measurements of discharge are made with a current meter by the general methods adopted by the Geological Survey on the basis of experience in stream gaging since 1888. These methods are described in Water-Supply Paper 888 and are also outlined in standard textbooks on the measurement of stream discharge.

Rating tables giving the discharge for any stage are prepared from stage-discharge relation curves defined by discharge measurements. If extensions to the rating curves are necessary to define the extremes of discharge, they are made on the basis of indirect measurements of peak discharge (such as slope-area or contracted-opening measurements, or computation of flow over dams or weirs), velocity-area studies, and logarithmic plotting. The application of the daily mean gage height to those rating tables gives the daily mean discharge, from which the monthly and yearly mean discharge are computed. If the stage-discharge relation is subject to change because of frequent or continual change in the physical features that form the control, the daily mean discharge is determined by the shifting-control method, in which correction factors based on individual discharge measurements and notes by engineers and observers are used in applying the gage heights to the rating tables. If the stage-discharge relation for a station is temporarily changed by the presence of aquatic growth or debris on the control, the daily mean discharge is computed by what is in effect the shifting-control method.

For some gaging stations there are periods when no gage-height record is obtained or the recorded gage height is so faulty that it

cannot be used to compute the daily discharge. This happens when the recorder stops or otherwise fails to operate properly, intakes are plugged, or for various other reasons. For such periods the daily discharges are estimated on the basis of recorded range in stage, adjoining good record, discharge measurements, weather records, and comparison with other station records from the same or nearby basins.

The data in this report generally comprise a description of the station, a skeleton rating table, and a table showing the daily discharge and monthly and yearly discharge of the stream. Records are published for the fiscal year which begins on July 1 and ends on June 30. A calendar for the 1964 fiscal year is shown on page II to facilitate finding the day of the week for any date.

The description of the station gives the location, drainage area, records available, type and history of gages, average discharge, extremes of discharge, and general remarks. The location of the gaging station and the drainage area are obtained from the most accurate maps available. Under "Records available" are given periods for which there are published records for the present station or for stations generally equivalent to the present one. Under "Gage" are given the type of gage currently in use and the datum of the gage above mean sea level, and a condensed history of the types, locations, and datums of previous gages used during the period of records available. The references to "datum of 1929" and adjustments of other years are to the datum and adjustments of the U.S. Coast and Geodetic Survey. Under "Average discharge" is given the average discharge for the number of years indicated. It is not given for stations having fewer than five complete years of record or for stations where changes in water development during the period of record cause the figure to have little significance. Under "Extremes" are given the maximum discharge and gage height, the minimum discharge if there is little or no regulation, and the minimum daily discharge if there is extensive regulation. In the first paragraph, the data given are for the complete current fiscal year unless otherwise specified. In the second paragraph, the data given are for the periods of record within the calendar year dates in the heading (not necessarily those for the complete years indicated by the heading dates). Reliable information concerning major floods that have occurred outside the period of record is given in the third or last paragraph under "Extremes." Unless otherwise qualified, the maximum discharge corresponds to the crest stage obtained by use of a water-stage recorder or crest-stage indicator. If the maximum gage height did not occur at the same time as the maximum discharge, it is given separately. Information pertaining to the accuracy of the records and to conditions which affect the natural flow at the gaging station is given under "Remarks."

Skeleton rating tables are published for all stations except those for which the daily discharge for the greater part of the period was

determined by the shifting-control method or other special methods involving an equivalent adjustment to the gage height of more than one-tenth foot. Skeleton rating tables are not published for canals, ditches, or springs.

The daily table gives the discharge corresponding to the daily mean gage height unless there are large or rapid changes in discharge during a day. For days having large or rapid changes, discharge for the day is computed by averaging the mean discharges for several parts of a day. For digital recorders, the daily mean discharge is always the average of the discharges at each punched reading.

In the table of daily discharge, the figures for the maximum day and the minimum day for each month are underlined. If the figure is repeated, it is underlined only on the first day of its occurrence.

In the monthly summary below the daily table, the line headed "Total" gives the sum of the daily figures; it is the total cfs-days for the month for Guam and Okinawa and million gallons for Hawaii and Samoa. The line headed "Mean" gives the average flow in millions of gallons per day and cubic feet per second during the month. Discharge for the month is expressed in acre-feet (line headed "Ac-ft").

In the yearly summary below the monthly summary, the figures of maximum are the maximum daily discharges, not the momentary discharges when the water was at crest stage. Likewise, the minimums in this summary are the minimum daily discharges.

Peak discharges and the times of their occurrence and corresponding gage heights for most stations are listed below the table of daily and monthly discharge. All independent peaks above the selected base are given. The base discharge, which is given in parentheses, is selected so that an average of about three peaks a year can be presented. Peak discharges are not published for any stream for which the peaks are subject to substantial control by man. Time of day is expressed in 24-hour time, for example 12:30 a.m. is 0030, 1:30 p.m. is 1330.

Footnotes to the table of daily discharge indicate periods for which discharge was computed or estimated by unusual or special methods because of no gage-height record or other conditions that reduce the degree of accuracy of the records. The footnotes are either reference footnotes, with corresponding symbols used in the table of daily discharge to indicate the days included, or general footnotes, introduced by the word "Note," in which the days included are stated. The method used in computing data for such footnoted periods have been explained in preceding paragraphs.

The accuracy of streamflow data depends primarily on (1) the stability of the stage-discharge relation or, if the control is unstable, the frequency of discharge measurements, and (2) the accuracy of observations of stage, measurements of discharge, and interpretation of records.

The station description states the degree of accuracy of the records. "Excellent" indicates that, in general, the error in the daily records is believed to be less than 5 percent; "good," less than 10 percent; "fair," less than 15 percent; and "poor," probably more than 15 percent. The records of monthly and yearly mean discharge and runoff are, in general, more nearly accurate than the daily records.

Discharge at some stations, as indicated by the monthly mean, may vary widely from natural runoff, owing to diversion, consumption, regulation by storage, increase or decrease in evaporation due to artificial causes, or to other factors.

SUPPLEMENTAL DATA

Data collected at partial-record stations and at miscellaneous sites are given at the end of this report. Data for partial-record stations are presented in two tables. The first is a table of discharge measurements at low-flow partial-record stations, and the second is a table of annual maximum stage and discharge at crest-stage stations. Discharge measurements at miscellaneous sites are given in a third table. Data for crest-stage partial-record stations in the State of Hawaii are not included in this report. They are included in an annual progress report entitled "An Investigation of Floods in Hawaii," copies of which may be obtained from the district office.

Information of a more detailed nature than that published for most of the gaging stations is on file in the district office, such as discharge measurements and recorder charts or nonrecording-gage readings. Most gaging-station records in the State through fiscal year 1960 have been analyzed with an electronic computer to give: (1) the number of days in each year that the daily discharge was between selected limits (duration tables); (2) the lowest mean discharge for selected numbers of consecutive days in each year; and (3) the highest mean discharge for selected numbers of consecutive days in each year. Information on the availability of electronic computer analyses and unpublished data may be obtained from the district office.

ISLAND OF KAUAI

100. Kawaikoi Stream near Waimea

Location.--Lat 22°08'09", long 159°37'22", on left bank at old trail crossing and 12.5 miles north of Waimea.

Drainage area.--4.1 sq mi, approximately.

Records available.--April 1909 to October 1912, December 1912 to March 1913, May 1913 to June 1915, August 1915 to May 1916, July to December 1916, July 1919 to June 1964. Monthly discharge only for some periods, published in WSP 1319.

Gage.--Water-stage recorder and concrete control. Altitude of gage is 3,420 ft (by barometer). Prior to May 26, 1910, staff gage at site 300 ft downstream at different datum.

Average discharge.--48 years (1911-12, 1913-15, 1919-64), 22.0 mgd (34.0 cfs).

Extremes.--Maximum discharge during year, 1,150 mgd (1,780 cfs) Jan. 5 (gage height, 7.44 ft), from rating curve extended above 300 mgd as explained below; minimum, 0.83 mgd (1.28 cfs) Dec. 4, 5.
1909-16, 1919-64: Maximum discharge, 6,900 mgd (10,700 cfs) Dec. 18, 1916 (gage height, 15.2 ft), from rating curve extended above 300 mgd on basis of slope-area measurements at gage heights 12.12 and 13.43 ft; minimum, 0.74 mgd (1.15 cfs) Sept. 21, 22, 1953.

Remarks.--Records good. No diversion above station.

Rating tables (gage height, in feet, and discharge, in million gallons a day)

July 1 to Jan. 4, May 22 to June 30				Jan. 5 to May 21	
1.9	0.83	3.4	55.5	2.1	2.90
2.1	2.45	3.7	97.0	2.2	4.10
2.3	5.05	4.0	155	2.4	7.40
2.5	8.50	4.5	255	2.7	15.4
2.8	17.1	5.0	355	3.1	32.7
3.1	31.5			3.4	55.5

Note.--Same as preceding table above 3.4 ft.

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	50.8	7.39	2.45	16.3	1.57	0.95	184	5.14	37.6	11.4	12.8	4.06
2	12.2	4.91	2.36	6.65	1.48	.95	111	4.99	17.8	9.60	9.38	3.91
3	19.8	4.48	2.27	19.9	1.39	.89	150	4.69	11.4	9.16	7.22	3.63
4	8.98	5.37	2.19	5.85	1.23	.83	353	4.54	9.86	8.50	6.49	3.39
5	6.65	4.48	2.27	6.84	1.31	.83	334	4.40	9.16	10.4	5.94	3.28
6	6.01	3.91	2.36	4.06	1.31	1.09	132	4.25	7.84	9.16	*5.43	3.28
7	5.53	3.77	2.57	3.16	1.39	1.16	28.0	4.25	30.3	9.16	5.14	3.16
8	5.21	3.63	2.36	5.85	1.83	1.09	18.8	4.25	305	14.1	5.14	3.04
9	6.01	3.39	2.19	3.77	1.75	44.4	154	4.25	225	8.94	5.14	2.92
10	5.37	3.51	2.10	2.69	38.0	49.1	159	8.51	95.5	7.84	4.99	*2.80
11	4.91	3.39	2.10	2.27	4.48	6.49	26.6	27.4	34.6	11.4	5.58	2.80
12	4.62	3.28	2.45	2.19	2.69	3.39	23.0	58.0	22.2	11.7	6.85	2.80
13	4.48	3.16	2.57	2.01	2.10	2.92	*16.4	44.0	18.1	9.16	6.67	2.69
14	8.85	3.04	2.36	1.92	1.75	12.7	132	54.5	14.1	7.04	5.28	2.80
15	9.76	3.04	2.27	1.83	1.57	4.20	68.3	29.2	11.7	6.13	4.69	2.80
16	7.76	3.28	66.9	1.83	1.48	15.9	52.6	20.5	10.4	5.76	4.40	3.28
17	23.5	4.62	220	1.75	1.31	14.3	16.4	*9.16	9.38	5.43	4.10	3.77
18	133	3.28	65.2	1.66	1.23	4.20	17.4	7.22	8.94	5.28	3.98	3.04
19	48.2	2.80	8.98	1.75	1.16	2.80	12.5	7.04	184	5.14	3.86	3.51
20	12.4	2.69	5.37	1.75	1.09	2.19	18.2	6.13	53.0	6.49	3.74	3.04
21	9.29	2.57	4.06	1.66	1.09	1.92	33.8	5.76	18.1	7.84	23.1	2.57
22	19.4	2.57	3.39	*1.57	1.02	88.7	14.1	5.28	20.7	5.94	55.4	2.80
23	9.46	2.45	2.92	1.83	1.02	23.2	10.6	5.28	27.3	22.1	36.7	8.34
24	*7.76	5.73	2.92	2.36	1.02	5.85	8.72	7.84	19.6	132	17.9	18.7
25	6.65	4.48	2.92	3.39	1.02	3.77	7.62	216	*16.9	30.3	20.2	10.8
26	5.69	6.45	3.16	3.51	1.02	3.04	7.04	51.4	28.5	30.3	22.3	5.53
27	6.17	*7.39	2.7	2.27	1.09	2.69	6.67	54.3	84.2	16.1	23.2	29.6
28	8.98	6.65	2.27	1.83	1.02	3.16	6.13	18.5	20.9	9.16	9.22	40.0
29	5.85	4.06	2.9	1.83	1.02	3.28	5.76	35.6	13.2	24.7	6.01	6.65
30	5.05	3.28	2.19	2.27	.95	2.45	5.58	---	11.7	13.2	4.91	18.2
31	5.53	2.80	---	1.92	---	65.3	5.28	---	14.4	---	4.48	---
Total	473.87	125.85	430.75	118.47	80.39	373.74	1,999.70	712.38	1,391.38	463.43	340.24	207.19
Mean												
Mgd	15.3	4.06	14.4	3.82	2.68	12.1	64.5	24.6	44.9	15.4	11.0	6.91
Cfs	23.7	6.28	22.3	5.91	4.15	18.7	99.8	38.1	69.5	23.8	17.0	10.7
Ac-ft	1,450	386	1,320	364	247	1,150	6,140	2,190	4,270	1,420	1,040	636

Calendar Year 1963: Max 412 Min 0.83 Mean mgd 19.2 Mean cfs 29.7 Ac-ft 21,500
Fiscal Year 1963-64: Max 353 Min 0.83 Mean mgd 18.4 Mean cfs 28.5 Ac-ft 20,610

Peak discharge (base, 1,300 mgd).--No peak above base.

* Discharge measurement made on this day.

130. Mohihi Stream at altitude 3,420 ft, near Waimea

Location.--Lat 22°07'13", long 159°36'14", on left bank at upper trail crosaing, 3.8 miles northeast of confluence with Waiahulu and Poomau Streams, and 12 miles northeast of Waimea.

Drainage area.--1.6 sq mi, approximately.

Records available.--June 1920 to October 1926, October 1936 to June 1964. Published as "at altitude 3,500 ft, near Waimea" prior to July 1947 and July 1952 to June 1962, and as "near Waimea" July 1947 to June 1952.

Gage.--Water-stage recorder. Altitude of gage is 3,420 ft (from topographic map).

Average discharge.--33 years (1920-26, 1937-64), 5.25 mgd (8.12 cfs).

Extremes.--Maximum discharge during year, 411 mgd (636 cfs) Jan. 4 (gage height, 4.87 ft), from rating curve extended above 110 mgd; minimum, 0.37 mgd (0.57 cfs) Dec. 5.
1920-26, 1936-64: Maximum discharge, 1,250 mgd (1,930 cfs) Aug. 15, 1950 (gage height, 7.23 ft), from rating curve extended above 50 mgd; minimum, 0.08 mgd (0.12 cfs) Sept. 21, 1953.

Remarks.--Records fair. Continuous records of rainfall are obtained at station.

Rating table (gage height, in feet, and discharge in million gallons a day)

0.8	0.29	2.0	11.8
.9	.49	2.3	21.1
1.0	.77	2.6	35.9
1.1	1.15	3.0	68.5
1.2	1.65	3.5	128
1.4	2.98	4.0	204
1.7	6.15		

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	9.89	1.45	0.69	3.58	0.71	0.41	18.7	1.40	11.9	4.07	2.69	1.45
2	4.17	1.40	.63	2.26	.66	.39	18.4	1.30	6.15	3.42	2.08	1.30
3	4.80	1.35	.57	6.75	.66	.39	13.3	1.30	3.24	3.24	1.65	1.20
4	3.16	1.30	.55	2.40	.60	.39	146	1.15	3.33	2.91	1.40	1.11
5	2.26	1.30	.57	3.77	.60	.39	90.4	1.15	2.91	2.69	1.30	1.04
6	2.02	1.15	.71	2.08	.63	.47	43.4	1.11	2.48	2.62	*1.20	1.00
7	1.83	1.11	.66	1.50	.77	.49	10.7	1.11	9.95	2.69	1.20	.96
8	1.71	1.07	.63	1.40	1.20	.52	6.30	1.11	154	4.69	1.20	.96
9	1.71	1.07	.57	1.25	.92	24.3	12.7	1.11	116	2.91	1.25	.92
10	1.65	1.04	.55	.96	12.6	21.8	27.1	1.35	25.6	2.40	1.25	*.92
11	1.55	1.04	.55	.81	2.08	2.91	7.39	4.90	13.4	2.48	1.25	.88
12	1.50	.92	.63	.71	1.20	1.65	5.28	7.50	8.84	2.55	1.30	.88
13	1.40	.88	.71	.69	.85	1.20	*4.07	10.5	6.77	2.84	1.25	.88
14	1.50	.88	.69	.63	.69	1.20	3.24	10.1	5.40	2.20	1.15	.92
15	1.55	.92	.66	.60	.63	1.20	9.46	8.24	4.48	1.89	1.04	.96
16	1.83	1.63	9.17	.57	.57	1.35	9.41	5.65	3.96	1.71	1.00	1.04
17	1.89	2.33	68.5	.55	.52	2.14	4.28	*2.55	3.68	1.65	.96	1.07
18	12.3	1.30	16.8	.57	.47	1.40	4.07	1.83	3.51	1.55	.88	.96
19	10.8	1.04	3.51	.63	.47	1.07	3.33	1.71	26.2	1.50	.81	.96
20	3.96	.88	1.89	.66	.43	.85	3.16	1.45	14.3	2.08	.77	.88
21	2.69	.81	1.40	.63	.41	.74	8.65	1.30	5.90	2.98	.96	.81
22	7.06	.74	1.11	*.63	.41	2.41	4.48	1.25	8.02	2.14	11.1	.85
23	3.96	.71	.96	.66	.41	4.48	3.07	1.45	13.8	6.10	9.64	.96
24	*2.69	1.45	.85	.88	.39	1.65	2.55	2.62	8.65	22.0	5.40	1.50
25	2.14	1.55	.77	1.45	.39	1.11	2.26	42.4	*6.02	8.28	4.50	2.55
26	1.83	1.11	.71	1.55	.45	.92	2.02	15.4	7.70	4.69	6.15	2.33
27	1.89	*1.04	.66	1.04	.63	.77	1.83	10.6	13.5	3.77	7.24	6.38
28	3.07	1.15	.66	.81	.52	.81	1.71	4.90	7.54	2.26	3.68	11.0
29	2.02	1.04	.81	.88	.47	.81	1.55	5.15	4.48	8.00	2.33	2.98
30	1.65	.88	.71	1.11	.43	.69	1.55	---	3.86	4.07	1.89	3.06
31	1.55	.74	---	.85	---	5.79	1.45	---	4.48	---	1.60	---
Total	102.03	35.28	117.88	42.86	31.77	84.70	471.81	151.59	510.05	116.38	80.12	52.71
Mean												
Mgd	3.29	1.14	3.93	1.38	1.06	2.73	15.2	5.23	16.5	3.88	2.58	1.76
Cfs	5.09	1.76	6.08	2.14	1.64	4.22	23.5	8.09	25.5	6.00	3.99	2.72
Ac-ft	313	108	362	132	97	260	1450	465	1570	357	246	162

Calendar Year 1963: Max 136 Min 0.39 Mean mgd 6.13 Mean cfs 9.48 Ac-ft 6870
Fiscal Year 1963-64: Max 154 Min 0.39 Mean mgd 4.91 Mean cfs 7.60 Ac-ft 5520

* Discharge measurement made on this day.

Peak discharge (base, 200 mgd)

Date	Time	Gage height	Discharge Mgd	Discharge Cfs	Date	Time	Gage height	Discharge Mgd	Discharge Cfs
1-4	0830	4.87	411	636	3-8	1900	4.72	370	572

140. Kokee ditch near Waimea

Location.--lat 22°06'25", long 159°40'45", on left bank 1,000 ft west of road and 10.5 miles north of Waimea.

Records available.--September 1926 to June 1964.

Gage.--Water-stage recorder and suppressed weir. Altitude of gage is 3,310 ft (by barometer). Prior to July 1, 1962, at datum 0.07 ft higher.

Average discharge.--37 years (1927-64), 15.8 mgd (24.4 cfs).

Extremes.--1926-64: Maximum daily discharge, 68 mgd (105 cfs) Dec. 2, 1929, Mar. 4, 1933; no flow at times.

Remarks.--Records good. Kokee ditch diverts water at altitude 3,400 ft from all streams tributary to Waimea River west of Mohihi Stream for irrigation near Kekaha.

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	38.2	10.3	3.90	16.2	2.76	2.10	37.0	8.90	33.6	18.2	17.0	6.88
2	18.2	7.73	3.62	12.2	2.76	2.10	35.4	8.50	26.0	16.5	14.7	6.20
3	28.2	6.88	3.48	19.5	2.76	2.10	40.8	8.10	15.4	17.2	11.6	6.20
4	15.4	7.73	3.34	10.3	2.43	2.10	41.2	7.90	13.8	17.0	10.5	5.56
5	12.0	6.88	3.34	10.5	2.32	2.10	40.6	7.73	13.1	18.2	9.90	5.40
6	10.7	6.37	3.48	7.56	2.43	2.43	27.8	7.39	11.4	16.8	9.30	5.40
7	10.1	6.04	3.62	5.72	2.32	2.65	15.4	7.22	22.2	16.3	8.90	5.40
8	9.50	5.88	3.62	7.70	2.54	2.54	11.0	7.39	47.5	20.5	*9.30	4.92
9	9.90	5.72	3.34	6.20	2.65	14.0	20.8	7.05	26.3	16.8	8.50	4.76
10	9.70	5.72	3.20	4.60	22.6	32.2	14.7	8.90	11.8	14.0	8.30	4.60
11	8.90	5.56	3.09	4.04	8.30	11.0	7.90	26.9	9.70	16.8	8.50	*4.60
12	8.50	5.40	3.48	3.76	5.08	6.37	13.8	40.8	10.6	17.5	9.70	4.46
13	8.10	5.24	3.62	3.62	4.18	5.08	22.9	37.5	11.2	15.6	9.70	4.32
14	12.0	4.92	3.62	3.34	3.48	14.1	19.0	43.5	7.39	12.9	8.30	4.46
15	13.3	4.92	3.34	3.34	3.34	6.54	*24.0	32.4	7.91	11.8	7.39	4.46
16	12.0	5.24	15.5	3.20	3.20	13.4	32.4	29.4	16.3	11.2	7.05	4.46
17	13.4	6.88	45.9	3.20	2.98	20.0	19.9	14.4	14.9	10.7	6.71	5.40
18	43.1	5.56	38.9	3.09	2.87	7.05	19.6	11.4	14.0	10.3	6.54	4.60
19	37.6	4.92	15.4	3.09	2.76	4.92	15.8	*10.7	40.2	9.90	6.37	4.76
20	19.0	4.76	9.50	3.09	2.65	3.90	15.8	7.26	35.6	12.2	6.20	4.46
21	13.3	4.46	7.39	3.09	2.65	3.48	32.3	5.78	10.1	14.0	14.2	4.04
22	26.0	4.46	6.37	2.98	2.43	27.2	19.9	7.73	16.5	11.4	39.8	4.18
23	14.9	4.18	5.72	3.09	2.32	30.0	15.4	7.39	31.1	20.2	29.5	8.24
24	*12.0	6.83	5.24	*3.76	2.32	10.5	13.8	9.30	20.6	44.3	23.5	18.2
25	10.3	6.88	4.92	4.46	2.32	7.05	12.2	31.6	15.4	36.6	20.9	14.6
26	8.50	7.43	4.76	5.40	2.21	5.72	11.6	42.4	22.1	32.7	28.0	7.73
27	8.30	9.10	4.46	3.90	2.32	4.92	11.2	43.1	*27.1	24.7	26.5	23.1
28	12.4	8.70	4.46	3.20	2.32	5.56	11.0	25.3	16.5	14.9	14.2	33.5
29	8.50	*6.04	4.18	2.98	2.21	5.88	10.3	33.9	7.90	28.4	9.90	10.7
30	7.39	4.92	4.04	3.34	2.21	4.46	9.70	--------	14.5	19.3	7.90	18.7
31	7.56	4.32	----------	3.09	----------	19.7	9.50	--------	20.5	----------	7.05	----------
Total	466.95	189.97	228.83	173.54	107.72	281.15	632.70	539.84	591.20	546.90	405.91	244.29
Mean												
Mgd	15.1	6.13	7.63	5.60	3.59	9.07	20.4	18.6	19.1	18.2	13.1	8.14
Cfs	23.4	9.48	11.8	8.66	5.55	14.0	31.6	28.8	29.6	28.2	20.3	12.6
Ac-ft	1430	583	702	533	331	863	1940	1660	1810	1680	1250	750

Calendar Year 1963: Max 46.3 Min 1.10 Mean mgd 13.1 Mean cfs 20.3 Ac-ft 14730
Fiscal Year 1963-64: Max 47.5 Min 2.10 Mean mgd 12.0 Mean cfs 18.6 Ac-ft 13530

* Discharge measurement made on this day.

160. Waimea River at altitude 840 ft, near Waimea

Location.--lat 22°04'55", long 159°39'15", on right bank in Waimea Canyon, 0.5 mile upstream from Koaie Stream, and 8.8 miles north of Waimea.

Drainage area.--20.0 sq mi.

Records available.--February to October 1916, October 1917 to June 1918, May 1925 to January 1949, September 1949 to July 1950, February 1951 to June 1964. Published as Waiahulu Stream near Waimea prior to July 1952 and as "at altitude 890 ft, near Waimea" July 1952 to June 1962.

Gage.--Water-stage recorder. Altitude of gage is 840 ft (from topographic map). Prior to May 25, 1925, at datum 1.55 ft lower.

Average discharge.--36 years (1925-48, 1951-64), 32.5 mgd (50.3 cfs).

Extremes.--Maximum discharge during year, 1,220 mgd (1,890 cfs) Jan. 5 (gage height, 6.20 ft), from rating curve extended above 130 mgd on basis of slope-area measurement at gage height 11.45 ft; minimum, 8.42 mgd (13.0 cfs) June 30.
1916-18, 1925-64: Maximum discharge, 18,100 mgd (28,000 cfs) Aug. 17, 1950 (gage height, 18.3 ft, from floodmarks), from rating curve extended above 320 mgd; minimum, 5.2 mgd (8.0 cfs) Nov. 4, 1927.

Remarks.--Records fair. Kokee ditch (see preceding page) diverts above station for irrigation near Kekaha.

Rating table (gage height, in feet, and discharge, in million gallons a day)
(Shifting-control method used Aug. 16 to Sept. 16, May 23 to June 30)

1.6	8.60	3.0	96.0
1.8	14.0	3.5	170
2.1	25.0	4.0	280
2.5	49.0	5.0	600

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	41.2	14.3	12.6	12.5	10.8	10.6	186	11.7	31.4	23.0	12.6	9.10
2	18.0	14.7	12.6	15.3	10.8	10.6	130	11.7	26.8	22.6	11.7	9.10
3	16.0	14.0	12.6	22.3	11.1	10.6	225	11.4	16.0	27.0	11.1	9.10
4	15.6	14.0	12.6	16.0	10.8	10.6	589	11.4	15.6	23.4	10.8	9.10
5	14.7	13.4	12.6	15.0	*10.6	10.8	542	11.4	16.0	22.2	9.80	9.10
6	14.7	13.4	12.6	14.0	10.6	11.7	248	11.1	14.0	18.8	9.80	9.10
7	14.7	13.4	12.6	12.6	10.8	11.4	53.0	11.1	17.8	17.3	9.80	9.10
8	14.7	13.4	12.6	11.7	10.8	11.4	31.8	11.1	512	*18.0	9.60	9.10
9	14.3	13.4	*12.6	11.7	11.1	82.6	243	11.1	547	17.3	9.60	9.40
10	14.3	14.0	12.6	11.1	40.4	123	271	11.4	131	15.3	9.80	9.40
11	14.3	14.0	12.6	10.8	14.7	20.6	51.4	16.2	58.8	15.0	9.80	9.40
12	14.3	14.3	12.6	10.8	11.4	14.0	33.6	39.7	31.2	15.0	9.80	9.40
13	14.3	14.3	12.6	10.6	10.6	11.7	24.6	25.7	26.0	15.3	9.80	9.40
14	14.3	14.3	12.6	10.1	10.1	10.8	19.9	48.6	22.2	15.0	9.80	9.40
15	14.3	14.7	12.3	10.1	9.80	10.8	56.4	23.8	20.3	14.7	9.80	9.60
16	14.3	15.0	37.5	10.1	9.80	10.6	66.4	24.6	18.8	14.0	9.80	9.60
17	14.3	13.4	312	9.80	9.60	11.7	24.2	15.3	17.7	13.7	9.80	9.60
18	111	12.8	76.8	9.80	9.80	11.7	21.8	12.6	17.3	13.4	9.80	9.60
19	56.6	12.6	18.4	9.80	9.80	10.1	19.2	12.0	180	13.4	*9.80	9.60
20	17.3	12.6	12.6	9.80	10.1	9.80	17.7	*13.5	124	24.5	9.80	9.60
21	14.3	12.6	11.1	9.80	10.1	9.60	32.5	12.0	33.6	21.0	9.80	9.60
22	17.3	12.6	10.6	10.1	10.1	66.0	20.6	11.7	28.8	17.3	44.5	9.40
23	16.3	12.6	10.1	10.1	10.1	42.9	16.6	11.7	54.7	16.6	25.6	*9.40
24	14.0	12.6	10.1	10.1	10.1	13.4	15.3	12.6	51.6	120	16.0	9.80
25	13.1	13.4	10.1	10.6	10.6	10.8	14.3	220	31.8	44.2	11.1	11.1
26	12.8	12.8	10.1	11.4	10.6	10.1	14.0	76.9	31.8	18.8	14.0	10.8
27	12.8	12.6	10.6	11.1	10.8	9.80	13.4	51.7	74.8	19.5	14.7	12.8
28	14.0	12.8	10.8	10.8	10.8	11.1	12.8	21.4	36.6	12.8	12.0	38.0
29	13.4	12.8	10.8	10.6	10.8	10.6	12.3	21.5	22.6	19.6	10.1	11.1
30	13.4	12.6	10.8	10.8	10.6	10.1	12.3	---	20.3	17.0	9.40	8.60
31	*13.4	12.6	---	10.8	---	43.5	12.0	---	20.6	---	9.10	---
Total	618.0	416.0	751.1	360.10	348.10	653.00	3030.1	784.9	2251.1	665.7	378.90	317.40
Mean												
Mgd	19.9	13.4	25.0	11.6	11.6	21.1	97.7	27.1	72.6	22.2	12.2	10.6
Cfs	30.8	20.7	38.7	17.9	17.9	32.6	151	41.9	112	34.3	18.9	16.4
Ac-ft	1900	1280	2300	1110	1070	2000	9300	2410	6910	2040	1160	974

Calendar Year 1963: Max 850 Min 9.60 Mean mgd 40.8 Mean cfs 63.1 Ac-ft 45,740
Fiscal Year 1963-64: Max 589 Min 8.60 Mean mgd 28.9 Mean cfs 44.7 Ac-ft 32,450

* Discharge measurement made on this day.

Peak discharge (base, 1,200 mgd)

Date	Time	Gage height	Discharge	
			Mgd	Cfs
1-5	0030	6.20	1,220	1,890

170. Koaie Stream at altitude 3,770 ft, near Waimea

Location.--lat 22°06'57", long 159°33'53", on left bank 3 miles upstream from Left Branch, 6.5 miles east of Kokee ranger station, and 12.7 miles northeast of Waimea.

Drainage area.--3.33 sq mi.

Records available.--July 1919 to July 1932, June 1954 to June 1964. Prior to July 1962, published as "at altitude 3,700 ft, near Waimea."

Gage.--Water-stage recorder. Altitude of gage is 3,770 ft (from topographic map).

Average discharge.--23 years, 17.5 mgd (27.1 cfs).

Extremes.--Maximum discharge during year, 1,940 mgd (3,000 cfs) Mar. 8 (gage height, 3.94 ft), from rating curve extended above 700 mgd; minimum, 1.19 mgd (1.84 cfs) Dec. 6, 8, 30.
1919-32, 1954-64: Maximum discharge, 4,210 mgd (6,510 cfs) Oct. 23, 1956 (gage height, 5.88 ft), from rating curve extended above 350 mgd; minimum, 0.6 mgd (0.9 cfs) May 21, 22, 1929.

Remarks.--Records fair. No diversion above station.

Rating table (gage height, in feet, and discharge, in million gallons a day)

0.46	1.19	1.1	62.0
.5	1.69	1.3	112
.6	3.91	1.6	220
.7	8.50	2.0	435
.8	16.5	3.0	1,120
.9	28.0		

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	52.5	2.17	3.34	23.3	2.17	1.43	47.9	2.37	76.5	6.81	20.0	2.59
2	9.12	1.99	1.83	7.35	1.99	1.43	45.6	2.17	23.4	4.23	7.91	2.37
3	45.1	2.17	1.56	45.0	1.83	1.30	127	1.99	9.77	4.23	4.96	2.17
4	5.82	2.17	1.43	7.91	1.83	1.30	360	1.83	5.82	4.58	4.23	1.99
5	4.23	1.99	2.17	106	1.99	1.30	200	1.83	16.7	5.82	4.58	1.83
6	3.34	1.83	2.37	7.35	1.99	1.30	142	1.69	13.6	13.6	*4.96	1.83
7	3.34	1.99	1.99	4.96	23.4	1.56	12.8	1.83	135	6.81	9.77	1.83
8	2.83	2.17	1.56	5.37	6.81	1.30	5.82	2.37	555	5.37	13.6	1.69
9	4.23	2.59	1.43	4.23	18.1	622	15.5	2.83	377	4.58	21.1	1.56
10	3.08	2.17	1.30	3.08	64.0	41.1	51.4	14.5	93.1	3.34	13.6	*1.56
11	2.59	2.17	1.43	2.17	6.81	5.37	8.50	23.4	40.0	6.81	16.5	1.56
12	3.34	1.83	1.69	1.99	4.23	3.34	11.2	59.8	26.8	16.3	22.2	1.43
13	2.59	1.56	2.83	1.83	3.08	2.59	*5.37	93.9	9.12	7.35	7.91	1.43
14	2.59	1.43	2.37	1.83	2.83	2.83	4.23	26.8	5.82	4.23	4.96	1.69
15	2.83	4.58	1.99	1.56	2.59	2.37	15.9	22.2	4.58	3.34	5.37	1.83
16	5.82	14.7	25.5	1.43	4.96	3.62	15.5	16.5	3.62	2.59	4.23	4.96
17	4.23	11.1	339	1.43	4.58	5.82	6.30	5.82	3.34	2.37	3.34	5.37
18	49.7	3.34	83.6	1.69	3.08	3.62	8.50	*3.91	3.34	2.17	2.83	5.37
19	25.7	2.17	8.50	2.17	2.59	2.59	7.35	6.81	25.7	1.99	2.37	4.96
20	7.35	1.99	4.58	2.17	2.17	1.99	35.8	4.23	16.5	5.46	2.37	3.34
21	15.9	1.83	3.34	3.62	1.83	1.69	60.1	3.62	5.82	6.81	57.1	2.83
22	57.7	1.56	2.59	*3.34	1.69	2.59	10.5	4.23	28.6	6.30	79.3	3.62
23	9.77	1.43	2.17	6.81	1.56	2.83	6.30	24.6	24.8	20.0	101	5.82
24	6.81	308	1.99	15.5	1.43	1.83	4.58	13.6	11.2	52.5	38.5	9.12
25	4.58	4.96	1.99	31.0	1.43	1.69	4.23	137	*8.50	17.6	34.5	22.6
26	3.62	3.91	1.83	7.35	2.37	1.56	4.58	36.0	12.8	25.7	25.7	28.0
27	21.4	7.91	1.56	3.34	2.37	1.30	3.62	21.1	32.5	15.5	29.5	61.0
28	9.77	*8.50	2.83	2.59	2.17	1.56	3.08	16.5	12.0	12.8	8.50	47.1
29	4.23	5.82	3.08	12.5	1.83	1.43	2.59	41.5	5.82	67.2	5.96	7.35
30	3.08	3.91	3.08	4.58	1.56	1.19	2.37	----------	6.81	15.5	3.62	22.4
31	2.59	2.83	----------	3.08	----------	6.30	2.59	----------	18.8	----------	3.08	----------
Total	379.78	139.57	514.93	326.53	179.27	172.33	1231.21	594.93	1612.36	351.89	563.55	261.20
Mean												
Mgd	12.2	4.50	17.2	10.5	5.98	5.56	39.7	20.5	52.0	11.7	18.1	8.71
Cfs	18.9	6.96	26.6	16.2	9.25	8.60	61.4	31.7	80.5	18.1	28.0	13.5
Ac-ft	1170	428	1580	1000	550	529	3780	1830	4950	1080	1730	802

Calendar Year 1963: Max 750 Min 1.19 Mean mgd 20.4 Mean cfs 31.6 Ac-ft 22900
Fiscal Year 1963-64: Max 555 Min 1.19 Mean mgd 17.3 Mean cfs 26.8 Ac-ft 19430

* Discharge measurement made on this day.

Peak discharge (base, 900 mgd)

Date	Time	Gage height	Discharge Mgd	Discharge Cfs	Date	Time	Gage height	Discharge Mgd	Discharge Cfs
9-17	1000	2.73	908	1,400	1-4	0900	2.85	1,000	1,550
10- 5	0100	2.79	952	1,470	3-8	1800	3.94	1,940	3,000

190. Waialae Stream at altitude 3,820 ft, near Waimea
(Formerly published as Waialae Stream at altitude 3,700 ft, near Waimea)

Location.--Lat 22°05'20", long 159°34'18", on left bank 5.0 miles northeast of mouth and 10.6 miles northeast of Waimea.

Drainage area.--2.5 sq mi, approximately.

Records available.--January 1920 to July 1932, June 1952 to June 1964. Prior to July 1954, published as Waialae River at altitude 3,700 ft, near Waimea and July 1954 to June 1963 as "at altitude 3,700 ft, near Waimea. See also Note below.

Gage.--Water-stage recorder. Altitude of gage is 3,820 ft (revised, from topographic map).

Average discharge.--24 years, 13.8 mgd (21.4 cfs).

Extremes.--Maximum discharge during year, 1,340 mgd (2,070 cfs) Mar. 8 (gage height, 5.67 ft), from rating curve extended above 720 mgd as explained below; minimum, 1.12 mgd (1.73 cfs) Dec. 5.
1920-32, 1952-64: Maximum discharge, 2,930 mgd (4,530 cfs) Jan. 16, 1921 (gage height, 8.44 ft), from rating curve extended above 720 mgd on basis of slope-area measurement at gage height 4.60 ft; minimum, 0.7 mgd (1.1 cfs) Mar. 18-20, 1925, June 14, 15, 1931.

Remarks.--Records fair. No diversion above station.

Note.--Published records for high-water periods in fiscal years 1921 and 1954, and figures of maximum discharge for the fiscal years 1921-32, 1953-54, have been found to be in error; revised records are on file in the district office and will be published in the next water-supply paper.

Rating table (gage height, in feet, and discharge, in million gallons a day)

0.8	0.76	1.4	17.5
.9	1.58	1.6	35.5
1.0	2.85	2.0	96.0
1.1	4.70	2.5	205
1.2	7.30	3.0	341
1.3	11.4	4.0	655

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	27.2	2.70	1.69	10.4	2.03	1.20	27.2	2.42	69.0	7.04	9.35	3.04
2	6.78	2.56	1.49	4.96	1.91	1.20	18.5	2.28	14.4	6.00	6.00	2.85
3	31.9	2.42	1.39	52.9	1.80	1.20	75.9	2.15	7.30	10.2	4.52	2.70
4	5.48	2.28	1.39	5.74	1.58	1.20	202	1.91	5.48	7.71	3.78	2.56
5	4.14	2.28	1.69	98.2	1.69	1.12	130	1.80	16.20	8.12	3.96	2.42
6	3.59	2.15	1.69	5.74	1.69	1.39	127	1.80	10.6	12.6	3.78	2.28
7	3.22	2.15	1.49	4.14	13.4	1.49	11.0	1.49	88.7	6.78	*4.96	2.42
8	3.04	2.42	1.39	4.14	4.14	1.29	6.52	2.28	461	5.74	7.30	2.28
9	4.14	2.56	1.29	3.22	2.85	830	11.4	2.52	312	5.22	10.2	2.15
10	3.40	2.56	1.29	2.70	41.6	41.3	26.3	8.12	83.6	4.70	7.04	2.15
11	3.04	2.28	1.29	2.42	4.52	4.52	7.04	15.1	43.0	6.26	8.12	2.15
12	3.04	2.15	1.58	2.28	3.22	3.22	7.30	50.7	28.5	11.4	11.0	2.15
13	2.56	2.03	1.80	2.15	2.56	2.42	5.48	105	10.6	6.78	5.48	2.15
14	2.56	1.91	1.69	2.03	2.28	2.15	*4.33	17.5	7.71	4.96	3.78	2.42
15	2.70	4.14	1.58	1.91	2.15	1.91	12.8	35.3	6.78	4.33	3.40	2.28
16	4.14	6.52	6.21	1.91	2.15	1.91	10.6	13.2	6.00	3.59	3.22	3.40
17	3.96	9.44	239	1.80	2.56	2.42	6.00	5.74	5.48	3.04	2.70	3.96
18	33.7	3.59	107	1.91	2.15	2.28	6.78	*4.33	5.22	2.70	2.42	3.78
19	11.4	2.85	7.04	2.03	1.91	1.91	7.04	4.52	7.71	2.56	2.28	3.78
20	5.22	2.42	4.70	2.03	1.69	1.69	35.0	3.96	11.0	7.30	2.15	3.04
21	12.5	2.15	3.59	2.03	1.58	1.58	55.4	3.59	6.78	6.52	42.7	3.40
22	35.3	2.03	3.04	2.42	1.39	1.69	9.76	4.14	39.9	4.96	60.4	3.59
23	6.52	2.03	2.70	*3.78	1.39	1.80	6.00	11.4	23.2	9.35	85.8	4.70
24	4.70	16.4	2.42	10.3	1.29	1.58	4.70	6.52	12.6	51.2	23.9	5.22
25	3.78	4.52	2.28	21.0	1.29	1.49	4.52	85.2	8.94	11.4	21.4	12.5
26	3.40	3.40	2.15	5.74	1.91	1.39	4.52	21.2	*10.2	18.4	10.2	19.4
27	22.2	4.70	2.15	3.22	2.15	1.29	4.14	14.4	13.8	10.6	10.6	47.4
28	7.71	*5.22	2.56	2.56	1.69	1.58	3.40	10.6	10.2	8.94	6.00	38.5
29	3.78	3.78	2.56	5.22	1.49	1.49	3.04	25.5	6.26	49.2	4.52	6.00
30	3.40	2.70	2.56	3.78	1.29	1.29	3.04	---	6.52	8.94	3.78	12.9
31	2.85	2.15	---	2.56	---	1.69	2.85	---	13.2	---	3.22	---
Total	271.35	110.49	412.70	275.22	113.35	175.69	839.56	464.67	1,351.88	306.54	377.96	207.57
Mean												
Mgd	8.75	3.56	13.8	8.88	3.78	5.67	27.1	16.0	43.6	10.2	12.2	6.92
Cfs	13.5	5.51	21.4	13.7	5.85	8.77	41.9	24.8	67.5	15.8	18.9	10.7
Ac-ft	833	339	1,270	845	348	539	2,580	1,430	4,150	941	1,160	637

Calendar Year 1963: Max 543 Min 1.12 Mean mgd 17.4 Mean cfs 26.9 Ac-ft 19,530
Fiscal Year 1963-64: Max 461 Min 1.12 Mean mgd 13.4 Mean cfs 20.7 Ac-ft 15,070

* Discharge measurement made on this day.

Peak discharge (base, 840 mgd)

Date	Time	Gage height	Discharge	
			Mgd	Cfs
3-8	1900	5.67	1,340	2,070

220. Kekaha ditch at Camp 1, near Waimea

Location.--Lat 22°02'35", long 159°38'30", on right bank 0.2 mile downstream from lower intake and 6.2 miles northeast of Waimea.

Records available.--May 1908 to February 1909, April, June, September, November 1909, January 1910 to June 1915, March 1916 to August 1917, October 1917 to June 1964. Prior to January 1910 and August 1932 to June 1933 monthly discharge only, published in WSP 1319; figures of daily discharge for latter period published in WSP 755 are unreliable. Published as "at intake, near Waimea" January 1910 to December 1911 and as "at Flume No. 4, near Waimea" March 1916 to June 1917.

Gage.--Water-stage recorder. Altitude of gage is 520 ft (by barometer). Prior to July 12, 1921, staff gage at several sites within 1 mile of present site at various datums.

Average discharge.--51 years (1910-15, 1916-17, 1918-24, 1925-64), 36.5 mgd (56.5 cfs).

Extremes.--1908-64: Maximum daily discharge, 67 mgd (104 cfs) Jan. 6, Mar. 3, 6, 7, 17, 18, 24-26, 29-31, 1921; no flow at times.

Remarks.--Records good. Ditch diverts from Waimea River 1 mile downstream from Waialae Stream for irrigation in vicinity of Kekaha.

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	48.6	38.3	30.9	39.2	31.9	0	27.3	33.5	33.2	29.1	43.6	33.2
2	49.3	37.8	29.8	46.8	30.7	0	27.3	32.6	50.3	31.9	31.4	32.3
3	45.1	35.8	30.2	45.7	29.8	0	26.6	31.9	50.3	28.0	33.7	31.4
4	39.1	34.8	29.1	42.5	28.6	0	28.4	31.2	50.3	23.5	41.1	30.2
5	45.6	35.3	30.7	38.5	*28.6	0	27.5	30.7	50.3	26.8	39.0	29.8
6	41.1	33.7	30.7	37.1	28.9	0	28.0	30.2	43.1	32.6	39.0	29.1
7	40.8	33.0	31.4	43.6	35.3	0	30.2	30.2	27.3	31.9	40.6	29.1
8	41.3	33.9	28.9	39.9	43.4	0	44.9	31.2	26.8	*45.7	41.7	29.1
9	41.8	34.4	*29.8	38.5	33.7	0	*28.9	31.9	24.6	49.8	32.6	28.4
10	42.7	33.7	28.4	35.1	37.9	0	28.6	37.4	7.48	42.9	35.0	28.0
11	39.7	33.0	28.6	33.2	46.4	0	27.0	50.5	12.2	33.2	50.3	27.7
12	39.7	33.7	28.6	32.1	38.3	0	27.5	50.0	28.0	35.4	50.5	27.7
13	38.8	31.9	27.3	31.4	33.7	3.64	28.6	50.3	27.3	49.8	49.1	27.3
14	19.2	31.4	31.4	30.5	32.1	8.25	31.6	44.7	27.3	48.6	40.6	27.3
15	.03	34.2	28.9	30.0	30.9	7.65	35.5	38.1	30.3	44.5	35.5	27.7
16	.02	36.7	30.5	30.0	30.9	7.80	36.5	37.6	50.3	42.2	31.9	28.6
17	.01	37.6	42.0	29.6	34.2	7.95	36.5	35.6	50.3	36.9	32.6	35.1
18	.01	39.4	46.6	29.3	31.9	7.20	37.4	44.3	50.0	31.6	32.6	31.9
19	13.2	34.8	47.0	30.2	5.78	21.0	36.5	30.9	51.0	33.6	*31.9	33.5
20	11.4	35.5	42.8	29.8	.02	26.1	46.0	*.01	42.4	43.4	30.9	30.9
21	11.6	32.6	34.6	30.5	.01	27.3	49.8	23.2	28.0	50.3	37.7	28.6
22	10.9	33.2	34.6	32.8	.01	28.0	49.1	35.5	30.7	48.6	42.6	29.6
23	11.8	31.2	34.4	34.6	0	26.8	49.8	39.4	34.4	50.5	31.9	*30.7
24	11.8	38.5	33.5	41.1	0	27.5	42.9	50.5	27.5	44.4	34.8	37.9
25	31.6	40.4	32.6	43.8	0	28.0	33.0	49.1	23.5	32.6	50.5	40.9
26	39.9	38.8	31.9	34.2	0	27.5	34.2	50.3	22.4	35.3	50.5	39.3
27	39.7	36.9	31.4	35.3	0	27.3	40.1	50.5	22.8	50.5	50.5	32.1
28	45.0	45.2	31.9	32.8	0	27.0	37.2	42.6	21.3	50.5	50.3	35.0
29	44.7	39.9	33.0	37.6	0	27.0	35.1	28.4	22.0	51.0	40.6	45.3
30	*39.2	35.8	32.3	39.2	0	27.0	34.6	---	21.7	50.3	32.6	42.4
31	38.3	30.9	---	33.2	---	27.5	33.9	---	24.6	---	32.1	---
Total	921.97	1102.3	983.8	1108.1	613.02	390.49	1080.5	1072.31	1011.68	1204.4	1217.7	960.1
Mean												
Mgd	29.7	35.6	32.8	35.7	20.4	12.6	34.9	37.0	32.6	40.1	39.3	32.0
Cfs	46.0	55.1	50.7	55.2	31.6	19.5	54.0	57.2	50.4	62.0	60.8	49.5
Ac-ft	2830	3380	3020	3400	1880	1200	3320	3290	3100	3700	3740	2950

Calendar Year 1963: Max 49.8 Min 0 Mean mgd 31.1 Mean cfs 48.1 Ac-ft 34,860
Fiscal Year 1963-64: Max 51.0 Min 0 Mean mgd 31.9 Mean cfs 49.4 Ac-ft 35,810

* Discharge measurement made on this day.

291. Waimea ditch below wasteway, near Waimea

Location.--Lat 21°59'10", long 159°39'59", on left bank at tunnel No. 4 outlet and below wasteway, 1.3 miles downstream from intake, and 2 miles north of Waimea.

Records available.--February 1960 to June 1964.

Gage.--Water-stage recorder and Parshall flume. Datum of gage is 131.2 ft above mean sea level (by stadia survey).

Extremes.--1960-64: Maximum daily discharge, 8.50 mgd (13.2 cfs) Nov. 12, 13, 1960, Jan. 26, 1961; no flow at times.

Remarks.--Records good except those for period of no gage-height record, which are poor. Water used for irrigation of sugar cane.

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	4.55	1.85	2.36	2.21	2.02	1.27	2.66	0.88	0.69	6.00	0.80	1.96
2	6.16	1.96	1.91	5.76	1.85	4.58	4.35	.69	2.80	5.76	1.53	1.38
3	5.92	1.58	1.32	5.62	1.80	6.24	3.58	.61	1.64	3.14	1.50	1.27
4	3.98	1.27	1.38	6.40	1.58	6.24	1.91	1.02	1.91	.93	1.65	1.12
5	1.32	1.17	1.27	6.40	1.43	2.36	1.80	1.96	2.96	1.07	.78	1.07
6	1.22	1.53	*1.48	2.77	1.32	5.04	.83	2.13	2.19	4.58	.61	1.02
7	.69	1.96	1.43	2.42	1.93	5.04	.46	2.02	1.12	6.08	.88	.98
8	1.17	1.91	1.38	2.60	5.76	5.04	.39	2.02	.93	5.25	2.54	.98
9	1.27	2.02	1.17	2.30	3.22	5.11	.29	2.13	.14	4.69	4.83	.93
10	1.85	2.08	1.22	1.85	5.53	5.25	.29	2.30	0	3.10	5.25	.93
11	1.58	1.91	1.07	1.43	5.35	5.04	.35	6.40	0	3.78	4.69	.93
12	1.17	1.85	1.12	1.12	2.07	4.90	.29	*7.47	0	1.74	5.18	.98
13	1.27	1.91	1.12	.93	2.24	4.83	.27	7.74	.84	3.79	5.04	.98
14	2.88	1.38	1.27	.83	1.74	4.76	.24	4.61	1.17	2.90	2.48	.88
15	5.84	1.38	1.43	.83	1.58	4.69	a.3	1.64	1.12	1.43	1.58	1.07
16	6.16	2.66	1.22	.83	1.48	4.62	a.2	1.64	.53	.78	2.60	.93
17	6.24	5.92	6.47	*.98	1.85	4.90	a.1	4.59	.29	.53	2.30	1.74
18	6.56	4.83	7.04	1.22	1.85	5.25	a.2	4.55	.16	2.13	1.43	2.24
19	4.98	2.66	6.64	1.53	4.11	4.83	a1.0	3.36	*.53	2.08	1.07	2.02
20	3.36	1.85	5.84	1.58	*6.24	4.20	a2.5	6.88	.83	1.42	.98	2.08
21	3.88	1.64	4.97	1.64	6.32	3.03	*2.66	5.68	.73	*5.11	1.07	1.80
22	4.20	1.27	3.74	1.85	6.32	3.03	2.60	2.48	.78	3.60	6.08	1.85
23	3.52	1.27	2.66	1.80	6.32	5.53	3.94	3.29	.50	3.16	5.84	2.13
24	5.11	3.40	2.24	2.96	5.35	2.30	4.02	6.08	2.01	5.25	3.75	2.66
25	4.97	5.09	2.08	6.32	3.42	.43	1.96	5.68	2.78	5.76	*5.11	2.84
26	3.22	2.13	1.91	6.64	5.30	.39	1.85	7.04	3.16	2.64	6.24	6.00
27	2.48	2.19	1.74	4.34	4.63	.50	2.24	6.88	3.10	3.62	6.16	5.05
28	4.76	4.28	1.69	2.48	1.48	.78	2.02	4.86	3.03	3.55	5.76	1.27
29	2.04	3.29	1.85	2.08	1.38	1.64	1.48	1.02	2.78	2.42	3.42	5.82
30	.98	2.36	1.85	4.55	1.32	1.17	1.17	---	4.96	.27	4.00	3.77
31	1.69	2.90	---	2.72	---	1.07	1.02	---	6.08	---	3.22	---
Total	105.02	73.50	72.87	86.99	96.79	114.06	46.97	107.65	49.76	96.56	98.37	58.68
Mean												
Mgd	3.39	2.37	2.43	2.81	3.23	3.68	1.52	3.71	1.61	3.22	3.17	1.96
Cfs	5.25	3.67	3.76	4.35	5.00	5.69	2.35	5.74	2.49	4.98	4.90	3.03
Ac-ft	322	226	224	267	297	350	144	330	153	296	302	180

Calendar Year 1963: Max 7.65 Min 0 Mean mgd 2.52 Mean cfs 3.90 Ac-ft 2820
Fiscal Year 1963-64: Max 7.74 Min 0 Mean mgd 2.75 Mean cfs 4.25 Ac-ft 3090

* Discharge measurement made on this day.
a No gage-height record.

310. Waimea River near Waimea

Location.--Lat 21°59'02", long 159°39'46", on right bank 1.2 miles upstream from Makaweli River and 1.8 miles north of Waimea.

Drainage area.--57.8 sq mi.

Records available.--July 1910 to June 1918, July to October 1919, November 1943 to June 1964.

Gage.--Water-stage recorder. Altitude of gage is 25 ft (by hand levels from mouth of Makaweli River). Prior to Oct. 5, 1911, staff gage at site 1 mile downstream at different datum. Oct. 5, 1911, to Oct. 31, 1919, staff gage at present site at different datum.

Average discharge.--27 years (1911-18, 1944-64), 85.9 mgd (133 cfs).

Extremes.--Maximum discharge during year, 5,140 mgd (7,950 cfs) Mar. 8 (gage height, 10.21 ft), from rating curve extended above 3,400 mgd as explained below; minimum, 0.22 mgd (0.34 cfs) July 12, 13.
1910-19, 1943-64: Maximum discharge, 24,000 mgd (37,100 cfs) Feb. 7, 1949 (gage height, 19.3 ft), from rating curve extended above 3,400 mgd on basis of slope-area measurements at gage heights 10.28 and 18.7 ft; practically no flow occasionally owing to upstream diversions.

Remarks.--Records good. Several upstream diversions for power and irrigation.

Rating tables (gage height, in feet, and discharge, in million gallons a day)
(Shifting-control method used Feb. 5-11)

July 1-18

2.9	0.22	3.7	10.4
3.0	.45	3.8	14.2
3.1	.80	4.0	25.0
3.2	1.40	4.3	48.3
3.3	2.30	4.6	84.0
3.4	3.60	5.0	160
3.5	5.30	5.5	320

July 18 to June 30

2.6	0.45	4.2	59.0
2.7	.80	4.6	109
2.8	1.30	5.0	190
2.9	2.00	5.5	350
3.1	4.20	6.0	600
3.3	7.90	7.0	1,350
3.5	13.8	8.0	2,310
3.8	28.0		

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	64.1	3.58	4.52	3.53	1.79	31.2	175	2.48	149	51.8	26.3	2.57
2	35.4	3.95	2.76	19.7	1.79	25.8	177	2.38	93.4	40.5	38.2	1.93
3	52.1	3.58	2.38	74.7	1.79	23.0	476	1.72	28.0	70.0	17.8	1.86
4	37.7	3.58	2.57	25.2	1.79	23.0	1,490	1.37	10.5	70.0	5.80	1.79
5	16.7	3.45	2.48	189	1.72	24.2	1,230	.76	19.2	84.6	4.20	1.79
6	15.2	4.68	*2.66	33.8	1.65	26.9	769	.56	20.6	62.3	3.95	1.86
7	13.1	2.57	2.66	6.43	2.04	27.4	158	.45	87.0	50.0	3.45	2.00
8	9.24	2.48	2.76	2.76	16.3	26.9	70.0	.85	2,090	25.2	3.32	2.00
9	3.82	2.48	2.66	2.38	3.20	139	284	.90	2,170	17.0	30.8	1.86
10	.34	2.66	2.76	2.10	106	514	440	.52	490	11.2	21.1	1.72
11	.27	2.48	2.66	2.10	20.6	76.0	110	22.7	254	19.7	8.42	1.72
12	.24	2.48	2.86	2.10	5.33	51.8	73.6	*103	155	26.4	19.1	1.79
13	2.64	2.57	2.95	2.19	1.65	40.5	53.6	166	95.0	30.4	12.2	2.00
14	15.7	2.48	2.95	1.93	1.30	37.5	33.2	144	72.4	10.8	3.20	2.19
15	17.7	2.57	3.20	2.10	1.51	36.8	41.2	66.7	57.2	8.42	2.28	2.19
16	19.8	3.58	2.95	2.00	1.65	35.2	125	85.9	30.6	7.27	3.95	1.44
17	20.9	33.8	948	*2.00	1.79	38.2	45.2	28.0	24.7	6.64	3.58	1.10
18	175	7.69	336	1.86	1.86	39.8	30.0	4.52	20.6	9.20	2.28	1.30
19	145	4.08	48.4	1.58	13.4	33.5	28.6	3.08	*126	9.46	1.86	1.20
20	68.9	2.86	10.5	1.58	*26.4	5.32	30.0	38.2	211	13.3	2.10	1.58
21	49.2	2.66	7.06	1.58	25.2	3.58	*131	22.1	71.2	*33.2	7.96	1.58
22	117	2.48	4.08	1.65	25.2	15.3	58.0	2.38	104	13.8	190	1.58
23	*72.4	2.48	2.95	1.51	25.2	74.0	16.6	4.49	147	11.2	173	1.37
24	50.0	4.41	2.57	2.00	26.4	11.5	7.48	19.2	164	172	113	1.65
25	21.1	16.6	2.48	26.2	29.3	6.01	11.5	371	126	109	*30.3	2.28
26	3.82	6.22	2.19	30.9	25.2	5.00	9.98	207	114	40.5	49.0	37.6
27	2.86	4.84	2.00	4.20	28.0	4.08	4.84	70.1	132	60.1	31.2	67.7
28	35.8	7.27	1.93	1.51	33.2	4.52	2.86	43.6	122	15.8	21.7	134
29	7.90	6.43	2.48	1.30	32.6	5.80	2.48	72.4	65.6	98.0	3.58	16.5
30	4.36	5.00	2.00	3.58	31.2	4.52	2.19	---	50.0	52.2	5.00	1.37
31	2.95	5.48	---	2.19	---	11.7	2.10	---	59.0	---	4.08	---
Total	1,081.24	161.47	1,418.42	455.66	495.06	1,402.03	6,088.43	1,486.36	7,359.0	1,229.99	842.71	301.52
Mean												
Mgd	34.9	5.21	47.3	14.7	16.5	45.2	196	51.3	237	41.0	27.2	10.1
Cfs	54.0	8.06	73.2	22.7	25.5	69.9	303	79.4	367	63.4	42.1	15.6
Ac-ft	3,320	496	4,350	1,400	1,520	4,300	18,680	4,560	22,580	3,770	2,590	925

Calendar Year 1963: Max 2,870 Min 0.24 Mean mgd 104 Mean cfs 161 Ac-ft 116,500
Fiscal Year 1963-64: Max 2,170 Min 0.24 Mean mgd 61.0 Mean cfs 94.4 Ac-ft 68,490

Peak discharge (base, 5,600 mgd).--No peak above base.

* Discharge measurement made on this day.

360. Makaweli River near Waimea

Location.--Lat 21°58'31", long 159°38'55", on left bank 0.7 mile upstream from mouth and 1.9 miles northeast of Waimea.

Drainage area.--25 sq mi, approximately.

Records available.--July 1943 to June 1964. Records for October 1911 to June 1917 at site 0.2 mile downstream not equivalent owing to diversion.

Gage.--Water-stage recorder. Datum of gage is 18.2 ft above mean sea level (by stadia survey). July 27, 1943, to June 15, 1959, at datum 1.00 ft higher.

Average discharge.--20 years (1944-64), 54.0 mgd (83.6 cfs).

Extremes.--Maximum discharge during year, 5,990 mgd (9,270 cfs) Mar. 8 (gage height, 9.69 ft), from rating curve extended above 2,100 mgd as explained below; minimum, 9.70 mgd (15.0 cfs) June 20, 21.
1943-64: Maximum discharge, 10,300 mgd (15,900 cfs) Apr. 15, 1963 (gage height, 12.25 ft), from rating curve extended above 2,100 mgd on basis of slope-area measurement at gage height 10.65 ft; minimum recorded, 2.05 mgd (3.15 cfs) July 19, 1951.

Remarks.--Records good except those for period of no gage-height record, which are fair. Olokele ditch diverts all low flow from Olokele River 9 miles above station for irrigation near Makaweli.

Rating table (gage height, in feet, and discharge, in million gallons a day)
(Shifting-control method used July 8-18, July 26 to Aug. 23, Sept. 22 to Oct. 3, Oct. 13-29)

0.3	8.4	2.5	215
.4	11.0	3.0	340
.7	21.2	4.0	690
1.1	40.5	5.0	1,240
1.5	70.5	6.0	1,950
2.0	126		

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	98.4	16.0	12.2	42.6	14.3	12.2	33.5	15.0	222	36.9	62.3	13.4
2	27.4	28.0	11.9	17.8	14.3	12.5	44.8	14.7	85.2	25.4	24.6	13.1
3	155	17.1	11.9	209	14.0	13.1	39.6	14.7	36.6	45.9	19.3	12.5
4	21.6	12.2	12.2	80.1	13.7	13.7	342	14.7	26.8	34.5	17.4	11.9
5	16.4	12.5	18.4	585	13.4	12.5	260	14.3	167	91.7	21.3	11.9
6	15.7	22.0	*14.0	79.0	14.0	14.0	573	13.7	57.7	115	23.4	11.6
7	18.5	11.6	12.5	46.5	82.0	15.0	91.1	13.7	189	33.2	51.5	11.9
8	14.0	13.1	12.2	30.0	23.3	13.4	59.9	19.7	1,880	23.7	29.7	11.9
9	20.5	11.9	12.2	19.7	14.0	104	70.5	15.7	1,690	21.2	63.3	11.6
10	13.7	11.6	12.2	17.1	57.1	237	69.6	28.8	421	29.0	27.3	11.3
11	16.3	11.3	11.9	15.4	17.4	27.2	43.5	46.5	224	33.0	27.2	11.3
12	16.0	11.3	12.2	14.7	14.0	18.5	52.8	*169	185	59.8	30.6	11.3
13	13.7	11.0	12.8	13.7	13.7	16.0	44.1	282	73.4	27.0	19.3	10.7
14	13.1	11.0	12.2	13.1	13.1	15.0	50.7	101	a45	18.9	15.7	10.7
15	17.3	54.1	12.2	13.1	12.2	14.7	69.8	88.1	a35	18.2	34.0	11.0
16	16.4	21.8	12.5	13.1	29.6	14.3	71.4	88.4	a45	16.7	14.7	28.4
17	13.4	110	898	*12.8	13.1	14.0	51.3	33.0	a26	15.7	13.4	12.2
18	86.0	14.7	382	15.4	14.0	14.0	26.8	25.0	a22	15.0	13.1	19.8
19	31.7	13.1	60.6	15.0	12.8	13.7	30.7	35.3	a25	15.0	12.5	13.4
20	17.1	11.6	25.9	12.8	*11.9	13.1	69.7	19.3	*a23	57.6	13.1	10.2
21	16.7	10.2	17.4	31.2	12.2	13.1	*224	18.5	20.1	*32.6	218	10.2
22	208	10.2	13.7	12.5	11.9	12.8	48.6	26.4	143	47.3	243	12.8
23	*37.3	15.2	13.1	29.6	12.2	13.1	34.0	115	96.4	38.8	463	15.3
24	22.0	112	11.9	33.1	12.5	12.5	21.6	37.6	88.7	56.5	201	12.5
25	17.1	17.8	11.6	87.1	12.5	12.5	27.0	118	103	30.5	232	30.4
26	13.4	14.7	11.3	24.4	12.5	12.8	22.9	88.1	96.8	67.0	*80.7	64.2
27	55.0	19.7	11.3	14.0	14.3	12.2	17.1	29.5	75.0	45.1	79.1	148
28	47.6	24.6	43.5	13.1	12.8	13.1	16.0	37.2	37.2	44.3	22.0	119
29	16.0	17.4	13.4	82.7	12.5	13.4	15.0	103	27.7	290	16.7	22.0
30	14.0	13.4	13.4	19.3	12.5	12.8	20.6	---	49.0	67.7	15.0	46.1
31	13.4	12.5	---	15.4	---	12.5	15.4	---	153	---	13.7	---
Total	1102.7	693.6	1730.6	1628.3	537.8	748.7	2557.0	1625.9	6368.6	1453.2	2117.9	740.6
Mean												
Mgd	35.6	22.4	57.7	52.5	17.9	24.2	82.5	56.1	205	48.4	68.3	24.7
Cfs	55.1	34.7	89.3	81.2	27.7	37.4	128	86.8	317	74.9	106	38.2
Ac-ft	3,380	2130	5310	5000	1650	2300	7,850	4,990	19540	4460	6500	2270

Calendar Year 1963: Max 2870 Min 8.37 Mean mgd 86.0 Mean cfs 133 Ac-ft 96340
Fiscal Year 1963-64: Max 1880 Min 10.2 Mean mgd 58.2 Mean cfs 90.0 Ac-ft 65380

Peak discharge (base, 1,300 mgd)

Date	Time	Gage height	Discharge Mgd	Discharge Cfs	Date	Time	Gage height	Discharge Mgd	Discharge Cfs
9-17	1500	7.11	2,890	4,470	3- 8	1900	9.69	5,990	9,270
10- 5	0230	7.20	2,980	4,610	5-23	1200	5.22	1,380	2,140
1- 6	0330	5.76	1,760	2,720					

* Discharge measurement made on this day.
n No gage-height record.

490. Hanapepe River below Manuahi Stream, near Eleele

Location.--lat 21°57'29", long 159°33'13", on left bank 200 ft downstream from Manuahi Stream and 4 miles northeast of Eleele.

Drainage area.--18.8 sq mi.

Records available.--July 1917 to January 1921, December 1926 to June 1964. Prior to July 1952, published as "at Koula, near Eleele." Records for August 1910 to December 1916 at site half a mile upstream not equivalent owing to inflow. See also Note below.

Gage.--Water-stage recorder. Datum of gage is 222 ft above mean sea level (by stadia survey). July 1, 1917, to Jan. 22, 1921, staff gage and Dec. 16, 1926, to June 30, 1951, water-stage recorder, at same site at datum 1.00 ft higher.

Average discharge.--40 years (1917-20, 1927-64), 54.4 mgd (84.2 cfs).

Extremes.--Maximum discharge during year, 4,520 mgd (6,990 cfs) Mar. 8 (gage height, 7.55 ft), from rating curve extended above 1,700 mgd on basis of slope-area measurement at gage height 14.87 ft; minimum, 7.38 mgd (11.4 cfs) Feb. 3, 4, 7.
1917-21, 1926-64: Maximum discharge, 25,200 mgd (39,000 cfs) Apr. 15, 1963 (gage height, 14.87 ft), from rating curve extended above 4,900 mgd on basis of slope-area measurement of peak flow; minimum, 3.3 mgd (5.1 cfs) May 21, 1954.
Revisions.--The maximum discharge for the fiscal year 1961 has been revised to 5,530 mgd (8,560 cfs) Dec. 4, 1960 (gage height, 8.70 ft), superseding figure published in Surface Water Records of Hawaii and other Pacific Areas (1961).

Remarks.--Records good. Hanapepe ditch diverts 3 miles above station for irrigation in vicinity of Makaweli.

Note.--The figures of maximum discharge for fiscal years 1918-21, 1927-60 have been found to be in error; revised records are on file in the district office and will be published in the next water-supply paper.

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	103	15.6	11.0	52.8	9.90	9.20	22.7	9.20	299	87.1	87.2	24.1
2	28.8	104	10.2	16.5	10.2	9.20	12.9	7.94	86.9	72.5	44.0	21.5
3	177	25.1	9.90	228	9.90	9.20	47.3	7.38	33.2	87.2	33.2	20.5
4	28.8	17.5	9.90	174	9.55	9.20	121	7.38	25.4	84.2	24.1	19.0
5	24.8	23.2	16.5	486	9.90	9.20	497	9.20	60.9	221	34.0	18.0
6	19.0	26.2	10.6	49.7	9.55	9.20	685	7.66	32.9	211	28.6	17.5
7	19.0	13.4	9.90	29.5	95.6	9.55	*64.3	7.38	212	51.6	50.3	17.5
8	13.8	*19.0	9.55	27.4	16.5	9.20	60.8	13.4	1,350	34.0	41.4	17.0
9	17.5	12.4	9.55	19.5	10.2	102	57.7	9.55	969	22.8	64.0	16.0
10	12.0	13.4	9.55	17.5	18.9	118	47.8	33.4	558	29.2	49.7	16.0
11	17.0	13.4	10.6	15.6	9.55	12.9	43.2	29.6	316	24.1	67.3	15.6
12	12.4	11.0	*14.7	15.6	8.85	10.2	46.8	179	222	54.6	39.8	15.6
13	10.6	11.0	11.3	13.8	*8.22	9.55	41.4	*219	125	24.8	26.7	14.7
14	10.6	11.0	10.6	11.0	8.22	9.20	38.0	76.9	72.4	18.5	21.0	15.6
15	21.2	49.3	10.6	11.3	8.22	9.20	41.4	66.1	34.8	15.2	33.8	15.6
16	26.6	82.4	9.90	10.6	8.85	9.20	42.3	54.4	35.5	14.2	19.0	34.7
17	12.0	106	*712	9.90	11.0	10.2	38.0	23.4	24.8	17.5	17.5	17.5
18	78.1	19.5	349	11.6	17.5	9.20	28.0	26.2	*39.4	12.9	16.5	36.0
19	31.0	15.6	*40.6	10.2	8.85	9.20	12.9	35.0	26.0	12.4	16.0	20.5
20	22.2	12.0	21.5	10.3	8.85	8.85	84.7	15.6	19.0	61.1	17.5	16.0
21	88.0	11.3	16.5	20.0	8.22	9.20	142	16.0	16.5	82.4	388	16.5
22	215	11.3	14.7	9.90	8.22	9.20	41.9	13.8	78.6	*76.3	433	19.5
23	46.8	18.3	12.9	25.4	8.85	8.85	26.7	168	44.1	74.9	722	24.2
24	37.2	248	11.6	26.7	8.85	8.85	14.7	35.8	45.3	78.6	332	18.5
25	20.5	16.0	11.3	94.2	8.85	8.85	18.0	107	73.8	33.2	428	36.4
26	16.5	18.0	11.0	19.0	10.2	8.85	15.2	57.4	132	66.3	*214	130
27	52.6	46.3	10.6	12.0	9.20	8.85	11.0	22.2	127	38.9	276	228
28	22.2	28.0	118	10.2	9.20	9.20	9.20	43.6	34.0	55.6	67.6	165
29	15.2	23.4	15.6	104	9.20	9.20	8.22	102	23.4	506	42.3	38.9
30	12.0	13.4	17.0	16.5	9.20	9.20	19.5	-------	76.8	100	33.2	66.0
31	11.3	12.0	----------	10.6	----------	9.20	10.6	---------	255	----------	27.4	----------
Total	1222.7	1047.0	536.65	1569.30	388.30	491.10	2350.22	1403.49	5448.7	2268.1	3695.1	1131.9
Mean												
Mgd	39.4	33.8	51.2	50.6	12.9	15.8	75.8	48.4	176	75.6	119	37.7
Cfs	61.0	52.3	79.2	78.3	20.0	24.4	117	74.9	272	117	184	58.3
Ac-ft	3750	3210	4720	4820	1190	1510	7210	4310	16720	6960	11340	3470

Calendar Year 1963: Max 3150 Min 8.22 Mean mgd 81.6 Mean cfs 126 Ac-ft 91370
Fiscal Year 1963-64: Max 1350 Min 7.38 Mean mgd 61.6 Mean cfs 95.3 Ac-ft 69210

* Discharge measurement made on this day.

Peak discharge (base, 2,300 mgd)

Date	Time	Gage height	Discharge Mgd	Discharge Cfs	Date	Time	Gage height	Discharge Mgd	Discharge Cfs
10-5	0100	6.66	3,390	5,250	3-8	1830	7.55	4,520	6,990
1-5	2330	7.12	3,950	6,110					

525. Lawai Stream near Koloa

Location.--Lat 21°54'03", long 159°30'19", on right bank at private road bridge, 0.9 mile upstream from mouth, and 2.6 miles southwest of Koloa.

Drainage area.--6.60 sq mi.

Records available.--Fiscal years 1962-63 (annual maximum), July 1963 to June 1964.

Gage.--Water-stage recorder. Datum of gage is 37.0 ft above mean sea level (by stadia survey). Apr. 24, 1962, to June 30, 1963, crest-stage gage at same site and datum.

Extremes.--Maximum discharge during year, 1,900 mgd (2,940 cfs) Jan. 5 (gage height, 8.93 ft), from rating curve extended above 43 mgd as explained below; minimum 0.17 mgd (0.26 cfs) Dec. 25.
1962-64: Maximum discharge, 2,290 mgd (3,540 cfs) Mar. 14, 1963 (gage height, 9.56 ft), from rating curve extended above 43 mgd on basis of slope-area measurements at gage heights 7.70 and 9.56 ft.

Remarks.--Records poor. Several diversions above station for irrigation of sugar cane.

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	4.71	2.95	1.24	1.46	0.84	0.24	0.28	1.19	3.51	3.70	6.54	1.97
2	3.58	2.66	.99	1.14	.84	.24	.30	1.14	1.75	3.70	7.62	1.90
3	3.70	2.26	.99	3.18	.84	.24	1.18	1.09	1.39	5.97	5.39	2.07
4	3.45	1.90	1.09	1.53	.79	.24	10.4	1.04	1.31	6.98	4.37	1.97
5	3.32	2.07	1.24	2.26	.74	.26	1.66	.99	1.24	25.6	3.32	1.90
6	3.20	2.17	1.19	1.53	.71	.32	*104	.99	1.24	20.8	3.20	1.82
7	2.66	2.26	1.14	1.46	1.04	.28	11.2	.94	1.97	3.58	3.08	1.97
8	2.85	2.26	.99	1.09	.89	.24	6.26	.89	94.1	3.20	3.20	1.82
9	3.45	2.17	.94	1.14	.71	1.91	6.26	.84	57.2	2.95	2.75	1.82
10	3.45	1.90	1.19	1.39	.64	4.74	4.37	1.04	33.6	2.95	2.66	1.82
11	3.70	1.75	1.39	1.09	.64	.54	3.82	.94	22.4	3.45	2.85	1.75
12	3.08	1.82	1.60	1.04	.64	.38	3.70	1.24	11.7	3.70	2.36	1.75
13	2.85	1.90	1.46	.99	*.67	.34	3.20	*1.24	6.80	3.20	2.17	1.68
14	2.46	*1.97	.99	.94	.64	.32	2.95	1.04	5.73	3.08	2.17	1.68
15	3.32	2.17	1.04	.94	.64	.30	3.20	1.19	5.22	3.58	1.97	1.75
16	3.70	2.36	.99	1.29	.60	.30	2.75	1.04	5.05	2.75	1.97	2.36
17	3.32	1.82	36.2	1.33	.60	.30	2.46	.94	4.71	2.85	1.97	1.82
18	3.95	1.60	11.2	1.38	.79	.30	2.36	.99	*5.14	2.66	1.90	2.17
19	3.82	1.75	*1.97	.99	.74	.28	2.36	1.19	4.37	2.56	1.82	1.90
20	3.20	1.82	1.97	.89	1.04	.26	3.08	.89	4.37	3.95	1.90	1.68
21	3.45	1.82	1.60	1.23	.71	.24	4.64	.94	3.95	66.1	2.44	1.68
22	11.9	2.07	1.53	1.33	.79	.24	4.26	.94	7.02	*6.18	22.9	1.75
23	4.08	1.90	1.53	.94	.67	.22	2.07	13.4	5.39	3.70	21.1	2.17
24	3.58	1.90	1.46	.99	1.30	.20	1.75	1.09	4.88	5.74	5.89	1.97
25	3.20	1.60	1.46	1.24	.54	.20	1.82	5.66	7.88	4.88	7.20	2.36
26	3.08	1.97	1.19	.94	.50	.24	1.68	6.03	7.23	7.08	*11	2.85
27	3.08	1.90	1.24	.79	.30	.22	1.53	1.31	23.7	3.95	17.3	3.32
28	2.56	1.90	1.24	.84	.26	.26	1.46	1.31	5.61	2.95	3.82	2.56
29	2.75	1.75	1.24	1.39	.24	.26	1.53	1.53	3.70	63.6	2.56	2.26
30	2.85	1.82	1.19	.99	.24	.24	1.90	---	3.82	15.0	2.17	2.56
31	2.66	1.46	---	.89	---	.24	1.31	---	4.63	---	1.97	---
Total	110.96	61.65	83.49	38.63	20.59	14.59	364.08	53.06	350.61	290.39	161.46	61.08
Mean												
Mgd	3.58	1.99	2.78	1.25	0.686	0.471	11.7	1.83	11.3	9.68	5.21	2.04
Cfs	5.54	3.08	4.30	1.93	1.06	0.729	18.1	2.83	17.5	15.0	8.06	3.16
Ac-ft	341	189	256	119	63	48	1120	163	1080	891	496	187

Calendar Year 1963: Max - Min - Mean mgd - Mean cfs - Ac-ft -
Fiscal Year 1963-64: Max 166 Min 0.20 Mean mgd 4.40 Mean cfs 6.81 Ac-ft 4,950

* Discharge measurement made on this day.

Peak discharge (base, 130 mgd)

Date	Time	Gage height	Discharge Mgd	Discharge Cfs	Date	Time	Gage height	Discharge Mgd	Discharge Cfs
1-5	2300	8.93	1,900	2,940	4-21	1400	7.96	1,360	2,100
3-8	1900	6.84	826	1,280					

534. Upper Haiku ditch near Puhi

Location.--Lat 21°58'48", long 159°27'12", on right bank 20 ft upstream from flume crossing a tributary to Kamooloa Stream, 0.8 mile downstream from intake on Papuaa Stream, and 3.6 miles west of Puhi.

Records available.--October 1963 to June 1964.

Gage.--Water-stage recorder (digital). Altitude of gage is 470 ft (from topographic map).

Extremes.--Maximum daily discharge, 18.3 mgd (28.3 cfs) Feb. 25; minimum daily, 0.16 mgd (0.25 cfs) Jan. 14, 18.

Remarks.--Records excellent. Ditch diverts from Papuaa Stream at Papuaa Reservoir and from Kamooloa Stream at intake 300 ft above Puuana Road crossing for irrigation of sugar cane in vicinity of Puhi.

Discharge, in million gallons a day, October 1963 to June 1964

DAY	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE
1				-	10.6	1.12	0.94	1.35	2.13	7.33	0.26	2.00
2				-	5.86	5.86	4.19	1.30	1.78	7.85	.22	2.13
3				-	5.86	5.86	3.92	11.6	1.61	5.52	.22	2.54
4				-	10.7	4.78	4.68	12.2	7.72	.22	1.26	5.40
5				-	11.0	6.21	9.65	11.2	9.20	2.07	5.40	4.68
6				-	13.0	6.10	5.98	9.20	*6.69	8.26	5.09	3.07
7				-	13.5	.46	.35	8.12	4.01	9.35	4.99	2.99
8				-	11.4	1.50	.22	1.16	17.0	10.9	3.30	8.93
9				-	7.59	6.10	.20	1.39	6.56	10.6	.22	9.20
10				-	9.07	4.58	.18	11.4	4.01	8.93	.84	9.65
11				-	15.4	5.52	.18	11.7	1.94	3.73	7.72	13.0
12				-	14.5	5.52	.18	14.1	.98	4.28	7.46	12.6
13				-	11.7	4.58	.18	11.6	.69	*9.80	11.4	4.47
14				-	9.50	3.82	.16	6.44	.51	10.1	18.3	1.26
15				14.1	8.12	3.82	.87	1.50	.38	9.65	*12.4	11.2
16				17.3	.73	3.73	2.07	1.44	.38	9.80	2.27	14.1
17				12.8	2.47	1.94	1.07	9.35	.31	9.50	2.20	15.6
18				8.80	*9.65	.87	.16	10.6	.54	2.00	13.7	15.4
19				2.20	9.95	.87	.94	9.50	.38	2.07	13.5	10.7
20				2.67	9.07	.87	*4.58	12.1	.29	11.4	12.8	3.14
21				13.9	8.26	.84	10.3	9.65	.27	11.9	13.9	3.14
22				16.5	5.52	.84	9.35	1.26	.76	6.82	6.69	12.2
23				16.5	.69	2.75	11.0	2.99	4.47	9.95	2.13	14.7
24				16.5	.69	3.30	8.80	13.9	12.2	9.35	2.13	13.2
25				13.0	.69	.80	2.07	16.0	15.6	.29	5.98	12.2
26				7.21	6.44	2.47	.35	11.0	7.99	1.66	6.56	*10.9
27				7.99	5.19	2.54	8.26	5.63	1.61	9.07	6.10	2.34
28				14.5	.59	.80	9.20	1.50	.29	8.93	1.07	2.13
29				15.6	.40	.80	13.2	1.61	2.47	8.80	1.44	11.4
30				16.1	.38	3.55	14.5	------	2.20	.40	2.00	17.3
31				13.9	------	3.30	10.1	------	3.07	------	1.83	------
TOTAL				-	218.52	96.10	137.83	222.79	118.04	210.53	173.38	251.57
MEAN												
MGD				-	7.28	3.10	4.45	7.68	3.81	7.02	5.59	8.39
CFS				-	11.3	4.80	6.88	11.9	5.89	10.9	8.65	13.0
AC-FT				-	671	295	423	684	362	646	532	772

Calendar Year 1963: Max - Min - Mean mgd - Mean cfs - Ac-ft -
Fiscal Year 1963-64: Max - Min - Mean mgd - Mean cfs - Ac-ft -

* Discharge measurement made on this day.

536. Lower Haiku ditch near Puhi

Location.--lat 21°58'19", long 159°27'12", on right bank 300 ft upstream from flume crossing a tributary to Kamooloa Stream, 0.5 mile downstream from intake on Kamooloa Stream, and 3.2 miles west of Puhi.

Records available.--October 1963 to June 1964.

Gage.--Water-stage recorder (digital prior to Mar. 18). Altitude of gage is 400 ft (from topographic map).

Extremes.--Maximum daily discharge, 32.8 mgd (50.7 cfs) May 27; minimum daily, 1.18 mgd (1.83 cfs) Dec. 5.

Remarks.--Records good except those for periods of no gage-height record, which are fair. Ditch diverts from Kamooloa Stream 0.4 mile below Papuaa Stream for irrigation of sugar cane in vicinity of Puhi.

Discharge, in million gallons a day, October 1963 to June 1964.

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1				-	2.30	1.39	2.00	2.50	7.86	15.6	19.8	12.5
2				-	2.30	1.25	2.10	2.40	6.80	15.3	16.8	9.22
3				-	2.30	1.25	3.30	2.40	a6.2	15.9	15.0	8.12
4				-	2.20	1.25	10.5	2.40	a5.5	14.2	11.0	5.90
5				-	2.20	1.18	22.4	2.30	a4.8	21.2	5.50	4.70
6				-	2.40	1.39	a18	2.20	*4.30	21.8	5.00	4.30
7				-	3.70	1.39	a10	2.30	6.90	14.2	5.00	4.70
8				-	2.70	1.25	a 6.0	2.20	30.8	10.9	8.34	4.30
9				-	2.30	2.90	a 4.5	2.10	30.4	6.80	14.8	4.00
10				-	2.20	5.10	a 4.5	2.70	30.0	6.10	13.8	3.50
11				-	2.10	2.20	a 4.5	2.60	28.0	5.80	11.4	3.40
12				-	2.20	1.80	a 4.5	3.70	21.4	6.50	7.20	3.20
13				-	2.10	1.60	a 4.5	5.20	18.0	*5.80	5.00	3.00
14				-	1.90	1.70	4.50	3.80	16.5	5.40	4.30	2.80
15				2.20	1.90	1.60	4.40	3.30	15.3	5.10	*4.30	2.90
16				2.40	1.90	1.46	4.40	3.30	15.3	4.50	3.60	3.10
17				2.50	1.90	1.46	4.50	2.70	*14.2	4.10	3.60	2.90
18				2.30	*1.80	1.46	4.90	2.60	17.5	3.90	4.10	3.00
19				2.10	1.70	a1.5	5.40	2.50	15.0	4.00	3.50	2.80
20				2.20	1.60	a1.5	7.20	2.40	13.0	6.40	3.30	2.50
21				3.30	1.53	1.46	14.5	2.60	12.5	9.33	12.5	2.70
22				2.90	1.53	1.46	6.80	3.00	20.0	9.98	25.1	2.80
23				3.40	1.46	1.39	4.50	9.06	19.6	10.3	27.4	3.20
24				3.10	1.60	1.70	3.60	5.10	16.0	12.3	24.1	3.10
25				3.70	1.60	1.46	5.10	9.54	17.1	13.5	27.4	3.10
26				3.10	1.60	1.46	6.70	9.38	27.0	15.6	25.6	*5.53
27				2.70	1.70	1.53	*4.70	5.50	30.0	13.5	32.8	4.80
28				2.60	1.53	1.39	3.10	4.70	19.6	9.87	21.4	4.40
29				3.20	1.53	1.39	3.50	5.50	15.6	29.4	18.0	3.30
30				2.70	1.46	1.53	3.40	---	16.2	22.2	16.2	3.30
31			---	2.50	---	1.60	3.00	---	17.1	---	15.0	---
Total				-	59.24	51.00	191.00	109.98	518.46	339.48	410.84	127.07
Mean												
Mgd				-	1.97	1.65	6.16	3.79	16.7	11.3	13.3	4.24
Cfs				-	3.05	2.55	9.53	5.86	25.8	17.5	20.6	6.56
Ac-ft				-	182	157	586	338	1,590	1,040	1,260	390

Calendar Year 1963: Max - Min - Mean mgd - Mean cfs - Ac-ft -
Fiscal Year 1963-64: Max - Min - Mean mgd - Mean cfs - Ac-ft -

* Discharge measurement made on this day.
a No gage-height record.

538. Kamooloa Stream near Puhi

Location.--Lat 21°58'13", long 159°27'08", on right bank at head of falls, 0.4 mile upstream from confluence with Kuia Stream, and 3.5 miles west of Puhi.

Drainage area.--5.94 sq mi.

Records available.--November 1963 to June 1964.

Gage.--Water-stage recorder. Altitude of gage is 390 ft (from topographic map).

Extremes.--Maximum discharge during period, 1,640 mgd (2,540 cfs) Jan. 5 (gage height, 5.10 ft), from rating curve extended above 390 mgd on basis of slope-area measurement of 2,750 mgd at gage height 6.66 ft Dec. 16, 1964; minimum, 0.06 mgd (0.09 cfs) June 19-21.

Remarks.--Records good. Kamooloa ditch diverts 4.3 miles above station into Kuia Stream. Upper Haiku ditch (see p. 20) and Lower Haiku ditch (see preceding page) divert 1.3 miles and 0.4 mile, respectively, above station for irrigation of sugar cane near Puhi.

Rating table (gage height, in feet, and discharge, in million gallons a day)

0.1	0.05	1.0	6.00
.2	.23	1.6	56.0
.3	.52	2.0	113
.5	1.35	2.5	230
.7	2.55	3.0	410
.9	4.40		

Discharge, in million gallons a day, November 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1					-	0.21	0.23	0.31	0.60	14.2	32.6	2.68
2					-	.14	.36	.33	.33	8.24	14.2	.14
3					-	.12	.76	.23	.28	14.2	7.68	.14
4					-	.12	14.8	.21	.26	8.80	2.88	.12
5					-	.12	260	.18	*.23	46.7	.16	.12
6					-	.14	162	.21	.23	37.0	.12	.10
7					-	.23	111	.23	1.21	5.68	.12	.10
8					0.28	.26	2.25	.33	196	2.14	1.68	.09
9					.42	.46	.36	.28	*137	.16	7.40	.09
10					.39	*.89	.31	.28	105	.14	5.36	.09
11					.26	.28	.28	.23	65.6	.12	7.50	.09
12					.21	.28	.33	.28	*32.6	.16	.10	.09
13					.28	.23	.28	.26	17.6	*.12	.09	.09
14					.28	.39	.18	.28	11.9	.14	.09	.07
15					.28	.42	.21	.26	7.96	.12	.09	.09
16					.28	.26	.18	.28	8.80	.12	.09	.09
17					.31	.26	.16	.16	5.36	.12	.09	.07
18					.23	.33	.23	.16	22.6	.10	.09	.09
19					.16	.42	.28	.16	13.1	.10	.07	.07
20					.14	.42	.92	.14	3.60	.23	.07	.07
21					.12	.33	8.96	.16	3.06	27.4	11.2	.09
22					.10	.28	.28	.16	30.8	.28	42.5	.09
23					.12	.23	.28	1.91	22.0	.39	86.7	.09
24					.12	.21	.26	.31	5.95	2.73	49.4	.09
25					.14	.21	.39	6.47	29.7	4.20	85.6	*.10
26					.16	.18	.36	1.95	41.0	8.52	64.2	.70
27					.21	.16	*.26	.31	86.7	3.51	131	.16
28					.21	.16	.23	.28	29.4	.88	31.0	.16
29					.18	.18	.26	.28	10.3	*222	15.7	.10
30					.18	.16	.23	-----	15.0	33.4	8.24	.10
31			----------		----------	.16	.21	---------	23.8	----------	5.84	----------
Total					-	8.24	466.94	16.63	927.97	441.90	611.86	6.17
Mean												
Mgd					-	0.266	15.1	0.573	29.9	14.7	19.7	0.206
Cfs					-	0.412	23.4	0.887	46.3	22.7	30.5	0.319
Ac-ft					-	25	1430	51	2850	1360	1880	19

Calendar Year 1963: Max - Min - Mean mgd - Mean cfs - Ac-ft -
Fiscal Year 1963-64: Max - Min - Mean mgd - Mean cfs - Ac-ft -

* Discharge measurement made on this day.

Peak discharge (base, 900 mgd)

Date	Time	Gage height	Discharge Mgd	Discharge Cfs	Date	Time	Gage height	Discharge Mgd	Discharge Cfs
1-5	0130	5.10	1,640	2,540	3-8	2000	4.12	982	1,520

545. Kuia Stream near Puhi

Location.--Lat 21°58'07", long 159°27'15", on right bank 0.2 mile downstream from Weoweopilau Stream and 3.6 miles west of Puhi.

Drainage area.--5.04 sq mi.

Records available.--November 1963 to June 1964.

Gage.--Water-stage recorder. Datum of gage is 393.27 ft above mean sea level (Grove Farm Co., Inc. bench mark).

Extremes.--Maximum discharge during period, 2,770 mgd (4,290 cfs) Jan. 5 (gage height, 11.30 ft), from rating curve extended above 420 mgd on basis of slope-area measurement of peak flow; minimum, 0.69 mgd (1.07 cfs) Dec. 8, 9, 18-30, June 22.

Remarks.--Records good except those for period of no gage-height record, which are fair. Two miles above station, Kamooloa ditch and Waiahi-Kuia aqueduct divert water into Kuia Stream from Kamooloa and Waiahi Streams. Koloa ditch diverts from Kuia Stream just below inflow, for power generation and irrigation of sugar cane near Koloa. About 0.3 mile above station, water is diverted for use at a rock quarry, with excess emptying into Kamooloa Stream below Lower Haiku ditch.

Discharge, in million gallons a day, November 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1					-	0.77	1.00	2.03	8.82	11.6	17.8	4.54
2					-	.77	1.08	1.92	5.72	10.6	9.92	4.07
3					-	.77	11.7	1.70	4.0	10.8	7.60	3.76
4					-	.77	52.4	1.70	3.3	7.80	5.72	3.46
5					-	.77	*4 37	1.60	*3.5	25.1	4.54	3.20
6					-	.77	2 34	1.49	3.76	27.6	4.38	2.92
7					-	.77	24.1	1.49	6.63	10.7	3.60	2.92
8					-	.69	11.3	1.60	3 9 3	8.60	5.17	2.79
9					-	4.61	8.20	1.27	*1 59	5.90	5.90	2.52
10					-	*8.61	6.45	2.25	92.1	4.38	4.54	2.38
11					-	1.27	5.72	1.92	66.5	4.23	6.53	1.60
12					-	.93	4.70	3.06	*37.1	4.70	3.20	1.00
13					-	.85	4.07	4.07	21.0	*4.07	2.52	1.00
14					-	.77	3.60	3.33	15.9	5.72	*2.52	.93
15					-	.77	3.46	2.92	9.23	4.86	2.52	.93
16					-	.77	3.33	2.79	9.00	2.79	2.66	1.00
17					-	.77	2.79	2.14	7.00	2.66	2.52	.85
18					-	.69	2.66	1.92	14.3	2.38	2.14	.93
19					-	.77	2.66	2.03	9.46	2.38	2.03	.85
20					-	.85	*3.60	1.81	5.72	5.04	2.03	.77
21					0.77	.69	6.82	1.81	5.17	a15	6.74	.93
22					.77	.69	3.91	2.03	30.6	a4.0	33.3	.93
23					.77	.69	3.20	18.2	12.1	a3.0	46.7	1.08
24					.77	.69	2.79	3.91	14.4	a4.0	39.5	1.00
25					.77	.89	3.33	13.6	58.7	a6.0	47.0	*1.00
26					.85	.69	3.06	11.6	69.6	a11	49.3	1.92
27					.77	.69	2.66	5.17	77.9	a5.0	81.9	2.66
28					.77	.69	2.38	4.70	25.5	a3.5	20.4	2.25
29					.77	.69	2.38	5.01	15.6	*a2.50	10.6	1.16
30					.77	.69	2.52	---------	12.3	29.6	7.60	1.16
31			----------		----------	.77	2.14	---------	16.2	----------	5.17	----------
Total					-	35.41	859.01	109.07	1,213.11	493.01	446.05	56.51
Mean												
Mgd					-	1.14	27.7	3.76	39.1	16.4	14.4	1.88
Cfs					-	1.76	42.9	5.82	60.5	25.4	22.3	2.91
Ac-ft					-	109	2640	335	3,720	1,510	1,370	173

Calendar Year 1963: Max - Min - Mean mgd - Mean cfs - Ac-ft -
Fiscal Year 1963-64: Max - Min - Mean mgd - Mean cfs - Ac-ft -

* Discharge measurement made on this day.
a No gage-height record.

Peak discharge (base, 1,000 mgd)

Date	Time	Gage height	Discharge Mgd	Discharge Cfs	Date	Time	Gage height	Discharge Mgd	Discharge Cfs
1-5	2330	11.30	2,770	4,290	3-8	1930	8.40	1,230	1,900

600. South Fork Wailua River near Lihue

Location (revised).--Lat 22°02'24", long 159°22'58", on right bank 0.2 mile upstream from Wailua Falls and 4.3 miles north of Lihue.

Drainage area.--22.4 sq mi.

Records available.--December 1911 to April 1919, June 1919 to March 1921, May 1921 to June 1957, August, September 1957, November 1957 to February 1958, June 1958 to June 1964. Monthly discharge only for some periods, published in WSP 1319. Published as "above Waiehu Falls, near Lihue" 1912-13. See also Note below.

Gage.--Water-stage recorder. Altitude of gage is 240 ft (from topographic map). Prior to Nov. 18, 1918, at site 0.3 mile upstream at different datum. Nov. 18, 1918, to June 30, 1957, at site 10 ft downstream from present site at datum 2.50 ft higher and July 1, 1957, to June 23, 1958, at present datum.

Average discharge.--48 years (1912-18, 1919-20, 1921-24, 1925-57, 1958-64), 75.6 mgd (117 cfs).

Extremes.--Maximum discharge during year, 5,780 mgd (8,940 cfs) Oct. 4 (gage height, 15.65 ft); minimum, 1.27 mgd (1.96 cfs) Dec. 5.
1911-64: Maximum discharge, 56,400 mgd (87,300 cfs) Apr. 15, 1963 (gage height, 22.90 ft), from rating curve extended above 8,400 mgd on basis of slope-area measurement of peak flow; minimum, 1.09 mgd (1.69 cfs) Sept. 21, 1953.

Remarks.--Records good except those for periods of no gage-height record, which are poor. Lihue and Hanamaulu ditches divert upstream for irrigation of sugar cane in vicinity of Lihue.

Note.--The figures of maximum discharge for fiscal years 1959 and 1960 have been found to be in error; revised records are on file in the district office and will be published in the next water-supply paper.

Rating table (gage height, in feet, and discharge, in million gallons a day)

1.6	1.45	3.5	76.0
1.8	3.30	4.0	123
2.0	6.20	5.0	245
2.3	12.5	7.0	570
2.6	22.1	11.0	1,450
3.0	41.0		

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	106	14.1	6.20	4.78	3.10	1.79	2.70	34.0	265	*265	247	*13.9
2	*33.5	213	6.20	*4.92	3.69	1.79	7.71	33.5	*114	101	142	18.2
3	168	69.6	*6.38	194	3.69	*1.79	72.1	*18.9	54.9	125	102	19.2
4	52.2	65.8	6.20	211	10.1	1.79	357	4.76	29.8	102	55.6	13.1
5	24.5	20.7	6.20	592	3.56	1.62	778	4.21	20.4	298	68.8	8.21
6	25.7	26.5	6.20	62.0	2.90	1.79	1.130	4.21	21.5	265	56.7	11.5
7	39.4	7.46	5.88	29.2	50.1	1.79	225	4.21	197	73.8	99.8	16.9
8	10.1	6.74	5.88	26.1	24.9	1.79	95.0	4.21	1.210	19.2	60.5	9.26
9	8.21	5.24	5.24	4.47	12.5	19.7	60.5	4.34	1.030	32.0	88.6	6.38
10	7.82	4.47	3.30	3.20	11.3	77.9	44.6	4.76	539	42.8	63.5	6.38
11	7.64	4.21	2.90	2.70	3.95	4.08	38.8	18.0	313	48.3	75.5	5.88
12	7.82	4.21	3.10	2.60	3.00	2.90	37.2	96.6	258	73.9	38.2	5.72
13	6.04	3.95	3.10	2.40	2.70	3.30	37.7	100	150	40.6	25.3	5.72
14	5.24	4.08	4.76	2.13	2.60	9.68	31.0	56.3	106	7.28	16.6	8.21
15	10.1	3.82	4.08	2.04	2.40	11.1	8.00	28.8	68.0	6.04	26.6	11.5
16	10.1	64.2	3.43	2.04	2.30	5.24	6.56	44.6	64.2	5.88	38.2	19.2
17	5.56	112	263	2.04	2.40	9.68	6.04	8.84	53.5	9.85	29.6	7.28
18	22.2	47.0	163	2.13	43.3	16.3	5.88	4.76	116	15.6	9.26	8.02
19	24.1	34.5	8.42	2.30	3.56	4.08	5.72	13.3	75.0	24.1	6.92	9.26
20	43.6	16.6	3.69	2.30	2.30	2.90	54.1	4.21	41.0	264	6.74	5.24
21	96.0	7.46	3.10	3.56	1.96	2.40	244	4.21	28.3	142	a250	18.9
22	312	6.92	2.80	2.90	1.88	2.04	112	4.08	137	160	a350	10.6
23	96.0	6.92	2.60	7.28	1.88	2.30	72.0	353	171	121	218	8.21
24	87.6	81.7	2.50	3.30	1.88	2.30	37.2	86.7	230	136	a200	6.92
25	40.4	24.9	2.70	48.3	1.96	2.04	34.0	117	309	55.6	a320	5.40
26	16.9	17.9	2.60	8.21	2.04	1.96	35.5	125	382	115	a250	46.0
27	50.1	36.0	2.60	5.72	2.13	1.96	24.9	46.4	497	84.0	a450	128
28	60.5	28.7	14.5	3.56	1.96	2.04	20.3	48.6	194	84.5	246	136
29	17.9	8.00	3.82	67.8	1.88	2.13	19.6	161	113	1.250	125	20.3
30	8.63	6.92	3.00	5.56	1.88	2.13	44.0	---------	99.2	*328	71.2	*19.2
31	*5.56	6.56	----------	*2.90	----------	*2.13	33.5	---------	368	----------	53.5	----------
Total	1409.42	960.16	557.38	1313.44	213.80	204.44	3680.61	1438.50	7254.8	4295.45	3791.12	608.59
Mean												
Mgd	45.5	31.0	18.6	42.4	7.13	6.59	119	49.6	234	143	122	20.3
Cfs	70.4	48.0	28.8	65.6	11.0	10.2	184	76.7	362	221	189	31.4
Ac-ft	4330	2950	1710	4030	656	627	11300	4410	22260	13180	11630	1870

Calendar Year 1963: Max 5.710 Min 1.62 Mean mgd 91.6 Mean cfs 142 Ac-ft 102600
Fiscal Year 1963-64: Max 1.250 Min 1.62 Mean mgd 70.3 Mean cfs 109 Ac-ft 78960

Peak discharge (base, 3,700 mgd)

Date	Time	Gage height	Discharge Mgd	Discharge Cfs	Date	Time	Gage height	Discharge Mgd	Discharge Cfs
10-4	2400	15.65	5,780	8,940	3-8	2000	15.38	5,220	8,080

* Discharge measurement made on this day.
a No gage-height record.

610. North Wailua ditch near Lihue

Location.--Lat 22°03'55", long 159°28'12", on left bank 300 ft downstream from intake, 8.3 miles west of Wailua, and 8.8 miles northwest of Lihue.

Records available.--July 1932 to June 1964.

Gage.--Water-stage recorder and sharp-crested weir. Datum of gage is 1,105.45 ft above mean sea level (levels by Lihue Plantation Co.).

Average discharge.--32 years, 12.1 mgd (18.7 cfs).

Extremes.--1932-64: Maximum daily discharge, 38 mgd (59 cfs) Dec. 21, 1933, Apr. 24, 1934; no flow at times.

Remarks.--Records good except those for period of no gage-height record, which are fair. Ditch diverts from North Fork Wailua River for power and irrigation in vicinity of Lihue.

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	13.8	*15.0	10.8	12.6	*13.5	10.8	15.9	11.7	11.3	*15.0	*9.93	11.1
2	13.2	15.6	10.6	*8.83	14.7	10.6	*13.2	11.7	*9.31	13.8	14.1	*11.4
3	*13.8	14.7	*10.3	10.2	14.7	*10.6	18.4	11.4	13.2	12.9	13.8	11.1
4	12.6	14.1	10.8	10.8	13.5	10.8	15.5	*11.4	13.5	13.8	13.5	11.1
5	13.2	14.7	15.0	5.10	14.1	10.8	12.9	11.4	13.8	15.6	14.1	10.8
6	13.2	14.4	10.8	2.72	13.2	11.1	12.6	11.4	12.9	15.0	14.1	10.6
7	12.6	14.1	10.6	2.53	15.6	10.8	10.6	12.0	14.4	13.5	15.0	10.3
8	12.3	13.8	10.3	3.12	12.6	10.8	9.68	12.6	15.0	12.9	14.4	9.97
9	13.5	13.2	9.97	2.33	13.5	18.4	12.3	11.4	14.4	12.6	12.9	9.97
10	12.0	13.5	9.68	2.13	15.6	15.3	12.6	15.0	13.5	15.0	11.4	9.97
11	12.9	14.1	11.4	1.94	12.9	12.6	12.0	14.1	12.0	14.7	12.0	9.97
12	12.3	13.2	12.0	1.94	12.6	12.6	12.6	12.9	12.6	16.2	12.6	9.03
13	11.7	13.5	10.8	1.79	12.3	12.3	12.6	12.3	12.3	13.8	12.3	10.6
14	11.1	14.4	9.68	1.79	12.9	12.6	13.2	12.6	13.5	12.6	13.5	10.6
15	13.5	15.9	9.97	1.61	12.6	14.1	14.7	14.4	13.5	12.3	13.8	11.4
16	12.3	15.9	13.5	a.6	16.2	15.9	13.5	13.8	14.1	13.5	13.5	13.8
17	11.7	16.2	18.1	a0	17.2	16.6	13.2	12.6	13.2	13.5	12.9	10.8
18	14.4	12.3	9.73	a0	17.2	12.9	12.9	14.4	12.6	14.1	12.6	13.8
19	12.9	12.3	3.31	a0	13.5	12.0	14.1	15.0	12.9	15.3	12.9	11.1
20	13.5	11.7	2.53	a.01	12.6	11.7	18.8	13.2	12.3	15.3	13.2	11.4
21	14.1	12.0	2.13	a0	12.3	11.7	15.0	13.5	12.0	14.7	14.7	11.4
22	15.3	11.7	2.13	a1.4	12.3	11.7	12.6	14.7	13.5	15.3	13.2	11.7
23	14.4	14.7	3.86	10.3	12.0	11.4	12.6	19.8	13.5	13.8	13.8	12.6
24	14.4	17.2	6.40	16.2	11.7	11.1	12.3	15.9	13.5	13.8	13.2	12.0
25	13.2	13.2	7.21	19.5	11.4	11.1	14.1	15.9	15.0	13.5	13.5	14.7
26	13.2	13.5	7.21	15.9	12.6	11.1	12.6	12.3	15.3	16.2	13.2	15.3
27	14.1	15.9	7.21	14.1	11.4	10.8	12.3	12.6	15.6	14.4	13.8	16.6
28	12.9	15.6	10.8	15.0	11.1	10.8	12.0	13.8	14.1	15.3	12.3	15.0
29	12.6	13.8	7.75	20.6	11.1	10.6	12.9	15.0	13.5	15.0	11.7	12.6
30	12.6	11.7	9.39	15.0	10.8	10.6	13.2	---	15.3	12.3	11.7	*14.1
31	12.3	11.4	---	14.1	---	13.2	12.0	---	16.9	---	10.6	---
Total	405.6	433.3	273.96	212.14	397.7	377.4	412.88	388.8	418.51	425.7	404.23	354.81
Mean												
Mgd	13.1	14.0	9.13	6.84	13.3	12.2	13.3	13.4	13.5	14.2	13.0	11.8
Cfs	20.3	21.7	14.1	10.6	20.6	18.9	20.6	20.7	20.9	22.0	20.1	18.3
Ac-ft	1,240	1,330	840	651	1,220	1,160	1,270	1,190	1,280	1,310	1,240	1,090

Calendar Year 1963: Max 20.6 Min 0 Mean mgd 10.5 Mean cfs 16.2 Ac-ft 11,720
Fiscal Year 1963-64: Max 20.6 Min 0 Mean mgd 12.3 Mean cfs 19.0 Ac-ft 13,820

* Discharge measurement made on this day.
a No gage-height record.

620. Stable storm ditch near Lihue

Location.--lat 22°04'09", long 159°26'46", on left bank 100 ft downstream from intake, 7.8 miles northwest of Lihue, and 8.2 miles west of Kapaa.

Records available.--December 1936 to June 1964.

Gage.--Water-stage recorder and sharp-crested weir. Altitude of gage is 710 ft (by barometer).

Average discharge.--27 years (1937-64), 7.12 mgd (11.0 cfs).

Extremes.--1936-64: Maximum daily discharge, 46 mgd (71 cfs) Apr. 3, 1948; no flow at times each year.

Remarks.--Records good. Ditch diverts from North Fork Wailua River for irrigation of sugar cane in vicinity of Lihue.

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	0.04	0.19	0.26	25.8	*18.1	17.2	23.0	0.02	0.07	*0.07	0.19	0.12
2	0	.26	.26	*24.0	18.7	*17.2	10.7	.02	.02	.12	.19	.19
3	.04	.19	.26	11.2	19.0	17.2	.26	.02	.12	.12	.19	.19
4	0	.19	*7.58	4.08	6.62	17.2	.26	11.5	.19	.12	.12	.19
5	0	.19	15.9	.07	.26	17.2	.47	18.1	.26	.12	.12	.19
6	0	.19	10.4	.07	11.2	17.2	.26	18.1	.19	.26	.07	.19
7	0	.19	9.86	.02	12.9	17.2	.12	19.4	.12	.26	.07	.19
8	0	.19	9.38	.02	.43	16.8	.07	20.7	1.46	.43	.19	.19
9	0	.12	8.90	0	.26	14.0	.07	18.4	.62	.26	.12	15.9
10	0	.12	8.90	0	.19	13.5	.07	23.7	.26	.19	.07	22.0
11	0	.12	10.8	0	.12	18.7	.07	23.0	.19	.26	0	22.0
12	0	8.99	11.5	0	.12	18.1	.02	9.35	.12	.19	.02	21.7
13	0	15.8	9.38	0	11.2	18.1	.02	.43	.12	.19	.12	22.0
14	0	15.3	8.66	4.51	17.8	18.7	0	.26	.02	.26	.19	22.0
15	8.80	18.0	8.66	10.1	17.5	18.7	11.7	.19	.07	18.4	.12	22.7
16	7.49	9.06	13.5	10.6	20.0	12.7	19.0	.12	.07	25.1	.19	11.2
17	11.2	.43	11.1	11.4	22.6	.52	7.34	.07	.07	24.0	.19	.26
18	23.7	.43	1.49	14.2	8.58	.43	.07	.07	.12	6.96	17.6	17.7
19	9.52	.43	14.5	12.4	.19	.26	.07	13.8	.12	.52	23.4	22.7
20	.52	.19	19.4	14.8	.19	.26	.12	21.0	.12	.26	24.4	22.3
21	.52	.07	18.4	16.5	.19	.26	.12	20.7	.12	.26	8.90	22.7
22	.52	.07	17.5	13.9	11.1	.19	.07	23.0	.12	.19	.26	22.7
23	.43	11.6	16.2	15.7	15.3	.19	.07	30.0	.07	.19	.62	24.0
24	.43	10.4	14.2	17.5	15.0	.12	.07	10.1	.07	.19	.43	23.4
25	.43	.52	18.3	8.45	15.3	.12	.02	.62	.07	.19	.19	25.4
26	.43	.52	21.7	.26	16.2	10.3	.02	.26	.12	.19	.19	9.00
27	.26	.52	22.0	.19	15.2	15.6	.02	.19	.12	.12	.43	.19
28	.26	.52	25.3	12.4	17.5	17.2	.02	.12	.07	.26	.07	.19
29	.26	.52	22.7	15.2	17.2	16.5	.02	.12	.07	.97	.02	.19
30	.26	.43	24.7	.26	17.2	16.5	.02	---	.07	.43	.07	.19
31	.19	.43	---	12.8	---	19.7	.02	---	.07	---	.07	---
Total	65.30	96.18	381.69	256.43	326.15	367.85	74.16	283.36	5.30	81.08	78.81	351.87
Mean												
Mgd	2.11	3.10	12.7	8.27	10.9	11.9	2.39	9.77	0.171	2.70	2.54	11.7
Cfs	3.26	4.80	19.6	12.8	16.9	18.4	3.70	15.1	0.265	4.18	3.93	18.1
Ac-ft	200	295	1,170	787	1,000	1,130	228	870	16	249	242	1,080

Calendar Year 1963: Max 29.6 Min 0 Mean mgd 5.65 Mean cfs 8.74 Ac-ft 6,330
Fiscal Year 1963-64: Max 30.0 Min 0 Mean mgd 6.47 Mean cfs 10.0 Ac-ft 7,270

* Discharge measurement made on this day.

630. North Fork Wailua River at altitude 650 ft, near Lihue

Location.--lat 22°04'02", long 159°26'21", on right bank 0.5 mile downstream from intake of Stable storm ditch and 7.8 miles northwest of Lihue.

Drainage area.--6.6 sq mi, approximately.

Records available.--September 1914 to March 1915, May 1915 to October 1918, December 1918, March 1919, June 1919 to June 1964. Monthly discharge only for some periods, published in WSP 1319.

Gage.--Water-stage recorder. Altitude of gage is 650 ft (from topographic map). Prior to Sept. 9, 1944, at datum 2.0 ft higher.

Average discharge.--48 years (1915-18, 1919-64), 46.7 mgd (72.3 cfs).

Extremes.--Maximum discharge during year, 1,910 mgd (2,960 cfs) Mar. 8 (gage height, 7.76 ft), from rating curve extended above 82 mgd as explained below; minimum, 0.36 mgd (0.56 cfs) Sept. 15, 16.
1914-64: Maximum discharge, 8,550 mgd (13,200 cfs) Nov. 12, 1955 (gage height, 13.53 ft), from rating curve extended above 470 mgd on basis of slope-area measurement at gage height 10.65 ft; minimum, 0.22 mgd (0.34 cfs) Oct. 27, 1953.

Remarks.--Records fair except those for periods of no gage-height record, which are poor. Since 1925 Kanalei tunnel (see p. 46) has diverted from Kanalei River basin into North Fork Wailua River above station; North Wailua and Stable storm ditches (see preceding pages) divert water above station for power development and irrigation in vicinity of Lihue.

Rating table (gage height, in feet, and discharge, in million gallons a day)
(Shifting-control method used Oct. 5 to Jan. 6, Apr. 29 to May 23)

1.6	0.22	2.6	19.5
1.7	.45	3.0	41.0
1.8	.90	3.5	86.0
1.9	1.65	4.0	158
2.0	2.80	4.5	260
2.1	4.40	5.0	400
2.3	9.00	6.0	785

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	64.4	59.3	14.5	24.0	*6.08	2.68	28.3	a28.0	99.7	*107	*121	39.2
2	35.0	95.5	13.8	*14.1	9.90	*2.57	24.7	a25.5	a71.0	67.0	80.5	*36.8
3	*64.5	36.2	13.1	131	9.91	2.46	154	*23.1	*52.0	55.2	70.0	35.0
4	29.6	27.5	*5.63	160	18.0	2.46	192	10.6	45.9	68.1	62.3	33.2
5	33.2	34.2	3.57	166	26.0	2.57	310	2.80	82.4	126	68.0	32.0
6	31.4	29.8	.58	57.8	11.7	2.68	*250	2.57	56.0	122	64.9	30.8
7	25.0	21.3	.50	43.8	38.0	2.68	83.8	4.08	133	58.7	97.9	31.4
8	20.0	24.5	.45	43.8	27.0	2.68	75.0	8.87	350	55.2	70.0	30.2
9	23.8	17.9	.45	34.4	26.5	66.8	72.0	2.68	290	48.0	93.4	133
10	17.5	17.9	.45	31.4	51.9	41.0	73.0	21.1	172	*49.8	71.0	5.03
11	22.9	23.8	.50	29.6	26.5	8.50	68.0	16.3	108	41.7	67.0	4.24
12	18.3	7.32	.43	28.5	25.0	7.00	68.0	55.6	124	59.9	59.6	4.40
13	15.9	2.00	.40	27.5	12.0	7.25	61.4	76.3	83.8	39.2	52.8	4.24
14	14.5	5.59	.38	21.8	4.08	8.00	55.2	44.5	a73.0	35.0	61.5	4.24
15	18.1	6.18	.36	15.2	3.60	10.2	44.5	54.0	a71.0	16.8	60.0	6.57
16	11.5	56.5	7.22	15.2	12.7	25.8	33.2	41.0	a75.0	12.9	49.6	35.2
17	4.51	45.8	206	16.3	41.8	56.0	41.0	30.8	a73.0	8.75	45.2	28.5
18	14.9	24.0	79.3	21.3	31.6	39.2	48.0	48.3	a73.0	26.4	23.1	26.5
19	7.75	27.0	17.9	17.1	25.0	33.2	49.6	24.2	a83.8	69.2	12.4	6.08
20	25.8	18.3	5.87	27.6	23.1	31.4	72.9	7.25	a71.0	149	16.1	4.40
21	55.8	15.2	4.24	27.8	22.2	28.0	103	8.49	a63.2	73.0	132	5.24
22	112	14.1	3.12	17.1	9.95	28.5	74.0	13.5	95.6	82.2	128	7.65
23	42.4	13.5	2.34	27.9	2.00	28.5	66.0	82.8	a83.8	73.5	216	10.1
24	43.4	51.3	1.50	23.5	2.00	28.0	59.6	62.6	a73.0	65.0	113	7.65
25	27.5	20.4	2.88	61.4	2.00	27.0	62.3	153	106	50.4	151	23.3
26	23.6	19.1	4.82	35.0	2.73	9.84	55.2	a65.0	124	89.8	123	42.6
27	44.4	25.0	5.45	28.5	2.57	2.68	50.4	s54.4	153	58.7	176	66.4
28	24.0	26.0	19.0	18.6	2.80	3.12	47.3	a62.3	78.3	94.8	82.0	51.2
29	20.4	22.6	6.08	69.0	2.96	2.80	50.0	81.3	73.0	433	55.2	28.5
30	20.0	17.5	16.3	33.2	2.80	2.80	a43.8	---	93.2	146	47.3	39.8
31	18.7	16.3	---	14.7	---	9.24	a33.8	---	255	---	42.4	---
Total	930.76	821.59	437.12	1283.1	482.38	525.61	2450.0	1110.94	3385.7	2382.25	2,512.2	693.74
Mean												
Mgd	30.0	26.5	14.6	41.4	16.1	17.0	79.0	38.3	109	79.4	81.0	23.1
Cfs	46.4	41.0	22.6	64.1	24.9	26.3	122	59.3	169	123	125	35.7
Ac-ft	2860	2520	1340	3,940	1480	1610	7,520	3410	10390	7,310	7,710	2130

Calendar Year 1963: Max 883 Min 0.36 Mean mgd 43.0 Mean cfs 66.5 Ac-ft 48140
Fiscal Year 1963-64: Max 433 Min 0.36 Mean mgd 46.5 Mean cfs 71.9 Ac-ft 52220

* Discharge measurement made on this day.
a No gage-height record.

Peak discharge (base, 1,200 mgd)

Date	Time	Gage height	Discharge	
			Mgd	Cfs
3-8	1900	7.76	1,910	2,960

680. East Branch of North Fork Wailua River near Lihue

Location.--Lat 22°04'19", long 159°25'05", on right bank 1,200 ft upstream from mouth and 7.5 miles northwest of Lihue.

Drainage area.--6.2 sq mi, approximately.

Records available.--July 1912 to September 1914, December 1914 to March 1915, May 1915 to March 1919, June 1919 to June 1964. Monthly discharge only for some periods, published in WSP 1319.

Gage.--Water-stage recorder and concrete control. Altitude of gage is 500 ft (from topographic map). Prior to Dec. 31, 1914, staff gage at site 725 ft downstream at different datum. Dec. 31, 1914, to May 10, 1934, water-stage recorder at site 75 ft upstream at present datum.

Average discharge.--49 years (1913-14, 1915-18, 1919-64), 30.8 mgd (47.7 cfs).

Extremes.--Maximum discharge during year, 1,790 mgd (2,770 cfs) Mar. 8 (gage height, 6.57 ft); minimum, 5.95 mgd (9.21 cfs) Dec. 8.
1912-64: Maximum gage height, 14.7 ft, from floodmarks, Nov. 12, 1955 (discharge not determined); minimum discharge, 4.4 mgd (6.8 cfs) July 3, 13, 1926.

Remarks.--Records good except those for periods of no gage-height record, which are fair. No diversion above station.

Rating tables (gage height, in feet, and discharge, in million gallons a day)

July 1-22		July 23 to June 30			
1.4	15.5	1.2	4.30	2.0	60.0
1.6	28.0	1.3	7.60	2.5	130
2.0	66.0	1.5	17.5	3.0	232
2.5	145	1.7	30.5	4.0	520

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	*54.0	46.4	14.2	27.9	11.6	7.60	32.5	11.1	52.6	50.1	78.5	*24.9
2	43.2	35.8	13.6	14.2	13.6	*7.27	18.4	11.1	29.1	37.3	49.0	24.2
3	44.6	23.5	13.1	51.9	12.6	6.94	128	10.7	22.3	30.5	40.0	21.7
4	32.8	19.9	12.6	138	11.1	6.61	169	10.2	21.1	29.1	33.0	20.5
5	28.8	18.1	14.2	84.3	10.7	6.61	206	9.80	27.0	67.8	29.8	19.3
6	26.0	19.3	12.6	29.1	10.7	6.28	236	9.80	21.1	69.5	27.0	18.1
7	23.9	17.0	12.0	22.3	24.0	6.28	74.2	10.2	84.0	33.9	36.4	19.3
8	22.6	19.3	11.1	21.1	12.0	5.95	44.0	10.7	310	32.2	27.0	17.0
9	23.9	15.8	10.7	16.4	11.1	21.2	31.4	9.36	259	25.6	32.2	16.4
10	21.2	15.8	10.2	14.8	30.2	15.8	37.3	17.5	135	24.9	24.9	15.8
11	21.2	15.8	11.1	13.1	12.0	7.60	24.9	15.8	79.8	23.5	22.9	14.8
12	21.9	15.3	12.6	13.1	11.1	6.94	22.3	28.5	80.1	24.9	21.1	14.8
13	20.6	14.2	11.1	11.6	10.7	6.61	18.7	23.5	52.3	22.3	19.3	14.2
14	20.1	14.2	10.2	11.1	10.2	6.94	17.0	16.4	38.2	21.7	18.7	13.6
15	26.0	21.1	9.80	10.7	9.80	7.60	18.7	17.0	31.4	19.3	18.7	14.2
16	23.2	84.4	14.0	10.7	10.2	9.36	17.5	14.8	29.1	18.1	18.1	21.1
17	19.5	36.4	*97.2	11.1	10.7	10.7	14.8	11.6	27.7	17.5	17.0	14.2
18	37.9	a29	46.4	11.6	14.2	8.48	14.2	15.3	27.7	15.8	15.8	18.1
19	30.4	a24	19.9	12.0	9.36	7.27	14.2	12.6	40.0	238	15.8	14.8
20	32.8	a21	15.8	11.6	8.92	6.94	27.5	10.2	29.1	92.8	17.0	14.2
21	38.8	a19	13.6	17.0	8.48	6.94	62.4	11.6	22.3	52.9	44.0	14.8
22	79.5	a18	12.6	13.1	8.48	6.61	23.5	11.1	34.4	52.3	63.1	15.3
23	36.4	a17	12.0	23.2	8.48	6.61	20.5	a25	93.8	54.5	82.7	17.5
24	33.9	40.0	11.6	13.6	8.48	6.61	16.4	a23	47.0	44.0	51.2	15.3
25	27.0	a23	11.1	19.9	8.04	6.61	15.8	a100	66.1	31.4	66.2	18.7
26	23.5	a24	10.7	13.6	8.92	6.28	14.8	a35	64.8	46.0	83.7	17.5
27	43.1	25.6	11.6	11.6	8.92	6.61	13.6	a22	93.7	30.5	133	42.3
28	24.9	24.9	12.0	12.6	8.48	6.61	13.1	*25.6	43.0	43.7	51.2	46.4
29	21.7	*18.1	11.1	40.0	8.04	6.61	13.1	36.7	33.0	388	36.4	21.7
30	18.7	15.8	*13.6	15.8	7.60	6.61	13.6	---------	36.4	*106	30.5	*23.5
31	*18.7	14.8	----------	*13.1	----------	*12.4	*12.0	---------	*168	----------	27.7	----------
Total	940.8	746.5	492.30	730.1	338.70	247.48	1385.4	566.16	2099.1	1529.9	1231.9	584.2
Mean												
Mgd	30.3	24.1	16.4	23.6	11.3	7.98	44.7	19.5	67.7	51.0	39.7	19.5
Cfs	46.9	37.3	25.4	36.5	17.5	12.3	69.2	30.2	105	78.9	61.4	30.2
Ac-ft	2890	2290	1510	2240	1040	759	4250	1740	6440	4700	3780	1790

Calendar Year 1963: Max 568 Min 5.95 Mean mgd 31.5 Mean cfs 48.7 Ac-ft 35320
Fiscal Year 1963-64: Max 388 Min 5.95 Mean mgd 29.8 Mean cfs 46.1 Ac-ft 33430

* Discharge measurement made on this day.
a No gage-height record.

Peak discharge (base, 1,000 mgd)

Date	Time	Gage height	Discharge Mgd	Discharge Cfs	Date	Time	Gage height	Discharge Mgd	Discharge Cfs
10-4	2330	6.06	1,480	2,290	4-29	0400	5.55	1,180	1,830
3-8	2030	6.57	1,790	2,770					

690. Wailua ditch near Kapaa

Location.--Lat 22°04'34", long 159°24'04", on right bank 2,000 ft downstream from Wailua Reservoir, 5.2 miles west of Kapaa, and 7 miles north of Lihue.

Records available.--November 1936 to June 1964.

Gage.--Water-stage recorder. Datum of gage is 462.3 ft above mean sea level (by stadia survey).

Average discharge.--27 years (1937-64), 10.1 mgd (15.6 cfs).

Extremes.--1936-64: Maximum daily discharge, 41 mgd (63 cfs) June 4, 1937; no flow at times.

Remarks.--Records fair. Ditch diverts water from North Fork Wailua River to reservoir 2,000 ft above station and thence to fields for irrigation of sugar cane.

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	*8.80	10.3	8.60	9.10	5.74	8.30	3.02	1.68	8.60	0.40	0	*4.54
2	8.90	11.9	8.60	9.10	9.23	*8.40	2.86	1.75	*10.7	.40	0	6.28
3	9.00	13.6	*8.70	10.7	10.8	8.50	2.78	*6.56	12.0	.40	0	6.19
4	9.10	13.5	10.2	13.4	10.4	10.7	2.78	2.78	7.90	.40	0	6.37
5	9.20	13.4	10.7	13.5	10.3	16.1	2.70	4.69	4.75	.48	0	6.37
6	9.20	13.4	14.4	13.5	10.4	18.7	2.42	.05	4.57	.53	0	6.46
7	9.20	13.4	18.9	13.5	10.4	18.7	2.28	.03	6.46	.53	0	6.46
8	6.97	13.4	18.8	13.5	10.3	17.8	2.21	2.73	7.90	9.74	0	6.55
9	*5.31	13.5	15.7	13.5	9.63	17.2	2.14	5.83	3.94	14.4	.86	6.55
10	5.92	13.5	14.2	15.4	9.30	15.0	2.07	5.74	1.37	4.88	1.20	6.55
11	8.03	13.4	14.1	17.5	9.30	14.1	2.00	5.65	1.20	.32	1.20	6.46
12	9.00	13.3	15.0	17.2	9.30	14.2	1.75	6.17	.88	.26	4.73	6.46
13	9.10	13.1	17.0	17.6	9.20	12.1	1.68	9.83	.88	3.74	*5.92	6.46
14	9.10	13.1	19.0	17.7	9.10	11.3	1.68	12.8	.98	*8.40	6.10	6.55
15	9.20	14.4	19.6	18.7	9.10	11.6	1.68	9.95	1.15	15.6	6.10	6.55
16	7.61	*10.5	18.8	*19.5	12.1	12.1	1.68	8.20	1.20	4.49	6.19	6.73
17	6.73	.98	14.4	19.5	13.5	12.8	1.68	7.34	1.26	0	6.37	6.73
18	9.05	.88	15.7	19.5	*13.4	9.50	1.68	8.23	1.04	0	6.37	6.73
19	9.90	5.75	19.3	19.6	13.4	4.14	1.62	11.3	.98	0	6.37	6.73
20	9.90	8.10	18.7	19.6	12.1	2.28	*1.62	13.0	.93	0	6.37	6.82
21	9.90	12.8	12.3	19.7	9.50	2.14	1.62	10.7	.93	0	6.37	6.82
22	10.0	17.0	10.8	18.1	9.30	2.00	1.56	5.67	.82	0	6.37	*8.28
23	10.1	19.3	11.1	15.8	9.20	2.07	1.43	4.66	.82	0	6.46	9.80
24	10.1	11.6	11.3	15.8	9.10	2.00	1.37	7.75	.82	0	6.46	15.6
25	10.1	8.30	11.4	15.8	9.00	2.07	1.32	12.4	.69	0	6.46	18.1
26	10.1	8.30	11.6	15.8	8.90	1.94	1.37	7.15	.48	0	6.55	14.9
27	10.1	8.40	9.90	15.8	10.4	5.79	1.37	10.7	.44	0	6.37	10.9
28	10.3	8.40	9.20	15.8	12.4	8.20	1.37	13.4	.40	0	6.28	12.0
29	10.3	8.50	9.20	11.0	12.4	8.20	1.50	9.56	.36	*0	4.16	10.5
30	10.3	8.50	*9.00	5.56	9.63	5.38	1.56	----------	.32	0	.36	*10.0
31	*10.3	8.50	----------	*5.65	----------	*3.02	1.62	----------	*.32	----------	.40	----------
Total	280.82	343.01	406.20	466.41	306.83	286.33	58.42	206.30	85.09	64.97	114.02	245.44
Mean												
Mgd	9.06	11.1	13.5	15.0	10.2	9.24	1.88	7.11	2.74	2.17	3.68	8.18
Cfs	14.0	17.2	20.9	23.2	15.8	14.3	2.91	11.0	4.24	3.36	5.69	12.7
Ac-ft	862	1,050	1,250	1,430	942	879	179	633	261	199	350	753

Calendar Year 1963: Max 19.9 Min 0.02 Mean mgd 8.21 Mean cfs 12.7 Ac-ft 9,200
Fiscal Year 1963-64: Max 19.7 Min 0 Mean mgd 7.82 Mean cfs 12.1 Ac-ft 8,790

* Discharge measurement made on this day.

710. North Fork Wailua River near Kapaa

Location.--Lat 22°03'08", long 159°22'22", on right bank 1.1 miles upstream from confluence with South Fork, 3.5 miles southwest of Kapaa, and 5.0 miles north of Lihue.

Drainage area.--18.7 sq mi.

Records available.--July 1952 to June 1964.

Gage.--Water-stage recorder. Altitude of gage is 18 ft (from topographic map).

Average discharge.--12 years, 78.3 mgd (121 cfs).

Extremes.--Maximum discharge during year, 3,550 mgd (5,490 cfs) Oct. 4 (gage height, 7.85 ft), from rating curve extended above 2,400 mgd as explained below; minimum, 3.74 mgd (5.79 cfs) Feb. 21.
1952-64: Maximum discharge, 34,400 mgd (53,200 cfs) Nov. 12, 1955 (gage height, 19.88 ft in gage well, 20.8 ft from floodmarks), from rating curve extended above 2,400 mgd on basis of slope-area measurement of peak flow; minimum, 1.37 mgd (2.12 cfs) Oct. 28, 1953.

Remarks.--Records fair. Wailua ditch (see preceding page) diverts above station for irrigation.

Rating table (gage height, in feet, and discharge, in million gallons a day)
(Shifting-control method used Jan. 7 to Feb. 24)

1.1	2.90	3.0	195
1.2	5.00	3.5	328
1.4	10.8	4.0	500
1.7	24.6	5.0	1,000
2.1	55.0	6.0	1,730
2.5	103		

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	138	94.8	31.0	54.3	18.3	6.30	49.9	32.4	179	234	257	87.7
2	72.7	154	30.4	34.5	28.9	6.30	39.2	33.1	110	145	159	82.5
3	115	59.0	29.1	191	35.9	6.30	303	31.0	76.0	118	133	71.6
4	59.0	46.9	27.8	300	32.4	6.30	450	21.0	*69.4	124	114	67.2
5	58.0	44.4	21.5	432	33.8	6.30	660	6.82	127	240	115	62.0
6	52.3	46.9	20.8	96.2	27.8	6.04	706	5.26	85.1	270	100	53.2
7	49.6	33.1	10.2	67.2	60.5	6.04	*207	8.78	220	128	147	55.0
8	38.0	40.4	9.52	66.4	42.0	5.52	115	21.9	947	106	104	55.0
9	*45.2	29.7	9.20	47.8	35.2	65.1	89.0	17.0	858	74.9	148	41.2
10	40.4	29.7	9.20	42.0	92.2	74.4	109	33.8	435	82.2	106	29.1
11	39.6	31.7	8.88	38.8	38.8	9.54	74.9	38.4	268	76.0	102	24.1
12	35.2	23.5	8.88	33.1	35.2	4.58	71.6	82.1	275	99.6	86.4	23.5
13	29.7	15.2	8.56	24.6	28.0	4.37	59.0	107	167	73.8	*67.2	23.0
14	29.7	13.5	8.56	23.0	15.2	4.16	51.4	65.0	118	*65.0	64.0	21.9
15	41.8	19.5	8.56	*18.3	15.6	4.37	50.5	63.5	94.6	38.3	82.3	13.9
16	41.2	189	8.88	128	19.4	5.26	41.2	60.8	98.8	13.1	62.0	41.1
17	33.1	154	283	13.5	31.5	46.5	43.6	31.0	89.0	22.6	58.0	42.0
18	50.7	81.2	141	18.4	*57.3	25.9	51.4	38.7	86.4	45.7	44.1	44.4
19	42.8	65.0	29.0	16.0	29.1	24.6	53.2	34.1	118	89.7	36.6	23.5
20	61.2	46.0	7.60	13.9	25.2	35.9	93.8	5.78	97.4	367	38.8	18.8
21	80.1	*33.1	6.82	42.0	27.8	38.8	204	4.37	77.3	174	180	19.7
22	242	26.5	6.82	20.8	27.8	37.3	101	7.88	164	175	222	*21.3
23	89.0	24.1	6.30	46.8	16.0	36.6	81.6	110	213	165	374	24.1
24	81.2	88.8	6.04	28.6	15.6	34.5	58.0	76.1	202	155	224	17.8
25	57.0	40.4	6.56	77.9	15.6	34.5	61.0	236	238	110	275	22.6
26	47.8	41.2	6.04	46.0	15.6	27.8	55.0	156	252	180	276	48.0
27	89.2	46.0	10.1	36.6	13.1	13.2	48.7	85.1	327	121	464	110
28	54.1	53.2	36.4	27.8	6.82	7.60	41.2	76.0	159	167	207	121
29	44.4	45.2	18.8	118	6.56	7.60	37.3	128	123	1050	125	57.0
30	38.0	36.6	28.2	51.4	6.56	7.08	50.6	---	164	358	103	71.0
31	38.0	33.8	---	31.7	---	10.0	35.2	---	504	---	91.8	---
Total	1934.0	1686.8	844.12	2071.4	853.74	608.76	4092.3	1616.89	6942.0	5067.9	4566.2	1393.2
Mean												
Mgd	62.4	54.4	28.1	66.8	28.5	19.6	132	55.8	224	169	147	46.4
Cfs	96.5	84.2	43.5	103	44.1	30.3	204	86.3	347	261	227	71.8
Ac-ft	5940	5180	2590	6360	2620	1870	12560	4960	21300	15550	14010	4280

Calendar Year 1963: Max 1670 Min 4.16 Mean mgd 89.8 Mean cfs 139 Ac-ft 100600
Fiscal Year 1963-64: Max 1050 Min 4.16 Mean mgd 86.6 Mean cfs 134 Ac-ft 97220

* Discharge measurement made on this day.

Peak discharge (base, 2,300 mgd)

Date	Time	Gage height	Discharge Mgd	Discharge Cfs	Date	Time	Gage height	Discharge Mgd	Discharge Cfs
10-4	2300	7.85	3,550	5,490	4-29	0400	6.87	2,570	3,980
3-8	2000	7.78	3,480	5,380					

715. Left Branch Opaekaa Stream near Kapaa
(Formerly published as Left Branch Opaikaa Stream near Kapaa)

Location (revised).--Lat 22°04'43", long 159°23'55", on left bank 0.4 mile upstream from mouth, 0.6 mile northeast of Wailua Reservoir, and 4.9 miles west of Kapaa.

Drainage area.--0.7 sq mi, approximately.

Records available.--May 1960 to June 1964. Prior to July 1963, published as Left Branch Opaikaa Stream near Kapaa.

Gage.--Water-stage recorder and concrete control. Datum of gage is 458.4 ft above mean sea level (by stadia survey).

Extremes.--Maximum discharge during year, 128 mgd (198 cfs) Mar. 8 (gage height, 4.08 ft), from rating curve extended above 7.9 mgd; minimum, 0.26 mgd (0.40 cfs) Nov. 22.
1960-64: Maximum discharge, 236 mgd (365 cfs) Apr. 15, 1963 (gage height, 5.21 ft), from rating curve extended above 7.9 mgd; minimum, 0.20 mgd (0.31 cfs) Jan. 14, 15, 1963.

Remarks.--Records fair. No diversion above station. Continuous records of rainfall are obtained at station.

Rating table (gage height, in feet, and discharge, in million gallons a day)
(Shifting-control method used Jan. 6 to Mar. 8)

0.8	0.26	1.5	7.50
.9	.69	2.0	18.3
1.0	1.33	2.5	33.5
1.2	3.25		

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	1.85	1.59	0.88	0.82	0.41	0.33	0.69	0.54	1.85	3.38	6.54	2.72
2	1.59	1.27	.88	.64	.69	.33	.75	.59	1.20	3.38	4.92	2.62
3	1.59	1.20	.88	1.33	.49	.33	3.25	.54	1.01	3.14	4.25	2.41
4	1.50	1.14	.88	.69	.41	.33	6.60	.49	*1.01	2.94	3.75	2.20
5	1.50	1.07	.88	.88	.41	.33	16.2	.45	1.01	2.83	3.38	2.11
6	1.42	1.01	.88	.69	.37	.33	14.4	.45	.95	2.94	3.14	2.11
7	1.27	1.01	.82	.64	.75	.33	6.06	.45	2.04	2.72	3.14	2.03
8	1.27	1.01	.82	.64	.49	.33	2.83	.49	17.9	2.52	3.04	1.94
9	*1.27	1.01	.75	.59	.41	.54	1.76	.45	26.7	2.30	2.94	1.85
10	1.20	.95	.75	.59	.41	.75	1.50	.59	8.40	2.30	2.72	1.76
11	1.20	.95	.75	.59	.37	.45	1.20	.59	6.06	2.20	2.52	1.76
12	1.14	.95	.75	.59	.37	.41	1.20	.69	4.64	2.20	2.41	1.68
13	1.14	.95	.75	.54	.33	.37	1.01	.59	3.88	2.11	*2.30	1.68
14	1.07	.95	.69	.54	.33	.37	.95	.54	3.38	*2.00	2.20	1.59
15	1.27	.88	.69	.49	.33	.37	.82	.54	3.04	1.94	2.20	1.59
16	1.14	*2.75	.69	*.49	.33	.41	.75	.49	2.94	1.85	2.52	1.68
17	1.07	1.42	*1.01	.54	.33	.49	.69	.41	2.83	1.76	2.20	1.50
18	1.20	1.07	1.01	.54	*.33	.41	.64	.41	2.72	1.76	2.03	1.50
19	1.27	1.07	.69	.54	.33	.37	.64	.37	2.83	1.94	2.03	1.42
20	1.50	1.01	.64	.54	.29	.33	*1.07	.33	2.62	5.55	1.94	1.42
21	1.42	1.01	.59	.64	.29	.33	2.11	.41	2.30	4.05	2.11	1.33
22	2.20	1.01	.59	.54	.29	.29	1.14	.41	2.62	2.72	2.62	*1.42
23	1.68	1.01	.54	.64	.29	.29	.82	.75	6.19	2.52	3.25	1.50
24	1.59	1.14	.54	.54	.29	.29	.69	.64	5.76	2.52	2.83	1.42
25	1.42	1.01	.54	.69	.33	.29	.69	2.42	4.64	2.20	2.83	1.33
26	1.33	1.01	.54	.54	.33	.29	.64	2.39	4.00	2.62	3.75	1.33
27	1.33	1.01	.54	.45	.37	.29	.59	.88	4.64	2.41	5.48	1.42
28	1.33	1.01	.54	.45	.37	.29	.59	.82	3.88	2.52	4.00	1.68
29	1.20	1.01	.54	.59	.33	.33	.64	1.07	3.38	29.1	3.25	1.33
30	1.14	1.01	.59	.45	.33	.33	.69	---	2.72	9.70	3.04	1.50
31	1.14	.95	---	.41	---	.41	.59	---	5.03	---	2.83	---
Total	42.24	34.44	21.64	18.85	11.40	11.34	72.20	19.79	142.17	112.12	96.16	51.83
Mean												
Mgd	1.36	1.11	0.721	0.608	0.380	0.366	2.33	0.682	4.59	3.74	3.10	1.73
Cfs	2.10	1.72	1.12	0.941	0.588	0.566	3.61	1.06	7.10	5.79	4.80	2.68
Ac-ft	130	106	66	58	35	35	222	61	436	344	295	159

Calendar Year 1963: Max 47.6 Min 0.20 Mean mgd 1.71 Mean cfs 2.65 Ac-ft 1,920
Fiscal Year 1963-64: Max 29.1 Min 0.29 Mean mgd 1.73 Mean cfs 2.68 Ac-ft 1,950

* Discharge measurement made on this day.

Peak discharge (base, 90 mgd)

Date	Time	Gage height	Discharge	
			Mgd	Cfs
3-8	2130	4.08	128	198

770. Makaleha ditch near Kealia

Location.--Lat 22°07'00", long 159°22'04", on left bank at end of last tunnel from which flow enters Mimino Reservoir, 3.9 miles northwest of Kealia, and 4.1 miles northwest of Kapaa.

Records available.--December 1936 to June 1964.

Gage.--Water-stage recorder and Parshall flume. Datum of gage is 518 ft above mean sea level (by stadia survey).

Average discharge.--27 years (1937-64), 4.45 mgd (6.89 cfs).

Extremes.--1936-64: Maximum daily discharge, 20.2 mgd (31.3 cfs) Aug. 1, 1961; no flow at times.

Remarks.--Records good except those for period of no gage-height record, which are poor. Ditch diverts from Makaleha Stream for irrigation of sugar cane near Kealia.

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	*7.28	*0.41	5.76	*10.0	*5.55	4.40	8.30	0.8	2.52	0.31	1.50	*1.71
2	7.26	.34	5.60	7.71	6.90	*4.14	*8.00	1.2	4.72	.28	.97	1.76
3	7.17	4.15	5.52	9.70	7.35	3.88	5.27	.8	*6.90	.28	.68	1.71
4	7.08	6.72	*5.57	9.50	6.18	3.95	.60	*.5	7.35	.28	.49	1.66
5	6.90	6.45	6.36	4.29	5.52	4.32	1.50	.02	8.80	.25	.39	2.76
6	6.90	6.72	5.76	.17	5.68	4.32	2.52	.02	7.80	.28	.36	5.36
7	6.72	6.72	5.28	3.92	7.90	4.56	1.5	.02	9.80	.31	.34	6.27
8	6.27	6.81	5.20	7.17	6.45	4.40	1.3	1.65	12.2	.31	1.27	5.60
9	6.81	6.45	5.04	5.76	5.60	6.12	1.5	4.48	9.15	.25	3.02	5.60
10	6.45	6.72	4.80	5.36	7.90	6.90	1.6	8.92	1.87	.22	3.02	5.76
11	6.45	6.72	5.12	5.12	5.92	5.36	1.3	7.53	1.34	.20	2.89	5.36
12	6.72	6.54	6.54	5.44	5.44	5.04	1.3	8.70	.84	.17	2.83	5.28
13	6.27	6.54	6.00	5.04	5.20	5.04	1.2	9.70	.60	.17	2.83	5.20
14	6.36	6.63	5.12	5.04	5.20	6.45	1.0	7.35	.46	4.27	2.76	5.36
15	6.81	6.81	5.28	4.64	4.96	7.35	1.3	3.62	.36	6.54	6.17	6.45
16	6.90	8.64	6.00	4.56	5.20	8.30	1.2	.20	.34	5.92	9.36	9.10
17	6.54	6.34	6.54	5.04	5.52	8.60	1.0	2.94	.22	6.54	7.71	6.36
18	7.35	8.60	5.44	6.18	6.90	6.90	1.0	4.96	.22	5.52	6.18	7.62
19	7.35	7.26	5.12	7.17	5.12	5.52	1.2	5.04	.22	6.90	6.09	7.17
20	7.17	6.54	5.04	6.45	4.72	5.12	1.8	4.56	.28	6.44	7.30	7.08
21	7.17	6.18	4.96	8.50	4.72	4.88	2.0	5.52	.28	1.02	11.3	7.17
22	7.71	5.92	4.80	7.80	4.72	4.96	1.3	5.76	.25	.68	11.8	7.35
23	7.44	6.27	4.80	8.50	4.72	4.96	1.2	10.9	.71	.57	5.44	8.40
24	7.17	7.62	4.80	7.80	4.64	4.64	1.1	9.70	2.33	.49	2.16	8.30
25	6.90	6.90	4.72	8.70	4.64	4.56	1.0	10.6	2.33	.39	2.10	8.80
26	6.72	6.81	4.64	7.71	5.04	4.48	.9	5.32	1.60	.39	2.22	8.40
27	6.99	7.08	4.64	6.54	5.84	4.48	.8	.46	.97	.39	3.35	9.60
28	6.90	6.72	4.21	6.38	4.80	4.25	.8	1.16	.64	.36	2.33	7.19
29	6.81	6.72	4.96	9.20	4.40	4.10	2.0	2.52	.39	5.02	1.99	.42
30	6.63	6.27	7.71	7.44	4.18	3.95	2.8	---	.36	*2.38	1.82	*5.47
31	4.40	5.92	---	6.09	---	6.27	.8	---	*.36	---	1.76	---
Total	211.60	194.52	161.33	202.92	166.91	162.20	59.09	124.95	86.21	57.13	112.43	174.27
Mean												
Mgd	6.83	6.27	5.38	6.55	5.56	5.23	1.91	4.31	2.78	1.90	3.63	5.81
Cfs	10.6	9.70	8.32	10.1	8.60	8.09	2.96	6.67	4.30	2.94	5.62	8.99
Ac-ft	649	597	495	623	512	498	181	383	265	175	345	535

Calendar Year 1963: Max 14.7 Min 0.02 Mean mgd 4.55 Mean cfs 7.04 Ac-ft 5,090
Fiscal Year 1963-64: Max 12.2 Min 0.02 Mean mgd 4.68 Mean cfs 7.24 Ac-ft 5,260

* Discharge measurement made on this day.
Note.--No gage-height record Jan. 7 to Feb. 4.

790. Kapahi ditch near Kealia

Location.--Lat 22°06'09", long 159°22'28", on right bank 500 ft downstream from intake and 4.0 miles west of Kealia.

Records available.--April 1909 to February 1911, May 1911, July 1911 to May 1914, July 1915 to April 1917, June 1917 to June 1964. Published as "at Kapahi, near Kapaa" prior to January 1913 and as "at Kapahi, near Kealia" January to December 1913.

Gage.--Water-stage recorder and Parshall flume. Datum of gage is 377.1 ft above mean sea level (by stadia survey). Prior to Nov. 26, 1936, at site 61 ft upstream at datum 2.52 ft higher.

Average discharge.--46 years (1917-20, 1921-64), 4.61 mgd (7.13 cfs).

Extremes.--1909-64: Maximum daily discharge, 89.2 mgd (138 cfs) Feb. 6, 1913,; no flow at times.

Remarks.--Records good. Ditch diverts from Kapaa Stream for irrigation in vicinity of Kapaa.

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	*8.68	*9.60	3.03	1.92	*2.49	1.83	0.23	0.23	0.23	0.13	0.74	1.66
2	4.16	11.2	2.92	1.68	1.16	1.83	.16	.19	.17	.13	.68	5.27
3	4.88	7.86	*2.82	4.01	.23	*1.83	.35	*2.75	.13	.13	.68	5.40
4	5.92	4.62	2.92	4.33	.19	1.83	.19	6.75	1.54	.23	8.22	5.14
5	5.59	4.04	4.79	1.46	.19	1.83	.19	4.41	2.38	.27	6.42	2.71
6	5.01	4.75	2.71	1.38	.19	2.01	.27	.23	3.82	.19	.23	1.74
7	4.28	4.75	2.49	1.38	.19	1.92	.23	.55	1.69	.19	.19	1.64
8	3.58	5.66	2.38	1.30	.19	1.92	.19	.23	1.12	6.94	.16	2.71
9	4.88	3.58	2.29	1.94	1.42	1.58	.19	.19	.88	6.33	.16	4.04
10	3.70	3.82	2.20	2.60	1.90	.19	.19	.19	.23	1.80	.16	3.82
11	3.58	4.83	2.29	2.49	.19	.16	.19	.16	.16	.19	6.13	3.70
12	4.50	3.47	3.14	2.60	.19	.16	.19	.16	2.20	.16	9.60	3.58
13	3.99	3.93	2.60	2.49	.97	.13	.76	.31	8.29	.16	8.05	3.47
14	4.16	3.70	2.29	2.49	2.49	.13	.23	.31	11.1	3.94	8.05	3.47
15	7.18	4.50	2.29	2.38	2.29	.13	.19	.23	10.9	4.50	5.69	3.93
16	6.47	4.50	2.59	2.29	2.29	.13	.19	.19	9.44	3.93	.23	2.33
17	3.58	2.82	.32	2.49	2.71	.13	.19	.30	3.54	4.28	.23	.16
18	13.7	2.71	2.58	2.60	4.04	.13	.19	.23	.16	4.04	.23	.16
19	12.9	3.65	6.20	2.71	2.29	.13	.19	.26	.16	4.75	2.80	1.26
20	2.29	4.62	4.50	3.79	2.01	.13	.19	.27	.10	3.19	4.88	3.93
21	2.20	4.28	1.43	2.95	2.01	.13	.23	.27	.10	.79	6.75	3.58
22	2.20	3.82	.23	.23	2.01	.13	.19	.34	.13	3.06	4.64	4.16
23	3.25	4.97	1.70	.19	2.01	.87	.19	.27	.54	4.04	.35	4.75
24	4.88	8.86	2.82	1.42	1.92	1.74	.19	.27	.34	5.59	.23	4.75
25	5.66	4.50	2.71	4.62	2.01	1.74	.19	.35	.23	5.10	3.53	5.66
26	4.75	5.40	2.49	3.14	2.01	1.64	.19	.16	.19	.16	5.27	4.75
27	6.22	8.20	2.41	2.71	2.38	1.64	.19	.16	.31	3.62	3.49	5.79
28	6.80	7.90	1.89	2.10	2.01	1.64	.19	.19	.16	7.90	.35	3.90
29	6.33	5.79	2.49	1.70	1.92	1.74	.23	.19	.23	2.98	.27	.16
30	4.39	3.58	3.14	3.82	1.83	1.74	.23	---	.19	*.74	.27	.13
31	7.04	3.36	---	2.82	---	.81	.23	---	.37	---	.23	---
Total	166.75	159.27	78.66	74.03	47.73	31.95	6.95	20.34	61.03	79.46	88.91	97.75
Mean												
Mgd	5.38	5.14	2.62	2.39	1.59	1.03	0.224	0.701	1.97	2.65	2.87	3.26
Cfs	8.32	7.95	4.05	3.70	2.46	1.59	0.347	1.08	3.05	4.10	4.44	5.04
Ac-ft	512	489	241	227	146	98	21	62	187	244	273	300

Calendar Year 1963: Max 13.7 Min 0.10 Mean mgd 2.45 Mean cfs 3.79 Ac-ft 2,740
Fiscal Year 1963-64: Max 13.7 Min 0.10 Mean mgd 2.49 Mean cfs 3.85 Ac-ft 2,800

* Discharge measurement made on this day.

800. Kapaa Stream at Kapahi ditch intake, near Kapaa

Location.--lat 22°06'15", long 159°22'29", on right bank at Kapahi ditch intake, 4 miles northwest of Kapaa, and 4.5 miles northwest of Wailua.

Drainage area.--3.3 sq mi, approximately.

Records available.--July 1936 to June 1964. Prior to July 1959, published as Kapaa River at Kapahi ditch intake, near Kapaa.

Gage.--Water-stage recorder and masonry control. Datum of gage is 381.8 ft above mean sea level (by stadia survey). Prior to July 1, 1962, at datum 0.07 ft higher.

Average discharge.--28 years, 13.2 mgd (20.4 cfs).

Extremes.--Maximum discharge during year, 1,190 mgd (1,840 cfs) Apr. 29 (gage height, 2.99 ft); no flow for many days. 1936-64: Maximum discharge, 4,960 mgd (7,670 cfs) Jan. 25, 1956 (gage height, 5.41 ft, present datum), from rating curve extended above 1,800 mgd by logarithmic plotting; no flow at times.

Remarks.--Records good. Entire low flow is diverted above station for irrigation of sugar cane. Records do not include flow of Kapahi ditch (see preceding page).

Rating table (gage height, in feet, and discharge, in million gallons a day)

0	0	0.7	35.2
.1	.28	.8	49.5
.2	1.41	1.1	105
.3	4.20	1.5	220
.4	8.90	2.0	445
.5	15.6		

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	*11.6	*23.7	0	*11.6	*0	0	29.9	4.67	27.7	19.2	40.9	*7.96
2	11.6	7.02	0	1.60	8.51	0	*7.49	3.20	*8.43	16.5	21.8	4.67
3	3.85	1.05	*0	13.0	4.20	*0	69.6	*2.47	3.50	14.9	18.3	3.50
4	1.22	.45	0	28.6	2.90	0	81.3	0	2.35	14.3	6.85	3.20
5	*.14	0	0	24.5	2.90	0	109	1.93	3.20	20.9	6.50	4.20
6	0	.46	0	13.6	2.90	0	92.0	5.61	.54	30.9	14.3	2.60
7	0	1.22	0	6.55	13.2	0	28.8	5.39	29.1	14.9	20.9	2.90
8	0	2.01	0	3.20	3.50	0	20.0	5.38	167	8.90	14.9	1.57
9	.89	0	0	1.08	1.51	10.6	17.4	1.85	156	6.08	16.5	0
10	0	0	0	0	10.1	5.96	28.3	6.11	58.6	10.9	12.2	0
11	0	.35	.04	0	2.90	2.35	12.9	3.20	30.9	12.9	5.51	0
12	0	0	.03	0	2.60	2.35	13.6	7.32	18.3	14.9	0	0
13	0	0	0	0	1.62	2.10	9.57	6.78	8.90	12.9	0	0
14	0	0	0	0	0	2.10	9.57	2.60	2.60	6.65	0	0
15	0	.31	0	0	0	4.20	12.2	5.66	.90	0	3.02	.05
16	0	79.4	6.16	0	0	12.1	10.9	7.49	4.20	.01	12.3	7.14
17	0	15.6	60.1	0	.59	9.88	9.57	3.72	11.9	.01	7.02	3.50
18	3.95	4.20	23.1	0	.54	2.90	9.57	1.62	13.5	0	5.14	8.43
19	1.69	1.87	.54	0	0	2.35	10.2	1.62	34.2	5.00	2.36	2.81
20	9.57	0	0	.13	0	2.10	29.9	1.62	17.4	72.1	0	0
21	15.6	0	2.27	3.11	0	2.10	45.3	1.62	12.2	38.9	12.1	0
22	46.3	0	2.90	3.85	0	2.35	14.9	1.70	14.9	30.9	21.2	.11
23	14.3	.06	1.09	13.6	0	1.69	13.6	8.70	72.6	26.6	47.8	.27
24	12.9	8.12	0	2.58	0	0	10.9	6.20	49.2	15.6	26.6	.03
25	2.21	0	0	2.06	0	0	10.9	47.5	59.3	10.9	37.8	.84
26	0	0	0	.04	0	0	10.2	13.6	52.6	26.6	50.8	.22
27	13.1	2.38	.61	0	0	0	8.90	9.57	62.1	12.2	85.2	11.2
28	2.20	.79	1.33	5.05	0	0	8.90	10.9	21.8	10.2	22.7	17.1
29	.09	0	0	21.4	0	0	7.51	17.3	14.9	290	14.9	11.6
30	0	0	.02	.18	0	0	6.55	---	18.3	*54.2	12.2	*8.43
31	.55	0	---	0	---	6.68	6.08	---	*59.4	---	10.9	---
Total	151.75	148.99	98.19	155.73	57.96	71.81	755.51	195.32	1,036.52	798.05	550.70	102.33
Mean												
Mgd	4.90	4.81	3.27	5.02	1.93	2.32	24.4	6.74	33.4	26.6	17.8	3.41
Cfs	7.58	7.44	5.06	7.77	2.99	3.59	37.8	10.4	51.7	41.2	27.5	5.31
Ac-ft	466	457	301	478	178	220	2320	599	3180	2450	1690	314

Calendar Year Max 360 Min 0 Mean mgd 12.5 Mean cfs 19.3 Ac-ft 14020
Fiscal Year Max 290 Min 0 Mean mgd 11.3 Mean cfs 17.5 Ac-ft 12650

Peak discharge (base, 1,400 mgd).--No peak above base.

* Discharge measurement or observation of no flow made on this day.

870. Anahola ditch wasteway near Kealia

Location.--Lat 22°08'16", long 159°22'28", on right bank 300 ft downstream from wasteway gates on Anahola ditch, 500 ft north of Kaneha Reservoir, 3.8 miles west of Anahola, and 4.9 miles northwest of Kealia.

Records available.--July 1936 to June 1964.

Gage.--Water-stage recorder and sharp-crested weir. Datum of gage is 825 ft above mean sea level (by stadia survey).

Average discharge.--28 years, 3.28 mgd (5.07 cfs).

Extremes.--1936-64: Maximum daily discharge, 54 mgd (84 cfs) Nov. 12, 1955; no flow at times.

Remarks.--Records good except those for period of no gage-height record, which are fair. Water that passes station flows into Kaupaku Stream and thence into Anahola Stream 2 miles below the Anahola Stream gaging station.

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	3.67	0.26	0.18	0.26	0.26	0.18	0.26	2.00	6.01	10.2	9.96	*4.25
2	6.94	.26	.12	.26	.34	.12	.12	2.00	5.25	6.51	8.04	3.85
3	6.51	.18	.09	.34	.26	.12	2.89	*1.85	*3.96	5.86	6.94	3.65
4	3.65	.18	.18	.34	.26	.12	13.0	1.71	5.65	5.65	5.86	3.32
5	3.85	.18	.26	.12	.26	.06	15.2	1.71	3.82	6.51	5.45	2.99
6	3.16	.18	.26	.12	.34	.12	16.1	1.08	.26	10.8	5.25	2.82
7	2.99	.26	.26	.18	.34	.18	10.2	.52	.34	6.51	7.16	2.82
8	2.66	.26	.34	.18	.26	.18	6.72	.52	11.8	6.51	5.86	1.20
9	1.51	.18	.26	.18	.26	.12	8.22	.43	14.5	3.48	6.08	.62
10	.43	.18	.26	.18	.26	.12	11.0	3.42	11.3	1.20	4.85	.62
11	.43	.18	.34	.18	.18	.06	6.51	2.09	10.5	1.20	4.45	.52
12	.43	.18	.26	.18	.18	.06	6.51	.26	9.48	1.20	4.25	.52
13	.43	.18	.26	.18	.18	.06	4.05	.18	7.58	.96	3.65	.52
14	.34	.26	.26	.18	.18	.12	3.48	.06	5.65	3.26	2.24	.52
15	.43	.18	.26	.18	.12	.12	4.05	.06	5.05	4.25	.72	.52
16	.34	.34	.26	.18	.12	.18	3.48	.12	5.45	3.65	1.63	.34
17	.34	.12	.12	.18	.18	.18	2.66	.12	6.94	3.32	2.99	.26
18	.62	.06	.02	.26	.18	.12	2.75	.12	5.25	3.32	1.86	.34
19	.52	.06	a .06	.26	.12	.12	4.05	.12	10.2	5.20	.52	.26
20	.52	.06	a .06	.18	.12	.12	9.00	.12	9.00	13.3	.52	.26
21	.72	.06	a .06	.18	.12	.12	10.2	.18	5.86	6.94	.52	.34
22	.62	.06	a .06	.12	.12	.12	6.08	.18	7.80	9.72	.52	.34
23	.72	.12	a .06	.18	.18	.12	4.45	.26	18.6	9.96	7.80	.34
24	.62	.18	a .12	.18	.18	.12	3.48	.12	13.8	9.72	9.00	.34
25	.52	.06	a .26	.18	.18	.12	3.65	.26	12.2	6.51	10.2	.34
26	.62	.12	a .18	.12	.18	.12	2.99	4.34	11.3	10.2	11.0	.26
27	.52	.18	a .18	.12	.18	.12	2.82	5.45	12.2	6.94	12.2	.26
28	.34	.18	a .12	.26	.18	.12	2.66	6.94	10.2	7.18	9.48	.26
29	.34	.18	a .18	.26	.18	.12	2.66	4.45	8.28	18.9	7.16	.26
30	.34	.18	a .26	.18	.18	.12	3.85	---	9.24	*10.5	5.65	.26
31	.34	.18	---	.18	---	.18	2.33	---	*11.1	---	4.85	---
Total	45.47	5.24	5.59	6.08	6.08	3.84	175.42	40.67	258.57	199.46	166.66	33.20
Mean												
Mgd	1.47	0.169	0.186	0.196	0.203	0.124	5.66	1.40	8.34	6.65	5.38	1.11
Cfs	2.27	0.261	0.288	0.303	0.314	0.192	8.76	2.17	12.9	10.3	8.32	1.72
Ac-ft	140	16	17	19	19	12	538	125	794	612	511	102

Calendar Year 1963: Max 35.7 Min 0.02 Mean mgd 3.11 Mean cfs 4.81 Ac-ft 3490
Fiscal Year 1963-64: Max 18.9 Min 0.02 Mean mgd 2.59 Mean cfs 4.01 Ac-ft 2900

* Discharge measurement made on this day.
a No gage-height record.

880. Anahola ditch above Kaneha Reservoir, near Kealia

Location.--Lat 22°08'10", long 159°22'28", on left bank at point of discharge into Kaneha Reservoir, 500 ft below wasteway gates, and 5 miles northwest of Kealia.

Records available.--December 1921 to June 1964. Records for May 1915 to December 1921 at site 520 ft upstream not equivalent owing to diversion.

Gage.--Water-stage recorder and Parshall flume. Datum of gage is 821.8 ft above mean sea level (Lihue Plantation bench mark). Dec. 9, 1921 to June 2, 1934, at site 480 ft upstream at different datum.

Average discharge.--40 years (1922-25, 1927-64), 2.98 mgd (4.61 cfs).

Extremes.--1921-64: Maximum daily discharge, 40 mgd (62 cfs) Nov. 12, 1947; no flow at times.

Remarks.--Records good except those for periods of no gage-height record, which are fair. Ditch diverts water from Anahola Stream to Kaneha Reservoir, where it is stored for irrigation. Flow sometimes diverted above station by Anahola ditch wasteway (see preceding page).

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	*8.25	*6.18	1.64	*7.48	*1.64	0.77	10.2	0.02	1.38	0.06	0.12	0.02
2	2.00	5.40	1.58	2.36	3.84	*.77	*6.61	.02	.06	.04	.06	.02
3	1.91	3.00	*1.58	6.49	1.91	.77	8.10	.02	.04	.02	.04	.02
4	1.04	2.56	1.42	7.84	1.64	.77	.12	.02	.04	.02	.04	.02
5	1.04	2.36	1.64	8.40	1.50	.77	.20	.02	1.86	.04	.02	.02
6	.83	2.36	1.42	4.88	2.27	.90	.24	.39	4.63	.09	.02	.02
7	.71	2.36	1.26	3.44	5.98	1.11	.09	.97	8.46	.04	.06	.02
8	.65	4.03	1.18	3.82	2.00	.83	.02	1.11	3.72	.02	.04	1.05
9	1.91	2.18	1.18	2.27	1.64	3.47	.06	.97	.16	1.11	.04	1.82
10	2.45	2.00	1.11	2.00	4.48	3.60	.09	2.18	.09	3.22	.04	1.73
11	2.36	2.56	1.66	1.82	1.64	1.18	.04	1.12	.06	3.91	.02	1.64
12	3.00	2.18	2.78	1.91	1.42	1.11	.06	.06	.04	5.40	.02	1.64
13	2.27	2.67	1.82	1.64	1.34	1.11	.04	.16	.02	3.22	.02	1.58
14	2.18	2.56	1.26	2.27	1.26	2.62	.04	1.90	.01	1.79	.88	1.59
15	6.77	3.22	1.26	1.58	1.18	3.28	.04	3.00	.01	.06	2.67	1.50
16	4.20	10.2	3.57	1.42	1.26	6.40	.04	2.89	.01	.06	1.47	3.53
17	2.27	5.79	12.6	1.64	1.42	8.13	.02	1.82	.04	.04	.04	1.82
18	9.36	3.22	8.38	2.36	2.00	2.56	.05	2.18	.04	.04	.80	3.85
19	9.30	2.78	2.89	2.78	1.18	1.58	.02	1.64	.12	.06	1.73	2.27
20	6.20	2.27	2.18	2.09	.97	1.26	.09	1.42	.06	.29	2.00	2.56
21	8.32	2.09	1.82	7.89	.97	1.11	.12	1.73	.04	.06	7.17	2.56
22	12.9	2.00	1.64	3.11	.97	1.18	.06	1.82	.06	.12	7.74	2.27
23	7.74	1.91	1.50	5.32	.90	1.26	.04	8.09	.75	.12	2.37	4.53
24	6.19	6.70	1.42	3.85	.83	.97	.04	6.28	.16	.12	.09	5.63
25	4.15	2.27	1.42	6.58	.83	.90	.04	8.41	.16	.04	.09	6.85
26	3.67	2.67	1.26	2.89	.97	.90	.02	2.94	.12	.16	.09	3.91
27	5.78	5.01	1.34	2.09	1.11	.83	.02	.06	.12	.06	.16	7.74
28	3.67	4.75	1.73	2.45	.90	.83	.02	.06	.09	.09	.12	5.84
29	4.68	3.22	2.00	7.72	.83	.77	.04	2.24	.04	.44	.06	*3.00
30	3.55	2.00	3.89	2.45	.83	.77	.04	-----	.06	.12	.04	3.22
31	6.83	1.82	-----	1.91	-----	4.88	.02	-----	*.12	-----	.02	-----
Total	136.18	104.32	70.43	114.75	49.71	57.39	26.63	53.54	22.57	20.86	28.08	72.26
Mean												
Mgd	4.39	3.37	2.35	3.70	1.66	1.85	0.859	1.85	0.728	0.695	0.906	2.41
Cfs	6.79	5.21	3.64	5.72	2.57	2.86	1.33	2.86	1.13	1.08	1.40	3.73
Ac-ft	418	320	216	352	153	176	82	164	69	64	86	222

Calendar Year 1963: Max 12.9 Min 0 Mean mgd 2.31 Mean cfs 3.57 Ac-ft 2590
Fiscal Year 1963-64: Max 12.9 Min 0.01 Mean mgd 2.07 Mean cfs 3.20 Ac-ft 2320

* Discharge measurement made on this day.

Note.--No gage-height record Jan. 8, 11-19, Jan. 22 to Feb. 5, Mar. 14-16, 21, Apr. 2-5, 7, 8, 17, 18, 25, May 3-13, 17, May 30 to June 7.

890. Anahola Stream near Kealia

Location.--lat 22°09'05", long 159°21'17", on right bank at intake of Lower Anahola ditch and 4.5 miles northwest of Kealia.

Drainage area.--5.5 sq mi, approximately.

Records available.--August to December 1910, January 1913 to November 1918, January 1919, March 1919 to June 1964. Monthly discharge only for some periods, published in WSP 1319. Published as Anahola River above dam at Kiokala, near Kealia prior to July 1913 and as Anahola River near Kealia July 1913 to June 1958.

Gage.--Water-stage recorder and concrete dam-orifice control. Datum of gage is 295.11 ft above mean sea level (Highway Department bench mark). Prior to May 4, 1934, at site 0.1 mile upstream at different datum.

Average discharge.--50 years (1913-18, 1919-64), 14.1 mgd (21.8 cfs).

Extremes.--Maximum discharge during year, 2,070 mgd (3,200 cfs) Mar. 23 (gage height, 6.17 ft), from rating curve extended above 280 mgd; minimum, 1.27 mgd (1.96 cfs) Dec. 29, 30.
1910,1913-64: Maximum discharge, 12,700 mgd (19,600 cfs) Jan. 25, 1956 (gage height, 14.6 ft, from floodmarks), from rating curve extended above 380 mgd; minimum, that of Dec. 29, 30, 1963.

Remarks.--Records fair except those for period Apr. 20 to May 25 and those above 600 mgd, which are poor. Records include flow in Lower Anahola ditch (see following page). Anahola ditch (see preceding page) diverts 3 miles above station for irrigation in vicinity of Kealia.

Rating table (gage height, in feet, and discharge, in million gallons a day)
(Shifting-control method used Aug. 18-23)

1.2	1.27	1.9	27.0
1.3	2.05	2.2	64.0
1.4	3.28	2.5	120
1.5	5.30	3.0	260
1.6	8.10	3.5	440
1.7	12.7		

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	*30.6	10.9	3.68	*13.5	*2.05	1.66	64.6	3.48	12.5	12.7	30.3	*8.10
2	11.3	7.26	3.48	3.48	2.66	*1.66	11.0	3.48	5.58	*11.3	19.0	7.82
3	12.7	5.10	*3.48	3.89	2.91	1.66	*55.6	*3.29	*4.36	10.4	15.8	7.26
4	8.10	4.69	3.68	57.9	2.30	1.66	33.6	3.28	4.49	12.7	14.0	6.98
5	7.82	4.29	3.68	17.7	1.89	1.66	109	3.28	4.49	10.4	12.7	6.70
6	7.26	4.09	3.28	5.86	1.97	1.82	110	3.16	4.90	24.6	12.2	6.70
7	6.98	3.89	3.03	4.69	10.6	1.82	25.4	3.03	10.4	11.8	13.3	6.42
8	6.70	3.89	2.91	3.89	3.48	1.74	17.1	2.91	181	10.9	11.8	6.14
9	6.70	3.89	2.66	3.48	2.66	7.06	20.2	2.79	187	8.56	11.3	5.86
10	6.42	3.68	2.54	3.03	3.89	6.39	26.7	4.90	59.8	9.94	10.4	5.86
11	6.14	3.68	3.16	2.60	2.79	2.30	10.9	5.86	33.6	10.4	10.4	5.58
12	6.70	3.48	3.48	2.91	2.30	1.89	9.02	19.0	17.1	10.9	9.94	5.58
13	6.14	3.48	3.16	2.42	2.30	1.82	7.54	9.48	13.3	9.02	9.48	5.30
14	5.86	3.28	2.66	2.54	2.17	3.28	6.98	6.98	10.4	11.8	9.48	5.30
15	10.9	3.28	2.54	2.30	2.05	4.09	6.70	3.68	8.56	10.9	9.94	5.30
16	8.10	80.1	4.62	2.17	2.05	7.80	6.42	3.16	7.82	9.02	9.02	6.10
17	5.86	17.7	53.6	2.42	2.79	9.98	5.58	2.91	9.94	8.10	8.56	5.86
18	14.6	7.54	22.2	2.54	2.54	4.09	5.58	3.03	10.4	7.82	8.10	6.42
19	17.7	6.14	4.49	2.66	2.05	2.66	5.86	2.79	32.5	9.48	8.10	5.86
20	8.10	5.58	3.89	2.54	1.89	2.17	18.4	2.54	18.4	78.5	8.10	5.30
21	9.48	5.30	3.28	6.98	1.82	1.89	49.7	2.79	8.10	24.6	15.8	5.30
22	65.0	5.10	2.91	3.28	1.89	2.30	9.89	2.66	20.3	23.0	19.0	4.90
23	11.3	5.10	2.66	5.58	1.82	1.97	6.14	38.6	210	22.2	44.4	7.26
24	9.48	9.78	2.66	3.89	1.74	1.74	5.30	15.0	141	19.0	19.0	7.54
25	5.86	5.30	2.66	8.10	1.74	1.58	5.10	39.3	67.2	12.7	85.6	9.02
26	5.10	5.10	2.42	3.16	1.82	1.58	4.69	158	54.2	24.6	58.0	6.14
27	5.58	5.58	2.54	2.91	1.82	1.58	4.49	6.70	88.0	13.3	86.3	8.56
28	5.10	5.58	2.30	2.79	1.74	1.50	4.49	5.58	27.0	11.8	29.2	7.26
29	6.42	4.90	2.54	5.58	1.66	1.35	4.29	9.41	18.4	279	12.7	4.69
30	4.29	4.29	3.03	2.91	1.66	1.35	4.69	---	15.8	*45.2	10.9	4.69
31	*6.98	4.09	---	2.54	---	1.74	3.89	---	34.7	---	9.02	---
Total	329.27	246.06	163.22	190.24	75.05	85.79	658.85	228.86	1321.24	764.64	631.84	189.80
Mean												
Mgd	10.6	7.94	5.44	6.14	2.50	2.77	21.3	7.89	42.6	25.5	20.4	6.33
Cfs	16.4	12.3	8.42	9.50	3.87	4.29	33.0	12.2	65.9	39.5	31.6	9.79
Ac-ft	1,010	755	501	584	230	263	2,020	702	4,050	2,350	1,940	582

Calendar Year 1963: Max 427 Min 1.35 Mean mgd 15.3 Mean cfs 23.7 Ac-ft 17,100
Fiscal Year 1963-64: Max 279 Min 1.35 Mean mgd 13.3 Mean cfs 20.6 Ac-ft 14,990

* Discharge measurement made on this day.

Peak discharge (base, 900 mgd)

Date	Time	Gage height	Discharge Mgd	Discharge Cfs	Date	Time	Gage height	Discharge Mgd	Discharge Cfs
10-4	2200	5.10	1,250	1,930	3-23	0700	6.17	2,070	3,200
3-9	0130	4.82	1,080	1,670	4-29	0300	4.95	1,160	1,790

910. Lower Anahola ditch near Kealia

Location.--Lat 22°08'13", long 159°19'31", on left bank 100 ft downstream from last wasteway, 1.3 miles southwest of mouth of Anahola Stream, and 2.5 miles northwest of Kealia.

Records available.--December 1936 to June 1964.

Gage.--Water-stage recorder and Parshall flume. Datum of gage is 276.11 ft above mean sea level (Highway Department bench mark).

Average discharge.--27 years (1937-64), 2.17 mgd (3.36 cfs).

Extremes.--1936-64: Maximum daily discharge, 12.0 mgd (18.6 cfs) June 1, 1938; no flow at times each year.

Remarks.--Records good. Ditch diverts from Anahola Stream for irrigation of sugar cane.

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	0.03	*2.22	3.40	*3.33	*2.28	1.20	1.02	0.03	0.06	0	0.03	0.03
2	.03	2.22	3.33	3.54	2.16	*1.25	*.81	.03	.06	0	.03	.03
3	.03	1.92	3.40	3.26	2.34	1.25	.91	.03	.06	0	.03	.03
4	.03	1.86	*3.40	1.91	2.22	1.25	.06	.03	.06	0	.03	.03
5	.03	1.80	3.26	1.20	2.34	1.25	.06	.03	.04	0	.03	.03
6	.03	1.92	3.12	2.48	2.34	1.30	.06	.03	.04	0	.03	.03
7	.01	1.80	3.05	.91	1.85	1.30	.06	.03	.03	0	.03	.03
8	.01	1.92	2.98	2.72	.06	1.30	.04	.03	.04	0	.03	3.37
9	2.10	2.41	2.98	2.60	.04	1.36	.04	.03	.03	0	.01	4.28
10	4.20	3.47	3.12	2.40	.04	1.36	.04	.03	.03	0	.01	3.90
11	4.05	3.47	3.05	2.40	.04	1.36	.04	.03	.03	0	.01	3.82
12	4.12	3.54	3.26	2.98	.04	1.47	.04	.74	.03	0	.01	3.82
13	4.05	3.61	3.47	2.92	.04	1.47	.04	2.10	.01	0	.01	3.68
14	3.82	3.54	3.05	2.92	1.63	1.69	.04	.67	.01	0	0	3.47
15	3.33	3.54	2.98	2.86	2.28	1.92	.04	.04	.01	0	0	3.54
16	2.53	4.35	3.19	2.72	2.28	2.04	.04	.04	.01	0	0	3.82
17	2.34	4.82	4.05	2.92	2.34	2.53	.04	1.24	.01	0	0	4.12
18	2.40	4.42	3.90	3.05	2.40	2.22	.04	3.05	0	0	0	4.20
19	2.40	4.20	3.61	2.79	2.10	1.92	.03	2.98	0	0	0	4.20
20	2.28	4.12	3.54	2.72	1.86	1.74	1.29	3.40	0	.01	0	3.61
21	2.16	3.98	3.40	1.92	1.69	1.64	.50	3.54	0	.01	1.85	3.75
22	3.24	3.90	3.12	.83	1.69	1.58	.03	2.92	0	.01	3.40	3.82
23	2.66	3.90	3.05	2.86	1.64	1.52	.03	3.81	.02	.01	1.08	2.56
24	2.40	4.20	3.05	2.72	1.58	1.47	.03	4.12	0	.04	.04	.06
25	2.22	4.05	2.86	3.05	1.52	1.42	.03	4.12	0	.03	.04	.06
26	2.16	3.90	2.79	2.72	1.47	1.36	.03	1.34	0	.03	.06	.06
27	2.16	3.90	2.72	2.46	1.42	1.36	.03	.07	0	.01	.04	.04
28	.60	4.05	2.72	2.40	1.30	1.30	.03	.06	0	.01	.03	.04
29	.83	3.75	2.66	2.92	1.25	1.30	.03	.06	0	.03	.03	.04
30	2.04	3.75	2.72	2.53	1.20	1.25	.03	---	0	.03	.03	1.41
31	2.04	3.54	---	2.53	---	1.25	.03	---	*0	---	.03	---
Total	60.33	104.07	95.23	79.57	45.44	46.63	5.54	34.63	0.58	0.22	6.92	61.88
Mean												
Mgd	1.95	3.36	3.17	2.57	1.51	1.50	0.179	1.19	0.019	0.007	0.223	2.06
Cfs	3.02	5.20	4.90	3.98	2.34	2.32	0.277	1.84	0.029	0.011	0.345	3.19
Ac-ft	185	319	292	244	139	143	17	106	1.8	0.7	21	190

Calendar Year 1963: Max 5.14 Min 0 Mean mgd 1.53 Mean cfs 2.37 Ac-ft 1.720
Fiscal Year 1963-64: Max 4.82 Min 0 Mean mgd 1.48 Mean cfs 2.29 Ac-ft 1.660

* Discharge measurement or observation of no flow made on this day.

942. Ka Loko ditch near Kilauea

Location.--lat 22°10'43", long 159°22'59", on left bank 35 ft downstream from Moloaa ditch, 400 ft upstream from Ka Loko Reservoir, and 3.5 miles southeast of Kilauea.

Records available.--August 1932 to June 1964.

Gage.--Water-stage recorder and Parshall flume. Datum of gage is 754 ft above mean sea level (by stadia survey).

Average discharge.--31 years (1933-64), 3.39 mgd (5.25 cfs).

Extremes.--1932-64: Maximum daily discharge, 63 mgd (98 cfs) Dec. 10, 1935; minimum daily, 0.11 mgd (0.17 cfs) Nov. 3, 4, 1959, Mar. 9, 1960.

Remarks.--Records good except those for periods of no gage-height record, which are fair. Ditch diverts from Moloaa and Puu Ka Ele Streams at points 0.5 mile southeast and 1.5 miles southwest of station, respectively, for irrigation in vicinity of Kilauea.

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	4.76	7.13	2.14	4.41	1.60	1.1	17.4	1.96	3.89	5.89	6.43	4.37
2	2.05	4.87	2.14	2.05	1.96	1.0	5.79	1.86	2.81	5.24	4.49	4.13
3	2.32	3.44	2.14	2.14	1.68	1.0	6.87	1.77	2.32	3.12	3.89	4.01
4	1.45	3.23	2.14	2.99	1.52	.9	6.06	1.68	2.23	.58	4.73	3.65
5	3.29	3.02	2.23	7.54	1.45	.9	21.4	1.68	2.32	.47	5.11	3.44
6	3.65	2.92	2.05	3.12	1.60	1.1	18.6	1.60	2.60	4.49	4.61	3.23
7	3.54	*2.81	1.96	2.14	6.16	1.0	6.15	1.60	7.0	4.25	5.50	3.12
8	3.34	2.81	1.86	2.14	2.0	.9	4.13	1.68	30	4.25	4.61	3.02
9	3.54	2.60	1.77	1.77	1.5	.9	5.39	1.60	25	3.65	4.61	2.92
10	3.23	2.51	1.68	1.68	2.0	3.0	5.80	2.70	9.5	4.01	4.01	2.81
11	3.54	2.42	1.77	1.60	1.5	1.2	3.44	2.51	*10.9	3.77	3.54	2.70
12	3.65	2.42	1.86	1.68	1.4	1.0	3.34	4.0	6.85	4.49	3.44	2.60
13	3.23	2.51	1.77	1.60	1.3	.9	2.60	2.51	5.76	3.44	3.12	2.60
14	3.12	2.42	1.60	1.60	*1.4	1.1	2.42	2.32	5.11	3.65	3.02	2.51
15	4.98	2.60	1.60	1.52	1.2	1.2	2.42	2.05	4.61	3.65	2.92	2.42
16	3.77	19.6	2.27	1.52	1.1	3.0	2.32	1.77	4.37	3.23	2.81	2.60
17	3.02	6.96	8.91	1.68	1.4	*4.0	2.14	1.60	4.61	*2.92	2.70	2.32
18	8.42	3.77	5.56	1.68	1.3	1.77	2.14	1.60	7.73	2.70	2.60	2.70
19	6.85	3.44	2.32	1.68	1.2	1.37	2.60	1.52	9.48	3.12	2.51	2.32
20	5.37	3.02	*2.05	1.60	1.2	1.21	6.01	1.45	7.40	11.2	2.51	2.32
21	6.80	3.02	1.96	5.07	1.2	1.13	15.5	1.96	4.49	8.47	5.99	2.23
22	13.4	2.81	1.77	2.23	1.2	1.60	4.13	1.52	6.56	8.56	*8.63	2.23
23	6.15	2.60	1.68	3.57	1.1	1.37	3.12	4.13	17.2	5.89	10.4	2.60
24	6.02	3.65	1.68	2.51	1.1	1.06	2.60	4.01	9.48	4.73	7.27	2.81
25	4.37	2.60	1.77	5.22	1.0	.98	2.70	3.44	8.56	4.01	15.8	3.12
26	3.89	2.92	1.68	2.32	1.1	1.06	2.42	3.89	4.84	4.85	12.5	*2.60
27	4.49	3.23	1.68	1.77	1.2	1.21	2.32	2.81	.47	4.49	9.70	4.13
28	3.89	3.54	1.60	1.86	1.1	.98	*2.23	2.42	.36	4.01	6.15	3.44
29	4.49	2.92	1.52	3.77	1.1	.98	2.23	4.13	.32	10.7	5.89	2.23
30	3.34	2.32	2.05	1.96	1.1	.98	2.42	---	5.84	4.35	5.37	2.32
31	4.01	2.23	---	1.68	---	1.52	2.05	---	8.28	---	4.73	---
Total	137.97	116.34	67.21	78.10	45.67	41.42	168.74	67.77	220.89	138.18	169.59	87.50
Mean												
Mgd	4.45	3.75	2.24	2.52	1.52	1.34	5.44	2.34	7.13	4.61	5.47	2.92
Cfs	6.89	5.80	3.47	3.90	2.35	2.07	8.42	3.62	11.0	7.13	8.46	4.52
Ac-ft	423	357	206	240	140	127	518	208	678	424	520	269

Calendar Year 1963: Max 42.8 Min 0.27 Mean mgd 3.61 Mean cfs 5.59 Ac-ft 4040
Fiscal Year 1963-64: Max 30 Min 0.32 Mean mgd 3.66 Mean cfs 5.66 Ac-ft 4110

* Discharge measurement made on this day.
Note.--No gage-height record Nov. 8 to Dec. 17, Feb. 12, Mar. 7-10.

950. Puu Ka Ele ditch near Kilauea

Location.--Lat 22°11'10", long 159°24'17", on left bank 200 ft upstream from Puu Ka Ele Reservoir and 2 miles south of Kilauea.

Records available.--August 1932 to June 1964.

Gage.--Water-stage recorder and Parshall flume. Datum of gage is 426 ft above mean sea level (by stadia survey).

Average discharge.--31 years (1933-64), 2.52 mgd (3.90 cfs).

Extremes.--1932-64: Maximum daily discharge, 21 mgd (32 cfs) Sept. 2, 1943; no flow at times each year.

Remarks.--Records good except those for periods of no gage-height record, which are fair. Ditch diverts from Puu Ka Ele Stream 0.8 mile south of station for irrigation of sugar cane in vicinity of Kilauea.

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	7.23	5.01	2.29	2.58	1.66	1.20	7.32	1.75	2.48	a0	0.30	2.69
2	3.94	3.73	2.29	2.20	1.75	1.12	7.38	1.66	1.20	1.72	.22	3.94
3	1.65	2.68	2.48	2.20	1.66	1.20	4.93	1.57	1.84	2.58	.22	3.94
4	.12	2.58	2.29	2.20	1.57	1.20	4.28	1.48	1.66	3.11	3.92	3.72
5	1.30	2.38	2.38	7.50	1.48	1.20	11.9	1.48	.26	2.68	4.88	3.49
6	3.18	2.29	2.20	3.28	1.75	1.27	9.19	1.48	a.1	.95	4.39	3.28
7	2.88	*2.29	2.11	2.29	4.95	1.27	3.26	1.48	a0	.12	4.75	3.18
8	2.78	2.38	2.02	2.11	2.02	1.20	4.16	1.41	3.51	.12	4.75	3.08
9	2.88	2.20	2.02	1.84	1.75	1.34	3.72	1.27	2.34	.12	4.50	2.88
10	2.48	2.11	1.93	1.84	2.48	1.84	4.88	1.84	a0	2.82	3.94	2.78
11	3.08	2.11	2.02	1.75	1.66	1.27	3.28	1.66	*a0	4.05	3.60	2.68
12	3.28	2.02	2.02	1.84	1.57	1.20	3.18	3.32	a0	4.28	3.49	2.58
13	2.58	2.02	1.93	1.75	1.66	1.20	2.68	2.48	3.58	3.72	3.18	2.58
14	2.78	2.11	1.93	1.66	*1.57	1.41	2.58	1.93	4.75	4.05	3.18	2.48
15	3.49	2.29	2.02	1.57	1.57	1.34	2.38	1.84	4.16	4.05	3.08	2.48
16	2.88	8.02	2.38	1.57	1.48	1.93	2.29	1.48	1.43	3.72	2.88	2.58
17	2.38	.22	8.49	1.57	1.75	*2.38	2.11	1.34	a0	3.38	2.78	2.38
18	6.61	.15	5.62	1.84	1.57	1.34	2.20	1.27	a0	3.28	2.68	2.58
19	4.75	1.90	2.58	1.66	1.48	1.12	2.38	1.20	a0	3.38	2.58	2.38
20	3.94	2.88	*2.29	1.66	1.34	1.05	1.81	1.12	a0	*5.25	2.78	2.38
21	6.84	2.88	2.11	3.62	1.34	1.05	.45	1.48	a0	4.81	6.30	2.48
22	9.55	2.78	1.93	2.20	1.34	1.41	a.1	1.20	.08	5.12	*8.64	2.20
23	.12	2.68	1.93	2.58	1.34	1.27	a.1	7.36	.46	3.28	4.64	2.29
24	1.78	3.49	1.93	2.11	1.34	1.05	a0	3.66	a.1	1.59	.30	2.58
25	2.02	2.78	1.93	3.63	1.27	1.05	a0	2.78	1.43	.18	2.26	2.68
26	1.84	2.78	1.93	2.20	1.27	.98	a0	3.08	a0	.18	1.27	*2.58
27	2.11	3.08	1.93	1.84	1.41	1.05	a0	2.29	a0	.18	2.39	3.60
28	1.93	4.39	1.84	1.84	1.34	1.05	*a0	2.02	a0	.18	.99	2.98
29	1.93	3.08	1.75	3.49	1.27	1.05	1.58	3.34	a0	3.70	.18	2.38
30	2.78	2.58	1.93	2.02	1.20	.98	2.20	---	a0	.34	.18	2.29
31	3.08	2.48	---	1.66	---	1.27	1.84	---	a0	---	.18	---
Total	98.19	84.37	72.50	72.10	49.84	39.29	92.18	60.27	29.38	72.94	89.43	84.14
Mean												
Mgd	3.17	2.72	2.42	2.33	1.66	1.27	2.97	2.08	0.948	2.43	2.88	2.80
Cfs	4.90	4.21	3.74	3.61	2.57	1.96	4.60	3.22	1.47	3.76	4.46	4.33
Ac-ft	301	259	222	221	153	121	283	185	90	224	274	258

Calendar Year 1963: Max 15.1 Min 0 Mean mgd 1.95 Mean cfs 3.02 Ac-ft 2190
Fiscal Year 1963-64: Max 11.9 Min 0 Mean mgd 2.31 Mean cfs 3.57 Ac-ft 2590

* Discharge measurement or observation of no flow made on this day.
a No gage-height record.

952. Ross ditch near Kilauea

Location.--Lat 22°11'22", long 159°24'33", on left bank 1,000 ft downstream from intake and 1.7 miles south of Kilauea.

Records available.--October 1956 to June 1964.

Gage.--Water-stage recorder (digital since Mar. 17) and Parshall flume. Datum of gage is 341 ft above mean sea level (by stadia survey). Prior to July 1, 1962, at datum 0.03 ft higher.

Average discharge.--7 years (1957-64), 2.35 mgd (3.64 cfs).

Extremes.--1956-64: Maximum daily discharge, 11.0 mgd (17.0 cfs) Apr. 15, 1963; no flow at times.

Remarks.--Records good. Ditch diverts from Puu Ka Ele Stream for irrigation in vicinity of Kilauea.

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	7.71	3.14	1.44	1.30	1.20	0.98	2.89	1.64	3.56	4.06	5.90	3.99
2	4.91	2.44	1.39	1.25	1.25	.90	1.41	1.64	3.85	2.56	5.56	2.44
3	5.50	2.19	1.39	1.39	1.25	.86	1.02	1.58	2.50	1.75	5.31	2.25
4	2.75	2.13	1.39	2.36	1.20	.94	.70	1.48	3.15	2.68	3.49	2.02
5	1.97	2.07	1.44	4.79	1.15	.98	3.40	1.48	4.21	2.31	2.68	1.85
6	.63	2.02	1.34	2.07	1.39	1.02	7.54	1.48	4.67	4.59	2.25	1.75
7	1.44	*2.13	1.30	1.44	3.27	.98	2.56	1.53	6.69	2.81	2.95	1.64
8	2.38	2.19	1.25	1.34	1.58	.94	.63	1.48	10.9	2.50	2.68	1.53
9	2.50	1.91	1.20	1.20	1.25	.94	.59	1.44	10.1	2.13	2.44	1.48
10	2.38	1.80	1.15	1.15	1.44	1.02	.82	1.91	7.65	2.68	2.07	1.44
11	3.15	1.80	1.20	1.15	1.20	.94	.59	1.85	*7.08	2.68	1.91	1.34
12	3.49	1.75	1.20	1.20	1.15	.94	.49	2.89	4.67	3.22	1.91	1.34
13	2.44	1.80	1.15	1.15	1.15	.94	.29	2.95	1.96	2.50	1.75	1.34
14	2.38	1.80	1.06	1.11	*1.15	1.11	.23	2.38	.74	2.13	1.80	1.34
15	2.95	1.91	1.15	1.11	1.11	1.06	.21	2.13	.59	1.91	1.64	1.25
16	2.38	7.32	1.34	1.11	1.15	1.58	.21	1.85	3.87	1.75	1.53	1.39
17	2.19	8.43	5.57	1.11	1.25	1.20	.21	1.64	6.08	1.58	1.48	1.25
18	5.51	6.34	3.96	1.15	1.20	.08	.21	1.58	6.98	1.53	1.44	1.44
19	4.38	3.80	1.64	1.06	1.11	.05	.29	1.48	5.23	1.58	1.39	1.30
20	3.08	1.96	*1.34	1.06	1.02	.04	1.35	1.44	3.78	*4.59	1.44	1.34
21	5.79	1.85	1.25	2.02	1.02	.03	7.54	1.64	2.75	4.67	3.49	1.48
22	10.5	1.75	1.20	1.30	1.02	.12	2.56	1.58	6.26	5.99	*3.56	1.25
23	8.84	1.69	1.20	1.30	.98	.07	1.80	5.35	9.77	5.23	4.67	1.34
24	7.45	2.31	1.15	1.34	.98	.05	2.51	2.95	8.14	4.74	5.73	1.64
25	5.56	1.75	1.15	2.02	.98	.04	4.82	2.88	7.45	5.23	7.45	1.96
26	5.07	1.75	1.11	1.44	.98	.04	4.21	2.95	7.84	5.56	7.08	*2.07
27	5.73	2.25	1.11	1.20	1.02	.04	3.85	2.25	7.45	5.48	7.45	3.42
28	5.07	2.68	1.11	1.44	1.02	.03	*3.78	2.13	5.73	5.31	6.98	2.13
29	4.90	2.19	1.06	2.38	1.02	.02	2.51	2.95	4.82	9.88	6.43	1.58
30	3.08	1.69	1.06	1.44	.98	.02	2.13	---	5.15	6.43	6.26	1.53
31	2.50	1.53	---	1.30	---	.03	1.80	---	5.73	---	6.17	---
Total	128.61	80.37	44.30	46.68	36.47	17.99	63.15	60.53	169.35	110.06	116.89	52.12
Mean												
Mgd	4.15	2.59	1.48	1.51	1.22	0.580	2.04	2.09	5.46	3.67	3.77	1.74
Cfs	6.42	4.01	2.29	2.34	1.89	0.897	3.16	3.23	8.45	5.68	5.83	2.69
Ac-ft	395	247	136	143	112	55	194	186	520	338	359	160

Calendar Year 1963: Max 11.0 Min 0 Mean mgd 2.29 Mean cfs 3.54 Ac-ft 2560
Fiscal Year 1963-64: Max 10.9 Min 0.02 Mean mgd 2.53 Mean cfs 3.91 Ac-ft 2850

* Discharge measurement made on this day.

959. Kalihiwai ditch above wasteway, near Kilauea

Location.--Lat 22°10'42", long 159°25'43", on left bank 1,800 ft upstream from wasteway gate, 0.7 mile upstream from Kalihiwai Reservoir, and 2.5 miles southwest of Kilauea.

Records available.--April 1960 to June 1964.

Gage.--Water-stage recorder and Parshall flume. Datum of gage is 413.4 ft above mean sea level (by stadia survey).

Extremes.--1960-64: Maximum daily discharge, 32.0 mgd (49.5 cfs) Mar. 8, 1964; minimum daily, 0.87 mgd (1.35 cfs) Feb. 7, 1961.

Remarks.--Records good. Ditch diverts from Pohakuhonu Stream for domestic use and irrigation of sugar cane in vicinity of Kilauea.

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	9.77	3.05	1.81	3.89	1.99	1.39	13.8	1.81	4.85	7.75	6.45	3.36
2	7.39	2.95	1.81	2.54	2.35	1.32	8.32	1.72	3.36	5.67	4.39	3.15
3	8.35	2.64	1.81	3.69	1.99	1.32	7.99	1.72	2.85	3.69	3.69	2.95
4	4.62	2.54	1.81	9.46	1.81	1.32	6.17	1.72	2.64	3.26	3.26	2.75
5	4.04	2.44	1.81	8.82	1.81	1.39	17.5	1.63	3.05	3.05	3.15	2.64
6	3.46	2.35	1.72	4.27	1.99	1.47	25.9	1.63	2.95	4.50	2.95	2.44
7	3.26	2.35	1.63	3.26	6.70	1.32	8.19	1.63	9.77	3.58	3.58	2.44
8	3.05	2.35	1.81	2.95	2.64	1.25	4.75	1.63	32.0	3.26	3.15	2.35
9	*3.15	2.26	1.99	2.54	2.35	1.25	3.26	1.54	25.4	3.05	3.05	2.26
10	2.85	2.17	1.90	2.35	2.44	1.47	4.27	2.17	*14.0	3.26	2.75	2.17
11	3.26	2.08	1.99	2.17	2.08	1.25	2.95	1.99	10.5	3.69	2.64	2.17
12	3.46	2.08	2.08	2.17	1.90	1.18	2.95	4.36	7.02	4.16	2.54	2.08
13	2.75	2.08	2.08	1.99	1.81	1.18	2.54	5.94	5.64	3.36	2.35	2.08
14	2.75	1.99	1.90	1.99	1.81	1.54	2.26	4.04	4.75	3.15	2.17	1.99
15	4.37	1.99	1.99	1.90	*1.72	1.47	2.17	3.15	4.16	2.85	2.09	1.99
16	3.26	5.42	2.75	1.81	1.99	2.84	2.17	2.85	3.92	2.64	2.08	2.08
17	2.75	2.54	12.2	1.81	1.72	3.36	1.99	2.17	4.39	*2.54	1.99	1.99
18	9.04	2.17	7.98	1.99	1.72	1.72	1.99	1.90	5.61	2.44	1.99	2.08
19	6.45	2.08	3.58	1.90	1.63	1.47	2.17	1.99	8.37	2.64	1.90	1.90
20	4.87	1.99	2.85	1.90	1.54	*1.32	3.79	2.17	4.75	4.26	2.08	1.81
21	12.0	1.90	2.44	3.83	1.54	1.32	9.86	2.95	4.16	3.15	*9.17	1.90
22	13.3	1.81	2.26	2.35	1.47	1.47	3.26	2.35	11.6	4.62	8.82	1.90
23	5.64	1.90	2.17	2.54	1.47	1.32	2.64	12.2	22.9	3.81	9.27	2.17
24	5.39	3.15	*1.99	2.64	1.54	1.25	2.35	4.35	8.34	3.46	8.93	2.75
25	4.16	2.17	1.99	4.97	1.47	1.25	2.26	6.87	9.89	3.15	18.7	2.95
26	3.69	*2.35	1.90	2.64	1.54	1.25	2.17	4.88	2.08	5.10	10.8	2.75
27	5.97	2.75	1.90	2.17	1.54	1.25	1.99	3.15	17.3	3.58	15.1	5.53
28	4.04	2.75	1.99	2.35	1.47	1.18	1.99	2.85	7.75	4.17	7.02	4.27
29	3.81	2.44	1.81	4.04	1.39	1.18	*1.90	4.32	6.17	23.2	5.00	*2.85
30	3.15	2.08	2.26	2.35	1.39	1.10	1.99	---	6.60	7.45	4.27	2.85
31	3.05	1.90	---	2.08	---	1.25	1.90	---	13.4	---	3.69	---
Total	157.10	74.72	78.21	95.36	58.81	44.65	157.44	91.63	288.89	134.49	159.01	76.60
Mean												
Mgd	5.07	2.41	2.61	3.08	1.96	1.44	5.08	3.16	9.32	4.48	5.13	2.55
Cfs	7.84	3.73	4.04	4.77	3.03	2.23	7.86	4.89	14.4	6.93	7.94	3.95
Ac-ft	482	229	240	293	180	137	483	281	887	413	488	235

Calendar Year 1963: Max 23.7 Min 1.10 Mean mgd 3.71 Mean cfs 5.74 Ac-ft 4,150
Fiscal Year 1963-64: Max 32.0 Min 1.10 Mean mgd 3.87 Mean cfs 5.99 Ac-ft 4,350

* Discharge measurement made on this day.

960. Kalihiwai ditch near Kilauea

Location.--Lat 22°11'07", long 159°25'58", on right bank 0.1 mile upstream from Kalihiwai Reservoir and 2.4 miles southwest of Kilauea.

Records available.--June 1934 to June 1964.

Gage.--Water-stage recorder and Parshall flume. Datum of gage is 409.2 ft above mean sea level (by stadia survey).

Average discharge.--30 years, 2.30 mgd (3.56 cfs).

Extremes.--1934-64: Maximum daily discharge, 29.5 mgd (45.6 cfs) July 16, 1937; no flow at times.

Remarks.--Records good except those for periods of no gage-height record, which are poor. Ditch diverts low flow of most branches of Pohakuhonu Stream at intakes about 1 mile south of station. Water discharges into Kalihiwai Reservoir, where it is stored for irrigation of sugar cane in vicinity of Kilauea.

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	0.07	0.38	1.08	3.92	1.0	1.02	13	.05	0.24	0.29	0.24	0.4
2	.07	.38	.16	2.54	1.0	.95	6.5	.07	.24	.24	.20	.4
3	.10	.33	.55	3.81	.9	.95	2.0	.05	.20	.24	.20	.4
4	.07	.33	1.30	8.5	.8	.87	1.5	.05	.2	.24	.16	.3
5	.07	.29	1.30	7.0	.8	.87	4.0	.04	.2	.20	.13	.3
6	.07	.24	1.23	4.0	.9	1.16	2.0	.04	.2	.24	1.06	.3
7	.07	.24	1.16	2.5	1.7	1.16	.2	.04	.4	.24	3.52	.3
8	.07	.24	1.30	1.8	1.2	1.09	.1	.04	.5	.20	2.84	.2
9	.10	.24	1.38	1.6	1.1	1.02	.1	.04	.4	.24	2.64	.2
10	.13	.20	1.38	1.5	1.1	1.23	.2	.56	*.3	.24	1.53	.2
11	.13	.20	1.46	1.3	.8	1.02	.14	1.23	.24	.29	.16	.2
12	.13	.20	1.54	1.1	.9	.95	.14	3.20	.24	.29	.16	.8
13	.13	.53	1.38	.9	1.3	.87	.10	5.03	1.98	.24	.13	1.5
14	.13	1.87	1.30	.8	1.2	1.23	.08	2.95	2.74	.24	.10	1.5
15	.13	2.05	1.30	.8	*1.16	1.09	.08	2.14	2.54	.24	.10	1.5
16	.13	4.16	2.14	.8	1.30	2.53	.07	1.78	2.34	.13	.10	1.5
17	.13	.61	11.8	1.2	1.23	2.82	.07	.94	1.60	.01	.07	1.5
18	.24	.5	7.81	1.5	1.16	1.38	.08	.02	.44	0	.07	1.5
19	.29	.5	3.15	1.5	1.16	1.09	.08	.57	.49	0	.05	1.5
20	.29	.5	2.54	1.5	1.09	*.95	.12	1.09	.38	.12	.05	1.5
21	.38	1.0	2.05	2.5	1.02	.80	.14	1.96	.24	.04	*.29	1.5
22	.55	1.6	1.96	1.5	.95	1.02	.10	1.38	.44	.07	.33	1.5
23	.44	1.6	1.87	1.5	.87	.87	.08	7.85	.95	.03	.29	1.5
24	.44	3.0	*1.78	1.0	.87	1.0	.07	.20	.44	0	.38	1.6
25	.44	1.8	1.87	3.0	.87	.9	.07	.29	.44	0	.49	1.9
26	.44	*2.05	1.78	1.0	.95	.9	.07	.24	.55	.04	.49	1.8
27	.49	2.44	1.70	.9	1.09	.9	.05	.16	.49	.02	.61	4.0
28	.49	2.44	1.70	1.0	1.09	.8	.05	.16	.38	0	.55	3.0
29	.44	2.14	1.62	2.5	1.02	.8	.04	.24	.24	.33	.55	*2.34
30	.44	1.78	2.24	1.6	.95	.8	.07	----------	.24	.29	.5	2.64
31	.44	1.62	----------	1.0	----------	.9	.07	----------	.33	----------	.5	----------
Total	7.54	35.46	63.83	66.07	31.48	33.94	31.37	32.41	20.61	4.75	18.49	37.78
Mean												
Mgd	0.243	1.14	2.13	2.13	1.05	1.09	1.01	1.12	0.665	0.158	0.596	1.26
Cfs	0.376	1.76	3.30	3.30	1.62	1.69	1.56	1.73	1.03	0.244	0.922	1.95
Ac-ft	23	109	196	203	97	104	96	99	63	15	57	116

Calendar Year 1963: Max 13.7 Min 0 Mean mgd 0.926 Mean cfs 1.43 Ac-ft 1040
Fiscal Year 1963-64: Max 13 Min 0 Mean mgd 1.05 Mean cfs 1.62 Ac-ft 1170

* Discharge measurement made on this day.
Note.--No gage-height record Aug. 18-25, Oct. 4 to Nov. 14, Dec. 24 to Jan. 28, Mar. 4-10, May 29 to June 28.

970. Pohakuhonu Stream near Kilauea

Location.--Lat 22°10'52", long 159°25'40", on left bank 0.8 mile upstream from confluence with Halaulani Stream, 1.2 miles upstream from Stone Dam, and 2.5 miles southwest of Kailuaea.

Drainage area.--1.8 sq mi, approximately.

Records available.--October 1957 to June 1964.

Gage.--Water-stage recorder. Datum of gage is 401.7 ft above mean sea level (by stadia survey).

Average discharge.--6 years (1958-64), 5.02 mgd (7.77 cfs).

Extremes.--Maximum discharge during year, 806 mgd (1,250 cfs) May 25 (gage height, 4.76 ft); minimum, 0.95 mgd (1.47 cfs) on many days in December.

1957-64: Maximum discharge, 1,750 mgd (2,710 cfs) Aug. 6, 1959 (gage height, 7.23 ft, from floodmark in well), from rating curve extended above 420 mgd on basis of slope-area measurement at gage height, 11.0 ft; minimum, 0.80 mgd (1.24 cfs) June 27, 28, 1959.

Maximum stage known, 11.0 ft Jan. 24, 1956, from floodmark (discharge, 3,620 mgd, 5,600 cfs, from slope-area measurement of peak flow).

Remarks.--Records good. Kalihiwai ditch (see p. 42) diverts about 0.5 mile above station for domestic supply and irrigation of sugar cane. Continuous records of rainfall are obtained at station.

Rating table (gage height, in feet, and discharge, in million gallons a day)

0.3	0.88	0.8	11.5
.4	1.80	1.1	26.2
.5	3.20	1.5	57.5
.6	5.30	2.0	117

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	14.9	3.41	1.69	2.22	1.28	0.95	28.3	1.69	4.67	4.25	7.33	3.41
2	9.14	3.06	1.58	1.80	1.38	.95	4.31	1.58	3.20	3.62	4.67	3.06
3	9.73	2.78	1.58	2.08	1.28	.95	5.54	1.58	2.50	4.46	3.83	2.92
4	4.88	2.64	1.58	22.6	1.19	.95	3.41	1.48	2.36	4.46	3.20	2.64
5	4.25	2.50	1.69	10.1	1.19	.95	23.4	1.48	2.78	3.62	3.06	2.50
6	3.62	2.22	1.58	2.78	1.38	1.02	44.8	1.48	2.50	6.93	2.92	2.22
7	3.20	2.36	1.48	2.08	5.76	.95	4.25	1.48	9.08	3.41	3.62	2.22
8	3.06	2.36	1.38	1.94	1.69	.95	3.20	1.48	108	3.06	3.41	2.08
9	*3.20	2.08	1.11	1.69	1.38	.95	3.83	1.38	84.3	2.78	3.20	1.94
10	2.92	1.94	1.11	1.58	1.58	.95	5.09	2.08	*16.2	2.92	2.78	1.80
11	3.62	1.94	1.11	1.48	1.28	.95	3.41	1.69	11.5	3.41	2.64	1.69
12	3.83	1.94	1.11	1.38	1.19	.95	3.41	4.09	6.75	4.04	2.50	1.58
13	2.92	1.94	1.02	1.28	1.19	.95	2.64	4.54	5.09	3.06	2.36	1.58
14	3.06	1.80	1.02	1.28	1.19	1.02	2.50	2.36	4.25	2.92	2.22	1.58
15	4.88	1.80	1.02	1.19	*1.19	.95	2.36	1.94	3.41	2.50	2.08	1.58
16	3.83	10.6	1.28	1.19	1.28	1.48	2.22	1.69	3.20	2.36	1.94	1.69
17	3.06	2.92	16.8	1.19	1.19	1.69	2.08	1.48	3.83	*2.08	1.94	1.48
18	13.5	2.08	8.04	1.28	1.19	1.02	1.94	1.58	5.60	2.08	1.80	1.69
19	7.33	1.80	2.50	1.19	1.19	.95	2.22	1.28	8.86	2.36	1.80	1.48
20	5.59	1.69	2.08	1.11	1.11	*95	4.46	1.02	4.67	3.62	2.08	1.48
21	20.6	1.58	1.80	2.36	1.11	.95	16.5	1.38	3.83	2.78	*11.6	1.58
22	30.3	1.58	1.69	1.38	1.11	1.11	4.25	1.11	19.2	4.88	11.3	1.69
23	6.75	1.58	1.58	1.48	1.11	1.02	3.06	16.6	74.4	3.62	13.3	1.94
24	7.04	3.06	*1.58	1.38	1.11	1.02	2.50	4.25	8.20	3.06	12.2	2.50
25	4.88	1.94	1.58	3.26	1.11	.95	2.50	7.18	10.8	2.64	74.6	2.92
26	4.25	*2.22	1.48	1.58	1.11	.95	2.22	4.88	35.8	4.88	12.3	2.92
27	7.04	2.92	1.48	1.38	1.11	.95	2.08	3.06	26.3	3.20	23.8	5.88
28	4.67	2.92	1.48	1.48	1.11	.95	1.94	2.64	7.62	4.29	7.91	4.25
29	4.46	2.50	1.38	2.50	1.11	.95	*1.94	3.83	5.30	61.8	5.30	*2.50
30	3.62	1.94	1.58	1.58	1.02	.95	2.08	---	6.46	8.20	4.25	2.78
31	3.20	1.80	---	1.38	---	1.02	1.80	---	17.0	---	3.62	---
Total	207.33	77.90	66.39	81.20	41.12	31.30	194.24	82.31	507.66	167.29	239.56	69.58
Mean												
Mgd	6.69	2.51	2.21	2.62	1.37	1.01	6.27	2.84	16.4	5.58	7.73	2.32
Cfs	10.4	3.88	3.42	4.05	2.12	1.56	9.70	4.39	25.4	8.63	12.0	3.59
Ac-ft	636	239	204	249	126	96	596	253	1560	513	735	214

Calendar Year 1963: Max 108 Min 0.95 Mean mgd 4.84 Mean cfs 7.49 Ac-ft 5430
Fiscal Year 1963-64: Max 108 Min 0.95 Mean mgd 4.82 Mean cfs 7.46 Ac-ft 5420

* Discharge measurement made on this day.

Peak discharge (base, 230 mgd)

Date	Time	Gage height	Discharge Mgd	Discharge Cfs	Date	Time	Gage height	Discharge Mgd	Discharge Cfs
10-4	2300	2.80	257	398	3-23	0530	4.13	604	935
1-6	0330	2.97	293	453	4-29	0300	3.16	336	520
3-9	0230	3.94	547	846	5-25	1000	4.76	806	1,250

975. Halaulani Stream at altitude 400 ft, near Kilauea

Location.--lat 22°10'54", long 159°25'17", on left bank 0.5 mile upstream from confluence with Pohakuhonu Stream, 1 mile upstream from Stone Dam, and 2.5 miles south of Kilauea.

Drainage area.--1.1 sq mi, approximately.

Records available.--November 1957 to June 1964.

Gage.--Water-stage recorder. Datum of gage is 391.8 ft above mean sea level (by stadia survey).

Average discharge.--6 years (1958-64), 7.46 mgd (11.5 cfs).

Extremes.--Maximum discharge during year, 582 mgd (900 cfs) May 25 (gage height, 5.51 ft), from rating curve extended above 130 mgd as explained below; minimum, 2.73 mgd (4.22 cfs) sometime during period Dec. 26-31.
1957-64: Maximum discharge, 1,340 mgd (2,070 cfs) Aug. 6, 1959 (gage height, 8.30 ft), from rating curve extended above 130 mgd on basis of slope-area measurement of peak flow; minimum, 2.32 mgd (3.59 cfs) Feb. 20-23, 27, 28, Mar. 4, 1963.

Remarks.--Records good except those for period of no gage-height record, which are fair. ,No diversion above station.

Rating table (gage height, in feet, and discharge, in million gallons a day)

0.8	2.40	2.0	41.0
1.0	4.85	2.5	79.0
1.2	8.80	3.0	130
1.5	17.8		

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	18.7	7.04	4.31	7.89	4.04	3.06	35	3.64	8.86	8.58	12.6	5.72
2	13.1	6.60	4.18	4.85	4.31	2.95	9.0	3.50	6.25	7.04	8.36	5.38
3	12.7	5.02	4.18	5.55	3.90	2.95	11	3.39	5.20	6.42	7.04	5.38
4	6.82	4.58	4.04	22.2	3.77	2.95	7.5	3.28	5.90	6.60	6.08	5.02
5	6.25	4.44	4.31	15.3	3.77	3.06	32	3.28	6.08	5.90	5.72	4.72
6	5.55	4.18	4.04	6.82	4.04	3.06	50	3.17	6.25	11.2	5.38	4.44
7	5.02	*4.31	4.04	5.38	10.4	3.06	8.0	3.28	20.1	6.42	7.22	4.31
8	4.85	4.44	3.90	5.20	4.58	2.95	7.0	3.28	79.4	5.72	6.60	4.18
9	5.02	4.04	3.77	4.44	4.04	3.06	8.0	3.17	54.6	5.20	6.08	4.04
10	4.72	3.90	3.77	4.18	4.58	3.28	9.5	4.72	23.0	5.72	5.38	4.04
11	5.90	3.77	3.90	4.04	3.90	2.95	7.5	4.04	*17.1	5.90	5.02	4.04
12	6.08	3.64	4.04	4.04	3.77	2.95	7.0	8.03	10.9	7.48	4.85	4.04
13	4.72	3.64	3.90	3.90	3.64	2.95	5.5	7.04	8.14	5.72	4.58	3.90
14	5.18	3.64	3.77	3.90	*3.64	3.39	5.5	5.38	6.60	5.55	4.44	3.90
15	7.92	3.77	3.77	3.77	3.64	3.39	5.0	4.58	5.72	5.02	4.31	3.90
16	6.25	25.4	4.58	3.77	3.77	5.22	4.6	4.04	5.72	4.72	4.18	4.04
17	4.85	7.13	20.5	3.77	3.77	*5.38	4.4	3.77	7.58	4.58	4.04	3.77
18	18.1	5.20	11.0	4.04	3.64	3.64	4.0	3.77	8.78	4.44	4.04	4.31
19	12.0	4.85	5.20	3.90	3.39	3.17	4.4	3.64	14.2	5.04	3.90	3.90
20	10.9	4.58	*4.44	3.77	3.28	2.95	9.0	3.50	9.90	*9.92	4.31	3.90
21	20.1	4.44	4.18	8.06	3.28	2.84	20	4.44	7.70	6.64	13.8	4.04
22	29.7	4.31	4.04	4.58	3.28	3.39	9.0	3.77	18.6	11.4	*14.7	4.04
23	11.4	4.44	4.04	5.68	3.28	2.95	6.5	20.2	49.5	8.36	18.7	4.58
24	10.9	7.26	3.90	5.02	3.17	2.84	5.5	8.08	15.8	6.60	15.4	5.72
25	7.70	5.02	3.90	8.82	3.17	2.84	5.5	10.3	18.5	5.72	52.8	6.42
26	6.60	5.38	3.77	5.02	3.17	2.8	5.0	7.26	36.6	9.84	20.4	*5.72
27	9.06	6.42	3.77	4.31	3.17	2.8	4.4	5.72	35.7	6.60	29.4	9.84
28	6.60	6.82	3.64	4.31	3.17	2.8	*4.04	5.38	13.0	7.34	15.0	7.26
29	7.26	5.72	3.50	7.48	3.06	2.8	4.18	7.57	9.06	64.3	9.06	5.38
30	5.90	4.85	4.31	4.58	3.06	2.8	4.18	----------	10.4	14.1	7.26	5.38
31	5.72	4.44	----------	4.04	----------	3.0	3.77	----------	19.5	----------	6.42	----------
Total	285.57	173.27	144.69	182.61	115.68	98.23	305.97	155.22	544.64	268.07	317.07	145.31
Mean												
Mgd	9.21	5.59	4.82	5.89	3.86	3.17	9.87	5.35	17.6	8.94	10.2	4.84
Cfs	14.2	8.65	7.46	9.11	5.97	4.90	15.3	8.28	27.2	13.8	15.8	7.49
Ac-ft	876	532	444	560	355	301	939	476	1,670	823	973	446

Calendar Year 1963: Max 88.1 Min 2.32 Mean mgd 7.33 Mean cfs 11.3 Ac-ft 8,210
Fiscal Year 1963-64: Max 79.4 Min 2.8 Mean mgd 7.48 Mean cfs 11.6 Ac-ft 8,400

Peak discharge (base, 300 mgd, revised)

Date	Time	Gage height	Discharge Mgd	Discharge Cfs	Date	Time	Gage height	Discharge Mgd	Discharge Cfs
3-9	0100	4.40	350	542	5-25	1000	5.51	582	900

* Discharge measurement made on this day.
Note.--No gage-height record Dec. 26 to Jan. 27.

1000. Hanalei tunnel outlet near Lihue

Location.--Lat 22°04'57", long 159°27'52", on right bank at outlet of Hanalei tunnel, 2.2 miles downstream from intake on Kaapoko Stream, and 9.8 miles northwest of Lihue.

Records available.--July 1932 to June 1964.

Gage.--Water-stage recorder and sharp-crested weir. Altitude of gage is 1,210 ft (from tunnel-profile).

Average discharge.--32 years, 17.9 mgd (27.7 cfs).

Extremes.--1932-64: Maximum daily discharge, 64 mgd (99 cfs) Apr. 11, 25, 26, 1942; no flow at times.

Remarks.--Records good. Tunnel diverts water from Kaapoko Stream and Hanalei River into North Branch of North Fork Wailua River, from which it is later diverted and used for irrigation in vicinity of Lihue and Kapaa.

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	1.68	*1.76	0.19	38	*14.2	15.9	26.4	16.4	31.0	30.5	*29.5	21.2
2	.41	.78	.19	16	15.1	15.9	*23.8	16.4	24.5	*22.6	23.0	20.3
3	*2.01	.19	.19	*26	15.1	*15.9	39.5	16.4	*23.0	20.8	22.1	*20.3
4	.54	.10	.19	36.5	14.2	15.9	41.0	*15.9	23.5	23.8	20.3	19.8
5	.68	.10	.19	15.8	14.2	16.4	42.5	15.9	31.0	31.0	22.1	19.4
6	.54	.10	.19	5.12	14.2	15.9	40.5	15.5	25.0	33.5	21.6	19.4
7	.41	.10	.19	3.94	20.6	15.5	28.5	17.2	33.5	22.1	27.5	19.4
8	.29	.10	.19	4.54	14.6	14.6	23.5	19.4	43.6	22.1	22.8	18.5
9	.41	.10	.19	3.40	17.2	27.7	24.5	15.9	39.0	19.0	28.0	18.5
10	.19	.10	.19	3.10	19.2	25.0	27.5	25.5	36.0	22.1	22.1	18.5
11	.29	.10	.19	2.85	15.1	18.1	21.6	23.5	30.5	20.3	22.6	18.5
12	.19	.10	.19	2.85	14.6	17.6	23.0	28.5	31.5	25.0	22.1	18.1
13	.19	.10	.19	2.61	14.6	17.2	20.3	32.0	23.5	19.8	19.4	18.5
14	.10	.10	.19	2.61	14.6	18.5	19.4	23.5	20.3	18.5	22.0	19.0
15	.19	.10	.19	2.61	14.6	19.0	23.5	26.0	19.8	19.0	22.6	20.3
16	.19	.54	.19	2.61	18.5	27.0	20.3	22.6	21.6	18.5	19.4	25.0
17	.19	.41	.83	2.61	21.0	28.0	19.8	19.0	18.1	18.1	18.5	19.8
18	.83	.10	.29	3.40	18.5	20.8	19.4	23.3	18.5	19.4	18.1	24.5
19	.41	.19	.19	3.10	15.1	19.0	20.3	21.2	25.0	22.5	18.1	19.8
20	.68	.10	.19	4.54	14.6	17.2	28.9	15.2	20.8	33.0	19.8	19.0
21	2.07	.10	.19	3.94	14.2	17.2	33.0	17.2	17.6	25.4	35.0	19.8
22	6.56	.10	.19	3.10	13.8	18.1	25.5	20.9	24.7	29.5	32.5	21.2
23	2.38	.10	.19	9.92	11.1	17.2	21.6	31.0	25.0	31.0	39.0	22.6
24	1.95	.29	.19	19.8	11.9	15.9	19.0	25.0	20.3	29.0	33.0	22.6
25	1.35	.10	14.3	23.0	11.9	14.4	21.6	33.1	28.5	24.5	35.0	27.5
26	1.15	.19	26.0	16.8	12.6	12.6	18.5	27.5	32.5	27.3	35.0	25.4
27	2.34	.19	25.1	14.6	11.7	13.2	17.6	23.5	35.5	23.5	36.5	19.8
28	1.15	.19	31.3	18.1	15.5	14.6	17.2	25.0	24.0	29.3	27.5	17.2
29	1.00	.19	27.5	23.5	15.5	14.6	18.8	29.0	21.2	40.0	23.5	11.1
30	1.15	.19	36.0	15.9	15.9	14.2	19.8	---	30.0	32.5	22.6	13.8
31	1.00	.19	---	14.6	---	21.2	17.6	---	40.5	---	21.6	---
Total	32.52	7.10	165.50	345.45	453.9	554.3	764.4	641.5	839.5	753.6	782.8	598.8
Mean												
Mgd	1.05	0.23	5.52	11.1	15.1	17.9	24.7	22.1	27.1	25.1	25.3	20.0
Cfs	1.62	0.36	8.54	17.2	23.4	27.7	38.2	34.2	41.9	38.8	39.1	30.9
Ac-ft	100	22	508	1,060	1,390	1,700	2,350	1,970	2,580	2,300	2,400	1,840

Calendar Year 1963: Max 38 Min 0.10 Mean mgd 8.09 Mean cfs 12.5 Ac-ft 9,070
Fiscal Year 1963-64: Max 43.6 Min 0.10 Mean mgd 16.2 Mean cfs 25.1 Ac-ft 18,220

* Discharge measurement made on this day.

1030. Hanalei River near Hanalei

Location.--Lat 22°11'31", long 159°27'57", on right bank 2.3 miles southeast of Hanalei and 4.9 miles upstream from mouth.

Drainage area.--19.1 sq mi.

Records available.--January 1912 to November 1919, December 1962 to June 1964.

Gage.--Water-stage recorder. Datum of gage is 35.8 ft above mean sea level (by stadia survey). Jan. 1, 1912, to Nov. 20, 1919, staff gage at site 0.2 mile upstream at different datum.

Extremes.--Maximum discharge during year, 17,600 mgd (27,200 cfs) Mar. 8 (gage height, 12.20 ft), from rating curve extended above 1,800 mgd; minimum, 29.0 mgd (44.9 cfs) Dec. 8, 9.
1912-19, 1962-64: Maximum discharge, 22,400 mgd (34,700 cfs) Apr. 15, 1963 (gage height, 13.13 ft), from rating curve extended above 1,800 mgd; minimum, 24.9 mgd (38.5 cfs) Mar. 4, 1963.

Remarks.--Records good except those above 4,000 mgd, which are fair, and those for periods of no gage-height record, which are poor. Since 1925 Hanalei tunnel (see preceding page) has diverted from Hanalei River and its tributary Kaapoko Stream above atation to North Branch of North Fork Wailua River for irrigation.

Rating table (gage height, in feet, and discharge, in million gallons a day)
(Shifting-control method used Dec. 10 to Jan. 1, Mar. 16-18, 21, May 3-8, 10-21, May 30 to June 30)

1.3	26.7	4.0	530
1.5	34.0	4.5	810
2.0	63.0	5.0	1,180
2.5	113	6.0	2,100
3.0	200	7.0	3,320
3.5	330		

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	331	161	58.8	114	46.4	29.7	277	45	300	216	250	70.2
2	234	170	56.7	51.8	47.0	29.7	177	40	150	130	127	62.3
3	292	98.8	56.0	391	458	29.3	350	40	110	102	107	58.8
4	132	96.0	56.0	542	43.0	29.3	1,100	40	90	93.3	83.0	54.8
5	121	85.0	65.4	441	42.0	29.7	740	40	200	127	84.0	51.2
6	102	*87.0	55.4	147	41.0	30.4	630	45	110	208	77.3	48.2
7	93.3	78.2	53.0	105	118	30.0	210	45	500	93.3	143	50.6
8	81.0	87.0	52.4	97.7	47.0	29.0	117	45	3,000	92.2	99.9	45.2
9	91.5	71.9	51.2	75.5	50.2	69.4	107	45	2000	69.4	139	43.5
10	75.5	74.6	50.0	69.4	133	76.7	166	120	800	71.0	99.9	42.0
11	82.0	75.5	51.8	64.6	47.6	39.5	83.0	110	300	83.0	97.7	40.5
12	78.2	66.2	56.7	61.6	43.5	41.0	81.0	220	200	99.9	82.0	39.5
13	69.4	64.6	51.8	58.1	42.5	41.0	61.6	400	110	75.5	63.8	39.5
14	71.0	65.4	48.8	56.7	41.5	48.8	53.6	150	90	68.6	56.0	39.5
15	124	97.8	50.0	53.6	*40.0	42.0	71.0	170	80	61.6	67.8	40.0
16	83.0	128	76.5	51.8	50.0	71.8	61.6	120	*99.9	*62.3	51.8	58.1
17	74.6	118	*1,210	53.0	51.0	78.6	50.0	90	75.5	58.1	47.6	40.0
18	316	73.7	*297	65.6	63.2	45.8	49.4	95	83.0	54.2	44.6	52.4
19	191	75.9	98.8	56.7	39.5	40.0	50.6	100	235	58.6	43.5	43.5
20	118	63.0	78.2	66.5	37.5	*38.5	134	70	139	264	50.0	39.0
21	254	60.2	67.0	108	36.5	38.0	316	80	80.0	149	358	44.6
22	446	58.8	60.9	66.2	36.0	40.0	91.1	100	284	176	353	45.8
23	176	69.8	58.8	102	37.0	40.0	77.3	200	372	208	556	51.8
24	151	164	56.7	70.2	35.5	36.5	56.7	120	144	285	348	64.6
25	103	70.2	53.0	131	33.6	36.5	56.0	900	208	156	683	93.3
26	95.5	76.4	43.5	60.2	35.5	38.0	51.8	300	312	235	462	83.0
27	215	105	44.0	50.0	36.0	37.5	47.0	150	559	146	622	218
28	111	98.8	58.2	54.7	31.2	36.0	44.6	120	208	241	*200	176
29	98.8	86.0	42.5	188	30.4	36.0	*50.0	140	127	1,160	121	72.8
30	86.0	66.2	50.0	59.5	30.0	35.5	55	---------	200	312	95.5	88.0
31	87.0	61.6	----------	50.0	----------	73.9	50	---------	800	----------	79.1	----------
Total	4.583.8	2.754.6	3,109.1	3,562.4	1.411.4	1,318.1	5.465.3	4.140	11.966.4	5.156.0	5,692.5	1.896.7
Mean												
Mgd	148	88.9	104	115	47.0	42.5	176	143	386	172	184	63.2
Cfs	229	138	161	178	72.7	65.8	272	221	597	266	285	97.8
Ac-ft	14.070	8.450	9.540	10.930	4.330	4,040	16.770	12710	36.720	15,820	17.470	5,820

Calendar Year 1963: Max 1430 Min 25.3 Mean mgd 142 Mean cfs 220 Ac-ft 159.400
Fiscal Year 1963-64: Max 3,000 Min 29.0 Mean mgd 139 Mean cfs 215 Ac-ft 156.700

Peak discharge (base, 2,900 mgd)

Date	Time	Gage height	Discharge Mgd	Discharge Cfs	Date	Time	Gage height	Discharge Mgd	Discharge Cfs
10-4	2130	7.66	4,320	6,680	4-29	0400	7.34	3,810	5,890
1-4	-	8.12	5,150	7,970	5-25	1100	7.10	3,460	5,350
3-8	-	12.20	17,600	27,200					

* Discharge measurement made on this day.
Note.--No gage-height record Jan. 4-6, Jan. 30 to Mar. 15, Mar. 31.

1080. Wainiha River near Hanalei

Location.--Lat 22°08'10", long 159°33'40", on left bank at Puwainui Falls, 1.5 miles upstream from Wainiha powerplant intake, and 6.0 miles southwest of Hanalei.

Drainage area.--10.2 sq mi.

Records available.--August 1952 to February 1956, October 1957 to June 1964.

Gage.--Water-stage recorder. Altitude of gage is 960 ft (from topographic map).

Average discharge.--8 years (1953-55, 1958-64), 86.0 mgd (133 cfs).

Extremes.--Maximum discharge during year, 3,570 mgd (5,520 cfs) Mar. 8 (gage height, 5.83 ft), from rating curve extended above 660 mgd as explained below; minimum, 25.7 mgd (39.8 cfs) Dec. 30.
1952-64: Maximum discharge recorded, 13,000 mgd (20,100 cfs) Aug. 6, 1959 (gage height, 8.19 ft), from rating curve extended above 660 mgd on basis of slope-area measurement at gage height 7.72 ft; minimum, 22.5 mgd (34.8 cfs) Feb. 12, 1954.
Flood of Feb. 17, 1956, which destroyed the station, reached a stage of about 14.1 ft (discharge not determined).

Remarks.--Records good. No diversion above station.

Rating tables (gage height, in feet, and discharge, in million gallons a day)

July 1, 2		July 3 to June 30			
2.1	96.0	1.2	22.5	3.0	300
2.5	165	1.3	27.1	3.5	530
3.0	300	1.7	51.5	4.0	850
		2.1	92.0	4.5	1,350
		2.5	158		

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	215	62.7	33.6	100	31.5	28.1	201	32.0	240	61.4	107	38.8
2	113	86.9	32.0	48.7	32.0	27.6	202	31.5	103	44.8	62.8	36.4
3	213	44.0	32.0	208	34.8	27.6	475	30.0	70.4	42.0	59.2	35.3
4	64.8	46.2	33.6	149	32.0	27.6	853	29.6	63.4	59.4	*45.5	34.2
5	71.6	62.0	60.7	234	37.5	28.1	647	29.1	157	87.0	68.9	33.1
6	71.6	54.4	34.8	60.0	33.6	29.1	543	29.1	78.4	109	60.6	32.6
7	57.4	47.2	32.6	51.5	109	31.5	95.5	36.8	316	44.0	100	33.6
8	*41.4	53.1	31.5	65.0	35.8	28.6	68.6	49.3	1,040	52.9	86.3	32.6
9	61.7	40.8	30.5	40.1	94.9	159	73.7	35.8	736	37.5	110	32.0
10	42.0	48.5	30.0	35.3	164	83.3	162	112	331	58.6	83.4	32.0
11	60.7	44.0	43.9	33.6	50.8	44.0	75.8	80.4	172	52.1	81.6	31.5
12	44.0	38.2	49.6	33.6	39.4	33.6	80.0	181	135	91.1	78.4	*31.0
13	38.8	39.4	40.8	32.0	37.5	32.0	53.2	242	70.6	48.4	51.6	32.6
14	38.8	48.9	32.6	*32.0	37.5	35.8	44.8	98.5	58.3	38.8	60.1	38.7
15	67.3	92.5	35.3	31.0	42.0	35.3	90.4	125	48.5	35.3	78.6	47.1
16	51.5	106	86.4	30.0	115	54.3	76.8	80.0	57.7	34.2	38.8	80.4
17	54.9	69.0	719	32.0	53.4	54.6	63.2	56.6	*40.1	34.2	36.4	47.8
18	167	42.0	282	59.2	55.5	33.1	60.0	65.8	39.6	33.6	34.8	69.2
19	99.7	49.9	66.6	39.3	*33.1	30.5	59.5	68.7	106	34.2	35.8	43.4
20	73.3	*35.8	49.2	62.5	30.5	29.1	154	38.8	93.7	78.7	46.6	38.8
21	138	33.6	42.7	64.5	30.0	28.1	215	45.1	70.6	53.4	290	45.5
22	227	33.6	37.5	40.8	30.5	30.0	81.6	66.4	164	91.6	259	50.5
23	83.6	61.5	34.8	75.4	29.6	32.0	63.2	138	82.4	115	504	63.6
24	75.4	167	33.6	86.7	29.1	28.6	*44.0	78.4	67.6	159	199	57.8
25	52.4	46.2	32.6	125	28.6	27.6	75.2	489	81.0	95.9	249	109
26	53.8	55.8	32.0	44.0	41.6	27.1	44.0	149	138	151	156	97.1
27	112	89.5	31.0	34.8	32.6	26.6	36.4	96.6	199	84.8	183	175
28	50.0	64.8	60.3	43.8	29.6	27.1	34.2	96.9	90.8	142	80.0	146
29	47.8	54.6	35.8	139	29.1	26.2	41.2	148	72.6	407	59.2	60.0
30	43.4	37.5	63.4	38.8	28.6	26.2	49.3	---	126	124	57.4	96.5
31	40.8	36.4	---	33.6	---	65.4	35.8	---	166	---	42.0	---
Total	2571.7	1792.0	2160.4	2103.2	1409.1	1197.7	4798.4	2759.4	5214.7	2500.9	3405.0	1702.1
Mean												
Mgd	83.0	57.8	72.0	67.8	47.0	38.6	155	95.2	168	83.4	110	56.7
Cfs	128	89.4	111	105	72.7	59.7	240	147	260	129	170	87.7
Ac-ft	7890	5500	6630	6450	4320	3680	14730	8470	16000	7670	10450	5220

Calendar Year 1963: Max 1790 Min 23.6 Mean mgd 95.0 Mean cfs 147 Ac-ft 106400
Fiscal Year 1963-64: Max 1040 Min 26.2 Mean mgd 86.4 Mean cfs 134 Ac-ft 97010

* Discharge measurement made on this day.

Peak discharge (base, 2,000 mgd)

Date	Time	Gage height	Discharge Mgd	Discharge Cfs	Date	Time	Gage height	Discharge Mgd	Discharge Cfs
1-4	0900	5.72	3,320	5,140	3-8	1830	5.83	3,570	5,520

1300. Nahomalu Stream near Mana

Location.--Lat 22°02'41", long 159°45'17", on left bank 1.1 miles northeast of Mana and 5.3 miles northwest of Kekaha School. Prior to July 1, 1963, crest-stage gage only, at site 155 ft downstream.

Drainage area.--3.77 sq mi.

Records available.--Fiscal years 1962-63 (annual maximum), July 1963 to June 1964.

Gage.--Water-stage recorder. Datum of gage is 236.8 ft above mean sea level (by stadia survey). May 7, 1962, to June 30, 1963, crest-stage gage at site 155 ft downstream at datum 8.26 ft lower.

Extremes.--Maximum discharge during year, 38.3 mgd (59.3 cfs) probably either Aug. 17 or Sept. 18 (gage height, 2.39 ft, from flood-marks), from rating curve extended above 2.5 mgd as explained below; no flow most of the time.
1961-64: Maximum discharge, 566 mgd (876 cfs) Apr. 25, 1962 (gage height, 5.13 ft, present site and datum), from rating curve extended above 2.5 mgd on basis of slope-area measurement of peak flow; no flow most of the time each year.

Remarks.--Records good except those for period of no gage-height record, which are poor. No diversion above station.

Rating table (gage height, in feet, and discharge, in million gallons a day)

1.06	0	1.4	1.15
1.1	.04	1.5	2.25
1.2	.18	1.6	3.80
1.3	.51		

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1		0	0				0		0	.11		
2		0	0				0		0	.12		
3		0	0				0		0	.25		
4		0	0				0		0	.25		
5		0	0				0		0	.34		
6		0	0				*0		0	.34		
7		0	0				0		0	.18		
8		0	0				0		0	.14		
9		0	0				.30		*1.06	.10		
10		0	0				.25		*.18	.07		
11		0	0			(*)	.04		.07	.02		
12		0	0				0	(*)	0	0		
13		*0	0				0		0	0		
14		0	0				0		0	0		
15		0	0				0		0	0		
16		0	0				0		0	0		
17		2.0	1.0	(*)			0		0	0		
18		1.0	3.0				0		0	0		
19		0	*0				0		0	0		
20		0	0				0		0	0		
21		0	0				0		.02	*0		
22		0	0				0		1.48	.02		
23		0	0				0		.21	0		
24		0	0				0		.17	0		
25		0	0				0		.18	0	(*)	
26		0	0				0		.15	0		
27		0	0				0		1.26	0		
28		0	0				0		.44	0		
29		0	0				0		.25	0		
30		0	0	(*)			0	---	.15	0		
31		0	---		---		0	---	.11	---		---
Total	0	3.0	4.0	0	0	0	0.59	0	5.73	1.94	0	0
Mean												
Mgd	0	0.10	0.13	0	0	0	0.019	0	0.185	0.065	0	0
Cfs	0	0.16	0.20	0	0	0	0.029	0	0.286	0.101	0	0
Ac-ft	0	9.2	12	0	0	0	1.8	0	18	6.0	0	0

Calendar Year 1963: Max - Min - Mean mgd - Mean cfs - Ac-ft -
Fiscal Year 1963-64: Max 3.0 Min 0 Mean mgd 0.004 Mean cfs 0.006 Ac-ft 46

Peak discharge (base, 50 mgd).--No peak above base.

* Discharge measurement or observation of no flow made on this day.
Note.--No gage-height record Aug. 14 to Sept. 18.

2000. North Fork Kaukonahua Stream above Right Branch, near Wahiawa
(Formerly published as Left Branch of North Fork Kaukonahua Stream near Wahiawa)

Location.--Lat 21°31'09", long 157°56'53", on left bank 140 ft upstream from Mauka ditch intake and Right Branch, and 4.5 miles northeast of Wahiawa.

Drainage area.--1.38 sq mi.

Records available.--May 1913 to July 1953, April 1960 to June 1964. Monthly discharge only for some periods, published in WSP 1319. Prior to July 1963, published as Left Branch of North Fork Kaukonahua Stream near Wahiawa.

Gage.--Water-stage recorder and concrete control. Altitude of gage is 1,150 ft (from topographic map).

Average discharge.--42 years (1913-24, 1926-53, 1960-64), 10.7 mgd (16.6 cfs).

Extremes.--Maximum discharge during year, 1,700 mgd (2,630 cfs) Mar. 23 (gage height, 8.55 ft), from rating curve extended above 44 mgd on basis of slope-area measurement at gage height 12.46 ft; minimum, 0.48 mgd (0.74 cfs) Dec. 30, 31.
1913-53, 1960-64: Maximum discharge, 3,550 mgd (5,490 cfs) Jan. 1, 1933 (gage height, 11.7 ft, from flood marks), from rating curve extended above 44 mgd by test on model of station site; maximum gage height, 12.46 ft Apr. 15, 1963; minimum discharge, 0.08 mgd (0.12 cfs) Mar. 2, 13, 1941.

Remarks.--Records good. No diversion above station.

Rating table (gage height, in feet, and discharge, in million gallons a day)
(Shifting-control method used July 1 to Aug. 4)

1.5	0.31	2.5	13.4
1.6	.56	2.7	22.0
1.7	.93	3.0	42.0
1.8	1.45	3.5	100
1.9	2.15	4.0	185
2.1	4.30	4.5	300
2.3	7.90		

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	67.4	12.8	6.30	16.1	4.62	1.59	12.0	1.09	16.4	9.91	7.30	8.15
2	61.8	*16.5	5.58	*14.4	4.18	1.52	1.92	5.34	27.1	11.9	9.80	6.90
3	48.1	8.65	12.1	34.9	3.46	1.40	30.1	1.19	7.28	17.2	10.9	6.30
4	16.2	47.8	21.0	132	4.67	1.35	11.6	1.03	33.0	42.4	6.90	5.58
5	11.9	11.8	21.8	30.4	3.22	*1.29	13.6	.86	8.28	48.3	8.28	5.10
6	9.90	8.22	8.40	9.65	3.00	1.87	28.2	1.35	6.57	44.7	6.30	4.78
7	8.65	9.63	6.90	6.50	9.07	1.52	3.46	1.38	20.6	12.5	4.78	4.46
8	7.90	6.50	5.10	6.30	6.05	1.14	2.72	2.01	102	9.90	24.5	5.50
9	7.70	6.10	4.46	5.90	10.6	1.09	2.01	.86	20.4	7.50	8.15	6.59
10	16.7	5.26	4.06	4.06	7.29	1.03	2.01	21.6	9.90	7.10	11.4	4.18
11	26.6	22.5	4.06	3.70	3.00	1.59	6.08	14.6	8.40	6.90	7.16	3.58
12	11.3	8.74	19.0	3.22	2.72	14.8	3.70	*21.7	10.9	20.0	5.42	3.46
13	13.1	11.9	6.10	4.90	2.62	4.41	1.73	12.0	6.50	5.58	4.62	4.36
14	11.6	5.74	4.30	17.9	2.62	2.79	1.35	3.34	5.42	4.78	38.5	3.70
15	37.9	25.7	3.70	3.58	2.34	2.53	1.40	5.73	5.52	4.30	6.30	6.76
16	11.3	75.4	4.78	2.82	25.7	4.76	1.52	7.55	9.24	3.94	4.78	6.10
17	7.90	13.7	76.8	3.70	7.42	5.32	1.09	2.72	4.62	4.18	4.30	5.63
18	11.2	31.3	73.3	15.2	3.74	2.08	.93	11.0	3.46	3.46	3.82	10.6
19	33.9	12.4	8.90	4.62	2.44	1.40	.89	2.82	3.00	20.7	3.46	3.58
20	40.4	8.65	6.70	43.3	2.24	1.24	3.76	2.15	2.82	11.1	14.9	3.34
21	46.4	7.30	5.58	8.35	2.44	1.09	11.8	2.62	4.42	16.8	59.9	3.00
22	40.8	7.10	4.94	9.28	2.62	1.03	2.53	2.44	69.7	10.9	36.5	6.30
23	28.7	32.2	4.30	5.74	1.87	.89	2.73	1.94	114	10.4	88.2	6.82
24	30.7	33.9	4.06	10.3	1.66	.82	1.29	2.53	49.0	11.3	108	3.22
25	19.2	8.65	3.58	9.40	1.73	.78	2.01	13.5	14.1	5.58	245	7.38
26	31.4	14.8	3.58	7.60	32.1	.71	2.08	2.85	51.5	12.2	63.0	9.77
27	92.6	23.5	3.34	4.06	5.10	.71	2.31	2.15	44.1	5.58	62.6	15.5
28	27.7	34.3	3.34	12.7	2.62	.63	1.29	2.08	13.6	29.0	17.0	5.26
29	24.3	17.8	12.6	54.1	2.01	.63	1.19	2.15	8.40	62.4	13.4	3.82
30	12.5	9.82	18.5	6.90	1.80	.51	1.45	----------	10.4	10.2	11.3	11.5
31	12.2	7.30	----------	4.94	----------	.93	1.35	----------	17.2	----------	9.15	----------
Total	827.95	545.96	367.16	496.52	164.95	63.45	160.10	152.58	707.83	470.71	905.62	181.22
Mean												
Mgd	26.7	17.6	12.2	16.0	5.50	2.05	5.16	5.26	22.8	15.7	29.2	6.04
Cfs	41.3	27.2	19.0	24.8	8.51	3.17	7.98	8.14	35.3	24.3	45.2	9.35
Ac-ft	2540	1680	1130	1520	506	195	491	468	2170	1440	2780	556

Calendar Year 1963: Max 558 Min 0.27 Mean mgd 15.8 Mean cfs 24.4 Ac-ft 17,710
Fiscal Year 1963-64: Max 245 Min 0.51 Mean mgd 13.8 Mean cfs 21.4 Ac-ft 15,480

* Discharge measurement made on this day.

Peak discharge (base, 700 mgd)

Date	Time	Gage height	Discharge Mgd	Discharge Cfs	Date	Time	Gage height	Discharge Mgd	Discharge Cfs
8-4	1000	5.92	791	1,220	3-8	0700	6.14	819	1,270
10-4	1330	5.89	763	1,180	3-23	0400	8.55	1,700	2,630
1-6	1000	6.10	805	1,250	5-25	0330	6.11	816	1,260

2030. Mauka ditch near Wahiawa

Location.--Lat 21°30'45", long 157°59'20", on left bank 0.7 mile northwest of Ku Tree Reservoir and 2.9 miles east of Wahiawa Post Office.

Records available.--March 1947 to June 1964. Prior to July 1958, published as Kaukonahua ditch near Wahiawa.

Gage.--Water-stage recorder (digital after Apr. 8) and Parshall flume. Altitude of gage is 1,140 ft (from topographic map).

Average discharge.--17 years, 3.08 mgd (4.77 cfs).

Extremes.--1947-64: Maximum daily discharge, 10.1 mgd (15.6 cfs) Jan. 27, 1948; no flow at times.

Remarks.--Records good except those for periods of no gage-height record, which are fair. Ditch diverts from North Fork Kaukonahua Stream for domestic use in Wahiawa.

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	0.94	0.20	0.04	4.22	*3.9	3.40	3.75	1.77	3.5	0.3	0.16	0.22
2	.63	.18	.04	4.46	4.10	3.19	*2.54	2.39	4.8	.3	.14	.20
3	.46	.18	.04	5.09	3.98	3.09	4.91	1.85	*3.09	.4	.32	.20
4	.25	.21	.04	4.46	3.98	3.09	4.96	1.69	3.30	.5	.39	.18
5	.21	.16	.04	1.39	3.86	2.89	4.73	1.46	3.19	.6	.65	.17
6	.18	.12	.04	.42	3.74	3.30	3.95	1.69	3.19	.5	.38	.16
7	.16	.12	.04	.31	4.34	3.30	2.89	1.85	3.74	.4	.45	.16
8	.14	.12	.04	.29	4.34	2.68	2.68	2.57	4.5	.3	.68	.16
9	.14	.12	.04	.31	4.46	2.39	2.58	1.46	2.0	.18	.27	.20
10	.16	.10	.04	.29	4.58	2.39	2.48	2.57	.6	.17	.31	.15
11	.21	.12	.06	.27	3.98	2.89	2.58	2.6	.5	.46	.25	.13
12	.23	.13	1.53	.23	3.74	4.0	2.68	4.0	.6	.65	.21	.13
13	.16	.2	3.09	.18	3.50	4.70	2.30	3.5	.5	.22	.14	.14
14	.16	.1	2.68	.36	3.50	3.74	2.12	2.6	.4	.19	.25	.14
15	.94	.13	2.58	.25	3.30	4.22	1.94	2.8	.4	.17	.17	.13
16	.54	.14	2.68	1.32	4.46	3.40	1.85	3.0	.5	.16	.14	.27
17	.25	.10	6.39	3.98	4.22	4.96	1.41	2.6	.4	.14	.13	.18
18	.36	.16	*6.39	4.70	4.10	3.86	.83	3.2	.4	.14	.13	.32
19	.39	.08	4.34	4.10	3.62	2.99	.78	2.6	.3	.15	.13	.14
20	.27	.04	3.86	5.2	3.30	2.39	1.13	2.5	.3	.19	.15	.20
21	.27	.04	3.50	4.7	3.19	1.94	1.83	2.30	.4	.14	1.09	.22
22	*.33	.04	3.40	4.8	3.50	1.77	.83	2.48	1.5	.15	1.39	.55
23	.36	.04	3.19	4.6	2.99	1.69	.78	2.48	3.0	.16	2.08	.21
24	.39	.04	3.09	5.0	2.89	1.53	1.14	2.79	.6	.61	1.06	.15
25	.21	.04	2.99	5.0	2.79	1.46	2.30	3.5	.5	.18	1.71	.33
26	.23	.04	2.89	4.6	5.35	1.39	2.30	3.19	.6	.21	.81	.50
27	1.77	.04	2.68	4.2	4.34	1.39	2.30	3.09	.6	.14	.70	1.36
28	.54	.04	2.68	4.7	4.10	1.39	1.85	3.09	.5	.40	.37	.50
29	.36	.04	3.19	5.7	3.98	1.32	1.69	3.09	.3	.49	.30	.23
30	.23	.04	4.22	4.5	3.74	1.25	1.85	-------	.4	.19	.27	.86
31	.21	.04	-------	4.3	-------	1.46	1.85	-------	.5	-------	.24	-------
Total	11.68	3.15	65.83	93.93	115.87	83.46	71.81	74.71	45.11	8.79	15.47	8.49
Mean												
Mgd	0.377	0.102	2.19	3.03	3.86	2.69	2.32	2.58	1.46	0.293	0.499	0.283
Cfs	0.583	0.158	3.39	4.69	5.97	4.16	3.59	3.99	2.26	0.453	0.772	0.438
Ac-ft	36	9.7	202	288	356	256	220	229	138	27	47	26

Calendar Year 1963: Max 6.48 Min 0.04 Mean mgd 1.91 Mean cfs 2.96 Ac-ft 2140
Fiscal Year 1963-64: Max 6.39 Min 0.04 Mean mgd 1.63 Mean cfs 2.52 Ac-ft 1830

* Discharge measurement made on this day.
Note.--No gage-height record, Aug. 13, 14, Oct. 20 to Nov. 1, Dec. 12, Feb. 11-20, 25, Mar. 1-2, Mar. 8 to Apr. 8.

2040. North Fork Kaukonahua Stream near Wahiawa

Location (revised).--Lat 21°30'54", long 157°59'19", on left bank 1.0 mile downstream from Poamoho tunnel inflow and 3.1 miles northeast of Wahiawa Post Office.

Drainage area.--4.86 sq mi.

Records available.--September 1946 to June 1964.

Gage.--Water-stage recorder and concrete control. Altitude of gage is 970 ft (from topographic map).

Average discharge.--17 years (1947-64), 21.5 mgd (33.3 cfs).

Extremes.--Maximum discharge during year, 1,240 mgd (1,920 cfs) Mar. 8 (gage height, 9.25 ft), from rating curve extended above 190 mgd as explained below; minimum, 0.73 mgd (1.13 cfs) Dec. 30, 31.
1946-64: Maximum discharge, 3,010 mgd (4,660 cfs) Apr. 15, 1963 (gage height, 20.95), from rating curve extended above 190 mgd on basis of slope-area measurements at gage heights 8.39 and 15.55 ft; no flow at times in 1953.

Remarks.--Records good except those for periods of no gage-height record, which are poor. Mauka ditch (see preceding page) diverts 2.6 miles above station for domestic use in Wahiawa. Poamoho tunnel (see p. 54) diverts from Poamoho Stream into North Fork Kaukonahua Stream 1.0 mile above station.

Rating table (gage height, in feet, and discharge, in million gallons a day)

0.3	0.53	1.6	37.5
.4	1.06	2.0	74.0
.5	1.80	2.5	148
.7	3.95	3.0	245
1.0	9.10	4.0	424
1.3	20.0	5.0	584

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	110	19.4	8.0	23.2	6.76	2.25	17.2	1.80	37.8	24.0	20.5	10
2	85.1	18.4	6.0	24.1	6.08	1.98	3.51	6.82	63.5	34.3	19.1	9.0
3	71.9	13.2	20	75.4	5.1	1.80	52.8	2.45	*120	48.0	28.8	8.0
4	27.9	80	36	240	5.4	1.64	33.3	1.34	69.3	81.2	16.6	7.0
5	18.7	20	40	70	4.23	1.64	41.9	106	27.7	103	28.9	6.0
6	15.7	13	13	20	3.59	2.07	110	1.27	15.2	90.5	20.3	5.6
7	13.9	16	9.0	14	12.7	2.45	8.90	2.99	42.0	29.8	14.6	5.0
8	12.1	10	6.0	10	9.49	1.64	5.57	5.10	301	24.0	87.1	8.0
9	118	9.0	5.0	8.0	13.7	1.34	3.95	1.64	65.9	18.3	26.2	17
10	18.3	8.0	4.3	5.4	16.8	1.41	3.47	23.5	28.0	16.6	25.0	10
11	48.0	40	4.3	4.5	4.23	1.64	6.70	25.3	22.0	21.3	21.5	8.0
12	16.1	15	34	3.7	2.99	19.9	9.25	55.9	30.2	69.5	14.3	7.0
13	12.8	20	8.0	7.0	2.87	5.81	4.65	42.2	20.4	15.7	11.5	8.5
14	21.8	9.0	5.0	40	2.87	2.75	2.35	8.70	33.2	13.5	57.8	7.4
15	65.0	36	4.6	6.0	2.35	3.41	1.98	12.1	12.1	11.8	13.9	18
16	24.0	120	6.0	3.5	37.7	2.16	*2.16	22.4	22.3	11.2	10.0	15
17	13.2	30	130	4.5	24.7	8.55	1.89	6.76	12.1	11.2	8.90	*12.5
18	20.2	50	*100	30	8.70	3.11	1.89	20.0	8.90	9.70	8.10	16.2
19	41.1	26	17.4	8.0	3.35	1.64	1.89	6.73	8.30	50.2	7.50	7.50
20	45.7	18	11.5	70	2.75	1.27	5.04	4.37	7.70	56.4	16.8	7.06
21	52.4	15	9.40	15	2.25	1.13	37.9	4.23	7.81	47.2	120	8.32
22	*82.8	13	7.90	18	3.35	1.13	6.76	4.23	264	25.0	75.3	12.7
23	32.0	46	7.30	9.0	2.25	1.06	8.78	3.59	240	27.3	200	11.1
24	44.8	50	6.59	12	2.25	.94	4.09	5.30	195	36.8	143	7.10
25	24.4	17	6.08	10	2.16	.94	4.03	20.0	37.5	16.6	515	15.5
26	37.6	26	5.74	8.0	57.0	.94	4.09	6.50	102	25.8	112	16.2
27	183	36	5.57	5.0	8.50	1.00	3.05	3.71	90.8	*15.3	113	35.6
28	36.3	55	5.10	20	5.42	.94	2.75	3.71	37.5	110	32.3	12.8
29	35.7	26	7.97	90	2.99	.88	1.64	3.71	22.0	163	24	7.30
30	18.7	17	28.8	*15	2.55	.83	1.89	---	22.5	31.1	18	19.0
31	17.4	12	---	7.70	---	.88	1.98	---	61.5	---	14	---
Total	1,258.4	884.0	558.55	877.00	265.08	79.13	395.36	307.41	1,920.2	1,238.30	1,824.00	338.38
Mean												
Mgd	40.6	28.5	18.6	28.3	8.84	2.55	12.8	10.6	61.9	41.3	58.8	11.3
Cfs	62.8	44.1	28.8	43.8	13.7	3.95	19.8	16.4	95.8	63.9	91.0	17.5
Ac-ft	3,860	2,710	1,710	2,690	813	243	1,210	943	5,890	3,800	5,600	1,040

Calendar Year 1963: Max 705 Min 0.15 Mean mgd 34.3 Mean cfs 53.1 Ac-ft 38,410
Fiscal Year 1963-64: Max 515 Min 0.83 Mean mgd 27.2 Mean cfs 42.1 Ac-ft 30,510

* Discharge measurement made on this day.
Note.--No gage-height record Aug. 4 to Sept. 18, Oct. 4-30, May 29 to June 16.

2085. Right Branch of South Fork Kaukonahua Stream near Wahiawa

Location (revised).--Lat 21°29'50", long 157°59'07", on left bank 500 ft downstream from Ku Tree Reservoir spillway, 1 mile upstream from mouth, and 3.1 miles east of Wahiawa Post Office.

Drainage area.--0.86 sq mi.

Records available.--August 1957 to June 1964.

Gage.--Water-stage recorder and masonry control. Altitude of gage is 980 ft (from topographic map).

Average discharge.--6 years (1958-64), 0.864 mgd (1.34 cfs).

Extremes.--Maximum discharge during year, 18.0 mgd (27.9 cfs) Mar. 22 (gage height, 2.15 ft); no flow Oct. 8, Dec. 9.
1957-64: Maximum discharge, 880 mgd (1,360 cfs) Apr. 15, 1963 (gage height, 6.00 ft), from rating curve extended above 110 mgd; no flow at times.

Remarks.--Records fair. Diversion from South Fork Kaukonahua Stream into Ku Tree Reservoir, above station, then to Schofield Barracks for domestic use.

Rating table (gage height, in feet, and discharge, in million gallons a day)

0.03	0	0.4	.31
.1	.02	.6	.76
.2	.07	.8	1.50
.3	.16		

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	0.32	0.02	0.02	0.01	0.02	0.01	0.12	0.01	0.07	0.05	0.01	0.02
2	.06	.02	.03	.01	.02	.01	.02	.01	.01	.06	.01	.02
3	.04	.02	.04	.01	.01	.01	.09	.01	.01	.04	.01	.02
4	.04	.03	.09	.01	.02	.01	.35	.01	.01	.05	.02	.02
5	.03	.02	.11	.09	.02	.01	.26	.01	.01	.02	.02	.02
6	.03	.02	.02	.01	.01	.03	.09	.01	.01	.02	.02	.02
7	.03	.02	.02	.03	.01	.02	*.04	.01	.02	.01	.02	.02
8	.03	.02	.01	0	.01	.01	.02	.03	.65	.07	.02	.02
9	.04	.03	.01	.01	.01	0	.03	.01	.07	.01	.03	.03
10	.05	.03	.01	.01	.01	.01	.01	.01	.05	.04	.03	.03
11	.05	.03	.01	.01	.01	.01	.02	.24	.05	.06	.04	.03
12	.10	.04	.01	.01	.01	.04	.02	.20	.05	.09	.04	.03
13	.04	.04	.03	.01	.01	.01	.02	.07	.05	.03	.03	.03
14	.03	.04	.01	.02	.01	.01	.01	.23	.05	.02	.02	.03
15	.34	.04	.01	.02	.02	.01	.01	.36	.05	.02	.02	.03
16	.28	.03	.02	.01	.02	.01	.01	.12	.05	.02	.02	.03
17	1.19	.04	.53	.01	.02	.01	.01	.02	.05	.03	.02	.03
18	.59	.05	.12	.01	.02	.01	.01	.02	.05	.03	.02	.04
19	.38	.05	.02	.01	.01	.01	.01	.01	.05	.03	.02	.04
20	.10	.05	.01	.01	.01	.01	.03	.01	.04	.04	.02	.02
21	.05	.04	.01	.01	.01	.02	.10	.01	.03	.05	.08	.02
22	.04	.04	.01	.01	.01	.02	.02	.01	.54	.10	.22	.05
23	.03	.24	.01	.03	.01	.02	.02	.01	.14	.12	.12	.04
24	.11	.03	.01	.03	.01	.02	.01	.01	.29	.16	.03	.03
25	.04	.04	.02	.03	.02	.02	.01	.06	.03	.02	.01	.03
26	.03	.05	.03	.02	.12	.03	.01	.01	.04	.01	.01	.03
27	.61	.05	.04	.01	.02	.03	.01	.08	.05	.01	.02	.31
28	.04	.03	.04	.01	.01	.03	.02	.01	.05	.04	.01	.04
29	.03	.03	.01	.01	.01	.04	.01	.07	.05	.04	.02	.01
30	.03	.03	.02	.01	.01	.04	.01	----------	.05	.01	.02	*.31
31	.02	.02	----------	.01	----------	.04	.01	----------	.05	----------	.02	----------
Total	4.80	1.24	1.32	0.49	0.51	0.56	1.40	1.67	2.72	1.30	1.00	1.40
Mean												
Mgd	0.155	0.040	0.044	0.016	0.017	0.018	0.045	0.058	0.088	0.043	0.032	0.047
Cfs	0.240	0.062	0.068	0.025	0.026	0.028	0.070	0.090	0.136	0.066	0.050	0.073
Ac-ft	15	3.8	4.1	1.5	1.6	1.7	4.3	5.1	8.3	4.0	3.1	4.3

Calendar Year 1963: Max 109 Min 0 Mean mgd 0.785 Mean cfs 1.21 Ac-ft 879
Fiscal Year 1963-64: Max 1.19 Min 0 Mean mgd 0.050 Mean cfs 0.077 Ac-ft 57

Peak discharge (base, 200 mgd).--No peak above base.

* Discharge measurement made on this day.

2109. Poamoho tunnel near Wahiawa

Location (revised).--Lat 21°31'12", long 157°58'51", on left bank 5 ft downstream from tunnel outlet and 3.6 miles northeast of Wahiawa Post Office.

Records available.--July 1958 to June 1964.

Gage.--Water-stage recorder and concrete control. Altitude of gage is 1,120 ft (from topographic map).

Average discharge.--6 years, 3.38 mgd (5.23 cfs).

Extremes.--1958-64: Maximum daily discharge, 128 mgd (198 cfs) Apr. 15, 1963; no flow at times each year.

Remarks.--Records good except those for periods of no gage-height record, which are fair. Tunnel diverts from Poamoho Stream to North Fork Kaukonahua Stream for storage in Wahiawa Reservoir.

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	14.2	0.58	0.05	3.08	0.02	0.50	2.25	0.01	2.75	0.7	1.5	0.01
2	5.86	.29	.05	4.12	.02	.42	.15	.01	4.16	.4	1.0	.01
3	6.42	.22	.05	8.55	.02	.40	6.85	.01	.01	1.0	.9	.01
4	1.47	7.78	.05	64.5	.02	.35	9.49	.01	9.76	3.5	.6	.01
5	.54	.20	.04	5.91	.02	.35	4.78	.02	2.55	3.2	1.6	.01
6	.37	.03	.03	.02	.02	.35	44.4	.02	1.08	2.8	1.2	.01
7	.23	.35	.02	.02	.02	.35	.01	.02	3.42	1.2	.7	.01
8	.14	.02	.02	.03	.02	.33	.01	.01	65.6	.4	5.3	.01
9	.16	.02	.02	.02	.08	.30	.01	.01	14.1	.2	2.3	.01
10	.13	.01	.02	.02	1.37	.30	.01	.36	3.04	.1	1.0	.01
11	5.86	.01	.02	.02	.02	.30	.01	.02	1.54	.1	.4	.01
12	.28	0	.01	.02	.02	2.41	.01	2.40	7.48	12	.01	.01
13	.33	0	0	.02	.02	.28	.01	1.34	1.62	3.5	.01	.01
14	1.19	0	0	3.23	.02	.26	.01	.01	12.7	1.2	.04	.01
15	4.56	0	0	.02	.03	.26	.01	.01	.59	.4	.01	.01
16	*1.3	10.4	0	.02	.57	.26	.01	.01	.81	.2	.01	.01
17	.22	.02	27.0	.02	5.96	.26	.01	.01	.22	.1	.01	.01
18	.82	.02	12.9	4.33	.03	.26	.02	.53	.01	.1	.01	.01
19	1.09	.03	1.35	.01	.03	*.28	.02	.01	.01	.2	.01	.01
20	.89	.03	1.24	3.73	.03	.28	.01	.01	.01	.8	.01	.01
21	2.53	.03	1.24	.01	.03	.28	5.23	.01	.01	.4	2.08	.01
22	9.64	.03	1.24	.01	.03	.28	.01	.01	61.9	.1	5.01	.01
23	.76	.04	1.24	.02	.40	.26	.21	.01	24.8	.1	14.5	.01
24	2.02	.04	1.24	.25	.68	.26	.01	.01	43.9	.2	.52	.01
25	.23	.02	1.24	.58	.64	.26	.01	.01	*4.2	.6	52.2	.01
26	1.65	.02	1.24	.01	2.02	.25	.01	.01	9.1	.2	6.50	.01
27	21.2	.02	1.24	.01	.68	.23	.01	.01	7.2	.1	5.28	.01
28	1.18	.02	1.18	3.41	.60	.23	.01	.01	3.8	.7	.01	.01
29	1.54	.03	1.18	4.68	.53	.21	.01	.01	1.4	20	.01	.01
30	.29	.03	2.98	.02	.53	.18	.01	--------	.8	3.5	.01	.01
31	1.30	.04	----------	.02	----------	.20	.01	--------	1.5	----------	.01	----------
Total	88.40	20.33	56.89	106.71	14.48	11.14	73.61	4.92	290.07	58.0	102.75	0.30
Mean												
Mgd	2.85	0.656	1.90	3.44	0.483	0.359	2.37	0.170	9.36	1.93	3.31	0.010
Cfs	4.41	1.01	2.94	5.32	0.747	0.555	3.67	0.263	14.5	2.99	5.12	0.016
Ac-ft	271	62	175	327	44	34	226	15	890	178	315	0.9

Calendar Year 1963: Max 128 Min 0 Mean mgd 5.67 Mean cfs 8.77 Ac-ft 6350
Fiscal Year 1963-64: Max 65.6 Min 0 Mean mgd 2.26 Mean cfs 3.50 Ac-ft 2540

* Discharge measurement made on this day.
Note.--No gage-height record July 16, Mar. 25 to May 11.

2110. Poamoho Stream near Wahiawa

Location (revised).--Lat 21°31'24", long 157°58'55", on left bank 180 ft downstream from Poamoho tunnel intake and 3.7 miles northeast of Wahiawa Post Office.

Drainage area.--1.79 sq mi.

Records available.--January 1947 to June 1964.

Gage.--Water-stage recorder and concrete control. Altitude of gage is 1,150 ft (from topographic map).

Average discharge.--17 years, 2.46 mgd (3.81 cfs).

Extremes.--Maximum discharge during year, 455 mgd (704 cfs) Oct. 4 (gage height, 3.73 ft), from rating curve extended above 49 mgd as explained below; no flow Sept. 28, 29.
1947-64: Maximum discharge, 1,440 mgd (2,230 cfs) Apr. 15, 1963 (gage height, 8.24 ft), from rating curve extended above 49 mgd by test on model of station site; no flow at times.

Remarks.--Records good except those for periods of no gage-height record, which are fair. Poamoho tunnel (see preceding page) diverts 180 ft above station to North Fork Kaukonahua Stream to augment storage in Wahiawa Reservoir.

Rating table (gage height, in feet, and discharge, in million gallons a day)

0.01	0	0.6	2.83
.1	.04	.8	5.75
.2	.19	1.0	10.0
.3	.47	1.2	16.2
.4	.99	1.5	31.5
.5	1.77	2.0	74.0

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	3.94	1.77	1.18	6.0	2.15	0.13	3.91	1.11	4.42	0.04	0.06	2.96
2	3.97	1.68	1.04	9.0	1.85	.11	1.13	1.55	4.73	.05	.05	2.46
3	4.73	1.60	1.31	14	1.68	.11	6.51	.85	2.35	.04	.04	2.35
4	3.55	2.22	1.77	40	1.50	.13	8.28	.64	4.17	.03	.03	2.15
5	3.05	2.25	5.94	10	1.41	.13	8.62	.55	4.15	.04	.03	1.97
6	2.83	1.77	2.42	4.0	1.33	.43	12.0	.59	3.70	.06	.04	1.77
7	2.72	5.12	1.68	3.5	1.33	.59	5.46	.79	3.85	.05	.04	1.77
8	2.46	2.80	1.11	*2.96	1.33	.15	2.96	1.33	10.2	.05	.07	1.85
9	2.60	1.68	.99	3.05	5.4	.11	1.97	.64	2.72	.03	.06	1.77
10	2.60	1.41	.92	2.46	6.09	.13	2.25	1.83	2.46	.04	.06	1.68
11	4.15	3.07	.79	2.05	1.50	.23	1.85	4.17	2.35	.06	.04	1.33
12	2.72	1.97	1.33	1.77	1.11	4.82	2.46	7.40	2.46	.06	*2.15	1.33
13	2.72	1.60	1.60	1.50	1.04	3.02	*1.51	*8.35	2.35	.05	1.97	1.25
14	3.05	1.60	.92	8.0	.99	.74	1.04	2.15	2.46	.05	3.60	1.18
15	3.70	1.60	.74	1.97	*.85	1.50	.92	1.68	2.35	.06	2.31	1.11
16	*3.30	12.6	.79	1.41	4.57	.69	1.18	4.64	2.35	.06	1.60	1.25
17	2.46	3.28	14.8	1.41	5.72	2.31	1.33	1.68	2.25	.03	1.41	1.68
18	2.83	2.60	11.9	8.0	3.29	.99	1.11	5.27	2.05	.02	1.33	2.47
19	2.72	1.41	5.0	2.35	1.33	*.30	.99	2.05	1.77	.36	1.25	1.60
20	2.72	3.77	2.0	9.1	1.11	.21	1.68	1.18	1.68	.10	1.50	1.56
21	2.60	1.97	.1	4.00	.99	.15	6.07	1.11	1.41	.14	8.79	1.83
22	3.19	2.25	.1	2.35	1.11	.13	2.25	.85	8.29	.10	9.79	1.77
23	2.72	1.90	.1	4.0	.43	.13	4.09	.74	.11	.10	12.1	2.73
24	2.96	7.06	.1	5.7	.06	.04	1.18	.85	.10	.10	10.2	*1.60
25	2.25	2.05	.1	7.4	.03	.02	2.72	1.04	.07	.10	23.1	4.94
26	2.60	2.72	.1	2.96	4.89	.02	1.60	1.25	.07	.11	17.0	3.28
27	3.05	2.60	.1	2.25	3.67	.07	1.11	.99	.07	.13	15.2	5.39
28	2.60	*3.02	0	9.5	.99	.02	.85	.99	.05	2.89	5.94	2.60
29	2.35	3.16	0	13	.36	.01	.79	.99	.04	.27	4.40	1.25
30	2.15	1.68	5.0	3.45	.19	.01	.85	----------	.03	.08	3.70	2.49
31	1.97	1.33	----------	2.35	----------	.05	1.18	----------	.04	----------	3.19	----------
Total	91.26	85.54	63.93	189.49	58.30	17.48	89.85	57.26	75.10	5.30	131.05	63.37
Mean												
Mgd	2.94	2.76	2.13	6.11	1.94	0.564	2.90	1.97	2.42	0.177	4.23	2.11
Cfs	4.55	4.27	3.30	9.45	3.00	0.873	4.49	3.06	3.74	0.274	6.54	3.26
Ac-ft	280	263	196	582	179	54	276	176	230	16	402	194

Calendar Year 1963: Max 150 Min 0 Mean mgd 2.88 Mean cfs 4.46 Ac-ft 3,230
Fiscal Year 1963-64: Max 40 Min 0 Mean mgd 2.54 Mean cfs 3.93 Ac-ft 2850

* Discharge measurement made on this day.
Note.--No gage-height record Sept. 19 to Oct. 7, Oct. 14, 18, 20, 23-25, 28, 29, Nov. 9.

2113. Makaleha Stream near Waialua

Location.--Lat 21°33'49", long 158°09'21", on left bank 1.0 mile southeast of Dillingham Ranch and 1.9 miles southwest of sugar mill at Waialua. Prior to Feb. 1, 1964, crest-stage gage only, at site 1,100 ft downstream Oct. 25, 1957, to Oct. 16, 1963, and at site 500 ft upstream Oct. 17, 1963, to Jan. 31, 1964.

Drainage area.--4.20 sq mi. Area at crest-stage gage sites, 4.24 and 4.15 sq mi.

Records available.--Fiscal years 1958-64 (annual maximum), February to June 1964.

Gage.--Water-stage recorder. Altitude of gage is 160 ft (from topographic map). Oct. 25, 1957, to Oct. 16, 1963, crest-stage gage at site 1,100 ft downstream and Oct. 17, 1963, to Jan. 31, 1964, crest-stage gage at site 500 ft upstream, both at different datums.

Extremes.--1963-64: Maximum discharge during fiscal year, 211 mgd (326 cfs) Mar. 24 (gage height, 3.58 ft); no flow most of the time.
1957-64: Maximum discharge, 1,320 mgd (2,040 cfs) Jan. 31, 1963, from slope-area measurement of peak flow (gage height not determined); no flow most of the time.

Remarks.--Records excellent except those for periods of flow, which are poor. No diversion above station.

Rating table (gage height, in feet, and discharge, in million gallons a day)

0.39	0	1.0	1.05
.5	.02	1.1	1.75
.6	.06	1.2	2.90
.7	.14	1.3	4.60
.8	.30	1.5	10.0
.9	.57		

Discharge, in million gallons a day, February to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1								0	0	0	*0	0
2								0	0	0	0	0
3								0	0	0	0	0
4								.07	.10	.31	0	0
5								.04	.05	.12	0	0
6								.02	0	0	0	0
7								0	0	0	0	0
8								0	1.65	0	.07	0
9								0	0	0	0	0
10								.09	0	0	0	0
11								.20	0	0	.06	0
12								.19	0	0	0	0
13								*.12	*0	0	0	0
14								.02	0	0	0	0
15								0	0	0	0	0
16								0	0	0	0	0
17								0	0	0	0	0
18								0	0	0	0	0
19								0	.10	0	0	*0
20								0	.17	0	0	0
21								0	0	0	0	0
22								0	1.32	0	.02	0
23								0	*4.08	0	.03	.15
24								.01	*9.31	0	0	.10
25								.07	5.31	0	0	0
26								0	4.29	0	0	0
27								0	3.61	0	0	0
28								0	1.59	0	0	0
29								0	.65	0	0	0
30								---	.22	0	0	0
31			---		---			---	0	---	0	---
Total								0.83	32.45	0.43	0.18	0.25
Mean												
Mgd								0.029	1.05	0.014	0.006	0.008
Cfs								0.045	1.62	0.022	0.009	0.012
Ac-ft								2.5	100	1.3	0.6	0.8

Calendar Year Max Min Mean mgd Mean cfs Ac-ft
Fiscal Year 1963-64: Max - Min - Mean mgd - Mean cfs - Ac-ft -

* Discharge measurement or observation of no flow made on this day.

2116. Makaha Stream near Makaha

Location (revised).--Lat 21°30'16", long 158°10'59", on right bank 1.5 miles northeast of Kaneaki Heiau and 3.4 miles northeast of Makaha.

Drainage area.--2.31 sq mi (revised).

Records available.--July 1959 to June 1964.

Gage.--Water-stage recorder and concrete-masonry control. Datum of gage is 938.64 ft above mean sea level (Waianae Plantation bench mark).

Average discharge.--5 years, 1.14 mgd (1.76 cfs).

Extremes.--Maximum discharge during year, 250 mgd (387 cfs) Mar. 24 (gage height, 4.10 ft), from rating curve extended above 32 mgd as explained below; no flow for several days in November.
1959-64: Maximum discharge, 756 mgd (1,170 cfs) Mar. 13, 1962 (gage height, 6.50 ft, from floodmark), from rating curve extended above 32 mgd on basis of slope-area measurement of peak flow; no flow at times.

Remarks.--Records good. No diversion above station. Continuous records of rainfall are obtained at station.

Rating table (gage height, in feet, and discharge, in million gallons a day)

1.04	0	1.5	1.54
1.1	.02	1.6	2.58
1.2	.11	1.7	4.00
1.3	.35	1.9	8.20
1.4	.80	2.1	15.0

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	1.06	0.24	0.11	0.16	0.36	0.06	1.56	0.21	0.38	1.00	0.42	0.16
2	.60	.18	.09	.16	.46	.05	.50	.21	.32	.80	.32	.16
3	.46	.16	.09	.16	.42	.05	*3.69	.18	.21	1.62	.29	.14
4	.46	.16	.09	.62	.24	.05	2.58	.29	1.00	1.36	.26	.12
5	.38	.16	.08	.38	*.18	.07	1.61	.32	.55	.92	.24	.11
6	.32	.14	.08	.29	.14	.48	1.12	.26	.29	1.00	.24	.11
7	.29	.14	.08	.21	.12	.38	1.12	.24	.21	.92	.18	.11
8	.29	.12	.07	.26	.11	.21	1.83	.18	2.67	.75	.18	.11
9	.29	.14	.07	.26	.61	.14	3.65	.16	*.60	.65	.16	.09
10	.26	.12	.07	.18	.11	.89	2.85	.42	.50	.70	.16	.09
11	.26	.12	.07	.16	.16	.92	1.70	1.05	.35	.65	.16	.09
12	.24	.12	.08	.14	.08	5.81	1.36	1.41	.26	.60	.16	.09
13	.26	.12	.08	.24	.01	1.23	.92	.86	.24	.50	.16	.09
14	.35	.12	.08	.29	0	.55	.70	.46	.18	.46	.16	.09
15	.32	.12	.08	.21	.01	.46	.80	.32	.16	.42	.16	.09
16	.38	.93	1.56	.18	0	.46	.70	.29	.14	.38	.14	.09
17	*.32	.46	*6.52	.16	0	.6	.50	.26	.12	.35	.14	.08
18	.26	.32	2.10	.12	.01	.32	.35	.24	.12	.32	.12	.08
19	.26	.24	.70	.11	.01	.26	.32	.24	.48	.29	.12	.08
20	.26	.21	.46	.11	.01	.21	.29	.21	.57	.38	.11	.08
21	.29	.16	.32	.12	0	.16	.35	.18	.24	.46	.14	.07
22	.50	.14	.26	.14	0	.29	.35	.16	4.13	.42	.91	.07
23	.46	.14	.21	.12	.01	.42	.29	.16	10.6	.70	1.49	.06
24	.60	.49	.18	.29	.01	.21	.29	.14	14.1	.55	.86	.06
25	.42	.26	.16	.24	.01	.14	.26	.16	6.96	.38	.46	*.05
26	.32	.18	.16	.16	.01	.14	.26	.16	4.65	.32	.55	.04
27	.54	.16	.21	.14	0	.18	.24	.18	5.09	.26	1.06	.08
28	.46	.18	.21	.12	0	.63	.21	.24	3.09	.26	.46	.14
29	.32	.26	.24	.18	.05	.50	.21	.26	2.10	*1.13	.29	.11
30	.29	.18	.16	.14	.06	.26	.24	---	1.54	.60	.21	.08
31	.26	.14	---	.12	---	.57	.21	---	1.28	---	.18	---
Total	11.78	6.61	14.67	6.17	3.19	16.70	31.06	9.45	63.13	19.15	10.49	2.82
Mean												
Mgd	0.380	0.213	0.489	0.199	0.106	0.539	1.00	0.326	2.04	0.638	0.338	0.094
Cfs	0.588	0.330	0.757	0.308	0.164	0.834	1.55	0.504	3.16	0.987	0.523	0.145
Ac-ft	36	20	45	19	9.8	51	95	29	194	59	32	8.7

Calendar Year 1963: Max 53.4 Min 0 Mean mgd 2.36 Mean cfs 3.65 Ac-ft 2650
Fiscal Year 1963-64: Max 14.1 Min 0 Mean mgd 0.533 Mean cfs 0.825 Ac-ft 598

* Discharge measurement made on this day.

Peak discharge (base, 100 mgd)

Date	Time	Gage height	Discharge Mgd	Discharge Cfs	Date	Time	Gage height	Discharge Mgd	Discharge Cfs
3-22	1530	3.42	143	221	3-24	0800	4.10	250	387

2118. Kaupuni Stream at altitude 374 ft, near Waianae

Location.--Lat 21°28'20", long 158°09'26", on right bank at diversion dam, 2.6 miles northeast of Waianae Cemetery, and 2.8 miles northeast of junction of Waianae Valley Road and Farrington Highway.

Drainage area.--3.27 sq mi.

Records available.--May 1960 to June 1964. Prior to July 1962, published as "at altitude 360 ft, near Waianae."

Gage.--Water-stage recorder and concrete-masonry control. Datum of gage is 374 ft above mean sea level (by stadia survey).

Extremes.--Maximum discharge during year, 48.0 mgd (74.3 cfs) Mar. 22 (gage height, 2.55 ft); no flow June 14-30.
1960-64: Maximum discharge, 446 mgd (690 cfs) Mar. 14, 1962 (gage height, 4.06 ft), from rating curve extended above 40 mgd on basis of slope-area measurement of peak flow; no flow at times each year.

Remarks.--Records good. Several water-development tunnels above station may affect flow.

Rating table (gage height, in feet, and discharge, in million gallons a day)
(Shifting-control method used July 7-17, Oct. 14-16)

1.06	0	1.5	1.25
1.1	.02	1.6	2.10
1.2	.10	1.7	3.50
1.3	.28	1.8	5.15
1.4	.64	1.9	7.40

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	0.55	0.22	0.14	0.26	0.20	0.10	0.07	0.09	0.04	0.12	0.22	0.04
2	.51	.20	.13	.24	.22	.12	.07	.09	.04	.13	.26	.04
3	.51	.18	.14	.24	.22	.10	*.07	.08	.04	.14	.14	.04
4	.47	.18	.13	.24	.16	.10	.07	.08	.06	.14	.09	.04
5	.49	.18	.13	.24	.14	.10	.07	.08	.07	.13	.08	.03
6	.51	.18	.13	.22	.14	.12	.08	.09	.06	.13	*.07	.03
7	.31	.18	.13	.20	.14	.12	.08	.09	.13	.14	.08	.03
8	.30	.18	.12	.22	.13	.10	.08	.09	.20	.14	.09	.02
9	.39	.18	*.13	.20	.14	.12	.08	.07	.24	.14	.09	.03
10	.39	.16	.13	.18	.20	.12	.08	.07	.13	.16	.06	.02
11	.43	.16	.13	.18	.24	.12	.07	*.07	.09	.16	.06	.02
12	.39	.16	.12	.16	.26	.09	.07	.08	.08	.14	.06	.02
13	.47	.16	.10	.16	.28	.08	.08	.08	.08	.13	.07	.01
14	.51	.18	.10	.23	.22	.08	.09	.08	.07	.14	.07	0
15	.47	.18	.10	.13	.14	.08	.09	.08	.06	.14	.07	0
16	.43	.18	.12	*.16	.13	.07	.08	.07	.05	.13	.07	0
17	*.42	.18	.20	.20	.10	.08	.06	.07	.05	.12	.07	0
18	.43	.18	.22	.20	*.13	.08	.06	.07	.05	.09	.06	*0
19	.43	.18	.18	.20	.10	.08	.06	.07	.05	.06	.06	0
20	.38	.18	.18	.20	.10	.08	.06	.07	.05	.06	.06	0
21	.33	.18	.16	.20	.10	.06	.06	.06	.04	.06	.06	0
22	.30	.18	.16	.20	.10	.06	.06	.05	3.51	.08	.06	0
23	.24	.16	.14	.22	.09	.07	.06	.05	1.90	.08	.06	0
24	.24	.18	.14	.22	.09	.07	.06	.05	*5.92	.09	.06	0
25	.24	.16	.14	.20	.10	.07	.05	.05	3.89	.09	.05	0
26	.22	.16	.14	.18	.12	.07	.07	.05	1.09	.10	.05	0
27	.24	.16	.19	.18	.13	.07	.08	.05	.33	.13	.05	0
28	.24	.16	.28	.16	.12	.07	.09	.05	.18	.16	.04	0
29	.22	.14	.26	.16	.10	.07	.10	.04	.14	.16	.05	0
30	.22	.14	.26	.20	.10	.06	.12	---	.14	.20	.04	0
31	.22	.14	---	.20	---	.06	.09	---	.10	---	.04	---
Total	11.50	5.34	4.63	6.18	4.44	2.67	2.31	2.02	18.88	3.69	2.39	0.37
Mean												
Mgd	0.371	0.172	0.154	0.199	0.143	0.086	0.075	0.070	0.609	0.123	0.077	0.012
Cfs	0.574	0.266	0.238	0.308	0.221	0.133	0.116	0.108	0.942	0.190	0.119	0.019
Ac-ft	35	16	14	19	14	8.2	7.1	6.2	58	11	7.3	1.1

Calendar Year 1963: Max 52.4 Min 0 Mean mgd 1.31 Mean cfs 2.03 Ac-ft 1,470
Fiscal Year 1963-64: Max 5.92 Min 0 Mean mgd 0.176 Mean cfs 0.272 Ac-ft 197

Peak discharge (base, 160 mgd).--No peak above base.

* Discharge measurement or observation of no flow made on this day.

2118.5 Puea mauka ditch near Waianae

Location.--Lat 21°28'12", long 158°09'43", on left bank 2.3 miles northeast of Waianae School and 2.8 miles north of Lualualei Naval Radio Station.

Records available.--June 1960 to June 1964.

Gage.--Water-stage recorder and Parshall flume. Altitude of gage is 360 ft (from topographic map).

Extremes.--1960-64: Maximum daily discharge, 1.4 mgd (2.2 cfs) Oct. 22, 1960; minimum daily, 0.11 mgd (0.17 cfs) Aug. 21, 1961.

Remarks.--Records good. Water is used for irrigation of truck farms in Waianae Valley. Continuous records of rainfall are obtained at station.

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	0.36	0.36	0.26	0.51	0.43	0.47	0.55	0.39	0.59	0.32	0.15	0.26
2	.36	.39	.23	.43	.39	.47	.47	.43	.43	.32	.20	.29
3	.36	.39	.23	.43	.43	.47	.43	.43	.47	.43	.20	.26
4	.39	.39	.23	.39	.32	.51	.51	.47	.59	.39	.13	.26
5	.39	.36	.26	.43	.39	.51	.51	.47	.47	.39	.26	.26
6	.47	.32	.23	.47	.36	.67	.67	.47	.47	.29	*.28	.36
7	.47	.36	.26	.43	.39	.67	.67	.39	.39	.32	.26	.32
8	.47	.36	.26	.43	.36	.63	.63	.36	.51	.36	.26	.29
9	.47	.39	.23	.39	.36	.59	.63	.51	.51	.29	.26	.32
10	.47	.36	.32	.43	.36	.67	.59	.36	.43	.26	.26	.29
11	.47	.32	.29	.36	.32	.63	.59	*.32	.39	.26	.23	.32
12	.51	.32	.29	.43	.39	.59	.51	.32	.47	.23	.20	.32
13	.55	.29	.29	.43	.43	.55	.51	.36	.43	.23	.18	.36
14	.51	.32	.29	.39	.39	.59	.51	.32	.43	.29	.20	.32
15	.51	.36	.32	.39	.36	.59	.59	.32	.43	.29	.20	.26
16	.43	.39	.32	*.38	.43	.59	.51	.39	.39	.32	.20	.32
17	*.36	.36	.43	.39	.43	.55	.51	.32	.43	.29	.23	.26
18	.26	.32	.43	.26	*.32	*.59	.47	.39	.43	.32	.20	*.32
19	.35	.26	.47	.29	.32	.47	.43	.36	.43	.36	.23	.39
20	.36	.29	.43	.47	.36	.39	.47	.36	.39	.29	.23	.36
21	.38	.29	.47	.36	.39	.47	.47	.36	.36	.32	.26	.26
22	.29	.29	.39	.43	.39	.51	.39	.39	.52	.32	.26	.32
23	.32	.29	.43	.39	.39	.43	.39	.43	.43	.23	.26	.32
24	.29	.29	.47	.43	.43	.47	.47	.43	.47	.26	.20	.32
25	.26	.23	.43	.43	.39	.51	.43	.39	.47	.26	.20	.32
26	.26	.23	.43	.39	.43	.47	.39	.43	*.39	.29	.26	.29
27	.39	.26	.47	.47	.43	.47	.39	.32	.39	.23	.29	.3
28	.29	.29	.55	.39	.51	.55	.39	.39	.43	.20	.32	.3
29	.29	.26	.59	.39	.47	.51	.39	.43	.39	.36	.32	.3
30	.29	.23	.55	.39	.43	.47	.43	----------	.29	.23	.32	.26
31	.32	.29	----------	.43	----------	.51	.43	----------	.32	----------	.32	----------
Total	11.90	9.86	10.85	12.63	11.80	16.57	15.33	11.31	13.54	8.95	7.37	9.13
Mean												
Mgd	0.384	0.318	0.362	0.407	0.393	0.535	0.495	0.390	0.437	0.298	0.238	0.304
Cfs	0.594	0.492	0.560	0.630	0.608	0.828	0.766	0.603	0.676	0.461	0.368	0.470
Ac-ft	37	30	33	39	36	51	47	35	42	27	23	28

Calendar Year 1963: Max 0.67 Min 0.15 Mean mgd 0.368 Mean cfs 0.569 Ac-ft 412
Fiscal Year 1963-64: Max 0.67 Min 0.13 Mean mgd 0.380 Mean cfs 0.588 Ac-ft 428

* Discharge measurement made on this day.

2128. Kipapa Stream near Wahiawa

Location.--Lat 21°28'15", long 157°57'50", on left bank 1,700 ft downstream from forest-reserve boundary, 4.9 miles southeast of Wahiawa Post Office, and 6.3 miles northeast of Waipahu.

Drainage area.--4.29 sq mi.

Records available.--January 1957 to June 1964.

Gage.--Water-stage recorder. Altitude of gage is 690 ft (from topographic map).

Average discharge.--7 years, 5.98 mgd (9.25 cfs).

Extremes.--Maximum discharge during year, 595 mgd (921 cfs) Mar. 8 (gage height, 6.06 ft), from rating curve extended above 190 mgd as explained below; minimum, 0.14 mgd (0.22 cfs) Dec. 25, 26, Feb. 3, 6.
1957-64: Maximum discharge, 3,670 mgd (5,680 cfs) May 14, 1963 (gage height, 12.29 ft), from rating curve extended above 190 mgd on basis of slope-area measurements at gage heights 7.96 and 12.29 ft; no flow at times.

Remarks.--Records good except those for periods of no gage-height record, which are fair. Continuous records of rainfall are obtained at station.

Rating table (gage height, in feet, and discharge, in million gallons a day)

2.1	0.06	2.8	8.40
2.2	.20	3.1	18.5
2.3	.59	3.5	40.0
2.4	1.30	4.0	78.0
2.5	2.40	4.5	135
2.6	3.90		

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	41.2	3.0	1.17	2.80	1.10	0.33	8.67	0.22	11.5	10.3	4.90	3.40
2	10.4	2.5	.98	2.40	.91	.27	1.87	.18	7.92	19.1	3.10	2.80
3	15.5	2.0	.98	3.10	.78	.25	3.55	.14	2.45	21.8	3.75	2.40
4	3.8	4.0	1.40	44.1	*.72	.27	13.4	.16	1.60	20.4	2.53	2.15
5	3.2	5.0	9.00	16.5	.78	.27	27.2	.20	2.25	12.1	3.74	1.80
6	2.9	2.40	2.15	6.85	.65	.50	22.3	.16	2.98	19.6	2.40	1.70
7	2.5	2.15	1.30	4.85	1.18	.72	5.79	.25	2.38	8.03	1.80	1.60
8	3.5	2.00	.98	2.65	5.21	.37	5.62	.27	68.5	5.70	2.52	1.60
9	5.4	1.80	.84	5.15	3.99	.25	2.95	.25	6.90	3.60	2.25	1.60
10	7.6	1.50	.65	2.00	9.02	.25	2.80	.60	*4.10	2.80	1.90	1.50
11	9.16	11.0	.65	1.30	1.72	.22	2.65	6.30	3.10	2.65	2.53	1.10
12	6.4	3.42	4.86	1.04	.84	4.75	2.53	6.37	2.95	7.46	1.50	1.17
13	4.4	1.90	2.54	.98	.72	3.80	1.40	7.66	4.32	3.10	1.10	.98
14	6.39	1.70	1.10	13.3	.59	1.10	*.84	2.40	3.29	2.00	*1.04	.91
15	16.6	1.17	.84	2.29	.46	.46	.84	1.70	1.40	2.00	1.10	.84
16	7.0	11.9	1.28	1.10	7.51	.75	.98	2.40	1.10	1.50	22.1	1.90
17	4.5	2.94	83.6	.91	1.50	5.45	.78	1.30	1.04	1.40	5.53	1.60
18	6.0	3.58	35.1	14.1	.78	1.82	.46	.91	.91	1.17	1.30	1.17
19	10	3.40	7.94	2.65	.59	.65	.37	.65	.98	1.17	.91	1.70
20	8.0	2.15	3.90	15.8	.41	.27	.41	.37	.59	6.64	.84	.84
21	18.7	1.40	2.65	6.06	.33	.18	1.30	.30	9.30	3.55	14.20	.65
22	21.7	1.17	1.80	2.65	.46	.20	1.04	.25	56.7	3.56	23.10	.78
23	7.5	5.27	*1.40	7.15	.33	.22	1.10	.22	53.2	10.6	43.70	2.97
24	20.9	16.8	1.10	6.30	.27	.16	.72	.20	63.2	13.9	35.40	2.25
25	4.0	3.15	1.04	3.25	.27	.16	.41	.25	14.3	3.85	131	3.48
26	3.0	3.82	.91	1.70	8.83	.16	.84	.59	42.5	3.10	86.7	2.65
27	35.1	4.73	.84	1.10	7.10	.22	.52	.59	50.6	1.80	72.7	4.90
28	20	8.62	.78	1.30	2.34	.27	.33	.37	18.9	5.54	13.7	1.70
29	10	5.11	8.47	15.1	.78	.27	.27	.37	6.90	91.0	8.10	.91
30	*6.0	2.40	8.24	2.73	.46	.22	.22	----------	4.90	8.70	5.50	1.30
31	3.5	1.60	----------	1.50	----------	.20	.20	----------	7.70	----------	4.30	----------
Total	324.85	123.58	188.49	192.71	60.63	25.01	112.36	35.63	458.46	298.12	505.24	54.35
Mean												
Mgd	10.5	3.99	6.28	6.22	2.02	0.807	3.62	1.23	14.8	9.94	16.3	1.81
Cfs	16.2	6.17	9.72	9.62	3.13	1.25	5.60	1.90	22.9	15.4	25.2	2.80
Ac-ft	997	379	578	591	186	77	345	109	1,410	915	1,550	167

Calendar Year 1963: Max 551 Min 0.11 Mean mgd 9.20 Mean cfs 14.2 Ac-ft 10,310
Fiscal Year 1963-64: Max 131 Min 0.14 Mean mgd 6.50 Mean cfs 10.1 Ac-ft 7,300

Peak discharge (base, 600 mgd).--No peak above base.

* Discharge measurement made on this day.
Note.--No gage-height record July 4-10, 12, 13, 16-20, 23, 25, 26, July 28 to Aug. 5.

2130. Waikele Stream at Waipahu

Location.--Lat 21°23'09", long 158°00'48", on left bank 300 ft upstream from bridge on Farrington Highway, 0.3 mile south of Waipahu, and 2.5 miles west of Pearl City.

Drainage area.--45.7 sq mi.

Records available.--June to October 1951, December 1951 to October 1959, July 1960 to June 1964.

Gage.--Water-stage recorder and concrete control. Datum of gage is 1.37 ft above mean sea level, datum of 1929. Prior to July 1, 1960, at site 300 ft downstream at datum 1.30 ft higher.

Average discharge.--11 years (1952-59, 1960-64), 24.3 mgd (37.6 cfs).

Extremes.--Maximum discharge during year, 708 mgd (1,100 cfs) Mar. 22 (gage height, 4.55 ft); minimum, 10.0 mgd (15.5 cfs) June 30. 1951-64: Maximum discharge, 8,790 mgd (13,600 cfs) Nov. 28, 1954 (gage height, 14.82 ft, site and datum then in use), from rating curve extended above 470 mgd on basis of slope-area measurement of peak flow; minimum, 2.44 mgd (3.78 cfs) Sept. 28, 29, 1962.

Remarks.--Records good. Diversions above station for irrigation of sugar cane in Waipahu area.

Rating table (gage height, in feet, and discharge, in million gallons a day)

1.9	8.70	2.9	82.0
2.0	11.3	3.2	145
2.3	23.0	3.5	250
2.6	42.0		

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	50.2	15.7	16.1	15.7	14.5	15.3	23.0	22.1	19.4	29.8	23.0	17.3
2	27.0	15.7	17.7	16.1	16.5	15.7	23.5	22.1	19.8	39.6	20.8	16.5
3	28.5	19.8	12.6	19.4	18.1	14.2	30.3	21.2	19.4	52.4	19.8	16.5
4	25.0	21.7	12.3	44.1	15.7	17.7	33.4	20.3	19.4	53.7	*19.8	16.9
5	17.7	21.6	11.3	67.1	14.5	17.7	54.7	17.3	18.5	40.4	19.0	14.9
6	16.5	*18.5	12.9	29.8	14.2	19.0	42.9	18.1	17.3	35.6	16.9	17.3
7	17.7	16.1	15.3	24.5	14.5	18.1	39.6	19.4	16.9	34.0	16.1	16.9
8	12.6	14.2	16.5	20.8	17.7	18.1	31.0	21.2	111	25.5	15.7	13.2
9	11.3	14.2	14.2	19.0	19.0	18.1	30.4	20.8	34.3	24.0	16.9	13.5
10	11.0	16.1	12.9	16.9	21.2	17.7	28.0	20.3	19.8	20.3	19.0	16.5
11	15.2	18.6	12.3	17.7	16.5	15.7	29.8	19.4	18.1	19.0	16.1	16.1
12	13.2	18.1	13.2	18.5	15.7	14.5	32.8	20.3	18.1	19.0	14.5	12.6
13	13.2	15.3	14.2	19.0	*14.2	15.3	29.8	20.3	18.1	20.8	14.2	14.2
14	22.1	12.9	15.7	17.8	13.5	14.5	25.5	19.8	18.1	21.2	13.9	16.5
15	24.3	12.6	16.1	18.5	13.9	14.5	24.5	20.8	18.5	20.3	14.2	13.2
16	22.1	16.5	13.2	15.3	18.1	16.9	22.6	20.8	18.5	19.0	22.6	12.9
17	18.1	18.5	*127	16.1	17.7	16.9	22.1	20.8	18.5	19.0	22.6	14.2
18	16.9	17.7	62.1	16.5	14.2	16.9	22.6	21.2	18.5	19.4	16.9	11.3
19	19.3	16.1	27.0	18.5	12.3	*18.1	22.1	21.6	17.7	21.2	15.7	11.0
20	21.6	13.2	21.6	18.9	11.9	15.7	22.6	20.8	17.3	21.2	15.3	12.9
21	27.2	12.6	24.5	28.2	11.3	16.9	21.6	20.3	16.9	20.3	14.9	15.7
22	32.6	11.9	24.5	21.6	11.3	17.7	20.3	20.8	157	19.4	22.7	11.9
23	19.8	11.9	22.6	18.5	16.1	17.7	19.8	22.1	100	18.5	58.5	11.0
24	26.1	18.1	22.1	19.0	17.7	17.7	20.3	21.2	210	33.2	50.9	*11.3
25	18.5	17.7	22.1	19.0	16.9	17.7	21.2	20.8	53.3	32.2	175	10.8
26	16.1	12.6	21.6	16.9	13.9	17.7	20.3	19.0	78.6	24.5	143	11.0
27	43.5	13.2	19.8	16.9	14.2	17.7	22.6	19.0	75.9	22.1	119	11.9
28	30.0	14.2	19.8	15.3	16.9	18.1	25.0	18.5	76.7	18.1	35.3	13.9
29	21.6	16.1	19.8	13.2	15.7	18.5	24.5	18.5	37.2	123	23.5	15.3
30	18.1	16.5	19.4	13.5	15.7	18.5	24.0	---	29.8	34.9	22.6	11.6
31	15.3	15.7	---	13.9	---	19.4	22.6	---	26.0	---	21.2	---
Total	672.3	493.6	680.4	646.2	463.6	528.2	833.4	588.8	1338.6	901.6	1039.6	418.8
Mean												
Mgd	21.7	15.9	22.7	21.5	15.5	17.0	26.9	20.3	43.2	30.1	33.5	14.0
Cfs	33.6	24.6	35.1	33.3	24.0	26.3	41.6	31.4	66.8	46.6	51.8	21.7
Ac-ft	2060	1510	2090	1980	1420	1620	2560	1810	4110	2770	3190	1290

Calendar Year 1963: Max 1430 Min 11.0 Mean mgd 37.2 Mean cfs 57.6 Ac-ft 41650
Fiscal Year 1963-64: Max 210 Min 10.8 Mean mgd 23.5 Mean cfs 36.4 Ac-ft 26410

* Discharge measurement made on this day.

Peak discharge (base, 700 mgd)

Date	Time	Gage height	Discharge	
			Mgd	Cfs
3-22	1700	4.55	708	1,100

2140. Pearl Harbor Springs at Waiawa, near Pearl City

Location.--Lat 21°23'35", long 157°59'10", on right bank at rear of Oahu Sugar Co. pumping plant 9, 0.7 mile west of Pearl City, and 9.8 miles northwest of Honolulu.

Records available.--March 1931 to June 1934, July 1937 to June 1964.

Gage.--Water-stage recorder and sharp-crested weir. Datum of gage is 0.73 ft below mean sea level, datum of 1929.

Average discharge.--30 years, 11.1 mgd (17.2 cfs), unadjusted for pumpage.

Extremes.--1931-34, 1937-64: Maximum daily discharge, 18.7 mgd (28.9 cfs) Feb. 27, 1949; minimum daily, 1.20 mgd (1.86 cfs) June 30, 1964.

Remarks.--Records good. Oahu Sugar Co. pump 9 diverts about 3 mgd at times for irrigation of sugar cane. Surface runoff from floods not included in figures of discharge.

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	4.50	3.22	2.26	1.60	1.60	4.25	5.34	4.78	4.78	3.74	2.03	1.30
2	4.00	3.22	4.78	2.74	1.60	2.26	5.34	5.06	3.22	3.74	1.45	1.30
3	4.25	3.22	2.26	3.48	1.81	2.03	5.34	3.22	*4.00	4.00	1.60	1.30
4	5.90	2.98	2.03	3.48	1.81	2.74	5.06	3.74	3.22	4.00	2.26	1.45
5	5.34	2.98	2.03	3.74	*2.74	2.74	5.06	3.74	3.22	4.00	2.03	1.45
6	6.20	2.98	1.81	4.00	2.74	3.22	5.34	3.74	3.74	4.00	1.60	1.30
7	6.20	2.98	1.60	4.00	3.74	4.00	5.34	3.48	4.78	2.26	1.60	1.45
8	5.06	3.48	1.60	4.00	1.60	4.00	5.34	5.06	4.78	1.81	1.60	1.45
9	5.06	*5.34	1.81	2.74	1.81	4.25	5.34	5.06	4.00	1.81	1.45	1.30
10	5.06	5.34	2.03	1.60	4.00	4.50	5.34	3.48	3.74	2.26	1.45	1.30
11	5.06	5.06	2.03	2.03	2.03	4.78	5.34	3.74	3.48	3.74	1.45	1.30
12	5.06	4.00	2.03	2.74	2.03	4.78	5.34	3.74	3.22	3.74	1.45	1.45
13	5.06	4.25	2.74	2.98	2.03	4.78	5.34	4.50	2.74	3.74	1.45	1.30
14	5.06	3.74	4.50	2.03	1.45	4.78	5.34	3.22	3.74	3.74	1.45	1.45
15	5.34	3.22	4.50	1.45	1.45	4.78	5.34	4.50	2.03	3.74	1.30	1.45
16	5.34	2.74	2.74	1.60	1.45	2.98	5.34	4.78	1.81	2.98	1.30	1.30
17	5.06	2.74	3.74	1.60	1.45	2.03	5.34	3.48	1.45	2.74	1.45	1.30
18	4.78	2.74	*4.50	2.03	1.45	2.98	5.34	3.74	1.45	3.48	1.45	1.30
19	5.06	2.98	4.25	4.00	1.45	2.98	5.34	4.00	1.45	3.74	1.45	*1.30
20	4.50	2.74	4.25	4.25	1.45	2.74	5.34	2.50	1.45	2.50	1.45	1.30
21	4.78	2.50	4.00	3.48	1.45	4.50	5.34	2.50	1.45	2.74	1.45	1.30
22	4.50	2.50	4.00	3.22	1.60	4.78	4.25	4.50	2.26	2.98	1.45	1.30
23	4.78	2.74	4.00	3.22	1.60	3.74	4.25	4.50	2.74	3.48	1.45	1.30
24	4.50	4.50	4.00	2.03	1.60	5.06	*4.00	2.98	2.98	3.22	1.45	1.30
25	4.78	4.78	4.00	1.60	1.60	5.34	5.34	2.74	3.74	4.00	1.45	1.30
26	4.78	3.48	4.00	1.60	1.81	5.06	5.06	2.50	3.74	4.00	1.45	1.45
27	5.06	4.50	4.00	1.60	2.03	5.06	5.06	3.22	4.00	3.22	1.45	1.45
28	5.90	4.78	4.00	1.60	4.00	5.06	4.78	3.22	4.00	2.98	1.45	1.45
29	4.25	4.50	4.00	1.45	4.00	5.34	4.78	4.78	4.00	*2.74	1.45	1.60
30	4.25	2.50	2.26	1.45	4.25	5.34	4.78	---	4.00	2.74	1.45	1.20
31	4.25	2.03	---	1.45	---	5.34	4.78	---	4.00	---	1.45	---
Total	153.72	108.76	95.75	78.79	63.63	126.22	158.66	110.50	99.21	97.86	47.22	40.70
Mean												
Mgd	4.96	3.51	3.19	2.54	2.12	4.07	5.12	3.81	3.20	3.26	1.52	1.36
Cfs	7.67	5.43	4.94	3.93	3.28	6.30	7.92	5.89	4.95	5.04	2.35	2.10
Ac-ft	472	334	294	242	195	387	487	339	304	300	145	125

Calendar Year 1963: Max 14.7 Min 1.45 Mean mgd 4.61 Mean cfs 7.13 Ac-ft 5,160
Fiscal Year 1963-64: Max 6.20 Min 1.20 Mean mgd 3.23 Mean cfs 5.00 Ac-ft 3,620

* Discharge measurement made on this day.

2160. Waiawa Stream near Pearl City

Location.--Lat 21°23'55", long 157°58'50", on left bank 100 ft upstream from bridge on Farrington Highway, 0.6 mile northwest of Pearl City, and 2.0 miles northeast of Waipahu.

Drainage area.--26.4 sq mi.

Records available.--June 1952 to June 1964.

Gage.--Water-stage recorder and concrete control. Datum of gage is 1.81 ft above mean sea level, datum of 1929.

Average discharge.--12 years, 15.4 mgd (23.8 cfs)

Extremes.--Maximum discharge during year, 1,740 mgd (2,690 cfs) Mar. 22 (gage height, 8.79 ft, from floodmarks), from rating curve extended above 680 mgd as explained below; minimum, 2.90 mgd (4.49 cfs) Sept. 28-30, Jan. 22.
1952-64: Maximum discharge, 10,900 mgd (16,900 cfs) Nov. 28, 1954 (gage height, 19.27 ft), from rating curve extended above 680 mgd on basis of slope-area measurement at gage height 17.1 ft; minimum, 1.67 mgd (2.58 cfs) June 8, 1957.

Remarks.--Records good except those for periods of no gage-height record, which are poor. Occasional small diversions for irrigation above station.

Rating table (gage height, in feet, and discharge, in million gallons a day)

1.6	2.90	3.0	75.0
1.8	5.50	3.5	151
2.1	11.8	4.0	263
2.3	19.3	4.5	378
2.6	37.3		

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	102	5.50	3.45	4.78	5.21	4.06	11.8	3.45	4.62	10.6	10.0	8.04
2	25.7	5.21	3.45	3.93	4.78	4.06	6.36	3.30	12.2	17.6	7.05	7.42
3	25.8	4.64	3.80	7.25	4.49	4.20	111	3.45	*8.48	22.0	5.50	7.22
4	15.4	8.00	4.35	100	4.64	3.93	36.4	3.57	5.67	12.6	4.92	6.88
5	7.84	8.36	5.11	49.2	*4.20	3.93	73.8	3.69	11.8	15.0	4.64	6.36
6	5.67	4.64	6.19	12.8	4.78	4.35	39.4	4.06	7.63	25.2	5.21	5.84
7	5.00	4.06	5.21	12.8	4.78	4.49	19.6	4.06	5.0	15.8	5.21	5.07
8	6.62	3.93	5.21	7.05	4.78	4.35	17.2	3.57	140	10.0	5.36	4.78
9	11.8	*3.45	4.64	8.64	6.26	4.20	14.1	3.45	25	7.63	6.70	5.07
10	17.7	3.30	4.49	5.50	11.1	4.06	8.86	3.45	15	6.02	6.02	5.67
11	10.2	8.45	4.35	4.06	6.02	4.20	7.84	5.49	8.0	5.21	6.02	5.50
12	9.16	7.53	4.20	3.57	4.78	5.07	6.19	6.70	7.6	7.21	6.02	5.84
13	14.2	4.92	3.69	3.30	4.49	8.17	4.92	7.73	7.2	6.53	6.70	5.21
14	35.0	4.35	3.93	20.9	4.78	4.35	4.20	6.53	7.0	5.07	7.66	4.49
15	40.3	3.93	3.80	7.42	5.21	3.93	3.80	5.50	7.4	4.8	6.88	4.35
16	22.0	4.06	3.93	5.50	6.53	3.45	3.57	8.24	7.8	4.5	5.84	4.20
17	10.5	4.78	*152	4.49	6.36	5.48	3.30	6.19	7.8	4.3	5.21	4.06
18	12.9	4.64	76.0	9.03	5.36	4.64	3.30	4.78	7.8	5.0	4.92	*4.64
19	18.4	4.49	20.1	7.36	5.21	4.06	3.30	3.93	7.4	6.0	4.92	4.92
20	14.9	4.49	9.06	26.6	5.36	4.35	3.20	4.06	7.0	6.6	5.36	4.64
21	37.2	4.49	6.19	19.4	5.21	4.06	3.10	4.78	6.0	6.0	6.19	4.64
22	47.2	4.64	5.07	7.05	5.21	3.93	3.00	3.93	350	5.6	21.9	4.92
23	13.4	5.50	*5.07	8.00	5.07	4.20	3.30	3.57	140	5.0	45.2	4.49
24	32.4	130	3.45	11.0	4.78	4.20	*3.45	3.69	200	30	38.8	5.21
25	10.8	7.68	3.10	9.27	4.78	3.93	3.80	4.20	32.8	25	295	4.78
26	6.88	5.21	3.20	6.70	4.64	4.06	3.80	4.35	63.9	15	369	4.92
27	101	4.64	3.00	5.36	5.07	3.69	3.93	4.79	73.2	12	152	5.07
28	33.4	5.21	3.00	4.92	4.78	3.80	3.57	4.49	33.3	7.0	34.0	5.21
29	19.8	11.1	3.00	25.9	4.35	4.06	3.57	4.35	13.5	*150	19.8	4.78
30	10.5	5.21	8.21	10.3	4.06	3.93	3.45	----------	8.86	21.3	12.1	5.67
31	7.05	3.93	----------	6.02	----------	3.69	3.57	----------	7.05	----------	8.66	----------
Total	730.72	173.34	370.25	418.10	157.07	132.88	420.68	133.34	1239.01	474.57	1122.79	159.89
Mean												
Mgd	23.6	5.59	12.3	13.5	5.24	4.29	13.6	4.60	40.0	15.8	36.2	5.33
Cfs	36.5	8.65	19.0	20.9	8.11	6.64	21.0	7.12	61.9	24.4	56.0	8.25
Ac-ft	2240	532	1140	1280	482	408	1290	409	3800	1460	3450	491

Calendar Year 1963: Max 1140 Min 2.80 Mean mgd 24.9 Mean cfs 38.5 Ac-ft 27,870
Fiscal Year 1963-64: Max 369 Min 3.00 Mean mgd 15.1 Mean cfs 23.4 Ac-ft 16,980

* Discharge measurement made on this day.
Note.--No gage-height record Mar. 7-24, Apr. 15-29.

Peak discharge (base, 800 mgd)

Date	Time	Gage height	Discharge Mgd	Discharge Cfs	Date	Time	Gage height	Discharge Mgd	Discharge Cfs
3-22	about 1700	8.79	1,740	2,690	5-26	0200	8.14	1,460	2,260
4-29	about 0500	7.50	1,200	1,860					

2190. Hawaiian Electric Co. tunnel at Waiau, near Pearl City

Location.--Lat 21°23'30", long 157°57'55", on right bank of ditch at Hawaiian Electric Co. Waiau powerplant, 20 ft downstream from tunnel portal, and 0.6 mile east of Pearl City.

Records available.--October 1939 to April 1942, July 1942 to December 1945, July 1952 to June 1964.

Gage.--Water-stage recorder and Parshall flume. Datum of gage is 2.91 ft above mean sea level, datum of 1929. Prior to July 1, 1952, at site 120 ft downstream at datum 2.27 ft lower.

Average discharge.--14 years (1940-41, 1944-45, 1952-64), 10.5 mgd (16.2 cfs).

Extremes.--1939-45, 1952-64: Maximum daily discharge, 17.3 mgd (26.8 cfs) Mar. 26, 27, 1940; minimum daily, 6.0 mgd (9.3 cfs) Aug. 3, 1941.

Remarks.--Records good. Water is used for cooling condensers in powerplant and afterwards for irrigation of sugar cane.

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	11.6	11.0	10.9	10.7	10.8	11.1	11.1	11.0	10.6	10.8	10.4	10.1
2	11.6	10.9	10.9	10.7	10.8	11.1	11.1	11.0	10.6	10.9	10.4	10.1
3	11.6	10.9	10.9	10.7	10.8	11.0	11.1	11.0	10.6	10.9	10.4	10.1
4	11.6	10.9	10.9	10.9	10.8	10.9	11.1	10.9	10.6	10.9	10.4	10.1
5	11.6	10.8	10.8	10.8	10.8	10.9	11.2	10.9	10.6	10.9	10.3	10.1
6	11.6	10.8	10.8	10.8	10.8	10.9	11.2	10.9	*10.4	10.9	10.3	10.1
7	11.6	10.8	10.8	10.8	10.8	11.0	11.2	10.8	10.4	10.9	10.3	10.1
8	11.6	10.7	10.8	10.8	10.8	11.1	11.2	10.8	10.6	10.8	10.2	10.0
9	11.5	*10.7	10.8	10.7	10.8	11.1	11.2	10.9	10.6	10.8	10.3	10.0
10	11.2	10.8	10.8	10.7	10.8	11.1	11.2	10.9	10.4	10.8	10.3	10.0
11	11.2	10.8	10.8	10.7	10.8	10.9	11.2	10.8	10.4	10.8	10.3	10.0
12	11.2	10.9	10.7	10.8	10.8	10.9	11.2	10.8	10.4	10.8	10.3	9.90
13	11.2	10.9	10.7	10.8	10.8	10.9	11.2	10.8	10.4	10.8	10.2	9.90
14	11.2	10.9	10.7	10.8	10.8	11.0	11.2	10.7	10.4	10.8	10.2	10.0
15	11.1	10.9	10.7	10.7	10.8	11.0	11.2	10.8	10.4	10.8	10.2	9.90
16	11.1	10.9	10.7	10.7	10.8	10.8	11.2	10.8	10.4	10.8	10.3	9.90
17	11.1	10.9	11.0	10.7	10.8	11.0	11.4	10.7	10.4	10.8	10.3	9.79
18	11.1	10.9	10.8	10.7	10.8	11.0	11.2	10.7	10.4	10.8	10.3	9.79
19	11.1	10.9	10.9	10.7	10.8	10.9	11.2	10.7	10.4	10.8	10.2	*9.79
20	11.1	10.8	10.8	10.7	10.8	10.9	11.2	10.7	10.4	10.8	10.2	9.79
21	11.2	10.8	10.8	10.7	10.8	11.0	11.2	10.6	10.6	10.8	10.2	9.79
22	11.1	10.8	10.9	10.7	10.8	11.0	11.2	10.7	10.7	10.8	10.2	9.79
23	11.1	10.8	10.8	10.7	10.8	11.0	11.1	10.7	10.7	10.8	10.2	9.79
24	11.1	10.8	10.8	10.7	10.9	11.0	11.1	10.7	10.8	10.8	10.2	9.79
25	11.1	10.8	10.8	10.7	10.9	11.0	11.1	10.6	10.7	10.8	10.2	9.79
26	11.1	10.8	10.8	10.7	10.9	11.0	11.2	10.6	10.8	10.8	10.2	9.79
27	11.1	10.8	10.8	10.7	10.9	11.0	11.2	10.6	10.8	10.7	10.2	9.79
28	11.1	10.8	10.7	10.7	10.9	11.1	11.1	10.6	10.9	10.7	10.2	9.79
29	11.0	10.8	10.7	*10.8	10.9	11.1	11.1	10.6	10.9	10.7	10.2	9.79
30	11.0	10.8	10.7	10.8	11.0	11.1	11.0	---	10.9	10.6	10.2	9.79
31	10.8	10.8	---	10.8	---	11.1	11.0	---	10.8	---	10.2	---
Total	348.6	335.9	324.0	332.9	324.8	340.9	346.1	312.3	328.0	324.1	318.0	297.36
Mean												
Mgd	11.2	10.8	10.8	10.7	10.8	11.0	11.2	10.8	10.6	10.8	10.3	9.91
Cfs	17.3	16.7	16.7	16.6	16.7	17.0	17.3	16.7	16.4	16.7	15.9	15.3
Ac-ft	1070	1030	994	1020	997	1050	1060	958	1010	1000	976	913

Calendar Year 1963: Max 11.8 Min 10.1 Mean mgd 11.0 Mean cfs 17.0 Ac-ft 12,340
Fiscal Year 1963-64: Max 11.6 Min 9.79 Mean mgd 10.7 Mean cfs 16.6 Ac-ft 12,080

* Discharge measurement made on this day.

2230. Waimalu Stream near Aiea

Location (revised).--Lat 21°23'34", long 157°57'03", on right bank 350 ft downstream from bridge on Moanalua Road and 1.3 miles northwest of Aiea Post Office.

Drainage area.--6.07 sq mi.

Records available.--January 1952 to June 1962, July 1963 to June 1964.

Gage.--Water-stage recorder (digital) and concrete control. Datum of gage is 1.97 ft above mean sea level. Prior to Feb. 21, 1961, at site 350 ft upstream at different datums. Feb. 21, 1961, to June 30, 1962, at datum 0.13 ft lower than present datum.

Average discharge.--11 years (1952-62, 1963-64), 4.16 mgd (6.44 cfs).

Extremes.--Maximum discharge during year, 508 mgd (786 cfs) May 25 (gage height, 2.86 ft); minimum, 0.09 mgd (0.14 cfs) Aug. 7.
1952-64: Maximum discharge, 2,790 mgd (4,320 cfs) May 14, 1960 (gage height, 9.49 ft, site and datum then in use), from rating curve extended above 390 mgd on basis of slope-area measurement of peak flow; no flow Sept. 25, Sept. 28 to Oct. 1, 1958.
Maximum discharge known, 3,440 mgd (5,320 cfs) May 14, 1963, result of slope-area measurement of peak flow.

Remarks.--Records good except those for period of no gage-height record, which are fair. Occasional small diversions for irrigation of truck farms above station.

Rating table (gage height, in feet, and discharge, in million gallons a day)
(Shifting-control method used July 27 to Aug. 9)

0.1	0.07	0.9	6.10
.2	.20	1.0	8.40
.3	.42	1.2	16.5
.4	.80	1.4	30.0
.5	1.34	1.6	52.0
.7	3.15	1.9	100

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	36.0	0.62	0.59	0.85	0.95	0.39	5.25	0.24	0.39	1.00	2.75	1.21
2	10.8	.39	.42	.80	.70	.36	1.34	.26	.66	.85	1.50	1.42
3	10.8	.66	.34	3.75	.55	.34	50.8	.24	1.10	3.15	.95	.95
4	5.55	.80	.36	31.0	.48	.34	13.8	.24	.62	1.21	*.66	.80
5	2.55	.62	1.00	21.3	.42	.34	24.0	.24	1.58	2.16	.80	.90
6	1.58	.24	.80	4.65	.39	.48	13.4	.26	.85	1.42	.70	.70
7	1.50	.13	.45	2.65	*.36	.34	6.30	.45	.59	1.15	*.52	.95
8	1.10	.18	.34	1.64	.34	.34	9.00	.39	37.0	1.10	.45	.90
9	1.27	*.62	.28	6.70	4.95	.34	4.35	.32	7.10	1.00	.36	1.21
10	1.34	.59	.32	1.98	3.90	.32	2.45	.30	2.75	.74	.34	.90
11	1.00	1.80	.28	1.00	.95	.32	2.07	.48	1.34	.59	.32	.74
12	1.50	1.15	.22	.62	.45	5.25	3.05	.59	.90	1.15	.34	.59
13	.95	.48	.18	.48	.34	4.65	1.58	.62	1.42	1.21	.30	.48
14	6.90	.34	.18	3.60	.55	.85	.90	.70	.95	.70	.52	.70
15	8.40	.45	.20	1.42	.70	.39	.62	.74	.55	.66	.59	.62
16	4.65	3.15	.55	.55	2.95	.34	.45	.62	.52	.48	.52	.59
17	2.85	2.07	*34.0	.39	1.21	7.80	.39	.62	.66	.39	1.58	.48
18	2.16	1.21	13.8	.34	.95	2.25	.42	.66	.80	.34	1.64	*.36
19	6.90	.74	4.20	.74	.70	.80	.36	.59	.66	.85	1.00	.36
20	6.90	.62	1.64	12.9	.55	.55	.32	.48	.55	1.50	.95	.32
21	10.0	.48	.85	6.10	.59	.45	.34	.45	.52	.90	.80	.30
22	13.8	.39	.55	1.98	.70	.39	.32	.39	7.30	1.27	2.55	.28
23	3.90	.36	*.42	2.35	.85	.34	*.28	.36	34.0	3.60	14.8	.28
24	6.10	8.10	.36	5.70	.85	.34	.34	.34	*44.8	3.05	14.8	a.3
25	2.65	1.80	.34	3.25	.74	.34	.59	.66	10.8	1.64	84.0	a.3
26	1.89	.70	.34	1.42	.66	.34	.26	.59	14.2	.90	90.0	a.3
27	24.0	.66	.34	.80	.59	.34	.26	.48	23.2	.62	44.8	a.3
28	6.90	2.35	.45	.55	.52	.32	.24	.59	10.4	.59	11.2	a.3
29	8.40	3.35	.55	7.30	.45	.34	.24	.45	3.60	46.0	4.95	a.3
30	2.55	1.34	1.80	2.75	.42	.32	.24	---	1.98	7.55	2.85	a.3
31	1.15	.74	---	1.42	---	.32	.24	---	1.15	---	1.72	---
Total	196.04	37.13	66.15	130.98	28.76	30.63	144.20	13.35	212.94	87.77	289.26	18.14
Mean												
Mgd	6.32	1.20	2.20	4.23	0.959	0.988	4.65	0.460	6.87	2.93	9.33	0.605
Cfs	9.78	1.86	3.40	6.54	1.48	1.53	7.19	0.712	10.6	4.53	14.4	0.936
Ac-ft	602	114	203	402	88	94	443	41	653	269	888	56

Calendar Year 1963: Max - Min - Mean mgd - Mean cfs - Ac-ft -
Fiscal Year 1963-64: Max 90.0 Min 0.13 Mean mgd 3.43 Mean cfs 5.31 Ac-ft 3,850

* Discharge measurement made on this day.
a No gage-height record.

Peak discharge (base, 250 mgd)

Date	Time	Gage height	Discharge Mgd	Discharge Cfs	Date	Time	Gage height	Discharge Mgd	Discharge Cfs
1- 3	0430	2.62	342	529	5-25	2230	2.86	508	786
3-23	1800	2.62	342	529					

2240. Pearl Harbor Springs at Kalauao, near Aiea

Location.--Lat 21°23'05", long 157°56'45", on left bank 900 ft downstream from Oahu Sugar Co. pump 6, 1.1 miles west of Aiea, and 7.6 miles northwest of Honolulu.

Records available.--March 1931 to June 1962, April to June 1964.

Gage.--Water-stage recorder and sharp-crested weir. Datum of gage is 1.38 ft below mean sea level, datum of 1929.

Average discharge.--31 years (1931-62), 15.8 mgd (24.4 cfs), unadjusted for pumpage.

Extremes.--1931-62, 1964: Maximum daily discharge, 25 mgd (39 cfs) Feb. 17-26, 1938, Feb. 23, 24, 1955; minimum daily, 7.06 mgd (10.9 cfs) Aug. 10, 1960.

Remarks.--Records good. When water is needed for irrigation of sugar cane, Oahu Sugar Co. pump 6 diverts about 7 mgd as a high-lift pump or 9 mgd as a low-lift pump. Surface runoff from floods not included in figures of discharge.

Discharge, in million gallons a day, April to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1										-	15.6	11.8
2									/12.1	-	15.6	14.5
3										-	15.6	14.5
4										-	15.6	13.5
5										-	15.6	14.5
6										-	15.6	14.5
7										-	15.6	13.1
8										-	12.8	14.5
9										-	15.2	11.4
10										*16.3	15.2	14.5
11								/12.4		16.3	14.9	14.5
12										16.3	14.9	11.1
13										16.0	14.9	14.5
14										15.6	11.8	14.5
15										15.6	11.4	14.5
16										15.6	12.8	11.8
17										15.6	12.8	14.5
18										15.6	14.9	14.5
19										15.6	14.9	*14.5
20										15.6	14.5	14.5
21										15.6	14.5	14.5
22										15.6	14.5	14.5
23										15.6	14.5	14.5
24										15.6	14.5	14.2
25										15.6	14.5	14.2
26										15.6	14.5	10.4
27										15.6	14.5	12.1
28										15.6	14.5	12.4
29										*15.6	10.4	14.5
30							/13.5			15.6	14.5	11.1
31											14.5	
Total										-	445.6	408.1
Mean												
Mgd										-	14.4	13.6
Cfs										-	22.3	21.0
Ac-ft										-	1,370	1,250

Calendar Year		Max		Min		Mean mgd		Mean cfs		Ac-ft		
Fiscal Year 1963-64:		Max	-	Min	-	Mean mgd	-	Mean cfs	-	Ac-ft	-	

* Discharge measurement made on thia day.
/ Result of discharge measurement.

2245. Kalauao Stream at Moanalua Road, at Aiea

Location.--Lat 21°23'07", long 157°56'22", on left bank at downstream side of Moanalua Road bridge, 0.4 mile northwest of Aiea Post Office, and 2.3 miles southeast of Pearl City Post Office.

Drainage area.--2.59 sq mi.

Records available.--July 1957 to June 1964.

Gage.--Water-stage recorder and concrete control. Datum of gage is 12.75 ft above mean sea level, datum of 1929.

Average discharge.--7 years, 1.36 mgd (2.10 cfs).

Extremes.--Maximum discharge during year, 165 mgd (255 cfs) Oct. 4 (gage height, 3.10 ft), from rating curve extended above 50 mgd as explained below; minimum, 0.08 mgd (0.12 cfs) June 24.
1957-64: Maximum discharge, 1,670 mgd (2,580 cfs) May 14, 1963 (gage height, 6.63 ft), from rating curve extended above 50 mgd on basis of slope-area measurements at gage heights 6.29 and 6.63 ft; minimum, 0.02 mgd (0.03 cfs) on several days in 1959 and 1960.

Remarks.--Records good except those for periods of no gage-height record, which are fair. Some return of irrigation water above station.

Rating table (gage height, in feet, and discharge, in million gallons a day)

0.4	0.10	0.9	3.20
.5	.28	1.0	4.75
.6	.64	1.2	9.30
.7	1.20	1.5	19.5
.8	2.00	1.8	35.0

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	16.6	0.59	0.19	0.16	0.16	0.25	0.19	0.18	0.18	0.25	0.44	0.13
2	2.39	.21	.23	.82	.18	.19	.18	.18	.14	.23	.16	.14
3	2.05	.36	.23	.73	.19	.21	15.9	.18	.14	.61	.14	.16
4	1.39	.43	.18	17.7	.18	.19	2.42	.18	.17	.30	.14	.13
5	.54	.19	.18	7.54	.18	.18	6.12	.19	.14	.21	.21	.12
6	.33	.25	.19	1.32	.18	.23	5.50	.19	*.14	.19	.23	.12
7	.28	*.18	.19	.59	.19	.18	2.08	.23	.17	.19	.18	.12
8	.28	.16	.16	.28	.18	.18	8.37	.21	10.5	.19	.12	.12
9	.23	.16	.16	1.86	1.34	.19	1.99	.19	1.35	.18	.12	.12
10	.21	.21	.18	.41	1.45	.18	.73	.23	a.8	.16	.13	.10
11	.19	.21	.18	.19	.28	.19	.43	.23	a.5	.16	.14	.14
12	.21	.19	.18	.19	.21	2.93	.80	.39	a.4	.16	.13	.13
13	.21	.21	.16	.18	.18	1.26	.25	.30	a.3	.16	.13	.10
14	.19	.21	.18	.18	.18	.19	.23	.19	a.3	.19	.14	.12
15	1.01	.18	.18	.16	.18	.18	.30	.23	a.2	.23	.13	.13
16	.95	.16	.16	.14	.18	.16	.21	.23	a.2	.23	.13	.12
17	.50	.16	1.18	.14	.18	2.89	.28	.23	a.2	.23	.14	*.11
18	.39	.16	*3.59	.14	.18	.42	.23	.23	.14	.19	.12	.12
19	6.84	.19	.70	.14	.18	.18	.21	.23	.13	.18	.12	.13
20	.59	.16	.21	.63	.18	.16	.25	.18	.13	.16	.12	.10
21	1.99	.18	.19	.70	.60	.16	.21	.18	.13	.14	.13	.10
22	3.33	.21	.18	.18	1.48	.16	.18	.14	a 1.0	.14	.40	.10
23	.66	.18	.18	.74	1.27	.16	*.20	.14	*6.97	.14	3.98	.14
24	1.26	.62	.18	1.93	.19	.18	.28	.14	*18.5	1.59	3.21	.16
25	.39	.19	.16	.61	.18	.16	.18	.14	*4.29	.21	27.8	.12
26	.23	.19	.16	.21	.19	.18	.18	.14	2.57	.28	30.3	.12
27	13.3	.19	.16	.16	.18	.18	.18	.16	4.93	.10	10.3	.13
28	3.72	.23	.16	.14	.19	.18	.18	.16	2.87	*.13	2.08	.10
29	2.79	.25	.16	*.80	.30	.18	.18	.19	.68	14.2	.97	.12
30	.84	.21	.46	.41	.47	.18	.18	----	.30	1.90	.39	.10
31	.59	.21	----	.18	----	.18	.18	----	.23	----	.14	----
Total	64.48	7.23	21.22	39.56	11.21	12.44	48.80	5.79	58.70	23.23	82.87	3.65
Mean												
Mgd	2.08	0.233	0.707	1.28	0.374	0.401	1.57	0.200	1.89	0.774	2.67	0.122
Cfs	3.22	0.361	1.09	1.98	0.579	0.620	2.43	0.309	2.92	1.20	4.13	0.189
Ac-ft	198	22	65	121	34	38	150	18	180	71	254	11

Calendar Year 1963: Max 115 Min 0.10 Mean mgd 2.50 Mean cfs 3.87 Ac-ft 2,800
Fiscal Year 1963-64: Max 30.3 Min 0.10 Mean mgd 1.04 Mean cfs 1.61 Ac-ft 1,160

Peak discharge (base, 150 mgd)

Date	Time	Gage height	Discharge	
			Mgd	Cfs
10-4	1430	3.10	165	255

* Discharge measurement made on this day.
a No gage-height record.

2260. North Halawa Stream near Aiea

Location.--Lat 21°23'45", long 157°53'35", on left bank 2.7 miles upstream from confluence with South Halawa Stream and 2.7 miles northeast of Aiea Post Office.

Drainage area.--3.45 sq mi.

Records available.--August 1929 to June 1933, July 1953 to June 1964. Monthly discharge only May, June 1931, published in WSP 1319.

Gage.--Water-stage recorder. Altitude of gage is 320 ft (from topographic map).

Average discharge.--14 years (1930-33, 1953-64), 3.93 mgd (6.08 cfs).

Extremes.--Maximum discharge during year, 580 mgd (897 cfs) Oct. 4 (gage height, 9.80 ft), from rating curve extended above 44 mgd on basis of slope-area measurements at gage heights 10.3, 13.04 and 13.46 ft; no flow for many days.
1929-33, 1953-64: Maximum discharge, 4,300 mgd (6,650 cfs) Feb. 28, 1932 (gage height, 13.36 ft), from rating curve extended above 270 mgd; maximum gage height, 13.46 ft May 14, 1963; no flow at times each year.

Remarks.--Records good. Continuous records of rainfall are obtained at station.

Rating table (gage height, in feet, and discharge, in million gallons a day)

4.07	0	4.6	1.65
4.1	.01	4.8	3.70
4.2	.07	5.1	8.40
4.3	.22	5.5	18.2
4.4	.50	6.0	38.5
4.5	.96	6.5	71.0

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	30.0	0.85	0.03	0.20	0.16	0	0.76	0	0	0.54	1.43	0.54
2	9.03	.62	.01	6.19	.07	0	.13	0	0	.40	.66	.37
3	6.74	.43	.01	2.16	.03	0	24.4	0	0	3.69	.40	.31
4	3.00	1.50	0	64.9	.01	0	5.22	0	0	.58	*.28	.26
5	1.57	.70	0	16.9	.01	0	10.8	0	1.02	.43	.20	.20
6	.96	.31	0	4.61	0	0	9.37	0	.43	.37	.10	.14
7	.66	.20	.01	2.50	0	0	5.27	0	.31	.34	*.04	.09
8	.46	.16	.03	2.61	1.40	0	12.4	0	22.6	.31	.02	.05
9	.43	.13	.01	3.82	6.28	0	4.48	0	*3.69	.28	.01	.03
10	.34	.10	.01	1.09	3.41	0	2.20	0	1.29	.20	.01	.02
11	1.50	1.27	.01	.50	.70	0	1.36	0	.62	.13	.01	.01
12	.62	*.34	0	.31	*.31	9.76	1.29	0	.37	.65	0	.01
13	.46	.14	0	.24	.18	2.64	.62	0	.28	.34	0	0
14	6.94	.07	.01	1.55	.10	.34	.43	0	.18	.24	0	0
15	6.90	.03	.01	.40	.05	.16	.34	0	.09	.16	0	0
16	2.94	.02	.01	.20	.03	2.09	.24	0	.05	.08	0	0
17	1.43	.04	20.9	.13	.01	4.24	.16	0	.02	.04	0	0
18	.90	.04	7.66	.06	.01	.90	.10	.01	.01	.02	0	0
19	1.70	.02	1.80	.03	.01	.28	.06	.01	.01	.01	0	0
20	2.99	.01	.62	1.77	.01	.20	.03	.01	.01	.01	0	0
21	7.55	.01	.28	.75	0	.09	.02	.01	.01	.01	0	0
22	6.22	.01	.18	.28	0	.03	.02	0	8.75	.01	2.79	0
23	1.90	.01	.09	2.00	0	.02	.01	0	9.28	.01	8.77	*0
24	3.56	3.69	.03	6.11	0	.01	.01	0	26.5	.42	7.56	0
25	1.15	.43	.01	1.43	0	.01	.01	0	*6.59	.46	5.28	0
26	2.61	.18	**.01	.46	0	0	0	0	13.0	.31	44.2	0
27	24.4	.11	0	.24	0	0	0	0	13.9	.22	16.9	0
28	7.45	.33	0	.18	0	0	0	.01	6.15	.29	5.30	0
29	6.68	.54	.10	2.56	0	0	0	0	2.30	25.2	2.60	0
30	2.50	.16	1.31	.62	0	0	0	---	1.22	*4.17	1.43	0
31	1.43	.08	---	.28	---	0	0	---	.85	---	.85	---
Total	145.02	12.53	33.14	125.08	12.78	20.77	79.73	0.05	119.53	39.92	146.36	2.03
Mean												
Mgd	4.68	0.404	1.10	4.03	0.426	0.670	2.57	0.002	3.86	1.33	4.72	0.068
Cfs	7.24	0.625	1.70	6.24	0.659	1.04	3.98	0.003	5.97	2.06	7.30	0.105
Ac-ft	445	38	102	384	39	64	245	0.2	367	123	449	6.2

Calendar Year 1963: Max 241 Min 0 Mean mgd 4.74 Mean cfs 7.33 Ac-ft 5,300
Fiscal Year 1963-64: Max 64.9 Min 0 Mean mgd 2.01 Mean cfs 3.11 Ac-ft 2,260

Peak discharge (base, 300 mgd)

Date	Time	Gage height	Discharge	
			Mgd	Cfs
10-4	2000	9.80	580	897

* Discharge measurement or observation of no flow made on this day.
** Field estimate made on this day.

2280. Moanalua Stream near Honolulu

Location.--Lat 21°22'50", long 157°52'20", on left bank 5 miles upstream from mouth and 5 miles north of Honolulu Post Office.

Drainage area.--2.73 sq mi.

Records available.--June 1926 to June 1964.

Gage.--Water-stage recorder and concrete weir. Datum of gage is 338.12 ft above mean sea level (City and County of Honolulu bench mark). Prior to July 1, 1960, at datum 1.0 ft higher.

Average discharge.--38 years, 1.97 mgd (3.05 cfs).

Extremes.--Maximum discharge during year, 662 mgd (1,020 cfs) Oct. 4 (gage height, 7.29 ft), from rating curve extended above 42 mgd on basis of slope-area measurement at gage height 11.82 ft; no flow for many days.
1926-64: Maximum discharge, 2,960 mgd (4,580 cfs) Nov. 18, 1930 (gage height, 12.58 ft, present datum), from rating curve extended above 72 mgd by test on model of station site; no flow at times each year.

Remarks.--Records fair except those for periods of no gage-height record, which are poor. Continuous records of rainfall are obtained at station; no rainfall records Nov. 6, 1953 to June 30, 1964, owing to vandalism.

Rating table (gage height, in feet, and discharge, in million gallons a day)

0.87	0	1.3	0.63	2.1	13.0
.9	.01	1.4	1.13	2.5	27.1
1.0	.03	1.5	1.86	3.0	55.0
1.1	.10	1.6	2.85	3.5	91.0
1.2	.30	1.8	5.70		

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	10.7	0.06	0	0	0.02	0	0.36		0	0.15	0.35	0.10
2	3.48	.04	0	0	.02	0	.02		0	.06	.09	.04
3	2.13	.03	0	0	.01	0	16.2		0	1.99	.04	.02
4	.91	.03	0	75.1	.01	0	8.43		0	.59	.03	.02
5	.41	.03	0	14.6	.01	0	7.87		0	1.58	.02	.02
6	.17	.03	0	3.58	*0	*0	9.01		*0	1.30	.02	.01
7	.07	.02	0	1.40	0	0	3.48		0	.59	.02	.01
8	.05	.02	0	.67	0	0	2.26		13.5	.30	.01	.01
9	.04	.02	0	.55	2.0	0	1.40		1.30	.13	.01	0
10	.02	.02	0	.28	.3	0	.76		*.41	.07	0	0
11	.02	.01	0	.08	.2	0	.44		.17	.06	0	0
12	.02	0	0	.04	.1	2.66	.25		.08	.05	0	0
13	.02	0	0	.03	.1	.64	.12		.04	.04	0	0
14	.02	0	0	.02	0	.03	.06		.03	.04	0	0
15	.55	0	0	.02	0	.02	.04		.02	.03	0	0
16	.81	0	0	.01	0	.02	.03		.02	.02	0	0
17	.25	0	3.82	.01	0	.01	.03		.02	.02	0	0
18	.09	0	2.23	.01	0	.06	.02		.02	.02	0	*0
19	.05	0	.26	0	0	.03	.02		.01	.02	0	0
20	.04	0	.04	0	0	.02	.02		0	.01	0	0
21	.03	0	.03	0	0	.01	.01		0	0	0	0
22	1.41	0	.02	0	0	0	.01		8.45	0	0	0
23	.38	0	.02	0	0	0	.01		10.3	0	1.11	0
24	.44	0	.01	.30	0	0	0		28.3	0	.78	0
25	.12	0	*0	.23	0	0	0		*4.84	0	29.3	0
26	.04	0	0	.03	0	0	0		*10.5	0	31.5	0
27	12.8	0	0	.02	0	0	0		10.8	0	14.3	0
28	2.87	0	0	.01	0	0	0		4.02	0	4.05	0
29	1.60	0	0	.01	0	0	0		1.34	14.4	1.53	0
30	.51	0	0	.01	0	0	0	---	.59	*1.59	.67	0
31	.19	0	---	.03	---	0	0	---	*.35	---	.30	---
Total	40.24	0.31	6.43	97.04	2.77	3.50	50.85	0	95.11	23.06	84.13	0.23
Mean												
Mgd	1.30	0.010	0.214	3.13	0.092	0.113	1.64	0	3.07	0.769	2.71	0.077
Cfs	2.01	0.016	0.331	4.84	0.142	0.175	2.54	0	4.75	1.19	4.19	0.119
Ac-ft	123	1.0	20	298	8.5	11	156	0	292	71	258	0.7

Calendar Year 1963: Max 120 Min 0 Mean mgd 2.55 Mean cfs 3.95 Ac-ft 2,860
Fiscal Year 1963-64: Max 75.1 Min 0 Mean mgd 1.10 Mean cfs 1.70 Ac-ft 1,240

Peak discharge (base, 150 mgd)

Date	Time	Gage height	Discharge Mgd	Discharge Cfs	Date	Time	Gage height	Discharge Mgd	Discharge Cfs
10-4	1200	7.29	662	1,020	3-22	1600	4.38	195	302

* Discharge measurement or observation of no flow made on this day.

Note.--No gage-height record Nov. 7 to Dec. 5, Jan. 31 to Mar. 5, June 30.

2290. Kalihi Stream near Honolulu

Location (revised).--Lat 21°21'59", long 157°50'49", on right bank 1.9 miles upstream from Kamanaiki Stream and 4.1 miles north of Honolulu Post Office.

Drainage area.--2.61 sq mi.

Records available.--September 1913 to April 1914, July 1914 to June 1964. Monthly discharge only for some periods, published in WSP 1319.

Gage.--Water-stage recorder and concrete control. Datum of gage is 464.40 ft above mean sea level, datum of 1929. Prior to Oct. 12, 1923, at datum 2.00 ft lower.

Average discharge.--50 years (1914-64), 4.52 mgd (6.99 cfs).

Extremes.--Maximum discharge during year, 1,680 mgd (2,600 cfs) Oct. 4 (gage height, 10.04 ft), from rating curve extended above 180 mgd as explained below; minimum, 0.76 mgd (1.18 cfs) Feb. 29, Mar. 1.
1913-64: Maximum discharge, about 8,000 mgd (about 12,400 cfs) Nov. 18, 1930 (gage height, 13.81 ft), from rating curve extended above 180 mgd on basis of indirect measurements at gage heights 8.9 ft and 11.27 ft; minimum, 0.06 mgd (0.09 cfs) Oct. 22, 1933.

Remarks.--Records good except those for periods of no gage-height record, which are fair. No diversion above station.

Rating table (gage height, in feet, and discharge, in million gallons a day)

2.1	0.53	3.5	39.0
2.2	1.21	4.0	62.0
2.3	2.30	5.0	126
2.5	6.10	6.0	215
3.0	20.7		

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	*10.6	2.90	1.39	*1.59	*2.04	1.05	4.79	1.30	1.92	*3.74	*3.08	*3.26
2	6.46	2.90	1.30	4.06	1.92	*.97	*1.92	1.21	*1.49	3.37	2.72	2.72
3	3.80	2.44	*1.49	2.72	1.80	.90	38.4	*1.39	1.13	4.57	2.58	2.58
4	3.08	3.72	1.39	160	1.92	.90	12.5	1.39	1.30	3.44	2.30	2.30
5	2.58	2.44	1.59	21.0	1.80	.90	10.1	1.30	1.21	6.58	1.98	2.04
6	2.30	2.16	1.39	8.10	1.69	1.21	10.8	1.30	1.05	4.00	*1.75	1.92
7	2.04	2.30	1.21	6.60	2.34	1.05	5.60	1.21	1.59	3.26	1.69	1.80
8	2.04	2.04	1.05	5.85	2.30	.90	7.94	1.21	7.51	3.44	1.69	1.80
9	2.30	2.04	.97	5.20	3.57	.83	5.85	1.13	1.69	2.72	1.49	1.92
10	2.16	1.92	.97	4.20	2.72	.97	4.80	1.49	1.26	2.30	1.49	1.69
11	2.58	2.58	.97	3.44	1.80	1.39	5.21	1.39	1.13	2.16	1.39	1.59
12	1.92	1.92	1.30	3.08	1.59	16.4	4.40	1.59	1.49	2.59	1.39	1.49
13	2.81	1.92	1.21	2.72	1.69	4.55	3.62	1.49	1.21	2.04	1.39	1.39
14	3.78	1.80	1.05	3.44	1.59	2.44	2.90	1.21	1.13	2.16	1.59	1.39
15	4.48	1.69	.97	2.58	1.49	2.04	2.72	1.30	.97	2.04	1.49	1.39
16	3.26	3.49	1.13	2.44	2.53	3.29	2.72	1.21	.97	1.80	1.39	1.49
17	2.44	2.04	8.32	2.44	1.59	4.49	2.30	1.13	1.05	1.59	1.21	1.30
18	2.44	2.04	5.94	3.36	1.49	2.72	2.16	.97	1.05	1.49	1.13	1.30
19	2.30	1.92	2.44	2.44	1.39	1.92	1.92	.97	1.39	2.13	1.05	1.21
20	2.30	1.80	1.80	4.70	1.30	1.80	1.92	.90	1.13	2.30	1.30	1.21
21	3.93	1.69	1.49	3.08	1.30	1.59	2.30	.90	.90	2.16	1.39	1.13
22	5.08	1.80	1.30	3.26	1.30	1.39	1.92	.90	19.7	1.92	5.98	a1.2
23	2.90	1.69	1.30	3.44	1.30	1.30	1.92	.90	23.2	2.16	5.50	a1.2
24	4.64	6.13	1.21	3.80	1.21	1.05	1.80	1.05	37.5	3.69	10.5	a1.2
25	2.58	2.16	1.21	2.90	1.21	.97	1.69	1.13	6.60	2.04	42.2	a1.9
26	3.08	1.80	1.21	2.30	1.49	.97	1.59	.97	a18	1.69	44.2	a1.3
27	31.5	1.59	1.13	2.04	1.49	1.13	1.59	.83	a14	1.59	15.8	a1.4
28	5.85	3.08	1.30	2.44	1.30	1.05	1.39	.90	a3.6	4.80	6.60	a1.6
29	4.60	2.16	1.80	5.32	1.30	.97	1.21	.83	a1.3	17.0	5.00	a1.2
30	3.62	1.59	1.92	2.72	1.21	.90	1.21	---	a1.1	4.80	4.00	a1.2
31	3.44	1.39	---	2.30	---	.97	1.30	---	a2.7	---	3.62	---
Total	136.89	71.14	51.75	283.56	51.67	63.01	150.49	33.50	160.27	99.56	178.89	49.12
Mean												
Mgd	4.42	2.29	1.72	9.15	1.72	2.03	4.85	1.16	5.17	3.32	5.77	1.64
Cfs	6.84	3.54	2.66	14.2	2.66	3.14	7.50	1.79	8.00	5.13	8.92	2.54
Ac-ft	420	218	159	870	159	193	462	103	492	306	549	151

Calendar Year 1963: Max 160 Min 0.74 Mean mgd 5.34 Mean cfs 8.26 Ac-ft 5,980
Fiscal Year 1963-64: Max 160 Min 0.83 Mean mgd 3.63 Mean cfs 5.62 Ac-ft 4,080

* Discharge measurement made on this day.
a No gage-height record.

Peak discharge (base, 400 mgd)

Date	Time	Gage height	Discharge	
			Mgd	Cfs
10-4	1300	10.04	1,680	2,600

2293. Kalihi Stream at Kalihi

Location.--Lat 21°20'29", long 157°52'36", on right bank at Kalihi, 0.4 mile northwest of Bishop Museum, and 2.4 miles northwest of Honolulu Post Office.

Drainage area.--5.18 sq mi.

Records available.--Fiscal year 1962 (annual maximum), July 1962 to June 1964.

Gage.--Water-stage recorder and concrete control. Altitude of gage is 70 ft (from topographic map). Aug. 28, 1961, to June 30, 1962, crest-stage gage at site 600 ft downstream at different datum.

Extremes.--Maximum discharge during year, 2,350 mgd (3,640 cfs) Oct. 4 (gage height, 6.66 ft), from rating curve extended above 510 mgd as explained below; minimum, 1.20 mgd (1.86 cfs) June 20, 21, 26.
1961-64: Maximum discharge, 4,090 mgd (6,330 cfs) May 14, 1963 (gage height, 8.24 ft), from rating curve extended above 510 mgd on basis of slope-area measurement of peak flow.
1962-64: Minimum discharge, that of June 20, 21, 26, 1964.
Flood of May 14, 1960, reached a stage of 8.0 ft, from floodmarks, present site and datum (discharge, 4,100 mgd or 6,350 cfs, from slope-area measurement of peak flow).

Remarks.--Records fair. No diversion above station. Continuous records of rainfall are obtained at station.

Rating table (gage height, in feet, and discharge, in million gallons a day)
(Shifting-control method used Aug. 4 to Sept. 5, Mar. 24-26, May 25 to June 30)

0.4	0.90	1.6	40.0
.5	1.50	2.0	79.0
.6	2.50	2.5	155
.8	5.40	3.0	270
1.0	10.0	3.5	410
1.3	21.5		

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	14.3	4.28	1.70	2.89	3.41	1.90	6.18	2.63	4.57	3.96	3.54	2.30
2	7.20	4.28	1.70	5.61	3.28	1.80	2.89	2.63	3.54	5.57	2.89	2.10
3	*5.47	3.96	1.90	4.12	3.02	1.80	42.3	2.76	3.02	6.24	2.50	1.90
4	4.92	3.70	1.90	299	2.89	1.80	16.8	2.76	3.93	4.28	2.30	1.80
5	4.76	2.40	*2.22	22.4	3.15	1.80	14.7	2.76	3.41	7.17	2.40	1.60
6	3.96	2.30	1.90	7.50	2.76	4.01	24.2	2.89	4.12	4.92	2.20	1.60
7	3.67	2.40	1.60	6.66	3.24	2.30	8.75	2.89	5.45	4.12	2.10	1.60
8	3.54	2.30	1.50	5.40	3.80	1.90	8.87	2.76	16.3	5.16	2.50	2.83
9	4.28	2.20	1.45	4.92	4.22	2.10	8.00	2.50	6.45	3.54	2.30	6.26
10	4.12	2.20	1.45	4.44	3.96	2.20	6.66	3.41	5.82	3.41	2.40	1.60
11	4.60	2.63	1.45	3.96	2.89	2.40	6.66	*3.41	5.82	3.28	2.20	1.50
12	3.80	2.40	1.80	3.54	2.50	15.1	5.82	4.33	6.24	3.80	2.00	1.50
13	4.76	2.50	1.70	3.28	2.50	4.76	4.92	4.06	5.82	2.89	*1.90	1.50
14	5.40	2.30	1.45	3.96	2.30	3.28	4.28	3.54	5.61	3.41	3.30	1.45
15	5.82	*2.00	1.35	3.15	2.30	2.89	4.44	4.32	5.40	3.02	2.20	1.60
16	5.24	2.76	1.50	3.02	3.41	3.10	4.44	3.41	5.82	2.76	2.00	1.70
17	4.44	2.10	*14.5	4.64	2.30	4.92	3.67	2.76	3.54	2.63	1.90	1.50
18	4.76	2.20	8.83	5.96	*2.24	3.41	3.80	2.50	2.40	2.50	1.80	1.50
19	4.44	2.10	3.54	2.89	2.10	2.89	3.41	2.30	2.76	3.21	1.70	1.35
20	4.28	2.00	2.89	4.28	2.00	2.63	3.80	2.40	2.89	3.73	2.00	1.35
21	4.92	1.90	2.50	3.54	2.10	2.40	4.28	2.50	2.50	3.02	2.30	1.20
22	5.71	2.10	2.20	*3.64	2.10	2.30	3.54	2.50	33.7	3.02	9.54	1.80
23	4.76	2.10	2.10	3.80	2.00	2.20	3.80	2.63	*40.7	3.80	7.99	1.50
24	6.24	4.39	2.10	4.92	1.90	2.10	3.28	2.76	*94.3	12.3	15.1	1.50
25	4.92	2.30	2.00	3.96	1.90	2.20	3.41	3.50	2.89	3.41	81.7	1.90
26	4.92	2.00	2.00	3.41	3.15	2.30	3.15	2.30	22.9	3.41	75.4	1.35
27	64.3	2.10	2.10	3.02	2.40	2.30	3.15	2.30	17.9	2.76	16.1	2.40
28	9.25	2.89	2.20	3.54	2.10	2.10	2.89	2.40	8.25	9.35	5.24	1.60
29	7.75	2.40	2.89	5.24	2.00	2.10	2.76	2.30	5.40	37.6	3.67	1.50
30	*6.34	2.00	2.89	3.54	1.90	1.86	2.76	----------	4.44	5.61	2.76	*2.00
31	5.79	1.80	----------	3.28	----------	*2.04	2.76	----------	4.44	----------	2.50	----------
Total	228.66	78.99	79.31	443.51	79.82	90.89	220.37	84.21	340.33	163.88	268.43	55.29
Mean												
Mgd	7.38	2.55	2.64	14.3	2.66	2.93	7.11	2.90	11.0	5.46	8.66	1.84
Cfs	11.4	3.95	4.08	22.1	4.12	4.53	11.0	4.49	17.0	8.45	13.4	2.85
Ac-ft	702	242	243	1360	245	279	676	258	1040	503	824	170

Calendar Year 1963: Max 343 Min 1.35 Mean mgd 9.79 Mean cfs 15.1 Ac-ft 10,970
Fiscal Year 1963-64: Max 299 Min 1.20 Mean mgd 5.83 Mean cfs 9.02 Ac-ft 6540

* Discharge measurement made on this day.

Peak discharge (base, 600 mgd)

Date	Time	Gage height	Discharge Mgd	Discharge Cfs	Date	Time	Gage height	Discharge Mgd	Discharge Cfs
7-27	1100	4.00	610	944	3-22	1600	4.04	630	975
10- 4	1330	6.66	2,350	3,640	3-24	0630	5.10	1,180	1,830

2320. Nuuanu Stream below reservoir 2 wasteway, near Honolulu

Location.--Lat 21°20'55", long 157°49'40", on right bank near Pali Road in upper Nuuanu Valley, 0.2 mile downstream from reservoir 2 wasteway, and 3.5 miles northeast of Honolulu Post Office.

Drainage area.--3.35 sq mi.

Records available.--October 1913 to January 1921, September 1921 to June 1964.

Gage.--Water-stage recorder and sharp-crested weirs. Datum of gage is 631.71 ft above mean sea level, datum of 1929. Prior to Sept. 7, 1915, staff gage at same site at datum 0.03 ft lower and Sept. 7, 1915, to Mar. 31, 1918, at same datum.

Average discharge.--47 years (1914-16, 1917-20, 1922-64), 4.82 mgd (7.46 cfs).

Extremes.--Maximum discharge during year, 565 mgd (874 cfs) Oct. 4 (gage height, 5.12 ft), from rating curve extended above 270 mgd on basis of slope-area measurement at gage height 6.69 ft; minimum, 1.30 mgd (2.01 cfs) Dec. 17.
1913-64: Maximum discharge, 4,520 mgd (6,990 cfs) Jan. 16, 1921 (gage height, 8.74 ft, from floodmarks), from rating curve extended above 270 mgd by test on model of station site; minimum, 0.06 mgd (0.09 cfs) Sept. 10, 11, 1925.

Remarks.--Records fair except those for periods of no gage-height record, which are poor. Low-flow regulation by reservoirs 2, 3, and 4 (capacities, 21, 34, and 1,630 acre-ft, respectively). Honolulu Board of Water Supply diverts ground water from tunnels in drainage area.

Rating table (gage height, in feet, and discharge, in million gallons a day)
(Shifting-control method used May 12-14)

0.5	1.70	1.5	18.8
1.0	4.40	2.0	42.8
1.1	5.80	3.0	107
1.2	8.30		

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	8.92	3.2	2.6	3.10	3.26	2.15	2.50	2.75	3.12	*3.68	3.44	3.1
2	4.68	3.1	2.4	3.92	3.15	2.10	4.12	2.75	2.50	4.41	3.15	3.0
3	4.22	3.0	3.6	3.38	3.05	2.06	14.1	2.75	2.45	4.28	3.05	2.9
4	3.92	3.5	3.4	*81.5	3.00	2.00	6.23	2.65	3.06	3.68	2.70	2.8
5	3.80	3.2	3.2	13.4	3.10	2.00	6.71	2.65	2.80	6.20	*2.80	2.7
6	3.68	3.0	3.0	7.05	*2.95	2.20	6.08	2.50	2.35	4.40	2.65	2.6
7	3.50	*3.62	2.8	6.05	3.17	2.30	4.28	2.65	3.20	3.86	2.55	2.4
8	3.50	3.1	2.5	5.80	3.20	2.00	4.22	2.55	4.09	3.56	2.70	2.8
9	3.56	3.0	2.3	5.80	3.46	1.95	4.04	2.50	2.50	3.20	2.50	2.5
10	3.50	2.9	2.4	5.24	3.32	1.90	3.68	2.50	2.35	3.15	2.40	2.4
11	3.59	3.5	3.0	4.68	2.90	1.95	3.68	2.70	2.50	3.15	2.35	2.5
12	2.90	3.0	4.2	4.04	2.75	5.49	3.50	2.90	2.50	3.68	2.20	2.6
13	3.38	2.7	3.2	3.92	2.80	3.94	3.38	2.95	2.40	3.05	2.15	2.8
14	4.81	2.5	3.0	3.92	2.70	2.65	3.32	2.65	2.40	3.10	6.46	2.7
15	5.27	2.4	2.8	3.74	2.65	2.50	3.44	2.50	2.25	3.00	3.18	2.6
16	3.80	6.0	4.2	3.56	3.48	2.25	3.32	2.45	2.25	2.75	7.12	2.6
17	3.44	3.4	*12	3.68	2.85	2.45	3.15	2.40	2.20	2.65	6.53	*2.70
18	3.38	3.7	6.03	4.16	2.70	2.50	3.26	2.40	2.15	2.55	4.0	2.75
19	3.38	3.3	3.62	3.86	2.60	2.30	3.10	2.15	2.20	6.13	2.5	2.70
20	3.56	3.0	3.32	4.04	2.50	2.25	3.15	2.30	2.15	3.99	3.0	2.75
21	4.03	2.9	3.15	3.98	2.50	2.20	3.20	2.25	2.10	3.10	4.0	2.65
22	4.15	2.8	3.05	3.74	2.45	2.00	*3.05	2.25	6.42	2.80	9.0	2.70
23	3.44	6.0	3.00	3.56	2.35	2.05	3.20	2.20	17.5	3.10	6.0	2.70
24	3.56	7.0	2.95	3.74	2.30	1.95	2.95	2.15	20.4	3.20	5.0	2.60
25	3.20	3.5	2.90	3.44	2.25	1.90	3.00	2.30	4.21	3.05	15	2.60
26	3.15	3.2	2.80	3.32	2.84	1.90	2.85	2.20	13.5	2.75	22	2.50
27	14.1	3.0	2.85	3.20	2.60	2.05	2.90	2.15	9.29	2.50	7.0	2.75
28	4.82	4.2	2.80	4.01	2.35	1.95	2.85	*2.25	5.52	5.53	4.5	2.40
29	4.1	3.4	3.15	5.11	2.25	1.95	2.85	2.20	4.34	14.5	4.0	2.35
30	3.5	3.0	2.90	3.50	2.20	2.06	2.80	---	3.56	4.10	3.5	2.40
31	3.3	2.9	---	3.32	---	2.30	2.80	---	5.39	---	3.4	---
Total	132.14	107.02	103.12	215.76	83.68	71.25	121.71	71.60	143.65	119.10	150.83	79.55
Mean												
Mgd	4.26	3.45	3.44	6.96	2.79	2.30	3.93	2.47	4.63	3.97	4.87	2.65
Cfs	6.59	5.34	5.32	10.8	4.32	3.56	6.08	3.82	7.16	6.14	7.54	4.10
Ac-ft	406	328	316	662	257	219	374	220	441	366	463	244

Calendar Year 1963: Max 121 Min 0.80 Mean mgd 6.55 Mean cfs 10.1 Ac-ft 7,340
Fiscal Year 1963-64: Max 81.5 Min 1.90 Mean mgd 3.82 Mean cfs 5.91 Ac-ft 4,300

* Discharge measurement made on this day.
Note.--No gage-height record July 29 to Aug. 6, Aug. 8 to Sept. 17, May 18 to June 16.

Peak discharge (base, 150 mgd)

Date	Time	Gage height	Discharge Mgd	Discharge Cfs
10-4	1300	5.12	565	874

2390. East Branch Manoa Stream near Honolulu

Location.--Lat 21°19'50", long 157°48'10", on right bank 5 ft downstream from highway bridge, 400 ft upstream from confluence with West Branch, and 4.2 miles northeast of Honolulu Post Office.

Drainage area.--1.06 sq mi.

Records available.--May 1913 to January 1921, August 1925 to June 1964.

Gage.--Water-stage recorder and combination Parshall flume and concrete weir. Datum of gage is 294.50 ft above mean sea level (Honolulu Board of Water Supply bench mark). Prior to May 20, 1914, staff gage at site 200 ft upstream at different datum. May 20, 1914, to Jan. 16, 1921, water-stage recorder at site 30 ft upstream at different datum. Aug. 18, 1925, to Mar. 15, 1928, water-stage recorder at present site at datum 2.99 ft lower, and Mar. 16, 1928, to Oct. 18, 1933, at datum 0.41 ft higher than present datum.

Average discharge.--45 years (1913-20, 1926-64), 3.16 mgd (4.89 cfs).

Extremes.--Maximum discharge during year, 192 mgd (297 cfs) Jan. 3 (gage height, 3.13 ft), from rating curve extended above 68 mgd by test on model of station site; minimum, 1.57 mgd (2.43 cfs) Feb. 21-24, June 29.
1913-21, 1925-64: Maximum discharge, 2,000 mgd (3,090 cfs) Jan. 16, 1921 (gage height, 10.4 ft, from floodmarks, site and datum then in use), from rating curve extended above 37 mgd; minimum, 0.4 mgd (0.6 cfs) June 7, 8, 1926.

Remarks.--Records fair except those for period of no gage-height record, which are poor. Honolulu Board of Water Supply at times diverts a small amount of ground water from tunnel above station. Occasional small diversions for irrigation above station.

Rating table (gage height, in feet, and discharge in million gallons a day)
(Shifting-control method used June 22-30)

0.3	1.15	1.2	11.5
.5	2.65	1.5	22.2
1.0	7.90	2.0	47.0

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	a7.0	3.24	2.49	3.70	3.38	2.25	5.61	2.09	2.68	2.41	2.57	2.65
2	a4.3	3.16	2.41	4.40	3.08	2.25	2.68	2.01	1.85	2.72	2.33	2.57
3	3.80	3.08	3.99	3.42	2.71	2.25	27.2	2.17	2.37	2.65	2.17	2.49
4	3.24	3.41	3.77	14.8	2.53	2.25	9.75	2.09	3.78	2.65	2.09	2.41
5	2.99	*2.82	3.54	4.64	3.08	2.33	7.16	2.09	*2.65	4.20	2.17	2.33
6	2.82	2.65	3.24	3.50	2.74	2.99	*5.72	2.01	2.17	3.08	1.93	2.33
7	2.57	3.32	2.82	3.42	4.22	2.41	4.20	2.01	2.86	2.65	1.85	2.25
8	2.90	2.74	2.49	3.80	3.33	2.33	4.54	1.93	3.42	2.82	2.01	2.33
9	2.82	2.65	2.41	3.90	7.17	2.25	4.00	1.93	2.33	2.65	1.93	2.41
10	2.82	2.57	2.41	3.16	4.07	2.49	3.60	2.76	2.17	2.41	1.85	2.25
11	2.90	3.75	2.82	2.99	2.82	2.65	4.68	2.58	2.25	2.33	1.85	2.25
12	2.57	2.65	4.46	2.90	2.49	15.6	2.99	2.79	2.33	2.65	1.85	2.33
13	5.66	2.74	2.74	2.99	2.49	3.24	2.65	2.33	2.49	2.25	1.85	2.49
14	5.21	2.57	2.65	4.23	2.41	3.36	2.49	2.01	2.17	2.88	2.89	2.37
15	6.28	2.57	2.49	2.90	3.33	3.20	2.90	1.85	2.25	2.33	1.93	2.33
16	3.60	6.48	*4.58	2.82	3.37	4.77	2.65	1.78	2.17	2.17	1.85	*2.22
17	2.90	2.90	14.3	2.90	2.57	4.58	2.41	1.78	2.25	2.09	1.78	2.01
18	2.90	3.33	6.63	3.66	2.41	2.65	2.74	1.78	2.09	2.01	1.78	2.09
19	3.16	2.90	3.33	3.35	2.41	2.33	2.33	1.78	2.17	4.50	1.71	2.01
20	4.74	2.65	2.99	4.86	2.33	2.17	2.41	1.71	2.09	2.95	2.25	1.93
21	5.47	2.57	2.74	4.10	2.41	2.09	2.49	1.71	2.17	3.00	2.83	2.01
22	4.99	2.49	2.65	3.69	2.41	2.09	2.41	1.64	5.01	2.99	7.56	2.21
23	4.01	5.89	2.57	3.51	2.41	1.93	2.57	1.64	18.0	3.39	5.09	1.85
24	4.52	7.75	2.49	4.11	2.41	1.93	2.33	1.64	13.8	3.66	4.04	1.85
25	3.16	3.08	2.49	3.08	2.41	2.01	2.57	2.01	3.80	2.65	17.9	1.78
26	3.70	2.82	2.57	2.99	3.26	2.01	2.25	1.78	*12.9	2.65	28.3	1.64
27	20.6	2.74	2.57	2.82	2.90	2.01	2.33	1.71	14.0	*2.38	8.45	2.01
28	5.16	4.53	3.45	4.41	2.49	2.09	2.17	1.71	4.72	3.70	4.20	1.78
29	4.00	2.99	4.69	6.13	2.41	2.01	*2.09	1.85	3.33	10.4	3.50	1.64
30	3.60	2.65	3.60	*3.12	2.33	1.93	2.17	----------	2.74	3.42	3.08	1.78
31	3.33	2.57	----------	2.82	----------	4.52	2.17	----------	2.74	----------	2.82	----------
Total	137.72	102.26	106.38	123.12	88.38	92.97	128.26	57.17	131.75	92.64	128.41	64.60
Mean												
Mgd	4.44	3.30	3.55	3.97	2.95	3.00	4.14	1.97	4.25	3.09	4.14	2.15
Cfs	6.87	5.11	5.49	6.14	4.56	4.64	6.41	3.05	6.58	4.78	6.41	3.33
Ac-ft	423	314	326	378	271	285	394	175	404	284	394	198

Calendar Year 1963: Max 78 Min 0.77 Mean mgd 3.97 Mean cfs 6.14 Ac-ft 4,440
Fiscal Year 1963-64: Max 28.3 Min 1.64 Mean mgd 3.43 Mean cfs 5.31 Ac-ft 3,850

Peak discharge (base, 200 mgd).--No peak above base.

* Discharge measurement made on this day.
a No gage-height record.

2400. West Branch Manoa Stream near Honolulu

Location (revised).--Lat 21°19'54", long 157°48'13", on left bank 100 ft upstream from bridge on Waaloa Road, 1.0 mile northeast of Manoa School, and 4.2 miles northeast of Honolulu Post Office.

Drainage area.--1.14 sq mi.

Records available.--May 1913 to January 1921, August 1925 to June 1964.

Gage.--Water-stage recorder (digital since July 3) and combination Parshall flume and V-notch weir. Datum of gage is 290.84 ft above mean sea level (Honolulu Board of Water Supply bench mark). Prior to June 17, 1914, staff gage at same site at different datum. June 17, 1914, to Jan. 16, 1921, water-stage recorder at site 150 ft upstream at different datum. Aug. 4, 1925, to Mar. 15, 1928, water-stage recorder at present site at datum 3.35 ft lower.

Average discharge.--45 years (1913-20, 1926-64), 2.42 mgd (3.74 cfs).

Extremes.--Maximum discharge during year, 300 mgd (464 cfs) Mar. 23 (gage height, 3.58 ft), from rating curve extended above 73 mgd by test on model of station site; minimum, 0.32 mgd (0.50 cfs) Feb. 22-25.

1913-21, 1925-64: Maximum discharge, 2,100 mgd (3,250 cfs) Jan. 16, 1921 (gage height, 10.4 ft, from floodmarks, site and datum then in use), from rating curve extended above 40 mgd; minimum, 0.05 mgd (0.08 cfs) Dec. 16, 18, 1913, Jan. 16-18, Feb. 4, 6, 1915, Mar. 16, 22, 1926.

Remarks.--Records good except those for periods of no gage-height record, which are poor. Occasional small diversion for irrigation above station.

Rating table (gage height, in feet, and discharge, in million gallons a day)

0.1	0.32	0.8	6.20
.2	.82	1.1	13.4
.3	1.42	1.5	30.0
.7	4.50		

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	11.9	1.42	1.05	2.5	1.31	0.7	4.5	0.63	1.96	1.4	*1.49	1.7
2	4.60	1.36	.96	3.5	1.22	.7	2.0	.56	.67	1.7	1.42	1.5
3	3.55	1.23	2.29	2.8	1.09	.7	20	.59	2.81	1.5	1.23	1.2
4	2.04	1.82	2.48	11	1.04	.7	7.0	.50	2.89	1.6	1.11	1.1
5	1.69	*1.29	2.08	3.5	1.4	.8	5.0	.48	*8.37	2.3	1.2	.9
6	1.51	1.11	1.47	2.8	1.2	1.3	*4.0	.48	8.76	1.9	1.0	.9
7	1.33	1.62	1.18	2.5	2.0	1.0	2.63	.52	3.29	1.7	.8	.8
8	1.43	1.11	1.05	2.8	1.6	.8	2.74	.58	2.28	1.9	.9	1.0
9	1.43	.99	.97	3.2	5.6	.6	2.16	.49	1.83	1.7	.82	1.3
10	1.46	.82	.90	2.2	3.0	.7	1.82	1.60	1.96	1.5	.71	1.0
11	2.09	1.75	.97	1.7	2.2	1.2	2.33	1.62	1.49	1.2	.71	.9
12	1.24	.87	2.67	1.6	1.7	10	1.8	1.48	2.65	1.4	.66	1.1
13	4.29	.99	1.08	1.5	1.5	2.0	1.5	1.17	2.8	1.0	.60	1.3
14	3.52	.71	1.03	3.0	1.3	2.5	1.0	.91	1.3	1.7	9.35	1.1
15	6.33	.66	.89	2.2	2.0	1.9	1.3	.80	1.5	1.3	.99	1.0
16	3.33	8.10	2.0	2.0	1.8	3.5	1.1	.53	1.2	1.1	.76	*.76
17	1.65	1.35	10	2.2	1.5	3.0	1.0	.48	1.5	.9	.66	.60
18	1.78	2.09	3.5	3.0	1.2	1.5	1.1	.46	1.0	.8	.60	.60
19	2.62	1.38	2.5	2.5	1.0	1.2	.8	.48	1.3	2.8	.55	.55
20	5.68	1.21	1.7	3.5	.9	.9	.9	.39	1.0	2.3	1.29	.46
21	5.20	1.04	1.5	3.0	1.1	.8	.9	.36	1.5	2.6	2.10	.46
22	4.07	.94	1.3	2.7	1.0	.6	.85	.36	2.5	2.3	12.0	1.62
23	3.39	7.77	1.1	2.5	.9	.5	1.15	.32	14	2.7	9.35	.93
24	3.78	9.58	.9	3.1	.8	.6	.84	.32	10	2.5	6.96	.82
25	1.82	1.91	1.0	2.5	.7	.7	.95	.66	2.0	1.5	23.7	.71
26	2.67	1.46	1.1	2.2	1.7	.7	.78	.44	*9.0	1.4	17.8	.55
27	25.5	1.38	1.2	1.9	1.3	.7	.91	.41	12	1.1	8.10	1.17
28	3.80	3.98	2.0	3.5	1.0	.8	.69	.42	3.0	2.5	3.57	.60
29	2.48	1.65	4.0	5.0	.9	.7	.62	.46	2.2	8.0	3.0	.50
30	1.89	1.31	2.1	*1.57	.8	.5	.61	---	1.8	2.0	2.3	.71
31	1.68	1.15	---	1.33	---	1.3	.63	---	1.7	---	2.0	---
Total	119.75	64.05	56.97	89.30	44.76	43.6	73.61	18.50	110.26	58.3	117.73	27.84
Mean												
Mgd	3.86	2.07	1.90	2.88	1.49	1.41	2.37	0.638	3.56	1.94	3.80	0.928
Cfs	5.97	3.20	2.94	4.46	2.31	2.18	3.67	0.987	5.51	3.00	5.88	1.44
Ac-ft	367	197	175	274	137	134	226	57	338	179	361	85

Calendar Year 1963: Max 72.6 Min 0.28 Mean mgd 2.90 Mean cfs 4.49 Ac-ft 3,250
Fiscal Year 1963-64: Max 25.5 Min 0.32 Mean mgd 2.25 Mean cfs 3.48 Ac-ft 2,530

Peak discharge (base, 200 mgd)

Date	Time	Gage height	Discharge Mgd	Discharge Cfs
3-23	about 1600	3.58	300	464

* Discharge measurement made on this day.

Note.--No gage-height record Sept. 16 to Oct. 29, Nov. 5 to Jan. 6, Jan. 12-21, Mar. 13 to Apr. 30, May 5-8, May 29 to June 15.

2440. Pukele Stream near Honolulu

Location.--Lat 21°18'35", long 157°47'30", on right bank 200 ft upstream from bridge on Palolo Avenue, 0.6 mile upstream from confluence with Waiomao Stream, and 4.8 miles east of Honolulu Post Office.

Drainage area.--1.18 sq mi.

Records available.--June 1926 to June 1964.

Gage.--Water-stage recorder (digital since July 3) and V-notch weir. Datum of gage is 344.78 ft above mean sea level (Honolulu Board of Water Supply bench mark).

Average discharge.--38 years, 1.25 mgd (1.93 cfs).

Extremes.--Maximum discharge during year, 139 mgd (215 cfs) Jan. 3 (gage height, 3.75 ft), from rating curve extended above 62 mgd on basis of slope-area measurement at gage height 6.13 ft; minimum, 0.22 mgd (0.34 cfs) Aug. 23, Sept. 15, 16.
1926-64: Maximum discharge, 1,680 mgd (2,600 cfs) Apr. 11, 1930 (gage height, 7.75 ft, from floodmarks), from rating curve extended above 46 mgd by test on model of station site; minimum, 0.05 mgd (0.08 cfs) Oct. 31, 1929.

Remarks.--Records good except those for periods of no gage-height record, which are poor. No diversion above station.

Rating table (gage height, in feet, and discharge, in million gallons a day)

0.9	0.18	1.3	2.33
1.0	.43	1.5	4.70
1.1	.87	1.8	10.2
1.2	1.50	2.2	21.7

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	6.30	0.5	0.31	0.48	0.79	0.31	2.41	0.35	0.28	0.87	0.67	1.04
2	3.90	.4	.31	.62	.49	.29	.40	.34	.27	.85	.66	1.04
3	1.67	.3	.32	.47	.46	.28	*20.4	.34	.26	.88	.64	.98
4	.82	.5	.29	6.0	.46	.28	5.50	.32	.26	.82	.62	.87
5	.77	.4	.27	1.3	.46	.28	5.24	.31	*.26	.84	.60	.82
6	.72	.3	.28	.9	.43	.35	1.97	.31	.25	.80	.58	.77
7	.70	.6	.26	.7	.46	.28	1.19	.31	.26	.73	.54	.72
8	.58	.5	.26	1.4	.42	.27	1.39	.30	.26	.75	.52	.72
9	.47	.4	.26	1.7	3.13	.26	1.13	.29	.26	.69	.48	.67
10	.46	.3	.26	.9	1.66	.26	1.04	.33	.27	.66	.46	.62
11	.40	.7	.26	.6	.45	.26	1.38	.29	.26	.62	.46	.58
12	.32	.5	.26	.5	.46	8.05	.96	.31	.25	.58	.43	.54
13	.56	.4	.24	.4	.46	.92	.92	.29	.25	.52	.43	.50
14	1.64	.3	.24	.7	.46	.37	.89	.28	.24	.60	.48	.46
15	1.18	.32	.23	.4	.47	.41	.87	.28	.24	.48	.40	*.46
16	.84	1.01	3.03	.3	.58	1.76	.83	.28	.24	.46	.38	.43
17	.98	.30	*20	.4	.46	2.04	.74	.28	.24	.46	.37	.43
18	*82	.32	5.8	.5	.44	.58	.71	.29	.24	.44	.37	.43
19	.63	.32	*2.0	.4	.43	.51	.62	.28	.25	.54	.35	.40
20	.64	.31	.66	1.5	.43	.53	.60	.28	.24	.47	.37	.40
21	.85	.31	.62	2.5	.41	.52	.57	.28	.24	.58	.42	.40
22	.70	.29	.62	1.2	.40	.51	.54	.28	.71	.46	2.43	.40
23	.51	.33	.62	1.0	.38	.48	.51	.27	5.94	.54	1.78	.40
24	.77	1.55	.61	*1.5	.37	.44	.49	.27	12.8	2.02	.97	.37
25	.50	.31	.58	.50	.35	.43	.47	.31	1.93	.66	8.56	.40
26	.68	.31	.56	.50	.37	.41	.44	.28	*9.89	.60	17.1	.37
27	19.0	.32	.54	.50	.34	.39	.43	.27	12.3	*.58	3.78	.37
28	5.75	.36	.51	.68	.33	.37	.42	.26	2.89	.61	1.43	.37
29	2.5	.33	.58	.56	.31	.35	.39	.26	1.13	3.73	1.04	.34
30	.9	.32	.51	.50	.31	.33	.37	---------	.87	1.03	1.04	.34
31	.7	.31	----------	.50	----------	.47	.37	---------	.87	----------	1.04	----------
Total	57.26	13.42	41.29	30.11	16.97	22.99	54.19	8.53	54.65	23.87	49.40	16.64
Mean												
Mgd	1.85	0.433	1.38	0.971	0.566	0.742	1.75	0.294	1.76	0.796	1.59	0.555
Cfs	2.86	0.670	2.14	1.50	0.876	1.15	2.71	0.455	2.72	1.23	2.46	0.859
Ac-ft	178	41	127	92	52	71	166	26	168	73	152	51

Calendar Year 1963: Max 51.4 Min 0.23 Mean mgd 1.96 Mean cfs 3.03 Ac-ft 2,200
Fiscal Year 1963-64: Max 20.4 Min 0.23 Mean mgd 1.06 Mean cfs 1.64 Ac-ft 1,200

Peak discharge (base, 90 mgd)

Date	Time	Gage height	Discharge Mgd	Discharge Cfs	Date	Time	Gage height	Discharge Mgd	Discharge Cfs
1-3	0400	3.75	139	215	3-23	1600	3.57	118	183

* Discharge measurement made on this day.
Note.--No gage-height record July 29 to Aug. 14, Sept. 17-19, Oct. 4-24.

2460. Waiomao Stream near Honolulu
(Formerly published as Waiomao Stream above Pukele Stream, near Honolulu)

Location.--Lat 21°18'35", long 157°47'10", on left bank 300 ft west of road, 0.8 mile upstream from confluence with Pukele Stream, and 5 miles east of Honolulu Post Office.

Drainage area.--1.04 sq mi.

Records available.--April to December 1911, May to December 1912, June 1926 to June 1964. Prior to July 1963, published as "above Pukele Stream, near Honolulu."

Gage.--Water-stage recorder and V-notch weir. Datum of gage is 373.66 ft above mean sea level (Honolulu Board of Water Supply bench mark). Apr. 12, 1911, to Dec. 31, 1912, staff gage at site 0.5 mile downstream at different datum.

Average discharge.--38 years (1926-64), 1.16 mgd (1.79 cfs).

Extremes.--Maximum discharge during year, 147 mgd (227 cfs) Jan. 3 (gage height, 3.87 ft), from rating curve extended above 90 mgd as explained below; minimum, 0.06 mgd (0.09 cfs) Dec. 5, Feb. 24, May 19.
1911-12, 1926-64: Maximum discharge, 1,000 mgd (1,550 cfs), revised, Apr. 11, 1930 (gage height, 6.27 ft), from rating curve extended above 65 mgd by test on model of station site; no flow at times.
Revisions.--The maximum discharge for the fiscal year 1930 has been revised to 1,000 mgd (1,550 cfs) Apr. 11, 1930 (gage height, 6.27 ft), superseding figure published in Surface Water Records of Hawaii and other Pacific Areas (1962, 1963).

Remarks.--Records good except those for periods of no gage-height record, which are fair. Honolulu Board of Water Supply diverts ground water from tunnels in drainage area.

Rating table (gage height, in feet, and discharge, in million gallons a day)

0.8	0.03	1.4	2.65
.9	.16	1.6	5.00
1.0	.40	1.9	10.5
1.1	.75	2.3	22.0
1.3	1.86		

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	4.92	0.34	0.3	0.28	0.82	0.08	5.0	0.20	0.16	0.55	0.67	0.31
2	2.61	.31	.2	.66	.69	.07	.7	.12	.31	.64	.46	.26
3	1.14	.26	.6	.43	.24	.07	*.20	.20	.18	1.41	.34	.22
4	.52	.40	.5	5.11	.20	.07	6.16	.16	.24	1.04	.31	.20
5	.43	.22	.8	1.20	.37	.06	4.92	.16	*.24	1.04	.26	.16
6	.34	.18	.7	.67	.20	.24	2.33	.14	.16	.79	.24	.14
7	.26	.29	.6	.63	.22	.22	1.50	.11	.28	.49	.22	.12
8	.26	.22	.5	1.13	.45	.12	1.50	.12	.49	.49	.24	.11
9	.31	.18	.4	1.38	3.04	.08	1.14	.11	.24	.43	.20	.12
10	.31	.14	.3	.49	2.65	.22	1.04	.20	.16	.37	.18	.11
11	.40	.56	.4	.31	.49	1.03	1.39	.28	.12	.31	.16	.09
12	.22	.24	.6	.24	.28	12.0	.94	.31	.16	.28	.14	.08
13	.80	.22	.5	.22	.24	4.12	.52	.59	.48	.26	.14	.09
14	3.75	.20	.3	.52	.22	1.53	.40	.28	.43	.51	.20	.08
15	1.61	.14	.2	.20	.18	1.74	.37	.22	.24	.43	.16	*.09
16	.75	1.32	3.0	.16	.87	.79	.49	.16	.24	.26	.16	.16
17	.40	.55	*1.1	.11	.34	5.32	.34	.12	.26	.22	.12	.11
18	*.78	.34	4.29	.39	.22	1.47	.40	.11	.37	.20	.09	.11
19	.52	.31	1.16	.20	.22	.71	.31	.12	.43	.38	.08	.09
20	.63	.31	.67	1.21	.18	.49	.28	.09	.26	.59	.14	.08
21	2.06	.20	.49	1.87	.14	.37	.34	.09	.11	1.04	.32	.07
22	1.48	.16	.34	.75	.14	.26	.37	.08	1.83	.67	3.09	.25
23	.67	.16	.28	.75	.12	.26	.28	.07	7.34	1.22	2.42	.20
24	1.74	2.0	.26	1.14	.11	.20	.28	.06	14.6	2.61	1.29	.14
25	.63	.5	.22	*.44	.11	.1	.34	.11	3.03	.92	7.68	.20
26	1.67	.3	.20	.31	.22	.2	.26	.22	*11.8	.52	14.3	.16
27	12.7	.3	.18	.22	.22	.2	.24	.12	11.1	*.37	3.92	.16
28	2.74	.7	.14	.72	.18	.1	.22	.09	3.17	.34	1.38	.14
29	1.11	.6	.72	.96	.14	.1	.18	.08	1.44	4.75	.84	.11
30	.63	.5	.43	.34	.11	.1	.16	---	.89	1.37	.52	.20
31	.46	.4	---	.24	---	1.5	.18	---	.97	---	.37	---
Total	46.85	12.55	30.28	23.28	13.61	33.82	52.58	4.72	61.73	24.50	40.64	4.36
Mean												
Mgd	1.51	0.405	1.01	0.751	0.454	1.09	1.70	0.163	1.99	0.817	1.31	0.145
Cfs	2.34	0.627	1.56	1.16	0.702	1.69	2.63	0.252	3.08	1.26	2.03	0.224
Ac-ft	144	39	93	71	42	104	161	14	189	75	125	13

Calendar Year 1963: Max 44.5 Min 0.06 Mean mgd 1.77 Mean cfs 2.74 Ac-ft 1980
Fiscal Year 1963-64: Max 20 Min 0.06 Mean mgd 0.953 Mean cfs 1.47 Ac-ft 1070

Peak discharge (base, 70 mgd)

Date	Time	Gage height	Discharge	
			Mgd	Cfs
1-3	about 0300	3.87	147	227

* Discharge measurement made on this day.
Note.--No gage-height record Aug. 24 to Sept. 17, Dec. 25 to Jan. 3.

2470. Palolo Stream near Honolulu

Location.--Lat 21°17'35", long 157°48'25", on left bank 250 ft downstream from bridge on Palolo Avenue and 3.9 miles east of Honolulu Post Office.

Drainage area.--3.63 sq mi.

Records available.--April 1952 to June 1964. See also Note below.

Gage.--Water-stage recorder (digital since Apr. 28) and concrete control. Altitude of gage is 95 ft (from topographic map).

Average discharge.--12 years, 3.32 mgd (5.14 cfs).

Extremes.--Maximum discharge during year, 198 mgd (306 cfs) Jan. 3 (gage height, 2.53 ft), from rating curve extended above 86 mgd as explained below; minimum, 0.45 mgd (0.70 cfs) on several days.

1952-64: Maximum discharge, 2,100 mgd (3,250 cfs) Mar. 5, 1958 (gage height, 5.33 ft), from rating curve extended above 86 mgd on basis of slope-conveyance study and slope-area measurements at gage heights 3.92 and 4.13 ft; minimum, 0.01 mgd (0.02 cfs) June 25, 1958.

Revisions.--Figures of maximum discharge for the fiscal years 1961 and 1962 have been revised to 944 mgd (1,460 cfs) Dec. 30, 1960 (gage height, 3.92 ft) and 580 mgd (897 cfs) Oct. 31, 1961 (gage height, 3.32 ft), superseding those published in Surface Water Records of Hawaii and other Pacific Areas for fiscal years 1961 and 1962, respectively.

Remarks.--Records fair.

Note.--Published records for high-water periods in fiscal years 1953, 1955-60 have been found to be in error; revised records are on file in the district office and will be published in the next water-supply paper.

Revisions.--Revised figures of discharge, in million gallons a day, for high-water periods in the fiscal years 1961 and 1962, superseding those published in Surface Water Records of Hawaii and other Pacific Areas (1961 and 1962) are given herewith:

1960
Oct. 17..... 17.7
Dec. 30..... 65.3

1962
Jan. 8..... 29.8
Mar. 28..... 25.2

Month	Million gallons	Maximum	Minimum	Mean		Runoff in acre-feet
				Mgd	Cfs	
October 1960	57.09	17.7	0.60	1.84	2.85	175
December	256.18	65.3	.92	8.26	12.8	786
Calendar year 1960	-	178	.21	3.16	4.89	3,550
Fiscal year 1960-61....	-	65.3	.20	2.57	3.98	2,880
January 1962.....	88.47	29.8	.45	2.85	4.41	272
March	224.33	25.2	2.60	7.24	11.2	688
Fiscal year 1961-62....	-	50	.30	2.88	4.46	3,230
Calendar year 1962	-	29.8	.25	2.10	3.25	2,350

Revised peak discharge.--1960-61: Oct. 17 (9 p.m.) 190 mgd (294 cfs), 2.51 ft; Dec. 30 (5 a.m.) 944 mgd (1,460 cfs), 3.92 ft. 1961-62: Oct. 31 (time unknown) 580 mgd (897 cfs), 3.32 ft; Mar. 28 (2030) 415 mgd (642 cfs), 2.99 ft.

2470. Palolo Stream near Honolulu--Continued

Rating table (gage height, in feet, and discharge, in million gallons a day)

1.4	0.22	1.9	15.6
1.5	.55	2.0	28.0
1.6	1.32	2.1	44.0
1.7	3.60	2.2	69.0
1.8	8.00		

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	12.7	1.20	1.01	1.10	1.96	0.78	9.08	1.32	0.96	1.46	1.74	1.84
2	7.50	1.32	.93	2.46	1.60	.78	1.46	1.32	.60	1.79	1.59	1.35
3	3.20	1.20	1.46	1.32	1.32	.78	46.0	1.32	.66	2.30	1.56	1.15
4	2.30	1.10	1.32	9.30	*1.14	.85	26.5	1.32	.78	1.90	1.56	1.04
5	2.30	.78	1.90	2.30	1.60	.85	18.2	1.20	*.78	2.10	1.63	.97
6	2.10	*.78	1.75	1.60	1.32	3.21	*6.31	1.32	.72	2.89	1.66	.94
7	2.10	.93	1.32	1.46	1.94	1.01	4.40	1.32	1.19	1.90	1.73	.98
8	2.10	.78	1.32	1.90	1.46	.85	5.37	1.01	1.10	2.10	1.78	1.01
9	2.50	.72	1.01	2.30	11.1	.85	3.53	1.10	.93	1.46	1.70	.90
10	2.50	.93	1.01	1.32	6.73	.93	2.50	1.32	.85	1.32	1.75	.85
11	2.50	1.10	1.10	1.20	1.20	.93	3.71	1.20	.85	1.10	1.68	.79
12	2.50	.78	1.46	1.01	1.01	27.5	2.10	1.46	.85	1.01	1.55	.75
13	4.28	.72	1.32	1.01	1.01	3.20	1.60	1.72	1.10	.93	1.37	.76
14	10.3	.72	1.01	1.32	1.01	1.75	1.46	1.32	1.32	1.01	1.87	.69
15	2.80	.66	.93	.93	1.10	1.75	1.60	1.32	.93	1.10	1.09	.71
16	1.90	3.62	5.28	.85	2.16	3.15	1.90	1.20	.93	.85	1.13	*.69
17	1.75	1.20	26.1	.93	1.32	5.20	1.20	1.32	.93	.85	1.03	.61
18	3.20	1.20	10.1	1.10	1.32	1.60	1.46	1.32	1.20	.85	.90	.58
19	2.50	1.10	*1.93	1.10	1.32	1.20	1.20	1.20	1.98	1.73	.86	.55
20	3.20	.85	1.46	2.10	1.20	1.10	1.46	1.01	.72	1.60	1.09	.55
21	4.40	.85	1.32	3.60	1.10	.97	1.32	1.01	.50	4.00	1.85	.53
22	4.00	.78	1.20	1.60	1.01	1.01	1.20	1.01	3.64	1.75	8.31	.81
23	3.20	1.35	1.01	1.46	1.10	.85	1.01	1.10	15.5	2.50	5.43	.65
24	4.00	5.45	1.01	2.10	1.10	.78	.93	1.10	26.6	8.95	2.93	.58
25	2.80	1.32	.93	1.32	.85	.72	1.01	1.93	3.83	2.10	20.3	.88
26	4.40	1.20	.85	1.10	1.01	.78	.93	.60	17.5	1.60	40.0	.61
27	44.2	1.20	.85	1.10	.85	.78	.93	.66	16.0	*1.15	11.0	.77
28	6.00	1.60	.93	1.60	.93	.72	1.01	.50	2.30	1.97	3.61	.56
29	2.30	1.46	1.98	1.75	.78	.72	1.10	.66	1.32	10.3	2.02	.52
30	1.20	1.20	1.32	1.32	.78	.66	1.20	----------	1.01	3.20	1.60	.69
31	1.20	1.10	----------	1.20	----------	3.05	1.32	----------	1.20	----------	1.50	----------
Total	151.93	39.20	75.12	54.76	52.33	69.31	153.00	34.19	108.78	67.77	127.82	24.31
Mean												
Mgd	4.90	1.26	2.48	1.77	1.74	2.24	4.94	1.18	3.52	2.26	4.12	0.810
Cfs	7.58	1.95	3.84	2.74	2.69	3.47	7.64	1.83	5.45	3.50	6.37	1.25
Ac-ft	466	120	231	168	161	213	470	105	334	208	392	75

Calendar Year 1963: Max 141 Min 0.55 Mean mgd 5.79 Mean cfs 8.96 Ac-ft 6490
Fiscal Year 1963-64: Max 46.0 Min 0.50 Mean mgd 2.62 Mean cfs 4.05 Ac-ft 2940

Peak discharge (base, 220 mgd).--No peak above base.

* Discharge measurement made on this day.

2500. Maunawili ditch near Waimanalo

Location.--lat 21°20'45", long 157°45'10", on left bank 80 ft downstream from Aniani Nui Ridge tunnel and 3.5 miles west of Waimanalo Post Office.

Records available.--March 1954 to June 1964.

Gage.--Water-stage recorder and sharp-crested weir. Altitude of gage is 390 ft (from topographic map).

Average discharge.--10 years, 1.81 mgd (2.80 cfs).

Extremes.--1954-64: Maximum daily discharge, 7.0 mgd (10.8 cfs) Mar. 5, 1958; no flow at times.

Remarks.--Records good except those for periods of no gage-height record, which are poor. Ditch diverts from headwaters of Maunawili and Makawao Streams for irrigation in vicinity of Waimanalo.

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	1.16	2.24	1.82	1.82	1.76	1.70	1.64	0.84	1.6	1.9	1.7	1.70
2	1.10	2.24	1.94	1.94	1.76	1.70	1.58	.79	1.6	1.8	1.7	1.70
3	1.16	2.24	2.06	1.82	1.76	1.70	2.11	.69	1.6	1.7	1.6	1.70
4	.89	2.37	1.94	2.12	1.70	1.70	1.76	.65	1.6	1.6	1.5	1.76
5	1.77	2.24	1.94	2.12	1.76	1.70	1.92	.61	1.6	1.7	1.5	1.82
6	2.58	2.24	1.94	2.06	1.70	1.76	1.88	.57	1.6	1.6	1.6	1.82
7	2.51	2.18	1.88	2.00	1.76	1.70	1.82	.53	1.6	1.5	1.7	1.76
8	2.58	2.12	1.76	1.82	*1.82	1.70	1.94	.53	1.6	1.5	1.7	1.76
9	2.51	2.18	1.70	1.88	1.88	1.70	1.64	.53	1.6	1.5	1.7	1.76
10	2.51	2.12	1.76	1.94	1.94	1.76	1.64	1.05	1.6	1.5	1.7	1.76
11	2.51	2.24	1.88	1.88	1.76	1.76	1.70	1.58	1.6	1.5	1.7	1.76
12	2.51	2.12	1.94	1.88	1.76	1.86	1.64	*1.46	1.6	1.5	*1.70	1.70
13	2.73	2.12	1.88	1.82	1.76	.94	1.51	1.46	1.6	*1.46	1.70	1.64
14	2.73	2.12	1.88	1.88	1.76	.79	1.55	1.46	1.6	1.46	1.70	1.64
15	2.82	2.12	1.88	1.82	1.76	.79	1.70	1.40	1.6	1.4	1.70	1.70
16	*2.58	2.12	2.00	1.82	1.76	.84	1.64	1.52	1.6	1.3	1.70	1.70
17	2.51	2.12	2.44	1.82	1.76	.89	1.64	1.70	1.6	1.2	1.76	1.70
18	2.51	2.12	*2.18	1.88	1.76	.79	1.64	1.70	2.0	1.2	1.70	1.70
19	2.44	2.12	2.00	1.82	1.76	.74	1.52	1.70	1.7	1.2	1.70	1.70
20	2.44	2.12	1.94	1.88	1.76	*.74	1.58	1.64	1.6	1.2	1.70	1.70
21	2.58	2.06	1.94	2.00	1.76	.69	1.52	1.6	1.5	.7	1.70	1.70
22	2.51	2.06	1.94	2.00	1.76	.65	1.52	1.6	1.0	1.0	1.76	1.70
23	2.44	2.18	1.88	1.82	1.76	.65	1.40	1.6	.8	1.2	1.70	1.70
24	2.44	2.18	1.88	1.88	1.76	.65	1.40	1.6	.6	1.3	1.70	*1.70
25	2.44	2.06	1.88	1.82	1.76	.65	1.40	1.6	.6	1.4	1.76	1.64
26	2.44	2.06	1.82	1.82	1.76	1.05	1.34	1.6	.6	1.5	1.82	1.64
27	3.25	2.06	1.82	1.82	1.76	1.58	1.16	1.6	.6	1.6	1.47	1.64
28	2.65	2.18	1.82	1.82	1.76	1.58	.99	1.6	1.0	1.6	1.76	1.6
29	2.44	2.00	1.94	1.82	1.76	1.58	.99	1.6	1.5	1.8	1.70	1.6
30	2.30	1.88	1.82	1.76	1.70	1.52	.99	---	1.7	1.7	1.70	1.6
31	2.30	1.82	---	1.70	---	1.64	.94	---	2.0	---	1.70	---
Total	72.34	66.03	57.50	58.28	52.98	39.50	47.70	36.81	44.4	43.52	52.23	51.00
Mean												
Mgd	2.33	2.13	1.92	1.88	1.77	1.27	1.54	1.27	1.43	1.45	1.68	1.70
Cfs	3.61	3.30	2.97	2.91	2.74	1.96	2.38	1.96	2.21	2.24	2.60	2.63
Ac-ft	222	203	176	179	163	121	146	113	135	134	160	157

Calendar Year 1963: Max 3.45 Min 0 Mean mgd 1.47 Mean cfs 2.27 Ac-ft 1.640
Fiscal Year 1963-64: Max 3.25 Min 0.53 Mean mgd 1.70 Mean cfs 2.63 Ac-ft 1.910

* Discharge measurement made on this day.
Note.--No gage-height record Feb. 21 to Apr. 12, Apr. 15 to May 11, June 28-30.

2540. Makawao Stream near Kailua

Location.--Lat 21°21'50", long 157°46'05", on left bank 650 ft upstream from mouth, 2.7 miles southwest of Kailua, and 4.3 miles southeast of Kaneohe Courthouse.

Drainage area.--2.04 sq mi.

Records available.--November 1912 to June 1916, January 1958 to June 1964.

Gage.--Water-stage recorder and concrete control. Altitude of gage is 80 ft (from topographic map). Prior to Jan. 1, 1958, staff gage at sites about 200 ft upstream at different datums.

Average discharge.--9 years (1913-16, 1958-64), 3.29 mgd (5.09 cfs).

Extremes.--Maximum discharge during year, 430 mgd (665 cfs) Dec. 12 (gage height, 5.90 ft); minimum, 1.10 mgd (1.70 cfs) Nov. 29, Dec. 5.
1912-16, 1958-64: Maximum discharge, 1,380 mgd (2,140 cfs) Mar. 5, 1958, Mar. 6, 1963 (gage heights, 9.08 and 9.03 ft, respectively), from rating curve extended above 310 mgd by logarithmic plotting; minimum, 0.44 mgd (0.68 cfs) Nov. 27, 1952.

Remarks.--Records good except those for period of no gage-height record, which are fair. Maunawili ditch (see preceding page) diverts 1.5 miles above station.

Rating table (gage height, in feet, and discharge, in million gallons a day)

1.4	0.72	1.9	5.97
1.5	1.30	2.1	10.5
1.6	2.05	2.5	24.0
1.7	2.98	3.0	50.0
1.8	4.23		

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	3.79	1.87	1.43	1.30	1.50	1.17	3.43	2.77	1.61	4.40	2.59	1.89
2	3.67	1.87	1.36	1.50	1.43	1.17	3.39	3.71	1.47	4.40	2.55	1.84
3	3.67	1.80	1.36	1.30	1.36	1.17	18.3	3.30	1.48	4.08	2.49	1.82
4	3.67	2.10	1.36	3.14	1.36	1.17	6.20	2.88	1.50	3.91	2.41	1.73
5	3.19	1.87	1.36	1.71	1.36	1.17	7.51	2.84	1.46	4.50	2.42	1.68
6	2.88	1.80	1.36	1.50	1.30	1.64	4.67	2.74	1.41	3.79	2.36	1.6
7	2.77	1.80	1.36	1.50	1.43	1.30	4.23	2.72	1.48	3.67	2.09	1.6
8	2.66	1.80	1.30	1.57	*1.45	1.24	7.79	2.67	1.53	3.67	2.00	1.6
9	2.66	1.80	1.30	1.71	1.64	1.24	4.50	2.63	1.40	3.55	1.96	1.6
10	2.57	1.71	1.36	1.50	1.57	1.36	4.23	2.16	1.39	3.55	1.92	1.6
11	2.57	1.71	1.36	1.36	1.36	1.80	4.99	*1.72	1.39	3.43	1.90	1.6
12	2.48	1.71	1.43	1.30	1.30	37.6	4.08	1.71	1.39	3.30	*1.88	1.5
13	2.39	1.71	1.43	1.30	1.30	5.83	3.91	1.69	1.52	3.30	1.85	1.5
14	2.85	1.71	1.36	1.50	1.24	3.43	3.67	1.61	1.40	3.43	1.86	1.5
15	2.85	1.71	1.36	1.30	1.24	3.30	3.43	1.60	1.37	3.30	1.84	1.5
16	*2.20	1.71	1.64	1.30	1.36	3.30	3.19	1.59	1.36	3.19	1.84	1.5
17	2.05	1.71	4.21	1.36	1.30	5.05	2.98	1.57	1.35	3.08	1.83	1.5
18	2.05	1.64	*1.87	1.43	1.24	3.79	2.98	1.56	2.89	3.08	1.79	1.5
19	2.05	1.64	1.50	1.43	1.24	3.08	2.77	1.56	1.62	3.08	1.76	1.5
20	2.05	1.64	1.50	1.50	1.17	*2.77	2.66	1.55	1.47	3.08	1.83	1.5
21	2.20	1.64	1.43	1.36	1.24	2.57	2.66	1.53	1.42	7.13	1.84	1.5
22	2.12	1.57	1.36	1.43	1.17	2.57	2.57	1.48	24.0	2.66	2.12	1.5
23	2.05	1.64	1.30	1.43	1.17	2.38	3.06	1.47	17.9	2.50	1.96	1.5
24	2.05	1.71	1.30	1.50	1.17	2.20	2.48	1.47	27.6	2.46	1.89	*1.5
25	1.95	1.57	1.30	1.30	1.17	2.20	2.48	1.64	8.30	2.33	2.31	1.50
26	1.95	1.57	1.24	1.30	1.17	2.28	2.57	1.47	11.9	2.30	2.90	1.50
27	3.21	1.50	1.24	1.36	1.17	2.20	2.66	1.44	11.1	2.20	2.37	1.57
28	2.28	1.71	1.24	1.43	1.17	2.28	2.77	1.48	7.60	2.35	2.16	1.43
29	2.12	1.57	1.36	1.43	1.17	2.20	2.77	1.46	6.35	3.47	2.02	1.43
30	2.05	1.43	1.30	1.36	1.17	2.20	2.77	----------	5.00	2.53	1.90	1.43
31	2.05	1.43	----------	1.30	----------	3.13	2.88	----------	*4.50	----------	1.85	----------
Total	79.10	52.65	44.28	45.71	38.92	108.79	128.58	58.01	156.16	101.72	64.49	46.92
Mean												
Mgd	2.55	1.70	1.48	1.47	1.30	3.51	4.15	2.00	5.04	3.39	2.08	1.56
Cfs	3.95	2.63	2.29	2.27	2.01	5.43	6.42	3.09	7.80	5.25	3.22	2.41
Ac-ft	243	162	136	140	119	334	395	178	479	312	198	144

Calendar Year 1963: Max 96.6 Min 1.10 Mean mgd 6.12 Mean cfs 9.47 Ac-ft 6,850
Fiscal Year 1963-64: Max 37.6 Min 1.17 Mean mgd 2.53 Mean cfs 3.91 Ac-ft 2,840

* Discharge measurement made on this day.
Note.--No gage-height record June 6-24.

Peak discharge (base, 70 mgd)

Date	Time	Gage height	Discharge Mgd	Discharge Cfs	Date	Time	Gage height	Discharge Mgd	Discharge Cfs
12-12	0500	5.90	430	665	1- 5	0100	3.47	84.3	130
1- 3	0230	3.68	103	159	3-22	1500	5.15	294	455

2739. Kamooalii Stream at Kaneohe

Location.--Lat 21°24'50", long 157°48'13", on right bank at Kaneohe, 450 ft upstream from bridge on Kamehameha Highway, and 0.2 mile south of Parker School.

Drainage area.--4.38 sq mi.

Records available.--January 1959 to October 1963 (discontinued).

Gage.--Water-stage recorder and combination masonry diversion dam and culvert control. Datum of gage is 37.82 ft above mean sea level (levels by City and County of Honolulu).

Extremes.--Maximum discharge during period, about 3,000 mgd (about 4,600 cfs) Oct. 4, from approximate stage comparison with slope-area measurement of flood of Feb. 4, 1965, for which channel conditions were similar; minimum, 5.85 mgd (9.05 cfs) sometime during period July 4-15.

1959-64: Maximum discharge, that of Oct. 4, 1963; minimum, 2.15 mgd (3.33 cfs) Aug. 28, 1962.

Flood of Oct. 23, 1958, reached a stage of 8.3 ft from floodmarks (discharge, 4,270 mgd or 6,610 cfs, from rating curve extended above 72 mgd on basis of slope-area measurement at gage height 5.69 ft).

Remarks.--Records fair except those for periods of no gage-height record, which are poor. Many diversions for irrigation above station. Continuous records of rainfall were obtained at station. Flood of Oct. 4, 1963, destroyed artificial control at station.

Rating table (gage height, in feet, and discharge, in million gallons a day)

3.7	4.85	4.2	55.0
3.8	10.7	4.5	110
3.9	18.8	5.0	237
4.0	29.0	5.5	410

Discharge, in million gallons a day, July to October 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	15.3	9.40	7.50	8.70								
2	12.9	9.40	7.50	10.2								
3	12.9	8.70	8.10	8.10								
4	12.2	10.5	8.10	a400								
5	a8.7	8.70	8.10	-								
6	a7.5	8.70	7.50	-								
7	a8.0	8.70	7.50	-								
8	a11	8.70	7.50	-								
9	a8.4	8.70	7.50	-								
10	a7.5	8.70	7.09	-								
11	a7.5	8.70	6.90	-								
12	a7.5	8.70	7.50	-								
13	a8.0	8.70	6.90	-							/7.11	
14	a15	8.70	6.90	-								
15	*10.7	8.10	6.90	-								
16	10.0	8.70	7.50	-								
17	9.40	8.70	12.5	-		/12.8			/5.81			
18	10.0	8.10	8.70	-	/8.01							
19	10.0	7.50	8.10	-								
20	10.0	8.10	6.90	-								
21	10.7	8.10	6.90	-								
22	12.2	8.10	6.90	-								
23	10.7	8.70	*6.90	-								
24	10.7	8.70	7.50	-								
25	10.7	8.10	7.50	-								
26	10.7	7.50	8.10	-								
27	15.3	7.50	8.10	-								
28	11.4	8.70	8.10	-								
29	10.7	8.10	8.70	-								
30	10.0	8.10	8.10	-				---				
31	9.40	8.10	---		---			---		---		---
Total	325.00	263.90	231.99	-								
Mean												
Mgd	10.5	8.51	7.73	-								
Cfs	16.2	13.2	12.0	-								
Ac-ft	997	810	712	-								

Calendar Year 1963: Max - Min - Mean mgd - Mean cfs - Ac-ft -

Fiscal Year 1963-64: Max - Min - Mean mgd - Mean cfs - Ac-ft -

* Discharge measurement made on this day.
/ Result of discharge measurement.
a No gage-height record.

Peak discharge (base, 500 mgd)

Date	Time	Gage height	Discharge	
			Mgd	Cfs
10-4	about 1400	-	about 3,000	about 4,600

2750. Haiku Stream near Keeia

Location.--Lat 21°24'45", long 157°49'35", on left bank 1.7 miles west of Kaneohe Post Office and 1.8 miles southwest of Keeia.

Drainage area.--0.97 sq mi.

Records available.--January 1914 to October 1919, July 1939 to June 1964.

Gage.--Water-stage recorder. Datum of gage is 271.9 ft above mean sea level (levels by City and County of Honolulu). Prior to Apr. 28, 1914, staff gage and Apr. 28, 1914, to Oct. 25, 1919, water-stage recorder, at same site at different datums.

Average discharge.--21 years (1943-64), 1.26 mgd (1.95 cfs).

Extremes.--Maximum discharge during year, 365 mgd (565 cfs) Mar. 22 (gage height, 3.41 ft), from rating curve extended above 37 mgd as explained below; minimum, 0.56 mgd (0.87 cfs) July 1, 6, 7, 10-12.
1914-19, 1939-64: Maximum discharge, 2,730 mgd (4,220 cfs) Mar. 26, 1951 (gage height, 5.39 ft), from rating curve extended above 37 mgd on basis of slope-area measurement at gage height 3.87 ft; minimum, 0.13 mgd (0.20 cfs) July 20, 1957, Sept. 17, 1961.

Remarks.--Records good except those for period of no gage-height record, which are fair. Honolulu Board of Water Supply has diverted water from tunnel in drainage area since 1943.

Rating table (gage height, in feet, and discharge, in million gallons a day)

1.0	0.46	1.8	11.3
1.1	.88	1.9	15.0
1.2	1.52	2.0	21.0
1.4	3.55	2.1	29.5
1.5	5.00		

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	1.64	1.18	0.93	0.93	1.17	0.93	1.52	0.99	0.99	1.17	1.05	1.11
2	1.20	1.17	.93	1.46	1.17	.93	1.23	1.05	.93	1.76	.99	1.11
3	.93	1.16	.95	1.11	1.11	.93	6.22	1.05	.99	*1.57	.99	1.11
4	.68	1.20	.94	24.4	1.11	.93	1.80	1.05	.99	1.32	.93	1.05
5	.60	1.16	.95	3.98	1.11	.93	1.99	.99	.99	1.21	.93	1.05
6	.56	1.13	.94	1.61	1.05	1.05	2.08	1.05	.99	1.17	.93	1.05
7	.64	1.12	.93	1.30	1.30	.93	1.99	.99	1.05	1.17	.93	1.05
8	.88	1.11	.93	1.23	1.11	.93	2.08	.99	2.57	1.17	.93	1.05
9	.73	1.11	.93	1.23	1.99	.93	1.61	.99	1.23	1.17	.93	1.05
10	.56	1.10	.93	1.23	1.61	.99	1.37	.99	1.05	1.17	.93	1.05
11	.56	1.13	.95	1.11	1.17	.99	1.30	.99	1.05	1.17	.93	1.05
12	.56	1.11	.95	1.11	*1.05	14.6	1.23	1.05	.99	1.18	.93	1.05
13	a.6	1.08	.94	1.11	1.05	2.18	1.17	.99	.99	1.17	*.93	1.05
14	a1.0	1.06	.95	1.23	.99	1.37	1.17	.99	.99	1.18	.93	1.05
15	a.9	1.05	.93	1.23	.99	1.23	1.17	.99	1.05	1.15	.93	1.05
16	a.8	1.08	.96	1.23	.99	1.23	1.11	.99	1.05	1.10	.93	1.11
17	*a.7	1.05	3.52	1.23	.99	1.45	1.11	.99	1.05	1.05	.93	1.05
18	a.7	1.05	1.37	1.30	.99	1.37	1.11	*1.05	1.05	1.05	.88	1.05
19	a.8	1.02	1.07	1.30	.99	1.23	1.05	.99	1.11	1.01	.88	.93
20	a.7	1.03	*.96	1.45	.93	1.17	1.05	.99	1.05	1.05	.93	.93
21	a1.4	.99	.93	1.45	.93	1.11	1.05	.99	1.05	1.06	.93	.93
22	a1.1	.99	.90	1.45	.93	1.11	1.05	.99	15.6	.96	.99	.93
23	a.9	1.01	.90	1.45	.93	*1.11	1.11	.99	9.04	.96	1.05	.99
24	a1.0	1.00	.88	2.18	.93	1.11	1.05	.99	8.58	.93	1.05	.99
25	1.17	.98	.89	1.61	.93	1.11	1.05	1.05	2.51	.92	4.86	.99
26	1.20	.95	.89	1.45	.93	1.17	1.05	.99	3.57	.90	7.36	*.93
27	2.28	.94	.90	1.45	.93	1.11	1.05	.93	2.69	.89	3.33	.99
28	1.61	.97	.94	1.37	.93	1.11	.99	.93	1.81	.92	1.71	.93
29	1.48	.93	.95	1.37	.93	1.11	.99	.93	1.40	3.22	1.37	.93
30	1.28	.93	.93	1.37	.93	1.11	.99	---	1.26	1.23	1.23	.93
31	1.19	.93	---	1.23	---	1.11	1.05	---	1.19	---	1.17	---
Total	30.35	32.72	31.07	67.16	32.17	48.57	44.79	28.95	70.86	35.98	43.79	30.54
Mean												
Mgd	0.979	1.06	1.04	2.17	1.07	1.57	1.44	0.998	2.29	1.20	1.41	1.02
Cfs	1.51	1.64	1.61	3.36	1.66	2.43	2.23	1.54	3.54	1.86	2.18	1.58
Ac-ft	93	100	95	206	99	149	137	89	217	110	134	94

Calendar Year 1963: Max 71.2 Min 0.31 Mean mgd 1.91 Mean cfs 2.96 Ac-ft 2130
Fiscal Year 1963-64: Max 24.4 Min 0.56 Mean mgd 1.36 Mean cfs 2.10 Ac-ft 1520

* Discharge measurement made on this day.
a No gage-height record.

Peak discharge (base, 100 mgd)

Date	Time	Gage height	Discharge Mgd	Discharge Cfs	Date	Time	Gage height	Discharge Mgd	Discharge Cfs
10-4	1930	3.31	315	487	3-22	1445	3.41	365	565
12-12	0615	3.04	212	328					

2780. Iolekaa Stream mauka near Heeia

Location.--Lat 21°25'15", long 157°49'50", on left bank 0.7 mile upstream from confluence with Haiku Stream, 1.5 miles southwest of Heeia, and 1.8 miles west of Kaneohe Post Office.

Drainage area.--0.28 sq mi.

Records available.--March 1940 to June 1964.

Gage.--Water-stage recorder (digital since Apr. 30) and concrete control. Datum of gage is 320 ft above mean sea level (transit levels by U.S. Navy).

Average discharge.--23 years (1940-42, 1943-64), 0.406 mgd (0.628 cfs).

Extremes.--Maximum discharge during year, 30.1 mgd (46.6 cfs) Oct. 4 (gage height, 1.85 ft), from rating curve extended above 2.1 mgd as explained below; minimum, 0.28 mgd (0.43 cfs) June 18, 29.
1940-64: Maximum discharge, 111 mgd (172 cfs) Apr. 15, 1963 (gage height, 2.92 ft), from rating curve extended above 2.1 mgd by test on model of station site; minimum, not determined; minimum daily, 0.10 mgd (0.16 cfs) Oct. 31 to Nov. 9, Nov. 24, 27, 1946.

Remarks.--Records good. No diversion above station.

Rating table (gage height, in feet, and discharge, in million gallons a day)

0.5	0.20	0.9	1.75
.6	.36	1.0	2.70
.7	.64	1.1	4.00
.8	1.06	1.2	5.80

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
	1.77	0.54	0.41	0.49	0.49	0.46	0.54	0.38	0.38	0.46	0.43	0.32
2	.64	.54	.41	.78	.49	.43	.41	.50	.38	1.09	.43	.32
3	.51	.54	.41	.49	.49	.43	2.35	.43	.38	*.73	.41	.32
4	.49	.51	.41	4.29	.49	.41	.75	.38	.38	.51	.41	.32
5	.46	.46	.41	1.54	.49	.43	.75	.36	.36	.43	.41	.30
6	.46	.43	.41	.78	.49	.46	.87	.38	.38	.41	.38	.30
7	.46	.46	.41	.61	.51	.41	.74	.38	.41	.38	.38	.30
8	.43	.43	.41	.61	.54	.41	.99	.36	1.16	.36	.38	.30
9	.43	.43	.41	.57	1.06	.41	*.67	.36	.43	.36	.38	.30
10	.43	.43	.41	.51	.57	.49	.51	.38	.43	.36	.38	.30
11	.46	.49	.41	.49	.51	.49	.49	.38	.41	.36	.38	.30
12	.43	.43	.41	.49	*.49	2.78	.46	.38	.38	.36	.38	.30
13	.46	.43	.41	.49	.49	.70	.43	.36	.38	.36	.38	.30
14	.63	.43	.41	.49	.49	.51	.41	.36	.38	.38	.38	.30
15	.54	.43	.41	.49	.49	.46	.41	.36	.38	.38	.38	.32
16	.46	.43	.41	.49	.49	.49	.38	.36	.38	.36	.38	.32
17	.43	.43	1.94	.49	.46	.51	.38	.36	.38	.36	.38	.32
18	.43	.43	.57	.49	.46	.43	.38	*.36	.38	.36	.38	.30
19	.49	.43	.49	.49	.46	.43	.38	.36	.43	.36	.38	.30
20	.43	.46	*.49	.57	.46	.41	.38	.36	.41	.41	.38	.30
21	.78	.46	.49	.51	.43	.41	.38	.36	.41	.43	.38	.30
22	*.59	.43	.49	.51	.46	.41	.38	.34	3.02	.38	.43	.30
23	.49	.43	.46	.57	.49	.38	.41	.34	2.65	.38	.51	.32
24	.49	.46	.46	.97	.49	.38	.38	.34	2.88	.36	.41	.30
25	.46	.43	.46	.54	.49	.38	.38	.38	.96	.36	2.58	.32
26	.49	.43	.46	.54	.49	.45	.38	.34	1.09	.36	2.58	.32
27	1.04	.43	.46	.51	.49	.41	.38	.34	.92	.36	1.06	.34
28	.57	.43	.46	.51	.46	.38	.41	.34	.61	.40	.51	.32
29	.66	.43	.46	.54	.46	.38	.41	.34	.51	1.57	.41	*.30
30	.54	.41	.46	.51	.46	.38	.41	----	.49	*.49	.34	.30
31	.54	.41	----	.51	----	.38	.38	----	.46	----	.34	----
Total	17.49	13.91	14.71	21.87	15.14	15.89	16.98	10.67	22.60	13.87	17.34	9.26
Mean												
Mgd	0.564	0.449	0.490	0.705	0.505	0.513	0.548	0.368	0.729	0.462	0.559	0.308
Cfs	0.873	0.695	0.758	1.09	0.781	0.794	0.848	0.569	1.13	0.715	0.865	0.477
Ac-ft	54	43	45	67	46	49	52	33	69	43	53	28

Calendar Year 1963: Max 13.1 Min 0.22 Mean mgd 0.655 Mean cfs 1.01 Ac-ft 733
Fiscal Year 1963-64: Max 4.29 Min 0.30 Mean mgd 0.518 Mean cfs 0.801 Ac-ft 582

* Discharge measurement made on this day.

Peak discharge (base, 15 mgd)

Date	Time	Gage height	Discharge Mgd	Discharge Cfs	Date	Time	Gage height	Discharge Mgd	Discharge Cfs
10-4	1930	1.85	30.1	46.6	3-22	1530	1.63	19.1	29.6

2830. Kahaluu Stream near Heeia

Location.--Lat 21°26'20", long 157°51'20", on left bank 40 ft upstream from intake of Libby ditch, 0.5 mile upstream from forest-reserve boundary, and 3.0 miles northwest of Heeia.

Drainage area.--0.28 sq mi.

Records available.--October 1935 to June 1964.

Gage.--Water-stage recorder and Parshall flume. Datum of gage is 357.52 ft above mean sea level (levels by Wright, Harvey & Wright).

Average discharge.--17 years (1947-64), 0.502 mgd (0.777 cfs).

Extremes.--Maximum discharge during year, 104 mgd (161 cfs) Oct. 4 (gage height, 3.87 ft), from rating curve extended above 8.4 mgd as explained below; minimum, 0.09 mgd (0.14 cfs) Aug. 31, Sept. 1.
1935-64: Maximum discharge, 308 mgd (477 cfs) Apr. 15, 1963 (gage height, 3.42 ft), from rating curve extended above 8.4 mgd by test on model of station site; minimum, 0.03 mgd (0.05 cfs) June 25, 1958, Dec. 5-9, 1962, Feb. 22-24, 26-28, Mar. 14-18, 1963.

Remarks.--Records good. Honolulu Board of Water Supply has diverted ground water from tunnel in drainage area since 1947. Continuous records of rainfall are obtained at station.

Rating table (gage height, in feet, and discharge, in million gallons a day)

0	0	0.4	1.60
.1	.1	.6	3.20
.2	.53	.9	6.40
.3	.98		

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	0.88	0.14	0.11	0.20	0.26	0.20	0.66	0.17	0.23	0.17	0.20	0.17
2	.52	.14	.11	.23	.26	.20	.26	.17	.26	.48	.17	.17
3	.30	.11	.11	.23	.23	.20	3.81	.17	.23	.45	.17	.14
4	.20	.17	.11	5.30	.23	.20	.45	.17	.23	.23	.17	.11
5	.14	.14	.11	.83	.23	.20	.41	.17	.23	.20	.14	.11
6	.11	.11	.11	.30	.23	.23	1.42	*.17	.23	.17	.14	.11
7	.11	.11	.11	.26	.23	.20	.41	.20	.26	.17	.14	.11
8	.11	.11	.11	.30	.23	.20	.37	.20	1.57	.17	.14	.14
9	.11	.14	.11	.37	.45	.20	.26	.17	.23	.17	.14	.14
10	.11	.14	.11	.26	.37	.23	.23	.17	.17	.17	.14	.14
11	.14	.17	.14	.23	.23	.26	.20	.20	.14	.14	*.14	.14
12	.17	.14	.14	.23	.20	2.24	.17	.20	.14	.11	.14	.14
13	.20	.17	.14	.23	*.18	.49	.17	.20	.14	.11	.14	.14
14	.51	.17	.11	.26	.17	.20	.17	.20	.11	.11	.14	.11
15	*.40	.17	.14	.20	.17	.20	.17	.20	.11	.11	.14	.11
16	.14	.17	.14	.20	.17	.17	.17	.20	.11	.11	.17	.11
17	.14	.17	2.08	.20	.17	.17	.14	.20	*.14	.11	.14	.11
18	.11	.20	.30	.23	.17	.17	.14	.20	.14	.11	.14	.11
19	.28	.20	.17	.20	.17	.17	.14	.23	.14	.11	.14	.11
20	.20	.23	.14	.98	.17	.17	.17	.23	.14	.11	.14	.11
21	.56	.20	.11	.49	.17	.17	.14	.23	.17	.11	.14	.11
22	.69	.20	.11	.34	.17	.17	.14	.23	3.31	.11	.17	.11
23	.23	.20	*.14	.30	.17	*.15	.17	.23	3.97	.24	.20	.11
24	.20	.23	.17	.37	.17	.14	.17	.23	2.11	.14	.26	.11
25	.17	.17	.17	.30	.17	.14	.17	.23	.45	.11	3.50	.11
26	.14	.20	.17	.26	.20	.20	.17	.20	.49	.11	5.88	*.11
27	.68	.20	.20	.26	.20	.23	.17	.20	.96	.11	2.09	.14
28	.30	.23	.20	.26	.20	.17	.17	.20	.41	.14	.41	.11
29	.38	.20	.23	.26	.20	.17	.17	.20	.23	3.49	.23	.11
30	.20	.14	.20	.26	.20	.17	.17	---	.20	.30	.20	.11
31	.14	.09	---	.26	---	.14	.17	---	.17	---	.17	---
Total	8.57	5.16	6.30	14.60	6.37	8.15	11.73	5.77	17.42	8.37	16.23	3.66
Mean Mgd	0.276	0.166	0.210	0.471	0.212	0.263	0.378	0.199	0.562	0.279	0.524	0.122
Cfs	0.427	0.257	0.325	0.729	0.328	0.407	0.585	0.308	0.870	0.432	0.811	0.189
Ac-ft	26	16	19	45	20	25	36	18	53	26	50	11

Calendar Year 1963: Max 10.9 Min 0.03 Mean mgd 0.347 Mean cfs 0.537 Ac-ft 390
Fiscal Year 1963-64: Max 5.88 Min 0.09 Mean mgd 0.307 Mean cfs 0.475 Ac-ft 345

* Discharge measurement made on this day.

Peak discharge (base, 30 mgd)

Date	Time	Gage height	Discharge Mgd	Discharge Cfs	Date	Time	Gage height	Discharge Mgd	Discharge Cfs
10-4	1930	3.87	104	161	3-22	1530	3.16	69.7	108
1-3	0230	2.58	46.3	71.6	3-23	1700	2.97	61.6	95.3
1-6	1000	2.72	51.6	79.8	4-29	0130	2.35	38.6	59.7
3-8	0600	2.28	36.5	56.5	5-25	2400	2.53	44.6	69.0

2836. South Fork Waibee Stream near Heeia

Location.--Lat 21°26'42", long 157°52'10", on left bank 0.6 mile upstream from confluence with North Fork, 3.0 miles southwest of Waiahole School, and 4.0 miles northwest of Heeia.

Drainage area.--0.03 sq mi.

Records available.--September 1962 to June 1964.

Gage.--Water-stage recorder and concrete control. Datum of gage is 615.74 ft above mean sea level (levels by Honolulu Board of Water Supply).

Extremes.--Maximum discharge during year, 35.0 mgd (54.2 cfs) Mar. 23 (gage height, 2.22 ft), from rating curve extended above 2.6 mgd as explained below; minimum, 1.00 mgd (1.55 cfs) on many days.
1962-64: Maximum discharge, 105 mgd (162 cfs) Apr. 15, 1963 (gage height, 3.25 ft), from rating curve extended above 2.6 mgd by logarithmic plotting; minimum, 0.92 mgd (1.42 cfs) on many days in 1963.

Remarks.--Records good except those for periods of no gage-height record and those above 6 mgd, which are fair.

Rating table (gage height, in feet, and discharge, in million gallons a day)
(Shifting-control method used July 1 to Aug. 19)

0.6	0.77
.7	1.20
.8	1.78
1.0	3.40

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	1.3	1.20	1.20	1.25	1.30	1.20	1.38	1.2	1.25	1.2	1.2	1.05
2	1.0	1.20	1.20	1.25	1.30	1.20	1.10	1.2	1.25	1.3	1.2	1.05
3	1.1	1.20	1.20	*1.25	1.30	1.20	2.65	1.2	1.25	1.2	1.2	1.05
4	1.0	1.20	1.20	2.25	1.25	1.20	1.44	1.2	1.25	1.2	1.2	1.00
5	*1.00	1.20	1.20	1.30	1.25	1.20	1.50	1.2	1.25	1.2	1.2	1.00
6	1.05	1.20	1.20	1.20	1.25	1.20	1.52	1.2	1.25	1.2	1.1	1.00
7	1.10	1.20	1.20	1.20	1.25	1.20	1.20	1.2	1.41	1.2	1.1	1.00
8	1.15	1.20	1.20	1.25	1.25	1.20	1.28	1.2	1.87	1.2	*1.05	1.00
9	1.15	1.20	1.20	1.30	1.42	1.20	1.15	1.2	1.25	1.2	1.05	1.00
10	1.15	1.20	1.20	1.20	1.25	1.20	1.15	1.2	1.20	1.2	1.05	1.00
11	1.15	1.25	1.20	1.20	1.25	1.20	1.15	1.2	1.20	1.2	1.05	1.00
12	1.15	1.20	1.20	1.20	1.25	1.81	1.1	1.2	1.33	1.2	1.05	1.00
13	1.19	*1.20	1.20	1.20	1.25	1.15	1.1	*1.2	1.25	1.2	1.05	1.00
14	1.34	1.20	1.20	1.36	*1.20	1.10	1.1	1.25	1.25	1.2	1.05	1.00
15	1.30	1.20	1.20	1.25	1.20	1.10	1.1	1.25	1.25	1.2	1.05	1.00
16	1.15	1.15	1.20	1.25	1.20	1.15	1.1	1.25	1.20	1.2	1.05	1.00
17	1.15	1.15	2.07	1.25	1.20	1.10	1.1	1.25	1.20	1.2	1.05	1.00
18	1.15	1.15	1.36	1.30	1.20	1.05	1.2	1.25	1.20	1.2	1.05	*1.00
19	1.24	1.15	1.30	1.25	1.20	*1.05	1.2	1.25	* 1.23	1.2	1.05	1.00
20	1.15	1.20	1.30	1.59	1.20	1.10	1.2	1.25	1.25	1.2	1.05	1.00
21	1.51	1.20	1.30	1.30	1.20	1.15	1.2	1.25	1.3	1.2	1.05	1.00
22	1.30	1.20	1.30	1.30	1.20	1.15	1.2	1.25	1.8	1.2	1.10	1.00
23	1.20	1.20	1.25	1.30	1.20	1.15	1.2	1.25	3.0	1.2	1.15	1.00
24	1.20	1.20	1.25	1.36	1.20	1.15	1.2	1.25	1.7	1.2	1.15	1.00
25	1.15	1.20	1.25	1.30	1.20	1.15	1.2	1.25	1.2	1.2	2.38	1.00
26	1.15	1.20	1.25	1.30	1.20	1.15	1.2	1.25	1.7	1.2	2.61	1.00
27	1.52	1.20	1.25	1.30	1.25	1.15	1.2	1.25	1.6	1.2	1.48	1.00
28	1.20	1.25	1.25	1.30	1.20	1.10	1.2	1.25	1.2	1.2	1.10	1.00
29	1.20	1.20	1.24	1.36	1.20	1.10	1.2	1.25	1.2	2.6	1.05	1.00
30	1.20	1.20	1.25	1.30	1.20	1.10	1.2	---	1.2	1.3	1.05	1.00
31	1.20	1.20	---	1.30	---	1.10	1.2	---	1.2	---	1.05	---
Total	36.80	37.10	37.82	40.72	37.02	36.26	38.92	35.60	42.69	37.6	37.02	30.15
Mean												
Mgd	1.19	1.20	1.26	1.31	1.23	1.17	1.26	1.23	1.38	1.25	1.19	1.00
Cfs	1.84	1.86	1.95	2.03	1.90	1.81	1.95	1.90	2.14	1.93	1.84	1.55
Ac-ft	113	114	116	125	114	111	119	109	131	115	114	93

Calendar Year 1963: Max 6.14 Min 0.92 Mean mgd 1.17 Mean cfs 1.81 Ac-ft 1,300
Fiscal Year 1963-64: Max 3.0 Min 1.00 Mean mgd 1.22 Mean cfs 1.89 Ac-ft 1,370

Peak discharge (base, 15 mgd)

Date	Time	Gage height	Discharge Mgd	Discharge Cfs	Date	Time	Gage height	Discharge Mgd	Discharge Cfs
10-4	1900	1.79	18.7	28.9	3- 8	0530	1.81	20.2	31.3
1-3	0030	1.76	17.8	27.5	3-23	about 1600	2.22	35.0	54.2
1-6	0930	1.95	23.5	36.4					

* Discharge measurement made on this day.
Note.--No gage-height record July 1-4, Jan. 12 to Feb. 13, Mar. 21 to May 7.

2837. North Fork Waihee Stream near Heeia

Location.--Lat 21°26'46", long 157°52'18", on left bank 0.6 mile upstream from confluence with South Fork, 2.8 miles southwest of Waiahole School, and 4.3 miles northwest of Heeia.

Drainage area.--0.03 sq mi.

Records available.--September 1962 to June 1964.

Gage.--Water-stage recorder. Datum of gage is 639.00 ft above mean sea level (levels by Honolulu Board of Water Supply).

Extremes.--Maximum discharge during year, 30.2 mgd (46.7 cfs) Mar. 23 (gage height, 1.75 ft), from rating curve extended above 12 mgd as explained below; minimum, 1.04 mgd (1.61 cfs) June 5.
1962-64: Maximum discharge, 110 mgd (170 cfs) May 14, 1963 (gage height, 2.64 ft), from rating curve extended above 12 mgd by logarithmic plotting; minimum, 0.86 mgd (1.33 cfs) on many days in 1963.

Remarks.--Records good except those for periods of no gage-height record, which are fair. No diversion above station.

Rating table (gage height, in feet, and discharge, in million gallons a day)

0.5	0.99
.6	1.52
.8	3.00

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	1.3	1.18	1.24	1.3	1.34	1.29	1.44	1.18	1.13	1.13	1.1	1.08
2	1.1	1.18	1.24	1.3	1.34	1.29	1.18	1.18	1.13	1.33	1.1	1.08
3	1.2	1.18	1.24	*1.40	1.29	1.29	2.29	1.18	1.13	1.24	1.1	1.08
4	1.1	1.24	1.24	1.98	1.29	1.29	1.42	1.18	1.13	1.13	1.1	1.08
5	*1.08	1.18	1.24	1.40	1.29	1.29	1.48	1.18	1.13	1.13	1.1	1.08
6	1.08	1.18	1.24	1.40	1.29	1.29	1.45	1.18	1.13	1.13	1.1	1.08
7	1.08	1.18	1.24	1.34	1.29	1.29	1.24	1.18	1.28	1.13	1.1	1.08
8	1.08	1.18	1.24	1.40	1.29	1.29	1.37	1.18	1.76	1.13	*1.08	1.08
9	1.13	1.18	1.24	1.46	1.43	1.29	1.24	1.18	1.29	1.13	1.08	1.08
10	1.13	1.18	1.24	1.34	1.34	1.29	1.24	1.18	1.29	1.13	1.08	1.08
11	1.13	1.24	1.24	1.34	1.29	1.29	1.24	1.18	1.29	1.13	1.08	1.08
12	1.18	1.18	1.3	1.34	1.29	1.82	1.24	1.18	1.29	1.13	1.08	1.08
13	1.18	*1.18	1.3	1.34	1.29	1.24	1.24	*1.18	1.24	1.13	1.08	1.08
14	1.24	1.24	1.3	1.44	*1.29	1.24	1.24	1.18	1.24	1.13	1.08	1.08
15	1.29	1.24	1.3	1.34	1.29	1.24	1.24	1.18	1.24	1.13	1.08	1.08
16	1.18	1.24	1.3	1.34	1.29	1.24	1.24	1.18	1.24	1.13	1.08	1.08
17	1.18	1.24	2.0	1.34	1.29	1.24	1.24	1.13	1.24	1.13	1.08	1.08
18	1.18	1.24	1.4	1.34	1.29	1.24	1.18	1.13	1.24	1.08	1.08	*1.08
19	1.27	1.24	1.3	1.34	1.29	*1.18	1.18	1.13	*1.24	1.08	1.08	1.08
20	1.19	1.24	1.3	1.58	1.29	1.18	1.18	1.13	1.24	1.13	1.08	1.08
21	1.50	1.24	1.3	1.40	1.29	1.18	1.18	1.13	1.24	1.13	1.13	1.08
22	1.34	1.24	1.3	1.34	1.29	1.18	1.18	1.13	1.96	1.13	1.13	1.08
23	1.24	1.24	1.3	1.34	1.29	1.18	1.18	1.13	2.72	1.13	1.13	1.08
24	1.24	1.24	1.3	1.40	1.29	1.18	1.18	1.13	1.70	1.13	1.18	1.08
25	1.18	1.24	1.3	1.40	1.29	1.18	1.18	1.13	1.18	1.13	2.24	1.08
26	1.18	1.24	1.3	1.34	1.29	1.24	1.18	1.13	1.69	1.13	2.29	1.08
27	1.46	1.24	1.3	1.34	1.29	1.18	1.18	1.13	1.58	1.13	1.46	1.08
28	1.24	1.29	1.3	1.34	1.29	1.18	1.18	1.13	1.24	1.18	1.08	1.08
29	1.18	1.24	1.3	1.46	1.29	1.18	1.18	1.13	1.18	2.13	1.08	1.08
30	1.18	1.24	1.3	1.34	1.29	1.18	1.18	---	1.13	1.13	1.08	1.08
31	1.18	1.24	---	1.34	---	1.18	1.18	---	1.13	---	1.08	---
Total	37.21	37.83	39.14	43.10	38.99	38.85	39.55	33.57	41.65	35.16	36.62	32.40
Mean												
Mgd	1.20	1.22	1.30	1.39	1.30	1.25	1.28	1.16	1.34	1.17	1.18	1.08
Cfs	1.86	1.89	2.01	2.15	2.01	1.93	1.98	1.79	2.07	1.81	1.83	1.67
Ac-ft	114	116	120	132	120	119	121	103	128	108	112	99

Calendar Year 1963: Max 4.59 Min 0.86 Mean mgd 1.14 Mean cfs 1.76 Ac-ft 1,280
Fiscal Year 1963-64: Max 2.72 Min 1.08 Mean mgd 1.24 Mean cfs 1.92 Ac-ft 1,390

* Discharge measurement made on this day.
Note.--No gage-height record July 1-4, Sept. 12 to Oct. 2, May 1-7.

Peak discharge (base, 20 mgd)

Date	Time	Gage height	Discharge	
			Mgd	Cfs
3-23	1630	1.75	30.2	46.7

2838. Waihee Stream at altitude 260 ft, near Heeia

Location.--Lat 21°26'57", long 157°51'55", on right bank 325 ft downstream from confluence of North and South Forks, 2.7 miles southwest of Waiahole School, and 3.7 miles northwest of Heeia.

Drainage area.--0.31 sq mi.

Records available.--May 1961 to June 1964.

Gage.--Water-stage recorder. Datum of gage is 259.28 ft above mean sea level (levels by Honolulu Board of Water Supply).

Extremes.--Maximum discharge during year, 88.8 mgd (137 cfs) Mar. 23 (gage height, 2.98 ft), from rating curve extended above 19 mgd; minimum, 1.87 mgd (2.89 cfs) June 23.
1961-64: Maximum discharge, 256 mgd (396 cfs) Apr. 15, 1963 (gage height, 4.91 ft), from rating curve extended above 19 mgd; minimum, 1.56 mgd (2.41 cfs), Oct. 10, 1962.

Remarks.--Records good except those for period of no gage-height record and those above 40 mgd, which are fair. Honolulu Board of Water Supply tunnel draft affects flow at station.

Rating tables (gage height, in feet, and discharge, in million gallons a day)

July 1 to Dec. 11		Dec. 12 to June 30	
0.5	2.43	0.4	1.45
.8	4.41	.7	3.50
1.1	7.20	1.1	7.20
		1.4	13.5

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	a4.1	3.25	2.73	2.79	3.05	3.12	4.06	2.84	2.56	2.84	2.49	2.28
2	a3.3	3.25	2.73	2.86	3.05	3.12	3.12	2.91	2.74	4.46	2.49	2.28
3	a3.4	3.25	2.73	*2.79	2.99	3.12	10.1	2.84	2.49	3.36	2.42	2.28
4	a2.9	3.32	2.73	6.45	2.99	3.12	4.38	2.91	2.63	2.84	2.35	2.28
5	*2.73	3.18	2.79	3.45	2.99	3.12	4.81	2.84	2.56	2.70	2.35	2.28
6	2.73	3.18	2.79	2.86	3.05	3.18	5.71	2.91	2.56	2.70	2.28	2.21
7	2.73	3.18	2.86	2.73	3.12	3.18	3.66	2.84	3.32	2.70	2.28	2.14
8	2.79	3.12	2.92	2.92	3.05	3.18	4.06	2.84	6.20	2.70	*2.28	2.14
9	2.73	3.12	2.86	3.18	3.59	3.18	3.34	2.84	2.98	2.63	2.35	2.14
10	2.79	3.12	2.86	2.92	3.32	3.18	3.26	2.84	2.70	2.56	2.35	2.14
11	2.73	3.38	2.79	2.86	3.25	3.25	3.19	2.84	2.70	2.63	2.35	2.07
12	2.73	3.12	2.99	2.86	3.25	6.16	3.12	2.84	2.92	2.56	2.28	2.07
13	2.86	*3.12	2.92	2.92	3.32	3.42	3.12	*2.84	2.70	2.49	2.28	2.07
14	3.04	3.12	2.99	3.35	*3.32	3.05	3.12	2.84	2.63	2.56	2.28	2.07
15	3.24	3.05	2.86	2.92	3.38	2.98	3.04	2.84	2.56	2.56	2.35	2.07
16	2.92	3.05	2.92	2.92	3.32	3.05	3.04	2.77	2.56	2.56	2.42	2.21
17	2.86	3.05	6.28	2.86	3.32	3.12	2.98	2.77	2.56	2.56	2.28	2.21
18	2.86	2.99	3.25	3.05	3.32	2.98	2.98	2.77	2.70	2.49	2.21	*2.14
19	3.20	2.92	2.99	2.92	3.32	*2.91	2.91	2.70	*2.70	2.49	2.21	2.07
20	2.99	2.99	2.86	4.12	3.25	2.91	2.91	2.70	2.77	2.63	2.21	1.93
21	4.42	2.92	2.86	3.25	3.25	2.91	2.91	2.70	2.84	2.70	2.42	1.93
22	3.86	2.92	2.73	3.05	3.25	2.91	2.91	2.63	8.50	2.70	2.63	1.93
23	3.18	2.99	2.61	3.05	3.18	2.91	2.91	2.56	10.7	2.84	2.77	1.93
24	3.12	3.12	2.67	3.18	3.05	2.91	2.91	2.56	7.26	2.63	3.00	2.00
25	3.05	2.99	3.67	3.12	2.99	2.91	2.91	2.70	3.34	2.56	9.81	1.93
26	3.05	2.92	2.67	3.05	3.05	3.05	2.91	2.63	5.88	2.49	11.6	1.93
27	4.55	2.92	2.67	2.99	3.39	2.91	2.84	2.49	5.48	2.42	6.05	2.14
28	3.45	3.12	2.67	2.99	3.25	2.91	2.84	2.56	3.34	2.97	2.91	2.07
29	3.38	3.05	2.84	3.45	3.25	2.91	2.84	2.56	2.98	9.45	2.63	2.00
30	3.25	2.92	2.73	3.18	3.18	2.91	2.84	---	2.91	2.77	2.42	2.00
31	3.25	2.79	---	3.18	---	2.98	2.84	---	2.84	---	2.35	---
Total	98.19	95.42	87.97	98.22	96.09	97.55	108.57	79.91	113.61	88.55	95.10	62.94
Mean												
Mgd	3.17	3.08	2.93	3.17	3.20	3.15	3.50	2.76	3.66	2.95	3.07	2.10
Cfs	4.90	4.77	4.53	4.90	4.95	4.87	5.42	4.27	5.66	4.56	4.75	3.25
Ac-ft	301	293	270	301	295	299	333	245	349	272	292	193

Calendar Year 1963: Max 24.2 Min 1.98 Mean mgd 3.13 Mean cfs 4.84 Ac-ft 3,510
Fiscal Year 1963-64: Max 11.6 Min 1.93 Mean mgd 3.07 Mean cfs 4.75 Ac-ft 3,440

* Discharge measurement made on this day.
a No gage-height record.

Peak discharge (base, 55 mgd)

Date	Time	Gage height	Discharge Mgd	Discharge Cfs	Date	Time	Gage height	Discharge Mgd	Discharge Cfs
10-4	1900	2.42	55.2	85.4	3-23	1600	2.98	88.8	137
1-6	0900	2.64	68.4	106	4-29	0030	2.61	66.6	103
3-8	0530	2.45	57.0	88.2	5-25	2330	2.57	64.2	99.3

2840. Waihee Stream near Heeia

Location.--Lat 21°27'00", long 157°51'40", on left bank 70 ft upstream from intake of Kihe ditch, 120 ft downstream from forest-reserve boundary, 3.5 miles northwest of Heeia, and 4.4 miles northwest of Kaneohe.

Drainage area.--0.93 sq mi.

Records available.--December 1935 to June 1964. See also Note below.

Gage.--Water-stage recorder and Parshall flume. Datum of gage is 193.44 ft above mean sea level (levels by Honolulu Board of Water Supply).

Average discharge.--28 years (1936-64), 6.15 mgd (9.52 cfs).

Extremes.--Maximum discharge during year, 145 mgd (224 cfs) Mar. 22 (gage height, 4.14 ft), from rating curve extended above 33 mgd as explained below; minimum, 3.28 mgd (5.07 cfs) June 20-26, 29.
1935-64: Maximum discharge, 1,010 mgd (1,560 cfs) Apr. 15, 1963 (gage height, 6.06 ft, from floodmarks), from rating curve extended above 33 mgd on basis of slope-area measurement of peak flow; minimum, 2.17 mgd (3.36 cfs) Oct. 15, 16, 1962.

Remarks.--Records good. Honolulu Board of Water Supply diverts ground water from tunnel in drainage area.

Note.--Published records for peaks in the fiscal years 1940-43, 1947-50, 1953, 1955, 1958 and 1959 have been found to be in error; revised records are on file in the district office and will be published in the next water-supply paper.

Rating table (gage height, in feet, and discharge, in million gallons a day)

0.6	3.05
.7	4.20
1.0	8.40
1.5	18.5
2.0	33.0

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	6.00	4.92	3.97	4.20	4.56	4.08	5.82	4.44	4.08	4.80	4.56	3.97
2	4.87	4.80	3.86	4.44	4.56	4.08	4.80	4.56	4.20	7.24	4.32	3.97
3	5.16	4.80	3.86	4.32	4.56	4.08	16.5	4.44	3.97	6.02	4.20	3.97
4	4.68	4.92	3.86	9.61	4.56	4.08	7.12	4.44	4.08	5.04	4.08	3.97
5	4.56	4.80	3.86	5.82	4.56	4.20	7.92	*4.44	3.97	4.80	4.08	3.97
6	4.56	4.68	3.86	4.80	4.56	4.32	11.2	4.44	3.97	4.68	*3.97	3.86
7	4.44	4.68	3.86	4.56	4.68	4.20	6.80	4.44	4.81	4.56	3.97	3.86
8	4.44	4.56	3.86	4.56	4.68	4.20	6.73	4.44	9.35	4.44	3.97	3.62
9	4.44	4.56	3.86	5.04	5.08	4.20	5.68	4.32	4.92	4.44	3.86	3.62
10	4.44	4.56	3.74	4.56	4.68	4.20	5.40	4.44	4.32	4.32	3.86	3.62
11	*4.44	4.80	3.74	4.56	4.56	4.32	5.28	4.44	4.32	4.32	3.74	3.51
12	4.44	4.56	3.86	4.44	4.56	7.93	5.16	4.44	4.39	4.20	3.74	3.40
13	4.56	4.56	3.86	4.56	4.56	5.40	4.92	4.44	4.08	4.08	3.74	3.40
14	4.68	4.56	3.86	4.92	4.56	4.92	4.92	4.32	4.08	4.20	3.74	3.40
15	4.88	4.44	3.86	4.56	4.56	4.68	4.92	4.32	3.97	4.08	3.86	3.40
16	4.68	4.44	3.86	4.44	4.56	4.68	4.80	4.32	3.97	4.08	3.97	*3.51
17	4.56	4.44	7.51	4.44	4.44	*4.68	4.80	4.20	3.97	4.08	3.74	3.51
18	4.56	4.32	4.68	4.56	4.44	4.56	4.68	4.20	*3.97	3.97	3.62	3.51
19	4.94	4.32	*4.32	4.44	4.32	4.56	4.68	4.20	4.08	3.97	3.62	3.40
20	4.56	4.20	4.08	6.03	4.32	4.56	4.56	4.20	4.08	4.08	3.74	3.40
21	6.34	4.20	4.08	5.04	4.20	4.44	4.56	4.20	4.08	4.20	3.86	3.28
22	5.82	4.08	3.97	4.68	4.20	4.44	4.56	4.08	13.9	4.20	4.08	3.28
23	5.16	4.20	3.97	4.68	4.08	4.44	4.56	3.97	16.7	4.32	4.20	3.28
24	5.04	4.32	3.97	4.92	3.97	4.44	4.56	3.97	12.4	4.08	4.44	3.28
25	4.92	4.20	3.97	4.68	3.86	4.44	4.56	4.08	6.38	3.97	9.96	3.28
26	4.92	4.20	3.97	4.56	3.97	4.56	4.56	4.08	9.38	3.97	24.9	3.28
27	6.51	4.08	4.08	4.56	4.35	4.44	4.44	3.97	*9.04	3.97	11.8	3.40
28	5.40	4.44	4.08	4.56	4.20	4.44	4.44	3.97	6.10	4.20	5.82	3.51
29	5.16	4.20	4.44	5.04	4.20	4.44	4.44	3.97	5.16	13.9	4.80	3.40
30	4.92	3.97	4.20	4.80	4.08	4.56	4.44	----------	5.04	5.04	4.44	3.40
31	4.92	3.97	----------	*4.56	----------	4.56	4.44	----------	4.80	----------	4.20	----------
Total	153.00	137.78	122.95	150.94	132.47	141.13	176.25	123.77	181.56	143.25	160.88	106.26
Mean												
Mgd	4.94	4.44	4.10	4.87	4.42	4.55	5.69	4.27	5.86	4.78	5.19	3.54
Cfs	7.64	6.87	6.34	7.54	6.84	7.04	8.80	6.61	9.07	7.40	8.03	5.48
Ac-ft	470	423	377	463	407	433	541	380	557	440	494	326

Calendar Year 1963: Max 50 Min 2.71 Mean mgd 4.90 Mean cfs 7.58 Ac-ft 5,490
Fiscal Year 1963-64: Max 24.9 Min 3.28 Mean mgd 4.73 Mean cfs 7.32 Ac-ft 5,310

* Discharge measurement made on this day.

Peak discharge (base, 90 mgd)

Date	Time	Gage height	Discharge Mgd	Discharge Cfs	Date	Time	Gage height	Discharge Mgd	Discharge Cfs
1-3	0230	3.46	103	159	3-22	1600	4.14	145	224
1-6	1000	3.43	101	156	5-26	0100	3.25	90.0	139

2850. Waiahole tunnel at Waianu, near Waiahole

Location.--Lat 21°29'05", long 157°53'15", on left bank in Waiahole tunnel at Waianu Stream intake and 2.1 miles west of Waiahole School.

Records available.--December 1950 to June 1964.

Gage.--Water-stage recorder and Parshall flume. Datum of gage is 785.5 ft above mean sea level (levels by Waiahole Water Co.).

Average discharge.--13 years (1951-64), 24.4 mgd (37.8 cfs).

Extremes.--1950-64: Maximum daily discharge, 74.0 mgd (114 cfs) July 28, 1954; minimum daily, 16.0 mgd (24.8 cfs) Jan. 24-29, 1952.

Remarks.--Records excellent except those above 40 mgd, which are good. Tunnel diverts from headwaters of nearly all streams from Waiahole Valley to Kahana Valley for irrigation in central Oahu. Occasional diversions at various intakes above station.

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	38.3	*30.7	30.2	30.7	30.2	28.1	27.6	25.6	24.9	29.4	*26.5	27.2
2	32.1	31.2	30.2	30.9	30.4	*28.1	26.7	25.6	27.3	42.0	26.2	27.2
3	34.6	30.0	30.9	30.9	30.2	28.1	30.2	25.1	24.9	32.1	26.0	27.2
4	28.5	37.9	31.4	40.9	30.4	28.1	27.8	24.9	31.0	39.7	25.6	26.9
5	27.8	30.0	31.4	32.8	30.0	27.8	28.5	24.9	25.1	32.2	25.6	26.9
6	27.8	30.0	30.7	30.2	29.5	28.1	30.5	24.6	24.0	35.2	25.8	26.9
7	27.6	30.2	30.2	30.2	29.5	27.8	27.8	24.9	26.2	28.1	25.3	26.9
8	27.6	30.0	30.0	31.4	29.0	27.8	27.4	24.6	35.5	26.9	26.0	26.9
9	27.8	30.4	30.0	32.4	33.3	27.6	26.9	24.6	25.6	26.2	25.3	26.9
10	29.5	30.2	30.0	30.9	29.7	27.4	26.9	27.3	24.6	26.0	25.8	26.7
11	30.2	34.6	30.2	30.7	28.8	27.6	26.9	25.3	24.4	25.8	25.3	26.5
12	28.1	31.2	33.6	30.4	28.5	31.9	26.7	26.9	32.3	26.9	25.1	26.5
13	29.0	30.9	30.2	32.4	29.0	29.0	26.5	25.1	25.3	25.8	25.1	26.5
14	28.5	30.7	30.0	35.0	29.0	28.3	26.5	24.6	24.6	25.8	26.6	26.5
15	30.2	35.7	29.7	30.7	28.5	28.1	26.2	24.6	24.4	25.6	26.0	26.7
16	28.1	36.3	30.4	30.7	31.6	28.3	26.2	24.4	24.4	26.5	30.5	26.7
17	28.1	31.2	47.4	30.7	31.2	28.8	26.0	24.9	24.0	26.0	26.0	26.5
18	28.1	31.2	36.3	33.8	28.1	28.1	26.0	24.9	24.0	25.8	25.3	27.2
19	31.9	30.4	30.9	30.7	29.2	27.6	26.0	24.2	23.7	28.8	25.1	26.5
20	33.6	30.4	30.7	40.9	29.0	27.4	26.0	24.2	23.5	29.2	25.3	26.5
21	37.8	30.4	30.2	31.9	28.8	27.4	26.0	24.4	25.0	32.4	32.2	26.5
22	39.9	30.2	30.0	31.4	28.5	27.2	25.8	24.4	39.2	27.2	33.3	26.5
23	33.1	33.3	30.2	31.4	28.5	27.2	25.6	24.2	48.8	27.2	37.7	27.6
24	33.8	32.4	30.2	32.1	28.5	26.9	25.6	24.2	44.0	27.6	37.1	26.5
25	30.0	30.4	30.2	31.4	28.3	26.9	25.6	25.8	33.7	25.8	69.9	26.5
26	31.6	30.4	30.2	32.1	30.2	26.9	25.6	24.4	47.0	26.2	66.4	26.7
27	40.5	30.9	30.0	30.9	29.7	26.9	25.6	24.2	44.1	25.6	57.1	27.4
28	31.9	33.1	29.7	31.6	28.5	26.7	25.6	24.0	30.2	30.6	30.9	26.7
29	30.9	30.9	35.0	38.3	28.3	26.7	25.6	24.0	26.7	50.6	28.5	26.5
30	30.0	30.7	33.1	31.2	28.1	26.5	25.3	---	26.0	27.6	27.6	26.5
31	30.7	30.4	---	30.7	---	26.5	25.3	---	30.0	---	27.4	---
Total	967.6	976.3	943.2	1000.3	882.5	859.8	824.9	720.8	914.4	884.8	966.5	803.2
Mean												
Mgd	31.2	31.5	31.4	32.3	29.4	27.7	26.6	24.9	29.5	29.5	31.2	26.8
Cfs	48.3	48.7	48.6	50.0	45.5	42.9	41.2	38.5	45.6	45.6	48.3	41.5
Ac-ft	2970	3000	2890	3070	2710	2640	2530	2210	2810	2720	2970	2460

Calendar Year 1963: Max 58.7 Min 17.4 Mean mgd 27.1 Mean cfs 41.9 Ac-ft 30370
Fiscal Year 1963-64: Max 69.9 Min 23.5 Mean mgd 29.4 Mean cfs 45.5 Ac-ft 32980

* Discharge measurement made on this day.

2860. Waiahole tunnel wasteway at intake 31, near Waiahole

Location.--lat 21°28'30", long 157°53'15", on left bank 150 ft downstream from wasteway gates at Waiahole tunnel intake No. 31 and 2.2 miles west of Waiahole School.

Records available.--January 1951 to June 1964.

Gage.--Water-stage recorder and Parshall flume. Datum of gage is 742.7 ft above mean sea level (levels by Waiahole Water Co.).

Average discharge.--13 years, 0.871 mgd (1.35 cfs).

Extremes.--1951-64: Maximum daily discharge, 62.1 mgd (96.1 cfs) Dec. 1, 1957; no flow most of time.

Remarks.--Records fair prior to Jan. 4, good thereafter. Station measures releases from Waiahole tunnel to Waiahole Stream.

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	*1.97	*0	0	*0	*0	0	0.07	0	0	*0	*0	(*)
2	.06	0	0	0	0	*7.57	*18.6	0	*0	0	0	
3	.21	0	*0	0	0	8.63	16.5	*15.6	0	0	0	
4	0	1.00	0	1.93	0	19.5	0	22.7	0	0	0	
5	0	0	0	0	0	27.0	.14	22.5	0	0	0	
6	0	0	0	0	0	27.0	.55	6.04	0	0	0	
7	0	0	0	0	0	6.98	0	0	0	0	0	
8	0	0	0	0	0	0	*1.03	0	.14	0	0	
9	0	0	0	0	0	18.7	0	0	0	0	0	
10	0	0	0	0	0	26.2	0	0	0	0	0	
11	0	.14	0	0	0	26.5	0	0	0	0	0	
12	0	0	0	0	0	32.0	0	0	0	0	0	
13	0	0	0	.11	0	18.0	0	0	0	0	0	
14	0	0	0	.15	0	0	0	0	0	0	0	
15	0	.35	0	0	0	0	17.6	0	0	0	0	
16	0	.06	0	0	0	20.4	23.6	0	0	0	0	
17	0	0	2.19	0	0	27.5	15.9	0	0	0	0	
18	0	0	.18	.20	0	26.8	0	0	0	0	0	
19	.20	0	0	0	0	26.2	0	0	0	0	0	
20	.09	0	0	1.31	0	26.2	16.4	0	0	0	0	
21	.74	0	0	0	0	17.3	23.4	0	0	0	0	
22	1.06	0	0	0	9.35	0	23.2	0	.47	0	0	
23	.09	0	0	0	0	11.0	23.2	0	.02	0	0	
24	.22	0	0	0	0	26.2	23.2	0	3.53	0	0	
25	0	0	0	0	0	26.2	7.14	0	4.54	0	.07	
26	0	0	0	0	10.4	26.2	0	0	13.5	0	.63	
27	1.48	0	0	0	9.90	26.0	16.1	0	11.5	0	1.56	
28	0	0	0	0	0	17.8	23.2	0	2.96	0	0	
29	0	0	.31	.59	0	0	23.0	0	.66	.73	0	
30	0	0	0	0	0	18.7	23.0	---	.05	0	0	
31	5.43	0	---	0	---	10.9	16.3	---	0	---	0	---
Total	11.55	1.55	2.68	4.28	29.65	525.48	312.13	66.84	37.37	0.73	2.26	0
Mean												
Mgd	0.373	0.050	0.089	0.138	0.988	17.0	10.1	2.30	1.21	0.024	0.073	0
Cfs	0.577	0.077	0.138	0.214	1.53	26.3	15.6	3.56	1.87	0.037	0.113	0
Ac-ft	35	4.8	8.2	13	91	1610	958	205	115	2.2	6.9	0

Calendar Year 1963: Max 32.0 Min 0 Mean mgd 2.00 Mean cfs 3.09 Ac-ft 2240
Fiscal Year 1963-64: Max 32.0 Min 0 Mean mgd 2.72 Mean cfs 4.21 Ac-ft 3050

* Discharge measurement or observation of no flow made on this day.

2870. Waiahole tunnel at north portal, near Waiahole

Location.--lat 21°28'15", long 157°53'30", on right bank in Waiahole tunnel directly below crest of Koolau Range and 2.6 miles southwest of Waiahola School.

Records available.--January 1951 to June 1964.

Gage.--Water-stage recorder and Parshall flume. Datum of gage is 752.5 ft above mean sea level (levels by Waiahole Water Co.).

Average discharge.--13 years, 26.2 mgd (40.5 cfs).

Extremes.--1951-64: Maximum daily discharge, 81.0 mgd (125 cfs) July 28, 1954; minimum daily, 1.48 mgd (2.29 cfs) Dec. 9, 1956.

Remarks.--Records excellent. Tunnel diverts from headwaters of nearly all streams from Kahana Valley to Waiahole Valley for irrigation in central Oahu. Occasional diversions at numerous intakes above station.

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	42.5	*35.0	34.2	34.2	33.7	29.9	28.5	25.6	27.3	32.2	*29.4	30.2
2	36.5	35.5	34.2	33.9	33.7	*20.0	9.97	26.1	30.7	42.6	28.7	30.2
3	38.6	34.7	33.6	34.5	33.7	20.2	15.6	9.20	27.8	35.2	28.7	29.9
4	33.4	41.3	35.0	41.9	33.7	10.2	28.5	1.78	33.9	39.7	28.5	29.9
5	32.4	34.7	35.2	35.2	33.4	2.55	29.7	1.78	27.8	33.8	28.5	29.7
6	32.4	34.7	34.7	33.2	33.2	2.15	32.1	18.8	27.0	36.4	28.5	29.7
7	32.4	34.7	34.2	33.9	32.6	20.9	28.7	26.8	29.0	29.4	28.2	29.7
8	32.4	34.7	33.9	35.0	32.4	28.7	27.3	27.3	38.6	28.2	29.0	29.7
9	32.4	34.5	33.7	36.0	36.7	10.3	28.0	27.3	28.5	28.2	28.5	29.7
10	33.4	34.5	33.7	34.7	33.4	2.35	28.0	29.7	27.0	28.7	28.5	29.7
11	34.7	38.4	33.9	34.5	32.4	2.05	28.0	27.8	27.0	28.7	28.2	29.7
12	32.4	34.7	37.3	33.9	32.4	2.76	27.8	29.7	33.9	29.7	28.0	29.7
13	34.2	34.7	34.2	35.5	32.6	11.5	27.5	28.0	28.5	28.7	28.0	29.4
14	33.2	33.4	33.7	38.6	32.4	28.7	27.5	26.8	27.8	28.5	29.4	29.4
15	35.8	37.9	33.7	33.7	32.1	28.5	10.5	25.6	27.3	28.2	29.0	29.7
16	32.9	40.4	34.5	33.4	35.3	10.3	2.05	25.6	27.3	29.0	33.9	29.4
17	32.6	34.5	48.4	33.4	34.4	2.25	9.92	26.8	27.0	28.5	29.0	29.4
18	32.9	34.7	38.5	36.3	32.3	2.05	26.6	27.8	26.8	28.2	28.2	29.9
19	35.8	34.7	33.4	31.4	32.1	2.05	26.8	27.3	26.8	30.6	28.0	29.4
20	38.4	34.7	32.4	38.9	30.6	2.05	8.99	27.0	26.6	31.8	28.5	29.2
21	42.6	34.7	32.1	34.2	30.6	9.78	1.96	26.1	28.1	33.8	34.9	29.2
22	42.3	34.5	32.1	34.2	21.4	27.5	1.87	25.2	40.7	29.9	36.6	29.2
23	37.1	37.1	32.1	35.0	30.4	10.0	1.78	25.2	48.6	29.7	40.6	30.4
24	38.6	36.5	32.1	35.5	30.4	2.05	1.78	25.0	41.8	29.7	40.3	29.4
25	34.7	34.7	33.4	35.0	30.4	2.05	18.7	26.3	29.2	28.5	74.0	29.9
26	35.5	34.5	33.7	35.2	21.7	1.96	26.1	25.6	32.6	28.7	71.0	29.4
27	42.6	34.7	33.7	34.2	21.6	1.87	9.24	26.6	31.9	28.2	60.0	29.0
28	35.8	36.5	33.7	34.7	30.4	9.05	1.87	26.6	28.5	31.6	33.2	28.0
29	35.5	35.0	39.0	41.2	30.2	27.3	1.78	26.6	27.3	52.2	31.4	28.0
30	34.2	34.5	36.8	34.5	29.9	9.90	1.78	---	27.3	30.6	30.9	28.7
31	28.0	34.2	---	33.9	---	15.8	8.60	---	31.8	---	30.6	---
Total	1096.2	1099.3	1041.1	1089.7	940.1	356.72	527.49	699.96	944.4	949.2	1060.2	884.8
Mean												
Mgd	35.4	35.5	34.7	35.2	31.3	11.5	17.0	24.1	30.5	31.6	34.2	29.5
Cfs	54.8	54.9	53.7	54.5	48.4	17.8	26.3	37.3	47.2	48.9	52.9	45.6
Ac-ft	3360	3370	3200	3340	2890	1090	1620	2150	2900	2910	3250	2720

Calendar Year 1963: Max 58.3 Min 1.87 Mean mgd 27.9 Mean cfs 43.2 Ac-ft 31250
Fiscal Year 1963-64: Max 74.0 Min 1.78 Mean mgd 29.2 Mean cfs 45.2 Ac-ft 32800

* Discharge measurement made on this day.

2872. Waiahole tunnel at adit 8, near Waipahu

Location.--Lat 21°27'00", long 157°57'30", on left bank at adit 8, 2,700 ft downstream from Ewa Forest Reserve and 5.2 miles northeast of Waipahu Post Office.

Records available.--August 1956 to June 1964.

Gage.--Water-stage recorder and concrete control. Datum of gage is 709.0 ft above mean sea level (levels by Waiahole Water Co.).

Average discharge.--7 years (1957-64), 31.3 mgd (48.4 cfs).

Extremes.--1956-64: Maximum daily discharge, 97.4 mgd (151 cfs) Oct. 23, 1958; minimum daily, 6.0 mgd (9.3 cfs) Dec. 9, 1956.

Remarks.--Records good. Records represent entire flow of Waiahole water-development tunnel; water is used for irrigation of sugar cane in vicinity of Waipahu.

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	*46.2	*40.6	38.8	*38.8	*37.8	32.7	31.5	28.2	31.2	*36.2	*33.3	*34.3
2	42.0	40.9	38.5	38.8	37.8	*24.9	*16.5	29.1	*34.0	41.3	32.7	34.3
3	44.4	39.8	*38.5	38.8	37.8	25.1	18.6	*15.4	30.9	40.6	32.4	34.0
4	39.5	45.4	39.2	45.1	37.8	18.1	32.1	7.95	36.1	42.1	32.1	33.6
5	38.5	39.5	40.6	40.9	37.5	9.38	33.3	7.78	32.4	36.9	32.1	33.6
6	38.5	39.5	39.2	37.8	36.9	9.20	34.9	20.4	30.9	38.5	32.1	33.3
7	38.2	39.5	38.8	38.2	36.9	23.2	32.7	29.4	32.4	33.6	31.8	33.3
8	38.2	39.5	38.5	39.2	36.5	32.1	30.3	30.3	43.5	32.1	32.1	33.3
9	38.5	39.5	38.5	40.2	40.1	17.8	31.5	30.6	32.4	32.1	31.8	33.3
10	38.8	39.5	38.5	38.8	37.5	9.20	31.5	32.1	30.9	32.4	31.8	33.3
11	40.9	43.0	38.5	38.5	36.2	8.84	31.2	31.2	30.9	32.4	31.5	33.3
12	38.2	39.5	41.2	38.2	36.2	9.02	31.2	32.4	35.8	33.0	31.2	33.3
13	38.8	38.8	38.8	38.8	36.5	15.3	30.9	32.4	33.0	32.1	31.5	33.0
14	38.8	38.5	38.5	43.4	36.2	31.8	30.9	30.9	31.2	32.1	32.4	33.0
15	40.9	40.9	38.2	38.5	35.6	31.8	17.1	29.4	30.9	31.8	32.1	33.3
16	38.5	44.4	38.5	38.2	38.7	17.6	8.66	29.7	30.9	32.1	35.6	33.0
17	38.2	39.2	50.8	38.2	37.5	9.20	13.4	30.6	30.6	32.1	32.4	33.0
18	38.2	39.2	43.4	40.9	35.6	8.66	30.0	31.2	30.6	31.5	31.5	33.6
19	40.6	39.2	38.5	36.9	35.2	8.12	30.0	30.9	30.3	33.0	31.2	33.0
20	43.0	39.5	37.5	42.3	34.3	8.66	16.3	30.9	30.0	34.0	31.5	33.0
21	46.2	39.2	37.2	38.5	34.3	13.8	8.30	30.0	31.2	36.5	36.9	33.0
22	47.6	38.8	36.9	38.5	26.2	30.6	8.12	29.1	42.1	34.0	38.8	33.0
23	41.2	40.6	36.9	38.8	33.6	16.9	7.95	29.1	47.4	33.3	42.0	34.3
24	44.0	42.0	37.2	39.5	33.6	8.66	7.78	29.1	48.9	33.6	40.5	33.3
25	40.6	39.5	37.8	38.8	33.6	8.30	20.3	30.0	32.7	32.1	74.1	34.0
26	41.2	39.5	38.5	39.2	26.2	8.30	29.1	29.4	35.9	32.4	72.0	33.3
27	47.6	39.8	38.5	38.5	25.7	8.12	15.6	30.3	35.6	31.8	65.8	33.3
28	42.0	41.2	38.2	38.8	33.3	13.1	7.95	30.3	33.0	34.3	37.5	32.1
29	42.0	40.2	42.0	43.7	33.0	29.7	7.78	30.0	31.2	53.8	35.6	31.8
30	40.2	39.2	41.2	38.8	33.0	16.1	7.42	---	31.2	34.9	35.2	32.4
31	34.3	38.8	---	38.2	---	18.9	12.5	---	34.6	---	34.3	---
Total	1265.8	1244.7	1177.4	1221.8	1051.1	523.16	665.36	808.13	1052.7	1046.6	1155.8	998.3
Mean												
Mgd	40.8	40.2	39.2	39.4	35.0	16.9	21.5	27.9	34.0	34.9	37.3	33.3
Cfs	63.1	62.2	60.7	61.0	54.2	26.1	33.3	43.2	52.6	54.0	57.7	51.5
Ac-ft	3880	3820	3610	3750	3230	1600	2040	2480	3230	3210	3550	3060

Calendar Year 1963: Max 69.9 Min 8.12 Mean mgd 32.5 Mean cfs 50.3 Ac-ft 36410
Fiscal Year 1963-64: Max 74.1 Min 7.42 Mean mgd 33.4 Mean cfs 51.7 Ac-ft 37460

* Discharge measurement made on this day.

2910. Waiahole Stream at altitude 250 ft, near Waiahole

Location.--Lat 21°28'35", long 157°52'30", on left bank 1.5 miles southwest of Waiahole School and 2.7 miles northwest of Kahaluu.

Drainage area.--0.99 sq mi.

Records available.--July 1955 to June 1964.

Gage.--Water-stage recorder and concrete control. Altitude of gage is 250 ft (from topographic map).

Average discharge.--9 years, 4.78 mgd (7.40 cfs).

Extremes.--Maximum discharge during year, 162 mgd (251 cfs) Oct. 4 (gage height, 2.81 ft), from rating curve extended above 72 mgd as explained below; minimum, 1.56 mgd (2.41 cfs) Apr. 19, 20.
1955-64: Maximum discharge, 1,440 mgd (2,230 cfs) Apr. 15, 1963 (gage height, 4.80 ft), from rating curve extended above 72 mgd on basis of field estimate at gage height 4.23 ft and slope-area measurement of peak flow; minimum, 1.48 mgd (2.29 cfs) Oct. 7-13, 1962.

Remarks.--Records good. During the fiscal year, an average of 1.20 million gallons a day was diverted above station by pumping into Waiahole tunnel for irrigation in central Oahu. Continuous records of rainfall are obtained at station.

Rating table (gage height, in feet, and discharge in million gallons a day)

0.4	1.00	0.9	7.50
.5	1.72	1.2	15.5
.7	4.00	1.7	39.0

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	5.41	2.73	2.51	2.73	2.62	3.87	7.00	4.48	2.73	2.62	3.61	3.74
2	3.48	2.85	2.51	2.85	2.62	10.8	21.4	4.64	2.73	5.91	3.22	3.61
3	3.65	2.85	3.09	2.73	2.51	9.97	25.5	17.9	2.73	6.07	3.09	3.48
4	3.09	4.14	2.51	10.5	2.51	15.7	6.93	24.0	2.73	4.32	2.85	3.09
5	2.85	2.97	2.85	6.35	2.51	21.1	8.88	23.1	2.73	3.87	2.73	2.62
6	2.73	2.73	2.51	3.74	2.62	21.1	12.4	*9.78	2.73	3.87	*2.62	2.51
7	2.73	2.62	2.51	2.85	2.62	9.27	6.36	3.22	2.73	3.74	2.73	2.40
8	2.73	2.62	2.51	2.97	2.51	3.87	6.28	2.62	8.42	3.61	2.62	2.30
9	2.73	2.73	2.51	2.73	3.09	15.3	5.12	2.62	2.85	2.97	2.62	2.10
10	2.73	2.73	2.51	2.62	2.85	21.1	5.12	2.73	3.09	2.10	2.62	2.10
11	*2.85	2.97	2.51	2.62	2.62	21.5	4.96	3.09	2.85	2.00	2.40	2.00
12	2.97	2.97	2.62	2.62	2.51	31.4	4.80	2.62	2.40	1.90	2.40	2.00
13	3.72	3.22	2.51	2.62	2.40	20.2	4.80	2.62	2.30	1.90	2.20	2.10
14	3.48	3.22	2.51	2.85	2.97	5.28	4.80	2.85	2.40	1.90	2.20	2.10
15	3.74	3.84	2.51	2.62	2.97	4.96	17.6	4.16	2.30	1.81	2.30	2.20
16	3.22	2.73	2.51	2.62	2.51	23.2	24.0	4.32	2.30	1.81	2.97	2.20
17	2.97	3.09	8.72	2.51	2.51	*35.2	18.7	3.09	2.30	1.72	2.62	2.30
18	2.97	3.22	5.28	3.53	2.51	34.0	4.64	2.73	*2.42	1.64	2.51	2.40
19	2.97	2.62	*4.64	4.32	2.97	34.0	4.64	2.62	2.30	1.56	2.51	*2.40
20	2.85	2.73	4.48	6.94	3.87	33.5	19.4	2.51	2.30	1.90	2.62	2.40
21	5.62	2.62	4.48	5.12	4.00	24.9	26.0	2.30	2.30	1.81	2.73	2.40
22	5.51	2.62	4.48	3.61	9.97	4.96	26.0	4.16	13.2	1.81	2.97	2.51
23	3.48	2.73	4.48	2.73	4.00	20.9	26.0	4.16	8.25	2.00	2.97	2.51
24	3.59	2.62	4.48	2.85	3.87	28.0	24.5	4.16	13.6	1.90	3.61	2.40
25	2.97	2.51	3.22	2.85	3.87	28.0	10.3	4.16	9.13	1.81	14.4	2.73
26	2.73	2.51	2.73	2.85	11.2	27.5	4.48	3.48	22.5	1.81	26.3	2.62
27	5.02	2.51	2.73	2.62	11.8	28.0	18.6	2.51	19.1	1.72	17.4	3.61
28	3.22	2.62	2.73	2.73	3.87	20.7	24.5	2.51	8.22	1.81	5.28	3.87
29	2.97	2.51	3.09	3.14	3.87	4.96	23.5	2.51	5.12	1.68	3.61	3.87
30	2.97	2.51	2.85	*2.73	3.87	20.5	23.1	---	4.32	4.48	4.00	3.22
31	7.52	2.51	---	2.62	---	14.0	17.5	---	3.09	---	4.00	---
Total	109.47	87.85	99.58	107.17	114.62	597.74	437.81	155.65	166.57	93.17	140.71	79.79
Mean												
Mgd	3.53	2.83	3.32	3.46	3.82	19.3	14.1	5.37	5.37	3.11	4.54	2.66
Cfs	5.46	4.38	5.14	5.35	5.91	29.9	21.8	8.31	8.31	4.81	7.02	4.12
Ac-ft	336	270	306	329	352	1830	1340	478	511	286	432	245

Calendar Year 1963: Max 111 Min 2.20 Mean mgd 6.44 Mean cfs 9.96 Ac-ft 7210
Fiscal Year 1963-64: Max 35.2 Min 1.56 Mean mgd 5.98 Mean cfs 9.25 Ac-ft 6720

* Discharge measurement made on this day.

Peak discharge (base, 100 mgd)

Date	Time	Gage height	Discharge Mgd	Discharge Cfs	Date	Time	Gage height	Discharge Mgd	Discharge Cfs
10-4	2000	2.81	162	251	3-22	1530	2.70	144	223
1-6	0930	2.46	109	169	5-25	2330	2.63	134	207

2949. Waikane Stream at altitude 75 ft, at Waikane

Location.--Lat 21°30'00", long 157°51'54", on right bank 0.3 mile downstream from Waikeekee Stream, 0.7 mile west of Waikane, and 1.2 miles northwest of Waiahole School.

Drainage area.--2.22 sq mi.

Records available.--December 1959 to June 1964.

Gage.--Water-stage recorder and concrete control. Altitude of gage is 75 ft (from topographic map).

Extremes.--Maximum discharge during year, 1,410 mgd (2,180 cfs) Jan. 6 (gage height, 7.22 ft), from rating curve extended above 74 mgd as explained below; minimum, 1.17 mgd (1.81 cfs) Nov. 30 to Dec. 5.
1959-64: Maximum discharge, 2,950 mgd (4,560 cfs) Apr. 15, 1963 (gage height, 9.46 ft, from floodmarks), from rating curve extended above 74 mgd on basis of slope-area measurements at gage heights 4.88 and 9.46 ft; minimum, 0.77 mgd (1.19 cfs) Oct. 10, 11, 1962.

Remarks.--Records good. Continuous records of rainfall are obtained at station.

Rating table (gage height, in feet, and discharge, in million gallons a day)

1.4	1.26	1.9	13.0
1.5	2.45	2.1	23.5
1.6	4.20	2.5	54.0
1.7	6.40	3.0	106

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	5.51	3.05	1.79	2.16	1.79	1.26	3.19	2.04	1.79	6.70	4.86	5.74
2	3.80	3.23	1.79	2.16	1.79	1.26	2.28	2.60	2.04	20.9	4.42	5.30
3	4.80	2.89	1.79	2.04	1.79	1.35	16.3	2.45	1.79	13.5	4.00	4.86
4	3.80	3.23	1.79	13.3	1.67	1.35	5.30	2.45	2.04	12.8	3.80	4.42
5	3.23	2.74	1.79	5.17	1.67	1.26	7.22	*2.16	1.79	8.50	*3.60	4.20
6	3.05	2.74	1.79	2.74	1.56	1.56	99.1	2.28	1.79	8.80	3.60	3.80
7	2.89	2.89	1.67	2.28	1.91	1.46	13.0	2.16	2.04	7.30	3.40	3.80
8	2.89	2.89	1.56	2.74	1.91	1.35	8.20	2.16	10.2	6.18	3.23	3.60
9	2.89	2.89	1.46	3.60	2.89	1.46	5.96	2.04	2.59	5.96	3.05	3.40
10	*3.05	2.74	1.56	2.28	2.28	1.56	5.74	2.16	2.04	5.52	2.89	3.40
11	3.40	3.32	1.67	1.91	1.79	1.79	4.86	2.16	2.04	5.08	2.89	3.23
12	2.74	2.59	2.04	1.91	1.56	12.4	4.64	2.28	1.91	5.08	2.74	3.05
13	2.89	2.59	*1.79	1.91	1.56	5.30	4.20	2.16	1.91	4.86	2.89	2.89
14	3.23	2.45	1.56	3.94	1.35	3.23	3.80	2.04	1.79	4.86	2.74	2.89
15	3.80	2.45	1.46	2.04	1.35	2.89	3.60	2.04	1.67	4.42	2.74	2.89
16	3.05	2.45	1.79	1.79	1.46	*3.03	3.40	2.04	1.56	4.20	10.1	*2.74
17	2.89	2.45	13.0	1.91	1.46	4.20	3.40	1.91	1.67	4.00	4.00	2.74
18	2.89	2.45	4.64	2.04	1.35	3.05	3.23	2.04	1.79	3.80	2.89	2.74
19	3.60	2.45	2.74	1.91	1.35	2.74	2.89	1.91	1.67	3.80	2.59	2.59
20	3.80	2.28	2.16	3.52	1.35	2.45	2.89	1.79	*1.56	6.03	2.45	2.28
21	6.46	2.16	2.16	2.59	1.35	2.28	2.74	1.79	1.67	6.40	3.05	2.45
22	7.35	2.04	2.16	2.04	1.35	2.16	2.59	1.91	56.1	4.64	5.02	2.28
23	4.86	2.28	2.16	1.91	1.35	2.16	2.59	1.79	28.8	4.00	5.61	2.74
24	5.30	2.45	2.16	2.45	1.46	2.16	2.45	1.79	26.7	4.86	4.64	2.28
25	4.20	2.04	2.04	2.16	1.35	2.16	2.59	2.04	11.9	4.00	27.9	2.45
26	4.20	1.91	2.04	2.04	1.56	2.16	2.45	1.91	22.4	3.60	39.4	2.28
27	8.08	1.91	2.04	1.91	1.79	2.28	2.28	1.67	30.6	3.40	63.0	2.28
28	4.42	2.16	2.04	1.91	1.46	2.16	2.28	1.79	16.0	3.60	15.0	2.16
29	3.80	1.91	3.49	1.91	1.35	2.16	2.16	1.79	10.1	39.0	9.76	2.04
30	3.40	1.79	2.45	1.91	1.26	2.04	2.16	---	7.60	6.18	7.60	2.04
31	3.23	1.79	---	*1.79	---	2.28	2.16	---	6.70	---	6.40	---
Total	123.50	77.21	72.58	83.97	48.12	78.95	229.65	59.35	264.25	221.97	260.26	93.56
Mean												
Mgd	3.98	2.49	2.42	2.71	1.60	2.55	7.41	2.05	8.52	7.40	8.40	3.12
Cfs	6.16	3.85	3.74	4.19	2.48	3.95	11.5	3.17	13.2	11.4	13.0	4.83
Ac-ft	379	237	223	258	148	242	705	182	811	681	799	287

Calendar Year 1963: Max 300 Min 1.26 Mean mgd 7.40 Mean cfs 11.4 Ac-ft 8280
Fiscal Year 1963-64: Max 99.1 Min 1.26 Mean mgd 4.41 Mean cfs 6.82 Ac-ft 4,950

* Discharge measurement made on this day.

Peak discharge (base, 300 mgd)

Date	Time	Gage height	Discharge Mgd	Discharge Cfs	Date	Time	Gage height	Discharge Mgd	Discharge Cfs
1-6	1230	7.22	1,410	2,180	3-22	1430	4.94	484	749

2965. Kahana Stream at altitude 30 ft, near Kahana

Location (revised).--Lat 21°32'38", long 157°53'07", on right bank 600 ft upstream from Kava Stream, 1.1 miles southwest of Kahana, and 2.2 miles southwest of Swanzy Beach Park in Kaaawa.

Drainage area.--3.74 sq mi.

Records available.--December 1958 to June 1964. See also Note below.

Gage.--Water-stage recorder and concrete-masonry control. Altitude of gage is 30 ft (from topographic map).

Average discharge.--5 years (1959-64), 21.0 mgd (32.5 cfs).

Extremes.--Maximum discharge during year, 1,880 mgd (2,910 cfs) Jan. 6 (gage height, 6.15 ft), from rating curve extended above 350 mgd as explained below; minimum, 8.30 mgd (12.8 cfs) Dec. 9, 10, Feb. 24, 27-29.
1958-64: Maximum discharge, 3,510 mgd (5,430 cfs) Apr. 15, 1963 (gage height, 8.10 ft), from rating curve extended above 350 mgd on basis of computation of peak flow over submerged weir; minimum, 6.50 mgd (10.1 cfs) Sept. 17, 18, 20, 1961.
Revisions.--Figures of maximum discharge for the fiscal years 1961 and 1962 have been revised to 1,170 mgd (1,810 cfs) Oct. 17, 1960 (gage height, 5.04 ft) and 2,270 mgd (3,510 cfs) Nov. 1, 1961 (gage height, 6.69 ft), superseding those published in Surface Water Records of Hawaii and other Pacific Areas for fiscal years 1961 and 1962, respectively.

Remarks.--Records fair. Approximately 6 mgd is diverted by Waiahole Water Co. at 800 ft elevation, 2.3 miles above station. Continuous records of rainfall are obtained at station.

Note.--Published records for high-water periods in fiscal years 1959 and 1960 have been found to be in error; revised records are on file in the district office and will be published in the next water-supply paper.

Revisions.--Revised figures of discharge, in million gallons a day, for the fiscal years 1961 and 1962, superseding those published in Surface Water Records of Hawaii and other Pacific Areas (1961 and 1962), are given herewith:

1960		1961-Con.	
Oct. 17	108	Nov. 1	177
1961		1962	
Jan. 14	68.6	Mar. 11	148
Feb. 13	148	12	150
Oct. 28	172	14	114

Month	Million gallons	Maximum	Minimum	Mean		Runoff in acre-feet
				Mgd	Cfs	
October 1960	613.2	108	12.1	19.8	30.6	1,880
Calendar year 1960	-	263	7.45	21.5	33.3	24,130
January 1961	697.0	77.4	12.1	22.5	34.8	2,140
February	622.9	148	10.8	22.2	34.3	1,910
Fiscal year 1960-61	-	148	9.65	17.6	27.2	19,660
October 1961	725.1	172	11.6	23.4	36.2	2,230
November	683.2	177	13.1	22.8	35.3	2,100
Calendar year 1961	-	177	6.80	17.2	26.6	19,310
March 1962	1,066.2	150	12.1	34.4	53.2	3,270
Fiscal year 1961-62	-	177	6.80	18.2	28.2	20,340
Calendar year 1962	-	150	7.49	15.7	24.3	17,620

Revised peak discharge.--1960-61: July 27 (11 a.m.) 582 mgd (900 cfs), 3.83 ft; Oct. 17 (6:30 p.m.) 1,170 mgd (1,810 cfs), 5.04 ft; Dec. 4 (4:30 p.m.) 582 mgd (900 cfs), 3.83 ft; Jan. 1 (7 a.m.) 582 mgd (900 cfs), 3.83 ft; Jan. 14 (7 a.m.) 574 mgd (888 cfs), 3.81 ft; Feb. 13 (2:30 a.m.) 850 mgd (1,320 cfs), 4.40 ft.
1961-62: Oct. 28 (1700) 1,240 mgd (1,920 cfs), 5.15 ft; Nov. 1 (1330) 2,270 mgd (3,510 cfs), 6.69 ft; Mar. 12 (0900) 820 mgd (1,270 cfs), 4.34 ft; Mar. 14 (0230) 1,220 mgd (1,890 cfs), 5.11 ft.

2965. Kahana Stream at altitude 30 ft, near Kahana--Continued

Rating table (gage height, in feet, and discharge, in million gallons a day)

1.4	5.60	2.1	67.5
1.5	9.70	2.5	145
1.6	15.1	3.0	290
1.8	30.8		

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	52.3	21.5	13.4	14.0	16.5	9.70	19.2	10.7	11.7	55.1	22.2	21.5
2	30.6	23.1	12.2	14.0	17.2	9.70	11.2	12.2	18.8	130	19.4	19.4
3	39.8	18.6	14.6	15.1	15.8	9.20	53.0	11.7	12.8	61.2	17.9	18.6
4	23.1	86.5	13.4	143	15.1	9.20	25.6	10.7	51.5	68.5	15.8	17.2
5	20.8	23.9	19.7	43.6	14.6	8.70	30.1	10.2	21.5	59.7	*15.8	16.5
6	18.6	20.8	14.0	23.1	14.0	10.7	215	9.70	17.9	62.4	17.2	15.8
7	17.9	19.4	12.2	19.4	14.6	9.20	37.9	9.70	23.3	37.9	14.6	15.8
8	17.2	17.9	11.7	20.1	14.0	8.70	26.5	9.70	114	29.9	14.6	15.8
9	16.5	16.5	11.2	20.1	22.2	8.70	21.5	9.20	25.6	25.6	14.0	15.1
10	*18.8	15.8	10.7	16.5	15.8	8.70	20.8	14.9	19.4	23.9	14.0	14.6
11	25.1	29.7	11.2	15.1	12.8	10.2	18.6	13.4	16.5	21.5	12.2	14.0
12	17.2	18.6	17.7	14.6	12.2	50.5	17.2	15.4	45.7	23.9	11.7	14.0
13	20.9	20.1	*11.7	14.6	11.7	20.8	15.1	13.4	20.8	19.4	11.2	13.4
14	19.4	16.5	11.2	25.4	11.2	15.8	15.1	10.2	18.6	18.6	12.8	12.8
15	20.1	37.5	10.7	14.6	11.2	14.0	14.6	9.70	15.8	17.9	23.9	13.4
16	17.2	81.6	11.7	13.4	18.0	*16.9	14.0	10.2	15.8	19.4	16.5	13.4
17	15.8	30.3	93.1	14.0	20.4	20.1	12.8	10.7	14.0	19.4	12.8	12.2
18	16.5	27.2	50.1	28.8	14.6	15.1	12.2	12.8	12.8	16.5	11.2	14.0
19	23.5	20.8	20.8	17.2	12.2	13.4	11.7	10.7	12.2	20.6	10.7	11.7
20	28.3	18.6	17.9	37.0	11.7	12.8	12.2	11.2	*11.7	40.0	11.7	11.2
21	36.4	17.9	15.8	20.8	11.7	12.2	15.1	11.7	42.9	50.7	29.9	11.2
22	52.8	16.5	14.6	18.6	10.7	11.7	12.8	9.70	211	26.5	31.7	11.7
23	28.4	21.1	13.4	17.2	10.7	11.2	14.0	9.20	237	23.9	45.9	13.4
24	37.3	24.2	12.8	20.8	10.2	11.2	11.7	8.70	161	23.1	46.5	11.2
25	22.2	16.5	12.2	17.9	9.70	10.7	12.8	11.7	68.8	20.1	249	*11.7
26	26.0	17.2	11.7	16.5	17.7	10.7	12.8	9.70	138	20.1	173	11.2
27	52.5	16.5	11.7	15.8	24.4	10.2	11.7	9.20	111	17.9	156	14.6
28	24.8	21.8	11.7	21.5	12.8	9.70	11.2	9.20	49.8	40.1	46.0	11.2
29	24.8	17.2	19.4	*37.0	11.2	9.70	*10.7	8.70	36.9	187	33.9	10.2
30	20.8	14.6	20.0	20.1	10.7	9.70	10.2	---	29.9	28.2	28.2	10.2
31	23.3	13.4	---	17.9	---	9.70	11.7	---	61.8	---	23.9	---
Total	808.9	761.8	532.5	747.7	425.60	398.80	739.0	314.20	1648.5	1209.0	1164.2	417.0
Mean												
Mgd	26.1	24.6	17.8	24.1	14.2	12.9	23.8	10.8	53.2	40.3	37.6	13.9
Cfs	40.4	38.1	27.5	37.3	22.0	20.0	36.8	16.7	82.3	62.4	58.2	21.5
Ac-ft	2480	2340	1630	2290	1310	1220	2270	964	5060	3710	3570	1280

Calendar Year 1963: Max 1130 Min 8.70 Mean mgd 28.0 Mean cfs 43.3 Ac-ft 31,380
Fiscal Year 1963-64: Max 249 Min 8.70 Mean mgd 25.0 Mean cfs 38.7 Ac-ft 28,120

* Discharge measurement made on this day.

Peak discharge (base, 800 mgd)

Date	Time	Gage height	Discharge Mgd	Discharge Cfs	Date	Time	Gage height	Discharge Mgd	Discharge Cfs
10-4	1930	5.77	1,620	2,510	3-22	1630	5.82	1,650	2,550
1-6	1130	6.15	1,880	2,910	4-29	0200	4.66	980	1,520

3020. Punaluu ditch near Punaluu

Location (revised).--Lat 21°33'41", long 157°54'11" on right bank 1,000 ft downstream from intake, 1.5 miles west of Kahana, and 1.7 miles southwest of Punaluu.

Records available.--May 1953 to June 1964.

Gage.--Water-stage recorder (digital since Apr. 30). Altitude of gage is 200 ft (from topographic map).

Average discharge.--11 years, 7.48 mgd (11.6 cfs).

Extremes.--1953-64: Maximum daily discharge, 22.3 mgd (34.5 cfs) Sept. 17, 1962; no flow Dec. 7-11, 1963.

Remarks.--Records good except those for periods of no gage-height record, which are fair. Ditch diverts from Punaluu Stream for irrigation of sugar cane in the Punaluu area.

Revisions.--The revised figure of discharge, in million gallons a day, for a day in the fiscal year 1961, superseding that published in Surface Water Records of Hawaii and other Pacific Areas (1961), is given herewith:

June 30, 1961..... 12.4

Month	Million gallons	Maximum	Minimum	Mean Mgd	Mean Cfs	Runoff in acre-feet
June 1961.....	334.6	13.3	10.5	11.2	17.3	1,030
Fiscal year 1960-61....	-	18.0	1.85	9.43	14.6	10,570
Calendar year 1961.....	-	17.4	.02	7.98	12.3	8,940

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	17.1	13.4	12.4	11.7	10.2	9.60	2.17	12.0	13.6	2.95	15.0	12.4
2	15.4	13.1	12.4	11.7	10.2	9.46	2.17	14.0	13.5	3.30	14.2	12.4
3	15.2	13.1	12.2	12.1	9.88	9.46	2.11	15.2	13.5	3.04	14.0	12.0
4	14.7	14.3	12.2	13.5	9.88	9.46	1.80	14.6	15.8	2.95	13.6	11.7
5	14.3	13.8	12.2	a10	9.88	9.46	1.40	14.2	14.4	2.87	13.5	11.7
6	14.1	13.4	12.2	a9.5	9.88	a3.1	2.98	14.0	14.2	2.79	13.5	11.6
7	14.0	13.4	12.2	a9.2	10.0	a0	.10	14.0	14.0	2.87	13.2	11.4
8	13.8	13.3	12.2	a8.9	10.0	a0	.08	14.0	20.2	3.20	13.3	11.4
9	*14.0	13.1	12.1	8.76	10.8	a0	.06	14.2	14.2	3.48	13.2	11.4
10	14.1	13.1	12.1	8.62	10.2	a0	.06	14.6	13.3	3.48	13.2	11.4
11	14.3	13.8	12.1	8.62	10.0	a0	.06	14.4	12.8	3.48	13.0	12.4
12	13.1	13.1	12.1	8.62	10.0	*a.04	.06	14.6	12.8	3.48	13.2	12.7
13	13.3	13.1	12.1	8.62	10.0	.06	.06	14.6	12.8	3.48	13.2	13.0
14	13.3	12.8	12.1	8.90	10.0	.06	.06	14.2	13.0	3.48	13.0	13.3
15	13.8	12.8	11.9	8.48	10.0	.07	.06	14.2	11.7	10.4	12.8	13.3
16	13.3	15.4	*12.1	8.48	10.3	.07	.06	14.4	*11.4	13.2	12.7	13.0
17	13.1	13.3	9.51	8.48	10.5	.07	.07	14.4	11.4	13.0	12.7	12.8
18	13.1	13.1	5.41	8.76	10.0	.05	.07	14.6	11.2	12.8	12.4	12.8
19	13.6	12.9	5.20	8.48	9.88	.05	.08	14.4	11.2	13.3	12.4	12.8
20	14.7	12.9	5.20	8.76	9.88	.05	.10	14.4	11.2	14.4	12.4	12.5
21	14.7	12.9	5.01	8.48	9.88	.05	.11	14.0	11.0	13.8	13.0	12.2
22	15.8	12.4	4.83	8.48	9.74	.05	.11	13.5	8.96	13.2	14.0	12.7
23	14.7	12.6	9.65	8.48	9.74	.07	.11	13.3	8.68	13.3	14.2	*13.5
24	14.7	13.1	11.9	8.48	9.74	.07	.11	13.2	5.12	13.0	13.5	13.2
25	14.3	12.9	11.7	8.48	9.74	.06	.11	13.2	3.04	12.4	18.2	13.3
26	14.1	13.1	11.6	8.48	9.88	.05	.11	13.2	3.30	12.5	17.3	13.3
27	14.9	12.8	11.6	8.34	10.0	.06	6.07	13.2	3.30	12.5	16.7	13.6
28	13.8	12.9	11.6	*8.48	9.74	.05	11.9	13.2	3.12	13.0	14.4	13.3
29	13.6	12.8	11.9	8.76	9.60	.08	11.7	13.2	3.12	19.8	13.8	13.3
30	13.3	12.6	11.9	4.49	9.60	.16	*11.6	----------	3.04	*15.4	13.2	13.3
31	14.4	12.6	----------	7.72	----------	1.59	11.7	----------	3.20	----------	12.8	----------
Total	440.6	407.9	321.61	278.85	299.14	53.35	67.24	405.0	322.08	260.85	425.6	377.7
Mean												
Mgd	14.2	13.2	10.7	9.00	9.97	1.72	2.17	14.0	10.4	8.70	13.7	12.6
Cfs	22.0	20.4	16.6	13.9	15.4	2.66	3.36	21.7	16.1	13.5	21.2	19.5
Ac-ft	1,350	1,250	987	856	918	164	206	1,240	988	801	1,310	1,160

Calendar Year 1963: Max 17.2 Min 0 Mean mgd 7.73 Mean cfs 12.0 Ac-ft 8,650
Fiscal Year 1963-64: Max 20.2 Min 0 Mean mgd 10.0 Mean cfs 15.5 Ac-ft 11,230

* Discharge measurement or observation of no flow made on this day.
a No gage-height record.

3030. Punaluu Stream near Punaluu

Location (revised).--Lat 21°33'33", long 157°54'06", on left bank at Punaluu ditch diversion dam, 1.4 miles west of Kahana, and 1.8 miles southwest of Punaluu.

Drainage area.--2.78 sq mi.

Records available.--May 1953 to June 1964. See also Note below.

Gage.--Water-stage recorder and masonry control. Altitude of gage is 212 ft (from topographic map).

Average discharge.--11 years, 8.49 mgd (13.1 cfs).

Extremes.--Maximum discharge during year, 1,810 mgd (2,800 cfs) Jan. 6 (gage height, 5.84 ft), from rating curve extended above 110 mgd as explained below; minimum, 0.23 mgd (0.36 cfs) Feb. 24, 26-29.
1953-64: Maximum discharge, 1,920 mgd (2,970 cfs) revised, Nov. 1, 1961 (gage height, 6.06 ft), from rating curve extended above 110 mgd on basis of slope-area measurement of peak flow; no flow at times.
Revisions.--The maximum discharge for the fiscal year 1962 has been revised to 1,920 mgd (2,970 cfs) Nov. 1, 1961 (gage height, 6.06 ft), superseding figure published in Surface Water Records of Hawaii and other Pacific Areas (1962).

Remarks.--Records fair except those below 0.5 mgd, which are poor. Records do not include flow of Punaluu ditch (see preceding page).

Note.--Published records for high-water periods in fiscal years 1956, 1957, and 1959 have been found to be in error; revised records are on file in the district office and will be published in the next water-supply paper.

Revisions.--The revised figure of discharge, in million gallons a day, for a day in the fiscal year 1962, superseding that published in Surface Water Records of Hawaii and other Pacific Areas (1962), is given herewith:

Nov. 1, 1961..... 110

Month	Million gallons	Maximum	Minimum	Mean		Runoff in acre-feet
				Mgd	Cfs	
November 1961.....	365.43	110	6.0	12.2	18.9	1,120
Calendar year 1961....	-	110	0	5.10	7.89	5,710
Fiscal year 1961-62...	-	121	0	6.39	9.89	7,160

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	11.6	4.80	1.68	1.37	4.40	2.50	12.4	0.43	0.49	23.2	6.05	3.64
2	6.48	4.20	1.68	1.66	4.40	2.50	11.2	.55	.62	54.0	4.70	3.32
3	6.86	4.00	1.79	2.10	4.20	2.50	23.2	.43	.43	32.9	4.12	3.00
4	5.00	9.45	1.68	72.5	4.00	2.50	28.7	.32	6.06	28.1	3.80	2.52
5	4.20	3.35	1.79	14.9	3.80	2.50	22.5	.37	1.57	26.0	3.64	2.37
6	4.00	2.80	1.79	8.52	3.65	8.06	155	.37	1.57	24.6	3.48	2.22
7	3.65	2.80	1.57	7.08	3.80	10.8	30.2	.32	1.93	20.4	3.00	2.07
8	3.50	2.65	1.47	8.02	3.65	10.5	22.5	.27	27.3	18.0	3.32	1.80
9	*3.35	2.50	1.47	7.80	7.08	10.5	19.0	.27	4.90	16.5	2.84	1.80
10	3.88	2.38	1.47	6.40	4.80	10.8	18.5	.43	3.00	16.0	2.68	1.68
11	5.26	3.05	1.57	6.00	3.65	11.7	17.5	.43	2.52	15.0	2.52	1.37
12	3.50	2.38	1.68	5.80	3.35	*38.4	16.5	.49	3.00	15.0	2.37	1.27
13	4.36	2.26	1.47	6.09	3.20	19.7	15.5	.62	3.01	14.0	2.22	1.18
14	4.00	2.14	1.47	8.90	3.20	16.5	15.5	.32	6.05	14.0	2.22	1.18
15	4.60	2.14	1.47	6.00	3.20	16.0	14.5	.32	2.84	6.59	2.07	1.18
16	3.65	9.76	*1.68	5.60	4.28	17.0	14.5	.32	*2.84	3.32	2.22	1.00
17	3.50	2.80	25.9	5.40	6.41	18.0	14.0	.32	2.84	3.00	1.93	1.00
18	3.80	2.50	13.8	9.37	3.65	16.0	14.0	.43	2.68	2.84	1.80	1.00
19	4.07	2.26	9.60	6.00	3.20	15.0	13.6	.43	2.68	3.77	1.68	.92
20	6.33	2.26	9.00	9.15	3.05	15.0	13.6	.49	2.37	7.20	2.07	.92
21	5.50	2.14	8.76	6.60	2.95	14.5	14.5	.37	97.2	9.35	3.64	.84
22	9.85	2.14	8.52	6.62	2.65	14.0	13.6	.32	129	4.30	6.26	.84
23	5.40	2.38	3.67	6.84	2.65	14.0	14.5	.32	97.4	5.13	8.19	*.98
24	5.67	2.80	1.47	7.32	2.50	13.6	13.6	.32	66.6	4.30	5.59	.84
25	4.00	1.90	1.47	6.60	2.65	13.6	13.6	.32	34.4	3.48	47.7	.92
26	4.20	2.26	1.37	6.40	3.43	13.2	13.2	.32	49.0	3.32	45.8	1.09
27	7.83	1.90	1.47	5.80	3.98	13.2	7.07	.32	38.6	3.00	30.6	1.57
28	4.60	2.02	1.37	*8.78	2.95	13.2	.43	.27	28.1	6.62	10.4	.84
29	4.60	2.14	1.78	9.96	2.65	13.2	.37	.32	23.9	53.5	7.20	.69
30	3.80	1.79	1.57	11.2	2.65	12.8	*.34	-----	20.4	*8.04	5.36	.62
31	9.14	1.68	-----	7.21	-----	11.6	.62	-----	29.6	-----	4.30	-----
Total	160.18	93.63	115.48	281.99	110.03	393.36	584.23	10.81	692.90	445.46	233.77	44.67
Mean												
Mgd	5.17	3.02	3.85	9.10	3.67	12.7	18.8	0.373	22.4	14.8	7.54	1.49
Cfs	8.00	4.67	5.96	14.1	5.68	19.6	29.1	0.577	34.7	22.9	11.7	2.31
Ac-ft	492	287	354	865	338	1,210	1,790	33	2,130	1,370	717	137

Calendar Year 1963: Max 653 Min 1.37 Mean mgd 13.1 Mean cfs 20.3 Ac-ft 14,650
Fiscal Year 1963-64: Max 155 Min 0.27 Mean mgd 8.65 Mean cfs 13.4 Ac-ft 9,720

* Discharge measurement made on this day.

Peak discharge (base, 500 mgd)

Date	Time	Gage height	Discharge		Date	Time	Gage height	Discharge	
			Mgd	Cfs				Mgd	Cfs
10-4	1900	3.36	684	1,060	3-22	1600	4.59	1,280	1,980
1-6	1200	5.84	1,810	2,800					

3089.9 Malaekahana Stream near Laie

Location.--lat 21°38'09", long 157°57'54", on left bank 2.3 miles southwest of Laie Temple and 3.0 miles south of Kahuku School.

Drainage area.--0.64 sq mi.

Records available.--July 1963 to June 1964.

Gage.--Water-stage recorder. Altitude of gage is 450 ft (from topographic map).

Extremes.--Maximum discharge during year, 323 mgd (500 cfs) Jan. 6 (gage height, 5.54 ft), from rating curve extended above 4.3 mgd on basis of slope-area measurement at gage height 4.89 ft; no flow Nov. 25, Dec. 4, 5.

Remarks.--Records good except those for periods of no gage-height record, which are poor. No diversion above station.

Rating table (gage height, in feet, and discharge, in million gallons a day)

1.33	0	2.0	1.70
1.4	.01	2.1	2.70
1.5	.06	2.3	5.65
1.6	.14	2.6	12.2
1.7	.31	3.0	26.5
1.8	.58	3.5	54.0
1.9	1.03		

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	3.0	0.6	0.04	0.19	0.07	0.01	4.52	0.3	1.0	0.38	0.4	0.21
2	1.0	.4	.04	.23	.07	.01	.31	.2	.8	2.67	.3	.19
3	1.4	.3	.04	*1.32	.05	.01	4.04	.1	.4	4.69	.3	.19
4	.9	.3	.06	2.87	.03	.0	5.30	.1	.2	1.69	.2	.17
5	.6	.3	.34	.97	.03	.0	3.73	.1	.2	.49	.2	.15
6	.5	.3	.20	.20	.03	.44	23.0	.1	.1	.62	.2	.15
7	.4	.3	.11	.11	.03	.29	2.18	.2	1.5	.43	.2	.14
8	.3	.2	.08	.47	.03	.08	1.10	.2	.40	.27	.2	.14
9	.3	.2	.07	1.16	1.44	.04	*.52	.1	3.0	.21	.3	.14
10	.5	.2	.05	.20	1.74	.42	.58	.4	1.5	.19	.1	.14
11	.9	.4	.03	.11	.13	2.50	.58	1.0	.7	.15	.1	.14
12	.6	.5	.02	.07	.07	17.9	.51	1.3	*.15	.20	.3	.15
13	.8	.3	.02	.06	.04	2.18	.27	2.0	.11	.21	.2	.15
14	1.8	.2	.03	3.18	*.04	.38	.20	.8	.13	.17	.2	.15
15	1.5	.2	.03	.17	.03	.33	.19	.3	.11	.15	.2	.14
16	.7	.1	.69	.09	.03	.52	.17	.4	.10	.1	.2	.13
17	.5	.1	7.39	.06	.08	1.44	.15	.2	.11	.1	.2	.17
18	.4	.2	5.19	.31	.06	.23	.14	.1	.10	.1	.1	1.00
19	.8	.2	.33	.20	.05	.13	.13	.1	.19	.1	.1	.38
20	1.0	.1	.20	.87	.03	.09	.13	.1	.40	.2	.1	.17
21	1.5	.1	.14	.27	.02	.07	.56	.2	3.95	.4	.8	.14
22	2.5	*.06	.13	.15	.01	.07	.25	.1	13.7	.6	2.5	.11
23	1.2	.06	.10	.49	.01	.07	.13	.1	8.87	.8	4.0	.11
24	2.0	1.17	.09	.41	.01	.06	.13	.1	4.17	.7	2.0	.11
25	.8	.12	.08	.23	.0	.06	.15	.4	.90	.6	20	.13
26	1.0	.07	.06	.17	.01	.07	.21	.5	6.51	.2	.30	.12
27	3.5	.07	.05	.11	.02	.10	.14	.2	3.75	.1	*5.6	1.46
28	1.7	.11	.04	.11	.04	.07	.11	.2	1.04	.1	.70	.33
29	1.2	.11	.06	1.23	.04	.06	.12	.3	.49	6.4	.40	.15
30	.7	.08	.26	.19	.02	.06	.1	---	.36	1.0	.31	*.17
31	.5	.06	---	.10	---	.07	.1	---	.27	---	.23	---
Total	34.5	7.41	15.97	16.30	4.26	27.76	49.75	10.2	94.81	24.02	70.64	7.03
Mean												
Mgd	1.11	0.239	0.532	0.526	0.142	0.895	1.60	0.352	3.06	0.801	2.28	0.234
Cfs	1.72	0.370	0.823	0.814	0.220	1.38	2.48	0.545	4.73	1.24	3.53	0.362
Ac-ft	106	23	49	50	13	85	153	31	291	74	217	22

Calendar Year 1963: Max - Min - Mean mgd - Mean cfs - Ac-ft -
Fiscal Year 1963-64: Max 40 Min 0 Mean mgd 0.991 Mean cfs 1.53 Ac-ft 1110

Peak discharge (base, 100 mgd)

Date	Time	Gage height	Discharge Mgd	Discharge Cfs	Date	Time	Gage height	Discharge Mgd	Discharge Cfs
1-6	1030	5.54	323	500	3-22	1730	4.20	115	178
3-8	about 0600	4.37	135	209					

* Discharge measurement made on this day.

Note.--No gage-height record July 1 to Aug. 21, Jan. 30 to Mar. 11, Apr. 16 to May 27.

3250. Kamananui Stream at Pupukea Military Road, near Maunawai

Location.--Lat 21°37'25", long 158°01'04", on right bank 75 ft upstream from Pupukea Military Road and 3.5 miles southeast of Maunawai.

Drainage area.--3.13 sq mi.

Records available.--Occasional low-flow measurements, fiscal years 1961-63, June 1963 to June 1964.

Gage.--Water-stage recorder and culvert control. Altitude of gage is 590 ft (from topographic map).

Extremes.--1963: Maximum discharge during period in June not determined; maximum daily discharge, 18 mgd (28 cfs) June 22; minimum discharge, 2.78 mgd (4.30 cfs) June 19.
1963-64: Maximum discharge during fiscal year, 660 mgd (1,020 cfs) Mar. 8 (gage height, 7.50 ft), from rating curve extended above 28 mgd on basis of slope-area measurement of peak of Dec. 9, 1964, at gage height 8.12 ft; minimum, 0.46 mgd (0.71 cfs) Dec. 4, 5, 25, 26.

Remarks.--Records good except those for periods of no gage-height record, which are fair. No diversion above station. Continuous records of rainfall are obtained at station.

Rating table (gage height, in feet, and discharge, in million gallons a day)
(Shifting-control method used Mar. 23-25)

0.5	0.32	1.5	13.2
.6	.76	2.0	26.5
.7	1.40	2.5	45.0
.8	2.27	3.0	70.0
1.1	5.85	4.0	140

Discharge, in million gallons a day, 1963

June 13	*3.42	June 18	3.09	June 23	4.50	June 28	4.26
14	3.20	19	2.99	24	3.54	29	3.42
15	3.20	20	3.42	25	a4.0	30	3.54
16	4.26	21	a12	26	a8.2		
17	2.99	22	a18	27	6.78		

Peak discharge (base, 300 mgd).--No peak above base.
* Discharge measurement made on this day.
a No gage-height record.

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	a16	3.09	0.66	1.73	1.12	0.61	a15	1.64	3.87	3.54	2.09	3.42
2	5.58	2.69	.61	2.37	1.12	.56	a5.2	1.05	3.04	7.80	1.48	3.09
3	a6.4	2.58	.66	5.83	.99	.51	a18	.93	2.09	11.2	1.48	2.78
4	a4.5	2.58	1.48	7.90	.93	.46	a22	.87	1.48	6.78	1.26	2.58
5	3.66	2.48	2.52	8.50	.93	.56	a26	.81	1.48	3.54	1.26	2.37
6	3.09	*2.18	1.48	2.09	*.93	1.62	*a60	.87	.99	4.77	1.19	2.18
7	2.89	2.09	1.12	1.91	.99	3.89	8.42	*.93	2.20	3.54	1.19	2.00
8	2.78	2.09	.71	1.19	1.05	.99	4.77	.99	107	2.89	1.19	2.00
9	2.78	2.09	.56	5.81	8.16	.66	3.20	.87	6.32	2.37	1.40	1.82
10	3.30	2.00	.56	2.00	11.9	.76	3.67	1.83	4.02	2.09	1.05	1.73
11	4.38	2.48	.56	1.12	2.27	2.89	3.56	5.07	3.09	2.00	1.05	1.56
12	3.30	2.89	.71	.93	1.33	41.5	4.02	5.79	2.09	2.89	*1.33	1.91
13	3.66	2.09	1.33	.93	1.05	10.2	2.27	8.51	1.64	2.18	1.26	1.91
14	8.50	2.00	.71	19.6	1.05	2.18	1.82	2.09	1.73	1.73	1.12	1.82
15	5.58	1.91	.56	2.68	1.12	1.64	1.73	1.48	1.56	1.64	.99	1.48
16	3.54	1.82	1.14	1.56	3.20	1.26	1.64	1.56	1.48	1.56	.87	1.56
17	2.78	1.82	27.0	1.19	1.56	8.43	1.48	.93	1.33	1.40	.81	2.48
18	2.78	2.09	22.1	3.24	1.05	1.73	1.40	.81	1.19	1.33	.71	4.50
19	4.26	2.09	4.02	2.27	.99	.99	1.26	.71	1.05	1.33	.71	3.54
20	4.64	1.73	2.48	4.89	.87	.71	1.25	.76	1.12	1.56	.71	1.40
21	6.49	1.73	1.73	3.70	.81	.66	4.95	.87	1.31	1.82	3.18	1.33
22	12.3	1.48	1.40	2.48	.81	.61	2.27	.66	57.9	2.00	9.20	1.26
23	4.90	1.48	1.19	4.46	.76	.66	1.91	.66	40.3	2.68	20.8	1.64
24	9.49	9.69	*1.12	4.68	.76	.51	1.40	*.56	19.9	2.48	7.40	2.00
25	3.90	1.91	1.12	2.48	.76	.46	2.19	2.00	5.49	1.91	78.8	1.48
26	4.26	1.40	1.05	2.09	1.05	.46	2.18	2.84	a20	1.40	95.9	2.27
27	17.5	1.33	.93	1.40	1.64	.51	1.33	.87	*a26	1.19	35.1	8.07
28	6.32	1.40	.93	1.40	.99	.61	1.19	.66	8.42	1.19	8.93	5.18
29	5.58	*2.00	1.12	6.40	.81	.61	1.12	.71	4.26	27.3	6.00	*1.68
30	3.66	1.12	2.54	2.37	.71	a.6	1.12	----------	3.66	3.78	4.64	2.58
31	3.09	.76	----------	1.40	----------	a.6	1.26	----------	4.26	----------	3.90	----------
Total	171.89	69.08	84.10	110.60	51.71	88.44	207.62	48.33	340.27	111.89	297.00	73.62
Mean												
Mgd	5.54	2.23	2.80	3.57	1.72	2.85	6.70	1.67	11.0	3.73	9.58	2.45
Cfs	8.57	3.45	4.33	5.52	2.66	4.41	10.4	2.58	17.0	5.77	14.8	3.81
Ac-ft	528	212	258	339	159	271	637	148	1040	343	911	226

Calendar Year 1963:	Max	-	Min	-	Mean mgd	-	Mean cfs	-	Ac-ft	-
Fiscal Year 1963-64:	Max	107	Min	0.46	Mean mgd	4.52	Mean cfs	6.99	Ac-ft	5070

Peak discharge (base, 300 mgd)

Date	Time	Gage height	Discharge Mgd	Discharge Cfs	Date	Time	Gage height	Discharge Mgd	Discharge Cfs
1-6	1200	7.05	570	882	3-22	1600	7.00	560	866
3-8	0600	7.50	660	1,020					

* Discharge measurement made on this day.
a No gage-height record.

3300. Kamananui Stream at Maunawei

Location.--Lat 21°38'20", long 158°03'27", on right bank at Maunawei, 25 ft upstream from Elehaha Stream, 4.9 miles northeast of Waialua School, and 7.3 miles southwest of Kahuku School.

Drainage area.--9.79 sq mi.

Records available.--February 1958 to June 1964. See also Note below.

Gage.--Water-stage recorder (digital since May 13) and concrete control. Altitude of gage is 20 ft (from topographic map).

Average discharge.--6 years, 8.66 mgd (13.4 cfs).

Extremes.--Maximum discharge during year, 1,030 mgd (1,590 cfs) Mar. 8 (gage height, 6.52 ft), from rating curve extended above 210 mgd as explained below; minimum, 0.20 mgd (0.31 cfs) Dec. 5.

1958-64: Maximum discharge, 2,230 mgd (3,450 cfs) Apr. 15, 1963 (gage height, 7.92 ft), from rating curve extended above 210 mgd on basis of slope-area measurement at gage height 7.72 ft; no flow at times.

Revisions.--Figures of maximum discharge for the fiscal years 1961 and 1962 have been revised to 660 mgd (1,020 cfs) Feb. 13, 1961 (gage height, 5.82 ft) and 2,030 mgd (3,140 cfs) Mar. 14, 1962 (gage height, 7.72 ft), superseding those published in Surface Water Records of Hawaii and other Pacific Areas for fiscal years 1961 and 1962, respectively.

Remarks.--Records good. No diversion above station.

Note.--Published records for high-water periods in fiscal years 1958-60 have been found to be in error; revised records are on file in the district office and will be published in the next water-supply paper.

Revisions.--Revised figures of discharge, in million gallons a day, for high-water periods in the fiscal years 1961 and 1962, superseding those published in Surface Water Records of Hawaii and other Pacific Areas (1961, 1962), are given herewith:

1960		1962	
Aug. 30	73.3	Mar. 12	98.2
1961		13	63.5
Feb. 13	177	14	451
Dec. 6	85.9	May 15	72.5

Month	Million gallons	Maximum	Minimum	Mean		Runoff in acre-feet
				Mgd	Cfs	
August 1960	183.65	73.3	0.43	5.92	9.16	564
Calendar year 1960	-	251	.02	9.00	13.9	10,100
February 1961	502.41	177	1.30	17.9	27.7	1,540
Fiscal year 1960-61	-	177	.36	5.92	9.16	6,630
December 1961	151.23	85.9	.43	4.88	7.55	464
Calendar year 1961	-	177	.09	5.03	7.78	5,640
March 1962	969.82	451	1.70	31.3	48.4	2,900
May	171.56	72.5	1.09	5.53	8.56	526
Fiscal year 1961-62	-	451	.09	6.20	9.59	6,950

3300. Kamananui Stream at Maunawai--Continued

Rating table (gage height, in feet, and discharge, in million gallons a day)

1.2	0.10	2.2	15.0
1.3	.33	2.5	28.0
1.4	.74	3.0	59.0
1.5	1.37	3.5	102
1.6	2.27	4.0	162
1.7	3.56	4.5	245
1.9	7.00		

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	24.0	3.17	0.85	1.64	1.23	0.30	19.1	2.09	1.73	4.64	2.92	2.95
2	9.42	2.66	.59	2.00	1.03	.27	5.84	1.46	5.41	10.1	1.91	2.55
3	9.77	2.53	.55	6.54	.85	.24	21.2	1.09	2.92	17.3	1.64	2.29
4	8.66	2.27	1.21	5.19	.74	.22	25.9	.96	1.64	9.51	1.46	2.10
5	4.79	2.18	2.31	12.9	.74	.27	28.8	.85	*2.01	5.48	*1.37	1.91
6	3.71	2.00	3.12	2.81	*.69	1.21	*79.9	.85	1.37	5.29	1.37	1.73
7	3.30	2.00	1.64	2.00	.69	5.34	17.0	.96	1.30	5.48	1.37	1.60
8	3.04	1.91	1.16	1.23	.79	1.64	10.1	.96	1.71	4.02	1.30	1.60
9	3.04	1.82	.69	5.01	10.5	.85	5.29	.90	14.4	3.04	1.55	1.53
10	3.43	1.73	.55	3.07	18.7	.85	4.79	.85	6.24	2.66	1.30	1.41
11	4.64	1.64	.43	1.37	3.56	3.15	5.10	5.33	5.67	2.53	1.09	1.24
12	4.50	2.87	.43	.96	1.73	52.1	5.88	6.14	3.17	3.17	1.09	1.20
13	3.17	2.00	.96	.79	1.23	24.3	3.30	12.8	2.27	3.30	1.23	1.40
14	114	1.55	.90	19.6	.96	4.48	2.40	3.71	2.09	2.40	1.09	1.29
15	7.82	1.46	.51	4.31	.79	2.92	2.18	2.09	2.00	2.00	.96	1.12
16	5.82	1.23	.51	1.82	1.88	2.18	2.09	2.09	1.64	1.91	.79	1.08
17	3.30	1.23	36.4	1.23	1.91	11.5	1.82	1.64	1.64	1.73	.64	1.30
18	3.30	1.30	46.7	1.66	1.03	3.87	1.55	1.16	1.37	1.55	.55	2.68
19	4.33	1.55	8.08	3.29	.79	2.00	1.37	.90	1.23	1.37	.47	4.05
20	5.48	1.30	*3.40	3.10	.64	1.23	1.46	.69	1.23	1.55	.39	1.68
21	5.20	1.23	2.27	5.78	.51	.96	4.34	.90	1.30	1.91	1.16	1.28
22	15.6	1.03	1.73	2.66	.47	.90	4.02	.69	69.9	2.27	9.40	1.06
23	6.27	.90	1.30	4.44	.43	.90	2.53	.59	56.8	2.27	25.0	1.18
24	118	8.83	1.09	4.54	.36	.85	2.09	.55	44.6	3.43	11.6	1.21
25	5.10	3.85	.90	4.20	.36	.64	1.82	.59	12.1	2.09	86.0	1.16
26	*3.95	2.00	.79	2.66	.64	.55	2.92	3.83	27.5	1.55	108	1.21
27	24.7	1.64	.69	1.64	1.30	.59	1.82	1.64	31.2	1.30	40.8	5.63
28	12.2	1.64	.59	1.37	.90	.64	1.37	.90	17.4	1.16	11.3	5.34
29	6.62	2.40	.59	5.97	.64	.64	1.23	.74	6.81	34.9	5.89	*2.18
30	4.79	2.09	1.41	3.88	.43	.64	1.23	---	4.95	5.90	4.23	2.20
31	3.30	1.16	---	1.82	---	.59	1.16	---	4.64	---	3.43	---
Total	226.45	65.17	122.35	119.48	56.52	126.82	269.60	57.95	507.53	145.81	331.30	59.16
Mean												
Mgd	7.30	2.10	4.08	3.85	1.88	4.09	8.70	2.00	16.4	4.86	10.7	1.97
Cfs	113	3.25	6.31	5.96	2.91	6.33	13.5	3.09	25.4	7.52	16.6	3.05
Ac-ft	695	200	375	367	173	389	827	178	1560	447	1020	182

Calendar Year 1963: Max 681 Min 0.22 Mean mgd 13.5 Mean cfs 20.9 Ac-ft 15,090
Fiscal Year 1963-64: Max 171 Min 0.22 Mean mgd 5.71 Mean cfs 8.83 Ac-ft 6,410

Peak discharge (base, 300 mgd)

Date	Time	Gage height	Discharge Mgd	Discharge Cfs	Date	Time	Gage height	Discharge Mgd	Discharge Cfs
1-6	1300	5.93	715	1,110	3-22	1930	5.47	508	786
3-8	0800	6.52	1,030	1,590					

* Discharge measurement made on this day.

3450. Opaeula Stream near Wahiawa

Location.--Lat 21°33'55", long 158°00'10", on left bank 4.3 miles northeast of Leilehua High School in Wahiawa and 8.1 miles east of Waialua School.

Drainage area.--2.98 sq mi.

Records available.--August 1959 to June 1964. See also Note below.

Gage.--Water-stage recorder and concrete control. Altitude of gage is 1,120 ft (from topographic map).

Extremes.--Maximum discharge during year, 1,160 mgd (1,790 cfs) Jan. 6 (gage height, 7.45 ft), from rating curve extended above 69 mgd as explained below; minimum, 0.37 mgd (0.57 cfs) Dec. 5.
1959-64: Maximum discharge, 1,460 mgd (2,260 cfs) Apr. 15, 1963 (gage height, 8.12 ft), from rating curve extended above 69 mgd on basis of slope-area measurement at gage height 6.74 ft; minimum, 0.20 mgd (0.31 cfs) Dec. 9, 10, 1962.

Remarks.--Records good except those for period of no gage-height record, which are fair.

Note.--Published records for high-water periods in the fiscal year 1960 have been found to be in error; revised records are on file in the district office and will be published in the next water-supply paper.

Rating table (gage height, in feet, and discharge, in million gallons a day)

1.3	0.26	2.0	4.50
1.4	.45	2.3	10.5
1.5	.72	2.6	21.0
1.6	1.09	3.0	46.0
1.7	1.60	3.5	100
1.8	2.25	4.0	190
1.9	3.20		

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	45.8	5.63	1.19	5.08	1.60	0.60	14.7	5.70	8.36	9.78	4.67	2.72
2	15.4	2.78	1.02	7.77	1.55	.50	5.42	2.06	10.0	32.2	3.33	2.25
3	10.1	4.14	.98	10	1.09	.45	39.3	1.09	4.70	22.3	3.01	1.99
4	10.1	3.10	4.22	7.0	1.05	.41	44.0	.72	12.1	7.91	*2.34	1.80
5	4.24	4.14	9.40	16	1.05	.39	24.4	.90	*8.82	8.15	2.44	1.55
6	3.46	1.86	3.34	5.0	1.45	.47	104	.68	5.08	14.7	3.20	1.40
7	2.92	1.67	3.02	2.5	1.29	1.49	9.22	.68	11.2	7.72	2.72	1.29
8	2.44	5.40	1.29	1.7	4.44	1.44	*5.16	1.14	90.3	6.96	1.86	1.24
9	2.25	2.54	.98	8.0	14.5	.76	2.82	1.14	13.2	4.24	2.12	1.24
10	2.68	1.60	.83	3.5	23.2	.60	2.95	1.19	7.53	3.10	2.12	1.50
11	10.1	6.31	.76	2.0	3.53	.83	3.85	10.8	5.86	3.46	2.62	1.34
12	4.38	4.90	3.90	1.3	1.60	38.1	5.01	8.18	4.50	4.70	2.82	.98
13	3.20	3.01	4.10	1.0	1.14	16.8	2.12	15.7	6.77	3.98	1.99	.87
14	13.1	2.25	1.55	25	1.09	3.48	1.29	15.2	5.57	2.18	1.61	.90
15	7.74	1.55	1.24	5.0	1.02	2.36	1.09	3.98	3.20	1.86	1.53	.98
16	5.49	4.12	1.05	2.5	8.82	3.57	1.29	2.44	2.25	1.67	1.26	2.44
17	3.01	3.57	86.7	1.7	2.73	14.4	1.55	3.20	2.18	1.55	1.05	3.72
18	3.10	1.62	20.1	2.5	4.80	6.05	.94	2.34	1.60	1.45	1.21	3.72
19	7.37	4.03	5.34	4.5	1.91	2.12	.72	1.55	1.34	1.34	.95	*4.37
20	10.1	2.06	*2.72	4.0	*1.09	1.29	.65	2.50	1.24	26.0	.88	1.50
21	10.4	2.71	1.92	7.0	.87	.98	6.55	2.59	22.1	8.70	18.0	1.02
22	20.6	1.34	1.50	3.5	.76	.83	3.02	2.63	148	9.57	37.1	.98
23	5.72	1.24	1.29	5.0	.76	.79	5.56	1.92	61.2	11.4	31.7	4.50
24	14.7	13.4	1.14	5.4	.68	.90	2.54	1.50	56.5	11.1	23.7	3.98
25	*5.64	3.86	1.05	4.5	.57	.83	1.14	1.09	9.54	5.69	123	3.59
26	7.15	1.86	.94	2.8	5.42	.62	1.82	1.05	41.4	5.26	78.4	5.01
27	30.3	5.82	.83	2.2	5.87	.60	2.06	1.80	55.8	6.15	43.0	15.6
28	8.41	4.84	.79	1.9	3.27	.57	1.45	1.24	14.3	8.76	8.10	4.67
29	7.22	7.50	.94	8.0	1.29	.72	1.34	.90	6.58	60.2	5.35	2.18
30	4.37	2.54	6.10	*4.11	.79	.55	.98	---	5.69	10.1	4.11	2.72
31	2.82	1.73	---	1.92	---	.57	.79	---	13.8	---	3.20	---
Total	284.31	113.12	170.23	162.38	99.23	104.07	297.73	95.91	640.71	302.18	419.39	82.05
Mean												
Mgd	9.17	3.65	5.67	5.24	3.31	3.36	9.60	3.31	20.7	10.1	13.5	2.74
Cfs	14.2	5.65	8.77	8.11	5.12	5.20	14.9	5.12	32.0	15.6	20.9	4.24
Ac-ft	873	347	522	498	305	319	914	294	1970	927	1290	252

Calendar Year 1963: Max 465 Min 0.39 Mean mgd 10.9 Mean cfs 16.9 Ac-ft 12170
Fiscal Year 1963-64: Max 148 Min 0.39 Mean mgd 7.57 Mean cfs 11.7 Ac-ft 8510

Peak discharge (base, 470 mgd)

Date	Time	Gage height	Discharge Mgd	Discharge Cfs	Date	Time	Gage height	Discharge Mgd	Discharge Cfs
1-6	1200	7.45	1,160	1,790	3-22	1730	6.70	895	1,380
3-8	0600	5.35	498	771					

* Discharge measurement made on this day.
Note.--No gage-height record Oct. 3-29.

4000. Halawa Stream near Halawa

Location.--Lat 21°09'30", long 156°45'53", on right bank 600 ft downstream from confluence of Hipuapua and Moaula Streams, 1.5 miles west of Halawa, and 6.0 miles northeast of Pukoo.

Drainage area.--4.62 sq mi.

Records available.--July 1917 to July 1932, November 1937 to June 1964.

Gage.--Water-stage recorder and log control. Altitude of gage is 200 ft (from topographic map). Prior to June 25, 1923, at site 350 ft upstream at different datum.

Average discharge.--41 years (1917-32, 1938-64), 19.5 mgd (30.2 cfs).

Extremes.--Maximum discharge during year, 1,520 mgd (2,350 cfs) Sept. 17 (gage height, 7.27 ft), from rating curve extended above 34 mgd as explained below; minimum, 2.01 mgd (3.11 cfs) Dec. 9, 10.
1917-32, 1937-64: Maximum discharge, 7,040 mgd (10,900 cfs) Jan. 1, 1961 (gage height, 13.6 ft), from rating curve extended above 46 mgd on basis of slope-area measurements at gage heights 6.7 and 13.6 ft; minimum, 0.49 mgd (0.76 cfs) Nov. 23, 1962.

Remarks.--Records fair. Small diversion above station by Maui County Board of Water Supply for domestic use at Halawa.

Rating table (gage height, in feet, and discharge, in million gallons a day)
(Shifting-control method used Dec. 11 to Mar. 8, Apr. 28 to June 30)

1.1	1.85	2.6	34.0
1.3	2.70	3.0	68.0
1.6	4.85	3.5	135
1.9	8.80	4.0	240
2.2	16.0	4.5	390

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	154	13.0	7.68	15.2	5.90	2.61	16.5	3.65	20.0	4.17	9.75	5.90
2	90.5	9.75	6.81	16.0	5.27	2.52	80.3	3.30	35.2	5.38	8.00	4.96
3	23.1	8.48	19.6	7.07	4.76	2.52	42.9	3.18	25.5	35.9	8.32	4.60
4	14.5	8.32	12.1	19.4	5.38	5.57	7.73	3.00	23.6	29.6	6.55	4.51
5	12.3	7.20	13.9	8.00	5.06	2.94	36.9	2.82	6.94	*28.6	13.6	4.00
6	10.1	6.94	8.48	6.55	4.34	2.56	29.2	2.94	5.27	30.8	8.80	4.26
7	8.48	8.16	12.9	5.58	33.9	2.34	34.2	3.72	6.16	8.48	6.16	11.0
8	7.84	7.36	7.52	68.9	18.1	2.25	25.0	5.85	77.1	8.02	5.58	9.85
9	9.18	7.07	7.20	28.8	141	2.09	9.94	3.18	7.36	11.1	5.16	5.53
10	9.61	6.42	6.03	*8.42	16.4	58.3	6.42	21.8	5.58	9.37	7.06	4.68
11	26.9	46.9	6.89	6.29	5.90	167	8.00	17.2	5.16	6.55	5.58	3.51
12	8.32	15.8	31.3	5.69	4.68	7.84	*11.8	12.8	4.26	16.4	18.6	4.00
13	11.6	10.7	10.1	6.55	5.16	8.32	6.81	36.1	6.14	5.16	9.75	3.93
14	13.2	7.52	10.5	9.36	4.60	33.7	5.16	12.9	6.74	4.51	18.7	3.86
15	62.2	6.55	17.8	5.16	17.3	39.8	5.27	18.8	6.50	11.8	20.5	5.91
16	38.9	7.20	71.5	4.60	15.5	104	21.5	7.20	5.16	12.9	7.52	*13.2
17	13.6	6.18	227	5.06	52.2	245	37.0	6.16	4.68	6.29	5.06	12.0
18	31.4	12.3	39.6	59.7	7.68	29.8	6.16	9.29	3.30	4.34	4.42	11.8
19	47.1	7.20	9.56	87.7	*5.16	9.75	5.06	12.2	3.00	3.86	3.93	5.80
20	55.5	8.16	7.52	103	4.60	7.07	13.7	6.55	2.76	56.3	*5.66	5.58
21	97.5	6.42	7.84	12.5	4.42	5.80	22.0	5.06	2.82	42.8	9.18	4.85
22	36.0	5.90	6.68	8.48	4.17	64.3	6.29	23.8	2.82	8.48	23.0	36.8
23	15.4	19.6	5.48	6.81	3.51	23.4	5.38	10.5	21.3	23.6	156	52.1
24	14.2	62.5	5.58	19.7	3.24	5.90	4.68	15.9	10.6	25.4	34.5	12.1
25	16.9	8.48	5.58	11.5	3.12	4.85	7.20	9.56	16.3	8.80	188	20.8
26	28.2	10.9	5.80	15.2	14.1	4.34	4.85	5.69	27.3	6.94	274	9.18
27	150	22.9	6.68	7.68	4.26	11.4	4.96	5.58	78.8	5.06	50.6	5.90
28	62.1	28.6	5.48	30.7	3.44	5.06	4.26	4.26	90.7	114	15.1	7.68
29	20.8	12.0	22.8	29.5	3.06	4.00	3.79	3.93	8.64	134	10.3	15.6
30	*15.8	*13.2	15.1	10.1	2.76	3.72	3.58	----------	6.94	14.8	8.32	32.5
31	31.5	14.4	----------	6.94	----------	3.86	4.00	----------	5.58	----------	6.55	----------
Total	1136.73	416.11	621.01	636.14	408.97	872.61	480.54	276.92	532.21	683.41	954.25	326.39
Mean												
Mgd	36.7	13.4	20.7	20.5	13.6	28.0	15.4	9.55	17.2	22.8	30.8	10.9
Cfs	56.8	20.7	32.0	31.7	21.0	43.3	24.0	14.8	26.6	35.3	47.7	16.9
Ac-ft	3490	1280	1910	1950	1260	2680	1470	850	1630	2100	2930	1000

Calendar Year 1963: Max 407 Min 2.09 Mean mgd 27.2 Mean cfs 42.1 Ac-ft 30,460
Fiscal Year 1963-64: Max 274 Min 2.09 Mean mgd 20.1 Mean cfs 31.1 Ac-ft 22,550

* Discharge measurement made on this day.

Peak discharge (base, 950 mgd)

Date	Time	Gage height	Discharge Mgd	Discharge Cfs	Date	Time	Gage height	Discharge Mgd	Discharge Cfs
7-1	0500	6.84	1,300	2,010	4-28	2000	6.15	960	1,490
9-17	0630	7.27	1,520	2,350					

4055. Waikolu Stream at altitude 900 ft, near Kalaupapa

Location.--Lat 21°08'43", long 156°55'18", on right bank 1.8 miles southwest of Haupu Bay, 2.3 miles upstream from mouth, and 5.2 miles southeast of Kalaupapa.

Drainage area.--1.99 sq mi.

Records available.--May 1956 to October 1961, July 1962 to June 1964.

Gage.--Water-stage recorder. Altitude of gage is 900 ft (from topographic map). Prior to July 1, 1962, at site 200 ft upstream at datum 6.14 ft higher.

Average discharge.--7 years, 6.25 mgd (9.67 cfs).

Extremes.--Maximum discharge during year, 432 mgd (668 cfs) Sept. 17 (gage height, 3.63 ft), from rating curve extended above 14 mgd on basis of approximate gage height for flood of Oct. 31, 1961; minimum, 0.76 mgd (1.18 cfs) Aug. 17-22, June 7-15.
1956-61, 1962-64: Maximum discharge, 790 mgd (1,220 cfs) Dec. 29, 1958 (gage height, 6.60 ft, site and datum then in use), from rating curve extended above 37 mgd; minimum, 0.32 mgd (0.50 cfs) Jan. 15, 16, 1963.
Flood of Oct. 31, 1961, reached a stage of 13.62 ft, from floodmarks, former site and datum (discharge, 4,020 mgd or 6,220 cfs, by slope-area measurement of peak flow).

Remarks.--Records good except those above 30 mgd, which are poor. Water diverted above station at times, either into or from Molokai water tunnel.

Rating table (gage height, in feet, and discharge, in million gallons a day)

1.2	0.63	1.6	15.0
1.3	2.30	1.8	29.4
1.4	5.50	2.2	73.0

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	26.5	1.54	1.20	1.90	1.04	0.90	15.6	1.04	8.50	1.54	1.54	1.04
2	4.70	1.36	1.04	5.39	.90	.90	14.0	1.04	7.75	1.20	1.20	1.04
3	2.80	1.20	1.04	1.90	.90	.90	12.8	1.04	17.0	1.20	1.54	.90
4	1.90	1.20	1.04	4.43	.90	.90	4.20	1.04	14.8	*2.55	1.72	.90
5	1.54	1.20	1.72	2.80	.90	.90	5.68	1.04	3.70	1.54	4.30	.90
6	1.20	1.20	1.54	1.90	.90	.90	2.55	1.04	1.72	3.40	5.99	.90
7	1.04	1.04	1.54	2.30	7.91	.90	2.10	1.04	2.55	1.72	1.90	.76
8	1.04	1.04	1.36	28.7	18.7	.90	2.55	1.36	35.1	3.37	1.36	.76
9	1.04	1.04	1.20	*5.86	68.9	.90	4.30	2.10	3.40	7.75	1.54	.76
10	1.04	1.04	1.20	1.54	41.8	13.2	2.55	12.7	1.90	5.50	8.46	.76
11	1.20	1.20	1.20	1.04	2.55	45.6	*2.80	8.59	1.54	1.72	6.82	.76
12	1.20	1.54	1.36	*1.04	1.54	2.55	3.70	24.7	1.20	2.10	7.58	.76
13	1.36	1.36	1.36	1.04	1.20	1.36	1.90	30.2	1.04	1.36	5.95	.76
14	1.72	1.36	1.20	2.58	1.20	1.20	1.36	13.7	1.04	1.04	1.54	.76
15	8.53	1.04	1.20	*1.20	1.04	1.72	1.20	15.3	1.04	1.04	1.20	.76
16	12.1	.90	33.3	1.04	4.20	17.5	6.30	3.70	1.04	1.04	1.04	1.20
17	5.10	.76	55.0	1.04	1.72	21.7	21.4	1.90	1.04	1.04	1.04	1.36
18	12.1	.76	10.6	1.04	1.36	2.80	1.90	*1.54	1.04	.90	.90	1.54
19	*3.07	.76	1.90	3.68	1.04	1.90	1.36	1.72	.90	.90	.90	*1.21
20	11.0	.76	1.20	7.73	1.04	1.36	1.36	1.20	1.04	8.10	1.04	1.04
21	4.30	.76	1.04	2.10	1.04	1.04	2.55	1.04	1.54	4.30	2.10	1.54
22	12.5	.76	1.04	1.20	.90	26.7	1.72	1.36	1.54	1.54	12.4	2.10
23	3.10	1.36	1.04	1.36	*.90	16.8	1.54	2.55	1.54	3.70	60.4	5.95
24	3.40	3.40	1.04	6.21	.90	1.72	1.54	4.00	1.72	17.8	*14.0	1.90
25	2.80	1.54	1.04	2.55	.90	1.20	4.00	1.72	6.43	7.02	33.9	1.54
26	2.80	4.00	1.04	1.36	4.83	1.72	1.72	1.20	12.5	2.30	24.8	1.36
27	14.0	*3.10	1.04	1.04	1.54	19.7	1.36	3.10	30.1	1.36	9.10	1.54
28	9.11	5.10	1.04	2.10	1.04	2.55	1.20	1.54	24.6	5.58	2.80	1.54
29	5.50	3.10	1.04	3.10	.90	1.72	1.04	1.20	2.55	21.4	1.72	1.36
30	1.90	2.10	1.36	1.36	.90	1.36	1.04	---	2.10	2.55	1.54	13.5
31	1.54	1.54	---	1.04	---	8.65	1.04	---	2.10	---	1.36	---
Total	161.13	49.06	131.92	101.57	173.59	202.15	128.36	143.70	194.06	116.56	221.68	51.20
Mean												
Mgd	5.20	1.58	4.40	3.28	5.79	6.52	4.14	4.96	6.26	3.89	7.15	1.71
Cfs	8.05	2.44	6.81	5.07	8.96	10.1	6.41	7.67	9.69	6.02	11.1	2.65
Ac-ft	494	151	405	312	533	620	394	441	596	358	680	157

Calendar Year 1963: Max 70.4 Min 0.76 Mean mgd 5.96 Mean cfs 9.22 Ac-ft 6680
Fiscal Year 1963-64: Max 68.9 Min 0.76 Mean mgd 4.58 Mean cfs 7.09 Ac-ft 5140

* Discharge measurement made on this day.

Peak discharge (base, 250 mgd)

Date	Time	Gage height	Discharge Mgd	Discharge Cfs	Date	Time	Gage height	Discharge Mgd	Discharge Cfs
9-17	0700	3.63	432	668	11-9	1630	3.56	406	628

4080. Waikolu Stream below pipeline crossing, near Kalaupapa

Location.--Lat 21°09'45", long 156°55'54", on left bank 0.7 mile upstream from mouth and 4.4 miles southeast of Kalaupapa Lighthouse.

Drainage area.--3.68 sq mi.

Records available.--July 1919 to November 1930, August 1931 to July 1932, September 1937 to January 1948, July 1948 to June 1964. Prior to August 1931, published as "at pipeline crossing, near Kalaupapa."

Gage.--Water-stage recorder. Datum of gage is 252 ft above mean sea level (hand levels by Bureau of Reclamation). Prior to Aug. 14, 1931, at site 500 ft upstream at different datums. Sept. 20, 1937, to Jan. 25, 1948, at present site at datum 1.49 ft higher and July 30, 1948, to June 30, 1962, at present site at datum 1.00 ft higher than present datum.

Average discharge.--35 years (1919-30, 1938-47, 1949-64), 12.0 mgd (18.6 cfs).

Extremes.--Maximum discharge during year, 346 mgd (535 cfs) Nov. 9 (gage height, 4.02 ft), from rating curve extended above 25 mgd as explained below; minimum, 3.50 mgd (5.42 cfs) May 19.
1919-32, 1937-64: Maximum discharge, 4,290 mgd (6,640 cfs) Oct. 31, 1961 (gage height, 13.75 ft, present datum, from floodmarks), from rating curve extended above 25 mgd on basis of slope-area measurement of peak flow; minimum, 1.3 mgd (2.0 cfs) Nov. 1, 2, 1925, June 5, 1926.

Remarks.--Records fair. Water is diverted above station for domestic use in Kalaupapa, and since Nov. 16, 1960, water has been diverted above station both to and from Molokai water tunnel.

Rating table (gage height, in feet, and discharge, in million gallons a day)

0.8	2.30	1.7	34.0
1.1	8.70	2.1	68.0
1.4	17.0		

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	23.3	5.30	4.90	4.90	4.10	3.90	13.1	4.30	8.40	4.90	4.50	4.10
2	8.70	5.10	4.90	7.82	4.10	3.90	15.0	4.10	9.39	4.50	4.30	4.10
3	6.94	5.10	4.90	5.10	3.90	3.90	14.0	4.10	12.4	4.50	4.30	3.90
4	6.50	4.90	4.90	6.50	3.90	3.90	8.04	4.10	18.0	*5.30	4.70	3.90
5	5.75	4.70	5.30	6.50	3.70	3.90	9.16	3.90	7.16	4.70	6.94	3.90
6	5.50	4.70	5.10	5.30	3.70	7.17	6.72	3.90	4.90	6.00	7.32	3.90
7	5.30	4.70	5.10	5.50	10.2	4.90	6.00	4.10	5.30	4.90	4.90	3.90
8	5.30	4.70	5.10	21.8	32.8	4.70	*6.00	4.30	25.3	5.46	4.30	3.90
9	5.30	4.70	5.10	9.16	62.1	4.30	7.82	4.90	6.94	9.39	4.30	3.90
10	5.30	4.70	4.90	5.50	37.0	14.8	6.25	11.6	5.10	8.04	8.10	3.70
11	5.30	4.70	4.90	4.70	7.38	66.1	7.16	9.60	4.70	5.10	8.12	3.70
12	5.30	5.10	5.10	4.30	5.50	8.26	7.60	19.9	4.50	5.50	7.88	3.70
13	5.50	4.90	5.10	4.50	5.10	6.00	5.75	23.7	4.30	4.50	7.99	3.90
14	6.00	4.90	4.90	6.00	4.90	5.30	4.90	12.2	4.10	4.10	4.70	3.70
15	10.4	4.70	4.90	*4.70	4.90	6.00	4.70	14.2	4.10	3.90	4.30	3.70
16	12.2	4.70	27.6	4.30	8.04	20.2	7.70	7.38	3.90	3.70	4.10	4.10
17	*8.26	4.70	45.3	4.10	5.50	22.6	20.2	*4.90	3.90	3.70	3.90	4.30
18	13.8	4.70	11.0	4.30	4.90	8.26	5.75	4.90	3.90	3.70	3.70	4.30
19	7.50	4.70	6.00	6.50	4.50	6.50	4.90	5.30	3.70	3.70	3.50	4.30
20	11.7	4.70	4.90	9.39	4.30	5.30	4.70	4.70	4.10	8.17	6.42	*4.10
21	8.04	4.70	4.50	5.50	*4.10	4.90	6.25	4.50	4.70	7.38	6.25	4.70
22	11.8	4.50	4.30	4.50	4.10	25.6	5.10	4.70	4.30	4.50	11.0	5.30
23	7.16	4.90	4.30	5.50	3.90	20.0	4.70	5.75	4.30	6.50	38.0	8.26
24	7.16	6.94	4.50	9.62	3.90	5.50	5.10	7.38	4.50	12.8	*11.5	5.50
25	6.72	5.75	4.30	6.72	4.30	4.90	7.60	5.10	7.79	8.90	22.8	4.70
26	6.72	7.38	4.30	4.90	8.04	5.10	5.10	4.50	11.2	5.30	24.2	4.50
27	12.6	6.94	4.10	4.30	5.10	18.2	4.70	6.50	26.7	4.50	9.85	4.70
28	8.00	8.26	4.30	4.50	4.70	6.94	4.50	4.70	27.9	5.32	6.25	4.70
29	8.48	7.16	4.30	6.72	4.10	5.30	4.30	4.30	7.38	16.3	5.10	4.70
30	5.75	6.25	4.50	4.90	3.90	4.70	4.30	---	6.00	5.75	4.50	11.8
31	5.30	*5.10	---	4.30	---	8.89	4.30	---	5.50	---	4.30	---
Total	251.58	164.28	213.30	192.33	266.66	319.92	221.40	203.51	254.36	181.01	252.02	137.86
Mean												
Mgd	8.12	5.30	7.11	6.20	8.89	10.3	7.14	7.02	8.21	6.03	8.13	4.60
Cfs	12.6	8.20	11.0	9.59	13.8	15.9	11.1	10.9	12.7	9.33	12.6	7.12
Ac-ft	772	504	655	590	818	982	679	625	781	555	773	423

Calendar Year 1963: Max 76.0 Min 3.50 Mean mgd 9.39 Mean cfs 14.5 Ac-ft 10,510
Fiscal Year 1963-64: Max 66.1 Min 3.50 Mean mgd 7.26 Mean cfs 11.2 Ac-ft 8,160

Peak discharge (base, 450 mgd).--No peak above base.

* Discharge measurement made on this day.

4114. Kamako Gulch near Mauna Loa

Location.--lat 21°10'39", long 157°12'31", on left bank 1.0 mile downstream from Kamakahi Gulch and 3.0 miles north of Mauna Loa School.

Drainage area.--5.34 sq mi.

Records available.--July 1963 to June 1964.

Gage.--Water-stage recorder. Altitude of gage is 380 ft (from topographic map).

Extremes.--Maximum discharge during year, 120 mgd (186 cfs) Jan. 7 (gage height, 1.43 ft), from rating curve based on slope-area measurements at gage height 0.72 ft and peak flow; no flow most of the time.

Remarks.--Records excellent except those for periods of no gage-height record and for periods of flow, which are poor. No diversion above station.

Rating table (gage height, in feet, and discharge, in million gallons a day)

0	0	0.5	20.0
.1	2.60	.8	44.0
.2	5.60	1.2	89.0
.3	9.30		

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1			0			0	0		0			
2			0			0	0		0			
3			0			0	0		0			
4			0			0	0		0			
5			0			0	0		0			
6			0			0	0		0			
7			0			0	*17.0		0			
8			0			0	78.8		0			
9			0			0	40		0			
10			0			0	15		0			
11			0			30.5	0		0			
12			0			27.0	*0		0			
13			0	(*)		12	0	(*)	0			
14			0			6.0	0		0			
15			0			0	0		0			(*)
16			0			0	0		0			
17			3.24			0	0		0			
18			1.80			0	0		0			
19			0			0	0		0		(*)	
20			0			0	0		0			
21			0			0	0		0			
22			0		(*)	0	0		0			
23			0			0	0		0			
24			0			0	0		0			
25			0			0	0		0			
26			0			0	0		4.89			
27			0			0	0		0			
28			0			0	0		0			
29		(*)	0			0	0		0			
30			0			0	0	---	0			
31			---		---	0	0	---	*0	---		---
Total	0	0	5.04	0	0	75.5	150.8	0	4.89	0	0	0
Mean												
Mgd	0	0	0.168	0	0	2.44	4.86	0	0.158	0	0	0
Cfs	0	0	0.260	0	0	3.78	7.52	0	0.244	0	0	0
Ac-ft	0	0	15	0	0	232	463	0	15	0	0	0

Calendar Year 1963: Max - Min - Mean mgd - Mean cfs - Ac-ft -
Fiscal Year 1963-64: Max 78.8 Min 0 Mean mgd 0.645 Mean cfs 0.998 Ac-ft 725

Peak discharge (base, 65 mgd)

Date	Time	Gage height	Discharge	
			Mgd	Cfs
1-7	2030	1.43	120	186

* Discharge measurement or observation of no flow made on this day.

Note.--No gage-height record July 1 to Aug. 28, Dec. 13-17, Jan. 9-11.

4140. Kaunakakai Gulch at Kaunakakai

Location.--Lat 21°06'21", long 157°00'34", on left bank 0.6 mile upstream from Molokai Ranch pipeline crossing, 1.3 miles northeast of Kaunakakai Post Office, and 1.7 miles upstream from mouth.

Drainage area.--6.57 sq mi.

Records available.--December 1949 to June 1964. Prior to July 1958, published as Kaunakakai Stream at Kaunakakai.

Gage.--Water-stage recorder. Altitude of gage is 240 ft (from topographic map).

Average discharge.--14 years (1950-64), 0.944 mgd (1.46 cfs).

Extremes.--Maximum discharge during year, 103 mgd (159 cfs) Nov. 10 (gage height, 3.73 ft); no flow for most of year.
1949-64: Maximum discharge, 1,980 mgd (3,060 cfs) Oct. 31, 1961 (gage height, 9.30 ft), from rating curve extended above 400 mgd on basis of slope-area measurement of peak flow; no flow for most of each year.

Remarks.--Records fair.

Rating table (gage height, in feet, and discharge, in million gallons a day)

1.29	0	1.8	1.20
1.4	.05	2.0	2.55
1.5	.19	2.2	4.70
1.6	.41	2.4	8.00
1.7	.74	2.7	17.0

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1			0		0			0		(*)		
2			0		0			0				
3			0		0			0				
4			0		0			0				
5			0		0			0				
6			0		0			0				
7			0		0			0				
8			0		0			0				
9			0		.36			0				
10			0		14.9			0				
11			0	(*)	.28		(*)	0				
12			0		0			0				
13			0		0			1.03				
14			0		0			*.16				
15			0		0			0				(*)
16	(*)		0		0			0				
17			7.02		0			0				
18			.18		0			0				
19			0		0			0				
20			0		0			0				
21			0		*0			0			(*)	
22			0		0			0				
23			0		0			0				
24			0		0			0				
25			0		0			0				
26			0		0			0				
27			0		0			0				
28			0		0			0				
29		(*)	0		0			0				
30			0		0			---				
31			---		---			---		---		---
Total	0	0	7.20	0	15.54	0	0	1.19	0	0	0	0
Mean												
Mgd	0	0	0.240	0	0.518	0	0	0.041	0	0	0	0
Cfs	0	0	0.371	0	0.801	0	0	0.063	0	0	0	0
Ac-ft	0	0	22	0	48	0	0	3.7	0	0	0	0

Calendar Year 1963: Max 25.0 Min 0 Mean mgd 0.582 Mean cfs 0.900 Ac-ft 653
Fiscal Year 1963-64: Max 14.9 Min 0 Mean mgd 0.065 Mean cfs 0.101 Ac-ft 73

Peak discharge (base, 500 mgd).--No peak above base.

* Observation of no flow made on this day.

4150. East Fork Kawela Gulch near Kamalo

Location.--Lat 21°06'46", long 156°54'23", on left bank at Molokai Ranch pipeline intake, 4.7 miles northwest of Kamalo, and 7.6 miles northeast of Kaunakakai.

Drainage area.--0.45 sq mi.

Records available.--September 1946 to June 1964. Published as Right Branch of East Fork Kawela Stream near Kamalo prior to July 1958 and as Right Branch of East Fork Kawela Gulch near Kamalo July 1958 to June 1962.

Gage.--Water-stage recorder and concrete control. Datum of gage is 3,624.86 ft above mean sea level (Territorial Survey bench mark).

Average discharge.--17 years (1947-64), 1.52 mgd (2.35 cfs).

Extremes.--Maximum discharge during year, 115 mgd (178 cfs) Sept. 17 (gage height, 4.31 ft), from rating curve extended above 4.3 mgd as explained below; no flow for many days.
1946-64: Maximum discharge, 882 mgd (1,360 cfs) Jan. 26, 1948 (gage height, 7.97 ft), from rating curve extended above 4.3 mgd by test on model of station site; no flow at times each year.

Remarks.--Records fair except those for period of no gage-height record, which are poor. Molokai Ranch diverts from gage pool.

Rating tables (gage height, in feet, and discharge, in million gallons a day)

July 1 to Sept. 17				Sept. 18 to June 30			
2.34	0	2.9	2.15	2.34	0	2.9	2.36
2.4	.04	3.0	3.14	2.4	.04	3.0	3.35
2.5	.19	3.1	5.10	2.5	.21	3.1	5.10
2.6	.46	3.2	8.10	2.6	.52	3.2	8.10
2.7	.86	3.3	12.5	2.7	.98	3.3	12.5
2.8	1.43	3.4	18.5	2.8	1.59	3.4	18.5

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	9.89	0	0.07	0.95	0	0	4.68	0	4.30	a0.3	0.29	0
2	1.88	0	0	2.59	0	0	3.61	0	3.13	*a .2	.44	0
3	.96	0	.02	.35	0	0	3.37	0	2.26	.20	.88	0
4	.57	0	.12	2.31	0	0	1.08	0	4.28	1.08	1.26	0
5	.12	0	1.74	1.04	0	0	1.48	0	1.74	.60	2.44	0
6	.01	0	.52	1.38	0	0	.78	0	.29	1.70	1.95	0
7	0	0	.62	1.86	1.35	0	.65	.08	1.78	.23	.52	0
8	0	0	.28	*5.91	1.64	0	1.77	.97	9.41	1.47	.16	0
9	0	0	.04	1.62	7.70	0	*2.90	.44	1.38	3.68	.78	0
10	0	0	0	.20	10.7	1.36	.99	5.08	.60	2.54	3.02	0
11	.07	.51	0	0	.46	4.59	1.04	3.24	.29	.64	2.00	0
12	0	.37	.24	0	.02	.61	2.74	6.70	.05	1.73	3.59	0
13	.32	.37	.11	0	.05	.05	.60	10.1	0	.11	1.83	0
14	.63	.07	0	1.14	.06	.05	.02	4.42	.12	0	.41	0
15	2.56	0	0	.09	.43	.71	.06	*5.39	0	0	.12	.38
16	4.98	0	7.95	0	3.19	3.47	4.37	1.74	0	0	.03	2.04
17	1.36	0	16.4	0	.60	3.16	5.36	.73	0	0	0	*1.20
18	4.75	0	4.66	.35	.17	.57	.52	.68	0	0	0	1.74
19	.49	0	.34	2.05	0	.30	.06	1.08	0	.01	0	.68
20	*1.10	0	0	4.29	*0	0	.02	.35	0	3.88	.01	.70
21	1.23	0	0	.76	0	0	1.96	.12	0	1.32	*1.38	1.03
22	3.16	0	0	.10	0	1.14	.38	.80	0	.60	4.52	2.38
23	.76	1.19	0	.02	0	2.63	.02	1.96	0	1.74	13.0	3.16
24	1.47	2.05	0	2.91	0	.07	0	1.82	.08	3.68	3.68	.78
25	1.00	.39	0	1.52	0	0	1.29	.88	3.45	1.66	7.50	.73
26	1.15	1.64	0	.21	4.86	0	.09	.62	6.34	.83	4.52	.56
27	4.72	1.69	0	.01	.36	3.64	.14	3.15	3.66	.08	2.54	1.14
28	1.42	2.50	0	.72	0	.78	.03	.52	2.36	2.13	.60	.68
29	1.33	1.18	.04	2.09	0	.35	0	.14	a 1.2	4.51	.18	1.28
30	.17	*.80	.76	.14	0	.01	0	---	a .5	.78	.07	5.90
31	.01	.37	---	0	---	11.0	0	---	a .4	---	.02	---
Total	46.11	13.13	33.91	34.61	31.59	34.49	40.01	51.01	47.62	35.70	57.74	24.38
Mean												
Mgd	1.49	0.424	1.13	1.12	1.05	1.11	1.29	1.76	1.54	1.19	1.86	0.813
Cfs	2.31	0.656	1.75	1.73	1.62	1.72	2.00	2.72	2.38	1.84	2.88	1.26
Ac-ft	142	40	104	106	97	106	123	157	146	110	177	75

Calendar Year 1963: Max 21.4 Min 0 Mean mgd 1.60 Mean cfs 2.48 Ac-ft 1,800
Fiscal Year 1963-64: Max 16.4 Min 0 Mean mgd 1.23 Mean cfs 1.90 Ac-ft 1,380

* Discharge measurement or observation of no flow made on this day.
a No gage-height record.

Peak discharge (base, 100 mgd)

Date	Time	Gage height	Discharge	
			Mgd	Cfs
9-17	0600	4.31	115	178

4160. Punaula Gulch near Pukoo

Location.--lat 20°05'50", long 156°48'48", on right bank 1.8 miles northwest of Pukoo and 5.2 miles northeast of Kamalo.

Drainage area.--0.24 sq mi.

Records available.--March 1947 to June 1964. Prior to July 1958, published as Punaula Stream near Pukoo.

Gage.--Water-stage recorder. Altitude of gage is 1,200 ft (from topographic map).

Average discharge.--17 years, 0.795 mgd (1.23 cfs).

Extremes.--Maximum discharge during year, 63.4 mgd (98.1 cfs) May 23 (gage height, 2.79 ft), from rating curve extended above 6.5 mgd as explained below; minimum, 0.04 mgd (0.06 cfs) Dec. 1-4, 6-10.
1947-64: Maximum discharge, 330 mgd (511 cfs) Apr. 2, 1948 (gage height, 6.35 ft), from rating curve extended above 6.5 mgd by test on model of station site; minimum, 0.01 mgd (0.02 cfs) Mar. 13, 1947, Feb. 19, 1954.

Remarks.--Record good. No diversion above station.

Rating table (gage height, in feet, and discharge, in million gallons a day)

0.4	0.01	0.8	0.81
.5	.05	.9	1.50
.6	.16	1.0	2.60
.7	.40	1.3	7.70

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	7.08	0.21	0.08	0.65	0.10	0.05	0.92	0.09	0.60	0.13	0.21	0.14
2	.98	.16	.07	1.02	.08	.04	1.64	.07	.46	.14	.17	.11
3	1.22	.13	.36	.41	.07	.04	1.18	.07	2.98	*2.89	.21	.10
4	.46	.13	*.16	1.04	.07	.08	1.48	.07	1.46	1.70	.28	.09
5	.26	.10	.75	.23	.08	.05	.46	.07	.26	.95	.53	.09
6	.21	.09	.17	.14	.07	.04	.21	.07	.13	1.14	.26	.09
7	.16	.10	.26	.14	1.88	.04	.83	.07	.14	.49	.16	.27
8	.13	.09	.11	3.50	1.13	.04	.61	.08	2.90	.46	.13	.31
9	.19	.10	.09	.94	4.00	.04	.65	.07	.34	.69	.10	.16
10	.49	.09	.07	.26	3.11	.09	*.26	.37	.19	.40	.34	.11
11	.63	1.63	.14	*.14	.23	1.96	.17	.75	.13	.21	.16	.08
12	.17	.46	1.19	.11	.13	.17	.14	1.01	.09	.62	.37	.10
13	1.25	.37	.26	.10	.11	.21	.10	2.10	.23	.19	.21	.10
14	.71	.16	.14	.14	.09	1.03	.08	.60	.26	.13	.21	.09
15	2.88	.09	.07	.09	.56	1.34	.09	.49	.24	.11	.74	.20
16	1.90	.09	2.49	.07	.86	2.04	.40	.19	.21	.16	.16	.46
17	.57	.09	6.29	.10	1.79	4.58	1.19	.09	.14	.16	.09	.62
18	*1.53	.14	1.36	1.36	.31	.99	.14	*.24	.09	.11	.07	*.40
19	1.16	.09	.23	4.95	.14	.19	.09	.28	.07	.08	.06	.21
20	1.75	.07	.14	2.85	*.10	.10	.24	.21	.07	2.92	.06	.14
21	3.13	.05	.16	.40	.08	.07	.34	.10	.05	2.94	.11	.28
22	1.32	.05	.10	.19	.07	.26	.14	.42	.05	.83	*.31	1.62
23	.46	.09	.08	.16	.07	.42	.13	1.60	1.71	3.50	5.06	2.47
24	.28	1.35	.10	.46	.07	.07	.11	1.54	.74	1.73	1.26	.69
25	.55	.14	.10	.34	.06	.06	.19	.65	.69	.40	6.36	.61
26	1.58	.10	.07	.34	.22	.06	.11	.21	.90	.26	5.25	.28
27	4.58	.45	.14	.17	.07	.31	.11	.13	5.14	.19	2.67	.19
28	1.19	1.01	.17	.99	.07	.11	.11	.08	3.23	3.13	.40	.21
29	.58	.26	1.73	1.13	.06	.07	.09	.07	.46	4.54	.28	.31
30	.34	.19	.98	.31	.05	.06	.08	---	.26	.43	.19	.81
31	.28	.14	---	.14	---	.15	.10	---	.17	---	.16	---
Total	38.02	8.22	18.06	22.87	15.73	14.76	12.39	11.79	24.39	31.63	26.57	11.34
Mean												
Mgd	1.23	0.265	0.602	0.738	0.524	0.476	0.400	0.407	0.787	1.05	0.857	0.378
Cfs	1.90	0.410	0.931	1.14	0.811	0.736	0.619	0.630	1.22	1.62	1.33	0.585
Ac-ft	117	25	55	70	48	45	38	36	75	97	82	35

Calendar Year 1963: Max 14.9 Min 0.03 Mean mgd 0.771 Mean cfs 1.19 Ac-ft 861
Fiscal Year 1963-64: Max 7.08 Min 0.04 Mean mgd 0.644 Mean cfs 0.996 Ac-ft 723

Peak discharge (base, 70 mgd).--No peak above base.

* Discharge measurement made on this day.

4195. Papio Gulch at Halawa

Location.--Lat 21°08'55", long 156°44'16", on left bank 200 ft downstream from wooden bridge on Highway 45 and 0.8 mile south of Halawa.

Drainage area.--0.94 sq mi.

Records available.--July 1963 to June 1964.

Gage.--Water-stage recorder. Altitude of gage is 640 ft (from topographic map).

Extremes.--Maximum discharge during year, 51.6 mgd (79.8 cfs) Sept. 17 (gage height, 3.01 ft), from rating curve extended above 6.4 mgd on basis of slope-area measurements at gage heights 4.60 and 7.15 ft for peaks of Dec. 12, 1964, and Feb. 4, 1965, respectively; no flow for many days.

Remarks.--Records good except those for periods of no gage-height record, which are poor. Diversion above station for domestic use at Puu O Hoku Ranch.

Rating table (gage height, in feet, and discharge, in million gallons a day)

0.55	0	1.0	0.60
.6	.02	1.1	.94
.7	.08	1.3	1.90
.8	.19	1.5	3.50
.9	.35		

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	1.5	0.1	0	0.1	0.04	0	0	0.04	0	0.01	0	
2	.8	.1	0	.1	.03	0	.9	.03	0	.01	0	
3	.3	0	.1	.1	.03	0	.5	.03	0	0	0	
4	.1	0	0	0	.02	0	.1	.03	0	.01	0	
5	0	0	0	0	.02	0	.3	.03	.01	.01	0	
6	0	0	0	0	.02	0	.2	.03	.01	.01	0	
7	0	0	.1	0	.08	0	.3	.02	0	.01	0	
8	0	0	0	0	.18	0	.1	.02	.20	.01	0	
9	0	0	0	.7	1.5	0	*.1	.02	.03	0	0	
10	0	0	0	*.2	.4	.03	.23	.02	.02	0	0	
11	.2	.4	.2	.01	.18	1.72	.19	.06	.01	0	0	
12	0	.1	.1	.01	.18	.11	.21	.06	.02	0	0	
13	0	0	.1	.01	.09	.05	.15	.03	.01	0	0	
14	.1	0	.2	.01	.05	.05	.11	*.04	.01	0	0	
15	.6	0	0	.01	.05	.23	.10	.05	0	0	0	
16	.4	0	1.0	0	.07	1.17	.16	.03	0	0	0	(*)
17	.1	0	3.0	0	.07	3.11	.23	.03	0	0	0	
18	.3	.1	.2	.02	.05	.41	.11	.02	0	0	0	
19	.5	0	.1	.45	.03	.16	.08	.02	0	0	0	
20	.6	0	.1	1.36	.01	.10	.10	.02	0	0	*0	
21	.9	0	.1	.21	.01	.07	.14	.02	0	0	0	
22	.4	0	0	.08	.02	.29	.09	.02	0	0	0	
23	.1	.1	0	.03	.02	.28	.07	.03	0	0	0	
24	0	.5	0	.07	.02	.09	.06	.01	0	0	0	
25	.1	.1	0	.04	.02	.07	.06	.02	0	0	0	
26	.3	.2	0	.04	.01	.08	.05	.01	.1	0	1.10	
27	*1.9	.1	0	.03	.01	.20	.05	.01	.3	0	.48	
28	.4	0	0	.07	.02	.08	.05	0	.4	0	.06	
29	.1	.1	.1	.14	.01	.06	.05	0	.1	0	.02	
30	0	.1	.1	.10	0	.05	.04	---	0	0	0	
31	.1	.1	---	.06	---	0	.04	---	**0	---	0	---
Total	9.8	2.1	5.5	3.95	3.24	8.41	4.87	0.75	1.22	0.07	1.66	0
Mean												
Mgd	0.32	0.07	0.18	0.127	0.108	0.271	0.157	0.026	0.039	0.002	0.054	0
Cfs	0.50	0.11	0.28	0.196	0.167	0.419	0.243	0.040	0.060	0.003	0.084	0
Ac-ft	30	6.4	17	12	9.9	26	15	2.3	3.7	0.2	5.1	0

Calendar Year 1963: Max - Min - Mean mgd - Mean cfs - Ac-ft -
Fiscal Year 1963-64: Max 3.11 Min 0 Mean mgd 0.114 Mean cfs 0.176 Ac-ft 128

Peak discharge (base, 130 mgd).--No peak above base.

* Discharge measurement or observation of no flow made on this day.
** Field estimate made on this day.
Note.--No gage-height record July 1 to Oct. 10, Nov. 9, 10, Dec. 31 to Jan. 9, Mar. 26-31.

5001. Kepuni Gulch near Kahikinui House

Location.--lat 20°37'21", long 156°15'16", on right bank 120 ft upstream from bridge on State Highway 31, 400 ft upstream from Kamole Gulch, 1.2 miles east of Kahikinui House, and 8.5 miles west of Kaupo. May 24, 1963, to Feb. 13, 1964, at site 70 ft downstream.

Drainage area.--1.91 sq mi.

Records available.--Fiscal year 1963 (annual maximum), May 1963 to June 1964.

Gage.--Water-stage recorder. Altitude of gage is 760 ft (from topographic map). May 24, 1963, to Feb. 13, 1964, at site 70 ft downstream at different datum.

Extremes.--1963: No flow during period May to June.
1963-64: Maximum discharge during fiscal year, 327 mgd (506 cfs) Sept. 17 (gage height, 6.38 ft), result of indirect measurement; no flow most of the time.
Maximum discharge during 1962-63 fiscal year, 153 mgd (237 cfs) Jan. 16, 1963 (gage height, 4.80 ft, from floodmarks, present site and datum), result of indirect measurement. Maximum discharge known, 576 mgd (891 cfs) date unknown, but prior to 1962-63 fiscal year (gage height, 7.95 ft, from floodmarks, present site and datum), result of indirect measurement.

Remarks.--No flow May 24 to June 30, 1963. Records fair. No diversion above station. Continuous records of rainfall are obtained at station.

Rating table (gage height, in feet, and discharge, in million gallons a day)

1.86	0	2.3	5.70
1.9	.40	2.5	10.8
2.0	1.25	3.0	29.0
2.1	2.35	3.5	53.0
2.2	3.80	4.0	87.0

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1			0						0			
2			0						0			
3			0						0			
4			0						0			
5			0		(*)				0			
6			0						0			
7			0				(*)		0			
8		(*)	0						0			
9			0						0			
10			0					(*)	0			
11			0						0			(*)
12			0						0			
13			0					(*)	*0			
14			0						*0			
15			0						0			
16			0			(*)			0			
17			*e59						0			
18			0						0			
19			*0						3.66			
20			0						*0			
21			0						0			
22			0						0			
23			0						0	(*)		
24			*0						0			
25			0						0			
26			0						0			
27			0				(*)		0			
28			0						0			
29			0						0			
30			0					----------	0			
31			----------		----------			----------	0	----------		----------
Total	0	0	59	0	0	0	0	0	3.66	0	0	0
Mean												
Mgd	0	0	2.0	0	0	0	0	0	0.118	0	0	0
Cfs	0	0	3.1	0	0	0	0	0	0.183	0	0	0
Ac-ft	0	0	181	0	0	0	0	0	11	0	0	0

Calendar Year 1963: Max - Min - Mean mgd - Mean cfs - Ac-ft -
Fiscal Year 1963-64: Max 59 Min 0 Mean mgd 0.171 Mean cfs 0.265 Ac-ft 192

Peak discharge (base, 50 mgd)

Date	Time	Gage height	Discharge Mgd	Discharge Cfs	Date	Time	Gage height	Discharge Mgd	Discharge Cfs
9-17	0500	6.38	327	506	3-19	1530	3.68	64.6	100

* Discharge measurement or observation of no flow made on this day.
e Stage-discharge relation indefinite.

5008. Kukuiula Gulch near Kipahulu

Location.--lat 20°39'15", long 156°04'42", on right bank on downstream side of State Highway 31, 1.3 miles west of Kipahulu, and 3.2 miles east of Kaupo.

Drainage area.--0.76 sq mi.

Records available.--May 1963 to June 1964.

Gage.--Water-stage recorder. Altitude of gage is 90 ft (from topographic map).

Extremes.--1963: Maximum discharge during period May to June, 78.0 mgd (121 cfs) May 29 (gage height, 2.62 ft), from rating curve extended above 0.9 mgd as explained below; minimum, 0.25 mgd (0.39 cfs) June 8.
1963-64: Maximum discharge during fiscal year, 436 mgd (675 cfs) Sept. 17 (gage height, 3.73 ft), from rating curve extended above 1.2 mgd on basis of slope-area measurement at gage height 3.28 ft; minimum, 0.08 mgd (0.12 cfs) Sept. 15.

Remarks.--Records poor. No diversion above station. Continuous records of rainfall are obtained at station.

Discharge, in million gallons a day, May to June 1963

Day	May	June	Day	May	June	Day	May	June	Day	May	June	Day	May	June
1	-	4.82	7	-	0.66	13	-	0.56	19	2.75	0.66	25	0.86	4.29
2	-	1.05	8	-	.47	14	-	.46	20	2.96	3.03	26	1.15	1.69
3	-	1.34	9	-	6.05	15	-	.56	21	1.73	1.92	27	.66	1.98
4	-	1.71	10	-	1.70	16	-	.37	22	2.13	2.74	28	2.40	.66
5	-	3.09	11	-	*.86	17	9.58	1.56	23	1.25	.33	29	4.11	.77
6	-	.66	12	-	.66	18	3.93	1.49	24	1.15	1.05	30	5.58	5.73
												31	1.47	----
Total													-	52.92
Mean, in million gallons a day													-	1.76
Mean, in cubic feet per second													-	2.72
Runoff in acre-feet													-	162

Peak discharge (base, 300 mgd).--No peak above base.

* Discharge measurement made on this day.

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	12.4	1.25	0.66	0.28	1.31	0.19	0.22	0.48	*5.86	2.95	12.9	0.93
2	6.56	1.05	.37	1.00	.62	.17	.51	.69	8.19	2.61	12.5	.21
3	3.32	.86	.96	.62	.69	.17	1.06	.42	*4.14	3.77	11.8	.19
4	2.15	6.46	.56	1.84	.75	*.72	1.03	.19	3.66	6.37	20.0	.18
5	1.86	1.15	*.80	1.16	.48	2.04	3.43	.19	3.11	5.88	12.2	.19
6	2.03	.86	.56	.54	.45	.54	7.24	.19	1.75	*6.17	3.87	.18
7	1.15	1.05	.33	.51	1.13	.39	*2.70	.17	6.02	1.85	1.05	.27
8	1.05	1.05	.25	6.5	1.77	.35	1.26	.17	14.4	10.8	.99	*.65
9	1.17	1.15	.21	.9	1.60	.32	.92	.17	6.20	13.2	.73	.61
10	1.05	.76	.14	.5	.58	.32	.78	.92	2.41	9.35	.97	.99
11	1.28	3.66	.12	.3	.37	.32	.70	1.41	2.78	2.14	.65	*.70
12	.56	2.00	.56	.2	.35	.26	1.02	1.81	2.28	9.56	.99	.64
13	.46	1.25	.66	.2	.32	.28	.74	3.31	4.35	.73	.99	.52
14	.33	1.97	.21	.7	.32	.43	.66	1.04	2.25	*13.1	8.30	.56
15	.56	1.52	.10	.3	.47	.72	*.72	3.75	1.85	19.0	2.30	1.14
16	.56	.96	.11	.2	.70	.39	2.54	2.13	1.85	43.0	.99	.76
17	2.92	.86	13.8	.2	1.74	.32	1.44	1.08	2.36	53.4	.83	.52
18	1.60	.96	1.18	.4	.37	1.46	.87	1.38	2.70	9.80	.73	.52
19	3.68	.56	.32	3.5	.28	.35	.66	2.37	2.14	46.0	*.83	.45
20	1.50	.37	.28	8.0	.26	.26	.70	1.13	1.66	61.0	1.78	1.84
21	.46	.29	.28	.9	.24	.22	1.20	.92	3.51	48.2	1.92	1.57
22	5.38	.33	.26	*.4	.22	.42	.62	8.69	5.47	21.6	2.01	1.62
23	*.76	5.28	.24	.33	.30	.32	.70	11.5	7.35	40.9	25.6	.85
24	.96	4.74	.26	.94	1.01	.26	.66	1.54	4.04	49.0	4.71	.33
25	1.05	.96	.24	.60	.24	.78	1.11	1.79	2.44	29.7	42.3	3.10
26	.66	1.73	.24	.91	1.46	.26	.58	.87	2.59	24.7	16.7	.60
27	7.26	3.13	.26	.32	.50	.24	1.01	1.09	1.85	15.6	7.66	.48
28	1.47	2.00	.22	.90	.28	.16	.54	.70	1.75	46.8	3.73	.39
29	2.34	1.88	.24	1.17	.22	.14	.62	.74	1.66	30.8	1.95	1.30
30	2.11	1.05	.30	.97	.20	.13	.51	---	1.85	17.8	.78	2.24
31	8.53	.86	---	1.21	---	.13	.70	---	2.38	---	.73	---
Total	77.17	52.00	24.72	36.50	19.23	13.06	37.45	50.84	114.85	645.78	203.49	24.53
Mean												
Mgd	2.49	1.68	0.824	1.18	0.641	0.421	1.21	1.75	3.70	21.5	6.56	0.834
Cfs	3.85	2.60	1.27	1.83	0.992	0.651	1.87	2.71	5.72	33.3	10.1	1.29
Ac-ft	237	160	76	112	59	40	115	156	352	1,980	624	77

Calendar Year 1963: Max - Min - Mean mgd - Mean cfs - Ac-ft -
Fiscal Year 1963-64: Max 61.0 Min 0.10 Mean mgd 3.55 Mean cfs 5.49 Ac-ft 3,990

Peak discharge (base, 300 mgd)

Date	Time	Gage height	Discharge Mgd	Discharge Cfs	Date	Time	Gage height	Discharge Mgd	Discharge Cfs
9-17	0200	3.73	436	675	4-23	0700	3.54	343	531
4-19	2230	3.70	420	650	4-28	1700	3.46	307	475

* Discharge measurement made on this day.
Note.--No gage-height record Oct. 8-22.

5010. Palikea Stream below diversion dam, near Kipahulu

Location.--Lat 20°41'05", long 156°04'10", on left bank 50 ft downstream from old diversion dam, 2 miles northwest of Kipahulu, and 2.1 miles upstream from mouth.

Drainage area.--6.29 sq mi.

Records available.--February 1927 to September 1929, December 1931 to September 1935, December 1935 to February 1938, May to October, December 1938, January 1939, August 1939 to June 1964. Published as Ohao Stream at elevation 1,550 ft, near Kipahulu 1927-29 and as Ohao Stream below diversion dam, near Kipahulu 1930-56.

Gage.--Water-stage recorder. Datum of gage is 1,546 ft above mean sea level (by vertical angles). Prior to Sept. 6, 1929, at site 100 ft upstream at different datum.

Average discharge.--29 years (1927-29, 1932-35, 1940-64), 37.0 mgd (57.2 cfs).

Extremes.--Maximum discharge during year, 2,960 mgd (4,580 cfs) Mar. 8 (gage height, 9.61 ft), from rating curve extended above 2,200 mgd as explained below; minimum, 0.01 mgd (0.02 cfs) Dec. 30, 31.
1927-29, 1931-64: Maximum discharge, 9,690 mgd (15,000 cfs) Dec. 20, 1955 (gage height, 17.5 ft, from floodmarks), from rating curve extended above 2,200 mgd on basis of computations of peak flow over dam at gage heights 12.68 and 17.5 ft; no flow at times.

Remarks.--Records good except those for periods of no gage-height record, which are poor. No diversion above station.

Rating table (gage height, in feet, and discharge, in million gallons a day)

0.1	0.02	1.5	27.0
.2	.22	2.0	52.5
.3	.65	2.5	88.0
.4	1.32	3.0	134
.6	3.40	4.0	260
.9	7.95	5.0	435
1.1	12.6	6.0	660

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	291	5.03	1.57	6.07	28.8	0.16	0.08	0.25	300	24.4	27.4	6.06
2	131	1.57	.55	49.6	3.00	.10	12.8	.50	400	44.6	60.7	1.3
3	37.6	1.10	4.19	47.5	3.33	.05	36.0	10.8	110	45.6	37.8	.9
4	12.0	90.6	.77	209	3.02	.58	78.0	.55	*65	69.8	144	.6
5	7.06	10.9	*5.26	42.3	.96	11.4	206	.29	56.2	83.0	145	.4
6	17.9	3.83	1.43	17.8	.55	.29	366	.32	19.6	114	121	.15
7	3.39	3.06	.50	16.2	72.1	.10	26.0	.69	261	14.1	110	1.5
8	.89	3.92	.22	42.9	132	.06	22.3	1.94	659	40.9	102	5.0
9	1.62	5.08	.19	14.1	114	.06	1.10	15.2	283	72.5	72.2	2.5
10	4.32	1.82	.10	1.39	112	.08	.71	53.8	53.0	40.4	172	1.3
11	10.6	74.9	.06	.50	2.90	.13	.45	85.0	45.7	10.1	55.4	2.0
12	.71	27.0	4.01	.45	1.10	.04	16.7	193	41.8	52.4	70.3	4.0
13	.50	11.6	14.0	.29	.89	.05	2.02	200	34.4	2.46	22.2	1.7
14	.29	11.1	2.06	4.31	.77	.25	.22	149	34.4	6.56	45.2	3.0
15	.55	11.7	.16	.25	58.1	.36	*.34	266	12.7	14.2	25.4	25
16	6.74	2.25	.10	.10	108	.22	182	92.4	13.2	22.1	5.07	6.0
17	63.8	1.17	476	.08	192	2.32	85.5	28.3	2.80	56.5	1.75	3.5
18	38.3	2.30	134	10.4	7.59	12.2	14.3	50.4	2.17	5.10	1.10	5.5
19	43.1	.65	4.46	58.6	1.17	.22	1.17	36.3	32.1	55.3	*.89	3.0
20	66.6	.36	1.10	207	.65	.08	7.25	16.5	5.99	203	51.3	9.0
21	21.3	.25	.65	7.31	.55	.05	31.5	3.4	105	118	60.2	20
22	166	.45	.45	*1.32	.36	.08	.60	250	377	29.5	52.5	40
23	*128	107	.29	1.06	.55	.10	.55	450	156	108	612	50
24	15.2	79.6	.22	63.6	6.16	.06	2.21	140	37.7	234	265	6.0
25	17.8	13.4	.16	40.8	.94	.29	61.5	190	21.4	109	550	76
26	20.2	27.6	.06	33.2	73.7	.06	1.17	120	10.1	51.3	161	30
27	167	32.6	.05	2.62	8.05	.03	22.8	150	3.27	13.4	40.8	3.0
28	38.9	39.0	.04	43.2	.71	.02	1.12	40	17.4	314	9.59	4.5
29	38.9	24.6	.13	50.3	.40	.02	.50	45	1.40	216	4.66	90
30	22.5	12.2	1.53	15.3	.25	.02	.32	---	30.8	52.4	1.75	82
31	37.7	3.68	---	10.3	---	.02	70.4	---	39.3	---	1.17	---
Total	1,296.27	610.32	654.31	997.85	934.60	29.50	1,251.61	2,589.64	3,231.43	2,222.62	3,029.38	483.91
Mean												
Mgd	41.8	19.7	21.8	32.2	31.2	0.952	40.4	89.3	104	74.1	97.7	16.1
Cfs	64.7	30.5	33.7	49.8	48.3	1.47	62.5	138	161	115	151	24.9
Ac-ft	3,980	1,870	2,010	3,060	2,870	90	3,840	7,950	9,920	6,820	9,300	1,480

Calendar Year 1963: Max 714 Min 0.02 Mean mgd 45.3 Mean cfs 70.1 Ac-ft 50,800
Fiscal Year 1963-64: Max 659 Min 0.02 Mean mgd 47.4 Mean cfs 73.3 Ac-ft 53,190

Peak discharge (base, 1,600 mgd)

Date	Time	Gage height	Discharge Mgd	Discharge Cfs	Date	Time	Gage height	Discharge Mgd	Discharge Cfs
9-17	0300	9.60	2,900	4,490	3-8	0330	9.61	2,960	4,580

* Discharge measurement made on this day.
Note.--No gage-height record Feb. 21 to Mar. 4, June 2-30.

5020. Hahalawe Gulch near Kipahulu

Location.--Lat 20°40'54", long 156°02'50", on left bank at old ditch intake, 0.7 mile upstream from mouth, and 1.8 miles northeast of Kipahulu Church.

Drainage area.--0.43 sq mi.

Records available.--February 1927 to March 1935, May 1935 to April 1937, May 1938 to June 1964. Monthly discharge only May, June 1938, published in WSP 1319. Published as Right Branch Kahalawe Stream near Kipahulu 1927-56 and as Right Branch Hahalawe Stream near Kipahulu 1956-62.

Gage.--Water-stage recorder and concrete control. Datum of gage is 885 ft above mean sea level (by vertical angles). Prior to May 1, 1938, at datum 8.0 ft lower.

Average discharge.--34 years (1927-34, 1935-36, 1938-64), 3.50 mgd (5.42 cfs).

Extremes.--Maximum discharge during year, 289 mgd (447 cfs) Sept. 17 (gage height, 3.28 ft), from rating curve extended above 54 mgd as explained below; minimum, 0.51 mgd (0.79 cfs) Dec. 31.
1927-64: Maximum discharge, 2,300 mgd (3,560 cfs) Apr. 29, 1937 (gage height, 15.74 ft, datum then in use), from rating curve extended above 54 mgd by test on model of station site; minimum, 0.15 mgd (0.23 cfs) Dec. 18, 1929.

Remarks.--Records good except those for period of no gage-height record, which are poor. No diversion above station.

Rating table (gage height, in feet, and discharge, in million gallons a day)

0.8	0.45	1.3	3.80
.9	.72	1.4	5.50
1.0	1.15	1.7	12.5
1.1	1.75	1.9	22.7
1.2	2.58	2.2	44.0

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	11.5	2.30	1.60	1.67	6.92	0.86	1.03	0.90	6.0	3.50	2.69	5.12
2	6.55	1.97	1.40	2.97	2.40	.79	3.87	1.29	9.0	3.00	3.10	2.20
3	3.15	1.15	3.05	1.82	2.05	.72	5.04	5.75	4.0	3.24	3.15	1.75
4	2.12	7.06	1.91	5.59	2.05	*.97	4.58	1.10	3.5	5.84	4.63	1.40
5	1.82	1.90	2.58	2.58	1.67	2.16	8.45	.82	2.8	6.12	4.18	1.29
6	3.13	1.67	2.33	1.75	1.40	.94	17.1	.86	*2.6	7.65	3.32	1.19
7	1.75	1.97	1.40	1.75	4.32	.78	4.00	1.15	6.84	2.69	2.20	2.54
8	1.60	2.12	1.29	4.75	4.16	.72	2.74	.94	12.9	4.04	2.05	4.00
9	2.54	1.90	1.19	2.37	7.53	.78	1.46	2.10	4.88	4.28	2.20	1.35
10	2.31	1.67	1.05	1.46	4.27	.78	1.10	3.39	2.30	3.34	4.25	1.19
11	1.90	8.28	1.05	1.15	1.75	.72	.94	3.60	2.81	2.20	2.20	1.29
12	1.35	6.48	6.53	1.29	1.35	.68	1.78	2.99	2.40	2.36	5.31	1.75
13	1.46	2.40	4.36	1.15	1.19	.78	1.05	3.18	3.59	1.75	2.71	1.24
14	1.29	3.73	2.55	3.36	1.10	2.49	1.00	1.67	2.82	*2.55	4.63	1.37
15	1.35	2.82	1.46	1.24	3.71	2.25	*1.00	5.36	3.85	2.94	8.52	3.34
16	1.96	1.75	1.24	1.00	2.74	3.10	4.54	3.36	2.95	3.81	2.05	1.90
17	4.66	1.75	18.7	.90	8.41	4.24	2.53	1.75	2.78	5.09	1.60	1.40
18	2.98	1.75	4.38	2.85	1.75	6.10	1.53	2.54	3.98	1.75	1.40	1.75
19	5.42	1.46	1.53	8.84	1.35	1.46	1.15	4.81	2.45	5.03	1.29	1.46
20	5.21	1.35	1.29	12.5	1.10	1.00	1.00	2.68	1.60	12.0	4.60	2.71
21	3.52	1.24	1.15	1.97	1.05	.82	1.82	1.7	3.14	7.82	3.63	3.54
22	6.46	1.40	1.05	*1.53	.94	.78	1.00	6.5	4.25	5.00	2.81	4.71
23	*2.02	5.74	.94	1.80	2.02	.72	1.00	12	9.48	12.7	11.0	4.71
24	4.33	8.66	.90	3.92	3.02	.95	1.87	2.5	6.94	7.29	3.42	2.09
25	4.23	2.30	.86	2.68	1.85	2.03	2.56	4.5	7.07	4.12	40.3	5.57
26	3.64	2.58	.82	5.83	4.62	.72	1.24	2.3	3.16	3.29	15.1	2.22
27	10.2	4.52	1.02	1.97	2.86	.68	2.29	3.0	2.29	2.30	4.50	1.67
28	5.27	2.58	1.35	5.51	1.53	.62	1.10	2.0	4.28	15.5	3.41	1.82
29	3.85	2.30	2.24	5.91	1.05	.59	1.28	2.3	2.05	7.59	2.58	5.81
30	3.33	1.90	3.36	6.04	.90	.56	1.00	---	3.10	3.04	1.97	5.28
31	9.52	1.60	---	8.53	---	.59	1.00	---	3.33	---	1.67	---
Total	120.42	90.30	74.58	106.68	81.06	41.37	82.05	87.03	133.14	151.83	156.47	77.66
Mean												
Mgd	3.88	2.91	2.49	3.44	2.70	1.33	2.65	3.00	4.29	5.06	5.05	2.59
Cfs	6.00	4.50	3.85	5.32	4.18	2.06	4.10	4.64	6.64	7.83	7.81	4.01
Ac-ft	370	277	229	327	249	127	252	267	409	466	480	238

Calendar Year 1963: Max 37.7 Min 0.56 Mean mgd 3.78 Mean cfs 5.85 Ac-ft 4240
Fiscal Year 1963-64: Max 40.3 Min 0.56 Mean mgd 3.29 Mean cfs 5.09 Ac-ft 3690

* Discharge measurement made on this day.
Note.--No gage-height record Feb. 21 to Mar. 6.

Peak discharge (base, 200 mgd)

Date	Time	Gage height	Discharge Mgd	Discharge Cfs	Date	Time	Gage height	Discharge Mgd	Discharge Cfs
9-17	0200	3.28	289	447	3-1	about 2100	3.03	212	328

5060. Makapipi ditch near Nahiku

Location.--Lat 20°48'17", long 156°06'25", on right bank at entrance to tunnel No. 1, 1.8 miles south of Nahiku, and 4.7 miles southeast of Keanae.

Records available.--July 1948 to June 1964.

Gage.--Water-stage recorder and Parshall flume. Datum of gage is 1,300 ft above mean sea level (by stadia survey).

Average discharge.--16 years, 2.88 mgd (4.46 cfs).

Extremes.--1948-64: Maximum daily discharge, 8.22 mgd (12.7 cfs) May 26, 1964; minimum daily, 0.42 mgd (0.65 cfs) Mar. 22, 23, 25, Apr. 13, 14, 1958.

Remarks.--Records good. Ditch diverts water from water-development tunnels into Koolau ditch for power, domestic use, and irrigation in central Maui.

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	4.98	4.64	2.53	2.15	3.36	1.98	1.12	2.65	4.90	3.14	4.56	3.82
2	5.06	4.22	2.53	3.40	3.14	1.93	1.28	2.53	4.98	3.14	4.56	3.58
3	4.98	3.90	2.53	3.21	2.92	1.88	2.69	2.40	5.06	3.00	4.22	3.36
4	4.30	3.66	2.40	3.74	2.72	1.82	2.19	2.28	4.72	2.92	4.30	3.14
5	4.06	3.43	2.34	3.66	2.53	1.71	3.58	2.15	4.30	2.78	5.51	2.85
6	3.90	3.21	*2.21	3.82	2.40	1.66	4.50	2.04	*4.14	2.72	5.69	2.59
7	3.74	3.00	2.15	3.98	2.41	1.60	5.06	1.93	4.90	2.59	5.69	2.46
8	3.58	2.72	2.04	5.06	4.22	1.55	4.56	1.88	5.42	2.53	4.90	2.34
9	3.43	2.59	1.93	5.51	3.84	1.50	4.06	1.76	5.60	3.50	4.72	2.21
10	3.28	2.40	1.82	4.81	4.56	1.55	3.90	1.93	5.60	3.50	5.15	2.04
11	3.14	2.53	1.76	4.30	4.56	1.60	3.74	2.57	5.51	2.78	5.24	1.98
12	3.00	2.65	1.71	4.06	4.06	1.46	3.50	4.14	4.98	2.72	4.98	1.88
13	2.92	2.53	1.82	3.82	3.90	1.46	3.28	4.30	4.47	2.65	5.33	1.76
14	2.72	2.46	1.88	3.66	3.74	1.41	3.00	4.22	4.06	2.65	4.64	1.71
15	2.59	2.34	1.88	3.36	3.98	1.36	2.78	4.81	3.82	2.59	4.38	1.60
16	2.53	2.21	1.82	3.21	4.90	1.36	*3.74	4.98	3.58	2.53	4.14	1.55
17	3.14	2.10	3.53	3.00	5.15	1.55	3.50	4.38	3.43	2.59	3.90	1.46
18	3.07	1.98	3.66	2.78	4.90	1.55	2.65	4.14	3.28	2.40	*3.66	1.41
19	3.01	1.88	3.28	3.59	4.14	1.46	2.59	4.06	3.00	2.40	3.43	1.36
20	4.72	1.82	3.36	4.98	3.90	1.41	2.53	3.98	2.72	2.65	4.98	1.31
21	5.33	1.76	3.00	4.90	3.66	1.36	2.53	3.82	2.59	2.59	4.98	1.36
22	5.69	1.66	2.85	4.14	3.43	1.36	2.53	5.06	2.46	2.53	5.33	1.31
23	5.69	1.76	2.78	*3.98	3.21	1.36	2.46	5.69	2.34	2.96	5.96	1.46
24	*4.98	2.34	2.65	4.72	3.00	1.31	2.62	6.05	2.21	4.72	6.34	1.41
25	4.64	2.21	2.53	4.72	2.72	1.26	3.36	6.14	2.10	4.81	7.80	1.50
26	4.81	2.28	2.40	4.22	2.59	1.22	2.65	6.14	2.15	4.64	8.22	1.60
27	5.60	2.34	2.21	3.98	2.40	1.17	2.85	5.87	2.29	3.82	7.70	1.60
28	5.87	2.40	2.10	3.82	2.28	1.17	2.78	4.98	4.38	4.47	6.90	1.60
29	5.87	2.46	2.21	3.82	2.15	1.12	2.78	4.38	3.98	5.69	5.78	1.60
30	5.78	2.53	2.15	3.66	2.04	1.12	2.78	---	3.90	5.33	4.90	1.71
31	5.15	2.53	---	3.58	---	1.12	2.72	---	3.28	---	4.14	---
Total	131.56	80.54	72.06	121.64	102.81	45.37	94.31	111.26	120.15	97.34	162.03	59.56
Mean												
Mgd	4.24	2.60	2.40	3.92	3.43	1.46	3.04	3.84	3.88	3.24	5.23	1.98
Cfs	6.56	4.02	3.71	6.07	5.31	2.26	4.70	5.94	6.00	5.01	8.09	3.06
Ac-ft	404	247	221	373	316	139	289	341	369	299	497	183

Calendar Year 1963: Max 7.50 Min 0.62 Mean mgd 2.99 Mean cfs 4.63 Ac-ft 3,350
Fiscal Year 1963-64: Max 8.22 Min 1.12 Mean mgd 3.28 Mean cfs 5.07 Ac-ft 3,680

* Discharge measurement made on this day.

5080. Hanawi Stream near Nahiku

Location.--Lat 20°48'35", long 156°07'00", on left bank 200 ft upstream from Koolau ditch intake and trail, 1.9 miles southwest of Nahiku, and 4.5 miles southeast of Keanae.

Drainage area.--3.49 sq mi.

Records available.--January 1914 to January 1916, November 1921 to June 1964. Monthly discharge only April to June 1915, published in WSP 1319.

Gage.--Water-stage recorder. Datum of gage is 1,318 ft above mean sea level (by vertical angles). Prior to Nov. 1, 1921, at site 50 ft downstream at datum 0.12 ft lower.

Average discharge.--43 years (1914-15, 1922-64), 14.5 mgd (22.4 cfs).

Extremes.--Maximum discharge during year, 1,240 mgd (1,920 cfs) Nov. 9 (gage height, 6.85 ft), from rating curve extended above 270 mgd as explained below; minimum, 1.91 mgd (2.96 cfs) Dec. 30, 31.
1914-16, 1921-64: Maximum discharge, about 3,600 mgd (about 5,570 cfs) Jan. 18, 1916 (gage height, 11.6 ft, present site and datum), from rating curve extended above 270 mgd by test on model of station site; minimum, 1.00 mgd (1.55 cfs) Nov. 14, 1962, Feb. 17, 1963.

Remarks.--Records good except those above 500 mgd, which are fair. No diversion above station.

Rating table (gage height, in feet, and discharge, in million gallons a day)

0.2	1.48	2.0	34.0
.3	2.10	2.5	56.0
.6	4.50	3.0	85.0
1.0	9.60	4.0	176
1.5	19.4	4.5	250

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	82.6	5.44	3.36	10.6	3.44	4.02	2.66	2.59	73.5	5.24	7.29	6.15
2	31.8	4.82	3.04	34.6	3.20	3.36	8.53	2.52	*98.4	4.50	8.25	6.03
3	8.40	4.32	3.52	6.88	3.04	*2.88	27.1	2.45	12.8	4.23	6.15	5.79
4	6.15	4.14	*3.04	6.39	2.96	2.80	18.2	2.38	9.15	3.87	8.77	5.55
5	4.71	3.87	2.88	4.71	2.88	2.73	74.3	2.38	8.25	3.60	19.4	5.34
6	4.05	3.69	2.80	8.68	2.88	2.66	1.76	2.38	7.42	4.05	17.8	5.13
7	3.69	3.60	2.66	9.95	11.0	2.66	15.2	2.31	53.6	4.23	14.5	4.82
8	3.69	3.44	2.59	48.8	48.5	2.59	8.74	2.31	2.43	9.96	7.42	4.60
9	4.60	3.36	2.45	13.0	1.39	2.52	4.23	8.02	1.14	24.2	8.10	4.41
10	5.91	3.47	2.38	5.24	2.02	4.12	3.36	23.5	28.6	16.2	21.7	4.14
11	4.50	7.70	2.31	3.87	8.02	3.05	3.60	30.4	11.9	6.03	12.3	3.96
12	3.69	5.34	6.41	3.44	5.24	2.52	4.30	67.2	8.40	5.55	19.5	3.78
13	3.69	3.96	8.84	3.12	4.60	2.45	3.12	83.3	7.16	*4.14	26.7	3.60
14	3.96	3.52	4.14	4.96	4.82	2.45	*2.66	81.5	6.63	3.69	7.70	3.52
15	4.14	3.36	2.88	3.20	15.7	2.38	3.23	104	6.39	3.36	5.91	3.52
16	6.23	3.12	2.73	2.88	16.4	2.66	71.5	30.3	6.03	3.20	5.24	3.36
17	32.2	2.96	1.25	2.73	24.1	5.50	37.1	8.54	5.91	3.60	4.82	3.20
18	13.0	2.88	20.6	3.52	6.03	3.12	18.0	6.03	5.67	3.04	*4.41	3.04
19	12.5	2.80	4.32	22.1	4.41	2.66	4.32	7.62	5.67	3.28	4.97	2.88
20	66.0	2.73	3.36	51.9	3.87	2.52	5.22	6.15	5.44	4.05	112	3.20
21	12.6	2.66	3.12	*6.22	3.60	2.38	5.10	4.82	5.13	3.28	28.6	5.40
22	*15.6	2.59	2.96	4.41	3.36	2.45	3.12	76.1	7.80	3.36	22.2	4.60
23	6.75	11.0	2.66	7.20	3.12	4.50	2.73	2.18	5.55	19.6	1.76	8.28
24	6.88	1.73	2.59	25.4	3.04	2.59	7.14	1.05	4.82	6.80	59.0	3.96
25	8.85	5.34	2.45	7.85	3.04	2.31	17.0	33.2	4.82	54.6	100	4.50
26	13.8	6.51	2.31	5.34	5.27	2.24	3.69	15.4	5.55	16.4	26.4	4.14
27	44.1	4.71	2.17	4.23	3.28	2.17	10.6	35.0	16.9	5.67	14.0	4.50
28	13.4	4.92	4.20	4.26	2.96	2.04	3.69	8.85	76.4	47.2	8.55	3.60
29	15.7	4.92	9.38	8.48	2.96	1.98	3.04	7.96	13.0	25.5	7.29	5.24
30	10.8	4.71	6.05	4.23	3.04	1.98	2.80	---	13.8	6.75	6.75	*1.37
31	7.02	3.87	---	3.78	---	1.98	2.88	---	6.75	---	6.39	---
Total	461.01	147.05	247.20	331.97	545.76	86.27	553.16	980.21	878.44	370.38	778.11	143.94
Mean												
Mgd	14.9	4.74	8.24	10.7	18.2	2.78	17.8	33.8	28.3	12.3	25.1	4.80
Cfs	23.1	7.33	12.7	16.6	28.2	4.30	27.5	52.3	43.8	19.0	38.8	7.43
Ac-ft	1420	451	759	1020	1680	265	1700	3010	2700	1140	2390	442

Calendar Year 1963: Max 255 Min 1.04 Mean mgd 13.0 Mean cfs 20.1 Ac-ft 14,600
Fiscal Year 1963-64: Max 243 Min 1.98 Mean mgd 15.1 Mean cfs 23.4 Ac-ft 16,980

* Discharge measurement made on this day.

Peak discharge (base, 850 mgd)

Date	Time	Gage height	Discharge Mgd	Discharge Cfs	Date	Time	Gage height	Discharge Mgd	Discharge Cfs
9-17	0230	5.91	936	1,450	2-23	0800	5.94	954	1,480
11- 9	2030	6.85	1,240	1,920	3- 8	0400	6.20	1,050	1,620
1- 6	1500	6.34	1,080	1,670					

5120. Koolau ditch at Nahiku weir, near Nahiku

Location.--Lat 20°48'55", long 156°07'15", on right bank between Kapaula and Waiohue Gulches, 1.8 miles southwest of Nahiku, and 3.8 miles southeast of Keanae.

Records available.--February 1919 to June 1964.

Gage.--Water-stage recorder and sharp-crested weir. Datum of gage is 1,289.14 ft above mean sea level, datum of 1929. Prior to Apr. 28, 1922, staff gage at same site and datum.

Average discharge.--45 years, 21.9 mgd (33.9 cfs).

Extremes.--1919-64: Maximum daily discharge, 64.4 mgd (99.6 cfs) May 11, 1963; no flow at times.

Remarks.--Records excellent except those for period of no gage-height record, which are fair. Ditch diverts water from nearly all streams from the Makapipi west to the Alo for power, domestic use, and irrigation in central Maui.

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	59.5	26.7	15.8	27.2	17.6	16.2	9.60	12.1	49.8	22.4	33.0	25.5
2	54.0	23.9	14.7	50.0	16.5	15.1	19.0	11.5	59.4	20.2	36.0	24.3
3	36.0	22.0	16.1	29.8	15.4	12.7	39.5	10.8	42.0	18.7	28.4	22.8
4	29.8	20.5	*14.4	30.6	14.7	11.8	42.0	10.2	32.5	16.8	37.0	21.6
5	*24.3	19.1	13.7	24.7	14.1	11.5	53.0	9.60	29.3	16.1	51.0	20.5
6	22.0	18.0	13.7	28.3	14.1	10.8	63.2	9.60	26.3	17.2	45.5	19.8
7	19.8	17.2	13.0	31.6	25.7	11.2	43.0	9.32	55.5	17.6	49.5	19.1
8	19.1	16.5	12.4	56.5	58.5	10.5	29.8	9.04	61.0	27.0	34.0	17.6
9	21.3	15.8	11.8	39.5	44.0	9.91	18.0	20.6	59.5	52.0	34.5	16.8
10	24.7	15.8	11.2	26.7	57.5	15.3	15.1	39.8	53.0	42.0	50.0	16.1
11	21.6	33.5	10.8	22.4	28.8	12.7	15.1	37.5	39.5	24.7	44.0	15.4
12	18.3	25.1	18.2	20.5	21.6	10.5	17.2	55.5	31.6	22.8	50.5	14.7
13	17.6	19.1	29.8	18.3	19.1	9.60	14.4	57.5	27.1	*18.0	36.1	14.1
14	17.6	16.8	18.3	22.4	19.1	9.91	*13.4	56.5	24.7	16.1	34.5	13.7
15	18.3	15.4	13.7	16.8	35.2	9.91	16.1	58.5	23.1	15.1	28.4	13.7
16	23.1	14.4	12.7	15.4	41.0	11.2	57.0	52.0	22.0	14.4	24.7	13.4
17	54.0	14.1	50.0	a14	46.5	22.7	43.5	30.6	21.3	18.0	22.4	12.4
18	36.8	13.4	42.5	a20	25.1	12.7	31.4	25.1	20.5	13.7	20.5	12.1
19	29.3	12.7	22.8	a40	20.5	10.5	19.1	28.0	20.5	16.3	20.1	11.5
20	52.0	12.4	18.3	a55	21.3	9.60	19.4	24.3	19.4	21.0	60.5	12.7
21	44.5	11.8	16.8	a29	19.4	9.04	19.4	21.3	18.0	16.1	58.0	19.1
22	44.5	11.5	15.4	22.8	17.6	9.32	14.7	55.9	22.7	15.8	55.5	17.6
23	27.5	26.3	14.1	24.5	16.1	14.1	13.4	62.6	19.1	39.0	63.2	26.6
24	27.1	48.0	13.7	51.0	15.1	9.60	18.7	61.0	17.6	58.5	61.5	16.8
25	32.0	23.9	12.4	35.5	15.1	9.04	35.5	58.0	18.0	58.0	63.8	19.4
26	42.0	23.9	11.8	26.3	20.2	8.76	16.8	46.0	23.5	47.0	60.0	17.2
27	58.5	20.9	10.8	21.6	15.1	8.48	31.4	49.5	26.1	26.7	55.5	17.2
28	46.5	21.3	16.1	21.6	13.4	8.20	16.8	31.1	58.5	45.5	44.5	15.1
29	51.0	21.3	31.8	32.5	13.4	7.92	15.1	28.0	39.5	52.0	36.5	19.4
30	39.5	20.9	23.1	22.4	13.4	7.64	14.1	---	42.0	32.5	31.1	35.5
31	29.8	17.6	---	19.4	---	8.20	13.7	---	26.3	---	28.4	---
Total	1042.0	619.8	539.9	896.3	715.1	344.63	788.40	981.46	1029.3	821.2	1298.6	541.7
Mean												
Mgd	33.6	20.0	18.0	28.9	23.8	11.1	25.4	33.8	33.2	27.4	41.9	18.1
Cfs	52.0	30.9	27.9	44.7	36.8	17.2	39.3	52.3	51.4	42.4	64.8	28.0
Ac-ft	3,200	1,900	1,660	2,750	2,190	1,060	2,420	3,010	3,160	2,520	3,980	1,660

Calendar Year 1963: Max 64.4 Min 1.46 Mean mgd 23.8 Mean cfs 36.8 Ac-ft 26,600
Fiscal Year 1963-64: Max 63.8 Min 7.64 Mean mgd 26.3 Mean cfs 40.7 Ac-ft 29,510

* Discharge measurement made on this day.
a No gage-height record.

5180. West Wailuaiki Stream near Keanae

Location.--Lat 20°49'15", long 156°08'37", on left bank 500 ft upstream from Koolau ditch crossing and trail bridge and 2.8 miles south of Keanae Post Office.

Drainage area.--3.66 sq mi.

Records available.--January 1914 to December 1915, May 1916 to October 1917, November 1921 to June 1964. Monthly discharge only for some periods, published in WSP 1319.

Gage.--Water-stage recorder. Datum of gage is 1,343.6 ft above mean sea level (by vertical angles).

Average discharge.--44 years (1914-15, 1916-17, 1922-64) 23.7 mgd (36.7 cfs).

Extremes.--Maximum discharge during year, 1,620 mgd (2,510 cfs) Feb. 23 (gage height, 8.11 ft), from rating curve extended above 420 mgd as explained below; minimum, 2.14 mgd (3.31 cfs) Dec. 29-31.
1914-17, 1921-64: Maximum discharge, about 4,500 mgd (about 6,960 cfs) Jan. 14, 1923 (gage height, 13.5 ft, from floodmarks), from rating curve extended above 420 mgd by logarithmic plotting; minimum, 0.3 mgd (0.5 cfs) July 26, 1922.

Remarks.--Records good. No diversion above station. Water is diverted by Koolau ditch, 500 ft below station, for domestic supply and irrigation of sugar cane in central Maui.

Rating table (gage height, in feet, and discharge, in million gallons a day)

0.3	1.85	2.5	73.0
.4	2.43	3.0	121
.7	4.85	3.5	185
1.1	10.3	4.0	270
1.5	19.2	5.0	510
2.0	39.5		

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	128	8.41	4.18	25.6	4.85	4.89	6.20	4.00	79.0	6.99	10.5	6.47
2	54.0	6.99	3.82	69.4	4.47	4.54	18.3	3.66	*92.2	5.95	10.3	5.62
3	14.2	6.21	4.56	12.1	4.18	*3.34	39.2	3.42	16.0	5.29	7.54	5.07
4	10.1	5.62	*3.74	7.98	3.90	3.26	20.7	3.18	11.2	4.76	9.34	4.76
5	7.68	5.07	3.66	6.34	3.82	3.34	49.3	2.97	9.34	4.47	16.6	4.47
6	6.47	4.76	3.74	19.0	4.00	2.97	121	2.97	7.98	5.29	16.1	4.09
7	5.73	4.56	3.58	24.4	20.50	4.38	21.5	3.50	48.8	5.18	11.6	3.90
8	5.51	4.38	3.34	109	72.30	4.02	13.2	4.02	216	19.6	7.98	3.74
9	7.12	4.28	3.34	27.2	149	3.03	7.12	18.3	70.1	47.7	8.26	3.58
10	8.96	4.44	2.90	10.3	251	3.57	5.73	38.8	31.5	29.6	18.3	3.34
11	5.95	10.8	2.97	7.54	13.0	4.34	6.82	50.2	13.4	9.50	11.9	3.26
12	4.76	6.34	9.91	6.34	8.86	2.70	7.23	87.0	9.98	7.68	21.7	3.18
13	5.07	4.38	15.4	5.73	7.54	2.43	5.07	104	8.41	*5.73	10.6	3.03
14	5.18	3.90	6.53	10.9	7.68	2.50	*4.18	135	7.40	5.18	9.34	3.26
15	6.09	3.66	4.28	5.73	22.5	2.56	8.31	148	6.73	4.66	7.40	4.18
16	11.9	3.50	4.18	4.96	17.6	4.39	129	42.8	6.08	4.38	6.21	3.50
17	66.1	3.34	104	4.75	26.9	11.1	72.4	12.9	5.29	4.56	5.51	3.03
18	26.8	3.42	27.6	5.99	8.12	4.78	25.2	10.3	4.85	3.82	*4.96	2.97
19	28.6	3.26	7.54	57.7	6.47	3.10	10.3	11.2	4.85	3.82	6.31	2.63
20	138	3.03	5.51	97.6	5.62	2.70	9.50	9.18	5.40	4.38	173	3.07
21	15.3	2.90	5.40	*11.1	5.07	2.50	8.70	7.61	4.85	3.66	44.5	6.30
22	*19.9	2.83	5.07	7.25	4.56	2.87	6.21	108	5.27	4.32	28.8	4.85
23	9.18	17.5	4.18	14.9	4.28	10.1	5.18	345	4.85	34.6	197	13.3
24	9.18	30.3	4.30	36.0	4.00	3.26	12.4	151	7.26	122	60.7	3.58
25	11.4	7.68	4.76	11.4	4.00	2.70	26.5	50.8	6.86	85.0	115	4.38
26	20.7	9.50	3.74	7.98	8.26	2.43	7.25	20.8	15.2	22.1	29.6	4.09
27	67.4	6.21	3.55	6.34	4.28	2.43	17.6	54.6	57.1	8.86	16.5	5.40
28	16.5	5.84	6.40	7.07	3.74	2.50	6.86	13.6	129	61.9	10.8	3.66
29	22.3	6.08	16.2	14.4	4.15	2.20	5.62	11.6	20.8	28.6	9.02	5.80
30	18.2	6.47	12.7	6.34	4.58	2.43	4.96	---	18.9	9.82	7.98	19.4
31	9.98	5.07	---	5.40	---	2.57	4.56	---	9.02	---	6.99	---
Total	766.26	200.73	291.08	646.74	689.23	113.93	686.10	1458.41	933.62	569.40	900.34	147.91
Mean												
Mgd	24.7	6.48	9.70	20.9	23.0	3.68	22.1	50.3	30.1	19.0	29.0	4.93
Cfs	38.2	10.0	15.0	32.3	35.6	5.69	34.2	77.8	46.6	29.4	44.9	7.63
Ac-ft	2350	616	893	1980	2120	350	2110	4480	2860	1750	2760	454

Calendar Year 1963: Max 386 Min 1.15 Mean mgd 18.5 Mean cfs 28.6 Ac-ft 20700
Fiscal Year 1963-64: Max 345 Min 2.20 Mean mgd 20.2 Mean cfs 31.3 Ac-ft 22720

* Discharge measurement made on this day.

Peak discharge (base, 1,200 mgd)

Date	Time	Gage height	Discharge Mgd	Discharge Cfs	Date	Time	Gage height	Discharge Mgd	Discharge Cfs
11-10	0400	7.45	1,360	2,100	2-23	1000	8.11	1,620	2,510

5220. Taro patch feeder ditch at Keanae

Location.--Lat 20°51'40", long 156°09'00", on left bank at Keanae, 80 ft downstream from intake on Palauhulu Stream, 500 ft downstream from highway bridge, 4.2 miles northwest of Nahiku, and 4.8 miles southeast of Kailua.

Records available.--September 1934 to June 1964.

Gage.--Water-stage recorder and Parshall flume. Altitude of gage is 51 ft (from topographic map).

Average discharge.--29 years (1935-64), 2.31 mgd (3.57 cfs).

Extremes.--1934-64: Maximum daily discharge, 7.9 mgd (12.2 cfs) June 30, 1941, Feb. 10, 1955; minimum daily, 0.05 mgd (0.08 cfs) Mar. 5, 1939.

Remarks.--Records good. Ditch diverts from Palauhulu Stream for irrigation of taro at Keanae.

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	4.14	2.55	2.00	1.90	2.24	2.29	2.00	2.05	2.66	2.24	1.82	3.08
2	3.39	2.49	2.00	2.76	2.20	2.34	2.18	2.05	3.28	2.20	1.77	3.03
3	2.81	2.44	2.00	2.05	2.20	2.20	2.89	2.00	2.15	2.20	1.72	2.97
4	2.65	2.39	2.00	1.82	2.20	2.20	2.86	2.00	2.00	2.15	1.68	2.92
5	2.55	2.34	2.00	1.72	2.20	2.20	2.97	2.00	1.90	2.10	1.77	2.86
6	2.49	2.29	1.95	1.77	2.20	2.20	3.98	2.00	1.90	2.10	1.72	2.81
7	2.44	2.24	1.95	1.90	2.43	2.24	3.14	1.95	2.46	2.05	1.64	2.76
8	2.39	2.20	1.95	3.37	3.54	2.20	3.14	1.95	3.76	2.20	1.59	2.76
9	2.34	2.15	1.90	2.34	3.91	2.15	3.08	1.95	*2.70	2.60	2.15	2.70
10	2.34	2.15	1.90	1.95	3.73	2.20	3.14	2.34	2.10	2.39	3.08	2.65
11	2.34	2.24	1.86	1.82	2.15	2.24	3.14	2.64	1.68	2.10	3.03	2.60
12	2.24	2.20	2.00	1.72	2.70	2.15	2.97	3.20	1.59	2.05	3.08	2.55
13	2.20	2.10	2.10	1.64	2.60	2.15	2.24	3.20	1.54	2.00	3.08	2.49
14	2.15	2.05	1.82	1.86	2.55	2.15	2.20	3.20	1.50	1.95	2.92	2.49
15	2.10	2.00	1.82	1.68	2.81	2.10	2.20	3.31	1.50	*1.90	2.81	2.49
16	2.24	1.95	1.77	1.64	3.08	2.10	*3.45	2.70	1.50	1.86	2.76	2.44
17	3.08	1.95	2.66	1.64	3.28	2.70	2.92	2.20	1.46	1.82	2.70	2.44
18	2.60	1.95	2.55	1.59	2.81	2.24	2.44	2.10	1.46	1.77	2.65	2.44
19	2.73	1.90	2.05	2.20	2.70	2.20	2.24	2.20	1.46	1.77	2.60	2.44
20	3.76	1.90	1.86	2.81	2.60	2.15	2.15	2.15	1.46	1.77	*5.19	2.39
21	2.29	1.86	1.82	2.05	2.55	2.10	2.15	2.05	1.95	1.72	3.72	2.39
22	2.24	1.82	1.77	1.86	2.49	2.10	2.10	3.47	2.24	1.72	3.14	2.39
23	1.95	1.82	1.77	*2.22	2.44	2.20	2.10	3.52	2.20	2.00	4.99	2.70
24	1.95	2.49	1.77	3.14	2.44	2.05	2.20	2.00	2.20	2.76	3.84	2.49
25	2.20	1.82	1.77	2.81	2.44	2.05	2.70	2.00	2.15	2.65	4.77	2.39
26	*2.81	1.77	1.72	2.65	2.44	2.05	2.15	2.20	2.24	2.10	3.60	2.34
27	3.37	1.72	1.72	2.49	2.34	2.05	2.55	2.49	2.41	1.90	3.26	2.34
28	2.76	1.86	1.68	2.44	2.29	2.00	2.15	1.90	3.43	2.24	3.26	2.34
29	2.86	2.05	1.95	2.81	2.24	2.00	2.10	1.86	2.55	2.15	3.26	2.29
30	2.92	2.05	1.82	2.49	2.24	1.95	2.10	---	2.60	1.86	3.20	2.75
31	2.60	2.05	---	2.34	---	1.95	2.05	---	2.29	---	3.14	---
Total	80.93	64.79	57.93	67.48	78.04	66.90	79.68	68.68	66.32	62.32	89.94	77.73
Mean												
Mgd	2.61	2.09	1.93	2.18	2.60	2.16	2.57	2.37	2.14	2.08	2.90	2.59
Cfs	4.04	3.23	2.99	3.37	4.02	3.34	3.98	3.67	3.31	3.22	4.49	4.01
Ac-ft	248	199	178	207	239	205	244	211	204	191	276	238

Calendar Year 1963: Max 5.30 Min 1.18 Mean mgd 2.27 Mean cfs 3.51 Ac-ft 2540
Fiscal Year 1963-64: Max 5.19 Min 1.46 Mean mgd 2.35 Mean cfs 3.64 Ac-ft 2640

* Discharge measurement made on this day.

5230. Koolau ditch near Keanae

Location.--lat 20°49'53", long 156°10'30", on right bank on west side of Keanae Valley, 2.6 miles southwest of Keanae Post Office, and 5.1 miles southeast of Kailua.

Records available.--January 1910 to December 1912, November 1917 to February 1918, April 1918 to June 1964.

Gage.--Water-stage recorder. Datum of gage is 1,237.7 ft above mean sea level (by plane-table traverse). Jan. 1, 1910, to Dec. 31, 1912, staff gage at same site and datum.

Average discharge.--48 years (1910-12, 1918-64), 66.3 mgd (103 cfs).

Extremes.--1910-12, 1917-64: Maximum daily discharge, 172 mgd (266 cfs) Apr. 19, 1935; no flow at times.

Remarks.--Records good except those for periods of no gage-height record, which are fair. Ditch diverts at altitude 1,260 ft from nearly all streams from the Makapipi west to the Alo for power, domestic use, and irrigation in central Maui.

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	122	80.7	62.5	103	47.9	52.6	46.3	37.3	a133	62.5	104	66.1
2	136	67.3	38.1	143	44.2	49.9	61.1	35.2	a140	55.2	107	61.3
3	118	58.9	47.5	101	41.8	35.2	134	33.2	124	49.6	80.0	56.4
4	92.0	54.0	38.9	91.3	39.3	33.2	130	31.1	98.9	46.3	107	53.6
5	70.4	49.6	36.9	68.8	38.1	32.4	140	29.5	82.5	44.2	133	50.8
6	60.5	47.5	*38.5	92.8	38.5	29.5	137	29.5	69.6	49.6	118	48.4
7	53.6	45.5	36.0	120	83.8	40.2	45.4	31.1	134	51.2	124	46.3
8	51.2	43.4	33.6	140	144	34.8	449	32.8	a140	85.0	89.8	44.2
9	68.1	42.6	33.2	137	111	28.8	484	92.3	*a144	145	92.0	42.6
10	84.2	42.6	29.2	86.6	123	40.1	5.56	123	a145	133	131	40.6
11	60.5	119	29.5	84.8	110	50.4	6.22	104	117	81.8	122	38.9
12	47.9	78.1	67.2	57.3	72.4	30.7	26.8	145	91.6	72.4	136	37.7
13	48.4	49.2	119	52.0	62.1	28.0	45.1	146	77.0	52.4	123	36.5
14	49.6	42.6	58.5	91.3	62.9	29.2	41.0	a145	68.4	47.1	84.9	36.9
15	57.7	39.3	40.2	51.2	98.0	29.2	58.7	a140	62.9	*43.4	72.7	41.8
16	91.8	36.9	38.5	45.5	106	44.2	*144	146	38.8	39.7	65.3	37.7
17	138	34.8	128	43.4	126	99.0	137	107	54.4	52.8	58.5	34.4
18	119	34.4	123	61.3	78.1	44.2	126	82.9	51.6	37.7	53.2	34.0
19	78.5	33.2	66.5	127	58.9	34.0	73.5	100	54.4	41.0	54.7	31.1
20	122	31.5	50.8	141	54.4	30.3	75.1	80.0	51.6	60.2	*141	37.3
21	135	29.2	49.6	98.2	50.4	28.0	78.1	63.7	48.4	41.4	*144	69.9
22	124	28.4	46.3	67.3	45.5	28.8	50.4	a145	57.7	46.3	141	54.4
23	87.3	93.4	39.3	*72.8	42.6	71.7	44.7	a140	50.4	129	138	82.9
24	90.2	133	40.2	144	40.2	31.1	67.4	a140	58.5	*144	141	45.9
25	105	72.4	40.2	108	39.7	28.0	111	a140	56.4	141	137	56.0
26	112	89.1	34.0	80.7	76.2	26.2	56.9	99.5	86.5	137	143	48.8
27	119	61.7	32.8	60.5	42.2	26.2	116	97.3	82.6	81.8	142	51.6
28	137	59.3	61.8	66.7	36.9	25.5	55.6	92.7	144	107	114	40.6
29	127	60.9	123	114	38.9	24.2	47.5	85.1	134	138	94.5	59.7
30	124	61.7	98.0	59.3	40.6	23.9	43.8	---	132	94.5	82.2	130
31	98.9	68.4	---	53.2	---	24.9	43.0	---	80.0	---	72.4	---
Total	2928.8	1788.6	1680.8	2763.0	1993.6	1134.4	2156.51	2674.2	2809.2	2310.1	3346.2	1516.4
Mean												
Mgd	94.5	57.7	56.0	89.1	66.4	36.6	69.6	92.2	90.6	77.0	108	50.5
Cfs	146	89.3	86.6	138	103	56.6	108	143	140	119	167	78.1
Ac-ft	8990	5490	5160	8480	6120	3480	6620	8210	8620	7090	10270	4650

Calendar Year 1963: Max 147 Min 10.8 Mean mgd 67.0 Mean cfs 104 Ac-ft 75120
Fiscal Year 1963-64: Max 146 Min 4.49 Mean mgd 74.0 Mean cfs 115 Ac-ft 83180

* Discharge measurement made on this day.
a No gage-height record.

5240. Honomanu Stream at Haiku-uka boundary, near Kailiili

Location.--Lat 20°49'19", long 156°12'15", on left bank at Haiku-uka trail crossing, 4.5 miles southwest of Keanae, 4.8 miles southeast of Kailiili, and 5 miles south of Kailua.

Drainage area.--2.54 sq mi.

Records available.--October 1919 to February 1927, July 1932 to December 1934, June 1962 to June 1964.

Gage.--Water-stage recorder. Altitude of gage is 2,900 ft (from topographic map).

Average discharge.--10 years (1920-26, 1932-34, 1962-64), 8.55 mgd (13.2 cfs).

Extremes.--Maximum discharge during year, 658 mgd (1,020 cfs) Feb. 23 (gage height, 6.71 ft), from rating curve extended above 75 mgd; minimum, 0.29 mgd (0.45 cfs) Sept. 10, 11.
1919-27, 1932-34, 1962-64: Maximum discharge, 1,290 mgd (2,000 cfs) Jan. 14, 1923 (gage height, 9.93 ft), from rating curve extended above 75 mgd; minimum, 0.06 mgd (0.09 cfs) Nov. 20, 1962.

Remarks.--Records good except those above 200 mgd, which are fair. No diversion above station.

Rating tables (gage height, in feet, and discharge, in million gallons a day)

July 1-19		July 20 to June 30			
0.8	0.80	0.6	0.17	1.4	8.30
.9	1.35	.7	.36	1.7	17.3
1.0	2.12	.8	.68	2.0	32.0
1.2	4.48	.9	1.18	2.5	65.0
1.4	8.10	1.0	1.88	3.0	109
1.7	17.3	1.1	2.90	3.5	164
		1.2	4.25		

Note.--Same as following table above 1.7 ft.

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	78.8	1.72	0.76	6.48	0.85	0.57	1.42	0.64	28.6	1.36	2.17	1.06
2	22.0	1.24	.60	26.3	.72	.60	5.22	.60	40.3	1.49	1.80	.95
3	3.28	1.00	.64	2.87	.80	.72	7.93	.60	4.09	1.06	1.30	.85
4	2.32	.90	.57	1.42	.85	.76	2.67	.53	1.88	.90	1.36	.76
5	1.63	.80	.47	1.12	.64	.57	3.68	.47	1.49	.80	2.69	.68
6	1.29	.76	.47	4.33	.57	.44	8.70	.47	1.24	1.42	3.61	.64
7	1.17	.80	.41	5.70	7.82	1.23	2.84	.60	15.2	1.56	1.49	1.01
8	1.05	1.06	.41	53.7	28.3	1.12	2.16	1.77	97.5	7.82	1.24	1.06
9	1.42	.95	.38	8.62	44.6	.60	1.12	5.82	13.3	19.2	1.36	.68
10	2.90	.94	.34	2.16	57.5	.53	.85	10.2	7.58	8.39	3.36	.60
11	1.84	4.78	.31	1.36	1.88	.90	1.36	16.4	2.06	1.72	2.26	1.33
12	1.17	1.72	4.11	1.06	1.36	.60	1.30	23.5	1.42	1.72	4.75	1.12
13	1.23	1.24	7.87	.95	1.30	.44	.95	36.5	1.18	1.18	4.22	.68
14	1.35	.80	3.06	*3.57	1.42	.41	.72	61.9	1.06	1.00	2.16	.80
15	*1.54	.64	1.36	1.24	4.03	.50	1.46	79.4	1.50	.85	1.49	1.36
16	5.71	.72	2.29	.95	3.33	1.24	57.4	9.68	1.49	.80	1.12	1.06
17	43.6	.76	22.1	.90	5.29	4.57	31.6	2.36	1.00	1.12	.95	.85
18	9.40	.60	10.3	1.30	1.64	1.62	6.34	2.02	.80	.80	.80	.80
19	25.2	.53	1.49	22.7	1.06	.80	1.88	3.16	.68	.68	.80	.60
20	25.7	.47	1.00	42.2	.90	.60	1.64	2.06	1.05	1.47	69.6	.53
21	2.56	.44	1.06	2.16	.76	.47	1.88	1.64	1.06	2.76	10.3	2.18
22	5.65	.36	1.06	1.30	.68	2.14	1.12	47.1	1.36	2.47	6.03	1.49
23	1.64	13.0	.72	4.11	.60	6.80	.90	147	3.91	14.0	95.2	4.61
24	1.30	11.4	1.42	13.4	.57	1.00	3.68	63.0	9.45	72.5	12.0	1.56
25	1.72	1.72	1.24	2.96	*.57	.68	6.06	*13.9	1.98	40.4	43.6	1.89
26	6.31	2.46	.95	1.80	1.88	.57	1.36	12.8	2.12	4.08	*13.7	1.67
27	21.7	1.18	.80	1.30	.90	.50	5.10	30.0	2.18	1.72	4.52	1.12
28	4.11	*1.00	1.98	2.23	.64	.47	1.42	3.03	36.6	31.7	2.16	.85
29	5.10	1.12	6.10	5.89	.60	.41	1.00	1.64	7.02	13.4	1.64	1.36
30	4.82	1.42	3.84	1.42	.57	.36	.80	---	5.46	2.06	1.42	7.29
31	2.67	.95	---	1.00	---	.62	.72	---	2.06	---	1.30	---
Total	290.18	57.48	78.11	226.50	172.63	32.84	165.28	578.79	296.62	240.43	300.40	41.44
Mean												
Mgd	9.36	1.85	2.60	7.31	5.75	1.06	5.33	20.0	9.57	8.01	9.69	1.38
Cfs	14.5	2.86	4.02	11.3	8.90	1.64	8.25	30.9	14.8	12.4	15.0	2.14
Ac-ft	891	176	240	695	530	101	507	1,780	910	738	922	127

Calendar Year 1963: Max 136 Min 0.14 Mean mgd 6.24 Mean cfs 9.65 Ac-ft 6,980
Fiscal Year 1963-64: Max 147 Min 0.31 Mean mgd 6.78 Mean cfs 10.5 Ac-ft 7,620

* Discharge measurement made on this day.

Peak discharge (base, 450 mgd)

Date	Time	Gage height	Discharge	
			Mgd	Cfs
2-23	1000	6.71	658	1,020

5270. Honomanu Stream near Keanae

Location.--lat 20°50'05", long 156°11'20", on left bank at Spreckels ditch intake, 3.3 miles southwest of Keanae School, and 4.5 miles southeast of Kailua.

Drainage area.--3.17 sq mi.

Records available.--November 1913 to January 1964 (discontinued). Monthly discharge only for some periods, published in WSP 1319.

Gage.--Water-stage recorder and combination orifice and broad-crested weir control. Datum of gage is 1,733 ft above mean sea level (by plane-table traverse). Prior to Apr. 14, 1950, at site 500 ft upstream at different datums.

Average discharge.--49 years (1914-63), 14.9 mgd (23.1 cfs).

Extremes.--Maximum discharge for period, 292 mgd (452 cfs) Nov. 9 (gage height, 7.18 ft), from rating curve extended above 13 mgd as explained below; minimum, 0.65 mgd (1.01 cfs) Dec. 30, 31.
1913-64: Maximum discharge, 2,310 mgd (3,570 cfs) Feb. 25, 1956 (gage height, 10.73 ft), from rating curve extended above 13 mgd by computation of flow through orifice and over dam; minimum, 0.06 mgd (0.09 cfs) Nov. 18-20, 1962.

Remarks.--Records fair except those above 15 mgd, which are poor.

Rating table (gage height, in feet, and discharge, in million gallons a day)

0.7	0.69	5.0	18.5
.8	1.25	5.6	22.5
1.0	2.68	5.8	32.0
1.5	7.40	6.0	50.0
2.0	10.3	6.5	120

Discharge, in million gallons a day, July 1963 to January 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	50	4.36	1.84	12.1	2.21	2.19	3.34					
2	10	3.50	1.58	35.0	1.98	2.29	4.11					
3	6.80	2.93	2.13	6.25	1.98	1.58	14.2					
4	5.12	2.60	1.58	3.69	2.06	1.77	8.42					
5	3.78	2.29	1.44	2.84	1.77	1.38	7.95					
6	3.17	2.37	1.44	6.26	1.70	1.08	12					
7	2.68	2.13	1.38	10.8	14.0	2.47	5.12					
8	2.45	2.52	1.32	72.7	28.4	2.37	4.54					
9	3.69	2.45	1.32	14.5	47.4	*1.19	2.29					
10	6.27	2.45	1.08	4.74	55.9	1.08	1.98					
11	3.88	10.6	*1.03	3.34	4.92	2.21	3.51					
12	2.45	4.36	8.01	2.84	3.69	1.14	3.01					
13	2.52	2.93	14.4	2.52	3.60	.91	1.98					
14	2.84	2.06	5.12	8.54	3.98	.91	1.51					
15	3.91	1.77	2.84	3.09	10.9	1.14	3.92					
16	11.5	1.77	4.34	2.37	7.83	2.62	47.8					
17	48.0	1.70	27.4	2.45	12.3	9.95	28.2					
18	12.4	1.51	15.5	4.16	4.36	3.42	8.80					
19	31.9	1.44	3.34	30.3	3.09	1.70	4.07					
20	51.6	1.25	2.21	54.9	2.52	1.25	-					
21	7.56	1.14	2.76	5.60	2.21	1.08	-					
22	11.0	1.08	2.52	3.69	1.98	2.36	-					
23	4.45	15.3	1.64	8.40	1.77	9.06	-					
24	4.26	21.9	3.01	19.6	1.64	1.77	-					
25	5.60	4.54	2.52	6.34	1.70	1.19	-					
26	14.9	5.70	1.77	4.26	5.14	1.03	-					
27	31.0	3.17	1.58	3.25	2.21	1.03	-					
28	9.19	3.17	3.58	5.42	1.70	.86	-					
29	11.0	3.69	11.8	12.2	1.64	.75	-					
30	11.7	3.88	7.40	3.50	1.58	.69	-	---		---		---
31	5.90	2.52	---	2.68	---	1.03	-	---		---		---
Total	381.52	123.08	137.88	358.33	236.16	63.50	-					
Mean												
Mgd	12.3	3.97	4.60	11.6	7.87	2.05	-					
Cfs	19.0	6.14	7.12	17.9	12.2	3.17	-					
Ac-ft	1,170	378	423	1,100	725	195	-					

Calendar Year 1963: Max 191 Min 0.38 Mean mgd 9.37 Mean cfs 14.5 Ac-ft 10,490
Fiscal Year 1963-64: Max - Min - Mean mgd - Mean cfs - Ac-ft -

Peak discharge (base, 600 mgd).--No peak above base.

* Discharge measurement made on this day.

5310. Kula diversion from Haipuaena Stream near Olinda

Location.--Lat 20°48'24", long 156°13'27", on left bank 3.4 miles east of Olinda and 6.2 miles south of Kailua.

Records available.--July 1945 to June 1964.

Gage.--Water-stage recorder and Parshall flume. Altitude of gage is 4,320 ft (from topographic map).

Average discharge.--18 years (1946-64) 0.438 mgd (0.678 cfs).

Extremes.--1945-64: Maximum daily discharge, 2.05 mgd (3.17 cfs) Mar. 20, 1948; minimum daily, 0.01 mgd (0.02 cfs) for several days in 1953-55, 1962, 1963.

Remarks.--Records good. Water is diverted from Haipuaena Stream at atation for domestic use and irrigation of truck crops in the Olinda and Kula areas.

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	1.49	0.31	0.11	1.04	0.16	0.03	0.27	0.09	1.03	0.72	0.46	0.19
2	1.32	.23	.08	1.20	.13	.03	.40	.07	.84	.69	.38	.14
3	.82	.16	.06	.71	.10	.03	1.09	.06	.89	.36	.30	.11
4	.50	.13	.04	.45	.09	.03	.58	.05	.71	.30	.24	.09
5	.33	.10	.04	.43	.07	.03	1.02	.04	.52	.40	.30	.07
6	.26	.09	.03	.89	.06	.03	1.01	.04	.41	.75	.38	.05
7	.20	.12	.03	1.08	.42	.18	.98	.04	1.46	*.43	.26	.05
8	.15	.23	.02	1.66	1.31	.23	.96	.21	.65	.81	.20	.05
9	.15	.23	.02	1.12	.96	.11	.34	1.07	.45	1.77	.28	.04
10	.64	.17	.02	.48	.52	.07	.21	1.20	.41	1.36	.30	.04
11	.53	1.00	.02	.27	.36	.10	.19	1.33	.45	.56	.34	.06
12	.23	.50	.32	.19	.36	.08	.20	1.38	.40	.46	.37	.16
13	.20	.30	.99	.13	.30	.05	.15	1.30	.30	.30	.74	.09
14	.24	.16	.66	.47	.24	.04	.11	1.25	.26	.23	.45	.07
15	.19	.13	.27	.23	.42	.03	.21	1.02	.31	.18	.27	.14
16	.49	.26	.62	.14	.67	.04	1.30	.68	.34	.14	.16	.14
17	1.74	.21	1.29	*.11	.71	.16	1.18	.58	.23	.13	.12	.09
18	1.20	.14	1.20	.14	.40	.16	1.31	.73	.18	.13	.09	.08
19	*.81	.11	.40	1.17	.20	.09	.58	1.09	.14	.44	.07	.07
20	.78	.11	.19	1.32	.14	.06	.36	.62	.22	1.20	1.38	.07
21	.60	.09	.13	.71	.11	.04	.31	.46	.50	1.36	1.30	.16
22	.71	.07	.10	.34	.09	.25	.20	1.22	.72	.92	1.16	.23
23	.50	.95	.07	.48	.07	.99	.15	.80	1.04	1.34	1.23	.66
24	.31	1.11	.15	1.36	.06	.27	.33	1.31	1.36	1.72	.68	.58
25	.27	.46	.33	.72	.05	.13	1.00	1.45	.90	1.00	.82	*.72
26	.54	.52	.35	.40	.18	.09	.34	1.22	.91	.75	1.25	.67
27	1.32	.30	.27	.26	.16	.10	.57	1.61	1.31	.46	1.22	.27
28	.86	.20	.36	.58	.10	.10	.31	.73	1.72	.78	.64	.20
29	1.00	.21	1.33	1.12	.06	.07	.19	.48	1.11	1.08	.41	.23
30	.66	.21	1.05	.41	.04	.05	.13	---	1.33	.78	.31	1.00
31	.46	.14	---	.23	---	.06	.11	---	.96	---	.24	---
Total	19.50	8.95	10.55	19.84	8.54	3.73	16.09	22.13	22.06	21.55	16.35	6.52
Mean												
Mgd	0.629	0.289	0.352	0.640	0.285	0.120	0.519	0.763	0.712	0.718	0.527	0.217
Cfs	0.973	0.447	0.545	0.990	0.441	0.186	0.803	1.18	1.10	1.11	0.815	0.336
Ac-ft	60	27	32	61	26	11	49	68	68	66	50	20

Calendar Year 1963: Max 1.80 Min 0.01 Mean mgd 0.430 Mean cfs 0.665 Ac-ft 481
Fiscal Year 1963-64: Max 1.77 Min 0.02 Mean mgd 0.480 Mean cfs 0.743 Ac-ft 538

* Discharge measurement made on this day.

5311. Haipuaena Stream at Kula pipeline intake, near Olinda

Location.--Lat 20°48'24", long 156°13'27", on left bank at Kula pipeline intake, 3.4 miles east of Olinda, and 6.2 miles south of Kailua.

Drainage area.--0.27 sq mi.

Records available.--January to April 1946 (fragmentary), May 1946 to June 1964.

Gage.--Water-stage recorder and concrete control. Altitude of gage is 4,320 ft (from topographic map).

Average discharge.--18 years, 0.513 mgd (0.794 cfs).

Extremes.--Maximum discharge during year, 56.0 mgd (86.6 cfs) Feb. 23 (gage height, 3.18 ft), from rating curve extended above 1.3 mgd as explained below; no flow for many days.
1946-64: Maximum discharge, 87 mgd (135 cfs) Jan. 24, 1948 (gage height, 3.72 ft), from rating curve extended above 1.3 mgd by differential-curve method; no flow at times each year.

Remarks.--Records fair. Kula pipeline diverts all water from Haipuaena Stream at low flow.

Rating table (gage height, in feet, and discharge, in million gallons a day)

0.85	0	1.3	1.60
.9	.03	1.5	3.50
1.0	.18	1.8	7.60
1.1	.52	2.1	13.2

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	6.05	0	0	0.31	0	0	0	0	2.58	0.04	0	0
2	1.43	*0	0	2.04	0	0	.47	0	4.13	0	0	0
3	.01	0	*0	.12	0	0	.89	0	.20	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	.18	0	0	0	0	0
6	0	0	0	.51	0	0	.78	0	0	0	0	0
7	0	0	0	.10	1.53	0	.16	0	2.62	*0	0	0
8	0	0	0	3.47	2.36	0	.09	0	8.82	.36	0	0
9	0	0	0	.44	4.75	0	0	.27	1.79	1.35	0	0
10	.05	0	0	0	5.28	0	0	.69	.84	.68	0	0
11	0	.04	0	0	.28	0	0	.94	.19	0	0	0
12	0	0	.03	0	.05	0	0	2.12	0	0	0	0
13	0	0	.27	0	0	0	*0	4.44	0	0	.01	0
14	0	0	.04	0	0	0	0	8.36	0	0	*0	0
15	0	0	0	0	0	0	0	6.40	0	0	0	0
16	.03	0	.02	0	0	0	7.56	1.16	0	0	0	0
17	4.08	0	2.22	*0	.01	0	4.18	.09	0	0	0	0
18	.86	0	.86	0	0	0	.68	.51	0	0	0	0
19	*2.97	0	0	2.49	0	0	0	.22	0	.23	0	0
20	1.36	0	0	4.13	0	0	0	0	0	.32	3.17	0
21	.08	0	0	.10	0	0	0	0	0	.46	.62	0
22	.73	0	0	0	0	.50	0	4.86	.02	.05	.20	0
23	.03	1.58	0	.59	0	1.00	0	1.28	.89	.83	7.98	.04
24	0	1.09	0	.93	0	0	.21	3.75	1.10	7.11	1.19	.04
25	0	0	0	.01	0	0	.39	.57	.04	3.46	4.12	*.12
26	.03	0	0	0	0	0	0	1.23	.14	.31	1.26	.08
27	1.65	0	0	0	0	0	0	2.85	1.71	0	.21	0
28	.16	0	.07	.33	0	0	0	.02	3.22	2.87	0	0
29	.38	0	.52	.37	*0	0	0	0	.42	1.62	0	0
30	0	0	.10	0	0	0	0	---	.49	.11	0	.10
31	0	0	---	0	---	0	0	---	.05	---	0	---
Total	19.90	2.71	4.13	15.94	14.26	1.50	15.59	51.28	29.25	19.80	18.76	0.38
Mean												
Mgd	0.642	0.087	0.138	0.514	0.475	0.048	0.503	1.77	0.944	0.660	0.605	0.013
Cfs	0.993	0.135	0.214	0.795	0.735	0.074	0.778	2.74	1.46	1.02	0.936	0.020
Ac-ft	61	8.3	13	49	44	4.6	48	157	90	61	58	1.2

Calendar Year 1963: Max 11.5 Min 0 Mean mgd 0.476 Mean cfs 0.736 Ac-ft 533
Fiscal Year 1963-64: Max 12.8 Min 0 Mean mgd 0.529 Mean cfs 0.818 Ac-ft 595

Peak discharge (base, 44 mgd)

Date	Time	Gage height	Discharge Mgd	Discharge Cfs	Date	Time	Gage height	Discharge Mgd	Discharge Cfs
2-23	1000	3.18	56.0	86.6	3-8	0200	2.97	45.5	70.4

* Discharge measurement or observation of no flow made on this day.

5360. Kaipuaena Stream above Spreckels ditch, near Huelo

Location.--Lat 20°51'04", long 156°11'28", on left bank 200 ft upstream from Speckels ditch, 2.8 miles west of Keanae, 3.3 miles southeast of Kailua, and 4.7 miles southeast of Huelo.

Drainage area.--1.16 sq mi.

Records available.--October 1913 to June 1964. Monthly discharge only July 1915, published in WSP 1319. Prior to July 1954, published as "Kaipuaena Stream near Huelo." Records for December 1910 to September 1913 at site 600 ft downstream not equivalent owing to inflow from Spreckels ditch.

Gage.--Water-stage recorder. Datum of gage is 1,512.22 ft above mean sea level (East Maui Irrigation Co. bench mark).

Average discharge.--50 years (1914-64), 9.74 mgd (15.1 cfs).

Extremes.--Maximum discharge during year, 539 mgd (834 cfs) Feb. 23 (gage height, 5.24 ft), from rating curve extended above 150 mgd; minimum, 1.14 mgd (1.76 cfs) Dec. 30, 31.
1913-64: Maximum discharge, 1,750 mgd (2,710 cfs) Aug. 12, 1940 (gage height, 6.91 ft), from rating curve extended above 150 mgd; minimum, slightly less than 0.1 mgd (about 0.2 cfs) on several days during January, February, May, June 1945, October 1953.

Remarks.--Records good. Kula pipeline diverts water above station.

Rating table (gage height, in feet, and discharge, in million gallons a day)

1.6	1.00	2.3	12.5
1.7	1.75	2.6	25.5
1.8	2.86	3.0	53.0
1.9	4.00	3.5	107
2.0	5.60		

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	65.5	4.96	2.65	11.4	2.97	3.00	3.09	1.93	28.2	3.32	6.30	3.32
2	26.0	4.00	2.32	33.4	2.43	2.52	5.82	1.75	31.9	3.09	6.93	2.97
3	7.50	3.54	3.20	7.14	2.43	1.67	18.9	1.67	6.17	2.54	4.48	2.65
4	5.44	3.20	2.32	4.32	2.32	1.75	12.4	1.51	4.48	2.22	5.98	2.43
5	4.00	2.86	2.02	3.54	2.02	1.59	8.97	1.43	3.89	2.12	9.31	2.22
6	3.54	2.65	2.22	6.01	1.93	1.35	23.9	1.43	3.43	2.86	8.07	2.12
7	3.09	2.54	1.93	9.33	15.7	2.75	7.34	1.59	25.4	2.97	5.79	2.12
8	2.86	2.43	1.75	76.0	30.7	2.02	4.96	2.22	79.2	7.42	4.48	2.43
9	3.43	2.32	2.02	14.0	44.2	*1.43	3.09	8.32	*15.3	20.3	4.48	1.75
10	5.29	2.68	1.59	5.60	49.2	1.51	2.54	17.6	10.3	10.9	10.6	1.67
11	3.54	11.2	*1.43	4.00	5.60	2.43	3.69	22.3	5.60	4.32	6.17	1.59
12	2.32	4.80	6.79	3.54	4.00	1.43	3.43	31.9	4.16	4.32	11.1	1.93
13	2.43	3.20	12.4	3.20	3.89	1.28	2.43	32.7	3.54	2.97	9.86	1.59
14	2.43	2.43	5.23	8.46	4.00	1.35	2.02	42.6	3.20	2.97	6.17	1.59
15	3.32	2.12	3.09	3.43	15.6	1.59	3.38	43.6	3.20	2.43	4.32	2.54
16	7.86	2.02	3.76	2.97	9.72	3.77	44.0	12.7	3.20	2.22	3.66	2.02
17	33.9	1.84	27.2	2.65	18.8	13.6	23.3	5.60	2.43	*4.22	3.09	1.67
18	11.9	1.93	17.0	5.17	4.96	3.66	8.54	5.59	2.22	2.22	2.65	1.67
19	39.8	1.75	4.00	27.8	3.66	2.12	4.00	6.66	2.02	2.12	4.95	1.35
20	61.7	1.59	3.09	57.5	3.09	1.75	3.89	4.80	2.54	2.97	94.4	1.51
21	9.11	1.51	3.09	6.93	2.65	1.51	4.16	4.00	2.22	3.66	24.7	5.16
22	11.0	1.43	3.09	4.16	2.32	3.07	2.86	52.4	2.02	3.89	12.4	3.54
23	4.96	14.4	2.22	9.04	2.12	10.0	2.43	95.8	3.21	16.0	97.9	6.71
24	4.64	24.4	3.24	18.6	1.93	1.93	7.58	56.1	7.39	52.1	27.5	2.86
25	6.36	5.28	2.65	6.93	1.93	1.59	11.0	15.0	3.20	47.5	61.0	3.09
26	13.1	6.55	2.12	5.12	5.13	1.43	3.43	8.51	3.32	11.9	21.0	3.20
27	33.0	3.77	1.84	3.77	2.22	1.35	9.55	16.5	14.1	5.28	9.80	2.86
28	9.14	3.77	3.16	5.03	1.75	1.28	3.43	4.64	43.2	39.4	5.98	1.93
29	11.7	4.16	11.8	12.9	1.75	1.21	2.86	4.32	9.34	17.4	4.80	3.77
30	*11.4	4.48	7.80	3.89	1.67	1.14	2.43	---	9.57	5.98	4.16	13.3
31	6.74	3.32	---	3.32	---	1.28	2.22	---	4.48	---	3.66	---
Total	417.00	137.13	147.02	369.15	250.69	78.36	241.64	505.17	342.43	291.61	485.69	87.56
Mean												
Mgd	13.4	4.42	4.90	11.9	8.36	2.53	7.80	17.4	11.0	9.72	15.7	2.92
Cfs	20.7	6.84	7.58	18.4	12.9	3.91	12.1	26.9	17.0	15.0	24.3	4.52
Ac-ft	1,280	421	451	1,130	769	240	742	1,550	1,050	995	1,490	269

Calendar Year 1963: Max 171 Min 0.73 Mean mgd 8.91 Mean cfs 13.8 Ac-ft 9,970
Fiscal Year 1963-64: Max 97.9 Min 1.14 Mean mgd 9.16 Mean cfs 14.2 Ac-ft 10,290

* Discharge measurement made on this day.

Peak discharge (base, 350 mgd)

Date	Time	Gage height	Discharge Mgd	Discharge Cfs	Date	Time	Gage height	Discharge Mgd	Discharge Cfs
2-23	0900	5.24	539	834	3-8	0500	4.92	427	661

5380. Spreckels ditch at Haipuaena weir, near Huelo

Location.--Lat 20°51'15", long 156°11'25", on right bank near Spreckels ditch trail between Haipuaena and Puohokamoa Streams, 2.7 miles west of Keanae, and 4.5 miles southeast of Huelo.

Records available.--April 1922 to June 1964. Published as "at Haipuaena, near Huelo" 1930-35.

Gage.--Water-stage recorder and sharp-crested weir. Datum of gage is 1,470.96 ft above mean sea level (East Maui Irrigation Co. bench mark). Apr. 29, 1922, to Feb. 19, 1930, at same site at different datum. Feb. 20, 1930, to Oct. 25, 1935, at site 100 ft upstream at different datum.

Average discharge.--41 years (1922-29, 1930-64), 13.6 mgd (21.0 cfs).

Extremes.--1922-64: Maximum daily discharge, 97 mgd (150 cfs) Feb. 10, 1955, Feb. 18, 1956; no flow at times.

Remarks.--Records fair. Spreckels ditch diverts from all streams between the Nuaailua and the Kailua above Koolau ditch east of the Puohokamoa and below Koolau ditch west of the Puohokamoa. About 4 mgd was diverted above station to East Maui Irrigation Co. powerplant at Kolea Gulch prior to June 30, 1961, when the plant was abandoned. Water used for domestic supply and irrigation in central Maui.

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	40.0	4.90	8.81	39.1	9.89	13.6	13.4	6.00	21.9	11.7	23.9	10.7
2	26.1	7.35	7.78	70.1	9.08	10.9	20.9	5.52	20.6	10.4	28.3	9.89
3	9.08	12.0	11.8	26.1	8.00	6.65	40.4	5.30	7.10	9.08	17.3	9.08
4	6.65	10.4	7.78	17.2	7.10	6.00	53.5	4.72	9.85	8.00	6.78	8.27
5	4.38	9.62	7.10	12.6	6.20	5.10	37.4	4.38	12.9	7.55	22.6	7.78
6	3.90	9.08	8.00	21.1	6.00	4.38	50.2	4.55	10.7	10.7	29.2	7.32
7	3.62	8.81	6.65	31.7	30.7	11.6	18.4	4.90	47.6	11.0	23.9	7.55
8	3.34	7.78	6.20	88.4	*70.0	8.31	19.1	7.50	53.2	25.0	16.1	8.54
9	4.05	7.10	6.88	48.5	46.6	5.30	10.4	30.7	47.0	51.7	17.5	6.42
10	5.86	8.56	5.30	20.2	62.2	6.22	9.35	28.1	38.0	36.3	38.8	6.00
11	3.90	46.5	*5.30	14.3	19.8	10.4	15.1	30.3	21.0	16.6	25.6	6.20
12	2.92	19.8	25.3	12.0	13.6	5.30	13.3	37.3	14.7	17.2	39.1	7.10
13	2.92	9.62	48.3	10.7	13.9	4.72	8.81	32.0	12.3	10.4	35.7	5.75
14	3.20	7.55	19.2	33.1	15.4	4.90	4.90	44.7	11.0	10.2	24.4	6.45
15	4.12	6.42	10.4	11.7	44.9	6.28	5.52	64.9	10.7	8.81	14.3	9.62
16	7.97	6.00	14.5	10.2	37.5	18.8	70.6	42.8	10.2	8.00	11.0	7.78
17	37.8	5.52	53.8	10.0	50.3	49.3	39.2	18.6	8.00	*18.4	9.62	6.42
18	16.5	5.52	48.2	22.5	18.1	13.5	12.5	6.95	5.03	8.00	3.22	6.20
19	31.3	4.90	13.9	63.6	12.6	7.78	5.75	10.4	3.20	7.55	5.88	5.10
20	47.2	4.72	10.2	76.8	10.7	6.65	5.75	6.88	4.05	10.4	75.0	5.75
21	12.0	4.72	11.6	27.0	9.62	5.75	6.00	5.75	3.48	11.1	60.7	19.8
22	14.4	5.30	11.7	15.8	8.27	11.4	4.38	61.6	3.20	14.8	41.6	14.8
23	6.65	39.2	8.00	24.0	7.78	32.0	3.90	67.0	4.30	44.2	75.0	23.4
24	6.20	59.7	11.6	*60.3	7.32	7.32	9.98	38.4	2.28	75.0	66.3	9.89
25	8.54	21.5	9.62	29.2	7.32	6.00	15.4	17.2	.61	70.2	74.2	11.7
26	17.9	25.5	7.55	20.2	21.9	5.52	4.72	10.5	8.92	40.8	55.0	10.6
27	45.3	13.3	6.88	13.6	8.27	5.30	12.9	21.1	23.7	19.3	36.0	9.62
28	10.2	12.9	14.4	18.2	6.88	4.72	4.90	6.88	66.0	43.1	22.2	6.42
29	16.0	15.7	46.2	42.4	6.65	4.55	4.38	6.65	36.5	48.6	16.9	15.3
30	*13.7	17.7	32.2	13.9	6.42	4.38	3.90	---	36.7	21.8	13.9	41.4
31	6.88	10.7	---	11.0	---	5.18	5.10	---	16.6	---	12.3	---
Total	422.58	428.37	485.15	915.5	583.00	297.81	530.04	631.58	571.32	685.89	942.30	310.85
Mean												
Mgd	13.6	13.8	16.2	29.5	19.4	9.61	17.1	21.8	18.4	22.9	30.4	10.4
Cfs	21.0	21.4	25.1	45.6	30.0	14.9	26.5	33.7	28.5	35.4	47.0	16.1
Ac-ft	1,300	1,310	1,490	2,810	1,790	914	1,630	1,940	1,750	2,100	2,890	954

Calendar Year 1963: Max 88.4 Min 0 Mean mgd 16.7 Mean cfs 25.8 Ac-ft 18,700
Fiscal Year 1963-64: Max 88.4 Min 0.61 Mean mgd 18.6 Mean cfs 28.8 Ac-ft 20,880

* Discharge measurement made on this day.

5410. Koolau ditch at Haipuaena, near Huelo

Location.--Lat 20°51'17", long 156°11'19", on right bank at Haipuaena Stream, 1,000 ft upstream from intake at Puohokamoa Stream, 3.3 miles southeast of Kailua, and 4.5 miles southeast of Huelo.

Records available.--April 1932 to June 1964.

Gage.--Water-stage recorder and Parshall flume. Altitude of gage is 1,240 ft (from topographic map). Prior to Mar. 21, 1933, at datum 1.94 ft lower, and Mar. 21, 1933, to Mar. 20, 1935, at datum 0.25 ft lower than present datum.

Average discharge.--32 years, 78.0 mgd (121 cfs).

Extremes.--1932-64: Maximum daily discharge, 194 mgd (300 cfs) July 1, 17, 1963; no flow at times.

Remarks.--Records good except those for period of no gage-height record, which are fair. Ditch is extension of Wailoa ditch east of Alo Stream; it receives water from Makapipi ditch at Kanawi Stream and diverts from nearly all streams from there west to the Alo. Water is used for power, domestic supply, and irrigation in central Maui.

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	194	95.0	43.7	105	48.8	48.8	44.5	37.0	162	63.0	99.0	64.6
2	178	76.0	40.2	169	44.0	53.1	61.7	34.3	183	55.8	107.0	60.6
3	136	61.4	50.5	104	41.6	34.3	141	32.5	148	50.8	77.2	56.2
4	114	56.2	40.6	88.2	39.0	32.2	138	30.7	107	46.4	113	53.2
5	83.0	52.0	38.2	68.1	37.8	31.9	144	29.2	83.5	44.0	149	50.4
6	71.0	49.6	40.6	100	37.8	29.8	99.6	28.9	72.0	50.4	120	48.0
7	62.6	46.8	36.7	130	83.2	38.9	12.0	30.4	160	50.8	121	45.2
8	59.0	44.4	34.3	160	156	34.6	.45	31.6	177	88.3	85.8	42.8
9	78.6	43.4	34.3	150	125	28.9	.85	93.9	*177	175	89.0	41.3
10	101	43.7	30.4	96	161	*37.8	1.30	144	161	143	141	39.4
11	71.3	124	30.4	88	112	50.8	.95	114	119	81.6	119	37.4
12	55.0	78.2	69.5	60	73.2	29.8	21.6	169	91.0	72.8	145	36.4
13	55.0	50.8	125	55	62.6	27.4	44.4	173	77.2	52.0	127	34.9
14	57.4	43.7	60.0	95	64.2	28.9	41.6	175	69.5	46.4	82.9	34.6
15	67.6	41.0	38.6	54	102	28.9	61.6	173	63.4	42.5	70.3	40.6
16	117	38.2	37.4	48	128	44.6	177	158	39.0	40.2	64.6	36.1
17	194	36.1	132	45	133	109	167	108	54.7	53.2	57.4	32.5
18	144	35.5	134	63	78.9	45.1	145	91.5	54.1	37.4	55.4	32.2
19	117	34.3	65.4	135	60.2	32.8	82.0	112	56.7	40.1	56.7	29.5
20	191	32.8	51.6	155	55.0	29.8	82.2	89.0	57.0	61.7	181	34.4
21	170	31.0	49.2	105	51.2	27.4	81.5	69.8	52.6	41.9	180	70.1
22	163	30.1	47.2	70	45.6	28.1	55.4	180	59.6	*44.7	153	53.3
23	101	86.3	38.6	75	42.2	76.0	48.8	186	57.8	142	182	83.7
24	105	131	38.6	160	39.4	30.4	75.1	186	68.3	182	180	44.0
25	125	71.6	39.0	115	38.5	27.4	160	184	64.4	182	182	51.8
26	149	89.5	33.1	81.5	75.9	25.6	65.0	155	90.6	154	173	47.8
27	186	63.8	31.0	61.4	42.2	25.6	142	131	90.6	82.0	150	51.3
28	166	61.0	55.5	66.4	36.4	24.7	63.8	106	181	111	112	39.0
29	*173	62.2	131	121	37.5	23.5	53.5	93.5	142	164	91.5	58.8
30	161	64.2	98.9	60.2	40.2	22.9	49.2	---	140	92.5	80.0	139
31	119	51.6	---	53.5	---	25.2	45.2	---	80.0	---	71.5	---
Total	3764.5	1825.4	1695.5	2937.3	2092.4	1134.2	2306.25	3146.3	3139.0	2491.5	3616.3	1489.1
Mean												
Mgd	121	58.9	56.5	94.8	69.7	36.6	74.4	108	101	83.0	117	49.6
Cfs	187	91.1	87.4	147	108	56.6	115	167	156	128	181	76.7
Ac-ft	11550	5600	5200	9010	6420	3480	7080	9660	9630	7650	11100	4570

Calendar Year 1963: Max 194 Min 9.24 Mean mgd 72.0 Mean cfs 111 Ac-ft 80690
Fiscal Year 1963-64: Max 194 Min 0.45 Mean mgd 81.0 Mean cfs 125 Ac-ft 90950

* Discharge measurement made on this day.
Note.--No gage-height record Oct. 6-25.

5415. Manuel Luis ditch at Puohokamoa Gulch, near Huelo

Location.--Lat 20°51'48", long 156°11'00", on right bank at lower portal of tunnel between Haipuaena and Puohokamoa Streams, 2.2 miles west of Keanae, and 4.4 miles southeast of Huelo.

Records available.--December 1917 to November 1924, January 1925 to June 1964.

Gage.--Water-stage recorder and sharp-crested weir. Altitude of gage is 920 ft (from topographic map).

Average discharge.--45 years (1918-24, 1925-64), 5.71 mgd (8.83 cfs).

Extremes.--1917-64: Maximum daily discharge, 92 mgd (142 cfs) Jan. 3, 1927; no flow at times.

Remarks.--Records good. Ditch is extension of Center ditch and picks up water from streams between Kolea and Waikamoi Streams for irrigation in central Maui.

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	36.4	1.70	0.54	0.85	0.85	0.93	0.66	0.54	19.3	0.72	1.70	1.00
2	10.4	1.38	.48	14.0	.78	.72	3.14	.48	46.3	.60	1.53	.85
3	1.45	1.07	.72	1.07	.72	.48	13.7	.48	2.61	.54	1.23	.85
4	1.23	.85	.54	1.00	.66	.42	12.3	.42	1.45	.54	9.01	.78
5	1.07	.78	.48	.93	.60	.48	4.55	.37	1.23	.48	9.73	.72
6	.93	.66	.48	.78	.54	.37	47.2	.42	1.07	.54	1.53	.60
7	.85	.60	.37	1.86	11.9	1.78	26.0	.42	17.0	.54	1.45	.54
8	.85	.54	.32	59.5	32.1	.85	6.41	.37	41.7	.54	1.07	.48
9	.93	.54	.42	8.00	27.0	.54	3.54	.48	7.74	3.33	.93	.42
10	1.23	.54	.32	4.68	39.1	.80	1.89	18.1	*2.46	.93	2.03	.42
11	.85	2.92	.28	2.52	1.99	1.46	1.89	23.8	1.89	.60	1.30	.37
12	.66	1.61	* .54	1.15	1.45	.60	1.70	29.3	1.45	.78	2.34	.37
13	.66	.78	1.23	.93	1.15	.54	1.07	30.8	1.15	.48	1.67	.42
14	.60	.60	.78	1.90	1.07	.66	.85	30.0	1.00	.42	1.15	.37
15	1.08	.54	.48	.85	18.0	.72	.93	38.3	.85	.37	.85	.42
16	1.00	.54	.48	.72	7.59	1.15	14.4	6.80	1.36	.48	.72	.42
17	2.96	.54	19.1	.66	24.2	13.4	7.46	.85	.78	.93	.66	.32
18	2.47	.48	10.4	1.45	2.66	1.45	1.39	.85	.66	.42	2.30	.28
19	14.6	.42	2.73	18.6	1.89	1.00	.72	2.22	.54	.42	3.74	.23
20	35.0	.42	.85	47.6	1.45	.85	.72	1.77	.66	1.00	67.3	.32
21	4.80	.37	.72	2.88	1.15	.78	*.78	1.00	.54	.66	17.90	.66
22	6.71	.32	.60	1.80	1.00	.80	.66	38.4	.42	.54	2.18	.78
23	2.55	1.33	.54	3.10	.85	2.30	.60	44.5	.42	7.65	63.5	2.07
24	2.55	33.8	.54	8.18	.78	.72	7.58	64.5	7.30	39.2	27.0	.72
25	3.82	1.38	.48	*2.08	.72	.60	11.4	28.7	4.68	37.4	68.4	.85
26	7.22	1.45	.48	2.46	1.07	.54	.85	3.45	3.00	3.28	19.9	.72
27	21.0	.93	.42	1.53	.72	.54	7.20	15.0	4.69	1.45	4.94	.48
28	4.68	.85	.72	1.30	.60	.48	.78	1.61	35.3	27.4	2.77	.37
29	6.22	.78	1.89	2.18	.54	.42	.66	1.38	1.38	11.3	1.89	.60
30	5.00	.66	1.30	1.23	.48	.42	.60	---	1.70	2.46	1.53	2.44
31	2.36	.54	---	1.00	---	.42	.60	---	.93	---	1.23	---
Total	182.13	71.89	49.23	196.79	183.61	37.22	182.23	385.31	211.56	146.00	323.48	19.87
Mean												
Mgd	5.88	2.32	1.64	6.35	6.12	1.20	5.88	13.3	6.82	4.87	10.4	0.662
Cfs	9.10	3.59	2.54	9.82	9.47	1.86	9.10	20.6	10.6	7.54	16.1	1.02
Ac-ft	559	221	151	604	563	114	559	1180	649	448	993	61

Calendar Year 1963: Max 59.8 Min 0.08 Mean mgd 6.15 Mean cfs 9.52 Ac-ft 6890
Fiscal Year 1963-64: Max 68.4 Min 0.23 Mean mgd 5.44 Mean cfs 8.42 Ac-ft 6100

* Discharge measurement made on this day.

5430. Middle Branch Puohokamoa Stream at Haiku-uka boundary, near Kailiili

Location.--Lat 20°49'42", long 156°12'50", on left bank 200 ft downstream from Haiku-uka trail crossing, 4.0 miles east of Kailiili, and 4.5 miles south of Kailua.

Drainage area.--0.48 sq mi.

Records available.--March 1919 to February 1927, July 1932 to June 1934, June 1962 to June 1964.

Gage.--Water-stage recorder and masonry control. Altitude of gage is 2,900 ft (from topographic map). Prior to June 12, 1962, at site 200 ft upstream at different datum.

Extremes.--Maximum discharge during year, 141 mgd (218 cfs) Feb. 23 (gage height, 3.68 ft), from rating curve extended above 9.0 mgd as explained below; minimum, 0.10 mgd (0.16 cfs) Dec. 13-15, 21, 22.
1962-64: Maximum discharge, 174 mgd (269 cfs) May 14, 1963 (gage height, 4.02 ft), from rating curve extended above 9.0 mgd on basis of slope-conveyance study; minimum, 0.04 mgd (0.06 cfs) Nov. 12, 16-20, 1962.

Remarks.--Records good except those above 20 mgd, which are poor. Kula pipeline diverts above station at altitudes 4,300 ft (since 1934) and 3,200 ft (since 1944) for domestic use.

Rating table (gage height, in feet, and discharge, in million gallons a day)

0.6	0.08	1.0	3.05
.7	.28	1.2	6.70
.8	.78	1.5	14.5
.9	1.70	2.0	32.4

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	20.8	1.28	0.35	3.44	1.00	0.19	0.54	0.49	7.93	1.18	1.59	1.00
2	7.62	1.00	.28	9.58	.85	.19	1.31	.49	10.5	1.00	1.48	.85
3	2.46	.85	.28	2.07	.85	.17	3.36	.44	2.33	.92	1.18	.59
4	1.82	.78	.22	1.28	.78	.17	1.08	.39	1.70	.85	1.18	.49
5	1.38	.65	.19	1.00	.71	.15	1.48	.35	1.48	.78	1.70	.44
6	1.18	.59	.17	2.17	.65	.13	2.67	.35	1.18	1.00	1.94	.39
7	1.08	.59	.17	2.90	4.48	.22	1.28	.35	7.31	1.00	1.18	.44
8	1.00	.65	.17	17.3	7.38	.28	1.00	.35	16.6	3.59	1.00	.54
9	1.18	.59	.15	4.30	10.5	.13	.59	2.20	5.10	*7.39	1.00	.35
10	1.70	.59	.15	1.94	12.1	.12	.54	4.54	3.05	3.48	1.82	.28
11	1.08	2.46	.13	1.38	2.07	.19	.71	6.49	1.82	1.38	1.38	.28
12	.65	1.08	1.77	1.18	1.48	.12	.65	9.17	1.48	1.28	2.37	.35
13	.59	.78	3.66	1.00	1.28	.10	.54	10.5	1.28	1.00	2.33	.22
14	.59	.49	1.28	*2.37	1.28	.10	.44	13.7	1.08	.85	1.08	.25
15	.71	.39	.65	1.18	2.56	.12	.85	14.2	1.28	.78	.78	.49
16	*2.54	.28	1.00	1.00	2.33	.25	14.4	4.16	1.18	.78	.65	.39
17	13.9	.28	5.79	.92	3.36	1.22	6.47	1.94	1.00	.85	.54	.28
18	4.13	.25	4.48	1.08	1.48	.44	3.22	1.48	.85	.71	.44	.25
19	7.51	.22	1.18	8.04	1.08	.15	1.28	1.70	.78	.65	.39	.19
20	10.9	.19	.85	12.6	1.00	.12	1.08	1.28	1.08	.78	21.6	.17
21	2.33	.17	.85	2.07	.92	.10	1.18	1.08	1.00	1.28	6.10	.59
22	3.35	.15	.78	1.38	.85	.95	.78	13.2	.85	1.18	3.66	.54
23	1.70	4.83	.65	2.60	.78	2.82	.65	25.8	1.28	4.30	24.7	1.84
24	1.48	5.08	1.00	5.48	.71	.44	1.75	15.7	3.07	16.0	5.90	.54
25	1.48	1.00	1.00	2.20	*.65	.31	3.16	*5.10	1.18	13.1	13.9	.59
26	3.57	1.38	.85	1.48	1.08	.28	.85	3.50	1.08	2.90	*6.10	.59
27	8.78	.78	.71	1.28	.65	.28	2.46	6.25	5.86	1.59	3.05	.35
28	2.90	*.54	1.06	1.93	.54	.25	.92	1.94	10.3	8.78	1.94	.25
29	3.50	.54	3.66	3.35	.39	.19	.71	1.59	3.20	4.70	1.48	.39
30	2.90	.65	2.20	1.28	.17	.17	.59	----------	2.75	1.82	1.38	3.24
31	2.07	.44	----------	1.08	----------	.22	.54	----------	1.48	----------	1.18	----------
Total	116.88	29.55	35.68	100.86	63.96	10.57	57.08	148.73	101.06	85.90	115.02	17.16
Mean												
Mgd	3.77	0.953	1.19	3.25	2.13	0.341	1.84	5.13	3.26	2.86	3.71	0.572
Cfs	5.83	1.47	1.84	5.03	3.30	0.528	2.85	7.94	5.04	4.43	5.74	0.885
Ac-ft	359	91	109	310	196	32	175	456	310	264	353	53

Calendar Year 1963: Max 32.5 Min 0.05 Mean mgd 2.25 Mean cfs 3.48 Ac-ft 2.520
Fiscal Year 1963-64: Max 25.8 Min 0.10 Mean mgd 2.41 Mean cfs 3.73 Ac-ft 2.710

* Discharge measurement made on this day.

Peak discharge (base, 87 mgd)

Date	Time	Gage height	Discharge Mgd	Discharge Cfs	Date	Time	Gage height	Discharge Mgd	Discharge Cfs
7-19	1400	3.16	98.2	152	2-23	0900	3.68	141	218

5450. Puohokamoa Stream above Spreckels ditch, near Huelo

Location.--Lat 20°51'21", long 156°11'29", on right bank 150 ft upstream from Spreckels ditch inflow and trail crossing, 3.2 miles southeast of Kailua, and 4.4 miles southeast of Huelo.

Drainage area.--2.35 sq mi.

Records available.--June 1913 to June 1964. Monthly discharge only for some periods, published in WSP 1319. Prior to July 1954, published as "Puohokamoa Stream near Huelo." Records for December 1910 to May 1913 at site 700 ft downstream not equivalent owing to inflow of Spreckels ditch.

Gage.--Water-stage recorder and masonry control. Datum of gage is 1,322.04 ft above mean sea level (East Maui Irrigation Co. bench mark). Prior to May 31, 1934, at site 130 ft downstream at different datum.

Average discharge.--51 years, 21.2 mgd (32.8 cfs).

Extremes.--Maximum discharge during year, 580 mgd (897 cfs) Feb. 23 (gage height, 4.62 ft); minimum, 1.74 mgd (2.69 cfs) Dec. 30, 31.
1913-64: Maximum discharge, 2,360 mgd (3,650 cfs) Apr. 16, 1960 (gage height, 9.31 ft), from rating curve extended above 410 mgd by logarithmic plotting; minimum, 0.4 mgd (0.6 cfs) Oct. 26, 1917.

Remarks.--Records good. Kula pipeline diverts above station at altitudes 4,300 ft (since 1934) and 3,200 ft (since 1944) for domestic use.

Rating table (gage height, in feet, and discharge, in million gallons a day)

0.7	1.86	1.2	17.0
.8	3.44	1.5	36.0
.9	5.62	2.0	86.0
1.0	8.60	3.0	252

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	132	11.3	4.42	22.8	5.89	4.95	4.62	3.79	49.9	7.29	14.6	*7.29
2	58.0	8.26	3.79	68.8	5.10	5.39	12.7	3.44	72.0	6.43	16.1	6.43
3	17.6	7.00	5.10	16.5	4.85	2.74	34.8	3.06	15.6	5.62	10.1	5.62
4	13.8	6.16	3.60	8.98	4.62	2.74	27.3	2.90	11.6	5.10	13.8	5.10
5	9.36	5.62	3.24	6.71	3.99	2.42	18.5	2.74	9.74	4.62	22.6	4.62
6	7.60	5.35	3.44	10.4	3.99	2.27	45.6	2.74	7.92	5.89	19.2	4.20
7	6.43	5.10	3.06	19.6	34.2	4.94	14.8	2.90	58.2	5.89	12.4	3.99
8	5.89	4.85	2.90	166	59.7	3.24	8.60	3.06	137	15.0	9.36	3.99
9	7.00	4.85	3.44	31.6	89.7	2.27	5.10	16.1	34.3	43.2	9.36	3.44
10	11.5	5.39	2.58	13.3	92.5	*2.42	4.62	35.9	*23.1	22.0	25.1	3.06
11	7.00	25.7	2.42	8.60	13.3	3.79	6.16	47.0	13.3	9.74	14.2	2.90
12	4.62	10.9	*13.2	7.00	8.98	2.27	6.16	69.2	10.1	9.74	24.9	2.90
13	4.42	6.43	26.1	6.16	8.60	2.13	4.20	64.3	8.60	6.16	22.3	2.74
14	4.42	5.10	9.96	18.9	8.98	2.27	3.44	69.2	7.60	5.62	13.3	2.90
15	6.16	4.20	4.85	6.71	37.3	2.58	5.35	83.4	7.00	4.85	8.60	4.20
16	16.2	3.79	7.95	5.35	21.9	6.43	73.3	29.7	7.29	4.62	7.00	3.60
17	58.8	3.06	54.6	5.10	42.9	*28.3	39.6	13.8	5.89	9.87	5.89	3.06
18	26.9	3.06	33.4	10.9	11.3	6.93	16.8	11.6	5.35	4.62	5.10	2.90
19	56.6	2.90	7.92	57.2	7.60	3.79	8.26	13.3	4.85	4.42	6.75	2.42
20	136	2.74	5.62	118	6.43	2.90	7.60	10.5	9.37	5.10	204	2.58
21	21.4	2.42	5.10	15.6	5.62	2.58	*7.92	8.26	6.71	5.62	58.1	11.1
22	23.8	2.27	5.10	9.74	5.10	3.96	5.35	103	5.10	6.71	28.7	7.00
23	11.6	27.0	3.99	14.2	4.42	19.7	4.62	138	5.10	32.8	193	12.8
24	11.3	48.2	4.56	44.2	3.99	3.60	14.3	118	11.2	98.1	62.5	5.10
25	13.8	10.5	4.42	16.6	3.99	2.74	23.7	38.5	6.43	106	136	5.10
26	32.2	13.8	3.24	11.3	10.8	2.42	6.43	18.1	6.43	26.9	48.2	4.85
27	73.8	7.00	3.06	7.92	4.42	2.27	22.2	29.2	23.3	12.4	23.7	4.85
28	20.3	6.43	4.34	9.66	3.60	2.13	7.00	12.0	91.7	80.4	15.2	3.44
29	26.7	7.60	23.4	28.0	3.60	1.99	5.35	10.9	20.8	36.1	12.0	6.71
30	27.1	8.98	15.4	8.60	2.90	1.86	4.85	---	22.6	13.8	9.74	21.1
31	15.6	5.62	---	6.71	---	1.99	4.42	---	9.74	---	8.26	---
Total	867.90	271.58	274.20	781.14	520.27	140.01	453.65	964.59	707.82	604.61	1,060.06	159.99
Mean												
Mgd	28.0	8.76	9.14	25.2	17.3	4.52	14.6	33.3	22.8	20.2	34.2	5.33
Cfs	43.3	13.6	14.1	39.0	26.8	6.99	22.6	51.5	35.3	31.3	52.9	8.25
Ac-ft	2660	833	841	2400	1600	430	1390	2960	2170	1860	3250	491

Calendar Year 1963: Max 256 Min 1.17 Mean mgd 18.2 Mean cfs 28.2 Ac-ft 20430
Fiscal Year 1963-64: Max 204 Min 1.86 Mean mgd 18.6 Mean cfs 28.8 Ac-ft 20880

Peak discharge (base, 750 mgd).--No peak above base.

* Discharge measurement made on this day.

5528. Waikamoi Stream above reservoir at Kula pipeline intake, near Olinda

Location (revised).--lat 20°48'27", long 156°14'02", on left bank 1,000 ft upstream from Kula pipeline intake and 3.3 miles east of Olinda Prison Camp.

Drainage area.--2.50 sq mi.

Records available.--July 1953 to June 1964. Prior to July 1956, published as Waiakamoi Stream above reservoir at Kula pipeline intake, near Olinda.

Gage.--Water-stage recorder and concrete control. Datum of gage is 4,487 ft above mean sea level (levels by Maui County Waterworks).

Average discharge.--10 years (1954-64), 1.46 mgd (2.26 cfs).

Extremes.--Maximum discharge during year, 136 mgd (210 cfs) Feb. 23 (gage height, 2.81 ft), from rating curve extended above 6.4 mgd as explained below; minimum, 0.01 mgd (0.02 cfs) on several days.
1953-64: Maximum discharge, 1,680 mgd (2,600 cfs) Dec. 10, 1954 (gage height, 8.16 ft), from rating curve extended above 6.4 mgd on basis of computation of peak flow over dam; no flow at times.

Remarks.--Records good except those above 10 mgd, which are fair. No diversion above station.

Reting table (gage height, in feet, and discharge, in million gallons a day)

0.1	0.01	0.8	1.70
.2	.05	1.0	6.20
.3	.14	1.2	12.5
.4	.28	1.5	25.0
.6	.74	2.0	56.0

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	8.68	0.09	0.04	0.48	0.05	0.01	0.07	0.04	2.94	0.25	0.23	0.04
2	2.25	.06	.03	2.58	.04	.02	.16	.03	5.25	.28	.12	.04
3	.63	.04	.02	.45	.03	.02	.53	.02	.80	.12	.08	.04
4	.30	.04	.02	.16	.03	.02	.16	.02	.43	.08	.06	.03
5	.14	.03	.02	.11	.02	.02	.25	.02	.30	.08	.07	.03
6	.08	.03	.02	.52	.02	.02	.49	.02	.15	.12	.11	.03
7	.06	.04	.02	.57	.30	.03	.56	.03	1.34	*.09	.07	.04
8	.05	.05	.02	3.96	3.88	.04	.46	.07	17.3	.36	.05	.04
9	.05	.05	.02	1.52	5.59	.02	.10	.36	1.70	2.05	.08	.03
10	.16	.04	.02	.25	6.79	.02	.05	.60	1.02	1.28	.08	.03
11	.16	.25	.01	.10	.50	.03	.05	.88	.37	.26	.10	.04
12	.08	.14	.08	.06	.18	.02	.05	2.26	.26	.16	.11	.04
13	.07	.08	.30	.04	.09	.02	.04	4.97	.10	.08	.20	.03
14	.08	.05	.18	.15	.07	.02	.04	9.67	.07	.05	.11	.04
15	.07	.04	.07	.07	.10	.02	.07	8.79	.07	.04	.07	.04
16	.19	.04	.20	.05	.18	.02	8.15	1.66	.08	.04	.04	.04
17	4.36	.04	1.55	*.04	.18	.03	6.30	.37	.05	.04	.04	.03
18	1.84	.04	1.60	.04	.11	.03	1.34	.58	.04	.03	.03	.04
19	*2.45	.04	.16	1.80	.05	.02	.36	.83	.04	.09	.03	.04
20	1.40	.04	.08	5.67	.04	.01	.12	.26	.13	.53	2.83	.04
21	.37	.03	.05	.54	.03	.01	.08	.15	.12	.79	1.13	.06
22	.77	.03	.04	.14	.03	.16	.06	5.46	.11	.43	.57	.06
23	.25	.69	.03	.27	.02	.63	.04	26.5	.92	.99	12.6	.18
24	.11	1.53	.04	1.96	.02	.07	.14	6.25	1.72	11.1	1.74	.14
25	.08	.19	.06	.31	.02	.03	.45	1.54	.60	4.40	4.88	.22
26	.14	.16	.08	.13	.06	.03	.12	1.84	.35	.69	2.07	.17
27	2.09	.09	.08	.07	.04	.05	.20	*4.75	1.54	.25	.82	.08
28	.48	.07	.09	.15	.03	.03	.09	.61	4.70	3.47	.31	.05
29	.65	.07	.52	.76	.02	.02	.06	.30	.80	2.28	.13	.05
30	.28	.07	.33	.16	.01	.02	.05	----------	.86	.54	.08	.30
31	.15	.05	----------	.07	----------	.03	.04	----------	.60	----------	.05	----------
Total	28.47	4.21	5.78	23.18	18.53	1.52	20.68	78.88	44.76	30.97	28.89	2.04
Mean												
Mgd	0.918	0.136	0.193	0.748	0.618	0.049	0.667	2.72	1.44	1.03	0.932	0.068
Cfs	1.42	0.210	0.299	1.16	0.956	0.076	1.03	4.21	2.23	1.59	1.44	0.105
Ac-ft	87	13	18	71	57	4.7	63	242	137	95	89	6.3

Calendar Year 1963: Max 64.8 Min 0 Mean mgd 0.905 Mean cfs 1.40 Ac-ft 1.010
Fiscal Year 1963-64: Max 26.5 Min 0.01 Mean mgd 0.787 Mean cfs 1.22 Ac-ft 883

* Discharge measurement made on this day.

Peak discharge (base, 130 mgd)

Date	Time	Gage height	Discharge	
			Mgd	Cfs
2-23	1200	2.81	136	210

5700. Kailiilihaele Stream near Huelo

Location.--Lat 20°52'28", long 156°13'06", on left bank 200 ft upstream from Wailoa ditch intake, 1,000 ft upstream from New Hamakua ditch trail, 1.5 miles south of Kailua, and 2.4 miles southeast of Huelo Church.

Drainage area.--3.58 sq mi.

Records available.--December 1910 to December 1911, October 1913 to June 1918, August to October 1919, December 1919 to June 1924, January 1925 to June 1964. Gage-height records for July to December 1912 at site 700 ft downstream not equivalent owing to diversion. Monthly discharge only for some periods, published in WSP 1319.

Gage.--Water-stage recorder and masonry control. Datum of gage is 1,205 ft above mean sea level (by vertical angles). Dec. 9, 1910, to Dec. 31, 1911, staff gage at site 300 ft downstream at different datum. Oct. 8, 1913, to Mar. 20, 1922, at present site at datum 0.50 ft higher.

Average discharge.--47 years (1914-18, 1920-24, 1925-64), 24.5 mgd (37.9 cfs).

Extremes.--Maximum discharge during year, 1,140 mgd (1,760 cfs) Mar. 8 (gage height, 6.98 ft), from rating curve extended above 390 mgd as explained below; minimum, 3.56 mgd (5.51 cfs) June 19, 20.
1910-11, 1913-64: Maximum discharge, 4,140 mgd (6,410 cfs) Nov. 18, 1930 (gage height, 10.74 ft), from rating curve extended above 390 mgd by logarithmic plotting; minimum, 0.45 mgd (0.70 cfs) July 14, 1920.

Remarks.--Records good except those above 800 mgd, which are fair. No diversion above station since 1922. All low flow diverted into Wailoa ditch (see p. 137) 200 ft below station for domestic supply, power, and irrigation.

Rating table (gage height, in feet, and discharge, in million gallons a day)

1.9	3.35	2.7	40.0
2.0	5.40	3.0	70.0
2.2	11.4	3.5	135
2.4	20.3	4.0	215

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	102	13.5	7.22	24.6	8.00	7.22	6.70	6.18	60.4	10.0	16.6	9.36
2	62.9	11.4	6.44	70.4	7.22	9.40	17.9	5.66	69.3	7.48	19.4	8.34
3	18.4	10.0	9.02	16.9	6.96	5.19	46.2	5.19	16.5	6.96	13.5	7.74
4	14.7	9.02	6.70	13.2	6.18	4.99	58.2	4.78	12.6	6.18	21.5	7.22
5	11.4	8.34	5.92	10.0	5.92	4.78	27.5	4.58	11.1	5.92	34.9	6.70
6	10.4	7.48	6.18	9.70	5.66	4.38	73.6	4.78	10.0	6.96	22.9	6.18
7	9.02	7.22	5.40	21.1	40.9	24.2	21.6	4.99	80.2	6.70	17.9	5.92
8	8.68	6.70	4.99	186	54.4	8.46	15.6	5.19	162	9.80	13.5	5.66
9	9.70	6.44	6.18	33.3	119	5.40	10.0	15.3	38.6	35.5	13.0	4.99
10	12.6	6.96	4.78	14.3	93.8	4.99	9.02	48.5	21.4	19.5	38.7	4.78
11	9.02	38.3	4.38	11.1	13.5	7.65	10.0	46.2	14.3	10.6	19.3	4.58
12	6.96	14.2	13.4	10.0	10.0	4.99	10.7	76.5	11.8	12.7	33.9	4.58
13	7.48	8.34	25.1	9.02	10.0	4.38	7.74	58.7	10.4	7.48	27.4	4.58
14	7.22	6.96	10.3	23.6	10.7	4.78	6.70	53.0	9.02	6.70	18.4	4.58
15	9.02	6.18	6.44	9.02	65.3	6.18	9.37	70.8	8.68	6.18	13.0	5.40
16	21.2	5.66	12.8	7.74	31.5	11.5	63.6	31.4	7.74	6.18	10.7	5.40
17	49.0	5.19	75.6	8.27	79.3	47.7	30.5	15.5	7.22	21.8	9.70	4.58
18	25.4	4.99	50.3	23.1	14.7	*9.70	14.7	13.9	6.44	6.70	8.68	4.38
19	98.5	4.78	11.1	69.4	10.7	7.22	10.4	18.5	6.18	6.44	11.5	3.96
20	176	4.78	8.68	160	9.36	6.18	10.4	16.6	12.6	8.68	206	4.38
21	27.3	4.38	8.00	20.3	8.34	5.40	10.4	12.6	7.74	7.48	73.8	15.3
22	17.9	4.17	7.74	13.0	7.48	11.2	8.34	112	6.18	7.22	31.2	10.5
23	14.7	25.1	6.44	26.2	6.96	26.5	7.48	93.2	5.66	34.0	202	12.7
24	15.1	73.9	6.18	52.0	6.18	6.70	26.0	108	5.92	90.3	89.1	7.22
25	19.2	14.0	5.66	19.7	5.92	5.66	29.0	53.3	5.92	121	177	7.48
26	46.7	16.3	5.19	14.3	16.9	5.19	9.70	18.9	5.92	34.3	63.5	6.70
27	94.9	10.0	4.78	10.7	7.22	4.99	27.0	18.9	14.0	14.7	27.3	6.96
28	25.4	9.70	6.42	12.5	5.66	4.58	9.70	13.0	100	106	17.9	5.40
29	36.5	10.4	23.0	*33.9	5.40	4.38	*8.00	11.8	18.9	38.6	14.3	10.7
30	26.8	12.4	18.7	10.7	5.19	4.38	7.48	---	24.6	*16.5	12.2	35.1
31	17.4	8.68	---	9.36	---	4.58	7.22	---	10.4	---	10.4	---
Total	1011.50	375.47	373.04	953.41	678.35	272.85	610.75	947.95	781.72	678.56	1289.18	231.37
Mean												
Mgd	32.6	12.1	12.4	30.8	22.6	8.80	19.7	32.7	25.2	22.6	41.6	7.71
Cfs	50.4	18.7	19.2	47.7	35.0	13.6	30.5	50.6	39.0	35.0	64.4	11.9
Ac-ft	3,100	1,150	1,140	2,930	2,080	837	1,870	2,910	2,400	2,080	3,960	710

Calendar Year 1963: Max 364 Min 2.55 Mean mgd 22.8 Mean cfs 35.3 Ac-ft 25,500
Fiscal Year 1963-64: Max 206 Min 3.96 Mean mgd 22.4 Mean cfs 34.7 Ac-ft 25,170

* Discharge measurement made on this day.

Peak discharge (base, 750 mgd)

Date	Time	Gage height	Discharge Mgd	Discharge Cfs	Date	Time	Gage height	Discharge Mgd	Discharge Cfs
7-20	0500	6.48	942	1,460	3-8	0530	6.98	1,140	1,760

5745. Kailua Stream near Kailiili

Location.--Lat 20°50'28", long 156°14'24", on right bank 0.4 mile downstream from Haiku-uka boundary trail, 2.1 miles east of Kailiili, and 3.9 miles south of Kailua.

Drainage area.--1.01 sq mi.

Records available.--June 1963 to June 1964.

Gage.--Water-stage recorder. Altitude of gage is 2,840 ft (from topographic map).

Extremes.--1963: Maximum discharge during period in June, 20.6 mgd (31.9 cfs) June 20 (gage height, 2.70 ft); minimum, 0.31 mgd (0.48 cfs) June 16.
1963-64: Maximum discharge during fiscal year, 402 mgd (622 cfs) Feb. 23 (gage height, 7.35 ft), from rating curve extended above 18 mgd by logarithmic plotting; minimum, 0.10 mgd (0.16 cfs) Sept. 11, 12.

Remarks.--Records good except those above 40 mgd, which are fair. Diversion above station at altitude 4,250 ft by Maui County Board of Water Supply for irrigation and domestic use.

Rating table (gage height, in feet, and discharge, in million gallons a day)

0.48	0.10	1.5	3.70
.5	.12	2.0	8.60
.6	.26	2.5	16.6
.7	.46	3.0	28.2
1.0	1.17	3.5	44.7
1.2	1.92	4.0	66.0

Discharge, in million gallons a day, 1963

June 14	*0.46	June 18	5.23	June 22	2.22	June 26	1.14
15	.37	19	1.84	23	2.65	27	.74
16	.33	20	10.0	24	2.97	28	.61
17	.75	21	6.82	25	2.11	29	.65
						30	1.75

Peak discharge (base, 200 mgd).--No peak above base.
* Discharge measurement made on this day.

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	39.6	0.65	0.23	1.99	0.52	0.18	0.17	0.35	11.0	0.85	1.20	0.59
2	12.1	.69	.20	16.0	.44	.23	.25	.31	21.9	.85	1.06	.52
3	2.90	.63	.18	2.90	.37	.18	3.00	.30	2.84	.65	.74	.44
4	1.47	.59	.17	1.01	.31	.18	1.09	.28	1.54	.52	.76	.39
5	1.01	.54	.15	.67	.26	.15	1.14	.23	1.14	.46	1.25	.35
6	.78	.52	.14	1.25	.23	.14	1.12	.20	.93	.50	1.79	.31
7	.65	.50	.13	2.67	2.95	.28	1.58	.18	7.16	.48	.81	.31
8	.61	.50	.12	27.4	16.1	.30	1.74	.21	55.8	1.34	.63	.33
9	.63	.50	.12	6.56	20.0	.20	.69	1.93	5.22	9.04	.59	.28
10	.83	.48	.11	1.43	30.5	.17	*.50	5.53	3.68	*4.73	1.57	.23
11	.81	1.27	.10	.85	2.17	.15	.52	9.71	1.54	1.27	1.06	.23
12	.61	.76	.17	.65	1.09	.14	.50	14.7	1.09	1.01	1.48	.21
13	.54	.56	1.17	.54	.83	.13	.39	18.7	.90	.69	2.17	.21
14	.52	.48	.81	1.74	.74	.12	.28	27.6	.76	.56	1.01	.20
15	.52	.44	.37	*.72	1.43	.11	.31	30.8	.74	.48	.69	.20
16	1.13	.42	.42	.50	1.95	.12	24.3	7.63	.72	.42	.54	.20
17	*22.5	.42	4.99	.42	2.33	.39	20.3	2.07	.54	.52	.48	.20
18	8.84	.39	6.59	.63	1.04	.31	5.73	1.34	.46	.39	.42	.20
19	3.96	.39	.90	5.47	.63	.21	1.71	1.58	.42	.31	.35	.18
20	14.7	.37	.52	25.0	.50	.18	1.09	1.12	.55	.33	30.1	.17
21	2.07	.35	.42	2.55	.42	.15	1.04	.88	1.09	.42	7.54	.42
22	2.37	.31	.37	1.04	.33	.24	.72	23.3	.72	.48	3.46	.46
23	1.20	1.96	.28	1.07	.30	6.22	.54	55.1	1.11	1.67	54.0	.67
24	.88	7.06	.23	8.99	.24	.74	1.02	22.9	1.62	27.9	7.06	.52
25	.78	.95	.23	2.32	.21	.37	4.21	5.50	1.06	19.4	18.6	.35
26	1.45	.72	.21	1.06	*.51	.23	.95	2.48	.74	3.10	6.21	.35
27	11.9	.50	.20	.76	.39	.26	2.64	10.1	2.57	1.24	*2.84	.39
28	2.48	.42	.18	.82	.24	.30	.98	2.12	15.6	11.8	1.43	.26
29	2.42	*.42	1.08	2.90	.20	.23	.63	1.43	3.29	5.99	1.01	.30
30	1.67	.50	1.34	.95	.18	.20	.52	---	2.60	1.50	.83	2.41
31	1.06	.31	---	.67	---	.17	.42	---	1.24	---	.72	---
Total	142.99	24.60	22.13	121.53	87.41	12.98	80.08	248.58	150.57	98.90	152.40	11.88
Mean												
Mgd	4.61	0794	0738	3.92	2.91	0419	2.58	8.57	4.86	3.30	4.92	0396
Cfs	7.13	1.23	1.14	6.07	4.50	0648	3.99	13.3	7.52	5.11	7.61	0613
Ac-ft	439	75	68	373	268	40	246	763	462	304	468	36

Calendar Year 1963: Max - Min - Mean mgd - Mean cfs - Ac-ft -
Fiscal Year 1963-64: Max 55.8 Min 0.10 Mean mgd 3.15 Mean cfs 4.87 Ac-ft 3,540

* Discharge measurement made on this day.

Peak discharge (base, 200 mgd)

Date	Time	Gage height	Discharge Mgd	Discharge Cfs	Date	Time	Gage height	Discharge Mgd	Discharge Cfs
2-23	1000	7.35	402	622	3-8	0630	6.40	267	413

5850. Hoolawanui Stream near Huelo

Location.--Lat 20°53'15", long 156°14'55", on right bank 250 ft upstream from Wailoa ditch intake, 2 miles west of Kailua, and 2 miles southwest of Huelo.

Drainage area.--1.34 sq mi.

Records available.--December 1910 to June 1964. Monthly discharge only for some periods, published in WSP 1319.

Gage.--Water-stage recorder and concrete control. Datum of gage is 1,219.42 ft above mean sea level (East Maui Irrigation Co. bench mark). Prior to June 20, 1914, staff gage at site 180 ft downstream at different datum. June 20, 1914, to Oct. 24, 1933, water-stage recorder at site 80 ft downstream at datum 4.43 ft lower.

Average discharge.--53 years (1911-64), 7.77 mgd (12.0 cfs).

Extremes.--Maximum discharge during year, 530 mgd (820 cfs) Mar. 8 (gage height, 3.20 ft), from rating curve extended above 92 mgd as explained below; minimum, 1.00 mgd (1.55 cfs) Sept. 11.
1910-64: Maximum discharge, 3,240 mgd (5,010 cfs) Apr. 27, 1950 (gage height, 5.94 ft), from rating curve extended above 92 mgd by logarithmic plotting; minimum, 0.15 mgd (0.23 cfs) Oct. 25, 1917.

Remarks.--Records good except those for period of no gage-height record and those above 200 mgd, which are fair. No diversion above station. All low flow diverted into Wailoa ditch (see p. 137) 250 ft below station for domestic supply, power, and irrigation.

Rating table (gage height, in feet, and discharge, in million gallons a day)

0.2	0.55	0.7	8.75
.3	1.15	.9	17.2
.4	2.20	1.2	36.7
.5	3.76	1.5	65.5
.6	5.95	2.0	140

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	18.3	*4.13	1.61	3.41	3.22	2.95	1.83	1.95	18	2.6	5.20	4.54
2	13.5	3.76	1.51	11.5	3.06	2.20	2.21	1.95	15	2.5	5.44	4.13
3	6.73	3.39	1.83	3.76	2.74	1.83	6.37	1.83	7.0	2.4	4.33	3.76
4	5.44	3.22	1.51	2.74	2.46	1.72	10.8	1.72	6.0	2.3	5.44	3.58
5	4.33	2.90	1.33	2.33	2.33	1.61	4.90	1.61	5.5	2.1	8.21	3.06
6	3.76	2.74	1.42	2.60	2.20	1.51	9.66	1.83	5.0	2.4	6.29	2.90
7	3.39	2.46	1.33	3.13	4.91	8.99	4.76	1.83	34	2.3	4.76	2.74
8	3.22	2.33	1.24	40.6	11.3	2.46	4.13	1.83	80	2.5	3.94	2.60
9	3.22	2.33	1.33	9.34	22.6	1.83	3.06	2.46	30	4.8	3.94	2.46
10	3.22	2.33	1.15	5.44	22.2	1.95	2.74	7.97	13	4.0	8.52	2.33
11	2.60	5.45	1.07	4.33	6.47	2.07	3.22	8.76	8.0	2.9	5.44	2.20
12	2.33	2.90	1.42	3.58	4.54	1.72	3.22	17.2	6.5	3.0	7.44	2.07
13	2.46	2.20	2.33	3.22	4.13	1.72	2.46	14.0	5.5	2.3	7.00	1.95
14	2.20	1.95	1.42	5.64	3.76	1.83	2.20	14.3	5.0	2.1	4.76	1.83
15	2.33	1.83	1.15	3.22	11.5	1.95	2.75	20.1	4.8	2.1	3.94	1.83
16	3.73	1.72	*2.54	2.90	7.50	2.60	11.0	12.9	*4.4	2.3	3.58	1.83
17	8.56	1.61	9.39	2.74	14.6	8.07	7.13	6.73	4.0	5.0	3.22	1.72
18	5.63	1.61	10.7	5.32	5.20	2.46	4.13	5.44	3.6	2.2	3.06	1.61
19	15.7	1.61	2.60	12.1	4.13	2.20	3.22	5.44	3.3	2.1	3.37	1.51
20	36.5	1.51	2.07	41.6	3.58	1.95	3.06	5.20	3.8	2.2	43.9	1.51
21	6.73	1.42	2.07	7.85	3.39	1.83	3.22	4.49	3.5	1.95	17.1	2.33
22	5.95	1.33	1.95	5.95	3.06	3.07	2.46	25.3	3.0	1.83	9.54	1.95
23	4.33	2.52	1.72	6.77	2.74	4.85	*2.33	25.5	2.5	4.09	57.0	2.20
24	4.13	9.24	1.72	14.8	2.46	2.07	5.51	33.7	2.1	13.6	26.6	1.61
25	4.33	2.60	1.72	6.73	2.46	1.83	6.23	19.5	2.0	32.2	46.2	1.61
26	8.09	2.74	1.61	5.44	3.76	1.83	2.74	8.15	2.4	7.28	21.8	1.51
27	20.2	1.95	1.51	4.54	2.33	1.72	5.50	7.28	2.9	4.76	11.9	1.61
28	6.73	1.95	1.61	4.62	2.07	1.61	2.60	5.69	17	20.3	8.15	1.33
29	7.28	1.95	2.60	6.81	1.95	1.61	2.33	5.20	3.5	9.61	7.00	1.72
30	5.69	2.33	2.87	3.94	1.83	1.51	2.33	---	3.9	5.44	5.95	4.89
31	4.54	1.83	---	3.39	---	1.72	2.33	---	2.7	---	5.20	---
Total	225.15	81.84	68.33	240.34	168.48	77.27	130.43	269.86	307.9	155.16	358.22	70.92
Mean												
Mgd	7.26	2.64	2.28	7.75	5.62	2.49	4.21	9.31	9.93	5.17	11.6	2.36
Cfs	11.2	4.08	3.53	12.0	8.70	3.85	6.51	14.4	15.4	8.00	17.9	3.65
Ac-ft	691	251	210	738	517	237	400	828	945	476	1,100	218

Calendar Year 1963: Max 230 Min 0.87 Mean mgd 6.46 Mean cfs 10.0 Ac-ft 7,230
Fiscal Year 1963-64: Max 80 Min 1.07 Mean mgd 5.88 Mean cfs 9.10 Ac-ft 6,610

Peak discharge (base, 400 mgd)

Date	Time	Gage height	Discharge Mgd	Discharge Cfs
3-8	about 0600	3.20	530	820

* Discharge measurement made on this day.
Note.--No gage-height record Mar. 1 to Apr. 20.

5870. Honopou Stream near Huelo

Location.--Lat 20°53'20", long 156°15'20", on left bank 75 ft upstream from Wailoa ditch intake, 2.2 miles southwest of Huelo, and 2.5 miles west of Kailua.

Drainage area.--0.64 sq mi.

Records available.--December 1910 to June 1964. Monthly discharge only for some periods, published in WSP 1319.

Gage.--Water-stage recorder and concrete control. Datum of gage is 1,208 ft above mean sea level (by vertical angles). Prior to June 19, 1914, staff gage at same site and datum.

Average discharge.--53 years (1911-64), 3.09 mgd (4.78 cfs).

Extremes.--Maximum discharge during year, 145 mgd (224 cfs) Mar. 8 (gage height, 2.96 ft), from rating curve extended above 70 mgd as explained below; minimum, 0.54 mgd (0.84 cfs) Sept. 15, 16.
1910-64: Maximum discharge, 3,690 mgd (5,710 cfs) Nov. 18, 1930 (gage height, 7.28 ft), from rating curve extended above 70 mgd by test on model of station site; minimum, 0.01 mgd (0.02 cfs) for several days in 1933, 1934.

Remarks.--Records good. No diversion above station.

Rating table (gage height, in feet, and discharge, in million gallons a day)

0.5	0.48	0.9	4.92
.6	1.26	1.2	9.90
.7	2.29	1.6	20.0

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	3.72	*2.41	0.76	1.16	1.76	2.09	1.00	1.16	6.20	1.26	2.29	2.90
2	3.48	2.18	*.68	5.27	1.76	1.42	1.73	1.08	5.82	1.16	2.41	2.53
3	1.96	2.06	.92	1.36	1.66	1.08	2.62	1.08	3.02	1.08	1.96	2.29
4	1.86	1.86	.76	1.16	1.56	1.00	6.56	1.00	2.65	1.08	2.41	2.18
5	1.76	1.76	.68	1.08	1.46	.92	2.32	1.00	2.41	1.00	3.83	1.96
6	1.66	1.66	.68	1.00	1.36	.84	5.84	1.00	2.29	1.08	2.47	1.86
7	1.56	1.56	.68	1.36	1.56	5.39	3.03	1.00	6.57	1.00	2.06	1.76
8	1.46	1.46	.60	9.38	3.66	1.46	2.29	1.00	20.0	1.08	1.96	1.56
9	1.56	1.36	.68	3.39	8.37	1.16	1.86	1.08	5.61	1.86	1.96	1.46
10	1.46	1.36	.60	2.29	5.46	1.16	1.76	2.35	4.21	1.66	3.25	1.36
11	1.36	2.35	.60	1.96	2.53	1.36	2.06	2.46	3.50	1.16	2.41	1.26
12	1.26	1.56	.68	1.86	2.18	*1.08	1.96	4.76	3.14	1.26	3.00	1.16
13	1.26	1.26	.92	1.86	2.06	1.00	1.66	4.14	2.77	.92	2.65	1.08
14	1.16	1.16	.68	2.18	1.86	1.00	1.56	3.50	2.53	.84	2.06	1.08
15	1.16	1.08	.54	1.66	4.76	1.08	1.76	4.24	2.29	.84	1.96	1.08
16	1.46	1.00	1.00	1.46	3.58	1.36	3.98	3.38	*2.06	.92	1.86	1.00
17	2.18	.92	3.11	1.56	6.70	4.38	2.65	2.65	1.96	2.16	1.76	.92
18	2.21	.92	3.65	2.33	2.90	1.46	1.86	2.53	1.76	.92	1.66	.92
19	5.47	.92	1.16	6.09	2.53	1.16	1.76	2.53	1.86	.92	1.66	.84
20	12.2	.84	1.00	11.6	2.29	1.08	1.66	2.53	1.76	*1.00	6.91	.84
21	3.26	.84	.92	4.35	2.18	1.08	1.66	2.29	1.66	.92	5.15	1.08
22	2.90	.76	.92	3.38	2.06	1.56	1.56	6.91	1.46	.84	3.26	.92
23	2.29	1.11	.84	3.78	1.86	1.88	1.36	4.07	1.36	1.42	12.0	1.08
24	2.18	3.30	.84	5.21	1.76	1.16	2.72	6.13	1.26	3.68	9.76	.84
25	2.29	1.26	.76	3.26	1.66	1.08	3.01	5.29	1.16	8.65	17.7	.84
26	3.42	1.16	.68	2.90	2.06	1.00	1.56	3.78	1.16	2.77	9.89	.68
27	8.18	1.00	.68	2.65	1.56	1.00	2.41	3.26	1.44	1.86	6.62	.76
28	3.50	1.00	.76	*2.53	1.36	.92	1.56	2.90	7.48	6.05	5.38	.68
29	3.93	.92	1.00	2.65	1.26	.92	1.36	2.65	1.76	*3.31	4.49	.84
30	3.14	1.00	1.08	2.06	1.26	.84	1.46	----------	1.96	2.41	3.78	1.26
31	2.77	.84	----------	1.86	----------	.92	1.36	----------	1.46	----------	3.26	----------
Total	88.06	42.87	28.86	94.64	77.02	43.84	69.94	81.75	104.57	55.11	131.82	39.02
Mean												
Mgd	2.84	1.38	0.962	3.05	2.57	1.41	2.26	2.82	3.37	1.84	4.25	1.30
Cfs	4.39	2.14	1.49	4.72	3.98	2.18	3.50	4.36	5.21	2.85	6.58	2.01
Ac-ft	270	132	89	290	236	134	215	251	321	169	405	120

Calendar Year 1963: Max 44.9 Min 0.36 Mean mgd 2.46 Mean cfs 3.81 Ac-ft 2760
Fiscal Year 1963-64: Max 20.0 Min 0.54 Mean mgd 2.34 Mean cfs 3.67 Ac-ft 2630

* Discharge measurement made on this day.

Peak discharge (base, 130 mgd)

Date	Time	Gage height	Discharge	
			Mgd	Cfs
3-8	0600	2.96	145	224

5880. Wailoa ditch at Honopou, near Huelo

Location.--Lat 20°53'20", long 156°15'19", on right bank 100 ft downstream from intake at Honopou Stream, 0.5 mile west of Lupi, and 2.2 miles southwest of Huelo.

Records available.--November 1922 to June 1964.

Gage.--Water-stage recorder. Datum of gage is 1,208 ft above mean sea level (by vertical angles).

Average discharge.--41 years (1923-64), 112 mgd (173 cfs).

Extremes.--1922-64: Maximum daily discharge, 195 mgd (302 cfs) for several days in 1954, 1955, and 1956; no flow Jan. 24-27, 1923.

Remarks.--Records good. Wailoa ditch receives water from Koolau ditch at Alo Stream and from all streams from there west to Halehaku Gulch at altitude of about 1,200 ft. Water is used for domestic supply, power, and irrigation in central Maui.

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	188	*162	80.2	149	97.0	91.4	88.0	71.1	93.4	113	180	124
2	188	135	72.0	188	88.0	104	106	67.2	93.4	103	188	113
3	187	119	97.6	175	81.1	64.5	186	56.0	93.4	90.6	162	103
4	177	108	73.2	158	77.8	63.0	187	52.4	154	82.0	176	*97.0
5	141	97.4	67.2	128	74.0	59.4	187	56.0	151	77.8	188	89.6
6	122	91.8	72.0	137	71.7	54.5	187	47.0	131	90.0	188	84.0
7	106	87.2	65.1	180	123	121	129	49.7	188	92.4	188	79.9
8	*99.0	82.8	60.2	185	188	83.7	95.0	50.6	187	126	163	79.0
9	124	80.8	65.7	188	185	60.6	63.3	77.2	188	188	168	72.4
10	151	81.4	54.5	170	187	61.4	54.2	89.2	188	187	187	69.3
11	118	186	52.7	133	184	103	65.7	86.0	187	148	188	66.3
12	88.0	162	109	117	140	*59.0	84.7	95.4	162	146	188	66.3
13	91.0	99.4	185	102	125	53.9	89.6	138	138	95.0	188	63.0
14	91.5	81.7	125	163	130	57.8	76.9	187	122	85.2	168	62.2
15	111	75.2	77.5	106	155	64.8	106	188	113	78.1	147	76.6
16	161	69.9	104	90.6	187	114	188	149	92.5	77.5	129	69.0
17	188	66.6	176	83.2	185	167	187	94.6	96.6	130	113	61.0
18	184	64.8	187	144	168	110	186	62.0	89.6	78.1	95.4	59.8
19	154	61.8	133	171	128	74.0	140	79.0	84.4	74.0	88.4	53.0
20	187	58.7	98.6	183	110	65.1	134	92.4	103	112	186	59.0
21	188	55.4	92.4	187	100	60.2	135	89.2	76.0	90.0	186	120
22	188	53.2	93.0	152	89.2	67.2	96.2	94.6	90.0	94.2	185	110
23	175	130	73.2	140	81.1	151	82.0	94.2	88.8	183	188	127
24	177	188	76.6	188	76.6	70.8	112	93.8	111	187	188	84.8
25	182	153	76.0	184	72.8	60.2	178	93.4	101	179	187	93.0
26	186	174	64.2	171	150	55.7	114	93.4	117	188	187	90.6
27	187	120	58.4	130	83.2	55.4	172	92.7	123	168	185	90.0
28	188	113	89.7	126	69.6	53.0	114	92.1	185	182	184	69.3
29	188	119	182	185	68.4	49.1	93.0	90.9	187	187	178	113
30	187	132	165	130	69.9	47.9	83.2	---	188	185	157	175
31	187	95.0	---	109	---	49.7	82.0	---	150	---	137	---
Total	4.889.5	3,304.2	2.926.0	4.652.8	3.545.4	2352.3	3.801.8	2.622.1	4.072.1	3.816.9	5.240.8	2.620.1
Mean												
Mgd	158	107	97.5	150	118	75.9	123	90.4	131	127	169	87.3
Cfs	244	166	151	232	183	117	190	140	203	196	261	135
Ac-ft	15.010	10.140	8.980	14.280	10.880	7.220	11.670	8.050	12.500	11.710	16.080	8.040

Calendar Year 1963: Max 188 Min 25.7 Mean mgd 114 Mean cfs 176 Ac-ft 127.900
Fiscal Year 1963-64: Max 188 Min 47.0 Mean mgd 120 Mean cfs 186 Ac-ft 134.600

* Discharge measurement made on this day.

5890. New Hamakua ditch at Honopou, near Huelo

Location.--lat 20°53'28", long 156°15'22", on right bank 15 ft upstream from tunnel portal, 600 ft downstream from Honopou Stream crossing and 2.1 miles southwest of Huelo.

Records available.--January 1918 to June 1964.

Gage.--Water-stage recorder. Datum of gage is 1,170 ft above mean sea level (by vertical angles). Prior to May 14, 1921, at site 300 ft upstream at different datum. May 15, 1921, to Mar. 18, 1962, at present site at datum 1.00 ft higher.

Average discharge.--46 years, 24.7 mgd (38.2 cfs).

Extremes.--1918-64: Maximum daily discharge, 116 mgd (179 cfs) Feb. 13, 14, 27, 1932; no flow at times.

Remarks.--Records good. Ditch diverts from streams between Waikamoi Stream and Kalehaku Gulch above Center and Lowrie ditches for irrigation in central Maui.

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	96.6	*4.18	0.69	35.3	1.37	2.32	0.90	0.79	68.1	1.37	8.48	3.16
2	83.9	2.85	.64	97.4	1.22	9.51	6.42	.69	101	1.15	46.0	2.76
3	20.8	2.36	1.02	38.3	1.08	.85	85.6	7.35	98.8	1.02	13.6	2.46
4	8.67	1.99	.69	5.48	.96	.74	74.8	7.84	28.9	.90	23.9	2.36
5	.96	1.76	.59	3.38	.90	.69	80.1	.59	3.44	.90	75.9	1.99
6	.85	1.52	.59	13.7	.85	.69	92.8	8.37	1.60	.85	49.5	1.84
7	.74	1.45	.55	3.51	14.5	32.9	23.1	13.0	85.8	.85	35.6	1.68
8	.69	1.29	.47	96.5	97.8	2.34	7.53	16.1	98.8	5.58	4.16	1.60
9	.74	1.22	.47	96.0	56.6	1.29	4.08	68.6	97.6	83.8	4.00	1.45
10	2.83	1.15	.43	17.5	99.2	1.31	3.28	93.4	91.6	63.7	64.6	1.37
11	.96	75.1	.39	1.91	36.8	5.52	3.16	82.0	31.6	9.08	51.8	1.22
12	.55	8.99	6.86	1.60	1.84	1.22	2.85	101	4.00	3.90	70.6	1.15
13	.59	1.52	67.8	1.29	1.52	1.08	2.36	100	2.36	.85	69.4	1.08
14	.55	1.08	13.4	43.2	1.29	1.15	1.99	98.6	1.99	.74	31.9	1.02
15	.64	.96	.59	1.45	36.7	1.29	1.99	99.2	1.84	.64	2.46	.96
16	15.2	.90	.98	1.15	67.9	2.33	90.1	99.8	1.60	.85	1.99	.96
17	59.4	.79	73.1	1.02	76.8	66.0	85.3	94.7	1.45	19.6	1.76	.85
18	47.4	.74	78.2	27.9	17.0	3.83	49.2	90.6	1.22	.85	1.68	.79
19	20.7	.69	4.53	67.1	2.95	1.68	3.52	93.4	1.22	.74	1.52	.74
20	99.0	.69	1.15	101	2.36	1.37	2.17	81.4	1.15	*1.51	*94.0	.69
21	87.2	.55	.96	62.7	1.99	1.22	2.99	45.2	1.30	1.02	98.8	18.0
22	78.8	.55	.90	3.26	1.76	1.39	1.52	101	.90	.85	96.0	1.69
23	10.8	32.4	.74	10.2	1.60	45.4	1.15	101	.85	48.8	101	24.6
24	5.59	93.3	.69	99.2	1.37	1.29	14.6	101	.74	96.0	100	1.30
25	34.8	4.75	.69	55.3	1.29	1.02	61.8	101	2.02	97.0	102	1.52
26	42.7	15.9	.64	7.51	14.9	.96	1.45	100	.74	88.2	101	1.02
27	100	1.08	.55	2.27	1.29	.90	58.2	94.8	2.77	8.91	98.4	.96
28	94.0	1.15	.60	2.61	1.02	.79	1.54	47.1	83.2	39.1	61.1	.79
29	58.4	.96	68.4	67.8	.90	.74	1.02	8.28	32.7	*95.8	13.8	1.02
30	1.08	1.27	32.2	2.02	.85	.69	.96	---	61.7	35.9	5.18	71.6
31	5.85	.79	---	1.52	---	.74	.96	---	7.67	---	3.62	---
Total	980.99	263.93	359.51	969.08	546.61	193.25	767.44	1856.81	918.66	710.46	1433.75	152.63
Mean												
Mgd	31.6	8.51	12.0	31.3	18.2	6.23	24.8	64.0	29.6	23.7	46.2	5.09
Cfs	48.9	13.2	18.6	48.4	28.2	9.64	38.4	99.0	45.8	36.7	71.5	7.88
Ac-ft	3,010	810	1,100	2,970	1,680	593	2,360	5,700	2,820	2,180	4,400	468

Calendar Year 1963: Max 101 Min 0.18 Mean mgd 20.9 Mean cfs 32.3 Ac-ft 23,390
Fiscal Year 1963-64: Max 102 Min 0.39 Mean mgd 25.0 Mean cfs 38.7 Ac-ft 28,090

* Discharge measurement made on this day.

5900. Old Hamakua ditch at Honopou, near Huelo

Location.--Lat 20°53'31", long 156°15'16", on right bank 400 ft downstream from Honopou Stream and Wailoa ditch trail crossing in Honopou Gulch, 2.0 miles southwest of Huelo, and 5.0 miles east of Haiku.

Records available.--January 1918 to June 1922, November 1936 to June 1964.

Gage.--Water-stage recorder and modified Parshall flume. Datum of gage is 1,117 ft above mean sea level (by vertical angles).

Average discharge.--31 years (1918-22, 1937-64), 2.01 mgd (3.11 cfs).

Extremes.--1918-22, 1936-64: Maximum daily discharge, 39.5 mgd (61.1 cfs) Apr. 7, 1938; no flow at times.

Remarks.--Records fair. Ditch intakes are at Hoolawanui and Honopou Streams, but Wailoa and New Hamakua ditches divert most of flow. Water etored in reservoirs to be used for irrigation in central Maui.

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	3.56	0.10	0.03	0.12	0.04	0.04	0.04	0.03	0.05	0.03	0.04	0.04
2	.82	.06	.03	6.47	.04	.04	.24	.03	.04	.03	.03	.04
3	.14	.05	.04	.27	.04	.04	4.12	.03	.04	.03	.03	.04
4	.07	.05	.03	.07	.04	.04	.16	.03	.04	.03	.03	.03
5	.05	.04	.03	.05	.04	.04	.06	.03	.04	.03	.04	.03
6	.04	.04	.03	.04	.04	.04	.12	.03	.04	.04	.04	.03
7	.04	.04	.03	.08	.26	.13	.05	.03	.05	.04	.04	.03
8	.04	.04	.03	18.2	10.1	.12	.05	.03	.10	.03	.04	.03
9	.04	.04	.03	8.12	1.74	.06	.04	.05	.04	.06	.04	.02
10	.03	.04	.03	.13	.08	.06	.04	.05	.04	.05	.04	.02
11	.03	.28	.03	.05	.06	.07	.04	.05	.04	.04	.04	.02
12	.03	.12	.03	.04	.06	.05	.04	.05	.04	.04	.05	.02
13	.03	.06	.13	.04	.05	.04	.04	.05	.04	.03	.05	.01
14	.03	.04	.09	.25	.05	.04	.04	.05	.04	.03	.04	.01
15	.03	.04	.05	.05	5.57	.04	.04	.04	.04	.03	.04	.01
16	.04	.04	.04	.04	6.13	.04	.05	.04	.04	.03	.04	.01
17	2.15	.04	5.16	.04	2.80	5.69	.05	.04	.04	.04	.03	0
18	6.79	.04	7.96	.12	.14	.12	.05	.04	.04	.03	.03	0
19	2.57	.04	.09	10.1	.09	.06	.04	.04	.04	.03	.03	0
20	9.80	.03	.04	8.16	.07	.04	.04	.04	.03	.03	*1.67	0
21	.14	.03	.04	.10	.06	.04	.03	.04	.03	.03	.12	0
22	.13	.03	.04	.07	.05	.04	.03	.06	.03	.03	.09	.01
23	.10	.08	.03	.05	.05	1.33	.03	.04	.03	.04	.09	.02
24	.07	8.21	.03	5.75	.05	.06	.03	.04	.03	.06	.07	.02
25	.08	.10	.03	2.08	.05	.04	.05	.04	.03	.05	.12	.01
26	.09	.06	.02	.08	.05	.04	.04	.04	.03	.04	.06	.01
27	3.31	.05	.02	.06	.05	.04	.05	.04	.03	.04	.04	.01
28	.36	.04	.02	.05	.05	.04	.04	.04	.07	.06	.04	0
29	.34	.04	.09	2.33	.05	.04	.03	.04	.04	.04	.04	0
30	.22	.04	.12	.08	.04	.04	.03	---	.04	.04	.04	.01
31	.19	.04	---	.05	---	.04	.03	---	.04	---	.04	---
Total	31.36	9.95	14.37	63.14	27.94	8.55	5.74	1.16	1.27	1.13	3.14	0.48
Mean												
Mgd	1.01	0.321	0.479	2.04	0.931	0.276	0.185	0.040	0.041	0.038	0.101	0.016
Cfs	1.56	0.497	0.741	3.16	1.44	0.427	0.286	0.062	0.063	0.059	0.156	0.025
Ac-ft	96	30	44	194	86	26	18	3.6	3.9	3.5	9.6	1.5

Calendar Year 1963: Max 18.2 Min 0.01 Mean mgd 0.492 Mean cfs 0.761 Ac-ft 550
Fiscal Year 1963-64: Max 18.2 Min 0 Mean mgd 0.460 Mean cfs 0.712 Ac-ft 516

* Discharge measurement made on this day.

5920. Lowrie ditch at Honopou Gulch, near Huelo

Location.--Lat 20°54'57", long 156°15'07", on left bank 0.2 mile downstream from siphon across Honopou Stream, 1.6 miles west of Huelo, and 2.7 miles northwest of Kailua.

Records available.--January 1910 to March 1927, February 1930 to June 1964. Published as "at Opana weir, near Huelo" 1910-27.

Gage.--Water-stage recorder and concrete control. Datum of gage is 598.0 ft above mean sea level, datum of 1929. Jan. 1, 1910, to Mar. 31, 1927, at site 1.5 miles downstream at different datum.

Average discharge.--50 years (1910-26, 1930-64), 26.7 mgd (41.3 cfs).

Extremes.--1910-27, 1930-64: Maximum daily discharge, 75 mgd (116 cfs) Oct. 31, 1921; no flow at times.

Remarks.--Records good. Lowrie ditch receives water from Center ditch at Nailiilihaele Stream and diverts from additional streams westward to Maliko Gulch for irrigation in central Maui.

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	54.7	22.0	9.00	20.6	13.0	12.0	8.34	7.87	47.5	10.4	36.4	17.7
2	53.0	19.3	5.68	56.4	9.60	10.7	10.8	7.66	56.0	11.0	20.9	15.8
3	18.5	17.2	10.1	34.8	10.3	8.50	24.1	8.18	50.7	12.1	17.7	14.8
4	8.44	15.5	8.08	13.2	17.4	7.87	36.4	8.26	19.0	9.16	22.8	14.5
5	*1.33	14.0	6.40	8.72	16.1	7.87	38.2	7.03	16.3	9.16	48.0	12.7
6	1.00	12.4	6.22	7.87	13.5	7.24	58.0	6.90	15.8	7.73	24.9	12.0
7	1.00	13.7	6.04	14.8	11.4	31.2	26.0	9.64	54.3	7.50	22.6	11.4
8	3.22	15.8	5.68	64.1	56.7	16.6	18.0	7.24	52.9	9.51	15.8	12.7
9	10.3	13.2	5.86	56.4	34.2	14.8	15.5	19.2	19.8	38.6	13.7	11.4
10	21.4	11.4	5.32	21.8	59.2	12.9	12.0	52.5	11.2	38.0	40.2	11.2
11	12.4	41.5	5.14	15.3	28.6	22.3	13.0	56.4	6.40	15.8	29.7	9.82
12	11.6	18.2	7.45	11.7	17.7	9.60	11.2	57.4	5.50	15.8	26.9	9.16
13	12.0	12.2	*29.7	10.3	15.5	10.0	13.2	50.8	8.37	5.59	53.2	9.16
14	9.16	13.5	14.5	31.9	13.7	10.7	13.3	18.9	14.8	10.5	21.2	8.50
15	11.2	12.7	10.8	17.4	28.5	11.7	18.2	10.2	13.5	10.7	14.5	8.94
16	16.2	12.2	12.4	17.7	48.7	15.8	51.4	3.85	11.5	11.4	11.0	8.72
17	49.0	11.7	42.1	15.0	51.4	37.2	29.4	19.6	12.9	15.9	10.0	8.08
18	45.2	11.7	53.9	16.7	32.5	20.8	1.42	24.9	*10.7	7.87	11.9	7.66
19	21.6	11.2	15.8	40.3	21.8	14.8	8.27	43.1	11.8	7.03	15.9	6.61
20	62.4	8.08	11.2	73.8	22.3	7.12	9.05	15.6	12.6	8.32	*57.4	6.82
21	53.8	7.03	7.66	41.7	19.8	3.70	7.75	9.00	15.0	11.5	60.9	13.0
22	52.6	6.40	7.60	21.5	16.6	3.70	5.96	65.5	9.82	10.3	48.0	10.3
23	26.8	14.4	12.2	21.2	14.5	4.30	7.39	31.5	8.83	28.5	56.7	18.6
24	24.3	52.3	12.2	60.9	10.3	2.98	8.52	2.98	10.1	63.7	56.9	11.4
25	26.0	17.2	9.51	41.4	10.7	2.73	34.6	2.73	12.4	60.8	58.0	12.2
26	29.8	13.0	9.41	18.5	17.7	2.60	12.0	2.48	9.68	54.6	56.9	10.7
27	67.0	12.2	8.38	17.2	12.0	2.73	14.2	2.13	8.08	22.6	55.7	8.29
28	45.4	13.7	5.68	18.0	8.50	3.72	10.8	21.2	55.4	29.2	52.4	7.45
29	59.6	13.5	25.0	*42.7	8.94	4.60	*8.34	37.1	40.4	*61.3	38.2	7.87
30	61.3	14.0	19.6	16.6	13.7	6.61	9.20	---	24.8	40.8	22.6	33.7
31	*45.4	11.2	---	16.3	---	7.03	9.84	---	14.3	---	19.8	---
Total	915.65	482.41	388.61	864.79	654.84	334.40	544.38	609.85	660.38	645.37	1040.8	351.18
Mean												
Mgd	29.5	15.6	13.0	27.9	21.8	10.8	17.6	21.0	21.3	21.5	33.6	11.7
Cfs	45.6	24.1	20.1	43.2	33.7	16.7	27.2	32.5	33.0	33.3	52.0	18.1
Ac-ft	2810	1480	1190	2650	2010	1030	1670	1870	2030	1980	3190	1080

Calendar Year 1963: Max 73.8 Min 0 Mean mgd 19.5 Mean cfs 30.2 Ac-ft 21830
Fiscal Year 1963-64: Max 73.8 Min 1.00 Mean mgd 20.5 Mean cfs 31.7 Ac-ft 22990

* Discharge measurement made on this day.

5940. Haiku ditch at Honopou Gulch, near Kailua

Location.--Lat 20°55'05", long 156°14'55", on right bank on west side of Honopou Gulch, 160 ft below new Government Road, 2.5 miles northwest of Kailua, and 5 miles east of Haiku.

Records available.--January 1910 to June 1912, January 1913 to December 1928, February 1930 to June 1964. Published as "at Peahi weir, near Huelo" January 1910 to June 1919, as "at Manawai Gulch, near Peahi" July 1919 to December 1928, and as "at Kapalalaea Gulch, near Huelo" February 1930 to January 1940. Monthly discharge only for some periods, published in WSP 1319.

Gage.--Water-stage recorder and concrete control. Datum of gage is 421.54 ft above mean sea level, datum of 1929. Jan. 1, 1910, to Oct. 6, 1914, water-stage recorder at site at Peahi weir on old Haiku ditch at different datum. Oct. 7, 1914, to Dec. 31, 1928, water-stage recorder at site 2.9 miles downstream at different datum. Feb. 19, 1930, to Feb. 20, 1940, water-stage recorder at site 0.9 mile downstream at different datum.

Average discharge.--50 years (1910-12, 1913-14, 1915-28, 1930-64), 18.5 mgd (28.6 cfs).

Extremes.--1910-28, 1930-64: Maximum daily discharge, 135 mgd (209 cfs) Nov. 13, 1934, Jan. 8, 9, Feb. 25-27, 1935, Jan. 27, 1938; no flow at times.

Remarks.--Records good except those for period of no gage-height record, which are fair. Ditch diverts water from all streams between Nailiilihaele Stream and Maliko Gulch for irrigation in central Maui.

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	61.1	2.02	0.65	1.66	1.22	1.57	1.10	1.64	40.5	4.69	1.94	1.77
2	65.3	1.57	.62	60.8	1.15	1.50	4.20	1.57	66.0	11.4	1.85	1.78
3	36.9	1.57	.85	12.0	1.10	1.50	40.7	3.31	36.9	5.94	1.64	1.71
4	28.6	1.50	.51	1.43	1.05	1.50	37.0	3.27	4.55	1.22	1.50	1.71
5	14.5	1.29	.48	1.00	1.05	1.50	42.0	3.54	1.94	1.22	23.8	1.57
6	12.0	1.10	.44	.85	1.05	1.43	12.9	3.07	1.71	3.70	17.1	1.50
7	11.1	1.05	.48	.85	3.58	17.6	48.5	1.15	29.5	3.73	3.20	1.43
8	*8.67	1.05	.40	60.9	63.7	2.88	52.4	.80	54.1	4.11	2.90	1.36
9	1.50	1.10	.44	42.5	19.8	1.50	30.3	8.84	58.1	38.3	2.80	1.29
10	1.93	1.10	.40	2.04	26.8	1.88	23.3	33.5	42.5	32.4	24.1	1.29
11	1.53	20.2	.37	1.94	4.16	4.84	19.6	41.4	17.8	1.57	8.22	.90
12	1.15	1.87	.65	1.29	1.71	3.18	17.5	58.8	20.2	2.06	9.00	.65
13	1.36	1.29	.80	1.22	1.64	1.36	10.8	19.6	14.8	3.93	32.7	.70
14	1.36	1.00	.58	5.97	1.57	1.15	8.70	17.9	a2.5	3.63	2.90	.75
15	1.29	.75	.40	1.00	21.1	1.36	7.67	4.46	a2.3	3.17	2.62	.80
16	2.74	.75	.58	.95	39.1	1.22	50.5	1.36	*a5.3	3.88	2.44	.95
17	55.0	.75	31.2	.95	34.6	*29.1	52.9	14.9	4.99	1.22	2.36	.80
18	32.2	.75	43.7	1.05	7.69	3.93	26.0	1.50	4.66	.95	2.36	.80
19	11.6	.70	1.50	37.3	3.70	1.57	10.6	16.5	5.64	.90	2.36	.70
20	52.4	.65	.95	53.1	3.94	6.63	6.67	7.31	7.54	2.74	59.0	.70
21	21.7	.62	.48	8.11	5.96	9.61	14.1	4.00	1.94	1.15	45.4	.75
22	20.7	.95	.44	2.44	2.70	9.61	17.5	4.63	1.71	.90	25.0	.70
23	2.02	4.47	.40	2.02	2.19	34.0	4.46	1.00	4.16	8.36	36.8	.85
24	1.85	56.0	.54	47.2	2.10	18.7	6.76	.95	4.27	64.4	35.8	.90
25	1.64	1.96	.65	16.9	2.02	7.58	33.3	.90	5.54	52.4	35.8	.80
26	11.8	1.00	.54	2.36	2.10	17.9	2.90	30.7	4.64	34.5	34.3	.65
27	61.7	.62	.51	1.94	1.94	6.78	26.5	32.3	1.64	2.27	35.7	.62
28	11.8	.75	.51	*1.94	1.71	5.18	6.38	27.6	58.6	19.9	11.3	.62
29	43.3	.75	.75	27.4	1.71	3.22	*6.41	12.0	36.5	45.0	2.90	.65
30	60.1	.70	.85	1.78	1.64	1.10	6.01	---	41.8	2.72	2.44	9.22
31	*20.2	.70	---	1.36	---	1.15	4.90	---	6.62	---	2.10	---
Total	659.04	110.58	91.67	402.25	263.78	202.03	632.56	358.50	588.95	362.36	472.33	38.92
Mean												
Mgd	21.3	3.57	3.06	13.0	8.79	6.52	20.4	12.4	19.0	12.1	15.2	1.30
Cfs	33.0	5.52	4.73	20.1	13.6	10.1	31.6	19.2	29.4	18.7	23.5	2.01
Ac-ft	2020	339	281	1230	810	620	1940	1100	1810	1110	1450	119

Calendar Year 1963:	Max	65.3	Min	0.09	Mean mgd	11.2	Mean cfs	17.3	Ac-ft	12550
Fiscal Year 1963-64:	Max	66.0	Min	0.37	Mean mgd	11.4	Mean cfs	17.6	Ac-ft	12830

* Discharge measurement made on this day.
a No gage-height record.

6180. Kahakuloa Stream near Honokohau

Location.--Lat 20°58'54", long 156°33'26", on right bank 0.5 mile downstream from Kapuna Stream, 1.3 miles south of Kahakuloa, 2 miles west of Puu Makawana, and 4.3 miles southeast of Honokohau.

Drainage area.--3.47 sq mi.

Records available.--July 1939 to August 1943, September 1947 to June 1964. Records for January 1913 to December 1914 (fragmentary), at site 1 mile upstream not equivalent owing to difference in drainage areaa.

Gage.--Water-stage recorder and concrete control. Altitude of gage is 330 ft (from topographic map).

Average discharge.--19 years (1940-43, 1948-64), 10.8 mgd (16.7 cfs).

Extremes.--Maximum discharge during year, 214 mgd (331 cfs) July 19 (gage height, 5.02 ft), from rating curve extended above 110 mgd on basis of slope-area measurement at gage height 8.35 ft; minimum, 3.14 mgd (4.86 cfs) on several days.
1939-43, 1947-64: Maximum discharge, 1,990 mgd (3,080 cfs) Dec. 14, 1942 (gage height, 7.02 ft, control then in use), from rating curve extended above 55 mgd by test on model of station site; minimum, 1.95 mgd (3.02 cfs) Feb. 9-11, 1954.

Remarks.--Records good except those for periods of no gage-height record, which are poor. No diversion above station.

Rating table (gage height, in feet, and discharge, in million gallons a day)

2.7	2.47	3.6	29.0
2.9	4.93	3.8	44.5
3.0	6.55	4.0	64.0
3.2	11.0	4.5	125
3.4	18.5		

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	25.0	5.90	3.85	8.01	5.0	3.8	13.7	3.85	4.26	3.8	4.93	4.39
2	18.2	5.09	3.85	28.4	4.8	3.7	14.2	3.72	5.09	3.7	4.52	3.98
3	5.58	4.80	26.9	6.23	4.6	3.8	23.2	3.72	6.15	3.6	4.12	3.85
4	4.66	4.66	6.75	6.32	4.5	3.6	7.95	4.12	5.82	3.5	3.98	3.98
5	4.26	4.39	5.09	5.25	4.3	3.6	4.93	3.72	4.52	6.0	3.85	3.72
6	4.12	4.26	4.66	4.66	4.1	*3.58	14.0	3.58	3.72	11	4.12	3.58
7	3.98	4.66	4.66	5.58	5.0	3.98	8.14	3.58	4.12	4.7	4.26	6.54
8	3.98	4.52	4.26	80.8	28	3.98	6.95	4.26	17.0	4.8	3.85	6.14
9	6.17	4.39	4.39	20.0	16	3.58	4.93	4.66	4.93	9.5	3.47	4.12
10	5.25	4.26	4.12	7.15	14	21.2	4.52	5.74	3.98	6.0	3.47	3.72
11	4.93	21.7	3.72	5.58	7.0	14.8	5.75	6.06	3.72	6.5	3.58	3.58
12	3.98	8.21	28.0	6.73	6.0	5.09	5.58	6.55	3.58	8.0	3.72	3.58
13	7.59	5.42	15.4	6.23	5.5	4.26	4.80	6.06	3.47	3.8	3.98	3.58
14	5.42	4.52	9.29	7.97	6.5	8.76	4.26	5.58	3.47	3.6	4.26	3.47
15	8.67	4.39	4.93	5.25	20	7.15	6.46	7.56	3.36	3.4	9.40	3.47
16	5.74	4.66	15.0	4.80	9.5	25.5	10.1	4.66	3.25	3.36	3.98	3.58
17	4.93	4.12	4.35	4.66	7.5	46.9	*16.0	3.98	3.25	6.76	3.58	3.47
18	6.39	3.98	9.38	*15.6	5.5	8.62	5.42	3.85	3.25	3.98	3.36	3.47
19	21.8	3.85	5.74	37.5	4.7	5.58	4.66	3.98	3.47	4.17	3.25	3.36
20	4.30	4.39	4.80	47.2	4.3	4.93	4.52	6.98	3.47	11.3	41.0	3.25
21	20.7	4.66	6.23	10	4.5	4.52	4.26	4.52	3.25	5.25	13.7	3.72
22	9.72	3.98	5.74	7.5	4.4	4.52	4.12	28.3	3.25	3.72	7.35	3.85
23	6.06	6.70	4.66	5.5	4.3	9.58	3.98	10.4	3.8	11.5	25.8	5.49
24	6.95	22.4	4.52	16	4.1	4.52	3.98	23.4	3.6	25.8	9.71	5.42
25	*7.39	5.42	5.09	6.5	4.0	4.12	9.52	12.8	4.0	28.6	93.3	5.80
26	19.4	5.90	4.26	7.0	9.0	3.98	4.52	5.42	4.9	13.5	62.6	3.58
27	33.8	4.39	4.12	6.0	5.1	4.39	5.25	4.66	10	5.09	10.9	3.47
28	9.44	4.39	4.12	21	4.3	4.12	4.52	*4.12	25	37.3	6.06	3.36
29	16.9	4.12	14.8	14	4.1	3.85	3.98	4.26	7.0	14.8	5.09	6.09
30	7.55	4.12	9.38	7.5	3.9	3.72	3.98	---	11	6.06	4.66	5.90
31	8.15	3.98	---	6.5	---	4.82	3.98	---	4.3	---	4.39	---
Total	339.71	182.23	271.21	421.42	214.5	238.55	222.16	194.09	173.98	263.09	364.24	125.51
Mean												
Mgd	11.0	5.88	9.04	13.6	7.15	7.70	7.17	6.69	5.61	8.77	11.7	4.18
Cfs	17.0	9.10	14.0	21.0	11.1	11.9	11.1	10.4	8.68	13.6	18.1	6.47
Ac-ft	1,040	559	832	1,290	741	732	682	596	534	807	1,120	385

Calendar Year 1963: Max 80.8 Min 2.47 Mean mgd 9.57 Mean cfs 14.8 Ac-ft 10,800
Fiscal Year 1963-64: Max 93.3 Min 3.25 Mean mgd 8.23 Mean cfs 12.7 Ac-ft 9,320

Peak discharge (base, 400 mgd).--No peak above base.

* Discharge measurement made on this day.
Note.--No gage-height record Oct. 21 to Dec. 5, Mar. 23 to Apr. 15.

6200. Honokohau Stream near Honokohau

Location.--Lat 20°57'48", long 156°35'22", on right bank 1,000 ft upstream from intake of Honokohau ditch and 4.1 miles (revised) southeast of Honokohau.

Drainage area.--4.11 sq mi (revised).

Records available.--September, November and December 1911 (combined flow of stream and ditch below point of diversion), March 1913 to September 1920, May 1922 to June 1964. Monthly discharge only for some periods, published in WSP 1319.

Gage.--Water-stage recorder and masonry control. Altitude of gage is 870 ft (from topographic map). Prior to Mar. 7, 1913, staff gage at site just below Honokohau ditch intake at different datum.

Average discharge.--49 years (1913-20, 1922-64), 26.0 mgd (40.2 cfs).

Extremes.--Maximum discharge during year, 776 mgd (1,200 cfs) May 25 (gage height, 5.54 ft), from rating curve extended above 120 mgd as explained below; minimum, 8.20 mgd (12.7 cfs) Mar. 19-22.
1911, 1913-20, 1922-64: Maximum discharge, 2,420 mgd (3,740 cfs) Dec. 14, 1942, Aug. 30, 1957 (gage height, 8.40 ft), from rating curve extended above 120 mgd by logarithmic plotting; minimum, 5.4 mgd (8.4 cfs) May 1, 1945, Jan. 5, 1946.

Remarks.--Records good. No diversion above station. All medium and low flow, together with the inflow from 2 development tunnels below station, is diverted into Honokohau ditch.

Rating table (gage height, in feet, and discharge, in million gallons a day)

1.9	6.70	3.0	75.0
2.0	9.20	3.5	147
2.3	20.3	4.0	250
2.6	38.0	4.5	395

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	96.8	13.0	11.4	25.3	11.4	11.1	33.8	9.51	16.5	9.51	11.4	12.0
2	52.7	12.7	11.1	54.4	11.4	10.8	24.6	9.20	26.3	9.20	14.6	11.7
3	15.3	12.3	33.3	62.0	11.7	11.4	45.9	9.20	23.4	8.70	11.1	11.4
4	14.4	12.0	16.4	50.3	11.7	11.4	24.8	8.95	15.7	9.09	10.8	11.4
5	14.2	*12.0	14.2	15.4	11.7	10.8	12.0	8.95	11.4	16.3	14.8	11.1
6	12.7	11.7	13.4	12.7	11.4	10.8	64.3	8.70	10.1	29.9	14.7	11.1
7	12.0	14.9	12.7	17.0	29.9	11.1	16.6	8.95	23.2	11.7	11.1	12.6
8	13.1	13.0	11.4	119	104	10.8	13.9	13.9	59.8	11.7	9.82	15.6
9	27.0	12.7	13.0	24.0	68.6	10.8	11.7	16.9	12.0	28.0	9.20	14.5
10	19.4	13.0	11.1	13.0	67.8	19.9	11.1	22.8	10.1	15.7	14.6	11.7
11	14.5	62.1	10.8	12.0	14.2	19.8	17.4	18.6	9.82	16.6	10.8	11.4
12	11.7	24.8	34.4	12.3	12.7	11.7	16.1	29.5	9.51	20.2	15.1	11.1
13	18.8	14.5	35.2	17.9	13.0	11.1	11.4	21.9	8.95	9.20	12.3	11.4
14	14.9	12.3	18.6	37.8	13.4	18.3	10.4	25.0	8.95	8.95	14.0	11.4
15	18.8	12.0	11.7	11.7	70.6	13.0	21.8	23.0	8.95	8.70	11.4	13.4
16	16.7	11.7	32.3	11.4	27.0	21.8	44.8	11.4	8.95	8.45	8.95	14.4
17	18.2	11.4	70.5	12.0	21.0	37.9	36.2	9.51	8.70	17.2	8.70	12.0
18	22.2	11.7	38.3	35.2	13.4	13.0	12.3	10.5	8.45	9.51	8.70	17.5
19	67.8	16.5	13.0	57.9	12.3	*11.4	10.8	16.4	*8.45	41.0	8.45	11.7
20	157	21.7	11.7	134	12.0	10.4	10.4	17.6	8.20	33.7	151	15.7
21	50.7	15.5	12.3	21.9	13.0	10.4	10.8	10.1	8.20	20.1	51.9	18.4
22	41.4	13.0	11.7	13.8	12.0	15.3	10.1	74.1	8.45	18.4	23.9	14.9
23	14.9	32.9	10.8	12.7	11.7	20.9	9.82	40.4	11.2	43.3	135	23.1
24	22.8	67.6	11.4	39.9	11.4	10.8	18.8	74.8	10.1	75.5	104	17.2
25	27.0	24.3	11.4	16.2	11.4	10.1	29.7	24.2	11.7	85.8	300	21.5
26	66.1	20.0	10.8	18.0	28.5	10.1	10.1	12.0	13.9	25.5	90.5	13.0
27	87.7	13.8	10.4	12.7	12.7	11.4	16.9	12.7	28.5	11.4	23.5	13.0
28	26.0	16.9	14.1	50.5	11.4	10.8	10.1	9.82	70.6	*119	15.3	11.1
29	15.8	13.0	29.4	40.4	11.4	10.1	9.51	10.1	15.6	40.7	13.8	19.0
30	16.9	13.4	27.9	*13.0	11.1	10.1	9.51	---	29.1	14.5	12.7	25.3
31	14.5	11.7	---	11.7	---	24.8	10.4	---	11.4	---	12.3	---
Total	1022.0	568.1	574.7	986.1	683.8	432.1	596.04	568.69	516.18	777.51	1154.42	429.6
Mean												
Mgd	33.0	18.3	19.2	31.8	22.8	13.9	19.2	19.6	16.6	25.9	37.2	14.3
Cfs	51.1	28.3	29.7	49.2	35.3	21.5	29.7	30.3	25.7	40.1	57.6	22.1
Ac-ft	3140	1740	1760	3030	2100	1330	1830	1750	1580	2390	3540	1320

Calendar Year 1963: Max 157 Min 5.70 Mean mgd 22.9 Mean cfs 35.4 Ac-ft 25610
Fiscal Year 1963-64: Max 300 Min 8.20 Mean mgd 22.7 Mean cfs 35.1 Ac-ft 25510

* Discharge measurement made on this day.

Peak discharge (base, 700 mgd)

Date	Time	Gage height	Discharge Mgd	Discharge Cfs	Date	Time	Gage height	Discharge Mgd	Discharge Cfs
7-20	0300	5.44	736	1,140	5-25	0900	5.54	776	1,200

6290. Honokowai ditch near Lahaina

Location.--Lat 20°55'57", long 156°37'31", on left bank just downstream from intake on Kapaloa Stream and 5.4 miles northeast of Lahaina lighthouse.

Records available.--July 1912 to December 1917, November 1918 to January 1958, June 1958 to June 1964. Monthly discharge only January 1916, published in WSP 1319.

Gage.--Water-stage recorder. Altitude of gage is 1,600 ft (from topographic map). Prior to Jan. 1, 1918, staff gage at site 0.5 mile downstream, Nov. 14, 1918, to May 27, 1921, water-stage recorder at site 1.5 miles downstream, and May 28, 1921, to Apr. 21, 1951, water-stage recorder in tunnel section now abandoned 75 ft downstream from Kapaloa Stream intake, all at different datums.

Average discharge.--48 years (1912-16, 1919-57, 1958-64), 5.80 mgd (8.97 cfs).

Extremes.--1912-64: Maximum daily discharge, 43 mgd (66 cfs) June 30, 1930; no flow at times.

Remarks.--Records good. Ditch diverts from Amalu and Kapaloa Streams just above station for irrigation of sugar cane and domestic use.

Cooperation.--Records of daily discharge since July 1932 furnished by Pioneer Mill Co.

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	23.3	2.32	2.80	7.40	2.80	3.04	7.63	2.92	5.55	3.13	3.39	3.15
2	12.6	2.25	2.80	13.9	2.80	2.83	5.84	2.92	11.7	3.04	5.02	3.15
3	3.68	2.25	5.29	13.8	2.80	2.80	7.15	2.79	8.26	2.92	4.05	3.15
4	3.33	2.25	3.31	13.4	2.80	2.74	7.85	2.80	5.11	2.92	3.30	3.15
5	3.20	2.25	3.60	4.73	2.80	2.68	3.00	2.80	3.59	4.26	4.77	3.15
6	2.37	2.25	3.00	3.15	2.80	2.68	6.83	2.80	3.31	7.79	3.15	3.15
7	2.25	2.25	2.56	5.10	8.81	2.55	4.46	2.80	9.50	3.73	2.75	3.15
8	2.99	2.25	2.55	21.0	18.0	2.55	4.17	3.65	15.0	3.29	2.68	3.39
9	5.84	2.25	2.49	5.43	9.00	2.78	3.67	5.32	4.09	10.9	4.97	4.15
10	3.22	2.25	2.55	3.48	10.8	3.34	3.23	8.60	3.17	5.62	3.36	3.71
11	2.85	10.1	2.55	3.15	4.23	4.73	5.05	6.02	2.98	3.42	3.05	3.45
12	2.02	4.09	5.62	3.15	4.23	3.49	5.51	11.0	2.92	8.76	4.71	3.15
13	3.29	2.85	7.59	5.94	4.23	4.05	3.49	8.67	2.92	3.02	3.69	3.15
14	2.84	2.43	4.23	10.3	4.23	4.11	3.15	8.01	2.92	2.80	3.51	3.15
15	*3.95	2.25	2.57	3.41	8.35	4.11	5.73	8.95	2.77	2.80	3.11	3.84
16	3.76	2.25	7.21	3.15	6.86	4.17	12.9	4.09	3.04	2.92	2.62	4.48
17	4.90	2.25	13.2	3.15	3.75	6.26	11.3	3.06	3.04	2.92	2.35	3.53
18	4.86	2.25	10.9	7.79	3.33	3.62	3.71	2.80	3.04	2.92	2.35	6.47
19	8.11	2.55	3.25	12.8	3.15	3.39	3.16	4.94	3.04	6.40	2.35	3.64
20	2.55	5.18	2.85	26.6	3.15	3.39	2.97	5.22	3.04	7.52	20.1	5.45
21	5.63	3.92	2.80	6.38	3.15	3.39	3.00	3.31	3.04	3.74	13.7	6.09
22	6.31	3.28	2.80	3.75	3.15	3.39	3.02	20.1	3.04	5.21	7.44	4.75
23	2.33	10.4	2.58	3.39	3.15	4.27	2.92	11.4	2.82	9.70	21.9	7.00
24	3.68	13.2	2.45	16.4	3.15	2.92	4.34	20.8	2.68	21.7	17.2	4.21
25	3.94	6.62	2.55	5.24	3.26	2.92	9.18	8.45	2.68	22.9	22.6	7.05
26	11.0	5.21	2.55	3.15	5.74	2.92	3.24	3.86	3.04	9.61	10.0	4.49
27	19.8	3.33	2.55	3.15	3.15	2.92	4.38	3.39	3.94	3.48	6.61	4.04
28	5.72	4.68	2.87	3.05	3.15	3.04	3.00	3.39	11.8	14.1	4.10	3.34
29	7.13	3.09	6.03	2.92	3.04	3.04	2.31	3.39	3.91	9.84	3.63	3.51
30	3.29	3.11	6.93	2.92	3.04	2.92	2.35	---	7.25	4.32	3.27	3.51
31	2.66	2.80	---	2.80	---	5.80	2.35	---	*3.67	---	3.15	---
Total	173.40	118.41	125.03	223.98	142.90	106.84	150.89	178.25	146.86	195.68	198.88	121.60
Mean												
Mgd	5.59	3.82	4.17	7.22	4.76	3.45	4.87	6.15	4.74	6.52	6.42	4.05
Cfs	8.65	5.91	6.45	11.2	7.36	5.34	7.54	9.52	7.33	10.1	9.93	6.27
Ac-ft	532	363	384	687	438	328	463	547	451	600	610	373

Calendar Year 1963: Max 26.6 Min 1.55 Mean mgd 5.13 Mean cfs 7.94 Ac-ft 5,740
Fiscal Year 1963-64: Max 26.6 Min 2.02 Mean mgd 5.14 Mean cfs 7.95 Ac-ft 5,780

* Discharge measurement made on this day.

6385. Kahoma Stream at Lahaina

Location.--Lat 20°53'10", long 156°40'36", on right bank 0.2 mile west of Kelawea, 0.6 mile northeast of Lahaina, 0.6 mile downstream from Kanaha Stream, and 0.9 mile upstream from mouth.

Drainage area.--5.22 sq mi.

Records available.--October 1962 to June 1964.

Gage.--Water-stage recorder. Altitude of gage is 90 ft (from topographic map).

Extremes.--Maximum discharge during year, 272 mgd (421 cfs) Oct. 3 (gage height, 5.71 ft), from rating curve extended above 16 mgd on basis of slope-area measurements at gage heights 5.28, 6.01, and 7.58 ft; no flow most of the time.
1962-64: Maximum discharge, 342 mgd (529 cfs) Jan. 16, 1963 (gage height, 6.01 ft), from rating curve extended above 45 mgd on basis of slope-area measurement of peak flow; no flow most of the time each year.
Maximum discharge known, 5,010 mgd (7,750 cfs) May 13, 1960, by slope-area measurement of peak flow at site 0.5 mile upstream.

Remarks.--Records good except those for day of no gage-height record, which are fair, and those below 1 mgd, which are poor. Diversion above station by Pioneer Mill Co. for irrigation of sugar cane. Diversion from Kanaha Stream above station by Maui County Board of Water Supply for domestic use. Continuous records of rainfall are obtained at station.

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	2.68	0.03	0	0	0	0	0.01	0	0.01	0	0	
2	*1.85	.02	0	.18	0	0	0	0	1.72	0	0	
3	0	.01	.12	21.0	0	0	0	0	0	0	0	
4	0	0	0	2.86	0	0	.19	0	0	0	0	
5	0	0	0	.88	0	0	0	0	0	0	.10	
6	0	*0	.01	.06	0	0	0	0	0	0	.01	
7	0	0	.05	.34	4.04	0	0	0	0	0	.01	
8	0	0	0	4.90	6.94	0	0	0	4.17	0	0	
9	.10	0	0	.44	.21	0	0	0	.01	0	0	
10	0	0	0	.01	.35	0	0	0	0	0	.02	
11	0	0	0	0	.01	*0	0	0	*0	0	0	
12	0	0	0	0	0	0	0	0	0	0	.01	
13	0	0	0	0	0	0	0	.04	.01	0	.01	
14	0	0	0	4.14	0	0	0	.03	0	0	.01	
15	0	0	0	.02	.06	0	0	.43	0	0	0	
16	0	0	0	0	.15	0	1.53	0	0	0	0	
17	2.14	0	*a85	.02	0	0	1.78	0	0	0	0	
18	3.15	0	7.20	.14	0	.01	.01	0	0	0	0	
19	2.58	0	.01	.20	0	0	0	0	0	0	0	
20	17.0	0	.01	25.9	.01	0	.01	0	0	0	0	
21	0	0	0	.12	0	0	0	0	0	*0	1.17	
22	.20	0	0	.01	0	0	*0	0	0	0	.01	
23	.21	3.59	0	.01	0	0	0	0	0	0	26.9	
24	1.43	1.75	0	.81	0	0	0	.32	0	.14	5.15	
25	0	.02	0	.08	0	0	0	0	0	.84	7.54	
26	0	0	*0	.01	.02	0	0	0	0	.07	.11	
27	15.6	0	0	0	0	0	0	0	0	.01	.03	
28	1.46	0	0	0	0	0	0	0	0	.61	*.01	
29	.04	0	0	.04	0	0	0	0	0	.10	0	
30	.27	0	0	0	0	0	0	---	0	.01	0	
31	.65	0	---	*0	---	0	0	---	0	---	0	---
Total	49.36	5.42	92.40	62.17	11.79	0.01	3.53	0.82	5.92	1.78	41.09	0
Mean												
Mgd	1.59	0.175	3.08	2.01	0.393	0.0003	0.114	0.028	0.191	0.059	1.33	0
Cfs	2.46	0.271	4.77	3.11	0.608	0.0005	0.176	0.043	0.296	0.091	2.06	0
Ac-ft	151	17	284	191	36	0.03	11	2.5	18	5.5	126	0

Calendar Year 1963: Max 85 Min 0 Mean mgd 1.44 Mean cfs 2.23 Ac-ft 1620
Fiscal Year 1963-64: Max 85 Min 0 Mean mgd 0.749 Mean cfs 1.16 Ac-ft 842

Peak discharge (base, 250 mgd)

Date	Time	Gage height	Discharge	
			Mgd	Cfs
10-3	1600	5.71	272	421

* Discharge measurement or observation of no flow made on this day.
a No gage-height record.

6450. Olowalu ditch near Olowalu

Location.--Lat 20°49'33", long 156°36'47", on left bank 1.2 miles northeast of Olowalu and 5.5 miles southeast of Lahaina.

Records available.--August 1911 to January 1916, April 1916 to September 1920, November 1920 to January 1958, June 1958 to June 1964. Prior to July 1913, published as Olowalu ditch 1 near Olowalu. Monthly discharge only for June 1932, published in WSP 1319.

Gage.--Water-stage recorder and Parshall flume. Altitude of gage is 480 ft (from topographic map). Prior to June 30, 1916, staff gage in tailrace of powerhouse 1,000 ft downstream at different datum. July 28, 1916, to June 8, 1919, staff gage, and June 9, 1919, to June 30, 1932, water-stage recorder, at site 300 ft upstream at different datum. July 1, 1932, to Oct. 7, 1933, records obtained by combining flows at three stations about 1,000 ft downstream.

Average discharge.--48 years (1912-15, 1917-20, 1921-57, 1958-64), 4.83 mgd (7.47 cfs).

Extremes.--1911-64: Maximum daily discharge, 13.7 mgd (21.2 cfs) Apr. 17, 1935; no flow at times.

Remarks.--Records good. Ditch diverts from Olowalu Stream at altitude 520 ft for irrigation and domestic use.

Cooperation.--Records of daily discharge since July 1932 furnished by Pioneer Mill Co.

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	7.58	6.87	3.47	5.01	6.20	3.49	6.56	2.81	3.84	3.53	5.64	5.36
2	7.71	6.19	3.32	8.25	5.63	3.46	4.78	2.75	3.95	3.21	5.36	4.95
3	7.39	5.72	4.95	7.10	5.33	3.42	7.46	2.74	3.63	3.06	4.69	4.65
4	7.19	5.38	4.06	5.94	4.99	3.41	5.70	2.72	3.50	2.93	4.06	4.40
5	6.98	5.13	3.62	5.00	4.72	3.32	4.72	2.59	3.29	2.99	3.86	4.10
6	6.16	4.88	3.50	4.61	4.45	3.28	4.41	2.54	3.09	3.08	3.66	4.02
7	5.47	4.68	3.43	5.60	5.34	3.24	5.56	2.43	3.17	2.91	3.44	3.90
8	5.17	4.46	3.24	9.24	9.03	3.20	6.56	3.07	6.18	2.75	3.28	3.93
9	5.40	4.36	3.35	9.13	8.94	3.15	7.77	3.01	4.01	3.63	3.12	4.01
10	4.54	4.22	3.08	8.16	9.06	4.22	7.33	3.51	3.46	3.63	3.16	3.68
11	3.90	7.19	3.05	6.42	8.68	4.30	6.31	3.85	3.24	2.89	2.97	3.56
12	3.78	7.13	5.07	5.87	7.70	3.87	5.06	5.33	3.08	3.48	2.87	3.45
13	3.76	5.66	6.04	5.17	6.57	3.32	4.36	3.83	2.97	2.90	2.86	3.39
14	3.88	4.93	5.11	7.13	5.89	3.70	3.97	4.59	2.88	2.82	2.72	3.24
15	*4.99	4.53	3.98	4.89	6.39	3.33	5.01	4.64	2.82	2.73	2.63	3.26
16	5.59	4.30	4.60	4.47	7.00	4.25	7.40	3.80	2.80	2.67	2.61	3.20
17	6.54	4.08	6.79	4.69	5.60	5.46	7.25	3.36	2.74	3.17	2.49	3.10
18	7.30	3.96	6.49	5.43	5.10	4.39	5.41	3.21	2.69	2.70	2.44	3.14
19	6.45	3.90	6.67	7.27	4.78	3.70	4.41	3.14	2.66	2.78	2.36	3.06
20	8.84	4.37	5.83	9.47	4.52	3.38	4.02	3.03	3.12	3.96	7.91	3.11
21	8.26	4.00	5.33	9.31	4.55	3.22	3.74	2.86	2.64	3.71	8.40	3.27
22	8.17	3.68	5.21	8.75	4.21	3.64	3.56	6.30	2.61	3.81	7.67	3.27
23	7.88	4.78	4.41	8.04	4.07	3.34	3.43	6.87	2.85	5.12	7.55	3.90
24	7.76	7.50	4.39	9.06	3.94	3.04	3.88	7.39	3.69	6.08	7.97	3.32
25	7.78	6.42	4.01	8.56	3.89	2.93	4.93	7.06	3.83	6.07	8.81	3.48
26	7.91	6.12	3.68	7.71	5.00	3.20	3.56	6.39	3.48	5.80	8.24	3.15
27	8.62	4.95	3.54	6.57	3.95	4.79	3.67	5.20	3.40	5.71	7.86	2.89
28	8.11	3.32	3.84	6.97	3.79	3.72	3.05	4.39	5.99	5.50	7.61	2.80
29	8.05	4.01	5.30	9.06	3.67	3.32	3.00	4.16	4.20	4.88	7.41	3.67
30	7.89	3.78	6.17	8.18	3.59	3.20	2.92	---	5.33	5.91	6.41	4.47
31	7.63	3.57	---	6.94	---	4.14	2.91	---	*4.15	---	5.67	---
Total	206.68	154.07	135.53	218.00	166.58	112.43	152.70	117.57	109.29	114.41	155.73	109.73
Mean												
Mgd	6.67	4.97	4.52	7.03	5.55	3.63	4.93	4.05	3.52	3.81	5.02	3.66
Cfs	10.3	7.69	6.99	10.9	8.59	5.62	7.63	6.27	5.45	5.89	7.77	5.66
Ac-ft	634	473	416	669	511	345	469	360	335	351	478	337

Calendar Year 1963: Max 11.0 Min 2.26 Mean mgd 5.79 Mean cfs 8.96 Ac-ft 6490
Fiscal Year 1963-64: Max 9.47 Min 2.36 Mean mgd 4.79 Mean cfs 7.41 Ac-ft 5380

* Discharge measurement made on this day.

6600. Kulanihakoi Gulch near Kihei

Location.--Lat 20°46'06", long 156°27'03", on right bank 0.5 mile northeast of Lihue Cemetery, 0.8 mile upstream from mouth, and 1.3 miles southeast of Kihei.

Drainage area.--14.4 sq mi.

Records available.--October 1962 to June 1964.

Gage.--Water-stage recorder. Altitude of gage is 35 ft (from topographic map).

Extremes.--Maximum discharge during year, 2.32 mgd (3.59 cfs) Jan. 7 (gage height, 1.50 ft); no flow most of the time.
1962-64: Maximum discharge, 290 mgd (449 cfs) Jan. 16, 1963 (gage height, 4.02 ft), from rating curve extended above 52 mgd on basis of slope-area measurement of peak flow; no flow at times each year.

Remarks.--Records fair. No diversion above station. Continuous records of rainfall are obtained at station.

Rating table (gage height, in feet, and discharge, in million gallons a day)

0.92	0
1.0	.04
1.1	.20

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1							0					
2							0					
3							0					
4					(*)		0					(*)
5							0					
6							0					
7		(*)					.19					
8							0					
9							0					
10							0					
11							0					
12							0					
13							0					
14							0					
15							0					
16							0					
17			(*)				0		(*)			
18							0					
19							0					
20						(*)	0					
21							0			(*)		
22							0					
23							0					
24							0					
25							0					
26							0					
27							0					
28							*0					
29							0					
30							0	---				
31			---		---		0	---		---		---
Total	0	0	0	0	0	0	0.19	0	0	0	0	0
Mean												
Mgd	0	0	0	0	0	0	0.006	0	0	0	0	0
Cfs	0	0	0	0	0	0	0.009	0	0	0	0	0
Ac-ft	0	0	0	0	0	0	0.6	0	0	0	0	0

Calendar Year 1963: Max 28.5 Min 0 Mean mgd 0.112 Mean cfs 0.173 Ac-ft 126
Fiscal Year 1963-64: Max 0.19 Min 0 Mean mgd 0.0005 Mean cfs 0.0008 Ac-ft 0.6

Peak discharge (base, 40 mgd).--No peak above base.

* Observation of no flow made on this day.

7000. Waiakea Stream near Mountain View

Location.--Lat 19°38'30", long 155°10'30", on left bank 450 ft upstream from Olaa Flume Road and 7.5 miles northwest of Mountain View.

Drainage area.--Not determined.

Records available.--September 1930 to June 1964. Prior to July 1962, published as "at middle flume house, near Mountain View." See also Note below.

Gage.--Water-stage recorder and combined Parshall flume and concrete-weir control. Datum of gage is 1,934 ft above mean sea level (by stadia survey).

Average discharge.--33 years (1931-64), 7.56 mgd (11.7 cfs).

Extremes.--Maximum discharge during year, 228 mgd (353 cfs) May 25 (gage height, 4.12 ft), from rating curve extended above 110 mgd as explained below; minimum, 0.70 mgd (1.08 cfs) Jan. 3.

1930-64: Maximum discharge, 365 mgd (565 cfs), revised, Mar. 14, 1942 (gage height, 4.43 ft), from rating curve extended above 110 mgd by logarithmic plotting; no flow at times.

Revisions.--Figures of maximum discharge for the fiscal years 1961 and 1962 have been revised to 350 mgd (542 cfs) Oct. 16, 1960 (gage height, 4.40 ft) and 118 mgd (183 cfs) Oct. 28, 1961 (gage height, 3.77 ft), superseding those published in Surface Water Records of Hawaii and other Pacific Areas for fiscal years 1961 and 1962, respectively.

Remarks.--Records good. No diversion above station. Large part of flow comes from 3 tunnels.

Note.--Published records for peaks in fiscal years 1939, 1942, 1944, 1945, 1947, 1949-53, 1955-58, 1960 have been found to be in error; revised records are on file in the district office and will be published in the next water-supply paper.

Rating table (gage height, in feet, and discharge, in million gallons a day)

0.3	0.73	2.3	20.0
.5	1.65	3.3	53.0
.9	4.20	3.5	71.0
1.8	12.0	3.6	86.0

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	*13.7	*10.8	8.38	8.74	4.69	4.69	0.90	5.94	20.8	12.9	*19.4	*16.6
2	13.4	10.2	7.93	9.24	4.34	*4.41	.77	5.62	*23.3	12.2	18.6	14.2
3	13.6	9.64	*7.39	9.46	4.06	4.27	.86	*5.30	24.2	11.5	17.8	12.4
4	13.6	10.6	6.98	11.7	3.85	4.06	2.07	5.14	24.8	11.1	17.6	11.3
5	13.0	9.64	6.58	11.2	3.57	3.92	8.87	4.83	21.2	10.6	17.2	10.9
6	12.2	9.01	6.26	10.8	3.64	4.56	9.88	4.62	18.2	10.4	18.4	9.82
7	11.3	8.47	5.94	10.6	3.36	4.06	7.93	4.41	18.2	10.1	23.9	9.10
8	10.7	8.47	5.78	10.1	4.28	3.78	6.42	4.20	29.6	10.6	19.8	8.83
9	11.3	8.47	5.46	9.82	3.64	3.57	5.14	3.99	*32.0	10.9	18.8	7.66
10	10.9	8.02	5.06	9.19	3.36	3.43	4.34	4.20	32.6	11.3	17.8	7.14
11	9.91	8.29	4.90	8.56	3.22	3.15	3.78	4.83	32.9	11.2	17.4	6.74
12	9.46	8.02	5.75	7.93	2.94	3.01	3.36	6.19	31.1	11.8	16.6	6.18
13	8.74	7.75	7.39	7.48	2.74	2.87	3.08	9.53	26.3	11.4	16.2	5.78
14	8.11	7.48	7.14	7.06	2.62	2.74	2.87	11.4	20.3	11.2	16.2	5.70
15	7.57	7.14	6.42	6.66	3.22	2.56	2.68	*30.4	17.8	10.9	15.4	5.30
16	7.22	6.74	6.26	6.18	4.83	2.50	3.89	35.6	16.0	10.7	14.4	4.76
17	8.20	6.26	7.10	5.86	9.36	2.32	3.99	36.2	13.9	11.6	13.3	4.41
18	8.20	5.78	7.48	5.78	7.93	2.20	7.55	34.1	13.0	10.6	12.6	4.13
19	7.84	5.46	7.06	5.14	6.74	1.98	7.84	29.6	12.3	10.2	14.4	3.92
20	7.30	5.06	6.66	4.76	5.86	1.82	7.30	21.2	11.5	10.7	23.6	3.78
21	12.1	4.69	6.42	4.41	5.38	1.70	7.06	17.8	13.2	11.7	23.0	4.70
22	22.9	4.41	6.26	4.13	5.06	1.60	6.90	18.6	30.7	11.8	22.1	4.13
23	17.4	6.02	6.02	3.99	4.83	1.50	6.50	22.4	31.7	11.9	38.9	4.69
24	18.0	9.37	5.62	3.78	5.58	1.40	6.18	25.4	31.4	13.0	52.2	4.97
25	17.6	8.74	5.38	4.88	5.22	1.30	5.94	20.0	29.0	15.0	*72.5	6.66
26	16.8	9.37	4.98	5.06	6.58	1.20	5.86	18.0	25.4	15.0	57.9	6.82
27	15.7	9.28	4.69	4.48	6.26	1.07	8.16	18.4	20.0	14.6	49.0	6.74
28	13.8	9.64	4.41	*4.62	5.78	1.02	7.06	16.8	18.0	18.2	41.0	6.10
29	12.9	9.46	11.6	5.14	5.46	.98	6.82	15.1	16.6	19.2	32.6	*7.06
30	12.2	9.28	*9.50	5.78	5.06	.90	6.50	---	15.8	18.2	24.5	6.82
31	11.5	8.83	---	5.22	---	*.86	6.26	---	*14.0	---	18.8	---
Total	377.15	250.39	196.80	217.75	143.46	79.43	166.76	439.79	685.8	370.5	781.9	217.34
Mean												
Mgd	12.2	8.08	6.56	7.02	4.78	2.56	5.38	15.2	22.1	12.1	25.2	7.24
Cfs	18.9	12.5	10.1	10.9	7.40	3.96	8.32	23.5	34.2	19.2	39.0	11.2
Ac-ft	1,160	768	604	668	440	244	512	1,350	2,100	1,140	2,400	667

Calendar Year 1963: Max 66.1 Min 0.12 Mean mgd 8.57 Mean cfs 13.3 Ac-ft 9,600
Fiscal Year 1963-64: Max 72.5 Min 0.77 Mean mgd 10.7 Mean cfs 16.6 Ac-ft 12,050

* Discharge measurement made on this day.

Peak discharge (base, 50 mgd)

Date	Time	Gage height	Discharge Mgd	Discharge Cfs	Date	Time	Gage height	Discharge Mgd	Discharge Cfs
2-15	1700	3.36	57.2	88.5	5-23	1500	3.49	69.9	108
3-1	2030	3.40	60.0	92.8	5-25	1600	4.12	228	353
3-22	1230	3.63	91.1	141					

7012. Waiakea Stream near Hilo

Location.--Lat 19°41'35", long 155°05'55", on right bank 2.5 miles south of Hilo Post Office and 3.0 miles southeast of Piihonua.
Drainage area.--97 sq mi, approximately, of which 79 sq mi is probably noncontributing.
Records available.--May 1957 to June 1964. See also Note below.
Gage.--Water-stage recorder. Datum of gage is 369 ft above mean sea level (by stadia survey).
Average discharge.--7 years, 4.04 mgd (6.25 cfs).
Extremes.--Maximum discharge during year, 600 mgd (928 cfs) May 25 (gage height, 5.80 ft), from rating curve extended above 190 mgd as explained below; no flow for many days.
1957-64: Maximum discharge, 632 mgd (978 cfs) revised, Aug. 30, 1957 (gage height, 5.88 ft), from rating curve extended above 190 mgd by logarithmic plotting; no flow at times each year.
Revisions.--Figures of maximum discharge for the fiscal years 1961 and 1962 have been revised to 181 mgd (280 cfs) Oct. 17, 1960 (gage height, 4.30 ft) and 490 mgd (758 cfs) Nov. 23, 1961 (gage height, 5.50 ft), both from rating curve extended above 190 mgd by logarithmic plotting. They supersede those published in Surface Water Records of Hawaii and other Pacific Areas for fiscal years 1961 and 1962, respectively.
Remarks.--Records good. Board of Water Supply, County of Hawaii, diverts about 25,000,000 gal per year above station at 1,500-ft elevation.
Note.--Published records for high-water periods in fiscal years 1958-60 have been found to be in error; revised records are on file in the district office and will be published in the next water-supply paper.
Revisions.--Revised figures of discharge, in million gallons a day, for high-water periods in the fiscal year 1962, superseding those published in Surface Water Records of Hawaii and other Pacific Areas (1962), are given herewith:

Oct. 28, 1961..... 126
Nov. 23, 1961..... 213

Month	Million gallons	Maximum	Minimum	Mean Mgd	Mean Cfs	Runoff in acre-feet
October 1961.....	275.89	126	0	8.90	13.8	847
November.....	544.57	213	0	18.2	28.2	1,670
Calendar year 1961.....	-	213	0	4.07	6.30	4,560
Fiscal year 1961-62.....	-	213	0	3.68	5.69	4,120

Revised peak discharge.--1961-62: Sept. 21 (2000) 194 mgd (300 cfs), 4.37 ft; Oct. 28 (2330) 436 mgd (675 cfs), 5.32 ft; Nov. 23 (0700) 490 mgd (758 cfs), 5.50 ft; Dec. 13 (1700) 248 mgd (384 cfs), 4.62 ft.

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	0		0	0	0		0	0	21.3	0	11.3	*148
2	1.67		0	0	0		0	0	40.8	0	7.79	*7.96
3	0		0	0	0		0	0	25.1	0	2.23	3.00
4	0		0	0	0		0	0	23.5	0	*3.34	.86
5	0		0	0	0		0	0	10.5	0	4.15	2.06
6	0		0	0	*0		*3.24	0	4.84	0	3.75	.12
7	0		0	0	0		.12	0	11.4	0	34.2	0
8	0		0	0	0		0	0	54.4	0	13.3	0
9	0		0	0	0		0	0	37.0	0	8.90	0
10	0		0	0	0		0	0	29.0	0	4.50	0
11	0		0	0	0		0	0	31.6	0	3.68	0
12	0		0	0	0		0	0	36.7	0	3.79	0
13	0		0	0	0		0	*.01	19.5	0	3.38	0
14	0		0	0	0		0	0	10.7	0	.78	0
15	0		0	0	0		0	94.0	4.70	0	.01	0
16	0		*0	0	0		0	32.5	2.21	0	0	0
17	0		0	0	1.96		0	*18.9	*.05	0	0	0
18	0		0	0	0		0	19.8	0	0	0	0
19	0		0	0	0		0	16.2	0	0	7.24	*0
20	0		0	0	0		0	*7.46	.14	0	53.7	0
21	.01		0	0	0		0	*2.94	6.06	.76	26.4	0
22	27.8		0	0	0		0	*15.3	75.1	.53	18.5	0
23	*.05		0	0	0		0	22.5	35.6	1.65	128	0
24	0		0	0	0		0	81.2	25.5	0	244	*0
25	0		0	.07	0		0	16.1	25.8	5.14	393	0
26	0		0	0	0		0	5.11	18.6	0	*190	0
27	.74		0	0	0		0	14.4	10.7	*0	139	0
28	0		0	0	0		0	*2.12	11.1	13.2	97.0	0
29	0		*2.31	0	0		0	.06	3.82	22.4	61.4	0
30	0		.01	0	0		0	---	4.26	*6.76	38.0	0
31	0		---	0	---		0	---	.63	---	24.7	---
Total	30.27	0	2.32	0.07	1.96	0	3.36	348.60	580.61	50.44	1526.04	28.80
Mean												
Mgd	0.976	0	0.077	0.002	0.065	0	0.108	12.0	18.7	1.68	49.2	0.960
Cfs	1.51	0	0.119	0.003	0.101	0	0.167	18.6	28.9	2.60	76.1	1.49
Ac-ft	93	0	7.1	0.2	6.0	0	10	1,070	1,780	155	4,680	88

Calendar Year 1963: Max 126 Min 0 Mean mgd 2.85 Mean cfs 4.41 Ac-ft 3,200
Fiscal Year 1963-64: Max 393 Min 0 Mean mgd 7.03 Mean cfs 10.9 Ac-ft 7,890

Peak discharge (base, 200 mgd)

Date	Time	Gage height	Discharge Mgd	Discharge Cfs	Date	Time	Gage height	Discharge Mgd	Discharge Cfs
2-15	1900	4.87	308	477	5-23	1600	4.75	278	430
2-24	0330	5.24	412	637	5-25	1700	5.80	600	928
3-22	1600	4.79	288	446					

* Discharge measurement or observation of no flow made on this day.

7017. Wailuku River near Pua Akala

Location.--lat 19°46'24", long 155°22'01", on right bank 50 ft upstream from Keanakolu Road, 2.4 miles southwest of Pua Akala, and 18 miles west of Hilo.

Drainage area.--10.2 sq mi.

Records available.--January to June 1964.

Gage.--Water-stage recorder. Altitude of gage is 6,840 ft (from topographic map).

Extremes.--Maximum discharge during period, 115 mgd (178 cfs) Mar. 8 (gage height, 2.90 ft), from rating curve extended above 15 mgd by logarithmic plotting; no flow for many days.

Remarks.--Records fair. No diversion above station.

Rating table (gage height, in feet, and discharge, in million gallons a day)

0.99	0	1.5	2.80
1.0	.01	1.6	4.70
1.1	.04	1.7	7.30
1.2	.20	1.9	14.6
1.3	.67	2.2	33.0
1.4	1.50		

Discharge, in million gallons a day, January to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1								0	1.33		0	
2								0	.82		0	
3								0	.01		0	
4								0	.01		0	
5								0	0		0	
6								0	0		.01	
7								0	0		.01	
8								0	*30.0		0	
9								0	*.60		0	
10								0	.01		0	
11								0	.01		0	
12								0	0		0	
13							(*)	.01	0		0	
14								.01	0		0	
15								.92	0		0	
16								.43	0		0	
17								0	0		0	
18								0	0		0	
19								0	0		0	
20								*0	.34		0	
21								0	.04		0	
22								0	.88		0	
23								0	1.06	(*)	4.51	
24								0	.77		6.68	
25								0	.01		5.24	
26								0	**.01		.08	
27								0	0		.01	
28								0	0		*0	
29								0	0		0	
30								---	0		0	
31			---		---			---	0	---	0	---
Total							0	1.37	35.90	0	16.54	0
Mean												
Mgd							0	0.047	1.16	0	0.53	0
Cfs							0	0.073	1.79	0	0.82	0
Ac-ft							0	4.2	110	0	51	0

Calendar Year Max Min Mean mgd Mean cfs Ac-ft
Fiscal Year 1963-64: Max - Min - Mean mgd - Mean cfs - Ac-ft -

Peak discharge (base, 20 mgd)

Date	Time	Gage height	Discharge Mgd	Discharge Cfs	Date	Time	Gage height	Discharge Mgd	Discharge Cfs
3-8	0800	2.90	115	178	5-25	1400	2.15	29.5	45.6

* Discharge measurement or observation of no flow made on this day.
** Field estimate made on this day.
Note.--No gage-height record Jan. 1-12.

7040. Wailuku River at Piihonua
(Formerly published as Wailuku River above Hilo Boarding School ditch intake, near Hilo)

Location (revised).--Lat 19°42'58", long 155°09'13", on left bank 0.2 mile downstream from Hookelekele Stream, 0.9 mile west of Piihonua, and 4.1 miles west of Hilo Post Office.

Drainage area.--125 sq mi.

Records available.--July 1928 to July 1940, October 1940 to December 1947, April 1948 to June 1964. Monthly discharge only July 1928, published in WSP 1319. Prior to July 1963, published as "above Hilo Boarding School ditch intake, near Hilo."

Gage.--Water-stage recorder (digital since Apr. 28). Altitude of gage is 1,070 ft (from topographic map).

Average discharge.--34 years (1928-40, 1941-47, 1948-64), 180 mgd (279 cfs).

Extremes.--Maximum discharge during year, 17,400 mgd (26,900 cfs) Mar. 8 (gage height, 20.1 ft), from rating curve extended above 6,900 mgd; minimum 2.08 mgd (3.22 cfs) Dec. 30, 31.
1928-64: Maximum discharge, 41,000 mgd (63,400 cfs) Aug. 11, 1940 (gage height, 28.6 ft, from floodmarks), from rating curve extended above 6,600 mgd; minimum, 0.16 mgd (0.25 cfs) Mar. 9, 1941.

Remarks.--Records good except those for periods of no gage-height record, which are poor. Hawaii County Board of Water Supply diverts about 4 mgd above station for domestic supply. Kapehu ditch diverted from Kapehu Stream into Wailuku River above station 1938-63.

Rating table (gage height, in feet, and discharge, in million gallons a day)

1.2	2.20	5.0	246
1.4	4.40	6.0	389
1.6	8.00	8.0	775
2.0	19.0	9.0	1,080
2.5	40.0	10.0	1,500
3.0	69.0	13.0	3,440
4.0	141	15.0	5,740

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	800	110	76.8	a210	56.4	45.6	2.60	42.0	1200	152	311	166
2	547	87.7	66.8	a200	51.0	38.0	4.16	35.5	1450	164	383	155
3	271	75.6	53.4	a340	50.4	*31.8	9.38	31.4	597	119	547	119
4	184	213	45.6	a420	67.2	28.5	64.8	31.8	650	154	389	98.9
5	136	161	39.5	a360	41.5	26.5	554	28.1	381	147	520	101
6	104	107	37.0	a260	39.5	23.3	294	23.7	234	157	597	79.2
7	84.0	93.3	34.6	a190	40.5	22.9	136	24.9	470	133	812	73.2
8	*72.0	111	36.0	a140	40.5	22.5	75.0	218	4.770	126	425	88.4
9	123	129	34.1	a90	36.0	19.4	46.8	21.4	1.680	215	275	61.2
10	149	87.7	27.7	75.0	31.0	17.1	35.0	29.7	1.060	179	223	*52.8
11	87.0	126	25.3	60.0	24.9	16.1	26.9	87.7	755	180	251	46.8
12	82.2	101	29.3	51.6	22.9	15.5	26.9	314	478	278	227	42.0
13	65.4	88.4	91.9	43.5	20.0	14.4	22.5	962	328	152	410	37.5
14	54.0	78.0	100	39.0	19.7	12.9	19.0	1.070	304	125	311	43.0
15	46.2	67.2	57.6	35.0	128	12.1	18.4	3.900	223	157	212	53.4
16	44.5	55.8	67.2	30.1	534	12.9	194	1.680	190	157	165	39.0
17	84.6	46.8	145	27.7	614	10.3	332	541	145	209	131	33.2
18	96.1	41.5	603	45.0	214	10.1	572	321	125	150	114	28.5
19	128	36.5	140	28.1	122	8.69	235	232	110	154	212	26.9
20	118	31.8	91.2	23.7	82.2	7.80	133	194	196	271	780	28.1
21	295	*31.0	67.8	21.1	61.2	6.40	94.0	173	346	305	599	103
22	3.410	41.0	54.6	*19.0	46.8	5.84	65.4	386	2.440	271	373	67.8
23	430	109	44.0	18.0	40.5	5.52	57.0	514	911	244	4.430	60.6
24	314	456	38.0	17.4	54.0	4.56	44.5	595	768	367	4.610	49.2
25	209	227	33.2	106	67.8	4.72	41.5	314	532	565	*a4.300	112
26	162	189	29.3	82.2	133	4.28	45.6	198	299	513	a1.500	227
27	253	148	28.1	51.0	112	3.32	370	299	215	311	*a700	153
28	175	132	24.1	39.5	66.0	3.00	103	163	174	*523	*459	98.2
29	203	151	648	94.0	66.6	2.30	70.2	136	141	*676	276	111
30	200	116	a310	69.0	75.6	2.20	52.8	---	210	354	236	113
31	145	95.4	---	70.8	---	2.30	57.0	---	212	---	185	---
Total	9.072.0	3.543.7	3.078.9	3.256.7	2.959.2	440.83	3.802.44	12370.0	21.594	7.508	24.963	2467.9
Mean												
Mgd	293	114	103	105	98.6	14.2	123	427	697	250	805	82.3
Cfs	453	176	159	162	153	22.0	190	661	1.080	387	1.250	127
Ac-ft	27.840	10.880	9.450	9.990	9.080	1.350	11.670	37.960	66.270	23.040	76.610	7.570

Calendar Year 1963: Max 5.910 Min 0.2 Mean mgd 233 Mean cfs 361 Ac-ft 260,800
Fiscal Year 1963-64: Max 4.770 Min 2.20 Mean mgd 260 Mean cfs 402 Ac-ft 291,700

Peak discharge (base, 5,600 mgd)

Date	Time	Gage height	Discharge Mgd	Discharge Cfs	Date	Time	Gage height	Discharge Mgd	Discharge Cfs
7-22	0300	18.87	13,700	21,200	5-23	1445	16.49	8,530	13,200
2-15	2000	15.73	7,030	10,900	5-25	about	-	about	about
3- 1	2230	15.76	7,080	11,000		1630		8,000	12,000
3- 8	0930	20.1	17,400	26,900					

* Discharge measurement made on this day.
a No gage-height record.

7176. Alia Stream near Hilo

Location.--Lat 19°50'40", long 155°06'15", on left bank 10 ft downstream from culvert on Mamalahoa Highway at Pepeekeo, 2.2 miles southeast of Honomu, and 8 miles north of Hilo.

Drainage area.--0.58 sq mi.

Records available.--April 1962 to June 1964.

Gage.--Water-stage recorder. Altitude of gage is 480 ft (from topographic map).

Extremes.--Maximum discharge during year, 120 mgd (186 cfs) May 24 (gage height, 3.36 ft), from rating curve extended above 27 mgd; minimum, 1.18 mgd (1.83 cfs) Dec. 14.
1962-64: Maximum discharge, 148 mgd (229 cfs) May 11, 1963 (gage height, 3.54 ft), from rating curve extended above 27 mgd; minimum, 0.70 mgd (1.08 cfs) sometime during period Jan. 24 to Feb. 12, 1963.

Remarks.--Records good except those above 60 mgd, which are fair. No diversion above station. Spring water not used by sugar mills enters stream above station.

Rating table (gage height, in feet, and discharge, in million gallons a day)

0.8	1.10	1.6	10.7
1.0	2.70	2.2	28.0
1.3	5.90	2.6	49.0

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	12.8	6.46	6.04	6.32	5.18	3.93	2.88	7.16	15.3	*4.48	6.60	5.90
2	8.54	6.18	5.78	9.79	5.18	3.71	3.24	6.46	13.7	4.70	6.18	5.42
3	8.42	5.90	5.06	6.46	5.18	3.51	3.93	6.04	10.2	5.54	6.18	4.82
4	8.10	6.46	4.48	7.82	5.18	3.33	4.04	6.32	*9.98	6.18	6.88	4.82
5	7.78	6.18	4.26	7.78	4.94	3.33	11.6	5.90	8.74	6.18	*7.58	4.82
6	7.46	5.90	4.15	6.60	5.06	3.42	14.7	*5.30	8.26	5.90	7.30	4.37
7	7.16	5.78	4.26	6.32	*6.31	3.24	5.90	5.30	9.72	5.66	14.3	4.04
8	6.74	6.88	4.82	5.90	5.18	2.92	5.66	5.18	22.0	5.78	7.30	3.93
9	7.94	7.16	5.66	5.90	4.82	2.97	5.18	6.60	13.9	5.90	6.46	*3.82
10	8.71	6.74	5.06	5.78	10.3	2.38	4.26	8.42	10.3	5.54	6.46	4.04
11	7.46	7.02	4.59	5.42	5.90	1.58	3.42	9.26	10.3	5.06	6.46	4.70
12	7.78	7.02	5.78	5.18	5.66	1.42	4.48	9.08	9.62	4.94	6.32	5.18
13	7.16	6.88	6.88	4.82	5.18	1.34	4.26	9.44	8.42	4.94	10.6	6.46
14	6.46	6.74	7.16	4.59	4.94	1.42	3.51	9.63	7.94	5.42	8.26	6.74
15	5.78	6.46	6.04	4.48	5.66	2.06	3.33	15.0	7.62	5.30	6.04	5.78
16	5.90	5.66	7.31	4.26	7.24	3.15	5.78	8.58	7.30	5.42	5.30	5.42
17	*7.30	5.06	7.53	4.04	15.1	2.97	5.78	7.30	7.02	6.18	4.94	5.54
18	7.02	4.82	7.40	5.42	6.46	3.42	6.04	7.02	6.74	5.54	4.82	5.30
19	7.16	4.37	6.18	4.37	5.66	2.38	5.78	7.02	6.46	5.30	8.18	4.85
20	7.62	4.04	6.04	4.48	5.30	*2.46	5.42	7.02	7.34	6.18	13.5	4.72
21	7.09	3.82	5.66	3.93	5.06	1.58	5.30	7.16	10.4	6.88	8.42	6.88
22	13.2	4.15	5.54	3.51	4.94	1.82	4.82	10.3	16.2	6.46	7.62	7.02
23	7.30	*5.18	4.82	3.33	4.70	2.22	4.94	14.2	7.02	5.90	30.0	6.74
24	7.30	7.20	4.82	4.41	5.06	2.46	5.06	13.5	8.90	6.60	38.6	6.60
25	6.74	6.74	4.82	15.3	5.30	2.54	5.42	12.1	9.26	7.54	47.1	7.30
26	6.74	6.60	4.37	6.91	5.18	2.54	6.18	7.16	8.58	6.32	21.1	7.78
27	10.2	6.18	4.26	5.30	4.94	2.38	10.8	6.74	8.10	6.04	12.8	6.62
28	7.16	5.90	4.04	4.94	4.59	2.14	7.62	7.30	10.9	11.7	9.08	5.71
29	7.78	6.04	18.1	5.30	4.37	1.90	7.78	8.10	9.08	8.32	7.46	7.16
30	7.02	5.90	*7.16	5.18	4.26	1.90	6.88	---	8.10	6.74	6.88	7.02
31	6.74	6.04	---	5.06	---	2.54	7.46	---	5.42	---	6.46	---
Total	240.56	185.46	178.07	178.90	172.83	78.96	181.45	238.59	302.82	182.64	345.18	169.50
Mean												
Mgd	7.76	5.98	5.94	5.77	5.76	2.55	5.85	8.23	9.77	6.09	11.1	5.65
Cfs	12.0	9.25	9.19	8.93	8.91	3.95	9.05	12.7	15.1	9.42	17.2	8.74
Ac-ft	738	569	546	549	530	242	557	732	929	561	1,060	520

Calendar Year 1963: Max 42.0 Min 0.8 Mean mgd 5.55 Mean cfs 10.1 Ac-ft 7,340
Fiscal Year 1963-64: Max 47.1 Min 1.34 Mean mgd 6.71 Mean cfs 10.4 Ac-ft 7,530

* Discharge measurement made on this day.

Peak discharge (base, 80 mgd)

Date	Time	Gage height	Discharge Mgd	Discharge Cfs	Date	Time	Gage height	Discharge Mgd	Discharge Cfs
3-1	2030	3.02	82.0	127	5-24	2200	3.36	120	186

7178. Pohakupuka Stream near Papaaloa

Location.--Lat 19°57'20", long 155°11'20", on right bank 200 ft downstream from Mamalahoa Highway, 2.8 miles northwest of Honohina, and 3.0 miles southwest of Papaaloa.
Drainage area.--2.94 sq mi.
Records available.--April 1962 to June 1964.
Gage.--Water-stage recorder. Altitude of gage is 200 ft (from topographic map).
Extremes.--Maximum discharge during year, 1,730 mgd (2,680 cfs) Mar. 1 (gage height, 10.42 ft), from rating curve extended above 310 mgd by logarithmic plotting; minimum, 1.62 mgd (2.51 cfs) Jan. 1.
1962-64: Maximum discharge, that of Mar. 1, 1964; minimum, 0.18 mgd (0.28 cfs) Nov. 9, 1962.
Revisions.--The maximum discharge for the fiscal year 1963 has been revised to 1,030 mgd (1,590 cfs) May 11, 1963 (gage height, 8.29 ft), superseding figure published in Surface Water Records of Hawaii and other Pacific Areas (1963).
Remarks.--Records good except those above 700 mgd, which are fair. No diversion above station. Irrigation ditches in basin occasionally overflow, but amount reaching stream is small.
Revisions.--Revised figures of discharge, in million gallons a day, for high-water periods in the fiscal year 1963, superseding those published in Surface Water Records of Hawaii and other Pacific Areas (1963), are given herewith:

1963	
Apr. 15	255
16	335
17	215
18	186
May 10	184
11	287

Month	Million gallons	Maximum	Minimum	Mean		Runoff in acre-feet
				Mgd	Cfs	
April 1963	1,719.56	335	1.84	57.3	88.7	5,280
May	1,163.35	287	7.10	37.5	58.0	3,570
Fiscal year 1962-63	-	335	.21	11.9	18.4	13,360

Revised peak discharge.--1962-63: Mar. 7 (1530) 514 mgd (795 cfs), 6.25 ft; Mar. 23 (1030) 439 mgd (679 cfs), 5.88 ft; Apr. 16 (0430) 979 mgd (1,510 cfs), 8.13 ft; May 11 (0330) 1,030 mgd (1,590 cfs), 8.29 ft.

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	84.1	5.20	4.75	9.25	2.95	3.70	2.06	2.95	164	*8.96	17.4	8.96
2	18.1	4.60	4.15	28.7	2.95	3.40	2.80	2.65	73.7	8.00	20.3	8.48
3	8.50	4.30	3.70	9.00	2.95	3.10	5.91	2.50	17.4	6.58	26.3	7.76
4	7.10	4.60	3.40	5.35	2.80	2.95	8.25	2.39	*16.6	6.14	23.3	7.52
5	5.50	4.75	3.25	9.69	*2.80	2.80	61.1	2.28	8.72	5.92	*37.1	10.9
6	4.90	4.00	3.10	6.30	2.80	2.80	17.3	*2.28	6.80	5.48	35.1	7.28
7	4.45	3.70	3.10	6.10	2.95	3.46	7.30	2.39	37.1	5.92	98.7	6.36
8	4.30	4.45	4.51	4.75	4.45	3.40	4.45	2.95	2.74	8.80	15.4	6.14
9	20.2	7.82	5.35	6.70	29.1	2.65	3.55	6.48	55.5	20.8	10.9	*5.92
10	28.2	5.05	4.00	4.30	45.1	2.50	2.95	17.5	43.6	19.7	11.2	5.48
11	5.70	6.50	3.40	3.40	10.0	2.39	2.80	24.2	25.3	19.1	14.4	5.26
12	5.20	4.45	12.1	3.40	8.95	2.28	3.10	48.4	18.3	19.5	12.9	5.04
13	4.60	3.70	40.4	3.25	5.2	2.28	2.80	102	10.0	6.80	56.0	4.60
14	4.45	3.55	17.3	2.95	4.96	2.17	2.39	109	8.72	5.26	24.6	4.60
15	3.85	3.25	8.71	2.95	26.8	2.06	2.28	*4.26	8.00	5.04	10.3	8.49
16	3.85	2.95	4.45	3.10	62.2	1.95	54.1	57.8	7.76	4.82	7.76	5.26
17	*29.6	2.80	6.10	2.65	46.7	2.17	40.5	13.3	6.58	6.80	6.80	4.44
18	8.59	2.65	48.7	8.34	10.6	3.40	45.7	7.75	5.92	5.26	8.24	4.12
19	5.20	2.50	6.70	3.25	6.50	2.28	13.3	6.10	5.48	4.60	90.9	3.80
20	7.15	2.39	4.30	3.10	5.20	*2.06	7.10	5.70	32.7	9.09	135	3.64
21	14.2	2.28	3.85	2.50	4.75	1.95	6.10	10.9	13.5	9.33	32.5	6.80
22	1.87	2.28	4.30	2.28	4.45	2.06	4.45	52.7	92.6	15.0	19.0	6.80
23	10.9	*10.2	3.70	2.28	4.15	8.61	3.70	82.3	16.2	26.7	3.84	7.05
24	16.0	9.27	3.55	2.50	4.15	3.25	3.25	63.2	11.3	69.0	384	5.26
25	8.00	19.0	3.55	27.2	4.15	2.28	3.25	54.6	15.1	83.2	250	6.61
26	11.1	17.5	3.40	17.1	8.09	2.06	4.60	14.8	8.24	35.6	38.8	11.4
27	40.2	7.30	3.40	4.60	5.50	1.95	66.7	47.3	8.24	11.2	21.8	5.92
28	11.5	5.20	3.40	4.53	4.15	1.84	7.50	9.50	61.9	84.1	15.4	5.48
29	14.6	6.70	*1.73	10.4	4.42	1.95	4.45	8.00	27.8	33.8	12.3	24.8
30	9.75	6.50	19.4	4.60	5.70	1.84	3.70	---	34.6	10.0	10.9	16.2
31	6.50	6.30	---	3.55	---	1.84	3.55	---	14.7	---	9.76	---
Total	593.29	259.17	413.02	208.07	335.47	83.43	400.99	1187.92	1130.36	560.50	1841.06	220.37
Mean												
Mgd	19.1	8.36	13.8	6.71	11.2	2.69	12.9	41.0	36.5	18.7	59.4	7.35
Cfs	29.6	12.9	21.4	10.4	17.3	4.16	20.0	63.4	56.5	28.9	91.9	11.4
Ac-ft	1820	795	1270	639	1030	256	1230	3650	3470	1720	5650	676

Calendar Year 1963: Max 335 Min 0.46 Mean mgd 15.5 Mean cfs 24.0 Ac-ft 17,320
Fiscal Year 1963-64: Max 426 Min 1.84 Mean mgd 20.0 Mean cfs 30.9 Ac-ft 22,210

* Discharge measurement made on this day.

Peak discharge (base, 600 mgd, revised)

Date	Time	Gage height	Discharge		Date	Time	Gage height	Discharge	
			Mgd	Cfs				Mgd	Cfs
7-22	0300	8.00	940	1,450	3- 8	1600	6.95	668	1,030
9-29	0600	6.71	613	948	4-28	2000	6.77	627	970
11- 9	2300	7.63	838	1,300	5-23	0730	7.83	892	1,380
2-15	0600	9.60	1,420	2,200	5-25	1130	6.68	607	939
3- 1	1900	10.42	1,730	2,680					

7200. Kawainui Stream above Upper Hamakua ditch, near Kamuela

Location.--Lat 20°05'18", long 155°40'58", on left bank 250 ft upstream from Upper Hamakua ditch intake and 4.5 miles north of Kamuela.

Drainage area.--1.58 sq mi.

Records available.--January to June 1964.

Gage.--Water-stage recorder (digital). Altitude of gage is 4,060 ft (from topographic map).

Extremes.--Maximum discharge during period, 215 mgd (333 cfs) Feb. 15 (gage height, 4.50 ft), from rating curve extended above 22 mgd by logarithmic plotting; minimum, 0.34 mgd (0.53 cfs) June 4.

Remarks.--Records fair. No diversion above station.

Rating table (gage height, in feet, and discharge, in million gallons a day)

1.1	0.10	2.0	11.1
1.2	.40	2.5	29.0
1.3	.90	3.0	58.0
1.4	1.60	3.6	109
1.6	3.60		

Discharge, in million gallons a day, January to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1							0.7	0.75	30.5	2.32	20.2	0.65
2							2.5	.60	15.9	1.39	14.2	.50
3							3.5	.45	12.2	1.04	7.50	.40
4							1.0	.55	7.90	.85	8.30	.34
5							.8	.55	3.27	1.04	34.5	.60
6							1.7	.60	2.05	1.18	*14.2	.75
7							2.2	1.46	11.1	1.96	17.2	.60
8							*1.4	6.53	27.0	*2.72	4.30	1.96
9							.90	30.0	5.17	11.1	3.74	1.18
10							.65	38.5	*3.49	17.6	27.4	1.04
11							.90	*21.8	4.86	16.2	13.9	*.80
12							3.38	12.2	6.02	23.8	24.2	.60
13							1.60	80.2	2.32	2.72	48.0	.40
14							.97	108	1.69	1.39	9.18	27.0
15							1.25	68.2	2.23	.97	3.49	11.1
16							53.1	14.6	5.68	.75	1.78	6.02
17							35.5	2.94	1.96	4.16	1.25	4.44
18							29.0	2.05	1.18	3.49	.97	2.23
19							4.44	3.38	.90	3.74	13.6	1.32
20							4.02	12.5	1.60	4.02	87.3	8.0
21							3.74	15.6	2.14	3.27	13.9	.35
22							2.05	53.8	1.46	6.70	6.53	.15
23							1.18	38.5	3.38	7.70	104	25
24							2.05	49.2	13.3	18.3	78.6	3.5
25							8.94	14.9	6.02	41.4	65.8	4.0
26							13.6	4.16	2.14	32.5	56.6	4.5
27							62.2	35.5	1.78	3.88	10.6	3.5
28							4.02	4.02	22.2	14.9	2.50	4.0
29							1.60	2.05	10.4	10.1	1.46	25
30							1.18	-----	26.2	3.49	1.04	10
31			-----		-----		1.04	-----	7.70	-----	.80	-----
Total							251.11	623.59	243.74	244.68	697.04	199.43
Mean												
Mgd							8.10	21.5	7.86	8.16	22.5	6.65
Cfs							12.5	33.3	12.2	12.6	34.8	10.3
Ac-ft							771	1,910	748	751	2140	612

Calendar Year Max - Min - Mean mgd - Mean cfs - Ac-ft -
Fiscal Year 1963-64: Max - Min - Mean mgd - Mean cfs - Ac-ft -

Peak discharge (base, 200 mgd)

Date	Time	Gage height	Discharge Mgd	Discharge Cfs	Date	Time	Gage height	Discharge Mgd	Discharge Cfs
2-15	0100	4.50	215	333	2-24	0030	4.43	205	317

* Discharge measurement made on thia day.
Note.--No gage-height record Jan. 1-8, June 20-30.

7205. Upper Hamakua ditch below Kawaiki Stream, near Kamuela

Location.--Lat 20°05'15", long 155°40'42", on right bank 800 ft downstream from Kawaiki Stream intake and 4.4 miles north of Kamuela.

Records available.--January to June 1964.

Gage.--Water-stage recorder and concrete control. Altitude of gage is 4,020 ft (from topographic map).

Extremes.--Maximum daily discharge during period, 20.0 mgd (30.9 cfs) May 20; minimum daily, 0.51 mgd (0.79 cfs) June 4.

Remarks.--Records good except those for period of no gage-height record, which are poor. Ditch diverts from Kawainui and Kawaiki Streams for irrigation near Kamuela. Continuous records of reinfall are obtained at station.

Discharge, in million gallons a day, January to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1							a0.6	0.98	7.92	3.12	9.50	0.87
2							a3.5	.76	12.6	1.92	14.2	.70
3							a5.0	.58	10.6	1.44	9.01	.58
4							a1.3	.65	8.88	1.14	9.75	.51
5							a1.0	.65	4.68	1.60	17.3	.98
6							a2.5	1.08	2.90	2.30	*13.7	1.28
7							a3.0	2.30	8.66	2.90	14.4	1.04
8							*a1.4	9.37	14.2	*4.51	5.52	3.96
9							a1.04	16.9	6.36	14.0	5.24	1.92
10							.65	17.3	*4.68	16.1	12.1	1.52
11							1.04	*16.6	7.42	11.1	12.9	*1.09
12							4.68	11.4	7.81	13.6	11.7	.76
13							2.10	16.8	3.48	3.84	18.2	.58
14							1.20	19.6	2.60	1.92	11.0	8.04
15							1.60	17.7	4.15	1.28	4.80	13.4
16							16.5	10.4	8.38	1.04	2.50	8.54
17							15.9	4.20	2.80	6.76	1.60	6.36
18							15.8	3.12	1.68	4.92	1.28	3.48
19							5.76	5.04	1.28	5.76	7.98	1.92
20							5.28	8.88	2.50	5.76	20.0	6.01
21							4.92	10.30	3.00	5.64	13.1	16.7
22							2.60	16.10	1.92	9.59	8.36	11.8
23							1.52	16.90	4.99	9.99	19.0	13.1
24							3.18	15.10	10.2	9.94	19.5	4.92
25							10.5	11.60	7.73	18.2	19.4	5.70
26							12.7	5.58	3.24	15.7	17.6	6.00
27							17.4	15.4	2.60	5.28	9.82	4.92
28							5.28	5.52	15.1	8.83	3.36	5.64
29							2.20	2.90	13.3	10.9	1.92	14.8
30							1.68	---	17.8	4.80	1.36	13.8
31			---		---		1.52	---	8.79	---	1.04	---
Total							153.35	263.71	212.25	203.88	317.14	160.92
Mean												
Mgd							4.95	9.09	6.85	6.80	10.2	5.36
Cfs							7.66	14.1	10.6	10.5	15.8	8.29
Ac-ft							471	809	651	626	973	494

Calendar Year	Max	Min	Mean mgd	Mean cfs	Ac-ft
Fiscal Year 1963-64:	Max -	Min -	Mean mgd -	Mean cfs -	Ac-ft -

* Discharge measurement made on this day.
a No gage-height record.

7250. Alakahi Stream above Upper Hamakua ditch, near Kamuela

Location.--Lat 20°04'27", long 155°40'25", on right bank 25 ft upstream from Upper Hamakua ditch intake and 3.5 miles north of Kamuela.

Drainage area.--0.87 sq mi.

Records available.--January to June 1964.

Gage.--Water-stage recorder (digital). Altitude of gage is 3,900 ft (from topographic map).

Extremes.--Maximum discharge during period, 78.0 mgd (121 cfs) Feb. 24 (gage height, 4.46 ft), from rating curve extended above 7.4 mgd by logarithmic plotting; minimum, 0.23 mgd (0.36 cfs) Jan. 15, 16.

Remarks.--Records good except those for periods of no gage-height record, which are poor. Parker Ranch pipeline diverts from tributary 0.4 mile above station for ranch use in Kamuela area.

Rating table (gage height, in feet, and discharge, in million gallons a day)

1.2	0.16	2.0	5.20
1.3	.38	2.5	12.7
1.4	.70	3.0	24.2
1.5	1.10	3.5	39.0
1.7	2.40		

Discharge, in million gallons a day, January to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1							0.3	0.44	4.0	1.77	11	0.60
2							2.0	.34	11	1.10	7.0	.54
3							2.5	.31	6.0	.86	3.5	.44
4							.6	.34	4.5	.74	5.0	.41
5							.4	.31	2.5	.78	17	1.02
6							1.2	.36	1.5	.98	*5.0	1.06
7							1.5	.86	6.0	1.64	6.40	.74
8							.90	4.98	10	*2.19	2.26	2.19
9							*.36	14.3	2.5	7.80	1.77	1.52
10							.29	14.5	*1.9	9.78	8.40	1.10
11							.29	*9.30	3.5	8.0	5.80	*.82
12							.38	3.65	5.0	14	6.54	.54
13							.36	16.8	2.0	2.5	22.6	.36
14							.25	34.8	1.4	1.5	4.87	12
15							.25	21.4	1.7	.9	2.05	7.0
16							14.1	4.65	4.2	.6	1.16	4.5
17							10.1	1.52	1.77	3.5	.78	3.0
18							7.52	1.06	1.06	1.6	.70	2.0
19							1.91	1.58	.86	2.5	9.78	.9
20							1.46	7.66	1.22	3.0	36.6	6.0
21							1.02	6.28	1.46	2.2	6.54	17
22							.78	17.3	.86	6.0	3.56	6.0
23							.44	18.4	1.46	7.0	27.9	11
24							.54	14.5	8.75	13	27.9	2.0
25							3.74	6.40	4.10	25	29.1	3.0
26							4.43	1.70	1.91	16	21.4	4.0
27							19.6	15	1.40	2.0	5.44	2.0
28							2.26	3.0	12.9	10	1.70	4.0
29							1.10	1.5	6.63	7.0	1.22	14
30							.70	---	15.9	1.7	.90	6.0
31			---		---		.64	---	3.65	---	.74	---
Total							81.92	223.24	131.63	155.64	284.61	115.74
Mean												
Mgd							2.64	7.70	4.25	5.19	9.18	3.86
Cfs							4.08	11.9	6.58	8.03	14.2	5.97
Ac-ft							251	685	404	478	873	355

Calendar Year	Max		Min		Mean mgd		Mean cfs	Ac-ft
Fiscal Year 1963-64:	Max	-	Min	-	Mean mgd	-	Mean cfs -	Ac-ft -

* Discharge measurement made on this day.

Note.--No gage-height record Jan. 1-7, Feb. 27 to Mar. 16, Apr. 11 to May 6, June 14-30.

Peak discharge (base, 60 mgd)

Date	Time	Gage height	Discharge	
			Mgd	Cfs
2-24	0015	4.46	78.0	121

7322. Wailoa Stream near Waipio

Location.--Lat 20°05'28", long 155°37'01", on right bank 1.0 mile downstream from confluence of Waipio and Waima Streams, 1.8 miles southwest of Waipio, and 3.3 miles southwest of Kukuihaele.

Drainage area.--14.3 sq mi.

Records available.--August 1901 to January 1902 (prior to any upstream diversions), July 1911 to December 1912 (gage heights only), February to June 1964. Published as Waipio River at elevation 360 ft, near Waipio 1901-2 and as Waipio River below Waima Stream, near Waipio 1911-12.

Gage.--Water-stage recorder (digital prior to Apr. 22). Altitude of gage is 150 ft (from topographic map). Aug. 15, 1901, to Jan. 22, 1902, and July 20, 1911, to Dec. 31, 1912, staff gage at site 1.0 mile upstream (400 ft below Waima Stream) at different datums.

Extremes.--Maximum discharge during period, 707 mgd (1,090 cfs) Feb. 22 (gage height, 4.94 ft), from rating curve extended above 190 mgd on basis of slope-area measurement at gage height 8.2 ft; minimum, 25.8 mgd (39.9 cfs) on several days in March.
1901-2, 1964: Maximum discharge, that of Feb. 22, 1964; minimum, 25.8 mgd (39.9 cfs) on several days in March 1964.
Maximum discharge known, 3,960 mgd (6,130 cfs) Nov. 8, 1963 (gage height, 8.2 ft, from floodmarks), result of slope-area measurement of peak flow.

Remarks.--Records good except those for periods of no gage-height record, which are fair. Upper and Lower Hamakua ditches divert water out of basin from upstream tributaries for irrigation in vicinity of Kamuela and for mill and domestic use, power generation, and irrigation on Hamakua coast. Parker Ranch pipeline diverts from Alakahi Stream for ranch use in Kamuela area.

Rating table (gage height, in feet, and discharge, in million gallons a day)

2.6	25.0	3.5	150
2.7	33.0	4.0	290
3.1	74.0	4.5	485

Discharge, in million gallons a day, February to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1								-	65.6	28.2	75.5	29.0
2								-	39.3	28.2	74.9	28.2
3								-	44.0	27.4	36.6	28.2
4								-	38.4	27.4	27.4	29.0
5								-	26.6	27.4	57.0	33.0
6								-	26.6	27.4	34.8	32.2
7								-	33.9	27.4	33.0	29.8
8								-	51.0	27.4	27.4	32.2
9								-	26.6	31.4	26.6	29.0
10								-	25.8	37.5	39.0	29.0
11								-	29.8	56.0	40.0	29.0
12								-	27.4	91.8	29.0	29.0
13								-	25.8	29.0	173	28.2
14								-	38.4	28.2	36.6	70.1
15								-	39.3	28.2	27.4	54.5
16								-	31.4	28.2	32.2	*29.0
17								-	26.6	28.2	33.0	28.2
18								-	26.6	28.2	27.4	28.2
19								*a30	26.6	28.2	*78.4	28.2
20								61.0	32.2	a30	439	42.2
21								35.7	27.4	*a30	72.7	61.9
22								160	26.6	29.8	35.7	33.9
23								120	27.4	30.6	273	41.6
24								152	49.0	31.8	296	30.6
25								48.0	*33.0	121	338	29.0
26								29.8	28.2	174	178	29.0
27								91.8	28.2	33.0	51.0	29.0
28								29.8	124	35.6	33.0	29.0
29								36.2	43.0	48.6	30.6	47.5
30								---------	90.0	31.4	29.8	46.3
31			---------		---------			---------	34.8	---------	29.0	---------
Total								-	1193.5	1231.5	2715.0	1044.0
Mean												
Mgd								-	38.5	41.0	87.6	34.8
Cfs								-	59.4	63.4	136	53.8
Ac-ft								-	3,660	3,780	8330	3,200

Calendar Year			Max			Min			Mean mgd		Mean cfs			Ac-ft	
Fiscal Year 1963-64:			Max	-		Min	-		Mean mgd	-	Mean cfs	-		Ac-ft	-

Peak discharge (base, 600 mgd)

Date	Time	Gage height	Discharge Mgd	Discharge Cfs	Date	Time	Gage height	Discharge Mgd	Discharge Cfs
2-22	1515	4.94	707	1,090	5-20	1215	4.92	696	1,080
4-26	0100	4.88	674	1,040					

* Discharge measurement made on this day.
a No gage-height record.

7330. Lower Hamakua ditch wasteway near Kukuihaele

Location.--lat 20°07'07", long 155°35'09", on left bank 50 ft downstream from Lower Hamakua ditch, 0.8 mile west of Kukuihaele School, and 1.0 mile northeast of Waipio.

Records available.--February to June 1964.

Gage.--Water-stage recorder (digital prior to Apr. 22) and sharp-crested weir. Altitude of gage is 980 ft (from topographic map).

Extremes.--Maximum daily discharge during period, 9.50 mgd (14.7 cfs) Mar. 30; no flow most of the time.

Remarks.--Records fair. The wasteway diverts excess water from Lower Hamakua ditch.

Discharge, in million gallons a day, February to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1								-	0	0	0	0
2								-	0	0	0	0
3								-	*0	0	0	0
4								-	1.68	0	0	0
5								-	0	0	.86	.99
6								-	0	0	1.05	1.98
7								-	0	0	0	0
8								-	4.36	0	0	2.53
9								-	1.50	.81	0	0
10								-	0	1.13	0	0
11								-	0	0	.70	0
12								-	0	1.33	0	0
13								-	0	1.09	5.76	0
14								-	0	0	2.69	3.55
15								-	0	0	0	0
16								-	2.08	0	0	0
17								-	0	0	0	0
18								-	0	0	0	0
19								-	0	0	*0	0
20								-	0	0	2.09	0
21								-	0	*0	.88	3.49
22								-	0	0	0	*1.03
23								-	0	0	2.54	3.86
24								-	0	0	3.81	1.34
25								4.0	*2.3	1.30	4.51	0
26								*.76	0	0	4.50	0
27								5.47	0	0	5.06	0
28								1.88	5.27	0	0	0
29								0	7.81	0	0	4.80
30								---	9.50	0	0	4.01
31			---		---			---	3.14	---	0	---
Total								-	37.64	5.66	34.45	27.59
Mean												
Mgd								-	1.21	0189	1.11	919
Cfs								-	1.87	0292	1.72	1.42
Ac-ft								-	116	17	106	85

Calendar Year		Max		Min		Mean mgd		Mean cfs		Ac-ft		
Fiscal Year 1963-64:		Max	-	Min	-	Mean mgd	-	Mean cfs	-	Ac-ft	-	

* Discharge measurement or observation of no flow made on this day.

7331. Lower Hamakua ditch below main weir, near Kukuihaele

Location.--Lat 20°07'07", long 155°35'09", on left bank 30 ft upstream from main weir, 0.8 mile west of Kukuihaelo School, and 1.0 mile northeast of Waipio.

Records available.--February to June 1964.

Gage.--Water-stage recorder (digital prior to Apr. 22) and sharp-crested weir. Altitude of gage is 990 ft (from topographic map).

Extremes.--Maximum daily discharge during period, 44.3 mgd (68.5 cfs) Mar. 2; minimum daily, 15.6 mgd (24.1 cfs) Mar. 15.

Remarks.--Records good. At high flow water can be diverted from the ditch 1/8 mile upstream and at the gage to prevent flume damage downstream.

Discharge, in million gallons a day, February to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1								-	21.8	30.3	22.4	29.5
2								-	44.3	28.2	16.9	28.9
3								-	40.8	27.1	30.2	28.2
4								-	37.5	26.6	29.5	28.2
5								-	31.8	27.1	35.9	33.7
6								-	28.6	27.9	34.4	32.3
7								-	22.3	28.9	34.4	29.5
8								-	37.0	26.8	30.9	34.4
9								-	31.1	36.4	27.5	30.2
10								-	28.4	38.4	30.2	28.9
11								-	30.7	24.7	34.4	28.2
12								-	34.2	26.8	31.6	26.8
13								-	28.3	29.1	38.8	26.2
14								-	16.3	27.4	33.0	32.3
15								-	15.6	26.1	30.2	37.3
16								-	35.6	25.6	23.6	32.3
17								-	27.9	31.2	21.1	29.5
18								-	26.1	30.7	26.2	28.2
19								-	25.7	29.9	*30.9	27.5
20								-	30.1	33.3	39.6	30.2
21								-	28.9	*32.3	36.6	37.3
22								-	26.7	37.3	35.2	*35.2
23								-	27.4	38.1	35.9	35.9
24								-	32.6	30.9	35.2	32.3
25								35	*36.0	28.2	35.2	31.6
26								*33.9	28.6	20.5	37.3	30.9
27								38.6	28.9	29.5	36.6	29.5
28								36.2	35.1	28.9	36.6	29.5
29								24.3	34.7	33.0	34.4	36.6
30								----	36.9	25.5	32.3	35.9
31			----		----			----	35.2	----	30.9	----
Total								-	945.1	886.7	987.9	937.0
Mean												
Mgd								-	30.5	29.6	31.9	31.2
Cfs								-	47.2	45.8	49.4	48.3
Ac-ft								-	2,900	2,720	3,030	2,880

Calendar Year		Max		Min		Mean mgd		Mean cfs		Ac-ft		
Fiscal Year 1963-64:		Max	-	Min	-	Mean mgd	-	Mean cfs	-	Ac-ft	-	

* Discharge measurement made on this day.

7332. Honokaa diversion at Honokaa

Location.--Lat 20°05'12", long 155°28'36", on left bank 50 ft downstream from Lower Hamakua ditch and 0.5 mile northwest of Honokaa Hospital.

Records available.--March to June 1964.

Gage.--Water-stage recorder (digital prior to Apr. 17) and sharp-crested weir. Altitude of gage is 950 ft (from topographic map).

Extremes.--Maximum daily discharge during period, 15.1 mgd (23.4 cfs) Apr. 25; minimum daily, 7.43 mgd (11.5 cfs) May 19.

Remarks.--Records good except those for period of no gage-height record, which are fair. The diversion is from Lower Hamakua ditch for use in Honokaa Sugar Co. mill.

Discharge, in million gallons a day, March to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1									a10	11.6	8.85	10.9
2									a12	10.5	8.60	10.9
3									*a14	9.76	13.2	10.3
4									13.4	9.76	9.44	10.0
5									11.6	9.57	10.0	11.4
6									10.7	9.57	10.2	12.3
7									9.76	10.2	10.2	11.1
8									11.2	9.89	10.3	12.0
9									11.2	12.0	9.76	11.4
10									10.8	13.1	9.57	10.5
11									10.0	12.2	10.2	10.2
12									12.2	11.9	10.0	10.0
13									11.4	10.7	10.8	9.44
14									9.44	9.57	11.1	8.27
15									7.76	9.76	10.0	9.44
16									12.7	*9.31	8.98	9.31
17									11.1	9.44	8.73	8.85
18									9.89	9.57	7.56	8.27
19									9.57	9.44	7.43	7.89
20									9.76	9.57	9.76	9.18
21									9.89	10.0	12.0	10.3
22									9.57	11.9	15.0	*10.2
23									10.0	13.4	13.3	10.2
24									10.8	11.1	13.4	10.2
25									12.2	15.1	13.3	9.57
26									*10.6	13.3	13.0	9.44
27									9.76	12.0	12.8	9.44
28									10.0	9.57	12.8	9.44
29									10.0	10.3	12.7	9.89
30								---	12.2	9.31	11.9	10.7
31			---		---			---	13.1	---	11.1	---
Total									336.60	323.39	335.98	301.03
Mean												
Mgd									10.9	10.8	10.8	10.0
Cfs									16.9	16.7	16.7	15.5
Ac-ft									1,030	992	1,030	924

Calendar Year		Max		Min		Mean mgd		Mean cfs		Ac-ft
Fiscal Year 1963-64:		Max	-	Min	-	Mean mgd	-	Mean cfs	-	Ac-ft -

* Discharge measurement made on this day.
a No gage-height record.

7333. Lower Hamakua ditch below Honokaa diversion, at Honokaa

Location.--Lat 20°05'12", long 155°28'34", on right bank 50 ft downstream from tunnel, 100 ft downstream from Honokaa diversion, and 0.5 mile northwest of Honokaa Hospital.

Records available.--February to June 1964.

Gage.--Water-stage recorder (digital prior to Apr. 17) and Parshall flume. Altitude of gage is 950 ft (from topographic map).

Extremes.--Maximum daily discharge during period, 21.9 mgd (33.9 cfs) Feb. 22; minimum daily, 1.27 mgd (1.96 cfs) Apr. 26.

Remarks.--Records fair prior to Apr. 17, good thereafter. Excess water is spilled at wasteway 8½ miles above station (see p. 158) and water for Honokaa Sugar Co. mill is diverted 100 ft above station (see preceding page).

Discharge, in million gallons a day, February to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1								-	4.88	14.8	9.82	15.2
2								-	19.7	13.9	2.46	14.6
3								-	*18.1	13.5	9.56	14.4
4								-	18.5	13.2	14.2	14.4
5								-	15.7	13.3	16.7	15.6
6								-	13.5	14.2	17.7	16.3
7								-	8.71	14.4	16.9	14.2
8								-	19.1	12.8	15.9	16.9
9								-	15.6	16.7	12.8	15.0
10								-	13.5	18.1	14.4	15.0
11								-	14.1	11.2	17.7	14.6
12								-	17.3	9.01	14.4	13.5
13								-	12.8	14.4	17.3	13.5
14								-	6.98	13.9	15.4	15.6
15								-	2.18	12.6	13.7	20.1
16								-	16.1	*12.1	11.1	16.7
17								-	12.3	14.2	8.15	14.6
18								15	11.8	16.3	12.8	13.9
19								*15.9	11.8	14.1	*13.5	13.5
20								16.1	13.2	17.9	14.5	13.9
21								19.1	15.7	16.1	16.0	19.5
22								21.9	12.8	18.1	15.4	*18.3
23								18.9	12.5	17.9	17.7	16.9
24								17.5	14.2	14.2	18.3	14.8
25								18.3	17.1	9.90	17.5	15.2
26								15.9	*13.7	1.27	18.5	14.8
27								17.5	15.0	12.5	18.5	14.8
28								16.5	18.3	14.4	18.5	15.6
29								7.78	19.5	16.5	17.1	17.3
30								---	19.3	13.5	16.1	16.9
31			---		---			---	17.3	---	15.7	---
Total								-	441.25	414.98	458.29	465.6
Mean												
Mgd								-	14.2	13.8	14.8	15.5
Cfs								-	22.0	21.4	22.9	24.0
Ac-ft								-	1,350	1,270	1,410	1,430

Calendar Year		Max		Min		Mean mgd		Mean cfs		Ac-ft		
Fiscal Year 1963-64:		Max	-	Min	-	Mean mgd	-	Mean cfs	-	Ac-ft	-	

* Discharge measurement made on this day.

7420. Kukui Stream near Waimanu

Location.--Lat 20°09'14", long 155°40'15", on left bank 300 ft upstream from Waimanu trail crossing, 0.4 mile east of head of Awini ditch, and 2.2 miles west of Waimanu.

Drainage area.--0.21 sq mi.

Records available.--February 1939 to July 1952, September 1959 to June 1964.

Gage.--Water-stage recorder. Altitude of gage is 1,940 ft (by barometer).

Average discharge.--17 years (1939-52, 1960-64), 1.22 mgd (1.89 cfs).

Extremes.--Maximum discharge during year, 58.5 mgd (90.5 cfs) Nov. 9 (gage height, 3.25 ft), from rating curve extended above 2.4 mgd as explained below; minimum, 0.24 mgd (0.37 cfs) Dec. 12.
1939-52, 1959-64: Maximum discharge, 195 mgd (302 cfs) Feb. 25, 1962 (gage height, 4.45 ft), from rating curve extended above 2.4 mgd by test on model of station site; minimum, 0.11 mgd (0.17 cfs) Sept. 6-8, 1961.

Remarks.--Records good except those for periods of no gage-height record and those above 4 mgd, which are poor.

Rating table (gage height, in feet, and discharge, in million gallons a day)

0.1	0.12	1.0	5.00
.2	.35	1.5	10.5
.3	.68	2.0	18.2
.6	2.10		

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	a2.0	0.61	0.76	2.61	0.55	0.33	0.30	0.35	2.00	0.68	0.55	0.65
2	.76	.55	.58	1.28	.55	.33	.33	.35	2.06	.61	.58	.58
3	.55	.55	.61	.85	.52	.33	.78	.33	1.19	.55	.61	.55
4	.52	.55	1.14	.81	.48	.30	.45	.33	.85	.55	.52	.61
5	.48	.52	.55	.97	.48	.30	.33	.30	.65	.52	.84	2.16
6	.48	.52	.61	.72	.45	.30	.35	.33	.61	.48	.55	.81
7	.45	.61	.48	1.19	.58	2.81	.33	.30	.76	.48	.78	.88
8	.66	.89	.81	1.14	1.45	.68	.28	.33	2.10	.92	.52	.93
9	3.19	.52	1.30	.81	6.41	.33	.26	.52	.68	2.12	.48	.55
10	.93	1.64	.61	.58	5.66	.28	.26	1.54	.55	1.40	.52	.52
11	.58	5.62	4.66	.55	1.37	.26	.88	1.16	.52	1.60	.52	.48
12	.72	2.23	1.99	.55	.85	*.26	.30	2.08	.52	2.03	.48	.45
13	.52	.97	*1.02	.65	.76	.46	.26	1.89	.48	.65	2.66	.42
14	.48	.65	.89	.52	.72	.72	.26	2.85	.48	.55	*.65	1.00
15	.45	.58	.68	.72	1.29	.48	.26	4.24	.89	.52	.45	1.06
16	.45	.52	.72	.55	.65	.38	2.63	.97	.89	.48	.42	.52
17	1.04	.48	.65	3.15	.58	1.03	2.19	.65	.52	.61	.38	.38
18	.61	.48	1.45	2.09	.58	.71	1.74	.65	.42	.48	.42	.38
19	.52	.45	.58	.88	.52	.45	.52	.92	*.38	.45	4.79	.35
20	1.56	.45	.52	1.87	.48	.33	.48	.67	1.40	.65	11.2	.45
21	1.90	.42	.55	.68	.45	.30	.42	.84	.52	.76	1.55	.81
22	2.31	.42	.68	.55	.42	1.88	.35	2.81	.42	.72	1.06	1.24
23	.85	1.22	.52	.73	.42	5.14	.33	3.75	.42	.61	7.49	1.06
24	1.36	6.84	.52	1.18	.42	.61	.48	3.03	.52	2.26	12.7	.58
25	*1.06	1.05	.45	5.03	.38	.48	1.67	1.94	.48	2.05	9.81	.42
26	2.73	1.01	.42	1.65	.38	.42	1.19	1.02	2.28	3.80	3.12	.35
27	1.50	.58	.38	.93	.35	.38	4.10	1.75	.72	.76	1.37	.38
28	.85	.52	2.54	1.37	.35	.35	.65	.85	7.45	1.29	.97	.38
29	1.36	.55	6.60	1.37	.35	.33	.48	.76	1.60	.89	.85	a1.0
30	.93	.68	1.74	.81	.33	.30	*.52	---	2.48	.58	.72	a1.5
31	.68	.55	---	*.61	---	.33	.48	---	.89	---	.68	---
Total	32.48	33.23	35.01	37.40	28.78	21.59	23.86	37.51	35.73	30.05	68.24	21.45
Mean												
Mgd	1.05	1.07	1.17	1.21	0.959	0.696	0.770	1.29	1.15	1.00	2.20	0.715
Cfs	1.62	1.66	1.81	1.87	1.48	1.08	1.19	2.00	1.78	1.55	3.40	1.11
Ac-ft	100	102	107	115	88	66	73	115	110	92	209	66

Calendar Year 1963: Max 9.78 Min 0.24 Mean mgd 1.07 Mean cfs 1.66 Ac-ft 1,200
Fiscal Year 1963-64: Max 12.7 Min 0.26 Mean mgd 1.11 Mean cfs 1.72 Ac-ft 1,240

Peak discharge (base, 30 mgd)

Date	Time	Gage height	Discharge Mgd	Discharge Cfs	Date	Time	Gage height	Discharge Mgd	Discharge Cfs
11- 9	2300	3.25	58.5	90.5	4-26	0100	2.88	41.2	63.7
12-22	2300	2.60	32.0	49.5	5-19	2200	2.65	33.5	51.8
2-23	2230	3.15	53.5	82.8					

* Discharge measurement made on this day.
a No gage-height record.

7430. Awini ditch at East Honokane Iki Gulch, near Niulii

Location.--Lat 20°09'55", long 155°43'10", at upper end of flume across East Honokane Iki Gulch and 4.5 miles southeast of Niulii.

Records available.--October 1927 to June 1938, September 1938 to June 1949, July 1950 to June 1964.

Gage.--Water-stage recorder. Altitude of gage is 2,000 ft (from topographic map).

Average discharge.--34 years (1928-38, 1939-49, 1950-64), 11.7 mgd (18.1 cfs).

Extremes.--1927-64: Maximum daily discharge, 33 mgd (51 cfs) Jan. 8, 1935, Aug. 10, 1938; no flow at times.

Remarks.--Records good except those for periods of no gage-height record, which are poor. Ditch diverts at altitude 2,000 ft from all streams between the Waikaloa and the Honokane for irrigation in vicinity of Kohala.

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	23.7	9.26	12.1	20.5	8.82	4.44	2.76	6.20	2.75	12.6	10	8.71
2	18.0	7.61	11.0	19.9	7.30	4.04	3.00	5.05	3.24	10.3	17	7.83
3	11.6	6.70	10.1	15.2	6.50	3.72	10.6	4.28	2.52	8.82	13	7.40
4	9.26	6.20	11.6	12.6	5.80	3.48	10.9	4.20	2.00	7.94	11	8.05
5	7.72	5.50	7.83	15.8	5.23	3.24	6.00	4.12	1.45	9.48	22	13
6	9.70	5.14	12.6	12.6	4.96	3.00	6.31	4.04	1.36	9.04	19	14
7	11.0	5.60	11.2	16.0	5.90	10.4	8.16	5.80	1.95	9.15	18	11
8	11.9	9.26	12.3	14.5	16.8	13.8	9.82	6.50	3.56	9.43	13	15
9	23.9	7.40	16.8	11.3	17.6	6.70	4.69	13.0	1.95	23.2	10	11
10	19.2	10.4	13.9	8.49	16.4	5.05	3.16	19.7	4.54	21.5	15	9.0
11	13.5	25.3	22.4	6.60	13.1	*4.44	10.5	19.6	8.71	17.9	17	7.0
12	13.8	21.7	*16.6	6.00	12.7	3.88	11.0	19.7	14.1	21.8	15	6.0
13	10.3	15.8	13.2	9.94	14.6	4.57	6.50	21.8	10.1	14.1	*25	5.5
14	7.72	12.2	12.1	7.61	15.0	9.94	3.88	23.6	8.82	10.4	15.8	10
15	10.7	9.04	9.70	10.1	21.8	9.70	3.56	10.4	9.37	8.49	11.7	16
16	10.3	7.20	9.94	7.94	18.0	7.83	20.0	1.85	15.8	7.30	9.04	11
17	21.5	6.00	7.72	12.8	15.8	7.16	19.9	1.16	11.3	14.2	7.50	9.0
18	16.0	5.14	12.3	21.5	15.6	9.94	20.5	.97	*7.94	13.2	6.70	8.0
19	10.3	4.52	6.90	18.0	10.5	6.00	13.6	1.28	6.90	12.8	12.0	7.0
20	14.6	4.44	8.71	22.5	8.16	4.04	14.1	1.45	11.6	16.0	26.6	9.0
21	20.5	4.04	7.20	16.6	7.10	3.40	11.8	1.70	11.0	16.2	20.5	20
22	23.2	5.23	7.72	11.0	6.40	3.98	9.15	5.70	7.50	15.6	17.6	16
23	17.2	11.4	6.00	9.37	5.80	21.2	6.20	5.05	7.40	16.0	26.0	16
24	*19.4	24.8	5.50	17.6	5.32	11.6	6.21	4.69	11.6	16.0	26.4	11
25	17.2	16.6	4.78	25.1	5.32	7.00	18.6	3.16	13.2	23.2	26.4	9.0
26	24.4	15.4	4.36	21.3	14.5	5.14	18.2	1.80	12.4	21.3	23.2	10
27	21.7	11.4	4.12	16.2	11.9	4.52	23.7	3.08	14.3	12	20.0	9.5
28	16.2	6.10	5.75	15.6	7.10	3.88	13.9	1.75	22.3	10	16.2	9.0
29	17.0	14.8	23.2	21.3	5.50	3.32	*8.93	1.50	19.7	18	13.0	12
30	16.7	14.8	20.2	*16.8	4.78	2.88	7.72	-----	22.9	11	11.2	16
31	12.1	13.2	-----	11.3	-----	3.08	9.48	-----	16.7	-----	9.70	-----
Total	480.30	322.18	327.83	452.05	314.29	195.37	322.83	203.13	288.96	416.95	504.54	321.99
Mean												
Mgd	15.5	10.4	10.9	14.6	10.5	6.30	10.4	7.00	9.32	13.9	16.3	10.4
Cfs	24.0	16.1	16.9	22.6	16.2	9.75	16.1	10.8	14.4	21.5	25.2	16.1
Ac-ft	1,470	989	1,010	1,390	965	600	991	623	887	1,280	1,550	988

Calendar Year 1963: Max 28.0 Min 0.55 Mean mgd 10.5 Mean cfs 16.2 Ac-ft 11,800
Fiscal Year 1963-64: Max 26.6 Min 0.97 Mean mgd 11.3 Mean cfs 17.5 Ac-ft 12,740

* Discharge measurement made on this day.
Note.--No gage-height record Apr. 27 to May 13, June 5-30.

7440. East Honokane Iki intake to Awini ditch near Niulii

Location.--Lat 20°09'55", long 155°43'15", on intake tunnel delivering water from East Honokane Iki Gulch to Awini ditch, on west side of gulch, and 4.5 miles southeast of Niulii.

Records available.--October 1927 to May 1928, July 1928 to December 1936, July 1937 to June 1938, July 1939 to July 1940, September 1940 to June 1949, July 1951 to June 1964. Prior to July 1962, published as "at East Honokane Iki Gulch, near Niulii."

Gage.--Water-stage recorder and sharp-crested weir. Altitude of gage is 2,000 ft (from topographic map).

Average discharge.--31 years (1928-36, 1937-38, 1939-40, 1941-49, 1951-64), 1.17 mgd (1.81 cfs).

Extremes.--1927-49, 1951-64: Maximum daily discharge, 8.4 mgd (13.0 cfs) Aug. 6, 1957; no flow at times.

Remarks.--Records fair.

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	6.10	0.52	0.60	1.50	0.41	0.14	0.12	0.56	2.44	0.83	1.47	0.60
2	2.23	.44	.44	1.30	.35	.12	.12	.44	2.63	.68	1.93	.48
3	.64	.41	.41	1.01	.32	.10	.84	.38	2.13	.52	1.61	.41
4	.44	.38	.52	.75	.29	.08	.68	.35	1.75	.48	.83	.44
5	.38	.35	.35	.97	.26	.08	.29	.35	1.16	.71	4.36	1.16
6	.60	.32	.87	.64	.26	.06	.32	.35	.87	.52	1.88	1.11
7	.64	.32	.71	.97	.26	1.35	.48	.60	1.80	.52	3.08	.60
8	1.30	.32	1.04	.87	1.47	.56	1.42	.56	2.70	1.21	1.16	1.16
9	5.85	.29	2.50	.48	1.58	.44	.35	2.32	1.60	5.69	.83	.48
10	2.78	1.11	1.21	.32	.17	.29	.17	4.36	1.16	4.71	1.21	.32
11	.87	7.12	4.94	.26	2.15	*.23	1.52	3.50	1.05	2.96	1.56	.26
12	1.04	3.70	*2.56	.23	1.75	.17	1.11	3.52	1.50	4.44	1.04	.20
13	.52	1.16	1.55	.32	1.06	.17	.35	6.12	.79	.97	*4.21	.17
14	.38	.56	1.21	.29	1.01	.29	.20	7.06	.71	.64	1.35	1.87
15	.52	.38	.71	.35	4.80	.38	.14	5.76	.71	.48	.64	2.18
16	.93	.32	1.36	.26	2.21	.29	5.32	2.89	1.55	.41	.48	.60
17	5.26	.26	.79	3.06	1.63	.23	4.12	1.35	.87	1.55	.38	.32
18	1.54	.23	3.26	3.37	1.21	.20	4.32	1.01	*.56	.87	.35	.23
19	.60	.20	.79	2.78	.64	.17	1.45	1.45	.44	1.41	1.79	.17
20	.93	.20	.41	5.54	.44	.12	1.44	2.44	1.26	1.60	6.60	1.95
21	3.35	.20	.35	1.75	.38	.10	1.06	1.87	.83	1.50	2.76	2.88
22	5.18	.20	.32	.71	.32	.53	.64	4.53	.52	1.30	1.75	1.45
23	1.40	2.08	.29	.56	.29	5.32	.38	3.99	.56	1.40	8.13	1.46
24	*2.68	4.96	.23	3.80	.26	.79	.44	3.70	2.48	2.94	6.86	.56
25	1.83	2.13	.20	5.77	.23	.35	5.47	2.76	1.30	4.77	6.02	.35
26	6.35	1.88	.20	3.02	2.03	.23	3.08	1.60	2.12	3.51	3.29	.48
27	3.96	.75	.17	1.01	.90	.23	5.73	3.22	1.24	1.11	2.44	.48
28	1.40	1.42	.94	1.80	.35	.20	1.40	1.45	6.68	1.49	1.55	.38
29	1.60	1.81	2.52	3.01	.23	.14	*.75	1.01	3.22	1.98	1.16	1.93
30	1.50	1.88	1.40	*1.26	.20	.12	.85	---	4.96	.68	.87	2.59
31	.71	1.11	---	.60	---	.12	1.16	---	1.60	---	.71	---
Total	63.51	37.01	32.85	48.56	27.46	13.60	45.72	69.50	53.19	51.88	72.30	27.27
Mean												
Mgd	2.05	1.19	1.10	1.57	0.915	0.439	1.47	2.40	1.72	1.73	2.33	0.909
Cfs	3.17	1.84	1.70	2.43	1.42	0.679	2.27	3.71	2.66	2.68	3.61	1.41
Ac-ft	195	114	101	149	84	42	140	213	163	159	222	84

Calendar Year 1963: Max 7.63 Min 0.02 Mean mgd 1.12 Mean cfs 1.73 Ac-ft 1260
Fiscal Year 1963-64: Max 8.13 Min 0.06 Mean mgd 1.48 Mean cfs 2.29 Ac-ft 1670

* Discharge measurement made on this day.

7455 (formerly 7490). Awini ditch at Awini weir, near Kohala
(Formerly published as Kohala ditch at Awini weir, near Kohala)

Location.--Lat 20°08'20", long 155°43'55", on right bank at Awini wier, 6 miles south of Niulii, and 8 miles southeast of Kohala.

Records available.--July 1907 to June 1917 (published as Kohala ditch at Awini weir, near Kohala), May 1963 to June 1964.

Gage.--Water-stage recorder (digital) and sharp-created weir. Altitude of gage is 1,840 ft (from topographic map). July 1, 1907, to June 30, 1917, staff gage at same site at different datum.

Average discharge.--11 years, 12.7 mgd (19.6 cfs).

Extremes.--1907-17, 1963-64: Maximum daily discharge, 36 mgd (56 cfs) May 20, 24, 1964; no flow July 11, 12, 16, Dec. 16-26, 1907, June 2, Oct. 29 to Nov. 2, 1913.

Remarks.--Records good except those for periods of no gage-height record, which are fair. Ditch diverts at altitude 2,000 ft from all streams between the Waikaloa and the Honokane and empties into Kohala ditch (see p. 167) for irrigation in vicinity of Kohala.

Discharge, in million gallons a day, May to June 1963

Day	May	June	Day	May	June	Day	May	June	Day	May	June	Day	May	June
1	-	18.7	7	-	7.96	13	-	8.50	19	24.0	20.5	25	10.9	20.1
2	-	18.4	8	-	7.15	14	-	6.07	20	26.8	20.8	26	8.23	17.3
3	-	21.9	9	-	10.0	15	-	5.11	21	*17.3	18.0	27	7.69	15.6
4	-	17.0	10	-	25.0	16	a25	4.42	22	13.3	12.4	28	9.40	11.2
5	-	11.5	11	-	20.8	17	20.8	10.0	23	10.9	29.2	29	10.3	17.7
6	-	10.0	12	-	*13.9	18	23.3	19.8	24	13.0	22.2	30	12.4	15.2
												31	10.6	----
Total													-	456.41
Mean, in million gallons a day													-	15.2
Mean, in cubic feet per second													-	23.5
Runoff in acre-feet													-	1,400

* Discharge measurement made on this day.
a No gage-height record.

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	32.0	10	13.9	27.8	9.70	4.1	2.99	6.83	9.40	16.3	12	9.5
2	24.3	8.0	12.7	25.4	7.69	3.7	2.65	5.11	11.8	12.4	20	8.0
3	14.2	7.0	11.2	18.7	6.61	3.5	7.96	4.19	8.23	10.3	15	7.5
4	11.5	6.0	12.4	13.9	5.6	3.1	15.6	3.96	6.34	8.50	13	9.0
5	9.10	5.0	7.96	18.0	5.0	2.9	8.23	3.96	3.16	10.9	30	18.0
6	11.2	4.6	13.6	14.2	4.8	2.8	4.42	3.50	2.31	9.70	25	19.1
7	12.7	7.0	12.7	18.0	5.5	14	9.70	6.07	5.57	9.70	25	13.0
8	13.3	10	13.9	17.0	20	16	11.5	6.61	13.6	18.7	18	20.5
9	32.7	9.0	21.5	12.7	22	9.0	9.10	15.6	5.34	31.3	13	13.9
10	26.8	12	16.6	9.10	19	5.0	3.96	27.5	7.15	27.1	20	10.0
11	17.0	33	30.6	6.61	15	*4.4	4.65	28.5	12.4	26.8	23	7.15
12	16.6	27	*22.2	5.80	14	3.50	17.3	27.5	15.2	25.7	20	5.57
13	12.1	22	17.3	10.3	16	3.96	12.1	29.6	10.6	17.3	*35	4.65
14	8.50	15	15.2	7.69	17	10.9	5.57	35.9	9.70	10.9	20	12.1
15	12	11	11.8	10.6	28	11.2	3.16	27.1	12.7	8.50	15	24.0
16	11	8.5	12.7	7.96	21	8.80	3.96	10.3	17.0	8.0	11	15.9
17	29	6.0	9.40	15.9	19	7.15	34.5	3.50	11.2	16	9.5	11.8
18	21	4.7	20.1	29.6	18	11.2	28.9	1.68	*8.50	15	8.0	8.80
19	11	4.1	8.23	22.2	15	6.34	28.9	2.82	6.88	14	13	6.34
20	15	3.9	9.70	32.0	10	3.73	19.1	5.11	14.5	18	36	12.4
21	27	3.3	7.42	22.2	8.0	2.99	16.6	4.19	14.2	19	28	25.7
22	32	5.0	8.23	13.3	7.0	2.31	14.9	18.4	9.10	17	20	21.2
23	22	9.0	5.80	10.0	6.0	30.6	10.0	17.3	8.50	18	34	21.2
24	*25	34	5.11	22.6	5.0	16.6	6.34	18.7	14.2	18	36	15.6
25	21.2	23	4.42	33.8	4.8	9.10	6.61	11.8	16.3	30	35	10.3
26	33	18	3.73	28.2	17	6.07	24.7	4.65	14.5	27	30	10.9
27	27	15	3.33	19.8	14	5.34	24.0	12.7	21.5	17	23	11.2
28	19	7.0	5.11	18.4	7.5	3.96	33.4	4.65	33.8	14	18	10.0
29	20	19.8	33.1	26.4	5.5	2.82	*10.0	2.99	25.0	25	16	19.1
30	18	18.7	26.4	*20.1	4.5	2.48	8.80	---	30.3	15	13	22.6
31	13	16.6	---	13.3	---	2.82	12.4	---	19.8	---	11	---
Total	598.20	383.2	396.34	551.56	358.20	220.37	402.00	350.77	398.78	515.10	645.5	405.01
Mean												
Mgd	19.3	12.4	13.2	17.8	11.9	7.11	13.0	12.1	12.9	17.2	20.8	13.5
Cfs	29.9	19.2	20.4	27.5	18.4	11.0	20.1	18.7	20.0	26.6	32.2	20.9
Ac-ft	1,840	1,180	1,220	1,690	1,100	676	1,230	1,080	1,220	1,580	1,980	1,240

Calendar Year 1963: Max - Min - Mean mgd - Mean cfs - Ac-ft -
Fiscal Year 1963-64: Max 36 Min 1.68 Mean mgd 14.3 Mean cfs 22.1 Ac-ft 16,040

* Discharge measurement made on this day.
Note.--No gage-height record July 15-24, July 26 to Aug. 28, Nov. 4 to Dec. 11, Apr. 16 to June 4.

7475. East Branch Honokane Nui Stream near Niulii

Location.--Lat 20°08'18", long 155°44'00", on left bank 500 ft upstream from Awini falls, 1.2 miles upstream from confluence with West Branch, and 6.0 miles south of Niulii.
Drainage area.--4.95 sq mi.
Records available.--May 1963 to June 1964.
Gage.--Water-stage recorder. Altitude of gage is 1,080 ft (from topographic map).
Extremes.--1963: Maximum discharge during period May to June, not determined; maximum daily, 29 mgd (45 cfs) June 3; minimum, not determined; minimum daily, 9.80 mgd (15.2 cfs) June 17.
1963-64: Maximum discharge during fiscal year occurred Nov. 8 (gage height and discharge not determined); maximum daily, 71.0 mgd (110 cfs) May 24; minimum, not determined; minimum daily, 9.80 mgd (15.2 cfs) Sept. 5.
Remarks.--Records poor. No diversion above station.

Rating tables (gage height, in feet, and discharge, in million gallons a day)

May 21 to Nov. 8, 1963		Nov. 9 to June 30, 1964	
0.7	7.00	0	9.00
1.8	62.0	1.0	39.0
		1.8	71.0

Discharge, in million gallons a day, May to June 1963

Day	May	June	Day	May	June	Day	May	June	Day	May	June	Day	May	June
1	-	17	7	-	10	13	-	10.6	19	-	26	25	10	15
2	-	19	8	-	10	14	-	10.2	20	-	25	26	10	15.5
3	-	29	9	-	11	15	-	10.2	21	*12	15.5	27	10	12.5
4	-	19	10	-	25	16	-	10.2	22	12	11.0	28	10	11.0
5	-	11	11	-	16	17	-	9.80	23	11	27.5	29	12	14.5
6	-	11	12	-	*10.6	18	-	21.0	24	11	18.0	30	12	12.5
												31	11	----
Total													-	464.60
Mean, in million gallons a day													-	15.5
Mean, in cubic feet per second													-	24.0
Runoff in acre-feet													-	1,430

* Discharge measurement made on this day.
Note.--No gage-height record May 21 to June 11, June 19, 20, 25.

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	40.0	11	11.0	36	13	12	10	14	25	13.5	12	12
2	20.5	11	10.6	34	13	11	11	13	30	12.9	24	12
3	12.0	11	10.2	16	12	10	17	12	20	12.0	20	12
4	11.5	11	10.2	13	12	10	12	11	18	12.0	14	11.7
5	11.0	11	9.80	14	12	10	12	11	16	12.0	37.5	13
6	11.0	11	10.2	13	12	10	14	10	16	12.0	26.1	13
7	11.0	10	10.2	14	12	13	15	13	18	12.0	27.0	12
8	12.5	10	11.5	13	50	26	20	13	35	13.5	16.5	14
9	49.5	10	20.5	12	22	14	12	35	18	20.7	13.5	12
10	30.0	10	14.0	12	45	12	11	58	16	25.2	25.5	12
11	16.0	42.5	33.5	11	15	*10	18	44	16	21.9	25.5	12
12	12.5	29.0	*18.5	11	25	10	16	32	18	34.5	*25.5	12
13	11.0	13.0	17.0	12	25	10	12	41	15	14.1	49.0	12
14	11.0	12	19	12	23	12	12	70	14	12.9	18.0	12
15	13	11	15	12	51	13	11	54	12	12.0	14.4	18
16	16	11	15	12	43	12	45	29	14	11.7	13.2	13
17	53	10	14	13	22	12	37	17	13	12.6	13.2	12
18	27	10	30	43	31	13	40	16	*10.8	12.6	12.0	12
19	14	10	13	14	17	12	20	16	10.8	13.2	14.1	12
20	14	10	13	32	16	12	16	18	12.0	13.2	67.0	12
21	21	10	12	14	15	11	14	19	12.6	13.2	26	33
22	42	10	12	12	14	11	13	46	12.0	12.9	15	19
23	15	14.5	11	12	14	53	12	50	12.9	15.6	63.0	14
24	*24.0	51.0	11	23	13	16	12	55	18.9	20.1	71.0	13
25	16.5	23.5	10	41	12	12	37	25	17.1	37.5	66.2	12
26	31.0	18.5	10	28	28	12	21	15	14.7	32	47.0	14
27	37	15.0	10	13	25	12	60	40	14.4	13	27.0	12
28	23	16.0	11	13	17	11	*15	18	29.4	12	15.6	12
29	17	21.5	57	24	14	10	14	14	20.4	31	15.0	15
30	19	21.0	54	*17	13	10	13	---------	28.5	13	14	20
31	12	15.0	----------	13	----------	10	15	---------	17.4	----------	13	----------
Total	654.0	480.5	504.20	559	636	412	587	809	545.9	504.8	840.8	414.7
Mean												
Mgd	21.1	15.5	16.8	18.0	21.2	13.3	18.9	27.9	17.6	16.8	27.1	13.8
Cfs	32.6	24.0	26.0	27.9	32.8	20.6	29.2	43.2	27.2	26.0	41.9	21.4
Ac-ft	2010	1470	1550	1720	1950	1260	1800	2480	1680	1550	2580	1270

Calendar Year 1963:	Max -	Min -	Mean mgd -	Mean cfs -	Ac-ft -
Fiscal Year 1963-64:	Max 71.0	Min 9.80	Mean mgd 19.0	Mean cfs 29.4	Ac-ft 21320

* Discharge measurement made on this day.
Note.--No gage-height record July 15-23, July 27 to Aug. 10, Aug. 14-22, Sept. 14 to Mar. 17, Apr. 26 to May 4, May 21, 22, May 30 to June 3, June 5-30.

7509. Kohala ditch at Honokane, near Niulii

Location.--Lat 20°09'50", long 155°43'50", on land of Honokane, on Honokane trail at tunnel adit, 28 ft from right side of tunnel, and 4.4 miles south of Niulii.

Records available.--May 1963 to June 1964.

Gage.--Water-stage recorder (digital). Altitude of gage is 960 ft (from topographic map).

Extremes.--1963-64: Maximum daily discharge, 62 mgd (96 cfs) May 24, 1964; no flow Feb. 24 to Mar. 7, 1964.

Remarks.--Records good except those for periods of no gage-height record, which are fair. Kohala ditch receives flow of Awini ditch at Honokane Gulch and diverts water at altitude of about 1,000 ft from East and West Branches Honokane Nui Stream. Water is used for irrigation in vicinity of Kohala.

Discharge, in million gallons a day, May to June 1963

Day	May	June	Day	May	June	Day	May	June	Day	May	June	Day	May	June
1	-	31.7	7	-	18.7	13	-	18.9	19	-	37	25	21.5	31
2	-	32.5	8	-	17.7	14	-	16.6	20	*40	37	26	18.9	31
3	-	39.3	9	-	19.5	15	-	15.7	21	27.1	30	27	18.5	26
4	-	31.5	10	-	39.0	16	-	15	22	24.1	23	28	20.1	22
5	-	22.7	11	-	*31.9	17	-	20	23	22.1	42	29	22.3	29
6	-	20.3	12	-	24.7	18	-	35	24	22.9	36	30	23.3	26
												31	21.7	----
Total													-	820.7
Mean, in million gallons a day													-	27.4
Mean, in cubic feet per second													-	42.4
Runoff in acre-feet													-	2,520

* Discharge measurement made on this day.
Note.--No gage-height record May 20, June 16-30.

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	51	21	22.9	45.0	20.9	15.9	13.6	19.3	0	26.3	22	21
2	36	19	21.1	43.0	18.9	15.7	14.2	17.4	0	23.1	36	20
3	24	18	20.1	30.5	17.7	16.0	23.7	16.6	0	20.3	31	19
4	21	17	22.5	25.3	16.8	15.7	25.5	16.5	0	20.3	25	20
5	19	16	18.3	29.1	16.2	15.3	18.5	16.2	0	22.1	45	26
6	21	16	23.7	25.5	16.0	14.7	18.5	15.1	0	21.1	39	27
7	23	17	23.3	29.1	16.3	25.5	22.3	18.3	0	21.1	40	22
8	23	19	24.7	27.9	22.1	35.0	29	18.3	12.9	20.1	29	28
9	52	18	36.3	23.5	7.60	20.9	18.1	39.3	20.1	38.8	23	23
10	43	20	28.9	19.9	9.10	*17.5	15	53.5	18.5	38.0	30	20
11	29	50	*44.8	17.4	27.5	16.5	22	48.3	21.7	33.8	36	19
12	27	42	36.0	16.8	33.5	16.2	25	43.0	29.7	45.5	*30	18
13	23	*30	30.7	20.5	34.3	16.2	19	47.5	24.1	27.5	52	17
14	20	25.1	30.5	18.5	34.0	21.7	16	57.8	22.1	21.9	30	23
15	24	20.7	24.9	20.9	51.0	22.9	15	52.0	21.1	19.3	25	35
16	25	18.3	25.5	18.7	45.0	20.5	43	33.8	28.5	18.3	20	27
17	52	16.8	22.5	27.1	34.3	19.1	48	19.3	*24.3	25.3	19	22
18	38	15.9	39.0	48.5	38.5	22.7	47	16.8	19.7	24.3	18	19
19	24	15.3	20.3	31.7	29.3	18.5	29	17.4	18.5	24.1	23	17
20	27	15.3	20.9	44.8	24.7	16.0	31	21.9	23.3	27.9	60	21
21	38	14.8	18.3	31.7	22.5	15.3	25	22.1	25.1	27.9	41	43
22	49	15.6	18.9	23.7	21.1	15.3	23	45.0	18.5	26.9	31	34
23	*32	22.5	16.8	21.1	19.9	53.0	19	28.3	19.9	30.3	59	31
24	40	54.0	16.3	34.0	18.5	29.1	18	0	27.9	29.5	62	25
25	32	36.5	15.6	49.3	17.4	19.5	36	0	32.1	48.5	60	21
26	48	32.9	15.1	41.8	36.3	16.6	37	0	24.9	43.0	48	24
27	48	24.9	14.7	29.1	33.5	16.0	53	0	28.1	26.3	33	23
28	35	26.5	16.5	28.5	21.7	15.7	*30	0	41.3	23	26	22
29	32	36.5	55.5	*39.0	18.1	15.6	24.3	0	37.0	37	27	30
30	32	35.0	43.5	32.5	16.5	15.0	21.1	---------	42.0	24	25	35
31	24	28.5	---------	24.7	---------	14.4	24.7	---------	32.5	---------	23	---------
Total	1012	758.1	768.1	919.1	739.20	608.0	804.5	683.7	613.8	835.5	1,068	732
Mean												
Mgd	32.6	24.5	25.6	29.6	24.6	19.6	26.0	23.6	19.8	27.8	34.5	24.4
Cfs	50.4	37.9	39.6	45.8	38.1	30.3	40.2	36.5	30.6	43.0	53.4	37.8
Ac-ft	3,110	2330	2,360	2,820	2,270	1,870	2,470	2,100	1,880	2,560	3,280	2,250

Calendar Year 1963: Max - Min - Mean mgd - Mean cfs - Ac-ft -
Fiscal Year 1963-64: Max 62 Min 0 Mean mgd 26.1 Mean cfs 40.4 Ac-ft 29,300

* Discharge measurement made on this day.
Note.--No gage-height record July 1 to Aug. 13, Jan. 8, 10-28, Apr. 28 to June 30.

7510. Kohala ditch at Pololu, near Niulii

Location.--lat 20°10'19", long 155°44'20", on right bank of open section of ditch, on land of Pololu, 0.5 mile upstream from Pololu Stream, and 3.7 miles south of Niulii.

Records available.--August 1927 to June 1938, September 1938 to June 1964.

Gage.--Water-stage recorder. Altitude of gage is 960 ft (from topographic map).

Average discharge.--35 years (1928-38, 1939-64), 26.9 mgd (41.6 cfs).

Extremes.--1927-64: Maximum daily discharge, 65.8 mgd (102 cfs) May 24, 1964; no flow at times.

Remarks.--Records good except those for period of no gage-height record, which are fair. Kohala ditch receives flow of Awini ditch at Honokane Gulch and diverts water at altitude of about 1,000 ft from East and West Branches Honokane Nui Stream and all streams west. Water is used for irrigation in vicinity of Kohala.

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	52.3	21.5	22.7	46.4	21.2	15.8	13.8	19.0	a0.05	26.5	22.9	22.1
2	39.0	19.4	21.2	43.9	19.2	15.6	14.2	17.6	a .05	22.9	38.0	20.6
3	24.3	18.2	20.3	30.5	18.2	15.8	22.5	16.6	a .05	21.7	32.8	19.6
4	21.0	17.6	22.3	25.5	17.4	15.7	24.9	16.3	a .05	21.3	26.1	20.1
5	18.9	16.9	18.5	29.3	16.8	15.4	18.2	16.2	a .05	23.1	48.3	27.4
6	21.5	16.4	23.3	25.7	16.4	15.1	17.7	16.0	a .05	22.1	41.4	28.7
7	23.9	16.8	22.9	29.6	16.6	23.2	21.5	17.9	a .05	21.9	41.7	22.9
8	23.7	19.4	24.7	27.8	24.6	34.9	29.3	18.5	8.20	23.1	30.7	30.0
9	54.7	18.4	36.2	23.7	9.48	20.1	18.2	36.7	20.1	41.2	24.3	23.7
10	45.0	19.9	28.7	20.3	16.2	*17.6	15.0	51.6	19.0	40.9	31.6	20.3
11	28.9	50.7	*45.8	18.2	26.5	16.4	22.5	49.0	22.3	35.8	37.9	19.4
12	27.8	43.1	37.0	17.6	33.0	16.2	25.9	44.2	30.0	47.4	*32.5	18.7
13	23.5	29.3	30.7	21.3	33.3	16.2	19.2	46.6	24.3	28.2	54.4	18.0
14	20.1	24.7	30.5	19.2	33.3	21.3	16.0	57.0	22.1	22.9	32.8	24.3
15	24.7	20.6	24.7	21.3	44.2	22.3	15.4	53.4	22.1	20.4	25.9	37.7
16	25.9	18.4	25.5	19.2	40.3	20.1	45.0	34.1	29.3	19.6	21.3	28.5
17	53.7	17.1	22.5	28.0	33.3	18.7	49.4	19.4	*24.7	25.9	20.3	23.1
18	38.5	16.2	38.2	49.3	37.7	22.1	48.4	17.2	20.4	25.5	19.6	19.6
19	24.3	15.7	20.3	32.3	28.0	18.0	29.1	17.7	19.4	24.5	23.2	18.2
20	27.3	15.6	21.0	47.3	23.3	16.0	30.9	22.3	24.9	28.5	64.4	22.8
21	38.0	15.1	18.5	31.4	21.2	15.2	26.3	21.8	25.1	29.3	43.4	45.8
22	49.0	15.8	19.0	23.7	19.9	15.0	23.5	47.4	19.4	27.4	32.1	34.2
23	*32.3	22.5	17.4	21.5	18.9	48.4	19.2	28.4	20.8	31.2	61.9	32.3
24	40.1	54.9	16.9	34.5	17.9	28.5	18.2	a1.0	30.2	28.0	65.8	26.3
25	32.3	36.0	16.2	50.7	17.2	19.4	36.4	a.05	31.5	52.7	64.0	22.3
26	48.4	32.5	15.6	42.5	34.9	16.8	37.2	a.05	26.5	47.7	50.3	24.5
27	48.7	24.5	15.2	29.1	32.1	16.0	53.7	a.05	27.6	29.8	34.4	23.5
28	35.0	27.0	17.1	28.2	20.8	15.7	*31.4	a.05	48.4	24.3	27.9	22.9
29	32.8	36.0	57.6	*39.5	17.7	15.6	24.3	a.05	37.0	40.0	28.7	31.6
30	32.1	34.7	44.7	32.3	16.6	15.0	21.2	---	44.5	25.5	25.7	37.2
31	25.3	30.5	---	24.7	---	14.4	24.3	---	31.6	---	23.5	---
Total	1033.0	765.4	775.2	934.5	726.18	596.5	812.8	686.15	629.75	879.3	1127.8	766.3
Mean												
Mgd	33.3	24.7	25.8	30.1	24.2	19.2	26.2	23.7	20.3	29.3	36.4	25.5
Cfs	51.5	38.2	39.9	46.6	37.4	29.7	40.5	36.7	31.4	45.3	56.3	39.5
Ac-ft	3170	2350	2380	2870	2230	1830	2490	2110	1930	2700	3460	2350

Calendar Year 1963: Max 58.4 Min 9.48 Mean mgd 25.2 Mean cfs 39.0 Ac-ft 28,220
Fiscal Year 1963-64: Max 65.8 Min 0.05 Mean mgd 26.6 Mean cfs 41.2 Ac-ft 29,870

* Discharge measurement made on this day.
a No gage-height record.

7550. Kehena ditch near Kohala

Location.--Lat 20°07'25", long 155°45'05", on right bank at old Honokane weir, near head of West Branch Honokane Nui Stream, and 8.5 miles southeast of Kohala.

Records available.--December 1917 to November 1919, April 1928 to June 1964.

Gage.--Water-stage recorder and weir control. Altitude of gage is 3,850 ft (from topographic map). Prior to Apr. 26, 1928, at same site at different datum.

Average discharge.--37 years (1918-19, 1928-64), 7.50 mgd (11.6 cfs).

Extremes.--1917-19, 1928-64: Maximum daily discharge, 54 mgd (84 cfs) Mar. 23, 1919; no flow at times.

Remarks.--Records good except those for periods of no gage-height record, which are poor. Ditch diverts from East Branch Honokane Nui Stream 2 miles above station for irrigation near Hawi. Small diversion upstream for watering stock.

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	15	2.06	3.20	19.1	0.84	0.23	0.23	0.98	14.1	3.95	5.92	1.32
2	6.0	1.32	1.87	14.3	.44	.14	1.66	.70	15.5	2.28	10.7	.98
3	1.5	.98	.98	5.92	.44	*.14	4.72	.56	10.4	1.87	9.60	.84
4	1.1	.84	.84	3.20	.23	.14	2.95	.56	10.4	1.68	9.22	.70
5	.7	.70	.70	4.20	.14	.08	1.87	.56	5.59	2.72	23.3	.84
6	1.5	.44	1.15	2.50	.08	0	3.30	.33	3.20	1.87	14.7	.84
7	3.5	.44	1.68	5.48	.23	.79	3.95	1.32	8.52	2.28	15.1	.84
8	2.0	.70	5.65	2.95	15.5	2.28	10.2	3.68	26.8	2.98	7.22	1.32
9	30	.70	9.97	1.50	11.8	.56	2.28	16.4	8.52	12.2	5.00	1.15
10	17	3.37	4.5	.84	29.0	.23	1.15	30.6	5.92	13.4	16.5	1.15
11	6.5	16.0	14	.44	9.97	.14	2.06	20.0	3.95	10.1	*15.1	.98
12	5.0	11.8	9.0	.23	4.72	.08	6.24	17.1	6.24	15.9	15.1	.56
13	4.5	7.55	6.5	.56	2.06	0	2.95	30.7	3.68	4.45	28.9	.33
14	.7	4.20	6.0	.84	1.68	0	1.50	48.8	2.50	1.87	9.22	4.03
15	2.5	2.06	5.0	.98	11.5	.06	1.68	35.6	1.87	.98	5.92	9.60
16	4.0	1.15	5.5	.44	13.3	.14	29.6	15.1	*3.20	.84	3.20	8.85
17	30	.70	3.0	4.50	2.50	.14	27.9	6.24	2.06	2.28	2.28	7.55
18	14	.44	5.0	17.7	1.68	.14	29.0	3.45	1.15	3.20	1.68	3.95
19	2.5	.33	*7.0	5.41	.84	.08	7.87	4.20	1.32	3.68	2.28	1.87
20	3.5	.23	2.50	10.4	.56	.02	5.59	7.55	3.20	5.38	33.4	1.87
21	10	.14	1.32	3.72	.33	0	5.38	7.87	3.95	3.20	15.1	22.1
22	15	.44	.84	1.50	.23	0	2.95	23.1	2.06	5.59	7.87	10.4
23	5.0	4.60	.56	*.98	.14	22.5	1.50	19.1	2.95	7.55	43.0	9.22
24	8.0	19.1	.44	4.04	.14	2.95	1.68	23.7	11.7	8.52	44.0	5.38
25	5.0	10.7	.33	12.2	.14	1.32	8.52	12.2	8.85	18.6	37.4	3.68
26	14	9.60	.23	10.7	3.04	.56	8.85	5.59	3.95	14.3	28.1	6.57
27	16	4.72	.14	3.95	2.72	.33	*16.1	19.4	2.28	5.59	12.6	4.20
28	12	6.44	.58	1.68	.98	.14	7.22	6.57	17.6	5.00	5.59	3.68
29	*11	10.1	29.8	6.57	.56	.08	2.72	3.20	10.4	10.7	3.20	7.22
30	7.22	12.2	15.1	5.92	.33	.04	1.68	----------	14.3	5.38	2.28	9.22
31	3.68	7.09	----------	1.87	----------	0	1.32	----------	8.52	----------	1.68	----------
Total	258.40	141.14	143.38	154.62	116.12	33.31	204.62	365.16	224.68	178.34	435.16	131.24
Mean												
Mgd	8.34	4.55	4.78	4.99	3.87	1.07	6.60	12.6	7.25	5.94	14.0	4.37
Cfs	12.9	7.04	7.40	7.72	5.99	1.66	10.2	19.5	11.2	9.19	21.7	6.76
Ac-ft	793	433	440	475	356	102	628	1120	690	547	1340	403

Calendar Year 1963: Max 41.6 Min 0 Mean mgd 5.75 Mean cfs 8.90 Ac-ft 6440
Fiscal Year 1963-64: Max 48.8 Min 0 Mean mgd 6.52 Mean cfs 10.1 Ac-ft 7330

* Discharge measurement made on this day.
Note.--No gage-height record July 1-29, Sept. 10-19.

7560. Kohakohau Stream near Kamuela

Location.--Lat 20°03'02", long 155°40'58", on left bank 0.2 mile downstream from Kohala Forest Reserve boundary and 2 miles northwest of Kamuela.

Drainage area.--2.34 sq mi.

Records available.--March 1956 to June 1964.

Gage.--Water-stage recorder. Altitude of gage is 3,500 ft (from topographic map). Prior to Oct. 23, 1957, at datum 0.35 ft lower.

Average discharge.--8 years, 6.19 mgd (9.58 cfs).

Extremes.--Maximum discharge during year, 1,220 mgd (1,890 cfs) Nov. 8 (gage height, 8.20 ft), from rating curve extended above 21 mgd as explained below; minimum, 0.20 mgd (0.31 cfs) Jan. 15.
1956-64: Maximum discharge, 2,510 mgd (3,880 cfs) Aug. 7, 1958 (gage height, 10.76 ft), from rating curve extended above 21 mgd by test on model of station site; minimum, 0.04 mgd (0.06 cfs) Nov. 22, 1962.

Remarks.--Records fair except those above 40 mgd, which are poor. Parker Ranch pipeline diverts above station.

Rating tables (gage height, in feet, and discharge, in million gallons a day)

July 1 to Nov. 8, Feb. 14 to June 30				Nov. 9 to Feb. 13			
0.5	0.15	1.0	7.20	0.4	0.18	0.9	4.80
.6	.60	1.2	13.8	.5	.43	1.1	10.0
.7	1.30	1.5	29.4	.6	.90	1.3	18.0
.8	2.50	2.0	66.0	.7	1.80	1.6	36.0
.9	4.50	2.5	106	.8	3.00		

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	21.2	1.30	2.26	13.9	*0.67	0.40	0.26	0.43	5.48	1.66	5.93	0.81
2	4.89	1.09	1.78	4.99	.46	.38	.84	.39	6.90	1.02	5.88	.74
3	1.66	.95	1.09	1.66	.42	.38	1.35	.36	7.30	1.02	3.02	.60
4	1.16	.88	1.02	.95	.28	.36	.66	.33	5.48	.81	2.14	.56
5	1.09	.81	.81	.95	.24	.36	.62	.30	1.90	1.66	14.8	.88
6	1.85	.67	1.42	.81	.24	.36	.96	.28	1.16	1.02	5.25	1.09
7	1.78	.60	1.66	.81	.24	.36	.99	.36	2.61	1.09	5.50	.67
8	4.97	.60	4.88	.67	85.3	.38	.76	.90	12.4	1.02	2.14	.88
9	28.7	.56	5.50	.56	7.95	.30	.48	10.0	2.38	3.02	1.42	.88
10	12.5	4.51	3.80	.51	30.2	.28	.33	16.7	1.16	6.33	8.99	.95
11	*2.54	25.6	18.0	.42	5.55	.26	.30	10.4	.95	5.68	6.71	.67
12	2.14	12.3	8.04	.42	2.76	*.26	.33	3.72	1.23	26.1	6.60	.51
13	1.42	3.80	5.25	.60	1.62	.26	.26	24.5	1.54	1.78	32.7	.46
14	1.02	2.14	8.03	.46	2.16	.36	.26	60.8	1.09	1.02	5.00	4.99
15	1.02	*1.16	3.73	.56	23.2	.33	.23	40.2	1.09	.74	2.14	5.76
16	6.52	.74	2.14	.42	11.3	*.28	12.3	7.20	2.67	.60	1.09	2.38
17	25.8	.56	2.14	7.94	2.28	.26	12.7	1.54	1.23	1.09	.81	1.78
18	5.85	.51	5.64	16.3	*1.71	.30	7.22	.95	.95	1.23	.67	1.16
19	2.38	.42	2.02	10.9	1.17	.26	1.71	.95	.88	1.02	5.69	.81
20	4.26	.38	*1.09	7.26	.85	.26	.99	6.05	1.42	*1.23	54.6	1.95
21	12.0	.33	.81	1.78	.76	.23	.76	3.02	1.09	1.23	*8.32	16.2
22	26.2	.33	.67	*.88	.66	.26	.57	27.4	.74	3.60	3.02	5.00
23	5.25	1.82	.56	.60	.57	2.13	*.43	21.6	.67	3.20	43.8	5.50
24	9.44	31.0	.46	.81	.52	.76	.40	24.5	*7.40	4.98	44.6	*2.14
25	6.06	5.95	.42	11.5	.66	.52	1.08	7.20	4.25	17.9	44.6	1.23
26	16.0	3.60	.38	7.59	2.04	.43	1.44	*2.02	1.66	12.8	39.7	1.30
27	13.0	1.78	.38	2.50	1.17	.52	26.0	21.0	.95	1.78	7.42	1.09
28	5.50	5.43	1.40	1.23	.71	.38	2.28	2.50	7.34	1.89	2.26	1.23
29	5.00	5.62	33.4	3.02	.57	.28	.99	1.16	5.25	4.69	1.66	6.95
30	3.60	6.74	9.77	2.14	.48	.26	.71	----------	14.9	1.23	1.16	7.02
31	2.02	3.02	----------	1.02	----------	.28	.57	----------	4.02	----------	1.02	----------
Total	236.82	125.20	128.55	104.16	186.74	12.44	78.78	296.75	108.09	112.44	368.64	76.19
Mean												
Mgd	7.64	4.04	4.28	3.36	6.22	0.401	2.54	10.2	3.49	3.75	11.9	2.54
Cfs	11.8	6.25	6.62	5.20	9.62	0.620	3.93	15.8	5.40	5.80	18.4	3.93
Ac-ft	727	384	395	320	573	38	242	911	332	345	1130	234

Calendar Year 1963: Max 85.3 Min 0.08 Mean mgd 4.03 Mean cfs 6.24 Ac-ft 4520
Fiscal Year 1963-64: Max 85.3 Min 0.23 Mean mgd 5.01 Mean cfs 7.75 Ac-ft 5630

Peak discharge (base, 200 mgd)

Date	Time	Gage height	Discharge	
			Mgd	Cfs
11-8	1730	8.20	1,220	1,890

* Discharge measurement made on this day.

7565. Kohakohau Stream at Waiaka, near Kamuela

Location.--Lat 20°01'48", long 155°42'05", on left bank 150 ft upstream from State Highway 25 at Waiaka and 2.0 miles west of Kamuela.

Drainage area.--4.30 sq mi.

Records available.--November 1963 to June 1964.

Gage.--Water-stage recorder and concrete control. Altitude of gage is 2,410 ft (from topographic map).

Extremes.--Maximum discharge during period, 1,430 mgd (2,210 cfs) Nov. 8 (gage height, 5.89 ft), from rating curve extended above 82 mgd by logarithmic plotting; minimum, 0.05 mgd (0.08 cfs) Jan. 15, 16.

Remarks.--Records fair. Two Parker Ranch pipeline diversions above station. Continuous records of rainfall are obtained at station.

Rating table (gage height, in feet, and discharge, in million gallons a day)
(Shifting-control method used Nov. 4-7, Jan. 30 to Feb. 4)

0.2	0.05	1.6	3.60
.3	.08	1.8	5.90
.4	.12	2.0	10.0
.5	.18	2.4	23.0
.8	.45	2.7	38.0
1.1	.90	3.0	65.0
1.2	1.20	3.5	133
1.4	2.10	4.0	250

Discharge, in million gallons a day, November 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1					0.60	0.31	0.10	0.31	3.72	1.65	5.48	0.87
2					.40	.28	.09	.24	9.47	.90	8.43	.76
3					*.30	.24	.96	.20	8.22	.83	4.30	.67
4					.25	.21	.61	.19	*10.9	.70	1.80	.58
5					.20	.19	.49	.18	2.45	1.68	16.8	.66
6					.17	.17	.44	.13	1.24	.73	7.05	.88
7					.17	.16	.83	.11	.96	.80	6.40	.64
8					104	.18	.52	.56	16.0	.64	2.88	.66
9					11.7	.18	.35	12.7	3.72	1.97	1.20	.64
10					51.8	.14	.23	25.9	1.20	5.95	6.68	.82
11					6.75	.13	.16	15.8	.82	5.93	9.81	.60
12					*3.60	.11	.13	4.62	.87	18.1	6.75	.50
13					*1.48	*.09	.13	40.0	1.44	2.05	65.7	.42
14					1.24	.10	.09	*153	.90	.90	7.09	4.11
15					*26.9	a.12	*.06	96.7	.70	.67	2.80	7.80
16					17.8	*.11	10.6	10.9	3.02	.57	1.32	2.73
17					2.66	.11	16.4	2.24	1.20	.62	.85	1.70
18					*1.80	.10	8.09	1.08	.73	1.11	.72	1.14
19					.96	.11	1.70	.96	.64	.73	3.74	.73
20					.75	.09	.73	6.36	1.47	*.96	*135	.70
21					.62	.07	.50	4.46	1.21	.85	14.8	24.4
22					.58	.10	.41	56.8	.58	2.97	4.30	6.24
23					.50	1.21	.30	32.6	.53	4.20	88.7	*7.09
24					.43	.67	.22	48.6	*7.14	3.25	97.8	2.88
25					.39	.33	.54	11.2	5.38	22.2	102	1.24
26					1.18	.25	.70	2.80	1.70	23.2	87.6	1.28
27					1.05	.30	41.6	30.0	.82	2.66	15.8	.96
28					.57	.26	2.59	4.37	6.58	1.32	3.70	1.08
29					.45	.15	.76	1.48	5.51	6.13	2.24	7.53
30					.37	.10	.50	---------	19.7	1.52	1.52	8.56
31			---------		---------	.08	.40	---------	5.25	---------	1.14	---------
Total					239.67	6.65	91.23	564.49	124.07	115.79	714.40	88.87
Mean												
Mgd					7.99	0.215	2.94	19.5	4.00	3.86	23.0	2.96
Cfs					12.4	0.333	4.55	30.2	6.19	5.97	35.6	4.58
Ac-ft					736	20	280	1,730	381	355	2,190	273

Calendar Year 1963: Max - Min - Mean mgd - Mean cfs - Ac-ft -
Fiscal Year 1963-64: Max - Min - Mean mgd - Mean cfs - Ac-ft -

* Discharge measurement made on this day.

Peak discharge (base, 350 mgd)

Date	Time	Gage height	Discharge Mgd	Discharge Cfs	Date	Time	Gage height	Discharge Mgd	Discharge Cfs
11-8	1830	5.89	1,430	2,210	2-22	1630	4.60	480	743
2-15	0200	4.40	390	603	5-26	1700	4.39	386	597

7570. Waikoloa Stream near Kamuela

Location.--Lat 20°03'17", long 155°40'02", on left bank 350 ft downstream from Parker Ranch boundary and 2.1 miles north of Kamuela.

Drainage area.--0.78 sq mi.

Records available.--May 1947 to June 1964. See alao Note below.

Gage.--Water-stage recorder and concrete control. Altitude of gage is 3,580 ft (from topographic map).

Average discharge.--17 years, 4.77 mgd (7.38 cfs).

Extremes.--Maximum discharge during year, 115 mgd (178 cfs) Nov. 8 (gage height, 3.31 ft); minimum, 0.95 mgd (1.47 cfs) Jan. 24.
1947-64: Maximum discharge, 860 mgd (1,330 cfs) Oct. 23, 1957 (gage height, 6.55 ft), from rating curve exteeded above 62 mgd; minimum, 0.58 mgd (0.90 cfs) Nov. 13-22, 1962.
Revisions.--The maximum discharge for the fiscal year 1962 has been revised to 110 mgd (170 cfs) Nov. 23, 1961 (gage height, 3.27 ft), superseding figure published in Surface Water Records of Hawaii and other Pacific Areas (1962).

Remarks.--Records good. No diversion above station.

Note.--Published records for high-water periods in fiscal years 1949-60 have been found to be in error; revised records are on file in the district office and will be published in the next water-supply paper.

Revisions.--Revised figures of discharge, in million gallons a day, for high-water periods in the fiscal years 1961-63, superseding those published in Surface Water Records of Hawaii and other Pacific Areas for fiscal years 1961, 1962 and 1963, are given herewith:

1961		1962	
Feb. 10	34.7	Dec. 15	24.5
11	40.0		
Apr. 2	50.2	1963	
3	72.9	Jan. 16	25.5
Nov. 22	21.5	Mar. 23	22.4
23	36.0	May 10	24.5
		12	23.4

Month	Million gallons	Maximum	Minimum	Mean		Runoff in acre-feet
				Mgd	Cfs	
Calendar year 1960	-	139	1.24	5.08	7.86	5,710
February 1961	177.25	40.0	.84	6.33	9.79	544
April	185.23	72.9	.97	6.17	9.55	568
Fiscal year 1960-61	-	72.9	.84	3.66	5.66	4,100
November 1961	174.79	36.0	1.40	5.83	9.02	536
Calendar year 1961	-	72.9	.84	3.15	4.87	3,530
Fiscal year 1961-62	-	36.0	.76	2.39	3.70	2,680
December 1962	94.55	24.5	.70	3.05	4.72	290
Calendar year 1962	-	24.5	.58	2.16	3.34	2,420
January 1963	74.50	25.5	.76	2.40	3.71	229
March	104.37	22.4	.70	3.37	5.21	320
May	182.81	24.5	1.85	5.90	9.13	561
Fiscal year 1962-63	-	25.5	.58	2.91	4.50	3,260

7570. Waikoloa Stream near Kamuela--Continued

Rating table (gage height, in feet, and discharge, in million gallons a day)

1.2	0.58	1.8	7.80
1.3	1.24	2.0	13.8
1.4	2.13	2.2	22.4
1.6	4.58	2.5	40.0

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	11.6	2.90	3.77	10.4	2.13	1.56	1.24	1.09	3.57	2.35	7.20	2.57
2	4.58	2.57	3.51	5.03	1.94	1.48	2.54	1.02	5.33	2.04	5.49	2.46
3	3.02	2.46	2.90	3.13	1.85	1.48	2.79	1.02	6.79	1.94	3.38	2.24
4	2.90	2.35	2.90	2.68	1.75	1.40	2.13	1.09	5.18	1.85	2.68	2.13
5	2.90	2.24	2.68	2.57	1.65	1.40	1.56	1.02	2.90	2.13	5.33	3.90
6	3.38	2.24	3.77	2.35	1.65	1.40	1.75	1.02	2.35	2.04	3.51	4.04
7	3.51	2.24	3.51	2.24	1.65	1.48	1.85	1.09	2.46	2.13	3.13	2.68
8	6.13	2.35	6.61	2.13	21.4	1.56	1.56	2.44	5.66	2.04	2.68	3.38
9	14.2	2.24	5.94	2.24	4.56	1.32	1.32	5.33	2.90	3.38	2.13	3.13
10	*8.80	8.73	4.73	2.04	11.5	1.32	1.24	9.02	2.24	5.33	3.94	2.90
11	3.90	23.8	17.8	1.85	7.12	1.24	1.24	5.18	2.35	6.05	4.18	2.35
12	3.38	10.9	9.30	1.85	3.90	1.24	1.24	2.90	2.68	8.09	3.47	2.13
13	3.02	4.88	6.10	2.57	2.79	*1.24	1.16	11.3	2.46	2.46	18.4	2.04
14	2.68	3.38	7.29	2.04	3.51	1.85	1.09	*26.8	2.35	1.94	4.58	7.24
15	2.79	*2.68	4.45	2.35	10.7	1.75	1.09	16.8	3.04	1.75	2.68	5.94
16	5.22	2.35	3.64	1.94	*5.33	1.56	5.43	4.58	4.66	1.56	2.13	3.25
17	10.6	2.13	3.38	12.0	3.64	1.56	5.26	2.46	2.24	2.24	1.94	2.79
18	5.03	2.13	4.88	10.9	3.38	1.94	3.77	2.13	1.75	2.46	1.85	2.46
19	3.90	2.04	3.51	16.4	2.35	1.48	2.04	2.57	1.85	2.35	9.16	2.13
20	5.87	2.04	*2.57	7.94	2.04	1.32	1.56	9.20	3.04	*2.68	*36.3	4.21
21	13.5	1.94	2.35	2.79	1.94	1.24	1.40	4.73	2.46	2.68	6.10	7.72
22	16.9	1.94	2.35	*2.24	1.94	1.32	1.24	16.8	1.94	4.73	4.32	4.58
23	5.94	3.21	2.13	1.94	1.75	5.80	*1.09	12.1	1.94	3.90	17.1	*6.32
24	7.29	19.0	2.04	3.24	1.75	2.24	1.02	12.6	*8.16	5.10	24.8	3.13
25	8.67	5.78	1.94	14.9	2.13	1.56	1.56	5.94	3.90	11.0	30.7	2.68
26	13.8	4.73	1.94	7.33	3.90	1.48	2.24	3.02	2.24	7.92	15.4	2.57
27	8.55	3.02	1.85	4.18	2.79	1.56	10.3	8.23	1.94	2.68	6.78	2.46
28	5.63	5.80	3.82	2.90	1.85	1.40	2.35	3.13	10.8	2.90	4.18	2.79
29	5.78	4.58	23.7	5.03	1.75	1.24	1.56	2.35	5.78	3.77	3.64	7.47
30	5.33	4.88	7.70	*4.04	1.65	1.24	1.32	---	11.0	2.24	3.02	5.63
31	3.90	4.04	---	2.35	---	1.24	1.24	---	3.77	---	2.79	---
Total	202.70	145.57	153.06	145.59	116.29	49.90	67.18	176.96	119.73	103.73	242.99	109.32
Mean												
Mgd	6.54	4.70	5.10	4.70	3.88	1.61	2.17	6.10	3.86	3.46	7.84	3.64
Cfs	10.1	7.27	7.89	7.27	6.00	2.49	3.36	9.44	5.97	5.35	12.1	5.63
Ac-ft	622	447	470	447	357	153	206	543	367	318	746	335

Calendar Year 1963: Max 25.5 Min 0.70 Mean mgd 3.97 Mean cfs 6.14 Ac-ft 4450
Fiscal Year 1963-64: Max 36.3 Min 1.02 Mean mgd 4.46 Mean cfs 6.90 Ac-ft 5010

* Discharge measurement made on this day.

Peak discharge (base, 100 mgd)

Date	Time	Gage height	Discharge	
			Mgd	Cfs
11-8	1830	3.31	115	178

7580. Waikoloa Stream at Marine Dam, near Kamuela

Location.--Lat 20°02'48", long 155°39'58", on right bank 160 ft upstream from Marine Dam and 1.5 miles north of Kamuela.

Drainage area.--1.18 sq mi.

Records available.--May 1947 to June 1964.

Gage.--Water-stage recorder (digital since Apr. 20) and concrete control. Altitude of gage is 3,450 ft (from topographic map).

Average discharge.--17 years, 5.88 mgd (9.10 cfs).

Extremes.--Maximum discharge during year, 111 mgd (172 cfs) Nov. 8 (gage height, 3.33 ft); minimum, 0.89 mgd (1.38 cfs) Jan. 15.
1947-64: Maximum discharge, 1,180 mgd (1,830 cfs) Oct. 23, 1957 (gage height, 6.99 ft), from rating curve extended above 76 mgd; minimum, 0.52 mgd (0.80 cfs) Nov. 21, 1962.

Remarks.--Records good except those for periods of no gage-height record, which are fair. Diversion above station for livestock and domestic use.

Rating table (gage height, in feet, and discharge, in million gallons a day)

1.4	0.68	2.2	14.0
1.5	1.25	2.5	28.5
1.7	3.25	2.8	52.0
1.9	6.50		

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	14.4	3.03	4.26	12.3	2.37	1.48	1.13	1.19	4.69	2.70	8.0	2.5
2	5.42	2.70	3.68	6.32	2.15	1.48	2.48	1.13	6.71	2.26	6.0	2.4
3	3.14	2.48	2.92	3.54	1.94	1.40	3.03	1.07	9.15	2.15	3.5	2.2
4	2.92	2.48	2.81	2.70	1.84	1.32	2.37	1.19	6.57	2.04	2.8	2.1
5	2.81	2.37	2.59	2.70	1.74	1.25	1.65	1.13	3.40	2.37	5.5	3.9
6	3.40	2.26	3.68	2.48	1.74	1.19	1.84	1.07	2.59	2.15	4.0	4.70
7	3.40	2.26	3.54	2.37	1.74	1.40	2.26	1.19	2.70	2.37	3.5	2.59
8	6.82	2.37	7.24	2.15	21.6	1.48	1.74	2.67	6.97	2.26	2.7	3.25
9	18.9	2.26	7.13	2.15	6.07	1.25	1.40	6.32	3.25	3.54	2.26	3.03
10	*11.6	9.32	5.42	1.94	14.6	1.19	1.25	12.3	2.48	6.01	4.70	2.81
11	4.95	30.9	21.9	1.74	9.80	1.13	1.07	7.13	2.48	7.08	4.88	2.26
12	3.83	14.6	11.0	1.84	4.88	1.13	1.13	3.40	2.92	10.8	3.98	1.94
13	3.14	5.78	7.55	2.48	3.14	*1.13	1.07	14.2	2.70	3.03	24.1	1.84
14	2.70	3.68	8.60	2.04	3.99	1.65	1.01	*38.0	2.59	2.26	5.96	7.97
15	2.70	*2.81	4.88	2.37	14.7	1.65	.95	23.9	3.39	1.94	3.14	7.55
16	5.12	2.48	3.83	1.94	*8.39	1.48	6.29	5.78	5.89	1.74	2.37	3.54
17	12.8	2.15	3.68	13.3	4.41	1.48	6.32	3.03	2.81	2.37	2.04	2.81
18	6.14	2.04	5.42	13.9	3.98	1.84	3.83	2.48	2.15	2.81	1.94	2.37
19	4.56	1.94	3.68	21.4	2.59	1.40	2.26	2.92	2.26	2.48	10.3	2.15
20	6.41	1.94	*2.59	11.0	2.37	1.32	1.56	12.3	4.05	*3.03	*45	4.56
21	15.4	1.84	2.15	3.40	2.15	1.25	1.25	5.97	3.14	3.0	6.0	9.80
22	22.2	1.84	2.26	*2.48	1.94	1.25	1.19	23.3	2.37	4.6	4.5	5.42
23	7.34	3.55	2.04	2.15	1.84	6.91	*1.13	17.3	2.37	3.9	20	*7.55
24	8.18	22.2	1.94	4.14	1.74	2.70	1.19	16.8	*9.36	5.0	25	3.68
25	8.75	6.71	1.84	20.7	2.26	1.65	1.74	7.76	5.40	12	35	2.81
26	17.8	5.42	1.84	9.41	4.26	1.56	2.37	3.68	2.59	8.5	20	2.70
27	12.5	3.25	1.74	5.06	3.03	1.56	1.34	11.2	2.15	2.7	7.0	2.48
28	6.71	6.53	4.21	3.25	2.04	1.40	2.92	3.83	14.1	3.0	4.4	2.70
29	6.32	5.35	30.0	6.14	1.84	1.25	1.84	2.70	7.80	3.5	3.8	9.08
30	5.96	5.86	10.3	*4.70	1.65	1.13	1.48	---	14.8	2.7	2.9	6.92
31	3.98	4.41	---	2.81	---	1.13	1.32	---	4.70	---	2.7	---
Total	240.30	166.81	174.72	174.90	136.79	49.44	74.47	234.94	148.53	114.29	277.97	119.61
Mean												
Mgd	7.75	5.38	5.82	5.64	4.56	1.59	2.40	8.10	4.79	3.81	8.97	3.99
Cfs	12.0	8.32	9.00	8.73	7.06	2.46	3.71	12.5	7.41	5.89	13.9	6.17
Ac-ft	737	512	536	537	420	152	229	721	456	351	853	367

Calendar Year 1963: Max 30.9 Min 0.64 Mean mgd 4.61 Mean cfs 7.13 Ac-ft 5160
Fiscal Year 1963-64: Max 45 Min 0.95 Mean mgd 5.23 Mean cfs 8.09 Ac-ft 5870

Peak discharge (base, 100 mgd)

Date	Time	Gage height	Discharge Mgd	Discharge Cfs	Date	Time	Gage height	Discharge Mgd	Discharge Cfs
11-8	1900	3.33	111	172	2-22	1500	3.28	105	162

* Discharge measurement made on this day.
Note.--No gage-height record Apr. 21 to May 8, May 20 to June 5.

7590. Hauani Stream near Kamuela

Location.--Lat 20°02'28", long 155°39'05", on left bank 1,350 ft downstream from Hawaii County pipeline intake and 1.8 miles northeast of Kamuela.

Drainage area.--0.47 sq mi.

Records available.--March 1956 to June 1964.

Gage.--Water-stage recorder (digital since Apr. 21) and concrete control. Datum of gage is 3,117.42 ft above mean sea level (Hawaii County Board of Water Supply bench mark).

Average discharge.--8 years, 1.06 mgd (1.64 cfs).

Extremes.--Maximum discharge during year, 57.0 mgd (88.2 cfs) Feb. 22 (gage height, 2.60 ft), from rating curve extended above 22 mgd by logarithmic plotting; minimum, 0.01 mgd (0.02 cfs) Feb. 3, 6.
1956-64: Maximum discharge, 325 mgd (503 cfs) Oct. 23, 1957 (gage height, 4.65 ft), from rating curve extended above 7.0 mgd by slope-conveyance study; no flow at times.

Remarks.--Records fair. Diversion above station for livestock and domestic use.

Revisions.--Revised figures of discharge, in million gallons a day, for high-water periods in the fiscal year 1963, superseding those published in Surface Water Records of Hawaii and other Pacific Areas (1963), are given herewith:

Date	Discharge	Date	Discharge	Date	Discharge
1963		1963-Con.		1963-Con.	
Mar. 7	0.89	Apr. 26	1.48	May 17	0.94
21	.99	27	.99	18	.94
22	2.11	28	1.48	19	.75
23	7.30	29	.79	20	.84
24	1.04	May 7	3.09	27	.94
28	1.41	8	1.34	28	.84
Apr. 14	1.69	9	1.48	June 1	.89
15	1.22	10	7.70	9	1.04
16	1.62	11	3.48	10	.84
17	.79	12	7.70	18	.99
23	2.30	13	2.70	29	.75
24	4.90	14	.75	30	1.41
25	.89	16	1.10		

Month	Million gallons	Maximum	Minimum	Mean		Runoff in acre-feet
				Mgd	Cfs	
March 1963.....	16.71	7.30	0	0.539	0.834	51
April.....	21.82	4.90	0	.727	1.12	67
May.....	38.42	7.70	.06	1.24	1.92	118
June.....	12.49	1.41	.06	.416	.644	38
Fiscal year 1962-63...	-	9.33	0	.418	.647	468

7590. Hauani Stream near Kamuela--Continued

Rating table (gage height, in feet, and discharge, in million gallons a day)

0.8	0.01	1.3	1.77
.9	.08	1.4	2.70
1.0	.27	1.6	5.50
1.1	.63	1.8	7.50
1.2	1.10	2.0	16.5

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	2.93	0.33	0.43	1.64	0.23	0.08	0.03	0.02	0.58	0.30	2.11	0.27
2	.71	.25	.36	.99	.19	.08	.08	.02	.71	.21	.94	.25
3	.33	.23	.30	.43	.19	.07	.19	.01	1.33	.19	.51	.23
4	.25	.21	.30	.33	.17	.06	.08	.02	.75	.17	.30	.21
5	.23	.19	.25	.30	.13	.04	.05	.02	.27	.19	.43	.71
6	.21	.17	.49	.25	.13	.04	.15	.01	.21	.17	.30	.59
7	.21	.15	.36	.21	.13	.07	.17	.02	.19	.21	.27	.25
8	.60	.15	1.01	.19	1.68	.13	.06	.15	.51	.15	.23	.36
9	4.69	.13	.94	.19	.54	.06	.04	.89	.27	.21	.21	.25
10	1.90	1.40	.63	.15	2.53	.04	.03	1.89	.17	.62	.59	.23
11	*.59	8.59	5.69	.13	1.37	.03	.03	.89	.19	1.20	.51	.19
12	.39	3.32	1.69	.13	.51	.03	.03	.27	.21	1.40	.71	.17
13	.27	.75	.84	.17	.30	.03	.02	4.82	.19	.33	4.90	.15
14	.23	.43	1.04	.13	.47	.09	.02	12.4	.15	.19	.75	2.02
15	.19	.30	.63	.17	2.34	.08	.02	7.22	.23	.15	.39	.94
16	.52	*.23	.51	.11	*.84	.06	1.10	1.10	.55	.13	.25	.36
17	1.57	.19	.43	2.17	.59	.05	.59	.36	.19	.19	.23	.27
18	.69	.17	.51	1.77	.43	.09	.25	.23	.13	.19	.21	.21
19	.47	.15	*.36	5.90	.23	*.05	.11	.27	.13	.13	2.20	.21
20	.63	.13	.23	1.82	.17	.04	.06	2.33	.51	.15	*15.3	.94
21	4.63	.15	.19	.36	.15	.03	.05	.59	.23	*.17	1.34	.79
22	5.11	.15	.19	.25	.13	.04	.04	6.65	.17	.71	.63	.71
23	1.19	.23	.15	*.19	.13	.94	.03	3.07	.19	.47	5.70	1.10
24	1.28	3.29	.15	.68	.08	.15	*.03	3.08	.50	1.10	9.10	*.39
25	1.94	.89	.13	4.63	.23	.02	.08	.94	*.39	2.96	15.3	.25
26	5.47	.63	.11	1.37	.51	.04	.15	*.47	.15	1.48	3.09	.21
27	2.59	.30	.09	.63	.21	.07	2.22	1.60	.15	.33	1.16	.19
28	.94	1.10	.59	.39	.13	.05	.23	.43	2.50	.30	.59	.21
29	.84	.59	5.53	.75	.09	.04	.08	.25	1.04	.39	.43	1.22
30	.71	.73	2.17	.51	.08	.03	.05	---	2.30	.21	.33	.71
31	.47	1.55	---	.30	---	.03	.03	---	.63	---	.30	---
Total	42.78	26.08	26.30	27.24	14.91	2.66	6.10	50.02	15.72	14.60	69.31	14.59
Mean												
Mgd	1.38	0.841	0.877	0.879	0.497	0.086	0.197	1.72	0.507	0.487	2.24	0.486
Cfs	2.14	1.30	1.36	1.36	0.769	0.133	0.305	2.66	0.784	0.754	3.47	0.752
Ac-ft	131	80	81	84	46	8.2	19	154	48	45	213	45

Calendar Year 1963: Max 8.59 Min 0 Mean mgd 0.675 Mean cfs 1.04 Ac-ft 756
Fiscal Year 1963-64: Max 15.3 Min 0.01 Mean mgd 0.848 Mean cfs 1.31 Ac-ft 954

* Discharge measurement made on this day.

Peak discharge (base, 50 mgd)

Date	Time	Gage height	Discharge	
			Mgd	Cfs
2-22	1500	2.60	57.0	88.2

7592. Right Branch Waiaha Stream near Holualoa

Location (revised).--Lat 19°38'41", long 155°54'55", on right bank 1,000 ft upstream from reservoir, 1.0 mile northeast of Holualoa Makai Camp, and 2.9 miles northeast of Holualoa School.

Drainage area.--1.89 sq mi (revised).

Records available.--April 1960 to June 1964.

Gage.--Water-stage recorder and concrete control. Altitude of gage is 3,280 ft (revised, from topographic map).

Extremes.--Maximum discharge during year, 196 mgd (303 cfs) May 27 (gage height, 4.70 ft), from rating curve extended above 0.87 mgd on basis of slope-area measurement at gage height 4.07 ft; no flow for many days.
1960-64: Maximum discharge, that of May 27, 1964; no flow at times each year.
Revisions.--The maximum discharge for the fiscal year 1961 has been revised to 116 mgd (179 cfs) Mar. 29, 1961 (gage height, 4.07 ft), superseding figure published in Surface Water Records of Hawaii and other Pacific Areas (1961).

Remarks.--Records good. Continuous records of rainfall are obtained at station.

Revisions.--Revised figures of discharge, in million gallons a day, for high-water periods in the fiscal year 1961, superseding those published in Surface Water Records of Hawaii and other Pacific Areas (1961), are given herewith:

1961	
Mar. 27	7.26
28	8.48
29	10.1
Apr. 23	2.04
June 8	3.21

Month	Million gallons	Maximum	Minimum	Mean Mgd	Mean Cfs	Runoff in acre-feet
March 1961	27.52	10.1	0.01	0.888	1.37	84
April	7.87	2.04	.01	.262	.405	24
June	10.03	3.21	.03	.334	.517	31
Fiscal year 1960-61	-	10.1	0	.158	.244	177
Calendar year 1961	-	13.5	0	.275	.425	307

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	1.04	0.12	0.07	0.18	0.02			.0	0	0.31	0.63	0.03
2	.27	.11	.05	.10	.02			0	0	.25	.53	.03
3	.12	.16	.04	.09	.09			0	0	.13	.27	.02
4	.10	.11	.03	.06	.03	(*)		0	0	.12	.16	.02
5	.06	.09	.03	.05	.02			0	0	.18	.15	.02
6	.05	.07	.09	.04	.01			0	0	.16	.12	.11
7	.04	.09	.07	.03	.01			0	.01	.16	2.66	.33
8	.04	.32	.23	.02	.01			0	.04	.21	.35	.23
9	.16	.12	.13	.02	.01			0	.04	.16	.16	.27
10	.12	.06	.19	.01	0			0	.13	.09	.11	.18
11	.07	.05	.11	.01	0			0	.10	.13	.09	.20
12	.42	.06	.53	.01	0			0	.05	.12	.08	.15
13	.10	.29	.98	.01	0			0	.02	.07	.49	.09
14	.05	.25	3.73	.01	0			0	.01	.07	.67	.05
15	.05	.23	.34	.01	0			0	.02	.11	.23	.05
16	.04	.38	1.93	.01	0		(*)	0	.03	.07	.18	.07
17	.03	.18	3.84	.01	0			0	.03	.12	.16	.07
18	*.03	.11	*.66	.01	0			0	.01	.13	.10	.05
19	.07	.22	.15	.01	0			*0	.01	.10	.09	.05
20	.05	.15	.09	.01	0			0	.03	.10	.05	.05
21	.03	*.11	.06	.01	0			0	.03	.39	.17	.10
22	.03	.13	.06	.01	0			0	.73	1.82	.15	.13
23	.07	.10	.14	.01	0			0	.94	*.38	.18	.23
24	.08	.07	2.66	*0	0			.02	1.90	3.20	.31	.18
25	.07	.86	1.59	0	0			.01	*.47	.51	5.26	.15
26	.04	.71	2.54	.01	0			.01	.15	.15	1.76	.21
27	.03	1.36	.50	.02	0			0	.09	.09	27.5	.46
28	.59	.31	.20	.01	0			0	.10	.09	*1.75	.20
29	1.68	.44	.18	.01	0			0	.13	.08	.25	.10
30	1.60	.39	.32	0	0			---	.08	.39	.10	.12
31	.29	.13	---	.01	---			---	.28	---	.05	---
Total	7.42	7.78	21.54	0.79	0.22	0	0	0.04	5.43	9.89	44.76	3.95
Mean												
Mgd	0.239	0.251	0.718	0.025	0.007	0	0	0.001	0.175	0.330	1.44	0.132
Cfs	0.370	0.388	1.11	0.039	0.011	0	0	0.002	0.271	0.511	2.23	0.204
Ac-ft	23	24	66	2.4	0.7	0	0	0.1	17	30	137	12

Calendar Year 1963: Max 17.9 Min 0 Mean mgd 0.376 Mean cfs 0.582 Ac-ft 421
Fiscal Year 1963-64: Max 27.5 Min 0 Mean mgd 0.278 Mean cfs 0.430 Ac-ft 312

Peak discharge (base, 25 mgd)

Date	Time	Gage height	Discharge Mgd	Discharge Cfs	Date	Time	Gage height	Discharge Mgd	Discharge Cfs
9-14	1830	2.98	32.1	49.7	5- 7	1630	3.03	34.8	53.8
9-17	1130	3.40	57.0	88.2	5-25	1600	3.13	40.8	63.1
9-24	1600	3.32	52.2	80.8	5-27	1800	4.70	196	303
4-24	1800	3.16	42.6	65.9					

* Discharge measurement or observation of no flow made on this day.

7593. Waiaha Stream at Luawai, near Holualoa

Location.--Lat 19°38'12", long 155°55'45", on right bank at Luawai, 1.8 miles northeast of Holualoa Post Office, and 4.2 miles southeast of Honokohau School.

Drainage area.--8.74 sq mi (revised).

Records available.--April 1960 to June 1964.

Gage.--Water-stage recorder and concrete control. Altitude of gage is 2,580 ft (from topographic map).

Extremes.--Maximum discharge during year, 310 mgd (480 cfs) May 27 (gage height, 4.60 ft), from rating curve extended above 20 mgd as explained below; no flow for many days.

1960-64: Maximum discharge (revised), 313 mgd (484 cfs) Mar. 29, 1961 (gage height, 4.61 ft), from rating curve extended above 20 mgd on basis of slope-area measurements at gage heights 4.34 and 4.51 ft; no flow at times each year.

Revisions.--The figures of maximum discharge for some fiscal years have been revised, as shown in the following table. They supersede those published in Surface Water Records of Hawaii and other Pacific Areas for the fiscal years indicated.

Fiscal Year	Date	Discharge		Gage height (feet)
		Mgd	Cfs	
/ 1960	May 12, 1960	37.6	58.2	2.86
1961	Mar. 29, 1961	313	484	4.61
1962	Nov. 2, 1961	154	238	3.92

/ For period Apr. 14 to June 30, 1960, published in the 1961 fiscal year report.

Remarks.--Records good. Huehue Ranch diverts entire low flow of a tributary above station for domestic use.

Revisions.--Revised figures of discharge, in million gallons a day, for the fiscal years 1960-62, superseding those published in Surface Water Records of Hawaii and other Pacific Areas (1961 and 1962) are given herewith:

Date	Discharge	Date	Discharge	Date	Discharge
1960		1960-Con.		1961-Con.	
May 11	0.90	Aug. 24	0.58	Mar. 28	37.0
12	5.40	31	.38	29	30.8
13	1.32	Oct. 8	.37	30	2.61
24	1.66	20	.51	Apr. 21	1.43
25	1.02			23	6.12
June 18	1.74	1961		24	2.06
July 25	.37	Mar. 27	25.4	June 8	24.7
				15	1.08

Month	Million gallons	Maximum	Minimum	Mean		Runoff in acre-feet
				Mgd	Cfs	
May 1960	13.10	5.40	0	0.423	0.654	40
June	9.05	1.74	.01	.302	.467	28
July 1960	.44	.37	0	.014	.022	1.4
August	2.37	.58	0	.076	.118	7.3
October	2.08	.51	0	.067	.104	6.4
March 1961	96.67	37.0	0	3.12	4.83	297
April	16.80	6.12	0	.560	.866	52
June	36.18	24.7	.02	1.21	1.87	111
Fiscal year 1960-61	-	37.0	0	.458	.709	513
Calendar year 1961	-	37.0	0	.712	1.10	799

Revised peak discharge.--1960-61: Mar. 29 (7 p.m.) 313 mgd (484 cfs), 4.61 ft; June 8 (5 p.m.) 250 mgd (387 cfs), 4.36 ft. 1961-62: Oct. 25 (1430) 108 mgd (167 cfs), 3.62 ft; Nov. 2 (1430) 154 mgd (238 cfs), 3.92 ft; Apr. 8 (1700) 116 mgd (179 cfs), 3.67 ft.

7593. Waiaha Stream at Luawai, near Holualoa--Continued

Rating table (gage height, in feet, and discharge, in million gallons a day)

1.04	0	1.6	1.50
1.1	.02	1.7	2.30
1.2	.10	1.9	4.50
1.3	.25	2.2	10.0
1.4	.50	2.6	23.0
1.5	.90	3.0	47.0

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	0.80	0.16	0.09	0.32	0.02			0	0	0.40	0.48	0.07
2	.70	.09	.05	.18	.03			0	0	.35	.42	.06
3	.22	.12	.03	.14	.24			0	0	.13	.63	.04
4	.13	.09	.02	.09	.06	(*)		0	0	.05	.45	.02
5	.07	.07	.07	.05	.01			0	0	.10	.59	.02
6	.04	.06	.10	.04	0			0	0	.16	.28	.13
7	.03	.09	.10	.03	0			0	0	.09	4.72	.63
8	.02	.54	.27	.02	0			0	.04	.18	.54	.48
9	.12	.19	.20	.01	0			0	.02	.18	.22	.50
10	.14	.07	.19	.01	0			0	.25	.06	.12	.30
11	.08	.03	.16	0	0			0	.10	.16	.10	.25
12	.42	.16	.75	0	0			0	.03	.16	.08	.25
13	.12	.70	2.45	0	0			0	.01	.05	.07	.19
14	.05	.89	7.28	0	0			0	0	.02	.09	.12
15	.03	.52	.60	0	0			0	0	.03	.09	.10
16	.03	.37	1.68	0	0		(*)	0	.01	.01	.04	.12
17	.05	.20	1.08	0	0			0	.01	.05	.08	.10
18	*.03	.16	*.38	0	0			0	.01	.07	.08	.08
19	.08	.22	.14	0	0			*0	.02	.04	.07	.07
20	.05	.28	.08	0	0			0	.02	.05	.02	.13
21	.02	*.14	.04	0	0			0	.02	1.00	.22	.34
22	.02	.09	.03	0	0			0	.22	2.02	.20	.37
23	.06	.08	.54	0	0			0	.25	*1.80	.09	.50
24	.09	.05	4.54	*0	0			.03	2.41	6.20	.13	.32
25	.07	2.31	5.81	0	0			.01	*.71	.76	3.18	.22
26	.03	2.99	3.69	.01	0			0	.09	.24	1.08	.35
27	.02	1.69	.66	0	0			0	.02	.12	44.9	.32
28	.92	.45	.32	0	0			0	.01	.08	*5.25	.20
29	2.95	.33	.82	0	0			0	.01	.06	.88	.12
30	4.33	.77	.81	0	0			---	.01	.45	.24	.12
31	.50	.22	---	.09	---			---	.98	---	.12	---
Total	12.22	14.13	42.70	0.99	0.36	0	0	0.04	5.25	15.07	65.46	6.52
Mean												
Mgd	0.394	0.456	1.42	0.032	0.012	0	0	0.001	0.169	0.502	2.11	0.217
Cfs	0.610	0.706	2.20	0.050	0.019	0	0	0.002	0.261	0.777	3.26	0.336
Ac-ft	38	43	131	3.0	1.1	0	0	0.1	16	46	201	20

Calendar Year 1963: Max 35.5 Min 0 Mean mgd 0.743 Mean cfs 1.15 Ac-ft 832
Fiscal Year 1963-64: Max 44.9 Min 0 Mean mgd 0.445 Mean cfs 0.689 Ac-ft 499

Peak discharge (base, 90 mgd)

Date	Time	Gage height	Discharge Mgd	Discharge Cfs	Date	Time	Gage height	Discharge Mgd	Discharge Cfs
9-18	1230	3.58	103	159	5-27	1800	4.60	310	480

* Discharge measurement or observation of no flow made on this day.

7595. Waiaha Stream near Holualoa

Location (revised).--Lat 19°38'12", long 155°56'40", on left bank 0.5 mile east of Waiaha, 1.2 miles north of Holualoa School, and 3.2 miles east of Kailua.

Drainage area.--9.35 sq mi (revised).

Records available.--December 1957 to June 1964. See also Note below.

Gage.--Water-stage recorder and concrete control. Altitude of gage is 1,910 ft (revised, from topographic map).

Average discharge.--6 years (1958-64), 0.692 mgd (1.07 cfs).

Extremes.--Maximum discharge during year, 334 mgd (517 cfs) May 27 (gage height, 3.02 ft), from rating curve extended above 160 mgd as explained below; no flow for many days.

1957-64: Maximum discharge, 1,560 mgd (2,410 cfs) Jan. 18, 1959 (gage height, 4.76 ft), from rating curve extended above 160 mgd on basis of 2 slope-area measurements at gage height 3.80 ft; no flow for many days each year.

Revisions.--The maximum discharge for the fiscal year 1961 has been revised to 734 mgd (1,140 cfs) June 8, 1961 (gage height, 3.82 ft), superseding figure published in Surface Water Records of Hawaii and other Pacific Areas for fiscal year 1961.

Remarks.--Records good. Diversion to offstream reservoir one mile above station for stock water.

Note.--Published records for high-water periods in the fiscal years 1959 and 1960 have been found to be in error; revised records are on file in the district office and will be published in the next water-supply paper.

Revisions.--Revised figures of discharge, in million gallons a day, for the fiscal years 1961 and 1963, superseding those published in Surface Water Records of Hawaii and other Pacific Areas (1961 and 1963) are given herewith:

1961		1961-Con.	
Mar. 27	38.8	Apr. 24	5.80
28	61.4	May 29	2.84
29	43.0	June 8	63.7
30	3.44		
Apr. 4	3.17	1963	
23	7.87	June 17	.01

Month	Million gallons	Maximum	Minimum	Mean		Runoff in acre-feet
				Mgd	Cfs	
Calendar year 1960	-	8.75	0	0.065	0.101	72
March 1961	146.86	61.4	0	4.74	7.33	451
April	19.76	7.87	0	.659	1.02	61
May	6.90	2.84	0	.223	.345	21
June	69.85	63.7	0	2.33	3.61	214
Fiscal year 1960-61	-	63.7	0	.680	1.05	762
June 1963	24.45	8.24	.01	.815	1.26	75
Fiscal year 1962-63	-	93.7	0	1.08	1.67	1,220

Revised peak discharge.--1960-61: Mar. 27 (5 p.m.) 343 mgd (531 cfs), 3.04 ft; Mar. 29 (8 p.m.) 375 mgd (580 cfs), 3.11 ft; June 8 (6 p.m.) 734 mgd (1,140 cfs), 3.82 ft.

7595. Waiaha Stream near Holualoa--Continued

Rating table (gage height, in feet, and discharge, in million gallons a day)

0.23	0	0.8	3.40
.3	.03	.9	5.20
.4	.18	1.0	7.60
.5	.55	1.2	14.5
.6	1.14	1.5	32.0
.7	2.05	2.0	75.0

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	0.14	0.03	0.01	0.15	0.03				0	0.03	0.13	0.01
2	.58	.03	.01	.05	.02				0	.02	.12	.01
3	.03	.03	0	.04	.06	(*)			0	.02	.39	.01
4	.01	.03	0	.02	.02				0	.02	.35	.01
5	.01	.02	.28	01	.01				0	.03	.36	.01
6	0	.02	.06	.01	.01				0	.02	.07	.02
7	0	.02	.04	0	0				0	.02	5.84	.05
8	0	.48	.20	0	0				.14	.07	.10	.10
9	.02	.08	.05	0	0				.02	.07	.03	.10
10	.02	.02	.03	0	0				.22	.03	.02	.04
11	.01	.01	.03	0	0				.05	.04	.02	.05
12	.29	.20	.82	0	0				.02	.06	.01	.03
13	.02	1.01	3.74	0	0				.01	.03	.01	.04
14	.01	.72	9.22	0	0				.01	.02	.01	.03
15	0	.48	.60	0	0				.01	.02	.01	.02
16	0	.36	.89	0	0		(*)		.01	.02	.01	.01
17	0	.22	20.1	0	0				.01	.02	0	.01
18	*0	.07	*.20	0	0				.02	.01	0	.01
19	0	.10	.03	0	0			(*)	.02	.01	0	.01
20	0	.47	.01	0	0				.02	.01	0	.02
21	0	*.09	.01	0	0				.01	2.24	0	.09
22	0	.03	0	0	0				.01	1.48	0	.12
23	0	.03	1.13	0	0				.02	*3.80	.01	.12
24	0	.02	6.87	*0	0				6.44	8.31	.01	.03
25	.01	5.82	9.57	0	0				.42	.40	2.30	.03
26	.01	18.2	7.41	0	0				*.02	.04	.10	.05
27	.01	2.63	.60	0	0				.01	.03	37.1	.06
28	3.38	.30	.15	0	0				.01	.02	*7.66	.03
29	7.61	.04	1.17	0	0				.01	.01	.72	.02
30	10.3	.44	.41	0	0			---	.01	.09	.03	.02
31	.43	.05	---	.19	---			---	.01	---	.02	---
Total	22.89	32.05	63.64	0.48	0.15	0	0	0	7.53	16.99	55.43	1.16
Mean												
Mgd	0.738	1.03	2.12	0.015	0.005	0	0	0	0.243	0.566	1.79	0.039
Cfs	1.14	1.59	3.28	0.023	0.008	0	0	0	0.376	0.876	2.77	0.060
Ac-ft	70	98	195	1.5	0.5	0	0	0	23	52	170	3.6

Calendar Year 1963: Max 93.7 Min 0 Mean mgd 1.19 Mean cfs 1.84 Ac-ft 1340
Fiscal Year 1963-64: Max 37.1 Min 0 Mean mgd 0.547 Mean cfs 0.846 Ac-ft 614

Peak discharge (base, 100 mgd)

Date	Time	Gage height	Discharge Mgd	Discharge Cfs	Date	Time	Gage height	Discharge Mgd	Discharge Cfs
8-26	2000	2.52	170	263	3-24	1900	2.26	117	181
9-17	1300	2.48	161	249	5-27	1800	3.02	334	517

* Discharge measurement or observation of no flow made on this day.

7598. Kiilae Stream near Honaunau

Location.--Lat 19°24'52", long 155°50'56", on right bank 2.4 miles northeast of Kealia and 2.9 miles southeast of Honaunau Post Office.

Drainage area.--0.67 sq mi.

Records available.--April 1958 to June 1964.

Gage.--Water-stage recorder. Datum of gage is 2,898 ft above mean sea level (by stadia traverse).

Average discharge.--6 years, 0.153 mgd (0.237 cfs).

Extremes.--Maximum discharge during year, 14.0 mgd (21.7 cfs) Mar. 24 (gage height, 1.54 ft); no flow for many days.
1958-64: Maximum discharge, 67 mgd (104 cfs) Jan. 13, 1959 (gage height, 2.32 ft), from rating curve extended above 3.7 mgd by logarithmic plotting; no flow at times each year.

Remarks.--Records good except those for periods of no gage-height record, which are poor. No diversion above station. Continuous records of rainfall are obtained at station.

Rating table (gage height, in feet, and discharge, in million gallons a day)

0.5	0	1.0	0.87
.6	.03	1.1	1.70
.7	.08	1.2	3.00
.8	.18	1.3	5.00
.9	.40		

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	1.50	0.09	0.03	0.14	0.06	0	0	0	0	0.31	1.10	0.04
2	1.07	.02	.02	.14	.08	0	0	0	0	.76	1.27	.06
3	.30	.09	0	.09	.03	0	0	.10	0	.18	.41	.06
4	.10	.04	0	.22	.09	*0	0	.03	0	.08	.45	.05
5	.04	.03	.01	.09	.03	0	0	0.00	0	.16	.08	.30
6	.02	.04	.23	.06	.22	0	0	0	.02	1.01	.04	.23
7	.04	.14	.14	.04	.04	0	0	0	.03	.26	.93	.23
8	.33	.15	.11	.02	0	0	.01	0	.05	.09	.70	.41
9	1.44	.07	.36	.01	0	0	.01	0	.05	.69	.19	.51
10	.23	.04	.08	0	0	0	.30	0	.25	.11	.16	.30
11	.09	.02	.08	0	0	0	.6	0	.10	.10	.10	.96
12	.55	.02	.37	0	0	0	.04	0	.06	.20	.05	.65
13	.08	.16	1.07	0	0	0	0	0	.04	.07	.6	.10
14	.03	.14	.83	0	0	0	0	0	.02	.13	.8	.05
15	.03	.16	.09	0	0	0	0	0	.02	.11	.25	.04
16	.03	.13	.20	0	0	0	0	0	.06	.07	.15	.08
17	*.05	.14	*.13	0	0	0	*0	0	.04	.05	.10	.07
18	1.51	.36	1.48	0	0	.30	0	0	.02	.22	.05	.07
19	1.17	.19	.12	0	0	.56	0	*0	.02	.09	.04	.03
20	.10	*.26	.08	0	0	0	0	0	.06	*.41	.02	.03
21	.04	.09	.08	0	0	0	0	0	.06	.47	.25	.20
22	.08	.06	.14	.14	0	0	0	0	.35	1.29	.10	.25
23	.18	.26	.24	.87	0	0	.03	0	1.1	.98	.7	.40
24	.08	.04	1.12	.03	0	0	.01	.6	1.7	.38	1.0	.15
25	.08	.57	1.03	*0	0	0	0	.05	*.6	.20	1.5	.15
26	.03	2.96	1.06	0	0	0	0	.02	.56	.32	1.0	.20
27	.02	1.60	.25	.03	0	0	0	0	.29	.23	*5.0	.60
28	.14	.48	.15	.02	0	0	0	0	.09	.07	.75	.15
29	1.56	.48	1.31	.01	0	0	0	0	.18	.04	.14	.10
30	1.09	.28	.86	.32	0	0	0	---	.49	1.00	.05	.15
31	.36	.13	---	.23	---	0	0	---	.97	---	.04	---
Total	12.37	9.24	11.67	2.46	0.55	0.86	1.00	0.80	7.23	10.08	18.02	6.62
Mean												
Mgd	0.399	0.298	0.389	0.079	0.018	0.028	0.032	0.028	0.233	0.336	0.581	0.221
Cfs	0.617	0.461	0.602	0.122	0.028	0.043	0.050	0.043	0.361	0.520	0.899	0.342
Ac-ft	38	28	36	7.5	1.7	2.6	3.1	2.5	22	31	55	20

Calendar Year 1963: Max 2.96 Min 0 Mean mgd 0.232 Mean cfs 0.359 Ac-ft 260
Fiscal Year 1963-64: Max 5.0 Min 0 Mean mgd 0.221 Mean cfs 0.342 Ac-ft 247

Peak discharge (base, 20 mgd).--No peak above base.

* Discharge measurement or observation of no flow made on this day.
Note.--No gage-height record Dec. 20 to Jan. 17, Feb. 1-19, Feb. 21 to Mar. 25, May 11-27, June 13-30.

7705. Paauau Gulch at Pahala

Location (revised).--Lat 19°12'40", long 155°28'45", on right bank 100 ft downstream from bridge on Wood Valley Road and 0.7 mile north of Pahala.

Drainage area.--1.42 sq mi.

Records available.--May 1962 to June 1964.

Gage.--Water-stage recorder. Altitude of gage is 970 ft (from topographic map).

Extremes.--Maximum discharge during year, 84.0 mgd (130 cfs) Mar. 22 (gage height, 3.42 ft); no flow for many days.
1962-64: Maximum discharge, 813 mgd (1,260 cfs) Oct. 18, 1962 (gage height, 4.87 ft, from floodmark), from rating curve extended above 230 mgd on basis of slope-area measurement at gage height 4.40 ft; no flow for many days each year.

Remarks.--Records good. No diversion above station.

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	0	0	0		0		0	0	0	0	0	
2	0	0	0		0		.21	0	0	0	0	
3	0	0	0		0		.32	0	0	0	0	
4	0	0	0		0		1.36	0	0	0	0	
5	0	0	0		0		.01	0	0	.01	0	
6	0	0	0		0		0	*0	0	0	0	
7	0	0	0		0		*0	0	0	0	0	
8	0	0	0		0		0	0	0	0	0	
9	0	0	0		0		0	0	0	0	0	
10	0	0	0		0		0	0	0	0	0	(*)
11	0	0	0		0		0	0	0	0	0	
12	0	0	0		0		0	0	0	0	0	
13	0	0	0		0		0	0	*0	0	0	
14	0	0	0		0		0	0	0	*0	0	
15	0	0	0		0		0	0	0	0	0	
16	0	0	0		0		0	0	.02	0	0	
17	*0	0	*0		0		0	0	0	0	0	
18	0	.08	0		0		0	0	0	0	0	
19	0	0	0		0		0	0	0	0	*0	
20	0	*0	0		0	(*)	0	0	*.49	0	0	
21	0	0	0		0		0	0	0	0	0	
22	*2.20	0	0		0		0	0	*8.65	0	0	
23	0	0	0		0		0	0	.07	0	0	
24	.03	.09	0		0		0	.01	.32	0	1.53	
25	0	0	0	(*)	0		0	0	.10	0	.67	
26	0	0	.01		0		0	0	0	0	0	
27	0	0	0		.04		0	0	.24	0	0	
28	0	0	.02		0		0	0	.22	0	0	
29	0	0	.07		0		0	0	.17	0	0	
30	0	0	.02		0		0	---	0	0	.01	
31	0	0	---		---		0	---	0	---	0	---
Total	2.23	0.17	0.12	0	0.04	0	1.90	0.01	10.28	0.01	2.21	0
Mean												
Mgd	0.072	0.005	0.004	0	0.001	0	0.061	0.0003	0.332	0.0003	0.071	0
Cfs	0.111	0.008	0.006	0	0.002	0	0.094	0.0005	0.514	0.0005	0.110	0
Ac-ft	6.8	0.5	0.4	0	0.1	0	5.8	0.03	32	0.03	6.8	0

Calendar Year 1963: Max 66.4 Min 0 Mean mgd 0.486 Mean cfs 0.752 Ac-ft 545
Fiscal Year 1963-64: Max 8.65 Min 0 Mean mgd 0.046 Mean cfs 0.071 Ac-ft 52

Peak discharge (base, 100 mgd).--No peak above base.

* Discharge measurement or observation of no flow made on this day.

8083. Finile River at Agat

Location.--Lat 13°22'41" N., long 144°39'26" E., on right bank 0.4 mile upstream from estuary and 0.4 mile southeast of Agat School.

Drainage area.--0.26 sq mi.

Records available.--April 1960 to June 1964.

Gage.--Water-stage recorder and concrete control. Altitude of gage is 20 ft (from topographic map).

Extremes.--Maximum discharge during year, 298 cfs Sept. 9 (gage height, 3.66 ft), from rating curve extended above 30 cfs as explained below; minimum, 0.39 cfs Apr. 3, 8, 9.

1960-64: Maximum discharge, 314 cfs (revised) June 6, 1963 (gage height 3.77 ft), from rating curve extended above 30 cfs on basis of slope-area measurement at gage height 3.66 ft; minimum, 0.11 cfs June 24, 1962.

Revisions.--The figures of maximum discharge for some fiscal years have been revised, as shown in the following table. They supersede those published in Surface Water Records of Hawaii and other Pacific Areas for the fiscal years indicated.

Fiscal Year	Date	Discharge (cfs)	Gage height (feet)
1961	Oct. 19, 1960	261	3.39
1962	Dec. 14, 1961	186	2.83
1963	June 6, 1963	314	3.77

Remarks.--Records good except those above 60 cfs, which are fair. No diversion above station.

Revisions.--Revised figures of discharge, in cubic feet per second, for high-water periods in the fiscal years 1961-63, superseding those published in Surface Water Records of Hawaii and other Pacific Areas (1961-63), are given herewith:

1960		1962-Con.	
Oct. 19	8.94	Nov. 11	17.1
1961		12	14.7
Aug. 12	7.64	Dec. 6	6.61
14	8.52	8	11.0
Sept. 18	18.9	1963	
Dec. 14	9.90	Apr. 29	35.3
1962		June 3	12.1
Sept. 12	6.12	5	10.3
30	10.2	6	13.9

Month	Cfs-days	Maximum	Minimum	Mean	Runoff in acre-feet
October 1960	67.11	8.94	1.15	2.16	133
Fiscal year 1960-61	-	8.94	.22	1.27	918
August 1961	98.95	12.5	.56	3.19	196
September	84.66	18.9	1.37	2.82	168
December	43.17	9.90	.78	1.39	86
Calendar year 1961	-	18.9	.39	1.52	1,100
Fiscal year 1961-62	-	18.9	.13	1.35	977
September 1962	68.03	10.2	.95	2.27	135
November	81.55	17.1	.95	2.72	162
December	81.42	11.0	1.37	2.63	161
Calendar year 1962	-	17.1	.13	1.28	925
April 1963	78.81	35.3	.62	2.63	156
June	105.75	13.9	1.25	3.52	210
Fiscal year 1962-63	-	35.3	.19	2.07	1,500

Revised peak discharge.--1960-61: Aug. 19 (12 p.m.) 133 cfs (2.33 ft); Sept. 2 (11 a.m.) 153 cfs (2.53 ft); Oct. 19 (7:45 p.m.) 261 cfs (3.39 ft).

1961-62: Aug. 12 (1230) 133 cfs (2.33 ft); Aug. 13 (2400) 182 cfs (2.80 ft); Aug. 15 (1000) 156 cfs (2.56 ft); Sept. 18 (1800) 184 cfs (2.82 ft); Oct. 10 (1800) 158 cfs (2.58 ft); Dec. 14 (0700) 186 cfs (2.83 ft).

1962-63: Aug. 2 (0430) 202 cfs (2.96 ft); Sept. 12 (1330) 177 cfs (2.76 ft); Sept. 30 (2230) 171 cfs (2.71 ft); Nov. 11 (2400) 214 cfs (3.06 ft); June 3 (1330) 214 cfs (3.06 ft); June 6 (1830) 314 cfs (3.77 ft).

8083. Finile River at Agat--Continued

Rating table (gage height, in feet, and discharge, in cubic feet per second)

0.2	0.26	0.6	6.85
.3	.86	.8	14.6
.4	2.05	1.0	26.0
.5	4.02		

Discharge, in cubic feet per second, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	1.49	1.15	2.32	3.41	3.33	2.72	1.49	0.95	0.56	0.44	0.78	1.37
2	1.37	1.15	3.79	2.55	3.36	2.05	1.49	.95	.56	.44	.78	1.37
3	1.62	1.25	4.02	*2.38	2.38	2.93	1.49	.95	.56	.44	.95	1.49
4	1.25	1.05	5.31	6.43	4.67	22.8	1.49	.95	.56	.44	8.60	1.25
5	1.15	1.05	3.79	4.61	3.41	3.12	1.49	.95	.56	.44	1.62	1.15
6	1.15	.95	2.55	3.12	2.72	3.12	1.37	.95	.50	.50	1.25	1.15
7	1.05	.95	2.38	2.92	4.66	2.72	1.37	.95	.50	.44	1.15	1.05
8	1.62	1.25	2.05	2.55	2.55	3.56	1.62	.95	.50	.44	5.25	1.05
9	1.15	1.25	*14.4	2.55	2.21	2.55	1.37	.95	.50	.50	5.63	1.05
10	7.93	1.49	4.02	2.72	2.05	2.38	1.25	.86	.50	.50	2.38	.95
11	3.09	1.97	2.92	13.7	2.05	2.21	1.25	.86	.44	2.64	2.38	.95
12	*3.07	3.69	2.72	12.8	3.52	2.21	1.25	*.82	*.56	.62	9.10	1.05
13	1.90	*5.48	4.97	7.20	7.59	2.05	1.25	.78	.78	*.56	7.25	.95
14	3.38	1.90	7.13	5.34	*2.92	2.05	1.25	.78	.62	.62	2.38	.86
15	2.05	1.49	4.00	3.33	3.12	1.90	*1.15	.86	.56	.56	2.05	.86
16	2.05	1.37	3.33	3.33	2.38	1.90	1.05	.86	.56	.56	5.40	.95
17	1.75	1.25	8.41	3.12	2.21	1.75	1.05	.78	.56	.56	14.7	1.05
18	1.62	1.25	7.98	2.92	2.21	*1.49	1.05	1.15	.56	.78	7.13	1.05
19	1.62	1.25	3.33	3.33	2.21	1.49	1.05	.78	.50	2.08	7.15	.86
20	1.62	1.90	3.12	3.12	2.05	1.49	1.05	.78	.50	1.62	6.20	1.05
21	1.49	1.49	2.92	2.55	2.05	1.49	1.05	.70	.44	.86	4.25	1.05
22	1.49	1.25	2.55	2.38	1.90	1.37	1.05	.70	.50	1.49	3.79	.86
23	1.49	1.25	5.67	5.95	1.90	1.49	1.05	.70	.50	.95	3.33	*.78
24	1.90	4.36	2.55	2.55	1.90	1.49	1.05	.70	.50	1.25	3.33	1.15
25	1.37	8.63	2.38	2.38	1.90	9.36	1.25	.62	.50	1.25	6.45	1.37
26	1.37	2.21	2.21	2.38	1.90	6.01	1.15	.62	.50	.95	*1.99	1.05
27	1.83	1.75	3.63	2.21	1.90	2.05	1.05	.62	.50	.86	1.75	1.15
28	1.37	3.49	7.22	2.21	1.90	1.90	1.05	.56	.50	1.05	1.62	.95
29	1.37	1.49	4.56	3.65	2.21	1.90	1.05	.56	.50	.95	1.62	.95
30	1.25	4.02	3.49	3.26	3.98	1.75	1.37	----------	.44	.95	1.49	1.15
31	1.15	2.21	----------	3.52	----------	1.75	.95	----------	.44	----------	1.49	----------
Total	58.01	65.24	129.72	124.47	83.14	97.05	37.90	23.64	16.26	25.74	123.24	31.97
Mean	1.87	2.10	4.32	4.02	2.77	3.13	1.22	0.815	0.525	0.858	3.98	1.07
Ac-ft	115	129	257	247	165	192	75	47	32	51	244	63

Calendar Year 1963: Max 35.3 Min 0.62 Mean 2.55 Ac-ft 1840
Fiscal Year 1963-64: Max 22.8 Min 0.44 Mean 2.23 Ac-ft 1620

* Discharge measurement made on this day.

Peak discharge (base, 170 cfs, revised)

Date	Time	Gage height	Discharge	Date	Time	Gage height	Discharge
9-9	1400	3.66	298	12-4	1100	2.90	194

8094. Cetti River near Umatac

Location.--Lat 13°18'58" N., long 144°39'21" E., on right bank 0.1 mile upstream from estuary and 1.3 miles northeast of Umatac School.

Drainage area.--0.72 sq mi.

Records available.--February 1960 to June 1964.

Gage.--Water-stage recorder and concrete control. Altitude of gage is 10 ft (from topographic map).

Extremes.--Maximum discharge during year, 1,130 cfs Dec. 4 (gage height, 5.24 ft), from rating curve extended above 66 cfs as explained below; minimum, 0.11 cfs Feb. 29, Mar. 11.
1960-64: Maximum discharge, 1,420 cfs Oct. 19, 1960 (gage height, 6.19 ft), from rating curve extended above 66 cfs by slope-area measurements at gage heights 1.78 and 6.19 ft; minimum, that of Feb. 29, Mar. 11, 1964.

Remarks.--Records good except those for period of no gage-height record, which are poor. No diversion above station.

Rating table (gage height, in feet, and discharge in cubic feet per second)
(Shifting-control method used Dec. 4-18, Dec. 26 to Jan. 23)

0.11	0	0.7	17.0
.2	.43	.8	24.5
.3	1.55	.9	35.0
.4	4.05	1.0	50.0
.5	8.00	1.4	126

Discharge, in cubic feet per second, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	1.55	6.75	5.05	14.1	4.63	2.10	3.03	0.75	0.37	0.58	1.70	1.70
2	1.22	1.37	25.2	2.78	3.03	.85	2.53	.75	.32	1.51	1.08	1.55
3	1.70	1.37	10.6	1.90	2.10	2.97	2.30	.66	.37	.43	3.01	1.90
4	1.22	1.08	7.44	34.6	5.25	124	2.30	.75	.50	.50	35.7	1.55
5	1.08	1.22	15.9	12.2	5.20	9.60	3.03	1.49	.32	.66	4.40	1.37
6	.96	1.70	4.05	4.40	2.30	8.00	1.90	.85	.43	.85	*4.91	1.22
7	.96	1.08	3.03	2.53	40.4	6.00	1.55	.58	.43	.66	5.01	1.55
8	.96	1.55	3.35	2.53	4.05	12.6	4.68	.58	.37	.66	22.9	1.37
9	.96	3.45	55.2	1.08	3.70	6.00	a1.4	.58	.32	.58	15.8	1.37
10	37.7	48.0	11.4	2.03	1.90	4.80	a1.0	.50	.23	.85	8.85	1.22
11	19.8	5.56	4.40	77.5	1.90	4.40	a1.0	.50	.16	2.50	*7.20	1.08
12	8.40	4.05	3.35	39.7	22.2	4.05	a.9	.58	*.46	.66	44.1	.85
13	3.70	25.7	19.8	14.2	3.03	3.03	a.9	*.50	17.2	.58	11.2	.75
14	11.6	22.3	8.88	7.60	4.63	2.78	a.9	.58	.96	.66	5.20	.85
15	3.70	*7.48	4.05	4.80	*2.10	2.30	a.9	.66	1.08	*.50	5.57	.75
16	4.05	4.80	2.78	3.70	1.70	1.90	a.8	.66	.96	.50	17.6	.66
17	2.78	3.03	2.30	3.35	1.22	1.70	a.7	.58	.85	.58	45.1	*1.08
18	2.30	2.30	*2.73	2.53	1.08	*1.37	a.7	4.16	.75	.66	30.2	1.22
19	*2.10	2.53	1.90	2.10	.96	1.55	a.7	.85	.75	4.28	25.9	1.08
20	8.40	6.82	3.49	8.61	.96	1.37	a.8	.75	.66	2.46	11.7	1.22
21	2.10	30.0	2.30	2.30	.85	1.37	.96	.66	.66	1.22	6.80	1.55
22	1.90	4.80	1.55	*2.20	.85	1.22	.85	.58	.66	2.49	4.05	1.22
23	1.70	6.00	17.9	86.3	1.22	1.37	*.96	.66	.58	1.22	3.61	.96
24	5.92	25.4	2.30	3.70	.75	1.37	.75	.58	.75	1.70	3.94	2.71
25	1.70	12.3	1.90	2.78	.75	39.0	.96	.51	.66	1.55	15.8	9.21
26	1.70	4.80	1.55	2.30	.96	22.6	.75	.37	.66	47.8	6.32	2.30
27	1.55	2.78	16.7	1.90	.85	5.60	.75	.43	.75	3.70	3.70	3.03
28	1.37	2.78	22.5	1.90	.66	4.40	.85	.27	.66	2.10	1.55	3.03
29	1.70	2.30	3.03	11.4	3.29	4.05	.75	.23	.66	1.37	.96	1.90
30	1.37	10.5	9.00	14.0	7.73	3.70	.96	---	.50	2.28	1.22	5.13
31	1.37	6.00	---	2.78	---	6.40	.75	---	.50	---	1.70	---
Total	137.52	259.80	273.63	373.80	130.25	292.45	41.31	21.60	34.53	86.09	356.78	55.38
Mean	4.44	8.38	9.12	12.1	4.34	9.43	1.33	0.745	1.11	2.87	11.5	1.85
Ac-ft	273	515	543	741	258	580	82	43	68	171	708	110

Calendar Year 1963: Max 200 Min 0.50 Mean 6.64 Ac-ft 4,800
Fiscal Year 1963-64: Max 124 Min 0.16 Mean 5.64 Ac-ft 4,090

Peak discharge (base, 800 cfs)

Date	Time	Gage height	Discharge	Date	Time	Gage height	Discharge
8-10	1230	5.12	1,100	11-12	0830	4.22	829
9- 9	1330	5.04	1,070	12- 4	1100	5.24	1,130
10-23	0630	4.40	884	4- 26	1230	4.11	806

* Discharge measurement made on thia day.
a No gage-height record.

8160. Umatac River at Umatac

Location.--Lat 13°17'45" N., long 144°39'50" E., on left bank 0.2 mile upstream from mouth, 0.3 mile southeast of Umatac, and 5.7 miles northwest of Inarajan.

Drainage area.--2.04 sq mi.

Records available.--September 1952 to June 1964.

Gage.--Water-stage recorder and concrete control. Altitude of gage is 8 ft (from topographic map). Prior to Oct. 16, 1953, at datum 0.62 ft higher.

Average discharge.--11 years (1953-64), 8.92 cfs.

Extremes.--Maximum discharge during year, 3,920 cfs Dec. 4 (gage height, 5.22 ft), from rating curve extended above 320 cfs as explained below; minimum, 1.06 cfs Mar. 11.
1952-64: Maximum discharge, 7,460 cfs Oct. 19, 1960 (gage height, 7.04 ft), from rating curve extended above 320 cfs on basis of slope-area measurements at gage heights 3.51 and 7.04 ft; minimum, 0.20 cfs June 23, 1960.

Remarks.--Records good except those for periods of no gage-height record, which are fair. Water diverted upstream at Piga Spring for domestic use at Umatac. Continuous records of rainfall are obtained at station.

Rating table (gage height, in feet, and discharge, in cubic feet per second)

0.2	0.56	0.7	19.6
.3	1.80	1.0	51.0
.4	4.00	1.2	85.0
.5	7.65	1.7	220
.6	12.5		

Discharge, in cubic feet per second, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	6.05	18.3	14.2	47.4	6.45	6.85	5.30	2.75	1.47	1.63	4.70	5.30
2	5.30	4.00	40.0	11.0	5.30	4.60	4.60	2.55	1.32	1.80	3.25	4.95
3	4.60	3.25	30.3	*10.8	4.95	8.77	4.60	2.35	1.32	1.63	16.1	9.23
4	4.00	3.00	12.5	66.8	8.68	200	4.60	2.55	1.9	1.80	43.5	5.30
5	3.75	3.25	16.5	35.3	7.65	12.0	5.30	5.65	1.4	1.97	10.5	4.60
6	3.50	3.00	9.00	13.7	7.25	10.0	4.30	4.95	1.6	2.55	8.05	4.30
7	3.75	3.00	7.65	9.50	50.2	8.05	4.00	3.00	1.6	1.97	11.4	4.30
8	3.50	3.50	7.65	8.05	10.0	18.8	6.85	2.75	1.5	2.15	51.6	4.00
9	3.25	*7.34	103	7.25	7.25	6.85	4.30	2.55	1.4	1.80	29.4	3.75
10	40.5	44.1	*30.2	6.85	6.05	5.65	3.75	2.35	1.3	2.75	27.6	3.75
11	15.0	21.7	12.5	182	6.85	5.30	3.75	2.35	1.2	3.50	16.4	3.50
12	*37.7	9.50	9.50	100	10.5	8.00	3.50	*2.35	*1.6	2.15	103	3.50
13	10.5	48.9	52.80	47.5	*9.50	4.95	3.50	2.15	31.8	1.80	30.6	3.25
14	8.05	19.4	20.50	33.1	13.7	4.30	3.50	2.35	9.50	1.97	15.7	3.25
15	6.85	21.1	11.5	17.2	13.4	4.00	*3.50	2.55	4.60	*1.63	15.7	3.25
16	7.65	13.7	9.00	17.2	6.85	4.00	3.25	3.25	3.25	1.63	45.5	3.75
17	6.45	8.50	7.65	12.0	6.05	*4.00	3.00	2.75	3.00	1.47	77.7	3.50
18	5.30	6.85	8.05	11.0	5.30	3.75	3.00	9.50	2.55	1.63	47.4	3.25
19	5.30	11.0	6.85	9.00	5.30	3.75	3.00	3.2	2.55	7.25	57.4	3.25
20	7.25	14.3	9.00	20.5	4.95	3.50	3.00	3.0	2.35	3.50	*55.6	3.75
21	4.95	17.1	11.4	9.00	4.95	3.50	3.00	2.7	2.15	2.75	23.2	4.00
22	4.60	8.50	9.50	10.0	4.60	3.25	2.75	2.4	2.15	6.35	15.0	3.25
23	4.30	21.8	31.0	111	5.30	3.50	3.25	2.4	1.97	3.25	11.5	3.00
24	9.89	61.2	9.00	10.5	4.60	3.50	2.75	2.2	2.15	3.00	14.8	*4.30
25	4.30	44.9	7.25	8.05	4.30	61.6	4.60	2.0	1.97	5.30	33.5	9.68
26	4.00	14.3	6.45	7.25	4.60	35.0	3.25	1.5	1.97	15.2	15.5	5.30
27	4.00	9.00	21.9	6.45	4.95	9.50	3.00	1.7	1.97	7.25	11.0	5.30
28	3.75	8.50	41.2	6.05	4.30	7.65	3.00	1.5	1.80	4.00	8.50	10.5
29	5.30	7.25	10.5	19.1	6.05	6.45	2.75	1.3	1.80	3.25	7.25	7.25
30	3.50	19.7	20.3	9.00	9.74	6.05	3.25	---	1.63	2.75	6.85	15.1
31	4.00	24.9	---	6.05	---	7.65	2.75	---	1.63	---	6.05	---
Total	240.84	504.84	586.85	868.60	249.57	474.77	114.95	82.60	98.40	99.68	824.25	151.41
Mean	7.77	16.3	19.6	28.0	8.32	15.3	3.71	2.85	3.17	3.32	26.6	5.05
Ac-ft	478	1,000	1,160	1,720	495	942	228	164	195	198	1,630	300

Calendar Year 1963: Max 319 Min 1.63 Mean 13.5 Ac-ft 9,790
Fiscal Year 1963-64: Max 200 Min 1.2 Mean 11.7 Ac-ft 8,510

* Discharge measurement made on this day.
Note.--No gage-height record Feb. 19-29, Mar. 4-12.

Peak discharge (base, 1,000 cfs)

Date	Time	Gage height	Discharge	Date	Time	Gage height	Discharge
8-24	1300	3.51	1,470	10-11	1800	3.87	1,880
9- 9	1430	3.98	2,040	10-23	0630	3.48	1,440
9-28	0400	3.28	1,240	11- 7	1630	3.54	1,530
10- 1	1400	3.14	1,110	12- 4	1030	5.22	3,920
10- 4	0300	3.42	1,380	5-19	2330	3.27	1,230

8210. Geus River near Merizo

Location.--Lat 13°16'15" N., long 144°40'40" E., on left bank 0.7 mile northeast of Merizo, 2.2 miles southeast of Umatac, and 4.7 miles west of Inarajan.

Drainage area.--0.95 sq mi.

Records available.--April 1953 to June 1964.

Gage.--Water-stage recorder and broad-crested weir. Altitude of gage is 60 ft (from topographic map).

Average discharge.--11 years, 3.46 cfs.

Extremes.--Maximum discharge during year, 2,050 cfs Sept. 9 (gage height, 3.90 ft), from rating curve extended above 56 cfs as explained below; minimum, 0.14 cfs Mar. 25.
1953-64: Maximum discharge, 2,940 cfs Oct. 19, 1960 (gage height, 4.16 ft), from rating curve extended above 56 cfs on basis of slope-area measurements at gage heights 4.00 and 4.16 ft; no flow for part of each day July 17, 1953, May 4, 5, 1960.

Remarks.--Records good. Water is diverted half a mile upstream for domestic use and at station for irrigation.

Rating table (gage height, in feet, and discharge, in cubic feet per second)

0.2	0.18	0.9	7.00
.3	.47	1.0	10.0
.4	.93	1.1	14.5
.5	1.57	1.4	34.0
.6	2.40	1.7	70.0
.7	3.52	2.0	118
.8	5.00		

Discharge, in cubic feet per second, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	2.07	7.40	4.45	13.4	2.51	2.95	1.65	0.63	0.40	0.34	0.43	1.10
2	1.89	2.95	15.7	4.80	2.32	2.07	1.43	.59	.37	.34	.47	1.04
3	1.57	1.82	11.6	*3.17	2.23	7.78	1.29	.59	.37	.28	3.01	.93
4	1.43	1.43	7.80	33.4	3.33	71.8	1.29	.87	.43	.31	16.8	.87
5	1.16	1.74	6.80	17.2	2.32	5.80	1.43	.98	.40	.47	2.84	.87
6	1.16	1.36	3.52	6.60	2.56	3.28	1.22	.77	.40	.40	1.50	.87
7	1.36	1.29	2.51	3.52	4.48	2.84	1.10	.55	.37	.34	.98	.87
8	1.10	1.04	2.84	2.51	5.40	6.30	1.82	.55	.37	.31	24.2	.77
9	1.16	*3.35	71.6	2.15	3.28	2.73	1.29	.51	.37	.28	14.0	.87
10	19.6	12.5	*15.6	2.15	2.40	2.15	1.10	.51	.40	.74	11.7	.93
11	1.16	11.4	5.40	1.16	2.32	1.82	1.04	*.43	.31	.74	7.00	.87
12	*21.2	5.80	3.40	58.3	4.27	1.96	.98	.47	.47	.51	68.9	.77
13	4.30	27.5	17.7	25.2	*5.07	1.57	.93	.43	20.8	.40	12.0	.93
14	3.17	6.00	10.1	19.4	3.40	1.43	.98	.43	4.24	.43	4.60	.93
15	2.62	6.70	5.39	7.78	10.3	1.04	*.93	.43	1.29	.31	2.84	.87
16	5.30	6.40	3.64	5.80	2.62	1.04	.98	.59	.77	*.28	17.1	.98
17	2.84	3.28	2.51	3.88	2.15	*.98	.93	.47	*.59	.28	35.0	.82
18	2.15	2.32	2.73	3.17	1.98	1.16	.87	2.21	.51	.31	23.9	.82
19	2.45	3.00	2.07	2.73	1.74	1.22	.87	.82	.43	3.69	24.4	.82
20	2.15	2.40	2.51	4.09	1.74	1.16	.87	.63	.40	.93	*44.7	.93
21	1.90	4.96	4.20	2.62	1.65	1.10	.77	.55	.34	.59	10.9	.87
22	1.57	2.84	3.17	3.35	1.57	1.10	.81	.47	.37	3.85	4.45	.77
23	1.43	7.27	9.30	17.5	1.57	1.10	.87	.51	.31	1.43	2.95	.77
24	4.02	10.0	3.88	3.88	1.57	1.22	.82	.43	.37	1.16	2.62	1.04
25	1.98	13.5	2.95	2.73	1.50	27.7	1.10	.43	.31	5.94	6.74	*2.62
26	1.57	5.40	2.07	2.32	1.57	15.2	.93	.43	.34	2.23	4.00	1.74
27	1.43	2.84	3.40	2.07	1.57	3.06	.77	.47	.40	1.90	3.17	1.22
28	1.43	2.79	11.3	1.90	1.50	2.86	.72	.40	.37	1.04	2.15	1.22
29	2.31	2.32	4.00	14.5	1.98	2.23	.63	.37	.40	.72	1.50	1.36
30	1.65	6.54	6.98	3.76	2.61	1.90	.72	----------	.40	.51	1.36	3.86
31	1.50	13.4	----------	2.73	----------	2.23	.63	----------	.37	----------	1.22	----------
Total	100.63	181.54	249.12	392.61	83.51	180.78	31.77	17.52	37.67	31.06	357.43	33.33
Mean	3.25	5.86	8.30	12.7	2.78	5.83	1.02	0.604	1.22	1.04	11.5	1.11
Ac-ft	200	360	494	779	166	359	63	35	75	62	709	66

Calendar Year 1963: Max 197 Min 0.43 Mean 6.06 Ac-ft 4390
Fiscal Year 1963-64: Max 116 Min 0.28 Mean 4.64 Ac-ft 3370

* Discharge measurement made on this day.

Peak discharge (base, 570 cfs)

Date	Time	Gage height	Discharge	Date	Time	Gage height	Discharge
9- 9	1330	3.90	2,050	10-11	1800	3.41	1,040
10- 4	0230	3.26	832	12- 4	1030	3.38	992

8350. Inarajan River near Inarajan

Location.--Lat 13°16'40" N., long 144°44'15" E., on right bank 0.6 mile northwest of Inarajan and 4.9 miles east of Merizo.

Drainage area.--4.49 sq mi.

Records available.--September 1952 to June 1964.

Gage.--Water-stage recorder and concrete control. Altitude of gage is 15 ft (from topographic map).

Average discharge.--11 years (1953-64), 17.9 cfs.

Extremes.--Maximum gage height during year, 12.90 ft Oct. 11 (discharge not determined); minimum discharge, 2.60 cfs Apr. 16.
1952-64: Maximum gage height, that of Oct. 11, 1963; minimum discharge, 0.99 cfs July 6, 7, 1960.

Remarks.--Records good except those for periods of no gage-height record and those above 1,820 cfs, which are fair. Stage-discharge relation not determined above gage height 11.0 ft owing to ungaged overbank flow. Village of Inarajan diverts about 40,000 gallons a day above station for domestic use.

Rating table (gage height, in feet, and discharge, in cubic feet per second)

0.5	3.05	1.6	75.0
.6	5.00	2.0	148
.7	7.80	3.0	295
1.0	19.5	4.0	460
1.3	41.0		

Discharge, in cubic feet per second, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	10.7	13.4	15.4	110	14.2	18.2	9.40	5.25	3.95	3.20	4.15	11.0
2	9.40	10.0	121	32	14.2	14.2	8.76	5.00	3.75	3.20	4.15	10.7
3	10.0	8.44	84.5	19.5	13.8	11.8	8.76	5.00	3.75	3.05	28.6	10.4
4	8.76	7.80	49.0	137	14.2	340	9.08	5.00	4.15	3.55	36.6	10.0
5	7.80	8.76	18.2	40	17.7	64.6	9.40	8.29	3.55	4.15	10.7	9.70
6	7.80	8.76	13.8	24	14.2	42.0	8.44	7.20	4.15	4.55	7.20	9.40
7	8.12	7.50	13.8	20	65.0	32.5	7.80	5.00	3.75	3.75	6.00	9.40
8	7.50	*9.40	62.8	18	110	68.1	11.4	5.00	3.55	3.35	95.7	9.08
9	7.50	119	243	*16.4	17.7	29.7	8.12	4.75	3.35	3.35	40.0	8.76
10	40.9	28.0	65.7	16.8	13.4	16.4	7.80	4.75	3.35	4.55	33.7	8.44
11	23.0	43.0	*19.5	387	14.6	12.2	7.50	*4.55	3.20	5.00	17.2	8.12
12	37.1	18.6	20.1	301	25.1	13.4	7.50	4.75	4.15	3.75	203	7.80
13	13.0	236	95.9	161	*21.4	10.0	7.50	4.35	103	3.55	32	8.12
14	13.0	49.4	66.0	100	18.7	8.44	7.50	4.55	13.4	3.55	20	8.12
15	11.0	70.6	167	58.1	21.5	8.12	7.20	4.75	7.20	3.20	13	7.80
16	15.5	25.5	20	29.0	12.6	7.80	*6.90	5.75	5.50	*3.05	60	9.40
17	*11.4	15.4	17	24.3	11.4	*7.50	6.60	4.75	*5.25	3.20	180	8.12
18	10.7	13.8	32.7	21.9	10.7	7.20	6.30	10.5	4.75	3.75	200	9.08
19	10.7	18.6	17.7	20.1	10.7	7.20	6.00	5.00	4.35	21.4	140	8.12
20	15.4	13.0	22.4	24.3	10.7	6.90	6.00	4.55	4.15	6.61	190	8.76
21	10.7	21.2	26.2	19.0	11.0	6.60	5.75	4.35	3.95	4.75	*36	8.76
22	9.40	11.8	19.5	19.5	10.7	6.60	5.50	4.35	3.95	11.1	24.3	7.20
23	8.76	18.2	55.8	246	10.7	6.60	6.00	4.35	3.75	5.50	20.1	7.80
24	23.4	14.6	19.5	24.9	10.4	6.90	5.75	4.15	4.15	5.00	30.5	11.4
25	10.4	19.5	15.9	21.9	10.4	180	10.8	3.95	3.75	54.6	26.1	*21.2
26	25.0	13.8	15.0	20.1	10.4	35.6	6.60	4.15	3.55	6.60	24.1	11.0
27	10.7	11.4	38.8	19.5	11.0	14.6	6.00	4.55	3.55	6.90	16.4	9.70
28	9.40	16.8	123	18.6	11.0	20.0	6.00	3.95	3.55	4.75	14.2	8.12
29	20.7	12.2	18	29.5	11.8	11.4	5.50	3.55	3.55	4.55	13.4	7.50
30	10.4	61.0	38	15.4	11.8	11.0	6.00	---	3.35	4.35	12.6	17.8
31	10.4	50.4	---	14.6	---	11.8	5.50	---	3.05	---	12.2	---
Total	428.54	975.86	1535.2	2009.4	561.0	1037.36	227.36	146.09	232.40	201.86	1551.90	290.80
Mean	13.8	31.5	51.2	64.8	18.7	33.5	7.33	5.04	7.50	6.73	50.1	9.69
Ac-ft	850	1940	3050	3990	1110	2060	451	290	461	400	3080	577

Calendar Year 1963: Max 655 Min 3.95 Mean 30.3 Ac-ft 21910
Fiscal Year 1963-64: Max 387 Min 3.05 Mean 25.1 Ac-ft 18260

Peak discharge (base, 1,500 cfs)

Date	Time	Gage height	Discharge	Date	Time	Gage height	Discharge
8- 9	2000	10.58	1,730	12- 4	1230	12.80	-
9- 9	1400	12.88	-	5-19	about 1130	12.84	-
10-11	1900	12.90	-				
10-23	0630	10.48	1,710				

* Discharge measurement made on this day.
Note.--No gage-height record Sept. 16, 17, Sept. 29 to Oct. 2, Oct. 5-8, May 13-21.

8400. Pauliluc River near Inarajan

Location.--Lat 13°17'05" N., long 144°45'00" E., on right bank 0.3 mile upstream from mouth, 0.9 mile northeast of Inarajan, and 3.8 miles south of Talofofo.

Drainage area.--1.86 sq mi.

Records available.--October 1952 to June 1964.

Gage.--Water-stage recorder and concrete control. Altitude of gage is 15 ft (from topographic map).

Average discharge.--11 years (1953-64), 6.19 cfs.

Extremes.--Maximum discharge during year, 1,350 cfs Oct. 11 (gage height, 8.80 ft), from rating curve extended above 210 cfs as explained below; minimum, 0.81 cfs Mar. 10, 11.
1952-64: Maximum discharge, 2,980 cfs Oct. 15, 1953 (gage height, 13.11 ft), from rating curve extended above 210 cfs by logarithmic plotting; minimum, 0.16 cfs June 2, 1954, Apr. 27, May 1, 1955, May 18, 1956.

Remarks.--Records good. No diversion above station.

Rating table (gage height, in feet, and discharge, in cubic feet per second)

0.3	0.40	0.8	7.40
.4	.88	1.0	18.3
.5	1.60	1.5	55.0
.6	2.65	2.0	106
.7	4.40	2.5	161

Discharge, in cubic feet per second, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	3.60	4.40	4.85	36.3	4.85	14.2	3.25	1.52	0.94	1.00	2.10	3.40
2	3.60	3.80	43.0	12.5	5.35	3.80	2.80	1.44	.94	1.06	1.80	3.25
3	3.60	2.95	45.2	7.40	5.35	3.80	2.65	1.44	.94	1.00	8.63	3.10
4	2.95	2.80	8.93	68.0	5.10	105	2.80	1.44	1.20	1.06	13.9	2.95
5	2.80	2.65	7.00	25.1	5.10	6.60	3.25	2.30	1.06	1.28	4.60	2.80
6	2.50	2.65	7.40	9.95	5.10	6.60	2.95	2.50	1.13	1.36	2.95	2.80
7	2.65	2.65	7.00	6.20	4.85	4.85	2.40	1.52	1.00	1.20	2.65	2.80
8	2.65	*3.10	11.2	5.60	21.5	7.40	4.40	1.52	.94	1.20	26.3	2.50
9	2.50	48.4	88.8	*5.60	8.42	4.00	2.65	1.36	.88	1.28	28.3	2.65
10	10.2	11.5	37.6	5.90	4.40	4.00	2.40	1.36	.88	1.44	14.8	2.50
11	6.60	13.4	*7.40	139	5.35	3.60	2.30	*1.28	.81	2.10	7.00	2.40
12	11.8	9.44	5.35	112	11.0	4.40	2.20	1.28	1.00	1.44	65.9	2.30
13	3.80	96.3	19.7	85.1	*8.89	3.25	2.20	1.20	24.7	1.20	13.7	2.20
14	4.20	46.9	39.1	36.1	11.4	3.25	2.30	1.28	3.60	1.13	5.90	2.20
15	4.00	18.1	39.7	23.0	9.97	3.10	2.10	1.36	2.20	1.06	5.35	2.20
16	4.40	11.5	8.93	12.0	4.60	3.10	*2.10	1.60	1.70	*1.06	55.8	2.95
17	*3.60	5.90	6.20	9.95	4.20	*2.95	2.00	1.52	*1.60	1.00	65.0	2.65
18	3.25	5.10	15.7	10.5	3.80	2.65	2.00	3.00	1.52	1.13	51.7	3.60
19	3.10	7.40	6.20	8.42	3.60	2.65	1.90	1.60	1.44	9.76	50.2	2.65
20	14.1	5.10	8.90	11.5	3.40	2.80	1.80	1.36	1.36	2.10	110	2.80
21	4.60	5.35	8.93	7.91	3.60	2.50	1.70	1.28	1.36	2.00	*14.8	2.65
22	3.40	4.40	5.90	7.40	3.40	2.40	1.70	1.28	1.28	1.90	8.93	2.20
23	3.25	9.44	33.2	84.1	4.00	2.40	1.90	1.28	1.28	1.80	6.60	2.30
24	6.88	4.60	7.00	7.91	3.25	2.50	1.80	1.20	1.36	1.70	14.70	3.60
25	3.60	7.91	5.35	6.60	3.25	65.0	2.50	1.13	1.28	29.1	15.60	*106
26	19.4	4.40	4.85	7.40	3.25	14.7	2.20	1.13	1.28	2.80	7.00	4.85
27	5.10	5.10	14.7	6.20	2.80	4.40	1.80	1.20	1.28	3.25	5.35	3.80
28	3.80	7.35	30.0	5.35	3.10	11.9	1.80	1.06	1.28	1.90	4.40	2.80
29	5.35	4.85	8.93	13.8	4.20	4.60	1.60	1.00	1.36	1.90	4.00	2.50
30	3.80	15.2	16.9	5.60	4.63	3.80	1.80	---	1.20	1.80	4.00	2.30
31	3.40	21.6	---	5.10	---	4.20	1.60	---	1.06	---	3.60	---
Total	158.48	394.24	553.92	787.49	171.71	310.40	70.85	42.44	63.86	82.01	625.56	92.30
Mean	5.11	12.7	18.5	25.4	5.72	10.0	2.29	1.46	2.06	2.73	20.2	3.08
Ac-ft	314	782	1,100	1,560	341	616	141	84	127	163	1,240	183

Calendar Year 1963: Max 182 Min 1.06 Mean 10.3 Ac-ft 7,430
Fiscal Year 1963-64: Max 139 Min 0.81 Mean 9.16 Ac-ft 6,650

* Discharge measurement made on this day.

Peak discharge (base, 400 cfs, revised)

Date	Time	Gage height	Discharge	Date	Time	Gage height	Discharge
8- 9	2100	5.24	576	10-23	0730	5.21	570
9- 9	1430	8.40	1,260	12- 4	1130	5.33	593
10- 4	0400	6.30	783	5-19	2400	7.41	1,020
10-11	1900	8.80	1,350				

8470. Imong River near Agat

Location.--Lat 13°20'14" N., long 144°41'55" E., on left bank 500 ft upstream from Fena Valley Reservoir, 1.4 miles southwest of Fena Dam spillway, and 4.3 miles southeast of Agat School.

Drainage area.--1.93 sq mi.

Records available.--March 1960 to June 1964.

Gage.--Water-stage recorder and concrete control. Altitude of gage is 120 ft (from topographic map).

Extremes.--Maximum discharge during year, 2,680 cfs Dec. 4 (gage height, 8.76 ft, from floodmark), from rating curve extended above 110 cfs as explained below; minimum, 1.95 cfs Mar. 30 to Apr. 1.
1960-64: Maximum discharge, 3,370 cfs Oct. 19, 1960 (gage height, 10.06 ft), from rating curve extended above 110 cfs on basis of slope-area measurements at gage heights 7.46 and 10.06 ft; minimum, 1.25 cfs July 7, 8, 1960.

Remarks.--Records good except those for periods of no gage-height record, which are fair. No diversion above station. Continuous records of rainfall are obtained at station.

Rating table (gage height, in feet, and discharge, in cubic feet per second)

0.4	1.80	1.1	42.4
.5	4.00	1.5	88.0
.6	7.50	2.0	163
.8	18.7		

Discharge, in cubic feet per second, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	8.00	*5.45	14.5	*23.1	57.7	14.3	6.30	3.25	2.75	1.95	4.00	5.90
2	6.70	4.30	54.6	12.1	14.1	6.30	*5.55	3.25	2.55	2.75	3.00	5.55
3	*6.30	3.75	35.2	11.0	7.50	14.8	5.20	*3.25	*2.55	*2.15	4.60	*9.10
4	5.55	4.00	*14.7	70.9	*9.08	a1.50	5.55	3.25	3.00	2.55	39.0	5.90
5	5.20	4.90	19.3	24.3	10.2	*a60	6.30	4.30	2.55	2.35	*12.7	5.55
6	5.20	4.60	9.00	11.5	8.00	11.5	5.20	4.00	2.55	2.75	6.70	5.20
7	4.90	3.75	7.50	9.00	34.1	11.0	4.90	3.25	2.55	2.55	7.10	4.90
8	5.55	5.55	9.05	8.00	19.9	16.2	8.04	3.25	2.55	2.35	26.1	4.90
9	4.90	13.2	79.2	7.10	10.0	10.0	5.20	3.25	2.55	2.35	35.0	4.90
10	36.2	26.6	29.0	7.10	8.00	9.50	4.90	3.25	2.55	2.75	15.1	4.60
11	11.5	15.7	11.5	a100	8.50	8.50	4.90	3.25	2.55	4.30	12.1	4.30
12	23.7	22.4	9.50	a70	41.6	8.00	4.90	3.50	2.55	2.55	56.8	4.30
13	10.0	68.8	30.3	a50	20.0	7.10	4.60	3.25	13.2	2.35	24.4	4.30
14	17.0	25.2	35.0	a34	9.00	7.10	4.90	3.25	5.90	2.55	11.0	3.75
15	10.0	17.1	11.9	a22	8.50	6.70	4.30	3.50	3.75	2.35	8.50	3.75
16	9.00	11.5	9.00	a17	6.30	6.70	4.30	3.50	3.25	2.35	22.6	3.75
17	7.50	8.50	8.00	a15	5.55	6.30	4.30	3.50	3.00	2.35	73.8	4.30
18	7.10	7.10	10.0	a15	5.20	6.30	4.00	5.89	3.00	2.55	28.6	5.20
19	6.70	8.20	6.70	a50	4.90	6.30	4.30	3.75	2.75	7.61	16.5	4.30
20	32.0	18.7	9.84	a46	4.90	6.30	4.00	3.50	2.55	4.30	41.1	4.30
21	9.00	39.1	6.30	a24	4.60	6.30	3.75	3.25	2.55	3.25	15.1	4.00
22	6.70	11.5	5.90	a20	4.30	5.90	3.75	3.25	2.75	6.47	10.5	4.00
23	5.55	9.00	29.7	a55	5.93	6.30	4.00	3.25	2.35	3.75	8.50	3.75
24	11.6	14.0	9.61	a14	4.30	6.30	3.75	3.00	2.75	6.12	15.3	5.20
25	5.90	24.4	8.50	12.5	4.00	62.7	4.30	2.75	2.15	8.52	24.4	12.7
26	5.20	11.4	6.70	10.0	4.60	31.1	4.00	3.00	2.35	15.1	15.1	7.10
27	4.90	9.00	16.3	9.50	4.60	10.0	3.75	3.00	2.55	6.70	11.0	6.70
28	4.60	9.18	53.9	9.00	4.30	9.89	4.00	2.75	2.15	5.55	8.50	5.20
29	6.25	6.70	15.2	21.3	8.84	7.50	3.50	2.75	2.35	4.00	7.10	5.55
30	4.90	37.1	16.3	24.6	12.2	6.70	4.00	------	1.95	3.75	6.70	17.9
31	5.55	17.8	------	11.5	------	9.00	3.50	------	1.95	------	5.90	------
Total	293.15	468.48	582.20	814.50	350.70	534.59	143.94	98.19	94.50	120.97	576.80	170.85
Mean	9.46	15.1	19.4	26.3	11.7	17.2	4.64	3.39	3.05	4.03	18.6	5.70
Ac-ft	581	929	1,150	1,620	696	1,060	286	195	187	240	1,140	339

Calendar Year 1963: Max 312 Min 2.15 Mean 13.7 Ac-ft 9,910
Fiscal Year 1963-64: Max 150 Min 1.95 Mean 11.6 Ac-ft 8,420

* Discharge measurement made on this day.
a No gage-height record.

Peak discharge (base, 900 cfs)

Date	Time	Gage height	Discharge	Date	Time	Gage height	Discharge
7-20	0030	4.68	928	10-11	about 1900	6.68	1,720
8-13	0730	4.72	942				
9- 9	1430	7.12	1,910	12- 4	about 1300	8.76	2,680
9-28	0330	5.38	1,190				
10- 4	0330	6.25	1,540	5-17	0600	5.08	1,070

8480. Almagosa Springs near Agat

Location.--Lat 13°20'45" N., long 144°40'45" E., on left bank 3.5 miles southeast of Agat and 3.5 miles northeast of Umatac.

Drainage area.--0.74 sq mi, hydrologic drainage boundary uncertain owing to ground-water exchange.

Records available.--September 1951 to June 1964.

Gage.--Water-stage recorder and concrete control. Altitude of gage is 640 ft (from topographic map).

Average discharge.--12 years (1952-64), 3.89 cfs.

Extremes.--Maximum discharge during year, 350 cfs Dec. 4 (gage height, 4.30 ft, from floodmark), from rating curve extended above 53 cfs as explained below; minimum, 0.01 cfs Feb. 28 to Mar. 12.
1951-64: Maximum discharge, 760 cfs Oct. 15, 1953 (gage height, 5.02 ft), from rating curve extended above 53 cfs by test on model of station site; no flow at times.

Remarks.--Records good except those for periods of no gage-height record, which are fair. Up to 3.9 cfs diverted above station for municipal use.

Rating table (gage height, in feet, and discharge, in cubic feet per second)

0.02	0.01	0.6	3.20
.1	.04	.7	5.00
.2	.16	1.0	14.2
.3	.48	1.5	38.3
.4	1.06	2.0	73.0
.5	1.95	3.0	143

Discharge, in cubic feet per second, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	2.05	0.99	9.11	12.4	18	7.61	2.53	0.12	0.01	0.03	0.85	2.17
2	1.85	.67	16.0	*9.93	7.3	3.84	2.29	.16	.01	.03	.44	1.65
3	1.65	.57	25.5	8.19	3.5	6.83	1.95	.18	.01	.03	.57	2.13
4	1.37	.40	16.1	17.8	4.8	80	1.75	.18	.01	.03	40.3	1.65
5	1.13	*.66	*15.3	19.0	*6.6	*27.2	1.65	.12	.01	.04	*17.6	1.06
6	.92	.23	10.8	14.2	5.58	13.5	1.37	.08	.01	.05	9.64	.85
7	.79	.12	9.06	9.93	7.33	9.93	1.21	.16	.01	.04	5.87	.62
8	*.67	1.19	6.16	7.90	13.7	9.93	1.28	.16	.01	.03	9.06	.57
9	1.90	3.44	37.4	5.87	7.90	7.03	.99	.16	.01	.03	29.3	.52
10	18.4	4.89	24.7	4.60	5.00	5.87	.79	*.12	.01	.08	16.1	.48
11	12.5	5.87	14.2	39.6	4.60	4.60	.67	.10	.01	.12	11.1	.52
12	19.1	10.8	10.5	69.3	6.74	4.20	.52	.12	.01	.05	30.5	.62
13	10.8	23.2	12.8	33.2	9.35	3.67	.40	.12	1.79	.03	27.0	.67
14	17.9	15.9	20.4	21.5	6.16	3.07	*.40	.07	.23	.03	15.3	.73
15	14.5	10.5	12.5	14.6	6.45	2.94	.23	.10	.12	.02	9.93	.62
16	9.64	8.19	9.64	11.8	4.80	2.53	.14	.09	*.16	.02	11.5	.67
17	6.45	5.29	7.61	9.64	4.20	4.40	.09	.08	.18	.02	44.5	.62
18	4.80	3.84	6.81	8.19	3.50	5.00	.03	.58	.12	.3	24.5	.73
19	3.67	3.07	4.60	6.45	2.80	5.58	.02	.16	.07	1.5	17.6	.8
20	8.28	4.33	5.00	8.96	2.53	5.58	.02	.12	.08	.4	23.4	.7
21	4.02	11.3	3.67	6.16	2.17	5.00	.02	.08	.10	.12	15.7	.6
22	3.20	9.93	3.20	4.80	1.85	5.00	.03	.07	.09	.83	10.8	.6
23	2.66	6.45	13.9	44.9	2.17	2.17	.03	.04	.08	.12	8.48	.5
24	3.20	8.37	9.64	14.1	1.55	.92	.02	.09	.09	.07	5.87	*.9
25	2.17	19.6	7.03	9.64	1.37	13.6	.03	.03	.07	.67	11.3	.73
26	1.85	13.3	5.00	7.90	1.28	31.0	.02	.02	.06	21.1	9.64	.57
27	1.65	9.06	5.76	5.87	1.28	10.8	.03	.04	.05	15.5	7.90	.57
28	1.37	6.52	22.7	4.80	1.21	6.74	.03	.01	.04	5.00	5.29	.48
29	1.37	5.00	12.9	6.87	3.30	4.80	.12	.01	.03	2.29	4.02	.52
30	1.06	7.21	11.4	8.93	3.14	3.50	.08	---	.03	1.21	3.50	5.79
31	.99	13.6	---	8.0	---	3.50	.16	---	.03	---	2.66	---
Total	161.91	214.49	369.39	455.03	150.16	300.34	18.90	3.37	3.54	49.79	430.22	29.64
Mean	5.22	6.92	12.3	14.7	5.01	9.69	0.610	0.116	0.114	1.66	13.9	0.988
Ac-ft	321	425	733	903	298	596	37	6.7	7.0	99	853	59

Calendar Year 1963: Max 159 Min 0 Mean 7.08 Ac-ft 5130
Fiscal Year 1963-64: Max 80 Min 0.01 Mean 5.97 Ac-ft 4340

Peak discharge (base, 80 cfs)

Date	Time	Gage height	Discharge	Date	Time	Gage height	Discharge
9- 9	1430	3.40	185	4-26	1600	2.32	95.4
9-28	0500	2.26	91.2	5- 4	0400	2.79	130
10-11	1400	2.97	141	5-17	0830	2.60	115
10-23	0700	3.48	195				
12- 4	about 0300	4.30	350				

* Discharge measurement made on this day.
Note.--No gage-height record Oct. 31 to Nov. 5, Dec. 4, Apr. 18-20, June 19-24.

8490. Fena Dam spillway near Agat

Location.--Lat 13°21'30" N., long 144°42'10" E., on left bank 4.0 miles southeast of Agat and 5.5 miles southwest of Yona.

Drainage area.--5.81 sq mi.

Records available.--September 1951 to July 1952, November 1952 to June 1964.

Gage.--Water-stage recorder and concrete-dam control. Datum of gage is 111.35 ft above mean sea level (from U.S. Navy construction plans).

Average discharge.--11 years (1953-64), 19.4 cfs.

Extremes.--Maximum discharge during year, 2,740 cfs Dec. 4 (gage height, 2.98 ft), from rating curve extended above 130 cfs on basis of broad-crested weir formula; no flow for many days.
1951-64: Maximum discharge, not determined, occurred Oct. 15, 1953 (gage height, at least 4.5 ft); no flow for many days each year.

Remarks.--Records fair. About 10 cfs is diverted from Fena Valley Reservoir and tributary springs for military and civilian use. Records represent only flow over spillway. Continuous records of rainfall are obtained at station.

Rating table (gage height, in feet, and discharge, in cubic feet per second)

0	0	0.5	189
.1	16.9	1.0	535
.2	47.8	1.5	983
.3	89.0		

Discharge, in cubic feet per second, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	16.9	9.90	28.0	66.9	116	66.9	16.9	0.54		0	66.9	9.90
2	12.1	9.90	119	*34.2	51.5	22.2	14.4	0		0	55.2	7.86
3	9.90	5.99	168	22.2	37.5	40.9	12.1	0		0	59.0	22.2
4	7.86	7.86	62.9	162	34.2	661	14.4	0		0	190	22.2
5	5.99	9.90	*62.9	103	*34.2	103	16.9	0		0	66.9	14.4
6	4.28	*7.86	31.1	55.2	28.0	40.9	12.1	0		0	34.2	9.90
7	4.28	5.99	28.0	28.0	97.4	31.1	9.90	0		0	31.1	7.86
8	*12.1	22.2	22.2	22.2	98.4	44.3	16.9	0		0	83.0	5.99
9	12.1	37.5	374	19.5	40.9	22.2	12.1	0		0	201	4.28
10	115	70.9	147	16.9	22.2	*19.5	7.86	*0		0	83.6	2.78
11	55.2	70.9	47.8	365	22.2	16.9	5.99	0		0	59.0	1.50
12	83.6	131	28.0	383	75.1	16.9	5.99	0		0	204	.54
13	37.5	185	59.0	218	75.1	14.4	5.99	0		0	131	.54
14	88.8	70.9	127	83.6	31.1	14.4	5.99	0		0	51.5	.54
15	44.3	44.3	55.2	47.8	37.5	12.1	5.99	0		0	28.0	0
16	28.0	37.5	31.1	37.5	25.1	9.90	4.28	0	(*)	0	51.5	0
17	19.5	22.2	25.1	34.2	19.5	9.90	4.28	0		0	248	0
18	12.1	19.5	40.9	31.1	16.9	7.86	2.78	0		0	108	1.50
19	9.90	14.4	25.1	28.0	14.4	5.99	2.78	0		0	66.9	4.28
20	47.8	31.1	28.0	75.1	12.1	5.99	1.50	0		*0	136	5.99
21	22.2	148	19.5	40.9	12.1	5.99	1.50	0		0	55.2	5.99
22	14.4	51.5	16.9	25.1	12.1	5.99	1.50	0		0	34.2	5.99
23	12.1	28.0	148	477	14.4	5.99	4.28	0		0	28.0	.54
24	25.1	28.0	51.5	51.5	9.90	5.99	2.78	0		0	34.2	7.86
25	16.9	83.6	28.0	31.1	7.86	160	9.90	0		0	79.3	22.2
26	9.90	47.8	22.2	25.1	7.86	184	9.90	0		0	*44.3	25.1
27	9.90	37.5	37.5	22.2	9.90	40.9	4.28	0		19.5	34.2	16.9
28	9.90	28.0	184	19.5	7.86	28.0	4.28	0		59.0	22.2	9.90
29	12.1	28.0	70.9	79.3	28.0	25.1	1.50	0		70.9	16.9	7.86
30	9.90	37.8	51.5	59.0	28.0	16.9	1.50	---		70.9	16.9	34.2
31	9.90	103	---	40.9	---	22.2	1.50	---		---	14.4	---
Total	779.51	1436.00	2140.3	2705.0	1027.28	1667.40	222.05	0.54	0	220.3	2334.6	258.80
Mean	25.1	46.3	71.3	87.3	34.2	53.8	7.16	0.019	0	7.34	75.3	8.63
Ac-ft	1550	2850	4250	5370	2040	3310	440	1.1	0	437	4630	513

Calendar Year 1963: Max 909 Min 0 Mean 41.2 Ac-ft 29,880
Fiscal Year 1963-64: Max 661 Min 0 Mean 35.0 Ac-ft 25,390

* Discharge measurement or observation of no flow made on this day.

8550. Ugum River near Talofofo

Location.--Lat 13°20'00" N., long 144°44'55" E., on left bank 0.3 mile upstream from confluence with Talofofo River, 1.3 miles south of Talofofo, and 4.2 miles north of Inarajan.

Drainage area.--6.96 sq mi.

Records available.--June 1952 to June 1964.

Gage.--Water-stage recorder and concrete control. Datum of gage is 3.23 ft above mean sea level.

Average discharge.--12 years, 30.2 cfs.

Extremes.--Maximum discharge during year, 7,660 cfs Dec. 4 (gage height, 12.06 ft), from rating curve extended above 910 cfs on basis of slope-area measurements at gage heights 11.30, 11.36, 11.87 and 11.90 ft; minimum, 5.60 cfs Apr. 17, 18.
1952-64: Maximum discharge, that of Dec. 4, 1963; minimum, 3.19 cfs June 15, 1960.

Remarks.--Records good except those above 200 cfs, which are fair and those for periods of no gage height record, which are poor. No diversion above station.

Rating table (gage height, in feet, and discharge, in cubic feet per second)

0.5	4.80	1.2	53.0
.6	8.00	1.5	97.0
.7	12.2	2.0	197
.9	24.0	7.0	855

Discharge, in cubic feet per second, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	30.4	24.0	31.2	112	58.0	49.7	24.0	12.7	9.20	6.95	12.2	28.0
2	25.6	18.2	143	49.7	49.7	24.8	22.7	12.2	9.20	7.30	10.8	26.4
3	24.0	17.0	100	40.0	48.6	41.3	22.0	12.2	9.20	6.95	20.0	27.2
4	22.7	17.0	54.3	242	41.0	798	22.0	12.2	10.4	6.60	a60	25.6
5	20.8	17.0	44.2	108	40.0	63.4	23.4	20.1	9.60	7.65	37.7	25.6
6	19.4	18.2	38.0	58.2	46.4	50.4	22.0	20.8	9.60	8.00	26.4	24.0
7	20.1	16.4	31.2	42.0	64.0	54.3	18.8	13.3	9.20	7.65	20.8	23.4
8	18.8	17.5	63.7	39.0	83.7	59.0	24.0	12.7	9.20	8.00	65.7	22.7
9	18.2	56.9	325	36.0	39.0	41.0	20.1	12.2	8.80	6.95	117	22.0
10	59.6	67.3	113	36.0	30.4	38.0	18.2	11.7	8.80	8.80	53.9	21.4
11	35.0	64.3	44.2	429	31.2	36.0	17.5	11.2	8.80	11.7	39.0	20.8
12	55.6	68.4	*34.0	311	54.3	30.4	17.0	11.2	9.20	8.80	a180	20.1
13	30.4	190	a200	182	49.7	29.6	16.4	11.2	64.8	7.65	69.0	20.1
14	27.2	93.6	129	98.8	48.6	28.0	17.0	11.2	26.4	7.65	38.0	20.1
15	25.6	*50.5	133	62.1	48.6	27.2	16.4	11.7	14.8	6.95	28.8	18.8
16	26.4	48.6	50.9	56.9	30.4	24.8	16.4	13.3	11.2	6.60	108	20.8
17	*23.4	28.8	40.0	45.3	28.0	24.8	16.4	13.3	10.0	*6.25	a220	20.8
18	21.4	24.0	50.8	44.2	24.8	22.0	15.9	20.1	*9.20	6.25	a90	22.0
19	19.4	30.4	40.0	42.0	22.7	*21.4	15.9	*13.8	8.80	23.6	a80	21.4
20	47.5	25.6	42.0	70.5	*22.0	21.4	15.9	12.2	8.40	12.2	a300	21.4
21	24.8	50.8	41.0	44.2	22.7	20.8	15.4	11.7	8.00	10.8	a70	19.4
22	21.4	28.8	36.0	*39.0	22.0	20.1	*14.3	10.8	8.40	a20	*a55	18.2
23	18.8	26.4	a120	316	25.6	20.1	14.8	10.8	8.00	16.4	45.3	17.0
24	31.2	29.6	44.2	50.8	22.0	20.1	14.3	10.8	9.20	11.7	57.1	18.8
25	22.0	76.9	39.0	47.5	22.0	146	17.5	10.0	8.00	a80	64.6	38.0
26	18.2	40.0	33.0	44.2	22.0	106	15.9	10.4	7.65	20.1	54.3	29.6
27	17.5	29.6	64.7	43.1	24.0	37.0	14.3	10.4	7.65	18.2	44.2	23.4
28	17.5	28.0	135	41.0	21.4	41.0	14.3	10.0	7.65	14.8	37.0	*20.8
29	24.0	28.0	54.3	55.0	29.6	30.4	13.8	9.60	7.65	11.7	33.0	21.4
30	18.8	50.4	60.8	47.5	28.0	26.4	14.8	----------	6.95	10.8	32.0	37.0
31	17.5	84.6	----------	44.2	----------	31.2	13.3	----------	6.95	----------	29.6	----------
Total	803.2	1366.8	2335.5	2877.2	1100.4	1984.6	544.7	363.80	350.90	387.00	2099.4	696.2
Mean	25.9	44.1	77.8	92.8	36.7	64.0	17.6	12.5	11.3	12.9	67.7	23.2
Ac-ft	1590	2710	4630	5710	2180	3940	1080	721	696	768	4160	1380

Calendar Year 1963: Max 798 Min 8.80 Mean 46.4 Ac-ft 33,590
Fiscal Year 1963-64: Max 798 Min 6.25 Mean 40.7 Ac-ft 29,560

Peak discharge (base, 1,400 cfs)

Date	Time	Gage height	Discharge	Date	Time	Gage height	Discharge
9- 9	1530	11.36	2,020	10-23	0730	11.88	5,680
10- 4	0430	10.62	1,530	12- 4	1330	12.06	7,660
10-11	2000	11.68	3,660				

* Discharge measurement made on this day.
a No gage-height record.

8580. Ylig River near Yona

Location.--Lat 13°23'20" N., long 144°45'00" E., on right bank 2 miles upstream from mouth, 2.1 miles southwest of Yona, and 5.8 miles south of Agana.

Drainage area.--6.58 sq mi.

Records available.--June 1952 to June 1964. See also Note below.

Gage.--Water-stage recorder and concrete control. Altitude of gage is 20 ft (from topographic map).

Average discharge.--12 years, 27.8 cfs.

Extremes.--Maximum discharge during year, 4,500 cfs Sept. 9 (gage height, 18.77 ft, from floodmark), from rating curve extended above 620 cfs on basis of slope-area measurements at gage heights 11.24 and 15.87 ft; minimum, 1.56 cfs Apr. 1, 2, 4.
1952-64: Maximum discharge, that of Sept. 9, 1963; minimum, 0.16 cfs June 18-22, 1959.

Remarks.--Records good except those for periods of no gage-height record, which are fair. No diversion above station.

Note.--Published records for high-water periods in fiscal years 1957 and 1958 have been found to be in error; revised records are on file in the district office and will be published in the next water-supply paper.

Rating table (gage height, in feet, and discharge, in cubic feet per second)

0.3	1.09	1.2	33.0
.4	2.12	1.5	64.0
.5	3.57	2.0	129
.6	5.50	3.0	259
.8	11.2	6.0	760
1.0	19.6		

Discharge, in cubic feet per second, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	14.2	15.5	28.6	55.2	20.8	177	19.1	6.25	3.40	1.66	8.32	17.3
2	15.0	13.1	196	31.5	20.8	20.2	16.8	6.00	3.24	1.66	7.25	16.4
3	14.6	11.2	388	32.6	25.1	34.2	15.5	5.75	3.24	1.77	23.4	34
4	12.3	11.2	74.9	490	38.8	400	15.9	6.00	3.91	1.66	150	24.5
5	10.9	11.2	50.8	155	20.2	150	15.5	6.25	3.57	1.77	50	18.7
6	10.6	10.9	42.0	57.4	19.1	50	14.6	6.25	3.24	1.88	24	16.4
7	10.6	10.6	34.8	39.3	36.0	40	13.9	5.30	3.08	2.24	20	14.6
8	62.6	11.6	27.2	32.3	63.0	80	22.6	5.10	2.93	2.37	193	13.9
9	14.6	35.8	500	*30.1	22.0	40	14.2	5.10	2.78	2.00	130	12.7
10	124	141	200	28.6	16.4	34	12.3	4.90	4.10	2.78	70	12.0
11	37.5	128	70	656	18.2	28	11.6	4.70	2.93	104	56.7	11.2
12	55.2	78.8	*30	549	82.5	24	11.2	4.70	2.93	8.64	222	10.6
13	31.0	75.4	196	296	144	22	11.2	4.70	31.3	5.30	130	11.6
14	46.6	*30.1	135	199	32.3	22	11.6	4.30	7.50	4.30	70	10.2
15	29.4	23.9	78.6	73.6	58.8	20	10.9	4.70	4.50	3.74	44.2	9.60
16	46.8	19.6	42.0	56.3	23.9	20	10.6	5.50	3.57	3.24	196	9.92
17	*24.5	16.8	76.2	47.5	20.2	18	9.60	4.90	3.08	*2.93	436	9.28
18	20.8	19.6	80.1	47.5	18.7	18	8.64	11.3	2.93	3.24	156	8.32
19	21.4	15.0	34.8	164	16.4	18	8.32	*6.00	2.78	86.1	67.6	8.00
20	19.1	29.4	30.8	119	*15.5	18	8.00	5.50	*2.64	116	242	13.7
21	32.6	71.4	28.6	41.1	15.0	18	8.00	5.10	2.37	20.8	64.0	8.96
22	19.1	19.6	26.4	33.0	14.2	15	*7.75	4.50	2.37	32.2	46.4	7.75
23	15.9	16.8	277	181	13.5	*11	8.96	4.50	2.24	15.9	37.5	7.25
24	66.4	13.1	41.1	33.0	13.1	10.2	8.00	4.30	2.24	44.1	149	18.5
25	19.6	21.2	27.2	29.4	12.0	351	9.92	4.30	2.12	22.6	50.8	*47.7
26	17.3	26.7	29.4	26.4	12.0	161	8.64	4.10	2.00	14.2	32.3	21.4
27	15.9	45.4	44.2	25.1	12.3	32.3	7.50	4.30	2.00	12.3	*27.2	24.7
28	18.7	17.3	178	22.0	11.2	110	7.25	4.10	1.88	11.6	25.7	14.2
29	20.2	21.4	124	215	18.9	30.1	6.75	3.57	2.00	10.2	22.6	11.2
30	15.0	35.6	60.9	32.3	61.8	24.5	8.00	---	1.77	9.28	22.6	11.2
31	15.0	217	---	24.5	---	22.0	6.75	---	1.66	---	19.1	---
Total	877.4	1214.2	3152.6	3822.7	896.7	2018.5	349.58	151.97	120.30	550.46	2793.67	455.78
Mean	28.3	39.2	105	123	29.9	65.1	11.3	5.24	3.88	18.3	90.1	15.2
Ac-ft	1740	2410	6250	7580	1780	4000	693	301	239	1090	5540	904

Calendar Year 1963: Max 656 Min 3.74 Mean 51.6 Ac-ft 37370
Fiscal Year 1963-64: Max 656 Min 1.66 Mean 44.8 Ac-ft 32530

Peak discharge (base, 2,000 cfs)

Date	Time	Gage height	Discharge	Date	Time	Gage height	Discharge
9- 3	0900	12.32	2,340	10- 4	0130	14.00	2,850
9- 9	about 1700	18.77	4,500	10-11	1930	14.00	2,850
9-23	1430	11.73	2,160	12- 4	1300	17.84	4,140

* Discharge measurement made on this day.
Note.--No gage-height record Sept. 9-12, Dec. 4-23, May 4-7, 9, 10, 13, 14, June 3.

8650. Pago River near Ordot

Location.--Lat 13°26'10" N., long 144°45'15" E., on left bank 0.8 mile south of Ordot, 2.5 miles south of Agana, and 3.6 miles southeast of Asan.

Drainage area.--6.18 sq mi.

Records available.--September 1951 to June 1964. See also Note below.

Gage.--Water-stage recorder and concrete control. Altitude of gage is 25 ft (from topographic map).

Average discharge.--12 years (1952-64), 26.3 cfs.

Extremes.--Maximum discharge during year, 4,440 cfs Sept. 9 (gage height, 14.70 ft, from floodmarks), from rating curve extended above 320 cfs as explained below; minimum, 1.32 cfs Mar. 30 to Apr. 2, Apr. 5.
1951-64: Maximum discharge, 9,470 cfs Aug. 2, 1962 (gage height, 18.87 ft from floodmarks), from rating curve extended above 320 cfs on basis of slope-area measurements at gage heights 13.22, 15.07 and 18.87 ft; no flow June 5-7, 10-23, 1959.

Remarks.--Records good except those for periods of no gage-height record, which are poor. No diversion above station.

Note.--The figures of maximum discharge for fiscal years 1954 and 1958 have been found to be in error; revised figures are on file in the district office and will be published in the next water-supply paper.

Rating table (gage height, in feet, and discharge, in cubic feet per second)

0.1	0.35	0.7	30.5
.2	1.50	1.0	72.0
.3	3.96	1.5	174
.4	7.90	2.0	256
.5	13.5	3.0	455
.6	21.0	6.0	1,210

Discharge, in cubic feet per second, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	8.90	8.90	17	61.8	8.90	52.8	13.5	4.28	1.90	1.32	7.00	11
2	11.0	9.40	100	42.0	8.90	8.40	11.6	3.34	1.90	1.50	6.10	10
3	8.90	8.40	300	57.2	9.40	19.2	11.0	3.34	1.70	1.50	6.55	24
4	7.45	7.90	70	345	31.5	440	11.0	3.34	2.10	1.50	49.9	14
5	7.00	7.45	40	123	20.7	44.8	10.5	3.64	1.90	1.32	11.6	10
6	16.8	7.00	24	44.8	9.40	33.7	8.90	3.64	1.70	1.50	9.95	9.0
7	8.90	7.00	18	33.8	38.8	25.5	8.40	3.06	1.70	1.50	8.90	8.0
8	39.5	7.00	14	*237	46.4	104	12.8	3.06	1.70	1.50	*136	7.5
9	9.40	9.95	400	17.8	11.0	20.1	8.90	3.34	1.70	1.50	220	7.0
10	134	56.1	120	17.0	8.90	16.3	7.45	3.06	4.60	1.50	56.0	6.5
11	30.5	26.5	40	986	11.6	14.2	7.00	2.80	1.70	14.0	64.8	6.0
12	61.5	37.2	20	451	138	17.8	7.00	3.06	1.70	3.96	154	5.5
13	64.6	58.3	*70	191	58.6	12.2	6.55	3.06	26.4	2.32	200	5.0
14	22.8	*21.9	53.5	116	*17.3	11.0	6.55	*2.56	6.10	2.10	100	4.5
15	18.5	14.2	53.1	39.6	21.0	9.95	6.55	3.06	3.64	1.90	40	4.0
16	46.5	10.5	50.5	32.7	12.8	8.90	6.55	3.34	2.80	1.70	150	4.2
17	18.5	9.40	27.5	24.6	11.0	8.90	6.10	3.06	2.56	1.70	400	4.0
18	*14.9	8.90	56.3	24.6	9.40	8.40	5.70	6.10	2.32	2.10	190	3.9
19	13.5	7.90	22.8	19.3	8.40	7.90	5.30	3.64	2.32	40	100	3.5
20	12.8	12.2	21.0	113	7.90	7.90	*5.30	3.06	*2.10	*126	240	10
21	28.9	154	32.6	22.8	7.90	7.45	4.94	2.80	2.10	21.0	90	4.5
22	11.6	17.8	37.2	16.3	7.90	7.45	4.60	2.56	2.10	53.5	60	3.4
23	9.95	14.2	76.9	14.9	7.90	*7.00	4.94	2.56	1.90	101	30	3.0
24	39.5	11.6	22.8	14.2	7.45	7.00	4.60	2.56	1.90	50.4	150	10
25	13.5	8.40	21.9	12.2	7.45	332	6.10	2.32	1.90	22.8	50	26
26	10.5	14.9	23.7	10.5	7.00	91.8	4.94	2.10	1.90	14.2	24	*6.0
27	9.95	12.2	30.5	9.95	7.00	24.6	4.60	2.32	1.70	11.0	20	13.2
28	27.6	7.90	97.6	9.40	7.00	97.1	4.94	2.32	1.70	9.95	18	96.8
29	11.6	8.40	113	44.4	7.45	27.5	4.60	2.10	1.50	8.40	15	21.0
30	8.90	112	36.0	19.3	7.90	19.3	4.94	------	1.32	7.45	15	31.8
31	8.40	45.4	------	9.95	------	17.8	4.60	------	1.32	------	12	------
Total	736.35	742.90	2009.9	2947.80	564.85	1510.95	220.45	89.48	91.88	510.12	2634.80	373.3
Mean	23.8	24.0	67.0	95.1	18.8	48.7	7.11	3.09	2.96	17.0	85.0	12.4
Ac-ft	1460	1470	3990	5850	1120	3000	437	177	182	1010	5230	740

Calendar Year 1963: Max 986 Min 2.32 Mean 40.1 Ac-ft 29,060
Fiscal Year 1963-64: Max 986 Min 1.32 Mean 34.0 Ac-ft 24,670

Peak discharge (base, 3,000 cfs)

Date	Time	Gage height	Discharge	Date	Time	Gage height	Discharge
9-9	about 0800	14.70	4,440	12-4	1230	13.20	3,710
10-4	0100	13.22	3,720	5-13	0330	13.90	4,000
10-11	1630	11.98	3,220				

* Discharge measurement made on this day.
Note.--No gage-height record Sept. 1-13, Apr. 19, May 13 to June 26.

8752. Benoki-gawa at Benoki

Location.--Lat 26°47'06" N., long 128°14'59" E., on left bank 0.9 mile southeast of Benoki and 1.6 miles east of Sate.

Drainage area.--3.8 sq mi, approximately.

Records available.--December 1963 to June 1964.

Gage.--Water-stage recorder. Altitude of gage is 220 ft (from topographic map).

Extremes.--Maximum discharge during period, 4,360 cfs June 16 (gage height, 8.40 ft), from rating curve extended above 100 cfs by logarithmic plotting; minimum, 4.02 cfs Apr. 27, 28.
Minimum discharge known, 3.20 cfs Oct. 30, 1963, result of discharge measurement.

Remarks.--Records good except those above 200 cfs, which are fair. No diversion above station. Sediment samples for high flows and continuous records of rainfall are obtained at station.

Rating table (gage height, in feet, and discharge, in cubic feet per second)

0.8	4.10	2.5	56.0
1.1	6.80	3.0	108
1.5	12.6	3.5	190
1.9	23.0	4.0	310
2.2	35.3	4.5	475

Discharge, in cubic feet per second, December 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1						-	10.4	16.4	10.4	6.61	4.72	135
2						-	13.7	14.9	9.70	5.61	4.48	193
3						-	*12.5	*13.4	9.12	5.52	4.40	*68.4
4						-	20.3	12.4	*8.91	5.43	4.32	39.8
5						-	11.6	11.6	8.42	5.24	4.51	38.6
6						-	10.0	10.9	51.2	5.24	12.3	32.2
7						-	9.26	10.3	15.7	5.06	8.83	31.7
8						-	18.0	9.85	11.9	4.98	9.10	188
9						-	10.9	9.40	10.8	4.98	142	52.5
10						-	9.85	9.85	10.0	4.90	17.6	35.9
11						-	9.12	8.70	9.40	4.90	39.7	67.3
12						-	8.56	8.42	8.84	5.06	*19.8	42.1
13						-	8.28	7.76	8.56	*4.72	12.4	33.6
14						*17.1	14.7	7.52	9.12	4.64	9.55	41.8
15						22.0	9.40	7.28	8.00	*4.56	8.14	345
16						15.7	8.42	7.40	7.76	4.56	7.40	413
17						25.4	14.9	7.40	7.52	4.64	7.04	*104
18						18.0	9.55	13.1	7.28	4.56	7.04	108
19						14.7	8.56	*7.71	7.16	4.40	53.6	78.9
20						13.0	8.28	7.37	9.91	4.32	22.5	55.1
21						11.6	7.76	12.6	7.28	4.32	17.5	42.3
22						10.6	7.52	9.26	6.70	4.25	13.0	98.6
23						10.0	30.9	8.68	*6.50	7.09	11.1	58.7
24						26.2	26.9	228	6.80	4.87	10.0	39.8
25						18.2	16.3	21.3	6.70	4.32	10.2	33.0
26						12.6	13.2	15.9	6.00	4.25	*10.6	29.9
27						10.8	11.8	13.6	5.90	4.17	9.47	26.9
28						10.2	256	11.8	5.80	*25.5	19.4	24.4
29						9.70	30.6	10.6	5.90	11.1	12.7	22.7
30				/3.20		9.12	22.7	---	6.00	5.40	219	*21.2
31			---		---	8.70	19.4	---	6.60	---	101	---
Total						-	669.36	533.40	299.88	175.20	833.40	2,501.4
Mean						-	21.6	18.4	9.67	5.84	26.9	83.4
Ac-ft						-	1330	1,060	595	348	1650	4,960

Calendar Year 1963: Max - Min - Mean - Ac-ft -
Fiscal Year 1963-64: Max - Min - Mean - Ac-ft -

Peak discharge (base, 1,300 cfs)

Date	Time	Gage height	Discharge	Date	Time	Gage height	Discharge
1-28	0600	7.38	2,770	6- 8	1300	6.11	1,420
2-24	0530	7.37	2,760	6-16	1600	8.40	4,360
5- 9	0930	6.58	1,860				

* Discharge measurement made on this day.
/ Result of discharge measurement.

8755. Yona-gawa at Yona

Location.--Lat 26°45'10" N., long 128°13'18" E., on left bank 0.9 mile southeast of Yona and 2.7 miles east of Hentona School.

Drainage area.--1.7 sq mi, approximately.

Records available.--December 1963 to June 1964.

Gage.--Water-stage recorder and concrete control. Altitude of gage is 150 ft (from topographic map).

Extremes.--Maximum discharge during period, 1,520 cfs June 16 (gage height, 4.90 ft), from rating curve extended above 70 cfs; minimum, 1.95 cfs Apr. 22-28.

Remarks.--Records good except those above 200 cfs, which are fair. No diversion above station. Daily sediment samples and continuous records of rainfall are obtained at station.

Rating table (gage height, in feet, and discharge, in cubic feet per second)

0.89	1.95	1.4	24.5
1.0	3.78	1.6	46.5
1.1	6.35	1.9	92.0
1.2	10.3	2.3	182
1.3	16.4		

Discharge, in cubic feet per second, December 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1						-	6.80	7.70	5.20	3.57	2.08	45.4
2						-	*11.4	7.00	4.70	2.84	2.08	108
3						-	9.30	6.35	4.45	2.68	2.08	*39.9
4						-	10.3	*6.05	*4.00	2.68	2.08	*21.8
5						-	7.35	5.75	3.78	2.52	2.22	18.5
6						-	6.67	5.45	13.0	2.52	5.72	15.0
7						-	6.05	5.20	6.05	2.36	12.2	15.8
8						-	9.26	4.70	4.95	*2.36	6.10	54.2
9						-	6.35	4.45	4.45	2.36	77.4	22.6
10						-	5.75	5.45	4.20	2.36	10.3	16.4
11						-	5.45	4.20	4.00	2.52	21.0	17.7
12						-	5.45	4.00	3.78	2.36	*13.0	15.0
13						*6.67	4.95	3.78	3.57	*2.22	7.35	14.3
14						7.35	7.46	3.57	4.45	2.36	5.75	15.7
15						8.50	5.45	3.57	3.57	*2.22	4.95	145
16						7.00	4.95	3.57	3.37	2.08	4.45	162
17						8.50	8.15	3.57	3.37	2.08	4.20	*62.7
18						6.67	5.45	6.05	3.18	2.08	4.00	49.8
19						5.75	5.20	*3.57	3.18	2.08	38.0	39.0
20						5.45	4.70	3.57	3.57	2.08	15.5	25.6
21				/2.09		5.20	4.45	3.57	3.18	2.08	10.8	20.1
22						4.70	4.45	3.37	3.00	2.08	8.10	85.6
23						4.45	20.0	4.45	*2.84	1.95	7.00	46.4
24						12.7	15.7	64.5	3.18	1.95	6.05	25.6
25						10.4	9.80	9.80	3.18	1.95	6.05	18.5
26						6.67	7.70	7.00	2.68	1.95	*6.35	15.7
27						5.75	7.00	6.05	2.68	1.95	5.75	13.0
28						5.20	*128	5.45	2.68	*6.91	11.2	11.3
29						4.95	16.4	4.95	2.68	*3.76	7.35	9.80
30				/2.90		4.70	11.3	---	2.68	2.22	78.9	*8.90
31			---		---	4.45	8.90	---	3.37	---	40.9	---
Total						-	370.14	206.69	122.97	75.13	428.91	1159.30
Mean						-	11.9	7.13	3.97	2.50	13.8	38.6
Ac-ft						-	734	410	244	149	851	2300

Calendar Year 1963: Max - Min - Mean - Ac-ft -
Fiscal Year 1963-64: Max - Min - Mean - Ac-ft -

* Discharge measurement made on this day.
/ Result of discharge measurement.

Peak discharge (base, 700 cfs)

Date	Time	Gage height	Discharge	Date	Time	Gage height	Discharge
1-28	0600	3.96	896	5- 9	0830	3.83	818
2-24	0500	3.63	705	6-16	1500	4.90	1,520

8762. Takazato-gawa near Hama

Location.--Iat 26°41'10" N., long 128°10'48" E., on right bank 2.3 miles southeast of Hama and 3.0 miles south of Okuma.

Drainage area.--0.9 sq mi, approximately.

Records available.--December 1963 to June 1964.

Gage.--Water-stage recorder. Altitude of gage is 400 ft (from topographic map).

Extremes.--Maximum discharge during period, 2,040 cfs June 16 (gage height, 6.10 ft), from rating curve extended above 44 cfs; minimum, 0.90 cfs May 3-5.

Remarks.--Records fair except those above 100 cfs, which are poor. No diversion above station. Sediment samples for high flows and continuous records of rainfall are obtained at station.

Discharge, in cubic feet per second, December 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1						-	2.28	5.38	2.90	1.75	0.98	18.7
2						-	3.21	4.55	2.70	1.48	.98	32.2
3						-	2.70	4.00	2.50	1.33	.90	20.2
4						-	2.70	3.73	2.50	1.33	.90	*13.5
5						-	2.30	3.50	*2.30	1.18	1.04	11.7
6						1.60	1.93	3.10	10.6	1.18	1.86	9.60
7						1.60	1.75	3.10	3.50	1.05	6.50	9.08
8						1.60	3.39	3.10	2.90	*1.05	4.97	15.1
9						1.48	*2.50	2.90	2.70	1.18	21.1	11.7
10						4.70	2.10	*3.39	2.50	1.33	5.94	9.60
11						4.27	2.10	2.30	2.50	1.33	7.30	8.80
12						2.70	1.75	2.10	2.30	1.18	5.94	8.42
13						1.93	1.75	1.93	2.30	1.05	*4.82	8.42
14						2.50	*2.80	1.75	2.50	1.05	4.27	8.03
15						2.30	1.75	1.75	2.30	1.05	3.50	30.1
16						1.93	1.60	1.93	2.30	1.05	3.10	102
17						2.50	1.93	1.75	2.30	1.48	3.10	43.0
18						1.93	1.60	3.20	2.10	1.05	2.90	*35.0
19						1.75	1.48	1.93	2.10	1.05	7.57	28.1
20						1.75	1.48	1.75	2.50	.98	5.94	22.4
21						1.60	1.48	2.10	1.75	.98	5.38	19.3
22						1.60	1.33	1.75	1.75	*.98	4.27	50.6
23						1.48	5.84	2.30	1.75	.98	4.00	22.1
24						6.03	3.73	15.6	1.93	.98	3.73	13.8
25						4.27	2.70	4.55	*1.60	.98	3.73	11.3
26						2.70	1.93	3.50	1.48	.98	*3.73	9.60
27						2.10	1.75	3.30	1.48	.98	3.10	8.42
28						1.93	25.2	2.90	1.48	1.49	3.30	6.53
29						1.75	*10.1	2.70	1.48	*1.33	2.90	5.94
30						1.60	7.65	---	1.60	1.05	22.1	5.38
31			---		---	1.60	6.53	---	1.93	---	18.3	---
Total						-	111.34	95.84	76.53	34.86	168.15	598.62
Mean						-	3.59	3.30	2.47	1.16	5.42	20.0
Ac-ft						-	221	190	152	69	334	1,190

Calendar Year 1963: Max - Min - Mean - Ac-ft -
Fiscal Year 1963-64: Max - Min - Mean - Ac-ft -

Peak discharge (base, 200 cfs)

Date	Time	Gage height	Discharge	Date	Time	Gage height	Discharge
2-24	0500	3.02	205	6-22	1800	4.16	580
6-16	1530	6.10	2,040				

* Discharge measurement made on this day.

8770. Right Branch of South Fork Henan-gawa near Tsuha

Location.--Lat 26°37'42" N., long 128°05'52" E., on right bank 1.6 miles upstream from Henan-gawa bridge at Highway 1 and 1.6 miles south of Tsuha.

Drainage area.--0.7 sq mi, approximately.

Records available.--November 1963 to June 1964.

Gage.--Water-stage recorder. Altitude of gage is 50 ft (from topographic map).

Extremes.--Maximum discharge during period, 961 cfs June 16 (gage height, 6.47 ft), from rating curve extended above 38 cfs; minimum, 0.35 cfs Dec. 1.

Remarks.--Records fair except those above 100 cfs, which are poor. No diversion above station. Sediment samples for high flows and continuous records of rainfall are obtained at station.

Rating table (gage height, in feet, and discharge, in cubic feet per second)

1.17	0.39	1.6	7.40
1.2	.51	1.8	15.6
1.3	1.22	2.0	28.0
1.4	2.58	2.4	64.0
1.5	4.60		

Discharge, in cubic feet per second, November 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1					-	0.39	0.85	1.55	0.85	0.78	0.51	5.62
2					-	1.89	1.11	1.43	*.78	.66	.51	19.8
3					-	1.37	.93	1.32	.78	.66	.51	6.50
4					-	.78	.85	1.32	.78	*.61	.51	4.14
5					-	.55	.72	1.22	.78	.61	.55	4.36
6					-	.42	.66	1.10	*8.04	.55	1.22	3.30
7					-	.42	.61	1.01	1.68	.55	2.85	3.30
8					-	.39	1.01	1.01	1.10	.55	1.32	10.0
9					-	.39	*.66	.93	1.01	.55	7.23	3.92
10					-	1.94	.51	1.01	1.01	.51	1.55	3.30
11					-	3.30	.55	*.85	.93	.61	4.30	3.10
12					-	1.32	.55	.85	.85	.61	2.10	3.58
13					-	.78	.51	.85	.85	.55	1.10	3.92
14					-	*1.01	1.01	.78	.93	.55	.85	3.50
15					-	1.22	*.66	.78	.85	*.51	.72	34.4
16					-	1.01	.61	.85	.78	.55	.66	60.3
17					-	1.43	*1.01	.78	*.78	.55	.61	11.9
18					-	.93	.66	1.22	.72	.55	*.61	20.1
19					-	.78	.61	.85	.72	.51	10.4	9.20
20					-	.66	.61	.78	.93	.51	2.73	6.20
21					-	.61	.55	.85	.78	.51	1.43	4.85
22					-	.55	.55	.85	.72	.51	1.10	29.2
23					-	.51	5.33	.93	.66	*.51	1.01	20.5
24					-	5.74	3.10	4.65	.72	*.55	.93	8.84
25					-	2.63	1.68	1.43	*.66	.51	.93	5.90
26					0.55	1.43	1.10	1.01	.66	.51	.78	4.60
27					.51	1.10	1.01	.93	*.61	.46	.72	4.60
28					.46	1.01	26.7	.85	.61	.62	.78	3.70
29					.42	.85	3.30	.78	.61	.93	.66	*3.10
30					.39	.78	2.25	---------	.66	.61	29.3	2.75
31			---------		---------	.78	1.81	---------	.93	---------	9.43	---------
Total					-	36.97	62.07	32.77	32.77	17.25	87.91	308.48
Mean					-	1.19	2.00	1.13	1.06	0.575	2.84	10.3
Ac-ft					-	73	123	65	65	34	174	612

Calendar Year 1963: Max - Min - Mean - Ac-ft -
Fiscal Year 1963-64: Max - Min - Mean - Ac-ft -

Peak discharge (base, 160 cfs)

Date	Time	Gage height	Discharge	Date	Time	Gage height	Discharge
1-28	0600	3.12	166	6-16	1400	6.47	961

* Discharge measurement made on this day.

8775. Genka-kawa near Genka

Location.--Lat 26°36'43" N., long 128°03'47" E., on right bank 1.2 miles south of Genka and 2.1 miles southeast of Nakaoshi.

Drainage area.--3.9 sq mi, approximately.

Records available.--November 1963 to June 1964.

Gage.--Water-stage recorder and since Apr. 3, concrete control. Altitude of gage is 90 ft (from topographic map).

Extremes.--Maximum discharge during period, 3,330 cfs June 16 (gage height, 9.78 ft), from rating curve extended above 170 cfs; minimum, 2.26 cfs Dec. 1.
Minimum discharge known, 1.89 cfs Oct. 21, 1963, result of discharge measurement.

Remarks.--Records fair except those for period of indefinite stage-discharge relation and those above 400 cfs, which are poor. No diversion above station. Daily sediment samples and continuous records of rainfall are obtained at station.

Rating tables, except for period of indefinite stage-discharge relation
(gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Nov. 22 to Dec. 10, June 16-30)

Nov. 22 to Apr. 2				Apr. 3 to June 30			
0.55	2.26	1.1	20.2	0.89	2.78	1.6	49.0
.6	3.00	1.4	43.5	1.0	5.60	2.0	105
.7	4.82	1.8	94.0	1.1	9.30	2.5	206
.9	10.6			1.2	14.4	3.0	333
				1.3	21.2	3.5	485

Discharge, in cubic feet per second, November 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1					-	2.26	4.82	8.30	4.60	e6.0	2.97	*80.0
2					-	9.30	6.30	7.12	*4.18	e4.5	2.78	164
3					-	9.11	6.03	6.57	4.18	4.15	2.97	58.6
4					-	6.03	6.30	6.57	4.18	4.15	2.78	33.8
5					-	4.18	4.82	*6.30	4.18	4.15	3.20	34.7
6					-	3.63	4.18	5.78	36.5	3.90	*8.50	28.2
7					-	3.45	4.18	5.30	10.3	*3.65	10.0	24.3
8					-	3.30	6.59	5.08	7.40	3.65	7.83	*60.7
9					-	3.15	*4.40	4.82	*6.30	3.65	36.5	32.8
10					-	7.56	3.63	5.30	6.03	3.65	10.3	25.1
11					-	13.7	3.45	*4.82	5.78	3.90	*24.6	24.3
12					-	7.12	3.30	4.82	5.53	3.90	14.9	23.1
13					-	4.82	3.15	4.60	5.53	3.65	*7.33	33.5
14					-	5.78	6.95	4.60	7.70	3.42	5.30	29.0
15					-	6.30	*4.40	4.40	5.53	3.42	4.75	221
16					-	5.30	3.63	4.60	5.08	3.20	4.15	388
17					-	*8.30	5.98	4.60	*5.08	3.20	4.15	99.7
18					-	5.53	4.18	7.39	4.82	3.20	4.15	100
19					-	4.60	3.98	5.08	4.60	2.97	*64.6	64.9
20					-	3.98	3.63	4.82	5.78	*2.97	21.2	41.6
21				/1.89	-	3.45	3.30	5.08	5.08	*2.97	12.2	33.8
22					3.15	3.30	3.00	4.60	4.40	2.78	8.50	39.7
23					2.70	3.00	28.5	5.12	4.40	2.78	8.10	58.2
24					2.55	22.4	19.1	16.3	4.60	*2.78	6.60	37.6
25					23.7	12.8	10.3	8.00	*4.82	2.78	6.60	30.0
26					3.30	7.40	7.70	*5.78	*4.40	2.97	5.92	25.9
27					2.85	5.78	6.57	5.08	e4.0	2.78	5.60	22.8
28					2.55	5.08	89.2	4.82	e4.0	*3.65	5.60	19.8
29					2.40	4.60	16.4	4.40	e4.0	5.00	5.30	18.5
30				/2.24	2.40	4.40	11.4	---	*e4.6	3.20	154	16.4
31			---		---	4.18	9.25	---	e10	---	98.1	---
Total					-	193.79	298.62	171.05	197.58	106.97	559.48	1870.0
Mean					-	6.25	9.63	5.90	6.37	3.56	18.0	62.3
Ac-ft					-	384	592	339	392	212	1,110	3,710

Calendar Year 1963: Max - Min - Mean mgd - Mean cfs - Ac-ft -
Fiscal Year 1963-64: Max - Min - Mean mgd - Mean cfs - Ac-ft -

Peak discharge (base, 700 cfs)

Date	Time	Gage height	Discharge
6-16	1430	9.78	3,330

* Discharge measurement made on this day.
/ Result of discharge measurement.
e Stage-discharge relation indefinite.

8782. Hanechi-okawa at Kawakami

Location.--Lat 26°36'28" N., long 128°01'16" E., on left bank 0.4 mile south of Kawakami, 0.7 mile southeast of Taira School, and 1.0 mile southwest of Nakaoshi.

Drainage area.--4.4 sq mi, approximately.

Records available.--November 1963 to June 1964.

Gage.--Water-stage recorder and concrete dam with regulating-headgate control. Altitude of gage is 50 ft (from topographic map).

Extremes.--Maximum discharge during period, 4,240 cfs June 16 (gage height, 7.03 ft), from rating curve extended above 190 cfs; minimum, not determined; minimum daily, 1.8 cfs Nov. 30, Dec. 1.

Remarks.--Records fair except those for periods of indefinite stage-discharge relation or no gage-height record, which are poor. No diversion above station. Records include small diversion from gage pool for irrigation below station. Sediment samples for high flows and continuous records of rainfall are obtained at station.

Rating tables (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used Dec. 31 to Jan. 16, Feb. 11-18, Apr. 9 to May 9, May 20-28)

Dec. 31 to Mar. 5		Mar. 6 to May 5				May 6 to June 30			
0.4	2.75	0.9	1.96	2.3	15.5	1.8	2.75	2.5	37.0
1.0	5.20	1.1	2.54	2.4	21.5	2.0	4.15	2.7	84.0
1.7	9.60	1.6	4.60	2.5	37.0	2.1	5.40	3.0	187
2.2	15.7	1.9	6.90	2.7	84.0	2.2	7.20	3.5	435
2.4	22.0	2.1	9.70			2.3	10.5	4.0	760
2.5	37.0					2.4	21.0		
2.6	58.0								

Discharge, in cubic feet per second, November 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1					-	1.8	2.98	7.35	5.87	6.47	2.33	*75.4
2					-	7.0	3.40	7.11	*5.47	4.40	2.13	162
3					-	6.0	3.48	6.93	5.20	*3.75	2.16	80.9
4					-	4.0	3.72	6.75	6.04	3.40	1.99	45.4
5					-	3.0	3.29	*6.42	6.42	3.03	2.10	39.1
6					-	2.6	3.17	5.76	63.7	2.73	6.74	33.8
7					-	2.5	3.13	5.24	20.3	2.42	6.52	27.4
8					-	2.4	3.40	4.80	15.5	2.42	10.7	45.4
9					-	2.4	*3.17	4.58	12.7	2.36	45.1	35.4
10					-	4.0	3.09	*7.43	*10.2	2.36	14.7	27.4
11					-	12	3.05	*4.84	9.53	2.51	17.8	25.8
12					-	6.0	2.98	4.36	7.78	2.66	12.6	24.2
13					-	4.0	2.94	4.00	7.23	2.48	8.52	35.4
14					-	4.5	5.50	3.88	7.01	2.30	7.02	35.4
15					-	4.7	*4.12	3.88	6.27	2.21	4.78	196
16					-	4.5	3.92	4.28	5.52	2.21	3.62	582
17					-	*8.0	5.0	4.54	*5.14	2.21	2.82	182
18					-	5.0	4.0	10.2	4.96	2.16	*2.94	146
19					-	3.8	3.8	5.98	4.72	2.16	28.0	128
20					-	3.3	3.2	5.12	7.10	*2.02	14.6	65.8
21				/0.40	-	3.0	*2.86	6.93	6.05	*2.02	7.86	47.5
22					2.1	2.8	2.86	5.70	4.30	1.99	6.84	55.9
23					2.0	2.7	7.40	6.01	4.15	2.63	6.30	96.5
24					1.9	16	6.28	16.7	4.78	2.73	6.12	71.0
25					14	11	4.04	8.97	4.90	2.27	6.12	45.4
26					4.0	7.0	3.44	*7.87	3.70	2.56	5.58	35.4
27					2.5	*4.8	3.13	7.11	3.75	2.58	5.28	29.0
28					2.0	4.0	44.5	5.98	3.70	2.45	*4.65	24.2
29					1.9	3.5	11.0	5.24	4.20	4.72	4.08	*21.0
30					1.8	3.0	8.56	---	4.35	3.17	116	16.8
31			---		---	*2.90	7.80	---	9.22	---	93.1	---
Total					-	152.20	173.21	183.96	269.76	83.38	459.10	2435.5
Mean					-	4.91	5.59	6.34	8.70	2.78	14.8	81.2
Ac-ft					-	302	344	365	535	165	911	4830

Calendar Year 1963: Max - Min - Mean mgd - Mean cfs - Ac-ft -
Fiscal Year 1963-64: Max - Min - Mean mgd - Mean cfs - Ac-ft -

Peak discharge (base, 600 cfs)

Date	Time	Gage height	Discharge
6-16	1630	7.03	4,240

* Discharge measurement made on this day.
/ Result of discharge measurement.
Note.--Stage-discharge relation indefinite prior to Dec. 31; no gage-height record Jan. 17-20.

8785. Oi-kawa at Jingusuku

Location.--Lat 26°39'07" N., long 127°57'24" E., on left bank 0.1 mile west of Jingusuku, 0.8 mile west of Gogayama, and 2.5 miles east of Manna.

Drainage area.--3.1 sq mi, approximately.

Records available.--March to June 1964.

Gage.--Water-stage recorder and concrete control. Altitude of gage is 180 ft (from topographic map).

Extremes.--Maximum discharge during period, 982 cfs June 16 (gage height, 4.97 ft), from rating curve extended above 21 cfs by logarithmic plotting; no flow for many days.

Remarks.--Records good except those for period of no gage-height record and those above 50 cfs, which are poor. Sediment samples for high flows and continuous records of rainfall are obtained at station.

Rating table (gage height, in feet, and discharge, in cubic feet per second)

0.97	0	1.6	8.90
1.0	.02	1.8	18.6
1.1	.20	2.1	42.0
1.2	.72	2.5	91.0
1.3	1.70	3.0	184
1.4	3.30	3.5	316
1.5	5.60		

Discharge, in cubic feet per second, March to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1									-	0	0.02	5.0
2									-	0	0	*22
3									-	0	0	12
4									-	0	.09	9.2
5									-	0	.14	8.8
6									-	0	4.12	8.0
7									-	0	1.96	7.4
8									-	0	1.57	*13
9									-	0	1.25	9.4
10									-	0	.88	8.0
11									-	0	*2.98	7.2
12									-	0	2.75	6.6
13									-	0	1.45	15
14									-	0	.88	7.0
15									-	0	.59	115
16									-	0	.37	300
17									-	0	.29	35
18									-	0	.24	60
19									-	0	*8.19	15
20									-	0	5.60	10
21									-	0	2.75	9.0
22									-	0	1.70	25
23									0.07	*0	1.25	40
24									.11	0	.88	*10
25									.07	0.23	.88	*8.10
26									.02	1.25	.59	7.40
27									0	1.25	.53	6.50
28									0	.91	*.37	5.90
29									0	1.50	.3	5.35
30								---	0	.28	20	4.85
31			---		---			---	0	---	7.0	---
Total									-	5.42	69.61	795.70
Mean									-	0.181	2.24	26.5
Ac-ft									-	11	114	1,580

Calendar Year Max Min Mean Ac-ft
Fiscal Year 1963-64: Max - Min - Mean - Ac-ft -

Peak discharge (base, 200 cfs)

Date	Time	Gage height	Discharge
6-16	1600	4.97	982

* Discharge measurement made on this day.
Note.--No gage-height record May 29 to June 24.

8820. Tengan-gawa at Yamashiro

Location.--Lat 26°24'26" N., long 127°48'35" E., on right bank 0.4 mile west of Yamashiro, 0.8 mile southwest of Iha, and 1.2 miles west of Higashi-onna.

Drainage area.--0.8 sq mi, approximately.

Records available.--June 1963 to September 1964 (discontinued).

Gage.--Water-stage recorder and combination of sharp-crested weir and concrete control. Altitude of gage is 180 ft (from topographic map). Prior to Nov. 7, 1963, at datum 0.30 ft higher.

Extremes.--1963: Maximum discharge during period in June, 5.05 cfs June 19 (gage height, 1.40 ft); minimum, 0.17 cfs June 30.
1963-64: Maximum discharge during fiscal year, 1,300 cfs June 16 (gage height, 11.3 ft, from floodmark), from rating curve extended above 59 cfs on basis of theoretical rating for the artificial control and a field estimate of peak flow; minimum, 0.05 cfs July 23-25.
1964: Maximum discharge during period July to September, 787 cfs July 24 (gage height, 8.08 ft), from rating curve extended above 59 cfs as explained above; minimum, 0.68 cfs Sept. 9.

Remarks.--Records good except those for periods of no gage-height record, which are fair, and those above 100 cfs, which are poor. No diversion above station.

Rating tables (gage height, in feet, and discharge, in cubic feet per second)

June 12 to Nov. 6, 1963

0.19	0.05	1.3	4.25
.3	.16	1.6	7.20
.4	.30	1.7	9.40
.5	.49	1.8	12.7
.6	.74	2.1	26.5
.9	1.84		

Nov. 7, 1963, to Sept. 22, 1964

0.6	0.16	1.9	7.20
.7	.30	2.0	9.40
.8	.49	2.3	21.5
.9	.74	2.5	33.5
1.2	1.84	3.0	72.0
1.6	4.25	4.0	178

Discharge, in cubic feet per second, 1963

June 12	0.68	June 17	0.33	June 22	0.35	June 27	0.19
13	.62	18	.80	23	.30	28	.22
14	.52	19	2.10	24	.25	29	.19
15	.53	20	1.02	25	.35	30	.17
16	.42	21	.58	26	.22		

Peak discharge (base, 180 cfs).--No peak above base.

Discharge, in cubic feet per second, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	0.16	0.72	0.57	*0.31	0.21	0.25	0.83	1.17	0.77	0.92	0.59	21.7
2	.15	.28	.81	.29	.21	*a28	1.56	1.08	.74	.76	.60	a58
3	.14	.17	.64	.27	.21	3.0	1.13	1.06	.71	.67	.64	7.57
4	.13	.66	.52	.25	.20	1.50	1.09	1.23	.71	.64	.53	3.69
5	.13	.45	.42	.24	.19	*.85	.81	1.05	.71	.59	.51	5.17
6	.21	.24	.37	.24	.19	.66	.71	.99	*9.07	.58	a 2.5	3.99
7	.24	.15	.37	.22	*.20	.59	.68	*.95	2.47	.53	a16	3.51
8	.18	.10	.35	.19	.22	.51	.97	.92	1.31	.53	a4.5	10.8
9	.22	.09	1.03	*.29	.20	.47	.83	.89	1.01	.56	1.83	4.47
10	.21	.10	8.20	.29	.18	*1.83	.68	1.04	.92	.56	1.15	3.17
11	.15	.16	1.56	.21	.20	*4.70	.64	.92	.86	.59	2.54	3.52
12	.19	a26	*.66	.18	.20	2.0	.61	.83	.80	.53	2.19	22.4
13	.19	1.62	.41	.17	.18	1.16	*.61	.80	.77	.49	1.39	11.3
14	.13	.84	1.15	.21	*.19	1.31	3.50	*.76	*.77	.49	1.03	4.66
15	.10	.52	1.94	.21	.20	1.16	1.29	.71	.74	.47	.85	64.6
16	.13	.36	.74	.19	.19	1.06	.89	.71	.71	*.45	.77	**a90
17	.10	.29	.46	.18	.17	2.53	1.11	.77	.71	.45	.74	a11
18	.08	.25	.35	.15	.18	1.35	.83	1.64	.66	.41	.74	a50
19	.10	.22	.33	.14	.19	.97	.71	.95	*.68	.39	2.75	14.8
20	.14	.22	2.10	.13	*1.20	.81	*.70	.83	.88	.39	3.69	7.82
21	.06	.18	1.57	.10	.60	.71	.68	.79	.86	.39	1.44	6.30
22	.07	.18	.63	.11	.38	.66	.66	.74	.71	.39	1.31	5.32
23	.05	.16	.44	.11	.32	*.62	*13.7	.81	.66	1.06	1.24	6.32
24	.05	.16	.35	.19	.41	1.30	*6.53	1.80	.77	.90	1.08	4.12
25	.06	.15	.33	1.76	3.07	1.15	2.64	1.04	.80	.56	.96	3.74
26	.08	.14	*.56	.54	.61	.80	1.72	.83	*.64	.45	.89	3.24
27	.13	.09	.49	.35	.37	.70	1.40	.77	.59	.42	.86	3.03
28	.11	.10	.60	.29	.30	.61	3.99	.74	.59	1.55	.86	2.80
29	.10	1.54	.39	*.25	.27	.59	1.97	.71	.61	1.47	.80	2.63
30	.10	1.51	.34	.24	.24	.56	*1.62	---	.74	.77	46.8	2.45
31	.12	.80	---	.22	---	.54	*1.32	---	1.75	---	9.96	---
Total	4.01	38.45	28.68	8.52	11.48	62.95	56.41	27.53	34.72	18.96	111.74	442.12
Mean	0.129	1.24	0.956	0.275	0.383	2.03	1.82	0.949	1.12	0.632	3.60	14.7
Ac-ft	8.0	76	57	17	23	125	112	55	69	38	222	877

Calendar Year 1963: Max - Min - Mean - Ac-ft -
Fiscal Year 1963-64: Max 90 Min 0.05 Mean 2.31 Ac-ft 1680

* Discharge measurement made on this day.
** Field estimate made on this day.
a No gage-height record.

Peak discharge (base, 180 cfs)

Date	Time	Gage height	Discharge	Date	Time	Gage height	Discharge
8-12	0500	8.45	898	6-12	2200	4.80	283
12- 2	0600	10.15	1,130	6-16	1400	11.3	1,300
5-30	1800	4.84	289	6-18	1200	9.87	1,080
6- 2	1200	6.30	503				

8820. Tengan-gawa at Yamashiro--Continued

Discharge, in cubic feet per second, July to September 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	2.25	2.01	0.95									
2	2.16	1.87	.92									
3	2.01	3.64	.89									
4	1.91	2.64	.86									
5	1.87	1.84	.83									
6	1.79	1.74	.83									
7	1.69	1.63	.83									
8	1.60	1.55	.77									
9	1.52	1.52	.74									
10	1.49	1.53	24.9									
11	1.45	1.32	6.78									
12	1.49	1.34	4.25									
13	1.44	1.42	2.80									
14	1.32	1.25	2.01									
15	1.28	1.25	1.60									
16	2.65	1.18	1.32									
17	2.10	1.83	1.18									
18	1.56	1.52	1.08									
19	1.49	5.14	1.05									
20	23.0	2.12	.98									
21	2.78	1.69	.95									
22	1.68	1.45	.95									
23	2.49	1.28	-									
24	1.41	1.18	-									
25	1.28	1.08	-									
26	42.3	1.05	-									
27	145	.95	-									
28	7.29	.95	-									
29	3.42	.92	-									
30	2.47	.92	-					---				
31	2.11	.92	---		---			---		---		---
Total	268.30	50.73	-									
Mean	8.65	1.64	-									
Ac-ft	532	101	-									

Calendar Year 1964: Max - Min - Mean - Ac-ft -
Fiscal Year 1964-65: Max - Min - Mean - Ac-ft -

Peak discharge (base, 180 cfs)

Date	Time	Gage height	Discharge	Date	Time	Gage height	Discharge
7-24	2400	8.08	787	9-10	1600	5.37	364

8828. Kanna-gawa near Kanna

Location.--Lat 26°29'20" N., long 127°56'46" E., on left bank 1.6 miles northwest of Kanna-shogakko (elementary school), 1.7 miles upstream from bridge at mouth, and 2.6 miles northeast of Kin.

Drainage area.--0.9 sq mi, approximately.

Records available.--June 1963 to June 1964.

Gage.--Water-stage recorder and combination of sharp-crested weir and concrete control. Altitude of gage is 70 ft (from topographic map). Prior to Nov. 14, 1963, at datum 0.40 ft higher.

Extremes.--1963: Maximum discharge during period in June, 4.38 cfs June 20 (gage height, 1.26 ft); minimum, 0.33 cfs June 27, 28.
1963-64: Maximum discharge during fiscal year, 810 cfs June 16 (gage height, 5.60 ft, from floodmark), from rating curve extended above 19 cfs on basis of theoretical rating for the artificial control; minimum, 0.12 cfs July 24, 26, 27.

Remarks.--Records good except those for periods of no gage-height record and those above 40 cfs, which are fair. No diversion above station. Continuous records of rainfall are obtained at station.

Rating tables (gage height, in feet, and discharge, in cubic feet per second)

June 12 to Nov. 13, 1963

0.3	0.14	0.9	1.96
.4	.28	1.3	4.70
.5	.48	1.4	6.40
.6	.74	1.5	11.5
.7	1.08	1.9	36.0

Nov. 14, 1963, to June 30, 1964

0.7	0.14	1.7	4.70
.8	.28	1.8	6.40
.9	.48	2.0	17.0
1.0	.74	2.5	51.0
1.1	1.08	3.0	106
1.3	1.96		

Discharge, in cubic feet per second, 1963

June 12	0.77	June 17	0.42	June 22	0.48	June 27	0.39
13	.58	18	.44	23	.66	28	.39
14	.64	19	1.43	24	.49	29	.44
15	.80	20	1.53	25	.60	30	.42
16	.48	21	.70	26	.42		

Peak discharge (base, 180 cfs).--No peak above base.

Discharge, in cubic feet per second, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	0.37	0.35	0.27	0.42	0.30	0.27	0.42	0.66	0.71	0.68	*0.39	9.61
2	.34	.27	.33	.37	.28	1.54	.68	.60	.53	*.52	.46	19.5
3	.31	1.42	.32	.33	.25	1.30	.58	.60	.50	.47	.48	5.29
4	.32	.90	.30	.30	.25	.70	.53	.63	.50	.44	.37	2.93
5	.30	1.01	.25	.27	.25	.44	.39	.60	.50	.42	.44	4.07
6	.52	.75	.23	.27	.25	.37	.37	.58	*6.08	.39	2.06	a3.3
7	1.28	.35	.28	.25	*.25	.35	.42	.52	1.50	.37	a15	a2.8
8	.39	.28	.23	.22	.25	.33	.70	.50	.86	.35	2.66	a7.0
9	.35	.23	.35	.28	.31	.32	.50	.50	.68	.35	a30	a3.3
10	.28	.27	5.40	.33	.30	1.22	.42	.85	.63	.35	3.61	a2.6
11	.27	.46	1.69	.32	.28	*1.67	.44	.53	.58	.42	a2.2	a3.0
12	.25	29.5	1.02	.28	.27	.94	.42	.48	.55	.35	a1.9	9.15
13	.23	7.04	.46	.25	.25	.55	.42	.46	*.53	.33	1.56	8.24
14	.19	2.46	.81	.22	.27	1.07	3.22	*.44	.53	.33	1.36	4.59
15	.18	1.76	1.87	.22	.27	1.23	.82	.44	.50	.32	1.27	a72
16	.18	1.54	1.21	.23	*.27	.77	.58	.53	.48	*.33	1.08	a65
17	.16	.65	.57	.22	.27	1.81	.94	.48	.48	.33	.89	a12
18	.16	.58	.39	.22	*.27	.75	.58	1.16	.48	.35	.80	a46
19	.24	.53	.39	.19	.27	.55	.48	.55	*.46	.35	3.13	a13
20	.50	.50	.48	.18	*1.02	.48	*.56	.50	.92	.35	2.74	6.40
21	.20	.44	.50	.18	.44	.42	.48	*.48	.59	.33	1.67	5.38
22	.18	.37	.46	.18	.37	.39	.44	.46	.46	.33	1.40	4.70
23	.15	.33	.42	.16	.32	*.39	*6.04	.59	.46	.33	1.36	39.4
24	.14	1.24	.35	.18	.30	1.34	*2.86	2.68	.53	.33	1.23	7.04
25	.15	1.60	.33	2.04	1.64	.88	1.20	.86	.50	.32	1.14	5.21
26	.14	.44	.35	.58	.39	.55	.83	.58	*.42	.82	1.14	4.73
27	3.11	.35	.37	.32	.32	.44	.68	.53	.39	.68	1.00	4.38
28	.58	.33	.42	.32	.30	.42	4.36	.50	.39	.51	.89	4.06
29	.30	.37	.48	.32	.30	.39	1.35	.48	.44	.84	.91	3.76
30	.58	.77	.44	*.41	.27	.39	.96	---	.60	.48	27.5	3.55
31	.35	.38	---	*.32	---	.37	*.74	---	1.40	---	7.57	---
Total	12.70	57.47	20.97	10.38	10.78	22.64	33.41	18.77	24.18	12.77	118.21	381.99
Mean	0.410	1.85	0.699	0.335	0.359	0.730	1.08	0.647	0.780	0.426	3.81	12.7
Ac-ft	25	114	42	21	21	45	66	37	48	25	234	758

Calendar Year 1963: Max - Min - Mean - Ac-ft -
Fiscal Year 1963-64: Max 72 Min 0.14 Mean 1.98 Ac-ft 1440

Peak discharge (base, 180 cfs)

Date	Time	Gage height	Discharge	Date	Time	Gage height	Discharge
8-12	0830	4.46	531	6-18	1300	4.50	420
5-30	1900	3.50	183	6-23	1700	4.78	504
6-16	1400	5.60	810				

* Discharge measurement made on this day.
a No gage-height record.

8830. Ufu-kawa near Ginoza

Location.--Lat 26°29'36" N., long 127°58'08" E., on left bank 1.1 miles northwest of Ginoza and 1.4 miles northeast of Kanna.

Drainage area.--1.3 sq mi, approximately.

Records available.--June 1963 to June 1964.

Gage.--Water-stage recorder and combination of sharp-crested weir and concrete control. Altitude of gage is 120 ft (from topographic map). Prior to Nov. 14, 1963, at datum 0.50 ft higher.

Extremes.--1963: Maximum discharge during period in June, 9.62 cfs June 11 (gage height, 1.63 ft); minimum, 0.10 cfs June 7.
1963-64: Maximum discharge during fiscal year, 455 cfs June 16 (gage height, 5.50 ft), from rating curve extended above 25 cfs on basis of theoretical rating for the artificial control; minimum, 0.05 cfs July 29.

Remarks.--Records good except those above 50 cfs, which are fair. Some regulation by two reservoirs above station. Diversion from reservoirs for irrigation of 262 acres of rice fields below station. Small diversion from reservoir on Left Fork for domestic use in Ginoza.

Rating tables (gage height, in feet, and discharge, in cubic feet per second)

June 7 to Nov. 13, 1963

0.2	0.05	1.0	2.50
.3	.13	1.3	4.80
.4	.27	1.6	8.40
.5	.46	1.7	12.5
.7	1.05	1.8	18.0

Nov. 14, 1963, to June 30, 1964

0.8	0.13	1.8	4.80
.9	.27	2.1	8.40
1.0	.46	2.2	12.5
1.2	1.05	2.3	18.0
1.5	2.50	2.8	62.0

Discharge, in cubic feet per second, 1963

June 7	0.12	June 13	0.23	June 19	0.47	June 25	0.20
8	.14	14	.22	20	.38	26	.14
9	.15	15	.20	21	.23	27	.13
10	.82	16	.17	22	.20	28	.15
11	1.36	17	.14	23	.20	29	.20
12	.27	18	.21	24	.25	30	.31

Discharge, in cubic feet per second, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	0.18	0.17	0.25	0.25	0.19	0.15	0.23	0.33	0.39	0.51	0.58	10.4
2	.12	.13	.30	.23	.19	1.38	.32	.30	.30	.39	.69	21.8
3	.11	.61	.23	.23	.19	.63	.28	.28	.30	.35	.66	7.56
4	.11	.70	.20	.27	.19	.32	.27	.28	.28	.35	.60	4.53
5	.10	.41	.19	.23	.19	.23	.22	.27	.28	.32	.66	5.16
6	.18	.32	.38	.22	.19	.20	.20	.27	3.85	.32	1.53	4.53
7	.58	.19	.36	.20	*.19	.19	.22	.25	*1.20	.30	16.5	4.21
8	.15	.17	.20	.20	.20	.18	.33	.25	.58	.30	6.52	6.44
9	.13	.14	.28	.28	.19	.17	.25	.25	.43	*.28	39.5	4.43
10	.11	.38	2.12	*.22	.18	*.56	.22	.37	.39	.28	8.81	3.82
11	.10	1.00	.74	.20	.19	.97	.22	.27	.35	.30	7.98	4.89
12	.09	18.0	*.35	.19	.19	.43	.20	.23	.33	.25	7.28	6.84
13	.09	3.50	.28	.19	.20	.28	.20	.23	*.33	.23	6.28	7.39
14	.08	1.93	1.19	.20	*.19	.57	1.68	*.25	.32	.22	5.60	9.35
15	.08	.81	.94	.20	.19	.64	.39	.25	.32	.20	17.1	61.2
16	.07	.46	.41	.19	.18	.43	.28	.27	.30	*.19	22.3	61.8
17	.07	.33	.30	.20	.17	.77	.66	.27	.30	.20	7.53	23.8
18	.07	.33	.25	*.17	.20	.39	.30	.65	.30	.22	.55	44.9
19	.16	.27	.27	.17	.29	.30	.25	.33	*.28	.18	8.00	*22.4
20	.13	.32	.30	.17	*.61	.25	.23	.30	.52	.26	3.86	16.4
21	.08	.42	.28	.17	.25	.23	.23	*.28	.39	.47	3.10	14.7
22	.07	.30	.25	.17	.25	.22	.22	.28	.32	.57	2.86	6.79
23	.07	.30	.23	.17	.19	*.22	2.80	.36	.30	.18	2.80	35.5
24	.07	.72	.23	.24	.19	.94	1.57	1.70	.33	.18	1.91	3.62
25	.07	.35	.23	1.21	.91	.55	.63	.51	.32	.18	.91	2.38
26	.07	.27	1.45	.32	.23	.35	.43	.35	*.28	.97	.66	1.97
27	.07	.25	.48	.27	.18	.28	.35	.32	.27	.43	.58	1.75
28	.07	.25	.37	.22	.17	.25	2.35	.28	.27	.54	1.02	1.60
29	.06	.27	.30	.22	.15	.23	.78	.27	.30	.60	.66	1.45
30	.19	.86	.27	*.20	.15	*.23	.48	---	.42	.63	27.8	1.32
31	.11	.28	---	.20	---	.22	*.39	---	1.10	---	9.88	---
Total	3.64	34.44	13.63	7.60	6.98	12.76	17.18	10.25	15.65	10.40	214.71	402.93
Mean	0.117	1.11	0.454	0.245	0.233	0.412	0.554	0.353	0.505	0.347	6.93	13.4
Ac-ft	7.2	68	27	15	14	25	34	20	31	21	426	799

Calendar Year 1963: Max - Min - Mean - Ac-ft -
Fiscal Year 1963-64: Max 61.8 Min 0.06 Mean 2.05 Ac-ft 1490

* Discharge measurement made on this day.

8833. Left Fork O-kawa near Kushi

Location.--Lat 26°31'18" N., long 127°59'50" E., on left bank 1.1 miles northwest of Kushi and 1.1 miles north of Katabaru.

Drainage area.--0.3 sq mi, approximately.

Records available.--June 1963 to June 1964.

Gage.--Water-stage recorder and combination of sharp-crested weir and concrete control. Altitude of gage is 60 ft (from topographic map). Prior to Nov. 20, 1963, at datum 0.40 ft higher.

Extremes.--1963: Maximum discharge during period in June, 4.80 cfs June 10 (gage height, 1.30 ft); minimum, 0.06 cfs June 9.
1963-64: Maximum discharge during fiscal year, 179 cfs June 16 (gage height, 3.82 ft), from rating curve extended above 0.7 cfs on basis of theoretical rating for the artificial control; minimum, 0.05 cfs July 17-27, 29.

Remarks.--Records good except those above 10 cfs, which are fair. No diversion above station. Continuous records of rainfall are obtained at station.

Rating tables (gage height, in feet, and discharge, in cubic feet per second)

June 6 to Nov. 20, 1963

0.2	0.5	0.8	1.45
.3	.13	1.0	2.55
.4	.27	1.3	4.80
.5	.46	1.6	8.40
.6	.73	1.7	11.4

Nov. 21, 1963, to June 30, 1964

0.6	0.05	1.4	2.55
.7	.13	1.7	4.80
.8	.27	2.0	8.40
.9	.46	2.1	11.4
1.0	.73	2.3	21.0
1.2	1.45		

Discharge, in cubic feet per second, 1963

June 6	0.09	June 11	0.26	June 16	0.11	June 21	0.18	June 26	0.11
7	.08	12	.18	17	.10	22	.11	27	.10
8	.08	13	.12	18	.11	23	.11	28	.31
9	.08	14	.16	19	.58	24	.14	29	.16
10	1.01	15	.16	20	.18	25	.18	30	.12

Peak discharge (base, 60 cfs).--No peak above base

Discharge, in cubic feet per second, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	0.10	0.21	0.11	0.13	0.08	0.07	0.15	0.14	0.13	0.17	*0.07	3.57
2	.09	.22	.20	.12	.08	.51	.17	.13	.11	*.11	.08	7.38
3	.08	.54	.17	.11	.08	.22	.13	.12	.10	.11	.08	2.36
4	.08	2.08	.17	.10	.07	.11	.14	.13	.10	.09	.07	1.23
5	.08	.29	.15	.10	.07	.09	.11	.12	.09	.09	.09	1.43
6	.13	.13	.13	.09	.07	.08	.10	.11	2.04	.08	.37	1.08
7	.14	.15	.16	.08	.08	.08	.10	.11	*.40	.08	2.96	.87
8	.10	.17	.15	.08	.07	.08	.17	.10	.22	.08	*1.06	2.11
9	.11	.30	.33	.18	.07	.08	.12	.10	.17	.08	3.50	1.09
10	.09	.32	1.46	*.12	.06	*.26	.10	.14	.15	.08	1.20	.82
11	.08	.42	.32	.09	.06	.44	.10	.10	.14	.11	.75	.84
12	.08	10.3	.19	.08	.07	.18	.10	.09	.13	.07	.62	1.55
13	.07	2.20	.16	.08	.07	.11	.10	.09	*.11	.07	.38	1.74
14	.06	1.60	.50	.08	*.07	.24	.43	*.08	.11	.07	.27	1.20
15	.06	1.06	.41	.08	.08	.31	.14	.08	.11	.07	.22	13.8
16	.06	.32	.21	.08	.08	.19	.11	.10	.11	.07	.21	19.1
17	.05	.25	.15	.08	.06	.35	.24	.10	.10	.07	.19	4.29
18	.05	.22	.14	.07	.07	.16	.12	.29	.10	.07	.19	10.7
19	.05	.25	.20	.07	.18	.11	.10	.13	.10	.06	4.81	4.19
20	.05	2.35	.17	.07	*.29	.10	.09	*.11	.16	.06	.98	2.52
21	.05	.50	.13	.07	.10	.09	.09	.10	.12	.06	.54	1.88
22	.05	.31	.12	.07	.09	.08	.09	.09	.10	.06	*.40	1.54
23	.05	.48	.11	.06	.08	*.08	1.31	.14	.09	.06	.32	5.16
24	.05	1.47	.09	.08	.12	.40	.56	.52	.11	.06	.28	2.46
25	.05	.52	.10	.53	.41	.24	.25	.17	.10	.06	.32	1.70
26	.05	.24	.37	.12	.09	.13	.17	.12	*.09	.07	.27	1.42
27	.05	.17	.16	.11	.08	.10	.14	.11	.08	.07	.23	1.25
28	.06	.15	.84	.09	.07	.10	1.76	.10	.08	.10	.34	1.09
29	.05	.14	.27	.08	.07	.09	.30	.10	.09	.16	*.26	.99
30	.10	.24	.17	.12	.07	*.09	.21	---	.14	.08	7.77	.91
31	.31	.14	---	.07	---	.09	*.17	---	.34	---	4.49	---
Total	2.48	27.74	7.84	3.29	2.94	5.26	7.87	3.82	6.02	2.47	33.32	100.27
Mean	0.080	0.895	0.261	0.106	0.098	0.170	0.254	0.132	0.194	0.082	1.07	3.34
Ac-ft	4.9	55	16	6.5	5.8	10	16	7.6	12	4.9	66	199

Calendar Year 1963: Max - Min - Mean - Ac-ft -
Fiscal Year 1963-64: Max 19.1 Min 0.05 Mean 0.556 Ac-ft 404

* Discharge measurement made on this day.

Peak discharge (base, 60 cfs)

Date	Time	Gage height	Discharge	Date	Time	Gage height	Discharge
8-12	1000	2.57	73.0	5- 9	0500	2.94	70.0
5- 7	1600	3.23	100	6-16	1400	3.82	179

8841. Fukuji-gawa near Yubaru

Location.--lat 26°38'32" N., long 128°13'00" E., on left bank 1.1 miles north of Yubaru and 2.4 miles northeast of Miyaji.

Drainage area.--5.8 sq mi, approximately.

Records available.--January to June 1964.

Gage.--Water-stage recorder. Altitude of gage is 130 ft (from topographic map).

Extremes.--Maximum discharge during period, 11,500 cfs June 16 (gage height, 10.00 ft), from rating curve extended above 710 cfs by logarithmic plotting; minimum, 3.41 cfs Apr. 19-21, 25, May 3-5.

Remarks.--Records good except those for period of no gage-height record and those above 2,000 cfs, which are fair. No diversion above station. Sediment samples for high flows and continuous records of rainfall are obtained at station.

Rating table (gage height, in feet, and discharge, in cubic feet per second)

0.7	2.70	1.6	63.0
.8	5.35	2.0	125
.9	8.95	2.5	255
1.1	18.5	3.0	440
1.3	33.0	3.5	700

Discharge, in cubic feet per second, January to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1							-	7.78	6.33	6.33	3.91	169
2							-	7.02	6.67	5.35	3.65	350
3							-	6.67	5.35	5.05	3.65	51.7
4							-	6.33	5.35	5.05	3.41	*27.1
5							-	6.00	5.05	4.75	3.41	28.9
6							-	5.67	130	4.46	7.78	28.8
7							-	5.35	20.0	*4.46	148	19.3
8							-	5.35	11.0	4.46	29.3	*185
9							-	5.05	8.95	4.18	186	35.9
10							*5.05	*5.05	8.16	4.18	23.3	21.3
11							5.05	5.05	7.78	4.18	13.9	*19.7
12							4.75	4.75	*7.40	4.18	15.2	22.0
13							4.46	4.46	7.02	4.18	8.54	39.8
14							10.7	4.18	7.02	3.91	*7.40	36.9
15							*7.27	4.18	7.02	3.91	a6.6	562
16							5.35	9.44	6.67	3.91	a6.0	665
17							6.00	8.29	6.33	4.18	a5.5	131
18							5.05	14.8	6.00	4.18	a5.2	253
19							5.05	6.33	6.00	3.65	a55	106
20							4.75	5.05	6.33	3.41	*30.0	56.4
21							*4.46	4.75	7.40	*3.65	15.0	41.5
22							4.46	4.46	5.67	3.65	10.2	51.4
23							*34.9	4.75	5.35	3.65	8.16	96.0
24							23.9	*110	*5.35	3.65	7.40	37.2
25							11.1	14.3	6.33	3.41	14.3	30.8
26							7.40	8.16	5.05	3.65	9.35	27.0
27							6.33	*6.67	4.75	4.46	7.78	24.1
28							194	6.33	4.75	4.75	8.95	22.0
29							*21.0	5.67	5.05	11.3	8.54	20.6
30							11.5	---	5.67	5.35	524	18.5
31			---		---		8.95	---	8.54	---	234	---
Total							-	291.89	338.34	135.48	1413.43	3,177.9
Mean							-	10.1	10.9	4.52	45.6	106
Ac-ft							-	579	671	269	2800	6,300

Calendar Year Max Min Mean Ac-ft
Fiscal Year 1963-64: Max - Min - Mean - Ac-ft -

Peak discharge (base, 1,800 cfs)

Date	Time	Gage height	Discharge	Date	Time	Gage height	Discharge
1-28	0900	5.00	1,850	6-16	1630	10.00	11,500
5-30	1430	6.70	4,090				

* Discharge measurement made on this day.
a No gage-height record.

8842. Fukuji-gawa at Fukuji

Location.--Lat 26°38'16" N., long 128°10'13" E., on left bank at Fukuji, 0.9 mile north of Kawata, and 1.3 miles northeast of Taira.

Drainage area.--12 sq mi, approximately.

Records available.--January to June 1964.

Gage.--Water-stage recorder. Altitude of gage is 10 ft (from topographic map).

Extremes.--Maximum discharge during period, 16,800 cfs June 16 (gage height, 9.55 ft), from rating curve extended above 1,900 cfs; minimum, 6.00 cfs Apr. 23-25.
Minimum discharge known, 2.57 cfs Oct. 22, 1963, result of discharge measurement.

Remarks.--Records good except those above 5,000 cfs, which are fair. No diversion above station. Daily sediment samples are obtained at station.

Rating table (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used June 15-30)

1.08	6.00	2.0	132
1.2	10.7	2.5	290
1.3	16.7	3.0	510
1.4	25.5	4.0	1,190
1.7	67.5	5.0	2,300

Discharge, in cubic feet per second, January to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1							-	17.4	12.8	12.2	7.70	*256
2							-	15.3	13.4	9.78	7.00	*509
3						/37.5	-	*14.6	11.2	9.30	7.35	153
4							-	*14.0	11.2	8.50	7.35	*88.1
5							-	13.4	10.7	8.50	7.70	79.4
6							-	*12.8	190	8.10	*16.9	75.4
7							-	12.2	45.2	*8.10	364	56.3
8							-	11.7	34.7	8.10	72.8	283
9							-	11.7	18.1	7.70	456	95.4
10							-	*12.2	15.3	7.70	64.8	65.9
11							-	11.2	14.6	7.70	40.2	*61.1
12							-	*10.2	*13.4	7.70	41.2	61.1
13							-	9.30	13.4	7.70	27.5	80.9
14							-	8.90	13.4	7.35	*21.5	85.2
15							/15.4	8.90	12.8	7.00	18.1	*940
16							-	12.2	12.2	7.00	16.0	1,650
17							-	14.8	11.7	*8.50	15.3	356
18							-	22.2	11.2	7.70	*14.6	*407
19							-	11.7	10.7	6.63	95.1	264
20							-	8.90	11.2	6.30	*65.9	155
21							/8.38	8.50	11.2	*6.30	37.3	120
22				/2.57			-	8.10	9.78	6.30	27.5	144
23							-	8.50	9.78	6.30	23.4	192
24							-	177	*10.2	6.00	21.5	104
25			/3.90				-	*31.0	10.7	6.00	28.4	86.5
26						/16.4	-	18.1	10.2	6.30	*22.4	73.2
27							-	*14.6	9.78	7.35	18.9	67.5
28							*350	13.4	9.30	7.02	19.7	62.7
29							*49.7	12.2	9.30	20.1	19.7	56.3
30							28.6	---	11.2	*11.3	885	53.1
31			---		---		21.5	---	*17.4	---	414	---
Total							-	545.00	606.04	244.53	2,884.80	6,681.1
Mean							-	18.8	19.5	8.15	93.0	223
Ac-ft							-	1,080	1,200	485	5,720	13,250

Calendar Year Max Min Mean Ac-ft
Fiscal Year 1963-64: Max - Min - - Mean - Ac-ft -

Peak discharge (base, 3,000 cfs)

Date	Time	Gage height	Discharge	Date	Time	Gage height	Discharge
5-30	1600	6.62	5,400	6-16	1700	9.55	16,800

* Discharge measurement made on this day.
/ Result of discharge measurement.

8846. Aha-gawa at Aha

Location.--Lat 26°42'41" N., long 128°16'55" E., on right bank 0.3 mile southwest of Aha School and 1.4 miles upstream from mouth.

Drainage area.--9.5 sq mi, approximately.

Records available.--December 1963 to June 1964.

Gage.--Water-stage recorder. Altitude of gage is 10 ft (from topographic map).

Extremes.--Maximum discharge during period, 10,500 cfs June 16 (gage height, 11.60 ft), from rating curve extended above 300 cfs on basis of slope-area measurement of peak flow; minimum, 8.00 cfs Apr. 23-27.
Minimum discharge known, 5.08 cfs Oct. 22, 1963, result of discharge measurement.

Remarks.--Records good. No diversion above station. Sediment samples for high flows and continuous records of rainfall are obtained at station.

Rating table (gage height, in feet, and discharge, in cubic feet per second)

0.7	7.00	1.5	133
.8	13.2	2.0	290
.9	21.8	2.5	480
1.0	33.2	3.0	720
1.2	65.0	3.5	1,000

Discharge, in cubic feet per second, December 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1						-	28.4	33.2	22.8	19.0	11.0	306
2						-	49.1	29.5	20.0	14.6	10.4	611
3						-	38.1	*27.2	18.0	13.8	10.4	*169
4						-	39.8	26.0	18.0	13.2	10.4	91.9
5						-	28.4	23.8	17.2	13.2	11.0	86.0
6						-	26.0	22.8	173	12.4	26.9	71.0
7						-	23.8	21.8	39.8	11.6	132	64.9
8						-	41.3	21.8	27.2	11.6	49.9	337
9						-	27.2	21.8	23.8	11.6	488	108
10						-	24.8	24.8	21.8	11.6	88.6	71.0
11						-	23.8	21.8	21.0	11.6	71.0	65.4
12						-	21.8	21.0	20.0	12.4	*52.8	60.8
13						-	21.8	20.0	18.0	11.6	33.2	61.5
14						-	29.5	20.0	21.0	*11.0	26.0	63.2
15						-	21.8	19.0	18.0	10.4	21.0	674
16						-	20.0	24.8	17.2	9.80	16.3	*947
17						-	27.2	22.1	16.3	9.80	14.6	*259
18						35.8	21.0	*39.2	16.3	9.80	15.5	249
19						29.5	20.0	19.0	15.5	9.80	242	177
20						26.0	19.0	17.2	19.0	9.80	87.3	118
21						24.8	19.0	17.2	17.2	9.80	56.2	89.6
22				/5.08		23.8	18.0	18.0	14.6	9.20	37.1	280
23						21.8	106	18.9	13.8	8.60	29.5	208
24						122	81.0	392	*16.3	8.00	23.8	116
25						72.9	44.5	*49.2	19.0	8.00	*27.2	87.3
26						39.8	33.2	30.5	13.8	8.00	34.5	71.0
27						31.7	*28.4	24.8	13.2	8.60	24.8	61.5
28						28.4	561	22.8	13.2	49.6	42.8	54.5
29						27.2	77.0	21.0	13.2	*34.0	30.5	47.5
30						24.8	52.8	---	14.6	13.2	570	42.8
31			---	/7.62	---	23.8	38.4	---	21.0	---	323	---
Total						-	1,612.1	1,071.2	733.8	395.60	2,617.7	5,648.9
Mean						-	52.0	36.9	23.7	13.2	84.4	188
Ac-ft						-	3,200	2,120	1,460	785	5,190	11,200

Calendar Year 1963: Max - Min - Mean - Ac-ft -
Fiscal Year 1963-64: Max - Min - Mean - Ac-ft -

Peak discharge (base, 3,000 cfs)

Date	Time	Gage height	Discharge	Date	Time	Gage height	Discharge
1-28	0700	6.05	3,050	5- 9	0900	6.87	3,870
2-24	0500	7.10	4,120	6-16	1530	11.60	10,500

* Discharge measurement made on this day.
/ Result of discharge measurement.

8848. Fun-gawa near Aha

Location.--Lat 26°44'33" N., long 128°16'53" E., on right bank 50 ft downstream from bridge, 2.0 miles north of Aha School, and 2.2 miles west of Ada.

Drainage area.--3.3 sq mi, approximately.

Records available.--February to June 1964.

Gage.--Water-stage recorder and concrete control. Altitude of gage is 380 ft (from topographic map).

Extremes.--Maximum discharge during period, 5,710 cfs June 16 (gage height, 17.62 ft), from rating curve extended above 1,300 cfs on basis of slope-area measurement at gage height 18.1 ft; minimum, 3.50 cfs Apr. 21-23, 26-28.

Flood of Oct. 25, 1963, reached a stage of 18.1 ft, from floodmarks, and that of Dec. 2, 1963, a stage of 21.5 ft, from floodmarks (discharge, 5,950 and 7,650 cfs, respectively, from rating curve extended above 1,300 cfs on basis of slope-area measurement at gage height 18.1 ft). Minimum discharge known, 2.50 cfs Oct. 22, 1963, result of discharge measurement.

Remarks.--Records fair prior to Mar. 3, good thereafter. No diversion above station. Sediment samples are being obtained during high flows.

Rating table (gage height, in feet, and discharge, in cubic feet per second)

1.46	3.50	3.0	89.0
1.5	4.20	4.0	215
1.7	8.90	5.0	405
2.0	19.3	6.0	670
2.5	48.0		

Discharge, in cubic feet per second, February to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1								-	8.70	6.50	4.36	131
2								-	8.40	5.20	4.20	197
3								10.1	7.80	5.00	4.00	*46.9
4								9.50	7.80	5.00	3.80	29.8
5								8.90	7.80	4.78	4.38	32.7
6								8.70	88.7	4.57	12.2	26.2
7								8.40	16.3	4.57	21.7	25.9
8								8.10	12.3	4.57	11.5	139
9								7.80	10.7	4.36	150	36.6
10								8.90	9.80	4.36	18.5	26.1
11								7.00	9.20	4.20	30.4	30.3
12								6.80	8.70	4.20	*15.2	26.0
13								6.50	8.40	4.00	10.4	22.6
14								6.30	8.40	*4.00	8.70	25.9
15								6.50	7.80	4.00	7.50	324
16								6.30	7.50	3.80	7.00	*455
17								6.30	7.30	3.80	6.80	*68.0
18								13.0	7.00	3.80	7.00	71.6
19								6.80	6.80	3.65	97.3	47.3
20								6.30	7.73	3.65	21.0	35.6
21								6.08	6.80	3.65	14.4	29.8
22				/2.50				6.08	6.30	3.50	11.6	89.9
23								6.30	6.08	4.65	10.1	62.1
24								110	*6.66	4.00	9.50	33.8
25								16.6	6.30	3.65	*8.90	27.6
26								13.0	5.60	3.65	10.4	24.5
27								11.0	5.40	3.50	9.20	22.1
28								9.80	5.20	43.0	14.5	19.8
29								8.90	5.40	*11.9	10.4	18.5
30								---	5.60	5.20	224	17.0
31			---		---			---	6.50	---	104	---
Total								-	322.97	174.71	872.94	2142.6
Mean								-	10.4	5.82	28.2	71.4
Ac-ft								-	641	347	1,730	4,250

Calendar Year Max - Min - Mean - Ac-ft -
Fiscal Year 1963-64: Max - Min - Mean - Ac-ft -

* Discharge measurement made on this day.
/ Result of discharge measurement.
Note.--Computed from thrice-daily staff-gage readings prior to Mar. 3.

Peak discharge (base, 1,200 cfs)

Date	Time	Gage height	Discharge	Date	Time	Gage height	Discharge
5-9	0900	9.15	1,810	6-16	1600	17.62	5,710

9060. Vaitolu Stream at Aoa

Location.--Lat 14°17'50" S., long 170°35'45" W., on left bank 0.4 mile southwest of Aoa and 0.5 mile upstream from mouth.

Drainage area.--0.22 sq mi.

Records available.--March 1958 to June 1964. Prior to July 1961, published as "near Aoa."

Gage.--Water-stage recorder. Altitude of gage is 185 ft (from topographic map).

Average discharge.--6 years, 0.338 mgd (0.523 cfs).

Extremes.--Maximum discharge during year, 74.0 mgd (114 cfs) Oct. 27 (gage height, 4.55 ft), from rating curve extended above 2.1 mgd as explained below; minimum, 0.02 mgd (0.03 cfs) Oct. 14, 15, 21.
1958-64: Maximum discharge, 154 mgd (238 cfs) Dec. 19, 1962 (gage height, 6.16 ft), from rating curve extended above 2.1 mgd by logarithmic plotting; minimum, 0.01 mgd (0.02 cfs) Sept. 7, 8, 1961.

Remarks.--Records good except those above 5 mgd, which are fair. No diversion above station.

Rating table (gage height, in feet, and discharge, in million gallons a day)

1.1	0.03	1.5	1.49
1.2	.20	1.8	3.90
1.3	.50	2.1	7.45
1.4	.94		

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	0.08	0.06	0.06	0.06	0.15	0.16	0.08	0.31	0.15	0.22	0.74	1.82
2	.11	.06	.06	.10	.13	.16	.08	.25	.11	.20	.36	.83
3	.10	.06	.06	.11	.13	.06	.12	.15	.11	.20	.27	.43
4	.11	.08	.06	.13	.13	.06	.06	.13	.11	.17	.20	.39
5	.11	.06	.08	.15	.24	.11	.05	.25	.11	.20	.17	.91
6	.08	.05	.10	.78	.13	.06	.06	.15	.13	.17	.13	.76
7	.08	.05	.05	.15	.11	.08	.06	.15	.11	.17	.95	.39
8	.08	.08	.26	.08	.15	.06	.06	.13	.11	.22	.58	.36
9	.10	.05	.47	.06	.13	.08	.05	.11	.13	1.40	1.44	.89
10	.08	.05	.10	.06	.11	.06	.05	.11	.13	.50	.54	.46
11	.08	.05	.05	.06	.11	.06	.06	.11	.11	.36	.30	1.64
12	.08	.05	.04	.05	.13	.06	.04	.16	.11	.30	.22	.72
13	.08	.05	.04	.05	.11	.06	.05	.17	.08	1.05	.17	.60
14	.11	.04	.03	*.03	.13	.06	.06	3.35	.06	.30	.17	.52
15	.08	.04	.03	.03	.33	.06	.05	1.20	.08	.20	.15	.39
16	.06	.05	*.04	.05	.17	.06	.04	.50	*.08	.17	.15	.52
17	.06	.04	.06	.06	.11	.06	.04	.30	.11	.15	.25	.36
18	.04	.04	.08	.09	.11	.06	.04	.22	.12	.15	1.35	.27
19	.04	.04	.10	.13	.11	.06	.05	.17	.14	.13	.77	.27
20	.04	.05	.13	.05	.10	.06	.06	.15	.11	.13	*.30	.27
21	.04	*.05	.13	.03	.08	.05	.06	.15	.10	*.13	.25	.45
22	.03	.05	.13	.04	.06	.05	.11	.15	.17	.13	.30	.33
23	*.05	.10	.15	.08	.06	.05	2.31	.22	.20	.15	.22	.34
24	.05	.11	.15	1.31	.10	.05	.58	.17	.80	.17	.36	.27
25	.05	.06	.15	.60	.08	.05	1.89	.25	.25	.15	.22	.42
26	.05	.46	.15	.25	*.06	.06	1.71	.25	.68	.20	.17	.27
27	.06	.20	.15	7.42	.05	.20	.43	.80	.76	.22	.15	.25
28	.08	.10	.13	3.19	.06	.15	*.22	.22	2.79	.42	.20	.22
29	.06	.06	.15	.62	.06	.14	.25	.17	.63	.25	.24	.22
30	.05	.08	.17	*.27	.06	.08	.17	----------	*.51	.30	.33	.22
31	.05	.06	----------	.17	----------	.05	.13	----------	.27	----------	.52	----------
Total	2.17	2.38	3.36	16.26	3.49	2.42	9.02	10.45	9.36	8.51	12.17	15.79
Mean												
Mgd	0.070	0.077	0.112	0.525	0.116	0.078	0.291	0.360	0.302	0.284	0.393	0.526
Cfs	0.108	0.119	0.173	0.812	0.179	0.121	0.450	0.557	0.467	0.439	0.608	0.814
Ac-ft	6.7	7.3	10	50	11	7.4	28	32	29	26	37	48

Calendar Year 1963: Max 7.42 Min 0.03 Mean mgd 0.216 Mean cfs 0.334 Ac-ft 242
Fiscal Year 1963-64: Max 7.42 Min 0.03 Mean mgd 0.261 Mean cfs 0.404 Ac-ft 292

* Discharge measurement made on this day.

Peak discharge (base, 40 mgd)

Date	Time	Gage height	Discharge	
			Mgd	Cfs
10-27	1930	4.55	74.0	114

9120. Afono Stream at Afono

Location.--Lat 14°16'55" S., long 170°39'10" W., on left bank at Afono and 1,500 ft upstream from mouth.

Drainage area.--0.67 sq mi.

Records available.--October 1958 to June 1964.

Gage.--Water-stage recorder and concrete control. Altitude of gage is 20 ft (from topographic map).

Average discharge.--5 years (1959-64), 2.21 mgd (3.42 cfs).

Extremes.--Maximum discharge during year, 490 mgd (758 cfs) May 9 (gage height, 4.70 ft), from rating curve extended above 14 mgd by logarithmic plotting; minimum, 0.18 mgd (0.28 cfs) Sept. 28.
1958-64: Maximum discharge, that of May 9, 1964; minimum, 0.16 mgd (0.25 cfs) Sept. 30, 1961.

Remarks.--Records good except those above 30 mgd, which are fair, and those for period of no gage-height record, which are poor. About 0.04 mgd diverted above station for domestic use in Afono.

Rating table (gage height, in feet, and discharge, in million gallons a day)

1.4	0.14	1.9	4.83
1.5	.44	2.0	7.06
1.6	.99	2.3	17.5
1.7	1.86	2.6	35.5
1.8	3.17	3.1	84.0

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	0.44	0.48	0.74	1.21	3.0	0.68	0.40	7.62	0.99	1.96	2.07	3.45
2	.44	.44	.52	.48	2.0	1.39	.67	3.59	.92	1.66	1.38	9.23
3	.40	.71	.44	.36	1.5	.57	.74	1.76	.86	1.56	1.21	2.19
4	.40	.86	.36	.32	1.2	.48	.57	1.47	.80	1.29	1.14	1.76
5	.40	.57	.36	.29	2.2	.62	.36	1.21	.74	1.21	.92	2.40
6	.36	.44	.94	22.6	1.4	.48	.32	1.06	.68	1.21	.80	4.10
7	.36	.36	.74	2.84	1.1	.48	.32	1.06	.68	1.06	3.07	2.19
8	.36	1.01	2.26	1.29	1.0	.44	.57	.92	.62	1.14	2.07	2.19
9	.57	.99	7.67	1.06	1.0	.48	.62	.86	.57	3.83	44.2	6.28
10	.88	.80	1.66	.92	.9	.44	.40	.74	1.86	2.44	4.46	2.72
11	.52	.74	1.06	.80	.8	.36	.44	.80	1.21	2.72	2.72	7.02
12	.48	.52	*.86	.68	.8	.36	.44	3.92	.80	1.76	2.07	3.77
13	.44	.84	.74	.62	1.0	.32	.57	3.47	.57	1.76	1.76	3.47
14	.52	.52	.62	.62	1.5	.32	3.43	24.5	.57	1.29	1.56	3.77
15	.36	.40	.57	.5	3.48	.32	1.56	6.14	.90	1.14	1.29	2.57
16	.36	.40	.52	.5	2.19	.32	.74	3.77	.57	.99	1.29	2.44
17	.36	.32	.44	.5	1.21	.29	.52	2.72	.52	.92	1.29	2.31
18	.36	.29	.40	.5	.92	.29	.36	1.96	.74	.86	5.31	1.76
19	.36	.29	.36	.4	.80	.32	.32	1.66	1.35	.86	*5.04	1.56
20	.36	.40	.36	.4	.74	.48	.40	1.38	1.70	.92	2.07	1.47
21	.40	.32	.32	.4	.68	.32	.32	1.21	1.21	.80	1.66	1.56
22	.36	.29	.32	.4	.62	.36	.32	1.21	.80	.74	1.96	1.56
23	.32	.32	.32	2.0	.62	.29	16.1	1.70	.86	.74	1.56	1.66
24	.36	.48	.29	10	.57	.26	3.62	1.21	6.01	.80	1.29	1.56
25	.36	.32	.29	4.0	.52	.23	13.4	1.66	2.83	.80	1.14	2.07
26	.32	1.67	.26	2.5	.52	.23	10.5	1.66	*6.18	1.14	1.06	1.56
27	.48	3.86	.23	80	.48	.32	3.32	1.86	6.73	1.56	.99	1.38
28	.77	1.06	.23	60	.48	.84	2.07	1.56	9.85	3.92	1.06	1.21
29	.52	.80	.23	20	.44	1.21	1.76	1.21	4.76	1.86	1.16	1.06
30	.32	1.92	.29	10	.48	.52	1.66	---	4.80	2.19	2.42	1.29
31	.32	1.21	---	5.0	---	.32	1.47	---	2.72	---	2.98	---
Total	13.26	23.63	24.40	231.19	34.15	14.34	68.29	83.89	64.40	45.13	103.00	81.56
Mean												
Mgd	0.428	0.762	0.813	7.46	1.14	0.463	2.20	2.89	2.08	1.50	3.32	2.72
Cfs	0.662	1.18	1.26	11.5	1.76	0.716	3.40	4.47	3.22	2.32	5.14	4.21
Ac-ft	41	73	75	709	105	44	210	257	198	138	316	250

Calendar Year 1963: Max 80 Min 0.23 Mean mgd 1.70 Mean cfs 2.63 Ac-ft 1,900
Fiscal Year 1963-64: Max 80 Min 0.23 Mean mgd 2.15 Mean cfs 3.33 Ac-ft 2,420

* Discharge measurement made on this day.
Note.--No gage-height record Oct. 15 to Nov. 14.

Peak discharge (base, 110 mgd)

Date	Time	Gage height	Discharge Mgd	Discharge Cfs	Date	Time	Gage height	Discharge Mgd	Discharge Cfs
10- 6	1400	4.14	295	456	1-23	1600	3.38	123	190
10-27	about 1930	4.48	402	622	2-14	0300	3.33	116	179
					5- 9	1000	4.70	490	758

9205. Aasu Stream at Aasu

Location.--Lat 14°19'00" S., long 170°45'35" W., on right bank at Aasu and 300 ft upstream from mouth.

Drainage area.--0.97 sq mi.

Records available.--October 1958 to June 1964.

Gage.--Water-stage recorder and concrete control. Altitude of gage is 5 ft (by hand levels from high-tide mark).

Average discharge.--5 years (1959-64), 4.08 mgd (6.31 cfs).

Extremes.--Maximum discharge during year, 104 mgd (161 cfs) Jan. 26 (gage height, 3.04 ft), from rating curve extended above 9.4 mgd as explained below; minimum, 0.53 mgd (0.82 cfs) July 31, Aug. 1.
1958-64: Maximum discharge, 415 mgd (642 cfs) Aug. 10, 1962 (gage height, 4.72 ft), from rating curve extended above 9.4 mgd by logarithmic plotting; minimum, 0.32 mgd (0.50 cfs) Sept. 29 to Oct. 1, 1961.

Remarks.--Records good except those for period of no gage-height record and those above 20 mgd, which are fair. Small diversion above station for domestic use. Continuous records of rainfall are obtained at station.

Rating table (gage height, in feet, and discharge, in million gallons a day)

1.2	0.33	1.7	6.60
1.3	.63	1.9	13.4
1.4	1.32	2.1	22.4
1.5	2.58	2.4	41.0
1.6	4.34		

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	1.12	2.11	2.58	3.64	7.20	1.82	1.22	4.79	2.58	3.99	2.58	5.02
2	1.03	1.70	2.08	2.76	6.15	2.78	1.12	3.99	2.45	3.64	1.82	8.10
3	.95	2.51	1.95	1.32	5.47	3.24	1.12	3.64	2.33	3.28	1.57	4.79
4	.95	2.07	*1.82	1.03	4.79	2.58	1.03	3.28	2.20	2.76	1.32	3.99
5	.95	2.14	2.19	1.22	4.34	3.11	.88	2.76	1.95	2.76	1.22	19.8
6	.88	1.12	5.65	1.12	3.64	2.20	.88	2.45	1.82	2.45	1.12	10.4
7	.82	.88	3.99	1.70	3.99	3.97	.88	2.58	1.82	2.08	1.45	7.50
8	.82	1.83	3.81	1.12	3.64	2.58	1.96	2.45	1.70	2.20	1.22	8.10
9	1.54	1.95	8.74	.95	3.81	1.95	1.32	2.08	1.70	2.58	7.72	11.5
10	1.76	1.45	5.02	.88	2.93	1.82	1.03	1.82	2.60	2.08	3.81	7.50
11	1.45	1.32	3.81	.77	2.33	1.82	1.22	1.57	1.82	4.76	2.33	a11
12	.95	.95	3.46	.72	2.20	1.70	1.63	2.19	1.57	2.45	1.82	a 8.0
13	.88	1.71	3.11	.67	2.76	1.70	2.45	2.45	1.45	1.95	1.70	a 6.0
14	1.12	1.32	2.93	.95	2.45	1.57	3.99	16.8	1.32	1.70	1.45	a 4.5
15	.82	1.12	2.58	.95	2.76	1.32	2.45	8.40	1.22	1.57	1.82	a 4.5
16	.77	1.75	2.33	.72	2.93	1.32	1.70	5.70	1.12	1.45	1.57	a 6.0
17	.72	1.32	2.20	.67	2.20	1.22	1.45	4.34	1.12	1.45	3.13	4.79
18	.67	1.12	1.95	.67	1.95	1.22	1.22	3.99	1.03	1.32	3.41	3.99
19	.67	.95	1.82	.88	1.82	1.22	1.12	3.64	* .95	1.32	4.79	3.64
20	.67	1.32	1.70	1.70	a 1.7	1.70	1.32	3.28	.95	1.22	2.93	3.99
21	.72	1.22	1.45	1.03	a 1.6	1.22	1.76	3.11	.88	1.12	3.46	3.81
22	.63	.95	1.32	1.22	a 1.5	1.22	1.45	2.76	.88	1.03	2.76	3.64
23	.63	1.28	1.22	3.46	a 1.5	1.03	6.31	5.59	.88	.95	2.08	3.46
24	.72	1.32	1.12	5.99	a 1.4	.88	4.57	5.24	5.47	1.03	2.58	3.11
25	.63	1.12	1.12	3.76	a 1.3	.82	17.9	3.46	1.95	1.03	1.95	3.81
26	.59	1.59	1.03	5.72	a 1.4	.82	22.2	3.28	2.58	2.05	1.82	3.28
27	.63	3.17	.95	38.6	a 1.2	1.03	11.7	3.11	5.32	1.45	1.70	3.11
28	1.44	1.95	.88	29.2	*1.22	2.00	8.70	3.99	17.0	4.16	1.95	2.45
29	.77	2.20	.88	16.2	1.12	3.52	7.20	2.93	6.60	2.58	1.82	2.45
30	.59	6.98	1.57	11.9	1.54	1.57	6.15	---	5.24	3.11	1.95	3.40
31	.56	3.81	---	9.00	---	1.12	5.24	---	4.34	---	6.35	---
Total	27.45	56.23	75.26	150.52	82.84	56.07	123.17	115.67	84.84	65.52	77.20	175.63
Mean												
Mgd	0.885	1.81	2.51	4.86	2.76	1.81	3.97	3.99	2.74	2.18	2.49	5.85
Cfs	1.37	2.80	3.88	7.52	4.27	2.80	6.14	6.17	4.24	3.37	3.85	9.05
Ac-ft	84	173	231	462	254	172	378	355	260	201	237	539

Calendar Year 1963: Max 38.6 Min 0.56 Mean mgd 3.02 Mean cfs 4.67 Ac-ft 3,380
Fiscal Year 1963-64: Max 38.6 Min 0.56 Mean mgd 2.98 Mean cfs 4.61 Ac-ft 3,350

* Discharge measurement made on this day.
a No gage-height record.

Peak discharge (base, 100 mgd)

Date	Time	Gage height	Discharge Mgd	Discharge Cfs	Date	Time	Gage height	Discharge Mgd	Discharge Cfs
10-27	2030	3.01	101	156	1-26	0130	3.04	104	161

9310. Atauloma Stream at Afao

Location.--Lat 14°21'05" S., long 170°47'45" W., on left bank at Afao, 100 ft upstream from bridge, and 500 ft upstream from mouth.

Drainage area.--0.59 sq mi.

Records available.--October 1958 to June 1964.

Gage.--Water-stage recorder. Altitude of gage is 20 ft (by hand levels from high-tide mark).

Average discharge.--5 years (1959-64), 0.93 mgd (1.44 cfs).

Extremes.--Maximum discharge during year, 36.2 mgd (56.0 cfs) June 5 (gage height, 1.87 ft), from rating curve extended above 5.3 mgd as explained below; minimum, 0.04 mgd (0.06 cfs) Oct. 21.
1958-64: Maximum discharge, 253 mgd (391 cfs) Aug. 12, 1962 (gage height, 3.48 ft), from rating curve extended above 5.3 mgd by logarithmic plotting; minimum, that of Oct. 21, 1963.

Remarks.--Records good except those for periods of no gage-height record and those above 20 mgd, which are fair. Diversion above station for use at Ataulona School averages 10,400 gallons per day. Continuous records of rainfall are obtained at station.

Rating table (gage height, in feet, and discharge, in million gallons a day)

0.4	0.08	0.9	2.95
.5	.26	1.0	4.35
.6	.60	1.2	8.20
.7	1.13	1.5	17.5
.8	1.89		

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	0.19	0.38	0.51	0.64	0.51	0.34	0.26	0.48	0.44	0.73	0.94	1.36
2	.19	.23	.34	.34	.44	.37	.26	.48	.44	.60	.64	3.13
3	.19	.36	.31	.21	.40	.74	.26	.40	.44	.60	.51	1.06
4	.19	.23	.26	.19	.34	.60	.21	.34	.44	.48	.44	.78
5	.19	.21	.39	.23	.48	.96	.19	.31	.37	1.93	.40	5.67
6	.17	.23	1.16	.34	.34	.55	.19	.31	.34	1.21	.37	1.74
7	.17	.23	.83	.23	.34	2.58	.19	.28	.54	.78	.51	1.06
8	.15	.34	.60	.26	.37	1.23	.21	.26	.48	.78	.44	1.11
9	.25	.34	*2.83	.21	.51	.83	.19	.26	.48	1.41	1.00	2.34
10	.21	.26	.94	.19	.34	.51	.17	.21	.34	.94	.83	1.59
11	.19	.36	.60	.17	.28	.48	.19	.21	.31	2.50	.55	2.32
12	.17	.19	.48	.15	.26	.37	.22	.35	.31	1.06	.44	1.81
13	.15	a.4	.37	.15	.44	.34	.26	.31	*.28	.73	.37	1.36
14	.21	a.2	.34	.17	.48	.31	.26	4.00	.28	.60	.34	1.00
15	.14	a.2	.31	.19	.94	.28	.19	1.74	.28	.55	.34	1.00
16	*.14	a.4	.28	.15	.89	.26	.15	.94	.26	.48	.31	1.36
17	.12	a.3	.26	.15	.44	.26	.15	*.64	.26	.48	.46	1.28
18	.12	a.2	.26	.15	.34	.23	.15	.55	.28	.44	1.07	.89
19	.12	a.2	.26	.14	.28	.23	.15	.48	.23	.40	1.28	.73
20	.12	a.3	.23	.15	.26	.26	.17	.40	.28	*.37	.78	1.02
21	.14	a.2	.21	.14	.26	.23	.28	.34	.26	.37	*1.10	1.37
22	.12	a.2	.21	*.14	.23	.26	.21	.40	.26	.34	.83	1.37
23	.14	a.4	.19	a.3	.23	.21	1.55	1.53	.23	.31	.64	1.21
24	.17	a.3	.19	a.7	.23	.19	.78	1.00	1.24	.34	.73	.94
25	.15	a.2	.23	a.5	.21	.19	5.39	.60	*.51	.40	.55	.89
26	.15	a.4	.21	a.6	.23	.19	17.2	.68	1.23	.60	.51	.78
27	.17	a.7	*.19	6.44	.19	.50	1.59	*.64	1.86	.55	.48	.73
28	.31	.40	.19	*6.10	.21	.66	1.00	.83	8.22	2.22	.51	.60
29	.19	.48	.19	1.81	.19	.94	.68	.51	1.74	1.17	.55	.60
30	.15	1.88	.21	.89	.26	.40	.48	---	1.13	1.21	.51	.83
31	.15	1.18	---	.64	---	.26	.48	---	.78	---	2.58	---
Total	5.22	11.90	13.58	22.67	10.92	15.76	33.66	19.48	24.54	24.58	21.01	41.93
Mean												
Mgd	0.168	0.384	0.453	0.731	0.364	0.508	1.09	0.672	0.792	0.819	0.678	1.40
Cfs	0.260	0.594	0.701	1.13	0.563	0.786	1.69	1.04	1.23	1.27	1.05	2.17
Ac-ft	16	37	42	70	34	48	103	60	75	75	64	129

Calendar Year 1963: Max 7.06 Min 0.12 Mean mgd 0.640 Mean cfs 0.990 Ac-ft 718
Fiscal Year 1963-64: Max 17.2 Min 0.12 Mean mgd 0.670 Mean cfs 1.04 Ac-ft 753

Peak Discharge (base, 70 mgd).--No peak above base.

* Discharge measurement made on this day.
a No gage-height record.

9480. Afuelo Stream at Matuu

Location.--Lat 14°19'20" S., long 170°41'15" W., on left bank 0.4 mile northwest of Matuu and 0.5 mile upstream from mouth.

Drainage area.--0.24 sq mi.

Records available.--March 1958 to June 1964. Prior to July 1962, published as Matuu Stream at Matuu.

Gage.--Water-stage recorder. Altitude of gage is 75 ft (from topographic map).

Average discharge.--6 years, 0.967 mgd (1.50 cfs).

Extremes.--Maximum discharge during year, 83.0 mgd (128 cfs) Oct. 27 (gage height, 2.59 ft), from rating curve extended above 5.4 mgd as explained below; minimum, 0.11 mgd (0.17 cfs) July 31, Jan. 18-20.
1958-64: Maximum discharge, 262 mgd (405 cfs) May 17, 1962 (gage height, 3.70 ft), from rating curve extended above 5.4 mgd by logarithmic plotting; minimum, 0.07 mgd (0.11 cfs) Sept. 29, 30, 1961.

Remarks.--Records good except those above 20 mgd, which are fair. No diversion above station.

Rating table (gage height, in feet, and discharge, in million gallons a day)

0.5	0.03	1.0	1.81
.6	.14	1.1	2.87
.7	.34	1.3	6.00
.8	.64	1.5	10.9
.9	1.09	1.8	22.3

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	0.17	0.25	0.39	0.66	0.56	0.36	0.23	1.83	0.27	0.50	2.04	1.03
2	.17	.32	.29	2.14	.44	.39	.34	1.16	.27	.36	.68	4.25
3	.16	.85	.23	.36	.39	.23	.31	.54	.27	.31	.48	.91
4	.16	.68	.21	.25	.34	.21	.25	.39	.25	.27	.36	.60
5	.16	.48	.27	.44	*2.12	.64	.17	.47	.23	.25	.29	2.07
6	.16	.19	2.25	1.52	.82	.27	.14	.42	.19	.25	.27	.86
7	.14	.16	1.45	.64	*2.76	.54	.12	.27	.17	.23	.52	.56
8	.14	.54	.93	.34	.78	.44	.31	.29	.26	.25	.93	.64
9	.17	.42	3.62	.23	.78	.39	.23	.21	.19	.57	8.89	1.66
10	.19	.44	.86	.21	.56	.25	.14	*.19	.24	.39	1.20	.82
11	.16	.39	.50	.19	.42	.21	.14	.25	.17	1.10	.68	2.64
12	.14	.23	.39	.23	.34	.19	.14	2.79	.16	.44	.84	1.04
13	.14	.53	.29	.16	.86	.23	.12	1.42	.17	.29	.48	.78
14	.19	.43	.25	.14	1.63	.21	4.42	1.06	.14	.23	.42	.64
15	.12	.23	.21	.14	3.40	.19	.21	6.32	.39	.21	.39	.86
16	.12	.35	.19	.14	4.76	.17	.14	1.52	.17	.21	.36	1.00
17	.12	.27	.17	*.14	.91	.16	.12	.86	*.16	.21	.50	.82
18	.12	.19	.16	.12	.56	.16	.11	.64	.17	.23	2.55	.54
19	.12	.16	*.16	.21	.44	.19	.11	.54	.28	.30	2.07	.42
20	.12	.21	.16	.42	.36	.39	.19	.44	.19	.26	.73	.50
21	.17	.19	.14	.17	.31	.19	.14	.36	.16	.23	.84	.68
22	.12	.16	.16	.23	.27	.19	.12	.52	.16	.21	1.32	.50
23	.12	.20	.14	1.17	.25	.16	4.63	2.83	.22	.21	.60	.44
24	.12	.47	.12	4.36	.23	.14	1.12	1.06	1.78	.21	.50	.39
25	.12	.38	.12	1.09	.21	.14	12.3	.54	.56	.19	.36	.50
26	.12	3.28	.12	2.34	.21	.14	5.62	.48	.95	1.49	.31	.54
27	.19	1.81	.12	21.6	.21	.19	1.52	.50	2.85	.86	.29	.54
28	.34	.86	.12	12.3	.23	.48	.86	.36	5.86	*1.57	.39	.39
29	.17	1.00	.12	2.23	.21	.54	*.64	.29	1.00	2.01	.29	.31
30	.12	1.09	.14	1.00	.23	.21	.68	---	1.03	3.81	.81	.95
31	.11	.73	---	.73	---	.16	.60	---	.54	---	1.33	---
Total	4.67	17.49	14.28	55.90	25.59	8.36	36.17	38.09	19.45	17.65	31.72	27.88
Mean												
Mgd	0.151	0.564	0.476	1.80	0.853	0.270	1.17	1.31	0.627	0.588	1.02	0.929
Cfs	0.234	0.873	0.736	2.79	1.32	0.418	1.81	2.03	0.970	0.910	1.58	1.44
Ac-ft	14	54	44	172	79	26	111	117	60	54	97	86

Calendar Year 1963: Max 21.6 Min 0.11 Mean mgd 0.781 Mean cfs 1.21 Ac-ft 876
Fiscal Year 1963-64: Max 21.6 Min 0.11 Mean mgd 0.812 Mean cfs 1.26 Ac-ft 914

* Discharge measurement made on this day.

Peak discharge (base, 70 mgd)

Date	Time	Gage height	Discharge Mgd	Discharge Cfs	Date	Time	Gage height	Discharge Mgd	Discharge Cfs
10-27	1800	2.59	83.0	128	5-9	0930	2.57	81.0	125

9600. West Branch Alega Stream at Alega

Location.--Lat 14°18'05" S., long 170°38'35" W., on left bank 500 ft above confluence with East Branch and 0.2 mile northwest of Alega.

Drainage area.--0.16 sq mi.

Records available.--March 1958 to June 1964.

Gage.--Water-stage recorder. Altitude of gage is 85 ft (from topographic map).

Average discharge.--6 years, 0.807 mgd (1.25 cfs).

Extremes.--Maximum discharge during year, 49.2 mgd (76.1 cfs) Oct. 27 (gage height, 3.03 ft), from rating curve extended above 3.5 mgd as explained below; minimum, 0.23 mgd (0.36 cfs) Aug. 14-19, 21-23, 25, 26.
1958-64: Maximum discharge, 73.2 mgd (113 cfs) July 24, 1962 (gage height, 3.47 ft), from rating curve extended above 3.5 mgd by logarithmic plotting; minimum, 0.20 mgd (0.31 cfs) July 11, 12, 1959.

Remarks.--Records good except those for period of no gage-height record and those above 7 mgd, which are fair. No diversion above station.

Rating table (gage height, in feet, and discharge, in million gallons a day)

0.8	0.15	1.2	1.90
.9	.38	1.5	4.90
1.0	.74	1.8	9.55

Discharge, in million gallons a day, fiscal year July 1963 to June 1964

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	0.38	0.32	0.32	0.39	0.99	0.41	0.28	2.28	0.51	1.04	0.99	0.74
2	.38	.35	.30	.32	.84	.44	.28	1.45	.48	.94	.79	2.14
3	.38	.38	.30	.30	.70	.38	.28	.84	.48	.79	.66	.99
4	.38	.38	.32	.32	.62	.41	.28	.70	.48	.70	.62	.84
5	.38	.38	.32	.35	.79	.45	.28	.62	.48	.66	.58	.90
6	.38	.41	.52	4.01	.58	.35	.28	.55	.44	.62	.55	1.09
7	.35	.41	.41	.95	.55	.41	.28	.55	.44	.62	1.14	.79
8	.35	.51	.60	.48	.51	.38	.30	.51	.41	.62	.79	.84
9	.38	.51	1.49	.44	.51	.38	.28	.48	*.41	*1.09	6.21	1.61
10	.44	.48	.44	.41	.48	.32	.28	.48	.44	.74	1.84	1.04
11	.35	.48	.38	.38	.44	.32	.28	.44	.38	.99	1.20	1.93
12	.35	.44	.32	.35	.44	.32	.28	.94	.38	.70	.94	1.39
13	.35	.35	.30	.35	.48	.32	.28	.66	.38	.62	.79	1.39
14	.35	.23	.30	.35	.63	.32	.44	5.79	.38	.55	.70	1.58
15	.35	.23	.30	.32	1.06	.32	.32	2.24	.49	.55	*.58	1.09
16	.35	.23	.30	.32	.74	.32	.30	1.84	.38	.51	.55	1.04
17	.35	.23	.30	.32	.55	.32	.30	1.20	.40	.51	.58	.94
18	.30	.23	.28	*.30	.51	.32	.28	.99	.41	.51	1.50	.89
19	.32	.23	.28	.32	.48	.30	.28	.84	.44	.51	1.56	.79
20	.32	*.26	.28	.30	.48	.30	.30	.70	.64	.58	.89	.74
21	.32	.25	.28	.30	.48	.30	.30	.66	.41	.51	.84	.79
22	.32	.25	.28	.30	.48	.30	.32	.58	.41	.48	.89	.70
23	.32	.28	.28	.69	.48	.30	a 4.5	.66	.41	.48	.74	.66
24	.32	.30	.28	2.18	.44	.30	a 1.2	*.58	1.69	.48	.70	.62
25	.35	.25	.28	1.44	.44	.30	a 3.5	.66	.74	.44	.66	.70
26	.35	.64	.28	.84	.38	.30	a 3.0	.58	2.66	.62	.62	.58
27	.41	.62	.25	8.66	.35	.32	a 1.5	.74	2.87	.58	.58	.58
28	.38	.38	.25	8.22	.35	.32	a 1.1	.55	4.45	1.16	.55	.55
29	.32	.32	.28	2.58	.35	.32	a .9	.51	1.90	.99	.62	.51
30	.30	.44	.33	1.71	.38	.30	a .7	---	1.98	1.14	.78	.55
31	.30	.35	---	1.20	---	.28	.58	---	1.26	---	1.41	---
Total	10.88	11.12	10.85	39.40	16.51	10.43	23.48	29.62	27.63	20.73	31.85	29.00
Mean												
Mgd	0.351	0.359	0.362	1.27	0.550	0.336	0.757	1.02	0.891	0.691	1.03	0.967
Cfs	0.543	0.555	0.560	1.96	0.851	0.520	1.17	1.58	1.38	1.07	1.59	1.50
Ac-ft	33	34	33	121	51	32	72	91	85	64	98	89

Calendar Year 1963: Max 8.66 Min 0.23 Mean mgd 0.652 Mean cfs 1.01 Ac-ft 731
Fiscal Year 1963-64: Max 8.66 Min 0.23 Mean mgd 0.714 Mean cfs 1.10 Ac-ft 803

* Discharge measurement made on this day.
a No gage-height record.

Peak discharge (base, 20 mgd)

Date	Time	Gage height	Discharge Mgd	Discharge Cfs	Date	Time	Gage height	Discharge Mgd	Discharge Cfs
10- 6	1230	2.47	26.7	41.3	2-14	0300	2.38	23.9	37.0
10-27	1900	3.03	49.2	76.1	5- 9	0630	2.62	30.4	47.0
1-23	about 1730	2.40	24.5	37.9					

As the number of streams on which streamflow information is likely to be desired far exceeds the number of stream-gaging stations feasible to operate at one time, the Geological Survey collects limited streamflow data at sites other than stream-gaging stations. When limited streamflow data are collected on a systematic basis over a period of years for use in hydrologic analyses, the site at which the data are collected is called a partial-record station. Data collected at these partial-record stations are usable in low-flow or flood-flow analyses, depending on the type of data collected. In addition, discharge measurements are made at other sites not included in the partial-record program. These measurements are generally made in times of drought or flood to give better areal coverage to those events. Those measurements and others collected for some special reason are called measurements at miscellaneous sites.

Records collected at partial-record stations are presented in two tables. The first is a table of discharge measurements at low-flow partial-record stations, and the second is a table of annual maximum stage and discharge at crest-stage stations. Discharge measurements made at miscellaneous sites for both low flow and high flow are given in a third table.

Low-flow partial-record stations

Measurements of streamflow in the area covered by this report made at low-flow, partial-record stations are given in the following table. Most of these measurements were made during periods of base flow when streamflow is primarily from ground-water storage. These measurements, when correlated with the simultaneous discharge of a nearby stream where continuous records are available, will give a picture of the low-flow potentiality of the stream. The column headed "Period of record" shows the fiscal years in which measurements were made at the same, or practically the same, site.

Discharge measurements made at low-flow partial-record stations during fiscal year 1964

Station No.	Station name	Location	Drainage area (sq mi)	Period of record	Measurements		
					Date	Discharge	
						Mgd	Cfs
		Island of Kauai					
110	Waiakoali Stream near Waimea	lat 22°07'25", long 159°37'25", 0.3 mile above mouth and 12 miles northeast of Waimea.	1.7	1909-13≠, 1914-18, 1920-25≠, 1961-64	6-10-64	0.97	1.50
120	Kauaikinana Stream near Waimea	lat 22°07'45", long 159°38'05", 0.6 mile above mouth and 12 miles northeast of Waimea.	1.17	1912-13, 1915-17, 1920-25≠, 1961-64	6-11-64	.31	.48
*295	Mokihana Stream near Waimea	lat 21°59'35", long 159°40'03", 500 ft above mouth and 2.5 miles north of Waimea.	4.77	1962-64	6-23-64	.34	.53
		Island of Maui					
5320	Haipuaena Stream at Haiku-uka boundary, near Kailiili	lat 20°49'26", long 156°12'30", 340 ft below Haiku-uka trail and 4.5 miles southeast of Kailiili.	.61	1919-27≠, 1933-34≠, 1963-64	7-15-63	6.33	9.79
					8-28-63	1.01	1.56
					10-14-63	1.75	2.71
					11-25-63	.52	.81
					2-25-64	8.92	13.8
					5-26-64	5.25	8.12
5420	East Branch Puohokamoa Stream at Haiku-uka boundary, near Kailiili	lat 20°49'36", long 156°12'39", 200 ft below Haiku-uka trail and 4.3 miles east of Kailiili.	.14	1920-27≠, 1933≠, 1963-64	7-16-63	1.81	2.80
					8-28-63	.32	.49
					10-14-63	.60	.93
					11-25-63	.26	.40
					5-26-64	1.18	1.83
5440	West Branch Puohokamoa Stream at Haiuku-uka boundary, near Kailiili	lat 20°49'51", long 156°13'03", 150 ft below Haiku-uka trail and 3.8 miles southeast of Kailiili.	.50	1919-28≠, 1933-35, 1963-64	7-16-63	7.95	12.3
					8-28-63	.40	.61
					10-14-63	1.65	2.55
					11-25-63	.49	.76
					1- 9-64	.29	.44
					2-25-64	8.08	12.5
					4- 9-64	16.9	26.1
					5-26-64	4.92	7.61
5540	Waikamoi Stream at Haiku-uka boundary, near Kailiili	lat 20°49'55", long 156°13'23", at Haiku-uka trail and 3.4 miles east of Kailiili.	3.46	1918-28≠, 1933-35, 1963-64	7-16-63	5.22	8.08
					8-28-63	2.60	4.02
					10-16-63	1.06	1.64
					11-27-63	.99	1.53
					5-26-64	9.50	14.7
5545	East Branch Waikamoi Stream at Haiku-uka boundary, near Kailiili	lat 20°49'53", long 156°13'21", 150 ft above Haiku-uka trail and 3.4 miles southeast of Kailiili.	.07	1918-28≠, 1933≠, 1963-64	7-16-63	3.31	5.12
					8-28-63	.42	.65
					10-16-63	.72	1.12
					11-27-63	.52	.81
					1- 9-64	.26	.40
					2-25-64	4.41	6.82
					4- 9-64	11.3	17.5
					5-26-64	2.76	4.27
5691	Nailiilihaele Stream near Kailiili	lat 20°50'27", long 156°13'38", 0.6 mile below Haiku-uka trail and 3.0 miles east of Kailiili.	.11	1963-64	7-18-63	.21	.32
					8-30-63	.06	.09
					10-15-63	.04	.06
					11-26-63	.04	.07
					2-26-64	.28	.44
					4-10-64	.30	.46
					5-27-64	.48	.75

* Also a crest-stage partial-record station.
≠ Operated as a continuous-record gaging station.

Discharge measurements made at low-flow partial-record stations during fiscal year 1964--Continued

Station No.	Station name	Location	Drainage area (sq mi)	Period of record	Measurements		
					Date	Discharge	
						Mgd	Cfs
		Island of Maui--Continued					
5762	East Branch Kailua Stream near Kailiili	Lat 20°50'25", long 156°14'07", on right bank 0.4 mile below Haiku-uka trail and 2.5 miles east of Kailiili.	0.35	1963-64	7-17-63 8-29-63 10-15-63 11-26-63 1-10-64 2-24-64 4-10-64 5-27-64	6.66 .52 .50 1.10 .30 10.0 1.15 1.40	10.3 .80 .77 1.70 .46 15.5 1.78 2.17
		Island of Guam, Mariana Islands					
*8073	Fonte River at dam, near Nimitz Hill	Lat 13°27'25" N., long 144°43'34" E., at old diversion dam, 0.4 mile south of Force Headquarters building on Nimitz Hill, and 1.2 miles southeast of Asan.	.60	1961-64	3-25-64		.11
8075 (formerly 8810)	Asan Spring at Asan	Lat 13°28'11" N., long 144°43'04" E., on hillside 200 ft above upper street in Asan, 0.2 mile southeast of Marine Drive, and 0.8 mile southwest of Coontz Junction.	-	1962, 1964	3-30-64		.41
8077 (formerly 8815)	Masso River at dam, near Piti	Lat 13°27'21" N., long 144°41'43" E., at end of penstocks on downstream side of dam, 0.5 mile southeast of Schroeder Junction, and 0.7 mile south of approximate center of Piti.	.74	1962, 1964	3-25-64		.40
8080 (formerly 8830)	Santa Rita Spring at Santa Rita	Lat 13°23'04" N., long 144°40'23" E., 0.1 mile southeast of Santa Rita Catholic Church and 1.1 miles southeast of junction of Santa Rita Road and Marine Drive.	-	1962, 1964	3-25-64		.15
8082	Faata Spring near Agat	Lat 13°22'25" N., long 144°39'58" E., 0.4 mile southwest of Alifan Mountain and 1.0 mile southeast of Agat.	-	1963-64	4-25-64		.28
8085	Taleyfac River near Agat	Lat 13°21'40" N., long 144°39'00" E., 800 ft above bridge on Agat-Umatac Road and 1.7 miles southwest of Agat School.	a1.77	1960-64	3-25-64		.68
8092 (formerly 8878)	Right Branch Cetti River near Umatac	Lat 13°18'58" N., long 144°39'21" E., at confluence with Left Branch, 50 ft upstream from gaging station on Cetti River, and 1.3 miles northwest of Umatac School.	.37	1961-62, 1964	3-27-64		.34
8100	Right Branch Umatac River at Umatac	Lat 13°17'50" N., long 144°39'50" E., 50 ft above confluence with Left Branch and 0.3 mile southeast of Umatac Catholic Church.	a.95	1960-64	3-31-64		.74
8120	Left Fork of Left Branch Umatac River near Umatac	Lat 13°17'25" N., long 144°39'50" E., 0.4 mile above confluence with Right Fork and 1.2 miles southeast of Umatac Catholic Church.	a.35	1960-64	3-31-64		.24
8140	Right Fork of Left Branch Umatac River at Umatac	Lat 13°17'40" N., long 144°40'20" E., 50 ft above confluence with Left Fork and 0.9 mile southeast of Umatac Catholic Church.	a.36	1960-64	3-31-64		.13
8170	Toguan River near Umatac	Lat 13°17'05" N., long 144°39'35" E., at highway bridge on Route 4 and 1.0 mile south of Umatac Catholic Church.	a.48	1952, 1960-64	3-31-64		.22
8200	Geus River above Siligin Spring tributary, near Merizo	Lat 13°16'45" N., long 144°49'55" E., above pipeline diversion to village of Merizo and 2.0 miles northeast of Merizo School.	a.50	1960-64	3-31-64		.13
8207	Geus River below Siligin Spring tributary, near Merizo	Lat 13°16'41" N., long 144°40'55" E., 1.6 miles northeast of Merizo School and 2.0 miles southeast of Umatac School.	.60	1962-64	3-31-64		.40
8250	Ajayan River near Inarajan	Lat 13°15'16" N., long 144°42'56" E., 2.4 miles southwest of Inarajan School and 3.8 miles southeast of Merizo School.	1.08	1962-64	3-31-64		.21

* Also a crest-stage partial-record station.
a Revised.

Discharge measurements made at low-flow partial-record stations during fiscal year 1964--Continued

Station No.	Station name	Location	Drainage area (sq mi)	Period of record	Measurements		
					Date	Discharge	
						Mgd	Cfs
		Island of Guam, Mariana Islands--Continued					
8280	Agfayan River near Inarajan	Lat 13°16'03" N., long 144°43'42" E., 1.2 miles southwest of Inarajan School and 4.5 miles east of Merizo School.	1.67	1962-64	3-31-64		0.41
8300	Right Fork of Right Branch Inarajan River near Inarajan	Lat 13°17'00" N., long 144°43'25" E., above confluence with Left Fork and 1.6 miles northwest of Inarajan Catholic Church.	a1.40	1960-64	3-26-64		.95
8310	Left Fork of Right Branch Inarajan River near Inarajan	Lat 13°17'00" N., long 144°43'25" E., above confluence with Right Fork and 1.6 miles northwest of Inarajan Catholic Church.	a.97	1960-64	3-26-64		1.12
8330	Right Fork of Left Branch Inarajan River near Inarajan	Lat 13°17'25" N., long 144°43'45" E., 1.6 miles northwest of Inarajan Catholic Church and 4.9 miles southwest of Talofofo School.	a.84	1960-64	3-26-64		1.01
8340	Left Fork of Left Branch Inarajan River near Inarajan	Lat 13°17'10" N., long 144°44'10" E., above confluence with Right Fork and 1.0 mile northwest of Inarajan Catholic Church.	a.39	1960-64	3-26-64		.20
8420	Asalonso River near Talofofo	Lat 13°19'41" N., long 144°45'34" E., 300 ft below highway bridge on Route 4 and 1.8 miles south of Talofofo School.	1.50	1952, 1961-64	3-26-64		.58
8450	Tolaeyuus River near Agat	Lat 13°21'55" N., long 144°42'40" E., 3.7 miles southeast of Agat and 4.8 miles southwest of Yona.	6.5	1952-61≠, 1962-64	3-30-64		2.52
8460	Tolaeyuus River at mouth, near Agat	Lat 13°21'30" N., long 144°42'30" E., above confluence with Fena River, about 0.4 miles east of Fena Dam spillway, and 4.0 miles southeast of Agat School.	7.42	1962-64	3-30-64		2.82
8540	Left Branch Ugum River near Talofofo	Lat 13°19'10" N., long 144°43'45" E., 50 ft above confluence with Right Branch and 2.9 miles southwest of Talofofo School.	2.96	1961-64	3-27-64		3.46
8545	Right Branch Ugum River near Talofofo	Lat 13°19'10" N., long 144°43'45" E., at confluence with Left Branch and 2.9 miles southwest of Talofofo School.	2.70	1961-64	3-27-64		2.89
8590	Left Branch Ylig River above pumping station near Yona	Lat 13°24'05" N., long 144°45'05" E., 0.3 mile above Ylig River and 1.7 miles southwest of Yona Catholic Church.	1.98	1960-62, 1964	3-26-64		1.11
8680	Santa Rosa Spring near Yigo	Lat 13°31'49" N., long 144°54'43" E., 0.3 mile south of radar station at Mt. Santa Rosa and 1.4 miles east of Yigo.	-	1962, 1964	3-27-64		0
8690	Chunge Spring near Yigo	Lat 13°32'07" N., long 144°54'52" E., about 300 ft northeast of intersection of Mt. Santa Rosa Road and access road to FAA radar station and 1.6 miles east of Yigo School.	-	1962, 1964	3-27-64		0
		Island of Okinawa, Ryukyu Islands					
8757	Hiji-gawa at Hiji	Lat 26°43'12" N., long 128°10'40" E., at Hiji, 0.4 mile above Taihoza-gawa, and 1.1 miles east of Hana.	3.3	1964	10-21-63 3-23-64 4- 8-64 4-14-64 4-29-64		2.95 4.90 3.55 3.10 5.22
8758	Tihoza-gawa at Hiji	Lat 26°43'21" N., long 128°10'55" E., 0.2 mile east of Hiji, 0.6 mile above mouth, and 1.4 miles northeast of Hana.	2.3	1964	10-21-63 3-23-64 4-29-64		2.30 3.50 3.06
8765	Taiho-okawa at Taiho	Lat 26°39'01" N., long 128°08'37" E., 1.0 mile east of Taiho and 1.7 miles north of Taira.	5.2	1964	10-29-63 2- 6-64 2-12-64 4-17-64 4-30-64		2.40 7.05 5.71 4.89 4.34
8772	North Fork Henan-gawa at Tsuha	Lat 26°38'28" N., long 128°05'47" E., 0.4 mile above confluence with South Fork and 0.8 mile south of Tsuha.	1.4	1964	3-27-64 4- 3-64 4-15-64 4-24-64 5-18-64		1.09 1.35 1.07 1.11 1.52

≠ Operated as a continuous-record gaging station.
a Revised.

Discharge measurements made at low-flow partial-record stations during fiscal year 1964--Continued

Station No.	Station name	Location	Drainage area (sq mi)	Period of record	Measurements		
					Date	Discharge	
						Mgd	Cfs
		Island of Okinawa, Ryukyu Islands--Continued					
8777	Genka-kawa at Genka	Lat 26°36'48" N., long 128°03'38" E., 0.9 mile southwest of Genka and 1.9 miles southeast of Nakaoshi.	5.5	1964	3-26-64 4- 7-64 4-28-64		5.82 4.87 3.33
8780	Makiya-okawa at Makiya	Lat 26°37'10" N., long 128°02'18" E., 0.3 mile south of Makiya, 0.5 mile east of Nakaoshi, and 0.6 mile above mouth.	1.7	1964	10-18-63 2-11-64 4- 7-64 4-21-64 4-30-64		.98 2.11 1.60 1.20 1.55
8790	Manna-gawa at Manna	Lat 26°39'12" N., long 127°55'06" E., at Manna, 0.5 mile east of Inoha-shogakko (elementary school) and 1.4 miles above highway bridge at mouth.	2.2	1964	3-31-64 4-23-64		2.10 1.26
8794	Yofuke-gawa at Yofuke	Lat 26°34'02" N., long 127°59'43" E., 0.6 mile southeast of Yofuke and 0.6 mile northeast of Sukuta.	1.2	1964	3-17-64 4-14-64		.76 .28
8795	Sukuta-kawa at Sukuta	Lat 26°33'33" N., long 127°59'23" E., 0.4 mile southeast of Sukuta, 0.6 mile above mouth, and 0.8 mile south of Yofuke.	1.1	1964	3-17-64 4-14-64		.80 .32
8796	Fukuchi-gawa at Kyoda	Lat 26°32'37" N., long 127°58'40" E., 0.7 mile northeast of Kyoda and 1.5 miles southwest of Sukuta.	1.1	1964	3-17-64 4-14-64		.60 .32
*8808	Hiya-gawa at Ojana	Lat 26°15'35" N., long 127°44'08" E., 0.1 mile south of Ojana and 0.6 mile above mouth.	2.3	1964	2-14-64		.30
8832	O-kawa at Kushi	Lat 26°30'50" N., long 127°59'50" E., 0.7 mile north of junction of Highways 13 and 108 and 0.7 mile west of Kushi.	1.3	1964	2- 4-64 2-21-64 3-13-64 4-13-64		.34 .39 .48 .29
8835	Suginda-gawa at Suginda	Lat 26°32'41" N., long 128°01'56" E., 0.1 mile west of Suginda and 0.4 mile south of Futami.	.9	1964	2-21-64 3-13-64 4-13-64		.54 .77 .43
8836	Oura-gawa at Oura	Lat 26°33'32" N., long 128°02'35" E., 0.5 mile north of Oura and 1.0 mile northwest of Sedake.	3.1	1964	2-17-64 3-13-64 4-13-64		2.04 3.04 1.73
8838	Teema-gawa at Mihara	Lat 26°33'11" N., long 128°04'48" E., below Mihara-gawa, 0.1 mile southeast of Mihara-shochugakko (school), and 0.9 mile east of Teema.	3.2	1964	2-17-64 3-13-64 4-13-64		2.18 2.40 1.81
		Island of Tutuila, Samoa Islands					
9000	Vailoa Stream at Tula	Lat 14°15'33" S., long 170°34'19" W., 0.5 mile west of Tula and 0.6 mile above mouth.	.06	1959-64	5-18-64	.04	.06
9025	Vaisa Stream at Onenoa	Lat 14°15'27" S., long 170°34'44" W., 30 ft below confluence of Left and Right Forks and 0.1 mile south of Onenoa.	.12	1964	5-14-64 5-18-64	.20 .13	.31 .20
9030	Afimuao Stream at Onenoa	Lat 14°15'35" S., long 170°34'53" W., 0.2 mile above mouth and 0.2 mile south of Onenoa.	.07	1959-64	5-14-64 5-18-64	.04 .03	.06 .05
9040	Laoulu Stream at Aoa	Lat 14°15'54" S., long 170°34'50" W., 0.2 mile east of Aoa and 0.2 mile above mouth.	.03	1959-64	5-14-64	.03	.05
9050	Lepa Stream at Aoa	Lat 14°16'22" S., long 170°35'17" W., 0.5 mile above mouth and 0.6 mile south of Aoa.	.06	1959-64	5-14-64 5-20-64	.16 b.21	.24 b.32
9070	Panota Stream at Masausi	Lat 14°15'54" S., long 170°36'09" W., 0.1 mile southeast of Masausi and 0.2 mile above mouth.	.05	1959-64	5-19-64	b.37	b.57
9080	Vaipito Stream at Masausi.	Lat 14°16'04" S., long 170°36'18" W., 0.3 mile above mouth and 0.3 mile south of Masausi.	.08	1959-64	5-19-64	b.56	b.87
9090	Tagau Stream at Masefau	Lat 14°15'48" S., long 170°38'20" W., 0.4 mile above mouth and 0.6 mile southwest of Masefau.	.02	1959-64	5-19-64	b.21	b.33

* Also a crest-stage partial-record station.
b Surface runoff included.

Discharge measurements made at low-flow partial-record stations during fiscal year 1964--Continued

Station No.	Station name	Location	Drainage area (sq mi)	Period of record	Measurements		
					Date	Discharge	
						Mgd	Cfs
		Island of Tutuila, Samoa Islands--Continued					
9100	Talaloa Stream at Masefau	Lat 14°15'51" S., long 170°38'07" W., 0.4 mile southwest of Masefau and 0.5 mile above mouth.	0.39	1959-64	5-19-64	b3.21	b4.96
9110	Pago Stream tributary at Afono	Lat 14°16'06" S., long 170°38'55" W., 200 ft above mouth and 0.3 mile south of Afono.	.32	1960-64	5-19-64	b.74	b1.15
9130	Gaoa Stream at Vatia	Lat 14°15'33" S., long 170°40'36" W., 0.3 mile southwest of Vatia and 0.3 mile above mouth.	.26	1959-64	5-19-64	b1.41	b2.18
9140	Leafu Stream at Vatia	Lat 14°15'24" S., long 170°40'44" W., 0.3 mile above Gaoa Stream and 0.4 mile west of Vatia.	.12	1959-64	5-19-64	b.96	b1.49
9160	Leua Stream at Fagasa	Lat 14°17'24" S., long 170°43'00" W., 0.2 mile above mouth and 0.3 mile northeast of Fagasa.	.14	1960-64	5-15-64	.21	.32
9170	Leele Stream at Fagasa	Lat 14°17'32" S., long 170°43'00" W., 0.2 mile above mouth and 0.3 mile east of Fagasa.	.26	1960-64	5-15-64	.10	.15
9180	Lesina Stream at Fagasa	Lat 14°17'38" S., long 170°43'14" W., 0.1 mile above mouth and 0.1 mile south of Fagasa.	.30	1960-64	5-15-64	.01	.02
9198	Aasu Stream at Aoloaufou	Lat 14°18'54" S., long 170°46'00" W., 0.3 mile north of Aoloaufou and 1.3 miles southeast of Aoloautuai.	.27	1960-64	5-14-64	.10	.16
9260	Vaitele Stream at Poloa	Lat 14°19'18" S., long 170°49'36" W., 750 ft above unnamed tributary on right and 0.4 mile east of Poloa.	.12	1960-64	5-12-64	.08	.12
9270	Puna Stream at Aranave	Lat 14°19'39" S., long 170°49'49" W., 0.2 mile above mouth and 0.2 mile north of Aranave.	.04	1959-64	5-12-64 5-20-64	.11 .19	.17 .30
9280	Afutele Stream at Agugulu	Lat 14°20'05" S., long 170°49'06" W., 30 ft below Right Branch and 300 ft north of Agugulu.	.15	1959-64	5-12-64 5-20-64	.31 .36	.48 .55
9290	Vaialae Stream at Utumea	Lat 14°19'56" S., long 170°48'50" W., 600 ft north of Utumea and 700 ft above mouth.	.14	1959-64	5-12-64 5-20-64	.30 .35	.46 .54
9298	Utanuatele Stream at Seetaga	Lat 14°19'41" S., long 170°48'35" W., 250 ft above Soonapule Stream and 0.2 mile north of Seetaga.	.12	1961-64	5-12-64 5-20-64	.34 .46	.53 .71
9300	Soonapule Stream at Seetaga	Lat 14°19'42" S., long 170°48'36" W., 100 ft above mouth and 0.1 mile north of Seetaga.	.12	1959-64	5-14-64 5-20-64	.29 .48	.45 .74
9320	Asili Stream near Asili	Lat 14°19'46" S., long 170°47'42" W., 0.1 mile below Right Branch and 0.4 mile north of Asili.	.38	1960-64	5-12-64 5-20-64	1.09 1.62	1.69 2.51
9325	Asili Stream at Asili	Lat 14°20'05" S., long 170°47'40" W., 300 ft north of Asili and 600 ft above mouth.	.54	1958-59≠, 1960-64	5-12-64 5-20-64	1.43 2.01	2.21 3.11
9330	Vaipuna Stream at Amaluia	Lat 14°19'48" S., long 170°47'21" W., 0.6 mile north of Amaluia and 0.6 mile northeast of Asili.	.19	1960-64	5-15-64	.10	.15
9340	Leafu Stream near Leone	Lat 14°19'54" S., long 170°46'48" W., 0.8 mile north of Leone and 0.8 mile northeast of Amaluia.	.20	1959-64	5-13-64	1.22	1.88
9350	Fuafua Stream at Malaeloa	Lat 14°20'01" S., long 170°46'09" W., 1,000 ft above tributary on left and 0.7 mile north of Malaeloa.	.35	1960-64	5-14-64	.45	.69
9355	Sigaloa Stream at Malaeloa	Lat 14°20'27" S., long 170°45'53" W., 0.1 mile above Vaitai Stream and 0.2 mile north of Malaeloa.	.04	1960-64	5-13-64	.03	.04
9360	Leaveave Stream at Mapusagafou	Lat 14°19'12" S., long 170°44'59" W., 0.7 mile northwest of Mapusagatuai and 0.7 mile northwest of Mapusagafou.	.05	1960-64	5-14-64	.20	.30
9370	Mapusagatuai Stream at Mapusagatuai	Lat 14°19'38" S., long 170°44'48" W., 0.3 mile west of Mapusagatuai and 0.5 mile northeast of Mapusagafou.	.08	1960-64	5-14-64 5-18-64	.18 .21	.27 .32

≠ Operated as a continuous-record gaging station.
b Surface runoff included.

Discharge measurements made at low-flow partial-record stations during fiscal year 1964--Continued

Station No.	Station name	Location	Drainage area (sq mi)	Period of record	Measurements		
					Date	Discharge	
						Mgd	Cfs
		Island of Tutuila, Samoa Islands--Continued					
9380	Right Branch Taumata Stream near Mapusagatuai	Lat 14°18'22" S., long 170°44'04" W., 0.5 mile above Left Branch and 1.5 mile north of Mapusagatuai.	0.08	1960-64	5-15-64	0.06	0.10
9390	Left Branch Taumata Stream near Mapusagatuai	Lat 14°18'27" S., long 170°43'49" W., 0.5 mile above Right Branch and 1.5 miles northeast of Mapusagatuai.	.24	1960-64	5-15-64	.13	.20
9400	Right Branch Vaitele Stream at Tafuna	Lat 14°18'52" S., long 170°43'34" W., 0.3 mile above Left Branch, 0.7 mile north of Lepine, and 1.0 mile north of Tafuna.	.25	1959-64	5-11-64 5-18-64	.63 b1.31	.97 b2.03
9410	Left Branch Vaitele Stream at Tafuna	Lat 14°18'57" S., long 170°43'21" W., 900 ft above mouth, 0.6 mile northeast of Lepine, and 0.9 mile north of Tafuna.	.11	1959-64	5-16-64 5-18-64	.16 .30	.25 .47
9420	Sauino Stream near Nuuuli	Lat 14°18'52" S., long 170°43'04" W., 0.5 mile above mouth and 1.3 miles west of cemetery in Nuuuli.	.10	1960-64	5-16-64 5-22-64	.16 .31	.24 .48
9430	Mataalii Stream near Nuuuli	Lat 14°18'42" S., long 170°42'51" W., 0.6 mile above mouth and 1.2 miles northwest of cemetery in Nuuuli.	.16	1960-64	5-16-64 5-22-64	.34 .78	.53 1.21
9440	Leele Stream near Nuuuli	Lat 14°18'26" S., long 170°42'29" W., 1.0 mile above mouth and 1.1 miles northwest of cemetery in Nuuuli.	.61	1960-64	5-16-64 5-22-64	.92 2.60	1.43 4.02
9450	Amaile Stream at Nuuuli	Lat 14°18'43" S., long 170°41'48" W., 0.3 mile above mouth and 0.6 mile north of cemetery in Nuuuli.	.14	1960-64	5-16-64	.39	.61
9460	Avau Stream at Faganeanea	Lat 14°18'32" S., long 170°41'37" W., 0.2 mile above mouth and 0.4 mile southwest of Faganeanea.	.08	1960-64	5-16-64 5-22-64	.18 .27	.28 .42
9470	Afu Stream at Faganeanea	Lat 14°18'16" S., long 170°41'24" W., 0.2 mile northwest of Faganeanea and 0.3 mile above mouth.	.21	1959-64	5-16-64 5-22-64	.10 .94	.15 1.45
9490	Matafao Stream at Fagaalu	Lat 14°17'35" S., long 170°41'42" W., at Vaitanoa Pool and 0.8 mile west of Fagaalu.	.24	1960-64	5-23-64	.40	.62
9498	Utumoa Stream near Pago Pago	Lat 14°17'36" S., long 170°42'20" W., 0.8 mile east of Fagalea and 1.1 miles south of Colman School in Pago Pago.	.06	1961-64	5-13-64	.32	.49
9505	Utumoa Stream at Pago Pago	Lat 14°17'21" S., long 170°42'22" W., 0.8 mile east of Fagalea and 0.8 mile south of Colman School in Pago Pago.	.13	1957-58≠, 1961-64	5-13-64	.25	.39
9510	Vaima Stream at Pago Pago	Lat 14°17'31" S., long 170°42'29" W., 0.7 mile east of Fagalea and 1.0 mile south of Colman School in Pago Pago.	.09	1960-64	5-11-64	.10	.16
9530	Mataginaile Stream above reservoir, at Aua	Lat 14°16'23" S., long 170°39'58" W., 0.2 mile above mouth and 0.2 mile northwest of Aua.	.09	1959-64	5-13-64	.10	.16
9535	Lalolanauta Stream at Aua	Lat 14°16'25" S., long 170°39'31" W., 0.3 mile northeast of Aua and 0.4 mile above mouth.	.10	1959-64	5-13-64	.23	.35
9550	Anasosopo Stream at Anasosopo	Lat 14°17'14" S., long 170°39'43" W., 300 ft north of Anasosopo and 0.1 mile above mouth.	.05	1960-64	5-13-64	.23	.35
9555	Vaisina Stream at Laulilfou	Lat 14°17'34" S., long 170°39'24" W., 0.1 mile north of Laulilfou and 0.2 mile above mouth.	.04	1960-64	5-13-64	.12	.18
9560	Vaitele Stream at Laulituai	Lat 14°17'04" S., long 170°39'08" W., 0.2 mile above confluence with Maga Stream and 0.5 mile north of Laulituai.	.05	1960-64	5-13-64 5-22-64	.40 1.01	.62 1.56
9565	Maga Stream at Laulituai	Lat 14°17'12" S., long 170°39'10" W., 0.1 mile above confluence with Vaitele Stream and 0.3 mile north of Laulituai.	.21	1960-64	5-13-64 5-22-64	.10 .05	.16 .07

≠ Operated as a continuous-record gaging station.
b Surface runoff included.

Discharge measurements made at low-flow partial-record stations during fiscal year 1964--Continued

Station No.	Station name	Location	Drainage area (sq mi)	Period of record	Measurements		
					Date	Discharge	
						Mgd	Cfs
		Island of Tutuila, Samoa Islands--Continued					
9570	Lesea Stream at Laulituai	Lat 14°17'19" S., long 170°39'00" W., 0.1 mile above mouth and 0.3 mile northeast of Laulituai.	0.17	1960-64	5-13-64 5-22-64	0.42 .74	0.65 1.15
9580	Right Branch Visa Stream at Aumi	Lat 14°17'20" S., long 170°38'39" W., 0.2 mile above mouth and 0.3 mile northeast of Aumi.	.05	1959-64	5-13-64	.37	.57
9585	Left Branch Visa Stream at Aumi	Lat 14°17'24" S., long 170°38'35" W., 250 ft above mouth and 0.3 mile northeast of Aumi.	.02	1959-64	5-13-64	.06	.10
9590	Visa Stream at Aumi	Lat 14°17'28" S., long 170°38'36" W., 100 ft above coastal road and 0.2 mile east of Aumi.	.14	1957-58≠, 1963-64	5-22-64	.42	.65
9605	East Branch Alega Stream at Alega	Lat 14°16'57" S., long 170°38'16" W., 300 ft above mouth and 0.2 mile north of Alega.	.16	1962-64	5-15-64 5-20-64	.25 .66	.38 1.02
9610	Mulioleva'i Stream at Auto	Lat 14°16'37" S., long 170°37'54" W., 0.5 mile above mouth and 0.5 mile northwest of Auto.	.14	1959-64	5-15-64 5-20-64	.56 .63	.87 .98
9620	Laloi Stream at Amouli	Lat 14°16'43" S., long 170°35'15" W., 0.2 mile above Fusilca Stream and 0.3 mile west of Amouli.	.08	1959-64	5-15-64 5-22-64	.14 .21	.22 .32
9630	Televai Stream at Amouli	Lat 14°16'24" S., long 170°34'54" W., 0.2 mile above Tuavaa Stream and 0.3 mile north of Amouli.	.10	1959-64	5-15-64 5-22-64	.15 .18	.23 .27
9640	Leafu Stream at Auasi	Lat 14°16'28" S., long 170°34'26" W., 0.1 mile north of Auasi and 0.2 mile above mouth.	.55	1959-64	5-14-64 5-22-64	.18 .19	.27 .30
9650	Vaialili Stream at Alao	Lat 14°16'15" S., long 170°34'10" W., 0.2 mile above confluence with Vaifusi Stream and 0.4 mile west of Alao.	.05	1959-64	5-14-64 5-18-64	.01 .06	.02 .09
9660	Vaifusi Stream at Alao	Lat 14°16'09" S., long 170°34'04" W., 300 ft above confluence with Vaialili Stream and 0.3 mile west of Alao.	.02	1959-64	5-14-64 5-18-64	.08 .01	.12 .02

≠ Operated as a continuous-record gaging station.

Crest-stage partial-record stations

Crest-stage partial-record stations for the State of Hawaii are published in an annual progress report entitled "An Investigation of Floods in Hawaii." The following table contains annual maximum discharges for crest-stage stations not included in that report. A crest-stage gage is a device which will register the peak stage occurring between inspections of the gage. A stage-discharge relation for each gage is developed from discharge measurements made by indirect measurements of peak flow or by current meter. The date of the maximum discharge is not always certain but is usually determined by comparison with nearby continuous-record stations, weather records, or local inquiry. Only the maximum discharge for each fiscal year is given. Information on some lower floods may have been obtained but is not published herein. The years given in the period of record represent fiscal years for which the annual maximum has been determined.

Annual maximum discharge at crest-stage partial-record stations

Station No.	Station name	Location	Drainage area (sq mi)	Period of record	Annual maximum		
					Date	Gage height (feet)	Discharge (cfs)
		Island of Guam, Mariana Islands					
*8073	Fonte River at dam, near Nimitz Hill	Lat 13°27'25" N., long 144°43'34" E., 0.4 mile south of Force Headquarters building on Nimitz Hill and 1.2 miles southeast of Asan.	0.60	1962-64	10-11-63	3.20	298
8098	Sabu River at Umatac	Lat 13°17'52" N., long 144°39'37" E., at highway culvert between Catholic church and public school at Umatac.	.038	1963-64	12- 4-63	3.70	98
		Island of Okinawa, Ryukyu Islands					
*8808	Hiya-gawa at Ojana	Lat 26°15'35" N., long 127°44'08" E., 0.1 mile south of Ojana and 0.6 mile above mouth.	2.2	1964	6-16-64	3.8	(/)
8812	Kanegusuku-gawa at Kanegusuku	Lat 26°11'31" N., long 127°43'36" E., 0.2 mile northwest of Kanegusuku and 1.3 miles east of Kokubu.	3.0	1964	6-16-64	10.2	(/)
8815	Mukue-gawa near Itomanoho	Lat 26°07'58" N., long 127°41'22" E., at highway bridge, 0.6 mile west of Yoza, and 0.9 mile northeast of Itomancho.	6.4	1964	6-16-64	10.5	(/)

* Also a low-flow partial-record station.
/ Not determined.

Measurements at miscellaneous sites

Measurements of streamflow at points other than gaging stations or partial-record stations are given in the following table.

Discharge measurements made at miscellaneous sites during fiscal year 1964

Stream	Tributary to	Location	Measured previously (fiscal years)	Measurements		
				Date	Discharge	
					Mgd	Cfs
Island of Oahu						
Left Fork Moanalua Stream	Pacific Ocean	Lat 21°23'30", long 157°50'23", 3.0 miles southwest of Castle High School and 3.6 miles south of Ahuimanu Ranch.		3-31-64	0.02	0.03
Left Fork Moanalus Stream	Pacific Ocean	Lat 21°23'28", long 157°50'52", 3.5 miles southwest of Castle High School and 3.7 miles south of Ahuimanu Ranch.		3-31-64	.19	.29
Manoa Stream	Pacific Ocean	Lat 21°19'48", long 157°48'12", 2.5 miles north of St. Louis College and 4.1 miles northeast of Honolulu Post Office.		1-29-64	2.54	3.93
Manoa Stream	Pacific Ocean	Lat 21°19'29", long 157°48'25", 2.2 miles north of St. Louis College and 3.8 miles northeast of Honolulu Post Office.		1-29-64	3.09	4.78
Manoa Stream	Pacific Ocean	Lat 21°18'57", long 157°48'37", 1.2 miles north of St. Louis College and 3.5 miles northeast of Honolulu Post Office.		1-29-64	2.82	3.66
Manoa Stream	Pacific Ocean	Lat 21°18'39", long 157°48'43", 1.2 miles north of St. Louis College and 3.4 miles east of Honolulu Post Office.		1-29-64	3.44	5.32
Manoa Stream	Pacific Ocean	Lat 21°17'56", long 157°48'58", 0.5 mile northwest of St. Louis College and 3.1 miles southeast of Honolulu Post Office.		1-29-64	3.12	4.82
Manoa Stream	Pacific Ocean	Lat 21°17'42", long 157°49'01", 0.5 mile northwest of St. Louis College and 3.1 miles southeast from Honolulu Post Office.		1-29-64	3.32	5.13
Manoa Stream	Pacific Ocean	Lat 21°17'38", long 157°49'03", 0.5 mile west of St. Louis College and 3.1 miles southeast of Honolulu Post Office.		1-29-64	4.14	6.40
Baskerville Springs	Keaahala Stream	Lat 21°25'18", long 157°48'31", 0.2 mile south of St. Ann's School and 1.3 miles northwest of Castle High School at Kaneohe.	1963-64	12- 4-63	2.04	3.16
Island of Molokai						
West Fork Kawela Gulch	Kawela Gulch	Lat 21°04'43", long 156°56'56", about 1000 ft above East Fork Kawela Gulch confluence and 3.5 miles east of Kamiloloa.		10-31-61	/2,280	/3,520
Kapulei Gulch at Kamalo	Kamalo Gulch	Lat 21°03'39", long 156°52'57", about 150 ft above Kamalo Gulch confluence and 0.8 mile northwest of Kamalo.		10-31-61	/401	/620
Island of Hawaii						
Wailuku River tributary	Wailuku River	Lat 19°46'13", long 155°22'04", 2.5 miles southwest of Pua Akala and 6.5 miles southeast of Mount Puu Makanaka.		3- 8-64 3- 9-64	8.73 .28	13.5 .43
Wailuku River	Pacific Ocean	Lat 19°43'05", long 155°17'32", 5.7 miles southeast of Puu Akala and 9.9 miles west of Piihonua.		12- 5-63	*.12	*.19
Wailuku River	Pacific Ocean	Lat 19°43'05", long 155°16'55", above tributary at altitude 3,760 ft, 6 miles southeast of Pua Akala, and 9.3 miles west of Piihonua.		12- 5-63	*.64	*.99
Wailuku River tributary	Wailuku River	Lat 19°43'07", long 155°16'54", at altitude 3,760 ft, 6 miles southeast of Puu Akala, and 9.3 miles west of Piihonua.		12- 5-63	*.36	*.56
Wailuku River	Pacific Ocean	Lat 19°43'20", long 155°15'59", 200 ft above Waipahoehoe Stream and 6.5 miles southeast of Pua Akala.		12- 4-63	*.66	*1.03

* Base flow.
/ Peak flow.

Discharge measurements made at miscellaneous sites during fiscal year 1964--Continued

Stream	Tributary to	Location	Measured previously (fiscal years)	Measurements		
				Date	Discharge	
					Mgd	Cfs
Island of Hawaii--Continued						
Waipahoehoe Stream	Wailuku River	Lat 19°43'21", long 155°15'58", 200 ft above Wailuku River and 6.5 miles southeast of Pua Akala.		12- 4-63	0.20	0.31
Wailuku River	Pacific Ocean	Lat 19°43'02", long 155°15'14", 200 ft below Lower "Blue Pond," 7.3 miles southeast of Pua Akala, and 7.4 miles west of Piihonua.		12- 4-63	*.64	*1.00
Kawainui Stream	Waipio Stream	Lat 20°05'44", long 155°42'03", 2.5 miles east of Mount Puu Ahia and 5.2 miles north of Kamuela.		11-14-63 12-10-63	*2.39 *.20	*3.70 *.30
Kawainui Stream	Waipio Stream	Lat 20°05'30", long 155°41'26", 200 ft above Right Fork, 3.3 miles east of Mount Puu Ahia, and 4.8 miles north of Kamuela.		10-29-63 11-14-63 12-10-63	5.88 *2.94 *.26	9.09 *4.55 *.40
Right Fork Kawainui Stream tributary	Right Fork Kawainui Stream	Lat 20°05'28", long 155°41'25", 100 ft above mouth, 3.3 miles east of Mount Puu Ahia, and 4.8 miles north of Kamuela.		10-29-63 11-14-63	1.67 *1.27	2.58 *1.96
Kawainui Stream at intake	Waipio Stream	Lat 20°05'18", long 155°40'54", 3.9 miles east of Mount Puu Ahia and 4.5 miles north of Kamuela.		10-29-63 11-14-63 12-10-63	8.92 7.37 *.31	13.8 11.4 *.48
Upper Hamakua ditch		Lat 20°05'10", long 155°40'38", 4.2 miles east of Mount Puu Ahia and 4.3 miles north of Kamuela.		10-29-63 11-14-63 12-10-63	10.7 12.3 *.46	16.6 19.1 *.72
Upper Hamakua ditch		Lat 20°04'54", long 155°40'22", 4.0 miles north of Kamuela and 4.5 miles east of Mount Puu Ahia.		10-29-63 11-14-63 12-10-63	10.4 12.5 *.36	16.1 19.3 *.55
Upper Hamakua ditch		Lat 20°04'35", long 155°40'25", 3.6 miles north of Kamuela and 4.6 miles east of Mount Puu Ahia.		10-29-63 11-14-63 12-10-63	9.50 9.40 *.25	14.7 14.6 *.38
Alakahi Stream tributary	Alakahi Stream	Lat 20°04'26", long 155°40'30", about 1,000 ft below ranch pipeline to Alakahi Stream, 3.4 miles north of Kamuela, and 4.6 miles east of Mount Puu Ahia.		10-31-63 11-14-63 12-10-63	*.12 *.34 *.10	*.19 *.53 *.15
Alakahi Stream	Waipio Stream	Lat 20°04'27", long 155°40'25", at Trail Bridge, 3.5 miles north of Kamuela, and 4.7 miles east of Mount Puu Ahia.		10-30-63 10-31-63 11-14-63 12-10-63	5.10 *1.10 4.62 *.28	7.89 *1.70 7.15 *.43
Upper Hamakua ditch		Lat 20°04'05", long 155°40'12", at road crossing, 3.0 miles north of Kamuela, and 5.0 miles southeast of Mount Puu Ahia.		10-31-63 11-15-63 12-11-63	*3.36 27.6 *.36	*5.20 42.7 *.56
Upper Hamakua ditch		Lat 20°03'15", long 155°39'46", below lined channel, 4.3 miles northwest of Puukapu Reservoir, and 4.7 miles north of Kamuela.		10-31-63 11-15-63 12-11-63	*1.50 15.0 *.17	*2.32 23.2 *.27
Upper Hamakua ditch		Lat 20°03'32", long 155°39'02", 600 ft above tunnel, 2.8 miles northeast of Kamuela, and 3.3 miles northwest of Puukapu Reservoir.		10-31-63 11-15-63 12-11-63	*4.59 24.1 *.74	*7.10 37.3 *1.14
Upper Hamakua ditch		Lat 20°03'35", long 155°38'51", below tunnel outlet, 2.9 miles north of Kamuela, and 3.2 miles northwest of Puukapu Reservoir.		10-31-63 11-15-63 12-11-63	*5.40 25.8 *.79	*8.36 39.9 *1.22
Upper Hakakua ditch		Lat 20°03'35", long 155°38'12", at Waima Stream crossing and 3.4 miles northeast of Kamuela.		10-30-63 12-11-63	8.79 *.85	13.6 *1.31
Upper Hamakua ditch		Lat 20°03'42", long 155°37'47", below Waima Stream gate, 2.3 miles northwest of Puukapu Reservoir, and 3.8 miles northeast of Kamuela.		10-30-63 11-15-63 12-11-63	9.57 37.4 *.76	14.8 57.8 *1.18
Upper Hamakua ditch		Lat 20°03'33", long 155°37'41", 2.1 miles northwest of Puukapu Reservoir and 3.7 miles northeast of Kamuela.		10-30-63 11-15-63 12-11-63	9.69 35.5 *.75	15.0 55.0 *1.16

* Base flow.

Discharge measurements made at miscellaneous sites during fiscal year 1964--Continued

Stream	Tributary to	Location	Measured previously (fiscal years)	Measurements		
				Date	Discharge	
					Mgd	Cfs
Island of Hawaii--Continued						
West Branch Honokane Iki Stream	Honokane Iki Stream	Lat 20°09'47", long 155°43'25", 2.3 miles above mouth and 4.4 miles southeast of Niulii cemetery.	1961-63	7-24-63	2.69	4.16
				9-12-63	2.45	3.79
				10-30-63	*.87	*1.35
				12-11-63	*.12	*.19
				1-29-64	*.39	*.60
				3-18-64	*.15	*.23
				5-13-64	6.98	10.8
East Branch Honokane Nui Stream	Honokane Nui Stream	Lat 20°08'58", long 155°43'59", 3.6 miles above mouth and 5.2 miles south of Niulii cemetery.		10-29-63	*.49	*.76
				12-11-63	1.15	1.78
				1-29-64	*.40	*.62
				3-17-64	*.47	*.73
				5-13-64	68.0	105
Waipahoehoe Stream	Honokoa Gulch	Lat 20°06'06", long 155°45'18", at Kohala Forest Reserve Boundary and 7.5 miles northwest of Kamuela.		11- 4-63	*.02	*.04
				11-19-63	*.28	*.43
				12-15-63	*.04	*.06
Keawewai Stream	Honokoa Stream	Lat 20°05'28", long 155°44'28", at Kohala Forest Reserve Boundary and 6.5 miles northwest of Kamuela.		11- 4-63	*.06	*.09
				11-19-63	*.40	*.62
				12-15-63	*.02	*.03
Kaawewai Stream	Honokoa Stream	Lat 20°05'16", long 155°44'43", 0.4 mile below Kohala Forest Reserve Boundary and 6.5 miles northwest of Kamuela.		11- 4-63	*.05	*.08
				11-19-63	*.25	*.39
				12-15-63	*.02	*.03
Kilohana Gulch	Keawewai Stream	Lat 20°05'40", long 155°44'39", at Kohala Forest Reserve Boundary and 6.7 miles northwest of Kamuela.		11- 2-63	*.01	*.02
				11-19-63	*.10	*.15
				12-15-63	*.01	*.01
Kilohana Gulch tributary	Kilohana Gulch	Lat 20°05'46", long 155°44'55", at water tank and 7.0 miles northwest of Kamuela.		11-19-63	*.03	*.05
				12-15-63	*0	*0
Kilohana Gulch	Keawewai Stream	Lat 20°05'08", long 155°46'02", at Waimea-Kohala Road and 0.6 mile above mouth.		11- 2-63	*.01	*.02
				11-19-63	*.18	*.28
Left Branch, Waiakanali Gulch	Waiakanali Gulch	Lat 20°04'17", long 155°43'40", at Kohala Forest Reserve Boundary and 4.9 miles northwest of Kamuela.		11- 2-63	*.02	*.03
				11-17-63	*.09	*.14
				12-14-63	*0	*0
Makeahua Gulch tributary	Makeahua Gulch	Lat 20°04'55", long 155°44'00", 400 ft below Kohala Forest Reserve Boundary and 5.6 miles northwest of Kamuela.		11- 2-63	*.01	*.02
				11-17-63	*.06	*.09
				12-14-63	*0	*0
Kohakohau Stream	Keanuiomano Stream	Lat 20°04'06", long 155°41'08", below diversion dam for pipeline and 3.2 miles north of Kamuela.		11-18-63	*.16	*.25
Kohakohau Stream	Keanuiomano Stream	Lat 20°03'53", long 155°41'18", 0.3 mile below diversion dam for pipeline and 2.9 miles northwest of Kamuela.		10-31-63	*.46	*.72
				11-18-63	*.74	*1.15
				12-12-63	*.19	*.29
Kohakohau Stream	Keanuiomano Stream	Lat 20°03'04", long 155°41'00", 2.3 miles northeast of Road Junction at Waiaka and 2.5 miles north of Kamuela.		11- 1-63	*.64	*.99
				11-18-63	*1.14	*1.77
				12-12-63	*.28	*.44
Kohakohau Stream	Keanuiomano Stream	Lat 20°02'37", long 155°41'12", 1 mile east of road junction at Waiaka and 1.3 miles northwest of Kamuela.		11- 1-63	*0.91	*1.41
				11-18-63	*2.08	*3.22
				12-12-63	*.31	*.47
Hokuula Spring	Kohakohau Stream	Lat 20°02'11", long 155°41'08", on slope of Hokuula Hob and 1.2 miles northwest of Kamuela.		12- 6-63	*.01	*.02
				12-16-63	*.01	*.02
Right Branch Mamaewa Gulch	Mamaewa Gulch	Lat 20°03'49", long 155°42'53", 2.4 miles north of Waiaka road junction and 3.9 miles northwest of Kamuela.		11- 2-63	*.03	*.05
				11-17-63	*.12	*.18
				12-14-63	*.01	*.01
Waikoloa Stream	Waiulaula Gulch	Lat 20°03'35", long 155°40'15", at bridge crossing to Hamakua ditch, 0.8 mile north of Mount Puu Ohu, and 2.5 miles north of Kamuela.		10-30-63	*2.54	*3.93
				11-16-63	3.94	6.10
				12-13-63	*1.10	*1.70

* Base flow.

Discharge measurements made at miscellaneous sites during fiscal year 1964--Continued

Stream	Tributary to	Location	Measured previously (fiscal years)	Measurements		
				Date	Discharge	
					Mgd	Cfs
Island of Hawaii--Continued						
Waikoloa Stream	Waiulaula Gulch	Lat 20°03'28", long 155°40'07", at crossing of pipeline that diverts from Alakahi Stream and 2.4 miles north of Kamuela.		10-30-63	*2.67	*4.13
				11-16-63	4.41	6.83
				12-13-63	*.84	*1.30
				12-13-63	*.81	*1.25
Waikoloa Stream	Waiulaula Gulch	Lat 20°02'58", long 155°39'48", at pipeline crossing 0.5 mile east of Mount Puu Ohu and 1.8 miles north of Kamuela.		10-30-63	*3.61	*5.58
				11-16-63	6.45	9.98
				12-13-63	*1.01	*1.56
Waikoloa Stream	Waiulaula Gulch	Lat 20°02'42", long 155°40'08", about 1,000 ft below Marine Dam, 0.3 mile south of Mount Puu Ohu, and 1.5 miles north of Kamuela.		10-30-63	*2.13	*3.29
				11-16-63	4.88	7.55
Kawaa Springs	Pacific Ocean	Lat 19°06'50", long 155°31'47", at altitude 5 ft and 5 miles northeast of Naalehu.		10- 3-63	*13.5	*20.9
				4-13-64	*9.64	*14.9
				6-10-64	*5.72	*8.85
Hilea Stream	Pacific Ocean	Lat 19°10'15", long 155°36'00", 300 ft above falls, 6.5 miles west of Punaluu, and 7.5 miles north of Naalehu.		10- 1-63	*1.04	*1.61
Ninole Springs	Pacific Ocean	Lat 19°07'57", long 155°30'54", 1.1 miles southwest of Punaluu and 3.6 miles northeast of Honuapo.		9-17-63	*28.6	*44.3
				3-13-64	*23.5	*36.4
				4-14-64	*22.4	*34.7
				6-10-64	*19.9	*30.8

* Base flow.

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