UNITED STATES DEPARTMENT OF THE INTERIOR
RAY LYMAN WILBUR, Secretary
GEOLOGICAL SURVEY
W. C. MENDENHALL, Director

Water-Supply Paper 695

SURFACE WATER SUPPLY *of* HAWAII

JULY 1, 1928, *to* JUNE 30, 1929

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Prepared in cooperation with the
TERRITORY OF HAWAII

UNITED STATES
GOVERNMENT PRINTING OFFICE
WASHINGTON : 1932

For sale by the Superintendent of Documents, Washington, D. C. - Price 10 cents (Paper cover)

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SURFACE WATER SUPPLY OF HAWAII, JULY 1, 1928, TO JUNE 30, 1929

AUTHORITY FOR INVESTIGATIONS

This volume contains records of measurements of flow made on certain streams and ditches in the Territory of Hawaii during the year ending June 30, 1929. The data presented in this report were collected by the United States Geological Survey in cooperation with the Territory of Hawaii, under the general sanction of the organic law of the Geological Survey (20 Stat. L., p. 394), which contains the following paragraph:

Provided, That this officer [the Director] shall have the direction of the Geological Survey and the classification of public lands and examination of the geological structure, mineral resources, and products of the national domain.

As water is the most abundant and most valuable of the minerals, the investigation of water resources is authorized under the provision for examining mineral resources. Since the fiscal year ending June 30, 1895, successive appropriation bills passed by Congress have carried the following item:

For gaging the streams and determining the water supply of the United States, and for the investigation of underground currents and artesian wells, and for the preparation of reports upon the best methods of utilizing the water resources.

For the fiscal years ending June 30, 1929, and thereafter the appropriation bills have carried, in addition to the above provisions, the following proviso: "*Provided,* That no part of this appropriation shall be expended in cooperation with States or municipalities except upon the basis of the State or municipality bearing all the expense incident thereto in excess of such an amount as is necessary for the Geological Survey to perform its share of general water resources investigations, such share of the Geological Survey in no case exceeding 50 per centum."

The Legislature of the Territory of Hawaii approved on March 22, 1909, "An act to promote the conservation and development of the natural resources of the Territory," which provided in substance as follows: A special tax of 2 per cent shall be levied, assessed, and collected annually on all incomes in excess of $4,000; and all amounts so collected shall constitute a special fund to be expended only for the encouragement of immigration and the conservation of natural resources in the proportion of three-fourths for immigration and one-

fourth for conservation. The conservation fund shall be used for the development, conservation, improvement, and utilization of the natural resources, and shall be available for expenditure at such times and in such manner as a board of three persons appointed in accordance with section 80 of the organic act shall, with the approval of the governor, determine.

An act of April 26, 1911, amended the original act so as to extend it until December 31, 1913.

On April 4, 1913, the Governor of the Territory of Hawaii approved Act 56, for the creation and maintenance of a division of hydrography under the board of agriculture and forestry, and Act 57, appropriating the revenues from water licenses for the use of the board of commissioners of agriculture and forestry toward forest protection and hydrographic surveying.

Since June 30, 1915, the funds for the use of the division of hydrography have been supplied by successive appropriations from the general revenues of the Territory.

On March 23, 1917, the following act (Act 27) by the Legislature of the Territory of Hawaii was approved:

SECTION 1. The division of hydrography, authorized by and created pursuant to section 483 of the Revised Laws of Hawaii, 1915, is hereby transferred, together with all the materials, equipment, and supplies now under the control of the division or of the board of commissioners of agriculture and forestry for the division, to the commissioner of public lands.

SEC. 2. The commissioner of public lands shall have and exercise the same powers, duties, and jurisdiction with respect to said division as are now exercised by the board of commissioners of agriculture and forestry.

SEC. 3. All unexpended balances of appropriations heretofore made for said division, the expenditure of which is now by law vested in the board of commissioners of agriculture and forestry, are hereby transferred to the commissioner of public lands and the expenditure thereof vested in said commissioner.

SEC. 4. This act shall take effect upon its approval.

COOPERATION

COOPERATION WITH THE TERRITORY OF HAWAII

Under the authority conferred by the Federal and Territorial legislation, the Director of the United States Geological Survey and the Governor of the Territory of Hawaii entered into a cooperative agreement, dating from July 1, 1910, for "the gaging of streams and the determination of the water supply of the Territory of Hawaii."[1]

The principal features of this agreement are:

1. The United States Geological Survey assumes the responsibility of gathering, analyzing, and publishing the data.

[1] The United States Geological Survey also cooperated with the Territory of Hawaii in mapping the eight main islands.

2. During the progress of the work all notes, maps, and data gathered as a result of field studies are at all times open to inspection by the representative of the Territory, and if they are not satisfactory the agreement can be terminated.

3. Accounts for payment of salaries, travel, and subsistence, supplies, or other expenses necessary to the completion of the work shall be rendered in the manner required by the laws and regulations of the contracting parties, and vouchers shall be proffered to either party for payment according as it may be convenient or according to the balance remaining in the respective allotments.

4. The cost of publication is borne entirely by the Geological Survey.

Unless otherwise stated, all data in this paper have been collected and are published under this cooperative agreement with the Territory of Hawaii.

Until June 30, 1913, the Territory of Hawaii was represented in the cooperation by the board of conservation; from July 1, 1913, to March 23, 1917, by the board of commissioners of agriculture and forestry; and since this date by the commissioner of public lands.

OTHER COOPERATION

Some of the data in this paper have been obtained in cooperation with the city and county of Honolulu, the city of Hilo, and private persons and corporations, under one of the plans indicated in the following paragraphs:

1. Expense of work, equipment, and installation paid entirely or in part by the cooperating party.

2. Records collected by employees of a cooperating party but under supervision of and by methods of the Survey.

3. Assistance given in the collection of records, such as furnishing transportation, subsistence, and equipment.

4. Records furnished by a cooperating party, collected by his methods and under his supervision.

Cooperation in the collection of records for whose accuracy responsibility has not rested with the Geological Survey has been acknowledged in the descriptions of the stations. Special acknowledgment is due to the following organizations cooperating under plans 1, 2, and 3: Island of Kauai—Kekaha Sugar Co., McBryde Sugar Co., East Kauai Water Co., Princeville Plantation Co., and American Factors (Ltd.); Island of Oahu—city and county of Honolulu, Board of Water Supply, B. P. Bishop Estate, and Wahiawa Water Co.; Island of Maui—Pioneer Mill Co. and East Maui Irrigation Co.; Island of Hawaii—Hilo Waterworks, C. Brewer & Co. (Ltd.), and Kohala Ditch Co.

SCOPE OF WORK

Since the beginning of stream-gaging work in Hawaii in 1910, records of flow of streams and ditches have been obtained at about 400 stations for periods ranging from a few months to 19 years. In addition hundreds of miscellaneous measurements have been made, and rather extensive studies of ground water have been made in Kau, Hawaii, and in Honolulu, Oahu.

In this volume are given the records of daily flow that were obtained at the 83 stations that were operated during the year ending June 30, 1929, and the results of miscellaneous measurements of stream flow made during that year. The results of ground-water studies will be published in separate water-supply papers. (See p. — for a record of other water-supply papers pertaining to Hawaii.)

DEFINITION OF TERMS

The volume of water flowing in a stream—the "run-off" or "discharge"—is expressed in various terms, each of which has become associated more or less definitely with a certain class of work. These terms may be divided into two groups: (1) Those that represent a rate of flow, as "second-feet," "gallons a minute," "gallons a day," "miner's inches," and "run-off in second-feet a square mile," and (2) those that represent the actual quantity of water, as "run-off in inches," "million gallons," and "acre-feet." Those used in this report may be defined as follows:

"Second-foot" is an abbreviation for cubic foot a second and is the unit for the rate of discharge of water flowing in a stream 1 square foot in cross section at a rate of 1 foot a second. It is generally adopted as the fundamental unit in the measurement of flowing water and is the "natural" unit, as the foot and the second are the units used in making the physical determinations.

An "acre-foot" is equivalent to 43,560 cubic feet and is the quantity required to cover an acre to the depth of 1 foot. The term is commonly used in connection with storage for irrigation.

In the Territory of Hawaii the unit most commonly used in measuring water is the "million gallons." This is used with two meanings—(1) to indicate a rate of flow and (2) to express an actual quantity of water. In the former sense "million gallons a day" is inferred, 1,000,000 gallons being taken as the unit of quantity and 24 hours as the unit of time. With this meaning the term is generally used in connection with pumping and irrigation. In the latter sense "million gallons" as an absolute quantity is used in the measurement of storage capacities of reservoirs.

The following convenient approximate relations exist between second-feet, million gallons a day, and acre-feet; 1 second-foot

flowing 24 hours equals about 2 acre-feet; 1,000,000 gallons equals about 3 acre-feet; and 1 second-foot equals approximately two-thirds of 1,000,000 gallons a day.

The following terms not in common use are here defined:

"Stage-discharge relation," an abbreviation for the term "relation of gage height to discharge."

"Control," a term used to designate the section or sections of the stream channel below the gage which determine the stage-discharge relation at the gage. It should be noted that the control may not be the same section or sections at all stages.

The "point of zero flow" for a gaging station is that point on the gage—the gage height—at which water ceases to flow over the control.

EXPLANATION OF DATA

The base data collected at gaging stations consist of records of stage, measurements of discharge, and general information used to supplement the gage heights and discharge measurements in determining the daily discharge. The records of stage used in computing discharges in this paper are obtained from water-stage recorders that give continuous records of the fluctuations. Measurements of discharge are made with a current meter by the general methods outlined in standard textbooks on the measurement of river discharge. Occasionally discharge is determined from a weir, using weir formulas.

From the discharge measurements, rating tables are prepared that give the discharge for any stage. The application of the daily gage heights to these rating tables gives the discharge from which the daily, monthly, and yearly discharges are determined.

The data presented in this report comprise, for each gaging station, a description of the station, a table showing the daily discharge of the stream, and a table of monthly and yearly discharge and run-off. All rates of flow are expressed as million gallons a day.

The description of the station gives location, drainage area, records available, discharge corresponding to maximum and minimum recorded stages, and, under "Remarks," notes on accuracy of the records, diversions that decrease the flow at the gage, and artificia regulation.

The table of daily discharge gives, in general, the discharge corresponding to the mean daily gage heights. At stations on streams subject to sudden or rapid diurnal fluctuation the discharge obtained from the rating table by applying the mean daily gage height may not be the true mean discharge for the day. At such stations the mean daily discharge may be obtained by averaging discharge for intervals during the day or by use of the discharge integrator, an instrument operating on the principle of the planimeter and containing as an essential element the rating curve of the station.

In the table of monthly discharge the column headed "Maximum" gives the flow for the day when the total discharge was greatest. This does not correspond to the rate of flow at the crest of the flood. The maximum rate of flow is given in the station description under the heading "Extremes," and the corresponding stage is always taken from the water-stage recorder graph unless otherwise noted. Likewise, in the column headed "Minimum" the quantity given is the flow for the day when the total discharge was least. The columns headed "Mean" give the average flow in million gallons a day and cubic feet a second during the month. The "total in million gallons" is the sum of the daily flows, and the "total in acre-feet" is computed from the mean monthly discharge in million gallons a day.

ACCURACY OF FIELD DATA AND COMPUTED RESULTS

The accuracy of stream-flow data depends primarily (1) on the permanence of the stage-discharge relation, and (2) on the accuracy of observation of stage, measurements of flow, and interpretation of records.

Permanence of the stage-discharge relation will be affected by any change in the control due to growth of vegetation in the stream bed, effects of floods, or any artificial changes, and it may be affected by changes in gage datum.

Observations of stage are taken from the water-stage recorder graphs, with a scale of gage heights so chosen as to give less than 2 per cent error. However, this accuracy may be interfered with by unsatisfactory operation of water-stage recorders or by plugged or sluggish intakes to stilling wells.

In general, measurements of flow by current meter give less than 5 per cent error except where it is impossible to find suitable measuring conditions. Rating curves are usually well defined, except for extremely low or high stages, by current-meter measurements and are extended by the use of area and velocity curves, slope measurements, weir tables, logarithmic curves, comparison with previous curves, knowledge of the station, or any combination of these methods.

Unless otherwise noted daily discharges are ascertained by applying to the rating table mean daily gage heights obtained from the recorder graph by inspection or, for days of considerable fluctuation in stage, by averaging discharges for intervals of the day. All computations are carried to three significant figures except where this would require the use of more than two decimal places. The discharges thus obtained are plotted, usually on semi-logarithmic paper, for comparison with the flow of comparable streams, and any inconsistencies that appear are verified or corrected.

A general statement under "Remarks" gives the accuracy of records, based on the above information, the terms "excellent," "good," "fair,"

or "poor," indicating that the record is probably accurate within 5, 10, 15, and 20 per cent, respectively.

It should be borne in mind that the observations in each succeeding year may be expected to throw new light on data previously published.

DIVISION OF WORK

The data were collected and prepared for publication under the direction of M. H. Carson, district engineer, Honolulu, Hawaii, by W. E. Armstrong, office engineer, K. N. Valsvik, J. H. Hofmann, K. M. Kelley, Sam Wong, H. W. Palm, G. T. Hirashima, Kenichi Kawamura, John Kaheaku, P. T. Goo, and Miss M. A. Davidson. The manuscript has been prepared by W. E. Armstrong and reviewed by M. H. Carson.

PUBLICATIONS

The following table gives by years the numbers of the papers on the surface-water supply of Hawaii containing data from 1903 to 1929, and used in conjunction with the list of stations maintained (see Water-Supply Paper 595) provides a convenient index for finding the data for any station. The data for any particular station will be found in the reports covering the years during which the station was maintained except when publication is delayed owing to undeveloped rating curves. Occasionally data are revised and republished in later papers. Miscellaneous discharge measurements made during any year at points other than regular gaging stations are published in the paper containing that year's data.

Numbers of water-supply papers containing data on the surface-water supply of Hawaii, 1903-1929

Year	Number	Year	Number	Year	Number
1903	[a] 77	1917-18	485	1924-25	615
1909-1911 [b]	318	1918-19	515	1925-26	635
1912 [b]	336	1919-20	516	1926-27	655
1913 [b]	373	1920-21	535	1927-28	675
1913-1915	430	1921-22	555	1928-29	695
1915-16	445	1922-23	575		
1916-17	465	1923-24	595		

[a] Water resources of Molokai, by Waldemar Lindgren.
[b] Calendar years; reports subsequent to Water-Supply Paper 373 cover the year beginning July 1 and ending June 30.

GAGING-STATION RECORDS

ISLAND OF KAUAI

WAIMEA RIVER BELOW KEKAHA DITCH INTAKE, NEAR WAIMEA, KAUAI

LOCATION.—Water-stage recorder in Waimea Canyon, 500 feet below Kekaha ditch intake and 8 miles by trail north of Waimea.

DRAINAGE AREA.—45.0 square miles.

RECORDS AVAILABLE.—July, 1921, to June, 1929.

EXTREMES.—Maximum discharge during year, 1,940 million gallons a day or 3,000 second-feet Nov. 4 (gage height, 16.20 feet); minimum, 0.2 million gallons a day or 0.3 second-foot May 20–22.

1921–1929: Maximum discharge, 2,770 million gallons a day or 4,290 second-feet Dec. 24, 1927 (gage height, 20.40 feet); no flow several days from July to November, 1926.

REMARKS.—Records good for medium stages except those estimated; all estimated and extremely high and low-stage records poor. Kokee ditch and Kekaha ditch divert above the station, taking practically all the water at low and medium stages for irrigation near Waimea.

Discharge, in million gallons a day, 1928–29

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	[b]110	1.01	0.87	0.82	0.64	7.8	4.1	0.43	36	0.29	0.27	118
2		1.9	.92	72	.62	3.9	.58	.43	8.8	.29	.27	6.9
3		.92	4.3	5.2	.62	1.03	14.9	.43	78	.29	.24	.27
4		.87	52	.87	821	.40	47	.43	76	.28	.24	.26
5	3.0	.87	28	.82	625	55	6.0	.43	191	.28	.24	2.5
6		.87	1.1	.92	434	29	40	.43	69	19.8	.26	1.2
7		.87	.92	.87	319	14.5	.38	.43	129	22	.27	.27
8		.92	.96	.78	165	9.2	8.6	.43	135	.99	.28	.26
9		.87	1.5	.78	304	49	.38	.46	76	.29	.29	.26
10		.87	36	.78	438	43	.38	.48	56	43	.28	.24
11		.92	74	.78	348	9.0	.38	109	25	33	.27	.24
12		.92	3.0	.78	100	47	.38	97	10.2	68	.27	.24
13	95	2.4	.96	.78	61	8.4	.38	63	4.3	33	.26	.24
14		4.9	.92	.82	62	4.1	.38	34	.99	.71	.26	.24
15		1.05	.92	.82	42	2.2	32	287	.48	79	.26	.24
16		.96	.92	.82	46	.40	62	386	.48	4.3	.26	.26
17		12.6	.87	.82	43	5.9	30	164	.48	.32	.26	.24
18		20	1.1	.87	76	.40	58	62	.46	.29	.26	.24
19		84	1.01	.82	31	.37	39	60	.46	35	.23	.24
20	1.0	41	1.6	.78	4.2	.36	15.7	59	.48	10.5	.21	.23
21		18.4	4.0	.78	.60	.36	2.8	46	179	.31	.21	.23
22		1.01	.87	.73	16.6	.36	24	82	34	.31	.22	.23
23	[a]2.3	1.01	.78	.78	5.1	.36	106	29	5.9	.31	.22	.23
24	1.1	.92	.73	.73	.48	.36	12.1	9.4	.78	.31	.24	.23
25	.92	.87	.73	.69	.46	73	.41	5.5	.55	.31	.24	.24
26	.92	.87	.73	.69	.44	24	.37	42	.34	.31	.24	.26
27	69	.87	.73	.73	.42	.43	51	16.1	.31	.31	1.4	.27
28	176	.87	.78	.73	44	.38	173	13.3	.31	.30	6.2	.27
29	7.0	.87	1.05	8.8	38	35	29	-------	10.7	.29	4.7	.27
30	.96	.87	.92	2.4	14.8	5.4	1.6	-------	4.4	.29	28	.27
31	.92	.87	-------	.64	-------	1.3	.43	-------	.31	-------	33	-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	----------	----------	46.3	71.6	1,440	4,400
August	84	0.87	6.65	10.3	206	633
September	74	.73	7.44	11.5	223	685
October	72	.64	3.54	5.48	110	337
November	821	.42	135	209	4,040	12,400
December	73	.36	13.9	21.5	432	1,320
January	173	.37	24.3	37.6	752	2,310
February	386	.43	56.0	86.6	1,570	4,810
March	191	.31	36.6	56.6	1,130	3,480
April	79	.28	11.8	18.3	355	1,090
May	33	.21	2.58	3.99	79.8	245
June	118	.23	4.50	6.96	135	414
The year	821	.21	28.7	44.4	10,500	32,100

[a] Partly estimated. [b] Estimated.

KAWAIKOI STREAM NEAR WAIMEA, KAUAI

LOCATION.—Water-stage recorder 2 miles northeast of Kokee ranger station and 12.5 miles northeast of Waimea.

DRAINAGE AREA.—4.1 square miles.

RECORDS AVAILABLE.—April, 1909, to June, 1929. July, 1917, to July, 1919, not published.

EXTREMES.—Maximum discharge during year, 1,590 million gallons a day or 2,460 second-feet Nov. 4 (gage height, 11.11 feet); minimum, 1.6 million gallons a day or 2.5 second-feet Oct. 16.

1909–1929: Maximum discharge, 1,670 million gallons a day or 2,580 second-feet Dec. 13, 1924 (gage height, 12.11 feet); minimum, 1.3 million gallons a day or 2.0 second-feet Sept. 15, 1921.

Highest known flood, 15.2 feet Dec. 18, 1916 (discharge not determined).

REMARKS.—Records good for ordinary stages. No diversions above station.

Discharge, in million gallons a day, 1928–29

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	12.9	41	4.5	4.4	5.1	7.8	5.9	6.7	11.9	5.4	3.7	33
2	10.3	18.3	22	11.0	2.9	6.9	5.6	6.3	14.4	4.9	3.6	8.8
3	5.2	9.6	13.6	5.5	2.1	6.3	72	5.9	83	4.5	3.5	5.5
4	4.5	7.8	58	3.3	634	14.1	37	5.6	33	4.3	3.6	6.3
5	6.9	6.9	16.2	3.0	390	62	11.0	5.2	143	4.1	4.0	30
6	5.5	6.2	7.9	3.4	215	38	7.9	5.0	53	3.9	3.7	13.4
7	55	6.3	19.2	2.7	172	17.1	8.2	4.6	84	3.7	7.8	7.6
8	148	5.5	15.8	2.3	107	37	41	4.5	65	3.6	24	4.9
9	17.2	4.5	6.2	2.1	204	63	10.3	4.2	51	9.3	6.9	4.0
10	27	4.2	4.7	2.1	315	26	7.6	6.1	32	90	7.0	4.2
11	72	7.4	22	2.0	168	15.5	7.2	100	18.7	32	6.7	23
12	19.3	6.0	7.1	1.9	45	25	6.4	25	22	88	4.5	23
13	16.3	7.8	4.4	1.8	56	11.9	5.7	12.0	22	23	3.6	13.0
14	47	12.4	3.8	1.6	42	17.6	6.3	8.4	12.4	45	8.2	7.3
15	23	12.7	4.2	1.6	30	13.6	56	48	10.3	58	13.3	6.0
16	94	7.3	4.2	1.6	26	10.3	62	138	9.4	16.5	6.0	6.3
17	137	5.1	4.1	1.8	62	10.6	22	68	8.5	10.1	3.8	5.6
18	28	15.9	3.7	3.4	63	7.9	27	22	7.8	8.5	3.1	6.2
19	14.3	20	3.0	2.5	24	6.9	14.6	56	7.0	22	2.8	5.2
20	10.5	6.2	2.8	2.0	16.5	6.3	9.4	37	7.3	13.2	2.5	6.4
21	8.8	10.6	3.4	1.9	29	5.7	32	24	53	7.8	2.4	3.8
22	7.6	9.4	2.9	2.7	51	5.4	34	65	12.9	6.6	2.4	3.1
23	31	4.8	2.6	4.5	17.4	5.0	36	21	8.0	5.9	4.0	2.7
24	10.3	3.8	2.3	2.7	11.9	5.0	12.9	12.9	6.9	5.4	3.1	2.6
25	12.1	3.7	2.1	2.0	9.9	123	9.4	10.5	6.6	5.0	2.5	5.0
26	17.3	4.5	2.1	1.8	9.0	20	8.2	24	6.3	4.6	2.3	8.2
27	134	4.0	2.0	1.6	8.0	9.4	11.4	13.2	5.6	4.4	6.0	5.5
28	50	3.4	2.3	1.7	32	8.0	55	19.1	5.9	4.1	8.0	3.2
29	12.9	3.3	7.9	6.6	13.2	17.0	11.4	-------	15.5	4.0	32	2.8
30	8.8	3.5	8.4	5.3	9.2	9.2	8.5	-------	9.6	3.9	26	2.5
31	36	3.0	-------	3.5	-------	6.7	7.4	-------	6.0	-------	44	-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	148	4.5	34.9	54.0	1,080	3,320
August	41	3.0	8.55	13.2	265	813
September	58	2.0	8.78	13.6	263	808
October	11.0	1.6	3.04	4.70	94.3	289
November	634	2.1	92.3	143	2,770	8,500
December	123	5.0	19.9	30.8	618	1,890
January	72	5.6	20.9	32.3	649	1,990
February	138	4.2	27.1	41.9	758	2,330
March	143	5.6	26.8	41.5	832	2,550
April	90	3.6	16.7	25.8	502	1,540
May	44	2.3	8.23	12.7	255	783
June	33	2.5	8.64	13.4	259	795
The year	634	1.6	22.9	35.4	8,350	25,600

KOKEE DITCH NEAR WAIMEA, KAUAI

LOCATION.—Water-stage recorder 1,000 feet west of road and 10½ miles north of Waimea.

RECORDS AVAILABLE.—September, 1926, to June, 1929.

EXTREMES.—Maximum discharge during year, 65 million gallons a day or 101 second-feet Nov. 4 and 5 (gage height, 2.62 feet); no flow for several short periods when water was shut out of ditch.

1926–1929: Maximum discharge, 68 million gallons a day or 105 second-feet Dec. 24, 1927 (gage height, 2.70 feet); no flow occasionally when water was turned out of ditch just above weir.

REMARKS.—Records excellent. Kokee ditch, at elevation 3,400 feet, diverts water from all streams tributary to Waimea River, east of and including Mohihi Stream, for irrigation near Kekaha. Regulated by head gates.

Discharge, in million gallons a day, 1928–29

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	14.0	45	6.6	7.6	7.9	15.9	11.0	14.9	21	12.0	8.3	39
2	15.6	27	22	11.8	5.6	14.4	10.5	13.7	19.8	11.4	8.1	14.4
3	9.2	15.1	16.1	10.0	4.4	13.3	45	13.1	45	10.5	8.1	9.3
4	8.1	12.4	29	6.0	40	12.6	43	12.4	42	10.3	8.1	8.4
5	9.9	11.4	26	5.1	49	44	18.7	11.8	57	9.9	9.0	28
6	9.2	10.5	10.8	5.6	60	42	13.5	11.4	56	9.7	8.4	18.7
7	36	10.8	18.1	5.0	60	28	12.0	11.0	56	9.3	10.5	11.0
8	56	10.6	21	4.4	60	40	42	10.8	60	9.3	23	8.3
9	28	9.0	9.9	4.2	60	44	18.7	10.5	56	9.2	11.6	7.1
10	31	8.4	7.6	4.4	60	38	13.7	12.3	43	50	10.5	6.9
11	46	9.6	21	4.1	64	22	12.6	43	31	38	10.5	18.4
12	27	10.5	12.0	4.0	60	32	11.6	38	30	49	8.3	24
13	24	12.0	7.7	3.8	56	19.8	10.6	24	34	38	7.1	17.1
14	39	16.1	6.8	3.8	56	24	10.5	18.7	22	25	9.4	9.9
15	26	16.1	6.8	3.8	41	21	34	34	19.8	51	16.1	8.8
16	46	12.9	7.4	3.7	40	16.1	53	53	18.7	27	9.7	8.8
17	56	9.2	6.9	3.8	52	17.4	31	53	17.4	17.4	7.3	7.7
18	40	13.1	6.5	5.6	56	14.2	35	34	16.1	14.7	6.5	8.8
19	22	28	5.8	5.1	38	12.6	27	48	15.4	21	6.0	7.6
20	16.1	11.4	5.8	4.4	28	11.8	17.4	43	15.4	24	5.8	8.4
21	13.7	11.3	6.2	3.8	26	11.2	23	35	36	13.9	5.6	6.3
22	12.0	15.8	5.8	4.0	53	10.6	41	49	26	12.0	5.6	5.6
23	28	8.6	5.2	6.9	28	9.0	46	32	17.4	11.2	7.1	5.2
24	15.6	7.4	4.8	5.0	21	9.9	26	22	14.7	10.6	6.5	5.0
25	14.4	7.1	4.5	4.1	18.7	48	18.7	19.6	13.9	10.1	5.7	6.4
26	17.5	7.6	4.5	3.7	17.4	31	16.1	32	13.7	9.7	5.4	9.7
27	53	7.3	4.2	3.4	15.9	15.6	17.2	24	12.9	9.0	6.7	7.9
28	47	6.5	4.4	3.4	37	13.9	47	27	12.6	8.8	12.4	5.7
29	19.8	6.3	9.3	9.1	26	21	24	-------	22	8.6	19.9	5.0
30	13.9	6.3	10.5	11.2	18.7	16.1	18.7	-------	18.7	8.4	30	4.7
31	34	6.0	-------	7.6	-------	12.2	16.1	-------	13.3	-------	35	-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	56	8.1	26.7	41.3	828	2,540
August	45	6.0	12.6	19.5	389	1,200
September	29	4.2	10.4	16.1	313	957
October	11.8	3.4	5.43	8.40	168	517
November	64	4.4	38.7	59.9	1,160	3,560
December	48	9.0	22.0	34.0	682	2,090
January	53	10.5	24.7	38.2	765	2,350
February	53	10.5	26.8	41.5	751	2,300
March	60	12.6	28.3	43.8	877	2,690
April	51	8.4	18.3	28.3	549	1,680
May	35	5.4	10.7	16.6	332	1,020
June	39	4.7	11.1	17.2	332	1,020
The year	64	3.4	19.6	30.3	7,150	21,900

WAIAHULU STREAM ABOVE KOAIE STREAM, NEAR WAIMEA, KAUAI

LOCATION.—Water-stage recorder in Waimea Canyon, half a mile above confluence with Koaie Stream and 8¾ miles north of Waimea.

DRAINAGE AREA.—20.0 square miles.

RECORDS AVAILABLE.—February to October, 1916; October, 1917, to June, 1918; and May, 1925, to June, 1929.

EXTREMES.—Maximum discharge during year, 2,310 million gallons a day or 3,570 second-feet Nov. 4 (gage height, 9.33 feet); minimum, 7.2 million gallons a day or 11.1 second-feet June 10.

1915–1918, 1925–1929: Maximum discharge, 2,550 million gallons a day or 3,950 second-feet Dec. 24, 1927 (gage height, 9.92 feet); minimum, 52. million gallons a day or 8.0 second-feet Nov. 4, 1927.

REMARKS.—Records good for ordinary stages; poor for estimated periods and all high-stage records. Kokee ditch diverts water for irrigation above station.

Discharge, in million gallons a day, 1928–29

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	13.0	12.9	8.2		8.0		10	11.2	17.4	10.9	11.8	37
2	14.8	12.3	8.9		7.8	12		10.9	14.2	10.6	9.9	12.9
3	11.4	10.6	9.6		7.8		34	10.6	84	10.4	9.9	9.9
4	10.8	9.6	34					10.6	47	10.4	9.9	8.7
5	10.8	9.4	18.5					10.6	207	10.4	9.9	9.6
6	11.1	9.4	10.1					10.4	41	10.4	9.9	9.9
7	14.8	9.6	9.2					10.4	110	10.4	9.9	8.4
8	209	9.4	10.1		300			10.6	94	10.4	10.9	7.6
9	17.6	9.2	9.9			32		10.6	32	10.4	11.5	7.4
10	13.2	8.9	9.2	9.5			13	13.1	24	64	10.9	7.4
11	53	8.9	13.6					192	17.4	21	10.6	7.4
12	17.2	8.9	11.8					34	14.6	85	10.6	8.2
13	13.8	8.9	9.9					22	14.2	18.2	10.6	8.0
14	29	9.6	9.2					16.6	13.2	64	10.9	7.8
15	13.2	9.9	9.2		44			83	12.6	41	11.2	8.0
16	69	9.6	9.2					228	12.3	20	11.2	8.0
17	200	9.2	9.2					97	12.0	13.5	11.5	8.2
18	26	9.9	9.2	8.7				27	11.8	12.6	11.5	8.4
19	12.3	17.4	9.4	8.7		11		45	11.5	21	11.5	8.7
20	10.6	11.2	9.4	8.7			30	28	12.0	15.2	11.5	8.9
21	10.1	10.1	9.9	8.7				26	73	13.5	11.5	9.2
22	10.1	9.4	9.6	8.7				78	19.0	13.2	11.5	9.4
23	12.3	9.2	9.2	8.7				24	12.9	12.9	11.5	9.6
24	10.4	8.7	9.2	8.7				17.0	12.0	12.9	11.5	9.9
25	9.9	8.4	9.2	8.7	20			15.6	11.5	12.9	11.2	10.4
26	9.9	8.4	9.2	8.7			16	21	12.3	12.6	10.9	9.4
27	107	8.4	9.2	8.7				16.3	11.2	12.6	11.2	8.2
28	52	8.4	9.2	8.7		22	96	16.0	11.5	12.3	12.0	8.0
29	12.9	8.4	9.4	9.6			17.0	-------	14.6	12.0	26	8.0
30	10.4	8.2	9.6	8.4			13.2	--- ---	12.6	12.0	26	8.0
31	10.1	8.2	-------	8.0	-------		11.8	-------	11.5	-------	39	------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	209	9.9	33.1	51.2	1,030	3,150
August	17.4	8.2	9.70	15.0	301	923
September	34	8.2	10.7	16.6	322	985
October	----------	----------	9.14	14.1	283	870
November	----------	----------	99.1	153	2,970	9,120
December	----------	----------	19.0	29.4	590	1,810
January	----------	----------	22.7	35.1	704	2,160
February	228	10.4	39.1	60.5	1,100	3,360
March	207	11.2	32.4	50.1	1,000	3,080
April	85	10.4	19.9	30.8	597	1,830
May	39	9.9	12.8	19.8	398	1,220
June	37	7.4	9.68	15.0	290	891
The year	----------	----------	26.3	40.7	9,580	29,400

KOAIE STREAM AT ELEVATION 3,700 FEET, NEAR WAIMEA, KAUAI

LOCATION.—Water-stage recorder at elevation 3,700 feet, 12½ miles N. 30° E. from Waimea.

DRAINAGE AREA.—3.4 square miles.

RECORDS AVAILABLE.—July, 1919, to June, 1929.

EXTREMES.—Maximum discharge during year, 1,040 million gallons a day or 1,610 second-feet Nov. 4 (gage height, 2.99 feet); minimum, 0.6 million gallons a day or 0.9 second-foot May 21 and 22.

1919–1929: Maximum discharge, about 3,750 million gallons a day or 5,800 second-feet Jan. 16, 1921 (gage height, 6.70 feet); minimum, that of May 21 and 22, 1929.

REMARKS.—Records good except those for high stages, which are poor. No diversions.

Discharge, in million gallons a day, 1928–29

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	74	14.2	[a] 4.9	4.4	2.5	4.5	2.7	2.1	12.1	1.9	1.5	63
2	14.7	12.5	14	83	1.8	3.5	2.5	1.9	5.7	1.8	1.3	4.8
3	6.1	8.1		8.2	1.8	3.2	18.0	1.6	41	1.6	1.5	3.8
4	11.6	7.0	69	4.5	372	2.9	26	1.5	22	1.5	1.3	3.2
5	24	5.7	14.4	6.1	24	24	6.6	1.5	74	1.9	1.5	10.6
6	8.1	5.3	5.7	6.6	157	24	3.8	1.3	26	1.9	1.9	5.7
7	18.1	5.3	6.9	4.2	102	12.0	2.9	1.2	47	1.6	2.1	3.2
8	87	6.5	14.3	3.8	58	19.8	3.5	1.1	46	1.3	5.2	2.1
9	12.2	4.9	19.0	3.5	101	29	2.9	1.1	35	1.3	3.2	1.6
10	15.3	4.2	46	3.5	141		2.3	1.3	27	25	2.1	1.5
11	79	3.9	85	3.2	91	17	2.1	14.2	8.3	26	1.6	1.5
12	18.8	5.3	9.1	2.9	17.7		1.8	54	4.8	32	1.3	2.1
13	14.2	18.7	5.7	2.5	13.7		1.6	21	3.8	24	1.1	3.2
14	25	17.6	4.9	2.3	22	[a] 8.3	1.8	22	3.2	6.6	1.1	3.2
15	12.7	7.0	7.0	2.3	14.6	7.1	25	145	2.7	36	1.1	2.7
16	34	6.5	7.0	2.3	17.7	11.4	27	133	2.3	11.0	1.0	2.3
17	97	25	9.9	3.4	23	7.8	15.0	43	2.1	5.2	.9	2.3
18	14.8	50	13.0	4.8	40	4.5	23	12.2	1.8	3.8	.8	2.1
19	7.5	39	7.0	3.8	15.6	3.5	8.2	19.6	1.5	30	.8	1.6
20	6.1	8.1	16.2	3.5	8.3	2.9	4.2	28	4.4	16.4	.7	1.2
21	4.9	6.1	9.9	2.7	6.6	2.7	5.0	14.3	79	4.8	.7	1.0
22	5.2	12.6	5.7	2.9	14.6	2.3	24	29	8.1	3.5	.7	.8
23	17.4	6.5	4.2	4.5	8.3	2.1	55	8.3	3.8	2.9	1.0	.8
24	7.0	4.9	3.6	2.5	5.2	2.1	7.0	4.8	2.7	2.5	.8	.7
25	5.3	4.5	3.3	1.9	4.2	33	4.2	3.5	4.5	2.1	.9	.8
26	5.3	5.7	3.0	1.6	3.2	9.9	3.2	9.3	3.8	1.9	1.1	.8
27	62	6.1	2.8	1.6	2.9	4.8	37	4.5	2.5	1.8	18.0	.7
28	86	4.5	7.0	1.6	18.6	5.7	29	16.0	2.5	1.6	11.1	.7
29	9.8	4.5	9.1	15.2	8.9	31	5.2	-------	6.9	1.5	3.8	.9
30	6.5	4.2	6.1	6.2	5.2	6.1	3.2	-------	3.2	1.3	8.2	1.2
31	8.6	3.9	-------	4.2	-------	3.6	2.5	-------	2.3	-------	17.0	-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	97	4.9	25.7	39.8	798	2,440
August	50	3.9	10.3	15.9	318	980
September	85	2.8	14.3	22.1	428	1,320
October	83	1.6	6.57	10.2	204	625
November	372	1.8	43.4	67.1	1,300	4,000
December	33	2.1	11.0	17.0	340	1,050
January	55	1.6	11.5	17.8	356	1,090
February	145	1.1	21.3	33.0	596	1,830
March	79	1.5	15.8	24.4	490	1,500
April	36	1.3	8.49	13.1	255	782
May	18.0	.7	3.07	4.75	95.3	292
June	63	.7	4.34	6.71	130	400
The year	372	.7	14.6	22.6	5,310	16,300

[a] Partly estimated.

WAIALAE RIVER AT ELEVATION 3,700 FEET, NEAR WAIMEA, KAUAI

LOCATION.—Water-stage recorder at elevation 3,700 feet, 10½ miles N. 30° E. from Waimea.

DRAINAGE AREA.—3.3 square miles.

RECORDS AVAILABLE.—January, 1920, to June, 1929. August, 1910, to January, 1916, at site 2 miles downstream.

EXTREMES.—Maximum discharge during year, 984 million gallons a day or 1,520 second-feet Nov. 4 (gage height, 3.98 feet); minimum, 1.2 million gallons a day or 1.9 second-feet June 30.

1920-1929: Maximum discharge (estimated), 4,500 million gallons a day or 6,960 second-feet Jan. 16, 1921 (gage height, 8.44 feet); minimum, 0.7 million gallons a day or 1.1 second-feet Mar. 18-20, 1925.

REMARKS.—Records good for ordinary stages, fair for estimated periods, and poor for extremely high and low stages. No diversions.

Discharge, in million gallons a day, 1928-29

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	59	7.4	2.8	2.8	3.5	4.3	2.8	3.0	11.0	3.1	2.2	59
2	7.8	6.8	6.2	75	3.0	3.7	2.8	2.8	7.4	2.9	2.9	6.3
3	2.8	4.6	22	7.1	2.8	3.5	8.3	2.8	21	2.9	2.4	4.8
4	7.5	3.9		4.1	362	3.0	16.6	2.8	14.9	2.9	2.4	4.6
5	20	3.2	9.5	4.3	182	11.3	4.6	2.8	41	3.4	2.9	10.8
6	4.8	2.8	3.9	4.6	138		3.2	2.8	17.5	2.9	2.6	6.6
7	13.3	2.6	3.9	3.5	90		2.8	2.8	29	2.9	2.6	4.6
8	49	3.5	7.9	3.0	41		2.8	2.6	30	2.8	3.8	4.1
9	5.9	2.6	15.4	3.2	68		2.8	2.6	24	2.8	3.4	3.6
10	[a] 19.4	2.5	37	3.7	118	16	2.6	2.8	20	16.9	2.8	3.6
11	74	2.2	63	3.0	74		2.5	13.8	8.0	12.8	2.8	3.4
12	18.6	2.4	6.1	2.5	15.3		2.4	54	5.6	21	2.6	3.4
13	11.2	10.8	3.9	2.5	10.5		2.4	21	4.8	9.8	2.6	3.6
14	24	12.9	3.2	2.4	17.0	5	2.4	28	4.4	5.4	2.6	3.6
15	8.0	4.8	4.1	2.4	11.0		14.3	162	4.4	26	2.4	3.8
16	28	4.1	4.1	2.4	11.8	6.7	15.7	189	3.8	6.0	2.4	3.6
17	74	28	5.4	3.4	9.5	5.6	13.1	40	3.4	3.8	2.4	3.6
18	11.5	24	7.0	3.9	24	3.9	24	13.2	3.1	3.1	2.4	3.4
19	5.6	28	4.3	3.2	8.8	3.2	6.4	13.2	2.9	27	2.2	3.1
20	4.3	4.8	11.7	3.2	5.3	2.8	3.9	21	14.6	7.9	2.2	3.1
21	3.5	4.1	6.6	3.0	4.6	2.6	3.5	12.1	75	4.1	2.2	3.1
22	3.2	7.4	3.9	3.5	6.5	2.5	23	18.4	9.6	3.1	2.2	2.9
23	5.6	4.3	2.8	4.3	5.0	2.4	35	8.3	5.6	2.8	2.2	2.9
24	4.1	3.0	2.5	3.0	3.9	2.4	5.6	5.9	4.4	2.8	2.2	2.8
25	3.2	2.6	2.4	2.8	3.2	14.0	3.9	6.2	5.1	2.6	2.1	2.8
26	2.8	3.2	2.2	2.6	3.2	5.9	3.2	17.2	4.6	2.4	2.1	2.2
27	38	3.0	2.0	2.5	2.8	3.5	51	6.6	3.6	2.4	12.2	1.7
28	87	2.6	6.4	2.5	18.6	6.5	22	14.7	3.9	2.4	15.1	1.6
29	7.2	2.4	5.9	22	9.0	23	5.2	-------	7.1	2.4	9.0	1.4
30	4.6	2.4	3.9	6.5	5.0	4.8	3.9	-------	4.1	2.2	14.4	1.3
31	5.0	2.2	-------	4.6	-------	3.1	3.5	-------	3.6	-------	10.6	-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	87	2.8	19.8	30.6	613	1,880
August	28	2.2	6.42	9.93	199	611
September	63	2.0	9.40	14.5	282	865
October	75	2.4	6.37	9.86	198	606
November	362	2.8	41.9	64.8	1,260	3,860
December	-------	-------	7.93	12.3	246	754
January	51	2.4	9.55	14.8	296	909
February	189	2.6	24.0	37.1	672	2,060
March	75	2.9	12.8	19.8	397	1,220
April	27	2.2	6.45	9.98	194	594
May	15.1	2.1	4.09	6.33	127	389
June	59	1.3	5.51	8.53	165	507
The year	362	1.3	12.7	19.6	4,650	14,300

[a] Partly estimated.

KEKAHA DITCH AT CAMP NO. 1, NEAR WAIMEA, KAUAI

LOCATION.—Water-stage recorder in Waimea Canyon, 6¼ miles N. 16° E. of Waimea.

RECORDS AVAILABLE.—November, 1907, to June, 1915; March, 1916, to June 1929.

EXTREMES.—Maximum discharge during year, 66 million gallons a day or 102 second-feet Sept. 10 (gage height, 4.18 feet); no flow several days in August and April.

1907–1929: Maximum discharge, 71 million gallons a day or 110 second-feet Apr. 25, 1928 (gage height, 4.33 feet); no flow occasionally when water is shut out of the ditch.

REMARKS.—Records good for ordinary stages except those estimated, which are fair; records for extremely low stages poor. Intake on Waimea River 8 miles north of Waimea. Water used for irrigation of sugar cane around Kekaha. Regulated by head gates.

Discharge, in million gallons a day, 1928–29

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	38	44	24	26	26	33	26	36	44	36	28	56
2	48	47	30	42	24	33	30	33	44	33	29	53
3	36	36	44	47	23	33	39	32	44	33	32	44
4	32	33	50	33	19.5	33	44	30	41	32	30	39
5	50	30	48	29	[a]42	44	41	30	44	32	30	41
6	44	29	36	33	[b]41	47	36	29	44	7.6	29	53
7	42	29	30	28	[b]30	47	32	29	44	2.3	29	41
8	47	29	39	26	[b]22	47	39	28	44	29	33	33
9	47	28	44	26	[b]28	47	32	28	44	30	36	29
10	50	26	50	26	[b]28	47	30	30	44	39	30	28
11	47	25	50	25	[b]28	47	29	39	44	50	29	28
12	47	25	44	24	[b]25	47	28	44	44	50	26	28
13	47	39	33	23	[b]25	44	26	44	44	50	26	32
14	47	44	29	23	[b]26	44	26	44	44	44	25	32
15	47	36	26	23	[b]28	44	33	30	41	50	26	32
16	50	32	32	22	[b]28	44	44	29	39	53	25	29
17	47	39	29	23	[b]33	44	44	28	36	41	25	28
18	47	50	39	27	[b]39	39	39	36	36	36	25	30
19	47	13.4	36	25	[b]44	33	24	39	33	44	25	28
20	39	0	33	24	[b]44	32	24	44	36	56	25	26
21	36	19.6	44	24	[b]41	30	32	44	41	41	24	26
22	33	39	30	23	[b]44	29	44	44	41	36	24	25
23	42	39	26	25	[a]45	29	44	44	41	33	25	25
24	41	29	25	24	41	28	44	44	41	32	25	25
25	32	28	23	23	36	37	41	44	41	30	25	25
26	30	26	23	20	36	44	35	44	44	29	25	24
27	44	29	23	22	33	39	32	44	39	29	33	24
28	50	28	23	22	33	33	29	44	39	29	56	24
29	50	26	36	34	33	41	41	-------	41	28	50	24
30	39	25	30	41	33	41	44	-------	39	28	50	23
31	36	24	-------	32	-------	33	39	-------	39	-------	56	-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	50	30	43.0	66.5	1,330	4,090
August (30 days)	50	0	31.6	48.9	947	2,910
September	50	23	34.3	53.1	1,030	3,160
October	47	20	27.3	42.2	845	2,600
November	-------	19.5	32.6	50.4	978	3,000
December	47	28	39.1	60.5	1,210	3,720
January	44	24	35.2	54.5	1,090	3,350
February	44	28	36.9	57.1	1,030	3,170
March	44	33	41.3	63.9	1,280	3,930
April	56	2.3	35.4	54.8	1,060	3,260
May	56	24	30.8	47.7	956	2,930
June	56	23	31.8	49.2	955	2,930
The year	56	0	35.0	54.2	12,700	39,000

[a] Partly estimated. [b] Estimated.

KEKAHA DITCH BELOW TUNNEL NO. 12, NEAR WAIMEA, KAUAI

LOCATION.—Water-stage recorder 1 mile north of Waimea, just above diversion for Waimea domestic water supply.

RECORDS AVAILABLE.—April, 1908, to November, 1914; July, 1916, to June, 1929.

EXTREMES.—Maximum discharge during year, 53 million gallons a day or 82 second-feet June 1 (gage height, 4.09 feet); no flow several days during August and April.

1908–1929: Maximum discharge, 70 million gallons a day or 108 second-feet Dec. 24, 1927 (gage height, 5.17 feet); no flow occasionally when water was shut out of ditch.

REMARKS.—Records good except those where shifting-control method is used, which are fair. Intake on Waimea River 8 miles north of Waimea. Water used for irrigation of sugar cane near Kekaha. Regulated by head gates.

Discharge, in million gallons a day, 1928–29

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	32	34	19.2	22	24	30	23	30	36	32	24	50
2	43	39	23	35	21	29	27	27	36	30	25	48
3	34	34	36	43	19.2	30	32	27	36	30	29	41
4	29	30	43	30	19.2	29	39	25	37	29	27	36
5	43	29	43	26	34	37	37	25	37	29	26	34
6	37	27	34	29	37	41	32	24	37	a8	25	43
7	34	26	27	24	27	41	29	24	37	a1.5	24	36
8	43	27	32	22	21	41	34	23	37	a26	26	29
9	41	26	37	22	23	41	29	23	37	27	32	25
10	41	24	41	22	22	41	27	23	37	30	26	24
11	39	23	41	21	22	41	25	34	37	43	23	23
12	37	23	39	20	21	41	23	39	37	43	22	23
13	37	34	30	19.2	21	39	22	39	37	43	22	23
14	39	37	25	19.2	21	39	22	37	37	41	23	25
15	37	34	22	19.2	22	39	26	29	36	41	23	24
16	41	30	26	19.2	23	37	34	26	34	43	23	23
17	41	32	24	18.3	25	39	34	24	32	39	23	22
18	39	43	32	21	34	34	34	30	32	34	23	24
19	37	a8	32	21	39	30	19.2	32	30	30	22	23
20	34	a0	29	20	39	29	17.5	34	30	43	22	22
21	30	a15	37	19.2	37	29	22	37	36	39	22	22
22	29	34	27	19.2	37	27	32	36	37	32	22	21
23	32	34	23	21	39	26	36	36	37	29	24	21
24	37	27	21	21	36	26	37	36	36	27	25	20
25	29	24	20	19.2	32	32	34	36	37	26	25	19.2
26	27	22	19.2	18.3	30	39	29	36	37	26	25	20
27	36	24	19.2	18.3	30	36	27	36	36	24	30	20
28	41	23	18.3	18.3	30	30	23	37	34	24	48	19.2
29	41	22	30	27	29	36	34	-------	36	24	46	19.2
30	34	22	26	37	29	37	36	-------	36	23	48	18.3
31	30	20	-------	29	-------	30	32	-------	34	-------	50	------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	43	27	36.3	56.2	1,120	3,450
August (30 days)	43	0	27.6	42.7	827	2,540
September	43	18.3	29.2	45.2	876	2,690
October	43	18.3	23.2	35.9	721	2,210
November	39	19.2	28.1	43.5	843	2,590
December	41	26	34.7	53.7	1,080	3,300
January	39	17.5	29.3	45.3	908	2.790
February	39	23	30.9	47.8	865	2.660
March	37	30	35.6	55.1	1,110	3,390
April	43	1.5	30.6	47.3	916	2,820
May	50	22	27.6	42.7	855	2,630
June	50	18.3	26.6	41.2	798	2,450
The year	50	0	30.0	46.4	10,900	33,500

a Estimated.

HANAPEPE RIVER AT KOULA, NEAR ELEELE, KAUAI

LOCATION.—Water-stage recorder just below junction with Manuahi Stream, 500 feet below siphon at Koula, and 4 miles northeast of Eleele.

DRAINAGE AREA.—18.8 square miles.

RECORDS AVAILABLE.—August, 1910, to January, 1921; and December, 1926, to June, 1929.

EXTREMES.—Maximum discharge during year, 969 million gallons a day or 1,500 second-feet Dec. 16 (gage height, 5.23 feet); minimum, 8.0 million gallons a day or 12.4 second-feet Jan. 9.

1910–1921, 1926–1929: Maximum discharge, at least 5,000 million gallons a day or 7,740 second-feet Dec. 18, 1916 (at old station above mouth of Manuahi Stream; gage height not known as station was destroyed by this flood); minimum, 7.1 million gallons a day or 11.0 second-feet Dec. 30, 31, 1913.

REMARKS.—Records fair for ordinary stages; poor for extremely high stages and estimated periods. Hanapepe ditch diverts water for irrigation from river 3 miles above station.

Discharge, in million gallons a day, 1928–29

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	105	37	26	28	16.4	18.1	19.4	11.0	50	12.0	17.3	108
2	66	40	26	128	13.9	17.4	19.4	11.3	34	12.5	49	48
3	30	31	93	47	13.4	16.4	22	11.3	34	30	21	44
4	34	23	126	34	232	17.4	48	11.3	21	44	22	30
5	34	19.4	50	43	306	14.9	24	11.3	16.6	30	23	36
6	17.4	18.7	29	28	320	13.9	18.1	11.3	12.9	25	12.9	27
7	38	49	24	34	244	12.9	15.9	11.7	14.9	11.3	11.3	19.9
8	72	25	36	28	114	16.6	11.3	11.3	21	10.2	10.6	15.9
9	40	16.4	53	25	90	27		11.3	48	10.8	10.2	14.3
10	53	14.4	90	23	147	28		11.7	63	28	9.9	13.6
11	148	13.9	212	18.1	146	28	10	11.7	26	21	9.5	13.0
12	63	52	53	16.4	69	50		20	16.4	42	9.5	13.6
13	38	55	35	14.9	54	24		22	15.9	23	9.2	13.6
14	50	45	29	16.7	64	35		19.4	32	20	9.2	13.6
15	31	37	50	16.4	50	23		81	23	37	9.5	12.7
16	36	31	31	14.9	48	197	75	211	13.9	17.4	14.5	12.0
17	105	104	35	22	35	51		102	12.4	13.4	31	15.0
18	54	167	56	14.9	54	28		48	12.7	12.4	18.1	12.4
19	41	150	46	29	38	19.4		38	11.3	197	9.5	11.7
20	28	59	110	18.1	28	16.9	14	21	13.1	54	9.5	11.4
21	31	98	50	16.4	26	15.9		14.9	48	36	8.8	11.2
22	53	128	32	22	26	15.4		13.9	22	22	11.0	10.7
23	82	48	25	16.4	24	16.4	11.7	13.4	38	15.9	9.2	10.2
24	34	35	21	13.4	21	15.4	11.0	12.9	46	13.9	9.2	10.2
25	28	30	19.4	12.9	22	17.2	10.6	13.4	75	17.6	9.9	10.2
26	19.4	29	19.4	12.4	22	25	10.6	33	28	12.9	11.6	10.2
27	110	25	24	13.4	19.4	15.4	14.3	39	18.1	11.3	63	10.2
28	186	21	55	17.1	33	14.9	27	45	12.9	11.3	67	10.2
29	61	18.7	31	69	32	92	12.0	-------	15.4	11.0	61	10.2
30	40	19.4	25	38	20	25	11.3	-------	11.3	12.2	94	10.2
31	31	15.4	-------	25	-------	18.7	11.0	-------	15.4	-------	81	------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	186	17.4	56.7	87.7	1,760	5,390
August	167	13.9	46.9	72.5	1,460	4,460
September	212	19.4	50.4	78.0	1,510	4,640
October	128	12.4	27.6	42.7	855	2,630
November	320	13.4	77.6	120	2,330	7,140
December	197	12.9	29.9	46.3	926	2,840
January	-------	-------	21.1	32.6	653	2,010
February	211	11.0	31.2	48.3	873	2,680
March	75	11.3	26.5	41.0	822	2,520
April	197	10.2	27.2	42.1	815	2,500
May	94	8.8	23.9	37.0	742	2,270
June	108	10.2	19.6	30.3	589	1,800
The year	320	-------	36.5	56.5	13,300	40,900

HANAPEPE DITCH AT KOULA, NEAR ELEELE, KAUAI

LOCATION.—Water-stage recorder at first flume below siphon at Koula, 4 mile below intake and 4 miles north of Eleele.

RECORDS AVAILABLE.—January, 1910, to June, 1921; March, 1927, to June, 1929.

EXTREMES.—Maximum discharge during year, 34 million gallons a day or 53 second-feet Apr. 19, May 19 (gage height, 3.05 feet); no flow several days when water was shut out of ditch.

1910-1921, 1927-1929: Maximum discharge, 36 million gallons a day or 56 second-feet Apr. 10, 1918 (gage height, 3.18 feet); ditch occasionally dry, owing to closing of head gates.

REMARKS.—Records good. Diverts water for irrigation from Hanapepe River 3 miles above station. Regulated by head gates and spillways.

Discharge, in million gallons a day, 1928-29

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	33	30	30	28	28	28		23	0.0	24	24	30
2	30	30	30	30	26	28		23	13.5	26	28	28
3	17.5	30	33	30	26	28		23	28	30	26	28
4	30	28	30	30	28	26		23	26	30	28	28
5	28	28	30	30	30	26	28	21	26	30	26	28
6	28	28	30	28	30	28		21	23	28	24	26
7	30	30	30	28	30	26		21	24	26	23	26
8	28	28	30	28	30	28		21	28	26	23	24
9	30	30	30	28	28	28		21	28	26	23	24
10	30	28	30	28	30	30		23	28	28	23	23
11	33	28	30	28	30	30	26	23	28	28	21	23
12	33	30	30	28	28	30		26	26	30	21	23
13	33	30	30	28	30	30		26	26	30	21	23
14	30	30	30	28	30	30		28	26	30	21	23
15	30	30	28	28	30	30		30	28	30	23	21
16	30	30	28	28	30	30		33	24	28	12.5	21
17	30	30	28	30	28	30		33	23	26	1.3	24
18	30	30	28	30	28	30		30	22	24	12	21
19	30	33	28	30	28	33		30	23	33	20	21
20	30	30	28	28	28	30	28	28	26	33	20	20
21	30	30	28	30	28	30		28	28	30	18.5	20
22	28	30	30	30	28	28		28	26	28	23	20
23	30	30	28	28	28	28	26	26	28	28	20	18.5
24	27	30	28	28	28	26	23	24	28	28	20	18.5
25	30	30	30	28	25	26	23	24	28	28	21	18.5
26	30	30	28	26	28	18.5	23	24	28	26	21	18.5
27	30	30	28	28	28	26	24	0	28	24	26	18.5
28	33	30	30	26	30	28	28	0	28	24	30	17.5
29	30	30	30	30	30	30	24	-------	26	23	28	17.5
30	30	30	28	24	28	28	23	-------	24	28	33	17.5
31	30	30	-------	28	-------	*28	23	-------	26	-------	30	-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	33	17.5	29.7	46.0	922	2,830
August	33	28	29.7	46.0	921	2,830
September	33	28	29.3	45.3	879	2,700
October	30	24	28.4	43.9	880	2,700
November	30	25	28.6	44.3	857	2,630
December	33	18.5	28.2	43.6	876	2,680
January	-------	-------	26.4	40.8	817	2,510
February (26 days)	33	0	25.4	39.3	661	2,030
March (30 days)	28	0	25.8	39.9	774	2,380
April	33	23	27.8	43.0	833	2,560
May	33	1.3	22.3	34.5	691	2,120
June	30	17.5	22.3	34.5	670	2,050
The year	33	0	27.0	41.8	9,780	30,000

* Estimated.

SOUTH FORK OF WAILUA RIVER NEAR LIHUE, KAUAI

LOCATION.—Water-stage recorder one-third mile above Wailua Falls and 5 miles northeast of Lihue. Prior to Nov. 18, 1918, one-third mile farther upstream.

DRAINAGE AREA.—22.4 square miles.

RECORDS AVAILABLE.—December, 1911, to June, 1929.

EXTREMES.—Maximum discharge during year, 12,600 million gallons a day or 19,500 second-feet May 30 (gage height, 8.44 feet); minimum, 2.0 million gallons a day or 3.1 second-feet Feb. 13 and 14.

1911–1929: Maximum discharge, 28,000 million gallons a day or 44,900 second-feet Jan. 16, 1920 (gage height, 11.25 feet); minimum, 1.2 million gallons a day or 1.9 second-feet May 3, 1926.

REMARKS.—Records good except those for extremely high stages, which are poor. Lihue ditch and Hanamaulu ditch divert above station at elevations of 600 and 500 feet, respectively, for irrigation.

Discharge, in million gallons a day, 1928–29

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	43	53	4.7	34	23	60	23	3.7	6.0	33	27	190
2	55	64	4.8	300	21	55	19.5	3.6	6.8	28	148	74
3	13.7	70	75	34	31	53	5.9	3.4	28	47	41	49
4	26	31	171	13.4	1,470	48	34	3.2	27	36	36	16.0
5	11.8	42	58	25	725	46	32	3.2	26	67	50	28
6	4.5	27	7.6	22	662	45	24	3.1	21	62	15.2	29
7	4.5	44	4.5	45	481	44	22	3.0	13.3	32	5.2	8.7
8	41	35	7.2	6.0	299	45	15.6	3.0	19.5	18.2	3.6	6.9
9	22	11.4	42	3.9	217	49	4.2	2.6	26	4.7	3.3	6.3
10	6.0	4.2	131	3.6	314	52	3.7	2.6	59	29	3.3	6.3
11	108	4.1	403	3.5	294	40	4.0	2.7	40	21	3.2	6.1
12	26	15.7	58	3.4	151	21	4.2	2.3	28	9.5	3.1	6.0
13	8.6	92	18.1	3.3	125	10.6	4.2	2.1	14.9	15.3	3.1	5.4
14	25	23	6.0	3.2	163	45	4.1	3.5	20	61	3.1	5.3
15	26	9.8	55	3.2	134	34	4.1	14.7	26	70	3.1	5.2
16	15.6	7.1	38	3.2	152	1,040	4.0	52	16.7	49	3.1	5.2
17	74	75	59	3.4	110	149	125	70	6.2	26	3.0	5.7
18	16.4	522	41	3.5	129	78	165	24	16.7	10.2	2.9	5.2
19	15.2	386	16.7	3.4	110	55	58	4.2	6.4	240	3.1	5.3
20	8.0	193	351	3.2	81	35	52	3.6	4.3	49	3.0	5.3
21	10.5	215	125	3.3	70	17.5	41	2.9	4.9	100	3.0	4.8
22	52	221	54	3.5	78	40	37	8.6	4.1	45	3.1	4.6
23	113	48	44	3.4	64	33	43	11.2	3.8	23	3.1	4.6
24	42	35	22	3.2	53	32	33	16.8	96	12.3	3.1	4.6
25	6.0	28	6.6	3.1	49	38	20	12.0	246	15.8	3.0	4.6
26	4.7	44	10.6	3.0	25	36	5.8	37	53	12.8	3.1	4.5
27	144	7.3	10.6	3.2	6.6	30	23	32	34	6.2	5.2	4.2
28	255	5.4	32	4.2	228	15.0	36	20	96	30	72	4.2
29	100	5.2	11.6	44	141	106	9.2	-------	82	19.0	12.8	4.1
30	80	5.1	18.5	9.5	72	37	4.6	-------	51	5.3	1,120	3.9
31	63	4.9	-------	11.1	---------	25	3.8	-------	48	-------	308	------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	255	4.5	45.8	70.9	1,420	4,360
August	522	4.1	75.1	116	2,330	7,140
September	403	4.5	62.9	97.3	1,890	5,790
October	300	3.0	19.7	30.5	612	1,870
November	1,470	6.6	216	334	6,480	19,900
December	1,040	10.6	77.9	121	2,410	7,410
January	165	3.7	27.9	43.2	865	2,650
February	70	2.1	12.5	19.3	351	1,070
March	246	3.8	36.5	56.5	1,130	3,470
April	240	4.7	39.2	60.7	1,180	3,610
May	1,120	2.9	61.3	94.8	1,900	5,830
June	190	3.9	17.1	26.5	513	1,570
The year	1,470	2.1	57.7	89.3	21,100	64,700

NORTH FORK OF WAILUA RIVER AT ELEVATION 650 FEET, NEAR LIHU , KAUAI

LOCATION.—Water-stage recorder 1½ miles above intake of Kanaha ditch and 7¾ miles northwest of Lihue.

DRAINAGE AREA.—6.6 square miles.

RECORDS AVAILABLE.—August, 1910, to June, 1929.

EXTREMES.—Maximum discharge during year, 2,450 million gallons a day or 3,790 second-feet May 30 (gage height, 7.25 feet); minimum, 19.8 million gallons a day or 30.6 second-feet June 25.

1910–1929: Maximum discharge, 3,410 million gallons a day or 5,280 second-feet Dec. 24, 1927 (gage height, 8.46 feet); minimum, about 7.7 million gallons a day or 11.9 second-feet Apr. 27, 1926.

REMARKS.—Records good for ordinary stages; poor for high stages. Hanalei tunnel discharges water into stream, and North Wailua ditch diverts water from stream above station for irrigation.

Discharge, in million gallons a day, 1928–29

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	98	61	37	50	46	46	49	24	43	46	66	112
2	49	63	37	155	40	43	49	24	42	57	87	97
3	38	54	88	71	40	40	91	23	71	85	46	67
4	48	43	115	57	417	40	76	23	43	64	54	56
5	52	40	56	63	252	58	49	23	83	70	49	63
6	34	37	43	49	255	53	40	22	53	56	37	52
7	49	93	49	57	178	43	37	22	68	37	34	43
8	71	43	71	50	147	46	40	22	76	34	37	40
9	49	37	72	39	132	57	29	21	80	45	32	37
10	44	34	100	36	158	49	29	24	80	94	29	34
11	78	34	170	36	127	52	29	35	56	63	29	37
12	54	90	67	34	95	59	27	40	46	73	28	37
13	43	60	52	32	90	55	27	32	46	46	28	34
14	40	48	46	35	100	59	27	54	57	43	28	37
15	37	43	60	34	104	61	39	87	43	52	30	32
16	40	37	40	37	90	263	43	107	34	40	27	32
17	106	62	73	47	85	72	83	85	34	34	27	32
18	62	228	80	34	105	52	72	52	32	38	29	29
19	62	149	69	47	80	43	37	68	29	166	29	34
20	43	120	192	34	67	40	30	43	34	82	28	29
21	43	176	94	37	64	37	36	34	73	72	28	27
22	72	131	59	40	90	34	38	42	54	52	28	25
23	87	76	46	32	63	34	43	32	61	46	28	20
24	46	59	40	32	56	34	29	29	131	43	29	20
25	49	56	55	32	52	80	27	29	156	46	34	20
26	43	49	46	32	49	40	27	59	67	37	32	21
27	110	46	48	38	46	40	54	34	52	34	65	22
28	136	37	57	46	108	60	43	52	60	34	63	24
29	77	34	43	78	59	128	27	-------	58	34	75	25
30	52	34	37	50	52	49	26	-------	43	42	342	25
31	46	29	-------	48	-------	46	25	-------	69	-------	127	-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	136	34	59.9	92.7	1,860	5,700
August	228	29	67.8	105	2,100	6,450
September	192	37	68.1	105	2,040	6,270
October	155	32	47.2	73.0	1,460	4,490
November	417	40	108	167	3,250	9,940
December	263	34	58.5	90.5	1,810	5,570
January	91	25	41.2	63.7	1,280	3,920
February	107	21	40.8	63.1	1,140	3,510
March	156	29	60.5	93.6	1,870	5,760
April	166	34	55.5	85.9	1,660	5,110
May	342	27	51.8	80.1	1,600	4,930
June	112	20	38.8	60.0	1,160	3,570
The year	417	20	58.2	90.0	21,200	65,200

KANAHA DITCH NEAR LIHUE, KAUAI

LOCATION.—Water-stage recorder a quarter of a mile below Kauai Electric Co.'s power line and 6¾ miles northwest of Lihue.

RECORDS AVAILABLE.—August, 1910, to June, 1929.

EXTREMES.—Maximum discharge during year, 41 million gallons a day or 63 second-feet May 30 (gage height, 3.07 feet); minimum, 0.6 million gallons a day or 0.9 second-foot Dec. 1.

1910–1929: Maximum discharge recorded, 45 million gallons a day or 70 second-feet Dec. 24, 1927 (gage height, 3.22 feet); no flow occasionally when water was shut out of ditch.

REMARKS.—Records good. Intake 8½ miles above mouth of North Fork of Wailua River at elevation of about 600 feet. Water used for irrigation of sugar cane. Regulated by head gates and spillways.

Discharge, in million gallons a day, 1928–29

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	8.9	8.9	8.3	8.9	8.3	0.7	0.9	7.0	7.3	6.7	7.1	5.7
2	8.9	8.9	8.9	8.9	8.3	.8	.9	5.0	7.3	6.9	7.2	5.0
3	8.9	8.9	8.9	8.9	8.3	.8	.9	4.1	7.1	7.0	7.6	4.9
4	8.9	8.9	8.9	8.3	6.3	.8	.8	4.1	7.0	6.8	7.9	4.0
5	8.9	8.9	8.3	8.3	2.0	1.2	.8	4.3	7.3	6.8	7.7	4.2
6	8.9	8.9	8.9	8.3	2.5	1.1	.8	4.4	7.5	6.9	7.6	4.2
7	8.9	8.9	8.9	8.9	2.0	1.1	.8	4.4	7.8	6.7	7.8	5.3
8	8.9	8.3	8.9	8.3	1.8	1.1	.8	4.4	7.3	6.8	8.1	7.8
9	8.9	8.9	8.9	8.3	1.6	1.1	3.3	5.4	7.2	6.9	8.1	7.7
10	8.9	8.9	8.9	8.3	1.6	1.1	6.1	7.1	7.2	7.0	8.1	7.7
11	8.9	8.9	9.5	8.3	1.4	1.0	7.8	6.8	7.1	6.8	7.8	7.7
12	8.9	8.9	8.9	8.3	1.4	1.0	7.8	6.8	7.2	6.7	7.8	7.9
13	8.9	8.3	8.9	8.3	1.2	1.0	7.9	6.6	7.3	6.6	7.8	7.6
14	8.9	8.3	8.9	8.3	1.2	.9	7.8	7.1	7.1	6.4	7.8	7.7
15	8.9	8.9	8.9	8.3	1.2	.9	7.9	6.9	7.0	6.8	7.6	7.8
16	8.9	8.3	8.9	8.3	1.2	1.0	5.6	7.1	7.2	6.6	7.3	8.3
17	8.9	8.3	8.9	8.3	1.1	.8	4.5	7.0	7.2	6.3	7.5	8.2
18	8.9	8.3	8.9	8.3	1.0	.8	4.5	6.8	7.2	6.4	7.6	7.5
19	8.9	8.2	8.9	8.3	1.0	.9	4.3	7.1	7.2	7.1	7.6	7.8
20	8.9	8.3	8.9	8.3	1.2	1.0	4.2	6.8	7.2	6.9	7.5	7.1
21	8.9	8.3	8.9	8.3	.8	1.0	4.2	7.1	7.2	6.7	7.6	6.9
22	8.9	8.2	8.9	8.9	1.0	.8	4.5	7.5	7.5	6.6	11.9	7.1
23	8.9	8.3	8.9	8.3	1.2	.8	4.6	7.1	7.5	6.8	15.0	7.0
24	8.9	8.3	8.9	8.3	1.2	.8	4.4	7.2	7.5	7.3	12.2	6.9
25	8.9	8.3	8.9	8.3	1.2	.7	4.3	7.5	7.2	7.3	7.7	7.0
26	8.9	8.3	8.9	8.9	1.0	.7	4.2	7.5	7.0	7.2	7.6	6.9
27	8.9	8.3	8.9	8.9	1.1	.7	4.4	7.1	7.1	7.2	7.6	6.7
28	8.9	8.3	8.3	8.2	1.2	.7	5.0	7.3	7.0	7.2	7.5	6.3
29	8.9	8.3	8.9	7.9	.8	.8	6.7	-------	6.9	7.3	7.8	5.7
30	8.9	8.3	8.9	8.3	.7	.8	6.9	-------	6.9	7.5	9.8	5.4
31	8.9	8.3	-------	8.3	-------	.8	7.0	-------	7.1	-------	6.1	------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	8.9	8.9	8.90	13.8	276	847
August	8.9	8.2	8.53	13.2	264	812
September	9.5	8.3	8.86	13.7	266	816
October	8.9	7.9	8.40	13.0	260	799
November	8.3	.7	2.16	3.34	64.8	199
December	1.2	.7	.89	1.38	27.7	85
January	7.9	.8	4.34	6.71	135	413
February	7.5	4.1	6.34	9.81	178	545
March	7.8	6.9	7.21	11.2	224	686
April	7.5	6.3	6.87	10.6	206	632
May	15.0	6.1	8.20	12.7	254	780
June	8.3	4.0	6.67	10.3	200	614
The year	15.0	.7	6.45	9.98	2,360	7,230

EAST BRANCH OF NORTH FORK OF WAILUA RIVER NEAR LIHUE, KAUAI

LOCATION.—Water-stage recorder 1,200 feet above confluence with North Fork and 7½ miles northwest of Lihue.

DRAINAGE AREA.—6.2 square miles.

RECORDS AVAILABLE.—July, 1912, to June, 1929.

EXTREMES.—Maximum discharge during year, 3,320 million gallons a day or 5,140 second-feet May 30 (gage height, 10.48 feet); minimum, 11.5 million gallons a day or 17.8 second-feet June 30.

1912–1929: Maximum discharge, 3,340 million gallons a day or 5,170 second-feet Dec. 24, 1927 (gage height, 10.57 feet); minimum, 4.4 million gallons a day or 6.8 second-feet July 8, 13, 1926.

REMARKS.—Records good for ordinary stages and fair for high and low stages. No diversions above station.

Discharge, in million gallons a day, 1928–29

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	19.1	26	19.2	16.5	15.5		21	13.2	19.2	22	19.2	64
2	16.5	27	19.2	37	14.0		21	13.0	17.5	24	23	40
3	15.5	24	31	19.2	14.0	24	35	12.8	29	26	19.2	35
4	20	22	42	17.5	473		39	12.8	22	33	19.2	28
5	19.2	21	26	19.2	206		24	12.8	41	26	17.5	30
6	16.2	19.2	21	17.2	181	21	21	12.5	28	22	16.8	26
7	20	25	21	16.8	117	19.2	19.2	12.5	32	21	16.5	24
8	33	19.2	24	16.8	82	19.2	19.2	12.3	37	21	16.5	22
9	24	17.5	26	16.2	67	24	17.5	12.1	37	23	15.8	21
10	22	17.5	26	15.8	90	21	17.5	15.3	44	51	15.5	21
11	36	17.5	71	15.5	75	21	17.2	16.0	33	35	15.0	19.2
12	24	26	26	14.8	42	24	16.8	23	28	38	14.5	21
13	21	24	22	15.0	37	25	15.8	14.2	28	28	14.5	19.2
14	21	25	21	14.8	37	24	15.5	45	28	26	14.8	19.2
15	19.2	21	24	15.2	40	21	17.0	49	22	30	15.0	17.5
16	18.3	19.2	21	15.2	38	98	21	29	21	24	14.5	17.0
17	58	24	22	16.5	33	30	35	39	19.2	22	14.0	16.8
18	28	116	21	16.0	42	24	39	26	19.2	22	13.8	16.2
19	28	64	21	15.8	33	22	22	36	17.5	67	13.8	16.8
20	22	93	92	15.0	28	21	19.2	22	21	30	13.8	16.0
21	22	69	30	14.5	24	19.2	19.0	19.2	28	36	13.2	15.2
22	30	48	24	14.8	30	19.2	21	21	21	28	14.0	14.5
23	42	33	22	14.2	24	17.5	21	19.2	21	26	13.8	14.2
24	24	28	21	13.8	22	17.2	17.0	17.0	74	24	13.2	13.8
25	24	26	21	13.2	21	32	15.8	19.6	72	24	13.2	13.5
26	21	24	21	13.0	24	19.2	15.2	38	35	21	14.0	13.0
27	53	24	19.2	14.0		17.2	15.0	22	30	21	21	12.8
28	37	21	22	14.0	40	16.8	16.8	21	34	19.2	43	12.3
29	26	21	19.2	24		113	14.5	-------	37	19.2	17.5	12.1
30	24	19.2	17.5	19.0		24	13.8	-------	26	19.2	396	11.9
31	22	19.2	-------	16.8	-------	21	13.5	-------	24	-------	160	------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	58	15.5	26.0	40.2	806	2,470
August	116	17.5	31.6	48.9	980	3,010
September	92	17.5	27.1	41.9	813	2,500
October	37	13.0	16.7	25.8	517	1,590
November	473	14.0	65.6	101	1,970	6,040
December	113	16.8	27.4	42.4	851	2,610
January	39	13.5	20.5	31.7	636	1,950
February	49	12.1	21.6	33.4	606	1,860
March	74	17.5	30.5	47.2	946	2,900
April	67	19.2	27.6	42.7	829	2,540
May	396	13.2	33.6	52.0	1,040	3,200
June	64	11.9	20.8	32.2	623	1,910
The year	473	11.9	29.1	45.0	10,600	32,600

KAPAHI DITCH NEAR KEALIA, KAUAI

LOCATION.—Water-stage recorder 500 feet below intake and 4.5 miles west of Kealia.

RECORDS AVAILABLE.—April, 1909, to May, 1914; May, 1915, to June, 1929.

EXTREMES.—Maximum discharge during year, 123 million gallons a day or 190 second-feet Aug. 18 (gage height, 2.07 feet); no flow Sept. 3, when water was shut out of ditch.

1909–1914, 1915–1929: Maximum discharge, 233 million gallons a day or 361 second-feet Mar. 31, 1923 (gage height, about 3.15 feet); no flow occasionally when water is shut out of ditch.

REMARKS.—Records good except those for extremely low stages, which are poor. Diverts water from Kapaa River at elevation of about 400 feet. Water used for irrigation. Regulated by head gates.

Discharge, in million gallons a day, 1928–29

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	16.3	7.6	3.4	3.7	5.2	0.08	3.8	2.9	3.4	10.4	4.0	0.08
2	7.0	6.5	2.1	5.8	6.2	.3	6.0	3.2	2.9	9.4	4.3	.08
3	6.8	8.0	6.4	4.0	6.2	5.5	6.1	2.9	1.1	9.8	3.7	.3
4	2.0	8.7	18.1	3.8	3.4	10.3	5.2	3.7	2.9	10.8	4.0	3.3
5	9.2	9.0	6.0	5.0	.4	20	.4	4.0	3.7	9.8	3.4	6.3
6	6.5	9.4	4.3	3.9	.3	13.6	2.5	4.0	11.5	6.6	5.2	6.7
7	11.0	13.1	8.2	1.5	.15	11.9	3.2	3.7	19.6	3.2	4.3	6.8
8	3.1	5.7	7.0	3.9	.15	12.7	3.7	3.7	15.8	4.0	4.8	6.2
9	9.2	5.4	1.6	4.0	.08	17.0	9.4	3.1	14.7	4.3	3.7	4.6
10	9.9	4.3	6.7	4.4	.08	13.6	6.8	1.5	16.4	6.9	3.9	5.9
11	12.6	4.0	6.9	3.4	.08	7.8	6.2	4.2	5.1	8.4	3.7	7.7
12	7.0	10.2	8.3	3.1	.08	12.6	7.6	5.2	8.0	5.2	1.9	9.6
13	7.2	10.3	5.2	3.8	.15	3.2	2.3	4.2	7.1	3.3	3.4	8.0
14	9.4	12.7	6.2	1.5	6.1	2.8	5.9	2.9	.55	.15	3.2	5.0
15	7.6	8.3	11.4	4.0	26	2.4	6.8	.08	.55	3.4	4.5	.9
16	7.9	8.2	6.2	3.3	23	1.5	8.0	.08	.55	3.7	3.7	.15
17	14.0	8.3	6.9	4.5	12.6	2.1	11.8	.08	.55	4.0	2.9	6.5
18	15.0	59	7.8	3.9	.4	2.3	4.0	.3	10.6	5.5	2.9	4.0
19	10.3	12.0	9.8	3.4	.4	2.9	3.9	2.1	8.0	9.0	1.7	4.3
20	8.2	11.0	12.7	3.2	.4	4.0	3.2	1.3	5.3	4.9	3.4	3.4
21	8.0	12.3	13.1	.7	.4	3.1	3.8	.55	4.1	7.4	2.9	2.8
22	3.5	11.4	9.4	3.1	.3	.9	6.5	1.7	3.0	.8	3.9	2.9
23	9.2	6.9	6.2	2.8	.3	1.1	6.8	2.4	3.8	3.8	4.2	.9
24	9.8	5.9	4.3	2.5	.3	1.1	6.5	6.3	3.4	2.9	3.2	2.8
25	11.9	6.8	7.2	2.7	3.2	1.3	6.5	7.2	4.9	2.9	3.4	2.4
26	4.9	5.2	5.5	2.6	11.9	7.6	5.2	5.6	13.0	2.4	1.7	2.6
27	10.0	6.2	4.0	3.6	10.7	10.7	2.8	6.4	11.9	3.6	8.5	2.6
28	5.3	4.4	9.2	3.2	5.7	11.1	3.4	6.9	5.8	3.2	8.4	2.6
29	6.2	3.2	4.6	13.7	.15	8.0	7.5	------	2.4	3.4	4.3	2.2
30	8.6	3.9	1.2	10.2	.08	.8	6.0	------	1.9	4.0	18.7	.9
31	6.9	3.2	------	4.3	------	.4	1.5	------	1.7	------	.8	------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	16.3	2.0	8.53	13.2	264	812
August	59	3.2	9.39	14.5	291	893
September	18.1	1.2	7.00	10.8	210	644
October	13.7	.7	3.98	6.16	124	379
November	26	.08	4.15	6.42	124	382
December	20	.08	6.22	9.62	193	592
January	11.8	.4	5.27	8.15	163	501
February	7.2	.08	3.22	4.98	90.2	277
March	19.6	.55	6.26	9.69	194	596
April	10.8	.15	5.24	8.11	157	482
May	18.7	.8	4.28	6.62	133	407
June	9.6	.08	3.75	5.80	113	345
The year	59	.08	5.63	8.71	2,060	6,310

ANAHOLA RIVER NEAR KEALIA, KAUAI

LOCATION.—Water-stage recorder a quarter of a mile above dam at Kiokala and 4½ miles northwest of Kealia.

DRAINAGE AREA.—5.5 square miles.

RECORDS AVAILABLE.—August to November, 1910; December, 1912, to June, 1929.

EXTREMES.—Maximum discharge during year, 875 million gallons a day or 1,350 second-feet May 31 (gage height, 7.10 feet); minimum, 2.4 million gallons a day or 3.7 second-feet Oct. 25, 26.

1910, 1912–1929: Maximum discharge, 1,530 million gallons a day or 2,370 second-feet Dec. 24, 1927 (gage height, 9.38 feet); minimum, 1.4 million gallons a day or 2.2 second-feet Sept. 12–13, 1923.

REMARKS.—Records good for ordinary stages except those estimated, which are poor; records for high stages poor. Anahola ditch diverts water 3 miles above station for irrigation and domestic supply.

Discharge, in million gallons a day, 1928–29

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	7.7	5.0	4.6	3.2	5.2		5.2	4.8	9.4	6.4	4.4	31
2	4.2	8.3	4.2	11.5	2.9	8	32	4.8	8.4	6.7	4.4	14
3	3.6	7.8	6.2	3.6	2.9		25	4.6	9.7	5.8	4.2	11.5
4	5.7	4.6	32	3.4	444		18.8	4.4	8.2	6.9	4.2	9.0
5	4.4	4.2	6.2	4.0	160	35	7.5	4.4	11.5	5.5	4.4	9.0
6	3.6	4.0	4.6	3.6	118	7.3	6.2	4.2	7.0	5.1	4.2	8.0
7	3.8	6.1	5.5	3.2	70	6.2	5.7	4.0	7.0	5.1	4.0	7.7
8	7.3	3.8	6.0	3.2	57	6.0	25	4.0	9.4	4.9	4.2	7.0
9	4.4	3.4	20	3.2	28	12.0	6.5	3.8	10.5	4.9	4.0	6.4
10	4.6	3.4	8.1	3.4	47	7.0	5.7	4.2	13	25	4.0	6.4
11	5.2	3.6	38	3.6	31	7.9	5.5	8.7	12	9.6	3.8	7.6
12	4.4	5.1	7.3	3.0	14.6	11.2	5.0	4.4	11.5	11	8.9	8.2
13	3.8	5.5	6.2	2.9	12.2	12.0	4.8	3.8	8.2	7.0	12	6.2
14	4.6	4.6	5.2	3.0	11.4	9.1	4.8	60	11.5	5.5	12	6.0
15	3.6	4.4	6.2	3.6	18.4	7.3	5.2	22	8.0	9.5	14	5.5
16	3.6	3.6	5.0	2.9	14.3	13.2	6.2	7.0	6.2	5.5	12.5	5.3
17	24	3.2	5.5	4.2		7.0	32	9.0	5.8	5.1	11.5	5.2
18	5.5	57	4.8	3.6	20	5.7	18.2	7.7	5.8	5.1	11.5	5.3
19	4.2	17.6	4.6	3.2		5.5	9.4	19.8	5.5	49	13	10.5
20	3.6	22	26	2.9		5.0	7.3	6.0	5.3	7.4	12.5	5.8
21	3.8	15.7	5.2	2.7		4.8	29	4.8	13.5	10	11.5	4.7
22	7.7	14.8	4.6	2.7		4.8	18.3	6.2	5.8	5.8	12	4.4
23	11.5	6.5	3.8	2.9	12	4.6	9.4	5.0	5.3	5.5	12	4.4
24	4.6	5.7	3.8	2.7		4.8	7.8	4.8	13	5.1	11.5	4.0
25	6.6	6.0	4.6	2.6		7.6	6.8	26	14.5	5.3	11.5	4.0
26	4.8	5.7	3.8	2.6		4.4	6.5	97	8.7	4.9	12.5	4.0
27	39	7.0	3.6	2.9		4.2	6.5	18.5	7.0	4.7	14.5	4.0
28	10.2	4.8	8.1	8.5		4.2	8.9	11.5	27	4.4	17.5	3.8
29	5.0	4.8	3.8	6.7	36	20	6.0	-------	21	4.4	15	3.7
30	4.4	4.4	3.6	4.6		4.8	5.2	-------	7.7	4.4	108	7.1
31	4.0	4.2	-------	6.4	-------	4.2	5.0	-------	6.7	-------	188	-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	39	3.6	6.88	10.6	213	655
August	57	3.2	8.28	12.8	257	788
September	38	3.6	8.37	13.0	251	771
October	11.5	2.6	3.89	6.02	120	370
November	444	2.9	43.4	67.1	1,300	4,000
December	35	4.2	8.32	12.9	258	792
January	32	4.8	11.1	17.2	345	1,060
February	97	3.8	13.0	20.1	365	1,120
March	27	5.3	9.81	15.2	304	933
April	49	4.4	8.18	12.7	246	753
May	188	3.8	18.3	28.3	568	1,740
June	31	3.7	7.32	11.3	220	674
The year	444	2.6	12.2	18.9	4,450	13,700

ANAHOLA DITCH ABOVE KANEHA RESERVOIR, NEAR KEALIA, KAUAI

LOCATION.—Water-stage recorder at upper end of second tunnel above Kaneha Reservoir, 5 miles northwest of Kealia.

RECORDS AVAILABLE.—May, 1915, to June, 1929.

EXTREMES.—Maximum discharge during year, 80 million gallons a day or 124 second-feet May 31 (gage height, 4.68 feet); no flow several days when water was shut out of ditch.

1915–1929: Maximum discharge recorded, 130 million gallons a day or 201 second-feet Jan. 16, 1921 (gage height, 6.25 feet); no flow occasionally when water was shut out of ditch.

REMARKS.—Records good. This station measures water diverted from Anahola River to Kaneha Reservoir, where it is stored for irrigation. Regulated by head gates and spillways.

Discharge, in million gallons a day, 1928–29

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	11.0	11.0	3.1	3.0	4.8	0	0	1.9	0	0	2.7	0
2	3.7	10.8	3.4	9.6	2.2	0	0	1.9	0	0	3.3	0
3	3.6	7.0	10.4	3.9	2.2	0	0	1.8	0	0	2.2	4.4
4	6.6	6.0	17.8	3.5	10.7	0	0	1.8	0	5.5	2.3	5.0
5	5.5	4.5	6.2	6.1	1.2	0	0	1.8	0	4.1	2.4	5.8
6	3.1	3.9	4.2	3.3	1.1	0	0	1.7	0	3.7	1.8	4.4
7	4.7	8.8	8.0	3.2	.9	0	0	1.7	0	3.2	1.8	3.9
8	10.0	3.8	6.6	3.2	.3	0	0	1.6	1.4	3.1	2.5	3.0
9	5.8	3.2	12.6	3.0	0	0	0	1.5	8.5	4.7	1.7	2.6
10	6.0	3.1	10.9	2.6	0	0	0	1.6	11.8	7.7	1.6	3.4
11	7.0	3.3	5.6	2.9	0	0	0.9	5.6	9.7	0	1.4	5.7
12	5.8	8.6	4	2.3	0	0	2.9	2.3	6.4	0	1.2	5.2
13	3.6	6.4	5.2	2.2	0	0	2.5	1.8	6.2	1.6	1.2	3.1
14	5.5	6.1	4.5	2.3	0	0	1.1	8.0	7.6	3.6	1.2	2.9
15	3.9	4.5	8.4	3.4	0	0	1.7	5.4	5.4	8.9	3.3	2.3
16	4.4	3.6	4.4	2.5	0	0	3.5	7.0	4.1	4.1	1.4	2.2
17	14.8	4.2	6.9	5.8	0	0	0	10.2	3.5	3.5	1.1	2.3
18	6.9	8.9	5.4	3.7	0	0	0	6.2	4.1	3.4	.9	2.3
19	5.3	0	5.6	3.0	0	0	0	11.0	3.1	10.6	.9	5.8
20	3.7	0	14.2	2.4	0	0	.1	4.6	4.3	0	.8	2.6
21	5.8	0	6.1	2.2	0	0	.5	3.4	8.6	0	.7	2.1
22	10.2	0	.02	2.5	0	1.0	.4	6.5	4.6	.05	.9	2.0
23	12.2	3.8	1.8	2.2	0	2.5	0	3.4	4.8	0	1.1	1.8
24	6.9	4.4	3.0	2.0	0	2.8	0	3.5	9.8	2.3	.8	1.8
25	11.1	5.5	4.2	1.8	0	8.5	0	9.8	11.8	3.9	.8	1.8
26	7.4	4.9	3.8	1.8	0	3.1	0	8.1	9.7	3.1	1.2	2.1
27	4.3	5.2	3.2	2.4	0	2.4	0	0	5.4	2.6	1.3	1.9
28	0	3.3	8.1	2.1	0	2.4	0	0	3.7	2.5	4.4	1.7
29	0	3.1	4.6	4.9	0	2.0	.8	-------	0	2.4	1.7	1.5
30	1.5	2.9	3.5	4.2	0	0	2.2	-------	0	2.4	10.7	1.5
31	4.6	2.8	-------	5.6	-------	0	2.0	-------	0	-------	4.0	-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July (29 days)	14.8	[a]0	6.38	9.87	185	568
August (27 days)	11.0	[a]0	5.32	8.23	144	441
September	17.8	.02	6.20	9.59	186	571
October	9.6	1.8	3.34	5.17	104	318
November (8 days)	10.7	[a]0	2.92	4.52	23.4	72
December (8 days)	8.5	[a]0	3.09	4.78	24.7	76
January (12 days)	3.5	[a]0	1.55	2.40	18.6	57
February (26 days)	11.0	[a]0	4.39	6.79	114	350
March (21 days)	11.8	[a]0	6.40	9.90	134	412
April (22 days)	10.6	[a]0	3.95	6.11	87.0	267
May	10.7	.7	2.04	3.16	63.3	194
June (28 days)	5.8	[a]0	3.04	4.70	85.1	261
The year (273 days)	17.8	0.0	4.28	6.62	1,170	3,590

[a] The whole month considered.

HANALEI RIVER AT ELEVATION 625 FEET, NEAR HANALEI, KAUAI

LOCATION.—Water-stage recorder 2 miles west of Kauai Electric Co.'s power line and about 10 miles above mouth of stream.

DRAINAGE AREA.—7.4 square miles.

RECORDS AVAILABLE.—January, 1914, to June, 1929.

EXTREMES.—Maximum discharge during year, 3,440 million gallons a day or 5,320 second-feet Nov. 4 (gage height, 7.04 feet); minimum, 9.0 million gallons a day or 13.9 second-feet June 30.

1914–1929: Maximum discharge, 6,500 million gallons a day or 10,100 second-feet Jan. 16, 1921 (gage height, 7.50 feet); minimum, 5.8 million gallons a day or 9.0 second-feet Apr. 28, May 1-3, 1926.

REMARKS.—Records good for ordinary stages except those estimated, which are poor; records for extremely high and low stages poor. Hanalei tunnel diverts water from stream about 2 miles above station.

Discharge, in million gallons a day, 1928–29

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	80	42	19.9	20	15.0	19.5	18.3	13.3	20	19.9	28	
2	26	37	20	136	13.6	18.7	19.1	12.9	21	21	24	
3	17.6	30	84	24	13.6	18.0	51	12.6	43	24	15.8	
4	22	26	100	22	651	18.3	39	12.6	26	23	27	26
5	22	24	36	22	271	40	24	12.6	81	20	18.0	
6	17.6	22	28	19.5	214	25	20	12.2	34	17.6	14.7	
7	24	42	30	19.5	129	19.9	18.7	11.9	46	16.5	14.0	
8	70	22	32	18.7	95	20	19.1	11.9	49	15.8	13.6	17
9	30	20	46	17.6	110	31	16.8	11.9	56	16.8	12.2	
10	26	19.5	53	16.8	156	23	16.1	13.3	56	55	12.2	
11	56	18.7	112	16.5	100	24	16.1	39	37	31	11.9	
12	30	60	32	15.8	46	28	15.0	34	30	45	11.2	22
13	26	30	26	16.1	38	34	14.7	16.1	28	28	11.2	
14	24	26	24	16.5	38	30	14.7	49	27	23	12.9	
15	22	23	28	15.4	41	24	22	69	23	35		
16	25	22	22	15.8	39	164	25	91	20	22	15	
17	98	48	32	18.0	41	35	87	72	18.7	19.1		15
18	42	212	35	17.2	52	26	36	33	17.6	19.9		
19	36	90	26	18.3	35	22	20	61	16.8	168		
20	26	61	137	16.1	28	19.9	18.0	28	18.0	34		
21	24	122	36	15.4	30	18.7	22	22	38	31		*14.0
22	41	80	25	15.8	46	17.6	21	30	21	24	12	13.3
23	81	39	22	14.7	27	16.8	20	21	25	21		12.6
24	30	32	21	14.3	23	16.5	16.5	19.1	76	19.5		11.9
25	30	28	19.9	13.6	21	62	15.4	28	109	19.9		11.9
26	26	25	19.1	13.6	26	20	15.0	40	33	17.6		11.6
27	117	24	18.0	14.0	20	17.2	30	22	26	16.1		10.5
28	124	21	24	15.0	76	17.2	22	27	35	15.4		10.2
29	40	19.9	19.5	31	26	89	14.7	-------	35	15.0	55	9.7
30	30	19.9	18.0	16.1	22	22	14.0	-------	24	15.0		9.3
31	28	18.7	-------	15.8	-------	19.1	13.6	-------	24	-------		-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	124	17.6	41.7	64.5	1,290	3,970
August	212	18.7	42.1	65.1	1,300	4,010
September	137	18.0	38.2	59.1	1,150	3,520
October	136	13.6	21.3	33.0	661	2,030
November	651	13.6	81.4	126	2,440	7,490
December	164	16.5	30.9	47.8	956	2,940
January	87	13.6	23.1	35.7	715	2,200
February	91	11.9	29.5	45.6	826	2,530
March	109	16.8	35.9	55.5	1,110	3,420
April	168	15.0	28.3	43.8	849	2,610
May	----------	----------	21.1	32.6	655	2,010
June	----------	9.3	17.2	26.6	517	1,580
The year	651	9.3	34.2	52.9	12,500	38,300

* Partly estimated.

WAIOLI STREAM NEAR HANALEI, KAUAI

LOCATION.—Water-stage recorder 2½ miles south of Hanalei and 3 miles above mouth of stream.

DRAINAGE AREA.—1.6 square miles.

RECORDS AVAILABLE.—July, 1914, to June, 1929.

EXTREMES.—Maximum discharge during year, 920 million gallons a day or 1,420 second-feet Nov. 4 (gage height, 6.10 feet); minimum, 6.9 million gallons a day or 10.7 second-feet Feb. 10.

1914–1929: Maximum discharge, 955 million gallons a day or 1,480 second-feet Dec. 19, 1916 (gage height, 6.15 feet); minimum, 2.0 million gallons a day or 3.1 second-feet July 22, 1914.

REMARKS.—Records good for ordinary stages except those estimated, which are fair; records for extremely high and low stages poor. No diversions.

Discharge, in million gallons à day, 1928–29

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	56	37	13.6	10.9	16.0	8.9	10.5	7.5	14.7	7.9	7.9	13.6
2	23	26	16.4	30	12.5	8.5	17.4	7.3	18.0	8.7	19.5	11.2
3	17.0	18.0	36	13.6	13.9	8.7	41	7.3	27	9.1	10.2	10.7
4	19.2	17.3	73	12.5	391	12.4	25	7.3	17.0	7.7	23	13.9
5	18.0	16.0	20	16.4	207	33	14.7	7.2	42	7.5	17.4	18.0
6	13.9	13.6	16.7	11.9	129	17.0	13.3	7.2	18.0	7.5	11.7	16.4
7	29	14.7	23	12.7	93	12.5	16.3	7.2	21	7.3	10.9	11.9
8	50	11.7	20	12.2	60	14.7	24	7.2	24	7.5	12.7	9.1
9	22	11.2	32	10.9	57	39	13.9	7.2	37	12.7	9.1	8.7
10	24	11.9	32	10.2	104	21	12.2	7.3	29	41	10.0	10.0
11	44	13.9	46	9.7	59	19.3	11.7	24	18.4	19.6	8.9	26
12	22	31	17.3	9.7	21	20	11.2	18.6	15.7	52	7.9	17.7
13	18.2	19.2	13.6	9.7	24	26	10.9	11.7	14.7	18.8	8.7	13.6
14	20	17.6	13.0	11.4	29	21	10.9	15.4	17.1	21	11.7	12.2
15	21	16.8	16.0	11.9	25	15.7	22	55	13.6	23	15.9	9.1
16	28	14.1	12.7	11.2	21	24		72	10.7	13.3	9.5	9.7
17	75	27	14.4	15.0	30	13.9	24	32	9.3	10.5	8.3	9.3
18	24	88	12.2	15.7	48	11.9		19.1	8.5	15.7	7.9	8.5
19	18.4	33	12.5	13.9	18.0	10.2		24	8.1	38	7.3	12.3
20	14.4	29	24	11.9	14.1	9.5	10.0	14.7	9.1	15.4	7.3	11.9
21	14.4	25	13.6	13.0	30	9.5	25	12.2	34	11.9	7.2	9.3
22	22	23	11.2	15.0	54	9.1	17.5	24	12.2	10.2	7.5	7.9
23	58	14.4	10.5	12.5	17.0	8.9	14.7	13.0	11.9	9.1	9.1	7.3
24	18.8	13.3	10.0	11.4	11.9	14.8	10.5	10.2	13.0	8.5	7.5	7.2
25	29	15.0	9.5	11.2	10.2	37	9.1	10.1	16.1	8.3	7.3	10.2
26	33	14.7	9.5	11.2	9.5	13.0	8.7	28	9.3	8.3	8.9	11.2
27	136	12.5	9.5	12.7	8.9	11.2	11.0	14.7	7.9	7.9	22	8.3
28	47	11.7	13.3	11.4	11.9	14.0	14.3	16.7	8.2	7.9	24	7.2
29	23	10.9	13.6	15.8	9.5	28	8.9	------	16.7	7.7	19.1	7.0
30	17.7	10.7	13.8	11.9	9.1	12.7	7.9	------	10.0	7.9	38	6.7
31	22	10.7	------	18.2	------	11.2	7.5	------	8.5	------	19.2	------

Month	Million gallons a day				Total run-off	
	Maximum	Minimum	Mean	Second-feet (mean)	Million gallons	Acre-feet
July	136	13.9	31.5	48.7	978	3,000
August	88	10.7	20.3	31.4	629	1,930
September	73	9.5	19.3	29.9	579	1,780
October	30	9.7	13.1	20.3	406	1,250
November	391	8.9	51.5	79.7	1,540	4,740
December	39	8.5	16.7	25.8	517	1,590
January	41	7.5	16.0	24.8	496	1,520
February	72	7.2	17.4	26.9	488	1,500
March	42	7.9	16.8	26.0	521	1,600
April	52	7.3	14.4	22.3	432	1,330
May	38	7.2	12.8	19.8	396	1,220
June	26	6.7	11.2	17.3	336	1,030
The year	391	6.7	20.1	31.1	7,320	22,500

LUMAHAI RIVER NEAR HANALEI, KAUAI

LOCATION.—Water-stage recorder 6 miles above mouth and 4½ miles southwest of Hanalei.

DRAINAGE AREA.—7.1 square miles.

RECORDS AVAILABLE.—May, 1914, to October, 1917; July, 1920, to June, 1929.

EXTREMES.—Maximum discharge during year, 3,290 million gallons a day or 5,090 second-feet Nov. 4 (gage height, 6.99 feet); minimum, 14.9 million gallons a day or 23.1 second-feet June 29 and 30.

1914–1917, 1920–1929: Maximum discharge (estimated), 5,000 million gallons a day or 7,740 second-feet Sept. 11, 1922 (gage height, 9.41 feet); minimum, 13.6 million gallons a day or 21 second feet May 15, 17, 1926.

REMARKS.—Records good for ordinary stages, fair for estimated period, poor for extremely high stages. No diversions.

Discharge, in million gallons a day, 1928-29

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	184	94	31	27	24	30	30	24	45	25	21	66
2	68	68	38	151	24	29	41	23	52	26	24	30
3	42	49	136	40	25	28	181	22	200	26	24	27
4	47	44	305	34	[a]1,750	40	92	22	96	24	43	31
5	47	41	76	41	750	129	48	21	376	22	42	42
6	35	37	52	31		75	38	21	114	22	22	35
7	108	50	83	30	398	47	35	21	160	21	27	26
8	355	34	65	30	274	55	47	20	174	21	40	20
9	79	31	74	27	392	134	30	19.9	186	50	24	18.9
10	70	32	76	26	604	78	29	20	123	277	24	19.9
11	185	34	213	25	326	65	27	96	71	101	21	47
12	82	[a]58	59	24	87	85	26	89	54	153	19.4	32
13	59		44	23	83	71	25	50	50	[a]74	19.9	24
14	73		39	24	76	64	26	59	48		24	22
15	67	36	48	24	67	49	82	235	43	55	30	18.9
16	129		37	24	64	105	104	340	35		21	19.4
17	428		44	30	127	51	100	209	32	[a]36	19.4	17.8
18	106		41	28	154	39	56	84	30	42	18.4	17.3
19	63		42	29	64	34	40	145	27	214	17.8	17.8
20	48	340	107	24	46	31	34	73	29	53	17.3	17.8
21	42		44	25	102	29	75	53	127	39	16.8	17.3
22	59		34	31	150	27	68	136	43	32	17.8	16.2
23	131	80	30	26	54	26	80	55	39	30	19.9	15.3
24	50		28	23	40	36	42	40	55	27	16.8	16.2
25	66		27	22	34	302	34	36	87	26	16.2	19.4
26	69	32	27	21	31	62	30	65	37	24	18.4	19.9
27	384		26	22	29	40	44	47	30	22	32	16.8
28	266		36	21	54	38	51	53	32	22	37	15.7
29	73	[a]28	33	31	32	89	30	-------	37	21	90	15.3
30	53	27	35	23	30	38	27	-------	28	21	115	15.3
31	65	27	-------	24	-------	32	25	-------	27	-------	46	-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	428	35	114	176	3,530	10,800
August	-------	-------	90.9	141	2,820	8,650
September	305	26	64.3	99.5	1,930	5,920
October	151	21	31.0	48.0	961	2,950
November	1,750	24	221	342	6,640	20,300
December	302	26	63.2	97.8	1,960	6,010
January	181	25	51.5	79.7	1,600	4,900
February	340	19.9	74.4	115	2,080	6,390
March	376	27	80.2	124	2,490	7,630
April	277	21	53.9	83.4	1,620	4,960
May	115	16.2	29.8	46.1	925	2,840
June	66	15.3	23.9	37.0	717	2,200
The year	1,750	15.3	74.7	116	27,300	83,600

[a] Partly estimated.

MISCELLANEOUS MEASUREMENTS

Measurements of streams and ditches on the island of Kauai at other than regular gaging stations are listed below:

Miscellaneous discharge measurements on Kauai, 1928-29

Date	Stream	Tributary to or diverting from	Locality	Discharge	
				Second-feet	Million gallons a day
July 19	Lumahai River	Pacific Ocean	Elevation 900 feet, near Hanalei.	51.9	33.5
19	do	do	Elevation 1,200 feet, near Hanalei.	18.8	12.2
Aug. 29	do	do	do	9.52	6.15
Apr. 19	Hanapepe ditch	Hanapepe River	Hawaiian Sugar Co.'s weir near Eleele.	45.2	29.2
May 13	do	do	do	31.2	20.2
June 8	do	do	do	39.1	25.3
May 13	do	do	Below last siphon near Eleele.	31.1	20.1
June 8	do	do	do	34.6	22.4
May 13	do	do	Above last siphon near Eleele.	29.9	19.3
17	Hanapepe diversion ditch B.	do	Near Eleele	3.13	2.02
23	do	do	do	1.84	1.19
June 1	do	do	do	5.60	3.62
8	do	do	do	.221	.143
May 17	Hanapepe diversion ditch C.	do	do	.400	.259
June 1	do	do	do	2.60	1.68
May 17	Hanapepe diversion ditch G.	do	Near Eleele (above taro patches).	1.78	1.15
23	do	do	do	.980	.633
24	do	do	do	.990	.640
30	do	do	do	2.60	1.68
31	do	do	do	1.46	.944
June 4	do	do	do	1.14	.737
6	do	do	do	1.12	.724
7	do	do	do	.937	.606
18	do	do	do	.462	.299
24	do	do	do	.265	.171
30	do	do	do	.900	.582
May 17	Hanapepe diversion ditch H.	do	Near Eleele	.750	.485
23	do	do	do	.212	.137
30	do	do	do	2.92	1.89
31	do	do	do	.980	.633
June 4	do	do	do	.140	.090
6	do	do	do	1.04	.672
24	do	do	do	.352	.228
May 17	Hanapepe diversion ditch I.	do	do	3.39	2.19
23	do	do	do	1.77	1.14
30	do	do	do	2.79	1.80
31	do	do	do	2.77	1.79
June 4	do	do	do	2.49	1.61
6	do	do	do	1.99	1.29
24	do	do	do	1.05	.679
May 17	Hanapepe diversion ditch J.	do	do	18.2	11.8
23	do	do	do	5.17	3.34
30	do	do	do	33.2	21.5
31	do	do	do	21.8	14.1
June 4	do	do	do	18.3	11.8
6	do	do	do	16.1	10.4
24	do	do	do	9.22	5.96
Apr. 19	Hanapepe diversion ditch L.	do	do	4.58	2.96
May 17	do	do	do	2.52	1.63
23	do	do	do	1.03	.666
30	do	do	do	5.88	3.80
31	do	do	do	2.65	1.71
June 4	do	do	do	1.89	1.22
6	do	do	do	1.76	1.14
24	do	do	do	.800	.517
Apr. 19	Hanapepe diversion ditch M.	do	do	11.6	7.50
May 17	do	do	do	6.25	4.04

Miscellaneous discharge measurements on Kauai, 1928–29—Continued

Date	Stream	Tributary to or diverting from	Locality	Discharge	
				Second-feet	Million gallons a day
May 23	Hanapepe diversion ditch M.	Hanapepe River	Near Eleele	3.72	2.40
30	do	do	do	12.9	8.34
31	do	do	do	7.49	4.84
June 4	do	do	do	6.40	4.14
5	do	do	do	2.52	1.63
6	do	do	do	5.94	3.84
24	do	do	do	3.82	2.47
May 17	Hanapepe diversion ditch N.	do	do	10.6	6.85
23	do	do	do	.770	.498
30	do	do	do	18.7	12.1
31	do	do	do	12.4	8.01
June 4	do	do	do	11.3	7.30
5	do	do	do	11.5	7.43
6	do	do	do	9.85	6.37
May 11	Hanapepe ditch	do	Hanapepe Falls, near Eleele	12.7	8.21
11	Hiloa ditch	Hiloa stream	do	25.7	16.6
11	Hanapepe ditch	Hanapepe River	Below junction of Hanapepe and Hiloa ditches at Hanapepe Falls, near Eleele.	37.1	24.0
11	do	do	½ mile below Hanapepe Falls, near Eleele.	39.7	25.7
11	do	do	1 mile below Hanapepe Falls, near Eleele.	39.6	25.6
11	Side flume No. 1	do	Hanapepe Falls, near Eleele	3.33	2.15
11	Side flume No. 2	do	do	.480	.310
11	Side flume No. 3	do	do	.148	.096
11	Hanapepe River	Pacific Ocean	½ mile below Hanapepe Falls, near Eleele.	3.85	2.49
11	Manuahi	Hanapepe River	Above confluence with Hanapepe River, near Eleele.	.409	.264
23	Hanapepe River	Pacific Ocean	Above Hanapepe diversion ditch B, at Koula near Eleele.	14.1	9.11
24	do	do	Above Hanapepe diversion ditch G, near Eleele.	16.5	10.7
June 6	do	do	Above Hanapepe diversion ditch H, near Eleele.	36.5	23.6
May 24	do	do	Above Hanapepe diversion ditch I, near Eleele.	15.4	9.95
June 6	do	do	do	32.9	21.3
24	do	do	do	15.4	9.95
May 23	do	do	Below Hanapepe diversion ditch J, near Eleele.	8.00	5.17
June 6	do	do	do	16.4	10.6
24	do	do	do	6.02	3.89
May 24	do	do	Above Hanapepe diversion ditch L, near Eleele.	10.1	6.53
June 5	do	do	do	21.6	14.0
6	do	do	do	27.2	17.6
6	do	do	Above Hanapepe diversion ditch M, near Eleele.	20.5	13.2
May 17	do	do	Below Hanapepe diversion ditch M, near Eleele.	12.4	8.01
June 5	do	do	do	13.5	8.73
6	do	do	do	18.8	12.2
May 31	do	do	Below Hanapepe diversion ditch N, near Eleele.	44.1	28.5
June 5	do	do	do	5.77	3.73
5	do	do	do	3.46	2.24
6	do	do	do	8.68	5.61
May 24	Hanapepe diversion ditch G.	Hanapepe River	Near Eleele (below taro patches).	.320	.207
31	do	do	do	.930	.601
June 7	do	do	do	.234	.164
18	do	do	do	.315	.204
24	do	do	do	.054	.035
30	do	do	do	.394	.255

ISLAND OF OAHU

RIGHT BRANCH OF NORTH FORK OF KAUKONAHUA STREAM NEAR WAHIAWA, OAHU

LOCATION.—Water-stage recorder 200 feet upstream from intake of Wahiawa Water Co.'s tunnel, which is just below confluence of right and left branches of North Fork of Kaukonahua Stream and 8 miles northeast of Wahiawa.

DRAINAGE AREA.—1.2 square miles.

RECORDS AVAILABLE.—May, 1913, to June, 1929.

EXTREMES.—Maximum discharge during year, 754 million gallons a day or 1,170 second-feet Oct. 1 (gage height, 7.47 feet); minimum, 0.4 million gallons a day or 0.6 second-foot Feb. 11, 12.

1913–1929: Maximum discharge, about 985 million gallons a day or 1,520 second-feet Mar. 26, 1920 (gage height, 9.0 feet, determined from floodmarks and comparison with record of left branch of North Fork of this stream); minimum, 0.09 million gallons a day or 0.15 second-foot Mar. 22, 1926.

REMARKS.—Records good for ordinary stages; poor for high stages and estimated periods. No diversions above station.

Discharge, in million gallons a day, 1928–29

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	34	7.3	3.1	62	1.2	1.6	6.3	0.6	2.7	3.4	10.2	2.5
2	5.5	8.9	11.0	53	.8	1.0	4.1	.6	1.9	5.0	11.9	19.2
3	3.4	20	21	7.1	.6	2.6	1.9	.6	6.1	4.4	2.9	7.0
4	7.0	5.1	15.8	4.9	82	1.1	1.6	.5	3.4	21	2.4	1.8
5	3.9	4.8	4.4	5.3	28	17.5	1.5	.6	10.0	7.3	5.6	1.5
6	2.9	20	3.4	2.8	13.7	1.6	1.4	.5	3.9	3.8	2.3	1.3
7	4.6	31	5.9	2.9	24	1.0	1.4	.6	1.9	2.6	1.9	1.2
8	5.0	8.4	19.7	2.4	22	1.0	1.3	.6	9.2	2.1	1.8	1.2
9	3.2	4.2	59	2.1		4.0	1.1	.6	16.7	1.8	1.5	1.2
10	18.9	3.8	23	4.3	14.7	5.7	1.0	.5	28	6.2	1.4	1.8
11	42	5.8	33	5.5	29	8.3	.9	.5	11.8	2.2	1.2	1.2
12	6.5	27	8.7	2.6	7.2	4.6	.8	.9	29	2.6	1.2	1.0
13	4.6	9.8	6.2	10.2	7.2	12.2	.8	.7	11.9	2.5	1.0	1.2
14	4.2	13.1	5.1	2.1	6.7	14.1	.8	38	5.3	1.9	1.0	1.2
15	3.5	5.2	4.9	4.3	6.6	8.7	2.6	24	3.8	2.4	1.0	2.0
16	3.3	15.3	4.1	1.5	4.9	83	3.4	5.7	2.9	1.9	.8	1.2
17	6.0	22	9.8	2.1	3.4	10.4	4.8	19.0	2.7	1.8	.8	1.0
18	9.9	38	11.5	1.7	5.8	4.9	1.3	4.5	7.8	50	1.6	1.6
19	4.0	9.2		21	2.8	3.0	.8	13.7	2.8	23	1.0	1.6
20	3.1	*8.8	9	2.3	2.6	2.6	.7	5.6	2.4	5.4	.8	1.0
21	4.4	7.5		1.6	2.3	2.1	1.0	2.6	2.1	3.6	.8	1.0
22	14.0	9.7		1.8	1.9	1.8	2.6	5.8	1.9	2.9	.8	1.0
23	10.3	4.7		1.2	1.9	1.6	.9	6.9	3.6	2.6	.7	1.2
24	3.5	8.8		1.0	1.7	1.4	.7	4.1	19.1	13.0	.7	1.0
25	3.6	4.7	3.5	1.0	1.5	2.6	.6	1.9	18.0	12.6	.7	1.4
26	4.0	4.2		.8	1.4	1.6	.6	1.8	27	3.4	1.0	1.0
27	26	3.7		.8	1.3	1.4	.6	5.2	4.8	2.8	1.2	.9
28	7.8	4.1	3.2	1.1	1.8	24	3.0	10.8	3.4	2.7	.9	.8
29	4.6	5.4	3.0	16.5	1.5	8.1	.7	-------	2.9	3.7	.7	.8
30	3.3	3.6	2.5	2.8	1.6	2.1	.6	-------	2.6	9.8	4.1	.8
31	3.1	3.2	-------	1.5	-------	2.9	.6	-------	10.3	-------	29	-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	42	2.9	8.39	13.0	260	798
August	38	3.2	10.6	16.4	327	1,010
September	59	2.5	10.2	15.8	306	939
October	62	.8	7.43	11.5	230	707
November	82	.6	10.1	15.6	302	930
December	83	1.0	7.69	11.9	238	732
January	6.3	.6	1.63	2.52	50.4	155
February	38	.5	5.62	8.70	157	483
March	29	1.9	8.38	13.0	260	797
April	50	1.8	6.95	10.8	208	640
May	29	.7	3.00	4.64	92.9	285
June	19.2	.8	2.05	3.17	61.6	189
The year	83	.5	6.84	10.6	2,490	7,660

* Partly estimated.

LEFT BRANCH OF NORTH FORK OF KAUKONAHUA STREAM NEAR WAHIAWA, OAHU

LOCATION.—Water-stage recorder 100 feet upstream from intake of Wahiawa Water Co.'s tunnel, which is just below confluence of the right and left branches of North Fork of Kaukonahua Stream, and 8 miles northeast of Wahiawa.

DRAINAGE AREA.—1.5 square miles.

RECORDS AVAILABLE.—May, 1913, to June, 1929.

EXTREMES.—Maximum discharge during year, 2,540 million gallons a day or 3,930 second-feet Oct. 1 (gage height, 8.78 feet); minimum, 0.5 million gallons a day or 0.8 second-foot June 30.

1913–1929: Maximum discharge, about 4,080 million gallons a day or 6,310 second-feet Jan. 14, 1923 (gage height, 10.3 feet); minimum, 0.1 million gallons a day or 0.16 second-foot Feb. 18, Mar. 5, 1920.

REMARKS.—Records fair for ordinary stages; poor for high stages and estimated periods. No diversions above station.

Discharge, in million gallons a day, 1928–29

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	36	22	6.2	[a]145	[a]3.6	3.0	8.0	1.2	3.8	4.1	7.3	2.4
2	8.5	25	23	[b]100	3.0	2.4	4.9	1.2	3.9	5.4	8.8	9.4
3	5.1	33	27		2.9	4.1	2.8	1.2	5.9	7.4	3.2	4.3
4	14.2	12.5	28	10	95	2.6	2.5	1.1	5.3	14.3	2.8	2.3
5	5.3	13.4	8.9		26	13.8	2.4	1.1	10.2	7.2	6.1	2.1
6	4.4	12.6	6.4		15.6	3.0	2.4	1.1	5.8	4.8	3.0	1.8
7	6.6	15.2	11.6		25	2.3	2.2	1.1	3.0	4.9	2.7	1.7
8	10.7	6.9	16.1		9.7	2.2	2.2	1.0	11.1	3.4	2.5	4.1
9	6.4	6.2	69		43	5.9	1.9	1.0	25	2.6	2.2	2.1
10	35	6.2	43	5.5	17.0	12.0	1.9	1.0	24	9.3	2.1	2.9
11	56	13.0	41		36	16.7	1.9	.9	13.5	3.2	2.0	1.6
12	14.3	24	12.0		10.3	10.4	1.8	1.2	41	4.7	1.9	2.9
13	9.2	22	9.5		11.1	13.2	1.7	1.1	11.0	5.6	1.8	3.2
14	8.6	24	8.6	11	11.6	26	1.8	13.4	6.6	2.8	1.8	7.1
15	6.9	8.9	8.9		13.2	16.1	2.5	10.9	5.6	5.5	1.9	5.3
16	6.6	17.3	6.6		8.2	59	10.0	7.4	4.4	2.8	1.7	1.9
17	13.7	54	17.4	3.2	6.4	12.1	8.8	19.1	4.1	2.4	1.5	1.7
18	17,0	63	17.4		11.9	7.4	3.2	4.6	7.1	35	1.8	2.4
19	8.6	14.7	19.2	[b]30	5.8	5.8	2.0	12.3	4.1	15.6	1.8	1.8
20	8.6	11.5	11.9		5.2	5.0	2.0	5.9	3.2	5.2	1.6	1.4
21	16.1	17.1	11.9		4.4	4.4	2.4	2.9	2.9	4.0	1.6	1.3
22	30	25	6.4		4.1	4.0	3.1	5.9	2.9	3.0	1.8	1.3
23	31	9.2	5.6		3.8	3.4	1.9	5.0	2.9	2.9	1.8	1.4
24	9.2	13.1	7.5	2.9	3.6	3.2	1.6	6.0	7.6	7.7	1.9	1.3
25	11.6	8.6	8.9		3.4	5.6	1.5	2.8	20	5.0	1.7	1.7
26	8.9	7.6	4.8		3.0	3.4	1.4	2.6	24	2.8	4.6	1.3
27	36	7.4	4.4		2.9	2.9	1.7	5.2	5.4	2.6	3.4	1.2
28	11.8	7.9	8.2		3.4	10.7	4.6	10.8	4.2	3.0	1.8	1.0
29	9.2	7.6	5.4	[b]25	2.9	9.3	1.6	-------	4.0	2.7	1.3	1.0
30	6.9	6.0	4.2	5	3.2	3.2	1.3	-------	3.2	13.2	5.3	.9
31	6.4	5.6	-------		-------	3.8	1.2	-------	5.3	-------	9.7	-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	56	4.4	14.8	22.9	459	1,410
August	63	5.6	16.8	26.0	520	1,600
September	69	4.2	15.3	23.7	459	1,410
October	145	----------	14.4	22.3	447	1,370
November	95	2.9	13.2	20.4	395	1,220
December	59	2.2	8.93	13.8	277	850
January	10.0	1.2	2.88	4.46	89.2	274
February	19.1	.9	4.61	7.13	129	396
March	41	2.9	9.06	14.0	281	862
April	35	2.4	6.44	9.96	193	593
May	9.7	1.3	3.02	4.67	93.5	287
June	9.4	.9	2.49	3.85	74.8	229
The year	145	.9	9.36	14.5	3,420	10,500

[a] Partly estimated. [b] Estimated.

MOANALUA STREAM NEAR HONOLULU, OAHU

LOCATION.—Water-stage recorder 4¼ miles from mouth of stream and 5¼ miles north of Honolulu post office.

DRAINAGE AREA.—3.2 square miles.

RECORDS AVAILABLE.—June, 1926, to June, 1929.

EXTREMES.—Maximum discharge during year, 157 million gallons a day, or 243 second-feet July 27 (gage height, 3.17 feet); no flow for several periods during year.

1926–1929: Maximum discharge, 1,120 million gallons a day or 1,730 second-feet Mar. 16, Nov. 19, 1927 (gage height, 8.48 feet); no flow for several periods.

REMARKS.—Records poor. Water for domestic use diverted from stream 1 mile above station by 2-inch pipe.

Discharge, in million gallons a day, 1928–29

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	0.8	0.03		0	0	0	0	0	0.2	0.01	0	0
2	.55	.03		.09	0	0	0	0	.1	0	0	0
3	.3	1.7		0	0	0	0	0	.06	0	[a]0	0
4	.09	.5		0	1.9	0	0	0	.03	0		0
5	.03	.06	0	0	.3	.35	0	0	.03	0		0
6	.02	.03		0	.25	.1	0	0	.03	0		0
7	.02	.5		0	.25	.03	0	0	.05	0		0
8	.01	.04		0	.2	.02	0	0	.03	0		0
9	.01	.03		0	.2	.1	0	0	[a].02	0		0
10	9.2	.04		0	.25	.8	0	0	.01	0		0
11	7.1	.06	.01	0	.35	.75	0	0		0	0	0
12	1.8	.5		0	.25	.9	0	0		0		0
13	1.1	1.1		0	.2	.75	0	0	.0	0		0
14	.9	.03	0	0	.2	.55	0	2.0		0		0
15	.25	.03	0	0	.2	.45	0	.6		0		0
16	.07	.02	0	0	.2	.6	0	.4	.11	0		0
17	3.6	.02	0	0	.2	.5	0	.5		0		0
18	1.1	2.5	0	0	.2	.4	.03	.35		3.0		0
19	.7	.8	0	9	.2	[a].35	.03	.3		.85		0
20	.1	1.0	0	0	.15	[b].3	2.3	.3	.00	.3	[a]0	0
21	.07	.6	0	0	.06	[b].25	.4	.25		.07	0	0
22	.06	.4	0	0	.03	[b].2	.3	.35		.01	0	0
23	.05	.09	0	0	.02	[b].2	.2	.35		0	0	0
24	.04	.04	0	0	.02	[b].15	.1	.3		0	0	0
25	.02	.03	0	0	.01	[b].09	.03	.25	.06	0	0	0
26	.01	.03	0	0	.01	[b].06	.02	.25		0	0	0
27	22	.02	0	0	.01	[a].03	.01	.1		0	1.3	0
28	5.6	.02	0	0	.01	.02	.01	.15	[a].03	0	.06	0
29	1.6		0	0	.01	.01	.02	-------	.02	0	0	0
30	.75	.01	0	0	.01	.01	.02	-------	.01	0	0	0
31	.06		-------	0	-------	.01	.02	-------	.01	-------	0	-----

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	22	0.01	1.87	2.89	58.0	178
August	2.5	.01	.332	.514	10.3	32
September	.01	0	.002	.003	.05	0
October	.09	0	.003	.005	.09	0
November	1.9	0	.190	.294	5.69	17
December	.9	0	.257	.398	7.98	24
January	2.3	0	.113	.175	3.49	11
February	2.0	0	.230	.356	6.45	20
March	.2	0	.035	.054	1.09	3
April	3.0	0	.141	.218	4.24	13
May	1.3	0	.044	.068	1.36	4
June	.00	0	.000	.000	.00	0
The year	22	.00	.270	.418	98.7	302

[a] Partly estimated. [b] Interpolated.

KALIHI STREAM NEAR HONOLULU, OAHU

LOCATION.—Water-stage recorder at Kioi Pool, three-eighths mile upstream from Catholic orphanage and 5 miles north of Honolulu post office.
DRAINAGE AREA.—2.7 square miles.
RECORDS AVAILABLE.—September, 1913, to June, 1929.
EXTREMES.—Maximum discharge during year, 570 million gallons a day or 882 second-feet Nov. 4 (gage height, 8.60 feet); minimum uncertain, owing to missing record.

1913-1929: Maximum discharge estimated, 1,250 million gallons a day or 1,930 second-feet Jan. 16, 1921 (gage height, 14.0 feet; determined from floodmarks); minimum, 0.1 million gallons a day or 0.15 second-foot Apr. 5, 1924, May 12–25, 1926.

REMARKS.—Records good. Water for domestic use diverted from stream above station.

Discharge, in million gallons a day, 1928–29

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	6.0	3.0		2.0	1.1	1.9	2.1	1.4		1.8		1.0
2	3.7	3.1		2.5	1.0	1.9	2.1	1.4		1.8		1.8
3	2.4	6.0		1.6	1.0	1.9	1.8		3.0	7.1		1.2
4	2.3	4.0		1.7	31	1.7	1.7			7.4		1.0
5	2.0	3.0	2.2	1.8	8.4	10.2	1.7		[b]6	3.0		1.0
6	1.8	2.8		1.6	5.2	2.5	1.8			2.3		1.0
7	2.1	8.7		1.5	10.3	1.9	1.6			2.3		.8
8	2.0	3.4		1.5	5.3	1.8	1.6	1.2	3.0	1.9		.9
9	1.9	2.7		1.5	7.0	4.4	1.5			3.2		.9
10	27	2.7	6	1.4	5.9	4.8	1.4			2.3	1.2	1.0
11	9.0	2.5		1.5	12.9	5.4	1.4			1.9		1.0
12	4.6	5.4		1.5	5.6	8.4	1.4			1.8		1.0
13	3.2	3.8		1.5	4.9	9.5	1.3		4.8	1.7		1.0
14	3.0	3.7	3.0	1.8	5.8	7.0	1.4			1.8		1.0
15	2.6	3.0		1.3	7.0	4.5	1.6		[b]19	1.7		.9
16	2.3	2.7		1.2	5.8	7.8	1.7			1.7		.9
17	2.8	2.8	1.6	1.2	4.5	5.1	2.6	8		40		1.0
18	2.3	14.3		1.3	8.0	3.8	1.8			8.9		1.0
19	2.1	4.9		1.2	4.8	3.2	1.5			4.3		1.0
20	1.9	5.3	2.8	1.2	3.8	3.0	40		4.2	3.1	[a]1.0	1.0
21	1.8	4.0		1.2	3.2	2.6	9.4				1.0	.9
22	2.0	3.4	1.6	1.2	3.0	2.5	3.8				1.0	.9
23	2.5	3.0	1.5	1.2	2.8	2.2	2.6			2.3	1.0	.8
24	1.8	3.6	1.5	1.1	2.6	2.1	2.0				1.0	.9
25	1.7	3.0	2.1	1.1	2.3	2.3	1.9	3.6	7		.9	.9
26	1.9	2.8	1.5	1.0	2.2	2.0	1.8				1.0	.8
27	29	2.6	1.4	1.0	2.1	1.8	1.8		[b]2.1		1.2	.7
28	7.8	2.5	1.4	1.1	2.3	1.8	1.8		[a]2.1	1.8	1.0	.6
29	3.8	2.3	1.4	1.4	2.1	1.8	1.6	-------	1.9		.9	.5
30	2.8	2.2	1.8	1.3	1.9	1.8	1.6	-------	2.1		1.6	.5
31	2.5	[b]2.3	-------	1.1	-------	1.8	1.5	-------	1.8	-------	1.9	------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	29	1.7	4.60	7.12	143	438
August	14.3	2.2	3.85	5.96	120	366
September	-------	1.4	2.54	3.93	76.2	234
October	2.5	1.0	1.40	2.17	43.5	133
November	31	1.0	5.46	8.45	164	503
December	10.2	1.7	3.66	5.66	113	348
January	40	1.3	3.28	5.07	102	312
February	-------	--	3.60	5.57	101	309
March	-------	1.8	4.38	6.78	136	417
April	40	-------	4.02	6.22	120	370
May	-------	.9	1.17	1.81	36.3	111
June	1.8	.5	.93	1.44	27.9	86
The year	40	.5	3.24	5.01	1,180	3,630

[a] Partly estimated. [b] Estimated

NUUANU STREAM BELOW RESERVOIR NO. 2 WASTEWAY, NEAR HONOLULU, OAHU

LOCATION.—Water-stage recorder on Pali road in upper Nuuanu Valley, 1 mile above end of car line and 5 miles from Honolulu post office.

DRAINAGE AREA.—3.4 square miles.

RECORDS AVAILABLE.—October, 1913, to June, 1929.

EXTREMES.—Maximum discharge during year, 202 million gallons a day or 313 second-feet Nov. 4 (gage height, 4.02 feet); minimum, 0.85 million gallons a day or 1.3 second-feet June 29, 30.

1913–1929: Maximum discharge, 1,600 million gallons a day or 2,480 second-feet Jan. 16, 1921 (gage height, 8.74 feet; from floodmarks); minimum, 0.06 million gallons a day or 0.09 second-foot Sept. 10, 11, 1925.

REMARKS.—Records fair for ordinary stages; poor for high stages and estimated periods. Reservoirs Nos. 2, 3, and 4 regulate flow, but diversion from them past station was discontinued in January. Honolulu waterworks diverts ground water from tunnels in drainage area.

Discharge, in million gallons a day, 1928–29

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	7.6	2.5	2.6	1.5	1.2	2.3	2.4	2.0	2.7	1.3	1.8	1.5
2	5.8	2.8	2.6	1.6	1.1	2.3	2.4	2.0	2.8	1.3	1.8	2.2
3	3.2	4.6	2.4	1.5	1.1	2.3	2.2	2.0	2.8	1.5	1.6	1.6
4	3.1	3.2	2.6	1.5	*31	2.2	2.2	1.8	3.1	2.2	1.7	1.5
5	2.8	2.9	2.0	1.5	5.3	9.9	2.1	1.8	5.4	1.5	1.5	1.5
6	2.4	3.1	2.2	1.5	4.6	3.3	2.0	1.7	2.8	1.4	1.5	1.5
7	2.1	7.7	2.4	1.4	*5.1	3.1	2.0	1.7	2.8	1.5	1.5	1.5
8	2.2	3.9	2.6	1.4		3.2	1.9	1.7	2.8	1.4	1.5	1.5
9	2.0	3.6	3.2	1.3		3.7	1.7	1.5	3.2	1.5	1.5	1.3
10	13.0	3.6	6.2	1.4		3.6	1.7	1.5	2.9	1.3	1.4	1.4
11	3.8	3.3	9.4	1.5	4.1	3.8	1.6	1.8	8.2	1.4	1.4	1.3
12	2.0	5.2	3.2	1.4		4.5	1.5	1.7	4.3	1.3	1.4	1.3
13	1.9	3.9	3.0	1.4		5.7	1.4	1.4	4.5	1.4	1.4	1.3
14	1.8	3.6	4.2	1.5		5.7	1.5	6.0	7.3	1.4	1.3	1.3
15	1.5	3.4	4.0	1.4		4.7	1.6	9.5	5.7	1.3	*1.3	1.3
16	1.7	3.3	1.5	1.4	2.6	20	1.8	7.9	4.6	1.3		1.3
17	3.1	3.6	1.9	1.4	2.2	6.9	2.0	9.4	3.9	13.5	1.3	1.3
18	2.6	12.6	2.8	1.4	4.7	4.9	2.0	3.4	3.6	2.8		1.3
19	2.5	4.7	4.9	1.3	2.9	3.9	1.7	10.3	2.9	1.9		1.2
20	2.4	4.9	2.8	1.2	2.8	3.3	23	5.2	2.7	1.8	*1.3	1.2
21	2.4	4.2	3.4	1.2	2.7	2.9	18.0	3.6	2.5	1.8	1.3	1.2
22	2.6	3.9	2.8	1.2	2.7	3.0	15.2	3.3	2.3	1.8	1.2	1.2
23	3.0	3.6	2.8	1.2	2.6	3.0	12.6	3.7	3.7	1.9	1.3	1.1
24	2.4	3.7	2.6	1.1	2.5	3.0	10.5	2.9	5.7	1.8	1.3	1.1
25	2.4	3.3	2.6	1.1	2.4	3.0	7.6	2.6	6.1	1.7	1.2	1.1
26	2.4	3.1	2.5	1.1	2.4	2.8	3.5	2.6	4.4	1.7	1.3	1.1
27	31	2.8	2.0	1.1	2.4	2.8	3.0	5.0	1.3	1.7	1.7	1.0
28	16.0	2.6	1.6	1.1	2.6	3.2	3.0	3.1	1.3	1.8	1.4	1.0
29	3.8	2.4	1.6	1.4	2.6	2.9	2.4	-------	1.2	1.9	1.4	.9
30	2.8	2.4	1.6	1.4	2.4	2.4	2.3	-------	1.4	1.8	1.5	.9
31	2.2	2.5	-------	1.3	-------	2.3	2.2	-------	1.3	-------	2.5	-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	31	1.5	4.47	6.92	138	425
August	12.6	2.4	3.90	6.03	121	371
September	9.4	1.5	3.00	4.64	90.0	276
October	1.6	1.1	1.35	2.09	41.7	128
November	31	----------	4.09	6.33	123	377
December	20	2.2	4.21	6.51	131	401
January	23	1.4	4.48	6.93	139	426
February	10.3	1.4	3.61	5.59	101	310
March	8.2	1.2	3.55	5.49	110	338
April	13.5	1.3	2.03	3.14	60.9	187
May	2.5	1.2	1.46	2.26	45.2	139
June	2.2	.9	1.30	2.01	38.9	120
The year	31	.9	3.12	4.83	1,140	3,500

*Partly estimated.

WEST BRANCH OF MANOA STREAM NEAR HONOLULU, OAHU

LOCATION.—Water-stage recorder 75 feet above lower highway bridge and 4 miles northeast of Honolulu post office.

DRAINAGE AREA.—1.1 square miles.

RECORDS AVAILABLE.—May, 1913, to January, 1921; August, 1925, to June, 1929.

EXTREMES.—Maximum discharge during year, 550 million gallons a day or 851 second-feet Jan. 20 (gage height, 3.45 feet); minimum, 0.15 million gallons a day or 0.25 second-foot Nov. 2.

1913-1921, 1926-1929: Maximum stage, 10.4 feet Jan. 16, 1921, from floodmarks (discharge (estimated), 2,100 million gallons a day or 3,250 second-feet); minimum, about 0.05 million gallons a day or 0.08 second-foot Mar. 16, 22, 1926.

REMARKS.—Records fair for low stages; good for medium stages; poor for high stages and estimated period. Gage datum raised 3.40 feet Mar. 16, 1928. No diversions above station.

Discharge, in million gallons a day, 1928–29

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	4.9	1.5	1.6	0.7	0.3	*0.6	1.5	0.6	1.6	1.1	0.9	0.8
2	3.1	2.2	1.5	.8	.25	.6	1.1	.6	2.6	1.0	1.0	1.1
3	2.0	4.9	1.6	.7	.25	1.1	.9	.5	1.8	.9	.9	.8
4	1.6	2.4	2.4	.8	33	.9	.7	.5	2.0	2.5	.6	.8
5	1.3	2.2	1.3	1.0	5.6	5.7	.7	.4	3.2	5.5	2.4	.7
6	1.2	2.0	1.3	.6	4.9	1.0	.8	.55	2.4	1.5	.7	.55
7	4.1	2.8	1.5	.55	7.8	.8	.7	.4	1.8	1.2	.6	.6
8	4.0	1.6	1.8	.55	6.7	.8	.6	.4	*2.6	1.2	.55	.9
9	1.2	1.5	2.0	.6	5.3	3.8	.55	.4	1.8	1.0	.5	.55
10	33	5.5	13.5	.6	3.3	2.8	.55	.25	2.8	1.1	.6	.6
11	10.0	2.2	15.0	.5	9.4	2.4	.5	.5	2.5	.9	.55	.6
12	3.4	5.3	1.8	.5	2.4	3.9	.7	.7	20	.8	.5	.55
13	2.4	3.1	1.3	.55	3.1	2.6	.6	.4	4.9	.7	.4	.8
14	2.4	3.4	1.1	.5	3.7	4.1	.6	3.0	5.7	.55	.5	.6
15	1.6	2.4	1.0	.7	4.0	2.8	.6	3.9	*3.1	.7	.5	.55
16	2.0	2.0	1.0	.6	2.4	36	1.3	6.3		.55	.5	.7
17	4.4	10.1	1.2	.55	2.2	8.1	2.0	15.2		.55	.5	.3
18	2.0	16.2	3.1	.7	10.4	3.4	1.4	3.4		27	.5	.9
19	1.6	3.1	4.3	.8	2.6	2.4	1.1	7.3	1.6	4.4	.55	.55
20	1.6	4.9	1.6	*.7	2.0	1.6	34	5.6		1.6	.55	.5
21	1.6	3.1	1.7	.6	1.6	1.6	5.8	2.6		1.2	.5	.5
22	2.5	3.4	1.0	.7	1.3	1.6	2.4	2.6	*1.0	1.1	.5	.55
23	2.2	2.2	.8	.6	1.3	1.5	1.5	3.4	1.1	.9	.6	.5
24	1.5	4.6	.9	.5	1.2	1.3	1.5	2.2	2.0	1.1	.6	.8
25	1.3	2.4	1.6	.4	1.3	1.1	1.2	1.8	2.4	1.1	.6	.55
26	1.6	2.0	.9	.4	1.1	1.1	1.1	1.5	2.2	1.0	.9	.55
27	18.0	1.8	.8	.4	.9	1.0	1.0	2.5	1.3	.9	4.2	.5
28	4.0	1.5	.7	.7	.9	1.0	.9	2.8	1.2	,8	1.0	.4
29	2.0	1.5	.6	.5	.8	1.0	.8	-------	1.0	.7	.8	.4
30	1.6	1.3	.8	.55	.8	1.0	.7	-------	.9	2.1	.8	.35
31	1.3	1.2	-------	.4	-------	.9	.55	-------	1.4	-------	1.4	-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	33	1.2	4.05	6.27	125	385
August	16.2	1.2	3.36	5.20	104	320
September	15.0	.6	2.32	3.59	69.7	214
October	1.0	.4	.605	.936	18.8	58
November	33	.25	4.02	6.22	121	370
December	36	.6	3.18	4.92	98.7	303
January	34	.5	2.20	3.40	68.4	209
February	15.2	.25	2.51	3.88	70.3	216
March	20	.9	2.67	4.13	82.9	254
April	27	.55	2.19	3.39	65.6	202
May	4.2	.4	.829	1.28	25.7	79
June	1.1	.3	.618	.956	18.6	57
The year	36	.25	2.38	3.68	869	2,670

* Partly estimated.

EAST BRANCH OF MANOA STREAM NEAR HONOLULU, OAHU

LOCATION.—Water-stage recorder just below highway bridge, 400 feet upstream from confluence with West Branch of Manoa Stream, and 4 miles northeast of Honolulu post office.

DRAINAGE AREA.—1.0 square mile.

RECORDS AVAILABLE.—May, 1913, to January, 1921; August, 1925, to June, 1929.

EXTREMES.—Maximum discharge during year, 129 million gallons a day or 200 second-feet Nov. 4 (gage height, 2.40 feet); minimum, 0.75 million gallons a day or 1.16 second-feet May 20–22.

1913–1921 1926–1929: Maximum gage height (determined from flood-marks), 10.4 feet Jan. 16, 1921 (discharge (estimated), 2,000 million gallons a day or 3,090 second-feet); minimum, 0.4 million gallons a day or 0.6 second-foot June 7, 8, 1926.

REMARKS.—Records fair for ordinary stages; good for medium stages; poor for high stages and estimated periods. Water is diverted from stream above station by East Manoa ditch and from tunnels in drainage area by Honolulu water works. Gage datum raised 3.40 feet Mar. 19, 1928.

Discharge, in million gallons a day, 1928–29

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	5.8	2.0	2.2	2.0	1.5	a1.8	2.8	1.1	a2.0	1.4	1.4	1.1
2	4.8	3.1	2.0	2.0	1.5	1.8	2.5	1.1	2.8	1.4	1.5	1.2
3	3.7	4.1	2.2	1.8	1.5	2.8	1.8	1.1	a2.0	1,4	1.4	1.0
4	3.4	2.5	2.5	a2.0	12.6	1.8	1.8	1.1		3.6	1.4	1.1
5	3.1	2.0	2.0	a2.0	6.6	6.6	1.6	1.1		5.7	1.8	1.1
6	2.8	2.0	2.0		5.1	2.0	1.6	1.1	2.8	2.5	1.6	.9
7	4.1	3.7	2.2		7.0	1.8	1.6	1.0		2.0	1.5	1.0
8	4.4	2.0	2.2		6.5	2.0	1.6	1.0		2.2	1.5	1.4
9	3.1	1.8	2.0	2.0	5.8	4.4	1.6	1.0	2.8	2.0	1.5	1.1
10	11.5	4.1	6.0		4.1	3.7	1.6	1.0	4.1	2.0	1.5	1.4
11	7.0	2.5	4.1		6.6	3.1	1.6	1.1	3.4	2.0	1.5	1.1
12	3.7	4.8	2.5	a2.0	3.1	3.7	1.6	1.2	9.2	1.8	1.4	1.1
13	3.4	3.4	2.2	2.0	4.8	3.1	1.6	1.1	4.8	1.8	1.4	1.0
14	3.7	4.1	2.0	2.0	4.8	3.4	1.5	2.8	4.9	1.6	1.5	1.0
15	3.1	3.1	2.0	2.0	4.4	3.7	2.0	2.4	4.1	1.8	1.2	1.1
16	3.7	3.1	2.2	2.0	3.4	14.7	2.5	4.1	3.4	1.8	.9	1.1
17	5.1	6.3	2.5	2.0	3.4	5.5	3.4	6.6	2.8	1.8	.9	1.1
18	3.7	9.8	2.8	2.0	7.0	3.4	2.5	2.0	2.5	14.8	.8	1.1
19	3.1	4.1	3.4	2.0	3.7	3.1	2.0	7.0	2.5	4.4	1.0	1.1
20	2.8	6.1	2.2	a1.8	3.7	2.8	12.8	3.1	2.2	2.5	.8	.9
21	2.8	3.4	2.0	1.8	3.1	2.2	5.1	2.0	2.0	2.0	.8	1.0
22	3.4	3.4	1.9	1.8	2.5	2.2	2.8	a5.1	1.5	1.6	.8	.9
23	3.4	2.8	1.5	1.8	2.2	2.2	2.0		1.4	1.5	.9	.9
24	2.2	5.1	1.5	1.8	2.0	2.2	2.0		1.8	1.5	.9	1.1
25	2.0	2.5	4.0	1.6	2.0	2.2	1.8		2.5	1.5	.8	1.0
26	2.0	3.1	1.6	1.6	1.8	2.5	1.8	2.8	2.0	1.5	1.1	1.0
27	9.1	2.5	1.6	1.6	1.8	2.5	1.8		1.5	1.4	1.8	.9
28	4.4	2.2	1.8	1.5	1.8	2.5	1.8		1.5	1.5	1.2	.8
29	2.5	2.5	1.8	1.5	1.8	2.2	1.8	-------	1.1	1.5	1.1	.8
30	2.0	2.5	2.5	1.5	a1.8	2.0	1.6	-------	1.2	1.6	1.2	.8
31	2.0	2.5	-------	1.5	-------	2.2	1.5	-------	1.5	-------	1.4	-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	11.5	2.0	3.93	6.08	122	374
August	9.8	1.8	3.45	5.34	107	328
September	6.0	1.5	2.38	3.68	71.4	219
October	2.0	1.5	1.86	2.88	57.6	177
November	12.6	1.5	3.93	6.08	118	362
December	14.7	1.8	3.23	5.00	100	307
January	12.8	1.5	2.39	3.70	74.0	227
February	7.0	1.0	2.35	3.64	65.9	202
March	9.2	1.1	2.76	4.27	85.5	363
April	14.8	1.4	2.47	3.82	74.1	227
May	1.8	.8	1.24	1.92	38.5	118
June	1.4	.8	1.04	1.61	31.1	96
The year	14.8	.8	2.59	4.01	495	2,900

a Partly estimated.

EAST MANOA DITCH NEAR HONOLULU, OAHU

LOCATION.—Water-stage recorder 150 feet east of lower highway and gaging station on East Branch of Manoa Stream and 4 miles northeast of Honolulu post office.

RECORDS AVAILABLE.—May, 1915, to December, 1916; January, 1918, to January, 1921; August, 1925, to June, 1929.

EXTREMES.—Maximum discharge during year, 6.4 million gallons a day or 9.9 second-feet Nov. 4 (gage height, 1.39 feet); minimum, 0.05 million gallons a day or 0.08 second-foot Aug. 19.

1915–1917, 1918–1921, 1926–1929: Maximum discharge, about 26 million gallons a day or 40 second-feet Jan. 16, 1921 (gage height, 2.27 feet); no flow Aug. 26, 1927.

REMARKS.—Records fair. Water diverted from East Manoa Stream about one-fourth mile above station by means of crude-stone dam.

Discharge, in million gallons a day, 1928–29

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	0.4	0.5	0.35	0.6	0.35	0.65	0.9	0.4	0.4	0.65	0.35	0.55
2	.35	.6	.35	.55	.3	.6	.9	.4	.5	.65	.35	.65
3	.35	.65	.35	.55	.3	.8	.8	.4	.5	.65	.35	.65
4	.35	.6	.35	.6	1.0	.6	.5	.4	.5	.75	.3	.6
5	.35	.55	.3	.6	.45	1.1	.3	.4	.55	.75	.35	.55
6	.3	.4	.35	.55	.3	.7	.3	.35	.45	.55	.3	.55
7	.35	.2	.4	.5	.65	.65	.35	.35	.35	.5	.3	.6
8	.35	.45	.45	.5	.9	.65	.45	.35	.55	.5	.25	.6
9	.3	.55	.45	.5	1.1	1.0	.4	.35	.45	.5	.25	.55
10	.4	.5	.5	.5	.85	.85	.4	.35	.5	.5	.3	.65
11	.35	.35	.45	.45	1.0	.75	.4	.35	.45	.5	.25	.55
12	.25	.5	.35	.45	.65	.85	.4	.4	.65	.45	.25	.55
13	.25	.45	.35	.45	.8	.8	.35	.35	.5	.45	.25	.55
14	.25	.4	.35	.35	.8	.6	.35	.55	.4	.45	.25	.55
15	.25	.35	.35	.35	.65	.65	.4	.65	.4	.45	.3	.55
16	.25	.3	.35	.45	.6	.8	.5	.8	.25	.45	.55	.6
17	.3	.45	.4	.35	.55	.7	.7	1.2	.25	.4	.6	.55
18	.3	.45	.45	.3	.7	.6	.5	.65	.35	.7	.55	.55
19	.25	.25	.45	.4	.45	.5	.45	1.2	.3	.55	.6	.5
20	.25	.65	.35	[a].4	.45	.7	.95	.95	.3	.45	.55	.5
21	.25	.6	.35	.4	.6	1.1	.6	.8	.45	.4	.5	.55
22	.4	.55	.45	.35	.65	1.05	.45	.95	.65	.4	.55	.5
23	.7	.5	.6	.35	.65	1.0	.4	.95	.65	.4	.55	.5
24	.6	.5	.6	.45	.65	1.0	.35	.8	.75	.4	.55	.55
25	.5	.45	.65	.45	.65	1.0	.35	.65	.9	.4	.55	.6
26	.5	.45	.6	.45	.65	.85	.35	.5	.85	.4	.65	.55
27	.6	.4	.6	.45	.65	.85	.35	.45	.7	.4	.9	.5
28	.1	.35	.55	.4	.65	.85	.35	.55	.65	.4	.65	.55
29	.35	.3	.55	.4	.65	.85	.35	-------	.65	.35	.55	.65
30	.5	.3	.6	.4	.65	.8	.3	-------	.65	.35	.6	.65
31	.5	.3	-------	.35	-------	.8	.4	-------	.7	-------	.65	-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	0.7	0.1	0.361	0.559	11.2	34
August	.65	.2	.447	.692	13.8	43
September	.65	.3	.442	.684	13.2	41
October	.6	.3	.447	.692	13.8	43
November	1.1	.3	.643	.995	19.3	59
December	1.1	.5	.797	1.23	24.7	76
January	.95	.3	.469	.725	14.6	45
February	1.2	.35	.589	.911	16.5	51
March	.9	.25	.523	.809	16.2	50
April	.75	.35	.492	.761	14.8	45
May	.9	.25	.450	.696	14.0	43
June	.65	.5	.567	.877	17.0	52
The year	1.2	.1	.518	.801	189	582

[a] Partly estimated.

PUKELE STREAM NEAR HONOLULU, OAHU

LOCATION.—Water-stage recorder 200 feet upstream from Palolo belt-road bridge, five-eighths mile above confluence of Pukele and Waiomao Streams, and 4¾ miles east of Honolulu post office.

DRAINAGE AREA.—1.2 square miles.

RECORDS AVAILABLE.—April, 1912, to September, 1913; June, 1926, to June, 1929.

EXTREMES.—Maximum discharge during year, 104 million gallons a day or 161 second-feet Jan. 20 (gage height, 3.18 feet; from floodmarks); minimum uncertain, owing to plugged intake.

1912–13, 1926–1929: Maximum discharge, 360 million gallons a day or 557 second-feet May 16, 1927 (gage height, 6.13 feet); minimum, 0.15 million gallons a day, or 0.25 second-foot June 3, 1926.

REMARKS.—Records fair for ordinary stages; poor for high stages and estimated periods. 2-inch pipe diverts water from stream above station.

Discharge, in million gallons a day, 1928–29

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	0.75	0.65	0.55	0.35	0.3	0.3	0.6	0.8	1.2	0.8	0.5	0.35
2	.75	.85	.45	.35	.25	.25	.6	.75	1.2	.45	.45	.35
3	.75	.85	.45	.35	.2	.25	.5	.7	1.1	[a].6	.45	.35
4	.75	.75	.4	.35	6.7	.2	.5	.65	1.05	.6	.5	.35
5	.8	.8	.35	.35	1.1		.5	.6	1.35	2.2	.5	.35
6	.8	.8	.35	.35	.4		.55	.55	1.3	.75	.45	.3
7	.85	.75	.35	.35	.95		.5	.5	1.15	.7	.45	.3
8	.75	.7	.4	.35	3.0		.5	.45	1.5	.75	.45	.3
9	.75	.6	.35	.35	1.3		.5	.4	1.25	.75	.5	.25
10	2.7	.65	1.8	.35	.95		.5	.35	1.8	.7	.5	.2
11	1.2	.75	1.6	.35	1.6		.5	.3	1.5	.7	.45	.2
12	.95	1.4	.5	.35	1.15		.5	[a].2	2.8	.65	.45	.15
13	.95	.85	.55	.35	1.1	1.8	.5	[a].3	1.8	.6	.45	[b].00
14	.95	.8	.55	.35	1.1		.5	.4	1.8	.6	.45	[b].1
15	.9	.8	.55	.35	1.15		.5	.4	2.6	.55	.45	[a].15
16	.9	.8	.55	.35	1.15		.5	.4	1.7	.5	.4	[b].15
17	1.05	.8	.55	.35	1.15		.5	4.2	1.7	.5	.4	[b].15
18	.95	3.3	.55	.3	1.15		.55	.9	1.7	1.4	.4	[b].15
19	.95	.95	.5	.3	1.15		.55	3.0	1.7	.65	.4	[b].15
20	.9	.95	.5	.3	1.1		11.7	1.8	1.7	.55	.35	.2
21	.85	.9	.5	.3	1.05		4.8	1.2	1.5	.55	.35	.2
22	.85	.9	.5	.3	.95	1.1	1.2	2.2	1.2	.55	.35	.2
23	.8	.8	.45	.3	.9	1.1	1.15	1.9	1.15	.55	.3	[b].2
24	.75	1.0	.5	.3	.8	1.05	1.15	1.8	[a]1.05	.55	.3	[b].25
25	.7	.85	.45	.3	.7	.95	1.15	1.35		.55	.3	[b].25
26	.7	.85	.45	.3	.6	.9	1.1	1.35		.5	[a].3	[b].25
27	.95	.8	.45	.3	.55	.85	1.1	1.3	.8	.5		[b].25
28	.75	.75	.4	.3	.45	.75	1.1	1.2		.5	.9	[b].25
29	.65	.7	.4	.3	.4	.7	1.0	-------		.5		[b].2
30	.65	.65	.35	.3	.35	.65	.95	-------		.5	[a].3	[b].2
31	.65	.6	-------	.3	-------	.6	.9	-------		-------	.35	-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	2.7	0.65	0.892	1.38	27.6	85
August	3.3	.6	.890	1.38	27.6	85
September	1.8	.35	.543	.840	16.3	50
October	.35	.3	.327	.506	10.2	31
November	6.7	.2	1.12	1.73	33.7	103
December	-------	.2	1.30	2.01	40.2	124
January	11.7	.5	1.20	1.86	37.2	114
February	4.2	.2	1.07	1.66	30.0	92
March	2.8	-------	1.37	2.12	42.4	130
April	2.2	.5	.687	1.06	20.6	63
May	-------	.3	.458	.709	14.2	44
June	.35	.09	.228	.353	6.84	21
The year	11.7	.09	.841	1.30	307	942

[a] Partly estimated. [b] Estimated.

WAIOMAO STREAM ABOVE PUKELE STREAM, NEAR HONOLULU, OAHU

LOCATION.—Water-stage recorder 300 feet west of road, 1 mile upstream from confluence of Waiomao and Pukele Streams, and 5 miles east of Honolulu post office.

DRAINAGE AREA.—1.0 square mile.

RECORDS AVAILABLE.—April, 1911, to December, 1912; June, 1926, to June, 1929.

EXTREMES.—Maximum discharge during year, 33 million gallons a day or 51 second-feet Jan. 20 (gage height, 1.58 feet); minimum, 0.02 million gallons a day or 0.03 second-feet Nov. 3, 4.

1911–12, 1926–1929: Maximum discharge at least 440 million gallons a day or 681 second-feet May 16, 1927 (gage height, at least 5.52 feet; from floodmarks); no flow July 27, to Aug. 5, 1926.

REMARKS.—Records fair for ordinary stages; poor for high stages and estimated periods. No diversions from stream above station.

Discharge, in million gallons a day, 1928-29

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	1.4	0.3	0.35	0.3	0.05			0.09	0.55	0.35	0.2	0.4
2	1.0	.8	.25	.25	.1	0.2		.08	.65	.25	.25	.5
3	.65	1.0	.3	.2	.05			.08	.65	.25	.25	.4
4	.7	.7	.35	.2	2.5			.08	.7	.4	.2	.35
5	.55	.55	.25	.15		2.0	0.5	.07	1.3	1.7	.4	.35
6	.45	.5	.2	.15	.3			.08	1.4	.7	.4	.25
7	.7	1.0	.35	.15		.1		.08	.7	.55	.25	.25
8	.7	.5	.5	.15			.35	.07	1.7	.55	.2	.3
9	.5	.4	.35	.15			.25	.08	.9	.4	.15	.2
10	2.5	1.0	.9	.15	1.3		.2	.07	1.1	.4	.2	.35
11	2.3	.6	1.4	.15		.5	.15	.09	.9	.35	.15	.2
12	.9	1.8	.55	.15			.2	.09	1.7	.25	.09	.2
13	.65	1.0	.4	.15			.2	.09	1.1	.25	.15	.3
14	.65	.9	.35	.1			.2	.25	1.1	.2	.15	.2
15	.5	.7	.25	.1			.35	.6	2.1	.25		.2
16	.45	.6	.3	.1			.65	.5	.85	.25		.3
17	1.2	.8	.35	.09	.7	2.4	1.3	3.4	.65	.15		.25
18	.75	2.5	.4	.09			1.2	1.0	.65	1.3		.2
19	.55	.9	.5	.09			.85	2.6	.5	.7		.2
20	.45	.9	.3	[a].09			5.1	1.8	.45	.55		.2
21	.4	.7	.25	[a].07			1.1	.9	.4	.45	.1	.2
22	.4	.55	.2	[a].06			.35	1.8	.4	.4		.15
23	.4	.5	.2	[a].06			.25	1.7	.4	.35		.1
24	.35	1.2	.2	.05			.2	1.4	.5	.35		.15
25	.25	.7	.25	.04		.6	.15	.75	.65	.35		.2
26	.3	.6	.2	.03	.3		.15	.65	.6	.2		.15
27	1.2	.55	.15	.03			.15	.65	.45	.2	1.5	.1
28	.85	.45	.15	.03			.2	.65	.4	.2	.6	.1
29	.5	.5	.1	.06			.15	-------	.3	.2	.55	.1
30	.4	.4	.45	.15			.1	-------	.3	.35	.5	.2
31	.35	.4	-------	[a].06	-------		.09	-------	.3	-------	.5	-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	2.5	0.25	0.740	1.14	23.0	70
August	2.5	.3	.774	1.20	24.0	74
September	1.4	.1	.358	.554	10.8	33
October	.3	.03	.116	.179	3.60	11
November	2.5	.05	.637	.986	19.1	59
December	-------	-------	.70	1.08	21.6	67
January	5.1	.09	.561	.868	17.4	53
February	3.4	.07	.704	1.09	19.7	60
March	2.1	.3	.785	1.21	24.4	75
April	1.7	.15	.428	.662	12.8	39
May	1.5	.09	.255	.395	7.89	24
June	.5	.1	.235	.364	7.05	22
The year	5.1	.03	.524	.811	191	587

[a] Partly estimated.

MISCELLANEOUS MEASUREMENTS

Measurements of streams and ditches on the island of Oahu at other than regular gaging stations are listed below.

Miscellaneous discharge measurements on Oahu, 1928–29

Date	Stream	Tributary to—	Locality	Discharge	
				Second-feet	Million gallons a day
Jan. 24	Hiilaniwai Stream	Luluku Stream	Elevation 460 feet, opposite Kailua water system's intake, near Kaneohe.	0.39	0.25
24	Luluku Stream	Kaneohe Stream	1,000 feet below Kailua water system's intake, near Kaneohe.	1.33	.86
24	First Division ditch	Taro patches	50 feet below intake near Kaneohe.	.12	.078
24	Diversion ditch of North Luluku ditch.	——do	300 feet above Kaneohe Stream, near Kaneohe.	.11	.07
24	Luluku Stream	Keneohe Stream	1,000 feet above confluence with Kaneohe Stream, near Kaneohe.	.82	.53
24	North Luluku ditch	Taro patches	Last main diversion on Waiahole side of Luluku Stream, near Kaneohe.	.80	.52
Mar. 28	North Halawa Stream	Pacific Ocean	Elevation 300 feet, near Aiea.	.6	.39

NOTE.—In addition to the above miscellaneous measurements 492 measurements were made by J. F. Kunesh or under his supervision. These measurements will be published in a supplement to the report of the Board of Water Supply, city and county of Honolulu, to the legislature of the Territory of Hawaii, sixteenth regular session, under the title "Water Resources of the City of Honolulu, 1928–1930."

ISLAND OF MOLOKAI

HALAWA STREAM NEAR HALAWA, MOLOKAI

LOCATION.—Water-stage recorder 750 feet below confluence of two main branches and 2 miles above mouth of stream and Halawa schoolhouse.

DRAINAGE AREA.—4.6 square miles.

RECORDS AVAILABLE.—August, 1917, to June, 1929.

EXTREMES.—Maximum discharge recorded during year, 431 million gallons a day or 667 second-feet Apr. 18 (gage height, 5.65 feet); minimum, 2.9 million gallons a day or 4.5 second-feet June 24.

1918–1929: Maximum discharge, about 1,550 million gallons a day or 2,400 second-feet Mar. 31, 1923 (gage height, 11.65 feet); minimum, 0.8 million gallons a day or 1.2 second-feet Oct. 13–15, 19, 1917.

A maximum discharge greater than 1,550 million gallons a day may have occurred Jan. 20, 1929.

REMARKS.—Records poor. 1-inch pipe line diverts water one-fourth mile above station for domestic use.

Discharge, in million gallons a day, 1928–29

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	28	24	8.4	20		4.3	12		12	10	7.6	5.5
2	36		8.2	8.0							8.1	5.2
3	17.8		[a]8.7	9.1	8.5			4.0	14	51	5.9	5.9
4	13.1		17	12.1			5.5		52		5.2	5.5
5	11.3			9.4		32			86	14.5	4.7	4.3
6	9.6			9.1	[b]36			14	35	8.2	9.8	5.0
7	19.7		13	8.0			[b]90		19.5	8.2	6.8	5.0
8	29			37					22	9.3	9.5	4.7
9	12.5	14		48			5.5	7	12	6.2	5.9	4.0
10	24		40	14.7					15	26	4.7	8.0
11	33			12.9					38	12	5.0	6.2
12	[b]12.1			15.6	14	30				8.2	4.7	5.5
13	[a]11.0			[a]15.1				14	32	6.5	5.0	8.5
14	[a]12.1		11	13			20			5.5	7.0	5.9
15	11							5.5	8	7.5	9.1	11.5
16	[b]33	26	28		22	9	9		44	5.0	4.3	5.0
17	13			4.9	14.5		85	28	11	19.5	4.0	5.2
18		28			7.8					11.5	3.8	4.3
19		20			7.2					7.5	3.6	3.8
20		12.1			[a]12.7					6.5	3.6	3.6
21	22	23								6.2	4.3	3.1
22		12.5	6			15	7.5		16	14	5.2	3.8
23								13		6.8	4.0	44
24	75	[b]11.0								5.2	9.2	16
25		12.8		70	5	6	18		6	5.0	47	5.5
26		11.0								8.6	16	4.5
27		11.0								19	8.9	4.0
28	17	17.1		8.5		9.5	6			5.5	9.3	3.6
29		9.6									13	
30												
31												

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July			23.7	36.7	735	2,250
August			17.4	26.9	538	1,660
September			13.4	20.7	401	1,230
October			15.5	24.0	480	1,470
November			11.6	17.9	349	1,070
December			17.9	27.7	555	1,700
January			24.1	37.3	748	2,290
February			11.8	18.3	329	1,010
March			21.6	33.4	668	2,050
April	123	5.0	14.7	22.7	442	1,350
May	47	3.6	7.89	12.2	245	751
June	44	3.1	7.34	11.4	220	676
The year			15.6	24.1	5,710	17,500

[a] Partly estimated. [b] Estimated.

PAPALAUA STREAM NEAR WAILAU, MOLOKAI

LOCATION.—Water-stage recorder a quarter of a mile above mouth, 2 miles east of Wailau landing, and 6½ miles due north of Pukoo village.

DRAINAGE AREA.—2.0 square miles.

RECORDS AVAILABLE.—September, 1919, to September, 1929 (discontinued).

EXTREMES.—Maximum discharge during period, 976 million gallons a day or 1,510 second-feet Jan. 20 (gage height, 7.78 feet); minimum, 1.2 million gallons a day or 1.9 second-feet July 15, 1929.

1920–1929: Maximum discharge, about 1,140 million gallons a day or 1,760 second-feet Dec. 24, 1920 (gage height, 8.58 feet); minimum, 0.9 million gallons a day or 1.4 second-feet July 1, 5, 6, 1926.

REMARKS.—Records good for ordinary stages; poor for extremely high stages. No diversion.

Daily discharge, in million gallons a day, 1928–29

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1928–29												
1	23	27	4.5	24	9.0	3.7	6.9	3.2	7.0	6.3	13.3	5.1
2	27	13.1	4.2	13.6	5.2	3.9	14.8	2.9	13.9	7.6	8.3	6.8
3	12.2	23	17.6	4.5	3.5	3.4	5.2	2.8	12.0	12.1	5.6	5.6
4	8.0	6.9	11.8	6.0	5.4	3.5	4.4	2.7	46	62	3.9	5.1
5	6.5	6.8	12.4	9.6	8.0	78	4.8	2.6	63	11.3	4.3	3.9
6	5.6	10.3	5.1	5.8	9.8	25	4.5	2.7	30	6.9	10.7	4.8
7	17.3	17.5	7.0	6.0	33	5.6	4.2	15.5	11.3	8.0	6.4	5.4
8	25	5.8	8.2	4.5	10.1	6.5	86	12.8	15.9	9.3	7.8	5.4
9	9.0	4.6	19.8	47	12.7	36	6.5	3.5	9.2	5.4	4.5	3.9
10	18.5	9.7	26	41	6.0	17.8	4.4	2.9	15.0	45	3.7	8.3
11	40	16.9	53	11.2	20	16.0	4.0	2.7	38	13.4	3.9	6.7
12	7.7	23	11.0	15.0	6.0	18.0	3.0	2.7	47	10.2	3.4	5.4
13	5.6	8.2	7.3	13.6	6.2	33	2.7	2.6	13.3	6.9	3.4	8.3
14	7.4	11.1	5.8	12.6	17.2	36	12.9	17.4	44	5.0	13.4	7.6
15	4.8	5.8	4.8	15.0	8.4	18.9	19.0	9.4	12.0	6.4	8.0	12.3
16	8.1	18.5	4.2	5.8	12.2	64	24	32	6.9	5.0	3.8	7.1
17	32	40	12.0	4.5	6.9	15.3	10.0	89	5.4	4.0	3.2	4.8
18	8.4	25	26	4.0	15.3	8.5	5.1	21	6.2	122	3.1	19.1
19	9.6	7.1	40	5.1	15.2	6.7	28	72	66	18.1	2.8	4.8
20	7.4	28	10.6	3.7	19.9	5.6	69	28	17.0	9.5	2.7	3.7
21	12.3	21	6.2	3.3	10.6	5.6	123	15.4	12.0	6.2	2.7	3.2
22	30	20	4.8	3.1	6.0	6.9	174	34	6.7	4.8	2.7	2.7
23	9.4	8.0	3.8	2.9	5.1	5.6	17.3	17.4	9.2	4.2	2.7	2.2
24	14.7	16.6	3.5	5.0	10.4	11.4	8.0	38	13.2	10.1	4.7	5.5
25	52	9.0	5.2	3.1	5.6	21	6.0	7.5	17.4	5.6	2.9	42
26	54	7.5	3.8	2.5	4.5	8.6	5.9	18.2	11.2	3.9	7.8	11.5
27	100	7.5	2.8	108	3.8	5.0	9.6	10.0	5.8	3.5	19.2	4.4
28	17.5	6.2	3.8	33	3.4	4.8	23	8.7	4.6	14.3	9.4	3.4
29	9.7	10.4	2.9	6.4	3.4	13.9	6.4	-------	4.2	21	5.2	2.9
30	6.9	14.3	2.6	5.0	3.5	5.4	4.5	-------	3.5	5.0	7.2	2.5
31	5.6	5.6	-------	4.0	-------	4.8	3.7	-------	3.7	-------	15.8	-------

Day	July	Aug.	Sept.	Day	July	Aug.	Sept.	Day	July	Aug.	Sept.
1929				1929				1929			
1	2.6	7.4	4.2	11	3.6	16.0	-------	21	5.9	6.7	-------
2	3.7	7.1	5.1	12	1.7	8.0	-------	22	6.4	7.5	-------
3	2.5	10.2	7.1	13	1.6	6.7	-------	23	4.6	5.1	-------
4	2.0	9.7	-------	14	1.5	5.4	-------	24	10.4	9.2	-------
5	1.8	6.0	-------	15	1.3	5.4	-------	25	29	10.6	-------
6	1.6	6.9	-------	16	35	8.3	-------	26	68	11.9	-------
7	4.8	6.9	-------	17	6.0	7.1	-------	27	14.3	5.1	-------
8	2.6	4.8	-------	18	4.2	5.1	-------	28	7.8	3.9	-------
9	1.7	22	-------	19	2.7	5.1	-------	29	5.1	3.1	-------
10	2.5	20	-------	20	3.7	4.8	-------	30	4.4	2.7	-------
								31	5.4	11.6	-------

Monthly discharge of Papalaua Stream near Wailau, Molokai, 1928–29

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
1928–29						
July	100	4.8	19.2	29.7	595	1,830
August	40	4.6	14.0	21.7	434	1,330
September	53	2.6	11.0	17.0	331	1,010
October	108	2.5	13.8	21.4	429	1,310
November	33	3.4	9.54	14.8	286	878
December	78	3.4	16.1	24.9	498	1,530
January	174	2.7	22.6	35.0	701	2,150
February	89	2.6	17.1	26.5	478	1,470
March	66	3.5	18.4	28.5	571	1,750
April	122	3.5	15.1	23.4	453	1,390
May	19.2	2.7	6.34	9.81	196	603
June	42	2.2	7.15	11.1	214	658
The year	174	2.2	14.2	22.0	5,190	15,900
1929						
July	68	1.3	8.01	12.4	248	762
August	22	2.7	8.07	12.5	250	768

WAIAKEAKUA STREAM NEAR WAILAU, MOLOKAI

LOCATION.—Water-stage recorder half a mile above confluence with Pulena Stream, 3 miles south of Wailau landing, and 4 miles northwest of Pukoo village.

DRAINAGE AREA.—1.4 square miles.

RECORDS AVAILABLE.—October, 1919, to September, 1929 (discontinued).

EXTREMES.—Maximum discharge during period, 582 million gallons a day or 900 second-feet Jan. 20 (gage height, 6.51 feet); minimum, 1.7 million gallons a day or 2.6 second-feet July 14, 1929.

1920–1929: Maximum discharge, about 710 million gallons a day or 1,100 second-feet Mar. 31, 1923 (gage height, 7.15 feet); minimum, 1.3 million gallons a day or 2.0 second-feet Mar. 7, 1920.

REMARKS.—Records good for ordinary stages, fair for estimated periods, and poor for high stages. No diversions.

Daily discharge, in million gallons a day, 1928–29

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1928-29												
1	13.0	9.7	4.8	10.8	5.3			3.5	7.7	5.7	5.1	3.2
2	14.5	6.6	6.8	5.5	4.2	3.4		3.2	11.6	5.6	4.7	3.4
3	8.9	9.4	6.8	4.1	3.8			3.0	9.1	5.7	5.2	3.2
4	7.2	5.7	8.6	4.3	4.1		4.8	2.9	24	14.9	4.0	3.5
5	6.2	5.1	4.8	4.7	4.3			2.7	26	6.6	4.5	3.3
6	5.3	6.3	4.6	4.2	4.4	20		2.7	13.6	5.6	6.2	4.0
7	7.2	10.4	6.6	4.2	19.8			5.6	15.0	5.6	4.3	3.5
8	[a]12.4	5.1	7.0	3.8	8.6	4.2	[b]28	4.5		7.4	5.6	2.9
9	[b]6.4	4.8	14.7	15.8	8.9			2.7		5.4	4.0	3.1
10	[b]7.4	11.7	28	11.4	5.3			2.7		16.2	4.0	3.4
11	12.3	11.3	14.2	5.3	8.2		3.9	2.9		10.5	3.8	5.1
12	6.4	11.0	8.2	6.7	5.0			2.7	14	7.9	3.8	5.1
13	5.3	6.8	6.6	6.9	5.1	13		2.7		6.9	3.8	3.8
14	5.3	6.8	5.7	6.2	7.2			4.0		5.6	5.5	4.5
15	4.6	5.5	5.1	8.2	4.7		12	3.6		7.4	4.4	4.7
16	5.5	5.7	4.8	4.4	5.0			15.6		5.6	3.4	5.4
17	13.6	16.1	5.0	3.8	4.4		5.7	63	6.6	5.2	3.3	3.2
18	5.9	12.4	6.9	3.6	5.3		4.4	18.2	10.5	29	3.2	3.1
19	6.4	6.6	11.8	3.4	8.8		12.7	54	31	11.9	3.1	3.0
20	5.3	16.7	5.0	3.1	9.1		35	24	14.9	7.7	2.9	2.9
21	5.3	14.4	4.6	3.0	7.0		29	18.5	9.4	6.1	2.9	2.8
22	8.4	9.9	4.2	3.0	4.4		78	19.7	7.2	5.6	2.8	2.7
23	5.0	7.2	4.1	2.9			21	17.0	6.9	5.1	2.8	2.7
24	6.1	12.7	4.1	3.0		6	10.0	13.5	7.9	9.4	4.3	2.8
25	22	6.8	4.7	2.9			7.2	11.5	9.1	5.2	2.9	19.2
26	19.4	6.8	3.8	2.8	3.9		6.4	22	6.6	4.5	3.5	6.0
27	52	5.7	3.7	23			7.2	10.3	5.4	4.5	3.6	3.6
28	15.3	5.7	4.2	15.1			9.0	8.8	5.2	5.1	3.7	3.1
29	10.7	7.2	3.8	6.2			4.3	------	5.1	7.6	3.3	2.7
30	8.2	4.8	3.9	5.0			3.8	------	4.7	4.3	3.5	2.5
31	6.8	4.7	------	4.4	------		3.6	------	4.9	------	4.7	------

Day	July	Aug.	Sept.	Day	July	Aug.	Sept.	Day	July	Aug.	Sept.
1929				1929				1929			
1	2.4	6.5	2.8	11	1.9	10.0	------	21	2.0	3.5	------
2	2.3	4.1	2.7	12	1.8	6.1	------	22	2.3	3.2	------
3	2.2	4.8	------	13	1.8	4.3	------	23	2.1	2.9	------
4	2.1	8.8	------	14	1.7	3.8	------	24	2.7	5.4	------
5	2.0	5.5	------	15	1.9	3.6	------	25	8.7	6.1	------
6	2.0	6.4	------	16	10.8	3.7	------	26	25	4.1	------
7	2.0	5.4	------	17	2.7	3.6	------	27	11.2	3.1	------
8	1.9	4.2	------	18	2.2	3.3	------	28	5.6	2.7	------
9	1.9	6.2	------	19	2.1	3.3	------	29	4.0	2.7	------
10	1.9	12.0	------	20	2.1	3.1	------	30	2.9	2.7	------
								31	3.4	2.7	------

[a] Partly estimated. [b] Estimated.

Monthly discharge of Waiakeakua Stream near Wailau, Molokai, 1928–29

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
1928–29						
July	52	4.6	10.3	15.9	318	980
August	16.7	4.7	8.37	13.0	260	796
September	28	3.7	6.90	10.7	207	635
October	23	2.8	6.18	9.56	192	588
November	----------	----------	5.80	8.97	174	534
December	----------	----------	8.48	13.1	263	807
January	78	----------	11.4	17.6	354	1,080
February	63	2.7	12.3	19.0	346	1,060
March	----------	4.7	11.9	18.4	368	1,130
April	29	4.3	7.79	12.1	234	717
May	6.2	2.8	3.96	6.13	123	377
June	19.2	2.5	4.08	6.31	122	376
The year	----------	----------	8.11	12.5	2,960	9,080
1929						
July	25	1.7	3.86	5.97	120	367
August	12.0	2.7	4.77	7.38	148	454

PULENA STREAM NEAR WAILAU, MOLOKAI

LOCATION.—Water-stage recorder half a mile above confluence with Waiakeakua Stream, 3 miles south of Wailau landing, and 4 miles northwest of Pukoo Village.

DRAINAGE AREA.—4.4 square miles.

RECORDS AVAILABLE.—October, 1919, to December, 1928 (discontinued).

EXTREMES.—Maximum gage height (determined from flood marks) at least 22 feet Jan. 20, 1929 (discharge undetermined); minimum, 6.8 million gallons a day or 10.5 second-feet Oct. 26, 27.

1920–1929: Maximum discharge, that of Jan. 20, 1929 (gage height, at least 22 feet); minimum, 3.0 million gallons a day or 4.6 second-feet June 28 and July 14, 1920.

REMARKS.—Records fair. No diversions. Station destroyed by flood of Jan. 20.

Discharge, in million gallons a day, 1928

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Day	July	Aug.	Sept.	Oct.	Nov.	Dec.
1		20	12.4	31	13.9	8.3	16	23	17.2	14.0	12.4	22	50
2	34	16.2	14.4	22	10.9	7.8	17	34	29	14.4	10.3	19.3	30
3		17.2	16.8	11.8	9.3	8.8	18	17.5	30	16.0	10.0	25	22
4		14.4	18.6	13.3	11.5	7.4	19	16.0	17.2	33	9.0	28	18.0
5		13.4	12.1	17.2	15.5	*71	20	13.2	27	14.0	8.3	33	14.9
6	16	14.2	10.6	11.8	18.4	44	21	12.6	22	11.8	8.1	30	------
7		28	12.3	11.8	*80	17.5	22	12.9	17.9	10.9	8.3	18.6	------
8		13.4	14.8	10.3	38	16.8	23	13.2	15.6	10.0	7.8	15.8	------
9	26	12.1	33	12.6	34	*66	24	14.2	27	9.5	8.8	15.4	------
10		35	74	18.4	21	43	25	37	17.2	9.5	7.4	13.4	------
11	33	30	52	10.3	37	32	26	41	14.4	8.8	7.0	12.1	------
12	19.8	24	24	11.9	20	26	27	166	13.0	8.3	*33	11.5	------
13	15.6	17.9	17.6	16.1	20	34	28	50	12.4	14.7	25	10.6	------
14	18.6	17.2	14.4	13.8	37	54	29	29	14.0	11.8	23	9.8	------
15	12.9	15.4	13.0	22	25	40	30	22	10.9	9.3	16.1	8.8	------
							31	18.2	10.3	-------	11.5	-------	------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	166	----------	27.9	43.2	864	2,650
August	35	10.3	18.8	29.1	584	1,790
September	74	8.3	17.9	27.7	536	1,650
October	33	7.0	14.2	22.0	440	1,350
November	80	8.8	22.2	34.3	665	2,040
December (20 days)	71	7.4	30.6	47.3	612	1,880
The period	166	7.0	21.4	33.1	3,700	12,300

* Partly estimated.

PELEKUNU STREAM NEAR PELEKUNU, MOLOKAI

LOCATION.—Water-stage recorder half a mile above confluence with Lanipuni Stream, 2 miles south of Pelekunu landing, and 6 miles north of Kamalo village.

DRAINAGE AREA.—2.4 square miles.

RECORDS AVAILABLE.—December, 1919, to January, 1929.

EXTREMES.—Maximum discharge during period, 1,330 million gallons a day or 2,060 second-feet Jan. 20 (gage height, 11.5 feet; estimated from floodmarks); minimum not known, owing to faulty record.

1920–1929: Maximum discharge, that of Jan. 20, 1929; minimum, 1.8 million gallons a day or 2.8 second-feet Mar. 7 and July 13, 1920.

REMARKS.—Records fair for ordinary stages except those estimated, which are poor. Records for extremely high stages poor. No diversions. Station destroyed by flood Jan. 20.

Discharge, in million gallons a day, 1928–29

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
1	21	8.4			3.9	3.3	7.7
2	11.3	7.2			3.1	3.1	6.6
3	9.6	7.3		6.5	2.6	3.0	6.0
4	8.3	6.2			5.0	2.8	5.2
5	6.2	5.7	4.7		6.5	48	6.2
6	5.2	5.6		4.6		28	5.2
7	15.2	10.8		4.6	22	14.4	4.7
8	20	5.2		4.1		16.3	14.6
9	10.9	5.0		3.6		33	7.0
10	22	12.2	19	4.2		22	5.6
11	17.6	9.6		3.2		17.8	5.0
12	11.3	7.7		3.6		14.4	4.4
13	8.6	7.3		4.0		17.6	4.2
14	11.5	6.5		4.8		19.0	21
15	7.3	5.8		5.1	9	17.8	20
16	11.7	5.4	5.5	3.4		17.8	
17	15.5	11.2		3.2		11.8	
18	9.2	10.7		3.2		9.6	9.6
19	7.8	6.6		2.8		8.0	24
20	6.6	8.4		2.6		7.2	------
21	6.2	6.0		2.6		7.0	------
22	6.2	5.1		2.7		7.3	------
23	5.7	4.7		2.6	6.6	5.8	------
24	6.2	7.0		2.9	5.8	5.7	------
25	11.6	5.6	3.7	2.5	5.0	37	------
26	21			2.4	6.1	22	------
27	54			3.3	4.6	12.2	------
28	20	4.0		3.4	4.1	15.6	------
29	13.3			5.4	3.8	10.9	------
30	10.2			3.2	3.5	8.2	------
31	8.6		------	2.7	------	7.5	------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	54	5.2	12.9	20.0	400	1,230
August	12.2	----------	6.62	10.2	205	630
September	----------	----------	5.56	8.60	167	512
October	----------	----------	3.97	6.14	123	378
November	----------	----------	7.90	12.2	237	727
December	48	2.8	14.6	22.6	454	1,390
January 1–19	----------	4.2	10.4	16.1	197	606
The period	----------	----------	8.78	13.6	1,780	5,470

LANIPUNI STREAM NEAR PELEKUNU, MOLOKAI

LOCATION.—Water-stage recorder half a mile above junction with Pelekunu Stream, 2 miles south of Pelekunu landing, and 6 miles north of Kamalo village.

DRAINAGE AREA.—0.9 square mile.

RECORDS AVAILABLE.—December, 1919, to September, 1929 (discontinued).

EXTREMES.—Maximum discharge during period, 938 million gallons a day or 1,450 second-feet Jan. 20 (gage height, 5.12 feet); minimum, 2.6 million gallons a day or 4.0 second-feet Dec. 4.

1920–1929: Maximum discharge, about 1,250 million gallons a day or 1,930 second-feet Dec. 24, 1920 (gage height, 5.90 feet); minimum, 1.8 million gallons a day or 2.8 second-feet Nov. 10, 11, 1926.

REMARKS.—Records good for ordinary stages; poor for extremely high stages. No diversions.

Daily discharge, in million gallons a day, 1928–29

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1928–29												
1	17.6	9.0	4.0	12.4	3.6	2.8	6.8	5.6	9.9	4.8	4.9	4.6
2	9.9	5.7	5.0	6.2	3.5	2.7	6.4	5.3	18.4	4.9	4.4	5.3
3	7.2	5.9	5.4	4.2	3.4	2.8	5.9	5.2	24	4.8	4.2	4.5
4	5.7	5.2	6.1	5.0	6.2	2.7	5.4	5.2	59	4.9	4.2	7.1
5	4.8	4.8	4.2	7.2	6.1	131	5.9	5.2	61	4.5	4.5	4.9
6	4.5	4.8	4.0	4.5	6.8	53	5.2	5.2	23	4.5	6.5	6.3
7	11.8	8.6	4.0	4.3	47	11.4	5.2	6.5	16.2	4.6	5.5	5.1
8	21	4.7	3.9	4.0	13.1	21	37	6.6	17.0	6.4	5.9	4.5
9	7.7	5.0	8.3	4.2	9.1	47	8.5	5.2	15.8	5.1	4.5	4.3
10	28	12.7	34	4.7	5.7	19.6	6.8	5.1	10.2	27	5.7	5.2
11	15.1	9.0	16.4	3.7	18.0	15.4	6.1	5.2	8.9	10.6	6.4	5.2
12	7.2	6.8	5.9	4.0	6.6	11.7	5.5	5.6	8.1	9.5	5.2	5.2
13	5.4	6.4	4.8	3.9	6.4	19.5	5.4	5.1	6.9	8.8	10.3	5.5
14	7.3	5.9	4.5	5.1	19.6	23	17.2	8.9	[a]6.4	5.9	7.8	7.7
15	4.8	5.2	4.2	5.2	9.2	14.0	27	14.5	[b]5.9	7.6	5.5	9.4
16	6.9	5.2	4.8	3.9	6.4	12.8	[a]16.4	25	[a]5.8	5.6	4.6	5.9
17	12.0	13.5	5.2	3.7	5.7	8.5	[b]10.1	79	5.5	5.5	4.5	4.9
18	5.7	9.0	5.8	3.7	8.1	7.0	[a]7.2	24	5.3	21	4.4	4.9
19	5.2	5.4	15.0	3.5	8.5	6.4	13.8	56	5.6	8.8	4.3	4.4
20	4.3	8.9	5.0	3.4	12.7	5.9	82	27	5.3	5.9	4.3	4.3
21	4.3	5.7	4.3	3.4	8.6	6.1	43	23	5.1	5.3	4.3	4.3
22	4.2	5.0	4.2	3.5	5.4	6.8	227	25	5.1	4.8	4.4	4.4
23	4.2	4.5	4.0	3.5	4.3	5.7	34	12.5	4.8	4.8	4.6	4.3
24	6.0	6.6	3.9	3.7	4.3	6.1	12.5	9.8	5.5	5.5	4.6	5.7
25	26	5.2	3.7	3.4	3.6	51	9.2	7.8	5.9	5.2	4.8	16.5
26	47	5.0	3.7	3.4	3.4	12.6	8.6	11.8	5.6	4.5	6.2	6.7
27	63	4.5	3.6	4.3	3.2	7.7	8.9	8.3	4.9	4.5	5.6	5.2
28	13.6	4.5	4.7	5.2	3.1	11.9	12.1	9.2	4.9	4.4	7.5	4.6
29	8.2	4.5	4.2	3.7	3.0	8.4	7.3	------	4.8	4.4	5.2	4.5
30	6.4	3.9	3.7	3.5	3.0	6.4	6.4	------	4.6	4.3	4.8	4.4
31	5.7	3.7	------	3.4	------	6.6	5.8	------	4.6	------	4.6	------

Day	July	Aug.	Sept.	Day	July	Aug.	Sept.	Day	July	Aug.	Sept.
1929				1929				1929			
1	4.4	5.0	4.8	11	4.0	17.3	------	21	4.4	5.3	------
2	4.4	4.8	4.6	12	3.9	6.6	------	22	4.4	4.9	------
3	4.1	7.8	4.5	13	4.0	5.6	------	23	4.2	4.8	------
4	4.0	7.0	4.4	14	3.9	5.2	------	24	4.5	4.8	------
5	4.0	5.6	4.3	15	5.1	5.1	------	25	7.1	10.9	------
6	4.0	5.3	------	16	23	5.2	------	26	22	6.4	------
7	4.1	4.9	------	17	5.3	4.8	------	27	10.5	5.2	------
8	4.1	5.1	------	18	4.5	4.8	------	28	5.9	4.9	------
9	4.0	6.2	------	19	4.3	5.3	------	29	5.1	4.8	------
10	4.0	23	------	20	4.2	5.3	------	30	4.6	5.1	------
								31	4.8	4.6	------

[a] Partly estimated. [b] Estimated.

Monthly discharge of Lanipuni Stream near Pelekunu, Molokai, 1928–29

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
1928–29						
July	63	4.2	12.3	19.0	381	1,170
August	13.5	3.7	6.28	9.72	195	597
September	34	3.6	6.35	9.82	190	585
October	12.4	3.4	4.45	6.89	138	423
November	47	3.0	8.25	12.8	248	760
December	131	2.7	17.7	27.4	548	1,680
January	227	5.2	21.2	32.8	659	2,020
February	79	5.1	14.7	22.7	413	1,260
March	61	4.6	12.1	18.7	374	1,150
April	27	4.3	6.95	10.8	208	640
May	10.3	4.2	5.30	8.20	164	504
June	16.5	4.3	5.66	8.76	170	521
The year	227	2.7	10.1	15.6	3,690	11,300
1929						
July	23	3.9	5.83	9.02	181	555
August	23	4.6	6.50	10.1	202	618
September (5 days)	4.8	4.3	4.52	6.99	22.6	69

WAIKOLU STREAM AT PIPE-LINE CROSSING NEAR KALAUPAPA, MOLOKAI

LOCATION.—Water-stage recorder at elevation 300 feet, 1 mile above mouth of stream, and 4 miles southeast of Kalaupapa.

DRAINAGE AREA.—3.7 square miles.

RECORDS AVAILABLE.—June, 1919, to June, 1929.

EXTREMES.—Maximum discharge during year, 772 million gallons a day or 1,190 second-feet Jan. 20 (gage height, 5.05 feet); minimum, 3.2 million gallons a day or 5.0 second-feet July 27.

1919–1929: Maximum discharge, 1,270 million gallons a day or 1,960 second-feet Dec. 24, 1920 (gage height, 10.20 feet); minimum, 1.3 million gallons a day or 2.0 second-feet Nov. 1–2, 1925, June 5, 1926.

REMARKS.—Records fair for ordinary stages; poor for estimated periods and extremely high stages. Kalaupapa water-supply system diverts above station for domestic use.

Discharge, in million gallons a day, 1928–29

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	23	6.5	6.2	6.2	6.0	4.8		6.6	[b]9.5	5.7	5.5	
2	8.4	6.5	6.2	6.6	5.7	4.8		6.6	16.8	5.7	5.5	
3	8.4	6.2	6.2	5.5	5.5	4.8		6.6	17.3	5.7	5.5	
4	6.8	6.2	6.9	5.5	6.9	4.8	6	6.6	48	5.7	[a]5.5	
5	6.8	6.2	6.6	8.2	9.8	99		6.6	63	5.7		
6		5.9	6.6	6.2	9.4	36		6.6	25	5.7		
7	9	6.8	6.6	5.7	48	8.4		6.9	23	5.5		
8		6.2	6.6	5.0	12.2	11.7	[b]30	6.9	17.1	5.7		
9		5.9	6.2	4.8	12.7	48	6.6	6.6	12.7	5.7		
10	15.8	14.3	12.3	4.8	7.6	17.0	5.5	6.2	9.4	25		
11	10.9	9.7	17.0	4.6	35	11.0	5.3	6.2	8.4	19.9		6
12	6.5	6.8	7.3	4.6	8.7	8.0	4.8	7.6	8.0	7.3		
13	6.2	6.5	6.2	4.8	8.0	10.2	4.8	6.9	8.0	8.7		
14	10.5	6.2	6.0	5.0	21	9.4	26	6.9	8.0	6.2		
15	6.5	6.2	5.7	4.8	13.2	8.7	40	24	8.4	6.2		
16	7.6	5.9	5.7	4.8	7.6	9.1	14.5	29	8.0	6.0		
17	13.4	7.4	6.0	4.8	6.9	6.6	9.2	74	8.0	6.0		
18	7.2	11.3	6.6	4.8	9.1	5.7	6.9	26	8.0	16.9	6	
19	6.5	6.6	9.1	4.6	9.4	5.5	24	63	8.4	11.8		
20	6.2	6.9	7.3	4.6	22	5.5	83	33	8.4	6.6		
21	6.2	7.6	6.0	4.6	15.6	5.5	85	35	7.3	6.2		
22	5.9	6.2	5.5	4.6	6.2	5.5	220	28	6.6	6.0		5.7
23	5.9	6.2	5.5	4.8	5.5	5.3	30	9.4	6.6	6.0		5.7
24	5.9	6.2	6.0	4.8	5.5	5.5	11.0	8.7	6.6	6.0		6.0
25	10.6	6.6	6.2	4.8	5.3	46	8.4	7.3	6.9	6.2		17.0
26	42	6.2	6.2	4.8	5.3	12.6	7.6	[b]30	6.6	6.0		9.0
27	22	6.2	6.6	5.0	5.0	6.2	11.9	8	6.2	6.0		6.2
28	9.7	6.2	6.6	5.0	5.0	8	32		6.0	6.0		5.7
29	6.8	6.2	5.7	5.7	5.0		8.7	-------	6.0	6.0		5.7
30	6.2	6.0	5.3	6.0	5.0		7.3	-------	5.7	5.7		5.7
31	6.2	6.0	-------	5.5	-------		6.6	-------	5.7	-------		-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	um	Mean		Million gallons	Acre-feet
July	42	----------	10.1	15.6	314	961
August	14.3	5.9	6.90	10.7	214	656
September	17.0	5.3	6.90	10.7	207	635
October	8.2	4.6	5.21	8.06	162	496
November	48	5.0	10.9	16.9	328	1,000
December	99	----------	14.1	21.8	438	1,340
January	220	----------	23.6	36.5	731	2,250
February	----------	6.2	17.0	26.3	477	1,460
March	63	5.7	12.7	19.6	394	1,210
April	25	5.5	7.73	12.0	232	712
May	----------	----------	5.94	9.19	184	565
June	----------	----------	6.42	9.93	193	591
The year	220	----------	10.6	16.4	3,870	11,900

[a] Partly estimated. [b] Estimated.

MISCELLANEOUS MEASUREMENTS

Measurements of streams and ditches on the island of Molokai at other than regular gaging stations are listed below:

Miscellaneous discharge measurements on Molokai, 1928-29

Date	Stream	Tributary to— or diverting from	Locality	Discharge	
				Second-feet	Million gallons a day
Apr. 1	Waileia Stream	Pacific Ocean	Elevation 2,750 feet, near Kalae.	0.113	0.073
2	Waihanau Stream	do	Elevation 2,450 feet, near Kalae.	.267	.173
2	Hawaiian Homes Commission tunnel.	Waihanau Stream	Near Kalae.	.312	.202

ISLAND OF MAUI

HONOKAHAU STREAM NEAR HONOKAHAU, MAUI

LOCATION.—Water-stage recorder 1,000 feet above intake of Honokahau ditch and about 5 miles southeast of Honokahau; elevation 910 feet.

DRAINAGE AREA.—4.2 square miles.

RECORDS AVAILABLE.—March, 1913, to September, 1920; May, 1922, to June, 1929.

EXTREMES.—1928–29; Not known, owing to loss of record.

1913–1920, 1922–1929: Maximum discharge, 2,200 million gallons a day or 3,400 second-feet Feb. 13, 1924 (gage height 7.92 feet); minimum, 6.2 million gallons a day or 9.6 second-feet June 30, 1926.

REMARKS.—Records good except those for extremely high stages and estimated periods, which are poor. No diversions.

Discharge, in million gallons a day, 1928–29

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	58							11.6	23	27	51	14.3
2	31	22	26	16	13	12		11.5	31	22	19.1	20
3	19.0							11.5	33	29	15.2	14.3
4	14.7		40					11.4	59	24	14.7	32
5	13.4			26	17		20	11.4	63	17.6	14.7	17.5
6	13.1	16	24			46		17.6	31	25	28	14.7
7	30							33	47	18.5	19.6	13.1
8	40		20					14.3	49	46	21	13.1
9	16.2							12.0	114	17.6	16.2	12.4
10	32	40	50	14	80	75	16	11.3	55	115	20	14.7
11	47							11.3	138	97	21	24
12	14.3							18.1	27	123	18.5	17.7
13	13.4	24						18.9	19.6	38	32	22
14	18.2			24		48	90	27	27	19.0	47	13.4
15	13.4	18	17					26	43	21	24	47
16								165	18.5	17.1	18.0	14.7
17	28	60			22		16	269	17.1	22	16.6	13.1
18						20		88	16.6	183	15.7	13.4
19			38	14				113	17.1	32	14.7	12.4
20							28	72	16.6	19.2	14.3	12.0
21	14	20					57	51	15.7	17.1	14.3	11.6
22				17		32	150	95	15.2	16.6	14.3	12.0
23							36	44	16.6	17.6	25	11.6
24						18	15.7	20	17.6	28	16.6	21
25		28	16		12		13.8	15.7	21	24	20	39
26	34					32	13.1	28	18.0	16.6	27	18.8
27				13			15.7	17.6	16.2	17.1	23	12.4
28		20					27	44	15.7	17.6	20	11.6
29			20			18	13.4	------	15.7	16.6	16.2	11.3
30	18						12.4	------	15.2	15.2	14.7	11.3
31			------		------		11.6	------	17.1	------	15.7	------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July			24.2	37.4	752	2,300
August			24.1	37.3	746	2,290
September			23.6	36.5	709	2,170
October			15.9	24.6	494	1,510
November			34.3	53.1	1,030	3,160
December			33.3	51.5	1,030	3,170
January	150		28.3	43.8	878	2,690
February	269	11.3	45.3	70.1	1,270	3,890
March	138	15.2	33.2	51.4	1,030	3,160
April	183	15.2	36.6	56.6	1,100	3,370
May	51	14.3	20.9	32.3	648	1,990
June	47	11.3	17.2	26.6	516	1,580
The year	269		28.0	43.3	10,200	31,300

HONOKAWAI DITCH NEAR LAHAINA, MAUI

LOCATION.—Water-stage recorder just below intake on Honokawai Stream, 2½ miles above Pioneer Mill Co.'s power house and 7½ miles northeast of Lahaina.

RECORDS AVAILABLE.—July, 1912, to June, 1929.

EXTREMES.—Maximum discharge during year, 49 million gallons a day or 76 second-feet Nov. 7 (gage height, 2.00 feet); minimum, 3.3 million gallons a day or 5.1 second-feet July 6.

1912–1929: Maximum discharge, 69 million gallons a day or 107 second-feet Sept. 10, 1922 (gage height, 2.71 feet); no flow occasionally when water is shut out of ditch.

REMARKS.—Records good. Diverts water for irrigation from Honokawai Stream just above station. Regulated by head gates at intake.

Discharge, in million gallons a day, 1928–29

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	15.6	7.2	3.8	4.2	4.0	4.1	12.4	4.0	8.2	4.1	11.6	4.1
2	7.6	6.0	10.5	4.0	4.0	3.8	6.3	4.0	11.9	5.6	5.1	4.6
3	5.2	15.2	8.8	4.1	4.0	3.8	4.4	4.0	10.9	4.4	4.0	4.8
4	4.2	4.5	13.2	7.7	4.6	3.8	4.2	4.0	12.1	4.9	4.0	13.4
5	3.6	4.9	4.2	10.0	4.3	22	5.6	4.0	11.9	4.1	3.9	5.6
6	3.3	3.9	3.9	4.5	5.0	20	7.4	4.0	7.8	4.1	5.0	4.9
7	9.2	4.9	4.7	4.4	32	7.0	5.6	6.8	14.4	4.4	4.4	4.5
8	13.5	4.5	4.8	4.0	10.4	15.5	8.3	4.6	13.4	15.2	4.6	4.2
9	4.2	3.9	9.0	4.0	7.2	26	4.6	4.0	21	4.2	4.1	4.2
10	12.4	11.8	26	4.0	8.9	13.3	4.2	3.9	10.7	24	4.8	4.6
11	11.4	9.7	12.1	4.0	18.3	10.8	4.1	3.9	14.5	21	5.8	9.8
12	3.8	11.1	4.8	3.9	10.7	11.9	3.9	7.6	5.8	35	4.8	7.0
13	3.6	12.8	4.1	3.9	10.0	14.2	4.0	4.8	4.9	11.2	10.4	8.6
14	4.7	5.7	4.0	5.0	27	20	12.9	13.4	4.6	4.8	11.7	5.2
15	3.6	5.2	4.0	6.5	9.3	13.7	14.2	13.4	4.6	6.3	6.1	16.8
16	15.9	13.2	4.5	4.1	5.9	17.4	8.2	27	4.4	4.1	4.2	5.5
17	11.1	36	4.4	4.0	5.0	8.3	4.6	30	4.2	5.2	4.2	4.9
18	5.2	13.0	4.2	4.0	7.9	7.0	4.1	15.6	4.1	28	4.1	4.4
19	4.2	4.4	21	4.0	6.6	6.7	14.1	22	4.1	8.2	4.1	4.1
20	3.6	8.1	4.8	4.0	6.3	5.8	13.0	20	4.1	4.5	4.1	4.1
21	3.5	5.2	4.2	4.0	5.0	8.7	18.3	19.2	4.1	4.1	4.1	4.1
22	6.6	4.5	4.0	5.4	4.2	5.9	19.1	28	4.1	4.0	4.1	4.1
23	5.0	5.6	4.0	4.2	4.2	4.4	8.6	11.3	4.0	4.0	7.1	4.1
24	17.2	9.5	4.0	4.0	4.2	6.2	5.4	5.8	3.9	6.6	5.0	5.8
25	31	5.2	4.0	4.0	4.2	14.8	4.5	4.6	3.9	5.8	8.0	12.7
26	33	4.1	4.0	4.0	4.2	8.0	4.0	4.6	4.0	4.1	10.1	6.2
27	16.9	4.1	4.0	4.0	4.2	4.8	4.5	5.0	3.9	4.2	6.2	4.4
28	7.0	7.8	4.0	4.0	4.3	8.6	10.4	16.1	3.9	4.1	6.1	4.2
29	4.9	3.9	4.9	4.0	4.4	7.3	4.4	-------	3.9	4.1	5.0	4.2
30	4.2	3.8	4.0	4.1	4.3	4.1	4.1	-------	4.0	4.0	4.4	4.2
31	5.5	3.6	-------	4.1	-------	4.0	4.1	-------	4.0	-------	4.2	-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	33	3.3	9.05	14.0	281	861
August	36	3.6	7.85	12.1	243	747
September	26	3.8	6.60	10.2	198	608
October	10.0	3.9	4.52	6.99	140	430
November	32	4.0	7.82	12.1	235	720
December	26	3.8	10.1	15.6	312	961
January	19.1	3.9	7.53	11.7	234	716
February	30	3.9	10.6	16.4	296	911
March	21	3.9	7.14	11.0	221	679
April	35	4.0	8.28	12.8	248	762
May	11.7	3.9	5.65	8.74	175	538
June	16.8	4.1	5.98	9.25	179	551
The year	36	3.3	7.57	11.7	2,760	8,480

KANAHA STREAM ABOVE PIPE-LINE INTAKE NEAR LAHAINA, MAUI

LOCATION.—Water-stage recorder 200 feet above intake of pipe line for Lahaina and Lahainaluna School and 2¾ miles northeast of Lahaina.

DRAINAGE AREA.—1.8 square miles.

RECORDS AVAILABLE.—February, 1916, to June, 1929.

EXTREMES.—Maximum discharge during year, 140 million gallons a day or 217 second-feet Feb. 17 (gage height, 3.43 feet); minimum, 2.8 million gallons a day or 4.3 second-feet frequently during first half of year.

1916–1929: Maximum discharge, 314 million gallons a day or 486 second-feet Nov. 26, 1918 (gage height, 3.79 feet); minimum, 1.6 million gallons a day or 2.5 second-feet Dec. 23–25, 1927.

REMARKS.—Records good for ordinary stages; poor for high stages. No diversions

Discharge, in million gallons a day, 1928–29

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	7.6	3.7	3.5	2.9	2.9	2.8	5.4	3.3	12.4	4.3	4.6	3.3
2	4.6	3.7	5.0	2.9	2.9	2.8	3.1	3.3	10.4	6.2	3.5	3.3
3	3.7	5.7	6.5	2.9	2.9	*2.8	3.1	3.3	5.6	4.6	3.1	3.3
4	2.9	2.9	10.0	5.4	4.2	*2.9	3.1	3.3	6.3	4.6	3.1	13.5
5	2.9	2.8	3.7	6.3	3.3	6.2	4.9	3.3	4.6	4.3	3.1	6.2
6	2.9	2.8	3.5	3.3	3.5	7.7	4.6	3.3	4.3	4.3	3.1	4.3
7	10.1	3.3	5.0	2.9	18.7	4.5	3.7	3.5	10.1	6.4	3.1	3.5
8	12.4	3.1	3.3	2.9	7.8	13.8	4.5	3.5	9.1	11.6	3.1	3.3
9	6.0	2.9	4.3	2.9	7.8	17.3	3.1	3.3	10.3	4.6	3.3	3.4
10	11.2	9.5	13.1	2.9	9.2	9.2	3.1	3.3	5.4	9.6	4.4	5.5
11	5.7	5.2	8.0	2.9	17.4	8.3	2.9	3.3	8.0	7.5	5.1	7.4
12	4.0	4.3	3.3	3.1	7.2	6.6	2.9	6.0	4.3	21	5.3	6.4
13	3.5	6.0	2.9	3.1	8.3	6.5	2.9	3.5	3.7	8.1	9.1	10.2
14	7.0	5.2	2.9	6.1	11.7	13.4	9.3	5.9	3.7	4.9	6.0	5.8
15	4.9	3.3	2.9	5.5	5.2	7.2	7.5	11.0	4.0	7.6	4.0	12.0
16	10.9	3.8	3.1	3.3	3.3	7.0	6.3	29	3.7	4.0	3.7	4.6
17	6.5	12.8	2.9	3.1	3.8	4.6	3.3	34	3.7	4.3	3.7	3.5
18	4.0	6.7	2.8	3.1	4.8	4.0	3.3	10.6	3.5	12.6	3.7	3.3
19	3.1	3.3	7.8	3.1	3.6	4.4	6.7	7.8	3.5	4.3	3.7	3.3
20	3.1	3.7	3.1	3.1	2.9	4.3	7.9	13.5	3.5	3.3	3.7	3.3
21	3.1	3.5	3.1	3.1	2.8	5.4	9.8	14.9	3.5	3.3	3.7	3.3
22	3.1	3.3	2.9	4.1	2.8	5.6	7.0	21	3.7	3.3	4.0	3.3
23	3.7	4.0	2.9	3.1	2.8	3.7	4.8	5.7	3.7	3.3	8.2	3.3
24	7.1	6.1	2.9	3.1	2.8	3.7	3.5	4.0	3.7	4.8	4.9	6.1
25	11.2	4.2	2.9	2.9	2.8	6.2	3.5	3.7	4.0	3.3	5.0	10.3
26	10.4	4.0	2.9	2.9	2.8	5.2	3.5	3.5	4.0	3.3	6.8	4.6
27	8.5	4.0	2.9	2.9	2.8	3.5	3.7	3.8	4.0	4.0	5.8	3.3
28	3.5	4.6	3.3	2.9	2.8	4.0	5.9	12.3	4.3	3.3	6.7	3.3
29	2.9	3.5	4.8	2.9	2.8	4.0	3.5	-------	4.3	3.3	4.0	3.3
30	2.9	3.3	2.9	3.1	2.8	3.1	3.3	-------	4.3	3.1	3.3	3.3
31	3.9	3.1	-------	2.9	-------	3.1	3.3	-------	4.3	-------	3.3	-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	12.4	2.9	5.72	8.85	177	544
August	12.8	2.8	4.46	6.90	138	424
September	13.1	2.8	4.30	6.65	129	396
October	6.3	2.9	3.41	5.28	106	324
November	18.7	2.8	5.31	8.22	159	489
December	17.3	2.8	5.93	9.18	184	564
January	9.8	2.9	4.63	7.16	143	440
February	34	3.3	8.10	12.5	227	696
March	12.4	3.5	5.29	8.18	164	503
April	21	3.1	5.77	8.93	173	531
May	9.1	3.1	4.45	6.89	138	423
June	13.5	3.3	5.12	7.92	154	471
The year	34	2.8	5.18	8.01	1,890	5,800

* Partly estimated.

OLOWALU DITCH NEAR OLOWALU, MAUI

LOCATION.—Water-stage recorder 425 feet above intake to penstock of hydroelectric power station, 1 mile above Olowalu, and 7 miles east of Lahaina.

RECORDS AVAILABLE.—August, 1911, to June, 1929.

EXTREMES.—Maximum discharge during year, 8.6 million gallons a day or 13.3 second-feet Dec. 26 (gage height, 1.18 feet); minimum, 1.4 million gallons a day or 2.2 second-feet Apr. 4.

1912–1929: Maximum discharge, 18 million gallons a day or 28 second-feet Dec. 25, 1920 (gage height, 1.53 feet); no flow occasionally when water is shut out of ditch.

REMARKS.—Records good except those for estimated periods, which are poor. Intake in Olowalu Stream at about 450 feet elevation. Water used for power and irrigation. Regulated by head gates.

Discharge, in million gallons a day, 1928–29

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	8.0		4.9	*3.9	3.5	3.0	6.6	4.4	7.0	4.7	4.3	3.4
2	8.0		5.9		3.2	3.0	5.0	4.1	7.2	4.4	4.0	3.3
3	7.3		6.8	3.9	2.9	3.2	4.7	3.8	7.3	4.1	3.8	3.0
4	5.6		7.3		3.4	3.0	4.4	3.8	7.6	3.8	3.6	3.7
5	4.3	3.8	5.9	*4.0	3.6	5.1	4.7	3.8	7.3	4.0	3.6	3.4
6	3.9		5.2		2.5	7.3	5.3	4.2	7.2	4.3	3.8	3.1
7	4.8		5.7		6.8	5.0	5.4	5.0	7.6	4.4	3.6	3.0
8	6.1		5.2		6.3	5.5	6.2	4.1	7.6	4.9	3.7	2.8
9	4.6		5.4	3.8	5.2	8.4	4.7	3.8	8.0	4.3	3.5	2.8
10	4.5		5.8		4.6	8.4	4.1	3.5	8.0	7.6	3.8	2.8
11	5.3		7.3		7.6	7.7	3.8	3.4	8.0	8.0	4.0	3.4
12	4.0		7.3	3.3	7.3	6.6	3.8	3.5	7.6	8.4	3.7	3.0
13	3.6	6.5	7.0	3.2	7.3	6.6	3.8	3.4	7.0	8.4	4.6	3.2
14	3.6		6.6	3.3	7.3	8.4	6.7	3.4	6.6	6.6	5.6	2.8
15	3.2		5.8	3.6	7.6	8.4	7.3	3.9	7.3	5.6	5.2	5.6
16	6.0		5.6	3.1	7.3	8.4	7.6	5.9	7.0	4.9	4.6	3.6
17	7.6		5.2	3.1	5.9	8.4	5.6	5.8	6.6	4.9	4.3	3.1
18	7.0		4.9	3.0	5.0	8.4	6.0	6.4	6.2	8.3	4.0	3.0
19	6.6	7.5	6.8	3.0	4.7	8.0	5.8	7.6	6.2	8.7	3.8	2.8
20	4.9		6.8	2.8	4.7	7.3	6.6	7.6	5.9	8.0	3.6	2.8
21	4.3		5.6	2.8	4.1	7.0	6.6	7.6	5.6	6.6	3.8	2.6
22	5.6		4.9	3.1	3.8	6.2	6.6	7.6	5.3	5.6	3.6	2.6
23	5.2		4.6	2.9	3.8	5.6	6.6	7.3	5.3	5.2	3.8	2.6
24	7.4	6	4.3	2.8	3.8	5.9	6.6	7.0	5.3	5.2	3.6	2.8
25	8.0		4.3	2.8	3.5	7.1	5.9	6.6	5.0	4.6	3.6	3.9
26	8.0			2.8	3.4	8.4	5.6	6.2	5.0	4.3	3.8	3.5
27		5.9		2.8	3.2	8.0	6.2	6.6	4.7	4.3	3.8	2.8
28		6.4	4.2	2.8	3.2	7.0	7.0	7.3	4.7	4.0	6.9	2.6
29	6	5.6		2.9	3.2	6.6	6.2	-------	4.7	4.0	5.2	2.6
20		4.9		3.0	3.1	5.3	5.3	-------	4.4	3.8	3.9	2.5
31		4.6	-------	3.7	-------	4.7	4.7	-------	4.4	-------	3.6	------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	8.0	3.2	5.72	8.85	177	544
August	----------	----------	5.58	8.63	173	531
September	7.3	----------	5.54	8.57	166	510
October	----------	2.8	3.33	5.15	103	317
November	7.6	2.5	4.73	7.32	142	435
December	8.4	3.0	6.51	10.1	202	619
January	7.6	3.8	5.66	8.76	175	538
February	7.6	3.4	5.27	8.15	148	453
March	8.0	4.4	6.37	9.86	198	606
April	8.7	3.8	5.53	8.56	166	509
May	6.9	3.5	4.09	6.33	137	389
June	5.6	2.5	3.10	4.80	93.1	285
The year	8.7	----------	5.12	7.92	1,870	5,740

* Estimated.

OHEO STREAM AT ELEVATION 1,550 FEET, NEAR KIPAHULU, MAUI

LOCATION.—Water-stage recorder at old diversion dam 2¼ miles above mouth and 2 miles northwest of Kipahulu.

DRAINAGE AREA.—5.8 square miles.

RECORDS AVAILABLE.—February, 1927, to June, 1929.

EXTREMES.—Maximum discharge during period, 3,340 million gallons a day or 5,170 second-feet Dec. 16 (gage height, 15.45 feet); dry several days during the year.

1927–1929: Maximum discharge, that of Dec. 16, 1928; stream becomes dry during dry periods.

REMARKS.—Records good for ordinary stages; poor for high stages. No diversions.

Discharge, in million gallons a day, 1928–29

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	316	5.4	1.2	87	3.0	3.2	22	0.13	188	1.8	2.8	4.7
2	15.6	15.2	35	53	1.6	.90	3.3	.03	49	5.1	14.5	68
3	9.5	26	48	36	.84	.71	4.9	0	9.9	4.7	1.3	5.8
4	17.1	3.2	55	19.8	.64	.45	1.5	0	4.1	61	.32	95
5	5.4	6.7	5.8	57	.58	.35	1.6	0	1.2	19.9	.16	38
6	2.1	4.2	2.2	18.8	.51	2.7	3.1	0	.74	21	.08	20
7	29	45	19.3	12.2	85	3.5	.72	0	8.7	18.1	.01	4.0
8	52	18.1	33	8.9	6.6	10.1	.40	0	7.8	40	0	.48
9	17.2	3.4	38	4.7	27	32	.24	0	69	3.8	0	.24
10	14.8	27	197	5.0	44	25	.16	0	60	19.2	0	.08
11	46	30	93	4.6	225	56	.14	0	105	40	0	.19
12	7.6	79	7.6	27	15.2	91	.13	50	66	197	0	.18
13	3.9	20	3.4	16.1	26	345	.11	37	10.5	39	.32	30
14	10.7	9.6	1.4	62	63	284	2.6	434	94	10.1	.03	13.5
15	22	9.1	.84	46	67	174	.48	412	247	29	.01	81
16	57	80	2.7	7.1	69	518	.01	275	6.6	2.7	0	10.4
17	83	159	17.5	6.7	16.4	17.8	0	499	10.6	.84	0	.82
18	29	70	28	27	68	4.7	0	98	10.2	71	0	.75
19	20	7.6	132	98	31	2.7	128	9.2	108	11.6	0	.24
20	18.0	89	9.5	7.6	6.4	2.7	55	103	92	5.0	0	.08
21	7.6	56	3.3	11.9	8.8	1.1	2.0	150	82	1.0	0	0
22	69	76	1.4	12.6	1.1	1.3	21	176	39	.58	0	0
23	21	16.6	.64	3.3	.64	1.0	8.2	91	17.2	.50	.01	0
24	53	27	4.5	1.2	.55	2.2	.24	75	79	9.2	15.5	0
25	42	7.6	22	1.4	19.0	6.9	.14	70	66	8.3	1.0	0
26	21	4.3	2.5	.60	5.6	13.4	1.5	4.7	27	.32	3.7	0
27	176	2.5	1.7	522	5.3	2.3	13.6	6.9	80	.27	0	0
28	39	10.0	26	170	1.1	109	10.8	244	54	.16	28	0
29	18.0	9.0	21	25	6.1	381	1.8	-------	10.2	.37	31	0
30	7.6	6.6	3.1	18.8	125	35	.40	-------	2.9	.24	15.8	0
31	2.7	1.2	-------	7.0	-------	3.4	.22	-------	2.5	-------	20	0

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	316	2.1	39.8	61.6	1,230	3,790
August	159	1.2	29.8	46.1	924	2,840
September	197	.64	27.2	42.1	817	2,500
October	522	.60	44.5	68.9	1,380	4,230
November	225	.51	31.0	48.0	930	2,850
December	518	.35	68.8	106	2,130	6,550
January	128	0	9.17	14.2	284	872
February	499	0	97.7	151	2,730	8,400
March	247	.74	51.9	80.3	1,610	4,940
April	197	.16	20.7	32.0	622	1,910
May	31	0	4.34	6.71	135	413
June	95	0	12.4	19.2	373	1,140
The year	522	0	36.1	55.9	13,200	40,400

RIGHT BRANCH OF KAHALAWE STREAM NEAR KIPAHULU, MAUI

LOCATION.—Water-stage recorder at old ditch intake, elevation 1,100 feet, 2 miles north of Kipahulu.

DRAINAGE AREA.—0.1 square mile.

RECORDS AVAILABLE.—February, 1927, to June, 1929.

EXTREMES.—Maximum discharge during year, 347 million gallons a day or 537 second-feet Feb. 17 (gage height, 10.07 feet); minimum, 0.3 million gallons a day or 0.5 second-foot June 28–30.

1927–1929: Maximum discharge, that of Feb. 17, 1929; minimum, 0.2 million gallons a day or 0.3 second-foot Mar. 23, 24, 1928.

REMARKS.—Records good for ordinary stages, poor for high stages. No diversion.

Discharge, in million gallons a day, 1928–29

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	9.6	2.7	2.0	2.0	1.5	1.4	3.5	0.9	5.4	2.3	1.6	1.1
2	5.5	3.2	4.8	2.8	1.2	1.2	1.9	.9	3.0	2.7	2.0	2.3
3	3.3	4.4	4.2	2.0	1.1	1.4	2.1	.9	2.1	2.1	1.8	.9
4	3.3	2.3	2.4	2.6	1.0	1.1	1.8	.8	2.4	7.8	1.0	2.0
5	2.3	3.0	2.0	4.8	1.0	1.0	1.6	.8	2.0	4.0	.9	1.8
6	2.0	3.0	1.8	2.1	1.1	1.5	1.8	.8	1.6	3.2	.9	1.6
7	3.3	4.4	7.2	2.3	7.1	1.4	1.5	1.8	3.5	3.5	.8	.9
8	3.6	2.7	3.6	1.9	1.5	1.9	1.4	1.4	3.1	4.3	.8	.9
9	2.1	2.0	5.3	1.5	1.9	2.2	1.4	.8	4.6	1.9	.7	.8
10	2.0	4.0	11.0	1.6	1.5	1.6	1.1	1.0	6.1	6.5	.7	.7
11	5.6	3.9	4.1	2.3	3.8	2.9	1.1	2.5	10.2	5.5	.7	1.4
12	2.0	3.8	2.3	5.2	1.4	2.4	1.0	.9	5.6	12.3	.9	1.0
13	1.6	2.7	2.3	2.1	1.6	10.6	1.0	1.0	2.4	3.0	2.4	2.5
14	1.6	2.3	2.0	2.6	7.5	8.8	1.4	3.2	12.6	2.1	1.6	1.6
15	1.5	2.1	1.9	2.1	2.8	9.8	1.1	7.1	17.4	2.0	1.1	6.6
16	3.5	3.0	2.3	1.4	6.7	19.8	1.0	15.7	2.7	1.9	.7	1.4
17	4.8	10.6	4.2	1.4	2.1	6.0	.9	31	2.7	1.6	.6	.9
18	3.5	5.1	4.0	4.3	2.1	2.7	1.0	8.0	2.4	4.3	.5	1.2
19	3.6	2.1	7.2	5.4	3.0	2.4	6.9	4.0	3.6	1.9	.5	.9
20	4.3	14.4	2.1	1.4	1.9	2.1	2.2	6.5	2.4	1.6	.5	.8
21	2.3	9.3	1.9	1.1	1.9	2.1	1.1	4.9	2.4	1.4	.6	.7
22	8.8	11.7	1.8	1.5	1.5	2.0	1.4	8.8	3.5	1.8	.6	.7
23	2.4	4.0	1.5	1.1	1.4	1.9	1.1	4.9	3.1	1.9	2.2	.6
24	5.6	6.3	3.7	1.0	1.6	2.1	.9	8.9	5.3	2.6	1.7	.6
25	4.6	3.0	7.4	1.4	2.1	4.7	.8	4.5	4.2	1.6	.8	.6
26	3.4	2.7	1.9	1.0	1.5	2.7	6.8	2.7	4.5	1.4	1.0	.6
27	10.6	2.7	1.8	6.2	1.4	1.6	7.7	2.4	18.4	1.4	1.1	.4
28	3.3	4.3	2.6	9.9	1.5	2.9	4.5	5.8	12.6	1.1	2.8	.3
29	3.0	3.6	3.5	2.4	3.7	15.9	1.5	-------	3.0	1.5	3.8	.3
30	2.7	2.3	1.6	3.4	5.8	2.8	1.1	-------	2.3	1.2	1.8	.4
31	2.1	1.9	-------	1.5	-------	1.8	1.0	-------	2.1	-------	3.7	-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	10.6	1.5	3.80	5.88	118	362
August	14.4	1.9	4.31	6.67	134	410
September	11.0	1.5	3.48	5.38	104	320
October	9.9	1.0	2.65	4.10	82.3	252
November	7.5	1.0	2.47	3.82	74.2	227
December	19.8	1.0	3.96	6.13	123	377
January	7.7	.8	2.05	3.17	63.6	195
February	31	.8	4.75	7.35	133	408
March	18.4	1.6	5.07	7.84	157	482
April	12.3	1.1	3.01	4.66	90.4	277
May	3.8	.5	1.32	2.04	40.8	126
June	6.6	.3	1.22	1.89	36.5	112
The year	31	.3	3.17	4.90	1,160	3,550

HANAWI STREAM NEAR NAHIKU, MAUI

LOCATION.—Water-stage recorder 200 feet above Koolau ditch intake and trail, 1¾ miles southeast of Nahiku, and 4½ miles southeast of Keanae.

DRAINAGE AREA.—0.8 square mile.

RECORDS AVAILABLE.—January, 1914, to January, 1916; November, 1921, to June, 1929.

EXTREMES.—Maximum discharge during year, 400 million gallons a day or 619 second-feet Dec. 16 (gage height, 6.00 feet); minimum, 2.2 million gallons a day or 3.4 second-feet June 29.

1914–1916; 1921–1929: Maximum stage from floodmarks, about 20 feet Jan. 18, 1916 (discharge not determined); minimum, 1.4 million gallons a day or 2.2 second-feet July 5, 8, 1926.

REMARKS.—Records good for ordinary stages; fair for estimated periods; poor for extremely high and low stages. No diversions.

Discharge, in million gallons a day, 1928–29

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	65	15.6	a5.3	11.1	3.8	5.8	13.2	4.9	46	4.2	4.0	2.6
2	8.2	10.3	23	10.1	3.5	5.6	8.2	4.9	27	4.1	3.9	2.5
3	7.2	12.0	14.8	5.6	3.3	5.3	35	5.0	24	4.2	3.8	2.5
4	5.5	11.2	14.0	5.6	3.5	5.1	10.3	5.0	49	3.9	3.6	3.8
5	4.5	12.0	9.6	7.8	3.9	50	8.6	4.8	51	3.5	3.7	5.6
6	4.0	9.6	7.7	5.5	3.5	30	15.4	6.3	26	3.5	4.8	4.2
7	7.3	8.6	10.8		40	9.6	8.4	7.0	57	4.0	4.3	3.2
8	11.3	8.0	7.1		7.0	13	8.1	5.2	40	8.0	4.5	2.7
9	5.9	7.3	10.0		15.1		7.1	4.7	79	4.1	3.5	2.6
10	6.1	10.1	32	3.7	31	14.6	6.4	4.4	34	43	3.7	2.6
11	7.3	8.4	26		89	14.7	6.2	4.2	37	100	8.2	4.4
12	5.1	8.8	8.6		8.5	29	5.8	29	15.0	145	7.0	4.0
13	5.1	8.2	6.9		12.7	51	5.7	6.3	12.0	24	20	5.1
14	5.5	7.3	6.0	b22	31	74	9.8	58	11.2	9.7	10.3	3.4
15	4.5	7.1	5.5	4.2	11.2	28	7.5	99	33	7.6	6.8	11.1
16	18.1	18.4	5.6		7.1	102	6.4	112	12.0	5.7	4.8	5.1
17	12.6	29	5.3	3.3	6.3	13.0	5.6	191	10.3	5.3	4.0	3.5
18	8.3	18.0	5.0	3.3	8.8	15.6	5.6	97	9.6	15.7	3.7	3.1
19	8.1	8.4	27	3.3	7.6	10.8	10.9	34	8.8	6.1	3.5	2.9
20	6.1	9.5	6.6	3.2	39	9.6	9.1	109	8.7	5.2	3.3	2.7
21	5.3	9.2	5.6	3.4	11.7	10.3	6.2	86	8.2	5.0	3.2	2.7
22	12.0	9.7	5.2	3.8	8.1	10.3	163	56	7.5	5.0	3.1	2.5
23	8.8	12.3	4.9	3.5	7.6	10.3	33	14.0	7.0	5.0	4.0	2.5
24	28	14.1	4.7	3.2	7.6	11.2	8.8	12.7	6.7	5.1	5.3	2.5
25	41	7.7	4.5	3.1	7.1	47	7.2	10.3	6.2	4.8	3.4	2.5
26	117	6.5	4.3	3.0	6.8	27	6.4	12.0	5.8	4.7	3.0	2.4
27	37	5.9	4.2	33	6.6	11.2	5.7	22	5.5	4.5	5.7	2.3
28	11.2	10.0	4.1	21	6.4	15.9	5.3	103	5.1	4.3	3.9	2.2
29	8.8	6.1	5.8	4.6	6.6	30	5.1	-------	4.8	4.2	3.0	2.2
30	8.6	a5.7	4.4	4.3	6.4	11.2	5.0	-------	4.5	4.1	2.7	2.3
31	9.4	b5.6	-------	4.2	-------	8.7	4.9	-------	4.3	-------	2.7	-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	117	4.0	15.9	24.6	493	1,510
August	29	5.6	10.3	15.9	321	980
September	32	4.1	9.48	14.7	284	873
October	33	3.0	6.52	10.1	202	620
November	89	3.3	13.7	21.2	411	1,260
December	102	5.1	22.3	34.5	693	2,120
January	163	4.9	14.3	22.1	444	1,360
February	191	4.2	39.6	61.3	1,110	3,400
March	79	4.3	21.2	32.8	656	2,020
April	145	3.5	15.1	23.4	454	1,390
May	20	2.7	4.88	7.55	151	464
June	11.1	2.2	3.39	5.25	102	312
The year	191	2.2	14.6	22.6	5,320	16,300

a Partly estimated. b Estimated.

KAPAULA STREAM NEAR NAHIKU, MAUI

LOCATION.—Water-stage recorder 150 feet above intake to Koolau ditch, 300 feet above ditch trail, 1¾ miles southwest of Nahiku, and 4 miles southeast of Keanae.

DRAINAGE AREA.—0.2 square mile.

RECORDS AVAILABLE.—November, 1921, to June, 1929.

EXTREMES.—Maximum discharge during year, 665 million gallons a day or 1,030 second-feet Dec. 16 (gage height, 5.23 feet); minimum, 1.2 million gallons a day or 1.9 second-feet June 30.

1922–1929: Maximum discharge, 868 million gallons a day or 1,340 second-feet Dec. 13, 1921 (gage height, 8.45 feet); minimum, 0.6 million gallons a day or 0.9 second-foot July 5, 1926.

REMARKS.—Records good for ordinary stages, fair for estimated periods, and poor for high stages. No diversions.

Discharge, in million gallons a day, 1928–29

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	48	12.8	3.5	8.4	2.2	2.4	11.8			2.2	1.8	1.6
2	6.3	7.9	21	9.3	2.0	2.3	6.5			2.2	1.6	1.6
3	5.6	8.3	13.5	3.4	1.8	2.2	30			2.3	1.6	1.6
4	3.8	7.7	11.8	3.4	2.0	2.1	10.0		34	2.1	1.6	4.9
5	2.8	7.4	7.9	6.6	2.9	64	7.4			1.9	1.6	9.0
6	2.4	5.1	5.4	3.5	2.3	29	14.5	2.5		1.8	2.7	5.2
7	10.1	4.7	10.4	2.6	39	9.6	8.2			2.1	2.9	2.7
8	13.2	4.3	6.1	2.3	7.5	13.9	10.1		31	7.6	3.2	2.0
9	5.4	4.0	8.6	2.0	13.8	16.7	[b]7.9		64	2.7	2.0	1.7
10	5.9	8.8	32	1.9	23	17.4	[b]4.6		24	42	2.0	1.7
11	6.8	7.2	20	1.8	70	16.7	[a]3.6		28	94	8.5	2.3
12	3.8	8.0	5.9	1.8	11.6	28	3.2		11.1	125	8.3	2.6
13	4.3	7.1	4.0	1.7	14.8	35	3.1	30	8.5	19.1	24	4.9
14	7.0	4.9	3.4	21	27	58	13.3		7.8	7.4	13.3	2.7
15	6.6	6.2	3.1	3.2	13.7	27	7.9		20	7.9	7.2	13.3
16	25	17.0	3.4	2.0	7.2	96	4.6		8.3	4.3	2.9	5.2
17	13.2	30	3.0	1.8	5.6	10.5	3.5	110	6.1	4.0	2.2	2.6
18	7.9	10.8	3.0	1.8	12.0	13.2	3.6		5.2	15.4	2.0	1.9
19	7.5	5.2	28	1.8	8.5	9.3	9.1		5.1	4.1	1.8	1.7
20	4.4	10.2	4.4	1.7	40	8.1	6.6		4.7	3.1	1.8	1.5
21	4.1	5.8	3.0	1.8	11.9	7.2	4.7		4.4	2.6	1.8	1.5
22	11.3	8.1	2.6	2.2	5.8	6.3	164		4.1	2.2	1.8	1.4
23	8.8	12.6	2.2	1.9	4.3	5.2	21	34	3.9	2.1	3.1	1.4
24	29	11.0	2.1	1.7	4.0	7.4	7.0		3.6	2.3	4.3	1.4
25	40	5.6	2.0	1.6	3.4	40	5.1		3.4	2.0	2.1	1.5
26	114	4.1	1.9	1.6	3.0	23	4.6		3.0	1.9	1.8	1.4
27	25	6.2	1.9	32	2.8	8.7	4.1	44	2.8	1.8	4.9	1.4
28	7.9	6.4	1.9	11.8	2.7	13.2	4.0		2.6	1.8	2.9	1.4
29	6.8	3.6	5.1	2.8	2.8	25	3.6	-------	2.4	1.7	1.9	1.3
30	6.6	2.9	2.4	3.5	2.9	9.4	3.2	-------	2.2	1.7	1.8	1.3
31	7.0	2.7	-------	2.8	-------	6.1	2.9	-------	2.2	-------	1.7	-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	114	2.4	14.5	22.4	450	1,380
August	30	2.7	7.95	12.3	247	756
September	32	1.9	7.45	11.5	224	686
October	32	1.6	4.70	7.27	146	447
November	70	1.8	11.7	18.1	350	1,080
December	96	2.1	19.8	30.6	613	1,880
January	164	2.9	12.7	19.6	394	1,210
February	----------	----------	38.6	59.7	1,080	3,320
March	----------	2.2	16.0	24.8	496	1,520
April	125	1.7	12.4	19.2	371	1,140
May	24	1.6	3.91	6.05	121	372
June	13.3	1.3	2.82	4.36	84.7	260
The year	----------	1.3	12.5	19.3	4,580	14,100

[a] Partly estimated. [b] Estimated.

KOOLAU DITCH AT NAHIKU WEIR, NEAR NAHIKU, MAUI

LOCATION.—Water-stage recorder between Kapaula and Waiohue Streams, 3½ miles southwest of Nahiku and 4 miles southeast of Keanae.

RECORDS AVAILABLE.—February, 1919, to June, 1929.

EXTREMES.—Maximum discharge during year, 56.8 million gallons a day or 87.9 second-feet some time between July 12 and Sept. 1; no flow Feb. 16–21 (water shut out of ditch).

1919–1929: Maximum discharge, that between July 12 and Sept. 1, 1928; no flow occasionally when intake gates are closed.

REMARKS.—Records excellent except those for extremely low stages, which are good; estimated records fair July 1–9, July 12 to Sept. 1, Sept. 3 to Oct. 15, Oct. 27 to Dec. 21, and Dec. 31 to Jan. 23 by comparison with discharges from twice daily readings of first ditch staff gage above station. Regulated by spillways and gates. Koolau ditch diverts at elevation of 1,200 feet from all streams from Makapipi to Alo.

Discharge, in million gallons a day, 1928–29

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	37	42	21	14	16	18	40	16.7	42	15.0	13.6	8.4
2	35	37	35	34	14	18	32	16.0	44	14.6	12.3	8.4
3	32	38	35	21	14	17	40	15.3	44	14.6	11.6	8.1
4	29	36	39	20	13	17	39	15.0	44	13.6	11.0	13.9
5	21	38	35	27	16	32	30	14.2	46	12.3	11.3	18.8
6	20	32	28	21	14	44	40	21	44	12.0	15.0	15.0
7	24	31	36	19	39	35	32	23	46	13.4	15.6	10.7
8	35	28	30	16	25	27	17	17.4	46	25	16.2	9.0
9	24	25	38	16	18	42	4.0	15.0	43	15.0	12.3	8.4
10	28	33	40	15	21	36	4.0	13.9	36	36	12.6	8.4
11	30	30	44	15	39	40	11	13.2	42	51	21	10.4
12	24	37	39	14	30	43	16	27	44	51	21	10.8
13	23	33	32	13	31	43	16	21	42	46	36	16.2
14	23	27	26	14	34	44	22	33	44	42	34	11.3
15	20	28	23	16	37	45	23	46	49	36	26	30
16	31	40	23	[a]13.2	33	40	19	18.5	42	28	17.8	18.1
17	35	44	22	13.2	28	37	18	0	38	24	15.6	12.3
18	32	44	19	12.9	34	42	19	0	36	43	14.2	10.7
19	32	35	39	12.9	30	37	29	0	34	28	13.2	9.8
20	27	40	25	12.3	34	32	28	0	32	23	12.3	9.3
21	23	36	22	12.3	36	33	20	15.4	30	21	12.0	9.0
22	30	33	20	13.9	29	34	45	28	28	18.9	11.6	8.7
23	33	37	18	12.9	25	32	44	21	26	17.8	14.6	8.4
24	36	42	17	12.3	26	36	40	34	24	17.8	17.0	8.4
25	38	30	16	11.3	23	40	32	38	23	18.1	12.0	8.1
26	32	32	15	11.0	21	42	28	38	21	15.6	10.4	7.9
27	37	27	15	27	20	40	24	40	19.6	15.0	16.7	7.3
28	35	35	15	35	19	40	23	46	18.5	14.2	12.6	7.1
29	33	25	20	19	18	42	20	-------	17.1	13.9	10.1	6.8
30	33	23	16	15	20	40	18.5	-------	16.0	13.6	9.3	7.1
31	32	20	-------	14	-------	36	17.4	-------	15.3	-------	9.0	-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	38	20	29.8	46.1	924	2,840
August	44	20	33.5	51.8	1,040	3,190
September	44	15	26.8	41.5	803	2,470
October	35	11.0	16.9	26.1	523	1,610
November	39	13	25.2	39.0	757	2,320
December	45	17	35.6	55.1	1,100	3,390
January	45	4.0	25.5	39.5	791	2,430
February (24 days)	46	0	24.4	37.8	587	1,800
March	49	15.3	34.7	53.7	1,080	3,300
April	51	12.0	23.6	36.5	709	2,170
May	36	9.0	15.4	23.8	478	1,470
June	30	6.8	10.9	16.9	327	1,000
The year (361 days)	51	0	25.3	39.1	9,120	28,000

[a] Partly estimated.

WAIOHUE STREAM NEAR NAHIKU, MAUI

LOCATION.—Water-stage recorder 200 feet above intake to Koolau ditch, 300 feet above ditch trail, 2¼ miles southwest of Nahiku, and 3½ miles southeast of Keanae.

DRAINAGE AREA.—1.5 square miles.

RECORDS AVAILABLE.—October, 1921, to June, 1929.

EXTREMES.—Maximum discharge during year, 430 million gallons a day or 665 second-feet Feb. 17 (gage height, 4.87 feet); minimum, 3.0 million gallons a day or 4.6 second-feet Oct. 25, 26, and 27.

1922–1929: Maximum discharge, 544 million gallons a day or 842 second-feet Apr. 17, 1927 (gage height, 5.63 feet); minimum, 1.7 million gallons a day or 2.6 second-feet Apr. 11, 1926.

REMARKS.—Records good for ordinary stages; poor for extremely high and low stages. No diversions.

Discharge, in million gallons a day, 1928–29

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	28	13.3	4.7	13.1	3.4	4.2	10.6	4.7	22	3.8	3.8	3.1
2	7.2	8.7	18.4	8.9	3.4	4.1	6.6	4.5	14.4	3.9	3.5	3.2
3	6.4	9.9	10.3	4.7	3.2	4.0	15.7	4.2	15.1	4.0	3.3	3.1
4	5.8	8.0	8.7	5.3	3.6	3.9	7.6	4.1	24	3.7	3.2	3.9
5	5.3	8.8	6.8	6.6	4.2	30	7.0	4.0	36	3.5	3.3	4.7
6	5.0	6.4	6.4	4.8	3.8	17.1	12.3	6.6	14.9	3.5	4.5	3.9
7	8.4	6.2	10.0	4.4	23	5.5	7.0	6.7	32	4.0	4.5	3.4
8	9.3	5.9	6.4	4.4	5.4	9.0	8.1	4.6	24	6.0	4.7	3.2
9	6.6	5.6	10.5	4.0	7.2	9.4	6.2	4.1	54	4.0	3.5	3.1
10	8.0	7.9	29	3.8	9.8	10.7	5.9	3.9	23	37	3.6	3.2
11	8.0	6.2	13.4	3.7	32	11.8	5.6	3.8	28	44	4.4	3.9
12	5.9	8.3	7.0	3.6	6.9	16.5	5.3	12.3	12.4	54	4.5	4.2
13	5.6	7.5	6.2	3.5	11.2	24	5.1	4.7	9.8	9.7	10.8	4.7
14	5.6	5.9	5.9	4.4	21	33	9.7	23	11.5	5.9	8.8	4.2
15	5.4	6.1	5.6	4.3	11.7	17.3	6.2	33	15.7	6.2	5.4	9.3
16	17.4	13.7	5.6	3.8	7.8	59	5.4	53	8.0	6.1	4.2	4.8
17	11.0	24	5.1	3.6	6.8	12.4	4.8	100	7.0	6.2	4.1	4.2
18	8.7	11.3	5.5	3.5	10.2	14.3	5.1	50	6.6	17.4	4.1	4.0
19	10.1	6.2	15.3	3.6	8.0	10.8	6.4	22	6.2	6.2	4.0	3.9
20	7.0	12.3	5.3	3.3	21	8.7	5.6	46	5.9	5.6	3.9	3.9
21	6.4	7.0	4.8	3.3	9.9	8.0	5.5	31	5.8	5.1	3.8	3.9
22	11.2	8.9	4.6	3.9	6.6	7.4	104	32	5.3	4.8	3.7	3.7
23	8.9	9.5	4.5	3.3	6.4	6.8	15.4	12.4	5.0	4.8	4.4	3.6
24	21	9.5	4.4	3.2	6.2	8.9	7.6	14.1	4.8	4.8	4.2	3.7
25	26	6.2	4.1	3.2	5.8	34	6.8	8.4	4.7	4.4	3.6	3.7
26	62	5.8	4.0	3.0	5.4	13.0	6.4	8.8	4.5	4.2	3.5	3.5
27	22	6.2	4.0	16.1	5.0	7.0	6.1	14.1	4.2	4.0	3.8	3.3
28	9.8	9.9	4.0	7.2	4.8	13.1	5.9	38	4.1	3.9	3.7	3.2
29	8.9	5.4	4.7	3.7	4.7	18.9	5.6	-------	3.9	3.7	3.4	3.2
30	8.0	5.0	4.0	3.3	4.6	7.2	5.1	-------	3.8	3.8	3.3	3.2
31	8.3	4.8	-------	3.3	-------	6.6	4.8	-------	3.8	-------	3.2	-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	62	5.0	11.8	18.3	367	1,120
August	24	4.8	8.40	13.0	260	799
September	29	4.0	7.64	11.8	229	703
October	16.1	3.0	4.86	7.52	151	462
November	32	3.2	8.77	13.6	263	807
December	59	3.9	14.1	21.8	437	1,340
January	104	4.8	10.3	15.9	319	980
February	100	3.8	19.8	30.6	554	1,700
March	54	3.8	13.6	21.0	420	1,290
April	54	3.5	9.27	14.3	278	853
May	10.8	3.2	4.28	6.62	133	407
June	9.3	3.1	3.90	6.03	117	359
The year	104	3.0	9.67	15.0	3,530	10,800

WEST KOPILIULA STREAM NEAR KEANAE, MAUI

LOCATION.—Water-stage recorder 600 feet above Koolau ditch crossing and highway bridge and 3 miles southeast of Keanae post office.

DRAINAGE AREA.—3.9 square miles.

RECORDS AVAILABLE.—January, 1914, to September, 1917; October, 1921, to June, 1929.

EXTREMES.—Maximum discharge during year, 807 million gallons a day or 1,250 second-feet Feb. 17 (gage height, 5.63 feet); minimum, 2.8 million gallons a day or 4.3 second-feet June 29.

1914-1917, 1921-1929: Maximum discharge, about 2,000 million gallons a day or 3,090 second-feet Jan. 18, 1916 (gage height, 9.25 feet); minimum, 0.6 million gallons a day or 0.9 second-feet Sept. 15–17, 1917.

REMARKS.—Records good for ordinary stages, fair for estimated periods, and poor for high stages. No diversions.

Discharge, in million gallons a day, 1928–29

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	50	16.8	6.9	4.4	4.4	4.9	14.7	5.4	56	3.9	3.7	3.5
2		10.7	36	16.7	4.4	4.6	8.0	5.3	31	4.1	3.3	3.5
3		11.4	22	5.8	4.0	4.5	46	5.2	28	4.0	3.2	3.5
4		10.2	16.6	5.2	4.1	4.4	11.6	4.9	56	3.6	3.1	9.6
5	7.5	10.2	12.4	6.9	5.9	70	9.4	4.7	71	3.4	3.3	21
6		7.9	9.0		4.5	75	21	7.3	41	3.5	4.4	9.0
7		7.5	14.7		66	19.6	9.6	7.5	101	4.4	4.2	5.9
8	15	7.0	9.6	4.7	11.2	18.5	10.1	5.2	70	8.6	5.0	4.7
9		6.7	12.7		27	40	7.5	4.6	97	3.9	3.4	4.2
10	10.3	12.8	48		67	34	6.8	4.5	42	69	4.0	4.1
11	10.3	9.0	25		172	28	6.3	4.5	43	154	11.4	5.3
12	7.7	9.3	9.4		33	50	6.0	34	14.6	208	9.4	4.8
13	8.5	8.9	7.5		30	61	6.2	7.8	11.2	37	39	7.0
14	16.3	7.2	6.7	4.1	40	101	37	53	11.9	11.4	17.0	4.8
15	20	8.5	6.3		26	46	11.0	103	27	11.6	8.2	20
16	50	25	6.8		10.4	118	8.1	185	9.6	7.9	5.3	6.9
17	26	45	6.2	3.7	8.8	15.0	6.7	347	8.1	6.7	4.7	4.9
18	14.4	18.4	6.5	3.7	14.4	17.1	7.0	158	7.3	21	4.3	4.3
19	12.2	9.2	35	3.7	11.3	12.3	19.2	43	6.9	6.0	4.0	3.9
20	8.8	13.2	7.5	3.5	54	9.6	13.0	168	6.5	5.2	3.9	3.7
21	7.5	8.4	6.5	3.8	27	9.0	9.6	135	6.0	4.8	3.7	3.6
22	20	11.8	5.9	4.7	9.8	8.1	278	88	5.6	4.6	3.8	3.4
23	12.3	18.9	5.4	3.5	8.5	7.4	55	22	5.3	4.6	5.9	3.3
24	57	16.5	5.4	3.3	7.5	8.6	12.8	17.4	5.2	4.7	6.2	3.4
25	83	9.0	5.2	3.2	6.7	56	9.6	9.8	4.9	4.1	3.9	3.4
26	230	7.7	4.9	3.0	6.2	45	7.9	15.3	4.7	4.1	3.7	3.1
27	79	8.2	4.5	23	5.9	11.3	7.2	33	4.4	3.9	8.4	2.9
28	16.4	10.4	5.0	23	5.7	19.2	7.2	126	4.2	3.7	4.9	2.9
29	12.2	6.5	8.5	4.7	5.4	26	6.7	-------	4.1	3.5	4.1	2.9
30	10.1	6.0	5.9	6.9	5.6	11.0	6.0	-------	3.9	3.6	3.8	3.0
31	11.7	5.9	-------	5.2	-------	8.8	5.9	-------	3.9	-------	3.7	-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	230	----------	29.0	44.9	899	2,760
August	45	5.9	11.7	18.1	364	1,110
September	48	4.5	12.1	18.7	362	1,110
October	23	----------	6.00	9.28	186	571
November	172	4.0	22.9	35.4	687	2,110
December	118	4.4	30.4	47.0	944	2,890
January	278	5.9	21.6	33.4	671	2,050
February	347	4.5	57.3	88.7	1,600	4,920
March	101	3.9	25.5	39.5	791	2,430
April	208	3.4	20.6	31.9	619	1,900
May	39	3.1	6.35	9.82	197	604
June	21	2.9	5.55	8.59	166	511
The year	347	2.9	20.5	31.7	7,490	23,000

EAST WAILUAIKI STREAM NEAR KEANAE, MAUI

LOCATION.—Water-stage recorder 1,000 feet above Koolau ditch crossing and trail and 3 miles southeast of Keanae post office.

DRAINAGE AREA.—3.7 square miles.

RECORDS AVAILABLE.—December, 1913, to October, 1917; July, 1922, to June, 1929.

EXTREMES.—Maximum discharge during year, 976 million gallons a day or 1,510 second-feet Feb. 17 (gage height, 7.26 feet); minimum, 2.8 million gallons a day or 4.3 second-feet June 29, 30.

1913–1917, 1922–1929: Maximum discharge, 1,900 million gallons a day or 2,940 second-feet Jan. 18, 1916 (gage height, 8.35 feet); minimum, 1.0 million gallons a day or 1.6 second-feet Oct. 22, 23, 1917; Aug. 1, 2, 1922.

Flood of Dec. 24, 1921, may have reached a higher stage, but owing to destruction of station no data are available for this peak.

REMARKS.—Records good for ordinary stages, fair for estimated periods, and poor for high stages. No diversions.

Discharge, in million gallons a day, 1928–29

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	80	16.6	7.6	11.5	4.6	4.9	16.6	5.6	46	5.2	4.0	3.4
2	11.1	10.8	44	10.7	4.3	4.7	9.7	5.4	27	5.3	3.6	3.4
3	9.1	12.2	26	5.9	3.9	4.4	56	5.1	29	5.4	3.5	3.4
4	7.9	11.0	18.2	6.5	4.2	4.3	13	4.9	63	4.7	3.3	10.8
5	6.5	10.7	12.2	9.1	7.4	98	10.6	4.7	83	4.4	3.6	21
6	5.7	8.5	9.1	6.1	4.7	71	25	7.5	32	4.6	5.2	9.2
7	17.2	7.9	18.5	5.3	80	18.1	11.1	8.8	88	6.4	5.0	5.3
8	19.5	7.2	10.5	5.1	12.8	17.8	11.2	5.4	65	11.9	6.1	4.2
9	9.4	6.9	14.5	4.6	31	39	9.1	4.7	111	5.4	3.8	3.8
10	10.0	14.2	59	4.3	58	35	7.9	4.5	42	112	4.4	3.8
11	10.3	9.8	28	4.1	170	26	7.6	4.7	48	158	14.9	5.3
12	7.6	9.7	10.4	4.0	27	54	7.1	35	16.0	225	11.3	5.0
13	7.9	9.0	8.5	3.8	28	67	7.5	8.6	12.6	33	44	7.8
14	15.8	7.7	7.2	5.2	45	112	33	56	13.1	13.6	19.1	5.2
15	14.7	9.3	6.8	6.4	23	49	13.0	100	27	13.9	9.0	24
16	50	29	7.2	4.3	11.1	105	9.1	170	11.1	9.0	6.0	7.4
17	23	48	6.4	4.1	9.1	15.9	7.6	358	9.8	7.9	5.1	5.0
18	12.6	18.0	6.3	3.9	14.3	18.3	8.2	140	9.1	24	4.5	4.3
19	11.8	9.1	42	4.0	10.8	13.3	20	45	8.5	7.6	4.2	4.0
20	8.5	13.4	7.6	3.7	57	11.5	13.9	165	7.9	6.4	4.0	3.8
21	7.5	9.3	6.4	4.3	28	10.4	10.4	124	7.6	5.7	3.8	3.6
22	23	12.1	5.8	5.4	9.8	9.1	242	88	7.1	5.4	4.0	3.5
23	13.0	21	5.4	4.0	8.5	8.5	56	20	6.8	5.3	7.0	3.3
24	45	18.2	5.4	3.8	7.8	10.2	13.9	16.2	6.6	5.4	6.9	3.5
25	87	9.8	5.0	3.7	6.7	87	9.8	10.4	6.3	4.7	4.2	3.5
26	215	7.9	4.7	3.5	6.2	38	8.5	24	6.0	4.6	3.8	3.3
27	64	8.3	4.7	25	5.7	12.6	7.7	49	5.8	4.3	7.5	3.0
28	15.1	11.0	5.6	19.2	5.5	20	7.7	115	5.5	4.1	5.7	3.0
29	11.8	7.0	10.6	4.9	5.4	25	7.0	-------	5.4	4.0	4.2	2.9
30	9.8	6.5	5.4	8.4	5.7	11.8	6.3	-------	5.1	4.0	3.8	3.2
31	11.0	6.3	-------	6.0	-------	9.8	5.9	-------	5.1	-------	3.5	------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	215	5.7	27.1	41.9	841	2,580
August	48	6.3	12.5	19.3	386	1,190
September	59	4.7	13.6	21.0	409	1,250
October	25	3.5	6.48	10.0	201	616
November	170	3.9	23.2	35.9	696	2,140
December	112	4.3	32.6	50.4	1,010	3,100
January	242	5.9	21.7	33.6	673	2,060
February	358	4.5	56.6	87.6	1,590	4,860
March	111	5.1	26.3	40.7	816	2,500
April	225	4.0	23.7	36.7	711	2,180
May	44	3.3	7.06	10.9	219	672
June	24	2.9	5.76	8.91	173	530
The year	358	2.9	21.2	32.8	7,720	23,700

WEST WAILUAIKI STREAM NEAR KEANAE, MAUI

LOCATION.—Water-stage recorder 500 feet above Koolau ditch crossing and trail bridge and 2¾ miles south of Keanae post office.

DRAINAGE AREA.—3.6 square miles.

RECORDS AVAILABLE.—January, 1914, to October, 1917; November, 1921, to June, 1929.

EXTREMES.—Maximum discharge during year, 2,210 million gallons a day or 3,420 second-feet Feb. 17 (gage height, 9.57 feet); minimum, 1.7 million gallons a day or 2.6 second-feet June 29, 30.

1914–1917, 1921–1929: Maximum discharge (estimated), 4,500 million gallons a day or 6,960 second-feet Jan. 14, 1923 (gage height, from flood-marks, about 13.5 feet); minimum, 0.3 million gallons a day or 0.45 second-foot July 26, 1922.

REMARKS.—Records good for ordinary stages; poor for extremely high stages. No diversions.

Discharge, in million gallons a day, 1928–29

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	98	22	9.5	16.9	5.4	4.6	19.2	5.1	60	3.2	2.9	3.0
2	16.0	13.8	53	15.2	4.7	4.0	29	4.9	35	3.3	2.5	2.8
3	13.1	15.3	35	7.0	4.0	3.7	59	4.4	36	3.2	2.2	2.8
4	10.5	13.8	28	7.7	4.6	3.7	16.0	4.2	69	2.7	2.0	18.6
5	7.9	13.3	18.0	10.7	10.2	135	13.7	3.7	103	2.2	2.6	34
6	6.8	10.1	12.8	6.8	5.4	93	30	6.6	50	2.5	5.4	14.5
7	26	9.1	35	5.9	97	28	13.5	10.0	102	4.2	5.6	7.3
8	28	7.7	16.0	5.4	20	24	14.0	5.0	82	13.3	7.3	5.0
9	13.8	7.1	17.1	4.6	50	52	10.5	4.0	220	4.6	4.2	4.3
10	13.3	21	73	4.2	86	46	8.5	3.6	55	138	5.0	4.2
11	13.5	14.2	40	3.9	234	37	7.5	3.8	63	212	19.2	6.3
12	10.3	11.5	14.2	3.5	44	67	6.7	38	20	319	14.2	5.4
13	12.6	11.3	10.7	2.8	39	92	7.7	10.7	14.8	51	57	9.9
14	31	9.1	8.9	4.4	54	148	44	53	17.8	19.8	25	6.1
15	23	11.6	7.9	5.9	34	53	18.0	112	27	20	12.6	31
16	70	34	8.7	3.5	15.8	178	10.9	358	12.0	12.2	7.5	9.8
17	35	60	7.0	3.0	12.4	20	7.9	778	9.9	9.7	5.9	6.0
18	19.0	27	6.8	2.8	22	22	9.5	240	8.3	27	5.0	5.0
19	15.5	12.8	50	2.9	15.0	17.4	29	55	7.3	9.5	4.3	4.3
20	12.0	16.1	10.3	2.4	79	14.5	18.0	267	6.7	7.3	3.9	3.7
21	9.5	12.4	7.7	3.5	34	12.4	13.1	168	6.0	6.2	3.6	3.3
22	30	13.8	6.5	5.1	13.8	10.7	436	109	5.4	5.7	3.7	2.9
23	19.0	24	5.7	3.0	11.1	9.1	71	31	5.0	5.4	8.7	2.6
24	81	28	5.6	2.6	9.3	10.9	20	30	4.7	5.3	8.6	2.9
25	124	13.8	4.9	2.5	7.5	120	13.1	13.8	4.3	4.3	4.4	3.2
26	393	10.5	4.4	2.1	6.7	38	10.6	33	4.2	4.2	3.6	2.6
27	107	9.5	4.4	30	6.0	18.0	8.9	58	3.9	3.9	11.1	2.0
28	24	12.3	8.1	20	5.4	29	8.3	159	3.7	3.3	7.8	1.8
29	16.0	7.9	17.1	5.6	5.1	25	7.0	-------	3.5	3.2	5.0	1.7
30	13.8	6.7	6.5	13.2	5.4	13.8	6.2	-------	3.2	3.2	4.0	2.1
31	15.0	6.5	-------	8.0	-------	11.7	5.6	-------	2.9	-------	3.5	------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	393	6.8	42.2	65.3	1,310	4,010
August	60	6.5	15.7	24.3	486	1,490
September	73	4.4	17.8	27.5	533	1,640
October	30	2.1	6.94	10.7	215	660
November	234	4.0	31.4	48.6	941	2,890
December	178	3.7	43.3	67.0	1,340	4,120
January	436	5.6	31.4	48.6	972	2,990
February	778	3.6	91.7	142	2,570	7,880
March	220	2.9	33.7	52.1	1,050	3,210
April	319	2.2	30.3	46.9	909	2,790
May	57	2.0	8.33	12.9	258	792
June	34	1.7	6.97	10.8	200	642
The year	778	1.7	29.6	45.8	10,800	33,100

EAST WAILUANUI STREAM NEAR KEANAE, MAUI

LOCATION.—Water-stage recorder 125 feet above Koolau ditch intake, 250 feet above trail, and 2½ miles south of Keanae post office.

DRAINAGE AREA.—0.5 square mile.

RECORDS AVAILABLE.—January, 1914, to October, 1917; November, 1921, to June, 1929.

EXTREMES.—Maximum discharge during year, 633 million gallons a day or 979 second-feet Feb. 17 (gage height, 4.89 feet); minimum, 0.6 million gallons a day or 0.9 second-foot June 29.

1914–1917, 1921–1929: Maximum discharge, 1,050 million gallons a day or 1,620 second-feet Feb. 12, 1925 (gage height, 6.96 feet); minimum, 0.1 million gallons a day or 0.2 second-foot Apr. 11, 1926.

REMARKS.—Records fair for ordinary stages; poor for estimated periods and high stages. No diversions.

Discharge, in million gallons a day, 1928–29

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	9.5	5.9	2.3	8.1	1.6	1.2	7.2	1.3	15.2	1.1	1.1	0.9
2		3.9	20	4.5	1.4	1.0	2.6	1.2	8.9	1.2	.9	.9
3		4.9	12.4	1.9	1.2	1.0	8.6	1.1	12.0	1.2	.8	.9
4		4.4	5.8	2.7	1.4	.9	3.8	1.1	23	.9	.8	2.1
5	2.8	3.9	4.5	3.6	4.0	28	2.8	1.0	40	.8	1.0	3.3
6		2.6	3.1	2.1	1.7	13.2	7.1	3.3	9.6	.8	2.0	1.8
7		2.4	7.2	1.8	25	3.0	3.1	3.5	14.0	1.6	2.2	1.2
8	3.8	2.1	3.4	1.8	5.2	5.2	4.0	1.6	17.9	5.0	2.1	1.0
9		2.1	8.1	1.4	4.4	5.6	2.4	1.3	51	1.3	1.1	.9
10		5.3	31	1.3	5.4	6.8	2.1	1.2	16.2	40	1.4	1.0
11	3.0	3.6	7.9	1.2	15.9	6.9	1.9	1.5	21	44	4.2	1.7
12		3.9	3.5	1.1	3.6	11.7	1.7	12.1	5.3	40	4.0	1.6
13		3.7	2.6	1.1	7.9	17.8	1.8	2.1	3.8	6.4	8.7	2.4
14		2.6	2.3	2.1	17.4	22	4.0	20	4.4	3.5	9.0	1.8
15	2.4	7.4	2.0	2.0	7.7	8.7	2.6	32	10.8	3.0	4.0	8.7
16	13.4	15.0	2.0	1.3	3.8	38	1.9	53	3.3	2.3	2.1	2.6
17	8.1	25	1.8	1.3	2.6	4.5	1.6	103	2.6	2.7	1.8	1.7
18	5.6	6.7	2.3	1.2	3.8	7.3	1.9	35	2.3	15.1	1.7	1.4
19	5.6	3.3	16.0	1.3	3.1	3.8	2.8	22	2.0	2.6	1.4	1.3
20	3.5	16.5	2.1	1.1	11.4	3.0	1.9	31	1.9	2.0	1.3	1.2
21	2.6	3.3	1.8	1.4	6.0	2.8	1.9	17.2	1.7	1.8	1.2	1.1
22	9.6	5.5	1.7	1.9	2.6	2.6	79	26	1.6	1.7	1.2	1.0
23	5.3	7.4	1.6	1.3	2.6	2.3	10.3	5.8	1.4	1.7	2.3	.9
24	15.0	5.8	1.4	1.2	2.3	3.5	3.0	10.7	1.4	1.6	1.9	1.1
25	23	3.0	1.3	1.2	1.9	33	2.6	3.3	1.3	1.4	1.3	1.0
26	57	2.4	1.2	1.1	1.8	10.3	2.3	6.8	1.2	1.4	1.1	.9
27	12.1	3.5	1.2	8.9	1.7	3.3	2.0	10.9	1.2	1.3	2.7	.8
28	4.2	3.9	1.6	3.6	1.6	6.7	2.0	24	1.1	1.2	1.8	.8
29	3.3	2.3	2.6	1.6	1.4	11.8	1.8	-------	1.0	1.1	1.3	.7
30	2.8	1.9	1.2	1.9	1.4	3.5	1.6	-------	.9	1.1	1.1	.8
31	3.7	1.9	-------	1.6	-------	2.6	1.4	-------	.9	-------	1.1	-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	57	----------	7.54	11.7	234	717
August	25	1.9	5.36	8.29	166	510
September	31	1.2	5.20	8.05	156	479
October	8.9	1.1	2.21	3.42	68.6	210
November	25	1.2	5.06	7.83	152	466
December	38	.9	8.77	13.6	272	834
January	79	1.4	5.60	8.66	174	533
February	103	1.0	15.5	24.0	433	1,330
March	51	.9	9.00	13.9	279	856
April	44	.8	6.33	9.79	190	583
May	9.0	.8	2.21	3.42	68.6	210
June	8.7	.7	1.58	2.44	47.5	145
The year	103	.7	6.14	9.50	2,240	6,870

WEST WAILUANUI STREAM NEAR KEANAE, MAUI

LOCATION.—Water-stage recorder 150 feet above Koolau ditch crossing and intake and 2¼ miles south of Keanae post office.

DRAINAGE AREA.—0.7 square mile.

RECORDS AVAILABLE.—December, 1913, to October, 1917; July, 1922, to June, 1929.

EXTREMES.—Maximum discharge during year, 775 million gallons a day or 1,200 second-feet Feb. 17 (gage height, 5.86 feet); minimum, 0.6 million gallons a day or 0.9 second-foot Apr. 5.

1914–1917, 1923–1929: Maximum discharge, 1,220 million gallons a day or 1,890 second-feet Jan. 14, 1923 (gage height, 7.70 feet); minimum, 0.2 million gallons a day or 0.3 second-foot July 16–21, 1922.

REMARKS.—Records fair for ordinary stages; poor for estimated and extremely high stages. No diversions.

Discharge, in million gallons a day, 1928–29

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	*25		3.4	8.6	1.9		9.0	1.8	24	1.1	1.5	1.4
2			20	6.5	1.6		5.2	1.7	15.1	1.1	1.4	1.3
3	5		14.5	2.6	1.4	1.4	19.7	1.6	15.8	1.0	1.3	1.3
4		5.5	9.1	3.1			6.0	1.5	27	.8	1.1	5.7
5	3.1		6.2	4.8	2.9		5.0	1.5	41	.7	1.6	9.7
6			4.8	2.6			10.6	5.5	19.1	.8	3.0	4.4
7			17.8	2.5		19	5.2	3.8	38	2.0	3.4	2.1
8		2.9	7.3	2.4	15		6.0	1.8	33	4.9	2.9	1.4
9			9.5	1.9			3.8	1.5	56	1.1	1.5	1.4
10	4.6		29	1.8	6.5		3.2	1.4	26	45	2.2	1.4
11			15.2	1.7		16.5	2.6	2.1	33	64	6.7	2.5
12		4.8	6.2	1.6	16	23	2.2	14.3	13.9	90	6.0	2.1
13	3.2		4.8	1.4		46	2.2	3.2	8.5	22	16.0	3.4
14			3.8	2.8	13	55	15.5	21	12.2	7.5	12.8	2.2
15	7.5		3.4	3.6		24	7.0	37	12.2	6.5	6.0	11.2
16	22		3.4	1.7		44	4.0	111	5.5	4.2	3.6	3.6
17	16.5	17	2.8	1.4	4.5	10.8	2.9	235	4.6	3.8	2.9	2.1
18	8.8		3.2	1.4		11.4	3.6	76	3.4	14.7	2.4	1.8
19	7.5		21	1.4		7.0	15.7	32	3.1	3.2	2.1	1.6
20	5.0	8	3.8	1.3	10	5.5	8.8	104	2.8	2.5	1.9	1.4
21			3.2	1.6		4.8	5.5	87	2.4	2.1	1.8	1.4
22	7.5		2.8	2.1		4.0	136	48	2.1	1.8	2.1	1.3
23		8.5	2.5	1.3	3.3	3.2	37	17.5	2.1	1.9	3.8	1.2
24			2.2	1.2		5.0	11.5	17.2	1.9	2.1	2.9	1.3
25			2.2	1.1		46	6.5	7.3	1.8	1.8	1.8	1.4
26	30		1.9	1.0	2.2	20	5.0	21	1.7	1.9	1.6	1.3
27		3.8	1.8	11.4		7.5	3.8	28	1.5	2.1	3.6	1.1
28			2.8	5.4		12.0	3.4	54	1.4	1.7	2.2	1.1
29			5.0	1.9	1.8	12.3	2.9	-------	1.3	1.6	1.7	1.0
30	5.5		2.4	3.3		5.7	2.4	-------	1,1	1.7	1.5	1.3
31		2.6	-------	1.9	-------	4.6	1.9	-------	1.0	-------	1.4	-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	----------	----------	9.96	15.4	309	948
August	----------	----------	6.25	9.67	194	595
September	29	1.8	7.20	11.1	216	663
October	11.4	1.0	2.82	4.36	87.3	268
November	----------	----------	6.25	9.67	188	575
December	55	----------	15.7	24.3	488	1,490
January	136	1.9	11.4	17.6	354	1,080
February	235	1.4	33.5	51.8	938	2,880
March	56	1.0	13.3	20.6	412	1,270
April	90	.7	9.85	15.2	296	907
May	16.0	1.1	3.38	5.23	105	322
June	11.2	1.0	2.48	3.84	74.4	228
The year	235	.7	10.0	15.5	3,660	11,200

*Estimated.

KOOLAU DITCH NEAR KEANAE, MAUI

LOCATION.—Water-stage recorder on west side of Keanae Valley 2¾ miles southwest of Keanae post office.

RECORDS AVAILABLE.—January, 1910 to December, 1912; and November, 1917, to June, 1929.

EXTREMES.—Maximum discharge during year, 160 million gallons a day or 248 second-feet Jan. 22 (gage height, 5.50 feet); minimum, 0.3 million gallons a day or 0.5 second-foot Dec. 13.

1910–1912, 1917–1929: Maximum discharge, 175 million gallons a day or 271 second-feet Jan. 4, 1922 (gage height, 6.36 feet); no flow occasionally, when water is shut out of ditch.

REMARKS.—Records excellent for ordinary stages and fair for high stages. Discharge Feb. 2 to Mar. 10 from twice daily staff gage readings. Regulated by gates and spillways. Koolau ditch diverts at 1,200-foot elevation from all streams from Makapipi to Alo. No diversions from ditch above station except from several spillways.

Discharge, in million gallons a day, 1928–29

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	140	140	73	61	46	50	95	54	148	44	36	28
2	125	114	124	108	44	50	103	54	148	44	31	28
3	111	125	136	66	38	47	148	50	148	44	30	27
4	90	118	140	69	37	44	133	47	148	38	28	83
5	70	118	125	104	78	93	114	44	148	35	34	106
6	63	97	104	66	50	148	144	57	148	36	57	72
7	122	90	117	57	128	131	118	111	148	45	58	45
8	139	83	112	54	116	105	105	60	148	115	62	34
9	105	76	125	44	131	148	66	80	152	47	36	31
10	111	125	136	41	144	140	33	76	148	115	46	31
11	115	111	144	38	152	148	60	76	148	152	97	48
12	83	111	122	38	148	144	63	152	136	152	93	45
13	90	107	97	35	148	69	63	87	125	148	134	70
14	120	90	83	50	148	133	132	111	125	135	134	45
15	107	100	73	64	144	129	111	160	140	123	91	113
16	122	136	76	41	125	122	83	164	118	82	60	70
17	144	144	66	38	100	133	66	0	104	79	51	45
18	133	140	64	36	133	144	76	0	97	135	45	39
19	125	114	136	38	118	129	122	0	90	90	39	35
20	97	120	83	33	109	118	114	0	83	70	36	34
21	83	111	70	38	140	114	90	0	80	63	35	31
22	119	118	60	54	107	104	152	0	73	57	36	30
23	129	122	57	35	93	97	148	0	66	51	66	28
24	140	136	54	33	90	114	132	41	63	52	62	30
25	148	104	50	32	76	133	107	118	60	45	38	30
26	148	90	44	30	70	148	90	125	57	42	34	27
27	148	84	44	78	63	129	76	111	54	39	68	24
28	140	111	54	110	60	140	76	152	50	38	51	23
29	125	76	97	54	57	144	66	------	47	36	36	22
30	114	65	50	64	60	125	60	------	44	35	31	24
31	110	60	------	55	------	107	57	------	41	------	30	------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	148	63	117	181	3,620	11,100
August	144	60	108	167	3,340	10,300
September	144	44	90.5	140	2,720	8,330
October	110	30	53.7	83.1	1,660	5,110
November	152	37	98.4	152	2,950	9,060
December	148	44	115	178	3,580	10,900
January	152	33	96.9	150	3,000	9,220
February (21 days)	164	0	91.9	142	1,930	5,920
March	152	41	106	164	3,280	10,100
April	152	35	72.9	113	2,190	6,710
May	134	28	54.4	84.2	1,680	5,180
June	113	22	43.3	67.0	1,300	3,990
The year	164	0	87.3	135	31,200	95,900

HONOMANU STREAM NEAR KEANAE, MAUI

LOCATION.—Water-stage recorder 500 feet above Spreckels ditch intake and trail bridge and 3 miles by trail northwest of Upper Keanae.

DRAINAGE AREA.—3.3 square miles.

RECORDS AVAILABLE.—November, 1913, to June, 1929.

EXTREMES.—Maximum discharge during year, 1,220 million gallons a day or 1,890 second-feet Feb. 17 (gage height, 8.96 feet); minimum, 0.9 million gallons a day or 1.4 second-feet June 29.

1913–1929: Maximum discharge, that of Feb. 17, 1929; minimum, 0.08 million gallons a day or 0.12 second-foot Mar. 24, 1928.

REMARKS.—Records good except those for high stages, which are poor. Estimated record fair for low water. No diversions.

Discharge, in million gallons a day, 1928–29

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	56	15.6	5.0	5.9	2.5		14.4	2.2	32	2.0	1.5	2.0
2	8.8	8.1	43	5.0	2.3	2.4	4.8	1.9	18.9	2.3	1.3	1.6
3	7.5	9.6	22	3.3	1.9		45	1.8	17.9	2.4	1.1	1.6
4	5.8	7.5	16.7	3.4	2.3		7.5	1.6	27	2.1	1.1	19.2
5	4.2	7.9	7.5	5.6	10.3	75	5.2	1.5	38	2.1	1.6	21
6	3.3	5.2	5.7	3.7	3.0		18.7	5.6	23	3.7	7.1	6.5
7	21	4.6	13.3	2.9	75	11	7.2	12.3	60	6.0	7.7	3.5
8	22	4.2	7.0	2.4	11.8		14.6	3.3	42	18.5	7.1	2.4
9		3.6	8.5	2.0	27	26	6.4	2.2	68	4.0	2.8	1.9
10	9	17.7	59	1.8	55		4.3	1.7	41	73	6.1	1.8
11		10.0	45	1.6	142	20	3.5	1.6	36	135	14.6	3.7
12		5.7	6.3	1.5	28	51	3.1	15.3	14.7	176	13.8	2.6
13		6.2	4.5	1.4	22	63	3.1	4.1	8.8	33	46	5.6
14	14	6.0	4.0	2.6	29	96	36	12.8	10.2	10.8	18.0	3.4
15	10.5	7.7	3.4	5.7	22	36	12.9	48	11.7	16.8	8.0	25
16	59	21	4.2	2.6	7.0	24	6.4	186	5.2	6.0	4.4	4.5
17	29	40	3.8	1.9	4.8	8.1	3.8	344	4.0	4.4	3.4	3.2
18	12.7	26	4.1	1.8	9.9	10.0	4.0	104	3.4	22	3.1	3.3
19	11.2	6.5	47	1.6	8.3	7.4	14.8	24	3.3	5.7	2.5	2.1
20	9.0	12.3	6.4	1.4	28	8.1	6.0	147	3.2	3.4	2.3	1.7
21	6.4	14.0	4.2	1.7	26	4.8	7.7	139	3.0	2.8	2.0	1.5
22	30	6.7	3.3	3.5		4.5		77	2.6	2.9	2.1	1.3
23	12.1	14.0	3.0	1.9		3.7	120	16.7	2.4	2.7	8.2	1.2
24	74	22	2.7	1.5		4.4		12.5	2.3	2.7	5.6	1.5
25	96	7.5	2.5	1.3	4.2	62	4.8	6.3	2.3	2.1	2.9	2.1
26	192	5.4	2.3	1.1		36	3.8	9.9	2.3	1.9	2.1	1.8
27	87	4.5	2.3	54		7.5	3.2	29	2.0	1.7	8.9	1.2
28	14.4	6.5	8.2	13.8	2.8	14.2	4.3	79	1.9	1.5	3.7	1.1
29	7.9	4.3	6.6	3.3		9.8	3.5	-------	1.8	2.5	3.4	1.0
30	6.3	3.4	3.8	2.4		5.1	2.7	-------	1.6	2.2	2.4	1.3
31	8.6	3.4	-------	2.6	-------	4.1	2.4	-------	1.5	-------	2.1	-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	192	3.3	27.7	42.9	859	2,640
August	40	3.4	10.2	15.8	317	970
September	59	2.3	11.8	18.3	355	1,090
October	54	1.1	4.68	7.24	145	445
November	142	----------	18.3	28.3	550	1,680
December	----------	----------	23.0	35.6	713	2,190
January	----------	2.4	19.8	30.6	614	1,880
February	344	1.5	46.1	71.3	1,290	3,960
March	68	1.5	15.9	24.6	492	1,510
April	176	1.5	18.4	28.5	552	1,690
May	46	1.1	6.35	9.82	197	604
June	25	1.0	4.35	6.73	131	400
The year	344	1.0	17.0	26.3	6,220	19,100

HAIPUAENA STREAM NEAR HUELO, MAUI

LOCATION.—Water-stage recorder 200 feet above inflow of Spreckels ditch and 3¼ miles southeast of Kailua.

DRAINAGE AREA.—1.1 square miles.

RECORDS AVAILABLE.—October, 1913, to June, 1929.

EXTREMES.—Maximum discharge during year, 582 million gallons a day or 900 second-feet Feb. 17 (gage height, 6.25 feet); minimum, 1.4 million gallons a day or 2.2 second-feet Oct. 26, 27.

1913–1929: Maximum discharge, that of Feb. 17, 1929; minimum, 0.3 million gallons a day or 0.5 second-foot frequently during December, 1919.

REMARKS.—Records fair for ordinary stages except those estimated, which are poor; records for extremely high stages poor. No diversions. Intake plugged often during year.

Discharge, in million gallons a day, 1928–29

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	43	16.2	5.2	6.1	3.4	a 2.8	16.2	a 2.0	24	2.0	2.0	2.7
2	8.3	8.6	45	5.8	3.1	2.7	6.6	a 1.6	14.6	2.3	1.6	2.2
3	6.9	10.2	23	4.0	2.7	3.2	34	a 1.6	15.4	2.7	1.5	2.1
4	5.6	8.9	17.4	4.3	3.1	4.0	8.6	a 1.4	24	2.4	a 1.5	11.0
5	4.7	9.3	8.8	7.4	16.7	64	6.8	1.4	33	2.1	2.3	13.0
6	4.0	5.9	6.7	5.0	3.9	53	20	4.5	17.6	3.2	7.4	6.0
7	14.4	5.4	12.2	4.0	72	16.1	8.5	8.9	38	5.0	8.7	a 4.1
8	18.5	4.5	7.5	3.8	13.5	8.0	22	2.6	28	14.0	8.3	a 2.7
9	7.6	3.9	11.5	3.4	24		a 9.2	1.7	59	4.7	3.1	2.3
10	9.2	11.0	63	b 3.0	37	20	a 5.4	1.5	27	54	4.5	2.3
11	8.7	9.8	25	a 2.6	90		4.5	1.5	27	77	11.8	3.9
12	6.9	7.0	8.2	2.5	19.4	44	3.9	11.6	10.2	96	9.2	3.1
13	9.1	7.1	6.2	2.4	21	55	4.0	3.2	6.9	17.7	29	5.1
14	13.4	6.5	5.2	4.0	35	81	32	11.5	9.0	8.2	15.2	3.6
15	7.2	7.8	4.8	7.1	23	33	12.5	42	14.3	10.5	7.6	18.8
16	45	28	5.4	3.5	9.2	30	6.9	110	6.0	5.4	4.7	5.2
17	24	56	4.9	2.8	6.8	9.8	4.5	156	a 4.7	4.9	3.7	3.7
18	10.4	19.8	5.2	2.6	11.5	12.9	5.4	52	a 4.2	22	a 3.4	3.8
19	10.0	7.4	54	2.5	9.2	8.2	11.8	26	a 4.0	5.9	a 3.0	2.9
20	7.2	15.0	8.0	2.3	25	8.7	5.9	66	a 4.0	4.2	2.7	2.6
21	5.1	10.4	5.3	2.7	18.5	6.5	8.7	60	a 3.6	3.4	2.7	2.6
22	24	7.7	4.4	5.7	6.7	5.8	154	48	2.8	3.3	a 2.9	a 2.6
23	9.1	13.9	3.9	a 5.4	5.4	4.9	24	11.1	a 2.5	3.1	6.7	1.8
24	57	17.7	3.7	a 3.4	5.2	6.8	5.2	12.7	a 2.3	3.2	5.0	2.1
25	75	6.7	a 3.5	a 2.3	5.8	61	3.4	5.6	2.3	2.6	2.9	2.6
26	134	5.2	a 3.2	2.0	5.4	26	2.8	6.8	2.2	2.4	2.4	2.3
27	44	5.4	3.1	51	4.0	8.4	2.5	15.1	2.0	a 2.6	4.7	a 1.8
28	12.1	7.3	7.6	13.9	a 3.6	14.8	3.9	48	1.9	2.0	3.5	1.6
29	8.0	4.8	12.8	4.2	a 3.3	11.8	a 2.9	-------	1.7	a 2.5	4.1	1.6
30	6.7	4.2	4.3	3.2	a 3.4	6.0	a 2.1	-------	1.7	a 2.7	3.1	1.9
31	8.5	4.0	-------	3.0	-------	5.0	a 2.0	-------	1.6	-------	2.9	-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	134	4.0	20.9	32.3	648	1,990
August	56	3.9	10.8	16.7	336	1,030
September	63	3.1	12.6	19.5	379	1,160
October	51	2.0	5.67	8.77	176	539
November	90	2.7	16.4	25.4	491	1,510
December	81	2.7	21.1	32.6	653	2,010
January	154	2.0	14.2	22.0	440	1,350
February	156	1.4	25.5	39.5	714	2,190
March	59	1.6	12.8	19.8	396	1,220
April	96	2.0	12.4	19.2	372	1,140
May	29	1.5	5.55	8.59	172	528
June	18.8	1.6	4.07	6.30	122	375
The year	156	1.4	13.4	20.7	4,900	15,000

a Partly estimated. b Estimated.

SPRECKELS DITCH AT HAIPUAENA WEIR, NEAR HUELO, MAUI

LOCATION.—Water-stage recorder between Haipuaena and Puohokamoa Streams on Spreckels ditch trail, 3¼ miles southeast of Kailua.

RECORDS AVAILABLE.—April, 1922, to June, 1929.

EXTREMES.—Maximum discharge during year, 81 million gallons a day or 125 second-feet Feb. 8 and Apr. 26 (gage height, 2.83 feet); minimum, 0.8 million gallons a day or 1.2 second-feet June 29.

1922–1929: Maximum discharge, that of Feb. 8 and Apr. 26, 1929; no flow nearly entire time Apr. 9–23, 1925, when water was shut out of ditch.

REMARKS.—Records excellent except those estimated, which are poor. Regulated by gates and spillways. Since May, 1928, East Maui Irrigation Co.'s power plant has diverted continuously about 4 million gallons a day just above station. Spreckels ditch diverts from all streams between Nuaailua and Kailua above Koolau ditch east of Puohokamoa and below Koolau ditch west of Puohokamoa.

Discharge, in million gallons a day, 1928–29

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	20	24	10.4	10.6	6.7	3.9	17.2	4.6			4.8	4.2
2		18.2	25	11.2	5.6	3.7	11.9	3.8			2.5	2.9
3		20	21	7.3	4.2	3.4	20	3.2			2.0	2.7
4	14	18.9	21	8.1	5.0	2.8	14.5	3.1		6	1.8	18.6
5	8.5	18.9	16.3	12.3	16.0	32	12.9	2.6			4.6	25
6		14.0	13.2	8.5	7.5	27	18.0	14.4			19.8	15.3
7		13.2	17.4	7.0	32	18.0	14.2	[a] 17.6	24		18.0	8.3
8		10.8	15.4	5.9	19.1	16.1	19.7	[b] 14		13	17.0	5.2
9		9.4	19.1	4.3	24	23	14.0				7.8	3.9
10	18	19.8	30	3.6	30	23	11.0	6.5			13.0	3.7
11		16.5	22	3.1	41	22	9.2				24	11.4
12		14.7	14.4	2.6	24	25	7.6				21	8.1
13		15.5	10.8	2.6	24	27	7.8				34	13.7
14		13.1	9.5	7.7	27	28	30	17	19.1	24	30	9.8
15	17.2	13.6	10.0	12.4	23	22	22		22		19.2	26
16	29	21	12.5	5.9	15.6	22	14.0				13.4	13.9
17	28	27	8.7	3.8	12.5	15.7	9.2		15		10.1	8.8
18	22	13.8	9.4	3.1	18.3	16.9	11.0	34			8.1	8.4
19	22	12.7	26	2.7	16.3	14.2	20				6.5	5.2
20	16.9	16.4	13.1	2.0	18.6	14.5	12.2		10	13	5.5	3.8
21	13.2	15.1	9.9	3.2	20	12.9	15.3				4.8	3.1
22	22	13.6	7.3	9.5	12.9	11.7	50	24			5.4	2.4
23	20	17.5	6.8	3.7	11.3	9.5	26				19.3	2.0
24	30	20	5.3	2.5	11.1	13.6	17.6		6.5	7	13.9	2.9
25	36	14.7	5.0	2.2	10.8	25	12.5	14			6.5	4.3
26	42	12.5	4.2	1.8	9.9	20	9.7				4.8	3.6
27	25	11.6	4.3	18.7	7.0	14.7	8.1	32		4.5	13.2	1.8
28	20	15.9	12.5	18.4	5.8	16.9	13.8			3.6	11.4	1.1
29	17.6	10.8	18.2	7.3	5.0	16.2	9.4	-------	4.0	5.6	9.3	1.0
30	15.7	8.1	7.2	5.0	5.3	12.3	6.5	-------		4.9	5.5	2.2
31	16.6	7.6	-------	5.0	-------	10.4	5.5	-------		-------	4.6	-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	----------	----------	20.1	31.1	622	1,910
August	27	7.6	15.4	23.8	479	1,470
September	30	4.2	13.5	20.9	406	1,240
October	18.7	1.8	6.52	10.1	202	620
November	41	4.2	15.6	24.1	470	1,440
December	32	2.8	16.9	26.1	523	1,610
January	50	5.5	15.2	23.5	471	1,450
February	----------	2.6	17.8	27.5	499	1,530
March	----------	----------	15.6	24.1	483	1,480
April	----------	----------	12.8	19.8	384	1,180
May	34	1.8	11.7	18.1	362	1,110
June	26	1.0	7.44	11.5	223	685
The year	----------	1.0	14.0	21.7	5,120	15,700

[a] Partly estimated. [b] Estimated.

PUOHOKAMOA STREAM NEAR HUELO, MAUI

LOCATION.—Water-stage recorder just above Spreckels ditch inflow and trail crossing and 3 miles southeast of Kailua.

DRAINAGE AREA.—2.6 square miles.

RECORDS AVAILABLE.—December, 1910, to June, 1929.

EXTREMES.—Maximum discharge during year, 920 million gallons a day or 1,420 second-feet Feb. 17 (gage height, 7.20 feet); minimum, 1.0 millon gallons a day or 1.6 second-feet Oct. 27.

1910-1929: Maximum discharge, 1,100 million gallons a day or 1,700 second-feet Jan. 14, 1923 (gage height, 7.85 feet); minimum, 0.4 million gallons a day or 0.6 second-foot Oct. 26, 1917.

REMARKS.—Records fair except those for high stages and estimates, which are poor. Kula pipe line diverts small amounts of water above station at elevation 4,300 feet.

Discharge, in million gallons a day, 1928-29

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	62	28	7.8	8.4	4.8	a3.9	21	7.1	61	4.7	4.7	3.9
2	15.4	15.4	71	7.8	4.2	a3.7	14.9	6.5	41	5.2	4.0	3.5
3	a13.3	a16.6	38	5.2	3.5	3.4	49	6.1	41	6.1	3.7	3.4
4	a11.4	b15	30	5.8	3.5	3.2	18.0	5.7	67	5.1	3.5	15.3
5	8.6	17.6	15.4	11.4	17.1	111	14.3	5.1	84	4.5	4.1	22
6	6.7	a11.4	11.4	6.8	5.1	64	38	28	40	7.3	15.7	9.7
7	a19.1	b11	19.7	5.1	113	20	17.4	25	83	10.5	16.0	5.6
8	32	a9.7	12.8	4.4	21	20	39	8.9	65	28	12.6	4.4
9	13.3	8.5	18.8	3.7	32	43	16.6	6.4	144	7.3	6.0	3.8
10	16.6	a24	106	3.4	49	45	12.3	5.4	62	107	8.5	3.8
11	15.0	a17.0	42	3.0	121	33	11.4	5.8	65	168	28	6.8
12	a10.5	a13.0	14.3	2.7	27	71	9.7	34	25	212	19.8	5.1
13	13.3	b14	11.4	2.5	34	88	10.1	10.7	18.4	39	61	9.0
14	a19.9	a15.4	8.9	5.5	60	142	53	27	31	21	38	5.9
15	a12.3	14.1	8.5	8.7	33	41	23	95	38	22	17.8	39
16	77	a45	8.9	4.2	15.4	47	14.3	207	16.6	13.3	10.5	9.7
17	40	a92	7.8	3.2	11.4	19.5	10.5	281	13.3	12.3	8.3	6.0
18	a19.5	a58	8.2	2.9	17.8	26	11.0	115	11.4	54	6.9	5.7
19	19.5	b15	96	2.7	14.4	18.0	17.7	65	10.5	13.3	5.9	4.6
20	14.3	a24	13.8	2.3	34	16.6	11.4	140	9.7	9.7	5.2	4.1
21	a10.5	b17	9.7	2.6	27	14.3	15.2	102	8.9	8.3	4.9	3.7
22	a43	b14	7.4	5.4	11.4	13.3	249	117	7.8	7.6	4.9	3.5
23	16.6	b20	6.3	2.9	8.9	11.4	96	30	7.0	7.0	13.4	3.2
24	b100	b30	5.6	2.3	a8.3	14.8	18.0	62	6.5	7.3	10.4	3.7
25	129	b14	5.1	2.1	a12.6	108	14.3	16.6	6.1	5.7	5.4	4.2
26	222	b10	4.5	1.6	12.2	38	12.3	14.3	5.6	5.4	4.6	3.8
27	a73	b10	4.4	85	6.3	16.6	11.0	38	5.2	5.1	8.3	2.9
28	b27	a13.3	9.2	20	5.3	28	15.2	100	4.9	4.7	7.4	2.6
29	a18.0	a7.9	a17.3	6.4	4.7	22	11.4	-------	4.6	5.2	7.2	2.4
30	15.4	a6.9	6.2	4.7	4.5	13.3	8.9	-------	4.4	4.9	4.5	2.6
31	15.0	a6.5	-------	4.2	-------	12.3	7.8	-------	4.2	-------	4.2	-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	222	6.7	35.8	55.4	1,110	3,410
August	92	6.5	19.8	30.6	614	1,880
September	106	4.4	20.9	32.3	626	1,920
October	85	1.6	7.64	11.8	237	727
November	121	3.5	24.1	37.3	722	2,220
December	142	3.2	35.8	55.4	1,110	3,410
January	249	7.8	28.1	43.5	872	2,670
February	281	5.1	55.9	86.5	1,560	4,800
March	144	4.2	32.0	49.5	992	3,040
April	212	4.5	27.0	41.8	812	2,490
May	61	3.5	11.5	17.8	355	1,090
June	39	2.4	6.80	10.5	204	626
The year	281	1.6	25.3	39.1	9,210	28,300

a Partly estimated. b Estimated.

PUOHOKAMOA INTAKE OF KOOLAU DITCH NEAR HUELO, MAUI

LOCATION.—Water-stage recorder 20 feet below intake on short feeder ditch from Puohokamoa Stream to Koolau ditch and 3 miles southeast of Kailua.

RECORDS AVAILABLE.—March, 1922, to June, 1929.

EXTREMES.—Maximum discharge during year, 33 million gallons a day or 51 second-feet Apr. 10 (gage height, 1.80 feet); minimum, 0.1 million gallons a day or 0.2 second-foot June 29.

1922–1929: Maximum discharge, 88 million gallons a day or 136 second-feet Oct. 22, 1922 (gage height, 3.04 feet); a higher discharge may have occurred during period of no record Sept. 4–15, 1923. Minimum discharge, that of June 29, 1929.

REMARKS.—Records excellent for ordinary stages, good for high stages, and fair for estimated periods. Diverts water from Puohokamoa Stream into Koolau ditch. Regulated by gates.

Discharge, in million gallons a day, 1928–29

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	13.0	15.4	14.1	14.3	9.4	9.0	17.1	12.2	22	8.7		
2	11.7	15.0	16.6	14.3	9.4	8.8	23	9.7	20	9.2		10
3	11.4	15.4	15.4	13.6	9.0	8.8	26	9.6	20	11.0	11	
4	11.2	15.0	15.4	13.9	8.8	8.7	23	9.6	22	12.6		
5	11.0	15.2	14.7	14.7	10.3	9.2	20	9.4	22	9.9		
6	11.0	14.7	14.5	14.1	9.4	4.1	23	13.4	20	9.7		15
7	11.9	14.7	15.0	13.6	11.6	3.7	22	16.6	22	9.6		
8	12.1	14.3	14.5	13.4	10.3	11.3	23	15.0	22	15.4		
9	11.2	14.1	15.0	12.5	10.6	15.4	22	12.3	24	17.8	15	
10	11.4	15.4	17.0	12.1	10.8	15.4	13.2	9.9	22	19.1		
11	11.4	15.2	15.4	10.0	12.1	15.2	14.7	9.9	22	11.9		11
12	11.0	15.0	14.7	9.2	10.5	16.6	14.5	17.8	22	10.8		
13	11.2	15.0	14.3	9.0	10.6	7.5	14.5	17.8	22	18.1		
14	11.7	14.7	13.9	9.7	11.0	.3	16.6	18.9	23	24		16
15	11.2	15.0	13.9	10.6	10.6	.2	16.6	22	23	24	19	
16	12.5	16.6	14.1	10.1	10.1	.2	15.2	17.1	22	19.3		15.4
17	12.3	17.8	13.9	9.6	9.7	.2	14.7	.6	20	14.1		15.0
18	11.7	16.6	14.1	9.6	10.1	.2	14.7	.4	20	15.4		14.7
19	11.7	15.0	16.6	9.4	10.1	9.8	15.4	.3	18.9	13.9		13.6
20	11.2	15.4	14.7	9.2	10.3	12.3	14.7	.3	17.8			10.2
21	11.0	15.2	14.3	9.6	10.5	12.1	15.0	.3	16.6		13	5.2
22	12.1	15.0	13.9	10.3	9.7	11.9	20	.3	15.4			5.2
23	11.7	15.4	13.6	9.7	9.7	11.7	16.6	.3	15.0			5.2
24	13.2	15.4	13.4	9.2	9.6	12.1	15.4	9.8	14.5	13		5.2
25	13.9	15.0	13.2	8.8	9.7	13.3	14.7	20	13.6			5.4
26	14.7	14.7	12.8	8.3	9.6	13.4	14.5	17.8	11.7			5.2
27	15.4	14.5	12.3	10.3	9.4	12.1	14.3	15.4	11.4			5.1
28	15.4	14.9	14.5	10.5	9.2	12.5	15.2	20	11.0	11.9	12	5.1
29	15.0	14.1	15.2	9.6	9.2	12.3	14.5	-------	9.9	12.3		3.0
30	14.7	13.9	13.9	9.4	9.2	11.9	13.9	-------	8.7	*12		5.1
31	14.7	13.6	-------	9.2	-------	11.7	13.6	-------	8.7	-------		------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	15.4	11.0	12.4	19.2	384	1,180
August	17.8	13.6	15.1	23.4	467	1,440
September	17.0	12.3	14.5	22.4	435	1,330
October	14.7	8.3	10.9	16.9	338	1,040
November	12.1	8.8	10.0	15.5	300	921
December	16.6	.2	9.42	14.6	292	896
January	26	13.2	17.1	26.5	532	1,630
February	22	.3	11.0	17.0	307	945
March	24	8.7	18.2	28.2	563	1,730
April	24	8.7	13.8	21.4	415	1,270
May	-------	-------	13.9	21.5	431	1,320
June	-------	3.0	10.4	16.1	311	957
The year	26	.2	13.1	20.3	4,780	14,700

* Estimated.

MANUEL LUIS DITCH AT PUOHOKAMOA GULCH, NEAR HUELO, MAUI

LOCATION.—Water-stage recorder in Puohokamoa Gulch at lower portal of tunnel between Haipuaena and Puohokamoa Streams, 3 miles southeast of Kailua.

RECORDS AVAILABLE.—December, 1917, to June, 1929.

EXTREMES.—Maximum discharge during year, 100 million gallons a day or 155 second-feet Feb. 17 (gage height, 4.00 feet); minimum, 0.2 million gallons a day or 0.3 second-foot June 28–30.

1917–1929: Maximum discharge, 116 million gallons a day or 179 second-feet Jan. 14, 1923 (gage height, 4.93 feet); minimum, 0.05 million gallons a day or 0.08 second-foot Mar. 3, 1920.

REMARKS.—Records good for low stages and fair above; estimated records poor. Ditch is extension of Center ditch and picks up water at elevation of 500 feet between Kolea and Waikamoi Streams. Regulated by gates.

Discharge, in million gallons a day, 1928–29

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	31	19.4	0.9	5.2	1.1	0.5		0.8	31	0.5	0.8	0.3
2	20	11.6	21	9.8	.9	.5	17	.8	26	.5	.5	.4
3	15.2	13.6	19.0	1.2	.7	.5		.7	26	.6	.5	.3
4	4.7	13.2	17.7	1.5	2.7	.4		.7	29	.6	.4	8.6
5	1.7	12.8	12.3	9.8	7.7	25		.6	34	.5	.4	13.5
6	1.4	2.7	5.8	1.6	1.0	32	2.5	6.3	28	.4	2.5	1.3
7	19.7	1.9	12.7	1.1	32	17.9		11.9	34	1.2	3.1	.5
8	27	1.1	8.2	1.0	13.7	8.6		1.1	34	17.6	2.7	.4
9	12.0	1.0	14.2	.8	19.4	28	8	.9	44	.7	.6	.3
10	17.2	14.5	28	.8	26	20		.8	34	26	1.0	.3
11	16.1	9.5	22	.7	41			1.2	35	44	12.4	.8
12	2.3	9.2	11.6	.7	22	27	1.5	21	26	47	8.1	1.1
13	4.6	8.1	4.1	.6	23	25		5.7	19	26	26	3.3
14	18.6	3.2	1.6	1.0	27	36		14.5	21	13.7	23	.8
15	11.9	5.7	1.5	5.0	23	26	4.2	34	26	19.3	9.4	17.5
16	27	23	1.5	.7	14.8	28		44	16.3	3.1	.7	.8
17	30	35	1.1	.6	3.7	16.3		42	8.0	4.5	.5	.5
18	22	22	1.3	.7	18.3	18.7		27	2.2	24	.5	.5
19	19.3	10.9	28	.9	13.1		1.8	22	1.5	4.9	.5	.4
20	5.8	16.4	3.0	.5	11.0	9		29	1.3	1.4	.4	.4
21	1.4	12.0	1.0	.5	21			19.8	1.2	1.1	.4	.3
22	16.1	10.4	.9	.8	7.8			32	1.0	1.0	.5	.3
23	13.8	14.8	.8	.5	2.0		24	7.7	.9	1.0	1.3	.3
24	29	18.6	.8	.5	1.8	11		13.2	.8	1.2	.8	.4
25	36	7.1	.7	.4	.8			9.4	.8	.9	.5	.4
26	47	1.3	.7	.4	.8		1.8	10.0	.7	.7	.4	.4
27	31	1.7	.6	19.3	.7			21	.7	.7	6.9	.3
28	17.1	9.4	.7	13.2	.7	12	2.4	36	.6	.7	1.5	.2
29	13.1	1.2	7.7	.8	.7		1.3	-------	.6	.6	.6	.2
30	10.8	1.0	.6	2.1	.8	3.8	1.0	-------	.5	.5	.4	.2
31	8.2	.9	-------	.8	-------		.9	-------	.6	-------	.4	-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	47	1.4	17.1	26.5	531	1,630
August	35	.9	10.1	15.6	313	961
September	28	.6	7.67	11.9	230	706
October	19.3	.4	2.69	4.16	83.5	256
November	41	.7	11.3	17.5	339	1,040
December	36	.4	14.7	22.7	456	1,400
January	-------	-------	6.26	9.69	194	596
February	44	.6	14.8	22.9	415	1,270
March	44	.5	15.6	24.1	485	1,480
April	47	.4	8.33	12.9	250	767
May	26	.4	3.47	5.37	108	330
June	17.5	.2	1.83	2.83	55.0	168
The year	47	.2	9.48	14.7	3,460	10,600

SPRECKELS DITCH AT WAHINEPE, NEAR HUELO, MAUI

LOCATION.—Water-stage recorder between Puohokamoa and Alo Streams, 1,000 feet below intake at Puohokamoa Gulch and 7 miles southeast of Kailua.

RECORDS AVAILABLE.—August, 1928, to June, 1929.

EXTREMES.—Maximum discharge during period, 64 million gallons a day or 99 second-feet Dec. 13 (gage height, 4.73 feet); minimum recorded, 0.1 million gallons a day or 0.2 second-foot May 2; actual minimum may have occurred during period of missing record.

REMARKS.—Records good. Intake is on Puohokamoa Stream just below intake of Koolau ditch and for normal flows takes all water which passes Koolau ditch intake.

Discharge, in million gallons a day, 1928–29

Day	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	-------	9.0	9.0			12.5	2.4	18.2	3.5	2.6	1.3
2	-------	25	12.0	3.1	2.6	6.3	3.6	18.2	6.2	3.0	.3
3	-------	26	4.4			19.5	3.0	18.2	7.6	2.9	5.6
4	-------	28	5.3			15.4	2.5	18.2	1.6	2.5	18.9
5	-------	21	16.1			10.6	1.9	19.5	2.4	6.0	23
6	-------	14.7	7.7		30	21	12.3	18.2	6.3	24	4.7
7	-------	19.6	4.5		26	14.9	23	19.5	13.2	17.4	.3
8	-------	17.5	2.9		20	19.8	7.2	19.5	27	14.4	.2
9	-------	23	1.2		24	13.4	2.3	22	5.6	5.1	.2
10	24	28		22	24	11.1	2.7	19.5	22	13.4	
11	21	28	1.2		24	8.7	3.3	19.5	32	24	2.7
12	18.7	19.5			24	6.0	28	20	32	22	
13	21	13.4			22	6.8	9.1	21	28	31	
14	16.7	9.4			21	19.5	15.6	19.8	22	31	17
15	16.6	7.5	14.2		13.4	18.2	31	24	23	20	
16	28	11.3	5.6		14.7	15.4	24	17.1	14.7	8.1	15.4
17	29	6.5	2.7	17	12.7	8.7	3.3	10.0	18.1	4.2	6.2
18	26	8.1	1.9		12.7	10.0	1.2	6.2	27	3.1	5.2
19	19.8	27	1.7		12.8	18.2	11.1	5.7	21	1.3	1.1
20	24	17.7	.7		17.5	12.7	17.5	4.4	13.4	2.2	2.6
21	22	9.4	2.0	32	18.2	15.7	16.1	4.3	8.7	2.6	6.1
22	20	5.6	10.6		16.1	22	16.8	1.6	8.1	3.2	5.4
23	22	3.6	2.7		12.0	17.5	14.7	1.2	7.4	23	4.6
24	26	2.8	1.1		16.6	13	15.3	.6	8.7	12.0	6.2
25	18.2	2.2	.5	9.5	19.5		13.4	1.0	1.8	3.9	8.7
26	13.4	1.2	*.4		19.5	10.6	14.4	1.6	1.1	2.4	7.4
27	11.6	.7			21	7.1	18.2	1.0	2.3	12.4	4.3
28	18.3	12.4	18		21	17.8	19.5	.5	1.2	9.8	3.2
29	8.7	21		3.2	21	8.7	-------	1.0	3.3	6.7	5.1
30	5.8	4.8	3.0		16.8	3.8	-------	1.7	2.2	2.2	4.1
31	5.0	-------		-------	14.0	2.4	-------	1.6	-------	2.2	-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
August 10–31	29	5.0	18.9	29.2	416	1,280
September	28	.7	14.1	21.8	424	1,300
October	----------	----------	5.10	7.89	158	485
November	----------	----------	15.8	24.4	476	1,450
December	----------	----------	17.3	26.8	535	1,650
January	22	2.4	12.9	20.0	400	1,230
February	31	1.2	11.9	18.4	333	1,020
March	24	.5	11.4	17.6	355	1,080
April	32	1.1	12.4	19.2	371	1,140
May	31	1.3	10.3	15.9	319	980
June	----------	----------	6.64	10.3	199	611
The period	----------	----------	12.3	19.0	3,990	12,200

*Estimated.

KOOLAU DITCH AT WAHINEPE, NEAR HUELO, MAUI

LOCATION.—Water-stage recorder between Puohokamoa and Waikamoi Streams, half a mile below Puohokamoa intake and 2½ miles southeast of Kailua.

RECORDS AVAILABLE.—March, 1922, to June, 1929.

EXTREMES.—Maximum discharge during year not known, owing to missing record; minimum, 1.4 million gallons a day or 2.2 second-feet Feb. 21.

1922–1929: Maximum discharge, 123 million gallons a day or 190 second-feet Dec. 8 (gage height, 5.62 feet); minimum, that of Feb. 21, 1929.

REMARKS.—Records good except those for estimated periods, which are fair. Completely regulated by gates and spillways. Koolau ditch diverts water at 1,200-foot elevation from all streams from Makapipi to Alo.

Discharge, in million gallons a day, 1928-29

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	107	113	81	68	52			56	113	46	48	36
2	104	110	110	98	49	50		52	110	47	36	35
3	104	110	110	74	42			49	110	50	34	29
4	93	110	110	77	45			47	113	46	32	85
5	77	110	107	104	76	90	100	44	113	39	36	110
6	70	104	104	79	54			63	113	44	83	95
7	100	101	107	64	101	99		92	113	54	83	61
8	107	93	104	62	102	98		62	113	103	85	44
9	101	85	110	56	104	107		51	116	58	48	39
10	104	110	113	52	107			44	113	97	60	39
11	101	107	113	47	110		60	47	116	110	106	61
12	91	107	110	44	107			98	113	110	105	57
13	96	107	105	42	107			83	110	110	116	79
14	104	99	93	52	107		100	85	110	110	116	58
15	99	101	85	69	106			104	113	110	106	109
16	107	116	85	47	101		80	104	110	98	81	86
17	107	116	77	44	99			56	107	90	67	59
18	104	113	75	42	104			13.6	104	107	59	52
19	107	107	113	44	101			3.4	99	91	54	47
20	104	110	97	38	99	100		2.7	93	72	46	40
21	91	110	80	44	104		100	2.2	87	64	70	35
22	104	107	72	58	99			2.5	80	62	43	32
23	110	110	67	42	93			2.7	75	59	81	31
24	116	113	64	38	88			36	72	60	79	32
25	116	107	62	37	77			107	67	54	48	34
26	119	99	59	35	72		90	107	62	54	42	31
27	116	100	56	67	67			110	59	51	75	28
28	113		67	94	62		81	113	54	47	65	27
29	110	83	97	58	59		72	-------	52	47	50	23
30	110	75	62	62	62		64	-------	47	44	42	28
31	107	70	-------	58	-------		63	-------	47	-------	38	-------

Month	Million gallons a day			Second-feet (mean)	Total run off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	119	70	103	159	3,200	9,800
August	116	70	103	159	3,200	9,800
September	113	56	89.8	139	2,700	8,270
October	104	35	57.9	89.6	1,800	5,510
November	110	42	85.2	132	2,560	7,840
December	----------	----------	93.0	144	2,880	8,850
January	----------	----------	88.4	137	2,740	8,410
February	113	2.2	58.5	90.5	1,640	5,030
March	116	47	93.7	145	2,900	8,910
April	110	39	71.1	110	2,130	6,550
May	116	32	65.6	101	2,030	6,240
June	110	23	50.7	78.4	1,520	4,670
The year	----------	2.2	80.3	124	29,300	89,900

ALO STREAM NEAR HUELO, MAUI

LOCATION.—Water-stage recorder just above Spreckels ditch inflow and trail crossing and 2½ miles southeast of Kailua.
DRAINAGE AREA.—0.2 square mile.
RECORDS AVAILABLE.—December, 1910, to June, 1929.
EXTREMES.—Maximum discharge during year, 410 million gallons a day or 634 second-feet some time between Dec. 7 and Jan. 25 (gage height, 3.75 feet); minimum, 0.5 million gallons a day or 0.8 second-foot Oct. 27.
1910–1929: Maximum discharge, 638 million gallons a day or 987 second-feet Dec. 9, 1916 (gage height, 4.35 feet); minimum, 0.4 million gallons a day or 0.6 second-foot Sept. 19, 1924, and Mar. 13–16, 1926.
REMARKS.—Records poor. No diversions.

Discharge, in million gallons a day, 1928–29

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	15.6	9.7			1.8						1.3	
2	6.0	3.0			1.2	0.8					.9	0.7
3	3.6	4.1	8.5		.9			0.8			.8	
4	2.7	5.2		3.0	1.3		4.3		15		.7	
5	2.1	4.7			6.9	30				1.8	1.1	1.9
6	1.9	2.0			1.2			6.5			6.6	
7	4.0	1.9	4.5		31				14		2.5	
8	11.3	1.6			4.5	4.8	6.5				2.2	.7
9	3.4	1.4			3.8						1.2	
10	7.4	4.1	20	1.0	3.0			1.2	42		2.0	
11	5.9	3.3			10.1	11	1.5			36	3.0	
12	3.1	6.5			2.2						1.9	
13	2.5	4.0			5.3			14	6		3.4	3.1
14	2.5	2.4			14.1		5.5				8.4	
15	2.1	2.0	2.3	1.8	9.6	26			14		2.9	
16	29	26			3.4					5.5	1.8	2.1
17	10.7	40			2.0			60			1.5	1.3
18	6.0	9.7		.8	3.8		1.9				1.3	1.2
19	8.8	2.8	a40		3.1				1.9		1.2	
20	3.9	8.9		.6	2.6	3.4		19				
21	2.8	3.0		.7	3.6							
22	8.6	5.5		1.5			28					
23	5.8	3.4		.7							1.3	
24	25	4.9		.6				7.5		1.4		.8
25	32	2.0	1.5	.5		16						
26	54	1.7		.5	1.5				.9			
27	11.4	1.9		25			1.9	11				
28	3.6	5.6		4.2						.8	3.2	
29	2.6			1.2		4.4				.9		
30	2.1	1.9		1.0						1.0	1.0	
31	2.3			.9								

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	54	1.9	9.12	14.1	283	868
August	40		5.71	8.83	177	543
September			6.29	9.73	189	579
October	25		2.26	3.50	70.2	215
November	31		4.30	6.65	129	396
December			9.95	15.4	308	947
January			5.52	8.54	171	525
February			13.9	21.5	389	1,190
March			9.95	15.4	308	947
April			6.16	9.53	185	567
May	8.4		2.11	3.26	65.4	201
June			1.34	2.07	40.3	123
The year			6.34	9.81	2,310	7,100

[a] Estimated.

WAIKAMOI STREAM ABOVE WAILOA DITCH, NEAR HUELO, MAUI

LOCATION.—Water-stage recorder 500 feet above intake of Wailoa ditch, one-quarter mile above Spreckels ditch trail, and 2½ miles southeast of Kailua.

DRAINAGE AREA.—4.4 square miles.

RECORDS AVAILABLE.—January, 1922, to June, 1929.

EXTREMES.—Maximum discharge during year, 863 million gallons a day or 1,340 second-feet Feb. 17 (gage height, 7.95 feet); minimum, 1.2 million gallons a day or 1.9 second-feet June 29, 30.

1922–1929: Maximum discharge, 1,360 million gallons a day or 2,100 second-feet Oct. 16, 1924 (gage height, 10.45 feet); minimum, 0.5 million gallons a day or 0.8 second-foot Mar. 21 and 22, 1926.

REMARKS.—Record good for ordinary stages; poor for high stages. Haleakala ranch and Kula pipe lines divert small amounts of water above station.

Discharge, in million gallons a day, 1928–29

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	64	12.6	4.9	7.8	3.4	3.0	20	3.8	49	2.1	2.8	2.4
2	12.3	11.1	48	5.7	3.4	2.8	7.8	3.5	29	2.7	2.0	2.2
3	9.7	14.2	25	4.0	2.9	2.8	45	3.3	26	2.8	1.8	2.0
4	7.6	9.8	24	4.0	3.2	2.6	10.6	3.0	35	2.4	1.6	22
5	5.7	9.9	9.5	6.7	12.3	75	7.6	2.8	50	2.0	2.1	28
6	4.8	6.6	6.7	4.8	4.6	69	22	6.5	38	2.8	10.9	11.5
7	18.0	6.3	11.6	3.9	81	25	11.0	19.9	71	5.0	12.7	6.1
8	28	5.6	7.8	3.5	16.9	17.3	38	6.4	52	21	12.0	3.5
9	11.1	4.8	10.0	3.0	33	49	12.0	4.0	90	5.0	5.2	2.7
10	11.8	19.2	65	2.8	56	43	7.1	3.3	43	57	6.2	2.6
11	9.9	13.4	33	2.6	120	31	5.7	3.4	50	114	21	5.1
12	7.2	9.2	9.5	2.4	32	63	4.9	21	20	152	13.2	4.0
13	9.9	9.1	6.6	2.3	30	62	4.9	7.6	12.5	40	61	8.0
14	24	8.9	5.4	3.2	39	104	56	12.8	17.2	15.2	27	4.9
15	13.9	8.0	4.9	7.4	29	46	19.6	65	20	21	13.6	39
16	59	25	5.7	3.7	11.1	31	10.1	155	9.1	9.8	7.2	8.5
17	34	66	4.9	2.8	7.9	13.9	6.4	278	7.0	7.4	5.4	4.6
18	14.7	31	6.2	2.7	13.3	14.5	5.8	94	5.6	35	4.6	4.8
19	13.6	10.1	54	2.6	11.8	9.3	17.8	41	5.5	9.8	3.8	3.3
20	10.3	13.9	9.6	2.3	31	10.8	9.1	171	5.4	6.2	3.1	2.7
21	7.6	16.5	5.8	2.6	25	7.8	6.2	136	4.6	4.8	2.8	2.3
22	29	9.7	4.8	4.2	8.1	6.6	168	106	3.6	4.3	2.9	2.1
23	13.3	16.3	4.0	2.9	6.3	5.4	54	27	3.3	4.0	10.2	1.9
24	67	29	3.7	2.4	5.8	7.1	14.4	19.9	3.0	4.0	8.9	2.2
25	89	9.9	3.4	2.2	8.7	56	8.9	10.5	2.9	3.1	4.0	3.0
26	163	7.1	3.1	2.0	7.1	42	7.1	11.9	2.6	2.8	2.8	2.6
27	74	6.3	2.9	54	4.6	11.3	5.8	29	2.4	2.8	5.7	1.7
28	19.8	8.0	7.5	17.2	3.9	20	11.6	93	2.2	2.4	7.7	1.4
29	11.5	5.1	17.1	5.3	3.6	16.0	8.3	-------	2.0	3.3	7.6	1.3
30	9.1	4.5	5.6	3.7	3.5	7.9	5.4	-------	1.9	2.9	3.4	1.4
31	9.2	4.2	-------	3.3	-------	6.1	4.3	-------	1.8	-------	2.8	-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	163	4.8	27.8	43.0	862	2,640
August	66	4.2	13.3	20.6	411	1,270
September	65	2.9	13.7	21.2	410	1,260
October	54	2.0	5.74	8.88	178	546
November	120	2.9	20.6	31.9	618	1,900
December	104	2.6	27.8	43.0	861	2,640
January	168	4.3	19.9	30.8	615	1,890
February	278	2.8	47.8	74.0	1,340	4,110
March	90	1.8	21.5	33.3	666	2,050
April	152	2.0	18.3	28.3	548	1,680
May	61	1.6	8.90	13.8	276	847
June	39	1.3	6.26	9.69	188	576
The year	278	1.3	19.1	29.6	6,970	21,400

KAAIEA STREAM NEAR KAILUA, MAUI

LOCATION.—Water-stage recorder 700 feet above Hamakua ditch trail crossing and 2 miles southeast of Kailua.

DRAINAGE AREA.—0.5 square mile.

RECORDS AVAILABLE.—December, 1921, to June, 1929.

EXTREMES.—Maximum discharge during year, 504 million gallons a day or 780 second-feet Dec. 13 (gage height, 3.52 feet); minimum, 0.6 million gallons a day or 0.9 second-foot May 4.

1921–1929: Maximum discharge, 900 million gallons a day or 1,390 second-feet Jan. 31, 1922 (gage height, 4.92 feet); minimum, 0.3 million gallons a day or 0.5 second-foot July 17, 1922, and Mar. 22, 1927.

REMARKS.—Records good for ordinary stages and poor for high stages. No diversions.

Discharge, in million gallons a day, 1928–29

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	8.8	7.7	1.5	3.5	1.8	0.9	7.0	1.0	13.2	0.9	1.4	0.9
2	4.2	3.1	23	3.1	1.4	.9	2.2	.9	6.6	1.1	.7	.8
3	3.0	4.5	6.8	1.4	1.1	.9	3.7	.9	12.7	1.8	.7	.7
4	2.1	4.8	4.7	1.9	2.5	.9	3.2	.8	13.4	1.2	.6	1.4
5	1.8	4.9	2.8	4.4	5.8	39	2.4	.7	32	.8	.9	3.3
6	1.5	2.6	2.2	2.1	1.5	9.1	6.2	5.6	7.2	1.0	6.5	1.5
7	2.9	2.4	7.1	1.6	26	3.4	3.0	5.5	11.6	1.9	3.4	1.0
8	7.7	1.9	2.6	1.4	4.3	5.4	12.9	1.6	12.2	6.4	2.8	.8
9	2.8	1.6	8.6	1.2	3.5	7.9	3.0	1.1	68	1.4	1.3	.7
10	5.5	4.3	33	1.0	3.9	15.0	2.2	1.1	16.6	32	2.3	.8
11	4.4	3.5	11.0	.9	9.3	8.1	1.9	1.5	25	40	4.3	2.4
12	2.6	5.2	3.5	.9	2.8	9.7	1.5	11.2	5.7	26	2.8	1.9
13	2.1	3.6	2.4	.8	5.6	37	1.5	2.1	3.7	5.3	4.8	2.7
14	3.2	3.2	1.9	1.7	16.7	29	7.3	11.6	7.6	3.2	8.6	1.9
15	1.9	2.6	1.8	2.8	6.0	8.5	3.5	24	21	3.3	3.2	7.3
16	25	21	2.2	1.1	3.5	19.1	2.4	62	3.7	2.6	2.1	2.4
17	5.0	31	1.6	1.0	2.4	4.2	1.6	55	2.8	2.8	1.8	1.6
18	4.8	9.1	1.7	.8	4.4	7.0	1.6	38	2.2	21	1.4	1.4
19	5.9	3.0	33	.9	3.4	3.7	2.8	21	2.1	3.2	1.2	1.2
20	3.2	6.0	2.8	.7	3.9	2.8	1.8	25	1.9	2.2	1.1	1.1
21	2.4	2.9	1.9	1.0	4.2	3.2	3.3	11.7	1.9	1.8	1.0	1.0
22	7.6	3.9	1.6	2.0	2.1	2.8	59	21	1.4	1.6	1.0	.9
23	4.1	3.5	1.4	1.0	1.8	2.2	8.5	5.0	1.3	1.5	3.0	.8
24	18.6	4.2	1.3	.8	1.9	4.5	3.0	14.7	1.2	1.9	1.8	1.0
25	21	2.2	1.2	.7	2.2	30	2.1	2.8	1.2	1.3	1.2	1.1
26	43	2.1	1.0	.7	1.8	7.6	1.8	2.9	1.0	1.2	.9	1.0
27	13.3	2.5	1.0	28	1.3	3.2	1.5	4.3	.9	1.3	6.5	.7
28	4.0	4.4	1.1	4.5	1.2	5.2	3.8	23	.8	1.0	2.6	.7
29	2.8	1.8	2.3	1.6	1.1	7.0	1.6	-------	.8	.8	1.5	.7
30	2.4	1.6	1.0	1.3	1.1	2.8	1.2	-------	.7	.9	1.1	.7
31	2.4	1.5	-------	1.1	-------	2.2	1.1	-------	.7	-------	1.0	-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	43	1.5	7.06	10.9	219	672
August	31	1.5	5.05	7.81	157	480
September	33	1.0	5.60	8.66	168	516
October	28	.7	2.45	3.79	75.9	233
November	26	1.1	4.28	6.62	128	394
December	39	.9	9.14	14.1	283	870
January	59	1.1	5.12	7.92	159	487
February	62	.7	12.7	19.6	356	1,090
March	68	.7	9.07	14.0	281	863
April	40	.8	5.71	8.83	171	526
May	8.6	.6	2.37	3.67	73.5	225
June	7.3	.7	1.48	2.29	44.4	136
The year	68	.6	5.80	8.97	2,120	6,490

SPRECKELS DITCH BELOW KAAIEA GULCH, NEAR HUELO, MAUI

LOCATION.—Water-stage recorder 1,000 feet below intake in Kaaiea Stream and 1.5 miles southeast of Kailua.

RECORDS AVAILABLE.—December, 1917, to June, 1929.

EXTREMES.—Maximum discharge during year, 81 million gallons a day or 125 second-feet Dec. 13 (gage height, 4.43 feet); minimum occurred sometime during periods of missing record.

1917–1929: Maximum discharge, 110 million gallons a day or 170 second-feet Jan. 16, 1921 (gage height, 5.65 feet) and May 16, 1924 (gage height, 5.45 feet); no flow occasionally when water is turned out of ditch.

REMARKS.—Records fair except those for estimated periods, which are poor. Spreckels ditch diverts water for irrigation from all streams between Nuaailua and Kailua above Koolau ditch east of Puohokamoa and below Koolau ditch west of Puohokamoa.

Discharge, in million gallons a day, 1928–29

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	8.8	3.1	0.7	5.4	1.2	0.3	6.3	0.9			0.4	
2	3.0	1.3	12.1	3.3	.8	.2	3.7	.6	7		.2	0.3
3	2.0	2.8	3.4	.8	.5	.2	3.3	.6			.2	
4	1.5	1.3	1.7	.6	2.5	.2	.7	.5	16	0.6	.1	
5	1.3	2.8	1.1	1.3	1.6	18.4	.7	.5			.1	1.4
6	1.1	1.2	1.0	.7	.6	3.7	1.0	5.3	6		2.1	
7	1.5	1.2	7.4	.6	9.9	1.6	.9	1.9			.7	
8	2.9	1.0	2.3	.6	1.6	2.2	13.1	.7		2.2	[a].6	
9	1.2	.9	3.5	.6	1.3	3.7	1.3	.5			.5	.3
10	1.9	1.3	13.6	.5	1.0	6.2	4.8	.4	17			
11	2.2	2.0	9.6	.5	5.2	4.2	1.6	1.4		22		
12	1.1	3.3	2.7	.4	1.0	7.5	.6	3.4	3.2			
13	.9	2.0	2.0	.4	2.5	18.7	.6	4.2		2.8	1.9	1.7
14	.9	1.4	1.5	.4	6.1	14.5	7.0		10			
15	1.2	.9	1.3	.9	2.7	5.3	1.7			1.4		
16	10.3	6.9	1.1	.4	1.3	18.3	1.0	22	2.4			
17	3.4	17.0	1.0	.4	1.3	3.6	.6		1.7			.4
18	2.0	5.9	1.0	.4	3.3	3.3	.8			8.5		.4
19	1.9	1.3	11.3	.9	1.3	2.2	1.3					.2
20	1.0	3.0	1.0	.4	1.4	1.6	.7		1.1		.4	.2
21	.8	1.3	.8	.4	1.5	1.8	2.8	9.5		1.3		.2
22	2.0	2.3	1.4	.5	.9	1.3	26					.2
23	1.9	1.5	.6	.4	.8	1.2	6.1				1.8	.2
24	11.9	2.2	.5	.3	.7	2.5	1.6		.6			
25	13.2	1.3	.4	.2	.6	12.3	1.2				.5	
26	19.6	1.2	.4	.2	.6	3.8	.9	1.7		.4		.3
27	8.6	1.1	.4	11.7	.4	1.4	.8				3.2	
28	2.6	2.5	.4	2.7	.4	3.4	3.1	[b]20	.4			
29	1.5	1.0	.5	.6	.4	6.8	.9	-------		.2		
30	1.3	.9	.4	.6	.4	1.2	.6	-------		.2	.7	
31	1.3	.7	------	.5	------	1.4	.6	-------		-------		-----

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	19.6	0.8	3.70	5.72	115	352
August	17.0	.7	2.47	3.82	76.6	235
September	13.6	.4	2.84	4.39	85.1	261
October	11.7	.2	1.21	1.87	37.6	115
November	9.9	.4	1.79	2.77	53.8	165
December	18.7	.2	4.94	7.64	153	470
January	26	.6	3.11	4.81	96.3	296
February	----------	.4	6.97	10.8	195	599
March	----------	----------	5.57	8.62	173	530
April	----------	.2	3.72	5.76	112	342
May	----------	.1	1.04	1.61	32.3	99
June	----------	----------	.60	.93	17.9	55
The year	----------	----------	3.14	4.86	1,150	3,520

[a] Partly estimated. [b] Estimated.

CENTER DITCH BELOW KOLEA RESERVOIR, NEAR HUELO, MAUI

LOCATION.—Water-stage recorder 200 feet below intake from Kolea Reservoir spillway, half a mile below intake in Waikamoi Stream, and 1¾ miles southeast of Kailua.

RECORDS AVAILABLE.—March, 1918, to June, 1929.

EXTREMES.—Maximum discharge during year, 89 million gallons a day or 138 second-feet Feb. 16 (gage height, 5.39 feet); minimum, 0.9 million gallons a day or 1.4 second-feet June 30.

1918–1929: Maximum discharge, 96 million gallons a day or 149 second-feet Nov. 17, 1927 (gage height, 5.72 feet); ditch dry Dec. 4, 1918, and Jan. 16, 1919.

REMARKS.—Records good for ordinary stages; fair for extremely high stages, and poor for estimated periods. Center ditch receives the flow of Manuel Luis ditch and diverts water from all streams between Waikamoi and Kailua. Regulated by head gates and spillways.

Discharge, in million gallons a day, 1928–29

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	47	30	*2.9	11.4	3.3	1.8		6.2	33	2.0	2.8	1.2
2	25	20	33	16.3	2.4	1.6	23	2.1	29	7.6	2.0	1.4
3	21	25	31	7.2	2.4	1.7		2.0	29	4.9	1.8	1.2
4	10.7	19.1	35	5.1	6.9	1.5		1.9	31	1.8	1.7	13.6
5	5.0	25	20	15.8	18.7	33		1.7	45	1.5	1.6	19.4
6	7.9	18.2	13.2	4.1	2.4	50		14.0	28	2.2	9.9	4.9
7	24	7.7	23	3.0	46	28	18	12.6	45	2.9	7.9	1.8
8	30	4.4	16.1	3.0	20	12.3		3.0	36	21	6.8	1.4
9	17.3	3.5	27	2.5	26	38		2.3	61	2.2	2.0	1.2
10	23	16.7	46	2.5	40	35		2.1	38	33	2.4	1.2
11	22	22	36	2.1	70			5.0	45	63	18.8	2.3
12	6.5	17.5	22	2.0	27		4.7	27	29	75	12.8	2.4
13	9.2	12.8	11.8	2.0	29	46		4.1	24	35	34	6.4
14	21.0	13.6	5.9	2.2	33			21	28	24	27	2.0
15	17.4	4.4	12.1	8.8	32		15	37	31	24	14.9	24
16	35	29	4.8	2.1	22			70	22	8.4	6.9	3.3
17	34	36	3.8	2.0	14.9	24		73	16.6	8.6	5.3	1.8
18	27	49	4.8	2.0	27			50	9.3	35	1.7	1.7
19	27	25	43	2.8	21			45	5.7	10.7	1.6	1.4
20	14.8	20	10.5	2.0	13.9	11	12	61	4.6	4.2	1.4	1.4
21	5.3	29	7.7	2.0	27			55	4.0	3.2	1.4	1.3
22	25	18.0	2.9	2.4	14.5			45	3.3	2.8	1.5	1.3
23	24	22	2.8	2.0	10.8	5.5	40	31	3.2	2.8	4.1	1.3
24	48	31	2.5	1.8	7.6			26	2.9	3.8	3.3	1.5
25	59	23	2.3	1.7	4.6			19.1	2.6	4.7	1.8	1.6
26	66	10.2	2.2	1.6	3.1	32	6.5	20	2.5	4.6	1.6	1.4
27	56	5.2	2.0	28	2.3			37	2.3	4.0	10.5	1.1
28	29	14.0	2.2	22	2.0		7.8	46	2.2	3.3	4.8	1.0
29	23	13.8	14.4	2.9	2.0	16	3.5	-------	2.0	3.3	2.0	1.0
30	20	3.5	2.1	3.7	2.5		2.8	-------	2.0	3.4	1.5	.9
31	13.2	3.0	-------	2.9	-------		6.1	-------	2.0	-------	1.3	-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	66	5.0	25.6	39.6	793	2,440
August	49	3.0	18.4	28.5	572	1,750
September	46	2.0	14.8	22.9	443	1,360
October	28	1.6	5.48	8.48	170	521
November	70	2.0	17.8	27.5	534	1,640
December	50	1.5	22.5	34.8	698	2,140
January	40	2.8	14.3	22.1	443	1,360
February	73	1.7	25.7	39.8	720	2,210
March	61	2.0	20.0	30.9	619	1,900
April	75	1.5	13.4	20.7	403	1,230
May	34	1.3	6.36	9.84	197	605
June	24	.9	3.55	5.49	106	327
The year	75	.9	15.6	24.1	5,700	17,500

* Partly estimated.

NAILILIHAELE STREAM NEAR HUELO, MAUI

LOCATION.—Water-stage recorder 200 feet above Wailoa ditch intake, 700 feet above New Hamakua ditch trail, and 1½ miles south of Kailua.

DRAINAGE AREA.—2.8 square miles.

RECORDS AVAILABLE.—October, 1913, to June, 1918; August, 1919, to June, 1929.

EXTREMES.—Maximum discharge, 365 million gallons a day or 565 second-feet Oct. 27 (gage height, 5.00 feet); minimum, 3.8 million gallons a day or 5.9 second-feet Oct. 26.

1913–1929: Maximum discharge, 1,800 million gallons a day or 2,790 second-feet May, 1916 (gage height, 6.3 feet); minimum, 0.45 million gallons a day or 0.7 second-foot July 14, 1920.

REMARKS.—Records good for ordinary stages, fair for estimated periods, and poor for high stages. No diversions.

Discharge, in million gallons a day, 1928–29

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	54	39	9.5	13.3	9.7		38	7.8		5.4	7.8	5.9
2	25	19.0	65	12.2	7.6		14.2	7.2		6.4	5.5	5.5
3	19.2	31	37	7.2	6.1	6.5	35	6.8	50	9.0	5.0	5.4
4	15.3	23	32	8.8	17.4		20	6.4		8.0	4.7	11.1
5	12.4	b30	17.3	18.6	21		15.8	5.9		5.5	5.4	25
6	10.8	16.1	13.7	9.8	8.2	60	40	23		7.0	36	12.2
7	17.8	15.8	30	8.2	88		20	30		10.7	24	7.8
8	43	13.4	15.3	7.0	26	25	58	10.6	70	38	18.1	6.1
9	18.9	11.5	32	5.9	24	45	19.6	7.2		9.5	8.6	5.4
10	35	29	87	5.5	36	50	14.8	6.4		73	15.0	5.5
11	28	25	46	5.0	61	47	12.7	8.0		113	36	11.8
12	17.3	27	20	4.8		58	10.8	52		120	23	9.9
13	17.3	25	15.6	4.6		85	10.3	13.1		42	43	15.1
14	19.2	20	13.2	8.2		101	50	36	28	26	48	10.4
15	14.8	17.6	11.7	13.8		48	24	92		24	23	43
16	69	64	13.2	7.0	34	57	14.5	122	23	16.1	14.5	14.7
17	50	99	9.9	5.5		25	11.0	148	17.0	19.4	12.0	9.7
18	30	45	11.3	5.2		38	11.2	90	14.5	65	9.9	8.4
19	34	23	87	5.0		22	16.7	58	14.8	21	8.8	7.2
20	22	30	15.8	4.6		18.9	12.0	110	13.5	14.8	8.0	6.6
21	17.0	21	11.7	5.2		20	19.8	63	12.4	12.4	7.2	6.1
22	44	21	10.1	9.9	22	16.7	136	92	9.2	11.2	7.4	5.7
23	26	21	9.0	5.2		13.7	46	38	8.4	10.3	18.4	5.2
24	73	32	8.2	4.6		22	20	42	7.8	11.0	13.0	5.9
25	90	16.4	7.6	4.2		76	15.0	21	7.2	10.8	8.0	6.3
26	122	14.5	6.8	3.8	11	40	12.9	19.5	6.8	8.0	6.8	6.1
27	73	13.8	6.4	75		19.2	11.0	a20	6.3	7.8	11.6	4.6
28	30	22	8.2	23		28	23	b100	6.1	6.7	28	4.2
29	23	11.5	14.2	9.0		34	12.2	-------	5.5	7.0	11.0	4.1
30	18.6	10.1	7.2	7.2		16.1	9.7	-------	5.2	7.0	7.2	4.4
31	17.0	9.5	-------	6.4	-------	13.9	8.6	-------	5.0	-------	6.6	-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	122	10.8	35.1	54.3	1,090	3,340
August	99	9.5	25.7	39.8	796	2,440
September	87	6.4	22.4	34.7	672	2,060
October	75	3.8	10.1	15.6	314	961
November	----------	----------	25.1	38.8	754	2,310
December	101	----------	36.3	56.2	1,130	3,450
January	136	8.6	24.6	38.1	763	2,340
February	148	5.9	44.1	68.2	1,240	3,790
March	----------	5.0	31.1	48.1	965	2,960
April	120	5.4	24.2	37.4	726	2,230
May	48	4.7	15.5	24.0	482	1,470
June	43	4.1	9.31	14.4	279	857
The year	148	3.8	25.2	39.0	9,210	28,200

a Partly estimated. b Estimated.

KAILUA STREAM NEAR HUELO, MAUI

LOCATION.—Water-stage recorder just above Wailoa ditch intake, 1¼ miles southwest of Kailua, and 2½ miles south of Huelo.

DRAINAGE AREA.—3.0 square miles.

RECORDS AVAILABLE.—December, 1910, to June, 1918; July, 1919, to June, 1929.

EXTREMES.—Maximum discharge during year, 915 million gallons a day or 1,420 second-feet Feb. 17 (gage height, 8.10 feet); minimum, 2.0 million gallons a day or 3.1 second-feet Oct. 26 and 27.

1911–1918, 1919–1929: Maximum discharge, about 1,500 million gallons a day or 2,300 second-feet Feb. 1, 1922 (gage height, 10.5 feet; determined from floodmarks); minimum, 0.07 million gallons a day or 0.11 second-feet June 27, 1921.

REMARKS.—Records for ordinary stages fair; for high and low stages poor. Partly estimated Sept. 7, 8, 14–18, 21–30, Oct. 1–15. No diversions above station.

Discharge, in million gallons a day, 1928–29

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	20	16.0	5.6	4.2	3.7	3.5	24	5.2	62	3.2	3.4	2.9
2		10.4	48	3.5	3.4	3.3	9.8	4.7	35	3.3	2.8	2.6
3		15.5	22	3.5	2.8	3.0	42	4.3	32	3.4	2.5	2.6
4		11.4	26	3.5	4.5	2.9	13.7	4.0	41	3.4	2.4	10.5
5	7.5	11.8	9.0	3.5	19.4	107	10.4	3.7	69	2.8	2.5	22
6		7.7	6.3	3.5	4.7	67	29	7.5	43	2.9	12.9	9.7
7		7.4	10.0	3.5	104	22	13.4	19.2	82	4.1	12.8	5.4
8	16	7.2	6.8	3.5	19.8	18.5	60	7.0	53	17.5	11.4	3.5
9		7.2	9.5	3.4	30	54	15.4	4.7	119	4.9	4.9	3.0
10		14.5	78	3.3	57	53	10.1	3.8	43	63	6.1	2.9
11	9.5	13.4	39	3.3	143	36	8.2	4.1	47	141	27	4.9
12		10.1	9.9	3.3	31	80	7.0	32	21	194	16.0	3.7
13	9.5	10.8	7.2	3.3	34	80	6.8	8.8	13.3	51	58	6.2
14	16.4	10.3	6.3	3.8	58	137	64	12.9	22	18.2	34	4.6
15	12.4	8.8	5.8	3.6	31	59	20	94	20	17.5	14.6	39
16	78	28	5.4	2.9	13.7	29	11.4	188	10.1	10.4	8.5	8.7
17	36	67	5.1	2.8	9.9	15.2	7.9	284	8.2	9.0	6.3	5.1
18	16.0	33	4.7	2.5	13.3	18.5	7.9	120	7.0	50	5.4	4.5
19	14.8	11.4	68	2.3	11.4	12.4	15.4	53	7.7	12.0	4.5	3.
20	10.4	10.6	8.2	2.3	36	11.8	11.7	199	7.0	7.9	4.0	3.4
21	8.5	10.7	5.8	2.3	24	10.1	28	126	6.3	6.3	3.8	3.3
22	33	7.7	5.4	3.4	10.1	9.0	244	130	5.1	5.6	3.7	3.0
23	13.0	10.6	4.9	2.4	8.2	7.4	57	32	4.7	5.1	8.1	3.0
24	67	19.1	4.5	2.2	7.2	9.0	18.0	19.2	4.3	4.9	7.8	3.4
25	108	8.7	4.3	2.1	17.6	84	11.7	11.0	4.2	4.2	4.3	3.7
26	212	6.5	4.0	2.1	8.4	41	9.3	11.6	3.8	4.0	3.5	3.7
27	87	5.6	3.8	72	5.8	13.3	7.9	24	3.5	3.8	3.4	3.0
28	21	7.0	3.7	16.9	4.9	18.9	16.4	123	3.4	3.5	13.0	2.9
29	13.0	5.6	7.9	5.4	4.3	16.4	9.6	-------	3.3	3.5	6.3	2.6
30	10.1	5.6	4.3	3.8	3.8	9.9	7.0	-------	3.2	3.4	3.8	2.8
31	9.0	5.6	-------	3.2	-------	8.2	5.8	-------	3.3	-------	3.3	-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	212	-------	30.3	46.9	939	2,880
August	67	5.6	13.1	20.3	405	1,250
September	78	3.7	14.3	22.1	429	1,320
October	72	2.1	5.85	9.05	181	557
November	143	2.8	24.2	37.4	725	2,230
December	137	2.9	33.6	52.0	1,040	3,200
January	244	5.8	25.9	40.1	803	2,460
February	284	3.7	54.9	84.9	1,540	4,720
March	119	3.2	25.4	39.3	787	2,420
April	194	2.8	22.1	34.2	664	2,030
May	58	2.4	9.71	15.0	301	924
June	39	2.6	6.01	9.30	180	553
The year	284	2.1	21.9	33.9	7,990	24,500

HOOLAWALIILI STREAM NEAR HUELO, MAUI

LOCATION.—Water-stage recorder just above New Hamakua ditch crossing, 2 miles west of Kailua, and 2 miles southwest of Huelo.

RECORDS AVAILABLE.—April, 1911, to June, 1929.

EXTREMES.—Maximum discharge during year, 220 million gallons a day or 340 second-feet Dec. 13 (gage height, 3.83 feet); minimum, 1.7 million gallons a day or 2.6 second-feet Oct. 13.

1911–1929: Maximum discharge, 485 million gallons a day or 750 second-feet Nov. 21, 1921 (gage height, 4.82 feet); minimum, 0.2 million gallons a day or 0.3 second-foot June 8, 1926.

REMARKS.—Records good for medium stages, poor for high stages, and fair where estimated. No diversions.

Discharge, in million gallons a day, 1928–29

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	9.5	5.1	2.7		2.3	2.5	5.3	2.8	13.7	2.3	2.4	2.5
2		4.4	8.5		2.1	2.4	3.8	2.7	8.9	2.1	2.3	2.7
3		5.6	5.1		2.0	2.3	3.6	2.7	8.9	2.1	2.3	2.5
4	3.8	4.2	4.4		4.8	2.3	3.4	2.5	8.6	2.1	2.3	2.7
5		5.8	3.6		3.2	21	3.2	2.4	14.7	2.0	2.3	2.8
6	3.0	3.8	3.4		2.3	8.0	3.8	3.9	10.7	2.0	3.8	2.7
7	2.8	3.4	6.2	2.0	11.3	4.8	3.6	4.2	10.1	1.9	2.7	2.4
8	3.8	3.0	3.8		4.7	4.6	17.2	3.0	8.6	2.5	2.7	2.4
9	4.0	2.7	5.3		3.8	7.0	4.6	2.7	43	2.0	2.7	2.3
10	4.4	3.2	21		3.4	9.5	3.8	2.5	14.6	16.3	3.0	2.3
11	5.1	3.8	10		6.4	8.0	3.4	3.0	21	13.0	3.2	2.4
12	3.8	5.0			3.8	11.1	3.0	8.3	10.1	11.4	3.0	2.1
13	3.4	4.2		1.8	5.4	25	2.8	3.4	7.2	6.9	4.0	2.4
14	3.2	4.2		1.8	9.6	24	5.3	5.4	11.1	5.1	4.4	2.4
15	3.2	3.2		2.0	7.3	12.3	6.0	18.6	8.8	4.4	4.2	4.5
16	13.4	8.1	4.1	1.9	5.1	13.1	3.6	38	5.8	3.8	3.8	2.7
17	6.9	14.9		1.9	4.4	7.7	3.0	47	4.8	3.8	3.4	2.3
18	4.6	10.8		1.9	5.1	8.3	3.0	29	4.4	12.7	3.2	2.4
19	4.4	5.6	[a]20	1.9	4.2	6.4	3.6	22	4.6	5.1	3.2	2.3
20	4.2	4.4		1.9	4.0	5.1	3.2	24	4.2	4.0	3.0	2.3
21	3.8	3.8	4.2	1.8	3.8	5.1	4.9	12.9	3.8	3.6	3.2	2.3
22	4.2	3.6		2.0	3.4	4.6	31	18.4	3.2	3.4	3.2	2.1
23	4.6	3.2		1.9	3.2	4.0	10.1	10.1	3.0	2.8	3.6	2.1
24	9.5	3.9		1.9	3.0	4.6	5.8	9.0	2.8	2.8	3.4	2.1
25	14.4	3.6		1.8	5.1	13.4	4.8	5.8	2.7	2.5	3.0	2.1
26	23	3.4	2.6	1.7	3.2	8.1	3.8	5.6	2.5	2.4	3.0	2.1
27	16.5	3.4		10.6	2.8	4.8	3.6	5.0	2.5	2.3	3.4	2.1
28	7.5	4.1		4.0	2.8	5.7	5.7	19.5	2.4	2.3	4.3	2.1
29	5.6	3.2		2.4	2.7	6.7	3.6	-------	2.4	2.1	3.2	2.0
30	4.4	3.0		2.3	2.5	4.4	3.2	-------	2.3	2.3	2.8	2.0
31	3.8	2.7	-------	2.1	-------	3.8	3.0	-------	2.3	-------	2.7	-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	23	2.8	6.20	9.59	192	590
August	14.9	2.7	4.62	7.15	143	440
September	----------	----------	5.40	8.36	162	497
October	10.6	----------	2.31	3.57	71.6	220
November	11.3	2.0	4.26	6.59	128	392
December	25	2.3	8.08	12.5	251	769
January	31	2.8	5.44	8.42	169	518
February	47	2.4	11.2	17.3	314	962
March	43	2.3	8.18	12.7	254	778
April	16.3	1.9	4.40	6.81	132	405
May	4.4	2.3	3.15	4.87	97.7	300
June	4.5	2.0	2.40	3.71	72.1	221
The year	47	----------	5.44	8.42	1,990	6,090

[a] Estimated.

HOOLAWANUI STREAM NEAR HUELO, MAUI

LOCATION.—Water-stage recorder just above intake of Wailoa ditch, 2 miles west of Kailua, and 2 miles southwest of Huelo; elevation 1,240 feet.

RECORDS AVAILABLE.—December, 1910, to June, 1929.

EXTREMES.—Maximum discharge during year, 156 million gallons a day or 241 second-feet Feb. 17 (gage height, 4.10 feet); minimum uncertain, probably occurred between June 26 and 30.

1910–1929: Maximum discharge, about 550 million gallons a day or 851 second-feet Feb 1, 1922 (gage height, 8.40 feet); minimum, 0.15 million gallons a day or 0.2 second-foot Oct. 25, 1917.

REMARKS.—Records good for ordinary stages, fair for estimated periods and high stages. No diversions.

Discharge, in million gallons a day, 1928-29

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	16.7	9.0	3.2	2.9	2.3	3.0	10.4	3.9	32	1.9	2.3	1.3
2	5.8	6.8	18.2	2.6	2.0	2.9	5.6	3.6	20	1.9	1.9	1.2
3	5.1	9.1	8.5	2.2	1.6	2.7	8.7	3.4	20	1.9	1.8	1.2
4	4.4	6.9	8.0	2.2	3.6	2.5	6.3	3.1	21	1.9	1.8	1.6
5	3.8	8.2	5.2	3.0	8.4	38	5.6	2.8	31	1.6	1.7	2.7
6	3.6	5.5	4.4	2.3	2.4	19.1	10.4	4.7	24	1.6	4.2	2.0
7	4.1	5.3	7.8	2.0	32	8.7	6.9	7.1	30	1.7	3.0	1.4
8	7.6	4.7	4.4	2.0	7.9	9.0	30	3.8	22	4.2	3.3	1.2
9	4.7	4.2	6.1	1.8	6.3	17.9	9.0	2.9	61	2.3	2.3	1.0
10	9.0	6.3	35	1.7	8.5	22	6.5	2.4	28	21	2.5	1.0
11	6.2	5.8	21	1.6	29	20	5.5	2.5	32	37	6.8	1.6
12	4.9	6.4	8.6	1.6	12.4	33	4.7	14.8	16.5	46	4.3	1.4
13	4.8	6.0	6.5	1.6	15.8	43	4.3	5.4	12.0	19.0	7.9	1.9
14	5.5	5.7	5.5	1.8	27	57	15.4	6.0	15.9	10.4	9.1	1.5
15	5.1	4.5	4.9	2.3	19.4	36	9.2	42	13.0	8.0	6.4	7.4
16	30	14.3	4.7	1.6	10.0	24	6.3	61	8.0	5.8	4.2	2.8
17	16.5	33	4.0	1.6	7.2	13.8	4.9	93	6.4	5.6	3.5	1.9
18	10.8	19.5	4.0	1.6	7.9	15.2	4.8	61	5.6	23	3.1	1.7
19	9.7	9.2	33	1.4	6.4	10.2	6.2	33	5.8	7.4	2.8	1.6
20	7.2	7.9	6.4	1.3	9.3	8.4	5.3	60	5.2	5.5	2.5	1.4
21	6.0	6.6	5.2	1.4	9.8	7.9	8.9	37	4.8	4.7	2.3	1.3
22	12.5	5.7	4.4	1.8	5.6	6.7	75	52	3.8	4.0	2.2	1.2
23	6.7	5.9	4.0	1.3	4.7	5.8	37	28	3.4	3.8	3.0	1.1
24	23	6.7	3.7	1.2	4.6	6.5	16.0	17.8	3.0	3.4	2.7	1.1
25	42	5.0	3.4	1.2	8.4	30	9.8	11.4	2.8	3.0	2.1	1.2
26	68	4.7	3.0	1.1	5.3	20	7.3	10.0	2.6	2.7	1.9	
27	53	4.4	2.8	19.1	3.9	9.2	6.0	8.5	2.5	2.6	2.1	
28	24	6.0	3.0	6.4	3.6	10.3	10.6	41	2.3	2.3	3.0	1.1
29	14.5	3.8	3.0	2.3	3.3	11.0	6.0	-------	2.2	2.2	2.6	
30	10.2	3.5	2.6	1.9	3.1	6.5	4.8	-------	2.0	2.2	1.6	
31	7.9	3.4	-------	1.6	-------	5.7	4.3	-------	2.0	-------	1.5	-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	68	3.6	14.0	21.7	433	1,330
August	33	3.4	7.55	11.7	234	718
September	35	2.6	7.82	12.1	234	720
October	19.1	1.1	2.53	3.91	78.4	241
November	32	1.6	9.06	14.0	272	834
December	57	2.5	16.3	25.2	506	1,550
January	75	4.3	11.3	17.5	352	1,080
February	93	2.4	22.2	34.3	622	1,910
March	61	2.0	14.2	22.0	441	1,350
April	46	1.6	7.95	12.3	239	732
May	9.1	1.5	3.24	5.01	100	308
June	7.4	-------	1.64	2.54	49.2	151
The year	93	-------	9.76	15.1	3,560	10,900

HONOPOU STREAM NEAR HUELO, MAUI

LOCATION.—Water-stage recorder just above New Hamakua ditch crossing, 2¼ miles west of Kailua, and 2¼ miles southwest of Huelo; elevation about 1,250 feet.

DRAINAGE AREA.—1.0 square mile.

RECORDS AVAILABLE.—December, 1910, to June, 1929.

EXTREMES.—Maximum discharge during year, 201 million gallons a day or 311 second-feet Dec. 13 (gage height, 3.44 feet); minimum 0.6 million gallons a day or 0.9 second-foot several days in October.

1910–1929: Maximum discharge, 658 million gallons a day or 1,020 second-feet Feb. 1, 1922 (gage height, 5.50 feet); minimum, 0.15 million gallons a day or 0.23 second-foot July 14, 1920.

REMARKS.—Records good. No diversions.

Discharge, in million gallons a day, 1928–29

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	3.7	4.0	1.6	1.4	1.0	0.9	4.1	1.7	11.2	1.3	1.5	1.0
2	2.3	3.7	5.6	1.3	.8	.9	2.7	1.5	7.2	1.3	1.3	1.0
3	2.0	3.7	2.8	1.2	.7	.8	2.6	1.4	7.4	1.3	1.2	.9
4	1.8	3.5	2.4	1.2	2.7	.7	2.4	1.3	6.8	1.2	1.2	1.2
5	1.7	3.5	2.1	1.5	1.8	17.3	2.4	1.2	10.8	1.2	1.2	1.4
6	1.6	2.6	1.8	1.1	.9	3.8	2.6	2.6	8.4	1.2	2.1	1.2
7	1.8	2.5	3.3	1.0	7.8	2.5	2.6	2.2	8.7	1.2	1.4	1.0
8	2.2	2.3	1.9	.9	2.8	3.0	12.3	1.4	8.0	2.1	1.4	.8
9	1.7	2.2	2.5	.8	2.1	3.6	3.2	1.2	34	1.2	1.2	.8
10	2.4	2.8	14.3	.8	1.9	5.9	2.8	1.1	12.5	11.7	1.7	.8
11	2.3	2.5	6.6	.7	3.7	4.7	2.5	1.5	14.3	6.6	1.5	1.2
12	1.9	3.2	3.6	.7	2.1	7.3	2.3	5.5	7.8	7.4	1.4	1.1
13	1.8	2.7	3.1	.7	3.2	20	2.2	1.7	6.0	4.6	2.1	1.4
14	2.0	2.3	2.8	.7	6.2	15.0	3.6	2.8	7.6	3.5	2.3	1.2
15	2.0	2.0	2.6	.8	4.0	8.9	3.7	13.0	6.2	3.2	2.1	2.6
16	11.7	5.6	2.4	.7	3.1	7.7	2.2	30	4.4	2.9	1.7	1.4
17	4.0	9.8	2.2	.7	2.7	5.2	2.0	43	3.8	2.8	1.5	1.1
18	3.2	6.0	2.2	.7	2.9	5.7	2.1	28	3.4	9.5	1.4	1.0
19	3.3	4.0	13.9	.7	2.3	4.2	2.5	21	3.5	3.4	1.3	1.0
20	2.7	3.7	3.1	.6	2.5	3.6	2.2	22	3.2	3.0	1.2	.9
21	2.4	3.2	2.7	.6	2.2	3.6	3.9	13.6	2.8	2.7	1.2	.9
22	2.7	3.0	2.4	.7	1.8	3.2	22	16.7	2.5	2.5	1.2	.8
23	2.6	3.0	2.2	.7	1.5	2.9	8.1	10.7	2.2	2.3	1.5	.8
24	6.1	2.9	2.1	.6	1.5	3.3	4.6	8.0	2.2	2.2	1.3	.9
25	9.4	2.4	2.0	.6	3.8	10.4	3.6	5.8	2.0	2.1	1.2	.9
26	16.1	2.2	1.8	.7	1.5	5.4	3.1	5.6	1.9	2.0	1.2	.9
27	14.1	2.2	1.6	6.2	1.2	4.1	2.7	6.6	1.7	1.8	1.2	.8
28	6.6	2.8	1.7	1.8	1.2	4.7	4.2	15.4	1.6	1.7	2.3	.7
29	5.0	1.9	1.6	.8	1.1	4.3	2.3	-------	1.5	1.6	1.3	.7
30	4.2	1.8	1.4	.7	1.0	3.3	2.1	-------	1.4	1.5	1.1	.7
31	3.7	1.7	-------	.7	-------	3.0	1.9	-------	1.3	-------	1.1	------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	16.1	1.6	4.16	6.44	129	396
August	9.8	1.7	3.22	4.98	99.7	306
September	14.3	1.4	3.34	5.17	100	308
October	6.2	.6	1.04	1.61	32.3	99
November	7.8	.7	2.40	3.71	72.0	221
December	20	.7	5.48	8.48	170	521
January	22	1.9	3.92	6.07	122	373
February	43	1.1	9.52	14.7	266	818
March	34	1.3	6.33	9.79	196	602
April	11.7	1.2	3.03	4.69	91.0	279
May	2.3	1.1	1.46	2.26	45.3	139
June	2.6	.7	1.04	1.61	31.1	96
The year	43	.6	3.71	5.74	1,350	4,160

WAILOA DITCH AT HONOPOU, NEAR HUELO, MAUI

LOCATION.—Water-stage recorder 100 feet below intake at Honopou Stream, half a mile west of Lupi, and 2½ miles west of Kailua.

RECORDS AVAILABLE.—November, 1922, to June, 1929.

EXTREMES.—Not known for this year, owing to missing record.

1923–1928: Maximum discharge, 171 million gallons a day or 265 second-feet Apr. 6–7, 1928 (gage height, 5.72 feet); minimum, 12.2 million gallons a day or 18.9 second-feet Jan. 13, 1927.

REMARKS.—Records fair. Discharges for July 4–6, July 13 to Aug. 24, Aug. 29 to Oct. 13, and Oct. 20 to Feb. 25 taken from an average of twice daily readings of staff gage by an employee of East Maui Irrigation Co.

Discharge, in million gallons a day, 1928–29

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	162	162	122	92	96	88	162	99	170	78	88	67
2	158	158	154	138	92	85	142	92	170	74	71	64
3	154	162	158	111	74	81	158	88	170	82	64	64
4	150	154	162	103	67	78	150	81	170	86	64	123
5	134	158	154	138	142	85	142	78	170	93	68	158
6	118	150	142	118	103	166	154	111	170	74	144	152
7	146	146	154	103	166	158	150	158	170	67	134	103
8	158	138	150	96	154	150	158	118	170	92	142	78
9	154	130	158	81	154	166	150	88	174	144	93	71
10	158	158	166	74	158	166	96	81	170	116	111	71
11	158	158	166	71	170	166	126	78	170	130	150	109
12	150	158	158	67	162	170	118	170	170	170	144	102
13	154	154	150	64	162	166	118	138	166	170	158	134
14	158	150	142	81	166	170	166	138	168	166	158	102
15	154	142	130	131	166	170	166	174	166	162	150	162
16	154	166	138	92	158	170	154	174	166	158	138	149
17	162	174	122	74	150	162	130	178	158	150	118	105
18	158	166	118	71	154	166	134	166	150	149	103	96
19	162	158	170	72	154	158	158	146	151	166	92	118
20	158	162	150	60	150	158	154	178	143	154	85	74
21	154	158	134	71	158	158	154	174	140	138	81	71
22	154	150	118	107	150	154	178	178	126	122	79	67
23	158	154	107	67	138	150	174	166	118	114	140	64
24	170	162	99	60	138	154	166	166	111	117	130	66
25	170	150	92	57	146	166	158	166	111	103	88	74
26	170	142	85	54	134	166	150	162	107	92	78	67
27	174	134	81	107	126	162	138	166	99	92	108	57
28	170	150	111	150	107	162	146	170	96	81	132	54
29	166	130	146	111	99	166	138	-------	88	81	103	51
20	162	122	99	85	103	158	118	-------	85	78	81	56
21	162	111	-------	96	-------	150	107	-------	81	-------	74	-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	174	118	157	243	4,870	14,900
August	174	111	151	234	4,670	14,400
September	170	81	135	209	4,040	12,400
October	150	54	90.4	140	2,800	8,600
November	170	67	137	212	4,100	12,600
December	170	78	149	231	4,620	14,200
January	178	96	146	226	4,510	13,900
February	178	78	139	215	3,880	11,900
March	174	81	144	223	4,470	13,700
April	170	67	117	181	3,500	10,800
May	158	64	109	169	3,370	10,400
June	162	51	91.0	141	2,730	8,380
The year	178	51	130	201	47,600	146,000

NEW HAMAKUA DITCH AT HONOPOU, NEAR HUELO, MAUI

LOCATION.—Water-stage recorder 600 feet below Honopou Stream crossing, 15 feet above tunnel portal, and 2½ miles west of Kailua.

RECORDS AVAILABLE.—January, 1918, to June, 1929.

EXTREMES.—Maximum discharge during year, 127 million gallons a day or 196 second-feet Sept. 19 (gage height, 5.68 feet); minimum, 0.4 million gallons a day or 0.6 second-foot June 29.

1918–1929: Maximum discharge, 134 million gallons a day or 207 second-feet Aug. 5, 1926 (gage height, 5.98 feet); minimum, 0.07 million gallons a day or 0.11 second-foot Aug. 7, 1923.

REMARKS.—Records good for ordinary stages, fair for high stages, and poor for estimated periods. New Hamakua ditch diverts from streams between Waikamoi and Halehaku above Center and Lowrie ditches. Regulated by gates and spillways.

Discharge, in million gallons a day, 1928–29

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	76	64	3.0	8.8	3.6	1.0	54	3.5	77	0.8	0.8	0.6
2	57	39	55	33	2.0	1.0	21	3.2	72	.7	.6	.6
3	39	62	65	1.6	.7	.9	59	3.2	69	.7	.6	.5
4	21	51	66	2.2	1.7	.8	42	3.0	71	.8	.5	18.6
5	4.0	58	46	39	40	[a]49	28	2.8	77	.7	.5	38
6	1.8	31	31	12.3	1.2	[b]78	59	20	73	.6	40	9.3
7	31	28	43	1.3	64	58	41	48	76	1.4	29	
8	64	15.2	39	1.2	54	38	79	7.7	74	50	27	
9	35	4.8	57	1.0	56	73	28	3.3	89	2.3	1.0	.9
10	57	55	78	.9	62	72	30	3.1	80	46	4.8	
11	54	50	80	.9	79	75	5.5	3.1	80	74	49	
12	22	41	55	.9	62	81		70	72	77	37	
13	26	56	34	.9	66	83	2.8	20	58	64	56	14
14	44	40	13.4	1.1	73	93		33	62	53	56	
15	32	26	[a]16.5	23	71	84		87	54	49	45	
16	64	68	28	1.1	56	81	65	90	47	25	9.4	38
17	73	87	11.3	.9	34	52		91	30	27	1.4	[a].9
18	62	77	8.9	.8	55	63	8	71	21	63	.8	1.2
19	65	54	98	.9	50	40		47	18.7	38	.8	.7
20	45	57	55	.7	38	41	20	86	11.4	8.7	.7	.6
21	19.3	53	19.4	.7	59	41		68	9.6	1.6	.6	.6
22	50	54	8.9	1.8	35	31		83	2.0	1.3	.6	.6
23	56	49	8.4	.8	19.2	18.6	75	35	1.6	1.0	17.1	.5
24	75	64	7.8	.7	21	40		40	1.5	1.5	17.8	.6
25	88	41	7.3	.6	22	69	12	44	1.4	.9	.8	.6
26	89	26	7.3	.6	13.9	71		54	1.2	.8	.7	.6
27	89	15.1	6.8	40	1.5	42	8.8	46	1.0	.8	12.7	.5
28	76	45	6.2	50	1.2	59	41	81	.9	.7	26	.5
29	54	9.5	35	2.8	1.2	62	9.9	-------	.8	.7	3.8	.4
30	37	2.8	1.7	1.2	1.2	32	4.0	-------	.8	.7	.8	.5
31	24	1.6	-------	2.0	-------	23	3.6	-------	.8	-------	.7	-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	89	1.8	49.4	76.4	1,530	4,700
August	87	1.6	42.7	66.1	1,320	4,060
September	98	1.7	33.2	51.4	997	3,060
October	50	.6	7.54	11.7	234	717
November	79	.7	34.8	53.8	1,040	3,200
December	93	.8	50.1	77.5	1,550	4,770
January	----------	----------	33.5	51.8	1,040	3,190
February	91	2.8	41.0	63.4	1,150	3,520
March	89	.8	39.8	61.6	1,230	3,790
April	77	.6	19.8	30.6	593	1,820
May	56	.5	14.3	22.1	442	1,360
June	----------	.4	7.07	10.9	212	651
The year	98	.4	31.1	48.1	11,300	34,800

[a] Partly estimated. [b] Estimated.

KAUHIKOA DITCH AT OPANA WEIR, NEAR HUELO, MAUI

LOCATION.—Water-stage recorder a short distance below crossing of Opana Stream and 8 miles by road west of Huelo post office.

RECORDS AVAILABLE.—January, 1910, to December, 1928 (discontinued).

EXTREMES.—See monthly discharge table for maximum and minimum daily discharges.

REMARKS.—Daily-discharge record furnished by East Maui Irrigation Co. Diverts water at elevation 900 feet from all streams between Halehaku and Maliko. Regulated by gates.

Discharge, in million gallons a day, 1928

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Day	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	70	5.4	6.7	19.0	5.8	2.2	16	75	64	13.4	2.0	46	78
2	52	45	56	21	2.3	2.2	17		85	4.0	1.8	35	47
3	32	51	57	2.5	2.0	2.0	18	55	66	16.2	1.8	56	59
4	15.3	50	55	10.7	23	2.0	19		45	72	1.8	42	40
5	3.8	46	39	35	19.5	65	20		56	26	1.7	45	38
6	2.8	28	28	6.1	3.9	74	21	14.1	43	6.8	1.6	51	37
7	39	24	47	2.4	77	50	22	54	44	3.4	2.5	29	26
8	56	12.3	35	2.1	52	46	23	46	51	3.0	1.5	21	14.5
9	32	9.7	51	2.0	53	68	24	82	54	2.8	1.4	16.2	41
10	56	53	81	1.8	62	69	25	88	34	2.7	1.4	29	70
11	42	46	71	1.8	78	69	26	94	21	2.6	1.3	6.7	59
12	17.8	34	46	1.8	61	78	27	88	23	2.4	56	3.0	38
13	24	49	30	1.7	65	85	28	52	32	5.7	33	2.8	58
14	44	28	14.8	12.9	71	91	29	70	7.5	32	2.6	2.5	47
15	24	35	9.0	11.4	63	86	30	33	3.2	2.4	3.2	2.4	26
							31	25	2.6		2.1		24

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	94	2.8	46.8	72.4	1,450	4,450
August	85	2.6	37.0	57.2	1,150	3,520
September	81	2.4	27.4	42.4	822	2,520
October	56	1.3	8.00	12.4	248	761
November	78	2.0	34.2	52.9	1,030	3,150
December	91	2.0	48.1	74.4	1,490	4,580
The period					6,190	19,000

HAIKU DITCH AT MANAWAI GULCH, NEAR PEAHI, MAUI

LOCATION.—Water-stage recorder in bottom of western branch of Manawai Gulch, just west of Keaaula-Opana boundary and 1 mile north of Peahi.
RECORDS AVAILABLE.—January, 1910, to December, 1928 (discontinued).
EXTREMES.—See monthly-discharge table for maximum and minimum daily discharges.
REMARKS.—Daily-discharge record furnished by East Maui Irrigation Co. Regulated by gates at frequent intervals. Diverts water at elevation 250 feet from all streams between Kailua Stream and Maliko Gulch.

Discharge, in million gallons a day, 1928

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Day	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	60	47	9.8	21	24	7.9	16	53	53	17.0	7.2	31	70
2	37	32	49	29	15.5	7.4	17	53	60	14.9	6.6	36	46
3	31	38	49	18.2	19.2	7.1	18	36	51	28	6.5	57	52
4	28	36	42	11.6	24	6.6	19	38	38	60	8.4	43	34
5	24	37	31	20	30	57	20	44	48	32	6.1	45	31
6	18.6	13.2	28	10.8	9.8	71	21	24	41	22	5.6	43	29
7	32	38	41	9.2	70	46	22	42	44	14.8	6.1	25	24
8	49	29	33	9.0	36	32	23	39	45	19.6	5.1	22	18.8
9	28	12.6	41	7.6	41	66	24	64	41	20	5.0	21	35
10	38	15.8	64	7.2	51	68	25	72	22	21	4.6	26	73
11	32	31	58	6.6	81	70	26	95	15.8	18.8	4.1	11.7	62
12	17.5	31	39	6.4	42	84	27	83	15.2	7.8	49	9.8	29
13	19.3	36	34	6.1	54	82	28	52	24	7.8	34	9.0	46
14	31	25	24	8.7	57	94	29	36	12.1	17.9	9.8	9.2	55
15	21	19.8	22	12.5	52	80	30	35	10.4	7.3	9.3	9.1	27
							31	38	9.8	-------	13.8	-------	23

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	95	17.5	41.0	63.4	1,270	3,900
August	60	9.8	31.3	48.4	972	2,980
September	64	7.3	29.1	45.0	874	2,680
October	49	4.1	11.8	18.3	365	1,120
November	81	9.0	33.5	51.8	1,000	3,080
December	94	6.6	46.3	71.6	1,430	4,400
The period					5,910	18,200

MISCELLANEOUS MEASUREMENTS

Measurements of streams and ditches on the island of Maui at other than regular gaging stations are listed below:

Miscellaneous discharge measurements on Maui, 1928-29

Date	Stream	Locality	Second feet	Million gallons a day
Oct. 12	Honokahau ditch	Napili	25.4	16.4
Mar. 18	do	do	35.9	23.2
19	do	do	35.7	23.1
Apr. 19	do	do	57.6	37.2
20	do	do	45.1	29.1
20	do	do	40.9	26.4
May 31	do	do	6.34	4.10
31	do	do	11.8	7.63
June 1	do	do	17.4	11.2
1	do	do	26.6	17.2
1	do	do	31.0	20.0
3	do	do	31.7	20.5
3	do	do	31.8	20.6
18	do	do	28.8	18.6

ISLAND OF HAWAII

WAILUKU RIVER ABOVE HILO BOARDING SCHOOL DITCH INTAKE, NEAR HILO, HAWAII

LOCATION.—Water-stage recorder 1,000 feet above Hilo Boarding School ditch intake, three-quarters of a mile west of Reservoir No. 1, and 4½ miles west of Hilo.

DRAINAGE AREA.—124.5 square miles.

RECORDS AVAILABLE.—July, 1928, to June, 1929.

EXTREMES.—Maximum discharge during period, 13,500 million gallons a day or 20,900 second-feet Feb. 15 (gage height, 17.5 feet); minimum, 6.0 million gallons a day or 9.3 second-feet Jan. 30.

REMARKS.—Station established June 28, but no reliable records were obtained until July 16. Records good for ordinary stages, fair for estimated periods, and poor for high stages. Hilo waterworks diverts about 1 million gallons a day from pool at Pukamaui, three-quarters of a mile upstream.

Discharge, in million gallons a day, 1928–29

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1		92	[a] 28	955	48	42	118	[b] 16	1,050	28	23	18.5
2		73	285	521	46	36	88	[a] 15.4	965	30	28	27
3		80	126	258	53	30	245	14.4	572	38	23	32
4		69	118	157	70	28	142	13.2	288	44	19.7	114
5		66	73	110	43	26	111	12.2	194	51	18.5	172
6		54	66	97	34	140	136	12.5	132	172	24	78
7		131	131	73	42	64	84	14.4	100	150	18.5	51
8		88	159	60	62	40	66	22	80	698	15.7	36
9		63	405	51	375	36	54	14.8	295	198	14.7	30
10		73	255	43	1,190	55	46	12.7	672	283	13.7	24
11		63	962	40	2,510	129	40	12.5	1,920	896	14.0	30
12		54	206	59	753	293	35	500	612	668	13.9	22
13		51	132	80	398	276	32	989	312	635	32	20
14		40	96	248	265	515	28	2,610	206	509	38	16.7
15		39	79	1,430	377	2,260	26	5,270	180	220	22	29
16	136	78	76	278	453	614	24	913	152	152	16.2	23
17	149	1,020	57	183	226	282	22	418	118	110	13.9	18.5
18	165	500	51	132	234	183	21	243	100	165	13.0	16.7
19	179	204	269	123	240	145	196	162	84	124	12.5	13.7
20	142	132	255	91	152	206	52	128	66	84	12.0	11.8
21	104	105	118	92	114	84	57	88	54	66	11.2	11.0
22	118	112	88	66	92	75	56	98	54	54	11.0	10.0
23	128	84	66	54	76	57	34	128	48	46	11.4	8.8
24	798	92	70	46	61	51	26	567	48	46	14.4	8.6
25	237	63	80	43	58	57	24	612	51	40	14.2	7.7
26	152	54	54	38	60	79		200	92	32	12.7	7.3
27	293	46	46	42	58	74		126	102	32	11.0	7.0
28	275	40	43	149	149	162	20	318	66	28	32	6.6
29	194	34	46	54	97	900		-------	43	24	17.7	7.0
30	152	34	36	60	60	415		-------	36	23	20	6.6
31	114	[a] 30	-------	64	-------	178		-------	32	-------	15.2	-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July 16–31	798	104	208	322	3,340	10,200
August	1,020	30	118	183	3,660	11,200
September	962	28	149	231	4,480	13,700
October	1,430	38	184	285	5,700	17,500
November	2,510	34	280	433	8,400	25,800
December	2,260	26	243	376	7,530	23,100
January	246	-------	60.7	93.9	1,880	5,770
February	5,270	12.2	483	747	13,500	41,500
March	1,920	32	281	435	8,720	26,700
April	896	23	188	291	5,650	17,300
May	38	11.0	18.0	27.9	557	1,710
June	172	6.6	28.8	44.6	864	2,650
The period	5,270	6.6	184	285	64,300	197,000

[a] Partly estimated. [b] Estimated.

KAPEHU STREAM AT PIIHONUA, NEAR HILO, HAWAII

LOCATION.—Water-stage recorder at Piihonua, one-quarter mile above confluence with Wailuku River and 3 miles west of Hilo.

DRAINAGE AREA.—4.9 square miles.

RECORDS AVAILABLE.—November, 1928, to June, 1929.

EXTREMES.—Maximum discharge during period, 2,330 million gallons a day or 3,610 second-feet Feb. 15 (gage height, 14.65 feet); minimum, 4.3 million gallons a day or 6.6 second-feet Feb. 12.

REMARKS.—Records good for low and medium stages; poor for extremely high stages. Station established Nov. 27, 1928. Small diversion above station for irrigation of sugarcane.

Discharge, in million gallons a day, 1928–29

Day	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	------	19.2	39	6.6	154	13.2	15.7	8.4
2	------	17.5	34	5.9	159	14.0	14.8	10.3
3	------	16.6	73	5.1	99	18.2	11.8	11.4
4	------	16.0	48	4.9	59	21	10.8	32
5	------	16.0	36	4.6	45	22	10.8	39
6	------	64	47	4.9	34	63	10.0	21
7	------	27	32	6.6	29	39	9.3	15.4
8	------	21	27	6.6	27	170	8.6	13.5
9	------	20	25	5.1	114	61	8.1	13.0
10	------	25	23	4.8	162	89	7.9	11.8
11	------	36	21	4.5	382	246	8.4	12.2
12	------	64	19.6	59	119	149	8.4	9.3
13	------	80	18.6	197	75	146	16.8	8.8
14	------	141	16.9	313	63	107	17.0	8.1
15	------	330	15.7	613	51	63	11.5	13.0
16	------	104	14.5	100	51	45	9.8	10.0
17	------	63	13.5	55	39	39	8.8	9.3
18	------	51	14.0	42	36	54	8.4	8.6
19	------	45	40	32	32	42	8.1	7.2
20	------	34	15.7	25	27	32	6.6	6.8
21	------	32	16.6	21	24	27	5.9	6.6
22	------	29	16.3	27	24	25	6.1	6.2
23	------	25	13.5	29	23	23	6.6	5.9
24	------	25	12.5	72	22	23	8.1	5.6
25	------	25	11.2	58	20	21	7.2	5.5
26	------	38	11.0	27	24	18.9	6.4	5.2
27	29	34	12.8	21	22	19.6	5.8	5.1
28	22	51	11.2	52	21	16.9	13.4	5.2
29	22	202	10.2	------	16.0	16.0	7.7	5.4
30	25	88	9.0	------	14.8	15.1	8.8	5.2
31	------	51	7.9	------	13.8	------	6.9	------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
November 27–30	29	22	24.5	37.9	98	301
December	330	16.0	57.8	89.4	1,790	5,500
January	73	7.9	22.8	35.3	706	2,170
February	613	4.5	64.4	99.6	1,800	5,530
March	382	13.8	63.9	98.9	1,980	6,080
April	246	13.2	54.6	84.5	1,640	5,080
May	17.0	5.8	9.50	14.7	294	904
June	39	5.1	10.8	16.7	325	994
The period					8,640	26,500

HONOLII STREAM NEAR HILO, HAWAII

LOCATION.—Water-stage recorder 500 feet above intake of Hilo Sugar Co.'s upper ditch, 2 miles from end of Kaiwiki road, and 10 miles from Hilo.

DRAINAGE AREA.—8.3 square miles.

RECORDS AVAILABLE.—February, 1924, to June, 1929.

EXTREMES.—Maximum discharge during year, 1,850 million gallons a day or 2,860 second-feet Feb. 15 (gage height, 12.47 feet); minimum, 1.0 million gallons a day or 1.6 second-feet June 29.

1924–1929: Maximum discharge, 3,060 million gallons a day or 4,730 second-feet Nov. 21, 1924 (gage height, 16.5 feet, estimated from flood-marks); minimum, 0.1 million gallons a day or 0.2 second-foot Feb. 9 and Apr. 14, 1926.

REMARKS.—Records good for ordinary stages except those estimated, which are poor. High-stage records poor. No diversions above station.

Discharge, in million gallons a day, 1928–29

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	585	11.7	4.6	245					217	4.8	4.5	6.3
2	42	10.2	79	95					128	5.0	6.1	12.5
3	21	12.8	49	45		5.5			66	7.6	5.0	13.3
4	12.8	12.1	37	23				2.8	28	7.5	3.7	50
5	8.8	12.8	17.2	16.4	10		24		16.5	11.0	3.7	92
6	7.8	10.2	15.1	15.4		48			10.6	55	3.2	27
7	118	29	79	11.7				[a] 2.3	8.7	49	2.8	12.3
8	28	20	59	10.2				4.1	9.7	176	2.5	8.1
9	15.4	12.4	130	8.8				2.3	170	32	2.5	6.3
10	12.4	13.6	65	7.5		13		2.3	198	50	2.5	5.0
11	9.1	13.2	212	7.8	340			2.3	320	300	2.7	6.6
12	8.8	10.2	25	12.9				61	57	140	2.8	4.8
13	26	8.2	15.0	23				249	25	117	11.9	4.3
14	225	6.3	13.2	40			5	417	33	104	10.2	3.7
15	100	6.6	12.4	241	85	110		664	24	27	6.6	7.2
16	44	44	14.1	35				107	27	16.5	4.1	6.6
17	49	387	10.2	18.8				41	14.2	10.9	3.0	5.6
18	50	97	9.4	15.9				18.5	13.9	40	2.7	4.8
19	33	32	98	22	36			10.9	12.0	30	2.2	3.7
20	24	17.7	83	13.2			19	7.4	9.5	12.0	2.0	3.0
21	14.1	15.4	21	17.7		11		6.1	7.9	8.7	1.9	2.7
22	18.8	18.2	13.2	11.7				37	7.9	7.4	1.8	2.3
23	39	14.6	9.8	11.3				37	7.1	6.3	2.2	2.0
24	214	21	12.4	10.2				252	8.7	7.9	4.3	1.8
25	38	12.4	19.6	7.8	12			65	8.1	6.6	3.9	1.6
26	21	9.1	11.7	6.1		22	7	22	27	5.2	2.8	1.4
27	57	7.5	9.1	10.2				11.6	20	5.2	3.0	1.3
28	54	6.6	8.5	64				177	13.5	4.3	11.6	1.1
29	31	5.6	9.1	14.1	40	80		-------	7.9	4.1	8.7	1.1
30	21	5.1	7.5	14.5				-------	6.3	3.9	9.0	1.1
31	15.4	4.1	-------	13.2	-------			-------	5.2	-------	5.6	-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	585	7.8	62.7	97.0	1,940	5,960
August	387	4.1	28.6	44.3	887	2,720
September	212	4.6	38.3	59.3	1,150	3,530
October	245	6.1	35.1	54.3	1,090	3,340
November	----------	----------	71.7	111	2,150	6,600
December	----------	----------	41.5	64.2	1,290	3,950
January	----------	----------	12.3	19.0	381	1,170
February	664	----------	79.1	122	2,210	6,800
March	320	5.2	48.6	75.2	1,510	4,620
April	300	3.9	41.8	64.7	1,250	3,850
May	11.9	1.8	4.50	6.96	140	428
June	92	1.1	9.98	15.4	300	919
The year	----------	1.1	39.2	60.7	14,300	43,900

[a] Partly estimated.

AWINI DITCH AT EAST HONOKANEIKI GULCH, NEAR NIULII, HAWAII

LOCATION.—Water-stage recorder on Awini ditch at flume across East Honokaneiki Gulch, 4½ miles southeast of Niulii.

RECORDS AVAILABLE.—October, 1927, to June, 1929.

EXTREMES.—Maximum discharge during year, 32 million gallons a day or 50 second-feet Sept. 10 (gage height, 3.49 feet); minimum, 1.0 million gallons a day or 1.6 second-feet Mar. 12.

1928–29: Maximum discharge, 32 million gallons a day or 50 second-feet Dec. 28, 1927, and Sept. 10, 1928 (gage height, 3.51 feet); minimum, that of Mar. 12, 1929.

REMARKS.—Records fair. Awini ditch diverts water from all streams between Waikaloa and Honokane. Regulated by head gates and spillways.

Discharge, in million gallons a day, 1928–29

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	26	16.0	8.5	9.0	4.5	6.3	16.0	12.8	7.6	8.5	9.0	5.1
2	21	17.6	12.4	7.6	10.6	6.2	15.6	11.0	7.9	13.2	9.8	5.2
3	24	23	19.9	7.1	21	5.8	30	10.2	9.6	19.2	11.4	7.1
4	17.5	25	22	7.1	19.0	5.3	25	9.6	8.5	21	9.2	12.4
5	12.8	26	18.4	8.5	16.8	7.5	23	9.0	7.6	15.2	8.5	15.1
6	10.8	19.8	17.5	9.1	9.0	28	23	13.5	8.0	10.0	8.2	14.9
7	24	24	17.5	15.1	18.6	18.4	22	19.5	7.6	13.7	16.1	10.2
8	22	24	20	11.8	22	15.2	22	20	7.6	17.5	22	7.4
9	18.9	18.8	23	8.5	30	20	22	21	8.8	17.5	21	6.2
10	14.3	21	25	7.1	27	20	20	23	8.0	24	14.4	7.9
11	15.5	21	28	6.2	28	19.8	19.2	20	6.4	28	17.7	17.9
12	14.2	19.2	23	5.8	18.3	26	16.3	20	3.9	28	19.2	17.5
13	21	17.2	18.4	6.5	19.2	24	15.1	19.2	10.0	25	21	12.8
14	19.0	17.5	15.1	11.8	28	28	15.1	26	25	24	22	8.5
15	19.2	11.4	14.8	18.1	26	26	15.1	19.2	22	20	19.2	9.2
16	14.2	13.6	14.3	9.0	25	24	15.1	17.8	20	17.2	18.4	15.5
17	15.4	23	11.4	6.6	21	17.5	16.0	21	18.4	22	15.8	15.1
18	23	26	14.0	5.8	20	27	15.1	19.2	17.5	26	11.6	14.2
19	24	23	[a] 24	5.8	20	25	26	14.0	15.1	20	9.6	9.6
20	20	17.5	[b] 19	4.3	19.2	21	19.2	27	13.5	17.5	9.0	7.6
21	15.1	15.1	[b] 14	6.4	16.8	26	15.7	22	12.8	19.2	8.0	6.2
22	20	13.5	[a] 10.0	6.4	11.4	24	30	18.0	12.1	16.0	7.6	4.9
23	25	14.9	6.6	5.0	9.0	20	28	14.6	18.9	14.2	8.8	3.6
24	28	22	6.2	4.3	9.8	25	23	6.4	13.5	18.4	12.8	3.5
25	25	17.1	9.0	6.0	10.0	30	20	7.6	12.8	16.0	10.0	8.5
26	25	16.4	8.0	8.6	9.0	27	18.6	6.6	10.8	12.8	11.4	3.6
27	22	17.5	5.8	7.0	8.5	19.2	16.0	9.0	9.6	10.8	8.8	3.6
28	20	16.3	4.8	9.6	8.0	19.2	15.9	8.6	9.0	10.8	7.1	3.6
29	20	11.4	11.7	7.6	7.6	19.2	24	------	8.5	10.8	6.6	3.1
30	18.4	11.4	12.8	7.1	7.1	16.8	16.0	------	8.0	10.2	5.8	8.0
31	16.0	9.0	------	5.3	------	14.2	13.5	------	8.0	------	5.3	------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	28	10.8	19.7	30.5	611	1,870
August	26	9.0	18.4	28.5	569	1,750
September	28	4.8	15.2	23.5	455	1,400
October	18.1	4.3	7.87	12.2	244	749
November	30	4.5	16.7	25.8	500	1,540
December	30	5.3	19.7	30.5	612	1,870
January	30	13.5	19.7	30.5	612	1,870
February	27	6.4	15.9	24.6	446	1,370
March	25	3.9	11.5	17.8	357	1,090
April	28	[a] 8.5	17.6	27.2	527	1,620
May	22	5.3	12.4	19.2	385	1,180
June	17.9	3.1	8.77	13.6	263	807
The year	30	3.1	15.3	23.7	5,580	17,100

[a] Partly estimated. [b] Estimated.

EAST HONOKANEIKI INTAKE TO AWINI DITCH AT EAST HONOKANEIKI GULCH, NEAR NIULII, HAWAII

LOCATION.—Water-stage recorder on intake tunnel delivering water from East Honokaneiki Gulch to Awini ditch on west side of gulch, 4½ miles southeast of Niulii.

RECORDS AVAILABLE.—October, 1927, to June, 1929.

EXTREMES.—Maximum discharge during year, 10.1 million gallons a day or 15.6 second-feet Sept. 2 (gage height, 1.33 feet); minimum, 0.18 million gallons a day or 0.28 second-foot Oct. 19, 20, June 29.

1928–29: Maximum discharge, that of Sept. 2, 1928; minimum, 0.11 million gallons a day or 0.17 second-foot Nov. 3, 4, 1927.

REMARKS.—Records good. Diverts water from East Honokaneiki Gulch to Awini ditch.

Discharge, in million gallons a day, 1928–29

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	4.2	1.3	1.6	0.44	0.20	0.47	1.2	1.8	1.2	0.53	0.9	0.61
2	5.2	2.1	6.6	.40	1.9	.48	1.2	1.1	1.0	.64	.9	1.0
3	5.9	4.0	5.4	.35	3.8	.48	5.2	.9	.8	1.3	.9	2.7
4	4.2	4.8	4.3	.35	3.1	.48	3.7	.9	.57	1.6	.8	2.2
5	3.8	3.6	2.8	.31	2.7	2.1	2.5	.8	.57	1.3	.8	1.0
6	3.6	2.0	3.5	.8	1.4	4.9	5.5	.8	.57	.7	2.4	.57
7	5.2	3.4	6.1	4.2	4.1	3.4	2.7	4.0	.57	1.3	3.7	.40
8	3.6	3.2	4.6	1.0	4.7	3.5	4.7	5.8	.66	4.6	3.5	.38
9	3.2	1.8	4.7	.48	6.9	5.5	3.6	2.7	.8	2.8	1.7	.31
10	1.6	2.7	5.3	.35	5.5	5.6	2.1	2.0	.26	4.3	1.2	.35
11	1.4	3.7	6.0	.31	4.4	5.2	1.6	1.3	.7	4.6	3.6	2.6
12	1.6	3.2	4.4	.31	3.8	5.8	1.4	1.2	2.4	4.2	2.9	3.9
13	4.0	2.4	3.1	.56	2.5	5.2	2.1	3.0	3.3	3.6	3.6	1.2
14	3.7	2.5	2.8	1.3	2.4	5.9	6.0	3.4	2.7	3.5	4.3	.66
15	3.2	.9	1.6	.7	2.4	5.0	4.5	4.3	2.4	3.3	3.3	2.9
16	1.6	2.1	1.3	.40	2.4	3.8	2.8	4.5	1.8	2.4	3.1	2.9
17	1.4	6.4	1.2	.31	2.2	2.4	1.6	5.3	1.8	2.4	2.2	1.6
18	4.0	3.9	1.4	.35	3.5	4.9	1.4	4.6	1.7	4.5	1.5	1.3
19	4.3	2.2	5.9	.20	4.3	3.7	6.2	2.7	1.5	3.4	1.3	.9
20	1.9	1.5	2.3	.20	3.1	2.4	2.5	6.0	1.3	2.2	1.2	.8
21	2.6	1.2	1.3	.20	2.4	3.6	1.7	5.4	1.2	1.9	1.2	.7
22	5.1	1.0	1.2	.22	1.4	3.9	6.3	5.7	1.1	1.5	1.1	.7
23	6.2	1.8	1.1	.22	1.1	2.9	5.4	3.4	1.4	1.3	1.1	.66
24	4.3	2.8	.9	.26	.9	2.9	3.2	.35	1.2	1.7	.57	.57
25	2.1	2.7	.9	.26	.8	2.9	2.6	.40	1.1	1.4	.54	.48
26	5.4	2.6	.8	.26	.8	2.8	2.4	.8	.9	1.2	.48	.44
27	3.2	2.6	.66	.22	.62	2.4	2.4	1.0	.9	1.0	.44	.40
28	2.3	2.4	.62	.22	.57	2.4	1.6	.8	.8	1.0	.40	.22
29	2.6	1.9	.57	.22	.48	2.1	3.5	-------	.53	.9	.35	.18
30	1.8	1.8	.53	.20	.44	1.3	2.8	-------	.47	.9	.31	.45
31	1.4	1.7	-------	.20	-------	1.0	1.9	-------	.48	-------	.26	------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	6.2	1.4	3.37	5.21	105	321
August	6.4	.9	2.59	4.01	80.2	246
September	6.6	.53	2.78	4.30	83.5	256
October	4.2	.20	.510	.789	15.8	49
November	6.9	.20	2.49	3.85	74.8	229
December	5.9	.47	3.21	4.97	99.4	305
January	6.3	1.2	3.11	4.81	96.3	296
February	6.0	.35	2.68	4.15	75.0	230
March	3.3	.26	1.18	1.83	36.7	112
April	4.6	.53	2.20	3.40	66.0	203
May	4.3	.26	1.63	2.52	50.6	155
June	3.9	.18	1.10	1.70	33.1	101
The year	6.9	.18	2.24	3.47	816	2,500

KOHALA DITCH AT POLOLU, NEAR NIULII, HAWAII

LOCATION.—Water-stage recorder on open section of ditch in Pololu Valley, just below boundary between Bishop Estate land of Honokane and territorial land of Pololu, 2¾ miles above mouth of Pololu Stream, and 4 miles south of Niulii.

RECORDS AVAILABLE.—August, 1927, to June, 1929.

EXTREMES.—Maximum discharge during year, 55 million gallons a day or 85 second-feet Dec. 6 (gage height, 3.66 feet); minimum, 1.2 million gallons a day or 1.9 second-feet Dec. 9.

1928–29: Maximum discharge, that of Dec. 6, 1928; minimum, that of Dec. 9, 1928.

REMARKS.—Records good. Regulated by head gates. Kohala ditch receives flow of Awini ditch and diverts from all streams west of Honokane.

Discharge, in million gallons a day, 1928–29

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	39	25	18.8	17.6	13.0	16.6	27	25	26	22	23	17.6
2	35	26	30	16.6	15.6	15.7	25	23	26	24	25	17.6
3	37	33	37	16.6	36	15.7	28	22	24	31	23	19.8
4	31	35	37	16.6	37	14.8	28	21	22	33	21	31
5	27	35	29	16.6	34	24	27	19.8	19.8	31	21	35
6	24	29	29	19.0	22	45	29	24	24	25	28	29
7	34	35	35	34	26	39	27	27	21	28	34	23
8	35	33	35	25	37	23	28	27	24	38	35	19.1
9	34	33	37	19.8	36	14.9	29	27	23	35	29	17.6
10	27	33	34	16.6	34	38	29	27	21	39	25	21
11	29	36	41	15.7	32	31	27	27	23	38	34	40
12	29	41	37	15.7	31	31	27	27	18.4	37	32	33
13	37	33	29	15.7	29	31	29	30	17.6	38	35	25
14	34	35	27	22	27	31	29	33	24	36	37	21
15	34	27	27	34	25	28	29	30	24	35	34	31
16	27	26	27	20	25	27	27	28	24	32	33	38
17	27	40	25	16.6	26	27	27	27	23	35	31	29
18	33	38	25	14.8	27	29	25	27	22	35	26	27
19	35	33	36	14.8	27	27	27	25	23	33	23	22
20	31	31	34	13.9	27	27	27	29	25	33	22	18.5
21	26	27	27	15.2	27	29	27	27	25	33	21	17.6
22	32	25	22	15.7	27	28	27	26	25	29	19.8	15.9
23	38	25	21	13.9	25	27	27	26	29	27	23	15.7
24	34	33	22	13.9	23	29	27	16.6	26	31	27	15.7
25	31	30	24	13.9	22	30	27	20	25	30	24	15.7
26	33	27	21	17.6	21	27	21	23	24	27	25	15.7
27	31	29	18.5	15.2	19.8	27	22	29	24	26	22	15.7
28	31	29	17.6	18.5	18.5	27	29	24	23	27	19.8	14.8
29	31	24	23	15.7	17.6	27	27	-------	22	25	19.8	14.8
30	29	28	19.8	16.6	17.6	27	27	-------	22	23	18.5	22
31	25	21	-------	14.8	-------	25	27	-------	21	-------	18.5	-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	39	24	31.6	48.9	980	3,010
August	41	21	30.6	47.3	950	2,910
September	41	17.6	28.2	43.6	846	2,600
October	34	13.9	17.8	27.5	553	1,690
November	37	13.0	26.2	40.5	785	2,410
December	45	14.8	27.1	41.9	839	2,580
January	29	21	27.1	41.9	839	2,580
February	33	16.6	25.6	39.6	717	2,200
March	29	17.6	23.3	36.1	721	2,220
April	39	22	31.2	48.3	936	2,870
May	37	18.5	26.1	40.4	809	2,480
June	40	14.8	22.6	35.0	679	2,080
The year	45	13.0	26.4	40.8	9,650	29,600

KEHENA DITCH NEAR KOHALA, HAWAII

LOCATION.—Water-stage recorder at old Honokane weir, just below head of West Branch of Honokanenui Gulch and 8½ miles southeast of Kohala.

RECORDS AVAILABLE.—December, 1917, to November, 1919; April, 1928, to June, 1929.

EXTREMES.—Maximum discharge during period, 67 million gallons a day or 104 second-feet Jan. 22 (gage height, 1.42 feet); minimum, 0.5 million gallons a day or 0.8 second-foot Apr. 28–30, Dec. 4, 5.

1917–1919, 1928–29: Maximum discharge, 86 million gallons a day or 133 second-feet Jan. 27, 1918 (gage height, 2.16 feet); ditch dry June 7, 1919.

REMARKS.—Records poor, owing to poor work of observer. Regulated by several gates above station. Intake on Honokanenui Stream 2 miles above station.

Discharge, in million gallons a day, 1928–29

Day	Apr.	May	June	Day	Apr.	May	June	Day	Apr.	May	June
1928				1928				1928			
1		3.4	0.8	11		2.2	9.4	21		11.5	2.2
2		1.6	3.2	12		10	6.4	22		4.5	1.8
3		1.1	6.0	13		15.5	3.2	23		2.2	1.4
4		12	36	14		15.5	2.4	24		1.4	1.6
5		5.3	11.5	15		5.5	5.3	25		.9	4.3
6		4.6	18	16		6.6	45	26	1.6	.8	3.7
7		17.5	20	17		3.0	42	27	1.1	.6	2.2
8		11.5	30	18		7.5	17.5	28	.6	.6	1.4
9		3.2	37	19		9.7	5.5	29	.5	.6	1.9
10		1.7	33	20		7.7	3.7	30	.5	.8	15.5
								31		.9	

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1928–29												
1	39	4.2	1.4	1.2	0.9	0.6	13.5	2.2	22	0.6	2.4	0.8
2	17	10.5	19.5	.9	10.5	.6	6.4	1.9	13.5	1.0	4.0	.8
3	18	16	13.5	.8	24	.5	44	1.6	7.2	3.7	2.0	.6
4	7.2	15	9.0	1.2	20	.5	21	1.4	6.0	3.0	1.3	13.5
5	4.0	12	5.5	1.4	16	13.5	9.6	1.2	13.5	3.6	1.1	19
6	2.4	4.5	4.2	5.1	3.5	52	29	2.6	14	1.9	1.6	7.8
7	25	7.4	11.5	11.5	20	26	9.3	17.5	19	5.3	3.8	3.2
8	13.5	11.5	7.0	4.5	17.5	13	42	17	14.5	26	5.8	1.8
9	11.5	6.2	6.4	2.4	45	28	14.5	11.5	11.5	8.2	3.5	1.2
10	8.4	11.5	10.5	1.4	43	26	4.4	3.7	12	22	2.2	4.7
11	7.1	18	29	1.1	48	25	2.2	2.2	15.5	32	16	28
12	5.9	20	7.0	.9	19	38	1.4	2.8	12	37	8.1	10.5
13	26	12	3.5	1.1	12	27	7.8	10.5	6.1	25	24	5.8
14	19.5	17.5	2.2	12	36	35	35	17	6.5	31	18.5	3.0
15	14.5	4.2	2.4	15	24	27	14	36	4.5	7.5	11	17
16	4.8	3.1	3.0	2.8	15	19.5	7.0	21	3.2	4.5	4.8	24
17	5.3	37	2.0	1.4	8.2	8.9	2.8	26	2.6	17	3.2	7.1
18	12.5	18	2.4	1.1	13.5	26	2.7	19	2.2	25	2.2	5.0
19	12	5.8	21	.9	17.5	12.5	41	9.0	1.8	5.8	1.6	2.6
20	5.8	3.2	10	.9	6.7	5.4	9.7	44	1.4	3.7	1.2	1.6
21	3.1	2.4	3.0	2.0	5.8	20	6.4	30	1.2	3.2	.9	1.1
22	9.4	2.0	1.7	1.8	3.2	28	51	16.5	.9	2.4	.8	1.1
23	25	2.4	1.4	1.2	2.2	9.7	41	10.5	1.1	2.2	8.7	.9
24	35	13.5	1.2	1.1	1.6	16	23	8.8	1.4	10.2	7.8	.8
25	13.5	6.1	1.4	1.2	1.4	30	10	5.8	1.4	4.0	4.8	1.4
26	19	5.0	1.4	2.8	1.2	32	3.9	5.1	1.1	2.2	5.8	1.4
27	16.5	4.2	1.1	4.4	1.1	10	1.5	9.4	.9	2.0	2.8	1.1
28	12	5.0	.9	5.2	.9	17.5	9.7	14.5	.8	2.0	1.6	.9
29	11.5	2.6	2.5	2.0	.8	20	18	-------	.8	2.2	1.2	.7
30	7.0	3.0	2.0	1.4	.8	8.1	4.5	-------	.6	1.8	.9	4.3
31	4.2	2.0	-------	1.1	-------	5.3	2.6	-------	.6	-------	.8	-------

Monthly discharge of Kehena ditch near Kohala, Hawaii, 1928–29

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
1928						
April (5 days)	1.6	0.5	0.86	1.33	4.3	13
May	17.5	.6	5.48	8.48	170	521
June	45	.8	12.4	19.2	372	1,140
1928–29						
July	39	2.4	13.4	20.7	416	1,270
August	37	2.0	9.22	14.3	286	877
September	29	.9	6.25	9.67	188	575
October	15	.8	2.96	4.58	91.8	282
November	48	.8	14.0	21.7	419	1,290
December	52	.5	18.8	29.1	582	1,790
January	51	1.4	15.8	24.4	489	1,500
February	44	1.2	12.5	19.3	349	1,070
March	22	.6	6.45	9.98	200	614
April	37	.6	9.87	15.3	296	909
May	24	.8	4.98	7.71	154	474
June	28	.6	5.72	8.85	172	527
The year	52	.5	9.98	15.4	3,640	11,200

MISCELLANEOUS MEASUREMENT

A measurement of Awini ditch, tributary to Kohala ditch, at Awini weir, at Honokanenui Gulch, near Niulii, on Mar. 12, 1929, showed a discharge of 8.74 second-feet or 5.65 million gallons a day.

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