UNITED STATES DEPARTMENT OF THE INTERIOR
HAROLD L. ICKES, Secretary

GEOLOGICAL SURVEY
W. C. MENDENHALL, Director

Water-Supply Paper 755

SURFACE WATER SUPPLY of HAWAII

JULY 1, 1932, to JUNE 30, 1933

NATHAN C. GROVER, Chief Hydraulic Engineer
MAX H. CARSON, District Engineer

Prepared in cooperation with the
TERRITORY OF HAWAII

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SURFACE WATER SUPPLY OF HAWAII, JULY 1, 1932, TO JUNE 30, 1933

AUTHORITY FOR INVESTIGATIONS

This volume contains results of measurements of the flow of streams and ditches in the Territory of Hawaii during the year ending June 30, 1933. 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:

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 percent 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, an act (Act 27) by the Legislature of the Territory of Hawaii was approved transferring the control of the division of hydrography from the board of commissioners of agriculture and forestry to the commissioner of public lands.

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 were:

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

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

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

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

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

In July 1930 a new cooperative agreement for "the investigation of the water resources of the Territory of Hawaii during the fiscal year July 1, 1930, to June 30, 1931" was entered into, in which the amounts of money to be contributed by each party were specifically stated, these amounts to include the cost of publication; and which provided that "expenses incurred in the performance of the work herein provided shall, so far as may be practicable, be paid in the first instance by the party of the first part with appropriate reimbursement thereafter by the party of the second part, all accounts to be rendered in conformity with the laws and regulations of the party of the second part."

The provisions regarding responsibility for and supervision of the collection of the data, availability of records, etc., however, remained essentially the same.

Similar cooperative agreements have been made for the fiscal years 1931–32 and 1932–33, differing from that of 1930–31 chiefly in the amounts of money to be spent.

Until June 30, 1913, the Territory of Hawaii was represented in 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 that date by the commission 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 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., and B. P. Bishop Estate; Island of Oahu—Board of Water Supply, City and County of Honolulu, B. P. Bishop Estate, and Wahiawa Water Co.; Island of Maui—Pioneer Mill Co. and East Maui Irrigation Co.; Island of Hawaii—Hilo Waterworks, Kohala Ditch Co., and Olaa Sugar 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 470 stations for periods ranging from a few months to 24 years. In addition hundreds of miscellaneous measurements have been made, and rather extensive studies of ground water have been made in Kau, Hawaii,[2] and in Honolulu, Oahu.

In this volume are given the records of daily flow that were obtained at the 103 stations that were operated during the year ending June 30, 1933, 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 "Publications" on page 7 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 which 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.

[2] Stearns, H. T., and Clark, W. O., Geology and the water resources of the Kau District, Hawaii: U.S. Geological Survey Water-Supply Paper 616, 1930.

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.

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 or a rating flume, using standard formulas. Rating tables giving the discharge for any stage are prepared from the discharge measurements. 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, average discharge if there has been more than 10 years of record, and, under "Remarks", notes on accuracy of the records, diversions that decrease the flow at the gage, and artificial regulation.

The table of daily discharge gives, in general, the discharge corresponding to the mean daily gage heights. But when, owing to sudden or rapid diurnal fluctuation, the discharge obtained from the rating table by applying the mean daily gage height would not be within 5 percent of the true mean, the mean has been obtained by averaging discharges for intervals during the day.

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 "Discharge", 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 total 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 percent of 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 percent of 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. Computations are carried to not more than three significant figures. The discharges thus obtained are plotted, usually on semilogarithmic 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 percent, 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. Vaksvik, Sam Wong, G. E. Ferguson, H. W. Palm, G. T. Hirashima, Kenichi Kawamura, John Kaheaku, P. T. P. 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 published from 1903 to 1933, 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, 1903–33

Year	Number	Year	Number	Year	Number
1903	[a] 77	1918–19	515	1926–27	655
1909–11 [b]	318	1919–20	516	1927–28	675
1912 [b]	336	1920–21	535	1928–29	695
1913 [b]	373	1921–22	555	1929–30	710
1913–15	430	1922–23	575	1930–31	725
1915–16	445	1923–24	595	1931–32	740
1916–17	465	1924–25	615	1932–33	755
1917–18	485	1925–26	635		

[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

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 1933.

DISCHARGE. Maximum during year, 6,950 million gallons a day or 10,800 second-feet Nov. 18 (gage height, 16.40 feet); minimum, 0.1 million gallons a day or 0.2 second-foot for several days during year.

1921–33: Maximum, 10,700 million gallons a day or 16,600 second-feet Dec. 24, 1927 (gage height, 20.40 feet); no flow several days from January to November 1926, November to December 1929.

REMARKS.—Records good for medium stages; poor for all extremely high and low stages. Kokee Ditch and Kekaha Ditch divert above station, taking practically all the water at low and medium stages for irrigation near Waimea and Kekaha.

Discharge, in million gallons, 1932–33

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	0.1	0.3	0.2	0.3	0.2	27	173	55	35	0.4	0.3	0.3
2	.1	.2	.2	.2	.2	7.9	174	27	238	102	.3	.3
3	.1	.2	.2	.2	.2	2.2	67	25	1,020	71	.3	95
4	2.8	.3	.6	.2	.2	.8	29	132	1,010	7.3	.4	1.4
5	15.5	.8	.3	.2	.2	.5	9.8	23	712	2.5	.3	.3
6	23	.4	.3	.3	.2	.4	1.6	3.8	979	.4	.3	.3
7	.2	.3	.2	.3	.2	.4	.6	1.5	510	.4	.3	31
8	.2	.3	.5	.3	.2	.4	.4	5.8	258	.4	.3	14.5
9	7.2	16.5	19.5	.2	.2	.4	.4	22	142	.4	.3	.4
10	1.2	.4	40	.2	.2	.4	.4	58	82	.4	.3	.3
11	.2	33	2.0	.3	.2	.4	.4	19.5	55	.4	20	.3
12	.2	10	.3	.3	.2	.4	.4	124	36	.3	52	.3
13	101	.3	.3	.3	.2	4	.4	72	29	.3	.4	.3
14	50	.2	.3	.3	.2	63	.3	51	23	33	5.1	.3
15	.7	.2	.3	.3	.2	401	1.7	33	19	2.1	342	.3
16	.2	.2	.2	.3	56	67	319	35	14	.4	76	.3
17	.1	.2	.2	.3	636	5.8	191	36	10	2.9	28	.3
18	.1	8.4	.2	2.5	2,100	.9	64	8.3	24	.4	3.7	.3
19	45	.5	.2	1.6	296	.4	51	1.9	30	.3	.3	.3
20	86	.2	.2	5.1	106	.4	91	146	17	.3	42	.3
21	86	1.0	.2	.5	63	.3	71	110	.7	.3	5.5	.3
22	4.6	.2	.2	1.6	63	.3	110	34	7.3	.3	.3	.3
23	2.1	.2	.2	24	392	.3	212	31	63	.3	.3	17.5
24	3.4	.2	.2	3.1	360	.3	171	18	44	.3	.3	1.6
25	1.8	.2	.2	.3	100	2.8	86	.8	6.5	.3	.2	.3
26	2.4	.2	.2	.3	88	7.3	147	.5	14	.3	.2	2.1
27	.3	.2	.3	.3	68	78	222	13	5.7	.7	.2	69
28	.2	.6	.3	.3	85	138	92	.8	1.8	.5	.2	31
29	3.7	.3	.3	.3	36	80	47	-------	16	1.5	.2	.7
30	.3	.2	.3	.3	19	128	32	-------	11.5	.4	37	24
31	.4	.2	-------	.2	-------	235	160	-------	.8	-------	5.3	-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	101	0.1	14.2	22.0	439	1,350
August	33	.2	2.46	3.81	76.4	234
September	40	.2	2.29	3.54	68.6	211
October	24	.2	1.45	2.24	44.9	138
November	2,100	.2	149	231	4,470	13,700
December	401	.3	40.3	62.4	1,250	3,840
January	319	.3	81.5	126	2,530	7,750
February	146	.5	38.9	60.2	1,090	3,340
March	1,020	.7	175	271	5,410	16,600
April	102	.3	7.68	11.9	230	707
May	342	.2	20.1	31.1	622	1,910
June	95	.3	9.79	15.1	294	901
The year	2,100	.1	45.3	70.1	16,500	50,700

KAWAIKOI STREAM NEAR WAIMEA

LOCATION.—Water-stage recorder 2 miles northeast of Kokee ranger station and 12½ miles northeast of Waimea.

DRAINAGE AREA.—4.1 square miles.

RECORDS AVAILABLE.—April 1909 to June 1933. July 1917 to July 1919 not published.

DISCHARGE.—Maximum during year, 1,070 million gallons a day or 1,660 second-feet sometime Mar. 3–6 (gage height, 9.00 feet); minimum, 2.0 million gallons a day or 3.1 second-feet Nov. 15, June 20.

1909–33: Maximum, 1,670 million gallons a day or 2,580 second-feet Dec. 13, 1924, and Aug. 3, 1931 (gage height, 12.11 and 11.49 feet respectively); minimum, 1.3 million gallons a day or 2.0 second-feet Sept. 15, 1921. Average, 14 years (1919–33), 21.6 million gallons a day (33.4 second-feet).

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

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

Discharge, in million gallons, 1932–33

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	3.0				7.4	11		19.5	6.2	8.6	5.9	2.8
2	3.0	[a] 4.3	[a] 4.4		4.5	8.6	[a] 30	14.5	49	91	4.5	2.7
3	35				3.7	6.6		17		30	3.8	2.8
4	32			[a] 2.3	3.1	5.7		40	[a]160	18.5	3.3	3.0
5	26	[a] 13	[a] 4.8		2.8	5.1	[a] 7	12		12	3.1	2.7
6	26				2.6	4.7		9.1		12	2.9	2.9
7	15	[a] 4.2	[a] 2.7		2.5	4.2		8.0	[a] 32	9.3	2.8	12.5
8	9.5				2.3	4.0		9.1		8.0	2.8	7.9
9	8.0	[a] 11			2.2	3.9		49		7.5	2.8	3.8
10	6.4		[a] 19	[a] 2.2	2.2	4.4	[a] 4.6	13		8.0	8.8	3.0
11	7.8				2.1	4.4		10.5	[a] 28	6.9	32	2.6
12	8.4	[a] 17			2.0	3.8		32		6.0	16.5	2.4
13	47		[a] 7.5		2.0	3.6	[a] 3.9	18.5		5.7	6.9	2.3
14	16.5				2.0	108		14		5.7	5.7	2.2
15	9.8			[a] 2.1	2.0	169		9.3		6.2	51	2.1
16	15	[a] 4.4	[a] 3.6		5.8	22		8.4	[a] 16	4.9	15	2.1
17	6.8				95	10	[a] 65	10		5.5	31	2.4
18	8.2				216	8.2		7.7		5.4	7.5	2.3
19	40			[a] 3.7	32	8.8	[a] 12	11	[a] 34	4.5	11.5	2.1
20	[a] 36		[a] 2.8		12.5	6.2		66		4.1	41	2.0
21	[a]20	[a] 9			7.7	5.1	37	34	[a] 20	7.2	14	2.2
22				[a] 5.5	5.9		58	14		9.7	7.1	8.8
23					131		75	10.5	[a] 30	6.2	5.1	23
24					91	[a] 4.0	52	8.6		5.2	4.1	8.1
25	[a] 4.7				16.5		38	7.1		4.2	3.6	3.7
26				[a] 3.2	30		41	6.4	23	3.8	3.3	8.6
27		[a] 4.3	[a] 2.5		26	[a] 5	100	5.9	11	3.6	3.2	44
28	[a] 3.5			2.6	47		38	5.5	32	3.6	3.0	16.5
29				2.9	14		26	-------	29	10.5	3.0	17
30	[a] 5.5			4.5	11	[a]32	19	-------	15	8.0	3.1	55
31			-------	3.8	-------		44	-------	9.8	-------	2.9	-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	47	3.0	14.2	22.0	442	1,360
August	----------	----------	6.65	10.3	206	633
September	----------	----------	4.76	7.36	143	439
October	----------	----------	2.95	4.56	91.6	281
November	216	2.0	26.2	40.5	785	2,410
December	169	----------	18.1	28.0	561	1,720
January	100	----------	27.2	42.1	844	2,590
February	66	5.5	16.8	26.0	471	1,440
March	----------	6.2	38.0	58.8	1,180	3,620
April	91	3.6	10.7	16.6	322	988
May	51	2.8	10.0	15.5	311	955
June	55	2.0	8.45	13.1	254	778
The year	216	2.0	15.4	23.8	5,610	17,200

[a] Partly estimated.

KOKEE DITCH NEAR WAIMEA

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

RECORDS AVAILABLE.—September 1926 to June 1933.

DISCHARGE.—Maximum during year, 69 million gallons a day or 107 second-feet Nov. 18 (gage height, 2.72 feet); no flow Aug. 10, Sept. 8, June 3, when water was shut out of ditch.

1926–33: Maximum, that of Nov. 18, 1932; no flow occasionally, when water was turned out of ditch just above weir.

REMARKS.—Records excellent except those for estimated periods, which are poor. Kokee Ditch, at elevation 3,400 feet, diverts water from all streams tributary to Waimea River east of Mohihi Stream, for irrigation near Kekaha. Regulated by head gates.

Discharge, in million gallons, 1932–33

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	5.2	9.5	6.2	4.4	7.4		32	27	15.5	17.5	10.5	6.2
2	5.1	6.8	5.4	4.2	6.0	a 15	42	22	37	43	9.0	5.8
3	19	10.5	5.9	4.1	4.5		27	18.5	64	43	8.1	5.9
4	34	24	12	4.0	3.8		16	36	68	31	7.6	6.3
5	26	16	7.6	4.2	3.4	9.7	13.5	20	64	22	7.1	5.8
6	30	9.2	5.7	4.1	3.2	9.0	12	15.5	40	21	6.9	5.8
7	23	8.3	5.1	3.8	2.9	8.4	11	14	31	18.5	6.8	12
8	12.5	17.5	4.9	3.7	2.8	8.1	10	16	30	16	6.8	12
9	11.5	25	19.5	3.5	2.7	7.4	9.5	45	30	16	6.8	7.3
10	9.3	10	32	3.8	2.4	9.5	8.6	22	32	16	10	5.8
11	9.9	31	13.5	3.5	2.4	9.5	8.6	18.5	36	14.5	25	5.2
12	11	16.5	13	3.4	2.3	7.6	8.4	41	a 34	13.5	28	5.1
13	40	9.7	15	3.2	2.3	7.1	8.1	30	a 32	12.5	13.5	5.0
14	24	8.3	15	3.0	2.2	19.5	7.7	27	28	12.5	10.5	4.8
15	13	7.3	8.3	3.0	2.2	56	8.9	18.5	26	13	32	4.7
16	18.5	7.1	6.6	3.3	9.0	a 24	41	17.5	22	11.5	23	4.5
17	10.5	6.8	5.8	3.5	43		42	18.5	21	11.5	27	4.7
18	9.0	8.1	5.4	7.4	56		18.5	15.5	38	11.5	13	4.7
19	25	12.5	5.7	8.3	36		16	18.5	35	10.5	11	4.4
20	43	12.5	5.6	7.3		a 14	24	53	27	10	40	4.1
21	36	21	5.4	9.2	a 16		32	38	26	11	23	4.2
22	15.5	9.7	5.1	15.5			49	22	35	15	12.5	7.6
23	10	7.1	4.8	11			56	17.5	51	11.5	9.5	22
24	8.4	7.4	4.5	7.9	a 55		51	15.5	35	10	8.4	12.5
25	9.5	8.8	4.5	5.1		a 8.5	40	14	31	9.2	7.7	6.6
26	11	9.5	5.2	3.8	a 32		49	13	36	8.6	7.1	7.4
27	7.9	7.2	4.8	3.4		a 24	51	12.5	21	8.3	6.8	38
28	6.8	16	5.0	3.2			35	11.5	34	7.9	6.6	24
29	12	7.9	4.8	3.0	a 20		31	-------	40	12.5	6.5	11
30	9.9	6.2	4.5	5.1		a 32	27	-------	27	12	6.5	49
31	11	9.0	-------	4.7	-------		38	-------	20	-------	6.3	-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	43	5.1	16.7	25.8	518	1,590
August	31	6.2	11.8	18.3	366	1,120
September	32	4.5	8.23	12.7	247	757
October	15.5	3.0	5.08	7.86	158	484
November	----------	2.2	17.4	26.9	520	1,600
December	56	----------	16.2	25.1	502	1,540
January	56	7.7	26.6	41.2	824	2,530
February	53	11.5	22.8	35.3	638	1,960
March	68	15.5	34.4	53.2	1,070	3,270
April	43	7.9	15.7	24.3	471	1,450
May	40	6.3	13.0	20.1	404	1,240
June	49	4.1	10.1	15.6	302	928
The year	68	2.2	16.5	25.5	6,020	18,500

a Estimated.

WAIAHULU STREAM NEAR WAIMEA

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, May 1925 to June 1933.

DISCHARGE.—Maximum during year, 1,320 million gallons a day or 2,040 second-feet Nov. 18 (gage height, 6.70 feet); minimum, 8.0 million gallons a day or 12.4 second-feet Nov. 11–15.

1916, 1917–18, 1925–33: Maximum, 2,550 million gallons a day or 3,950 second-feet Dec. 24, 1927 (gage height, 9.92 feet); minimum, 5.2 million gallons a day or 8.0 second-feet Nov. 4, 1927.

REMARKS.—Records good for ordinary stages, poor for high stages. Kokee ditch diverts water for irrigation above station.

Discharge, in million gallons, 1932–33

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	11.5	10	8.6	9.1	8.8	13	37	17	21	15	10.5	8.8
2	11.5	10	8.6	9.3	9.3	13	50	15	112	94	10.5	9.3
3	17.5	9.8	8.4	9.1	9.1	12	20	14	487	39	10	10.5
4	18	12	8.6	9.3	9.1	12	14	51	392	19	9.8	11
5	18.5	12	8.8	9.6	8.8	11.5	12	16.5	407	16	9.6	9.8
6	22	9.3	8.8	9.3	8.6	11.5	11.5	13	563	15	9.3	10
7	15	9.1	8.8	9.3	8.6	11	11.5	13	311	14.5	9.1	10
8	12	9.1	8.8	9.3	8.4	11	11	13	137	13.5	8.8	12.5
9	13	12.5	9.1	9.1	8.4	11.5	11	30	58	14	8.8	11.5
10	12.5	11	19	9.1	8.2	12	10.5	14.5	36	14.5	9.1	10.5
11	11.5	14	14	9.1	8.2	12	10.5	15	25	13.5	15	10
12	11.5	14	11.5	9.1	8.2	11.5	10.5	38	21	12.5	27	9.8
13	24	10	10.5	9.1	8.2	11	10.5	25	19.5	13.5	11	9.8
14	22	8.8	11.5	9.1	8.0	110	10.5	21	18	25	10.5	9.8
15	13.5	8.6	11	9.1	8.2	300	10.5	16	17.5	14.5	50	9.6
16	13	8.6	10	9.3	23	34	171	16.5	17	12	19	9.6
17	12	8.4	9.8	9.1	254	16	52	15	16.5	11.5	11	9.6
18	11.5	10.5	9.6	9.1	689	13	16	13	24	11.5	9.8	9.6
19	16.5	10.5	9.3	9.6	122	12	14.5	12	20	11.5	8.8	9.6
20	27	9.1	9.3	9.8	35	11.5	14	42	17.5	11.5	18.5	9.6
21	31	9.3	9.6	10.5	22	11	22	26	16.5	11	13	9.3
22	15	10	9.3	10.5	16.5	11	51	14	16.5	11	9.6	9.3
23	11.5	8.8	9.3	11.5	205	10.5	74	13	33	11	8.8	9.6
24	10.5	8.6	9.3	12	185	10.5	41	11.5	22	11	8.6	11
25	10.5	8.8	9.1	10	23	10.5	19.5	11	17.5	11	8.4	10
26	11	8.8	9.1	9.3	18.5	10.5	27	11	23	11	8.4	9.8
27	11	8.4	9.3	8.8	22	13	117	11	16.5	11	8.4	17
28	10.5	9.8	9.3	8.6	44	80	34	11	18	11	8.4	18
29	10.5	9.8	9.3	8.6	18	45	19	------	20	10.5	8.4	11.5
30	11	8.8	9.1	8.6	14	52	16	------	17.5	10.5	8.6	24
31	10.5	8.6	------	8.6	------	26	39	------	16	------	9.1	------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	31	10.5	14.7	22.7	457	1,400
August	14	8.4	9.90	15.3	307	942
September	19	8.4	9.89	15.3	297	911
October	12	8.6	9.42	14.6	292	896
November	689	8.0	60.6	93.8	1,820	5,580
December	300	10.5	30.0	46.4	930	2,850
January	171	10.5	31.2	48.3	968	2,970
February	51	11	18.5	28.6	519	1,590
March	563	16	94.7	147	2,940	9,010
April	94	10.5	16.7	25.8	500	1,540
May	50	8.4	12.1	18.7	376	1,150
June	24	8.8	11.0	17.0	330	1,010
The year	689	8.0	26.7	41.3	9,740	29,800

KEKAHA DITCH AT CAMP NO. 1, NEAR WAIMEA

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 1933.

DISCHARGE.—Maximum during year, 68 million gallons a day or 105 second-feet June 2 (gage height, 4.25 feet); no flow several days in November and March, when water was shut out of ditch.

1907–33: Maximum, 71 million gallons a day or 110 second-feet Apr. 25, 1928 (gage height, 4.33 feet); no flow occasionally, when water was shut out of ditch. Average, 14 years (1918–24, 1925–33), 38.1 million gallons a day (58.9 second-feet).

REMARKS.—Records good for ordinary stages, poor for extremely low stages. Intake on Waimea River 8 miles north of Waimea. Water used for irrigation of sugarcane at Kekaha plantation. Regulated by head gates.

Discharge, in million gallons, 1932–33

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	24	36	25	22	26	44	34	44	41	41	38	32
2	24	29	24	22	28	47	44	44	39	43	32	33
3	25	26	25	20	26	39	41	44	12	41	32	48
4	44	30	33	22	24	32	44	41	0	43	43	48
5	41	36	32	23	23	29	44	44	0	43	34	41
6	50	39	26	23	22	26	41	44	0	43	30	39
7	39	32	24	22	22	25	36	44	0	39	28	48
8	33	30	29	23	20	24	32	47	0	37	28	48
9	47	50	47	22	20	24	29	44	9.8	38	28	39
10	41	39	55	22	20	26	26	41	34	39	32	32
11	36	44	50	20	20	25	25	44	36	34	51	30
12	41	50	39	20	19	22	25	44	36	33	48	29
13	47	39	39	20	19	22	24	32	39	32	46	29
14	50	33	41	20	19	26	24	29	39	35	46	28
15	44	32	30	20	19	41	29	28	38	38	46	27
16	44	30	26	20	36	44	44	28	38	41	51	27
17	36	29	25	22	31	44	44	28	38	41	51	28
18	36	41	24	37	11.5	41	44	41	41	41	48	30
19	47	44	24	44	17	33	44	47	39	33	41	28
20	50	33	23	50	26	29	44	47	38	31	51	26
21	50	44	24	44	25	26	47	44	39	31	48	26
22	47	39	23	50	5.8	24	44	47	41	31	41	29
23	33	30	23	53	[a] 0	23	44	44	41	32	34	51
24	28	28	23	50	[a] 0	22	44	44	38	32	32	46
25	33	28	22	33	[a] 0	33	44	44	39	30	30	38
26	44	28	22	28	17.5	41	44	39	41	29	29	46
27	30	29	22	32	33	44	44	41	39	34	29	48
28	26	44	23	28	39	44	44	41	43	46	28	51
29	39	33	23	28	36	44	44	------	48	48	29	46
30	39	26	22	26	33	44	44	------	46	41	43	51
31	39	26	------	28	------	38	44	------	43	------	43	------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	50	24	38.9	60.2	1,210	3,700
August	50	26	34.7	53.7	1,080	3,310
September	55	22	28.9	44.7	868	2,660
October	53	20	28.8	44.6	894	2,740
November 1–22, 26–30	39	5.8	23.6	36.5	638	1,960
December	47	22	33.1	51.2	1,030	3,150
January	47	24	38.9	60.2	1,200	3,700
February	47	28	41.0	63.4	1,150	3,530
March 1–3, 9–31	48	9.8	37.5	58.0	976	2,990
April	48	29	37.3	57.7	1,120	3,440
May	51	28	38.4	59.4	1,190	3,650
June	51	26	37.4	57.9	1,120	3,440
The year (357 days)	55	5.8	34.9	54.0	12,500	38,300

[a] Estimated.

KEKAHA DITCH BELOW TUNNEL NO. 12, NEAR WAIMEA

LOCATION.—Water-stage recorder 1 mile north of Waimea.
RECORDS AVAILABLE.—April 1908 to November 1914; July 1916 to June 1933.
DISCHARGE.—Maximum during year, 57 million gallons a day or 88 second-feet Nov. 18 (gage height, 4.32 feet); no flow several days in November and March, when water was shut out of ditch.

1908–14, 1916–33: Maximum, 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. Average, 15 years (1917–24, 1925–33), 32.0 million gallons a day (49.5 second-feet).

REMARKS.—Records good. Intake on Waimea River 8 miles north of Waimea. Water used for irrigation of sugarcane at Kekaha plantation. Regulated by head gates.

Discharge, in million gallons, 1932–33

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	19	37	25	21	25	37	36	44	39	41	37	34
2	19	29	24	21	27	39	43	44	43	41	34	30
3	19	27	24	21	25	36	43	44	22	41	32	44
4	37	29	32	21	23	32	43	39	0	43	43	44
5	36	34	32	22	22	30	43	44	0	41	36	41
6	41	39	26	22	21	27	41	44	0	41	30	39
7	32	32	24	21	20	26	39	44	0	39	29	43
8	27	29	24	21	20	26	36	46	0	37	27	46
9	37	46	41	20	20	27	34	44	[a] 2.6	37	27	39
10	36	39	48	21	19	29	32	44	32	39	30	34
11	29	37	46	20	19	29	30	46	34	36	46	30
12	34	46	37	20	19	25	30	46	34	34	46	30
13	36	37	36	20	19	25	30	39	36	34	44	29
14	41	34	39	19	19	26	30	36	36	36	44	29
15	37	30	30	19	19	41	32	34	36	39	46	27
16	36	30	27	19	29	43	44	34	36	41	48	27
17	30	29	24	20	37	43	44	34	36	39	46	29
18	30	36	23	31	24	41	44	41	37	41	46	30
19	37	44	23	41	21	36	44	44	37	36	41	29
20	41	34	22	43	36	32	44	44	36	32	44	27
21	39	39	23	43	30	30	44	44	37	32	44	26
22	39	39	23	44	[a] 12	29	44	44	39	32	41	29
23	29	30	22	46	0	27	44	44	41	32	36	44
24	20	29	22	46	0	26	44	43	36	34	32	46
25	29	29	22	34	0	32	44	43	37	30	30	37
26	41	27	22	27	[a] 12	41	44	39	39	29	29	44
27	32	27	21	29	34	43	44	39	37	30	29	36
28	27	37	22	27	34	43	44	41	39	43	27	48
29	32	34	22	26	34	43	44	-------	43	46	27	46
30	37	27	21	25	30	44	44	-------	43	43	37	48
31	36	26	-------	25	-------	39	44	-------	41	-------	43	-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	41	19	32.7	50.6	1,020	3,110
August	46	26	33.6	52.0	1,040	3,200
September	48	21	27.6	42.7	827	2,540
October	46	19	26.9	41.6	835	2,560
November 1–22, 26–30	37	12	24.1	37.3	650	1,990
December	44	25	33.8	52.3	1,050	3,210
January	44	30	40.2	62.2	1,250	3,820
February	46	34	41.9	64.8	1,170	3,600
March 1–3, 9–31	43	2.6	35.7	55.2	929	2,850
April	46	29	37.3	57.7	1,120	3,430
May	48	27	37.1	57.4	1,150	3,530
June	48	26	36.2	56.0	1,080	3,330
The year (357 days)	48	2.6	33.9	52.5	12,100	37,200

[a] Estimated.

HANAPEPE RIVER AT KOULA, NEAR ELEELE

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, December 1926 to June 1933.

DISCHARGE.—Maximum during year unknown, due to missing gage-height record; minimum, 13.5 million gallons a day, or 20.9 second-feet Oct. 1, 2.

1910–31, 1926–33: Maximum, 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. Average, 12 years (1913–20, 1927–33), 56.4 million gallons a day (87.3 second-feet).

REMARKS.—Records good for ordinary stages, poor for estimated periods and extremely high stages. Hanapepe Ditch diverts water from river 3 miles above station for irrigation.

Discharge, in million gallons, 1932–33

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	14.5	20	17	14	20		207			29	22	30
2	16	19.5	16.5	15	21	[b] 36	[a] 562		[b] 80	34	19	192
3	17	19.5	21	16.5	19		162	[a] 100		21.	28	239
4	15.5	25	20	15	18		102			19	53	127
5	22	82	16.5	16.5	17.5	[b] 28	59		[b] 300	18	32	166
6	130	28	16	15	17.5		40			18	38	
7	26	20	17	19	17.5		31	[b] 36		17.5	30	[b] 170
8	25	43	22	15	16.5	[b] 22	39		[b] 80	17.5	23	
9	54	38	149	16.5	16.5		30			17	20	
10	27	21	113	15	16.5		22			17	22	[b] 65
11	56	147	37	14.5	16	[b] 19	21	[b] 85	[b] 34	19.5	32	
12	30	50	28	14.5	16		21			32	38	[b] 38
13	196	50	25	14.5	16.5	[a] 37	20	[b] 65		33	23	
14	75	33	22	15	16	[a] 27	25			44	19.5	
15	41	31	19.5	14.5	33		67		[b] 18	56	222	
16	26	41	18	17.5	136	[b] 42	[a] 502	[b] 38		22	89	[b] 24
17	32	23	17.5	68	188		[a] 206		26	131	74	
18	25	113	19	96	[a]300		[a] 126		28	31	41	
19	124	67	17.5	88		[b] 28	[a] 92		25	22	50	
20	130	33	16.5	92	98		278		25	19.5	48	
21	124	46	17.5	75	66	[a] 24	[a] 185	[b] 70	24	22	27	[b] 17
22	37	24	16	75	53	20	163		80	26	20	
23	28	21	16	126		19	214		55	24	19	
24	23	21	15.5	34	[b]80	19.5	233		29	20	26	
25	62	21	15.5	28		34	223	[b] 36	35	18.5	18	[b] 24
26	26	31	15.5	46	58	66	200		28	18	18	
27	21	21	15.5	60	[a] 24	115			21	61	17.5	
28	21	22	15.5	56	[a] 26	86		[b] 180	71	42	17.5	[b] 34
29	41	17	15	27		53			57	50	33	
30	27	19	14.5	31	[b] 28	223	[b] 160		36	30	325	
31	28	28		21		252			41		40	

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	196	14.5	49.0	75.8	1,520	4,660
August	147	17	37.9	58.6	1,180	3,610
September	149	14.5	26.2	40.5	784	2,410
October	126	14	37.8	58.5	1,170	3,590
November		16	60.8	94.1	1,820	5,590
December	252		48.4	74.9	1,500	4,600
January	562	20	151	234	4,670	14,300
February			67.4	104	1,890	5,790
March			83.6	129	2,590	7,950
April	131	17	31.0	48.0	930	2,850
May	325	17.5	47.9	74.1	1,480	4,560
June			64.3	99.5	1,930	5,920
The year	562	14	58.8	91.0	21,500	65,800

[a] Partly estimated. Estimated.

HANAPEPE DITCH BELOW INTAKE, NEAR ELEELE

LOCATION.—Water-stage recorder 1 mile below intake and 7 miles northeast of Eleele.

RECORDS AVAILABLE.—March 1930 to June 1933.

DISCAHRGE.—Maximum during year, 35 million gallons a day, or 54 second-feet Nov. 18, Mar. 31; maximum gage height, 3.66 feet May 30; no flow occasionally when water was turned out of ditch.

1930–33: Maximum, 41 million gallons a day, or 63 second-feet Nov. 12, 1931 (gage height, 3.96 feet); no flow occasionally, due to closing of head gates.

REMARKS.—Records good except those for estimated periods, which are fair. Ditch diverts water from Hanapepe River at intake, 1 mile above station.

Discharge, in million gallons, 1932–33

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1		32			25		33	23	33	33	30	30
2		32			26		20	23	31	25	30	30
3	a 25	30		a 23	25		27	25	9.5	33	32	32
4		32	a 29		23		32	8.6	13.5	33	32	32
5					23		30	3.2	26	33	32	32
		a 32				a 23						
6					25		28	22	26	33	32	30
7			23	a 24	23		28	23	25	32	32	32
8		a 29	28		23		7.9	23	22	32	32	30
9			30		23		19.5	23	17.5	32	30	30
10	a 33		30		23		25	25	a 10	33	32	30
11			30		22		26	23		32	32	30
12			28		22	a 24	28	26	a 9.5	24	32	30
13			28		22		28	25		12.5	32	30
14			28		22		22	23		27	30	30
15			28	a 23	24		17.5	23	a 25	30	32	30
16			26		33		30	25		30	30	30
17			26		33	a 29	26	22	26	30	30	30
18	a 32		25				23	25	28	30	30	30
19			25		a 33		22	26	26	30	30	30
20	33	a 30	25				23	30	28	29	30	30
21	33		25				23	26	28	30	27	32
22	32		25	a 29	a 31	28	22		32	32	29	32
23	32		25			28	18.5		32	32	29	32
24	32		25			28	10.5	a 26	32	29	29	30
25	33		25			32	18		32	29	27	32
					a 32							
26	32					30	24		32	29	29	32
27	32			30		33	14.5	33	32	30	27	32
28	32		a 24	30		32	3.9	32	32	30	27	30
29	33			28	a 26	32	7.8	-------	33	30	29	30
30	32	a 29		17		32	22	-------	33	30	30	32
31	33		-------	26	-------	32	26	-------	33	-------	29	------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July			31.6	48.9	981	3,010
August			30.1	46.6	933	2,860
September			26.6	41.2	799	2,450
October			25.5	39.5	789	2,420
November			27.2	42.1	815	2,500
December			27.1	41.9	841	2,580
January	33	3.9	22.1	34.2	686	2,110
February	33	3.2	23.8	36.8	668	2,050
March	33		25.0	38.7	776	2,380
April	33	12.5	29.8	46.1	894	2,750
May	32	27	30.1	46.6	934	2,870
June	32	30	30.7	47.5	922	2,830
The year		3.2	27.5	42.5	10,000	30,800

a Estimated.

HANAPEPE DITCH AT KOULA, NEAR ELEELE

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

RECORDS AVAILABLE.—January 1910 to June 1921; March 1927 to June 1933.

DISCHARGE.—Maximum recorded during year, 33 million gallons a day or 51 second-feet June 3 (gage height, 2.94 feet); no flow occasionally, when water was shut out of ditch.

1910–21, 1927–33: Maximum, 36 million gallons a day or 56 second-feet Apr. 10, 1918, and Aug. 3, 1931 (gage height, 3.18 and 3.05 feet respectively); no flow occasionally due to closing of head gates. Average, 16 years (1910–20, 1927–33), 26.3 million gallons a day (40.7 second-feet).

REMARKS.—Records good except those for estimated periods, which are fair. Diverts water for irrigation from Hanapepe River 3 miles above station. Regulated by head gates and spillways.

Discharge, in million gallons, 1932–33

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1			24	19.5	21	a 18	8.3	22	29	27	27	29
2	a 22	a 27	24	19.5	21	18.5	9.9	21	27	21	27	29
3			24	18.5	19.5	19.5	22	13	1.3	29	27	32
4			24	19.5	18.5	19.5	27	2.3	8.5	29	27	29
5		a 28	22	21	18.5	19.5	27	2.1	29	29	27	29
6	a 27		22	19.5	19.5	19.5	25	21	16	27	27	29
7		24	20	19.5	18.5	19.5	25	22	a 20	27	27	29
8		25	24	19.5	18.5	18.5	8.0	22		27	27	29
9		25	25	19.5	18.5	19.5	17.5	21	18.5	27	27	27
10		24	25	19.5	18.5	18.5	24	24	7.0	27	27	27
11		25	25	18.5	18.5	16	24	22	7.0	23	27	27
12	a 28	25	24	18.5	17	19.5	25	24	7.0		27	27
13		25	24	17	17	22	25	22	8.9	a 17	27	27
14		25	24	18.5	17	22	20	19.5	21		25	27
15		25	24	18.5	18.5	24	16	19.5	24		29	25
16		25	22	19.5	25	24	29	21	24		29	27
17		25	22	22	29	25	25	17	24		27	27
18	a 26	25	19.5	24		25	22	21	25	a 25	27	27
19		25	21	25	a 29	25	22	22	25		27	25
20		25	21	24		25	22	25	25		29	25
21	a 28	25	21	25		25	18.5	24	25		25	27
22		25	19.5	24		24	8.8	22	29	27	27	29
23		24	19.5	24		24	8.3	22	29	27	27	29
24		25	19.5	24	a 27	24	9.3	22	27	25	27	27
25		25	19.5	24		25	17	24	29	25	25	29
26	a 27	25	19.5	24		25	22	22	29	25	25	27
27		25	19.5	25		29	15	29	29	27	25	27
28		25	19.5	24		29	3.1	27	29	27	24	27
29		24	19.5	24	a 21	27	5.4	-------	29	27	25	27
30		24	19.5	16.5		29	19.5	-------	29	27	29	27
31		24	-------	22	-------	22	24	-------	29	-------	27	-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	-------	-------	26.5	41.0	823	2,530
August	-------	24	25.3	39.1	784	2,410
September	25	19.5	21.9	33.9	657	2,020
October	25	16.5	21.2	32.8	658	2,020
November	29	17	22.4	34.7	673	2,070
December	29	16	22.6	35.0	701	2,150
January	29	3.1	18.5	28.6	575	1,760
February	29	2.1	20.6	31.9	575	1,770
March	29	1.3	21.9	33.9	680	2,090
April	29	-------	25.2	39.0	756	2,320
May	29	24	26.8	41.5	830	2,550
June	32	25	27.6	42.7	829	2,540
The year	32	1.3	23.4	36.2	8,540	26,200

a Estimated.

SOUTH FORK OF WAILUA RIVER NEAR LIHUE

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

DRAINAGE AREA.—22.4 square miles.

RECORDS AVAILABLE.—December 1911 to June 1933.

DISCHARGE.—Maximum during year, 11,400 million gallons a day or 17,600 second-feet Jan. 2 (gage height, 8.21 feet); minimum, 2.2 million gallons a day or 3.4 second-feet Oct. 5–7, 10, 12–17.

1911–33: Maximum, 29,000 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. Average, 11 years (1921–24, 1925–33), 71.9 million gallons a day (111 second-feet).

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

Discharge, in million gallons, 1932–33

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	4.0	4.0	3.8	2.8	11.5	73	325	249	189	44	3.7	6.0
2	4.3	4.0	3.7	2.8	9.4	110	2,520	156	400	45	2.8	288
3	4.1	5.3	3.9	2.5	4.0	77	444	136	958	27	2.8	113
4	4.1	5.1	3.7	2.5	3.1	89	244	152	396	10	3.7	69
5	4.1	22	3.6	2.3	2.8	74	191	97	1,170	8.8	9.1	139
6	22	5.4	3.4	2.2	2.7	64	146	69	1,400	6.8	29	47
7	8.0	3.8	3.2	2.4	5.7	48	136	81	533	6.2	18	347
8	4.7	3.9	3.4	2.8	3.2	46	116	84	202	5.3	9.5	145
9	5.3	4.4	91	2.4	2.6	42	116	66	146	4.8	3.9	92
10	5.3	4.1	48	2.3	2.6	40	95	202	126	5.7	3.2	63
11	9.4	46	7.5	2.3	2.6	36	87	97	116	10.5	4.9	86
12	7.0	8.5	5.6	2.3	2.3	10.5	81	198	100	4.6	46	74
13	24	6.2	4.3	2.3	3.3	112	83	146	94	3.9	23	58
14	9.6	5.9	3.9	2.3	4.0	67	98	108	80	26	45	45
15	4.4	7.0	3.6	2.2	19	349	121	90	42	91	68	36
16	4.7	22	3.4	2.3	89	190	207	113	48	47	69	30
17	3.8	6.8	3.2	3.0	269	116	307	108	36	99	59	47
18	3.7	20	3.0	8.8	1,450	105	178	86	44	10.5	40	35
19	21	11	3.2	16	210	116	195	95	58	4.6	17.5	17
20	6.0	5.0	2.9	34	100	108	256	218	30	3.7	36	6.4
21	34	5.1	3.4	5.6	73	92	204	157	22	3.9	25	6.2
22	5.6	4.7	3.3	3.9	59	74	178	193	81	4.3	6.4	5.7
23	3.9	4.4	3.2	47	519	66	167	146	62	3.8	4.6	31
24	3.6	4.4	3.4	22	182	60	204	97	34	3.7	4.3	6.8
25	6.1	4.3	3.4	11.5	94	89	152	78	29	3.4	4.3	52
6	5.8	4.4	3.4	4.1	155	71	183	78	47	3.1	3.9	22
7	3.6	4.6	3.4	4.8	89	162	253	561	22	10.5	3.4	66
8	3.8	3.9	3.3	4.1	80	116	156	108	51	4.8	3.2	22
29	4.1	3.7	3.0	4.3	60	97	156	-------	93	3.5	201	8.2
30	4.7	3.7	2.8	5.0	85	236	188	-------	44	3.5	205	43
31	4.6	4.8	-------	15	-------	374	453	-------	27	-------	9.2	-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	34	3.6	7.72	11.9	239	734
August	46	3.7	8.01	12.4	248	762
September	91	2.8	8.03	12.4	241	739
October	47	2.2	7.35	11.4	228	699
November	1,450	2.3	120	186	3,590	11,000
December	374	10.5	107	166	3,310	10,200
January	2,520	81	266	412	8,240	25,300
February	561	66	142	220	3,970	12,200
March	1,400	22	215	333	6,680	20,500
April	99	3.1	17.0	26.3	509	1,560
May	205	2.8	31.1	48.1	964	2,960
June	347	5.7	66.9	104	2,010	6,160
The year	2,520	2.2	82.8	128	30,200	92,800

NORTH FORK OF WAILUA RIVER AT ELEVATION 650 FEET, NEAR LIHUE

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 1933.

DISCHARGE.—Maximum during year, 2,340 million gallons a day or 3,620 second-feet Jan. 2 (gage height, 7.05 feet); minimum, 21 million gallons a day or 32 second-feet July 1, 2, Oct. 12, 13, Nov. 15.

1910–33: Maximum, 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. Average, 12 years (1921–33), 50.8 million gallons a day (78.6 second-feet).

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

Discharge, in million gallons, 1932–33

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	21	25	29	22	30	65	122	96	80	30	27	40
2	24	26	29	22	29	60	516	67	144	63	24	74
3	25	27	34	24	26	52	142	79	230	40	48	76
4	28	33	32	23	25	43	88	67	172	30	85	63
5	37	56	28	22	25	42	78	56	286	28	52	91
6	60	32	27	22	29	46	63	49	391	26	60	65
7	27	27	26	22	29	38	49	40	187	25	51	194
8	32	35	32	22	26	34	46	40	94	25	40	113
9	43	33	80	23	24	32	43	43	74	25	36	79
10	27	27	84	22	23	30	38	127	61	35	52	54
11	42	77	49	22	23	29	35	59	51	27	49	57
12	30	38	42	22	22	28	40	92	46	24	61	48
13	75	45	40	21	23	66	40	67	43	24	43	46
14	40	35	34	22	22	76	57	52	38	49	50	40
15	38	38	29	23	55	126	57	53	36	62	85	38
16	29	50	30	25	84	69	111	60	33	38	76	40
17	26	61	28	32	174	67	134	59	32	74	77	43
18	28	84	28	47	440	57	89	60	40	32	51	36
19	43	64	27	67	94	52	89	65	38	27	61	30
20	46	46	26	54	68	59	131	114	33	25	61	28
21	60	64	26	43	49	43	113	76	30	32	43	36
22	34	40	24	38	48	35	94	94	71	32	36	36
23	32	38	24	66	157	34	94	83	51	32	33	45
24	59	40	24	47	78	38	98	56	36	26	38	33
25	46	40	24	35	64	46	91	46	35	25	32	43
26	32	51	23	43	85	55	82	58	30	26	36	42
27	30	38	23	46	59	60	124	287	27	54	29	68
28	28	38	22	43	64	49	72	61	54	36	28	43
29	32	32	22	34	46	49	72	------	79	33	158	43
30	30	40	22	32	64	105	104	------	52	28	117	46
31	28	35	------	30	------	176	148	------	38	------	46	------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	75	21	36.5	56.5	1,130	3,470
August	84	25	42.4	65.6	1,320	4,040
September	84	22	32.3	50.0	968	2,970
October	67	21	32.8	50.7	1,020	3,120
November	440	22	66.2	102	1,980	6,090
December	176	28	56.8	87.9	1,760	5,400
January	516	35	98.7	153	3,060	9,390
February	287	40	75.2	116	2,110	6,460
March	391	27	84.3	130	2,610	8,020
April	74	24	34.4	53.2	1,030	3,170
May	158	24	54.4	84.2	1,680	5,170
June	194	28	56.3	87.1	1,690	5,190
The year	516	21	55.8	86.3	20,400	62,500

HANALEI TUNNEL OUTLET NEAR LIHUE

LOCATION.—Water-stage recorder on the North Branch of the North Fork of Wailua River at elevation 1,220 feet, 2½ miles northwest of Lihue Plantation's Wailua Stable Camp and 9 miles from Lihue.

RECORDS AVAILABLE.—July 1932 to June 1933.

DISCHARGE.—Maximum during year, 72 million gallons a day or 111 second-feet Feb. 27 (gage height, 1.73 feet); no flow for several hours Apr. 13, 14, when water was shut out of ditch.

REMARKS.—Records good. Tunnel diverts water from Hanalei River at intake, 4,400 feet above station. Regulated by spillway and head gate.

Discharge, in million gallons, 1932–33

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	22	24	23	19	24	23	24	25	23	17.5	18	19
2	24	24	23	19	22	22	28	22	27	23	17	23
3	25	24	24	20	21	23	15.5	23	34	19.5	19.5	23
4	26	26	24	19	20	22	14	23	27	18	24	23
5	27	28	22	18.5	20	22	18	23	34	17.5	19.5	24
6	27	26	21	18.5	22	22	21	23	40	17	21	23
7	25	24	21	19	21	21	20	22	28	17	19.5	31
8	27	26	25	19	19.5	20	20	22	20	17	18	26
9	28	26	29	20	18.5	20	20	25	18	17.5	18	23
10	25	25	30	19	18.5	20	19	32	18.5	18	21	20
11	28	29	28	18.5	18.5	19.5	18.5	27	20	17	22	20
12	26	27	27	18	18.5	19.5	19.5	32	19.5	16.5	22	20
13	29	27	26	18	18.5	23	20	28	18.5	5.0	21	20
14	26	27	25	18.5	18	24	22	25	18.5	11.5	22	19.5
15	26	27	23	19.5	21	26	22	24	18	22	27	19.5
16	25	27	23	22	23	23	26	26	18	19.5	24	20
17	25	27	22	25	25	23	28	27	18	23	23	21
18	26	28	23	26	32	22	25	27	20	18	20	18.5
19	27	28	22	27	23	21	25	29	19.5	17	21	18.5
20	27	27	21	27	22	21	26	37	18	17	21	18.5
21	28	27	22	26	20	21	27	32	18.5	18	18	20
22	26	26	20	26	21	21	26	34	23	18	17.5	21
23	25	25	20	27	24	21	26	32	21	18	19	21
24	25	26	20	26	22	21	26	27	18	17	21	19.5
25	26	26	21	25	23	21	25	25	19	17	20	22
26	25	27	20	25	25	22	25	30	17.5	17	21	21
27	25	26	20	26	24	22	28	23	17	22	19.5	25
28	25	26	19	26	23	21	24	19	21	20	19.5	22
29	26	24	19	25	22	21	24	-------	23	19	26	23
30	26	24	19	25	23	24	25	-------	20	18	27	24
31	26	24	-------	24	-------	26	26	-------	18.5	-------	19	-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	29	22	25.9	40.1	804	2,470
August	29	24	26.1	40.4	808	2,480
September	30	19	22.7	35.1	682	2,090
October	27	18	22.3	34.5	692	2,120
November	32	18	21.8	33.7	653	2,000
December	26	19.5	21.9	33.9	678	2,080
January	28	14	23.0	35.6	714	2,190
February	37	19	26.6	41.2	744	2,280
March	40	17	21.7	33.6	674	2,070
April	23	5.0	17.8	27.5	532	1,630
May	27	17	20.8	32.2	646	1,980
June	31	18.5	21.6	33.4	649	1,990
The year	40	5.0	22.7	35.1	8,280	25,400

NORTH WAILUA DITCH NEAR LIHUE

LOCATION.—Water-stage recorder 300 feet below intake diversion dam on the North Fork of Wailua River, 8 miles northwest of Wailua, and 8½ miles northwest of Lihue.

RECORDS AVAILABLE.—July 1932 to June 1933. Records from 1926 to June 1932 may be obtained from Lihue Plantation Office, Lihue.

DISCHARGE.—Maximum during year, 51 million gallons a day or 79 second-feet Oct. 19 (gage height, 1.52 feet); no flow Jan. 5, 6, Feb. 28, when water was turned out of ditch.

REMARKS.—Records good except those for estimated periods, which are poor. Regulated by gates.

Discharge, in million gallons, 1932–33

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	14	15.5	15.5	12.5	15	11	8.7	[a] 0.10	8.4	12	15.5	11.5
2	17.5	16.5	16.5	12.5	15.5	11	7.5	.10	4.6	12.5	14	12
3	15.5	17	17.5	13.5	14	12	6.6	.14	.40	12	14.5	11
4	16	23	17	12.5	13	12	6.1	.55	.40	12	12.5	13
5	[a] 21	23	14.5	12.5	13	12	1.8	.22	.71	12	12	12
6	20	16.5	14	12	15.5	12	[b] 4.8	3.0	.72	12.5	12	12
7	18	15.5	13.5	14	14.5	12		9.2	.31	12	11.5	10.5
8	18.5	17	18.5	13	13	12.5	[b] 9.5	9.2	.22	12.5	12	9.5
9	24	17.5	25	13.5	12.5	13		9.2	.14	13	12	9.5
10	19	16.5	22	12	12.5	12.5		7.3	5.1	12	13.5	9.2
11	18.5	20	19	12	13	12.5	[b] 9.9	6.2	6.6	11.5	13	9.2
12	19	20	19	12	13	12.5	[b] 10	7.1	6.6	12	12	9.0
13	22	21	18	12	13	13.5	[b] 8.4	6.8	7.6	12	11.5	9.5
14	20	19	16.5	12	12	13		6.8	9.2	12.5	9.5	9.5
15	21	19.5	16	13	14.5	11.5		6.8	9.2	10.5	9.8	9.5
16	19	19	16.5	15	15.5	9.5	[b] 6.7	6.8	9.5	12	9.5	9.6
17	17.5	20	15.5	23	9.5	9.8		5.4	9.5	13	9.2	9.8
18	18.5	19	16	24	9.5	9.8		4.6	9.5	12	9.2	10.5
19	22	18	15.5	28	6.6	9.8	[a] 6.8	4.6	9.8	12.5	9.8	12
20	21	16.5	14	22	8.4	9.8	2.7	4.9	9.2	12.5	9.5	12
21	21	17.5	14.5	25	9.2	10.5	.31	4.6	12.5	14	9.5	12.5
22	20	18	13.5	22	12	12.5	.31	4.0	12	14	10.5	12.5
23	17.5	17.5	13.5	22	10.5	12.5	.31	2.8	11.5	14	12	15
24	16.5	18	13.5	19	9.0	12	.31	6.8	12	13	12.5	14
25	21	18.5	13.5	17.5	9.5	9.8		9.5	11.5	13	12.5	13.5
26	18	20	13	19	9.2	9.8		9.8	11.5	13	12.5	13
27	16	19	13	20	9.2	9.5	[b] .2	.77	11.5	17	12.5	13.5
28	18	18	13	20	9.5	9.2		3.8	12	17.5	12.5	12
29	20	15.5	12.5	16.5	11.5	9.5		-------	12	16.5	12.5	13
30	19	18	12.5	16	11.5	9.2		-------	12	15.5	8.8	13
31	18	16.5	-------	15	-------	8.7		-------	12	-------	9.5	-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	24	14	18.9	29.2	587	1,800
August	23	15.5	18.3	28.3	566	1,740
September	25	12.5	15.8	24.4	472	1,450
October	28	12	16.5	25.5	513	1,570
November	15.5	6.6	11.8	18.3	355	1,090
December	13.5	8.7	11.1	17.2	345	1,060
January	-------	-------	4.76	7.36	147	452
February	9.8	.10	5.04	7.80	141	433
March	12.5	.14	7.68	11.9	238	731
April	17.5	10.5	13.0	20.1	390	1,200
May	15.5	8.8	11.5	17.8	358	1,100
June	15	9.0	11.4	17.6	343	1,050
The year	28	.10	12.2	18.9	4,460	13,700

[a] Partly estimated. [b] Estimated.

KANAHA DITCH NEAR LIHUE

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

RECORDS AVAILABLE.—August 1910 to June 1933.

DISCHARGE.—Maximum during year, 15.0 million gallons a day or 23.2 second-feet July 8 (gage height, 1.90 feet); no flow Jan. 3, when water was shut out of ditch.

1910–33: Maximum 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. Average, 13 years (1916–22, 1926–33), 9.24 million gallons a day (14.3 second-feet).

REMARKS.—Records good except those for estimated periods, which are fair. Intake 8½ miles above mouth of river at elevation of about 600 feet. Water used for irrigation of sugarcane. Regulated by head gates and spillways.

Discharge, in million gallons, 1932–33

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	8.9	[a]6	6.6	4.9	4.7	4.9	4.5	2.3	0.7	1.9	4.2	4.9
2	11		7.6	4.9	4.7	5.2	4.5	2.1	.6	2.9	4.2	5.2
3	11.5		7.9	5.2	4.7	5.2	4.2	1.9	.6	2.3	4.5	5.2
4	11		7.5	5.2	4.5	4.9	4.2	1.9	1.0	2.3	4.7	4.9
5	10	6.2	7.0	5.7	4.7	5.2	4.0	1.4	1.2	4.2	4.5	5.2
6	9.5	5.7	7.0	6.0	5.2	5.2	3.4	1.1	1.1	4.5	4.5	4.9
7	9.5	5.8	7.1	6.0	5.4	4.7	2.5	.7	1.0	4.2	4.5	4.7
8	10	6.3	7.6	5.7	5.2	4.7	2.1	.7	.7	4.2	4.5	4.7
9	10	6.9	6.8	5.7	4.9	4.9	1.9	.7	.7	4.2	4.2	4.7
10	9.5	6.4	6.1	5.7	4.9	4.9	1.3	1.0	.6	4.2	4.5	4.7
11	8.2	6.1	5.7	5.7	4.9	4.9	1.1	.7	.6	4.0	4.7	4.7
12	5.5	5.6	5.9	5.7	4.7	4.9	1.4	.8	.6	4.2	4.9	4.7
13	5.8	4.7	6.0	5.7	4.7	5.4	1.4	1.1	.5	4.2	4.9	4.7
14	5.4	7.5	4.9	6.0	4.7	5.4	2.9	1.3	.3	4.5	5.2	4.7
15	5.5	5.9	4.9	6.2	4.9	5.7	3.0	1.3	.3	4.5	5.2	4.9
16	5.4	5.6	4.9	6.5	4.9	4.9	3.7	1.4	.2	4.5	5.2	4.9
17	5.4	5.3	4.9	6.8	4.9	4.9	4.5	1.4	.2	4.2	4.9	4.9
18	5.6	6.3	4.9	5.7	5.4	4.9	3.8	1.4	.4	4.0	4.9	4.9
19	5.6	5.9	4.9	5.7	4.9	4.9	3.6	1.4	.4	4.0	5.2	4.9
20	5.8	6.0	4.9	5.7	5.2	4.5	4.2	2.1	.2	4.5	5.2	4.9
21	5.7	6.3	4.9	5.4	5.2	4.5	4.2	1.7	.1	4.5	4.9	4.9
22	5.5	5.8	4.9	4.9	5.2	4.5	4.0	1.9	.6	4.2	4.9	4.9
23	5.9	5.8	4.9	5.4	4.9	4.7	3.3	1.7	.5	4.5	4.9	4.9
24	5.8	6.1	4.7	5.2	4.9	4.9	2.7	1.4	.3	4.2	4.9	4.9
25	5.8	5.7	4.7	4.9	5.2	5.2	2.7	1.1	.4	4.2	4.9	4.9
26	6.8	5.9	4.7	5.2	5.2	5.2	2.5	1.3	.1	4.2	4.9	4.9
27	[a]6.5	5.7	4.9	5.2	4.7	5.4	3.1	1.3	.1	4.5	4.7	5.2
28		5.6	4.9	5.2	4.7	4.9	2.5	.7	1.9	4.2	4.9	4.9
29		5.7	4.9	4.9	4.9	4.9	2.9	-------	3.1	4.2	5.2	[b]4.9
30		7.9	4.9	4.7	5.2	5.2	2.5	-------	2.9	4.2	4.7	[a]4.9
31		6.6	-----	4.7	-----	4.9	2.5	-------	2.3	-------	4.7	------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	11.5	5.4	7.33	11.3	227	697
August	7.9	4.7	6.04	9.35	187	575
September	7.9	4.7	5.72	8.85	172	526
October	6.8	4.7	5.50	8.51	170	523
November	5.4	4.5	4.94	7.64	148	455
December	5.7	4.5	4.98	7.71	154	474
January	4.5	1.1	3.07	4.75	95.1	292
February	2.3	.7	1.35	2.09	37.8	116
March	3.1	.1	.78	1.21	24.2	74
April	4.5	1.9	4.01	6.20	120	369
May	5.2	4.2	4.78	7.40	148	455
June	5.2	4.7	4.89	7.57	147	450
The year	11.5	.1	4.47	6.92	1,630	5,010

[a] Estimated. [b] Partly estimated.

EAST BRANCH OF NORTH FORK OF WAILUA RIVER NEAR LIHUE

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 1933.

DISCHARGE.—Maximum during year, 2,120 million gallons a day or 3,280 second-feet Jan. 2 (gage height, 8.09 feet); minimum, 9.8 million gallons a day or 15.2 second-feet Oct. 12–15.

1912–33: Maximum, 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 3, 13, 1926. Average, 13 years (1920–33), 33.2 million gallons a day (51.4 second-feet).

REMARKS.—Records fair except those for estimated periods, which are poor. No diversions above station.

Discharge, in million gallons, 1932–33

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	13		15	10.5	13	24	196	63	[a] 70	21	15	22
2	15		14.5	10.5	13	28	581	37		38	14	21
3	17	[a] 18	16	11	12.5	45	155	33		28	14	22
4	15		16	11	12	26	121	28		21	22	21
5	13		14	10.5	11.5	24	60	26	[a] 170	19	19.5	30
6	14	17	13.5	10.5	14	22	48	24		19	16.5	29
7	13	15	13	10.5	22	21	40	22		17	37	93
8	13	23	16	10.5	14.5	19	35	22		17	22	48
9	19	19	41	10.5	12.5	17	30	22	[a] 65	17	19	37
10	15.5	15.5	56	10.5	11.5	16.5	28	[a] 65		17	105	28
11	22	45	27	10	12	15	24		[a] 36	16	[a] 80	32
12	17	22	18	10	11.5	15	22	[a] 42		15	52	26
13	32	28	35	10	11	42	24			16.5	28	24
14	19	21	21	10	11	70	22			19.5	[b] 37	22
15	21	21	16.5	9.8	14,5	115	24			[b] 22		21
16	17.5	34	16	10	22	44	55	[a] 36		[b] 17	[a] 46	21
17	15	28	14.5	14	79	37	54		[a] 26	[b] 29		21
18	16	33	14.5	19	392	33	31			[b] 15	[b] 24	17.5
19	30	24	14	24	76	28	43			[b] 14	33	17
20	22	21	13	32	38	30	59			[b] 14	33	17
21	46	24	16	27	28	24	58	[a] 55		15.5	22	17.5
22	21	17.5	13	21	28	22	45		36	17	21	17.5
23	19	17	12.5	22	179	21	45		33	17.5	19	22
24	16	22	12.5	17	73	22	43		22	15	17.5	17.5
25	23	21	12	15	40	22	35	[a] 34	22	14	17	21
26	17.5	21	12	14	54	27	37		21	14	16.5	21
27	15.5	17.5	11.5	16	35	23	84	[a] 120	19	16	16	34
28	15	19	11.5	17	39	22	40		34	16	15	24
29	19	16	11	14	26	28	40	-------	51	17.5	82	21
30	19	16	11	13	29	68	46	-------	33	16	58	21
31	[a] 17	16.5	-------	12.5	-------	103	45	-------	24	-------	24	-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	46	13	18.9	29.2	587	1,800
August	45	----------	21.4	33.1	664	2,040
September	56	11	17.6	27.2	528	1,620
October	32	9.8	14.3	22.1	443	1,360
November	392	11	44.5	68.9	1,330	4,100
December	115	15	34.0	52.6	1,050	3,230
January	581	22	70.0	108	2,170	6,660
February	----------	22	44.5	68.9	1,250	3,820
March	----------	19	56.7	87.7	1,760	5,390
April	38	14	18.4	28.5	550	1,690
May	105	14	32.8	50.7	1,020	3,120
June	93	17	26.2	40.5	786	2,410
The year	581	9.8	33.3	51.5	12,100	37,200

[a] Estimated. [b] Partly estimated.

KAPAHI DITCH NEAR KEALIA

LOCATION.—Water-stage recorder 500 feet below intake and 4½ miles west of Kealia.

RECORDS AVAILABLE.—April 1909 to May 1914, May 1915 to June 1933.

DISCHARGE.—Maximum during year, 129 million gallons a day or 200 second-feet Aug. 11, Sept. 9 (gage height, 2.13 feet); no flow occasionally, when water was shut out of ditch.

1909–14, 1915–33: Maximum, 233 million gallons a day or 361 second-feet Mar. 31, 1923 (gage height, about 3.15 feet); no flow occasionally, when water was shut out of ditch. Average, 15 years (1917–20, 1921–33), 7.62 million gallons a day (11.8 second-feet).

REMARKS.—Records good except those for extremely low stages and estimated periods, 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, 1932–33

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	4.3	3.2	4.3	1.9	1.9	0	0.3	2.9	4.0	0.15	6.8	a3.5
2	6.2	4.8	2.6	1.9	2.1	0	.25	3.2	2.7	.3	4.9	6.8
3	4.2	4.9	2.6	4.1	2.1	0	.15	2.4	.3	3.1	7.6	4.0
4	.55	8.2	2.9	4.3	1.9	0	0	1.9	.15	4.0	6.2	1.1
5	2.9	10	2.4	3.7	1.9	0	0	.4	.95	4.3	7.6	4.9
6	2.6	4.3	2.1	3.2	3.1	0	0	.4	.4	5.2	4.9	4.6
7	2.6	3.2	2.4	3.7	4.3	0	0	2.3	.4	6.2	3.4	3.2
8		9.6	2.4	3.3	2.8	0	0	7.8	.3	4.2	7.6	1.3
9	a3.9	4.9	27	1.9	2.6	1.4	0	7.7	.3	.9	6.8	1.3
10		5.2	39	3.2	2.4	.3	0	6.6	.4	2.4	6.9	1.5
11	a4.5	33	9.8	3.2	2.4	2.9	0	5.3	.4	3.2	4.4	2.9
12		9.0	3.4	2.6	2.4	4.6	0	.4	.3	3.4	5.5	10
13		10.5	2.1	2.6	2.4	13	0	.55	.3	2.4	.9	3.7
14	a6	5.2	3.4	1.5	4.2	6.7	0	.55	.3	.7	a.2	4.0
15		6.8	4.9	1.5	5.4	4.6	0	.55	.15	1.9		4.0
16		12	4.6	1.3	9.0	.3	0	.55	1.0	.4		4.0
17	a.7	4.9	4.6	4.0	17.5	.4	0	.4	5.9	2.8	a1.7	3.2
18		9.1	21.1	69	1.4	.4	0	.55	4.3	3.7		1.3
19		7.1	4.0	10	.4	.55	0	.55	.3	4.3		6.3
20	a6.5	4.6	4.0	8.7	.4	.7	0	.55	3.7	4.3	a6	5.2
21		5.5	5.5	8.8	.1	.7	0	.4	3.9	4.6		6.2
22		4.0	3.7	4.3	0	1.4	0	.4	4.0	3.8		6.2
23		3.7	3.6	5.1	0	.9	.08	.4	3.6	1.5		6.5
24		10.5	2.4	6.1	0	1.7	.4	.55	2.4	4.6		6.2
25	a4.3	7.4	2.1	4.2	0	1.7	.4	.4	1.8	4.6	a4.0	4.6
26		8.0	2.1	5.7	0	1.5	.4	.4	.3	4.9		5.2
27	4.0	6.5	1.9	5.8	0	1.7	.4	.4	.3	5.5		16
28	3.7	3.7	1.9	9.6	0	1.7	.3	1.25	.3	6.2		9.4
29	4.0	6.2	1.9	4.7	0	1.2	.3	-------	.3	6.5		8.7
30	4.9	5.5	2.1	2.4	0	.4	.4	-------	.15	6.2	a7	10.5
31	3.7	6.2	-------	2.1	-------	.55	2.4	-------	.15	-------		------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	----------	----------	4.05	6.27	125	385
August	33	3.2	7.35	11.4	228	699
September	39	1.9	5.26	8.14	158	484
October	10	1.3	4.27	6.61	132	406
November 1–21	17.5	.1	3.37	5.21	70.7	217
December 9–31	13	.3	2.14	3.31	49.3	151
January 1–3, 23–31	2.4	.08	.482	.746	5.78	18
February	7.8	.4	1.78	2.75	49.8	153
March	5.9	.15	1.41	2.18	43.8	134
April	6.5	.15	3.54	5.48	106	326
May	----------	----------	4.71	7.29	146	448
June	16	1.1	5.21	8.06	156	480
The year (329 days)	39	.08	3.86	5.97	1,270	3,900

a Estimated.

ANAHOLA RIVER NEAR KEALIA

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 1933.

DISCHARGE.—Maximum during year not determined, owing to faulty gage-height record; minimum, 1.9 million gallons a day or 2.9 second-feet Oct. 10–16. 1910, 1912–33: Maximum, 1,820 million gallons a day or 2,820 second-feet Jan. 25, 1930 (gage height, 10.32 feet); minimum, 1.4 million gallons a day or 2.2 second-feet Sept. 12–13, 1923. Average, 14 years (1919–33), 13.3 million gallons a day (20.6 second-feet).

REMARKS.—Records good for ordinary stages, poor for estimated periods and high stages. Anahola Ditch diverts water 3 miles above station for irrigation and domestic supply.

Discharge, in million gallons, 1932–33

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	2.3	2.2	2.3	2.1	3.1		26	31	6.2	7.1	4.9	a4.5
2	2.4	2.1	2.3	2.1	3.1		a200	10.5	20	15	4.6	5.5
3	2.5	2.2	2.3	2.1	3.1	a7.5	a28	8.5	66	10	4.8	5.8
4	4.0	2.3	2.3	2.1	3.1			7.5	63	7.1	4.8	5.8
5	2.4	3.2	2.1	2.0	2.8			7.2	a120	6.9	5.1	8.0
6	2.3	2.3	2.0	2.1	2.8		a11	6.9		6.9	4.8	6.2
7	2.3	2.1	2.1	2.1	13.5			6.5	53	6.4	5.1	24
8	2.3	2.9	2.7	2.1	3.7			6.5	26	6.4	4.9	7.1
9	2.4	3.7	18	2.1	3.0			6.9	19	9.4	5.5	6.6
10	2.3	2.2	38	2.0	2.8	a5.5		45	15.5	7.1		5.3
11	2.6	21	9.8	1.9	2.6			12.5	13.5	6.4		6.7
12	2.5	6.6	4.4	1.9	2.6		a8	16.5	12.5	6.8		5.8
13	3.8	4.1	15.5	1.9	2.5	a15		12	11	7.1		4.9
14	2.8	2.5	6.2	1.9	2.5	48		8.8	10	6.2	a5.5	4.8
15	4.0	4.0	3.0	1.9	4.6	141		8.2	9.9	6.4		5.8
16	2.8	8.8	2.6	2.0	5.8	38		31	9.5	6.0		4.8
17	2.3	2.8	2.5	2.2	34	17	a15	10.5	8.9	6.5		4.6
18	2.3	22	2.6	3.2	151	15		8.8	13.5	5.8		4.5
19	11.5	6.3	2.8	14	22	13	8.8	8.5	10	5.5		4.5
20	3.2	3.4	2.8	8.2	10.5	11	12	9.5	8.6	5.3		4.3
21	21	4.9	11	4.4	7.5	8.8	9.2	9.0	8.6	5.5	a4.6	4.3
22	3.0	3.0	3.0	3.8	9.2	7.8	9.2	10.5	11	6.2		4.5
23	2.4	2.5	2.4	6.3	a20	7.2	7.8	8.8	10.5	5.8		5.8
24	2.3	3.8	2.3	3.7		7.2	7.2	6.9	8.3	5.3		4.5
25	2.3	3.1	2.8	3.1		7.5	7.2	6.2	8.3	5.1		4.3
26	2.3	3.1	2.5	3.1		6.5	8.5	7.6	8.3	5.1	a4.3	4.6
27	2.2	2.5	2.3	3.4	a8	12	27	15	7.3	5.1		5.5
28	2.2	2.8	2.3	8.9		6.2	10.5	6.5	29	5.8		5.3
29	2.3	2.3	2.2	3.2		6.0	8.2	-------	14	5.1		4.6
30	2.5	2.3	2.1	2.8		41	12.5	-------	9.2	5.1	a12	4.5
31	2.3	2.4	-------	2.8	-------	48	17	-------	7.6	-------		------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	21	2.2	3.48	5.38	108	331
August	22	2.1	4.50	6.96	139	428
September	38	2.0	5.31	8.22	159	489
October	14	1.9	3.40	5.26	105	323
November	151	2.5	12.8	19.8	384	1,180
December	141	----------	17.2	26.6	532	1,630
January	----------	----------	18.5	28.6	572	1,760
February	45	6.2	11.9	18.4	333	1,020
March	----------	6.2	23.8	36.8	738	2,270
April	15	5.1	6.61	10.2	198	609
May	----------	----------	5.60	8.66	174	533
June	24	4.3	5.91	9.14	177	544
The year	----------	1.9	9.92	15.3	3,620	11,100

a Estimated.

ANAHOLA DITCH ABOVE KANEHA RESERVOIR, NEAR KEALIA

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

RECORDS AVAILABLE.—May 1915 to June 1933.

DISCHARGE.—Maximum during year, 72 million gallons a day or 111 second-feet May 13 (gage height, 4.45 feet); no flow occasionally, when water was shut out of ditch.

1915–33: Maximum 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. Average, 10 years (1921–25, 1927–33), 3.81 million gallons a day (5.89 second-feet).

REMARKS.—Records good except those for high stages and estimated periods, which are poor. 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, 1932–33

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	1.45	1.8	2.0	1.15	1.8	0	0	0	3.4	3.4		5.0
2	1.9	1.65	2.1	1.1		0	.05	0	5.4	13.5		3.3
3	3.8	1.9	2.7	1.3	1.8	0	0	0	2.2	5.2	a3.2	7.0
4	5.6	2.0	2.3	1.25	1.65	0	0	0	0	3.8		4.0
5	1.9	3.5	1.65	1.05	1.45	0	0	0	0	3.4		9.7
6	1.5	2.3	1.5	1.05	2.4	0	0	0	0	3.5	2.0	5.0
7	1.5	1.65	1.45	1.05	6.1	0	0	0	0	2.8	5.4	16
8	1.5	3.5	4.2	1.0	2.2	0	0	0	0	2.7	2.3	9.6
9	2.9	4.3	12	1.05	1.75	0	0	2.6	0	a4.3	5.9	
10	1.8	2.1	14.5	1.0	1.5	3.5	0	1.2	0		13.5	
11	4.3	7.3	10.5	.95	1.5	2.7	0	0	0		11	a5
12	2.3	5.8	6.4	.90	1.4	1.9	0	0	0	a3.2	7.5	
13	5.9	5.7	5.9	.85	1.25	6.1	0	0	0		6.1	
14	2.8	3.9	6.4	.90	1.3	.01	0	0	2.8		.17	
15	5.9	6.8	3.5	.90	1.9	0	0	0	3.5		.02	
16	3.4	7.6	2.8	.95	4.1	0	0	.01	3.0	a7.5	2.0	a3.4
17	2.1	4.5	2.4	2.2	8.8	0	0	0	2.9		.89	
18	2.0	10.5	2.5	6.2	6.3	0	0	0	10.5	2.6	.33	
19	6.2	9.4	2.4	6.8	0	0	0	0	7.6	2.2	4.4	
20	4.6	9.8	2.1	8.5	0	0	0	0	3.4	2.1	4.8	
21	6.6	10	7.5	a5.5	0	0	0	0	3.4		.85	a3.0
22	3.2	4.0	2.3		0	0	0	0	11.5	a4.0	2.5	
23	2.7	3.4	1.8		.01	0	0	0	10.5		2.8	
24	2.3	5.9	1.65		0	0	0	1.2	4.2		2.8	
25	3.0	4.5	2.5		0	0	0	3.0	6.0	a1.9	2.4	
26	2.1	3.8	1.75	a6	0	0	0	4.3	4.7		2.2	a6
27	1.75	4.0	1.5		0	0	0	7.0	3.4		2.1	
28	1.65	4.6	1.4		0	0	0	1.25	6.9	a5.5	1.9	
29	3.2	2.5	1.3		0	0	0	-------	.02		12	a3.5
30	3.4	2.2	1.25	a2.1	0	.01	0	-------	3.8		9.3	
31	2.9	2.7	-------		-------	0	0	-------	4.0	-------	3.0	-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	6.6	1.45	3.10	4.80	96.2	295
August	10.5	1.65	4.63	7.16	144	441
September	14.5	1.25	3.74	5.79	112	344
October	8.5	.85	3.01	4.66	93.4	287
November 1–18, 23	8.8	.01	2.58	3.99	49.0	150
December 10–14, 30	6.1	.01	2.37	3.67	14.2	44
January 2	.05	.05	.050	.077	.05	0
February 9–10, 16, 24–28	7.0	.01	2.57	3.98	20.6	63
March 1–3, 14–31	11.5	.02	4.91	7.60	103	316
April	13.5	-------	4.44	6.87	133	408
May	13.5	.02	4.01	6.20	124	381
June	16	-------	4.84	7.49	145	445
The year (269 days)	16	.01	3.85	5.96	1,030	3,170

a Estimated.

KA LOKO DITCH NEAR KILAUEA

LOCATION.—Water-stage recorder 60 feet below junction of Ka Loko and Moloaa Ditches, 400 feet above Ka Loko Reservoir, and 3½ miles southeast of Kilauea.
RECORDS AVAILABLE.—August 1932 to June 1933.
DISCHARGE.—Maximum during period, 108 million gallons a day or 167 second-feet Jan. 2 (gage height, 4.41 feet); minimum, 0.19 million gallons a day or 0.29 second-foot May 24.
REMARKS.—Records excellent except those for estimated periods, which are poor. No diversions.

Discharge, in million gallons, 1932–33

Day	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	-------	1.2	1.5	1.5	3.2	7.2	6.4	2.5	2.4	1.25	2.0
2	-------	1.2	1.4	1.35	3.0	48	3.0		3.9	1.25	1.8
3	-------	1.5	1.35	1.25	2.7	22	3.3	[a]3.2	3.5	1.25	1.9
4	-------	1.55	1.35	1.25	2.5	8.8	2.6		2.5	1.4	1.7
5	-------	1.35	1.25	1.2	2.3	6.9	1.7		2.3	1.4	2.1
6	-------	1.35	1.2	1.2	2.4	5.8	1.65	[a]11	2.2	1.35	1.95
7	-------	1.25	1.25	4.2	2.1	5.4	1.5		2.1	1.5	7.5
8	-------	2.1	1.25	1.75	2.1	4.6	1.9	4.6	2.1	1.4	3.7
9	-------	9.3	1.25	1.35	1.9	4.4	2.4	2.8	3.1	2.3	3.2
10	1.1	9.3	1.05	1.25	2.2	3.7	9.8	2.6	2.8	7.1	2.4
11	5.1	4.1	1.05	1.2	1.8	3.5	4.0	2.4	2.4	4.2	2.2
12	3.9	2.6	1.05	1.2	3.8	3.5	6.8	1.75	2.1	4.7	2.2
13	3.2	4.1	1.05	1.1	25	4.2	4.4	3.2	2.3	9.1	1.9
14	2.1	3.8	1.05	1.1	9.6	3.2	3.1	3.9	2.1	5.5	1.8
15	3.0	2.3	1.1	2.2	22	3.3	2.9	3.7	2.3	5.0	1.9
16	4.5	2.1	1.1	2.5	10.5	5.0	5.9	3.4	2.1	3.4	1.7
17	2.1	2.0	1.4	6.4	5.9	5.6	3.1	3.2	2.7	3.0	1.55
18	7.0	2.1	2.2	24	5.9	3.4	2.8	4.6	2.0	2.4	1.5
19	3.6	2.0	3.8	5.0	5.0	4.3	3.0	3.5	1.8	2.6	1.4
20	2.3	2.1	3.8	3.4	4.5	6.0	3.7	2.8	1.7	2.8	1.4
21	3.0	6.1	2.7	2.4	3.9	5.0	3.4	2.7	2.1	2.1	1.35
22	2.0	2.3	2.2	2.8	3.5	4.5	4.0	4.3	2.4	1.8	1.35
23	1.7	2.0	3.8	16.5	3.3	3.8	3.7	4.4	2.1	.9	2.2
24	2.1	1.8	2.0	6.3	3.4	3.4	2.8	2.7	1.9	1.35	1.1
25	2.0	2.1	1.55	4.0	3.6	3.5	2.5	2.6	1.7	1.7	1.2
26	1.9	1.8	1.55	5.4	3.7	4.0	3.1	2.5	1.1	1.8	1.4
27	1.7	1.7	1.5	3.9	3.8	10	6.3	2.2	1.55	1.65	2.1
28	1.55	1.65	1.9	5.0	2.7	4.9	3.0	7.2	2.6	1.55	2.0
29	1.35	1.4	1.25	3.3	2.8	4.4	-------	5.8	1.65	4.8	1.9
30	1.35	1.5	1.2	3.2	7.3	6.2	-------	3.5	1.25	4.7	1.5
31	1.35	-------	1.2	-------	8.3	7.4	-------	2.7	-------	2.1	-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
August 10–31	7.0	1.1	2.63	4.07	57.9	178
September	9.3	1.2	2.66	4.12	79.6	244
October	3.8	1.05	1.65	2.55	51.3	157
November	24	1.1	3.91	6.05	117	360
December	25	1.8	5.31	8.22	165	505
January	48	3.2	6.96	10.8	216	663
February	9.8	1.5	3.67	5.68	103	315
March	----------	1.75	4.13	6.39	128	393
April	3.9	1.1	2.22	3.43	66.8	205
May	9.1	.9	2.82	4.36	87.4	268
June	7.5	1.1	2.06	3.19	61.9	190
The period (325 days)	48	.9	3.49	5.40	1,130	3,480

[a] Estimated.

PUU KA ELE DITCH NEAR KILAUEA

LOCATION.—Water-stage recorder 100 feet above Puu Ka Ele Reservoir and 2 miles south of Kilauea.

RECORDS AVAILABLE.—August 1932 to June 1933.

DISCHARGE.—Maximum during period, 26 million gallons a day or 40 second-feet Nov. 23, May 13 (gage height, 1.81 feet); no flow for several periods during year.

REMARKS.—Records excellent. Regulated by wasteway 100 feet above station.

Discharge, in million gallons, 1932–33

Day	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	-------	2.9	2.5	2.5	4.9	2.5	4.3	3.6	3.7	2.9	4.0
2	-------	2.8	2.5	2.4	4.9	7.2	5.8	4.6	4.6	2.6	3.9
3	-------	3.1	2.4	2.2	4.3	.21	5.0	3.7	4.6	2.5	3.7
4	-------	3.1	2.4	2.2	3.8	0	5.2	2.7	3.6	2.7	3.6
5	-------	2.6	2.4	2.0	3.7	0	5.0	10	3.4	2.5	4.6
6	-------	2.5	2.3	2.0	3.8	0	4.6	6.2	3.3	2.4	4.2
7	-------	2.4	2.7	5.6	3.5	.10	4.5	3.1	3.0	2.2	9.1
8	-------	4.3	2.7	2.8	3.4	.19	4.4	2.2	3.0	2.1	5.9
9	-------	12.5	2.4	2.4	3.1	.15	4.4	1.65	6.3	2.7	4.9
10	-------	12	2.3	2.2	3.0	0	6.6	1.9	6.6	7.9	4.3
11	5.4	6.3	2.2	2.2	2.9	0	4.9	1.9	5.0	6.5	3.9
12	4.9	4.9	2.1	2.1	2.8	0	6.7	1.65	4.0	6.4	3.7
13	3.8	6.3	2.0	2.1	8.4	.11	5.5	4.3	3.8	8.9	3.4
14	3.4	5.6	2.1	2.1	5.6	0	4.5	4.7	3.7	6.3	3.1
15	4.5	4.2	2.2	2.2	8.8	0	4.2	4.4	3.9	5.7	3.1
16	5.7	3.9	2.2	2.5	5.9	.46	4.3	4.2	3.7	5.0	3.0
17	3.9	3.7	2.6	5.2	1.85	.84	3.9	3.9	4.9	4.7	2.8
18	9.6	3.8	4.4	15.5	.12	.23	4.2	5.2	3.5	5.1	2.6
19	5.4	3.8	5.8	8.2	0	.58	4.3	4.4	3.0	4.2	2.6
20	4.5	4.0	5.2	5.1	0	.95	4.7	3.9	2.9	4.6	2.5
21	5.8	7.8	4.2	4.2	0	.88	4.7	3.8	3.3	3.6	2.5
22	4.0	4.0	3.4	4.3	0	.75	4.9	5.5	3.6	3.3	2.6
23	3.6	3.3	7.2	15	0	.63	4.6	5.6	3.3	3.1	3.8
24	4.0	3.0	3.3	9.6	.01	.52	3.8	3.8	3.0	3.1	2.9
25	4.4	3.8	2.8	6.3	0	.52	3.6	3.8	2.9	2.9	3.1
26	4.3	3.0	2.9	7.2	.04	.57	5.1	3.4	2.6	3.3	3.3
27	3.6	2.8	2.7	5.6	.07	2.6	6.9	3.3	2.9	2.8	4.0
28	3.9	2.6	2.7	7.1	0	.45	4.0	6.9	3.9	2.7	3.7
29	3.3	2.6	2.4	5.2	0	.33	-------	6.7	3.4	7.2	3.1
30	[a] 2.8	2.6	2.4	5.0	2.0	1.35	-------	4.6	3.1	7.2	2.6
31	[a] 2.9	-------	2.2	-------	2.9	1.95	-------	3.8	-------	4.2	------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
August	9.6	2.8	4.46	6.90	93.7	288
September	12.5	2.4	4.34	6.71	130	400
October	7.2	2.0	2.95	4.56	91.6	281
November	15.5	2.0	4.77	7.38	143	439
December 1–18, 24, 26–27, 30–31	8.8	.01	3.47	5.37	79.8	245
January 1–3, 7–9, 13, 16–31	7.2	.10	1.05	1.62	24.1	74
February	6.9	3.6	4.80	7.43	134	412
March	10	1.65	4.17	6.45	129	397
April	6.6	2.6	3.75	5.80	112	345
May	8.9	2.1	4.24	6.56	131	403
June	9.1	2.5	3.68	5.69	110	339
The period (308 days)	15.5	.01	3.83	5.93	1,180	3,620

[a] Partly estimated.

HANALEI RIVER AT ELEVATION 625 FEET, NEAR HANALEI

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 1933.

DISCHARGE.—Maximum during year, 2,890 million gallons a day or 4,470 second-feet Feb. 27 (gage height, 6.65 feet); minimum, 10.0 million gallons a day or 15.5 second-feet Oct. 13, 14.

1914–33: Maximum, 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. Average, 15 years (1918–33), 53.9 million gallons a day (83.4 second-feet).

REMARKS.—Records good for ordinary stages; poor for extremely high and low stages. Hanalei tunnel diverts water from stream about 2 miles above station.

Discharge, in million gallons, 1932–33

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun
1	11.5	16.5	16	11.5	17	35	127	70	44	28	24	32
2	14	16.5	16	11.5	14.5	33	642	39	104	85	20	49
3	19.5	18	17	12	14.5	46	107	39	186	47	30	54
4	31	21	17.5	11	13.5	24	64	32	101	32	60	39
5	31	53	14.5	11	13	24	46	22	435	29	35	61
6	32	22	13.5	10.5	13.5	24	33	20	586	26	34	46
7	16.5	17	13	11	13	18.5	28	19	197	24	34	152
8	31	36	17.5	11	12	17	26	18.5	86	24	24	68
9	41	31	81	10.5	12	16	25	26	60	26	24	46
10	20	20	76	10.5	12	15.5	21	95	46	29	53	35
11	37	86	35	10.5	12	14.5	19.5	26	36	22	39	33
12	22	33	21	10.5	12	14.5	20	49	31	20	42	30
13	84	35	35	10	12	34	22	28	28	19	28	25
14	34	26	22	10.5	12	83	26	21	24	37	33	22
15	32	28	17	10.5	30	209	26	20	22	40	116	22
16	22	38	16	11	32	64	94	22	22	28	66	23
17	18.5	41	15.5	17	69	55	109	18.5	22	48	57	24
18	22	65	15.5	41	366	39	63	19.5	35	24	38	19
19	49	42	14.5	56	70	35	73	24	31	21	48	17.5
20	41	32	14	51	42	45	99	60	22	20	47	17
21	67	36	16	38	30	27	83	30	23	24	32	19.5
22	30	22	13.5	26	33	22	78	45	63	24	27	22
23	22	20	13	56	194	19.5	78	35	56	26	23	33
24	20	26	12.5	37	98	21	69	21	33	21	22	22
25	48	24	12.5	18.5	48	32	62	20	34	20	19.5	32
26	23	35	12	30	72	34	57	45	28	20	20	28
27	18.5	27	12	28	48	44	111	375	24	50	17.5	46
28	17.5	25	11.5	33	45	39	52	46	56	31	17	33
29	25	18	11.5	18	30	43	46	-------	83	31	89	30
30	26	18.5	11.5	17	43	175	57	-------	50	24	144	39
31	22	18.5	-------	15	-------	219	79	-------	36	-------	33	-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	84	11.5	29.9	46.3	928	2,850
August	86	16.5	30.5	47.2	947	2,910
September	81	11.5	20.4	31.6	614	1,880
October	56	10	21.1	32.6	655	2,010
November	366	12	47.8	74.0	1,430	4,400
December	219	14.5	49.1	76.0	1,520	4,670
January	642	19.5	78.8	122	2,440	7,500
February	375	18.5	45.9	71.0	1,290	3,950
March	586	22	84.0	130	2,600	7,990
April	85	19	30.0	46.4	900	2,760
May	144	17	41.8	64.7	1,300	3,980
June	152	17	37.3	57.7	1,120	3,430
The year	642	10	43.1	66.7	15,700	48,300

LUMAHAI RIVER NEAR HANALEI

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 1933.

DISCHARGE.—Maximum during year, 4,300 million gallons a day or 6,650 second-feet Feb. 12 (gage height, 7.12 feet); minimum, 17.8 million gallons a day or 27.5 second-feet May 9.

1914–17, 1920–33: Maximum (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. Average, 13 years (1920–33), 72.6 million gallons a day (112 second-feet).

REMARKS.—Records good for ordinary stages, poor for estimated periods and extremely high stages. No diversions. All records from Nov. 18, 1930, to June 30, 1932, have been revised in this paper.

Discharge, in million gallons, 1930–33

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1930–31												
1	253	238	48	133	35	33	33	32	26	25	22	21
2	330	113	83	50	32	278	32	30	126	111	22	21
3	168	76	97	45	31	99	32	27	100	40	22	21
4	88	50	65	42	30	55	32	27	43	27	22	21
5	80	41	42	49	30	42	37	27	48	27	21	20
6	57	170	39	143	30	39	32	26	31	37	21	20
7	44	52	38	68	157	43	40	26	27	42	30	20
8	48	41	35	49	102	41	52	26	26	31	30	19.5
9	38	35	32	48	49	36	34	30	37	26	32	19
10	38	92	32	43	45	55	33	34	44	25	74	19
11	80	180	90	37	113	65	45	27	34	24	44	19
12	102	352	38	34	213	42	88	26	27	24	68	18.5
13	100	80	34	32	70	37	126	25	25	24	34	18.5
14	49	58	37	31	46	36	66	31	25	23	60	18.5
15	40	70	65	30	42	35	42	27	25	23	36	18
16	37	52	270	31	38	42	35	34	24	25	30	38
17	33	67	74	31	87	110	36	28	24	24	28	40
18	32	95	51	31	797	74	40	28	24	23	27	20
19	45	86	39	30	551	46	32	36	24	169	27	18.5
20	58	60	46	29	84	46	31	29	27	320	27	18
21	37	52	51	29	56	62	29	26	25	42	26	17.5
22	42	60	46	29	55	44	26	34	25	29	25	29
23	52	42	50	36	52	45	25	35	24	27	24	33
24	39	38	38	44	46	44	25	58	24	25	25	23
25	32	62	36	40	44	39	25	52	23	24	24	33
26	30	44	37	31	50	38	24	32	23	24	24	61
27	30	42	53	30	43	34	24	39	23	23	23	42
28	29	37	42	33	38	34	24	29	23	22	23	48
29	32	37	42	135	35	76	23	-------	23	22	23	27
30	91	42	116	76	34	36	22	-------	30	22	22	27
31	195	38	-------	41	-------	34	32	-------	42	-------	22	-------

Discharge, in million gallons, of Lumahai River near Hanalei, 1930–33—Continued

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1931-32												
1	28	80	47	40	38	32	132	285	a 111	139	b 300	
2	22	193	74	36	238	43	62	407	86	86		b 65
3	19	672	274	51	436	320	47	111	76	86		
4	18	246	210	46	113	129	42	98	57	98	b 85	
5	22	62	112	36	62	216	39	225	a 71	119		
6	18.5	62	71	39	55	81	36	332	a 54	71		a 44
7	18	42	262	122	46	52	35	211	a 48	62	b 120	
8	24	39	219	51	55	48	34	111	a 52	66		b 36
9	22	69	70	51	83	50	33	364	a 46	76		
10	24	68	98	48	66	56	44	336	42	126		
11	35	66	86	51	51	57	42	150	39	131	b 70	
12	55	66	118	39	168	112	34	a 966	38	202		
13	159	50	62	34	62	129	49	a 219	38	81		
14	57	69	54	32	46	325	76	a 111	37	81		
15	37	54	66	34	51	612	42	a 76	58	62	b 100	b 28
16	29	612	66	34	86	174	35	62	46	51		
17	25	101	100	42	76	125	32	157	39	100		
18	22	66	104	40	50	118	42	66	36	51	b 50	
19	22	142	66	91	42	230	292	62	35	44		
20	49	130	47	51	36	193	260	62	34	42		
21	103	288	41	110	36	252	81	66	33	39		
22	157	147	71	96	47	a 125	52	50	32	136		
23	71	76	53	57	35	a 118	47	44	32	248		
24	41	147	139	71	32	a 76	69	105	32	147	b 75	b 24
25	34	62	108	190	32	b 60	57	144	32	110		
26	29	151	66	98	43	a 80	66	57	31	232		
27	28	76	57	52	32	66	72		31	71	b 190	
28	25	49	46	46	31	50	287	b 180	50	267		
29	24	42	42	39	29	43	492		71	109		b 26
30	55	37	43	35	32	85	76	-------	261	76	b 75	
31	33	35	-------	32	-------	76	280	-------	348	-------		-------
1932-33												
1		40	34	26	38	54		101	39	40	26	36
2	b 28	38	34	26	33	48	b 360	62	49	225	22	51
3		38	39	27	29	40		52	145	84	26	60
4		35	36	27	27	34		54	120	51	31	48
5	b 46	55	32	25	26	32	b 70	42		41	24	53
6		46	31	25	25	30		39	b 420	37	21	52
7		37	30	25	25	30		36		34	21	130
8	b 38	64	44	25	24	28	b 34	38		32	18.5	62
9		64	147	27	24	27		54	62	34	18.5	45
10		49	144	26	24	27		88	52	32	38	36
11	b 48	121	66	25	24	25		47	42	28	38	35
12		57	56	25	23	25		62	38	27	33	34
13	b 110	56	52	25	24	31	b 32	49	35	25	36	31
14		48	43	25	23	289		42	32	24	26	29
15		51	38	25	23	b 300		38	30	25	692	29
16	b 55	48	35	27	25		b 140	38	29	27	98	33
17		39	34	40	44			34	32	41	71	32
18		48	34	52	319	b 60	92	36	48	25	49	27
19		46	34	53	74		83	51	40	22	56	25
20	b 110	73	33	55	42		118	117	31	22	66	24
21		62	39	53	34		111	74	32	29	45	29
22		42	32	50	30	b 44	133	62	76	28	36	42
23	b 48	39	30	64	310		129	54	87	27	33	52
24		42	29	44	278		111	42	50	24	31	35
25		38	32	34	66	39	103	37	63	21	28	39
26	b 42	36	29	43	90	51	117	131	46	21	27	50
27		46	28	39	71	69	203	112	39	35	26	87
28		44	27	42	99	76	92	42	104	31	26	60
29		35	27	35	56	111	76	-------	86	32	35	54
30	50	40	26	35	57	b 220	71	-------	62	27	100	76
31	50	38	-------	33	-------		134	-------	46	-------	36	-------

a Partly estimated. b Estimated.

Discharge, in million gallons, of Lumahai River near Hanalei, 1930–33—Contd.

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
1930–31						
July	330	29	75.1	116	2,330	7,140
August	352	35	80.7	125	2,500	7,680
September	270	32	58.9	91.1	1,770	5,420
October	143	29	48.7	75.4	1,510	4,630
November	797	30	101	156	3,040	9,310
December	278	33	56.1	86.8	1,740	5,340
January	126	22	38.0	58.8	1,180	3,610
February	58	25	31.5	48.7	881	2,700
March	126	23	33.9	52.5	1,050	3,230
April	320	22	44.3	68.5	1,330	4,080
May	74	21	30.3	46.9	938	2,880
June	61	17.5	25.6	39.6	769	2,360
The year	797	17.5	52.1	80.6	19,000	58,400
1931–32						
July	159	18	42.1	65.1	1,310	4,010
August	672	35	129	200	4,000	12,300
September	274	41	95.7	148	2,870	8,810
October	190	32	57.9	89.6	1,790	5,510
November	436	29	73.6	114	2,210	6,780
December	612	32	133	206	4,130	12,700
January	492	32	96.4	149	2,990	9,170
February	966	44	187	289	5,420	16,600
March	348	31	64.4	99.6	2,000	6,130
April	267	39	107	166	3,210	9,850
May	----------	----------	101	156	3,140	9,640
June	----------	----------	34.5	53.4	1,040	3,180
The year	966	18	93.1	144	34,100	105,000
1932–33						
July	----------	----------	54.6	84.5	1,690	5,200
August	121	35	48.9	75.7	1,520	4,650
September	147	26	43.2	66.8	1,300	3,970
October	64	25	34.9	54.0	1,080	3,320
November	319	23	66.2	102	1,990	6,100
December	----------	25	81.4	126	2,520	7,740
January	----------	----------	111	172	3,440	10,600
February	131	34	58.4	90.4	1,630	5,010
March	----------	29	103	159	3,200	9,810
April	225	21	38.4	59.4	1,150	3,530
May	692	18.5	59.2	91.6	1,830	5,630
June	130	24	46.5	71.9	1,400	4,280
The year	----------	18.5	62.3	96.4	22,800	69,800

HANAKAPIAI STREAM NEAR HANALEI

LOCATION.—Water-stage recorder 1½ miles above mouth of stream and 6 miles west of Hanalei.

DRAINAGE AREA.—1.6 square miles.

RECORDS AVAILABLE.—December 1931 to June 1933.

DISCHARGE.—Maximum during year, 674 million gallons a day or 1,040 second-feet Mar. 6 (gage height, 4.83 feet); minimum, 2.7 million gallons a day or 4.2 second-feet June 20, 21.

1931–33: Maximum, that of Mar. 6, 1933; minimum, that of June 20, 21, 1933.

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

Discharge, in million gallons, 1932–33

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	4.1	5.9	4.4	3.6	6.1		10	14.5	3.4	5.0	3.7	2.9
2	4.2	5.1	4.3	3.5	4.8	a5.5	25	8.7	11.5	45	3.4	3.1
3	6.6	27	5.0	3.5	3.7		8.6	7.9	42	13	3.3	3.1
4	14	26	6.5	3.5	3.4		5.4	8.1	28	6.9	3.2	2.9
5	9.3	9.8	4.7	3.5	3.4	a4.0	4.6	5.0	129	5.5	3.0	2.9
6	6.4	7.1	4.2	3.4	3.3		4.0	4.4	162	5.0	2.9	3.1
7	6.0	5.6	4.1	3.8	3.2	3.4	3.8	4.2	59	4.7	2.9	10.5
8	6.0	21	5.0	3.5	3.2	3.4	3.6	5.5	16.5	4.3	2.9	5.0
9	5.4	17	26	3.4	3.0	3.3	3.4	14.5	9.0	4.7	3.1	3.4
10	5.0	8.5	16.5	3.5	3.0	4.5	3.4	5.4	7.4	4.6	8.9	3.2
11	5.5	20	7.4	3.4	2.9	3.9	3.2	5.3	6.0	3.9	22	3.0
12	5.6	8.8	9.4	3.4	2.9	3.4	3.2	11	5.4	3.7	11	2.9
13	32	6.9	7.3	3.3	2.9	3.4	3.1	6.8	5.0	3.6	6.0	2.9
14	9.2	6.3	6.0	3.3	2.9	94	3.0	6.0	4.7	12	5.1	2.9
15	6.6	5.6	4.8	3.3	2.8	95	11	4.4	4.3	4.1	21	2.9
16	8.6	5.6	4.4	3.4	2.9	14	98	6.7	4.1	3.7	8.0	2.9
17	5.6	6.0	4.2	5.1	17.5	7.6	22	4.8	5.9	4.3	8.6	2.9
18	9.4	6.0	4.2	5.3	65	6.2	11.5	4.1	16	3.8	4.8	2.9
19	35	5.9	4.2	4.6	11.5	6.0	8.1	7.0	11	3.5	5.0	2.8
20	22	25	4.1	4.6	5.6	4.8	19	33	5.8	3.4	10	2.8
21	24	12.5	4.1	5.2	4.3	4.2	18.5	14	8.1	4.3	5.4	2.9
22	8.8	6.8	4.0	8.1	3.8	3.8	24	6.9	9.8	4.8	4.0	3.8
23	6.6	6.0	3.8	6.0	a50	3.6	37	5.4	14.5	3.9	3.6	6.5
24	5.6	6.3	3.7	4.2		3.5	26	4.4	7.3	3.5	3.4	4.2
25	7.8	5.9	4.2	3.6		4.1	20	3.9	16	3.4	3.2	3.2
26	6.0	5.5	3.9	3.4	a13	6.9	18.5	3.7	8.9	3.2	3.1	4.4
27	5.0	5.1	3.7	3.3		14.5	44	3.5	5.5	3.2	3.0	18
28	5.1	6.0	3.7	3.3		21	18.5	3.4	31	3.2	3.0	7.4
29	9.0	4.7	3.6	3.4		27	11	-------	18	4.1	3.1	5.6
30	6.3	4.7	3.6	4.1	a8	23	7.9	-------	8.3	4.0	3.2	21
31	8.3	4.8	-------	3.7	-------	13	27	-------	5.5	-------	3.0	-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	35	4.1	9.65	14.9	299	918
August	27	4.7	9.59	14.8	297	913
September	26	3.6	5.83	9.02	175	537
October	8.1	3.3	3.97	6.14	123	378
November	65	2.8	11.0	17.0	330	1,010
December	95	3.3	13.1	20.3	406	1,250
January	98	3.0	16.3	25.2	506	1,550
February	33	3.4	7.59	11.7	212	652
March	162	3.4	21.6	33.4	669	2,050
April	45	3.2	6.08	9.41	182	559
May	22	2.9	5.70	8.82	177	543
June	21	2.8	4.87	7.54	146	448
The year	162	2.8	9.65	14.9	3,520	10,800

a Estimated.

HANAKOA STREAM NEAR HANALEI

LOCATION.—Water-stage recorder three-quarters of a mile above mouth of stream and 7½ miles west of Hanalei.

DRAINAGE AREA.—1.1 square miles.

RECORDS AVAILABLE.—December 1931 to June 1933.

DISCHARGE.—Maximum during year, 289 million gallons a day or 447 second-feet Mar. 6 (gage height, 4.20 feet); minimum, 0.2 million gallons a day or 0.3 second-foot Nov. 10–17.

1931–33: Maximum, that of Mar. 6, 1933; minimum, that of Nov. 10–17, 1932.

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

Discharge, in million gallons, 1932–33

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	0.3	0.6		0.4	0.9	1.7		3.8	1.0	1.2	0.5	0.4
2	.3	.5		.3	.6	1.4	[a] 5.5	2.8	4.1	17	.4	.4
3	.6	4.3		.3	.4	1.1		2.6	19	4.5	.4	.4
4	.9	5.8		.3	.4	.9		2.6	13	2.2	.4	.4
5	2.4	1.9	[a] 0.5	.3	.4	.8		1.7	47	1.7	.4	.4
6	1.0	1.0		.3	.3	.6	[a] 2.2	1.3	68	1.3	.4	.4
7	.6	.7		.3	.3	.6		1.2	29	1.1	.4	1.0
8	.5	4.4		.3	.3	.5		1.8	7.2	1.0	.4	
9	.5	2.9	[a] 5.5	.3	.3	.5		4.4	3.9	1.1	.5	[a] .5
10	.4	1.3		.3	.2	1.0	[a] 1.2	1.5	2.9	.9	1.7	
11	.5	4.1		.3	.2	.7		2.1	2.1	.7	11.5	
12	.5	[a] 1.2	[a] .8	.3	.2	.5		4.5	1.8	.7	4.1	
13	6.3			.3	.2	.7		2.4	1.5	.6	1.5	
14	1.3			.3	.2	41		2.2	1.3	1.7	.9	
15	.7			.3	.2	[b] 39		1.4	1.1	.7	4.7	
16	1.1	[a] .6	[a] .5	.4	.2	5.7		2.0	1.0	.6	1.8	[a] .4
17	.6			.5	7.5	2.5		1.2	1.2	.7	2.1	
18	.9		.5	.6	33	1.8	[a] 4.1	1.1	4.2	.6	1.0	
19	9.2		.5	.5	4.2	1.5		1.5	2.8	.5	.9	
20	4.8	[a] 4.0	.4	.5	1.7	1.2		9.9	1.4	.5	2.6	
21	4.1		.4	.6	1.1	.9		3.9	1.9	.6	1.3	
22	1.4		.4	1.3	.8	.8		2.1	2.4	.7	.8	
23	.9	[a] .8	.4	.9	34	.7	[a] 8	1.4	3.9	.6	.6	
24	.6		.4	.5	14.5	.7		1.1	1.9	.5	.5	[a] .5
25	.8		.4	.4	2.8	.9	6.0	.9	4.1	.5	.5	
26	.6		.4	.3	3.5	1.6	7.4	.8	2.5	.4	.5	
27	.5		.4	.3	3.1	3.1	16	.7	1.4	.4	.4	
28	.5	[a] .6	.4	.3	8.5	6.8	6.4	.6	6.0	.4	.4	[a] 2.6
29	1.0		.4	.3	2.4	8.7	3.9	-------	4.4	.6	.4	
30	.6		.4	.4	1.9	[a] 6	2.8	-------	2.1	.5	.4	
31	.9	-------		.4	-------		10.5	-------	1.5	-------	.4	-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	9.2	0.3	1.46	2.26	45.3	139
August	----------	----------	1.55	2.40	48.1	148
September	----------	.4	.84	1.30	25.1	77
October	1.3	.3	.41	.63	12.8	39
November	34	.2	4.14	6.41	124	381
December	41	.5	4.51	6.98	140	429
January	16	----------	4.46	6.90	138	425
February	9.9	.6	2.27	3.51	63.5	195
March	68	1.0	7.92	12.3	246	754
April	17	.4	1.48	2.29	44.5	137
May	11.5	.4	1.38	2.14	42.8	131
June	----------	----------	.74	1.14	22.2	68
The year	68	.2	2.61	4.04	952	2,920

[a] Estimated. [b] Partly estimated.

KALALAU STREAM NEAR HANALEI

LOCATION.—Water-stage recorder 2 miles above mouth and 9 miles southwest of Hanalei.
DRAINAGE AREA.—2.6 square miles.
RECORDS AVAILABLE.—November 1931 to June 1933.
DISCHARGE.—Maximum during year, 66 million gallons a day or 102 second-feet Mar. 6 (gage height, 2.87 feet); minimum, 2.3 million gallons a day or 3.6 second-feet Jan. 13–15.

1931–33: Maximum, 72 million gallons a day or 111 second-feet Feb. 25, 1932 (gage height, 3.00 feet); minimum, that of Jan. 13–15, 1933.
REMARKS.—Records good for ordinary stages; poor for high stages. No diversions.

Discharge, in million gallons, 1932–33

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	3.8	3.1	3.0	2.7	2.5	2.8	2.9	4.1	2.7	2.6	2.6	2.7
2	3.8	3.1	3.0	2.7	2.5	2.7	3.1	3.7	4.0	6.0	2.6	2.7
3	3.8	3.3	3.0	2.7	2.5	2.7	2.9	3.5	16	5.9	2.6	2.8
4	3.8	3.9	3.0	2.7	2.5	2.7	2.7	3.3	17.5	4.0	2.6	2.8
5	4.0	3.4	3.0	2.7	2.5	2.6	2.6	3.1	17	3.4	2.6	2.8
6	3.9	3.2	2.9	2.7	2.5	2.4	2.5	2.9	34	3.1	2.6	2.8
7	3.9	3.1	2.9	2.7	2.5	2.4	2.4	2.8	19.5	2.9	2.6	2.9
8	3.8	3.3	2.9	2.7	2.5	2.4	2.4	2.9	10.5	2.8	2.6	2.9
9	3.8	3.3	3.0	2.7	2.5	2.4	2.4	3.4	6.3	2.8	2.7	2.9
10	3.8	3.2	3.0	2.6	2.5	2.5	2.3	2.9	4.7	2.7	2.8	2.9
11	3.8	3.3	2.9	2.6	2.5	2.4	2.3	3.1	3.9	2.7	4.4	2.8
12	3.8	3.2	3.0	2.6	2.5	2.4	2.3	4.0	3.3	2.7	3.7	2.8
13	4.0	3.1	3.0	2.6	2.5	2.4	2.3	3.7	3.1	2.7	3.1	2.8
14	3.9	3.1	3.0	2.6	2.5	5.3	2.3	3.5	2.9	2.7	2.8	2.8
15	3.8	3.1	2.9	2.6	2.5	13	2.4	3.1	2.8	2.7	3.1	2.7
16	3.8	3.1	2.8	2.6	2.6	7.1	6.9	2.9	2.7	2.6	2.8	2.7
17	3.6	3.1	2.8	2.6	4.1	3.9	4.4	2.8	2.7	2.6	2.8	2.7
18	3.6	3.1	2.8	2.6	16	3.1	3.1	2.7	3.2	2.6	2.7	2.7
19	4.0	3.1	2.8	2.6	6.5	2.9	2.9	2.7	2.9	2.6	2.7	2.7
20	4.4	3.1	2.8	2.6	3.4	2.7	2.9	3.1	2.7	2.6	2.9	2.7
21	3.9	3.1	2.8	2.6	3.1	2.6	3.1	2.9	2.7	2.6	2.8	2.8
22	3.8	3.1	2.8	2.6	2.8	2.5	3.8	2.7	2.7	2.6	2.7	2.9
23	3.6	3.1	2.8	2.6	8.0	2.5	8.1	2.7	2.8	2.6	2.7	2.9
24	3.3	3.1	2.8	2.6	9.2	2.4	8.1	2.6	2.7	2.6	2.7	2.9
25	3.3	3.1	2.8	2.6	4.3	2.4	6.3	2.5	2.8	2.6	2.7	3.0
26	3.2	3.1	2.8	2.6	3.5	2.4	5.8	2.5	2.8	2.6	2.7	3.1
27	3.2	3.1	2.8	2.6	3.2	2.4	9.1	2.5	2.6	2.6	2.7	3.1
28	3.2	3.0	2.8	2.6	3.9	3.3	7.9	2.4	3.0	2.6	2.7	3.1
29	3.2	3.0	2.8	2.5	3.2	3.5	5.4	------	2.9	2.6	2.7	3.1
30	3.2	3.0	2.8	2.5	3.0	3.8	4.0	------	2.7	2.6	2.7	3.7
31	3.2	3.0	------	2.5	------	3.1	6.2	------	2.7	------	2.7	------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	4.4	3.2	3.68	5.69	114	350
August	3.9	3.0	3.16	4.89	97.9	300
September	3.0	2.8	2.88	4.46	86.5	265
October	2.7	2.5	2.62	4.05	81.2	249
November	16	2.5	3.81	5.89	114	351
December	13	2.4	3.28	5.07	102	312
January	9.1	2.3	4.06	6.28	126	386
February	4.1	2.4	3.04	4.70	85.0	261
March	34	2.6	6.22	9.62	193	592
April	6.0	2.6	2.96	4.58	88.7	272
May	4.4	2.6	2.81	4.35	87.1	267
June	3.7	2.7	2.87	4.44	86.2	265
The year	34	2.3	3.46	5.35	1,260	3,870

ISLAND OF OAHU

RIGHT BRANCH OF NORTH FORK OF KAUKONAHUA STREAM NEAR WAHIAWA

LOCATION.—Water-stage recorder 200 feet upstream from intake of Wahiawa Water Co.'s tunnel 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 January 1933.

DISCHARGE.—Maximum during period, 1,160 million gallons a day or 1,790 second-feet Jan. 1 (gage height, 9.63 feet); minimum, 0.3 million gallons a day or 0.5 second-foot Oct. 14, 15.

1913–33: Maximum, that of Jan. 1, 1933; minimum, 0.09 million gallons a day or 0.15 second-foot Mar. 22, 1926. Average, 15 years (1915–24, 1926–32), 7.95 million gallons a day (12.3 second-feet).

REMARKS.—Records good for ordinary stages, poor for high stages and estimated periods. No diversions above station. Gage-house well was washed away Jan. 1.

Discharge, in million gallons, 1932–33

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
1		3.3	1.8	0.7	1.1	2.1	79
2		2.9	2.6	.7	1.0	68	-------
3	[a] 3.7	4.5	4.3	.7	.9	[a] 65	-------
4		17	4.0	.6	.8		-------
5	[b] 2.8	12		.6	.8	5.2	-------
6	[b] 2.5	10.5	[a] 3.4	.6	6.1	3.9	-------
7	[b] 2.4	3.7		.6	1.7	3.6	-------
8	[b] 8.6	8.6	10.5	.7	.9	3.0	-------
9	7.8	3.5	40	.6	.7	2.8	-------
10	3.7	4.5	11.5	.5	.8	2.5	-------
11	5.4	25	4.0	.5	11	2.4	-------
12	3.2	4.3	4.0	.4	9.1	4.1	-------
13	15.5	4.0	2.9	.4	2.1	14.5	-------
14	3.2	3.7	2.5	.4	1.3	13.5	-------
15	3.7	2.9	2.3	.4	1.0	30	-------
16	2.9	2.6	2.0	.7	24	58	-------
17	2.4	19	1.8	1.8	29	9.2	-------
18	13	13.5	1.7	2.3	5.2	4.3	-------
19	5.4	3.8	1.5	28	3.8	4.3	-------
20	12.5	5.4	1.4	9.8	3.8	6.6	-------
21	10.5	5.5	1.4	1.9	2.4	3.5	-------
22	13	3.2	1.3	4.0	1.9	3.0	-------
23	4.0	2.8	1.3	5.3	2.6	2.7	-------
24	16	4.2	1.2	2.6	18	8.0	-------
25	6.2	3.7	1.0	1.4	2.7	5.0	-------
26	3.7	2.8	1.0	8.5	3.8	4.8	-------
27	3.3	2.7	.9	7.7	2.7	7.8	-------
28	10	2.4	.8	5.7	3.5	3.5	-------
29	11.5	2.0	.8	2.4	2.8	5.5	-------
30	5.1	7.2	.8	2.0	3.8	19	-------
31	4.3	2.4	-------	1.3	-------	89	-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	16	2.4	6.37	9.86	197	606
August	25	2.0	6.25	9.67	194	594
September	40	.8	3.98	6.16	120	367
October	28	.4	3.03	4.69	93.8	288
November	29	.7	4.98	7.71	149	458
December	89	2.1	16.8	26.0	520	1,600
The period (184 days)	89	.4	6.92	10.7	1,270	3,190

[a] Estimated. [b] Partly estimated.

LEFT BRANCH OF NORTH FORK OF KAUKONAHUA STREAM NEAR WAHIAWA

LOCATION.—Water-stage recorder 100 feet upstream from intake of Wahiawa Water Co.'s tunnel just below confluence of 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 1933.

DISCHARGE.—Maximum during year, 5,400 million gallons a day or 8,360 second-feet Jan. 1 (gage height, determined from flood mark on well, 11.7 feet); minimum, 0.4 million gallons a day or 0.6 second-foot Oct. 13–15.

1913–33: Maximum, that of Jan. 1, 1933; minimum, less than 0.1 million gallon a day or 0.2 second-foot June 15, 1931. Average, 16 years (1915–24, 1926–33), 11.9 million gallons a day (18.4 second-feet).

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

Discharge, in million gallons, 1932–33

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	5.2	6.7	3.8	1.5	2.0	3.4	a110	35	6.2	a 25		a 3.1
2	6.4	6.0	7.7	1.5	2.0	79		7.7	5.7			
3	8.4	13.5	11	1.4	1.9	158	a 9	6.2	76	a 3.9		a22
4	5.5	36	11	1.2	1.8	9.1		5.4	34			
5	4.2	20	9.8	1.0	1.6	6.0		4.7	30		a 2.4	15
6	4.0	18.5	4.0	1.4	6.5	4.7		4.0	61			5.7
7	4.0	6.7	3.5	1.8	2.3	4.2	a 5.5	3.6	17.5			22
8	6.8	22	14.5	2.2	1.6	3.6		4.7	9.3			6.5
9	18.5	7.4	86	1.0	1.5	3.4		15	7.4			8.0
10	11.5	14.5	18.5	.7	1.6	3.2		51	8.7	a 2.8	a 1.6	19.5
11	14	34	8.1	.6	15	a 5		18.5	6.2			6.7
12	6.0	8.4	8.4	.4	21			9.9	5.4			4.2
13	37	12.5	5.5	.4	3.4		a 4.4	16	5.7			3.4
14	6.7	10.5	4.8	.4	2.3			10.5	4.7			3.2
15	7.7	6.7	4.2	.4	2.0	a 3.9		6.2	4.2			3.1
16	5.8	5.5	4.0	3.5	32			6.4	4.0	a 4.5	a 2.6	2.9
17	4.2	25	3.8	7.3	35		a 19	7.1	3.6			2.2
18	25	20	3.1	4.9	6.2			30	3.4			1.9
19	10.5	6.4	3.1	37	7.2			22	3.6			1.8
20	34	9.7	2.9	18	5.1			33	3.1	a 2.5	a 1.9	1.5
21	28	9.9	2.9	3.8	3.2	a 7	a 12	17	3.8			2.8
22	29	5.2	2.6	12	2.9			8.0	6.2	a 1.7	1.6	6.6
23	7.8	5.5	2.7	6.6	3.9		8.4	6.2	6.0			3.3
24	27	16	2.4	4.0	25		10.5	5.4	3.4	1.5		2.9
25	13.5	17	2.0	2.9	3.6		9.2	5.2	4.2		a 2.9	9.5
26	6.7	10	2.0	4.1	9.9	a 10	6.8	38	3.9	a 1.8		4.5
27	5.8	8.5	1.8	6.5	5.0		6.0	66	2.5			14
28	10	5.0	2.0	13	4.2		5.4	7.7	2.3	a 7	a 1.8	3.2
29	51	4.2	1.6	3.6	3.5		5.2	-------	27			6.2
30	11	14.5	1.5	3.1	6.0	a 30	30	-------	60	a 3.5	a 3.0	5.9
31	12.5	4.8	-------	2.3	-------	a 165	76	-------		-------		-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	51	4.0	13.8	21.4	428	1,310
August	36	4.2	12.6	19.5	391	1,200
September	86	1.5	7.97	12.3	239	734
October	37	.4	4.79	7.41	148	456
November	35	1.5	7.31	11.3	219	673
December	-------	3.2	19.4	30.0	601	1,840
January	-------	-------	18.1	28.0	562	1,730
February	66	3.6	16.1	24.9	450	1,380
March	76	2.3	15.5	24.0	479	1,470
April	-------	1.5	3.96	6.13	119	365
May	-------	-------	2.31	3.57	71.5	219
June	-------	1.5	7.22	11.2	217	665
The year	-------	.4	10.8	16.7	3,920	12,000

a Estimated.

PUHAWAI STREAM AT LUALUALEI, NEAR WAIANAE

LOCATION.—Duplex water-stage recorder in Lualualei Valley, 1 mile north of McCandless ranch house and 5 miles northeast of Waianae.

DRAINAGE AREA.—0.6 square mile.

RECORDS AVAILABLE.—September 1930 to June 1933.

DISCHARGE.—Maximum during year, 19 million gallons a day or 29 second-feet Feb. 13 (gage height, 2.16 feet); minimum, 0.04 million gallons a day or 0.06 second-foot Nov. 13, 14.

1930–33: Maximum, 60 million gallons a day or 93 second-feet Feb. 21, 1932 (gage height, 3.58 feet); minimum, 0.01 million gallons a day or 0.02 second-foot Dec. 19–20, 1931, Jan. 11, 1932.

REMARKS.—Records good for ordinary stages, poor for estimated periods. Continuous rainfall records are obtained at station.

Discharge, in million gallons, 1932–33

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1		a 0.10	a 0.10			0.12	a 1.0	0.14	0.14	0.17	0.10	
2	a 0.12	b .10	.09		a 0.06	.12		.12	.17	.19	.10	a 0.12
3			.08			.12		.14	2.9	.21	.10	
4			.09	0.07	.07	.12		.12	b 2.6	.17	.10	
5	a .17	a .13	.10		.06	.12	a .3	.10		.16	.10	
6			.10		.07	.12		.10	a 2.5	.16	a .16	a .06
7			.10		.06	.12		.10		.16		
8	a .13		.10	a .06	.06	.12		.56	a .36	.15	a .2	
9			.20		.06	.12		.45	a .29	.17		
10		a .08	.19		.06	.15	a .19	.22	.21	.16		
11	b .12		.15	b .06	.06	.13		.17	.20	.17		a .15
12	.12		.16	.06	.05	.12	.16	.95	.18	.16		
13	.18		.10	.06	.05	.12	.15	8.5	.17	.15	a .19	
14	.12		.08	.06	.05	.24	.14	2.8	.16	.15		
15	.10	a .04	.08	.06	.05	.15	.16	.97	.16	.13		.10
16	.09		.07		.51		.20	.64	.15	.13		.12
17	.07	.20	.06	a .06	6.6		.14	.46	.16	.13		.10
18			.07		1.1		.13	.34	.16	.12		.09
19			.06		.49	a .12	.12	.26	.16	.12		.09
20	a .08	a .16	.06		.26		.12	.23	.16	.13		.09
21			.06		.18		.12	.22	.18	.12		.14
22			.06		.15		.13	.19	.19	.12	a .16	.12
23		a .13		a .08	.15		.13	.16	.21	.12		.10
24					.21		.12	.14	.17	.12		.10
25	a .12				.14		.10	.13	.17	.12		.10
26			a .05		.17	a .13	.12	.14	.17	.12		.10
27		a .11			.15		.12	.14	.15	.10		.12
28					.16		.12	.14	.16	.10		.10
29	a .10				.15		.12	------	.22	.10	a .13	.12
30				a .07	.14		.12	------	.18	.10		.17
31			------		------		.14	------	.16	------		------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	----------	----------	0.115	0.178	3.55	11
August	----------	----------	.111	.172	3.45	11
September	0.20	----------	.085	.132	2.56	8
October	----------	----------	.069	.107	2.15	7
November	6.6	0.05	.381	.589	11.4	35
December	----------	----------	.129	.200	4.00	12
January	----------	.10	.223	.345	6.92	21
February	8.5	.10	.665	1.03	18.6	57
March	----------	.14	.574	.888	17.8	55
April	.21	.10	.140	.217	4.21	13
May	----------	.10	.156	.241	4.83	15
June	----------	----------	.110	.170	3.29	10
The year	8.5	----------	.227	.351	82.8	255

a Estimated. b Partly estimated.

PEARL HARBOR SPRINGS AT WAIAWA, NEAR PEARL CITY

LOCATION.—Water-stage recorder on right bank of Waiawa Stream, at rear of Oahu Sugar Co.'s pumping plant no. 9, 1.7 miles from Pearl City and 13.2 miles northwest of Honolulu.

RECORDS AVAILABLE.—March 1931 to June 1933.

DISCHARGE.—Extremes not determined because extremes at gaging-station site are caused by changes in tidal backwater.

REMARKS.—Records good. When needed for irrigation of sugarcane, Oahu Sugar Co.'s pump no. 9 diverts about 3 million gallons a day. Surface run-off caused by flood not included in figures given below.

Discharge, in million gallons, 1932–33

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	15	11.5	12.5	12	12	15.5	15.5	15	16	16	14	14
2	15	11	12	12	12	15.5	15.5	15	16	16	14.5	14
3	15.5	11	12	12	12	15.5	15.5	15.5	17	16	14.5	14
4	15.5	11	13	12	12	15.5	15.5	15.5	17	16	14.5	14
5	15	11	13	12	13.5	15.5	15.5	15.5	16.5	15.5	14.5	14
6	15.5	11	12	12	14	15.5	15.5	15	16.5	15.5	14.5	14
7	15.5	11.5	12	12	12.5	15.5	15.5	15	16.5	15.5	14.5	11
8	15.5	14.5	12	12	12.5	15.5	15.5	15.5	17	15.5	14	10
9	15	14	12	12	12.5	15.5	15.5	15.5	16.5	15.5	14	11
10	15	14	13	12	12.5	15.5	15.5	15.5	16.5	15	14	14
11	15	12.5	13	12	14	15.5	15.5	15.5	16.5	15	14	14
12	15	13	12	12	16	15.5	15.5	16	16.5	15	14	14
13	15	13.5	12	12	14.5	15.5	15.5	16	16.5	15	14	14
14	15.5	14	12	12	13.5	15.5	15.5	16	16.5	15.5	14	14
15	15.5	12	12	12	13	15.5	15.5	15.5	16.5	15.5	14	11
16	15.5	12.5	12.5	12	13.5	15.5	15.5	15.5	16.5	15	14	10
17	15.5	12.5	12.5	12	15.5	15.5	15	15.5	16.5	15	11	11
18	15.5	12.5	14	12	15.5	15.5	15	15.5	16.5	15	10.5	13.5
19	15	12.5	13	12	15.5	15.5	15	15.5	16.5	15	10.5	14
20	15	13	12.5	12	15.5	15.5	14.5	16	16.5	15	13	11
21	15	13.5	12.5	12	15.5	15.5	14.5	16	16.5	14.5	14	10
22	15	12.5	12.5	14	15.5	15.5	14.5	16	16.5	15	14	9.6
23	15.5	12.5	12	12	15.5	15.5	14.5	16	16.5	15	14	11
24	15.5	12	14	12	15.5	15.5	14.5	16	16.5	14.5	14	13.5
25	15	12	14	12	15.5	15.5	14.5	16	16.5	14.5	14	13.5
26	15	12	14	12	15.5	15.5	14.5	16	16.5	14	14	13.5
27	15	13	14.5	12	15.5	15.5	14.5	16	16.5	14	14	10
28	14	14	13.5	12	15.5	15.5	14.5	16	16.5	14	14.5	9.3
29	11.5	12	12.5	13.5	15.5	15.5	14.5	-------	16.5	14	14.5	9.3
30	11.5	12	12	14	15.5	15.5	15	-------	16.5	14	14	9.3
31	11.5	12	-------	12	-------	15.5	15	-------	16	-------	14	------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	15.5	11.5	14.8	22.9	460	1,410
August	14.5	11	12.5	19.3	386	1,180
September	14.5	12	12.7	19.6	380	1,170
October	14	12	12.2	18.9	378	1,160
November	16	12	14.2	22.0	427	1,310
December	15.5	15.5	15.5	24.0	480	1,470
January	15.5	14.5	15.1	23.4	468	1,440
February	16	15	15.6	24.1	438	1,340
March	17	16	16.5	25.5	512	1,570
April	16	14	15.0	23.2	451	1,380
May	14.5	10.5	13.8	21.4	427	1,310
June	14	9.3	12.2	18.9	366	1,120
The year	17	9.3	14.2	22.0	5,170	15,900

PEARL HARBOR SPRINGS AT PUUKAPU, NEAR PEARL CITY

LOCATION.—Water-stage recorder on left bank of stream near levee two-fifths of a mile from Pearl City and 11½ miles northwest of Honolulu.

RECORDS AVAILABLE.—July 1931 to June 1933.

DISCHARGE.—Extremes not determined because extremes at gaging-station site are caused by changes in tidal backwater.

REMARKS.—Records excellent. About a million gallons a day is occasionally diverted from stream. Surface run-off caused by floods not included in figures give below.

Discharge, in million gallons, 1932–33

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	5.6	5.2	5.2	4.6	4.6	5.5	5.6	5.8	5.7	5.3	5.2	4.9
2	5.7	5.1	5.1	4.6	4.7	5.5	5.6	5.7	5.6	5.6	5.2	4.8
3	5.9	5.2	5.4	4.5	4.8	5.6	5.8	5.8	5.8	5.6	5.0	5.2
4	5.8	5.2	5.4	4.3	4.9	5.7	5.7	5.8	6.0	5.6	5.1	5.2
5	5.7	5.2	5.4	4.4	4.9	5.7	5.7	5.7	5.9	5.5	5.0	5.2
6	5.4	5.1	5.3	4.5	4.9	5.4	5.7	5.8	5.7	5.4	5.1	5.2
7	5.5	5.2	5.3	4.5	4.8	5.5	5.7	5.8	5.7	5.6	5.1	5.1
8	5.5	5.3	5.2	4.5	4.9	5.1	5.8	5.9	5.7	5.5	5.1	5.2
9	5.5	5.2	5.4	4.5	4.9	5.0	5.8	5.9	5.7	5.7	5.1	4.9
10	5.6	5.2	5.4	4.7	5.1	5.6	5.7	5.8	5.7	5.8	5.0	
11	5.5	5.3	5.4	4.4	5.2	5.5	5.6	5.8	5.8	5.6	5.1	[a]4.8
12	5.3	5.3	5.4	4.3	5.2	5.6	5.7	5.8	5.8	5.7	4.8	
13	5.2	5.2	5.2	4.3	5.3	5.6	5.5	5.9	5.8	5.7	5.0	
14	5.3	5.3	5.1	4.2	5.4	5.5	5.7	5.9	5.8	5.6	5.1	5.0
15	5.3	5.3	4.9	4.1	5.2	5.5	5.8	5.9	5.8	5.6	5.1	4.9
16	5.2	5.2	5.1	4.1	5.3	5.5	5.8	5.8	5.8	5.4	5.0	4.9
17	5.2	5.4	4.9	4.1	5.4	5.5	5.7	5.7	5.8	5.3	5.0	4.7
18	5.2	5.4	5.2	4.1	5.5	5.7	5.7	5.7	5.8	5.5	4.9	5.1
19	5.3	5.4	5.2	4.1	5.5	5.5	5.7	5.8	5.8	5.4	4.9	5.2
20	5.2	5.4	5.1	4.1	5.5	5.4	5.5	5.8	5.8	5.5	4.9	5.1
21	5.1	5.4	5.0	4.6	5.5	5.2	5.6	5.8	5.7	5.4	4.8	4.9
22	5.2	5.4	5.0	4.6	5.5	5.2	5.7	5.9	5.8	5.2	4.6	4.8
23	5.1	5.5	5.1	4.9	5.6	5.4	5.6	5.9	5.4	5.2	4.6	4.6
24	5.2	5.4	5.0	4.7	5.7	5.5	5.6	5.8	5.5	5.2	4.8	4.7
25	5.3	5.4	5.1	4.9	5.5	5.6	5.6	5.7	5.6	5.2	4.9	5.0
26	5.3	5.1	4.9	4.9	5.5	5.6	5.5	5.8	5.6	5.2	4.9	5.0
27	5.2	5.3	4.8	5.0	5.5	5.6	5.7	5.9	5.7	4.9	4.6	5.0
28	5.0	5.3	4.9	4.9	5.7	5.7	5.5	5.7	5.7	5.1	4.9	4.7
29	5.1	5.4	4.7	4.8	5.6	5.6	5.7	-------	5.5	5.2	4.9	4.9
30	5.2	5.3	4.7	4.8	5.5	5.5	5.7	-------	5.6	5.3	4.9	4.6
31	5.2	5.3	-------	4.8	-------	5.5	5.9	-------	5.6	-------	4.9	-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	5.9	5.0	5.35	8.28	166	509
August	5.5	5.1	5.29	8.18	164	503
September	5.4	4.7	5.13	7.94	154	472
October	5.0	4.1	4.51	6.98	140	429
November	5.7	4.6	5.25	8.12	158	484
December	5.7	5.0	5.49	8.49	170	523
January	5.9	5.5	5.67	8.77	176	540
February	5.9	5.7	5.81	8.99	163	499
March	6.0	5.4	5.72	8.85	177	544
April	5.8	4.9	5.43	8.40	163	500
May	5.2	4.6	4.95	7.66	154	471
June	5.2	----------	4.93	7.63	148	454
The year	6.0	4.1	5.29	8.18	1,930	5,930

[a] Estimated.

PEARL HARBOR SPRINGS AT LOKO KUKONA, NEAR PEARL CITY

LOCATION.—Water-stage recorder on left bank of stream near levee, half a mile from Pearl City and 11½ miles northwest of Honolulu.
RECORDS AVAILABLE.—June 1931 to June 1933.
DISCHARGE.—Extremes not determined because extremes at gaging-station site are caused by changes in tidal backwater.
REMARKS.—Records excellent. No diversions. Surface run-off caused by floods not included in figures given below.

Discharge, in million gallons, 1932–33

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	3.5	3.2	3.1	3.0	3.0	3.1	3.4		3.4	3.4	3.1	3.0
2	3.4	3.2	3.1	3.1	3.0	3.1	3.5		3.4	3.5	3.1	3.0
3	3.4	3.3	3.0	3.0	3.0	3.1	3.5		3.6	3.5	3.1	3.0
4	3.5	3.2	3.0	3.0	3.1	3.1	3.3		3.6	3.4	3.1	3.0
5	3.4	3.1	3.0	3.0	3.1	3.1	3.2	[a] 3.3		3.4	3.2	3.1
6	3.4	3.1	3.0	3.0	3.1	3.1	3.2			3.4	3.1	3.1
7	3.4	3.1	3.0	3.1	3.1	3.4	3.3			3.4	3.1	3.1
8	3.4	3.2	3.0	3.1	3.1	3.3	3.4		[a] 3.5	3.4	3.1	3.1
9	3.4	3.1	3.0	3.1	3.1	3.4	3.4	[b] 3.3		3.5	3.1	3.1
10	3.5	3.1	3.0	3.1	3.0	3.4	3.3	3.3		3.5	3.1	3.1
11	3.4	3.1	3.0	3.1	3.1	3.4	3.3	3.2		3.5	3.1	3.1
12	3.4	3.1	3.0	3.0	3.2	3.4	3.3	3.3		3.4	3.1	3.1
13	3.4	3.3	3.0	3.0	3.2	3.3	3.2	3.4	[b] 3.5	3.4	3.1	3.1
14	3.5	3.4	3.0	3.0	3.1	3.3	3.3	3.3	3.5	3.4	3.1	3.1
15	3.5	3.4	3.1	3.0	3.1	3.3	3.3	3.3	3.5	3.5	3.1	3.0
16	3.6	3.4	3.1	3.0	3.1	3.3	3.3	3.2	3.5	3.6	3.1	3.0
17	3.6	3.4	3.1	3.0	3.1	3.2	3.2	3.3	3.5	3.6	3.1	3.0
18	3.5	3.2	3.2	3.0	3.1	3.2	3.2	3.3	3.5	3.5	3.1	3.0
19	3.4	3.2	3.2	3.0	3.1	3.4	3.2	3.3	3.5	3.5	3.0	3.0
20	3.4	3.2	3.1	3.0	3.0	3.3	3.2	3.3	3.5	3.5	3.0	3.0
21	3.3	3.1	3.0	3.0	3.0	3.3	3.5	3.3	3.4	3.5	3.0	3.0
22	3.2	3.1	2.9	3.0	3.1	3.3	3.5	3.4	3.5	3.5	3.0	3.0
23	3.2	3.1	2.9	3.0	3.1	3.3	3.4	3.4	3.5	3.5	3.0	3.0
24	3.2	3.1	2.9	2.9	3.1	3.4	3.2	3.4	3.4	3.5	3.1	3.0
25	3.3	3.1	2.9	2.9	3.1	3.4	3.1	3.6	3.5	3.5	3.0	3.0
26	3.3	3.1	2.9	3.0	3.1	3.4	3.1	3.6	3.5	3.5	3.0	3.0
27	3.3	3.1	2.8	3.0	3.1	3.3	3.3	3.5	3.5	3.5	3.0	3.0
28	3.3	3.2	2.9	3.0	3.1	3.4	3.3	3.4	3.5	3.3	3.0	3.1
29	3.2	3.2	3.0	3.0	3.1	3.3	3.3	-------	3.5	3.1	3.0	3.1
30	3.3	3.1	3.0	3.0	3.1	3.3	[b] 3.3	-------	3.4	3.1	3.0	3.1
31	3.2	3.1	-------	3.0	-------	3.3	[a] 3.4	-------	3.4	-------	3.0	-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	3.6	3.2	3.38	5.23	105	322
August	3.4	3.1	3.18	4.92	98.6	303
September	3.2	2.8	3.01	4.66	90.2	277
October	3.1	2.9	3.01	4.66	93.4	287
November	3.2	3.0	3.09	4.78	92.6	284
December	3.4	3.1	3.29	5.09	102	313
January	3.5	3.1	3.30	5.11	102	314
February	3.6	3.2	3.34	5.17	93.5	287
March	3.6	3.4	3.49	5.40	108	332
April	3.6	3.1	3.44	5.32	103	317
May	3.2	3.0	3.06	4.73	95.0	292
June	3.1	3.0	3.04	4.70	91.3	280
The year	3.6	2.8	3.22	4.98	1,170	3,610

[a] Estimated. [b] Partly estimated.

PEARL HARBOR SPRINGS AT KALUAOOPU, NEAR PEARL CITY

LOCATION.—Water-stage recorder on left bank of stream one-fifth of a mile below Kamehameha Highway, 1 mile from Pearl City, and 11.3 miles northwest of Honolulu.

RECORDS AVAILABLE.—August 1931 to June 1933.

DISCHARGE.—Extremes not determined because extremes at gaging-station site are caused by changes in tidal backwater.

REMARKS.—Records good. No diversions. Surface run-off caused by floods not included in figures given below.

Discharge, in million gallons, 1932–33

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	20	19.5	19	18.5	19	20	21	21	22	21	21	19.5
2	20	19.5	19	18.5	19	20	21	21	22	21	20	19.5
3	21	19.5	19.5	18.5	19	20	21	21	22	21	20	19.5
4	21	19.5	19.5	18.5	19	20	21	21	22	21	20	[a] 21
5	21	19.5	19.5	18.5	19	20	21	21	22	21	20	[a] 16.5
6	20	19.5	19.5	18.5	19	20	21	21	21	21	20	19.5
7	20	19.5	19.5	18.5	19.5	20	21	21	22	21	20	19.5
8	20	19.5	19.5	18.5	19.5	20	21	21	22	21	20	19.5
9	20	19.5	19.5	18.5	19.5	20	21	21	22	21	20	19.5
10	20	19.5	19.5	19	19.5	21	21	21	22	21	20	19.5
11	20	19.5	19.5	19	19.5	21	21	21	22	21	20	[a] 14
12	20	19.5	19.5	19	19.5	21	21	22	22	21	19.5	[a] 19.5
13	20	19	19.5	19	19.5	21	21	22	22	20	19.5	[a] 19.5
14	19.5	19	19	19	19.5	21	21	22	21	20	20	19
15	19.5	19	19	19	19.5	20	21	22	21	20	20	19
16	19.5	19	19	19	19.5	20	21	22	21	21	20	19
17	19.5	19	19	19	20	21	21	22	21	21	20	19
18	19.5	19.5	19	19	20	21	21	22	21	20	20	19
19	19.5	19.5	19	19	20	21	21	22	21	20	20	19
20	19	19.5	19	19	20	21	21	22	21	20	20	19
21	19	19.5	19	19	20	21	21	22	21	20	20	19
22	19.5	19.5	19	19	20	20	21	22	21	21	21	19
23	19.5	19.5	19	19.5	20	20	21	22	21	21	20	19
24	19.5	19.5	19	19.5	20	21	21	22	21	21	20	19
25	19.5	19.5	19	19.5	20	21	21	22	21	21	20	19
26	19.5	19.5	19	19	20	21	21	22	22	21	20	19
27	19.5	19.5	19	19	20	21	21	22	22	21	20	18.5
28	19.5	19.5	18.5	19	20	21	21	22	22	20	20	18.5
29	19.5	19.5	18.5	19	20	21	21	-------	22	21	19.5	18.5
30	19.5	19	18.5	19	20	21	21	-------	21	21	19.5	19
31	19.5	19	-------	19	-------	21	21	-------	21	-------	19.5	-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	21	19	19.8	30.6	613	1,880
August	19.5	19	19.4	30.0	601	1,840
September	19.5	18.5	19.1	29.6	574	1,760
October	19.5	18.5	18.9	29.2	586	1,800
November	20	19	19.6	30.3	589	1,810
December	21	20	20.6	31.9	638	1,960
January	21	21	21.0	32.5	651	2,000
February	22	21	21.6	33.4	605	1,860
March	22	21	21.5	33.3	667	2,050
April	21	20	20.7	32.0	622	1,910
May	21	19.5	20.0	30.9	620	1,900
June	----------	----------	18.9	29.2	568	1,740
The year	22	----------	20.1	31.1	7,330	22,500

[a] Partly estimated.

PEARL HARBOR SPRINGS AT WAIAU, NEAR PEARL CITY

LOCATION.—Water-stage recorder on left bank of Waiau Stream one-fifth of a mile below Kamehameha Highway, 1.1 miles from Pearl City, and 11.2 miles northwest of Honolulu.

RECORDS AVAILABLE.—May 1931 to June 1933.

DISCHARGE.—Extremes not determined because extremes at gaging-station site are caused by changes in tidal backwater.

REMARKS.—Records excellent except those for estimated periods, which are fair. A small pumping plant diverts water above station for irrigation. Surface run-off caused by flood not included in figures given below.

Discharge, in million gallons, 1932–33

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	7.3	9.0	8.8	8.8	8.8	9.9	9.9	9.5	9.0	9.9	9.3	
2	7.5	8.8	8.8	9.0	8.8	9.9	9.9	9.5	9.9	9.9	9.0	
3	7.3	8.8	8.8	9.0	8.7	9.9	9.9	9.7	10	9.7	9.0	
4	7.9	8.8	8.8	8.8	8.8	9.9	9.7	9.5	9.7	9.7	9.0	
5	7.9	9.0	9.0	9.0	8.7	9.9	9.7	9.7	9.9	9.7	9.0	
6	7.5	9.3	8.8	8.8	8.5	9.9	9.7	9.5	9.9	9.5	9.0	[a]8.5
7	7.3	9.3	9.0	8.8	7.9	9.9	9.7	9.5	9.9	9.5	9.3	
8	7.3	9.3	9.0	8.8	8.8	9.9	9.9	9.9	9.9	9.7	9.0	
9	7.1	9.0	9.0	9.3	8.8	9.7	9.9	9.5	9.9	9.7	8.8	
10	7.1	9.0	8.8	9.0	8.8	9.9	9.7	9.5	9.9	9.7	8.7	
11	6.9	9.0	9.3	8.8	8.8	10	9.7	9.7	9.9	9.5	8.5	
12	6.7	9.0	9.3	8.8	8.8	9.9	9.7	9.9	9.9	9.9	8.8	
13	6.7	9.0	9.0	8.8	9.3	9.7	9.7	10	9.9	9.0	8.8	[b]8.5
14	6.5	9.0	8.8	8.8	9.3	9.5	9.7	9.9	10	9.7	8.8	8.5
15	6.5	9.0	8.8	8.5	9.0	9.5	9.9	9.9	9.9	9.7	8.8	8.5
16	6.4	8.8	8.8	8.8	9.3	9.7	9.7	9.9	9.9	9.9		8.3
17	6.4	8.8	9.0	8.8	9.5	9.5	9.7	9.9	9.9	9.9		
18	6.0	8.8	9.3	8.8	9.3	9.7	9.5	9.9	9.9	9.7		
19	6.0	8.8	9.0	8.7	9.3	9.7	9.5	9.9	9.9	9.5		
20	6.9	9.3	8.8	8.7	9.3	9.5	9.5	9.9	9.9	9.7		
21	8.1	9.5	8.8	8.7	9.3	9.5	9.5	9.9	9.9	9.5		[a]8
22	9.0	10	8.8	8.7	9.5	9.3	9.7	9.9	9.9	9.5		
23	9.3	9.3	8.8	8.8	9.7	9.3	9.5	9.9	9.9	9.7	[a]8.5	
24	8.3	8.8	8.8	8.8	9.9	9.3	9.5	9.9	9.7	9.5		
25	8.7	8.8	8.8	9.0	9.9	9.7	9.3	9.9	9.9	9.3		
26	8.3	8.8	8.8	8.8	9.9	9.7	9.3	9.9	9.9	9.3		[b]8.3
27	8.8	8.8	8.8	8.8	9.9	9.7	9.3	9.9	9.9	9.0		8.3
28	8.8	9.0	8.8	8.8	9.9	9.5	9.3	9.9	9.9	9.0		8.3
29	8.8	8.8	8.8	8.8	9.9	9.5	9.5	-------	9.9	9.3		8.1
30	9.0	8.8	8.8	8.8	9.9	9.5	9.5	-------	9.9	9.3		8.3
31	9.3	8.8	-------	8.8	-------	9.7	9.5	-------	9.9	-------		-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	9.3	6.0	7.60	11.8	236	723
August	10	8.8	9.01	13.9	279	857
September	9.3	8.8	8.90	13.8	267	819
October	9.3	8.5	8.83	13.7	274	840
November	9.9	7.9	9.21	14.2	276	848
December	10	9.3	9.68	15.0	300	921
January	9.9	9.3	9.63	14.9	298	916
February	10	9.5	9.78	15.1	274	841
March	10	9.0	9.86	15.3	306	938
April	9.9	9.0	9.56	14.8	287	880
May	9.3	-------	8.70	13.5	270	828
June	-------	-------	8.30	12.8	249	764
The year	10	6.0	9.08	14.0	3,320	10,200

[a] Estimated. [b] Partly estimated.

PEARL HARBOR SPRINGS AT KALAUAO, NEAR AIEA

LOCATION.—Water-stage recorder on left bank of Kalauao Stream a quarter of a mile below Honolulu Plantation pump no. 6, 1.1 miles from Aiea, and 9.7 miles northwest of Honolulu.

RECORDS AVAILABLE.—March 1931 to June 1933.

DISCHARGE.—Extremes not determined because extremes at gaging-station site are caused by changes in tidal backwater.

REMARKS.—Records good. When needed for irrigation of sugarcane, Honolulu Plantation pump no. 6 diverts about 7 million gallons a day when used as a high-lift pump or 9 million gallons a day as a low-lift pump. Surface run-off caused by flood not included in figures given below.

Discharge, in million gallons, 1932–33

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	22	22	16	21	13.5	22	22	22	17	22	14	13
2	22	22	17	21	12.5	22	22	22	15.5	20	14	13
3	22	22	18	18.5	12.5	22	16	23	21	16	14	18.5
4	23	22	22	14.5	15	22	21	23	24	14.5	14	18.5
5	15.5	21	17	16	20	16	18.5	23	24	14.5	17	13
6	14	22	16.5	17	18.5	15.5	19.5	18	24	14.5	22	13
7	14	22	16	15.5	15.5	17	22	15.5	23	17	20	13
8	18.5	22	15.5	15.5	18.5	16	21	18	23	22	14	13
9	21	22	19	21	12.5	17	15.5	23	24	22	14	13
10	20	22	18.5	16	15.5	22	15	23	24	15	14	18.5
11	14	22	22	15.5	21	20	16.5	23	24	15	14	18.5
12	18.5	22	18	15.5	21	14	18.5	23	24	15.5	16	13
13	22	22	16	17	20	14	17	24	24	17	22	12.5
14	22	22	14	15	13	15	23	24	24	22	20	12.5
15	22	15.5	15.5	16	14	17	21	23	18	23	14	12.5
16	22	15.5	17	20	16	18.5	16.5	23	20	21	14	12.5
17	22	18	21	15.5	21	22	16	23	24	15.5	14	19
18	22	22	22	15	21	20	15.5	23	24	15	14	18.5
19	22	22	15	15	21	14	15	23	24	15	16.5	13
20	22	22	15.5	14	21	14	17.5	23	23	15	22	12.5
21	22	22	18.5	12.5	22	18	23	23	18.5	17.5	20	12.5
22	22	22	16.5	18.5	22	21	21	23	15.5	23	14	14
23	22	22	15.5	20	22	21	15.5	23	15	20	14	14
24	22	17.5	17	14	22	22	15.5	24	17	14.5	14	15
25	22	17	21	18	22	22	15.5	24	23	14	14	18.5
26	22	17	15	15.5	22	20	16	24	22	14	15.5	13
27	22	20	15.5	13	22	14	17	20	15.5	14	21	12.5
28	22	22	14.5	14.5	22	14	22	17	15	15.5	20	12.5
29	22	15.5	15	15.5	22	16	21	-------	14.5	22	14	12.5
30	22	19.5	16	20	22	21	14.5	-------	14	19.5	13.5	12.5
31	22	14.5	-------	17	-------	22	17.5	-------	16	-------	13	-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	23	14	20.7	32.0	642	1,970
August	22	14.5	20.4	31.6	631	1,940
September	22	14	17.2	26.6	516	1,580
October	21	12.5	16.5	25.5	513	1,570
November	22	12.5	18.8	29.1	563	1,730
December	22	14	18.4	28.5	571	1,750
January	23	14.5	18.3	28.3	568	1,740
February	24	15.5	22.2	34.3	620	1,900
March	24	14	20.5	31.7	634	1,950
April	23	14	17.5	27.1	526	1,610
May	22	13	16.0	24.8	496	1,520
June	19	12.5	14.3	22.1	428	1,310
The year	24	12.5	18.4	28.5	6,710	20,600

NORTH HALAWA STREAM NEAR AIEA

LOCATION.—Duplex water-stage recorder 300 feet above sea level in North Halawa Gulch, 2.4 miles north of Kamehameha Highway, and 3½ miles northeast of Aiea post office.

DRAINAGE AREA.—3.6 square miles.

RECORDS AVAILABLE.—August 1929 to June 1933 (discontinued).

DISCHARGE.—Maximum recorded during year, 1,100 million gallons a day or 1,700 second-feet Mar. 3 (gage height, 9.83 feet); no flow during dry periods. 1929–33: Maximum discharge, 4,300 million gallons a day or 6,650 second-feet Feb. 28, 1932 (gage height, 13.36 feet); no flow during dry weather.

REMARKS.—Records good for ordinary stages, poor for high stages and estimated periods. No diversions. Continuous records of rainfall are obtained at station.

Discharge, in million gallons, 1932–33

Day	July	Aug.	Sept.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	June
1	0.30	[a] 0.8	[a] 0.2		[a] 0.2	[a] 30	[a] 20	1.7	14	0
2	.23	.65						1.65	1.95	0
3	.22	3.5	[a] .6		[a] 110			237	14.5	0
4	.20	11						47	1.8	0
5	.17	2.6	[a] .3		[a] 7	[a] 2.8	[a] .5	24	1.0	0
6	.14	8.4		[a] 0				88	.65	0
7	.12	1.9	.17		[a] 1.4			33	.30	0
8	.13	9.4	1.35			[a] .3	[a] 4.2	7.2	.28	0
9	1.4	2.2	49					3.7	.26	0
10	.79	2.0	14.5		[a] 3.5			2.7	.23	1.0
11		7.0	2.1			.16	[a] 26	2.2	.22	.84
12	[a] .6	2.2	1.05	[a] .1		.14		[a] 1.8	.20	.18
13			[b] .51			.12		[a] 1.5	.20	.16
14	1.05	[a] 3.9	[b] .25	[a] 0			[a] 50	[a] 1.3	.19	.14
15			.21		[a] 6	[a] .3		[b] 1.1	.18	.10
16	[a] 1.1	[a] .5	.18	[a] 15			[a] 7.5	.93	.18	.03
17		1.8	.16	[a] 16		[a] 1.2		.79	.18	0
18		1.8		2.8				.79	.16	0
19		.86	[a] .1	.86				[b] .79	.14	0
20		4.6		.25	[a] .7		[a] 2.9	[a] .79	.12	0
21	[a] 3.5	1.3		.20		[a] 1.5		[a] .72	.05	0
22		.51		.17	[a] .3			[b] .65	0	0
23		.26		.15			[a] 1.3	.72	0	0
24		.22		2.5	[a] .8			.58	0	0
25		1.4	[a] 0	9.3			1.0	.30	0	0
26	[a] .4	.28		.27		[a] .6	8.7	.30	0	0
27		.20		.23	[a] .3		6.2	.28	0	0
28		.16		.29			2.7	.25	0	0
29						[a] .3	-------	.23	0	0
30	[a] 1.9	[a] .5		[a] .2	[a] 9	-------	-------	.23	0	[b] 0
31	-------	-------	-------	-------	[a] 100	[a] 200	-------	.22	-------	-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	----------	0.12	1.24	1.92	38.6	118
August	11	.16	2.43	3.76	75.3	231
September	49	0	2.40	3.71	72.0	221
November	16	0	1.62	2.51	48.6	149
December	----------	----------	16.4	25.4	510	1,560
January	----------	----------	9.28	14.4	288	883
February	----------	----------	12.4	19.2	348	1,070
March	237	.22	14.9	23.1	462	1,420
April	14.5	0	1.23	1.90	36.8	113
June	1.0	0	.082	.127	2.45	8
The year	237	0	5.15	7.97	1,880	5,770

[a] Estimated. [b] Partly estimated.

NOTE.—No flow during October and May.

MOANALUA STREAM NEAR HONOLULU

LOCATION.—Duplex 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 1933.
DISCHARGE.—Maximum during year, 578 million gallons a day or 894 second-feet Mar. 3 (gage height, 6.41 feet); no flow for several periods during year. 1926–33: Maximum, 2,370 million gallons a day or 3,670 second-feet Nov. 18, 1930 (gage height, 11.58 feet); no flow occasionally during dry weather.
REMARKS.—Records good except those for estimated periods, which are poor. Water for domestic use diverted from stream 1 mile above station by means of a 2-inch pipe. Continuous records of rainfall are obtained at station.

Discharge, in million gallons, 1932–33

Day	July	Aug.	Sept.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.
1	0.04	0.05	0	0	0	10.5	21	0.79	2.3
2	.03	.04	0	0	2.6	9.1	3.4	.52	.58
3	.03	.04	0	0	47	1.25	1.35	128	3.8
4	.02	1.4	0	0	[a] 3.4	.84	.76	17.5	.60
5	.01	.41	0	0	[a] 1.35	.60	.30	14	.12
6	.01	.95	0	0	[a] .68	.42	.13	43	.05
7	0	.16	0	0	[a] .18	.32	.07	20	.03
8	0	3.2	0	0	.08	.15	5.2	5.1	.01
9	0	.90	[b] 110	0	.06	.08	5.0	3.0	.01
10	0	.22		0	.05	.06	16.5	2.3	0
11	0	.62	[b] 16	0	.04	.05	6.4	1.4	0
12	0	.56		0	.03	.04	5.1	1.15	0
13	0	.45		0	1.2	.04	16.5	.68	0
14	0	.24	[b] 3.0	0	.69	.03	68	.47	0
15	0	.07		0	4.5	.02	7.8	.32	0
16	0	.05		0	1.15	.09	4.4	.17	0
17	0	5.2	[b] .2	.19	.38	.12	3.0	.11	0
18	0	1.65		.16	.12	.09	2.7	.07	0
19	0	.50	0	.02	.06	.08	2.3	.06	0
20	0	2.6	0	.01	.04	.25	2.3	.04	0
21	3.9	.56	0	0	.03	.30	2.7	.03	0
22	.85	.15	0	0	.02	.24	1.35	.02	0
23	.21	.06	0	0	.01	.27	.94	.01	0
24	.06	.05	0	0	.01	.22	.50	.01	0
25	.05	.04	0	0	0	.14	.32	.01	0
26	.04	.04	0	0	0	.12	.43	0	0
27	.03	.03	0	0	0	.09	2.7	0	0
28	.02	.02	0	0	0	.07	1.3	0	0
29	.66	.02	0	0	.24	.06	-------	0	0
30	.24	.01	0	0	.57	.05	-------	0	0
31	.08	0	-------	-------	4.3	59	-------	0	-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	3.9	0	0.203	0.314	6.28	19
August	5.2	0	.655	1.01	20.3	62
September	-------	0	5.59	8.65	168	514
November	.19	0	.013	.020	.38	1
December	47	0	2.22	3.43	68.8	211
January	59	.02	2.73	4.22	84.7	260
February	68	.07	6.52	10.1	182	560
March	128	0	7.70	11.9	239	733
April	3.8	0	.250	.387	7.50	23
The year	128	0	2.13	3.30	777	2,380

[a] Partly estimated. [b] Estimated.

NOTE.—No flow during months omitted.

KALIHI STREAM NEAR HONOLULU

LOCATION.—Water-stage recorder at Kioi Pool, three-eighths of a 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 1933.

DISCHARGE.—Maximum during year, 748 million gallons a day or 1,160 second-feet Mar. 3 (gage height, 8.56 feet); minimum, 0.4 million gallons a day or 0.6 second-foot June 15, 17–20.

1913–33: Maximum, 2,730 million gallons a day or 4,220 second-feet Nov. 18, 1930 (gage height, 13.81 feet); minimum, 0.1 million gallons a day or 0.2 second-foot Apr. 5, 1924, May 12–25, 1926. Average, 16 years (1916–20, 1921–33), 5.14 million gallons a day (7.95 second-feet).

REMARKS.—Records good for ordinary stages, poor for high stages. Water for domestic use diverted from stream above station.

Discharge, in million gallons, 1932–33

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	1.8	2.0	1.7	1.4	0.8	1.4	40	27	4.9	5.2	[a] 1.0	0.8
2	1.6	1.8	1.8	1.4	.8	11	12	6.6	4.3	2.9	.9	1.0
3	1.5	2.0	2.3	1.3	.8	39	6.5	4.8	[a] 117	5.7	1.0	1.1
4	1.9	22	7.2	1.3	.7	5.8	8.4	3.8	18.5	2.6	1.0	.9
5	2.1	4.0	3.0	1.2	.8	3.8	5.1	3.4	30	2.2	1.0	.7
6	1.7	12.5	2.0	1.2	1.2	2.8	4.6	3.1	51	2.2	1.1	.7
7	1.4	3.5	1.8	1.2	.9	2.5	3.7	2.7	34	2.1	1.2	1.1
8	1.4	6.9	5.8	1.2	.8	2.2	3.1	12	12	2.0	2.1	1.1
9	4.0	3.5	36	1.1	.8	2.1	2.7	13.5	9.5	2.0	1.5	.9
10	2.0	3.1	7.6	1.1	.8	2.0	2.5	21	8.1	2.0	1.1	5.8
11	1.8	6.5	4.0	1.1	1.2	1.8	2.3	9.9	7.0	1.9	1.0	2.2
12	1.6	3.5	3.2	1.0	2.6	51	2.1	12	6.1	1.8	1.0	1.1
13	2.0	7.4	2.6	1.0	1.3	9.8	2.2	22	5.4	1.8	1.0	1.0
14	1.7	3.4	3.2	1.0	1.1	4.5	2.2	66	4.9	1.8	1.0	.7
15	3.2	2.8	2.1	1.0	1.0	10.5	2.6	13	4.5	[a] 1.7	1.0	.7
16	1.9	2.5	1.9	1.1	1.2	4.9	4.0	11	4.1	[b] 1.6	1.0	.6
17	1.6	20	1.9	1.5	7.4	4.0	2.7	8.9	3.7	[b] 1.4	1.0	.5
18	7.9	5.4	1.9	1.1	4.1	3.2	2.5	8.9	3.4	[b] 1.3	1.0	.5
19	2.7	3.5	1.7	1.9	2.5	3.0	2.3	8.1	3.4	[b] 1.3	.9	.4
20	2.8	6.7	1.7	1.5	1.8	2.5	2.5	7.8	3.0	[b] 1.3	.9	.4
21	8.9	3.7	1.7	1.1	1.5	2.2	2.2	7.2	2.8	[b] 1.2	1.0	.6
22	3.1	3.1	1.6	1.9	1.3	2.1	2.2	6.3	2.6	[b] 1.2	1.0	.7
23	2.3	3.4	1.6	1.3	1.3	1.9	1.9	5.3	2.5	[b] 1.2	.9	.6
24	2.1	3.0	1.5	1.1	1.8	2.3	1.8	4.8	2.3	[b] 1.2	1.0	.6
25	2.3	3.1	1.5	1.0	1.2	1.9	1.7	4.3	2.2	[b] 1.2	.9	.9
26	1.9	2.6	1.5	1.0	1.3	1.8	1.5	6.9	2.1	[b] 1.2	1.0	.7
27	1.7	2.3	1.4	1.0	1.9	1.7	1.6	7.3	1.9	[b] 1.2	1.0	1.0
28	1.7	2.0	1.5	1.0	3.2	2.0	1.4	5.4	1.9	[b] 1.1	.9	1.5
29	4.6	1.9	1.5	.9	2.0	3.1	1.3	-------	1.9	[b] 1.1	.7	1.2
30	3.0	2.0	1.4	.9	1.7	4.7	2.2	-------	1.9	[b] 1.1	1.0	1.2
31	2.7	1.8	-------	.8	-------	15	62	-------	1.9	-------	1.0	------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	8.9	1.4	2.61	4.04	80.9	248
August	22	1.8	4.90	7.58	152	466
September	36	1.4	3.59	5.55	108	331
October	1.9	.8	1.18	1.83	36.6	112
November	7.4	.7	1.66	2.57	49.8	153
December	51	1.4	6.66	10.3	206	634
January	62	1.3	6.25	9.67	194	595
February	66	2.7	11.2	17.3	313	961
March	[a] 117	1.9	11.6	17.9	359	1,100
April	5.7	[b] 1.1	1.88	2.91	56.4	173
May	2.1	.7	1.04	1.61	32.1	99
June	5.8	.4	1.04	1.61	31.2	96
The year	[a] 117	.4	4.43	6.85	1,620	4,970

[a] Partly estimated. [b] Estimated.

NUUANU STREAM BELOW RESERVOIR NO. 2 WASTEWAY, NEAR HONOLULU

LOCATION.—Water-stage recorder on Pali road in upper Nuuanu Valley, 5 miles from Honolulu post office.

DRAINAGE AREA.—3.4 square miles.

RECORDS AVAILABLE.—October 1913 to June 1933.

DISCHARGE.—Maximum during year, 778 million gallons a day or 1,200 second-feet Feb. 13 (gage height, 6.11 feet); minimum, 0.70 million gallons a day or 1.08 second-feet June 14.

1913–33: Maximum, 1,600 million gallons a day or 2,480 second-feet Jan. 16, 1921 (gage height, 8.74 feet, from flood marks); minimum, 0.06 million gallons a day or 0.09 second-foot Sept. 10, 11, 1925. Average, 14 years (1917–20, 1922–33), 5.52 million gallons a day (8.54 second-feet).

REMARKS.—Records good for ordinary stages, poor for high stages. Reservoirs nos. 2, 3, 4 regulate flow, but diversion from them past station was discontinued in January 1928. The Board of Water Supply diverts ground water from tunnels in drainage area.

Discharge, in million gallons, 1932–33

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	3.3	3.1	3.2	2.2	1.7	1.8	35	34	13	8.2	1.45	0.86
2	3.0	3.0	3.4	2.2	1.6	19	21	11.5	9.9	6.7	1.4	1.3
3	3.0	3.1	3.4	2.4	1.6	33	12	8.9	181	7.6	1.6	1.5
4	3.2	16	4.2	2.3	1.5	5.1	11.5	6.5	40	4.6	1.6	1.55
5	2.9	4.6	4.7	2.2	1.5	3.7	6.7	5.7	46	4.2	1.5	1.2
6	2.7	10.5	3.3	2.0	1.7	3.3	6.7	5.1	65	3.8	2.1	1.1
7	2.7	3.7	3.0	2.0	1.5	3.1	5.7	4.7	25	3.6	1.85	1.3
8	2.6	7.3	5.7	2.0	1.4	2.9	5.3	29	17	3.5	1.75	1.2
9	4.5	4.1	52	1.9	1.4	2.9	4.9	17	15.5	3.4	1.65	1.0
10	3.6	3.7	8.2	1.9	1.4	2.8	4.7	23	14	3.2	1.45	3.5
11	3.0	6.1	5.3	1.8	1.6	2.7	4.7	10	12	3.2	1.35	2.2
12	2.8	3.8	4.6	1.8	2.4	5.2	4.5	11.5	10.5	3.0	1.25	1.4
13	3.9	6.4	4.0	1.7	1.6	11	4.1	28	9.6	3.4	1.25	1.2
14	2.8	3.9	3.7	1.7	1.5	6.3	3.7	114	9.0	3.0	1.25	.98
15	4.0	3.4	3.6	1.7	1.5	10	4.5	24	8.1	2.7	1.45	1.0
16	2.8	3.2	3.4	1.8	4.1	6.3	4.9	19	7.9	2.6	1.2	1.0
17	2.6	35	3.3	1.8	6.2	5.9	4.0	15	7.2	2.8	1.15	.98
18	7.7	9.4	3.3	1.7	4.2	5.3	6.4	19	7.0	2.4	1.0	.90
19	3.5	5.3	3.1	2.9	2.8	4.9	7.6	13.5	6.5	2.2	.98	.86
20	3.2	5.7	3.0	2.7	2.4	4.5	4.2	16	6.7	2.2	.98	.82
21	6.6	4.5	2.8	2.0	2.2	3.4	3.6	15	7.2	2.1	1.0	.90
22	3.5	3.9	2.8	2.6	2.0	3.4	5.3	13.5	7.6	2.1	.94	.94
23	2.9	3.9	2.8	2.2	2.1	3.8	3.7	10.5	6.5	2.0	.90	.94
24	3.6	4.1	2.6	2.0	3.4	4.2	3.4	9.3	5.4	1.9	1.0	.86
25	3.4	7.1	2.6	1.8	2.1	4.0	3.0	8.8	5.4	1.8	.86	.94
26	3.0	4.2	2.6	1.8	2.1	4.0	3.0	19.5	5.1	1.75	.82	.90
27	2.9	3.7	2.4	1.8	2.1	4.0	3.1	27	5.0	1.8	.78	1.3
28	3.5	3.4	2.5	2.2	2.7	4.9	2.8	11	5.4	1.8	.78	1.55
29	6.1	3.3	2.5	1.9	2.1	6.1	2.6	------	6.0	1.65	.78	.98
30	5.7	3.6	2.4	1.8	2.0	9.0	6.0	------	5.2	1.55	.86	1.2
31	3.6	3.2	------	1.7	------	18.5	114	------	5.1	------	.90	------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	7.7	2.6	3.63	5.62	113	346
August	35	3.0	6.01	9.30	186	571
September	52	2.4	5.15	7.97	154	474
October	2.9	1.7	2.02	3.13	62.5	192
November	6.2	1.4	2.21	3.42	66.4	204
December	33	1.8	6.61	10.2	205	629
January	114	2.6	10.0	15.6	313	959
February	114	4.7	18.9	29.2	530	1,630
March	181	5.0	18.5	28.6	575	1,760
April	8.2	1.55	3.16	4.89	94.8	291
May	2.1	.78	1.22	1.89	37.8	116
June	3.5	.82	1.21	1.87	36.4	112
Total	181	.78	6.50	10.1	2,370	7,280

WEST BRANCH OF MANOA STREAM NEAR HONOLULU

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 1933.

DISCHARGE.—Maximum during year, 686 million gallons a day or 1,060 second-feet Jan. 31 (gage height, 3.98 feet); minimum, 0.1 million gallons a day or 0.2 second-foot Oct. 13.

1913–21, 1925–33: Maximum stage, 10.4 feet Jan. 16, 1921, from flood marks (discharge estimated, 2,100 million gallons a day or 3,250 second-feet); minimum discharge, about 0.05 million gallons a day or 0.08 second-foot Mar. 16, 22, 1926. Average, 14 years (1913–20, 1926–33), 3.07 million gallons a day (4.75 second-feet).

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

Discharge, in million gallons, 1932–33

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	1.0	2.0	1.0	0.7	0.6	1.2	5.2	10.5	4.0	6.7	0.5	0.4
2	1.0	1.7	1.3	.6	.6	8.4	3.5	4.4	2.7	3.1	.5	.8
3	2.0	2.1	1.7	.5	.5	7.6	6.7	3.8	24	3.1	.5	1.7
4	1.0	8.2	3.0	.5	.5	2.4	4.0	2.6	11	1.5	.6	1.5
5	.9	3.8	3.4	.5	.5	1.8	2.3	2.0	11	1.3	.7	.9
6	.8	7.7	1.6	.4	.7	1.4	2.2	1.6	15.5	1.1	1.2	.8
7	.8	3.1	1.4	.4	.5	1.4	1.7	1.5	9.2	1.1	1.4	1.8
8	.9	6.5	2.4	.5	.4	1.2	1.5	7.4	5.8	1.0	1.4	1.1
9	4.7	3.2	15	.4	.4	1.2	1.3	7.7	4.5	1.0	1.0	1.0
10	3.1	3.2	5.2	.4	.4	1.1	1.2	13.5	4.7	1.0	.8	5.3
11	2.2	5.5	2.5	.4	1.9	1.0	1.2	7.1	3.4	1.1	.7	1.5
12	1.7	3.2	1.8	.4	3.4	2.3	1.1	5.4	3.0	1.1	.6	1.1
13	4.3	5.9	1.5	.4	1.0	3.0	1.0	9.0	2.7	.9	.6	.8
14	2.1	3.2	1.4	.3	.7	1.6	1.0	18	2.3	.9	.6	.8
15	5.9	2.3	1.3	.3	.6	3.5	1.8	7.2	2.1	.9	.7	.7
16	2.3	2.0	1.1	.5	2.5	2.4	1.5	5.6	1.9	.9	.7	.6
17	1.6	13.5	1.1	.9	3.3	2.6	1.1	4.4	1.9	1.1	.6	.6
18	6.6	4.4	1.1	.6	2.5	1.8	1.2	8.5	1.7	1.0	.5	.5
19	2.3	2.5	1.0	2.3	1.7	1.5	1.1	5.6	1.7	.8	.5	.5
20	2.3	3.3	1.0	1.4	1.3	1.3	1.1	6.9	1.6	.8	.7	.4
21	5.4	2.1	1.0	.7	1.0	1.1	1.0	6.3	1.6	.7	.6	.7
22	2.9	1.5	1.0	2.4	.9	1.1	2.5	4.7	2.3	.7	.5	1.6
23	1.7	1.4	1.0	1.0	1.5	.9	1.4	3.4	2.2	.7	.5	1.1
24	1.7	1.9	.9	.7	6.1	1.4	1.5	3.0	1.4	.7	.9	1.0
25	3.6	4.0	.8	.6	2.0	.9	1.1	2.6	1.4	7	.5	1.1
26	1.5	1.8	.8	.6	2.0	.9	1.0	5.5	1.4	.6	.5	.7
27	1.3	1.4	.7	.6	1.7	.8	1.5	5.7	1.1	.8	.5	2.6
28	2.6	1.2	.8	1.7	3.9	2.5	1.1	2.8	1.1	.7	.5	2.6
29	7.7	1.1	.9	.8	2.1	2.6	.9	-------	1.6	.6	.4	2.2
30	4.5	1.7	.9	.7	1.5	3.1	3.1	-------	1.1	.6	.4	3.5
31	3.2	1.1	-------	.7	-------	7.4	37	-------	1.0	-------	.4	-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	7.7	0.8	2.70	4.18	83.6	257
August	13.5	1.1	3.44	5.32	106	327
September	15	.7	1.95	3.02	58.6	180
October	2.4	.3	.74	1.14	22.9	70
November	6.1	.4	1.56	2.41	46.7	143
December	8.4	.8	2.30	3.56	71.4	219
January	37	.9	3.03	4.69	93.8	288
February	18	1.5	5.96	9.22	167	512
March	24	1.0	4.22	6.53	131	402
April	6.7	.6	1.24	1.92	37.2	114
May	1.4	.4	.66	1.02	20.5	63
June	5.3	.4	1.33	2.06	39.9	122
The year	37	.3	2.41	3.73	879	2,700

EAST BRANCH OF MANOA STREAM NEAR HONOLULU

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 1933.

DISCHARGE.—Maximum during year, 215 million gallons a day or 333 second-feet Jan. 31 (gage height, 3.58 feet); minimum, 0.9 million gallons a day or 1.4 second-feet June 1.

1913–21, 1925–33: Maximum gage height, 10.4 feet Jan. 16, 1921, determined from flood marks (discharge, estimated, 2,000 million gallons a day or 3,090 second-feet); minimum discharge, 0.4 million gallons a day or 0.6 second-foot June 7, 8, 1926. Average, 14 years (1913–20, 1926–33), 3.10 million gallons a day (4.80 second-feet).

REMARKS.—Records good for ordinary stages, poor for high stages. Water is diverted from stream above station by East Manoa Ditch, and Board of Water Supply diverts water from tunnels in drainage area.

Discharge, in million gallons, 1932–33

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	2.0	3.0	1.8	1.6	1.3	1.6	3.1	12.5	2.6	[a] 18	1.2	1.0
2	2.0	2.7	1.9	1.7	1.2	6.0	2.6	1.7	2.1	[a] 8.4	1.2	1.3
3	2.9	3.5	2.7	1.6	1.2	5.5	4.8	1.6	22	[a] 7.4	1.2	1.5
4	2.0	6.5	2.8	1.7	1.2	2.4	4.4	1.5	7.0	[a] 1.6	1.2	1.2
5	2.1	4.0	3.5	1.6	1.2	2.0	3.0	1.5	9.6	1.5	1.2	1.0
6	1.9	5.7	2.3	1.6	1.3	1.7	2.7	1.4	18	1.6	1.4	1.0
7	1.8	3.2	2.0	1.6	1.2	1.7	2.0	1.5	7.2	1.5	3.7	1.7
8	1.9	4.3	2.8	1.6	1.2	1.7	1.6	7.6	4.0	1.4	3.0	1.2
9	4.6	3.2	11	1.6	1.2	1.7	1.6	6.7	3.5	1.4	1.8	1.2
10	3.8	4.2	3.6	1.6	1.2	1.6	1.6	11	3.5	1.4	1.6	5.8
11	2.6	4.6	2.6	1.6	2.2	1.4	1.5	4.2	2.6	1.5	1.4	1.8
12	2.4	3.1	2.4	1.6	3.7	3.6	1.4	3.3	1.8	1.6	1.4	1.4
13	11.5	4.5	2.1	1.5	1.4	4.1	1.3	6.7	1.7	1.4	1.4	1.2
14	2.3	3.1	2.0	1.4	1.3	2.9	1.3	12.5	1.6	1.3	1.3	1.4
15	4.9	2.6	1.9	1.4	1.3	4.4	1.6	4.2	1.5	1.2	1.3	1.3
16	2.6	2.5	1.8	1.6	2.5	2.7	1.5	4.6	1.4	1.2	1.3	1.2
17	2.4	13.5	1.8	1.7	3.0	2.5	1.3	3.1	1.4	1.4	1.2	1.1
18	6.6	4.8	1.8	1.5	1.8	1.8	1.4	5.7	1.3	1.2	1.2	1.0
19	3.0	3.4	1.8	2.4	1.6	1.7	1.3	3.2	1.3	1.2	1.2	1.0
20	3.3	4.3	1.8	1.8	1.4	1.6	1.3	4.0	1.2	1.3	1.4	1.0
21	6.2	3.4	1.8	1.6	1.3	1.6	1.2	3.5	1.2	1.2	1.2	1.2
22	3.6	2.7	1.8	2.5	1.3	1.6	1.7	2.6	1.7	1.2	1.2	1.7
23	2.7	2.6	1.8	1.7	1.8	1.4	1.3	2.1	1.8	1.2	1.2	1.3
24	2.8	3.0	1.7	1.6	5.4	2.0	1.3	2.0	1.2	1.2	1.3	1.4
25	3.6	4.1	1.7	1.5	1.8	1.5	1.2	1.8	1.2	1.2	1.1	1.3
26	2.5	3.2	1.7	1.4	2.1	1.5	1.2	3.1	[a] 1.2	1.2	1.1	1.4
27	2.5	2.5	1.7	1.3	1.9	1.4	1.3	3.0	[a] 1.2	1.4	1.0	1.7
28	3.4	2.2	1.7	2.0	3.5	3.2	1.2	2.0	[a] 1.2	1.3	1.0	1.4
29	6.9	2.0	1.9	1.4	1.9	2.7	1.2	------	[a] 1.4	1.2	1.2	1.4
30	4.0	2.8	1.7	1.4	1.7	2.9	2.4	------	[a] 1.2	1.2	1.0	1.5
31	3.6	1.9	------	1.3	------	5.9	29	------	[a] 1.2	------	1.0	------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	11.5	1.8	3.50	5.42	108	333
August	13.5	1.9	3.78	5.85	117	359
September	11	1.7	2.40	3.71	71.9	221
October	2.5	1.3	1.63	2.52	50.4	155
November	5.4	1.2	1.84	2.85	55.1	169
December	6.0	1.4	2.53	3.91	78.3	240
January	29	1.2	2.72	4.21	84.3	259
February	12.5	1.4	4.24	6.56	119	364
March	22	1.2	3.54	5.48	110	337
April	18	1.2	2.33	3.61	69.8	214
May	3.7	1.0	1.38	2.14	42.9	132
June	5.8	1.0	1.45	2.24	43.6	134
The year	29	1.0	2.60	4.02	950	2,920

[a] Partly estimated.

EAST MANOA DITCH NEAR HONOLULU

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 1933.

DISCHARGE.—Maximum during year, 9.0 million gallons a day or 13.9 second-feet Jan. 31 (gage height, 1.43 feet); minimum, 0.60 million gallons a day or 0.93 second-foot Aug. 26, May 5.

1915–16, 1918–21, 1925–33: Maximum, 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 good except those for estimated periods, which are fair. Water diverted from East Manoa Stream about a quarter of a mile above station by means of crude stone dam.

Discharge, in million gallons, 1932–33

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	1.45	1.4	1.3	1.2	1.05	1.0	0.76	1.3	1.3	1.8	0.84	0.68
2	1.4	1.35	1.25	1.1	1.0	1.3	.68	1.4	1.25	1.4	.80	.80
3	1.55	1.35	1.45	1.1	.97	1.45	.76	1.35	1.95	1.55	.84	.84
4	1.5	1.4		1.1	.97	1.1	.80	1.15	1.3	1.25	.84	.80
5	1.6	1.2		1.05	88	.97	.72	1.05	1.25	1.2	.88	.72
6	1.55	1.25	[a]1.4	1.05	.93	.88	.64	1.0	1.85	1.15	.97	.76
7	1.5	1.1		1.0	.93	.88	.80	.97	1.5	1.15	1.0	1.0
8	1.5	1.1		1.0	.84	.88	1.05	1.5	1.2	1.1	1.2	.88
9	1.75	1.0		1.05	.88	.88	1.05	1.7	1.05	1.1	1.05	.80
10	1.8	1.0	[a]1.8	1.05	.88	.72	1.05	2.1	1.1	1.1	.97	2.0
11	1.6	1.0		1.05	1.15	.76	1.0	1.55	1.15	1.1	.93	1.1
12	1.55	.97	[a]1.4	1.05	1.45	.97	1.0	1.45	1.4	1.1	.88	.88
13	1.5	1.15		1.0	1.0	1.15	.93	1.6	1.4	1.1	.88	.80
14	1.45	1.2		1.0	.97	.97	.88	2.0	1.35	1.05	.88	.88
15	1.7	1.15		1.0	.97	1.15	1.05	1.55	1.3	1.0	.88	.86
16	1.55	1.1	[a]1.3	1.0	1.15	1.05	1.05	1.6	1.3	1.0	.88	.76
17	1.45	2.0		1.05	1.45	.97	.97	1.5	1.25	1.0	.88	.70
18	1.65	1.05		1.0	1.2	.93	.93	1.6	1.25	1.0	.84	.68
19	1.5	1.0		1.15	1.05	.88	.88	1.5	1.3	.97	.88	.72
20	1.45	1.05		1.05	1.0	.84	.88	1.55	1.25	.97	.88	.68
21	1.65	1.05	1.3	1.0	1.0	.84	.84	1.55	1.2	.97	.88	.72
22	1.5	1.05	1.25	1.05	1.0	.84	1.05	1.5	1.35	.97	.88	.87
23	1.4	1.05	1.25	1.0	1.15	.84	.93	1.45	1.5	.93	.84	.88
24	1.35	1.05	1.25	1.0	1.6	.88	.93	1.4	1.3	.93	.88	.80
25	1.45	.93	1.25	.97	1.15	.88	.93	1.4	1.25	.88	.84	.80
26	1.4	.64	1.25	1.1	1.15	.84	.93	1.35	1.25	.88	.84	.80
27	1.35	.97	1.15	1.15	1.15	.80	.97	1.3	1.2	.93	.80	1.05
28	1.4	1.2	1.15	1.35	1.3	.88	.93	1.2	1.15	.88	.80	.97
29	1.6	1.2	1.2	1.2	1.1	.93	.88	-------	1.2	.88	.84	.88
30	1.5	1.4	1.2	1.15	1.05	.93	1.1	-------	1.15	.88	.76	.97
31	1.45	1.35	-------	1.1	-------	1.0	2.2	-------	1.1	-------	.68	------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	1.8	1.35	1.52	2.35	47.0	144
August	2.0	.64	1.15	1.78	35.7	110
September	----------	1.15	1.34	2.07	40.2	123
October	1.35	.97	1.07	1.66	33.1	102
November	1.6	.84	1.08	1.67	32.4	99
December	1.45	.72	.948	1.47	29.4	90
January	2.2	.64	.954	1.48	29.6	91
February	2.1	.97	1.45	2.24	40.6	125
March	1.95	1.05	1.30	2.01	40.4	124
April	1.8	.88	1.07	1.66	32.2	99
May	1.2	.68	.879	1.36	27.2	84
June	2.0	.68	.869	1.34	26.1	80
The year	2.2	.64	1.13	1.75	414	1,270

[a] Estimated.

PUKELE STREAM NEAR HONOLULU

LOCATION.—Water-stage recorder 200 feet upstream from Palolo belt-road bridge' five-eighths of a 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 1933.

DISCHARGE.—Maximum during year, 157 million gallons a day or 243 second-feet Jan. 31 (gage height, 3.94 feet); minimum, 0.19 million gallons a day or 0.29 second-foot Nov. 9–15, June 8–10.

1912–13, 1926–33: Maximum, 805 million gallons a day or 1,250 second-feet Apr. 11, 1930 (gage height, 7.75 feet, from flood marks); minimum, 0.15 million gallons a day or 0.23 second-foot June 3, 1926, and between June 25 and 30, 1931.

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

Discharge, in million gallons, 1932–33

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	0.44	0.70	[a]0.50	0.29	0.22	0.54	0.62	[a]2.6	[b]10	0.63	0.33	[a]0.22
2	.44	.70	.49	.29	.22	1.6	.56	.56		1.0	.32	[a].22
3	.45	.68	.47	.29	.22	4.7	.59	.61		2.3	.30	[a].21
4	.45	2.2	.45	.29	.22	[a].72	[a]1.15	.61		.77	.29	[a].21
5	.44	[a].68	.49	.29	.22	[a].72	[a].68	.63	[b]26	.75	.30	[a].21
6	.42	[a]1.75	.47	.29	.22	.72	.61	.63		.75	.29	[a].21
7	.42	[a].68	.45	.29	.22	.70	.61	.61		.75	.29	[a].21
8	.42	1.35	.45	.29	.22	.68	.61		[b]5	.75	.48	.19
9	.54	[a].88	2.9	.29	.21	.65	[a].59	[b]11		1.9	.70	.35	.21
10	.69	[a].68	.84	.29	.21	.59	.57			1.65	.66	.32	[a].21
11	.47	[a].68	.66	.29	.21	.56	.52	[b]4.3		1.55	.65	.30	[a].25
12	.45	[a].68	.63	.27	.19	.67	.49			1.35	.61	.32	[a].25
13	.50	[a].68	.63	.27	.19	1.05	.45	[b]11		1.35	.57	.32	[a].25
14	.50	[a].68	.63	.27	.19	.56	.44			1.3	.56	.32	[a].25
15	.52	[a].68	.59	.25	.19	2.9	.44	[b]5		1.35	.54	.32	[a].24
16	.52	[a].68	.56	.25	.24	.92	.40			1.3	.52	.32	[a].24
17	.52	1.8	.52	.25	.33	.75	.38			1.25	.50	.32	[a].24
18	2.4		.50	.25	.32	.72	.38			1.2	.49	.30	[a].24
19	.57	[b]2.1	.45	.25	.30	.72	.35			1.1	.45	.30	[a].24
20	.57		42	.24	.29	.70	.35	[b]2.1		1.1	.45	.30	[a].24
21	2.4		.40	.24	.29	.68	.35			1.0	.44	.30	[a].24
22	.77		.40	.24	.29	.65	.37			.96	.42	[a].27	[a].24
23	.70	[b].7	.37	.24	.32	.59	.35			.89	.42	[a].27	[a].24
24	.75		.35	.24	1.35	.54	.35			.82	.40	[a].27	[a].24
25	.75		.33	.24	.44	.50	.35			.77	.38	[a].29	[a].24
26	.70		.32	.24	.42	.45	.35	[b].9		.70	.37	[a].27	[a].24
27	.70		.32	.24	.44	.44	.33			.68	.37	[a].27	[a].24
28	.68	[b].5	.32	.24	.71	.42	.33			.66	.37	[a].25	[a].24
29	1.05		.30	.24	.52	.42	.32	-------		.63	.37	[a].25	[a].24
30	.70		.29	.24	.52	.40	.32	-------		.61	.35	[a].24	[a].24
31	.70	[a].50	-------	.24	-------	2.0	14.5	-------		.57	-------	[a].24	------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	2.4	0.42	0.689	1.08	21.6	66
August	18	----------	1.46	2.26	45.2	139
September	2.9	.29	.550	.851	16.5	51
October	.29	.24	.262	.405	8.13	25
November	1.35	.19	.331	.512	9.93	30
December	4.7	.40	.912	1.41	28.3	87
January	14.5	.32	.926	1.43	28.7	88
February	----------	.56	3.54	5.48	99.0	304
March	----------	.57	5.12	7.92	159	487
April	2.3	.35	.610	.944	18.3	56
May	.48	.24	.300	.464	9.31	29
June	.25	.19	.231	.357	6.94	21
The year	----------	.19	1.23	1.90	451	1,380

[a] Partly estimated. [b] Estimated.

WAIOMAO STREAM ABOVE PUKELE STREAM, NEAR HONOLULU

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 1933.

DISCHARGE.—Maximum during year, 120 million gallons a day or 186 second-feet Mar. 3 (gage height, 3.40 feet); no flow Oct. 11–17, May 4–6, 31, June 1–7. 1911–12, 1926–33: Maximum, 461 million gallons a day or 713 second-feet Apr. 11, 1930 (gage height, 6.27 feet); no flow in extremely dry weather.

REMARKS.—Records good for ordinary and medium stages, poor for very high stages and estimated periods. Board of Water Supply diverts water from tunnels in drainage area.

Discharge, in million gallons, 1932–33

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	0.11	0.33	0.12	0.04	0.07	0.19	[a]3.5	1.9	1.15	0.31	[a]0.01	0.0
2	.08	.42	.11	.04	.04	1.35		.58	1.2	.73	[b].01	0
3	.18	.53	.37	.09	.04	3.6		.46	27	1.85	[b].01	0
4	.18	3.0	.25	.08	.03	.71	[a].9	.33	9.7	.41	[a]0	0
5	.08	.97	[a].60	.03	.02	.49		.19	8.0	.24	0	0
6	.07	2.3		.02	.04	.35		.13	22	.20	[b]0	0
7	.05	.66	[b].2	.02	.05	.25		.10	5.7	.13	[b].5	.03
8	.09	1.35		.02	.03	.19	[a].3	5.9	2.1	.10	[b]1.0	.09
9	.80	.79	[a]3.7	.02	.02	.16		6.2	1.25	.09	.56	.04
10	1.1	.50	1.5	.02	.02	.18	.13	11.5	1.05	.12	.24	.73
11	.50	.62	[b].58	.01	.29	.18	.12	4.1	.71	.32	.12	.53
12	.33	.39	[b].35	0	1.2	1.45	.09	2.1	.54	.11	.08	.20
13	.32	.62	[a].20	0	.30	2.8	.08	4.2	.44	.06	.07	.11
14	.18	.48	.18	0	.13	1.25	.07	11.5	.35	.05	.28	.09
15	.33	.32	.13	0	.09	3.7	.22	3.4	.26	.04	.10	.11
16	.26	.24	.10	0	.52	1.25	.28	4.0	.22	.04	.08	.07
17	.14	12	.08	.19	1.3	1.05	.13	1.95	.19	.04	.06	.04
18	1.9	2.4	.16	.07	.69	.66	.12	1.95	.18	.04	.04	.03
19	.72	.87	.09	.35	.37	.54	.09	1.65	.14	.03	.03	.03
20	.49	1.65	.08	.20	.25	.41	.11	2.0	.11	.03	.05	.02
21	3.1	.71	.10	.09	.16	.28	.09	1.95	.10	.03	.04	.03
22	1.15	.46	.08	.36	.11	.30	.35	1.25	.21	.03	.03	.04
23	.50	.39	.09	.16	.33	.20	.18	.79	.25	.02	.02	.03
24	.39	.33	.07	.09	2.4	.35	.14	.66	.14	.02	.03	.04
25	.64	.44	.07	.07	.50	.22	.09	.56	.11	.02	.03	.08
26	.30	.26	.07	.05	.73	.16	.08	.58	.11	.02	.02	.04
27	.20	.20	.06	.04	.77	.16	.08	.96	.08	.02	.02	.12
28	.27	.16	.08	.41	.98	.27	.06	.71	.07	.02	.01	.18
29	1.0	.13	.06	.16	.52	.52	.04	-------	.08	.02	.01	.20
30	.76	.43	.07	.10	.30	.69	.04	-------	.08	.02	.01	.32
31	.56	.21	-------	.08	-------	[b]2.0	5.0	-------	.06	-------	0	------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	3.1	0.05	0.541	0.837	16.8	51
August	12	.13	1.10	1.70	34.2	105
September	3.7	.06	.332	.514	9.95	31
October	.41	0	.091	.141	2.81	9
November	2.4	.02	.410	.634	12.3	38
December	3.7	.16	.836	1.29	25.9	80
January	-------	.04	.596	9.22	18.5	57
February	11.5	.10	2.56	3.96	71.6	220
March	27	.06	2.70	4.18	83.6	256
April	1.85	.02	.172	.266	5.16	16
May	-------	0	.112	.173	3.46	11
June	.73	0	.107	.166	3.20	10
The year	27	0	.787	1.22	287	884

[a] Partly estimated. [b] 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, 1932–33

Date	Stream	Tributary to—	Locality	Second-feet	Million gallons a day
1932					
July 13	Pearl Harbor Springs	Pacific Ocean	Ditch levee 1,000 feet west of Puukapu gaging station.	[a] 0.08	[a] 0.05
Aug. 4	do	do	do	0.136	.088
Sept. 8	do	do	do	.074	.048
Oct. 12	do	do	do	.236	.153
Nov. 10	do	do	do	[a] .015	[a] .01
Dec. 8	do	do	do	1	0
Oct. 12	do	do	Ditch levee 900 feet west of Puukapu gaging station.	0.55	1.00
July 13	do	do	27-inch culvert 300 feet west of Waiau railway station.	4.81	3.11
Aug. 4	do	do	do	3.81	2.46
Sept. 19	do	do	do	4.21	2.72
Oct. 12	do	do	do	3.77	2.44
Nov. 10	do	do	do	4.41	2.85
Dec. 8	do	do	do	4.40	2.84
July 13	do	do	Wooden culvert 10 feet west of Waiau railway station.	.664	.429
Aug. 4	do	do	do	.448	.290
Sept. 19	do	do	do	.759	.491
Oct. 12	do	do	do	.582	.376
Nov. 10	do	do	do	.665	.430
Dec. 8	do	do	do	.903	.584
July 13	do	do	Below diversion dam of Waiau gaging station.	5.06	3.27

[a] Estimated.

ISLAND OF MAUI

HONOKAHAU STREAM NEAR HONOKAHAU

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 1933.

DISCHARGE.—Maximum during year, 1,130 million gallons a day or 1,750 second-feet Mar. 5 (gage height, 6.30 feet); minimum, 9.2 million gallons a day or 14.2 second-feet June 20, 21.

1913–20, 1922–33: Maximum, 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. Average, 15 years (1916–20, 1922–33), 25.4 million gallons a day (39.3 second-feet).

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

Discharge, in million gallons, 1932–33

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	37	19.5	16	13.5	13.5	14.5	51	14	11	100	11.5	14.5
2	23	18	17	13.5	14	12	15.5	11	10.5	46	11	15.5
3	38	18	57	13.5	12.5	11.5	13.5	14	16	79	15	23
4	17	17.5	50	13.5	12.5	11.5	12.5	28	24	15	11.5	25
5	16	19.5	54	13.5	12.5	11.5	12	11.5	143	12.5	11	13.5
6	16	32	18.5	13.5	12	11	11.5	10.5	182	12	20	11.5
7	15.5	18	16.5	13	12	11	11.5	10.5	255	12	13.5	13.5
8	19	23	62	13	12	11	11	10.5	129	11.5	12	13.5
9	25	22	148	13	12	11	11	103	22	11.5	11.5	15
10	30	23	21	13	13	11	11	32	69	12.5	10.5	25
11	28	34	17.5	13	39	12	12	12	19	12	10.5	11
12	23	21	16.5	13	36	40	11.5	11	14.5	11.5	10.5	10
13	84	32	17.5	13	13	93	11.5	45	17.5	11.5	10	9.7
14	24	20	16	12.5	12	21	11	90	19.5	11.5	12.5	9.7
15	85	18	15.5	12.5	12	57	33	17.5	13.5	14.5	10.5	10
16	24	17.5	15	12.5	11.5	17	20	19	12.5	14	11.5	12
17	22	38	15.5	13.5	12	23	14	16.5	12	23	20	13.5
18	65	20	16	12.5	11.5	19.5	35	28	12	14	13.5	9.7
19	24	17.5	16	40	11.5	19	15.5	38	12	12	10.5	9.4
20	38	25	15.5	19	11.5	13.5	15.5	18	11.5	11.5	37	9.4
21	45	19	14.5	14	11.5	12	18	38	12	11.5	21	14
22	87	17.5	15.5	24	11	11.5	37	16	26	11.5	10.5	13.5
23	91	17.5	16	16	14	11.5	26	12	36	11.5	11.5	12
24	64	19	14.5	14	153	26	16	11	16.5	11.5	14.5	28
25	29	18	14	13	42	25	12.5	13.5	16.5	11.5	11.5	15
26	27	17	14	13	17.5	12	12.5	13	41	40	11.5	11
27	20	17.5	14	13	28	12	18	12	13	14	10.5	10.5
28	31	18.5	14	12.5	61	30	20	11	11.5	24	10.5	10
29	50	25	13.5	12.5	23	34	17.5	-------	12	32	22	17
30	58	17.5	13.5	15	18	12.5	13	-------	12	16	13.5	41
31	40	16.5	-------	13	-------	292	13.5	-------	11.5	-------	10.5	-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	91	15.5	38.6	59.7	1,200	3,670
August	38	16.5	21.2	32.8	656	2,010
September	148	13.5	25.5	39.5	764	2,350
October	40	12.5	14.7	22.7	454	1,390
November	153	11	22.5	34.8	675	2,070
December	292	11	29.3	45.3	910	2,790
January	51	11	17.5	27.1	544	1,670
February	103	10.5	23.8	36.8	666	2,050
March	255	10.5	39.1	60.5	1,210	3,720
April	100	11.5	21.0	32.5	631	1,940
May	37	10	13.6	21.0	422	1,290
June	41	9.4	14.9	23.1	446	1,370
The year	292	9.4	23.5	36.4	8,580	26,300

HONOKAWAI DITCH NEAR LAHAINA

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 1933.
DISCHARGE.—See table of monthly discharge for maximum and minimum during year.

1912–33: Maximum, 76 million gallons a day or 118 second-feet Aug. 11, 1929 (gage height, 2.17 feet); no flow occasionally, when water is shut out of ditch. Average, 14 years (1919–33), 6.24 million gallons a day (9.66 second-feet).

REMARKS.—Record of daily discharge furnished by Pioneer Mill Co. Diverts water for irrigation from Honokawai Stream just above station. Regulated by head gates at intake.

Discharge, in million gallons, 1932–33

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	8.5	4.1	3.6	3.2	3.3	3.8	4.4	2.8	2.6	7.5	2.6	2.7
2	6.5	3.7	4.4	3.2	3.4	3.2	3.2	2.8	2.6	6.8	2.7	3.5
3	8.8	3.6	15	3.2	3.3	3.1	3.0	3.4	2.7	10.5	3.1	4.6
4	3.8	3.6	11	3.2	3.2	3.1	2.9	5.1	4.1	2.6	2.0	4.8
5	3.6	4.0	15.5	3.2	3.3	3.0	2.8	2.6	12.5	2.6	2.0	3.1
6	3.5	7.7	3.9	3.2	3.3	3.0	2.8	2.7	16.5	2.6	2.5	2.7
7	4.5	3.7	3.5	3.2	3.3	2.9	2.8	2.8	25	2.6	2.7	2.6
8	4.3	4.9	11	3.2	3.3	2.9	2.8	2.8	16	2.7	2.6	2.8
9	7.8	5.0	25	3.2	3.2	2.9	2.8	12.5	3.7	2.8	2.6	2.8
10	7.8	4.0	4.2	3.2	3.3	2.9	2.8	5.9	9.3	2.8	2.7	2.8
11	10.5	8.7	3.6	3.2	4.0	2.9	2.8	2.8	3.4	2.8	2.7	2.7
12	6.1	3.9	3.4	3.2	6.0	4.7	2.8	2.7	2.9	2.8	2.7	2.6
13	22	6.5	3.4	3.2	2.7	13.5	2.8	7.9	3.2	2.8	2.7	2.7
14	5.7	4.1	3.4	3.2	3.1	3.9	2.8	17	3.9	2.8	2.7	2.6
15	22	3.6	3.4	3.3	3.2	7.3	7.9	1.9	2.8	2.8	2.6	2.7
16	5.7	3.2	3.3	3.3	3.4	3.4	4.2	1.4	2.8	3.0	2.7	3.2
17	5.0	6.0	3.3	3.3	3.3	5.4	3.5	2.2	2.7	4.7	5.3	2.9
18	17.5	4.1	3.3	3.3	3.3	3.9	9.4	5.3	2.7	3.0	3.0	2.5
19	6.2	3.6	3.3	9.6	3.3	3.9	4.0	8.6	2.7	2.7	2.8	2.6
20	10.5	4.6	3.3	4.8	3.3	3.1	3.9	4.1	2.7	2.8	8.0	2.5
21	7.6	3.9	3.3	3.3	3.3	2.9	4.8	11	2.6	2.8	5.1	2.7
22	23	3.6	3.3	8.3	3.3	2.8	7.6	3.6	4.2	2.8	2.7	3.0
23	18	3.5	3.3	4.1	3.3	2.8	7.1	2.7	6.1	2.9	2.7	2.7
24	13.5	3.6	3.3	3.4	23	8.0	3.5	2.7	3.4	2.8	2.7	6.9
25	7.6	3.6	3.4	3.2	7.7	6.9	2.8	3.5	3.3	2.8	2.6	3.3
26	4.8	3.6	3.3	3.2	3.9	3.0	2.9	2.7	8.1	9.3	2.7	2.7
27	4.1	3.6	3.2	3.3	6.3	3.0	4.4	2.7	2.8	2.7	2.6	2.7
28	3.9	3.6	3.2	3.4	13.5	7.9	4.3	2.6	2.7	7.9	2.6	2.7
29	10.5	4.0	3.2	3.3	4.8	6.2	3.8	-------	2.6	9.3	2.7	6.1
30	14.5	3.6	3.2	3.4	4.4	3.0	2.9	-------	2.5	3.5	2.8	8.3
31	9.7	3.6	-------	3.4	-------	9.2	2.8	-------	2.6	-------	2.8	-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	23	3.5	9.27	14.3	288	882
August	8.7	3.2	4.28	6.62	133	408
September	25	3.2	5.45	8.43	164	502
October	9.6	3.2	3.70	5.72	115	352
November	23	2.7	4.73	7.32	142	436
December	13.5	2.8	4.47	6.92	138	425
January	9.4	2.8	3.91	6.05	121	372
February	17	1.4	4.60	7.12	129	395
March	25	2.5	5.35	8.28	166	509
April	10.5	2.6	4.02	6.22	120	370
May	8.0	2.0	2.99	4.63	92.7	284
June	8.3	2.5	3.35	5.18	100	308
The year	25	1.4	4.68	7.24	1,710	5,240

OLOWALU DITCH NEAR OLOWALU

LOCATION.—Water-stage recorders on East Branch 150 feet southeast of power house and on West Branch 300 feet northwest of power house and a 90° V-shaped weir just above the West Branch station. The power house is 1 mile above Olowalu and 7 miles east of Lahaina.

RECORDS AVAILABLE.—August 1911 to June 1933.

DISCHARGE.—See monthly discharge table for maximum and minimum during year.

1911–33: Maximum, 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. Average, 15 years (1917–20, 1921–33), 4.74 million gallons a day (7.33 second-feet).

REMARKS.—Records furnished by Pioneer Mill Co. Intake in Olowalu Stream at elevation about 450 feet. Water used for power and irrigation. Regulated by head gates. Records are obtained by adding together the flows of the East and West Branches and the water used daily for irrigation measured by the 90° weir.

Discharge, in million gallons, 1932–33

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	6.0	8.0	3.4	3.3	2.5	3.9	4.1	3.2	3.9	5.2	3.6	2.9
2	5.4	7.2	3.5	3.3	2.7	3.3	7.8	3.5	3.8	7.3	3.3	3.2
3	7.1	6.7	5.9	3.9	2.6	3.1	6.5	3.9	4.0	7.8	3.4	3.0
4	5.0	6.1	7.1	3.7	2.5	2.9	5.4	7.3	7.6	5.4	3.2	2.9
5	4.6	5.8	7.2	3.2	2.3	2.8	5.0	4.4	8.2	5.1	3.0	3.5
6	4.4	5.7	6.4	3.3	2.3	2.7	4.4	3.8	12	4.6	3.0	3.2
7	4.6	5.3	4.5	3.1	2.2	2.7	4.2	3.5	14.5	4.2	3.0	3.2
8	4.3	5.4	4.4	3.1	2.3	2.7	4.0	6.3	14.5	4.2	3.3	3.1
9	4.4	5.3	14	3.3	2.4	2.7	3.9	9.1	15	3.9	3.1	2.7
10	4.4	5.0	11	2.8	2.5	4.5	3.8	13	16.5	4.8	3.0	3.5
11	5.1	4.8	6.2	2.8	2.4	3.5	3.7	7.7	11	4.2	2.9	2.9
12	5.0	4.9	4.8	2.9	2.5	4.8	3.5	5.6	7.5	4.1	2.8	2.8
13	9.6	5.4	4.2	2.8	2.3	8.5	3.4	7.4	8.0	3.8	2.8	2.6
14	7.1	4.8	4.0	2.8	2.2	9.4	3.3	4.8	7.1	3.7	2.8	2.6
15	9.8	4.4	3.5	2.7	2.5	8.9	6.6	5.3	6.7	3.7	2.7	2.5
16	8.5	4.2	3.7	2.8	2.5	6.7	5.4	6.1	6.8	3.6	2.7	2.8
17	6.8	4.9	4.2	2.7	2.4	4.9	4.0	6.0	6.4	4.1	3.0	2.9
18	7.1	4.4	3.8	2.7	2.3	4.4	4.8	6.4	6.2	3.9	3.0	2.5
19	7.3	4.1	3.5	3.7	2.3	4.0	3.9	6.3	5.6	3.4	2.6	2.5
20	7.4	4.5	3.7	3.2	2.2	3.8	3.8	4.9	5.4	3.4	3.5	2.3
21	7.8	4.0	3.4	2.9	2.3	3.8	3.8	5.0	5.5	3.0	3.4	2.7
22	10.5	3.9	3.6	3.0	2.2	3.6	6.1	4.7	5.4	3.2	2.9	2.4
23	9.0	3.9	3.5	4.2	2.4	3.3	4.5	4.9	6.0	3.2	2.8	2.5
24	9.5	4.0	3.5	2.8	12	3.1	4.0	4.9	6.0	3.1	2.8	2.5
25	8.1	4.2	3.3	2.7	6.8	3.5	3.6	4.4	5.4	3.0	2.8	2.9
26	6.5	3.8	3.4	2.8	4.0	4.4	3.4	4.3	5.7	3.4	3.0	2.4
27	5.9	3.6	3.3	2.6	4.2	3.0	3.5	4.0	5.0	3.5	2.6	2.2
28	6.9	3.6	5.2	2.7	8.2	4.2	3.5	4.0	5.2	3.3	2.6	2.2
29	9.6	4.0	4.3	2.6	5.8	4.0	3.5	------	4.3	4.7	4.3	2.5
30	10.5	3.6	3.8	2.6	4.6	3.3	3.4	------	3.8	4.0	3.7	4.0
31	8.6	3.4	------	2.6	------	7.6	3.2	------	3.7	------	3.1	------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	10.5	4.3	6.99	10.8	217	665
August	8.0	3.4	4.80	7.43	149	457
September	14	3.3	4.88	7.55	146	449
October	4.2	2.6	3.02	4.67	93.6	287
November	12	2.2	3.35	5.18	100	308
December	9.4	2.7	4.32	6.68	134	411
January	7.8	3.2	4.32	6.68	134	411
February	13	3.2	5.52	8.54	155	475
March	16.5	3.7	7.31	11.3	227	696
April	7.8	3.0	4.16	6.44	125	383
May	4.3	2.6	3.05	4.72	94.7	291
June	4.0	2.2	2.80	4.33	83.9	257
The year	16.5	2.2	4.54	7.02	1,660	5,090

OHEO STREAM BELOW DIVERSION DAM NEAR KIPAHULU

LOCATION.—Water-stage recorder below old diversion dam at elevation 1,550 feet, 2 miles northwest of Kipahulu and 2½ miles above mouth.

DRAINAGE AREA.—5.8 square miles.

RECORDS AVAILABLE.—February 1927 to September 1929, December 1931 to June 1933. Prior to September 1929 at site 100 feet upstream at old diversion dam.

DISCHARGE.—Dec. 19, 1931, to June 30, 1932: maximum, 4,240 million gallons a day or 6,560 second-feet Feb. 13 (gage height, 10.00 feet); minimum, 0.03 million gallons a day or 0.05 second-foot Dec. 18.

July 1, 1932, to June 30, 1933: maximum, 6,190 million gallons a day or 9,580 second-feet Jan. 4 (gage height, 11.95 feet); minimum, 0.02 million gallons a day or 0.03 second-foot Oct. 1–5.

1927–29, 1931–33: Maximum discharge, that of Jan. 4, 1933; no flow during dry periods.

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

Discharge, in million gallons, 1931–33

Day	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1931-32							
1		170		144	216	419	63
2		206	[a]24	65	34	22	48
3		21		27	56	64	19.5
4		2.6	[a]800	7.1	13.5	8.2	26
5		.86		2.8	43	26	20
6		.50	[a]300	1.25	147	90	10.5
7		.33		.86	32	73	6.3
8		41	106	19	26	22	1.6
9		249	427	7.5	68	76	2.2
10		207	671	.82	23	21	11
11		151	1,290	.54	9.8	10	2.3
12		13.5	1,030	.42	76	85	12.5
13		175	1,030	1.4	143	30	72
14		66	228	1.85	42	14.5	91
15		78	12	.94	28	74	16
16		14	5.4	.52	25	12.5	7.6
17		3.9	272	.54	7.4	4.7	6.3
18		151	11	.28	1.25	6.4	29
19	245	574	3.3	.18	.72	1.95	16
20	71	305	39	.21	20	9.2	56
21	49	206	316	.33	37	8.3	4.0
22	41	92	1,450	.42	29	14.5	.95
23	15		36	.28	74	59	.86
24	14	120	6.8	3.4	146	97	.44
25	2.4		15	5.4	46	24	.30
26	.39		5.4	14	72	49	9.7
27	.25	22	124	11.5	16.5	150	4.7
28	.16		524	25	2.8	57	94
29	.12		507	15.5	46	31	9.8
30	.22	70	----------	37	1,250	34	2.0
31	7.7		----------	54	----------	19.5	----------

[a] Estimated.

Discharge, in million gallons, of Oheo Stream below diversion dam near Kipahulu, 1931–33—Continued

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1932-33												
1	0.44	5.2	0.04	0.03		22	1,100			142	27	1.95
2	.54	1.15	.08	.02	[a] 0.4	147	47	[a] 19	[a] 65	17	4.1	92
3	7.4	.77	32	.02		65	1,010			34	64	157
4	.25	.47	34	.02		23	1,060		519	9.2	23	117
5	.64	.36	25	3.7		5.2	410		[b] 63	.77	37	54
6	.91	.45	1.95	2.5	[a] 20	1.55	80	[b] 1.0	[b] 168	.39	60	9.6
7	.15	.21	.39	.12		1.1	[b] 58		828	.28	44	17
8	.09	.49	42	.05		.82	[a] 14		[b] 132	.21	71	15
9	.30	2.6	395	.03	[a] .1	.54			[a] 15	.18	57	5.6
10	9.5	.16	22	.03		26		[a] 20		.52	91	5.7
11	39	17.5	3.2	.03	[a] 32	3.6	[a] .3	178	[a] .6	.28	7.1	1.45
12	11.5	.51	.82	.03		.50		145		.19	70	.64
13	268	8.6	.64	.03	[a] 3.7	6.9			[a] 11	.12	69	.44
14	16.5	1.4	29	.09		1.1	[a] 20	[a] 26		74	296	.33
15	42	.19	11.5	.07	119	48				70	215	.42
16	5.5	.12	1.1	.04	54	1.4	165	207	[a] .7	34	28	2.2
17	1.35	195	.68	.03	3.1	29	223	[b] 29		51	62	6.8
18	15	35	.59	.54	12	9.7	209	64	.30	12	19	.18
19	8.8	2.6	2.6	178	27	5.7	166	145	.22	2.6	3.4	.16
20	67	5.8	1.7	55	10.5	1.55	133	140	.19	.70	35	.20
21	45	2.4	.21	1.65	1.35	.54	34	182	.18	.44	40	16
22	310	.36	.14	41	.64	.97	69	[b] 38	13	.59	3.7	72
23	70	.64	.08	137	.42	.59	90		53	.79	.95	51
24	137	2.4	.05	17	129	107	[b] 119	[a] 32	30	5.1	3.8	22
25	86	7.6	1.4	2.5	26	116	[a] 80		9.3	6.2	.59	30
26	5.6	.52	.47	[a] 10	23	31	49	271	34	42	.44	5.9
27	1.65	.39	.21		37	8.7	86	191	2.2	103	.44	1.65
28	20	.21	.22		57	148	[a] 65	572	.36	245	12.5	17.5
29	76	.15	.11	[a] .3	27	79		-------	3.3	34	20	47
30	63	.16	.06		102	4.0	[b] 131	-------	1.45	48	17.5	129
31	40	.08	-------		--------	701	725	-------	8.2	--------	1.4	-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
1931-32						
December 19–31	245	0.12	34.3	53.1	446	1,370
January	574	.33	109	169	3,360	10,300
February	1,450	3.3	358	554	10,400	31,900
March	144	.18	14.5	22.4	449	1,380
April	1,250	.72	91.0	141	2,730	8,380
May	419	1.95	52.0	80.5	1,610	4,950
June	94	.30	21.5	33.3	644	1,970
The period (195 days)	1,450	.12	101	156	19,600	60,200
1932-33						
July	310	.09	43.5	67.3	1,350	4,140
August	195	.08	9.47	14.7	293	901
September	395	.04	20.2	31.3	607	1,860
October	178	.02	14.9	23.1	461	1,410
November	129	----------	26.2	40.5	786	2,410
December	701	.50	51.5	79.7	1,600	4,900
January	1,100	----------	201.	311	6,240	19,200
February	572	----------	87.0	135	2,440	7,480
March	828	.18	68.3	106	2,120	6,490
April	245	.12	31.2	48.3	935	2,870
May	296	.44	44.6	69.0	1,380	4,250
June	157	.16	29.3	45.3	880	2,700
The year	1,100	.02	52.3	80.9	19,100	58,600

[a] Estimated. [b] Partly estimated.

RIGHT BRANCH OF KAHALAWE STREAM NEAR KIPAHULU

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 1933.

DISCHARGE.—Maximum during year, 129 million gallons a day or 200 second-feet Apr. 1 (gage height, 8.95 feet); minimum, 1.0 million gallons a day or 1.6 second-feet Apr. 25, May 2.

1927–33: Maximum, 612 million gallons a day or 947 second-feet Feb. 5, 1932 (gage height, 11.20 feet); minimum, 0.15 million gallons a day or 0.23 second-foot Dec. 16, 1929.

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

Discharge, in million gallons, 1932–33

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	3.0	2.4	1.0		1.2	a14	18			32	1.4	
2	2.3	2.1	1.6	a1.0	1.2		5.1		a12	3.2	1.1	a6
3	4.8	2.1	5.2		a1.4	a6	23	a4.0		2.5	1.2	
4	1.6	1.9	7.4				a12			1.9	2.5	
5	3.7	1.8	4.4	a3.0	a2.8	a3.1			a90	1.4	4.7	
6	4.2	2.0	1.6				5.8			1.3	8.0	a3.0
7	1.9	1.5	1.0			2.8	9.2	a2.6		1.3	4.7	
8	1.9	2.5	2.1			2.8	3.5			1.2	5.4	
9	2.7	1.8	18	a1.6	a1.6	2.5	2.9	2.1	a22	1.1	7.2	
10	3.2	1.4	3.3			2.8	2.8	4.3		2.5	6.5	5.2
11	4.5	4.3	2.1			2.5	3.8			1.8	2.2	2.8
12	2.0	1.8	1.8		a2.8	2.9		a7	a3.3	2.4	19.5	2.2
13	5.3	3.9	1.6			5.8	a3.2			1.3	6.5	2.1
14	2.3	1.6	10		a1.4	3.1		a24		4.5	4.8	1.9
15	8.6	1.2	3.8	a1.2	17.5	4.1			2.1	3.7	4.5	2.2
16	2.4	1.1	1.9		4.9	2.2	a12			1.8	1.6	2.8	1.8
17	1.9	13.5	1.8		2.6	5.9				1.6	6.3	4.3	1.9
18	1.9	4.3	1.6	a6.5	10.5	3.6		a11		1.5	2.2	2.6	1.5
19	1.8	1.6	1.7		6.3	2.8				1.4	1.3	2.1	1.5
20	6.7	2.4	1.6	a2.8	3.9	2.3	a6.5			1.3	1.3	3.7	1.8
21	11.5	1.8	1.4		2.5	1.9		a32		1.3	1.2	2.5	3.2
22	16.5	1.4	1.2	a10	2.1	3.5				3.8	1.3	1.9	4.5
23	9.0	3.5	.9		1.9	2.2	a14			3.0	1.6	1.8	3.8
24	11	3.2	.9		13	5.5		a7		1.8	1.6		3.5
25	5.9	2.3	3.2	a4.3		2.2	2.6			1.3	1.2		3.0
26	3.0	1.4	1.4		a5	2.4	2.5			1.9	2.1		2.2
27	2.1	1.5		3.2		1.9		a34		1.3	2.8	a1.6	1.8
28	6.6	1.2	a1.2	1.9		6.3	a4.0			1.1	2.7		2.4
29	9.0	1.1		1.6		2.9				1.7	2.4		3.6
30	7.5	1.9		1.8	a15	3.0	a13			1.3	2.6		3.9
31	5.5	1.1		1.4		22				5.4			

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	16.5	1.6	4.98	7.71	154	474
August	13.5	1.1	2.44	3.78	75.6	232
September	18	.9	2.91	4.50	87.3	268
October			2.78	4.30	86.2	265
November		1.2	4.69	7.25	141	432
December	22	1.9	4.71	7.29	146	448
January	23		7.69	11.9	238	732
February			12.3	19.0	345	1,060
March		1.1	15.8	24.4	490	1,500
April	32	1.1	3.14	4.86	94.3	289
May	19.5	1.1	3.70	5.72	115	352
June		1.5	3.19	4.94	95.8	294
The year		.9	5.67	8.77	2,070	6,350

a Estimated.

HANAWI STREAM NEAR NAHIKU

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 1933.

DISCHARGE.—Maximum during year, 352 million gallons a day or 545 second-feet Dec. 31 (gage height, 5.63 feet); minimum, 1.6 million gallons a day or 2.5 second-feet Nov. 14, 15.

1914–16, 1921–33: Maximum stage from flood marks, about 20 feet during flood of Jan 18, 1916 (discharge not determined); minimum discharge, 1.4 million gallons a day or 2.2 second-feet July 5, 8, 1926. Average, 11 years (1922–33), 11.9 million gallons a day (18.4 second-feet).

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

Discharge, in million gallons, 1932–33

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	4.2	9.6	2.9	2.3	1.9			16.5	5.7	26	6.8	2.5
2	4.5	8.2	3.0	2.3	1.8	[a]7	[a]28	8.3	5.0	42	4.4	4.0
3	10	7.5	6.1	2.2	1.8			7.3	23	66	6.2	4.9
4	4.1	6.8	12	2.2	1.8	[a]3.4	[a]36	6.8	8.6	8.5	3.9	3.3
5	3.6	6.4	12.5	2.2	1.8			6.6	37	6.1	3.6	3.1
6	3.4	6.4	4.8	2.1	1.8		[a]6	6.4	74	5.2	3.5	2.8
7	3.3	6.1	3.7	2.1	1.7	[a]2.5		6.3	247	4.8	3.2	2.6
8	3.2	6.4	4.7	2.0	1.7			6.2	97	4.3	3.2	2.5
9	3.5	7.1	36	2.0	1.7	2.2		21	17	4.0	3.0	2.4
10	3.9	6.3	7.2	2.0	1.7	2.2		10	23	3.9	3.0	2.3
11	8.5	6.4	4.9	2.0	1.8	2.2	[a]5	8.1	10.5	3.8	2.7	2.2
12	7.0	5.7	4.2	1.9	1.8	3.1		7.1	7.2	3.7	2.7	2.2
13	61	6.1	4.0	1.9	1.6	3.6		7.0	10	3.5	2.6	2.1
14	9.9	5.2	3.9	1.8	1.6	2.4		13.5	10.5	3.5	9.7	2.1
15	34	4.8	3.5	1.9	1.6	5.2		6.7	7.7	3.9	9.8	2.1
16	10.5	4.5	3.2	1.9	3.0	2.8	[a]36	6.2	7.6	3.5	5.3	2.1
17	8.4	7.2	3.1	1.9		2.7		5.7	7.6	5.6	4.7	2.1
18	18.5	4.6	3.2	1.8	[a]1.8	2.7	18.5	6.4	7.6	5.2	4.6	2.0
19	10.5	4.1	3.2	3.0		2.9	8.4	12	7.3	3.6	3.5	1.9
20	20	4.0	3.1	2.4		2.5	8.8	19.5	7.0	3.3	11	1.8
21	15	4.0	2.8	2.0		2.4	13	25	6.8	3.2	14	2.0
22	72	3.9	2.7	2.1	[a]1.6	2.3	15.5	8.8	8.7	3.2	4.2	4.3
23	46	9.5	2.6	2.9		2.3	19	6.4	19	3.2	3.5	11
24	38	5.7	2.4	2.4	[a]38	6.3	22	5.7	17	3.5	3.2	6.4
25	19	3.9	3.5	2.0		14	13.5	6.2	8.2	3.1	3.0	6.6
26	10.5	3.7	2.8	2.0	[a]10	4.6	14.5	7.5	15.5	3.1	2.8	3.4
27	8.0	3.6	2.5	1.9		3.9	17.5	5.2	6.4	4.1	2.7	2.8
28	8.2	3.5	2.4	1.8		15	18.5	11.5	5.6	12.5	2.7	2.6
29	14	3.5	2.4	1.9	[a]22	30	10.5	------	5.3	7.9	2.7	6.3
30	19	3.2	2.3	2.1		4.2	7.3	------	5.0	8.7	2.7	13
31	18.5	3.1	------	2.0	------	115	33	------	4.4	------	2.5	------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	72	3.2	16.1	24.9	500	1,540
August	9.6	3.1	5.52	8.54	171	525
September	36	2.3	5.19	8.03	156	478
October	3.0	1.8	2.10	3.25	65.0	199
November	----------	1.6	6.77	10.5	203	623
December	115	2.2	8.70	13.5	270	828
January	----------	----------	16.4	25.4	509	1,560
February	25	5.2	9.42	14.6	264	810
March	247	4.4	23.3	36.1	722	2,220
April	66	3.1	8.76	13.6	263	807
May	14	2.5	4.56	7.06	141	434
June	13	1.8	3.65	5.65	109	336
The year	247	1.6	9.24	14.3	3,370	10,400

[a] Estimated.

KAPAULA STREAM NEAR NAHIKU

LOCATION.—Water-stage recorder 40 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 1933.

DISCHARGE.—Maximum during year 603 million gallons a day or 933 second-feet Mar. 6 (gage height, 5.03 feet); minimum, 0.8 million gallons a day or 1.2 second-feet Nov. 21–23.

1921–33: Maximum, 1,400 million gallons a day or 2,170 second-feet Dec. 18, 1929 (gage height, 7.39 feet); minimum, 0.6 million gallons a day or 0.9 second-foot July 5, 1926. Average, 11 years (1922–33), 10.4 million gallons a day (16.1 second-feet).

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

Discharge, in million gallons, 1932–33

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1				1.2	1.1	7.9	42	15	4.4	29	4.4	1.5
2	[a] 3.5	[a] 6	[a] 3.1	1.2	1.0	5.4	6.6	7.5	3.1	36	2.6	2.6
3				1.2	1.0	5.6	43	4.9	6.7	49	4.2	4.2
4				1.2	1.0	3.7	15.5	4.7	7.0	6.6	2.2	2.3
5			[a] 12	1.1	1.0	2.2	4.9	4.9	35	4.1	1.8	2.0
6	[a] 2.6	[a] 3.8		1.1	1.0	1.8	3.4	3.9	73	3.4	1.8	1.8
7			[a] 3.7	1.1	.9	1.6	2.8	3.2	198	3.0	1.5	1.6
8				1.1	.9	1.4	2.6	2.9	79	2.9	1.4	1.4
9	[a] 2.4		29	1.1	.9	1.3	2.4	19.5	11.5	2.8	1.4	1.4
10			6.4	1.1	.9	1.2	2.3	11	19	2.7	1.5	1.4
11			3.1	1.1	1.0	1.4	2.3	7.4	8.1	2.6	1.4	1.4
12	[a] 6.5	[a] 3.0	2.4	1.1	1.0	3.0	2.3	5.9	5.1	2.3	1.4	1.3
13			3.2	1.1	.9	3.8	2.2	6.6	7.0	2.1	1.4	1.3
14	[a] 24		2.7	1.1	.9	1.8	2.0	17.5	7.2	2.0	7.3	1.2
15		[a] 2.6	2.1	1.1	.8	7.5	33	6.5	4.6	2.3	8.0	1.3
16	[a] 5.5		1.8	1.1	2.6	2.3	41	4.9	3.8	2.2	3.5	1.3
17		[a] 3.8	1.8	1.1	1.4	2.0	23	3.6	3.2	4.1	3.2	1.2
18			1.9	1.1	1.0	2.0	14.5	5.8	3.0	3.6	3.1	1.2
19			2.2	2.1	.9	2.2	5.8	11	2.8	2.3	2.1	1.1
20	[a] 14		2.0	1.8	.9	1.7	5.9	18.5	2.7	1.9	8.2	1.1
21		[a] 2.2	1.7	1.3	.8	1.5	9.1	23	2.8	1.8	14.5	1.2
22	[a] 50		1.6	1.4	.8	1.4	14.5	10.5	6.4	1.8	3.1	3.1
23		[a] 6	1.5	1.8	.9	1.4	16	5.8	21	1.8	2.2	10
24	[a] 28		1.4	1.6	65	5.6	17	4.1	13.5	1.8	1.9	5.4
25			2.4	1.4	11.5	12	13	5.8	6.9	1.7	1.8	6.0
26	8.7		1.9	1.2	4.0	3.5	13	7.4	16.5	1.7	1.6	2.6
27	6.1		1.5	1.1	12	2.9	16.5	4.1	5.4	2.3	1.6	1.8
28	[a] 6.5	[a] 1.9	1.4	1.1	37	21	16.5	8.8	3.8	10.5	1.6	1.8
29			1.3	1.1	13.5	22	9.2	-------	3.6	6.6	1.6	4.5
30	[a] 16		1.2	1.2	17.5	4.1	6.6	-------	3.2	6.8	1.6	15
31			-------	1.1	-------	125	16.5	-------	2.9	-------	1.5	-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	----------	----------	13.1	20.3	405	1,240
August	----------	----------	3.23	5.00	100	307
September	29	1.2	3.96	6.13	119	365
October	2.1	1.1	1.24	1.92	38.4	118
November	65	.8	6.14	9.50	184	565
December	125	1.2	8.39	13.0	260	799
January	43	2.0	13.1	20.3	405	1,240
February	23	2.9	8.38	13.0	235	720
March	198	2.7	18.4	28.5	570	1,750
April	49	1.7	6.72	10.4	202	619
May	14.5	1.4	3.08	4.77	95.4	293
June	15	1.1	2.80	4.33	84.0	258
The year	198	.8	7.39	11.4	2,700	8,270

[a] Estimated.

KOOLAU DITCH AT NAHIKU WEIR, NEAR NAHIKU

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 1933.

DISCHARGE.—Maximum during year, 55 million gallons a day or 85 second-feet July 22 (gage height, 1.66 feet); minimum, 4.9 million gallons a day or 7.6 second-feet Nov. 13–15, 21, 22, 23.

1919–33: Maximum, 58 million gallons a day or 90 second-feet Feb. 25, 1930 (gage height, 1.72 feet); no flow occasionally, when intake gates are closed. Average, 14 years, 19.0 million gallons a day (29.4 second-feet).

REMARKS.—Records excellent except those for extremely low stages, which are good. Regulated by spillways and gates. Koolau Ditch diverts water at elevation 1,200 feet from all streams from Makapipi to Alo.

Discharge, in million gallons, 1932–33

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	16.5	40	11.5	9.0	6.6	28	42	44	21	32	24	10.5
2	17.5	32	11.5	8.7	6.3	26	42	40	23	46	18	15.5
3	28	28	21	8.7	6.1	24	42	34	28	44	24	18.5
4	16.5	26	34	8.4	5.9	23	46	28	26	34	17.5	14
5	14	24	34	8.1	5.6	17.5	36	24	28	28	15.5	13
6	13	24	19.5	7.9	6.1	15	28	24	42	24	15.5	12.5
7	13	23	16	7.9	5.6	13	23	23	46	21	14	11
8	12.5	24	19.5	7.6	5.4	12.5	20	22	44	19.5	13	10.5
9	13	26	51	7.3	5.4	11.5	18	32	40	18	12.5	10
10	14.5	23	34	7.3	5.4	10.5	16.5	36	42	17.5	12.5	10
11	26	24	23	7.1	5.9	10.5	16.5	32	34	16.5	11.5	9.5
12	23	21	19.5	6.8	5.9	16	15.5	30	34	15.5	11	9.3
13	46	23	19	6.6	5.1	17	14.5	32	38	14.5	10.5	9.0
14	34	20	17.5	6.6	4.9	11.5	14	40	38	14	23	8.7
15	46	18.5	15	6.6	5.1	24	30	28	30	15	34	8.7
16	38	18	14	6.6	10	13	44	26	28	14	22	8.4
17	34	24	13	6.6	6.8	12.5	46	23	26	18.5	20	8.1
18	46	18	13	6.6	5.9	12.5	44	26	24	18	19.5	7.9
19	40	16.5	14	10.5	5.6	12.5	32	38	24	14	15.5	7.6
20	46	16	12.5	9.0	5.4	10.5	34	42	23	12.5	28	7.3
21	46	15.5	11.5	7.3	5.1	9.8	38	48	23	12.5	34	7.9
22	49	14.5	11	7.9	4.9	9.5	44	42	30	12	18.5	14.5
23	44	27	10.5	9.8	5.4	9.0	44	30	34	12	15.5	26
24	51	22	10	8.4	45	21	40	24	34	12	14	19
25	49	16.5	15	7.3	31	32	38	26	30	11.5	13	21
26	44	14.5	12.5	6.8	18	17	40	21	38	11.5	12.5	12.5
27	38	14	10.5	6.8	26	15	42	16	24	14	11.5	10.5
28	36	13.5	9.8	6.6	38	28	40	26	21	32	11.5	10.5
29	44	13	9.5	6.6	34	32	38	-------	20	28	11.5	19
30	49	12.5	9.3	7.1	40	18	34	-------	19	30	11	32
31	49	11.5	-------	6.8	-------	42	40	-------	17.5	-------	10.5	-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	51	12.5	33.4	51.7	1,040	3,180
August	40	11.5	20.8	32.2	644	1,970
September	51	9.3	17.4	26.9	522	1,600
October	10.5	6.6	7.59	11.7	235	722
November	45	4.9	12.2	18.9	366	1,120
December	42	9.0	17.9	27.7	554	1,700
January	46	14	33.6	52.0	1,040	3,200
February	48	16	30.6	47.3	857	2,630
March	46	17.5	30.0	46.4	930	2,850
April	46	11.5	20.4	31.6	612	1,880
May	34	10.5	16.9	26.1	525	1,610
June	32	7.3	12.8	19.8	383	1,180
The year	51	4.9	21.1	32.6	7,710	23,600

WAIOHUE STREAM NEAR NAHIKU

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 1933.

DISCHARGE.—Maximum during year, 452 million gallons a day or 699 second-feet Dec. 31 (gage height, 5.11 feet); minimum, 1.8 million gallons a day or 2.8 second-feet Nov. 22.

1921–33: Maximum, 576 million gallons a day or 891 second-feet Dec. 18, 1929 (gage height, 5.94 feet); minimum, 1.7 million gallons a day or 2.6 second-feet Apr. 11, 1926. Average, 11 years (1922–33), 8.22 million gallons a day (12.7 second-feet).

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

Discharge, in million gallons, 1932–33

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	3.8	7.4	3.2	3.0	2.3	4.6	22	14	4.8	18.5	4.4	3.2
2	4.0	6.4	3.3	3.0	2.2	4.3	5.3	8.1	4.6	16.5	3.8	4.6
3	4.7	6.1	4.6	2.9	2.1	3.9	28	6.4	5.2	31	4.8	4.5
4	3.9	5.8	7.5	2.8	2.1	4.8	11.5	5.8	4.5	5.4	3.6	3.7
5	3.6	5.6	7.1	2.8	2.1	3.8	5.6	5.4	29	4.7	3.4	3.5
6	3.5	5.4	4.2	2.8	2.1	3.6	5.1	5.1	49	4.6	3.4	3.2
7	3.5	5.1	3.7	2.7	2.0	3.5	4.8	4.8	88	4.5	3.2	3.1
8	3.5	5.8	5.6	2.7	2.0	3.5	4.6	4.6	38	4.4	3.2	3.0
9	3.7	5.6	21	2.7	2.0	3.4	4.5	11.5	11.5	4.2	3.2	2.9
10	4.0	5.1	5.3	2.6	2.0	3.2	4.2	7.7	17.5	4.1	3.2	2.7
11	5.9	5.1	4.6	2.6	2.1	3.3	4.4	5.6	9.0	3.9	3.0	2.7
12	4.7	4.7	4.2	2.6	2.1	5.2	4.2	5.4	7.2	3.9	2.9	2.6
13	22	5.1	4.8	2.5	2.0	5.6	3.9	5.6	7.7	3.7	2.8	2.6
14	6.4	4.5	4.5	2.5	2.0	3.5	3.6	15	7.9	3.5	7.5	2.6
15	19	4.2	4.0	2.4	2.0	7.8	16	5.0	6.2	3.9	6.0	2.6
16	6.1	4.2	3.9	2.5	3.0	3.5	22	4.8	5.4	3.7	4.1	2.6
17	5.8	4.7	3.9	2.4	2.2	3.5	15	4.4	5.1	4.4	4.5	2.5
18	12.5	4.0	4.0	2.4	2.0	3.8	10.5	5.6	4.8	3.9	3.7	2.4
19	8.9	3.9	4.0	3.3	2.0	3.7	5.6	7.6	4.6	3.6	3.2	2.3
20	11	3.9	3.7	2.8	2.0	3.2	5.9	12.5	4.5	3.4	5.6	2.3
21	12	3.8	3.5	2.5	1.9	3.0	8.5	17	4.4	3.2	7.1	2.4
22	38	3.8	3.4	2.6	1.9	2.9	11	7.0	5.6	3.2	3.6	3.2
23	19	8.6	3.4	2.9	1.9	2.8	10.5	5.3	12.5	3.2	3.2	4.8
24	20	4.6	3.3	2.6	32	5.5	10.5	5.1	8.5	3.2	3.2	3.4
25	12	3.9	4.6	2.4	6.3	7.3	9.4	6.1	5.0	3.1	3.1	3.9
26	10	3.7	3.6	2.3	3.2	3.9	10	6.4	9.8	3.1	3.0	3.2
27	8.1	3.6	3.3	2.3	5.8	3.6	12	5.4	4.5	3.5	3.0	2.7
28	9.0	3.8	3.2	2.2	15	12	12	6.8	4.2	6.7	3.0	2.8
29	10	3.6	3.2	2.3	5.7	7.6	9.3	------	4.4	5.6	3.2	4.2
30	14	3.4	3.1	2.4	8.1	3.5	8.1	------	4.2	5.3	3.2	7.4
31	14	3.3	------	2.3	------	87	14.5	------	4.1	------	3.1	------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	38	3.5	9.89	15.3	307	941
August	8.6	3.3	4.80	7.43	149	456
September	21	3.1	4.72	7.30	142	435
October	3.3	2.2	2.61	4.04	80.8	248
November	32	1.9	4.14	6.41	124	381
December	87	2.8	7.12	11.0	221	678
January	28	3.6	9.76	15.1	302	928
February	17	4.4	7.29	11.3	204	626
March	88	4.1	12.3	19.0	382	1,170
April	31	3.1	5.86	9.07	176	540
May	7.5	2.8	3.81	5.89	118	363
June	7.4	2.3	3.25	5.03	97.6	300
The year	88	1.9	6.31	9.76	2,300	7,070

WEST KOPILIULA STREAM NEAR KEANAE

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 1933.

DISCHARGE.—July 1, 1930, to June 30, 1931: Maximum unknown due to faulty record; minimum, 1.8 million gallons a day or 2.8 second-feet Jan. 28 to Feb. 6.

July 1, 1931, to June 30, 1932: Maximum, 1,290 million gallons a day or 2,000 second-feet July 21 (gage height, 4.65 feet); minimum, 2.8 million gallons a day or 4.3 second-feet July 3, 4, June 24, 25.

July 1, 1932, to June 30, 1933: Maximum, 1,000 million gallons a day or 1,550 second-feet Mar. 7 (gage height, 4.15 feet); minimum, 1.0 million gallons a day or 1.6 second-feet Nov. 21–23.

1914–17, 1921–33: Maximum, 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-foot Sept. 15–17, 1917. Average, 11 years (1922–33), 18.2 million gallons a day (28.2 second-feet).

REMARKS.—Records good for ordinary stages, poor for high stages and estimated periods. No diversions. Revised figures for 1930–31 and 1931–32 are given in this paper.

Discharge, in million gallons, 1930–33

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1930–31												
1	24	5.3	3.3	34	2.9		6.2	3.0	5.9	36	5.0	5.3
2	11.5	4.8	3.3	8.4	3.3		5.0	2.2	7.3	186	4.7	4.7
3	9.9	5.4	3.0	6.0	2.7	[a] 3.6	4.2	2.0	34	233	5.1	4.0
4	7.0	4.1	3.0	8.1	2.7		4.4	1.8	10.5	16	13	3.8
5	6.4	16.5	3.6	28	2.7		4.2	2.0	22	36	5.6	3.6
6	6.0	6.5	6.8	26	22		5.4	2.8	11	13.5	6.9	3.4
7	5.5	4.2	3.4	11.5	4.5		4.7	15.5	7.1	9.9	7.4	3.2
8	5.0	3.8	2.8	10.5	5.7		5.0	3.4	5.9	6.5	5.6	3.0
9	4.7	17	2.6	7.0	3.4		3.8	12	6.8	5.3	6.2	2.8
10	4.6	77	3.8	5.8	2.9		3.4	7.4	11.5	4.4	11	2.8
11	4.2	98	4.0	5.2	2.6	[a] 3.1	3.4	3.6	7.7	4.0	9.5	2.6
12	6.3	17.5	5.2	4.8	2.6		4.7	3.0	5.3	3.8	12.5	2.4
13	29	8.4	20	4.6	5.6		3.2	2.8	4.7	3.6	14	2.6
14	7.3	15.5	14.5	4.1	13.5		2.8	3.8	4.2	4.2	96	2.4
15	4.7	22	15.5	3.8	17		2.6	5.9	3.8	8.1	50	2.3
16	4.2	25	10	3.5	91		2.4	6.2	3.6	15	11	2.4
17	4.0	18.5	5.3	3.2	174		2.3	3.0	3.4	4.7	7.8	9.4
18	4.2	15	4.0	3.1	[a] 220	[a] 22	7.6	3.2	3.2	4.0	6.2	4.8
19	7.5	7.3	3.5	2.9			3.8	3.0	3.0	3.6	5.6	13
20	6.5	6.2	12	2.8		[a] 4.2	2.6	3.0	2.8	151	5.3	16
21	4.7	7.5	5.0	2.7	[a] 14	52	2.4	3.8	2.8	406	13.5	25
22	4.1	5.7	8.3	3.1		10.5	2.4	5.3	2.6	212	22	25
23	3.8	5.5	20	5.7	[a] 44	14.5	2.3	5.6	2.6	50	12.5	7.8
24	4.0	5.3	70	3.1		14.5	2.2	36	2.4	18.5	7.4	5.0
25	3.3	6.4	34	3.0	[a] 9.5	9.0	2.2	151	2.3	13	6.2	16
26	6.0	5.2	8.7	2.6		45	2.1	31	2.3	8.6	5.3	12
27	11	5.3	6.7	2.5		9.4	2.1	22	2.3	6.8	4.7	7.1
28	49	4.4	5.5	4.9	[a] 5	6.5	2.0	8.6	2.2	5.9	4.4	4.4
29	74	4.1	5.5	21		138	2.0	-------	2.2	5.6	109	4.2
30	16	3.6	5.2	3.6		15.5	1.8	-------	2.1	5.3	11.5	3.8
31	7.5	3.4	-------	2.8	-------	8.2	1.8	-------	13	-------	6.8	------

[a] Estimated.

Discharge, in million gallons, of West Kopiliula Stream near Keanae, 1930–33—Continued

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1931–32												
1	3.4	5.9	9.0	19	9.2	4.7	54	23	15.5	228	162	28.5
2	3.4	7.4	7.4	13.5	7.9	4.4	57	166	11	28	18	9.9
3	3.0	6.5	8.2	14	134	15	12	124	8.6	17	24	6.5
4	3.4	4.6	7.1	10.5	50	8.1	12.5	30	7.4	10.5	12	5.9
5	18.5	19	16	8.2	14	4.4	8.6	51	8.5	11.5	13	5.3
6	15.5	14.5	22	7.4	10.5	20	6.8	115	8.4	17.5	12.5	5.0
7	13.5	19.5	28	6.8	7.9	5.3	6.2	66	5.9	7.4	10.5	4.7
8	6.5	10.5	23	6.5	17	4.4	5.9	25	9.3	8.2	9.0	4.4
9	5.3	10.5	30	5.9	26	4.0	6.2	47	6.7	23	22	4.8
10	6.8	31	28	5.6	15.5	3.8	5.6	199	5.3	40	14.5	6.8
11	19	14	48	5.9	31	3.6	6.5	310	5.0	70	14	5.3
12	10.5	12	22	11.5	67	3.4	6.5	191	4.7	180	153	9.3
13	13	9.0	18.5	5.3	14	3.4	19.5	249	4.4	99	37	6.2
14	11	7.4	19.5	5.0	108	3.4	5.9	172	4.0	22	20	7.4
15	6.5	24	29	4.7	81	101	6.5	22	3.8	39	60	5.3
16	5.3	9.5	107	4.4	15	14	4.7	15.5	3.8	24	22	4.7
17	4.4	9.1	24	5.9	25	15	4.4	26	4.4	12	15.5	4.4
18	10	103	27	7.8	14	53	35	14.5	8.3	9.4	14	4.2
19	6.8	57	13.5	4.7	10.5	440	74	11.5	9.3	8.6	11	4.4
20	28	14	11.5	4.7	9.0	170	53	10.5	10.5	8.2	9.9	7.0
21	437	9.9	9.4	37	11.5	70	9.4	9.4	9.5	6.8	8.2	3.8
22	42	16.5	9.9	239	121	34	7.1	8.6	6.2	6.8	7.4	3.6
23	14	18	8.2	12.5	13.5	21	12.5	8.2	4.4	12.5	6.5	4.0
24	9.4	8.2	13	43	9.9	30	15	7.1	4.0	30	6.5	3.2
25	15.5	8.2	29	94	7.8	12	23	8.2	3.8	29	6.5	3.0
26	10	7.1	33	16	7.8	9.0	19.5	46	3.4	91	7.1	13.5
27	8.6	5.9	49	27	6.5	7.8	91	454	4.4	35	12	11
28	7.7	6.8	46	12.5	5.9	7.1	168	100	6.2	125	6.8	9.0
29	16	13	144	8.6	5.3	6.5	52	39	4.0	102	8.6	4.2
30	9.6	26	109	6.8	5.0	14	51	-------	8.0	180	19.5	3.8
31	6.8	20	-------	8.7	-------	25	14	-------	60	-------	8.4	------
1932–33												
1	4.0	14	2.6	2.3	1.5	17	85	36	4.2	50	6.4	2.6
2	4.8	10.5	3.0	2.3	1.4	9.2	13.5	14	4.2	62	4.1	4.6
3	12	7.4	9.4	2.2	1.3	8.4	91	9.9	23	129	5.9	5.0
4	3.8	6.2	20	2.2	1.3	6.1	25	7.8	17.5	14	3.6	2.6
5	3.4	5.9	25	2.1	1.3	4.0	10.5	6.8	67	8.2	3.2	2.4
6	3.4	6.2	7.6	2.1	1.3	3.6	7.4	6.2	163	6.5	3.0	2.1
7	3.2	5.3	5.3	2.0	1.2	3.2	6.2	5.9	600	5.9	3.0	2.0
8	3.0	8.0	7.0	2.0	1.2	3.0	5.3	5.3	217	5.0	2.6	1.8
9	3.8	7.3	43	2.0	1.2	2.8	4.4	30	27	4.7	2.6	1.8
10	4.2	5.9	8.7	1.8	1.2	2.6	4.2	18.5	30	4.7	2.4	1.7
11	10.5	5.9	5.9	1.8	1.3	2.8	4.4	8.2	15	4.7	2.3	1.7
12	8.1	5.0	4.4	1.8	1.4	5.8	4.2	7.1	9.4	4.2	2.3	1.7
13	109	5.6	9.4	1.8	1.2	6.6	3.8	7.7	12.5	3.8	2.2	1.7
14	14	4.4	5.0	1.7	1.1	3.2	3.4	40	11	3.4	8.5	1.6
15	52	4.2	4.0	1.7	1.1	19.5	89	10	7.1	4.2	8.0	1.7
16	16	4.0	3.8	1.8	6.8	5.6	94	7.8	5.9	3.4	4.1	1.7
17	11.5	8.4	3.8	1.8	1.6	4.4	40	6.8	5.6	7.0	4.4	1.7
18	25	4.2	4.4	1.8	1.2	4.4	22	7.8	5.0	5.0	[b] 3.8	1.5
19	14	3.8	4.8	3.2	1.1	4.0	9.9	15.5	4.7	3.4	[b] 2.4	1.4
20	29	4.0	3.8	2.1	1.1	3.2	9.4	27	4.4	3.0	14	1.5
21	25	3.8	3.4	1.7	1.0	3.0	15	36	4.4	2.8	21	2.0
22	151	3.6	3.2	2.2	1.0	2.8	26	12.5	11	3.0	4.7	6.8
23	71	17	3.0	2.8	1.1	2.8	39	7.8	39	3.4	3.4	15
24	41	6.8	2.8	2.0	125	11	41	6.5	26	3.4	3.0	7.9
25	23	3.8	4.6	1.6	23	17.5	25	7.1	13	3.0	2.8	8.1
26	15.5	3.6	3.6	1.5	7.0	4.7	30	6.5	27	3.0	2.6	3.2
27	11	3.4	2.8	1.4	26	4.2	35	5.3	8.6	4.2	2.4	2.3
28	10.5	3.6	2.6	1.3	108	39	34	6.0	6.5	16.5	2.6	2.8
29	17	3.6	2.4	1.5	30	56	16.5	-------	6.2	9.3	2.4	8.9
30	28	3.0	2.4	2.0	36	7.7	10.5	-------	5.0	9.5	2.4	25
31	30	2.8	-------	1.7	-------	242	20	-------	4.2	-------	2.2	------

[b] Partly estimated.

Discharge, in million gallons, of West Kopiliula Stream near Keanae, 1930–33—Continued

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
1930–31						
July	74	3.3	11.2	17.3	346	1,060
August	98	3.4	14.0	21.7	434	1,330
September	70	2.6	9.95	15.4	298	916
October	34	2.5	7.69	11.9	238	731
November	----------	2.6	32.3	50.0	968	2,970
December	138	----------	13.8	21.4	428	1,310
January	7.6	1.8	3.39	5.25	105	322
February	151	1.8	12.6	19.5	353	1,080
March	34	2.1	6.47	10.0	200	615
April	406	3.6	49.3	76.3	1,480	4,540
May	109	4.4	15.9	24.6	492	1,510
June	25	2.3	6.83	10.6	205	629
The year	406	1.8	15.2	23.5	5,550	17,000
1931–32						
July	437	3.0	24.9	38.5	771	2,370
August	103	4.7	17.0	26.3	528	1,620
September	144	7.1	31.6	48.9	949	2,910
October	239	4.4	21.4	33.1	662	2,030
November	134	5.0	28.7	44.4	861	2,640
December	440	3.4	36.0	55.7	1,120	3,430
January	168	4.4	27.5	42.5	853	2,620
February	454	7.1	91.0	141	2,550	7,820
March	60	3.4	8.35	12.9	259	794
April	228	6.8	49.4	76.4	1,480	4,550
May	162	6.5	24.2	37.4	751	2,310
June	28.5	3.0	6.64	10.3	199	611
The year	454	3.0	30.1	46.6	11,000	33,700
1932–33						
July	151	3.0	24.4	37.8	758	2,330
August	17	2.8	5.85	9.05	181	556
September	43	2.4	7.06	10.9	212	650
October	3.2	1.3	1.94	3.00	60.2	185
November	125	1.0	13.0	20.1	389	1,190
December	242	2.6	16.5	25.5	510	1,570
January	94	3.4	26.6	41.2	825	2,530
February	40	5.3	13.1	20.3	366	1,120
March	600	4.2	44.7	69.2	1,380	4,250
April	129	2.8	13.0	20.1	390	1,200
May	21	2.2	4.46	6.90	138	424
June	25	1.4	4.16	6.44	125	383
The year	600	1.0	14.6	22.6	5,330	16,400

EAST WAILUAIKI STREAM NEAR KEANAE

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 1933.

DISCHARGE.—Maximum during year, 920 million gallons a day, or 1,420 second-feet Mar. 6 (gage height, 6.29 feet); minimum, 1.4 million gallons a day, or 2.2 second-feet Nov. 21-23.

1913–17, 1922–33: Maximum, 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. Average, 11 years (1922–33), 19.2 million gallons a day (29.7 second-feet).

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

Discharge, in million gallons, 1932–33

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	4.5	14	2.4	2.8	1.9	14	58	39	5.2	38	7.2	3.3
2	5.4	9.6	2.6	2.8	1.8	7.2	11.5	13	4.8	61	4.8	5.3
3	12	8.2	8.2	2.8	1.8	7.2	85	8.7	14	131	6.2	5.3
4	4.5	7.2	20	2.7	1.8	4.9	18	7.7	14.5	15	4.0	3.2
5	3.8	6.6	22	2.7	1.8	3.7	9.4	6.9	69	8.9	3.7	3.1
6	3.5	6.8	7.6	2.5	1.8	3.3	6.6	6.3	166	7.2	3.6	2.8
7	3.4	6.1	4.5	2.4	1.7	2.9	5.4	5.8	473	6.3	3.4	2.7
8	3.2	8.2	5.2	2.4	1.6	2.7	4.8	5.4	180	5.9	3.3	2.5
9	4.2	8.0	65	2.4	1.6	2.5	4.2	42	24	5.6	3.2	2.4
10	4.5	6.6	9.5	2.3	1.6	2.4	4.0	16	31	5.5	3.2	2.3
11	12.5	6.6	6.0	2.2	1.8	2.5	4.1	7.2	16.5	5.3	3.0	2.2
12	9.7	5.5	4.9	2.2	1.8	4.7	3.8	6.6	10.5	5.2	2.9	2.2
13	101	5.9	8.8	2.2	1.6	7.0	3.5	10.5	14	4.7	2.8	2.1
14	15	4.6	5.8	2.1	1.6	3.4	3.2	31	12	4.5	6.9	2.0
15	69	4.3	4.5	2.1	1.6	20	85	9.8	8.4	5.1	7.8	2.1
16	15	4.0	4.2	2.2	7.0	4.7	85	6.9	7.3	4.1	4.7	2.1
17	10.5	7.2	4.2	2.2	2.3	3.7	39	6.6	6.7	8.0	4.8	2.1
18	28	4.3	4.6	2.1	1.7	3.6	18.5	7.2	6.1	6.0	4.6	1.9
19	16	3.8	4.6	3.5	1.6	3.6	8.4	15	5.8	4.1	3.3	1.9
20	26	3.9	3.9	2.4	1.6	2.7	8.0	26	5.5	3.6	17	1.9
21	23	3.7	3.6	2.0	1.5	2.4	13	33	5.6	3.4	22	2.3
22	146	3.4	3.5	2.6	1.4	2.2	24	12	10.5	3.4	4.9	7.8
23	78	18.5	3.4	3.1	1.5	2.2	27	7.4	44	3.7	3.8	16.5
24	42	8.6	3.2	2.4	143	9.9	31	6.6	38	3.7	3.5	9.2
25	22	4.1	4.5	2.0	25	16	21	7.0	11	3.3	3.3	9.6
26	16	3.6	3.7	2.0	6.4	4.9	21	6.6	26	3.3	3.1	4.3
27	11	3.4	3.2	1.9	27	4.1	27	5.4	9.2	4.2	2.9	3.0
28	11	3.3	3.1	1.8	95	47	30	5.8	6.7	16.5	2.9	3.1
29	16	3.4	3.0	1.9	28	45	15	-------	6.3	9.6	2.8	11.5
30	28	2.8	2.9	2.3	29	5.9	9.8	-------	5.7	10.5	3.0	26
31	28	2.5	-------	2.0	-------	213	16	-------	5.2	-------	2.7	-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	146	3.2	24.9	38.5	773	2,370
August	18.5	2.5	6.09	9.42	189	579
September	65	2.4	7.75	12.0	233	714
October	3.5	1.8	2.35	3.64	73.0	224
November	143	1.4	13.3	20.6	398	1,220
December	213	2.2	14.8	22.9	459	1,410
January	85	3.2	22.6	35.0	700	2,150
February	42	5.4	12.9	20.0	361	1,110
March	473	4.8	40.1	62.0	1,240	3,810
April	131	3.3	13.2	20.4	397	1,220
May	22	2.7	5.01	7.75	155	477
June	26	1.9	4.89	7.57	147	450
The year	473	1.4	14.0	21.7	5,120	15,700

WEST WAILUAIKI STREAM NEAR KEANAE

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 1933.

DISCHARGE.—Maximum during year, 1,350 million gallons a day, or 2,090 second-feet Dec. 31 (gage height, 7.42 feet); minimum, 0.5 million gallons a day, or 0.8 second-foot Nov. 15.

1914–17, 1921–33: Maximum (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. Average, 11 years (1922–33), 25.3 million gallons a day (39.1 second-feet).

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

Discharge, in million gallons, 1932–33

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	5.0	16	2.1	2.0	0.8	18	59	39	5.7	31	7.9	2.8
2	6.4	11	2.4	1.8	.8	11	16	15	5.3	69	5.1	4.7
3	13.5	9.5	9.0	3.2	.8	10	83	11	15	126	5.9	4.7
4	5.8	7.9	25	2.7	.7	7.0	22	8.7	14.5	18	3.9	2.4
5	6.2	7.0	26	1.9	.7	5.4	13	7.1	74	11	3.5	2.2
6	4.3	7.3	9.4	1.7	.7	4.7	9.1	6.3	196	8.3	3.0	1.8
7	3.9	6.3	6.5	1.5	.7	4.0	7.5	5.7	631	6.8	2.7	1.6
8	3.3	8.7	9.2	1.4	.6	3.5	6.2	5.3	175	6.2	2.5	1.4
9	4.0	8.3	64	1.3	.7	3.0	5.6	42	31	5.9	2.4	1.3
10	4.2	6.8	12	1.2	.6	2.7	5.0	20	42	5.9	2.4	1.2
11	10.5	6.3	8.1	1.1	.6	2.8	4.9	8.5	20	5.6	2.1	1.1
12	11.5	5.6	6.3	1.1	.6	6.0	4.3	7.1	14	5.6	1.8	1.1
13	100	5.7	13	1.0	.6	12	4.2	12	16	4.7	1.7	1.1
14	16	4.6	7.1	1.0	.6	7.5	3.5	37	13	4.2	5.2	.9
15	70	4.3	5.4	1.0	.5	24	97	12.5	9.7	4.6	7.1	1.0
16	18.5	3.9	4.9	1.2	*9.5	7.3	83	9.1	8.1	3.6	4.6	1.0
17	13.5	8.5	4.6	1.2	2.6	5.6	39	8.3	*7.0	8.0	4.2	.9
18	31	5.4	5.1	1.2	1.0	5.0	21	8.2	6.2	6.3	4.3	.7
19	19	4.2	5.3	2.4	.8	4.6	11	16.5	5.6	4.0	2.6	.7
20	31	4.0	4.6	1.3	.7	3.5	9.5	28	5.3	3.3	18	.7
21	29	3.7	3.9	1.0	.6	2.9	14	36	5.1	3.0	24	1.1
22	185	3.3	3.7	1.7	.6	2.8	31	16	12	2.9	6.5	7.3
23	80	27	3.5	2.4	.7	2.5	35	9.9	52	3.5	4.6	18
24	45	11.5	2.9	1.4	140	10	36	8.5	41	3.3	3.7	11
25	25	7.6	4.1	1.0	28	17.5	25	8.1	13.5	2.6	3.2	10.5
26	16	4.7	4.2	.9	9.7	7.0	25	7.1	30	2.5	2.6	5.1
27	12	4.2	3.2	.9	36	6.2	32	6.0	11	3.3	2.4	3.0
28	11.5	3.7	2.7	.9	109	53	37	6.0	7.7	14.5	2.4	2.9
29	19	3.5	2.7	.8	38	58	18	-------	6.8	9.5	2.1	11.5
30	36	2.8	2.6	1.1	38	11	12	-------	5.9	10.5	2.4	33
31	38	2.4	-------	.9	-------	233	15	-------	5.3	-------	1.8	-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	185	3.3	28.2	43.6	874	2,680
August	27	2.4	6.96	10.8	216	662
September	64	2.1	8.78	13.6	264	809
October	3.2	.8	1.43	2.21	44.2	136
November	140	.5	14.2	22.0	425	1,300
December	233	2.5	17.8	27.5	552	1,690
January	97	3.5	25.3	39.1	784	2,410
February	42	5.3	14.5	22.4	405	1,240
March	631	5.1	47.9	74.1	1,480	4,560
April	126	2.5	13.1	20.3	394	1,210
May	24	1.7	4.73	7.32	147	450
June	33	.7	4.56	7.06	137	420
The year	631	.5	15.7	24.3	5,720	17,600

* Partly estimated.

EAST WAILUANUI STREAM NEAR KEANAE

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

DRAINAGE AREA.—0.6 square mile.

RECORDS AVAILABLE.—January 1914 to October 1917, November 1921 to June 1933.

DISCHARGE.—Maximum during year, 683 million gallons a day or 1,06Q second-feet Dec. 31 (gage height, 5.14 feet); minimum, 0.6 million gallons a day or 0.9 second-foot Nov. 21–23.

1914–17, 1921–33: Maximum, 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. Average, 11 years (1922–33), 5.67 million gallons a day (8.77 second-feet).

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

Discharge, in million gallons, 1932–33

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	2.2	4.2	1.2	1.0	0.7	3.7	15.5	9.0	1.7	5.1	2.8	1.3
2	2.4	3.7	1.2	1.0	.7	2.2	3.4	3.4	1.5	13.5	2.0	2.5
3	4.2	3.6	3.5	1.2	.7	1.8	26	3.6	1.5	20	2.7	2.2
4	1.8	3.4	6.9	1.0	.7	1.7	4.9	2.2	1.4	3.0	1.5	1.3
5	1.6	2.2	5.6	1.0	.7	1.7	3.7	1.7	65	1.8	1.4	1.3
6	1.6	2.9	2.0	1.0	.7	1.4	2.9	1.7	[a]170	1.7	1.4	1.2
7	1.5	2.0	1.7	.9	.6	1.3	1.8	1.7		1.5	1.3	1.1
8	1.5	3.6	2.7	.9	.6	1.2	1.7	1.5		1.4	1.2	1.1
9	1.6	3.6	33	.9	.6	1.1	1.5	8.5	[a]9.5	1.3	1.1	1.0
10	1.7	3.4	3.4	.9	.6	1.1	1.5	3.0		1.4	1.1	1.0
11	5.3	2.9	2.9	.8	.7	1.1	1.4	1.7	[a]4.2	1.3	1.0	1.0
12	4.5	1.8	2.0	.8	.7	3.1	1.4	1.8		1.4	1.0	1.0
13	17.5	2.0	5.0	.8	.6	4.4	1.3	4.4		1.2	1.0	.9
14	4.7	1.7	2.0	.7	.6	1.4	1.3	7.6		1.1	2.9	.9
15	22	1.7	1.7	.7	.6	6.9	8.2	2.2		1.4	3.3	.9
16	4.7	1.7	1.7	.8	4.7	1.5	14.5	2.0	[a]2.2	1.2	1.9	1.0
17	3.8	2.2	1.7	.8	.9	1.7	11.5	1.7		2.7	2.3	.9
18	13.5	1.5	1.7	.8	.7	1.7	6.6	2.2		1.6	2.1	.9
19	7.0	1.5	1.8	1.3	.6	1.7	3.7	5.8	1.7	1.2	1.3	.8
20	8.4	1.5	1.5	.9	.6	1.3	3.7	8.8	1.5	1.1	5.7	.8
21	9.4	1.5	1.4	.8	.6	1.3	6.7	16	1.7	1.0	6.7	1.0
22	37	1.5	1.3	1.0	.6	1.2	6.0	4.2	3.0	1.0	1.7	3.5
23	23	12	1.3	1.1	.7	1.1	4.5	3.6	6.5	1.2	1.5	5.8
24	24	2.9	1.3	.9	38	4.6	5.3	2.9	3.3	1.1	1.4	3.5
25	7.7	1.7	1.4	.8	5.4	7.0	5.4	3.4	2.1	1.0	1.3	3.4
26	6.0	1.5	1.3	.7	2.6	2.0	4.7	2.2	5.2	1.1	1.3	1.9
27	3.8	1.4	1.3	.7	4.7	1.7	5.7	1.7	1.7	1.3	1.2	1.3
28	3.5	1.4	1.2	.7	16.5	11	5.0	1.7	1.5	6.4	1.2	1.3
29	6.2	1.4	1.2	.7	6.2	7.2	4.5	-------	1.5	4.3	1.1	5.1
30	10.5	1.3	1.2	.9	5.7	2.9	3.5	-------	1.4	4.5	1.1	7.7
31	10	1.3	-------	.8	-------	102	6.8	-------	1.3	-------	1.1	------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	37	1.5	8.15	12.6	253	775
August	12	1.3	2.55	3.95	79.0	242
September	33	1.2	3.20	4.95	96.1	295
October	1.3	.7	.88	1.36	27.3	84
November	38	.6	3.28	5.07	98.3	302
December	102	1.1	5.94	9.19	184	565
January	26	1.3	5.63	8.71	175	536
February	16	1.5	3.94	6.10	110	338
March	----------	1.3	21.2	32.8	656	2,010
April	20	1.0	2.93	4.53	87.8	269
May	6.7	1.0	1.89	2.92	58.6	180
June	7.7	.8	1.92	2.97	57.6	177
The year	----------	.6	5.16	7.98	1,880	5,770

[a] Estimated.

WEST WAILUANUI STREAM NEAR KEANAE

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 1933.

DISCHARGE.—Maximum during year, 420 million gallons a day or 650 second-feet Dec. 31 (gage height, 4.30 feet); minimum, 0.6 million gallons a day or 0.9 second-foot Nov. 13, 21, 22.

1913–17, 1922–33: Maximum, 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. Average, 11 years (1922–33), 9.43 million gallons a day (14.6 second-feet).

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

Discharge, in million gallons, 1932–33

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	1.9	8.1	1.4	1.2	0.8	7.5	28	18.5	2.2	9.7	3.4	1.6
2	2.2	6.0	1.5	1.1	.7	4.5	7.6	6.6	2.0	23	2.0	2.7
3	4.9	5.7	4.4	1.3	.7	3.8	31	4.6	6.7	47	2.9	2.7
4	1.6	4.3	9.3	1.2	.7	3.0	10	3.8	9.2	8.2	1.8	1.7
5	1.7	4.0	8.8	1.0	.7	2.3	5.7	3.0	36	4.5	1.8	1.5
6	1.4	3.8	4.1	1.0	.7	2.0	4.3	2.8	69	3.4	1.7	1.3
7	1.4	3.4	2.9	.9	.6	1.9	3.5	2.3	247	2.9	1.6	1.3
8	1.2	4.3	3.5	.9	.6	1.8	3.0	2.2	102	2.4	1.4	1.2
9	1.4	4.3	31	.9	.6	1.7	2.6	12.5	19.5	2.2	1.3	1.2
10	1.6	3.8	5.2	.9	.6	1.6	2.4	10.5	22	2.2	1.4	1.2
11	5.1	3.5	3.5	.9	.7	1.6	2.4	3.4	10.5	2.0	1.3	1.2
12	3.8	2.9	2.9	.9	.7	4.2	2.1	3.0	6.0	2.2	1.2	1.1
13	25	3.0	5.7	.8	.6	6.5	2.0	3.0	6.9	1.8	1.2	1.1
14	6.8	2.6	3.2	.8	.6	2.8	1.8	19.5	5.7	1.7	3.3	1.0
15	25	2.3	2.3	.8	.6	9.1	33	5.2	4.0	1.9	3.6	1.0
16	8.5	2.2	2.2	.9	4.2	2.8	40	4.8	3.4	1.6	2.3	1.1
17	5.7	3.8	2.1	1.0	1.0	2.4	17.5	4.0	2.9	3.4	2.1	1.0
18	15	2.4	2.3	.9	.7	2.2	11.5	3.5	2.6	2.4	2.2	.9
19	8.3	2.1	2.8	1.5	.7	2.4	5.0	7.2	2.4	1.6	1.5	.9
20	12.5	2.1	2.0	1.1	.6	1.8	4.6	9.8	2.2	1.4	6.7	.8
21	12.5	2.0	1.8	.9	.6	1.7	6.9	15	2.3	1.4	8.7	1.0
22	51	2.0	1.8	1.2	.6	1.6	10	5.7	4.8	1.4	2.4	4.0
23	36	11.5	1.7	1.3	.6	1.6	13.5	3.8	15.5	1.6	2.0	6.7
24	26	6.3	1.5	1.0	52	5.4	14.5	3.2	18	1.5	1.8	4.2
25	13	4.6	1.9	.9	13	8.3	10	3.4	5.0	1.3	1.7	4.1
26	8.8	2.4	1.9	.8	3.8	2.8	8.8	2.8	11.5	1.3	1.6	2.1
27	6.4	2.1	1.5	.8	12.5	2.6	11.5	2.4	4.3	1.6	1.4	1.5
28	6.2	1.9	1.3	.7	42	11	13	2.4	3.2	6.9	1.4	1.5
29	9.1	2.1	1.3	.8	15.5	18.5	7.6	-------	2.9	4.8	1.4	4.9
30	15.5	1.7	1.3	.9	15	4.1	5.3	-------	2.4	4.8	1.4	10.5
31	16.5	1.6	-------	.8	-------	90	7.5	-------	2.1	-------	1.3	------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	51	1.2	10.8	16.7	336	1,030
August	11.5	1.6	3.64	5.63	113	346
September	31	1.3	3.90	6.03	117	359
October	1.5	.7	.97	1.50	30.1	92
November	52	.6	5.76	8.91	173	530
December	90	1.6	6.89	10.7	214	655
January	40	1.8	10.5	16.2	327	1,000
February	19.5	2.2	6.03	9.33	169	518
March	247	2.0	20.5	31.7	634	1,950
April	47	1.3	5.07	7.84	152	467
May	8.7	1.2	2.25	3.48	69.8	214
June	10.5	.8	2.23	3.45	67.0	206
The year	247	.6	6.58	10.2	2,400	7,370

KOOLAU DITCH NEAR KEANAE

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

RECORDS AVAILABLE.—January 1910 to December 1912; November 1917 to June 1933.

DISCHARGE.—Maximum during year, 166 million gallons a day or 257 second-feet Mar. 5 (gage height, 5.65 feet); no flow occasionally, when water is shut out of ditch.

1910–12, 1917–33: Maximum, 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. Average, 15 years (1918–33), 61.3 million gallons a day (94.8 second-feet).

REMARKS.—Records excellent for ordinary stages, fair for high stages and estimated periods. Regulated by gates and spillways. Koolau Ditch diverts water at 1,200 feet elevation from all streams from Makapipi to Alo. No diversions from ditch above station except from several spillways.

Discharge, in million gallons, 1932–33

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	50	125	33	26	15	106		133	2.0	82	78	36
2	63	100	33	26	15	80		122	57	140	55	60
3	94	87	82	27	13.5	[a]76	[b]120	93	71	148	72	64
4	50	76	118	26	13.5			80	102	114	49	43
5	47	73	133	22	13.5	[b]55		66	85	83	46	40
6	41	73	74	21	15			63	54	70	43	32
7	38	66	54	21	13.5	35	[b]60	57	0	60	40	30
8	38	83	59	20	13.5	33		54	0	54	37	26
9	44	83	140	20	15	30		81	0	50	36	25
10	50	70	104	18.5	15	28		113	0	50	37	25
11	100	73	70	18.5	15	30		80	0	47	32	23
12	90	63	57	18.5	15	65	[b]48	76	0	46	31	22
13	140	66	78	17	15	81		8.8	0	41	30	20
14	125	57	60	17	15	41		0	0	38	64	19
15	144	54	47	16	15	93		0	0	46	95	19.5
16	129	47	44	17	48	47		0	0	39	66	19
17	111	80	44	17	22	41		0	0	71	65	22
18	140	50	47	17	15	41		0	0	56	61	20
19	129	44	54	34	13.5	41	[b]120	0	5.9	38	47	18.5
20	140	47	41	26	15	33		8.3	57	36	111	18
21	140	44	36	17	15	28		8.0	57	34	120	24
22	144	44	35	22	15	27	136	0	97	32	75	71
23	148	79	35	28	15	26	140	0	108	36	65	104
24	148	86	33	21	132	79	136	0	122	36	62	81
25	144	57	48	17	104	[b]85	133	0	87	31	58	88
26	136	44	41	16	66		133	0	134	32	42	49
27	111	44	33	15	116	[b]60	133	0	76	47	34	34
28	114	44	30	15	140		133	0	63	100	36	36
29	136	44	30	15	148		125	-------	60	100	32	78
30	140	36	28	18.5	148	[b]85	104	-------	54	101	34	125
31	140	34	-------	16	-------		111	-------	47	-------	30	-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	148	38	105	162	3,260	10,000
August	125	34	63.6	98.4	1,970	6,050
September	140	28	57.4	88.8	1,720	5,280
October	34	15	20.2	31.3	626	1,920
November	148	13.5	41.0	63.4	1,230	3,770
December	----------	26	57.1	88.3	1,770	5,430
January	----------	----------	101	156	3,130	9,610
February 1–13, 20–21	133	8.0	69.5	108	1,040	3,200
March 1–6, 19–31	134	2.0	70.5	109	1,340	4,110
April	148	31	61.9	95.8	1,860	5,700
May	120	30	54.3	84.0	1,680	5,160
June	125	18	42.4	65.6	1,270	3,900
The year (340 days)	148	2.0	61.5	95.2	20,900	64,100

[a] Partly estimated. [b] Estimated.

HONOMANU STREAM AT HAIKU-UKA BOUNDARY, NEAR KAILIILI

LOCATION.—Water-stage recorder at end of Haiku-uka boundary trail and 4¾ miles southeast of Kailiili.

DRAINAGE AREA.—2.4 square miles.

RECORDS AVAILABLE.—October 1919 to February 1927; July 1932 to June 1933.

DISCHARGE.—Maximum during year, 506 million gallons a day or 783 second-feet Mar. 5 (gage height, 5.85 feet); minimum, 0.1 million gallons a day or 0.2 second-foot Oct. 7.

1919–27, 1932–33: Maximum, 1,290 million gallons a day or 2,000 second-feet Jan. 14, 1923 (gage height, 9.93 feet); minimum, that of Oct. 7, 1932.

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

Discharge, in million gallons, 1932–33

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	1.3	3.4	0.6	0.3	0.2	6.0	17	1.5	1.4	30	1.6	0.5
2	3.6	24	.4	.1	.4	1.8	2.8	1.2	.7	35	.8	1.0
3	5.3	4.6	5.9	.1	.8	1.4	2.0	.9	.5	52	.6	.8
4	.2	15.5	13.5	.1	.5	1.0	2.6	24	.5	3.7	.5	.6
5	.8	4.5	15.5	.1	.2	.9	2.0	1.6	43	1.7	.8	.8
6	[a].2	4.4	2.5	.1	.2	.8	1.4	.9	55	1.2	2.8	.6
7	.3	2.0	1.6	.1	.2	.7	1.0	.8	294	1.0	1.5	.4
8	.1	2.7	1.5	.2	.2	.6	.9	.7	109	.9	.9	.4
9	.5		32	.2	.2	.5	.7	27	13	.8	.7	.3
10	.8	[b]3.8	2.9	.2	.2	.4	.6	11.5	25	1.0	.6	.7
11	1.8		1.8	.2	.7	.6	.6	1.4	8.2	1.0	.5	.4
12	3.6	[b]2.5	2.3	.2	1.4	2.7	.6	1.1	3.1	.7	.4	.2
13	59		1.9	.2	.4	4.6	.5	1.0	2.4	.6	.3	.2
14	3.6	1.3	2.8	.2	.2	1.5	.5	21	2.2	.5	.3	
15	39	1.0	1.4	.2	.2	5.0	71	3.3	1.7	.6	1.2	
16	4.4	.6	.1	.2	.5	1.3	42	6.6	1.3	.5	.9	
17	3.0	9.0	.8	.3	.4	.9	6.7	2.5	1.1	1.4	.5	[b].2
18	12	2.6	.4	.3	.2	.7	4.0	1.5	.9	1.8	.6	
19	7.8	1.0	.6	.4	.2	.6	1.8	3.9	.8	.8	.4	
20	10.5	.9	.7	.6	.2	.5	1.3	7.6	.8	.6	7.2	
21	6.2	1.0	.5	.3	.2	.4	4.0	9.7	[b].8	.4	5.9	
22	76	1.3	.8	.7	.2	.4	15	3.1		.4	1.1	
23	31	11	1.5	.8	.2	.4	15.5	1.4		.4	3.7	[b]4.7
24	5.6	24	.4	.5	62	2.5	12.5	1.0		.4	1.8	
25	8.3	3.3	.1	.3	9.4	4.6	5.2	.8	[b]7.5	.3	.8	
26	2.3	.7	.1	.2	2.3	1.2	4.9	.7		.3	.6	[b]1.8
27	2.0	.4	.2	.2	20	1.0	12.5	.6		.4	.5	
28	2.1	.2	.2	.2	56	27	14.5	.9	[b]1.6	4.8	.5	[b].6
29	12	.2	.7	.2	15	16.5	2.4	-------	1.0	1.4	.5	
30	14	.4	.4	.3	19	1.5	1.8	-------	1.0	2.1	.6	[b]12
31	21	.4	-------	.3	-------	84	1.7	-------	1.6	-------	.5	-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	76	0.1	10.9	16.9	338	1,040
August	24	.2	4.41	6.82	137	420
September	32	.1	3.14	4.86	94.1	289
October	.8	.1	.27	.42	8.3	25
November	62	.2	6.39	9.89	192	589
December	84	.4	5.55	8.59	172	528
January	71	.5	8.06	12.5	250	767
February	27	.6	4.94	7.64	138	424
March	294	.5	19.7	30.5	610	1,870
April	52	.3	4.89	7.57	147	450
May	7.2	.3	1.28	1.98	39.6	122
June	----------	----------	1.71	2.65	51.4	158
The year	294	.1	5.96	9.22	2,180	6,680

[a] Partly estimated. [b] Estimated.

HONOMANU STREAM NEAR KEANAE

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 1933.
DISCHARGE.—Maximum during year, 716 million gallons a day or 1,110 second-feet Mar. 5 (gage height, 6.46 feet); minimum, 0.2 million gallons a day or 0.3 second-foot Nov. 22, 23.

1913–33: Maximum, 1,270 million gallons a day or 1,960 second-feet Dec. 18, 1929 (gage height, 9.25 feet); minimum, 0.08 million gallons a day or 0.12 second-foot Mar. 24, 1928. Average, 17 years (1916–33), 16.1 million gallons a day (24.9 second-feet).

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

Discharge, in million gallons, 1932–33

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	3.0	8.4	2.1	1.7	0.5	11	29	3.4	3.1	34	4.9	2.1
2	6.8	23	2.3	1.4	.4	4.9	6.0	2.9	2.1	51	2.9	3.8
3	10	8.0	13	1.3	1.2	3.8	5.6	2.4	1.9	69	2.8	3.1
4	3.1	14	23	1.1	.9	3.0	5.0	24	1.7	8.2	1.8	1.9
5	2.6	7.0	23	1.0	.5	2.6	3.8	3.7	72	4.8	1.7	1.9
6	2.9	7.2	6.3	1.0	.4	2.2	3.0	2.5	95	3.7	4.0	1.7
7	1.9	3.8	4.1	.9	.3	1.8	2.4	2.2	330	3.2	3.8	1.3
8	1.9	5.5	4.2	.8	.3	1.7	2.1	1.9	154	2.8	2.1	1.2
9	2.3	5.0	65	.8	.2	1.5	1.8	36	25	2.6	1.7	1.1
10	2.5	6.5	8.4	.8	.2	1.4	1.6	14	43	3.3	1.7	1.3
11	6.2	6.0	5.4	.7	.7	1.8	1.6	3.2	16	3.1	1.4	1.2
12	9.0	3.8	4.6	.7	2.4	8.4	1.4	3.0	7.3	2.4	1.1	.9
13	68	3.5	5.2	.6	.8	13	1.4	2.8	8.6	2.1	.9	.7
14	8.2	2.9	6.3	.5	.4	4.5	1.3	23	7.0	1.9	1.4	.7
15	54	2.6	5.3	.5	.2	16	78	5.5	5.0	2.1	4.3	.7
16	10	2.5	3.2	.7	3.1	4.2	46	7.3	4.2	1.9	3.0	.7
17	7.5	10.5	2.7	.7	1.4	3.4	13.5	4.2	3.7	5.2	2.0	.7
18	24	4.8	3.2	.6	.5	2.8	8.7	3.4	3.2	5.0	2.4	.5
19	13.5	2.5	3.6	1.3	.4	2.5	4.0	9.2	2.9	2.6	1.4	.5
20	19.5	2.4	2.8	1.2	.3	2.0	3.3	14	2.6	1.9	14.5	.5
21	15	2.3	2.2	.8	.3	1.7	8.5	19	2.5	1.6	17	.8
22	113	2.7	2.5	1.5	.2	1.6	18	7.0	8.2	1.4	3.7	8.4
23	69	15	3.8	1.9	.2	1.4	18.5	3.7	36	1.7	4.9	14
24	24	24	2.4	1.1	84	7.6	16	3.0	30	1.5	4.3	10.5
25	18.5	7.5	2.0	.6	17	13.5	10.5	3.0	6.9	1.2	2.2	7.5
26	8.3	4.0	1.9	.4	5.6	4.2	9.3	2.3	25	1.1	1.7	3.7
27	6.8	3.0	1.4	.4	26	3.7	15.5	2.1	6.2	1.3	1.4	2.3
28	6.7	3.0	1.4	.4	68	43	17.5	2.5	3.7	12	1.4	2.0
29	19.5	3.6	4.2	.4	22	25	5.6	-------	3.1	5.8	1.5	11.5
30	22	2.8	3.8	.6	27	4.9	4.0	-------	2.8	7.5	2.0	30
31	30	2.1	-------	.6	-------	137	3.8	-------	4.2	-------	1.6	-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	113	1.9	19.0	29.4	590	1,810
August	24	2.1	6.45	9.98	200	613
September	65	1.4	7.31	11.3	219	673
October	1.9	.4	.87	1.35	27.0	83
November	84	.2	8.85	13.7	265	814
December	137	1.4	10.8	16.7	336	1,030
January	78	1.3	11.2	17.3	347	1,060
February	36	1.9	7.54	11.7	211	648
March	330	1.7	29.6	45.8	917	2,810
April	69	1.1	8.20	12.7	246	755
May	17	.9	3.27	5.06	102	311
June	30	.5	3.91	6.05	117	360
The year	330	.2	9.80	15.2	3,580	11,000

FOURTH BRANCH OF HONOMANU STREAM AT HAIKU-UKA BOUNDARY, NEAR KAILIILI

LOCATION.—Water-stage recorder at Haiku-uka boundary trail 4½ miles southwest of Keanae.

DRAINAGE AREA.—0.1 square mile.

RECORDS AVAILABLE.—July 1932 to January 1933 (discontinued).

DISCHARGE.—Maximum during period, 33 million gallons a day or 51 second-feet Dec. 31 (gage height, 2.25 feet); minimum, 0.01 million gallons a day or 0.02 second-foot Aug. 16.

REMARKS.—Records fair except those for high stages and estimated periods, which are poor. No diversions above station.

Discharge, in million gallons, 1932–33

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
1	[a]0.4	0.34	0.09	0.34	0.09	0.24	[a]1.0
2		.54	.33	.34	.12	.12	.75
3	1.2	.29	1.4	.24	.16	.12	.88
4	1.35	.34	1.4	.24	.16	.12	.96
5	.84	.34	1.3	.24	.09	.12	.75
6	1.2	.44	.20	.24	.09	.09	.75
7	.58	.20	.16	[a].2	.09	.09	.68
8	.68	.29	.16		.09	.09	.68
9	.24	.29	4.2		.09	.09	.68
10	.12	.56	.39		.09	.09	.68
11	.47	.39	.24		.12	.09	.68
12	.86	.24	.16		.16	.61	.62
13	3.9	.16	.12		.09	.85	-------
14	.34	.12	.35	[a].1	.06	.24	-------
15	3.5	.09	.64		.06	1.2	-------
16	.39	.56	.88		.28	.16	-------
17	.56	1.45	.51		.12	.16	-------
18	1.75	.24	.85		.09	.12	-------
19	1.3	.16	.50		.09	.12	-------
20	.95	.16	.12		.09	.09	-------
21	1.15	.16	.09	.09	.09	.09	-------
22	6.1	.16	.09	.16	.09	.09	-------
23	3.9	1.45	.12	.16	.09	.09	-------
24	.99	1.9	.43	.12	5.0	.67	-------
25	.72	.30	.44	.12	.64	.97	-------
26	.44	.79	.39	.09	.29	.20	-------
27	.39	.68	.34	.09	1.2	.20	-------
28	.34	.81	.34		.30	.67	-------
29	1.25	1.05	1.2	[a].09	1.0	4.1	-------
30	1.6	.46	.96		.92	.16	-------
31	1.6	.26	-------		-------	7.7	-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	6.1	-------	1.27	1.96	39.5	121
August	1.9	0.09	.491	.760	15.2	47
September	4.2	.09	.613	.948	18.4	56
October	.34	.09	.143	.221	4.43	14
November	5.0	.06	.485	.750	14.6	45
December	7.7	.09	.637	.986	19.8	61
January 1–12	-------	.62	.759	1.17	9.11	28
The period (196 days)	7.7	.06	.617	.955	121	372

[a] Estimated.

SEVENTH BRANCH OF HONOMANU STREAM AT HAIKU-UKA BOUNDARY, NEAR KAILIILI

LOCATION.—Water-stage recorder on Haiku-uka boundary trail 4.3 miles southwest of Keanae.
DRAINAGE AREA.—0.3 square mile.
RECORDS AVAILABLE.—July 1932 to January 1933 (discontinued).
DISCHARGE.—Maximum during period, 136 million gallons a day or 210 second-feet Dec. 31 (gage height, 3.19 feet); minimum, 0.06 million gallons a day or 0.09 second-foot Oct. 27, 28, 29.
REMARKS.—Records poor. No diversions above station.

Discharge, in million gallons, 1932–33

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
1	[a]0.4	1.45	0.25	0.32	0.10	1.55	2.8
2	1.25	4.7	[a].9	.28	.62	.78	1.0
3	2.3	1.35		.22	.53	.65	.92
4	.65	2.7	3.5	.22	[b].25	.59	1.35
5	.85	1.5	4.2	.19	[b].17	.65	.78
6	.65	[b]1.7	1.05	.19	.12	.59	.54
7	.36	.78	.65	.17	.10	.32	.40
8	.32	1.05	.65	.14	.10	.25	.32
9	.28	1.0	7.1	.12	.08	.19	.32
10	.36	5.5	1.35	.12	.07	.14	.28
11	1.0	1.3	.92	.10	.72	.26	.28
12	1.6	.78	4.8	.10	.85	1.8	.28
13	10.5	.65	.85	.08	.32	2.2	.25
14	1.2	.59	1.4	.08	.17	.73	.22
15	7.5	.45	.85	.08	.10	2.3	.32
16	1.75	.40	.45	.10	1.55	[b].59	[b].36
17	1.55	2.2	.45	.10	.46	[b].49	-------
18	4.2	.78	.54	.10	.19	.36	-------
19	3.0	.45	.59	.30	.14	.32	-------
20	2.9	.45	.54	.36	.12	.25	-------
21	3.2	.45	.35	[b].22	.14	.22	-------
22	16	.65	6.2	[b].47	.12	.22	-------
23	[b]6.3	3.8	.85	.40	.12	.19	-------
24	2.0	5.1	.40	.25	9.9	[b]1.3	-------
25	2.7	1.05	.28	.14	3.8	2.1	-------
26	1.3	.54	.25	.10	1.25	.59	-------
27	1.25	.45	.22	.08	3.8	.59	-------
28	1.25	.40	.22	.06	8.5	8.0	-------
29	3.4	.54	1.1	.06	3.3	2.5	-------
30	3.8	.45	.68	.10	3.5	[b].65	-------
31	4.6	.32	-------	.14	-------	[b]16.5	-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	16	0.28	2.85	4.41	88.4	271
August	5.5	.32	1.40	2.17	43.5	134
September	7.1	.22	1.42	2.20	42.5	130
October	.47	.06	.174	.269	5.39	17
November	9.9	.07	1.37	2.12	41.2	126
December	16.5	.14	1.54	2.38	47.9	147
January 1-16	2.8	.22	.651	1.01	10.4	32
The period (200 days)	16.5	.06	1.40	2.17	279	857

[a] Estimated. [b] Partly estimated.

HAIPUAENA STREAM AT HAIKU-UKA BOUNDARY, NEAR KAILIILI

LOCATION.—Water-stage recorder 50 feet upstream from Haiku-uka boundary trail and 4½ miles southeast of Kailiili.

DRAINAGE AREA.—0.4 square mile.

RECORDS AVAILABLE.—May 1919 to January 1927, July 1932 to June 1933.

DISCHARGE.—Maximum during year, 128 million gallons a day or 198 second-feet Mar. 5 (gage height, 4.66 feet); minimum recorded, 0.1 million gallons a day or 0.2 second-foot between June 16–30.

1919–27, 1932–33: Maximum, 162 million gallons a day or 251 second-feet Oct. 16, 1924 (gage height, 3.02 feet); minimum, 0.1 million gallons a day or 0.2 second-foot Sept. 19, 1924, and that between June 16–30, 1933.

REMARKS.—Records good for ordinary stages, poor for high stages and estimated periods. Practically all low flow diverted into Kula pipe line above station.

Discharge, in million gallons, 1932–33

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	[a] 1.4	3.1	0.6	[a] 0.7	0.3	3.4	6.9	[b] 1.0	1.2	7.5	0.8	0.4
2	2.5	8.4	.6	[b] .6	.3	1.6	1.8	[a] .9	.8	11	.5	.6
3	4.5	3.2	4.8	[b] .6	.5	1.2	1.3	.8	.6	15	.4	.4
4	1.4	4.3	7.9	[b] .5	.4	1.0	1.6	8.6	.6	1.8	.3	.5
5	1.3	2.9	8.1	[b] .5	.3	.8	1.2	1.2	14	.9	.3	.6
6	[a] 1.3	3.4	2.2	[a] .4	.3	.7	.9	.8	23	.8	1.5	.3
7	[b] .7	1.7	1.3	.4	.2	.7	.8	.8	52	.6	1.0	.2
8	[a] .8	2.4	1.3	.4	.2	.6	.8	.6	24	.6	.5	.2
9	.8	2.0	16	.4	.2	.6	.7	8.7	5.0	.6	.4	.2
10	1.0	2.7	2.7	.3	.2	.6	.6	4.0	10.5	.7	.4	.3
11	1.7	2.7	1.8	.3	.6	.5	.6	1.1	3.8	.6	.3	.2
12	3.0	1.6	1.7	.3	.9	1.3	.6	1.0	1.6	.5	3	.2
13	21	1.4	1.6	.3	.4	3.3	[a] .6	.9	1.5	.4	.2	.2
14	3.4	1.3	1.4	.3	.3	1.0	[b] .5	8.1	1.4	.4	.2	.2
15	15.5	1.0	1.4	.3	.2	3.1	[b] 18	1.8	1.1	.4	.6	.2
16	3.8	1.0	1.0	.3	.4	1.0		3.8	.9	.3	.4	.1
17	2.8	5.5	.9	.3	.3	.7		1.5	.8	.8	.3	
18	7.6	2.1	1.0	.3	.2	.6		1.3	.7	.8	.3	
19	4.9	1.0	1.0	.4	.2	.5	[b] 3.8	3.5	.6	.4	.2	[b] .1
20	7.8	1.0	.8	.5	.2	.5		5.4	.6	.3	4.1	
21	5.7	1.0	.7	.4	.1	.5		5.9	.6	.3	3.8	
22	25	1.0	.8	.6	.1	.4		2.2	2.3	.3	.6	
23	14.5	5.4	1.2	.8	.2	.4	[b] 8.5	1.3	11.5	.3	1.8	[b] 4.0
24	4.3	7.4	.7	.6	22	2.0		1.0	7.1	.2	.9	
25	5.7	2.4	.6	.4	3.8	3.4		1.0	1.9	.2	.5	
26	2.7	1.3	.6	.3	1.7	1.0	[b] 4.8	.8	7.4	.2	.4	[b] .8
27	2.3	1.1	.5	.3	8.5	.9		.8	1.3	.2	.3	
28	2.3	1.0	.5	.3	17.5	9.6	[b] 8.5	1.3	.8	3.1	.4	
29	7.7	1.2	.9	.2	7.3	7.9		-------	.7	.7	.4	[b] 8.5
30	8.5	1.0	[a] 1.0	.3	8.8	1.2	[b] 1.6	-------	.7	1.1	.4	
31	10.5	.8	-------	.3	-------	23		-------	1.1	-------	.3	-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	25	----------	5.69	8.80	176	541
August	8.4	0.8	2.46	3.81	16.3	234
September	16	.5	2.19	3.39	65.6	201
October	.8	.2	.41	.63	12.6	39
November	22	.1	2.55	3.95	76.6	235
December	23	.4	2.39	3.70	74.0	227
January	----------	----------	4.22	6.53	131	401
February	8.7	.6	2.50	3.87	70.1	215
March	52	.6	5.81	8.99	180	553
April	15	.2	1.70	2.63	51.0	157
May	4.1	.2	.71	1.14	22.8	70
June	----------	----------	1.25	1.93	37.5	115
The year	52	----------	2.67	4.13	974	2,990

[a] Partly estimated. [b] Estimated.

HAIPUAENA STREAM NEAR HUELO

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 1933.

DISCHARGE.—Maximum during year, 439 million gallons a day or 679 second-feet Dec. 31 (gage height, 5.33 feet); minimum, 0.4 million gallons a day or 0.6 second-foot Nov. 23.

1913–33: Maximum, 582 million gallons a day or 900 second-feet Feb. 17, 1929 (gage height, 6.25 feet); minimum, 0.3 million gallons a day or 0.5 second-foot frequently during December 1919. Average, 17 years (1916–33), 10.4 million gallons a day (16.1 second-feet).

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

Discharge, in million gallons, 1932–33

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	3.1	7.9	1.5	1.3	0.8	8.3	18.5	3.7	3.0	21	3.8	1.9
2	5.8	12	1.5	1.1	.7	4.0	5.7	3.0	2.1	29	2.5	3.5
3	10.5	6.0	9.7	1.0	.9	3.0	5.1	2.5	1.8	47	3.2	2.9
4	3.2	6.2	16.5	1.0	1.0	2.5	4.7	14.5	1.8	6.1	1.9	2.0
5	2.8	5.0	15	1.0	.7	2.2	3.7	3.0	46	3.8	1.8	2.3
6	2.8	5.8	4.8	1.0	.6	1.9	2.7	2.3	61	3.0	2.5	1.8
7	2.3	3.6	3.0	.9	.6	1.7	2.4	2.1	162	2.6	2.8	1.5
8	2.1	5.3	4.2	.9	.5	1.6	2.1	1.8	73	2.3	1.8	1.3
9	2.6	4.9	51	.9	.5	1.3	1.9	24	14	2.1	1.6	
10	2.8	4.9	6.9	.8	.5	1.2	1.8	9.8	26	2.5	1.5	[a]1.2
11	6.7	5.2	4.4	.8	.9	1.3	1.9	3.2	9.8	2.2	1.3	
12	9.3	3.5	3.1	.8	1.6	5.6	1.8	3.0	5.0	1.8	1.1	
13	59	3.4	3.9	.7	.9	11	1.7	2.8	6.9	1.6	1.0	
14	9.2	2.6	3.7	.7	.6	3.0	1.4	17	5.8	1.5	1.3	
15	54	2.3	3.3	.6	.6	12.5	43	4.4	4.0	1.8	3.0	
16	11	2.2	2.3	.8	.9	3.0	27	5.4	3.4	1.6	2.2	
17	8.2	7.2	2.1	.9	.9	2.5	12	3.5	2.9	3.4	1.9	[a].8
18	27	3.7	2.1	.8	.6	2.1	8.8	3.8	2.5	3.3	2.2	
19	14	2.2	2.3	1.3	.5	2.1	4.2	8.5	2.3	1.8	1.5	
20	23	2.2	1.9	1.2	.5	1.7	3.6	13	2.1	1.5	9.7	
21	16.5	2.1	1.6	.9	.4	1.5	7.3	19.5	2.1	1.3	13.5	
22	88	2.1	1.6	1.6	.4	1.3	14	6.9	5.7	1.2	3.0	
23	50	11.5	2.1	1.7	.5	1.3	12.5	4.1	18.5	1.3	2.9	
24	26	10.5	1.6	1.2	57	5.2	12	3.4	15.5	1.3	3.2	[a]7.5
25	16	4.1	1.4	.9	12	9.9	8.2	3.7	3.8	1.1	2.1	
26	8.6	2.4	1.5	.7	4.4	3.0	7.8	2.6	15.5	1.1	1.7	
27	6.9	2.2	1.2	.7	16	2.5	12	2.4	4.1	1.3	1.5	[a]2.7
28	6.6	2.1	1.1	.6	40	27	13.5	2.5	2.7	9.0	1.5	
29	16	2.5	2.1	.7	15	17	6.1	-------	2.5	5.2	1.7	
30	19.5	2.0	2.3	1.0	18	3.5	4.5	-------	2.3	5.8	1.7	[a]15
31	23	1.7	-------	.9	-------	94	4.4	-------	3.3	-------	1.6	-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	88	2.1	17.3	26.8	536	1,650
August	12	1.7	4.49	6.95	139	427
September	51	1.1	5.32	8.23	160	490
October	1.7	.6	.95	1.47	29.4	90
November	57	.4	5.95	9.21	178	548
December	94	1.2	7.70	11.9	239	733
January	43	1.4	8.27	12.8	256	787
February	24	1.8	6.30	9.75	176	541
March	162	1.8	16.5	25.5	511	1,570
April	47	1.1	5.62	8.70	168	517
May	13.5	1.0	2.68	4.15	83.0	255
June	----------	----------	3.24	5.01	97.3	299
The year	162	.4	7.05	10.9	2,570	7,910

[a] Estimated.

FIRST BRANCH OF HAIPUAENA STREAM AT HAIKU-UKA BOUNDARY, NEAR KAILIILI

LOCATION.—Water-stage recorder at Haiku-uka boundary, 4.6 miles southwest of Keanae post office.
DRAINAGE AREA.—0.05 square mile.
RECORDS AVAILABLE.—July 1932 to January 1933 (discontinued).
DISCHARGE.—Maximum during period, 32 million gallons a day or 50 second-feet Dec. 31 (gage height, 1.70 feet); no flow Oct. 15–17.
REMARKS.—Records good for ordinary stages, poor for high stages and estimated periods. No diversions above station.

Discharge, in million gallons, 1932–33

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
1	0.09	0.18	0.02	0.04	0.02	0.12	0.25
2	.62	.15	.02	.04	.01	.09	.12
3	.33	.15	.23	.04	.01	.09	.09
4	.09	.09	.42	.04	.02	.09	.09
5	.09	.09	.32	.04	.02	.09	.09
6	.06	.12	.06	.02	.02	.09	.06
7	.04	.06	.04	.02	.02	.06	.06
8	.04	.09	.04	.02	.02	.04	.06
9	.04	.06	2.7	.02	.02	.04	.06
10	.04	[a].12	.09	.02	.02	[b].02	.06
11	.14	[a].06	.06	.02	.02	[a].02	.06
12	.32	.09	.06	.01	.04	.22	.06
13	1.15	.09	.04	.01	.04	.25	.04
14	.10	.09	.06	.01	.02	.06	.02
15	1.35	.09	.04	0	.01	.44	1.3
16	.25	.09		[b]0	.01	.04	.65
17	.29	.12		[b]0	.01	.04	.21
18	.80	.09	[b].04	[b].04	.01	.04	.15
19	.58	.04		[b].04	.01	.04	.06
20	.44	.04		[b].04	.01		.06
21	.44	.04		[a].02	.01	[b].02	
22	2.8	.04	[b].03	.04	.01		
23	2.7	.40		.04	.01		
24	.49	.12	.04	.04	2.2	.21	
25	.34	.06	.04	.02	.24	.40	
26	.25	.04	.04	.02	.12	.09	
27	.21	.04	.04	.02	.37	.09	
28	.21	.02	.04	.02	1.2	1.65	
29	.43	.02	.10	.02	.39	.30	
30	.64	.02	.04	.02	.34	.04	
31	.53	.02		.02		3.8	

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	2.8	0.04	0.513	0.794	15.9	49
August	.40	.02	.088	.136	2.73	8
September	2.7	.02	.161	.249	4.83	15
October		0	.024	.037	.75	2
November	2.2	.01	.175	.271	5.25	16
December	3.8		.275	.425	8.54	26
January 1–20	1.3	.02	.178	.275	3.55	11
The period (204 days)	3.8	0	.204	.316	41.6	127

[a] Partly estimated. [b] Estimated.

THIRD BRANCH OF HAIPUAENA STREAM AT HAIKU-UKA BOUNDARY, NEAR KAILIILI

LOCATION.—Water-stage recorder on Haiku-uka boundary trail 4.6 miles southwest of Keanae.
DRAINAGE AREA.—0.06 square mile.
RECORDS AVAILABLE.—July 1932 to January 1933 (discontinued).
DISCHARGE.—Maximum during period, 14.2 million gallons a day, or 22.0 second-feet Dec. 28 (gage height, 1.48 feet); no flow Nov. 9, 10, 15, 16, 22, 23.
REMARKS.—Records fair except those for high stages and estimated periods, which are poor. No diversions above station.

Discharge, in million gallons, 1932–33

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
1	[a]0.16	0.27	0.10	0.13	0.07	0.23	[b]0.9
2	.55		.10	.13	.07	.13	
3	.36		.52	.13	.10	.13	
4	.13		.82	.13	.10	.10	[b].4
5	.13	[b].2	.70	.13	.07	.10	
6	.10		.19	.10	.07	.10	[b].2
7	.10		.16	.10	.07	.10	
8	.10		.16	.10	.01	.10	.10
9	.10		3.0	.10	0	.07	.10
10	.10	[b].4	.23	.10	0	.07	[a].07
11	.37		.19	.10	.07	.07	[a].07
12	.60		.16	.10	.13	.33	[a].07
13	2.0	.16	.16	.10	.10	.47	----
14	.23	.16	.28	.07	.07	.13	----
15	2.2	.16	.16	.07	.01	.72	----
16	.23	.13	.13	.07	.10	.10	----
17	.32	.27	.13	.10	.07	.10	----
18	1.05	.16	.13	.10	.07	.10	----
19	.78	.13	.13	.10	.04	.10	----
20	.57	.10	.16	.10	.04	.10	----
21	[b]1.8	.10	.13	.07	.04	.07	----
22		.10	.13	.10	0	.07	----
23	[b]1.1	.76	.10	.10	.01	.07	----
24		.41	.10	.07	3.0		----
25		.16	.10	.07	.44		----
26		.10	.10	.04	.19	[b].4	----
27	[b].7	.10	.10	.04	.69		----
28		.10	.10	.04	1.7		----
29		.10	.26	.04	.61		----
30		.10	.13	.07	.60	[b]3.2	----
31	.97	.10	----	.07	----		----

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	----	0.10	0.682	1.06	21.2	65
August	----	.10	.222	.343	6.87	21
September	3.0	.10	.295	.456	8.86	27
October	.13	.04	.089	.138	2.77	9
November	3.0	0	.285	.441	8.54	26
December	----	.07	.489	.757	15.2	47
January 1–12	----	.07	.318	.492	3.81	12
The period (196 days)	----	0	.343	.531	67.2	207

[a] Partly estimated. [b] Estimated.

SPRECKELS DITCH AT HAIPUAENA, NEAR HUELO

LOCATION.—Water-stage recorder between Haipuaena and Puohokamoa Streams on Spreckels Ditch trail, 3½ miles southeast of Kailua.

RECORDS AVAILABLE.—February 1930 to June 1933.

DISCHARGE.—Maximum during year, 76 million gallons a day, or 118 second-feet Mar. 5 (gage height, 5.03 feet); no flow Feb. 10.

1930–33: Maximum, that of Mar. 5, 1933; no flow when water is turned out of ditch.

REMARKS.—Records good. Regulated by gates and spillways. 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, 1932–33

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1		25		5.2	3.7	24	26	15	11	21	15	8.6
2		24	a9	4.5	3.3	14	20	11	7.8	32	10.5	15
3	a15	21		4.2	4.5	12	20	9.2	6.9	24	13.5	12.5
4		19	29	4.0	4.4	10.5	20	22	6.7	19	7.4	7.1
5			28	4.2	3.3	8.5	15	11.5	15.5	12	7.2	7.1
6			15	4.0	3.0	7.6	11.5	8.3	24	10	10.5	6.1
7		a16	11	3.7	2.8	6.7	9.6	7.6	24	8.7	10.5	5.0
8	a9		14	3.3	2.7	6.2	8.3	6.4	13	7.6	6.7	4.7
9			37	3.5	2.7	5.9	7.6	18	19	7.1	6.2	4.4
10			20	3.2	2.7	5.6	7.6	10.5	33	9.2	6.4	5.0
11	a18	a13	14	3.2	4.2	6.4	7.8	7.8	22	7.6	5.6	4.5
12			11	3.2	6.9	21	7.8	12	17	6.4	5.0	3.8
13			15	3.0	4.0	25	7.1	11	21	5.9	4.7	3.3
14			15	2.8	3.0	12	6.1	27	20	5.4	7.3	3.0
15			12.5	2.8	2.7	23	27	16	14	6.7	17	3.0
16	a28	a10	8.3	3.3	8.3	12	33	16	11.5	6.1	11	3.2
17			7.9	3.7	5.2	11.5	28	12.5	10	14	10	3.2
18			10	3.5	3.5	10.5	24	14	8.7	13	10.5	2.6
19			10.5	6.8	3.0	10	16	26	7.8	6.7	6.4	2.4
20		a8	7.9	5.7	2.7	7.2	14	28	7.1	5.7	23	2.0
21			6.6	4.2	2.6	6.4	19	33	8.2	5.2	28	3.3
22	a30		7.4	8.1	2.6	6.1	28	22	20	5.2	12	11.5
23			10.5	7.2	2.7	5.7	27	14	25	5.4	12	21
24	32	a12	6.1	5.0	38	17	26	12.5	27	5.4	12	19
25	29		6.9	3.8	27	25	24	15	14	4.7	7.9	22
26	27		7.4	3.3	18	13	24	10	30	4.7	6.4	11.5
27	24		4.7	3.2	28	11	25	8.3	14	5.7	5.7	6.7
28	24	a7	5.0	3.0	37	22	26	9.2	9.4	24	6.1	7.8
29	32		11	3.2	31	27	21	-------	8.7	21	6.1	20
30	33		11	4.7	33	15	15	-------	7.4	21	7.1	34
31	33		-------	3.8	-------	31	16	-------	11	-------	5.7	------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	33	----------	22.7	35.1	704	2,160
August	25	----------	12.4	19.2	384	1,180
September	37	4.7	12.3	19.0	370	1,130
October	8.1	2.8	4.11	6.36	127	391
November	38	2.6	9.88	15.3	296	910
December	31	5.6	13.5	20.9	419	1,290
January	33	6.1	18.3	28.3	567	1,740
February	33	6.4	14.8	22.9	414	1,270
March	33	6.7	15.3	23.7	475	1,460
April	32	4.7	11.0	17.0	330	1,010
May	28	4.7	9.79	15.1	303	931
June	34	2.0	8.78	13.6	263	808
The year	38	2.0	12.7	19.6	4,650	14,300

a Estimated.

PUOHOKAMOA STREAM NEAR HUELO

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 1933.

DISCHARGE.—Maximum during year, 955 million gallons a day or 1,480 second-feet Mar. 5 (gage height, 7.05 feet); minimum, 0.9 million gallons a day or 1.4 second-feet Nov. 9, 15, 19–23.

1910–33: Maximum, 1,100 million gallons a day or 1,700 second-feet Jan. 14, 1923, Nov. 18, 1930 (gage height, 7.88 feet); minimum, 0.1 million gallons a day or 0.2 second-foot Nov. 17, 1929. Average, 16 years (1917–33), 21.2 million gallons a day (32.8 second-feet).

REMARKS.—Records good for ordinary stages, poor for high stages and estimated periods. Kula pipe line diverts small amount of water above station at elevation of 4,300 feet.

Discharge, in million gallons, 1932–33

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	6.1	16	2.8	2.6	1.4			7.8	6.0	55	8.2	4.0
2	11.5	17.5	2.9	2.2	1.3	[a]11	[a]30	7.2	4.7	68	5.6	7.0
3	20	11	17.5	2.1	1.3			6.0	4.2	93	6.6	6.0
4	6.1	10	31	2.0	1.5			[b]21	4.1	15.5	4.5	4.2
5	5.1	9.2	26	2.0	1.2		[a]8.5	8.5	91	11	4.5	4.2
6	4.8	11	8.7	2.0	1.1	[a]6		6.0		8.8	5.6	3.6
7	4.4	7.2	5.5	1.8	1.1			5.5	[a]280	7.6	5.6	3.2
8	4.4	10	7.6	1.7	1.0		[a]5.5	5.5		7.1	4.2	3.0
9	5.6	9.9	128	1.7	[b].9			12.5	32	6.1	3.6	2.9
10	5.3	9.2	14	1.6	1.0	[a]3.9	4.7	9.2	51	7.1	3.6	3.2
11	12.5	10	8.5	1.5	1.6		5.1	7.8	22	6.1	3.3	2.9
12	21	6.5	6.0	1.4	2.2		4.5	8.5	14.5	5.2	3.1	2.6
13	106	6.5	6.5	1.4	1.6	[a]15	4.2	6.5	19	4.8	3.0	2.4
14	17	5.1	6.0	1.4	1.2		3.7	23	15.5	4.5	3.2	2.3
15	89	4.7	5.1	1.3	1.0		69	11	12	4.8	6.1	2.3
16	21	4.5	4.3	1.4	1.5		49	10	9.5	4.5	4.8	2.4
17	15.5	10	3.9	1.5	1.4	[a]6	27	7.8	8.8	8.0	4.2	2.3
18	51	6.5	4.1	1.4	1.1		18	8.5	7.6	7.6	4.8	2.0
19	27	4.5	4.2	2.5	.9		10	17	7.1	4.8	3.6	1.9
20	41	4.2	3.7	2.2	[b].9		8.5	24	6.6	4.2	20	1.8
21	29	4.0	3.2	1.7	[b].9		10.5	44	6.6	3.8	27	2.3
22	146	4.1	3.2	2.8	[b].9	[a]3.7	32	17.5	13.5	3.6	7.1	10
23	131	19	3.7	2.7	[b].9		22	10	30	3.8	5.6	23
24	47	12.5	3.0	2.0	111		22	7.8	28	3.8	6.6	14
25	18.5	6.6	3.1	1.6	22	[a]16	17	7.8	3.6	3.3	4.5	13
26	14.5	4.5	3.3	1.4	7.8	[a]8.5	22	6.0	26	3.2	3.8	6.5
27	14.5	4.2	2.6	1.4	28		16	5.5	10	3.6	3.6	4.2
28	12.5	4.1	2.4	1.2	74	[a]38	24	5.5	7.1	18.5	3.6	3.8
29	30	4.5	3.4	1.2	26		13.5	-------	6.6	11	3.6	14.5
30	39	3.5	3.9	1.7	[a]30	[a]9	10	-------	6.1	12.5	3.6	37
31	44	3.2	-------	1.5	-------	[a]200	9.2	-------	8.8	-------	3.6	------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	146	4.4	32.3	50.0	1,000	3,070
August	19	3.2	7.86	12.2	244	748
September	128	2.4	10.9	16.9	328	1,010
October	2.8	1.2	1.77	27.4	54.9	168
November	111	.9	10.9	16.9	327	1,000
December	----------	----------	16.2	25.1	501	1,540
January	69	3.7	16.5	25.5	512	1,570
February	44	5.5	11.3	17.5	317	974
March	----------	3.6	42.0	65.0	1,300	4,000
April	93	3.2	13.4	20.7	401	1,230
May	27	3.0	5.83	9.02	181	555
June	37	1.8	6.42	9.93	192	591
The year	----------	.9	14.7	22.7	5,360	16,500

[a] Estimated. [b] Partly estimated.

WEST BRANCH OF PUOHOKAMOA STREAM AT HAIKU-UKA BOUNDARY, NEAR KAILIILI

LOCATION.—Water-stage recorder at trail crossing 500 feet above Haiku-uka boundary and 3¾ miles southeast of Kailiili.

DRAINAGE AREA.—0.5 square mile.

RECORDS AVAILABLE.—March 1919 to July 1928, July 1932 to June 1933.

DISCHARGE.—Maximum during year unknown, due to missing records; minimum, 0.16 million gallons a day or 0.25 second-foot several days during October and November.

1919–28, 1932–33: Maximum (estimated), 250 million gallons a day or 387 second-feet Mar. 22, 1920 (gage height, 8 feet, estimated from faulty recorder graph); minimum, 0.08 million gallons a day or 0.12 second-foot Dec. 22, 23, 1919.

REMARKS.—Records good for ordinary stages, poor for high stages and estimated periods. Small amount of water diverted above station by Kila pipe line.

Discharge, in million gallons, 1932–33

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	[a]1.35	2.5	0.52	0.44	0.28	1.25	[b]5.5	0.95	[b]0.6	[b]18	0.95	0.49
2	2.6	[b]16	.52	.40	.25	1.15		.75			.60	.70
3	3.6		4.2	.36	.34	.90		[b]7			.52	.56
4	1.0		6.9	[a].34	.34	.85	[b]1.5	[b]13		[b]2.0	.44	.44
5	.90	[b]4.5	7.2	[b].34	.25	.80			[b]24		.40	.44
6	.85		1.65	[a].34	.23	.65	[b].8	[b].7	[b]80		.94	.40
7	.75		.90	.31	.21	.60					.85	.36
8	.65		.90		.19	.56	.65			[b].7	.56	.34
9	.75		24		.16	.49	.65		[b]10		.44	.31
10	.80	[b]2.3	2.4		.19	.44	.60	[b]12			.40	.34
11	1.5		1.4	[b].3	.56	.52	.60		[b]4.0		.40	.31
12	2.8		1.0		.65	1.4	.56	[b].8			.40	.28
13	[b]28		1.15		.34	3.3	.52				.34	.25
14	[b]3.5	1.0	.95		.28	.92	.44	[b]10	[b]1.4	[b].6	.34	.25
15	[b]18	.90	.90	.25	.23	3.5	34				.60	.25
16	[a]3.6	.85	.75	.28	.36	.75	16.5	[b]3.8			.56	.23
17	2.7	[b]3.9	.70	.31	.34	.65	5.3				.44	.23
18	8.8		.70	.31	.23	.65	4.0	[b]1.3			.52	.21
19	4.5		.80	.52	.19	.60	1.95		[b].7	[b].8	.36	.19
20	8.5		.70	.40	.16	.52	1.6				4.1	.21
21	5.4	[b].7	.60	.28	.16	.52	3.3	[b]4.2			4.6	.31
22	44		.65	.57	.16	.49	8.5		[b]7.5	[b].4	.75	3.0
23	24	[b]7	.80	.60	.16	.44	7.5				1.25	4.8
24	[b]4.9	5.2	.56	.40	30	2.7	6.8				.90	2.9
25		1.7	.52	.28	4.3	3.6	4.5		[b]3.8		.56	1.7
26		.90	.56	.28	1.5	.95	4.0			.34	.49	.75
27	[b]1.4	.85	.49	.28	5.1	.85	6.9			.36	.44	.60
28		.80	.40	.23	1.25	[b]10	7.4			3.5	.44	.49
29	[b]7	.85	.58	.23	1.25		2.2	-------	[b].8	.90	.44	3.6
30	7.4	.75	.70	.31	1.25	[b]1.0	1.5	-------		1.5	.52	9.5
31	9.5	.60	-------	.31	-------	[b]42	1.15	-------	-------	-------	.44	------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	44	0.65	6.66	10.3	206	634
August	----------	.60	2.73	4.22	84.6	260
September	24	.40	2.14	3.31	64.1	197
October	.60	.23	.338	.523	10.5	32
November	30	.16	1.70	2.63	50.9	156
December	----------	.44	3.00	4.64	93.0	286
January	34	.44	4.46	6.90	138	424
February	----------	----------	3.29	5.09	92.1	283
March	----------	----------	9.04	14.0	280	860
April	----------	.34	2.56	3.96	76.7	235
May	4.6	.34	.806	1.25	25.0	77
June	9.5	.19	1.15	1.78	34.4	106
The year	----------	.16	3.17	4.90	1,160	3,550

[a] Partly estimated. [b] Estimated.

MIDDLE BRANCH OF PUOHOKAMOA STREAM AT HAIKU-UKA BOUNDARY, NEAR KAILIILI

LOCATION.—Water-stage recorder at trail crossing 200 feet above Haiku-uka boundary and 4.1 miles southeast of Kailiili.

DRAINAGE AREA.—0.6 square mile.

RECORDS AVAILABLE.—March 1919 to February 1927, July 1932 to June 1933.

DISCHARGE.—Maximum during year, 163 million gallons a day or 252 second-feet Mar. 5 (gage height, 8.13 feet); minimum, 0.2 million gallons a day or 0.3 second-foot June 19.

1919–27, 1932–33: Maximum recorded, 207 million gallons a day or 320 second-feet Mar. 22, 1920 (gage height, 8.47 feet); minimum, 0.06 million gallons a day or 0.09 second-foot July 14, 1920.

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

Discharge, in million gallons, 1932–33

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	1.1	2.5	0.7	0.6	0.4	3.0	5.6	1.0	1.3	6.5	0.7	0.4
2	2.2	5.2	.6	.6	.4	1.6	2.0	.8	.7	9.7	.5	.6
3	2.5	2.4	3.3	.6	.6	1.3	1.5	.7	.6	11	.5	.6
4	1.1	2.8	5.0		.4	1.1	1.8	4.9	.6	2.0	.4	.5
5	1.1	2.4	5.6	[a].5	.4	.8	1.3	1.2	15	1.2	.4	.7
6	1.0	2.4	1.8		.3	.7	1.1	.8	15.5	1.0	1.2	.5
7	.8	1.5	1.2	.5	.3	.6	.8	.7	44	.9	1.0	.3
8		1.9	1.1	.4	.3	.6	.7	.7	22	.8	.6	.4
9	[a].7	1.7	13.5	.4	.3	.5	.6	6.6	5.1	.7	.5	.3
10		2.2	2.4	.4	.3	.5	.6	3.2	8.4	.8	.4	.4
11		1.9	1.6	.4	.6	.6	.6	1.1	3.6	.8	.4	.3
12	[a]2.0	1.3	1.3	.4	.8	1.2	.6	.9	1.9	.7	.3	.3
13		1.2	1.5	.3	.4	2.8	.5	.8	1.6	.6	.3	.3
14	[a]6	1.1	1.4	.3	.4	1.1	.5	4.2	1.5	.6	.3	.3
15		.9	1.2	.3	.3	2.7	14	1.6	1.1	.6	.8	.3
16	2.7	.9	.9	.4	.3	1.0	8.9	1.9	1.0	.5	.5	.2
17	2.2	3.1	.9	.3	.3	.6	2.9	1.3	.9	.8	.4	.2
18	5.8	1.6	1.0	.3	.3	.6	2.1	1.1	.7	1.0	.4	.2
19	4.1	1.0	1.1	.5	.3	.6	1.2	2.5	.7	.6	.4	.2
20	5.3	.9	.9	.6		.5	.9	4.1	.6	.5	3.0	.2
21	4.0	1.0	.8	.5	[a].3	.5	2.5	5.1	.6	.4	3.3	.3
22	22	1.1	.8	.8		.4	4.4	2.2	1.7	.4	.8	2.3
23	13	3.6	1.2	.7		.4	4.2	1.1	7.8	.4	1.2	3.2
24	4.3	4.0	.8	.5	[a]9	1.6	4.0	.9	4.2	.4	1.0	[a]2.2
25	4.4	1.7	.7	.4		3.1	2.9	.8	2.0	.3	.5	
26	2.5	1.1	.6	.4	1.7	.9	2.8	.7	4.5	.3	.4	
27	2.0	.9	.6	.3	5.7	.7	4.8	.6	1.2	.4	.4	[a].6
28	1.9	.9	.5	.3	13	9.3	4.3	1.0	.8	2.4	.4	
29	5.3	1.1	.6	.3	5.5	5.8	1.6	-------	.7	.8	.4	
30	5.4	.9	1.0	.4	6.4	1.3	1.3	-------	.7	1.0	.5	[a]6
31	7.1	.7	-------	.4	-------	21	1.2	-------	1.5	-------	.4	-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	22	0.7	4.06	6.28	126	386
August	5.2	.7	1.80	2.79	55.9	172
September	13.5	.5	1.82	2.82	54.6	168
October	.8	.3	.45	.70	13.8	42
November	13	.3	1.96	3.03	58.9	181
December	21	.4	2.17	3.36	67.4	207
January	14	.5	2.65	4.10	82.2	252
February	6.6	.6	1.88	2.91	52.5	161
March	44	.6	4.92	7.61	152	468
April	11	.3	1.60	2.48	48.1	148
May	3.3	.3	.72	1.11	22.3	68
June	----------	.2	1.04	1.61	31.2	96
The year	44	.2	2.10	3.25	765	2,350

[a] Estimated.

EAST BRANCH OF PUOHOKAMOA STREAM AT HAIKU-UKA BOUNDARY, NEAR KAILIILI

LOCATION.—Water-stage recorder 200 feet downstream from trail crossing and 4¼ miles southeast of Kailiili.

DRAINAGE AREA.—0.1 square mile.

RECORDS AVAILABLE.—October 1919 to February 1927, July 1932 to January 1933 (discontinued).

DISCHARGE.—Maximum during period, 50 million gallons a day or 77 second-feet Dec. 31 (gage height, 5.81 feet); minimum, 0.1 million gallons a day or 0.2 second-foot Nov. 21–23.

1919–27, 1932–33: Maximum recorded, about 102 million gallons a day or 158 second-feet Mar. 22, 1920 (gage height, old datum, 3.27 feet; estimated by comparison with flow of West and Middle Branches of Puohokamoa Stream); no flow several days December 1919, July 1920.

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

Discharge, in million gallons, 1932–33

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
1	0.4	0.9	0.3	0.3	0.2	0.9	1.8
2	1.0	.8	.3	.3	.2	.5	.7
3	1.0	.7	1.2	.3	.2	.4	.6
4	.4	.6	2.1	.3	.2	.4	.6
5	.3	.6	1.8	.3	.2	.3	.4
6	.3	.7	.6	.3	.2	.3	.3
7	.3	.5	.4	.3	.2	.3	.4
8	.3	.6	.4	.2	.2	.3	.4
9	.3	.6	9.2	.2	.2	.3	.4
10	.3	.9	1.1	.2	.2	.2	.3
11	.6	.7	.7	.2	.2	.2	.3
12	1.1	.5	.6	.2	.3	.7	.3
13	5.1	.4	.6	.2	.2	1.0	-------
14	.8	.4	.7	.2	.2	.3	-------
15	5.7	.4	.5		.1	1.6	-------
16	1.0	.4	.4		.2	.4	-------
17	1.0	.7	.4		.2	.4	-------
18	3.0	.4	.4	[a].3	.1	.3	-------
19	1.9	.4	.4		.1	.3	-------
20	1.9	.4	.4		.1	.3	-------
21	1.6	.4	.3		.1	.2	-------
22	9.9	.4	.3	.3	.1	.2	-------
23	9.9	1.6	.3	.3	.1	.2	-------
24	2.2	1.0	.3	.2	7.1	.7	-------
25	1.4	.6	.3	.2	1.4	1.5	-------
26	1.1	.4	.3	.2	.6	.4	-------
27	.9	.4	.3	.2	1.8	.4	-------
28	.8	.4	.3	.2	4.9	4.7	-------
29	1.8	.4	.4	.2	1.9	2.1	-------
30	2.4	.4	.4	.2	1.9	.5	-------
31	2.6	.3	-------	.2	-------	10.5	-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	9.9	0.3	1.98	3.06	61.3	188
August	1.6	.3	.58	.90	17.9	55
September	9.2	.3	.86	1.33	25.7	79
October	-------	.2	.25	.39	7.8	24
November	7.1	.1	.79	1.22	23.6	72
December	10.5	.2	.99	1.53	30.8	95
January 1–12	1.8	.3	.54	.84	[a]6.5	20
The period (196 days)	10.5	.1	.89	1.38	174	533

[a] Estimated.

MANUEL LUIS DITCH AT PUOHOKAMOA GULCH, NEAR HUELO

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 1933.

DISCHARGE.—Maximum during year, 34 million gallons a day or 53 second-feet July 21 (gage height, 2.35 feet); minimum, 0.2 million gallons a day or 0.3 second-foot Nov. 9, 10, June 20, 21.

1917–33: Maximum, 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. Average, 14 years (1918–24, 1925–33), 6.56 million gallons a day (10.1 second-feet).

REMARKS.—Records good for low stages; other stages fair. Estimated periods poor. Manuel Luis 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, 1932–33

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	0.7	2.2	0.4	0.5	0.3	4.5					0.4	0.3
2	.6	3.8	.4	.4	.3	1.0	a12			a11	.3	.5
3	5.0	1.5	4.4	.4	.2	.9		a 2.1	a 2.2		.4	.4
4	.7	1.8	9.6	.4	.2	1.8					.3	.3
5	.7	1.2	7.0	.4	.2	1.0	a 1.5				.2	.3
6	.6	1.2	1.0	.4	.2	.8				a .8	.3	.3
7	.6	.9	.8	.3	.2	.7		a .9			.2	.2
8	.6	1.2	2.5	.3	.2	.7			a22		.2	.2
9	.8	1.3	20	.3	.2	.7		a12			.2	.2
10	1.0	.8	1.8	.3	.2	.5	a .9				.2	.3
11	2.4	1.1	1.1	.3	.4	.5				.6	2	2
12		.8	.9	3	.3	3.7		a 1.0	a 3.1	.5	.2	.2
13	a10	.8	3.2	.3	.2	9.4				.5	.2	.2
14		.7	1.4	.2	.2	1.5				.5	.6	.2
15		.6	1.0	.2	.2	9.2		a 6.5	a 1.7	.5	.7	.2
16		.5	.8	.3	.6	2.2	a14			.5	.5	.2
17		1.2	.8	.2	.4	1.8				.7	.3	.2
18		.7	.8	.2	.3	1.4		a 3.5	a 1.1	.5	.4	.2
19	a 3.3	.5	.9	.9	.3	1.4	a 5			.4	.3	.2
20		.6	.7	.5	.3	1.0	3.0			.3	1.0	.2
21		.5	.6	.4	.3	.8	2.9	a12	a .9	.3	4.2	.2
22	20	.4	.6	.9	.3					.3	.5	.6
23	21	5.9	.6	.8	.3	a .8		2.6		.3	.5	4.4
24	17	4.7	.5	.4	19.5			2.2	a10	.2	.4	.4
25	8.1	1.0	1.7	.3	7.4			2.9		.2	.4	.4
26	2.9	.5	.9	.3	1.2	a 4.4	a 6	1.8	a 5.5	.2	.4	.3
27	1.8	.5	.6	.3	9.3			1.5		.2	.4	.2
28	2.0	.5	.5	.3	16	a 4.3		1.2		3.1	.4	.2
29	7.4	.8	.5	.3	8.3			-------		.5	.4	.7
30	10.5	.4	.5	.4	12.5	a12	a 1.7	-------	a .6	.7	.4	9.3
31	12.5	.4	-------	.3	-------			-------		-------	.3	-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	21	0.6	5.70	8.82	177	542
August	5.9	.4	1.26	1.95	39.0	120
September	20	.4	2.22	3.43	66.5	204
October	.9	.2	.38	.59	11.8	36
November	19.5	.2	2.68	4.15	80.5	247
December	----------	.5	3.02	4.67	93.6	287
January	----------	----------	5.26	8.14	163	501
February	----------	----------	4.23	6.54	118	363
March	----------	----------	5.97	9.24	185	568
April	----------	.2	1.65	2.55	49.6	152
May	4.2	.2	.50	.77	15.4	47
June	9.3	.2	.72	1.11	21.7	67
The year	----------	.2	2.80	4.33	1,020	3,130

a Estimated.

MANUEL LUIS DITCH WEST OF PUOHOKAMOA STREAM, NEAR HUELO

LOCATION.—Water-stage recorder 500 feet below intake in Puohokamoa Stream at lower portal of intake tunnel and 3 miles southeast of Kailua.

RECORDS AVAILABLE.—February 1930 to June 1933.

DISCHARGE.—Maximum during year, 71 million gallons a day or 110 second-feet Dec. 31 (gage height, 4.93 feet); minimum, 0.2 million gallons a day or 0.3 second-foot Nov. 23.

1930–33: Maximum, 82 million gallons a day or 127 second-feet Nov. 18, 1930 (gage height, 5.80 feet); minimum, 0.1 million gallons a day or 0.2 second-foot Feb. 13, 1931.

REMARKS.—Records fair except those for high and low stages, which are poor. Manuel Luis Ditch is an 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, 1932–33

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	0.7	4.1	0.5	0.5	0.3	6.8	29	3.0	1.8	10.5	0.6	0.3
2	.7	6.5	.5	.5	.3	1.3	8.4	2.3	1.5	17	.5	.6
3	6.3	2.8	6.5	.5	.3	1.4	12	1.9	1.4	23	.6	.6
4	.7	2.6	11.5	.5	.3	2.7	7.8	9.0	5.0	2.3	.4	.4
5	.5	1.7	11	.5	.3	1.5	4.5	1.6	11	1.7	.4	.5
6	.5	1.8	1.5	.5	.3	1.2	3.2	1.4	35	1.4	.5	.4
7	.5	1.3	1.1	.5	.3	1.2	2.4	1.3	41	1.2	.4	.4
8	.5	1.9	3.0	.4	.3	1.2	2.0	1.2	35	1.1	.4	.4
9	.8	1.8	24	.5	.3	1.1	1.6	13	14.5	.9	.3	.4
10	1.0	1.2	3.0	.4	.3	1.0	1.6	18.5	28	1.0	.3	.4
11	3.2	1.5	1.7	.4	.4	1.1	1.7	3.6	5.2	.8	.3	.3
12	1.6	1.0	1.3	.4	.4	5.1	1.8	1.9	2.9	.8	.3	.3
13	19.5	1.0	4.0	.4	.3	14	1.6	2.5	4.9	.7	.3	.3
14	3.8	.8	2.0	.4	.3	2.4	1.2	20	4.1	.7	.8	.3
15	18	.7	1.4	.4	.3	15	18.5	3.4	2.6	.9	.9	.3
16	3.8	.6	1.1	.5	.6	3.4	25	3.7	2.2	.7	.6	.3
17	.8	1.4	1.0	.4	.4	2.8	12.5	2.3	2.0	1.0	.5	.3
18	2.4	.7	1.1	.4	.3	2.2	10.5	4.0	1.8	.8	.5	.2
19	1.3	.6	1.2	1.1	.3	2.1	2.7	10.5	1.6	.6	.4	.2
20	10.5	.7	.8	.6	.3	1.6	2.3	15.5	1.3	.5	2.1	.2
21	9.4	.6	.8	.4	.3	1.4	4.8	30	1.2	.5	9.5	.3
22	23	.6	.8	1.0	.2	1.2	13	7.8	1.8	.5	.6	.7
23	24	7.2	.7	.8	.2	1.2	8.0	3.4	12	.5	.5	5.5
24	22	5.1	.6	.4	30	3.6	9.2	2.7	12	.5	.5	.5
25	13	1.1	2.4	.4	10.5	8.6	3.9	3.5	1.2	.4	4.6	.6
26	6.6	.7	1.2	.4	1.2	1.5	4.0	2.4	26	.4	6.4	.4
27	4.1	.8	.7	.4	12	1.4	8.0	2.0	1.8	.5	3.5	.3
28	3.3	.8	.6	.3	23	7.6	12.5	1.7	.9	6.5	.4	.3
29	13	.8	.6	.3	8.9	14	3.7	-------	.9	.9	.4	1.8
30	14.5	.5	.6	.4	17	1.3	2.4	-------	.8	.9	.4	15.5
31	16.5	.5	-------	.4	-------	28	3.8	-------	.8	-------	.3	-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	24	0.5	7.31	11.3	226	695
August	7.2	.5	1.72	2.66	53.4	164
September	24	.5	2.91	4.50	87.2	268
October	1.1	.3	.48	.74	15.0	46
November	30	.2	3.66	5.66	110	337
December	28	1.0	4.48	6.93	139	426
January	29	1.2	7.21	11.2	224	686
February	30	1.2	6.22	9.62	174	534
March	41	.8	8.46	13.1	262	805
April	23	.4	2.64	4.08	79.2	243
May	9.5	.3	1.23	1.90	38.2	117
June	15.5	.2	1.10	1.70	33.0	101
The year	41	.2	3.95	6.11	1,440	4,420

SPRECKELS DITCH AT WAHINEPEE, NEAR HUELO

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 1933.

DISCHARGE.—Maximum during year, 53 million gallons a day or 82 second-feet Dec. 31 (gage height, 4.00 feet); no flow sometimes, due to regulation.

1928–33: Maximum, 69 million gallons a day or 107 second-feet Dec. 7, 1929 (gage height, 5.05 feet); no flow sometimes, due to regulation.

REMARKS.—Records good except those for estimated periods, which are poor. 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, 1932–33

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	0.1		0.1	0.1	0.1	2.2	1.4	0.1	5.3	7.6	0	0.1
2	.1	[a]2.9	.1	.1	.1	.1	.5	.1	.5	14	0	.1
3	11		6.9	.1	.1	.1	.7	.1	.1	17.5	.1	.1
4	.1		15.5	.1	.1	.2	.3	5.0	.1	.5	.1	.1
5	.1		21	.1	.1	.1	.1	.1	5.9	.1	.1	.1
6	.1		.2	.1	.1	.1	.1	.1	16	.1	.1	.1
7	.1		.1	.1	0	.1	.1	.1	22	.1	.1	.1
8	.1		2.5	.1	0	.1	.1	.1	15.5	.1	.1	.1
9	.1		29	.1	0	.1	.1	6.7	8.7	.1	.1	.1
10	.2		3.8	.1	.1	.1	.1	4.6	24	.1	.1	.1
11	3.4	[a]1	.1	.1	.1	.1	.1	.1	6.1	.1	.1	.1
12	2.9		.1	.1	.1	3.3	.1	.1	.1	.1	.1	.1
13	34		1.6	.1	.1	8.7	.1	.1	1.8	.1	.1	.1
14	7.1		.2	.1	.1	.2	.1	20	.8	.1	.2	.1
15	33		.1	.1	0	8.5	15	2.2	.1	.1	.1	.1
16	12		.1	.1	.1	.2	22	2.8	.1	.1	.1	.1
17	3.1	[a].2	.1	.1	.1	.2	11	.6	.1	.1	.1	.1
18	28		.1	.1	0	.1	4.0	1.1	.1	.1	.1	.1
19	11.5	.1	1.7	.2	0	.1	.1	18.5	7.3	0	.1	.1
20		.1	.1	.1	0	.1	.1	22	.1	0	8.3	.1
21		.1	.1	.1	0	.1	2.9	32	.1	0	9.8	.1
22		.1	.1	.1	0	.1	8.7	4.5	.1	0	.1	1.4
23	[a]28	8.4	.1	.1	0	.1	3.7	.1	11.5	0	.1	7.9
24		2.8	.1	.1	27	.9	5.3	.1	11	0	.1	3.3
25		.1	.2	.1	8.5	7.1	1.6	.3	.1	0	.1	.1
26		.1	.1	.1	.1	.1	1.9	.1	28	0	0	0
27	[a]14	.1	.1	0	9.4	.1	3.3	.1	7.4	0	0	0
28		.1	.1	0	20	6.8	9.6	.1	.1	7.5	0	0
29		.1	.1	.1	5.2	10	.2	-------	.1	.1	0	.6
30	[a]24	.1	.1	.1	15	.1	.1	-------	.1	.1	.1	20
31		.1	-------	.1	-------	15.5	.2	-------	.1	-------	.1	-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	34	0.1	13.6	21.0	423	1,300
August	----------	.1	.82	1.27	25.5	78
September	29	.1	2.82	4.36	84.5	259
October 1–26, 29–31	.2	.1	.10	.16	3.0	9
November 1–6, 10–14, 16–17, 24–30	27	.1	4.32	6.68	86.5	265
December	15.5	.1	2.12	3.28	65.6	201
January	22	.1	3.02	4.67	93.6	287
February	32	.1	4.35	6.73	122	374
March	28	.1	5.59	8.65	173	532
April 1–18, 28–30	17.5	.1	2.32	3.59	48.7	149
May 3–25, 30–31	9.8	.1	.82	1.27	20.5	63
June 1–25, 29–30	20	.1	1.31	2.03	35.4	109
The period (335 days)	34	.1	3.53	5.46	1,180	3,630

[a] Estimated.

WAIKAMOI STREAM ABOVE WAILOA DITCH, NEAR HUELO

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

DRAINAGE AREA.—4.4 square miles.

RECORDS AVAILABLE.—January 1922 to June 1933.

DISCHARGE.—Maximum during year, 1,080 million gallons a day or 1,670 second-feet Dec. 31 (gage height, 6.44 feet); minimum, 0.5 million gallons a day or 0.8 second-foot Nov. 22, 23.

1922–33: Maximum, 4,660 million gallons a day or 7,210 second-feet Oct. 16, 1924 (gage height, 10.45 feet); minimum, 0.4 million gallons a day or 0.6 second-foot Nov. 16, 1929. Average, 11 years, 15.3 million gallons a day (23.7 second-feet).

REMARKS.—Records 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, 1932–33

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	3.8	12	1.9	1.7	1.1	14	30	5.2	4.1	41	4.3	1.8
2	6.7	15.5	1.9	1.5	.9	5.5	8.8	4.2	3.0	48	3.0	3.5
3	13	11.5	13	1.4	.9	4.3	6.1	3.5	2.4	80	3.4	3.0
4	4.1	6.8	24	1.3	1.1	3.6	6.1	36	2.2	10	2.1	2.1
5	3.1	7.8	24	1.3	.9	2.8	4.9	7.4	88	5.5	2.0	2.1
6	3.0	9.6	8.1	1.4	.8	2.3	3.7	4.0	78	4.2	2.8	2.0
7	2.6	5.5	4.4	1.1	.8	2.0	3.1	3.1	352	3.4	3.6	1.6
8	2.5	7.0	6.9	1.1	.7	1.8	2.8	2.7	137	3.0	2.2	1.4
9	3.0	7.4	78	1.1	.6	1.7	2.4	27	22	2.7	1.8	1.4
10	3.3	7.2	9.9	1.0	.7	1.6	2.2	24	39	3.1	1.7	1.6
11	6.7	8.2	5.8	.9	1.2	1.6	2.4	5.8	17	3.0	1.6	1.4
12	10.5	4.9	4.3	.9	2.1	6.5	2.2	4.5	8.6	2.4	1.4	1.2
13	87	4.4	4.4	.9	1.3	13.5	2.1	3.8	10.5	2.1	1.4	1.1
14	12.5	3.6	4.0	.8	.9	4.0	1.8	20	7.8	1.9	1.6	1.1
15	62	3.2	3.6	.8	.8	16.5	76	10	5.2	2.2	3.2	1.1
16	15	3.0	3.0	.9	.8	4.2	56	8.1	4.3	1.9	2.6	1.1
17	9.9	6.9	2.8	1.1	1.1	3.3	17	7.2	3.7	3.6	2.2	1.1
18	30	5.6	3.0	1.0	.9	2.8	12.5	5.9	3.2	4.4	2.3	.9
19	14.5	3.1	3.0	1.8	.7	2.5	6.4	14	3.0	2.4	1.7	.9
20	32	3.0	2.9	1.9	.7	1.9	4.8	21	2.7	1.8	13	.8
21	19	2.8	2.3	1.3	.6	1.7	6.6	28	2.6	1.6	16	1.1
22	114	2.9	2.2	2.0	.6	1.6	24	13	6.8	1.6	3.7	6.7
23	71	9.4	2.8	2.6	.6	1.5	21	6.1	24	1.6	3.0	16.5
24	28	10.5	2.1	1.8	77	6.4	21	4.6	34	1.6	4.0	9.3
25	23	7.0	2.1	1.2	21	14.5	14	4.9	5.6	1.4	2.4	7.6
26	12 5.	3.3	2.6	1.0	5.8	4.0	14	3.4	24	1.4	1.9	3.4
27	8.8	3.0	1.8	.9	23	3.3	19.5	3.0	7.0	1.6	1.8	2.3
28	8.0	2.7	1.6	.8	65	33	27	3.1	4.0	12	1.8	2.2
29	21	3.5	2.1	.8	22	27	10	-------	3.3	5.6	1.8	13
30	30	2.6	2.7	1.1	30	5.1	6.4	-------	2.9	6.8	1.8	31
31	35	2.2	-------	1.1	-------	158	6.2	-------	5.9	-------	1.7	------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	114	2.5	22.4	34.7	696	2,130
August	15.5	2.2	6.00	9.28	186	571
September	78	1.6	7.71	11.9	231	710
October	2.6	.8	1.24	1.92	38.5	118
November	77	.6	8.82	13.6	265	812
December	158	1.5	11.4	17.6	352	1,080
January	76	1.8	13.6	21.0	421	1,290
February	36	2.7	10.1	15.6	284	870
March	352	2.2	29.5	45.6	914	2,800
April	80	1.4	8.73	13.5	262	803
May	16	1.4	3.15	4.87	97.8	300
June	31	.8	4.14	6.41	124	381
The year	352	.6	10.6	16.4	3,870	11,900

WEST BRANCH OF WAIKAMOI STREAM AT HAIKU-UKA BOUNDARY NEAR KAILIILI

LOCATION.—Water-stage recorder at Haiku-uka boundary trail, 3½ miles southeast of Kailiili. Elevation 3,000 feet.

DRAINAGE AREA.—3.5 square miles.

RECORDS AVAILABLE.—May 1918 to June 1928, July 1932 to June 1933.

DISCHARGE.—Maximum during year, 328 million gallons a day or 507 second-feet Dec. 31 (gage height, 3.62 feet); minimum, 0.2 million gallons a day or 0.3 second-foot Nov. 22, 23.

1918–28, 1932–33: Maximum, about 2,020 million gallons a day or 3,130 second-feet Dec. 6, 1918 (gage height, 9.85 feet); minimum, 0.2 million gallons a day or 0.3 second-foot Mar. 21–22, Dec. 17, 1926, Nov. 22–23, 1932.

REMARKS.—Records good for ordinary stages, poor for high stages and estimated periods. At 5,300-foot elevation Haleakala ranch diverts a small amount of water.

Discharge, in million gallons, 1932–33

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	1.5	4.1	0.8	0.5	0.3	6.7	13.5	[a] 1.6		29	1.2	
2	2.9	10	.7	.4	.2	2.0	3.1	[a] 1.4	[b] 1.2	31	.8	
3	5.1	4.7	5.2	.4	.3	1.5	1.9	[a] 1.2		45	.6	
4	1.6	3.2	11	.4	.4	1.2	1.8	31		4.2	.6	[b] 0.6
5	1.3	3.2	13.5	.4	.3	1.0	1.4	3.1		2.0	.6	
6	1.2	4.0	2.9	.4	.2	.9	1.2	1.4	[b] 75	1.6	1.0	
7	1.2	2.0	1.5	.4	.2	.7	1.0	1.2	[b] 5	1.0		
8	1.1	2.2	1.4	.4	.2	.7	.9	1.1			.7	
9	1.1	2.4	40	.4	.2	.7	.8	16.5			-------	
10	1.0	3.9	3.9	.3	.2	.7	.7	14	[b] 17		.6	[b] .5
11	1.7	3.1	2.0	.2	.6	.6	.7	2.2		[b] 1.5	.6	
12	3.4	1.7	1.6	.2	1.0	1.3	.6	1.5			.5	
13	63	1.6	1.5	.2	.6	3.4	.6	1.3	[b] 4.0		.4	
14	4.2	1.3	1.3	.2	.4	1.2	.6	15			.5	
15	34	1.2	1.2	.2	.2	3.8	62	4.7			1.1	
16	4.5	1.2	1.2	.3	.4	1.2	40	5.7	[b] 2.4	[b] 1.3	.7	[b] .3
17	2.6	3.4	1.0	.4	.6	1.1	6.4	3.7			.6	
18	11.5	1.9	1.1	.3	.3	1.0	3.5	2.4			.6	
19	4.5	1.2	1.2	.6	.2	.8	1.5	6.0			.4	
20	16	1.2	1.0	.6	.2	.6	1.2	10.5	[b] 1.5		5.6	
21	6.4	1.1	.8	.4	.2	.6	2.7	15			5.8	
22	68	1.2	.8	.6	.2	.6	12.5	6.2	[b] 7	[b] .8	1.1	
23	31	4.6	.8	.7	.2	.6	13	2.5			1.4	[b] 3.8
24	5.3	5.9	.7	.6	51	2.4	11.5	1.8			1.2	
25	8.5	2.8	.7	.4	8.7	5.2	5.9	1.5	[b] 5.5	.5	.6	
26	3.0	1.3	.9	.2	1.9	1.2	5.8	1.3		.5	.6	[b] 1.6
27	2.2	1.2	.6	.2	15	1.1	11.5	1.2	[b] 2.2	.5	.6	
28	2.0	1.1	.6	.2	50	24	14	[b] 1.4		3.9	.6	[b] .7
29	9.5	1.2	.7	.2	13.5	12.5	3.1	-------	1.3	1.2	.6	
30	13.5	1.1	.8	.3	18.5	1.7	2.2	-------	1.2	1.5	.6	[b] 17
31	19	.9	-------	.4	-------	72	1.9	-------	5.3	-------	.6	-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	68	1.0	10.7	16.6	332	1,020
August	10	.9	2.58	3.99	79.9	245
September	40	.6	3.38	5.23	101	311
October	.7	.2	.37	.57	11.4	35
November	51	.2	5.54	8.57	166	510
December	72	.6	4.94	7.64	153	470
January	62	.6	7.34	11.4	228	698
February	31	1.1	5.59	8.65	156	480
March	----------	.9	13.6	21.0	422	1,300
April	45	.5	5.02	7.77	151	462
May	5.8	.4	1.05	1.62	32.4	99
June	----------	.2	1.97	3.05	59.2	182
The year	----------	.2	5.18	8.01	1,890	5,810

[a] Partly estimated. [b] Estimated.

EAST BRANCH OF WAIKAMOI STREAM AT HAIKU-UKA BOUNDARY, NEAR KAILIILI

LOCATION.—Water-stage recorder at elevation 3,020 feet, 200 feet above Haiku-uka boundary trail and 3½ miles southeast of Kailiili.

DRAINAGE AREA.—0.4 square mile.

RECORDS AVAILABLE.—May 1918 to June 1928, July 1932 to January 1933 (discontinued).

DISCHARGE.—Maximum during period, 85 million gallons a day or 132 second-feet Dec. 31 (gage height, 6.17 feet); minimum, 0.2 million gallons a day or 0.3 second-foot several times during November and December.

1918–28, 1932–33: Maximum, 230 million gallons a day or 356 second-feet Mar. 22, 1920 (gage height, 7.92 feet); minimum, 0.07 million gallons a day or 0.11 second-foot Apr. 15, 1919. Average, 10 years (1918–28), 2.74 million gallons a day (4.24 second-feet).

REMARKS.—Records good for ordinary stages, poor for extremely high stages. A little water is diverted above station by Kula pipe line.

Discharge, in million gallons, 1932–33

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
1	[a] 1.1	2.2	0.6	0.6	0.4	2.3	3.5
2	2.6	3.2	.6	.5	.3	1.4	1.6
3	2.7	2.0	3.4	.4	.4	1.1	1.2
4	1.0	1.9	4.9	.4	.4	.8	1.5
5	.9	2.0	4.9	.4	.3	.7	1.1
6	.9	2.4	1.2	.4	.3	.6	.8
7	.8	1.2	.9	.4	.3	.6	.7
8	.7	1.8	.8	.4	.3	.4	.6
9	.7	1.8	[a] 12	.4	.3	.4	.6
10	.7	2.2	1.9	.4	.4	.4	.6
11	1.6	2.6	1.3	.3	.8	.4	.6
12	3.2	1.3	1.1	.2	1.1	1.4	.6
13	14	1.2	1.1	.2	.5	3.1	-------
14	2.0	1.0	1.0	.2	.3	1.0	-------
15	11.5	.9	.9	.2	.2	3.3	-------
16	2.3	.9	.8	.3	.4	1.0	-------
17	2.2	2.5	.8	.4	.4	.7	-------
18	5.9	1.3	.8	.3	.2	.6	-------
19	3.7	.9	.8	.7	.2	.6	-------
20	4.4	.8	.7	.6	.2	.5	-------
21	3.4	.8	.6	.4	.2	.4	-------
22	[a] 22	.8	.6	.9	.2	.4	-------
23	14	3.0	.8	.7	.2	.4	-------
24	4.2	2.6	.6	.4	16.5	2.4	-------
25	4.0	1.4	.6	.3	3.4	3.7	-------
26	2.6	.8	.7	.2	1.8	1.1	-------
27	2.1	.7	.6	.2	5.8	1.0	-------
28	2.2	.7	.6	.2	11	10.5	-------
29	5.6	1.0	[a] 1.0	.2	5.4	4.3	-------
30	5.7	.7	[a] 1.0	.4	5.2	1.1	-------
31	6.4	.6	-------	.4	-------	21	-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	-------	0.7	4.36	6.75	135	415
August	3.2	.6	1.52	2.35	47.2	145
September	-------	.6	1.59	2.46	47.6	146
October	.9	.2	.39	.60	12.0	37
November	16.5	.2	1.91	2.96	57.4	176
December	21	.4	2.18	3.37	67.6	207
January 1–12	3.5	.6	1.12	1.73	13.4	41
The period (196 days)	-------	.2	1.94	3.00	380	1,170

[a] Partly estimated.

ALO STREAM NEAR HUELO

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 1933.

DISCHARGE.—Maximum during year, 369 million gallons a day or 571 second-feet Dec. 31 (gage height, 3.73 feet); minimum, 0.2 million gallons a day or 0.3 second-foot Nov. 22–23.

1910–33: Maximum, 1,600 million gallons a day or 2,480 second-feet Nov. 18, 1930 (gage height, 6.90 feet); minimum, that of Nov. 22–23, 1932. Average, 22 years (1911–33), 5.13 million gallons a day (7.94 second-feet).

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

Discharge, in million gallons, 1932–33

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	1.0	3.8	0.6	0.5	0.3	2.9	9.0	2.4	1.2	12.5	1.6	0.9
2	1.1	2.8	.7	.5	.3	1.7	3.4	1.6	1.0	7.6	1.4	2.6
3	2.7	2.1	6.1	.4	.3	1.2	3.7	1.4	1.0	16.5	3.3	1.9
4	.8	1.7	8.8	.4	.3	2.0	3.5	3.0	.9	2.6	1.1	1.1
5	.7	1.4	5.8	.4	.3	1.1	2.1	1.4	9.7	1.7	1.0	1.1
6	.6	1.8	1.8	.4	.3	.9	1.6	1.2	20	1.4	1.3	.8
7	.6	1.2	1.5	.4	.2	.8	1.4	1.0	25	1.2	.9	.7
8	.7	3.0	6.0	.3	.2	.7	1.2	1.0	14.5	1.1	.8	.6
9	1.2	2.8	19.5	.4	.2	.6	1.0	7.7	5.3	1.0	.7	.7
10	1.6	1.4	3.0	.3	.3	.6	1.0	4.2	11	1.2	.7	.8
11	4.2	2.0	1.8	.3	.5	.8	1.2	1.4	3.5	1.0	.6	.6
12	2.3	1.7	1.4	.3	.4	8.3	1.4	2.0	2.4	.8	.6	.6
13	10.5	1.8	1.8	.3	.3	8.2	1.2	1.7	4.0	.7	.6	.5
14	3.8	1.2	1.6	.3	.3	1.6	.8	5.4	3.8	.6	1.0	.5
15	17.5	1.1	1.2	.3	.2	12.5	5.2	2.0	2.1	1.0	2.4	.5
16	4.5	1.3	.9	.3	.4	2.0	7.7	1.4	1.6	.9	1.6	.5
17	3.2	2.6	.9	.3	.4	2.0	7.0	1.2	1.4	2.0	2.0	.6
18	8.8	1.0	.9	.3	.3	1.7	6.6	2.7	1.2	1.3	1.8	.5
19	4.7	.9	1.0	1.3	.3	1.9	2.6	5.6	1.1	.7	.8	.4
20	7.3	1.0	.8	.7	.2	1.1	2.3	5.3	1.0	.6	3.7	.4
21	8.0	.9	.7	.4	.2	1.0	3.3	10	1.2	.6	4.5	.6
22	19.5	.9	.7	1.7	.2	.9	5.2	4.0	2.6	.6	1.4	1.4
23	20	4.7	.6	1.1	.2	.8	4.0	2.4	3.4	.6	1.2	3.3
24	16.5	1.6	.6	.5	20	3.0	4.2	2.0	2.3	.6	1.1	1.8
25	7.6	1.0	1.0	.4	4.4	5.2	3.2	3.6	1.7	.5	1.0	2.8
26	5.7	.9	.8	.4	2.4	1.7	3.3	1.7	5.6	.6	.9	1.3
27	3.8	1.0	.6	.3	5.8	1.5	4.1	1.4	1.6	.7	.8	.8
28	4.0	1.5	.5	.3	9.0	2.9	5.2	1.3	1.2	4.7	.8	1.0
29	7.1	1.3	.8	.3	4.5	3.5	4.1	-------	1.1	3.8	.8	3.3
30	8.1	.8	.7	.4	5.9	1.4	2.4	-------	.9	2.8	.8	5.6
31	9.5	.7	-------	.4	-------	51	3.0	-------	1.0	-------	.6	------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	20	0.6	6.05	9.36	188	576
August	4.7	.7	1.67	2.58	51.9	159
September	19.5	.5	2.44	3.78	73.1	224
October	1.7	.3	.47	.73	14.6	45
November	20	.2	1.95	3.02	58.6	180
December	51	.6	4.05	6.27	126	385
January	9.0	.8	3.42	5.29	106	325
February	10	1.0	2.86	4.43	80.0	246
March	25	.9	4.33	6.70	134	412
April	16.5	.5	2.40	3.71	71.9	221
May	4.5	.6	1.35	2.09	41.8	128
June	5.6	.4	1.27	1.96	38.2	117
The year	51	.2	2.69	4.16	984	3,020

KAAIEA STREAM NEAR HUELO

LOCATION.—Water-stage recorder 700 feet above Hamakua Ditch trail crossing, 2 miles southeast of Kailua, and 3¼ miles southeast of Huelo.

DRAINAGE AREA.—0.5 square mile.

RECORDS AVAILABLE.—December 1921 to June 1933.

DISCHARGE.—Maximum during year, 848 million gallons a day or 1,310 second-feet Dec. 31 (gage height, 5.18 feet); minimum, 0.4 million gallons a day or 0.6 second-foot Nov. 21, 22, 23.

1921–33: Maximum, 2,300 million gallons a day or 3,560 second-feet Nov. 18, 1930 (gage height, 7.93 feet); minimum, 0.3 million gallons a day or 0.5 second-foot July 17, 1922, Mar. 22, 1927, Nov. 16, 1929. Average, 11 years (1922-33), 4.88 million gallons a day (7.55 second-feet).

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

Discharge, in million gallons, 1932–33

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	1.6	4.0	0.8	0.7	0.6	3.1	9.5	2.6	1.1	15.5	2.2	1.1
2	1.6	2.8	.9	.7	.5	1.6	3.0	1.8	1.0	10	1.7	3.1
3	4.0	2.1	6.7	.7	.5	1.2	2.6	1.5	1.0	19.5	4.1	2.4
4	1.4	1.8	10	.6	.5	1.8	2.8	3.3	1.0	2.6	1.5	1.3
5	1.2	1.5	6.1	.6	.5	1.1	1.8	1.5	13.5	1.8	1.4	1.2
6	1.1	1.9	2.2	.6	.5	1.0	1.4	1.2	27	1.5	1.8	1.1
7	1.1	1.4	1.8	.5	.4	.8	1.2	1.1	41	1.3	1.4	.9
8	1.1	2.8	5.2	.5	.4	.7	1.1	1.1	20	1.2	1.2	.8
9	1.6	3.1	26	.5	.4	.7	1.0	9.9	5.6	1.1	1.0	.8
10	2.6	1.6	3.5	.5	.4	.7	.9	4.3	13	1.3	1.0	1.1
11	5.2	2.1	2.1	.5	.7	.8	1.1	1.6	4.0	1.1	.9	.8
12	3.3	1.8	1.6	.4	.6	7.8	1.4	2.0	2.4	.9	.8	.8
13	17	1.9	1.5	.4	.5	8.2	1.2	1.8	5.1	.7	.7	.8
14	5.0	1.3	1.5	.4	.4	1.8	.9	5.4	4.0	.7	1.0	.7
15	24	1.2	1.3	.4	.4	14	6.4	2.1	2.1	1.0	2.2	.8
16	5.3	1.2	1.1	.5	.5	2.1	8.2	1.5	1.6	.9	1.8	.8
17	4.0	2.9	1.1	.5	.6	2.1	7.2	1.3	1.4	1.9	1.9	.8
18	11.5	1.2	1.1	.5	.4	1.6	6.8	2.6	1.2	1.5	1.9	.7
19	5.9	1.0	1.1	1.5	.4	1.9	2.6	6.4	1.2	.8	1.1	.6
20	9.4	1.1	.9	.9	.4	1.2	2.2	6.6	1.1	.7	4.8	.6
21	11.5	1.0	.8	.6	.3	1.0	3.4	11.5	1.2	.7	6.1	.8
22	32	1.0	.8	1.8	.3	.9	5.9	4.2	3.4	.7	1.6	2.0
23	25	4.4	.8	1.3	.3	.8	4.5	2.2	3.9	.7	1.4	4.9
24	25	2.4	.7	.7	23	3.0	4.6	1.9	2.6	.7	1.3	2.6
25	8.2	1.5	.9	.6	5.4	5.8	3.6	3.5	1.7	.7	1.2	3.7
26	5.3	1.1	1.2	.6	2.4	1.8	3.9	1.8	7.0	.7	1.1	1.8
27	3.7	1.2	.7	.5	6.4	1.5	4.6	1.5	1.6	.8	1.0	1.1
28	3.6	1.2	.7	.5	11	2.8	5.7	1.3	1.2	6.3	1.0	1.4
29	7.9	2.0	1.2	.6	4.2	4.5	4.4	-------	1.2	4.6	1.0	4.4
30	10	1.0	1.2	.7	6.7	1.5	2.8	-------	1.0	4.0	1.1	7.3
31	11	.9	-------	.6	-------	68	2.8	-------	1.0	-------	.9	-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	32	1.1	8.10	12.5	251	771
August	4.4	.9	1.82	2.82	56.4	173
September	26	.7	2.85	4.41	85.5	262
October	1.8	.4	.66	1.02	20.4	63
November	23	.3	2.32	3.59	69.6	214
December	68	.7	4.70	7.27	146	447
January	9.5	.9	3.53	5.46	110	336
February	11.5	1.1	3.12	4.83	87.5	269
March	41	1.0	5.62	8.70	174	534
April	19.5	.7	2.86	4.43	85.9	264
May	6.1	.7	1.68	2.60	52.1	160
June	7.3	.6	1.71	2.65	51.2	157
The year	68	.3	3.26	5.04	1,190	3,650

OOPUOLA STREAM NEAR HUELO

LOCATION.—Water-stage recorder between Kaaiea and Nailiilihaele Streams, 100 feet above Wailoa Ditch intake, 300 feet above ditch trail, and 4 miles southeast of Huelo.

DRAINAGE AREA.—0.2 square mile.

RECORDS AVAILABLE.—August 1930 to June 1933.

DISCHARGE.—Maximum during year ending June 30, 1932, unknown but above limit of rating table Jan. 18 (gage height, 5.12 feet); minimum, 0.2 million gallons a day or 0.3 second-foot July 3, 4.

Maximum during year ending June 30, 1933, unknown but above limit of rating table Dec. 31 (gage height, 4.98 feet); minimum, 0.11 million gallons a day or 0.17 second-foot Oct. 15.

1930–33: Maximum, that of Jan. 18, 1932; minimum, 0.1 million gallons a day or 0.2 second-foot Mar. 28, 29, 1931.

REMARKS.—Records good. No diversions.

Discharge, in million gallons, 1931–33

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1931-32												
1	0.2	0.3	0.4	1.4	0.6	0.2	4.2	6.3	1.45	5.6	14	5.8
2	.2	2.8	.4	1.0	.6	.2	6.5	19.5	.98	2.5	1.35	1.2
3	.2	1.6	1.5	3.1	18.5	.9	1.35	9.2	.92	2.0	2.1	.74
4	.2	.6	.4	1.3	8.2	1.6	.92	14	.68	1.1	.98	.74
5	1.4	3.1	3.1	.7	1.4	.3	.80	11	1.1	1.3	1.4	.80
6	1.6	2.1	5.4	.6	.9	8.6	.62	21	1.9	3.4	1.8	.50
7	.5	2.3	7.1	.6	1.0	[a].9	.50	7.0	.68	1.1	1.4	.50
8	.2	1.1	2.7	.5	1.4	[a].6	.47	2.4	1.05	1.15	.98	.47
9	.2	.7	2.7	.3	1.9	[a].5	.47	7.2	.74	5.6	3.4	.68
10	.4	[b]10	3.5	.3	1.4	.44	.50	15	.47	2.0	1.35	.65
11	2.6	2.0	9.4	.3	4.4	.44	.50	16.5	.41	4.5	.86	.50
12	3.4	1.6	1.8	.7	7.9	.44	.50	13	.38	3.0	4.0	.98
13	1.2	1.3	1.8	.3	1.4	.41	3.5	39	.38	10.5	1.65	1.3
14	1.0	.9	1.4	.2	3.8	.38	1.1	15.5	.35	2.3	3.2	1.7
15	.4	7.1	2.4	.2	6.4	8.6	1.85	1.75	.35	1.35	8.2	.80
16	.3	1.4	5.7	.2	1.5	1.55	.92	1.1	.32	2.3	1.75	.62
17	.2	.8	1.1	.3	2.9	1.8	.62	.86	.38	.92	1.35	.83
18	1.3	15	2.6	1.1	1.2	3.5	20	.74	.50	.74	1.3	.86
19	1.0	8.9	.7	.3	.9	8.6	4.8	.62	1.4	.74	.86	.68
20	5.3	1.3	.5	.3	.7	2.8	2.6	.62	1.45	.92	.80	1.1
21	16	.7	.5	1.6	1.5	4.6	1.4	.50	.98	.68	.62	.56
22	9.5	1.8	1.2	13	7.6	2.8	.85	.50	.62	.75	.62	.50
23	1.2	2.8	.5	1.8	1.1	3.0	5.2	.44	.47	1.55	.50	.50
24	.6	.6	1.8	1.9	.7	2.4	2.3	.44	.44	2.6	.50	.44
25	2.3	.4	4.4	4.7	.5	1.1	3.7	2.3	.41	1.55	.56	.41
26	.8	1.0	2.7	1.5	.5	.86	1.65	8.2	.38	6.6	1.1	1.4
27	.6	.3	3.4	.9	.4	.80	2.7	39	.41	2.6	2.6	.99
28	.5	.5	1.1	.7	.4	.68	4.8	5.3	1.15	4.4	.80	.95
29	1.4	1.0	7.1	.6	.3	.56	1.45	5.3	.87	13.5	.92	.44
30	.6	.9	10.5	.3	.3	1.4	2.2	-------	3.5	17	1.4	.41
31	.4	.9	-------	.7	-------	3.6	1.05	-------	4.2	-------	.98	-------

[a] Partly estimated. [b] Estimated.

Discharge, in million gallons, of Oopuola Stream near Huelo, 1931–33—Continued

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1932-33												
1	0.41	1.35	0.23	0.20	0.18	0.93	4.3	0.97	0.38	6.1	0.44	0.32
2	.47	.92	.26	.20	.17	.50	1.35	.62	.38	3.0	.65	.93
3	1.2	.74	2.3	.18	.17	.41	1.1	.56	.35	8.2	1.05	.62
4	.41	.56	3.6	.17	.17	1.15	1.4	.92	.35	.86	.38	.41
5	.35	.50	2.0	.17	.17	.44	.80	.50	2.9	.56	.41	.41
6	.32	.62	.62	.17	.17	.38	.68	.44	11.5	.50	.50	.32
7	.32	[a].47	.56	.17	.17	.35	.50	.41	12	.44	.41	.26
8	.35	[b].92	2.9	.17	.16	.32	.47	.38	6.1	.41	.32	.26
9	.49	[a]1.05	7.9	.17	.16	.29	.44	.31	1.85	.35	.29	.29
10	.86	.56	.98	.16	.18	.29	.44	1.3	5.6	.44	.26	.38
11	1.8	.74	.62	.16	.38	.36	.50	.50	1.2	.35	.26	.26
12	.81	.56	.50	.14	.32	4.7	.66	.78	.80	.32	.26	.23
13	5.5	.62	.54	.14	.18	2.0	.44	.77	.80	.29	.26	.23
14	1.4	.44	.44	.12	.17	.68	.35	2.1	1.0	.26	.32	.23
15	9.8	.38	.38	.12	.16	12.5	2.3	.74	.50	.35	.80	.23
16	1.6	.38	.35	.14	.20	.98	2.8	.56	.44	.34	.62	.20
17	1.2	1.1	.35	.16	.20	.92	2.6	.44	.41	.68	.64	.20
18	2.8	.35	.35	.14	.16	.78	3.0	1.25	.38	.44	.62	.20
19	1.65	.32	.35	.61	.16	.86	.98	2.4	.35	.29	.29	.20
20	3.1	.35	.29	.36	.16	.47	.92	2.2	.35	.26	1.3	.18
21	[a]3.9	.32	.26	.20	.16	.44	1.25	4.1	.38	.23	1.35	.23
22		.32	.26	.84	.14	.38	1.85	1.3	.92	.26	.41	.48
23	[b]9.5	1.75	.26	.65	.14	.35	1.55	.80	1.15	.26	.38	.47
24		.58	.20	.29	7.1	1.6	1.80	.62	.66	.26	.38	.51
25	[a]3.4	.38	.29	.20	1.75	1.85	.98	1.2	.56	.20	.38	.68
26	2.0	.32	.32	.18	.86	.74	1.1	.50	1.85	.20	.35	.35
27	1.2	.35	.20	.18	2.4	.68	1.45	.44	.47	.29	.32	.26
28	1.1	.48	.20	.17	2.8	1.6	2.1	.41	.38	1.7	.29	.26
29	2.9	.55	.26	.18	1.45	1.8	1.70	-------	.35	1.35	.29	1.25
30	3.4	.29	.26	.20	1.8	.41	.98	-------	.32	.97	.35	1.7
31	4.4	.26	-------	.18	-------	33	1.25	-------	.29	-------	.29	------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
1931-32						
July	16	0.2	1.80	2.79	55.7	171
August	15	.3	2.45	3.79	75.8	233
September	10.5	.4	2.93	4.53	87.8	269
October	13	.2	1.34	2.07	41.4	127
November	18.5	.3	2.68	4.15	80.3	246
December	8.6	.2	2.08	3.22	64.6	198
January	20	.47	2.58	3.99	80.0	246
February	39	.44	9.11	14.1	264	811
March	4.2	.32	.946	1.46	29.3	90
April	17	.68	3.48	5.38	104	320
May	14	.50	2.04	3.16	63.3	194
June	5.8	.41	.935	1.45	28.0	86
The year	39	.2	2.66	4.12	974	2,990
1932-33						
July	----------	0.32	2.76	4.27	85.6	263
August	1.75	.26	.598	.925	18.5	57
September	7.9	.20	.934	1.45	28.0	86
October	.84	.12	.230	.356	7.12	22
November	7.1	.14	.746	1.15	22.4	69
December	33	.29	2.33	3.61	72.2	221
January	4.3	.35	1.36	2.10	42.0	129
February	4.1	.31	.983	1.52	27.5	84
March	12	.29	1.77	2.74	55.0	169
April	8.2	.20	1.01	1.56	30.2	93
May	1.35	.26	.480	.743	14.9	46
June	1.7	.18	.418	.647	12.6	39
The year	33	.12	1.14	1.76	416	1,280

[a] Partly estimated. [b] Estimated.

NAILILIHAELE STREAM NEAR HUELO

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 1933.

DISCHARGE.—July 1, 1931, to June 30, 1932: Maximum, 790 million gallons a day or 1,220 second-feet Jan. 18 (gage height, 7.50 feet); minimum, 4.9 million gallons a day or 7.6 second-feet June 24–25.

July 1, 1932, to June 30, 1933: Maximum, 1,270 million gallons a day or 1,960 second-feet Dec. 31 (gage height, 9.90 feet); minimum, 2.2 million gallons a day or 3.4 second-feet Nov. 15, 16.

1913–18, 1919–33: Maximum, 1,800 million gallons a day or 2,790 second-feet May 1, 1916; maximum gage height, 10.74 feet Nov. 18, 1930; minimum, 0.45 million gallons a day or 0.70 second-foot July 14, 1920. Average, 12 years (1920–24, 1925–33), 20.2 million gallons a day (31.3 second-feet).

REMARKS.—Records good for ordinary stages, poor for high stages. No diversions. All data from Jan. 18 to June 30, 1932, have been revised in this paper.

Discharge, in million gallons, 1931–33

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1931-32												
1	8.5	11.5	17	35	14	9.0	34			72	76	40
2	8.0	37	14	25	13	8.5	51		e 22	32	24	16.5
3	7.5	25	29	32	154	12.5	20	e 130		25	32	12
4	7.5	14	15.5	30	104	30	17			17.5	20	11.5
5	32	49	36	18	26	9.5	15		e 20	19.5	22	12
6	32	43	58	16	20	76	12.5	e 85		32	24	10
7	17	47	77	15	20	15	11			18.5	19	10
8	10.5	25	47	13	32	11	10		e 14	19.5	16	9.5
9	10	21	59	11	36	9.5	9.5		15	64	40	11
10	13.5	80	54	10	25	8.8	9.2	e 95	11.5	38	21	14
11	44	32	130	9.5	51	8.5	8.8		10.5	94	17.5	9.8
12	34	28	44	13	96	8.0	9.0		10	97	59	15.5
13	24	32	35	9.5	26	7.5	50	e 110	9.8	120	29	13.5
14	18.5	21	38	8.8	33	7.1	12.5		9.2	32	28	16.5
15	12	65	53	8.2	58	65	18		8.7	34	66	11
16	10	27	105	8.0	25	27	13.5	e 32	8.2	36	23	9.5
17	9.2	19	35	8.5	48	28	9.2		9.0	20	21	9.8
18	28	176	47	17	25	48	86		12.5	17	21	8.7
19	20	94	25	9.2	20	151	42	e 15	20	15.5	16	11
20	64	29	22	8.5	17.5	72	36		25	16.5	15	9.2
21	216	22	21	58	23	64	19		19	13.5	13.5	6.7
22	89	30	25	105	83	45	16		14.5	14.5	13	6.1
23	26	42	19	19	22	38	44	e 22	11.5	24	11.5	6.5
24	18	20	35	40	17	41	36		10.5	35	11.5	5.5
25	35	18	72	75	14.5	24	48		9.8	26	11.5	5.1
26	b 19	20	52	25	13.5	18.5		e 85	9.0	76	12.5	17.5
27	e 14	14	64	17	12.5	16			10	28	21	10.5
28		14.5	50	14	11.5	14	e 44	e 44	14.5	72	11	10
29	e 48	31	115	14.5	9.8	12.5			11.5	72	13	6.5
30		43	126	11	9.2	33			30	128	20	5.7
31	14	30		19		55			42		15	

e Estimated. b Partly estimated.

Discharge, in million gallons, of Nailiilihaele Stream near Huelo, 1931–33—Contd.

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1932-33												
1	5.9	24	9.2	3.4	3.3	20	33	13.5	7.7	33	11	5.5
2	6.3	20	9.2	3.1	3.2	14.5	13	11.5	6.7	37	8.6	11.5
3	13	18	26	3.1	3.1	12.5	10.5	10	6.3	77	13	9.2
4	5.1	16.5	39	3.1	3.1	13	10.5	18	5.9	14	7.2	6.1
5	4.6	15.5	28	3.0	3.1	11	8.4	9.8	48	11	6.7	5.9
6	4.1	17	15	3.0	3.1	9.8	7.2	8.7	78	9.8	8.4	4.9
7	4.1	14.5	13	2.9	3.0	9.0	[b] 6.7	8.0	149	9.2	6.7	4.3
8	4.3	17.5	21	2.9	2.9	8.7	[b] 6.1	7.2	89	8.4	5.5	4.1
9	5.3	19	120	3.0	2.8	8.0	[b] 5.3	35	24	7.7	4.9	4.1
10	6.7	14.5	19	3.0	3.0	7.4	[b] 4.9	22	46	8.4	4.6	4.7
11	13	16	14	2.9	4.1	8.0	5.7	10	19.5	7.7	4.1	4.0
12	13	14	12.5	2.8	3.7	27	[b] 7.7	10.5	14	6.5	4.0	3.7
13	66	14	11.5	2.8	2.9	36	7.0	10	21	6.1	3.7	3.4
14	15	12.5	11	2.8	2.7	13	5.7	21	17.5	5.5	4.1	3.3
15	75	12	10	2.8	2.3	49	32	11.5	12.5	6.3	8.2	3.4
16	17	11.5	9.2	2.8	3.0	14	36	9.5	11	5.5	7.7	3.4
17	14.5	16.5	9.0	2.8	3.4	14	30	8.2	9.8	8.7	7.4	3.6
18	36	11.5	8.7	2.8	2.8	12.5	26	11.5	9.0	8.4	8.2	3.1
19	23	11	8.7	6.9	2.8	13	13.5	24	8.4	5.1	4.6	3.0
20	30	11.5	7.7	5.7	2.8	10.5	12.5	26	7.7	4.4	20	2.9
21	25	11	6.5	4.0	2.6	9.5	16	45	7.7	4.0	26	3.7
22	100	10.5	6.1	9.8	2.5	9.2	26	18	14.5	4.0	8.7	9.1
23	98	17.5	5.9	8.7	2.6	8.7	22	12.5	18	4.0	7.2	21
24	[b] 75	17	4.7	5.1	94	18.5	23	11	16.5	4.0	6.7	13.5
25	35	12.5	5.7	3.6	26	30	20	14	9.6	3.3	6.3	15.5
26	28	11	7.2	3.4	15.5	13.5	21	9.5	25	3.3	5.5	9.2
27	23	11	4.6	3.4	31	12.5	22	8.4	10	4.1	4.9	5.7
28	21	11	3.9	3.3	56	29	27	8.0	8.2	21	4.9	5.9
29	34	13	6.3	3.3	27	34	19.5	-------	8.0	17.5	5.1	18
30	42	10.5	6.2	4.1	34	13.5	15.5	-------	7.2	17	5.3	32
31	44	9.5	-------	3.3	-------	180	14.5	-------	7.0	-------	4.7	------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
1931-32						
July	216	7.5	30.7	47.5	951	2,920
August	176	11.5	37.4	57.9	1,160	3,560
September	130	14	50.6	78.3	1,520	4,660
October	105	8.0	22.7	35.1	703	2,160
November	154	9.2	35.3	54.6	1,060	3,250
December	151	7.1	31.4	48.6	973	2,990
January	----------	8.8	29.1	45.0	901	2,770
February	----------	----------	68.5	106	1,990	6,100
March	42	8.2	15.6	24.1	484	1,480
April	128	13.5	43.6	67.5	1,310	4,020
May	76	11	24.0	37.1	743	2,280
June	40	5.1	11.4	17.6	341	1,050
The year	216	5.1	33.1	51.2	12,100	37,200
1932-33						
July	100	4.1	28.6	44.3	887	2,720
August	24	9.5	14.2	22.0	442	1,350
September	120	3.9	15.3	23.7	459	1,410
October	9.8	2.8	3.79	5.86	118	361
November	94	2.3	11.7	18.1	352	1,080
December	180	7.4	21.6	33.4	669	2,050
January	36	4.9	16.4	25.4	508	1,560
February	45	7.2	14.7	22.7	412	1,270
March	149	5.9	23.3	36.1	723	2,220
April	77	3.3	12.1	18.7	362	1,110
May	26	3.7	7.55	11.7	234	718
June	32	2.9	7.59	11.7	228	699
The year	180	2.3	14.8	22.9	5,390	16,500

[b] Partly estimated.

SECOND BRANCH OF NAILILIHAELE STREAM AT HAIKU-UKA BOUNDARY, NEAR KAILIILI

LOCATION.—Water-stage recorder on Haiku-uka boundary, 5.6 miles southeast of Makawao.
DRAINAGE AREA.—0.2 square mile.
RECORDS AVAILABLE.—July 1932 to January 1933 (discontinued).
DISCHARGE.—Maximum during period, 86 million gallons a day or 133 second-feet Dec. 31 (gage height, 1.80 feet); no flow during dry periods.
REMARKS.—Records fair. No diversions above station.

Discharge, in million gallons, 1932–33

Day	July	Aug.	Sept.	Nov.	Dec.	Jan.	Day	July	Aug.	Sept.	Nov.	Dec.	Jan.
1	[a] 0.08	0.65	[b] 0.01	0	0.33	0.52	16	0.48	0.15	0.08	0	0.02	1.95
2	.38	.61		0	.15	.15	17	.48	.15	.07	0		.48
3	.48	.48	.36	0	.12	.12	18	2.1	.12	.05	0		.30
4	.15	.43	.91	0	.08	.10	19	1.35	.08	.05	0		.18
5	.12	.38	.99	0	.05	.08	20	1.35	.07	.04	0	[b] 0	.12
6	.08	.48	.20	0	.03	.05	21	1.05	.05		0		------
7	.07	.34	.12	0	.01	.05	22	8.4	.04	[b] .02	0		------
8	.05	.43	.10	0	0	.03	23	4.9	.41		0		------
9	.05	.38	6.0	0	0	.01	24	1.2	.23	[b] 0	4.7	.01	------
10	.04	.59	.30	0	0	0	25	1.1	.15		.30	.28	------
11	.08	.43	.20	0	0	0	26	.72	.08	[b] .02	.03	0	------
12	.48	.30	.18	0	.01	0	27	.54	.05		.74	[b] 0	------
13	5.4	.26	.15	0	.20	0	28	.48	.05	[b] 0	2.8	2.7	------
14	.38	.23	.12	0	0	0	29	1.35	.04		6.2	1.1	------
15	3.8	.20	.10	0	.26	5.2	30	1.9	[b] .02		.94	.07	------
							31	2.0		------	------	10.5	------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	8.4	0.04	1.32	2.04	41.0	126
August	.65	----------	.255	.395	7.90	24
September	6.0	0	.337	.521	10.1	31
November	6.2	0	.524	.811	15.7	48
December	10.5	0	.514	.795	15.9	49
January 1–20	5.2	0	.467	.723	9.34	29
The period (204 days)	10.5	0	.490	.758	99.9	307

[a] Partly estimated. [b] Estimated.

NOTE.—No flow during October.

KAILUA STREAM AT HAIKU-UKA BOUNDARY, NEAR KAILIILI

LOCATION.—Water-stage recorder at trail crossing, 100 feet above Haiku-uka boundary and 2½ miles southeast of Kailiili.
DRAINAGE AREA.—0.8 square mile.
RECORDS AVAILABLE.—July 1918 to June 1928; July 1932 to June 1933.
DISCHARGE.—Maximum during year, 278 million gallons a day or 430 second-feet Mar. 5 (gage height, 6.03 feet); minimum, 0.01 million gallons a day or 0.02 second-foot Nov. 21, 22, 23.
1918–28, 1932–33: Maximum, 386 million gallons a day or 597 second-feet Oct. 16, 1924 (gage height, 7.83 feet); minimum, that of Nov. 21, 22, 23, 1932.
REMARKS.—Records fair for ordinary stages, poor for high stages and estimated periods. No diversions above station.

Discharge, in million gallons, 1932–33

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	*0.4	2.4	0.06	0.08	0.04	4.3	10	0.45	0.35	1.4	0.35	0.06
2	1.3	3.0	.06	.08	.04	.78	1.6	.25	.25	13.5	.13	.08
3	1.6	2.1	1.4	.06	.04	.35	.78	.19	.25	31	.10	.08
4	.35	.95	5.7	.06	.04	.25	.78	11.5	.13	3.0	.10	.08
5	.19	.95	7.0	.06	.04	.19	.25	.95	29		.10	.08
6	.19	1.6	1.85	.05	.04	.10	.19	.35	39	*.6	.13	
7	.13	.78	.60	.04	.04	.08	.13	.25	118		.13	
8	.10	1.15	.35	.04	.04	.08	.10	.19	53	4.5	.10	
9	.13	.95	*12	.04	.04	.06	.08	9.5	6.3	.35	.10	*.07
10	.08	1.45		.04	.04	.06	.08	*7	*9	.35	.08	
11	.13	1.35	.95	.04	.04	.08	.08			.45	.06	
12	2.1	.45	.60	.04	.05	.13	.08	*.5			.06	
13	37	.35	.45	.03	.05	.95	.08		*.7	*.3	.06	
14	2.1	.25	.35	.03	.04	.19	.06	*7.5			.06	
15	*11	.19	.25	.03	.04	1.1	33	2.3		.35	.13	*.03
16		.19	.25	.04	.05	.55	23	1.35	*.4	.19	.10	
17	1.6	.35	.19	.04	.05	.25	4.0	1.15		.35	.08	
18	7.5	.60	.19	.04	.05	.19	1.8	.78		.45	.06	
19	4.8	.19	.19	.06	.04	.13	.60	2.7		.25	.06	
20	9.5	.19	.19	.05	.04	.08	.35	5.7	*.2	.19	1.9	*.04
21	3.7	.19	.13	.05	.03	.08	1.9	8.4		.13	4.1	
22	43	.13	.13	.06	.02	.08	6.0	2.5	*3.8	.10	.35	
23	22	1.25	.10	.08	.02	.08	7.0	.95		.10	.25	*2.0
24	3.5	1.65	.08	.06	30	.74	7.9	.60		.10	.25	
25	3.7	.95	.10	.05	4.8	3.0	3.7	.45	*2.8	.06	.13	
26	1.6	.25	.19	.05	.78	.35	3.0	.35		.06	.10	*.2
27	1.15	.19	.08	.04	7.5	.19	5.3	.35		.05	.08	
28	.78	.13	.08	.04	29	15.5	8.5	.35	*.8	1.25	.08	
29	4.2	.13	.08	.03	7.3	9.3	1.6	-------	.78	.35	.08	*6
30	8.2	.10	.08	.04	11	.95	1.15	-------	.60	.35	.08	
31	10.5	.08	-------	.04	-------	47	.78	-------	1.6	-------	.06	-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	43	0.08	6.24	9.65	194	594
August	3.0	.08	.790	1.22	24.5	75
September	----------	.06	1.52	2.35	45.7	140
October	.08	.03	.048	.074	1.49	5
November	30	.02	3.04	4.70	91.3	280
December	47	.06	2.81	4.35	87.2	268
January	33	.06	4.00	6.19	124	380
February	11.5	.19	2.41	3.73	67.6	207
March	118	.13	9.33	14.4	289	887
April	31	.05	2.05	3.17	61.6	189
May	4.1	.06	.305	.472	9.45	29
June	----------	----------	.664	1.03	19.9	61
The year	118	.02	2.78	4.30	1,020	3,120

* Estimated.

KAILUA STREAM NEAR HUELO

LOCATION.—Water-stage recorder above Wailoa Ditch intake, 1¼ miles south west 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 1933.
DISCHARGE.—Maximum during year, 2,820 million gallons a day or 4,360 second-feet Dec. 31 (gage height, 8.14 feet); minimum unknown, due to mud in well. 1910–18, 1919–33: Maximum, 3,390 million gallons a day or 5,250 second-feet Nov. 18, 1930 (gage height, 8.61 feet); minimum, 0.07 million gallons a day or 0.11 second-foot June 27, 1921. Average, 14 years (1919–33), 17.7 million gallons a day (27.4 second-feet).
REMARKS.—Records good for ordinary stages, poor for high stages and estimated periods. No diversions above station.

Discharge, in million gallons, 1932–33

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	4.2	13.5	1.9	2.3		[a] 16.5	49	7.2	4.6	39	6.0	
2	5.2	10	2.0	2.3		7.5	13	6.0	3.9	67	3.9	
3	11	9.4	11.5	2.3	[b] 1.7	5.3	8.5	4.9	3.5	111	4.6	[b] 2.3
4	4.2	7.2	28	2.3		4.6	7.5	25	3.3	14.5	2.9	
5	3.4	6.5	22	2.3		3.6	6.2	7.5	138	8.8	2.7	
6	3.0	7.6	8.0	2.3		3.1	4.9	5.1	119	6.8	3.3	[a] 1.9
7	2.8	5.9	4.8	2.3	[b] 1.5	2.8	4.2	4.2	380	5.7	3.1	1.8
8	2.5	7.5	6.8	2.3		2.5	3.8	3.8	203	4.8	2.5	1.7
9	2.8	7.8	130	2.2		2.3	3.3	35	33	[b] 4.2	2.3	1.7
10	3.2	6.5	14.5	2.2	[b] 1.8	2.1	3.0	26	53		2.2	1.7
11	6.1	7.4	8.0	2.2		2.3	3.1	7.2	20		2.1	1.7
12	17	5.3	6.2	2.2		6.3	3.1	6.0	12		2.1	1.7
13	108	4.8	5.3	2.2		19.5	2.8	5.5	15		2.1	1.7
14	13.5	4.0	4.6	2.2		4.5	2.6	22	12.5		2.2	1.7
15	8.1	3.5	4.3	2.2	[b] 1.5	22	82	10	8.8	[b] 3.2	2.9	1.7
16	17	3.4	3.9	2.2		5.3	67	7.0	7.0		3.1	1.7
17	11	4.4	3.6	2.3		4.3	19	6.6	6.2		2.5	1.7
18	38	3.7	3.3	2.2		3.8	16	6.8	5.3		[b] 1.9	1.7
19	21	3.0	3.3	2.3		3.5	8.5	16.5	4.8	[a] 3.0		1.7
20	39	3.0	3.3	2.0	[b] 1.3	2.8	6.8	25	4.3	2.4	[b] 7	1.7
21	21	2.6	3.2	1.9		2.5	9.9	45	4.3	2.2		1.7
22	135	2.4	3.1	2.3		2.3	25	16.5	8.5	2.2		3.6
23	102	7.2	3.1	2.3		2.3	24	9.5	22	2.1	[b] 3.1	19.5
24	46	6.0	2.9	1.8	[b] 22	7.1	26	7.8	31	2.1		9.8
25	23	4.6	3.0	1.7		21	18	7.8	8.2	2.0		10.5
26	13.5	2.9	3.2	1.7	[b] 5.5	5.5	18	5.7	27	2.0		4.6
27	9.7	2.5	2.6	1.7		4.3	19.5	4.8	9.0	2.0		2.8
28	8.6	2.4	2.4	1.7		29	31	4.5	5.7	13.5	[b] 2.3	2.4
29	19	2.8	2.6	1.7	[b] 24	43	13.5	-------	4.9	8.0		9.4
30	34	2.3	2.7	[b] 1.6		7.0	9.8	-------	4.5	10.5		47
31	39	2.1	-------		-------	231	8.5	-------	4.3	-------		-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	135	2.5	24.9	38.5	772	2,370
August	13.5	2.1	5.23	8.09	162	498
September	130	1.9	10.1	15.6	304	933
October	2.3	----------	2.09	3.23	64.8	199
November	----------	----------	5.40	8.36	162	497
December	231	2.1	15.5	24.0	480	1,470
January	82	2.6	16.7	25.8	518	1,590
February	45	3.8	12.1	18.7	339	1,040
March	380	3.3	37.6	58.2	1,170	3,580
April	111	2.0	11.5	17.8	344	1,050
May	----------	----------	3.05	4.72	94.5	290
June	47	1.7	4.95	7.66	149	456
The year	380	----------	12.5	19.3	4,560	14,000

[a] Partly estimated. [b] Estimated.

NINTH BRANCH OF KAILUA STREAM AT HAIKU-UKA BOUNDARY, NEAR KAILIILI

LOCATION.—Water-stage recorder on Haiku-uka boundary trail 5.2 miles southeast of Makawao.
DRAINAGE AREA.—0.2 square mile.
RECORDS AVAILABLE.—July 1932 to January 1933 (discontinued).
DISCHARGE.—Maximum during period, 22 million gallons a day or 34 second-feet Dec. 31 (gage height, 1.51 feet); minimum, 0.02 million gallons a day or 0.03 second-foot Nov. 18–23.
REMARKS.—Records fair. No diversions above station.

Discharge, in million gallons, 1932–33

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
1	[a] 0.20	0.20	0.04	0.04	[b] 0.04	0.16	0.30
2	.39	.24	.04	.04		.12	.16
3	.30	.16	.29	.04	[a] .04	.12	[a] .12
4	.16	.16	.46	.04	.04	.12	[b] .1
5	.16	.12	.49	.04	.04	.12	
6	.16	.18	.09	.04	.04	.09	
7	.12	.09	.06	[b] .04	.04	.06	[a] .09
8	.09	.16	.06		.04	.06	.09
9	.09	.12	2.9		.04	.06	[b] .06
10	.09	.22	.12		.04	.06	
11	.12	.12	.09	[b] .03	.04	.06	
12	.55	.12	.09		.06	.11	
13	1.75	.12	.09		.04	.28	[a] .04
14	.16	.12	.06	[a] .06	.04	.09	.04
15	1.4	.12	.06	.06	.04	.27	1.6
16	.24	.09	.06	.04	.04	.09	.79
17	.29	.09	.06	.06	.04	.09	.24
18	.87	.09	.06	.04	.02	.06	.19
19	.58	.09	.06	.06	.02	.06	----
20	.57	.09	.06	.04		.06	----
21	.36	.09	.06	.04	[b] .02	.06	----
22	2.4	.09	.04	.06		.06	----
23	1.45	.30	.04	.06		[b] .1	----
24	.44	.12	.04	.04	2.2		----
25	.40	.09	.06	.04	.25	.48	----
26	.24	.06	.04	.04	.12	.12	----
27	.24	.06	.04	.04	.70	.12	----
28	.20	.06	.04	.04	1.3	1.5	----
29	.48	.06	.04	.04	.54	[a] .31	----
30	.60	.04	.04	[b] .04	.52	[a] .09	----
31	.61	.04	----		----	3.3	----

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	2.4	0.09	0.507	0.784	15.7	48
August	.30	.04	.120	.186	3.71	11
September	2.9	.04	.189	.292	5.68	17
October	.06	----	.043	.066	1.33	4
November	2.2	.02	.215	.333	6.45	20
December	3.3	.06	.270	.418	8.38	26
January 1–18	1.6	.04	.233	.361	4.20	13
The period (202 days)	3.3	.02	.225	.348	45.4	139

[a] Estimated. [b] Partly estimated.

TENTH BRANCH OF KAILUA STREAM AT HAIKU-UKA BOUNDARY, NEAR KAILIILI

LOCATION.—Water-stage recorder on Haiku-uka boundary trail 5¼ miles southeast of Makawao.
DRAINAGE AREA.—0.1 square mile.
RECORDS AVAILABLE.—July 1932 to January 1933 (discontinued).
DISCHARGE.—Maximum during period, 48 million gallons a day or 74 second-feet Jan. 31 (gage height, 2.04 feet); minimum, 0.08 million gallons a day or 0.12 second-foot Nov. 18.
REMARKS.—Records good for ordinary stages, poor for high stages and estimated periods. No diversions above station.

Discharge, in million gallons, 1932–33

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
1	[a] 0.6	1.15	0.22	0.22	0.09	0.93	1.25
2	.95	1.05	.22	.19	.09	.53	.53
3	.92	1.0	.79	.19	.09	.43	.43
4	.53	.93	1.3	.17	.09	.35	.43
5	.48	.93	1.45	.17	.09	.31	.31
6	.43	1.0	.66	.15	.09	.28	.28
7	[b] .39	.86	.43	.15	.09	.25	.28
8	[b] .28	.86	.43	.15	.09	.22	.28
9	.28	.80	5.7	.15	.09	.19	.28
10	[b] .28	1.0	.93	.15	.09	.19	.22
11	[a] .9	.86	.66	.15	.13	.19	.22
12		.73	.53	.15	.15	.34	.19
13		.73	.48	.13	.11	.71	.19
14	[a] 3.3	.73	.39	.13	.09	.28	.22
15		[b] .66	.39	.13	.09	.80	3.4
16	1.05	[a] .60	.31	.13	.11	.28	2.5
17	.93	[a] .53	.31	.13	.09	.28	1.0
18	2.1	[a] .48	.31	.13	.08	.25	.80
19	1.65	[b] .43	.35	.17	.09	.22	.48
20	2.0	.43	.28	.15	.15	.22	.43
21	1.55	.39	.28	.13	.15	.19	-------
22	5.9	.35	.25	.17	.15	.17	-------
23	4.1	.77	.22	.17	.15	.17	-------
24	1.75	.66	.25	.15	4.3	.59	-------
25	1.4	.43	.28	.13	1.1	.99	-------
26	1.05	.35	.28	.13	.48	.28	-------
27	1.0	.35	.22	.13	1.6	.25	-------
28	.86	.31	.19	.11	3.1	4.0	-------
29	1.7	.31	.19	.11	1.65	1.3	-------
30	2.0	.28	.19	.11	1.95	.35	-------
31	2.2	.25	-------	.11	-------	6.3	-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	5.9	0.28	1.55	2.40	48.1	148
August	1.15	.25	.652	1.01	20.2	62
September	5.7	.19	.616	.953	18.5	57
October	.22	.11	.146	.226	4.54	14
November	4.3	.08	.554	.857	16.6	51
December	6.3	.17	.705	1.09	21.8	67
January 1–20	3.4	.19	.686	1.06	13.7	42
The period (204 days)	6.3	.08	.703	1.09	143	441

[a] Estimated. [b] Partly estimated.

HOOLAWALIILII STREAM NEAR HUELO

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

DRAINAGE AREA.—Not determined.

RECORDS AVAILABLE.—April 1911 to June 1933.

DISCHARGE.—Maximum during year ending June 30, 1931, 657 million gallons a day or 1,020 second-feet Nov. 18 (gage height, 6.74 feet); minimum recorded, 0.9 million gallons a day or 1.4 second-feet Feb. 19.

Maximum during year ending June 30, 1932, 334 million gallons a day or 517 second-feet Feb. 27 (gage height, 4.20 feet); minimum, 1.1 million gallons a day or 1.7 second-feet July 4, 5.

Maximum during year ending June 30, 1933, 266 million gallons a day or 412 second-feet Dec. 31 (gage height, 3.63 feet); minimum, 0.7 million gallons a day or 1.1 second-feet Nov. 21–23.

1911–33: Maximum, 657 million gallons a day or 1,020 second-feet Nov. 18, 1930 (gage height, 6.74 feet); minimum, 0.2 million gallons a day or 0.3 second-foot June 8, 1926. Average, 21 years (1911–15, 1916–33), 5.27 million gallons a day (8.15 second-feet).

REMARKS.—Records good for ordinary stages, poor for high stages. No diversions. All records from Nov. 18, 1930, to June 30, 1932, have been revised in this report.

Discharge, in million gallons, 1930–33

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1930-31												
1	12.5	[a] 4.8	2.4	4.2	2.0	3.4	2.9	1.7	2.1	12.5	3.4	2.3
2	9.2	4.2	2.3	3.8	2.0	3.1	2.7	1.5	3.7	3.7	3.1	2.3
3	7.5	3.8	2.1	3.4	1.9	3.1	2.7	1.5	4.6	3.4	3.4	2.1
4	5.8	3.8	2.0	4.9	1.8	2.9	2.7	1.5	2.9	2.7	4.0	1.9
5	4.8	6.7	2.0	7.1	1.8	2.7	2.5	1.3	4.8	6.9	2.9	2.1
6	4.8	5.4	2.3	8.1	2.6	2.7	[a] 2.1	1.5	3.7	16	3.1	2.1
7	4.2	3.8	2.1	4.8	2.1	2.7	[b] 1.9	1.9	3.1	5.0	3.1	2.1
8	3.6	3.4	2.0	5.5	2.1	2.7	[a] 1.5	1.5	3.1	4.0	2.9	2.1
9	3.2	5.5	2.0	4.2	2.1	2.7	[b] 2.5	1.9	2.9	3.1	2.7	2.1
10	3.0	15	2.8	3.6	2.0	2.7	[b] 2.5	1.9	5.6	2.9	2.9	2.1
11	2.8	20	2.7	3.2	1.9	2.5	[b] 3.7	1.7	4.0	2.7	3.1	2.1
12	2.8	12	2.5	2.8	1.8	2.5	2.7	1.5	2.9	2.5	3.7	1.9
13	6.4	8.3	4.5	2.7	2.1	2.3	2.3	1.5	2.7	2.3	3.8	1.9
14	3.6	7.2	3.4	2.5	2.0	2.5	2.1	1.7	2.7	2.5	11.5	1.9
15	3.0	6.9	5.0	2.4	2.5	2.5	1.9	2.3	2.7	2.7	6.7	1.9
16	2.8	10.5	3.6	2.3	7.5	3.1	1.5	2.9	2.5	2.7	4.3	1.9
17	2.7	12	3.2	2.1	16.5	4.3	[a] 1.3	2.1	2.3	2.5	3.7	2.6
18	2.8	9.8	3.9	2.0	99	4.6	[a] 2.7	2.1	2.3	2.3	3.7	2.1
19	5.4	7.5	3.0	2.0	26	3.1	2.1	1.7	2.1	2.3	3.7	2.1
20	4.8	6.1	3.9	2.0	11	2.9	1.9		2.1	11	3.7	2.3
21	4.2	5.8	3.0	1.9	7.6	2.9	1.9	[b] 1.9	2.1	18	3.4	3.7
22	3.6	5.1	3.2	1.9	5.6	2.7	1.7		1.9	39	3.7	4.2
23	3.4	4.4	4.0	[a] 2.0	37	2.7	1.7	4.0	1.9	24	3.1	2.7
24	3.4	4.0	7.5	[a] 2.0	29	2.7	1.7	4.6	1.9	9.6	2.9	2.3
25	3.0	4.2	7.2	1.9	13	2.7	1.7	2.9	1.7	7.2	2.9	3.5
26	3.8	3.8	4.4	1.8	8.6	3.4	1.5	4.4	1.7	5.3	2.9	3.7
27	3.8	3.6	4.2	1.8	5.9	2.7	1.5	3.7	1.7	5.0	2.9	2.9
28	9.3	3.2	3.6	2.4	5.3	2.7	1.5	2.7	1.7	4.3	2.7	2.5
29	9.5	2.8	3.6	4.5	4.3	9.7	1.5		2.1	4.0	4.4	2.3
30	7.6	2.7	4.6	2.5	3.7	3.4	1.5		1.7	3.7	3.1	2.1
31	5.6	2.5		2.1		2.9	1.3		6.3		2.5	

[a] Partly estimated. [b] Estimated.

Discharge, in million gallons, of Hoolawaliilii Stream near Huelo 1930–33—Continued

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1931–32												
1	1.9	3.7	3.7	10	3.1	2.3	4.6	11	9.1	13.5	31	8.0
2	1.7	5.5	3.4	7.6	2.9	2.3	6.3	29	5.9	6.7	9.6	3.7
3	1.7	5.0	4.6	7.6	28	2.8	4.3	17.5	4.6	5.6	8.6	3.1
4	1.5	4.0	3.7	6.2	22	2.7	3.7	24	4.0	4.6	5.9	3.1
5	1.3	5.6	5.0	5.6	7.6	2.3	3.4	23	4.3	4.6	5.6	2.7
6	2.5	6.7	7.8	5.0	5.6	15	3.1	32	4.6	6.2	5.9	2.7
7	2.5	7.2	16	4.6	5.0	3.1	3.1	19	3.1	4.6	5.3	2.5
8	2.1	5.6	7.6	4.3	5.3	2.9	2.7	10.5	4.4	4.3	4.3	2.3
9	2.1	5.0	8.1	4.0	6.2	2.9	2.7	14.5	3.4	12	6.7	2.3
10	2.1	13	9.6	3.7	5.3	2.7	2.5	28	2.9	6.2	5.6	2.9
11	2.9	7.2	24	3.4	9.1	2.7	2.5	34	2.9	13.5	4.3	2.3
12	3.7	6.2	10.5	3.4	14.5	2.5	2.5	28	2.7	13	11	2.5
13	3.1	5.6	8.1	2.7	6.7	2.5	5.6	55	2.7	26	5.9	2.3
14	2.9	5.0	7.2	2.7	5.9	2.3	3.1	33	2.7	11	6.2	2.5
15	2.5	11	7.2	2.7	10	12	3.7	11	2.5	7.6	15	2.1
16	2.3	6.7	15	2.5	5.9	4.3	3.4	7.2	2.5	8.1	7.2	1.9
17	2.1	5.3	7.6	2.5	6.2	3.7	2.9	5.6	2.7	5.3	6.2	1.9
18	2.9	26	8.1	2.7	5.3	5.8	18	4.3	2.7	4.3	5.9	1.9
19	2.9	25	5.9	2.3	4.3	17.5	7.2	4.0	2.9	4.0	5.0	2.1
20	6.2	10	5.3	2.1	4.0	9.6	7.2	6.2	3.1	4.0	4.6	2.3
21	34	6.7	5.0	3.8	4.0	9.6	4.6	3.4	3.1	3.1	4.0	2.1
22	21	6.7	5.3	17.5	15.5	8.6	3.7	4.3	2.9	3.1	3.7	2.1
23	8.6	7.6	4.6	3.7	4.6	6.7	8.9	3.7	2.5	3.4	3.4	2.1
24	5.9	5.6	5.3	3.7	4.0	7.2	5.9	3.1	2.5	5.3	3.1	2.1
25	7.1	5.0	9.1	8.2	3.7	5.3	8.7	6.4	2.3	4.3	3.1	1.9
26	5.3	5.3	8.6	4.0	3.7	4.3	6.2	15	2.3	11.5	3.1	2.5
27	5.0	4.3	10	3.4	2.9	4.0	8.5	71	2.3	6.2	4.0	2.3
28	4.6	4.0	7.6	3.1	2.7	3.4	13.5	24	2.7	7.2	3.1	2.7
29	5.3	4.0	20	3.4	2.5	3.4	6.2	17.5	2.5	22	3.1	2.1
30	5.0	4.3	25	2.9	2.5	4.0	6.2	------	4.4	37	3.1	1.7
31	4.3	4.0	------	4.1	------	6.6	5.3	------	7.8	------	3.1	------
1932–33												
1	1.7	5.0	1.5	1.7	[e]0.9	2.5	14.5	3.4	2.5	2.8	1.7	1.5
2	1.5	4.3	1.5	1.7	.9	2.1	6.2	3.1	2.5	4.7	1.7	1.7
3	1.5	3.7	2.1	1.7	.9	1.9	5.0	3.1	2.3	14.5	1.9	1.7
4	1.5	3.4	3.7	1.7	.9	1.9	4.0	2.9	2.1	3.4	1.7	1.7
5	1.3	2.9	3.1	1.7	.9	1.7	3.7	2.9	4.1	3.1	1.5	1.5
6	1.3	2.9	2.3	1.7	.9	1.7	3.1	2.9	14.5	2.7	1.7	1.3
7	1.3	2.7	2.1	1.7	.9	1.5	2.7	2.7	28	2.7	1.5	1.3
8	1.3	2.7	3.1	1.7	.9	1.5	2.5	2.9	21	2.5	1.5	1.3
9	1.3	2.7	18	1.7	.9	1.5	2.3	6.4	9.1	2.5	1.3	1.3
10	1.3	2.5	4.0	1.7	.9	1.5	2.3	2.9	13	2.5	1.3	1.3
11	1.9	2.3	3.1	1.7	1.1	1.5	2.3	2.5	6.2	2.5	1.3	1.1
12	1.7	2.1	2.7	1.5	.9	3.7	2.1	2.5	5.3	2.1	1.3	1.1
13	6.9	2.1	2.7	1.5	.9	5.8	2.1	3.1	5.0	1.9	1.5	.9
14	2.7	1.9	2.5	1.5	.9	2.7	9.9	3.4	4.3	1.9	1.5	.8
15	12.5	1.9	2.5	1.5	.9	9.3	3.1	2.7	3.4	1.9	1.7	.8
16	3.4	1.9	2.1	1.5	.9	3.1	4.0	2.5	3.4	1.9	1.7	.8
17	3.1	1.9	2.1	1.5	.9	2.7	4.0	2.5	3.1	1.9	1.7	.8
18	4.6	1.9	2.1	1.5	.8	2.5	4.6	3.6	2.9	1.9	1.7	.8
19	4.0	1.9	2.1	1.9	.8	2.3	2.9	3.1	2.9	1.7	1.7	.8
20	5.7	1.7	1.9	1.7	.8	2.1	2.7	5.9	2.9	1.7	2.1	.8
21	5.6	1.9	2.1	1.5	.7	1.9	2.7	7.1	2.9	1.5	2.5	.9
22	18.5	1.9	2.1	1.7	.7	1.7	3.4	4.3	2.9	1.5	2.1	1.1
23	16	2.3	2.1	1.7	.7	1.7	3.4	3.4	3.1	1.5	1.9	1.5
24	17	2.1	2.1	1.5	4.3	2.7	4.2	3.4	2.9	1.5	1.9	1.5
25	9.0	1.9	[e]2.1	1.5	2.5	3.1	3.4	3.4	2.7	1.5	1.9	1.7
26	5.9	1.7	[e]2.0	[e]1.5	1.7	2.3	3.7	2.9	3.7	1.3	1.9	1.5
27	4.6	1.7	[e]1.9	[e]1.4	2.1	2.1	3.7	2.9	2.7	1.3	1.7	1.5
28	4.0	1.7	1.9	[e]1.3	3.8	3.3	5.5	2.7	2.5	1.9	1.7	1.5
29	4.6	1.7	1.9	[e]1.2	2.7	4.0	4.3	------	2.1	1.9	1.7	1.9
30	7.1	1.5	1.9	[e]1.1	2.7	2.7	3.7	------	2.1	1.9	1.7	2.7
31	9.2	1.5	------	[e]1.0	------	40	3.7	------	2.1	------	1.7	------

[e] Interpolated.

Discharge, in million gallons, of Hoolawaliilii Stream near Huelo, 1930–33—Continued

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
1930-31						
July	12.5	2.7	4.93	7.63	153	469
August	20	2.5	6.41	9.92	199	610
September	7.5	2.0	3.43	5.31	103	316
October	8.1	1.8	3.17	4.90	98.4	302
November	99	1.8	10.4	16.1	311	954
December	9.7	2.3	3.15	4.87	97.5	299
January	3.7	1.3	2.05	3.17	63.7	195
February	4.6	1.3	2.20	3.40	61.7	189
March	6.3	1.7	2.82	4.36	87.5	269
April	39	2.3	7.13	11.0	214	656
May	11.5	2.5	3.67	5.68	114	350
June	4.2	1.9	2.39	3.70	71.8	220
The year	99	1.3	4.31	6.67	1,570	4,830
1931-32						
July	34	1.3	5.06	7.83	157	482
August	26	3.7	7.32	11.3	227	696
September	25	3.4	8.96	13.9	269	825
October	17.5	2.1	4.63	7.16	143	440
November	28	2.5	6.97	10.8	209	641
December	17.5	2.3	5.32	8.23	165	506
January	18	2.5	5.49	8.49	170	522
February	71	3.1	18.8	29.1	545	1,670
March	9.1	2.3	3.52	5.45	109	335
April	37	3.1	8.94	13.8	268	823
May	31	3.1	6.34	9.81	197	603
June	8.0	1.7	2.56	3.96	76.7	235
The year	71	1.3	6.93	10.7	2,540	7,780
1932-33						
July	18.5	1.3	5.23	8.09	162	497
August	5.0	1.5	2.33	3.61	72.3	222
September	18.0	1.5	2.84	4.39	85.3	262
October	1.9	1.0	1.55	2.40	48.2	148
November	4.3	.7	1.33	2.06	39.8	122
December	40	1.5	3.84	5.94	119	365
January	14.5	1.9	3.80	5.88	118	361
February	7.1	2.5	3.40	5.26	95.1	292
March	28	2.1	5.43	8.40	168	516
April	14.5	1.3	2.55	3.95	76.6	235
May	2.5	1.3	1.70	2.63	52.7	162
June	2.7	.8	1.30	2.01	39.1	120
The year	40	.7	2.95	4.56	1,080	3,300

HOOLAWANUI STREAM NEAR HUELO

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.

DRAINAGE AREA.—Not Determined.

RECORDS AVAILABLE.—December 1910 to June 1933.

DISCHARGE.—Maximum during year, 477 million gallons a day, or 738 second-feet Dec. 31 (gage height, 7.71 feet); minimum, 0.4 million gallons a day, or 0.6 second-foot Nov. 21, 22, 23.

1910–33: Maximum, 584 million gallons a day or 904 second-feet Nov. 18, 1930 (gage height, 9.37 feet); minimum, 0.15 million gallons a day, or 0.23 second-foot Oct. 25, 1917. Average, 21 years (1911–15, 1916–33), 7.96 million gallons a day (12.3 second-feet).

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

Discharge, in million gallons, 1932–33

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	2.3	7.8	1.3	1.3	0.6	4.1	22	4.8	3.3	4.2	2.1	0.9
2	2.3	6.6	1.2	1.3	.7	2.4	9.5	4.2	3.0	9.4	1.9	1.1
3	2.5	6.0	11	1.3	.7	2.0	7.2	3.8	2.9	35	2.3	1.0
4	2.2	5.2	5.9	1.3	.7	1.8	6.2	4.6	2.8	6.7	1.7	.9
5	1.9	4.8	4.1	1.2	.7	1.7	5.2	3.6	19.5	5.1	1.6	.9
6	1.8	4.6	2.5	1.2	.6	1.5	4.5	3.3	33	4.2	1.7	.9
7	1.7	4.1	2.0	1.1	.6	1.4	3.9	3.0	90	3.7	1.6	.9
8	1.7	4.4	3.9	1.0	.6	1.3	3.7	2.8	72	3.4	1.5	.8
9	1.7	4.4	37	1.0	.5	1.3	3.3	10	20	3.0	1.4	.8
10	1.8	3.8	5.2	1.0	.6	1.1	3.2	7.1	22	2.9	1.3	.9
11	2.3	3.7	3.7	1.0	.8	1.3	3.0	3.8	12	2.8	1.3	.8
12	3.0	3.4	3.2	.9	.6	3.5	2.9	3.6	8.9	2.5	1.3	.7
13	18.5	3.3	2.9	.8	.6	5.7	2.7	3.6	9.1	2.3	1.3	.7
14	4.4	3.0	2.7	.8	.5	2.3	2.5	7.4	7.8	2.1	1.3	.7
15	23	2.8	2.5	.8	.5	9.5	7.0	4.5	6.2	2.3	1.5	.7
16	6.2	2.7	2.5	.8	.6	3.2	9.8	3.8	5.6	2.1	1.4	.7
17	5.0	2.8	2.4	.9	.6	2.7	7.4	3.4	5.1	2.2	1.3	.7
18	9.6	2.5	2.3	.8	.4	2.4	7.1	3.8	4.5	2.0	1.3	.6
19	7.3	2.3	2.2	1.2	.4	2.4	4.6	6.0	4.1	1.7	1.2	.6
20	11	2.3	2.1	.9	.4	2.1	4.2	7.3	3.8	1.7	1.9	.6
21	8.4	2.2	2.0	.7	.4	1.9	4.4	13.5	3.8	1.7	4.8	.7
22	37	2.1	1.9	1.2	.4	1.9	7.1	7.1	4.2	1.7	1.8	.9
23	42	2.6	1.8	1.0	.4	1.8	6.7	5.4	4.4	1.7	1.6	2.0
24	30	2.4	1.7	.8	11	3.0	8.2	4.2	5.2	1.5	1.4	1.1
25	14.5	2.0	1.8	.7	3.6	5.0	6.7	5.1	3.8	1.3	1.3	1.7
26	10	1.8	1.8	.7	1.6	2.7	7.4	4.1	6.7	1.3	1.3	1.2
27	8.2	1.8	1.6	.7	4.0	2.4	6.9	3.8	3.7	1.3	1.1	.9
28	7.1	1.7	1.5	.6	11.5	5.7	10	3.6	3.0	3.3	1.0	.8
29	8.0	1.8	1.5	.6	4.6	9.2	6.7	-------	2.9	2.5	1.0	1.3
30	12.5	1.7	1.5	.6	6.5	3.6	5.7	-------	2.7	2.9	1.0	6.7
31	13.5	1.4	-------	.6	-------	68	5.2	-------	2.5	-------	.9	-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	42	1.7	9.72	15.0	301	925
August	7.8	1.4	3.29	5.09	102	313
September	37	1.2	3.92	6.07	118	361
October	1.3	.6	.93	1.44	28.8	88
November	11.5	.4	1.86	2.88	55.7	171
December	68	1.1	5.13	7.94	159	488
January	22	2.5	6.29	9.73	195	598
February	13.5	2.8	5.04	7.80	141	433
March	90	2.5	12.2	18.9	378	1,160
April	35	1.3	3.95	6.11	118	364
May	4.8	.9	1.55	2.40	48.1	148
June	6.7	.6	1.11	1.72	33.2	102
The year	90	.4	4.60	7.12	1,680	5,150

HONOPOU STREAM NEAR HUELO

LOCATION.—Water-stage recorder just above Wailoa Ditch crossing, 2½ miles southwest 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 1933.

DISCHARGE.—Maximum recorded during year, 270 million gallons a day, or 418 second-feet Dec. 31 (gage height, 3.85 feet); minimum, 0.1 million gallons a day, or 0.2 second-foot Nov. 21–23.

1910–33: Maximum, 1,220 million gallons a day, or 1,890 second-feet Nov. 18, 1930 (gage height, 7.28 feet); minimum, that of Nov. 21–23, 1932. Average, 20 years (1911–14, 1916–33), 3.17 million gallons a day (4.90 second-feet).

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

Discharge, in million gallons, 1932–33

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	1.1	3.8	0.6	0.6	0.2	1.2		2.2	1.6	1.7	0.9	0.4
2	1.1	3.3	.6	.5	.2	.8	e 7	1.8	1.5	5.1	.9	.5
3	1.1	3.0	1.1	.5	.2	.8		1.6	1.4	8.5	1.2	.5
4	1.0	2.8	2.5	.5	.2	.7	e 2.9	1.8	1.4	2.2	.7	.5
5	.9	2.5	2.1	.4	.2	.6		1.6	3.1	1.8	.6	.4
6	.9	2.5	1.0	.4	.1	.6		1.4	11	1.7	.7	.4
7	.9	2.2	.8	.4	.1	.5		1.3	19	1.6	.7	.3
8	.9	2.2	2.9	.4	.1	.5	e 1.7	1.3	19.5	1.5	.6	.3
9	.8	2.2	10.5	.4	.1	.5		4.3	8.5	1.4	.6	.3
10	.8	2.0	2.1	.3	.1	.5		2.6	9.5	1.4	.6	.4
11	1.2	1.8	1.6	.3	.1	.5		1.6	6.0	1.2	.5	.3
12	1.0	1.6	1.4	.3	.1	2.8	e 1.2	1.5	4.8		.5	.3
13	5.3	1.6	1.2	.3	.1			1.5	4.3		.4	.3
14	1.6	1.5	1.2	.3	1	e 2.8		3.2	3.8		.4	.3
15	8.8	1.3	1.1	.2	.1			1.8	3.3	e 1.0	.4	.3
16	2.8	1.2	1.1	.2	.1		e 3.9	1.6	2.9		.4	.3
17	2.4	1.2	1.1	.3	.1			1.5	2.5		.4	.3
18	3.8	1.2	1.1	.3	.1	e 1.2		1.7	2.2		.4	.3
19	3.1	1.1	1.0	.4	.1			2.9	2.0	1.0	.4	.3
20	4.0	1.1	.9	.2	.1		e 2.0	3.0	1.8	.9	.7	.3
21	3.4	1.0	.8	.2	.1			5.2	1.8	.9	1.0	.3
22	13.5	1.0	.8	.5	.1	e .9		2.9	2.0	.9	.5	.2
23	13	1.2	.8	.4	.1			2.5	1.7	.8	.4	.6
24	13.5	1.1	.8	.4	3.7	e 1.8		2.4	1.5	.8	.4	
25	7.2	.9	.8	.3	1.2		e 3.6	2.6	1.7	.8	.4	
26	5.7	.8	.8	.2	.7			2.2	2.4	.8	.4	e 4.2
27	4.6	.8	.7	.2	1.1	e 1.6		2.0	1.5	.8	.4	
28	4.1	.8	.6	.2	2.4			1.8	1.2	1.2	.3	
29	4.3	.8	.6	.3	1.5	e 3.0	2.8	-------	1.2	1.1	.3	
30	6.4	.7	.6	.3	1.6		2.4	-------	1.1	1.2	.4	e 6.5
31	7.0	.6	-------	.2	-------	e 18	2.3	-------	1.0	-------	.3	-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	13.5	0.8	4.07	6.30	126	387
August	3.8	.6	1.61	2.49	49.8	153
September	10.5	.6	1.44	2.23	43.2	133
October	.6	.2	.34	.53	10.4	32
November	3.7	.1	.50	.77	15.0	46
December	----------	.5	1.92	2.97	59.5	183
January	----------	----------	2.91	4.50	90.3	277
February	5.2	1.3	2.21	3.42	61.8	190
March	19.5	1.0	4.10	6.34	127	390
April	8.5	.8	1.54	2.38	46.3	142
May	1.2	.3	.54	.84	16.8	52
June	----------	.2	1.33	2.06	39.8	122
The year	----------	.1	1.88	2.91	686	2,110

e Estimated.

WAILOA DITCH AT HONOPOU, NEAR HUELO

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 1933.

DISCHARGE.—Maximum during year, 166 million gallons a day or 257 second-feet July 15, 22, Apr. 3 (gage height, 5.60 feet); minimum, 24 million gallons a day or 37 second-feet Nov. 23.

1922–33: Maximum, 173 million gallons a day or 268 second-feet Nov. 23, 1930 (gage height, 5.77 feet); minimum, 11 million gallons a day or 17 second-feet Feb. 12, 1932. Average, 10 years (1923–33), 111 million gallons a day (172 second-feet).

REMARKS.—Records good except those estimated, which are fair. Wailoa Ditch receives the water from Koolau Ditch at Alo and from all streams west of Alo to Halehaku at elevation of about 1,200 feet.

Discharge, in million gallons, 1932–33

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	99	162	60	54	36	154	162	158	54	134	124	*75
2	114	162	60	51	33	130	162	158	88	162	88	
3	146	158	138	48	33	122	162	142	97	162	121	
4	99	154	158	48	33	114	162	154	122	162	78	*80
5	88	146	158	45	32	85	158	126	115	142	71	
6	81	150	134	45	32	74	134	107	162	122	81	57
7	78	126	103	42	30	67	111	99	162	107	74	54
8	74	138	108	42	29	60	99	92	162	99	64	48
9	71	150	162	42	28	57	92	129	162	92	57	48
10	103	130	158	40	29	54	85	158	162	96	60	51
11	146	142	138	38	38	57	88	134	146	88	54	45
12	146	118	111	38	42	140	88	130	107	81	51	42
13	166	122	118	37	32	156	81	73	130	74	48	42
14	158	103	118	36	29	99	71	142	116	71	72	40
15	162	96	101	36	28	144	128	88	81	78	134	42
16	162	88	85	38	62	111	162	67	67	71	100	40
17	158	146	81	40	42	99	162	64	60	112	89	40
18	162	107	88	37	32	92	162	74	57	109	94	37
19	158	85	92	65	29	92	158	130	51	74	64	36
20	162	85	78	54	28	71	154	141	94	64		34
21	162	81	71	40	27	64	154	162	94	60	*130	42
22	166	78	67	60	26	60	162	126	154	60		87
23	166	105	71	64	27	57	162	81	142	60		145
24	166	146	60	48	143	113	162	71	158	60	*90	111
25	166	111	74	40	154	158	162	85	134	54		150
26	162	81	79	36	130	111	162	60	162	54		90
27	162	81	60	34	142	96	162	54	134	64		60
28	162	78	54	33	158	141	162	51	107	137	*65	60
29	162	92	64	34	158	158	162	-------	103	148		122
30	162	71	67	42	158	126	158	-------	92	150		158
31	162	64	-------	37	-------	150	158	-------	94	-------		-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	166	71	140	217	4,330	13,300
August	162	64	115	178	3,560	10,900
September	162	54	97.2	150	2,920	8,950
October	65	33	43.4	67.1	1,340	4,120
November	158	26	60.0	92.8	1,800	5,520
December	158	54	104	161	3,210	9,860
January	162	71	140	217	4,350	13,300
February	162	51	109	169	3,060	9,380
March	162	51	115	178	3,570	11,000
April	162	54	98.2	152	2,950	9,040
May	-------	48	83.0	128	2,570	7,900
June	158	34	69.0	107	2,070	6,360
The year	166	26	97.9	151	35,700	110,000

*Estimated.

NEW HAMAKUA DITCH AT HONOPOU, NEAR HUELO

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 1933.

DISCHARGE.—Maximum during year, 105 million gallons a day or 162 second-feet Dec. 31 (gage height, 5.67 feet); minimum, 0.2 million gallons a day or 0.3 second-foot Nov. 21, 22.

1918–33: Maximum, 143 million gallons a day or 221 second-feet Feb. 27, 1932 (gage height, 5.90 feet); no flow when water is shut out of ditch. Average, 15 years (1918–33), 27.4 million gallons a day (42.4 second-feet).

REMARKS.—Records good. New Hamakua Ditch diverts water from streams between Waikamoi and Halehaku above Center and Lowrie Ditches. Regulated by gates and spillways.

Discharge, in million gallons, 1932–33

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	1.1	70	1.1	0.9	0.3	49	100	24	1.9	22	2.7	0.6
2	1.3	42	1.2	.9	.2	1.1	54	10.5	1.9	90	.7	2.1
3	45	30	42	.9	.3	2.2	31	2.5	1.8	98	8.4	1.6
4	1.1	6.2	78	.8	.3	3.4	37	41	1.7	51	.7	.7
5	1.0	4.7	84	.8	.2	.9	14	2.5	21	6.6	.7	.6
6	1.0	8.6	16.5	.7	.2	.7	2.9	1.4	74	1.8	.8	.6
7	1.0	1.7	1.3	.7	.2	.6	2.6	1.3	101	1.6	.8	.6
8	1.0	11	15	.7	.2	.6	2.3	1.3	101	1.4	.7	.6
9	1.1	24	99	.7	.2	.5	2.1	27	48	1.4	.7	.5
10	1.3	4.8	46	.7	.2	.5	2.0	44	100	1.4	.7	.6
11	29	10.5	3.4	.7	.6	.5	1.9	1.8	25	1.4	.7	.6
12	26	1.4	1.3	.6	.5	20	1.9	2.4	3.6	1.3	.7	.6
13	93	1.3	7.7	.6	.4	51	1.7	2.2	3.2	1.3	.7	.5
14	66	1.3	2.1	.6	.3	2.1	1.4	21	2.9	1.3	1.1	.5
15	94	1.2	1.1	.6	.2	57	46	3.2	2.5	1.3	2.6	.5
16	81	1.1	1.0	.6	.2	3.5	90	1.9	2.2	1.3	.9	.5
17	48	10.5	1.0	.7	.3	2.8	84	1.7	2.1	3.4	.9	.5
18	92	1.6	1.0	.7	.3	2.1	71	2.1	1.8	3.6	.9	.4
19	70	1.2	1.0	1.4	.2	2.1	14.5	24	1.7	1.0	.8	.4
20	94	1.3	1.0	1.0	.2	1.5	6.2	27	1.9	.9	45	.3
21	90	1.3	1.0	.8	.2	1.4	15.5	88	1.7	.7	56	.5
22	99	1.2	.9	1.2	.2	1.4	84	9.3	23	.8	1.2	6.2
23	101	23	.9	1.0	.2	1.3	81	2.9	28	.8	.7	59
24	101	31	1.0	.6	73	28	78	2.6	61	.8	.7	22
25	97	5.1	1.0	.5	57	54	61	2.6	1.9	.8	.7	23
26	87	1.1	1.1	.4	1.1	1.6	68	2.3	80	.9	.6	1.4
27	57	1.1	1.0	.4	53	1.3	68	2.1	10.5	.9	.6	.3
28	42	1.3	1.0	.3	88	21	86	2.0	1.1	37	.6	.3
29	88	1.4	1.0	.3	84	68	55	-------	1.0	18	.6	10.5
30	93	1.2	1.0	.3	84	2.0	22	-------	1.0	31	.6	81
31	96	1.1	-------	.3	-------	64	17.5	-------	.9	-------	.6	------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	101	1.0	54.8	84.8	1,700	5,210
August	70	1.1	9.78	15.1	303	930
September	99	.9	13.8	21.4	415	1,270
October	1.4	.3	.69	1.07	21.4	66
November	88	.2	14.9	23.1	446	1,370
December	68	.5	14.4	22.3	446	1,370
January	100	1.4	38.8	60.0	1,200	3,690
February	88	1.3	12.7	19.6	355	1,090
March	101	.9	22.9	35.4	709	2,180
April	98	.7	12.8	19.8	384	1,180
May	56	.6	4.33	6.70	134	412
June	81	.3	7.25	11.2	218	667
The year	101	.2	17.3	26.8	6,330	19,400

LOWRIE DITCH AT HONOPOU GULCH, NEAR HUELO

LOCATION.—Water-stage recorder a quarter of a mile below siphon across Honopou Stream and 1½ miles northwest of Kailua.

RECORDS AVAILABLE.—February 1930 to June 1933.

DISCHARGE.—Maximum during year, 70 million gallons a day or 108 second-feet Dec. 31, Mar. 6 (gage height, 5.05 feet); minimum, 0.7 million gallons a day or 1.1 second-feet June 27.

1930–33: Maximum, 86 million gallons a day or 133 second-feet Nov. 18, 1930 (gage height, 5.45 feet); no flow at times.

REMARKS.—Records good except those estimated, which are poor. Lowrie Ditch diverts water at elevation of 500 feet from all streams between Kailua and Halehaku Streams. Regulated by gates.

Discharge, in million gallons, 1932–33

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	10.5	50	7.0	7.6	4.6	40	52	21	14.5	30	6.9	3.4
2	9.2	45	7.2	7.3	4.3	9.6	46	13.5	13.5	52	5.9	4.0
3	29	37	23	7.2	4.2	4.3	41	11	12	55	7.4	4.0
4	9.2	25	47	6.8	4.1	12.5	41	31	15.5	46	5.5	4.5
5	8.0	18.5	48	6.7	4.0	5.3	37	16	21	38	5.6	3.4
6	7.9	19.5	35	6.6	4.0	4.0	20	8.7	58	19	6.5	3.2
7	7.8	15.5	12	6.2	3.8	3.5	10.5	8.0	55	9.9	5.4	4.0
8	7.8	16.5	10.5	5.9	3.7	3.3	13.5	7.4	42	8.7	5.5	3.0
9	8.6	21	56	5.9	3.6	3.0	7.4	31	49	11	5.2	2.9
10	9.2	14.5	44	5.7	3.7	2.9	6.9	49	41	8.2	6.0	3.5
11	19	16.5	25	5.6	5.5	3.3	11	33	36	7.4	5.5	3.8
12	14.5	13.5	21	5.4	5.1	21	10	13.5	30	7.2	5.2	2.9
13	54	13	14.5	5.3	3.8	52	9.4	18.5	41	9.2	5.1	2.6
14	43	11	14.5	5.2	3.6	30	7.8	44	41	8.7	5.4	2.5
15	54	11	10.5	5.2	3.6	45	25	23	22	9.2	8.2	2.5
16	51	10.5	9.8	5.6	4.2	40	49	19	18	8.5	6.9	2.4
17	37	12	9.2	5.5	4.2	29	46	17	16.5	9.4	4.8	2.4
18	53	10.5	9.8	5.2	3.6	12.5	49	18	15.5	8.5	5.5	2.8
19	45	9.2	9.8	7.6	3.5	11	38	32	14.5	5.8	4.9	2.0
20	56	10.5	9.2	6.6	3.5	8.9		34	14.5	5.4	17.5	1.9
21	56	9.2	8.6	5.2	3.4	7.7	*40	52	12.5	5.4	39	2.6
22	56	8.6	8.6	7.4	3.2	7.1		40	18	6.8	20	2.9
23	56	14.5	9.2	7.8	3.6	6.4		23	22	6.8	10	32
24	59	29	8.6	5.9	35	18	39	20	49	6.8	5.1	9.7
25	56	12.5	10	5.1	39	38	30	20	26	6.2	4.7	9.8
26	53	8.0	10.5	4.8	28	8.2	36	17	43	6.2	4.5	2.7
27	50	8.6	8.6	4.6	31	7.2	27	16.5	17	6.4	3.8	2.0
28	46	8.0	8.0	4.6	47	11	46	14.5	9.5	28	4.6	2.1
29	49	9.2	8.0	4.6	49	49	40	-------	9.4	24	3.7	2.5
30	56	7.5	8.0	4.9	49	31	18	-------	8.5	15.5	3.7	44
31	56	7.3	-------	4.6	-------	48	18	-------	8.0	-------	3.4	------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	59	7.8	36.3	56.2	1,130	3,460
August	50	7.3	16.2	25.1	503	1,540
September	56	7.0	17.0	26.3	511	1,570
October	7.8	4.6	5.89	9.11	183	560
November	49	3.2	12.3	19.0	369	1,130
December	52	2.9	18.5	28.6	573	1,760
January	52	6.9	30.1	46.6	934	2,870
February	52	7.4	23.3	36.1	652	2,000
March	58	8.0	25.6	39.6	793	2,430
April	55	5.4	15.6	24.1	469	1,440
May	39	3.4	7.46	11.5	231	710
June	44	1.9	5.73	8.87	172	528
The year	59	1.9	17.9	27.7	6,520	20,000

*Estimated.

HAIKU DITCH AT KAPALALAEA GULCH, NEAR HUELO

LOCATION.—Water-stage recorder in open section of ditch just below tunnel between Honopou and Kapalalaea Gulches, 1¾ miles northwest of Kailua.

RECORDS AVAILABLE.—February 1930 to June 1933.

DISCHARGE.—Maximum during year, 98 million gallons a day or 152 second-feet July 19, Dec. 15, Mar. 6 (gage height, 5.47 feet); minimum, 0.3 million gallons a day or 0.5 second-foot Oct. 28.

1930–33: Maximum, 110 million gallons a day or 170 second-feet Nov. 18, 1930 (gage height, 5.87 feet); no flow Nov. 26 to Dec. 1, 1930.

REMARKS.—Records good except those estimated, which are poor. Haiku Ditch diverts water at elevation of 250 feet from all streams between Kailua Stream and Maliko Gulch. Regulated by gates.

Discharge, in million gallons, 1932–33

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	1.4	15	0.7	0.7	0.4	19	78	2.3	2.8		1.1	1.4
2	1.1	3.9	.7	.7	.4	1.6	35	2.0	2.6		1.0	2.9
3	5.1	4.3	5.4	.7	.4	1.0	23	1.9	2.5	e16	1.0	2.1
4	1.1	2.2	34	.8	.4	.8	12.5	14	2.3		1.0	.7
5	.8	2.1	36	.7	.4	.7	4.8	1.9	12.5		1.1	1.6
6	.7	2.2	5.1	.7	.4	.6		1.5		e5.5	1.2	1.5
7	.7	1.7	1.2	.6	.4	.6	e2.7	1.4			1.0	.6
8	.6	1.8	1.1	.6	.4	.6		1.3			.8	1.3
9		3.1	73	.6	.4	.5	e1.4	14.5	e26	e5	1.4	1.3
10	e4.2	1.8	14	.6	.4	.4		38			.7	1.6
11		1.9	1.4	.6	.6	.5	e2.4	2.6			.7	.5
12		1.7	1.3	.6	.5	2.0		2.2	e19		.6	.9
13		1.6	1.5	.5	.4	44	e1.1	2.8			.6	1.0
14	e36	1.5	1.4	.5	.4	2.0		7.4			.6	1.0
15		1.2	1.2	.5	.4	41		3.9	e6.5	e3.4	.6	1.0
16	3.6	1.2	1.2	.6	.5	4.5		3.7			.7	.9
17	3.4	1.1	1.1	.6	.4	2.8	e36	3.2			1.0	.8
18	2.7	1.1	1.4	.5	.4	2.2		3.9			.6	.4
19	15.5	1.0	1.6	.8	.4	1.5		4.6		3.1	.6	.6
20	68	1.4	1.4	.6	.4	1.3		12.5	e3.8	2.8	1.6	.7
21	51	1.1	1.1	.5	.4	1.1	e18	43		2.5	27	1.3
22	88	.9	1.0	.7	.3	1.2		9.3		1.4	1.1	1.2
23	88	4.9	.8	.8	.4	1.7	e35	4.1		1.5	.7	12
24	88	6.3	.8	.6	48	1.1	23	3.9	e12	1.6	.7	1.4
25	66	1.0	1.0	.5	35	23	2.7	3.7		1.6	.7	.4
26	16	.8	1.0	.5	1.0	1.3	12.5	3.9		1.6	.6	1.4
27	3.4	.8	.8	.5	22	1.1	4.2	4.0		1.5	1.1	1.0
28	3.7	.8	.8	.4	45	3.3	46	3.7	e3.4	13.5	.8	1.0
29	32	.6	.8	.5	27	40	2.9	------		1.4	1.5	1.8
30	65	.7	.7	.6	45	1.8	2.3	------		1.2	1.6	43
31	70	.7	------	.5	------	50	2.2	------		------	1.5	------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	88	0.6	25.8	39.9	801	2,460
August	15	.6	2.27	3.51	70.4	216
September	73	.7	6.45	9.98	194	594
October	.8	.4	.60	.93	18.6	57
November	48	.3	7.75	12.0	232	714
December	50	.4	8.17	12.6	253	777
January	78	----------	17.8	27.5	553	1,700
February	43	1.3	7.19	11.1	201	617
March	----------	----------	9.59	14.8	297	913
April	----------	1.2	5.21	8.06	156	480
May	27	.6	1.78	2.75	55.2	169
June	43	.4	2.91	4.50	87.3	268
The year	88	.3	8.00	12.4	2,920	8,960

e Estimated.

EAST BRANCH OF OPANA STREAM AT HAIKU-UKA BOUNDARY, NEAR KAILIILI

LOCATION.—Water-stage recorder just above Haiku-uka boundary trail and 4 miles southeast of Makawao.

DRAINAGE AREA.—0.6 square mile.

RECORDS AVAILABLE.—July 1932 to January 1933 (discontinued).

DISCHARGE.—Maximum during period, 246 million gallons a day, or 381 second-feet Jan. 15 (gage height, 2.85 feet); minimum, 0.02 million gallons a day, or 0.03 second-foot Oct. 12–16, Oct. 31 to Nov. 23.

REMARKS.—Records fair. No diversions above station.

Discharge, in million gallons, 1932–33

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
1	0.25	1.45	0.06	0.06	0.02	2.0	5.6
2	.25	.96	.05	.05	.02	.76	1.3
3	.39	.83	.26	.05	.02	.51	.64
4	.25	.51	1.1	.05	.02	.32	.51
5	.17	.43	1.7	.05	.02	.19	.32
6	.14	.51	.92	.05	.02	.14	.22
7	.12	.39	.39	.05	.02	.11	.19
8	.11	.43	.28	.04	.02	.09	.14
9	.09	.35	7.3	.03	.02	.07	.12
10	.09	.35	1.5	.03	.02	.06	.09
11	.09	.43	.64	.03	.02	.06	.09
12	.12	.32	.35	.02	.02	.09	.07
13	11.5	.25	.25	.02	.02	.14	.07
14	2.0	.22	.19	.02	.02	.09	.07
15	4.7	.17	.17	.02	.02	.17	28
16	1.6	.12	.12	.02	.02	.17	12.5
17	.70	.14	.11	.03	.02	.11	2.2
18	1.15	.25	.11	.03	.02	.09	1.0
19	.83	.17	.09	.03	.02	.07	.51
20	3.1	.12	.11	.03	.02	.06	.32
21	1.25	.11	.12	.03	.02	.05	[a].8
22	12.5	.11	.09	.04	.02	.05	
23	5.5	.11	.07	.05	.02	.05	[a]3.0
24	1.55	.66	.07	.05	7.2	.09	
25	1.55	.62	.07	.03	1.8	.32	
26	.89	.25	.12	.03	.47	.17	[a].6
27	.64	.17	.07	.03	2.5	.09	
28	.47	.12	.06	.03	13	1.25	[a]2.2
29	.97	.11	.07	.02	3.4	2.6	1.1
30	2.5	.09	.07	.02	4.6	.51	.70
31	3.6	.07	-------	.02	-------	26	.51

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	12.5	0.09	1.91	2.96	59.1	181
August	1.45	.07	.349	.540	10.8	33
September	7.3	.05	.550	.851	16.5	51
October	.06	.02	.034	.053	1.06	3
November	13	.02	1.11	1.72	33.4	103
December	26	.05	1.18	1.83	36.5	112
January	28	.07	2.31	3.57	71.7	220
The period (215 days)	28	.02	1.07	1.66	229	703

[a] Estimated.

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 Island of Maui, 1932–33

Date	Stream	Tributary to—	Locality	Second-feet	Million gallons a day
Jan. 5	East Fork of Kahalawe.	Pacific Ocean	Elevation 1,250 feet, near Kipahulu.	2.33	1.51
Feb. 8	do	do	do	6.65	.430
Mar. 14	do	do	do	.881	.569
Jan. 24	Waimuki	Oheo Stream	Above falls where it enters Oheo Stream.	3.08	1.99
24	Waihoi	Waiohonu Stream	Elevation 1,400 feet, near Hana	3.30	2.13
Jan. 25	East Wailua (Manamana).	Pacific Ocean	Elevation 1,650 feet, near Kipahulu.	2.19	1.42
Mar. 16	do	do	Elevation 1,500 feet, near Kipahulu.	1.47	.950
16	do	do	Government road, near Kipahulu.	1.91	1.23
Jan. 25	West Wailua (Honolewa).	do	Elevation 1,600 feet, near Kipahulu.	2.26	1.46

ISLAND OF HAWAII

WAIAKEA STREAM AT MIDDLE FLUME HOUSE, NEAR MOUNTAIN VIEW

LOCATION.—Water-stage recorder 800 feet above Olaa Sugar Co.'s main flume at middle flume house, 7½ miles northwest of Mountain View.

RECORDS AVAILABLE.—September 1930 to June 1933.

DISCHARGE.—Maximum during year, 145 million gallons a day or 224 second-feet Dec. 2 (gage height, 4.68 feet); no flow Oct. 24 to Nov. 5, Nov. 8–15.

1930–33: Maximum, 149 million gallons a day or 231 second-feet July 21, 1931 (gage height, 4.70 feet); no flow when tunnels and stream dry up.

REMARKS.—Records excellent for ordinary stages, poor for high stages and estimated periods. No diversions. Large part of flow comes from 3 tunnels.

Discharge, in million gallons, 1932–33

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	[a]1.8	5.4	1.35	1.7	0	[a]14	4.7	16	6.0	2.4	9.8	6.3
2		5.2	1.3	1.55	.01		4.4	14	6.6	2.2	9.8	6.3
3		5.0	1.3	1.45	.01		5.5	12	6.0	2.3	10	6.3
4	[a]2.7	4.7	1.4	1.35	0	[a]12	8.6	10	6.3	2.2	9.8	7.3
5		4.4	1.25	1.2	0		9.4	8.6	6.0	2.0	9.8	7.1
6		4.2	1.2	1.1	.24		9.8	7.4	5.7	1.9	9.2	6.3
7		4.2	1.1	.97	.01	[a]6.5	8.6	6.3	9.4	1.85	9.2	6.0
8		3.4	1.05	.87	.01		8.0	5.4	15.5	1.8	9.2	5.7
9	[a]1.9	3.2	4.2	.77	0		7.1	5.0	10.5	1.75	7.4	5.4
10		4.2	3.2	.66	0		6.6	4.7	10.5	3.0	6.6	5.2
11		4.4	4.2	.58	.03	[a]3.8	6.3	4.4	10	2.2	6.0	5.0
12	3.0	3.4	3.2	.52	.16		6.0	4.0	9.2	1.95	5.7	4.7
13	5.0	3.2	2.8	.47	0		5.7	3.4	8.6	2.2	5.4	4.4
14	4.0	2.8	4.0	.40	0		5.2	3.0	7.4	3.2	5.2	4.0
15	4.6	2.6	3.0	.35	[a].01	[a]2.8	6.1	2.5	6.3	4.8	6.6	3.4
16	5.2	2.5	2.8	.29			8.0	3.8	5.7	4.4	5.4	3.0
17	4.7	4.0	2.6	.24			13	2.5	5.2	5.0	5.4	2.6
18	4.4	2.9	2.5	.20	[a]0	3.2	12	2.2	5.2	5.7	5.2	2.3
19	4.4	2.7	2.5	.24		2.8	11	2.3	4.7	5.0	5.0	2.1
20	4.4	2.5	2.3	.29	[a].01	2.2	11	4.0	4.2	4.7	6.6	1.9
21	4.4	2.4	2.2	.09		2.0	10	4.2	4.0	4.4	10	1.9
22	6.0	2.3	2.9	.06	[a]0	1.8	9.8	4.2	4.8	4.4	7.1	1.9
23	8.7	2.4	2.6	.03		1.75	9.2	3.7	3.8	5.0	6.6	2.3
24	7.7	2.3	2.3	.01	[a]6.5	2.8	9.8	3.4	4.5	5.0	6.6	2.3
25	6.6	2.1	2.2	0		3.6	10	3.6	4.0	5.2	6.3	2.3
26	6.6	2.0	2.2	0		3.0	9.8	4.2	5.4	5.4	6.0	2.1
27	6.6	2.0	2.1	0		4.2	9.8	7.5	4.4	6.5	6.0	1.9
28	6.3	1.85	2.0	0	[a]6	5.2	10	7.4	3.7	11	6.3	1.8
29	6.3	1.75	1.95	0		4.7	10	-------	3.2	8.6	6.8	1.8
30	6.0	1.6	1.85	0		4.2	16	-------	2.8	9.8	6.6	2.8
31	6.0	1.5	-------	0	-------	3.4	18.5	-------	2.6	-------	6.6	-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	8.7	----------	4.32	6.68	134	411
August	5.4	1.5	3.13	4.84	97.1	298
September	4.2	1.05	2.32	3.59	69.6	213
October	1.7	0	.496	.767	15.4	47
November	----------	0	1.45	2.24	43.5	134
December	----------	1.75	5.20	8.05	161	495
January	18.5	4.4	9.03	14.0	280	859
February	16	2.2	5.70	8.82	160	490
March	15.5	2.6	6.20	9.59	192	590
April	11	1.75	4.20	6.50	126	386
May	10	5.0	7.17	11.1	222	682
June	7.3	1.8	3.88	6.00	116	357
The year	----------	0	4.43	6.85	1,620	4,960

[a] Estimated.

WAILUKU RIVER AT PUKAMAUI, NEAR HILO

LOCATION.—Water-stage recorder at Pukamaui, three-quarters of a mile above Hilo Boarding School Ditch intake and 4½ miles west of Hilo.

DRAINAGE AREA.—97.2 square miles.

RECORDS AVAILABLE.—April 1923 to June 1928, July 1929 to June 1933.

DISCHARGE.—Maximum during year, 4,920 million gallons a day or 7,610 second-feet Dec. 2 (gage height, 13.90 feet); no flow Oct. 12–18, 30, 31, Nov. 1–5.

1923–28, 1929–33: Maximum, 5,760 million gallons a day or 8,910 second-feet July 21, 1931 (gage height, 14.95 feet); no flow occasionally.

REMARKS.—Records good for ordinary stages except those estimated, which are fair. High-stage records poor. Hilo waterworks diverts water for domestic use from pool at control. In very dry weather this amounts to entire flow above station. Regulated by this diversion.

Discharge, in million gallons, 1932–33

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	6.7	11	3.2	2.7	0	96	92	292	58	9.6	[a] 130	[a] 42
2	6.5	9.6	2.9	2.4	0	1,970	63	116	54	9.9		
3	24	9.3	2.9	2.2	0	413	46	78	35	10.5		
4	9.3	8.6	5.3	2.1	0	132	68	58	30	14.5	[a] 80	49
5	7.4	7.9	6.2	2.0		73	195	44	45	9.9		54
6	6.7	7.7	5.8	4.0	[a] 20	46	388	34	54	8.4	54	34
7	6.3	8.8	4.7	3.2		32	78	28	72	7.9	45	24
8	6.3	9.1	4.3	2.2	5.8	26	50	23	272	7.3	54	19
9	6.5	7.7	10	2.0	4.0	20	34	19.5	166	7.0	44	17
10	5.8	7.7	13.5	1.5	3.4	14.5	26	18.5	78	11	50	14
11	8.3	12.5	25	1.1	4.7	12.5	26	18.5	54	29	31	12.5
12	24	9.3	9.3	.4	8.8	11	28	14.5	37	13	25	11
13	53	8.1	7.3	0	6.0	9.6	33	14.5	28	12.5		9.9
14	32	7.5	20	0	4.1	9.6	21	12	23	24	[a] 32	9.3
15	25	7.3	12.5	0	3.6	9.6	52	10.5	19.5	63		8.8
16	46	6.8	8.1	0	18	9.3	175	26	16	41	46	8.1
17	27	17.5	6.4	0	16.5	12	581	27	14	32	38	8.1
18	19	14.5	5.8	.2	7.3	13	322	16	12.5	46	43	7.9
19	17.5	11	5.1	2.8	6.6	16.5	109	16	11	21	26	7.3
20	15.5	8.6	5.1	7.0	15.5	9.9	84	48	10.5	14	29	6.6
21	14	6.6	4.3	5.1	9.1	8.6	68	58	9.1	12	[a] 140	6.6
22	13.5	6.0	4.7	3.4	6.6	8.4	58	42	11.5	10.5		8.6
23	35	5.8	6.4	2.9	5.6	7.7	58	26	12	13	[a] 46	14
24	18	5.6	4.5	2.6	14.5	12.5	165	28	17	17.5		11.5
25	19.5	5.1	4.0	2.1	73	130	142	98	13.5	19.5		14
26	14	4.7	4.0	1.5	40	38	208	75	62	31	[a] 26	[a] 7.5
27	13.5	4.3	3.8	1.5	23	37	90	86	18.5			
28	14	3.8	3.6	1.4	29	70	203	102	12.5	[a] 170		
29	12.5	3.8	3.1	1.0	31	37	148	-------	10.5			6.6
30	11.5	3.2	2.9	.3	41	23	[b] 404	-------	9.6		[a] 48	28
31	12.5	3.2	-------	0	-------	21	[b] 718	-------	9.3	-------		------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	53	5.8	17.1	26.5	531	1,630
August	17.5	3.2	7.83	12.1	243	745
September	25	2.9	6.82	10.6	205	628
October	7.0	0	1.86	2.88	57.6	177
November	73	0	14.6	22.6	437	1,340
December	1,970	7.7	107	166	3,330	10,200
January	718	21	153	237	4,730	14,500
February	292	10.5	51.0	78.9	1,430	4,390
March	272	9.1	41.1	63.6	1,280	3,910
April	----------	7.0	39.2	60.7	1,180	3,610
May	----------	----------	54.9	84.9	1,700	5,220
June	----------	----------	17.9	27.7	538	1,650
The year	1,970	0	42.9	66.4	15,700	48,000

[a] Estimated. [b] Partly estimated.

WAILUKU RIVER ABOVE HILO BOARDING SCHOOL DITCH INTAKE NEAR HILO

LOCATION.—Water-stage recorder 1,000 feet above Hilo Boarding School Ditch intake, three-quarters of a mile west of Reservoir No. 1, and 4 miles west of Hilo.

DRAINAGE AREA.—124.5 square miles.

RECORDS AVAILABLE.—July 1928 to June 1933.

DISCHARGE.—Maximum during year, 19,000 million gallons a day or 29,400 second-feet Dec. 2 (gage height, 19.35 feet); minimum, 2.3 million gallons a day or 3.6 second-feet Nov. 4, 5.

1928–33: Maximum, estimated as 21,000 million gallons a day or 32,500 second-feet July 21, 1931; minimum, 1.5 million gallons a day or 2.3 second-feet July 5, 1931.

REMARKS.—Records good for ordinary stages, poor for high stages and estimated periods. Hilo waterworks diverts about 1 million gallons a day from pool at Pukamaui, three-quarters of a mile upstream.

Discharge, in million gallons, 1932–33

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	25	*32	14		3.4	372	346	1,240	199	25	651	109
2	25		14		2.6	7,600	193	483	198	25	348	128
3	90		14.5	*6	2.6	1,540	154	276	113	24	350	179
4	36		21		2.4	579	255	191	97	38	290	162
5	25		19		2.4	276	1,010	141	137	25	235	178
6	23	*26	18	28	171	181	1,360	105	160	19.5	202	132
7	22		17		27	127	316	81	245	16.5	170	93
8	22		16.5	*8.5	12.5	93	191	64	1,310	15	202	74
9	21		57		8.0	70	127	51	757	15	172	60
10	19.5		59		6.4	54	93	43	310	47	201	51
11	29	*36	102	*5	11.5	43	89	43	202	85	122	46
12	78		34		29	33	93	38	141	38	93	38
13	179		25		14	29	109	38	101	40	81	33
14	93		110		9.3	27	67	31	81	95	78	29
15	85	*24	54		7.8	29	163	27	67	217	198	25
16	140		31	*3.7	89	26	700	88	54	132	151	22
17	89	*60	27		58	36	2,340	82	46	118	132	21
18	67		22		25	36	1,450	48	38	160	151	18.5
19	57	29	20	*5.5	19.5	48	437	55	36	81	97	16.5
20	51	22	21	22	60	27	305	167	31	57	107	15.5
21	43	19.5	17.5	14	31	21	235	186	27	46	914	16.5
22	40	17	21	8.2	20	18.5	191	141	43	38	270	25
23		16	27	6.7	16	17	181	93	40	48	170	54
24		15.5		7.1	58	41	545	98	60	60	141	36
25	*70	17	*11	5.7	300	457	489	375	33	70	109	46
26		15		4.9	144	109	783	219	188	127	89	33
27		14.5		4.7	81	109	276	296	60	584	85	21
28		14.5	*8	4.9	112	239	789	309	43	1,020	109	17
29	*44	14		3.9	108	144	640	-------	33	396	146	17.5
30		14		3.5	149	114	2,010	-------	27	605	206	95
31		14	-------	3.6	-------	93	2,940	-------	27	---------	132	------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	179	19.5	56.8	87.9	1,760	5,400
August	----------	14	25.2	39.0	782	2,400
September	110	----------	27.6	42.7	826	2,540
October	----------	----------	7.09	11.0	220	675
November	300	2.4	52.7	81.5	1,580	4,850
December	7,600	17	406	628	12,600	38,600
January	2,940	67	609	942	18,900	57,900
February	1,240	27	179	277	5,010	15,400
March	1,310	27	158	244	4,900	15,000
April	1,020	15	142	220	4,270	13,100
May	914	78	207	320	6,400	19,600
June	179	15.5	59.7	92.4	1,790	5,500
The year	7,600	2.4	162	251	59,000	181,000

* Estimated.

HILO BOARDING SCHOOL DITCH AT INTAKE, NEAR HILO

LOCATION.—Water-stage recorder on Hilo Boarding School Ditch 200 feet below intake diversion dam on Wailuku River and 3¾ miles northwest of Hilo.

RECORDS AVAILABLE.—October 1931 to June 1933.

DISCHARGE.—Maximum gage height during year, 6.51 feet (discharge greater than 21 million gallons a day or 32 second-feet) Dec. 2; minimum discharge, 2.3 million gallons a day or 3.6 second-feet Nov. 5.

1931–33: Maximum discharge is beyond the measuring capacity of this station; minimum, that of Nov. 5, 1932.

REMARKS.—Records excellent up to maximum capacity of Parshall flume control, which is 21 million gallons a day at gage height 2.5 feet. Above this stage the control is drowned by overflow from Wailuku River.

Discharge, in million gallons, 1932–33

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	7.3	8.2	6.9	6.4	3.3	12.5	10.5	13.5	11	8.7		10
2	7.3	7.8	7.8	6.0	2.7	19.5+	10.5	12	11	8.7		10
3	9.2	7.8	9.7	5.7	2.6	14	10.5	11	10.5	8.7	*11	10.5
4	8.2	7.8	11	5.6	2.5	12.5	10.5	11	10	9.2		10
5	7.8	7.3	10.5	6.4	2.4	12	13	11	10.5	8.7		10.5
6	7.3	7.3	10.5	9.7	10	11	13	10.5	10.5	8.7	10.5	10
7	7.3	7.8	10	8.2	9.7	10.5	11	10	11	8.2	10.5	9.7
8	7.3	7.8	9.7	7.3	8.7	10	10.5	10	13.5	8.2	10.5	9.7
9	7.3	7.3	10.5	6.4	7.3	10	10.5	9.7	12.5	8.2	10.5	9.7
10	7.3	7.3	10	5.7	6.4	9.7	10	9.7	11	8.7	10.5	9.2
11	7.8	8.7	11	5.2	8.2	9.7	9.7	9.2	10.5	9.7	10	9.2
12	9.2	7.8	9.7	4.8	9.7	9.2	9.7	9.2	10.5	9.2	9.7	8.7
13	10	7.3	9.2	4.5	8.7	9.2	10	9.2	10	9.2	9.7	8.7
14	9.7	7.3	11	4.3	7.8	9.2	9.7	9.2	10	9.7	9.7	8.7
15	9.2	7.3	10	3.7	7.3	8.7	10	8.7	9.7	10.5	10.5	8.2
16	10	6.9	9.7	3.7	9.6	8.7	12	9.7	9.7	10.5	10	8.2
17	9.7	9.2	9.7	3.6	10.5	9.2	16.5	10	9.2	10	10	8.2
18	9.2	8.7	9.2	3.8	9.7	9.2	13.5	9.7	9.2	10.5	10	8.2
19	8.7	7.8	8.7	6.4	9.2	9.7	11	9.7	9.2	9.7	9.7	7.8
20	8.7	7.8	8.7	9.7	10.5	8.7	11	10.5	8.7	9.7	9.7	7.8
21	8.7	7.3	8.7	9.2	10	8.2	11	11	8.7	9.2	12.5	7.8
22	8.7	7.3	8.7	7.5	9.2	8.2	10.5	10.5	9.2	9.2	11	8.2
23	10	7.3	9.2	6.9	8.7	7.8	10.5	10	9.2	9.2	10.5	9.2
24	9.2	6.9	8.2	6.9	10	8.2	12	10	9.7	9.7	10	8.7
25	9.2	7.3	8.2	6.0	12.5	12	12	12	9.2	9.7	10	9.2
26	9.2	6.9	7.8	5.0	12	10	12	11	10.5	10	9.7	8.7
27	9.2	6.9	7.8	4.9	11	10	11	11	9.7	12	9.7	8.2
28	9.2	6.9	7.3	5.0	11	11	12.5	12	9.2	12.5	10	8.2
29	8.7	6.9	7.3	4.0	11	10.5	12	-------	9.2	12	10.5	7.8
30	8.2	6.4	6.9	3.5	12	10	14.5+	-------	8.7	12	10.5	9.7
31	8.7	6.4	-------	3.4	-------	10	17.5	-------	8.7	-------	10	------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	10	7.3	8.63	13.4	268	821
August	9.2	6.4	7.47	11.6	232	711
September	11	6.9	9.12	14.1	274	840
October	9.7	3.4	5.79	8.96	179	551
November	12.5	2.4	8.47	13.1	254	780
December	19.5+	7.8	10.3	15.9	319	979
January	17.5+	9.7	11.6	17.9	359	1,100
February	13.5	8.7	10.4	16.1	291	893
March	13.5	8.7	10.0	15.5	310	952
April	12.5	8.2	9.67	15.0	290	891
May	12.5	9.7	10.4	16.1	321	985
June	10.5	7.8	8.96	13.9	269	825
The year	19.5+	2.4	9.22	14.3	3,370	10,300

* Estimated.

NOTE.—Control was drowned by overflow from Wailuku River from 4 a.m. to 8 p.m. Dec. 2, 5 p.m. Jan. 30 to 12:30 a.m. Jan. 31, and 5:20 to 9:10 p.m. Jan. 31.

KAPEHU STREAM AT PIIHONUA, NEAR HILO

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

DRAINAGE AREA.—4.9 square miles.

RECORDS AVAILABLE.—November 1928 to June 1933.

DISCHARGE.—Maximum during year, 1,490 million gallons a day or 2,310 second-feet Dec. 2 (gage height, 7.18 feet); minimum, 3.0 million gallons a day or 4.6 second-feet Nov. 5.

1928–33: Maximum, 3,640 million gallons a day or 5,630 second-feet Aug. 12, 1930 (gage height, 9.98 feet); minimum, 1.2 million gallons a day or 1.9 second-feet Feb. 17, 1931.

REMARKS.—Records good for low and medium stages, poor for extremely high stages and estimated periods. Small diversion above station for fluming sugarcane.

Discharge, in million gallons, 1932–33

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	9.3	17	10	6.4	3.4	99	70	a150	48	16.5	100	34
2	10	15	9.5	6.2	3.2	732	52		62	14	63	41
3	41	14	11.5	6.1	3.2	190	61		42	12.5	67	50
4	13	13	14.5	5.8	3.1	80	88	a55	36	11	59	46
5	12	12	12	7.3	3.1	51	205		42	9.0	55	48
6	13	12.5	12.5	10.5	19.5	39	212		42	7.2	55	36
7	12.5	14	11	6.1	6.0	32	80	a30	100	6.7		32
8	15	13	11	5.8	4.2	27	55		320	6.2	a50	29
9	13	12	26	5.8	3.6	23	42		128	6.4		27
10	11.5	11.5	28	5.2	3.5	20	36		71	16		24
11	16.5	19.5	36	5.0	5.5	18	36	a19	51	16		22
12	32	12	15.5	4.8	10	16.5	36		39	9.5	a30	18.9
13	67	11.5	13	4.4	5.4	15	42		32	12		17
14	34	10.5	50	4.3	4.3	15.5	29		27	36		15.5
15	38	10.5	21	4.3	4.4	15.5	59		25	57		14.5
16	45	10.5	16.5	4.2	23	14.5	138	a25	22	34	a48	14
17	36	46	15.5	4.2	15	15.5	347		19.5	37	39	14
18	29	27	13.5	4.3	7.0	18	189	a18	18	46	42	13
19	25	15.5	13	6.3	7.6	20	80		16.5	25	29	12
20	23	14	14	9.8	22	15	63	a55	16	19	34	11.5
21	20	13.5	13	6.4	11.5	13	55		14.5	16	208	12
22	19	12	14	5.0	11	12	a55	a34	22	14.5	61	14.5
23	47	12	16	5.0	11	11			19	19	39	22
24	25	11.5	12	5.0	31	20		34	23	20	36	14.5
25	27	11	11	4.4	106	75		72	19	24	32	19
26	22	10	9.8	4.3	48	31	a150	44	60	37	27	14
27	21	11	8.4	4.3	32	44		58	21	69	27	12
28	23	9.8	7.2	4.2	41	91		78	18	152	36	11
29	21	11	6.9	4.1	36	64		-------	16.5	73	48	12
30	18.5	11	6.6	3.7	52	58	a320	-------	16	108	50	31
31	19	11	-------	3.6	-------	39		-------	15.5	-------	39	-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	67	9.3	24.5	37.9	758	2,330
August	46	9.8	14.0	21.7	435	1,330
September	50	6.6	15.3	23.7	459	1,410
October	10.5	3.6	5.38	8.32	167	512
November	106	3.1	17.9	27.7	536	1,650
December	732	11	61.8	95.6	1,910	5,880
January	----------	29	117	181	3,620	11,100
February	----------	----------	44.2	68.4	1,240	3,800
March	320	14.5	45.2	69.9	1,400	4,300
April	152	6.2	31.0	48.0	930	2,850
May	208	----------	50.4	78.0	1,560	4,790
June	50	11	22.7	35.1	681	2,090
The year	732	3.1	37.6	58.2	13,700	42,000

a Estimated.

AWINI DITCH AT EAST HONOKANEIKI GULCH, NEAR NIULII

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

RECORDS AVAILABLE.—October 1927 to June 1933.

DISCHARGE.—Maximum during year, 25 million gallons a day or 39 second-feet Dec. 2 (gage height, 3.41 feet); no flow occasionally, when ditch was dry.

1927–33; Maximum, 32 million gallons a day or 50 second-feet Dec. 28, 1927, Sept. 10, 1928 (gage height, 3.51 feet); no flow when ditch is dry or water is turned out.

REMARKS.—Records fair. Awini Ditch diverts water at about elevation 2,000 feet from all streams between Waikaloa and Honokane. Regulated by head gates and spillways.

Discharge, in million gallons, 1932–33

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	12	9.2	4.5	1.3	0	17.5	11	16	8.6	6.5	22	14.5
2	19.5	7.5	3.9	.78	0	24	10.5	12	7.5	14.5	19	14.5
3	21	6.3	8.2	.54	0	18	7.5	9.2	6.5	20	22	18
4	[a]16	5.5	12	.42	0	14.5	5.7	16.5	6.2	18	19.5	12
5	[b]13.5	5.8	14	.29	0	13	5.4	13	12	12	18	13.5
6	[b]11.5	11	15	.19	0	11	7.5	9.2	18	9.2	22	11.5
7	[b]9.7	13.5	12	.14	0	8.0	6.2	7.5	24	8.0	19.5	9.2
8	[a]9.7	15	8.6	.10	0	6.0	6.1	6.5	24	7.0	17.5	7.5
9	14.5	17	13	.09	0	4.4	10.5	14	23	6.4	14	7.5
10	9.7	20	11	.05	0	3.7	7.0	14	22	8.4	11.5	11.5
11	18.5	17	10.5	.04	0	3.1	10.5	9.4	22	16	9.7	9.2
12	18	11.5	6.5	.01	.08	2.8	11	7.5	17.5	9.2	8.6	7.5
13	20	14.5	5.0	0	.01	2.6	13.5	6.1	14	7.0	7.5	6.2
14	17	9.7	4.3	0	0	2.4	10	6.0	12	5.9	7.0	5.4
15	19.5	10.5	3.7	0	0	2.5	13	9.7	14.5	11.5	8.0	4.9
16	20	9.2	3.3	0	0	2.5	19	11	14.5	13	16	4.5
17	19.5	14	3.3	0	0	8.4	21	8.6	11.5	17.5	15	5.3
18	20	13.5	2.8	0	0	14.5	18	19	9.7	21	19.5	4.9
19	16	8.6	2.4	0	0	18	13	18	8.6	13.5	19.5	4.2
20	14.5	9.5	2.1	3.1	0	11	14	19.5	8.6	8.6	17	3.7
21	14	13	1.85	3.9	0	6.5	17.5	21	8.0	6.5	24	4.7
22	14.5	11.5	2.4	1.85	0	4.9	19.5	19.5	12	5.7	19.5	9.7
23	15	10.5	8.0	.98	0	4.1	14.5	14	16	8.6	15	8.0
24	14.5	8.0	5.0	.60	2.7	8.8	12	13	18	13	19	8.0
25	12	5.6	3.3	.42	10.5	20	17.5	21	12	11.5	19.5	11.5
26	14	4.5	2.4	.37	11	14	13.5	16	22	11	17.5	14.5
27	14	6.3	1.9	.27	13.5	9.7	11	13	16	19	14	8.6
28	12	6.0	1.6	.09	19	7.5	20	11.5	11	22	14.5	5.3
29	14	9.2	1.85	0	19.5	11.5	21	-------	8.6	17.5	17.5	4.4
30	14	9.2	2.0	0	19.5	8.6	18	-------	7.5	22	14.5	9.7
31	13.5	6.5	-------	0	-------	8.5	19	-------	6.5	-------	18	-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	21	9.7	15.2	23.5	472	1,450
August	20	4.5	10.3	15.9	319	979
September	15	1.6	5.88	9.10	176	541
October	3.9	0	.501	.775	15.5	48
November	19.5	0	3.19	4.94	95.8	294
December	24	2.4	9.42	14.6	292	896
January	21	5.4	13.0	20.1	404	1,240
February	21	6.0	12.9	20.0	362	1,110
March	24	6.2	13.6	21.0	422	1,300
April	22	5.7	12.3	19.0	370	1,140
May	24	7.0	16.3	25.2	506	1,550
June	18	3.7	8.66	13.4	260	798
The year	24	0	10.1	15.6	3,690	11,300

[a] Partly estimated. [b] Estimated.

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

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 1933.

DISCHARGE.—Maximum during year, 5.4 million gallons a day or 8.4 second-feet Apr. 26 (gage height, 1.06 feet); no flow several days from September to December.

1927–33: Maximum, 10.8 million gallons a day or 16.7 second-feet Mar. 27, Apr. 2, 1930 (gage height, 1.35 feet); no flow occasionally.

REMARKS.—Records fair. Diverts water from East Honokaneiki Gulch to Awini Ditch.

Discharge, in million gallons, 1932–33

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	0.87	0.71	0.17	0	0	2.3	0.48	1.8	0.68	0.26	3.4	0.71
2	3.3	.35	.10	0	0	2.5	.48	1.2	.48	.60	2.5	.98
3	3.4	.23	.20	0	0	1.85	.38	.87	.41	2.9	2.8	1.5
4	1.2	.17	1.7	0	0	1.75	.26	.86	.38	2.2	1.7	.60
5	.75	.17	2.2	0	0	1.2	.26	.60	1.4	.83	1.45	.52
6	.60	.85	2.2	0	0	.71	.29	.68	1.75	.56	2.2	.41
7	.44	.81	.87	0	0	.52	.32	.52	2.2	.41	1.55	.32
8	.44	1.4	.44	0	0	.29	.29	.44	1.35	.32	1.15	.26
9	.79	2.3	1.15	0	0	.23	.79	1.8	.35	.32	.83	.23
10	.60	3.0	.71	0	0	.23	.38	1.5	.17	1.0	.64	.23
11	3.3	1.6	.41	0	0	.14	.75	.64	1.75	1.3	.52	.23
12	2.9	.60	.20	0	0	.03	.75	.44	1.7	.48	.44	.23
13	4.2	1.15	.10	0	0	0	1.5	.35	1.1	.32	.35	.17
14	2.2	.52	.08	0	0	.03	.60	.41	.87	.26	.32	.12
15	3.5	.41	.06	0	0	.06	2.3	1.25	.97	.32	.44	.10
16	3.7	.41	.04	0	0	.19	2.5	1.15	.83	.38	1.4	.10
17	3.2	.71	.04	0	0	.60	3.4	1.35	.60	2.5	1.65	.10
18	3.0	.83	.04	0	0	1.6	3.1	2.3	.48	3.1	2.9	.10
19	1.25	.26	.03	0	0	2.4	1.75	2.3	.44	.87	2.4	.10
20	.97	.26	.03	.15	0	.75	1.85	2.9	.38	.44	1.3	.06
21	.87	.60	.02	.10	0	.38	2.3	3.9	.32	.29	3.4	.06
22	.79	.44	.02	0	0	.26	2.7	2.6	.38	.20	2.1	.10
23	1.1	.32	.02	0	0	.17	1.25	1.2	1.1	.25	1.2	.23
24	.75	.23	.04	0	1.85	2.0	1.45	1.3	1.9	.75	1.5	.38
25	.48	.14	.04	0	3.4	3.3	1.75	3.4	.71	.87	2.0	.64
26	.52	.12	.04	0	1.65	1.3	1.3	1.65	3.1	1.35	1.1	2.2
27	.60	.10	.04	0	.97	.71	1.0	1.05	1.35	3.6	.68	.48
28	.38	.10	.03	0	2.4	.48	3.7	1.05	.68	3.6	.64	.23
29	.75	.17	.01	0	2.5	.48	3.5	-------	.44	2.2	1.0	.10
30	1.3	.29	0	0	2.5	.44	2.5	-------	.32	3.9	.86	.81
31	.79	.23	-------	0	-------	.41	2.6	-------	.32	-------	1.3	------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	4.2	0.38	1.58	2.44	48.9	150
August	3.0	.10	.628	.972	19.5	60
September	2.2	0	.368	.569	11.0	34
October	.15	0	.008	.012	.25	1
November	3.4	0	.509	.788	15.3	47
December	3.3	0	.881	1.36	27.3	84
January	3.7	.26	1.50	2.32	46.5	143
February	3.9	.35	1.41	2.18	39.5	121
March	3.1	.17	.933	1.44	28.9	89
April	3.9	.20	1.21	1.87	36.4	112
May	3.4	.32	1.47	2.27	45.7	140
June	2.2	.06	.410	.634	12.3	38
The year	4.2	0	.908	1.40	332	1,020

KOHALA DITCH AT POLOLU, NEAR NIULII

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 1933.

DISCHARGE.—Maximum during year, 76 million gallons a day or 118 second-feet Dec. 2 (gage height, 4.33 feet); minimum, 10.2 million gallons a day or 15.8 second-feet Nov. 20–23.

1927–33: Maximum, that of Dec. 2, 1932; no flow Nov. 13, 1930, when water was shut out of ditch.

REMARKS.—Records fair. Regulated by head gates. Kohala Ditch receives the flow of Awini Ditch and diverts at about elevation 1,200 feet from all streams west of Honokane.

Discharge, in million gallons, 1932–33

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	29	29	19	14.5	11	43	24	34	23	19	51	28
2	40	24	18	11.5	11	56	23	29	20	28	45	26
3	43	22	21	11.5	11	40	21	24	19	49	50	31
4	33	20	29	11.5	11	31	19	42	21	42	37	25
5	29	20	30	11.5	10.5	26	18	28	25	29	34	27
6	27	a 27	34	11.5	10.5	23	19	24	31	24	38	24
7	25	a 27	29	11	10.5	20	19	21	55	21	34	21
8	24	31	24	11	10.5	19	18	19	57	20	31	19
9	27	33	26	11	10.5	18	21	28	47	19	28	19
10	25	39	26	11	10.5	17	19	30	42	29	25	22
11	42	37	24	11	10.5	16	24	22	36	34	23	20
12	41	27	21	11	10.5	16	25	19	30	23	21	18
13	50	29	20	11	10.5	15.5	28	18	28	20	20	17
14	37	25	18	11	10.5	15.5	23	19	28	18	18	16
15	35	25	17	11	10.5	15.5	34	27	30	23	22	15.5
16	26	24	17	11	10.5	15.5	43	25	30	25	36	15.5
17	29	27	17	11	10.5	20	57	24	26	32	36	15.5
18	31	29	16	11	10.5	27	53	38	23	40	47	15.5
19	a 25	24	16	11.5	10.5	34	32	36	21	28	38	14.5
20	a 24	22	16	14.5	10.5	24	32	42	21	22	33	14.5
21	27	27	16	14.5	10	18	40	44	20	19	58	15.5
22	31	25	17	11.5	10	16	48	30	23	18	40	20
23	31	23	20	11	10.5	15.5	31	28	29	20	31	20
24	31	20	19	11	30	32	43	27	33	27	34	21
25	27	17.5	17	11	54	62	32	40	27	27	36	27
26	29	16.5	15.5	11	32	37	29	36	54	25	31	36
27	29	17.5	13.5	11	26	24	41	29	33	45	28	21
28	27	21	14.5	11	39	22	51	27	26	54	28	17
29	27	22	14.5	11	45	24	54	-------	22	38	31	16
30	31	23	14.5	11	47	22	40	-------	20	58	28	24
31	27	22	-------	11	-------	21	44	-------	19	-------	31	-------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	50	24	30.9	47.8	959	2,940
August	39	16.5	25.0	38.7	776	2,380
September	34	13.5	20.0	30.9	600	1,840
October	14.5	11	11.5	17.8	355	1,090
November	54	10	17.2	26.6	516	1,580
December	61	15.5	25.6	39.6	794	2,440
January	57	18	32.4	50.1	1,000	3,080
February	44	18	28.9	44.7	810	2,490
March	57	19	29.6	45.8	919	2,820
April	58	18	29.2	45.2	876	2,690
May	58	18	33.6	52.0	1,040	3,200
June	36	14.5	20.7	32.0	622	1,910
The year	61	10	25.4	39.3	9,270	28,500

a Partly estimated.

KEHENA DITCH NEAR KOHALA

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

RECORDS AVAILABLE.—December 1917 to November 1919, April 1928 to June 1933.

DISCHARGE.—Maximum during year, 57 million gallons a day or 88 second-feet Nov. 28 (gage height, 1.30 feet); no flow during dry periods.

1917–19, 1928–33: Maximum, 86 million gallons a day or 133 second-feet Jan. 27, 1918 (gage height, 2.16 feet); no flow during dry periods.

REMARKS.—Records good except those for estimated periods, which are poor. Regulated by several gates above station. Intake on Honokanenui Stream 2 miles above station, at elevation of about 4,200 feet.

Discharge, in million gallons, 1932–33

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	2.2	7.4	0.3	0	0	28	1.5	8.1	2.4	1.1	29	4.7
2	16.5	2.8	0	0	0	47	1.8	6.6	1.7	7.2	13	4.2
3	16.5	1.8	3.3	0	0	21	1.5	4.7	1.3	23	23	7.2
4	3.7	1.1	16.5	0	0	10	.9	30	9.6	16	9.8	4.5
5	1.8	.2	12	0	0	6.1	.8	8.2	5.5	3.5	6.1	5.0
6	1.2	8.7	12.5	0	0	4.7	.7	3.5	5.2	1.8	7.2	5.5
7	1.1	8.7	7.0	0	0	4.0	.7	2.4	31	1.1	6.9	3.8
8	.9	9.7	3.5	0	0	3.5	.9	1.7	28	.8	5.0	2.6
9	.9	13.5	6.1	0	0	3.0	2.2	4.9	25	.5	5.0	2.4
10	.5	17.5	5.8	0	0	2.8	11.3	6.9	11	10.5	3.8	2.6
11	24	16.5	5.9	0	0	2.4	3.0	3.3	12.5	11.5	2.6	2.8
12	20	4.8	2.2	0	0	2.4	6.4	2.0	5.0	3.3	2.2	2.4
13	33	7.5	1.2	0	0		7.2	1.5	3.3	1.5	1.8	1.7
14	13.5	3.2	.9	0	0	[a]2.0	3.3	2.4	2.4	.9	1.5	1.5
15	20	4.8	.3	0	0		23	2.8	3.5	1.8	1.8	1.3
16	25	2.8	0	0	0		20	2.0	3.3	2.8	20	1.1
17	11.5	5.8	0	0	0		37	3.1	2.2	12	15.5	1.3
18	16.5	5.8	0	0	0	[a]6	34	10	1.5	18	30	1.5
19	8.1	2.4	0	0	0		8.4	12	1.3	4.5	12.5	1.3
20	11	3.3	0	[b].8	0		12	22	1.1	2.0	8.1	[a]1.0
21	8.7	7.0	0	[b]3.5	0	[a]1.3	24	31	.9	1.3	38	
22	6.7	4.8	0	.8	0	.8	28	23	2.4	.9	16.5	
23	6.4	2.2	0	.4	0	.7	6.6	8.1	4.5	4.1	5.8	[a]2.1
24	4.8	.4	0	.7	14	15.5	17.5	4.7	11	7.8	5.0	
25	3.2	0	0	.7	32	38	14	24	6.8	11.5	8.1	13
26	4.2	.1	0	.3	13	10	8.8	11.5	34	5.5	5.8	22
27	4.5	.1	0	.2	11	3.8	7.8	6.4	8.1	20	4.0	4.9
28	3.2	.2	0	.1	34	2.6	42	3.8	3.3	33	3.8	2.4
29	5.9	2.6	0	0	30	4.0	36	-------	1.8	12	5.8	2.0
30	13.5	2.6	0	0	39	2.4	16	-------	1.5	36	4.0	16
31	10	1.6	-------	0	-------	1.7	18.5	-------	.9	-------	4.2	------

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	33	0.5	9.65	14.9	299	918
August	17.5	0	4.84	7.49	150	460
September	16.5	0	2.58	3.99	77.5	238
October	3.5	0	.24	.37	7.5	23
November	39	0	5.77	8.93	173	531
December	47	.7	7.99	12.4	248	760
January	42	.7	12.8	19.8	396	1,210
February	31	1.5	8.95	13.8	251	769
March	34	.9	7.48	11.6	232	712
April	36	.5	8.53	13.2	256	785
May	38	1.5	9.86	15.3	306	938
June	22	----------	4.20	6.50	126	387
The year	47	0	6.91	10.7	2,520	7,730

[a] Estimated. [b] Partly estimated.

MISCELLANEOUS MEASUREMENTS

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

Miscellaneous discharge measurements on island of Hawaii, 1932–33

Date	Stream	Tributary to—	Locality	Second-feet	Million gallons a day
July 7	Awini Ditch	Kohala Ditch	Honokane weir near Niulii	13.5	8.73
Sept. 9	do	do	do	16.5	10.7
10	Kohala Ditch	Cane fields	Niulii weir near Niulii	39.0	25.2

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