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SURFACE WATER SUPPLY of HAWAII

JULY 1, 1929, to JUNE 30, 1930

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Prepared in cooperation with the
TERRITORY OF HAWAII



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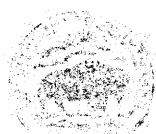
UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

Water Supply Paper No. 1400

SURFACE WATER SUPPLY OF HAWAII

JULY 1, 1920, to JUNE 30, 1920

REPORT OF THE SURVEY
MADE BY THE SURVEYOR
GENERAL OF THE SURVEY
AND THE ASSISTANT SURVEYOR
GENERAL OF THE SURVEY



UNITED STATES
GOVERNMENT PRINTING OFFICE
WASHINGTON: 1920

CONTENTS

	Page
Authority for investigations.....	1
Cooperation.....	2
Cooperation with the Territory of Hawaii.....	2
Other cooperation.....	3
Scope of work.....	3
Definition of terms.....	4
Explanation of data.....	5
Accuracy of field data and computed results.....	6
Division of work.....	7
Publications.....	7
Gaging-station records.....	8
Island of Kauai.....	8
Waimea River below Kekaha Ditch intake, near Waimea.....	8
Kawaikoi Stream near Waimea.....	10
Kokee Ditch near Waimea.....	11
Walahulu Stream near Waimea.....	12
Koale Stream at elevation 3,700 feet, near Waimea.....	13
Waiiale River at elevation 3,700 feet, near Waimea.....	14
Kekaha Ditch at camp No. 1, near Waimea.....	15
Kekaha Ditch below tunnel No. 12, near Waimea.....	16
Hanapepe River at Koula, near Eleele.....	17
Hanapepe River at makai siphon, near Eleele.....	18
Hanapepe Ditch below intake, near Eleele.....	19
Hanapepe Ditch at Koula, near Eleele.....	20
Hanapepe Ditch below makai siphon, near Eleele.....	21
Gee Ditch at makai siphon, near Eleele.....	22
South Fork of Wailua River near Lihue.....	23
North Fork of Wailua River at elevation 650 feet, near Lihue.....	24
Kanaha Ditch near Lihue.....	25
East Branch of North Fork of Wailua River near Lihue.....	26
Kapahi Ditch near Kealia.....	27
Anahola River near Kealia.....	28
Anahola Ditch above Kaneha Reservoir, near Kealia.....	29
Hanalei River at elevation 625 feet, near Hanalei.....	30
Waioli Stream near Hanalei.....	31
Lumalai River near Hanalei.....	32
Miscellaneous measurements.....	33
Island of Oahu.....	34
Right Branch of North Fork of Kaukonahua Stream near Wa- hiawa.....	34
Left Branch of North Fork of Kaukonahua Stream near Wa- hiawa.....	35
North Halawa Stream near Aiea.....	36
Moanalua Stream near Honolulu.....	37
Kalihi Stream near Honolulu.....	38
Nuuanu Stream below Reservoir No. 2 wasteway, near Honolulu.....	39

Gaging-station records—Continued.

Island of Oahu—Continued.

	Page
West Branch of Manoa Stream near Honolulu.....	40
East Branch of Manoa Stream near Honolulu.....	41
East Manoa Ditch near Honolulu.....	42
Pukele Stream near Honolulu.....	43
Waiomao Stream above Pukele Stream, near Honolulu.....	44
Miscellaneous measurements.....	45

Island of Molokai.....

Halawa Stream near Halawa.....	45
Waikolu Stream at pipe-line crossing near Kalaupapa.....	47
Waihanau Stream near Kalaupapa.....	48
Miscellaneous measurements.....	49

Island of Maui.....

Honokahau Stream near Honokahau.....	50
Honokawai Ditch near Lahaina.....	51
Kanaha Stream above pipe-line intake near Lahaina.....	52
Olowalu Ditch near Olowalu.....	53
Oheo Stream at elevation 1,550 feet, near Kipahulu.....	54
Right Branch of Kahalawe Stream near Kipahulu.....	55
Hanawi Stream near Nahiku.....	56
Kapaula Stream near Nahiku.....	57
Koolau Ditch at Nahiku weir, near Nahiku.....	58
Waiohue Stream near Nahiku.....	59
West Kopihula Stream near Keanae.....	60
East Wailuaiki Stream near Keanae.....	61
West Wailuaiki Stream near Keanae.....	62
East Wailuanui Stream near Keanae.....	63
West Wailuanui Stream near Keanae.....	64
Koolau Ditch near Keanae.....	65
Honomanu Stream near Keanae.....	66
Haipuaena Stream near Huelo.....	67
Spreckels Ditch at Haipuaena weir, near Huelo.....	68
Spreckels Ditch at Haipuaena, near Huelo.....	69
Puohokamoa Stream near Huelo.....	70
Puohokamoa intake of Koolau Ditch, near Huelo.....	71
Manuel Luis Ditch at Puohokamoa Gulch, near Huelo.....	72
Manuel Luis Ditch west of Puohokamoa Stream, near Huelo.....	73
Spreckels Ditch at Wahinepee, near Huelo.....	74
Koolau Ditch at Wahinepee, near Huelo.....	75
Alo Stream near Huelo.....	76
Waikamoi Stream above Wailoa Ditch, near Huelo.....	77
Kaaiea Stream near Kailua.....	78
Spreckels Ditch below Kaaiea Gulch, near Huelo.....	79
Center Ditch below Kolea Reservoir, near Huelo.....	80
Nailillhaele Stream near Huelo.....	81
Kailua Stream near Huelo.....	82
Hoolawallihii Stream near Huelo.....	83
Hoolawanui Stream near Huelo.....	84
Honopou Stream near Huelo.....	85
Wailoa Ditch at Honopou, near Huelo.....	86
New Hamakua Ditch at Honopou, near Huelo.....	87
Lowrie Ditch at Honopou Gulch, near Huelo.....	88
Haiku Ditch at Kapalalaea Gulch, near Huelo.....	89
Miscellaneous measurements.....	89

CONTENTS

v

Gaging-station records—Continued.

	Page
Island of Hawaii.....	90
Wailuku River at Pukamaui, near Hilo.....	90
Wailuku River above Hilo Boarding School Ditch intake, near Hilo.....	91
Kapehu Stream at Piiponua, near Hilo.....	92
Honolii Stream near Hilo.....	93
Awini Ditch at East Honokaneiki Gulch, near Niulii.....	94
East Honokaneiki intake to Awini Ditch at East Honokaneiki Gulch, near Niulii.....	95
Kohala Ditch at Pololu, near Niulii.....	96
Kehena Ditch near Kohala.....	97
Miscellaneous measurements.....	98
Index.....	99

SURFACE WATER SUPPLY OF HAWAII

JULY 1, 1929, TO JUNE 30, 1930

AUTHORITY FOR INVESTIGATIONS

This volume contains results of measurements of the flow of streams and ditches in the Territory of Hawaii made during the year ending June 30, 1930. 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 years 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, 1930, 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 per cent shall be levied, assessed, and collected annually on all incomes in excess of \$4,000; and all amounts so collected shall constitute a special fund to be expended only for the encouragement of immigration and the conservation of natural resources in the proportion of three-fourths for immigration and one-fourth for conservation. The conservation fund shall be used for the

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

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

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

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

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

SECTION 1. The division of hydrography, authorized by and created pursuant to section 433 of the Revised Laws of Hawaii, 1915, is hereby transferred, together with all the materials, equipment, and supplies now under the control of the division or of the board of commissioners of agriculture and forestry for the division, to the commissioner of public lands.

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

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

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

COOPERATION

COOPERATION WITH THE TERRITORY OF HAWAII

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

The principal features of this agreement are:

1. The United States Geological Survey assumes 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 are at all times open to inspection

¹ The U. S. Geol. Survey also cooperated with the Territory of Hawaii in mapping the eight largest islands.

by the representative of the Territory, and if they are not satisfactory the agreement can be terminated.

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

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

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 this date by the commissioner of public lands.

OTHER COOPERATION

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

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

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

3. Assistance given in the collection of records, such as furnishing transportation, subsistence, or 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., Gay & Robinson, McBryde Sugar Co., East Kauai Water Co., and B. P. Bishop Estate; Island of Oahu—Wahiawa Water Co., B. P. Bishop Estate, and Honolulu Sewer and Water Commission; Island of Maui—Pioneer Mill Co. and East Maui Irrigation Co.; Island of Hawaii—Kohala Ditch Co. and Hilo waterworks.

SCOPE OF WORK

Since the beginning of stream-gaging work in Hawaii in 1910, records of flow of streams and ditches have been obtained at about 400 stations for periods ranging from a few months to 18 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 86 stations that were operated during the year ending June 30, 1930, 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 which 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 a unit for the rate of discharge of water flowing in a stream 1 square foot in cross section at a rate of 1 foot a second. It is generally adopted as the fundamental unit in the measurement of flowing water and is the "natural" unit, as the foot and the second are the units used in making the physical determinations.

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

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

The following convenient approximate relations exist between second-feet, million gallons a day, and acre-feet: 1 second-foot flowing 24 hours equals about 2 acre-feet; 1,000,000 gallons equals about 3 acre-feet; and 1 second-foot equals approximately two-thirds of 1,000,000 gallons a day.

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

The following terms not in common use are here defined:

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

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

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

EXPLANATION OF DATA

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

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

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

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

The table of daily discharge gives, in general, the discharge corresponding to the mean daily gage heights. At stations on streams subject to sudden or rapid diurnal fluctuation the discharge obtained from the rating table by applying the mean daily gage height may not be the true mean discharge for the day. Under such conditions the mean daily discharge 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 "Extremes," and the corresponding stage is always

taken from the water-stage recorder graph unless otherwise noted. Likewise, in the column headed "Minimum" the quantity given is the flow for the day when the total discharge was least. The columns headed "Mean" give the average flow in million gallons a day and cubic feet a second during the month. The "Total in million gallons" is the sum of the daily flows and "Total in acre-feet" is computed from the mean monthly discharge in million gallons a day.

ACCURACY OF FIELD DATA AND COMPUTED RESULTS

The accuracy of stream-flow data depends primarily (1) on the permanency 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 change, and it may be affected by changes in gage datum.

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

In general, measurements of flow by current meter give less than 5 per cent 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 rating tables mean daily gage heights obtained from the recorder graphs 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 per cent respectively.

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

DIVISION OF WORK

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

PUBLICATIONS

The following table gives by years the serial numbers of the papers on the surface-water supply of Hawaii published from 1903 to 1930, 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, 1903-1930

Year	Number	Year	Number	Year	Number
1903.....	* 77	1917-18.....	485	1924-25.....	615
1909-1911 ^b	318	1918-19.....	515	1925-26.....	635
1912 ^b	336	1919-20.....	516	1926-27.....	655
1913 ^b	373	1920-21.....	535	1927-28.....	675
1913-1915.....	430	1921-22.....	555	1928-29.....	695
1915-16.....	445	1922-23.....	575	1929-30.....	710
1916-17.....	465	1923-24.....	595		

* Water resources of Molokai, by Waldemar Lindgren.

^b Calendar years; papers subsequent to Water-Supply Paper 373 cover the year beginning July 1 and ending June 30.

GAGING STATION RECORDS

ISLAND OF KAUAI

WAIIMEA RIVER BELOW KEKAHA DITCH INTAKE, NEAR WAIIMEA, KAUAI

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

DRAINAGE.—45.0 square miles.

RECORDS AVAILABLE.—July, 1921, to June, 1930.

EXTREMES.—Maximum discharge during year, 2,270 million gallons a day (3,150 second-feet) Feb. 27 (gauge height, 17.92 feet); no flow several days in November and December.

1921-1930: Maximum discharge, 2,770 million gallons a day (4,290 second-feet) Dec. 24, 1927 (gauge height, 20.40 feet); no flow several days from July to November, 1926, and from November to December, 1929.

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

Discharge, in million gallons a day, 1929-30

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	0.27	0.20	0.26	3.3	16	33	72	82	87	51	27	0.4
2	.27	.20	.26	.30	14	524	112	68	97	82	41	.6
3	.27	.20	.26	.26	.4	82	107	59	59	39	55	.9
4	.27	.23	1.35	1.4	406	45	51	45	44	25	56	36
5	.27	.33	.33	4.8	163	18.5	36	39	36	59	162	6.8
6	.28	.4	.20	30	126	6.1	29	34	76	63	46	.8
7	.30	.37	.20	.33	59	.13	22	31	68	139	15.5	.7
8	.31	.30	.20	.26	30	.09	17.5	25	76	117	7.6	.6
9	.31	.26	.20	.23	10.5	.06	16	21	117	87	4.5	.6
10	.31	.26	.23	.20	11	.06	12	19	162	59	.22	.6
11	.31	.26	.23	.16	41	.04	7.9	13	273	186	.32	.6
12	.31	.30	.23	.13	6.4	.04	87	10	59	137	.8	34
13	.31	.30	.23	.13	.0	.02	249	41	36	51	.8	2.7
14	.31	.30	.23	.09	0	1.4	63	17.5	24	25	.7	.8
15	.31	.30	.23	.09	0	178	243	12.5	15	19.5	.7	.7
16	.87	.37	.20	.09	10	63	77	9.1	9.1	15.5	.7	30
17	6.7	.37	.20	.09	128	34	51	7.6	8.5	10	.7	.0
18	.30	.33	.23	.13	18	10	40	6.5	7.6	9.7	.7	1.5
19	.29	4.9	.23	.13	.9	151	33	5.2	3.4	8.8	.7	.8
20	.28	1.9	.23	.13	0	460	22	2.7	.7	6.0	.8	.8
21	.29	29	.26	.09	0	184	15	4.2	.6	6.2	8.4	.8
22	34	4.1	.30	.09	0	534	12.5	2.7	33	6.0	2.7	.8
23	9.2	.37	.38	.09	7.7	435	9.1	2.0	316	4.1	15	6.5
24	.29	.33	4.0	.09	1.0	569	11.5	5.4	140	3.2	.8	38
25	.27	.30	.20	.09	41	306	18	53	187	.9	.6	44
26	192	.26	.6	.09	75	183	211	191	82	.9	.6	10.5
27	53	15	.30	3.5	28	102	63	709	59	.9	.6	50
28	10.5	12	.20	.33	49	90	36	133	46	.9	.6	58
29	.33	.33	21	.6	5.4	277	410	-----	39	.9	.5	3.2
30	.26	.23	35	.6	0	340	234	-----	34	.9	.4	.8
31	.23	.26	-----	.37	-----	133	122	-----	31	-----	.4	-----

* Estimated.

* Partly estimated.

*Discharge, in million gallons a day, of Waimea River below Kekaha Ditch intake,
near Waimea, Kauai, 1929-30—Continued*

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July.....	192	0.23	10.1	15.6	313	961
August.....	29	.20	2.40	3.71	74.3	228
September.....	35	.20	2.27	3.51	68.0	209
October.....	30	.09	1.72	2.66	53.2	164
November.....	408	0	41.6	64.4	1,250	3,830
December.....	569	.02	154	238	4,760	14,700
January.....	410	7.9	80.1	124	2,480	7,620
February.....	709	2.0	58.9	91.1	1,650	5,060
March.....	316	.6	71.8	111	2,230	6,830
April.....	186	.9	40.5	62.7	1,210	3,730
May.....	162	.4	16.3	25.2	508	1,550
June.....	58	.4	11.1	17.2	333	1,020
The year.....	709	0	40.9	63.3	14,900	45,900

KAWAIKOI STREAM NEAR WAIMEA, KAUAI

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, 1930. July, 1917, to July, 1919, not published.

EXTREMES.—Maximum discharge during year, 854 million gallons a day (1,320 second-feet) Feb. 27 (gage height, 8.02 feet); minimum, 1.6 million gallons a day (2.5 second-feet) Oct. 25-27.

1909-1930: Maximum discharge, 1,670 million gallons a day (2,580 second-feet) Dec. 13, 1924 (gage height, 12.11 feet); minimum, 1.3 million gallons a day (2.0 second-feet) Sept. 15, 1921.

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

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

Discharge, in million gallons a day, 1929-30

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1.	2.4	3.7	2.6	7.8	2.6	77	32	15.5	41	71	37	5.4
2.	2.2	3.5	2.3	10.5	7.9	278	72	13	50	38	49	5.5
3.	2.4	4.2	2.2	14	3.6	34	62	14.5	22	18	51	5.2
4.	2.4	7.3	2.1	12	184	28	17	32	27	69	24	
5.	2.0	34	2.0	4.9	27	17	29	11.5	26	64	91	9.8
6.	1.9	36	2.0	7.9	32	13	20	9.8	82	84	20	5.5
7.	2.4	21	2.0	4.2	12.5	10.5	17	8.2	45	98	13	4.6
8.	4.3	9.8	2.0	4.3	8.4	9.4	14.5	7.9	52	81	11	4.0
9.	28	13	2.2	4.1	6.4	8.5	13	7.4	51	66	10.5	3.7
10.	9.4	11.5	2.0	3.2	48	7.8	12	7.0	153	30	9.2	3.4
11.	9.7	11	1.9	2.9	27	7.0	11	6.7	148	138	10.5	3.6
12.	6.4	19	2.1	2.5	7.8	6.4	100	6.3	31	71	8.4	3.8
13.	3.2	10.5	2.2	2.0	6.7	5.9	89	19.5	21	26	7.4	6.2
14.	2.5	6.3	2.0	1.9	5.7	6.2	22	8.5	17	18	6.7	5.1
15.	2.4	8.9	1.9	3.6	7.3	46	77	6.7	14	30	6.4	33
16.	34	9.6	1.8	5.7	68	32	22	6.0	12.5	23	5.9	33
17.	14.5	6.0	1.8	3.3	108	13	17	5.6	11	14	5.6	8.9
18.	4.9	4.2	1.8	2.6	18.5	14	18.5	5.2	9.8	11.5	5.5	6.3
19.	3.2	6.3	1.8	2.1	9.8	213	14	5.2	8.9	16	5.7	5.0
20.	2.7	7.0	1.8	2.0	23	312	13.5	4.9	8.9	17.5	12	7.0
21.	7.8	41	1.8	1.8	9.9	105	11	21	8.2	19.5	10.5	8.4
22.	22	13.5	1.7	1.7	25	361	9.9	16	15	15.5	35	11.5
23.	12	8.0	1.7	1.6	41	248	9.4	9.0	81	11	24	20
24.	5.1	4.9	3.3	1.6	11.5	301	10	20	25	8.9	8.4	59
25.	3.4	3.7	3.4	1.6	43	141	9.4	117	52	18.5	7.0	42
26.	100	15	4.1	1.6	29	111	50	155	23	10.5	6.6	62
27.	26	16.5	2.5	1.7	52	44	14.5	319	12.5	7.9	5.9	64
28.	15	9.2	2.2	2.8	29	92	10	45	10.5	7.2	5.2	33
29.	9.8	4.3	10.5	2.8	11.5	195	103	-----	9.8	6.9	4.9	17
30.	6.2	3.2	12.5	2.8	14.5	177	48	-----	8.9	23	4.6	14
31.	4.3	2.8	-----	2.8	-----	53	24	-----	18.5	-----	4.4	-----

Month	Discharge			Total run-off		
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July	100	1.9	11.4	17.6	352	1,080
August	41	2.8	11.4	17.6	355	1,080
September	12.5	1.7	2.81	4.35	84.2	259
October	14	1.6	4.01	6.20	124	381
November	134	2.6	27.7	42.9	831	2,550
December	361	5.9	95.7	148	2,970	9,100
January	103	9.4	31.7	49.0	983	3,020
February	319	4.9	31.7	49.0	888	2,720
March	153	8.2	35.5	54.9	1,100	3,380
April	138	6.9	35.7	55.2	1,070	3,290
May	91	4.4	18.1	28.0	560	1,720
June	64	3.4	17.6	27.2	528	1,620
The year	361	1.6	27.0	41.8	9,840	30,200

ISLAND OF KAUAI

11

KOKES DITCH NEAR WAIMEA, KAUAI

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

RECORDS AVAILABLE.—September, 1926, to June, 1930.

EXTREMES.—Maximum discharge during year, 68 million gallons a day (105 second-feet) Nov. 4, Dec. 2 (gage height, 2.69 feet); no flow Sept. 5, 24, Feb. 19.

1926-1930: Maximum discharge, 68 million gallons a day (105 second-feet) Dec. 24, 1927, Nov. 4, Dec. 2, 1929 (gage height, 2.70 feet); no flow occasionally when water was turned out of ditch just above weir.

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

Discharge, in million gallons a day, 1929-30

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	4.4	5.2	4.2	9.0	3.5	35	31	35	47	53	41	8.6
2	4.1	5.1	4.0	11.5	9.2	68	40	32	56	51	45	9.2
3	4.2	5.2	3.8	11	5.4	56	51	32	35	32	53	8.6
4	4.4	6.6	3.5	14	39	45	47	32	40	34	49	21
5	4.0	21	3.3	6.9	41	31	45	28	38	56	60	15.5
6	3.8	30	3.3	9.2	36	26	36	26	56	49	32	9.9
7	3.8	27	3.3	6.0	20	20	32	22	45	56	21	8.8
8	6.2	12	8.2	5.0	12	18.5	30	21	42	47	18.5	7.9
9	19.5	9.6	3.3	5.7	9.3	16	28	20	43	47	17.5	7.6
10	13	16.5	3.2	4.4	24	15	26	18.5	40	41	15	7.4
11	11	11	2.8	4.5	32	13.5	24	18.5	41	49	16	7.3
12	9.5	13.5	2.9	3.7	11	12.5	85	17.5	43	49	14	11.5
13	5.7	14.5	3.0	3.0	8.4	12	64	31	36	36	12.5	9.9
14	4.7	7.3	2.8	2.8	7.6	12	41	20	34	31	12	8.6
15	4.4	8.6	2.8	3.4	8.3	43	60	17.5	80	35	12	22
16	22	9.9	2.7	6.5	11.5	46	45	16	27	34	11	36
17	20	7.4	2.7	4.4	56	26	36	15	26	26	10.5	13
18	7.4	5.8	2.6	3.7	26	20	36	14	24	22	10.5	9.7
19	5.2	6.3	2.8	3.2	13.5	52	32	13	22	26	10.5	8.3
20	4.4	8.4	2.7	2.9	30	64	30	13	21	27	15	9.2
21	6.4	31	2.4	2.7	14	64	27	33	20	23	22	11
22	21	16	2.4	2.7	22	64	26	26	24	26	30	13
23	13.5	9.5	2.9	2.4	48	56	24	17.5	59	20	32	39
24	7.3	6.5	4.3	2.4	18.5	36	24	26	41	17.5	14	47
25	5.1	5.4	6.0	2.3	35	53	32	31	56	24	11	43
26	34	11	5.2	2.2	40	51	44	60	45	18.5	11	45
27	31	16	3.7	2.3	38	43	31	64	31	16	10	51
28	18.5	13	3.2	3.3	39	38	24	56	23	14.5	9.2	38
29	11	6.5	9.8	3.7	20	36	51	26	26	14	8.8	21
30	8.1	5.1	12	3.5	18.5	34	60	26	23	23	8.6	18.5
31	6.2	4.5	-----	3.8	-----	34	49	-----	26	-----	8.3	-----

Month	Discharge			Total run-off	
	Million gallons a day			Million gallons	Acre-feet
	Maximum	Minimum	Mean		
July	34	3.8	10.4	324	989
August	31	4.5	11.5	355	1,080
September	12	2.4	3.83	115	353
October	14	2.2	4.91	152	467
November	56	3.5	23.2	697	2,140
December	68	12	36.8	56.9	1,140
January	64	22	37.1	67.4	1,150
February	64	13	27.0	41.8	756
March	55	20	36.2	56.9	1,120
April	56	14	33.4	51.7	1,000
May	60	8.3	20.7	32.0	641
June	51	7.3	18.6	58.8	1,710
The year	68	2.2	22.0	34.0	8,010

WAIAHULU STREAM NEAR WAIMEA, KAUAI

LOCATION.—Water-stage recorder in Waimea Canyon, half a mile above confluence with Koale Stream and $6\frac{1}{2}$ 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, 1930.

EXTREMES.—Maximum discharge during year, 1,190 million gallons a day (1,840 second-feet) Feb. 27 (gage height, 6.32 feet); minimum, 7.0 million gallons a day (10.8 second-feet) Sept. 5.

1916-1918, 1925-1930: Maximum discharge, 2,550 million gallons a day (3,950 second-feet) Dec. 24, 1927 (gage height, 9.92 feet); minimum, 5.2 million gallons a day (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 a day, 1929-30

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1-----	8.0	7.6	7.4	9.6	14	51	58	34	26	39	21	13.5
2-----	8.0	7.6	7.4	8.9	12.5	518	106	24	44	42	27	14
3-----	8.2	7.8	7.4	8.9	9.2	42	118	23	18	18	38	14
4-----	8.2	8.0	7.6	8.7	322	23	40	21	14	15.5	48	15
5-----	8.2	8.0	7.2	11.5	92	16.5	30	18.5	13.5	42	113	18
6-----	8.2	12	7.2	11	65	12.5	26	17.5	60	64	22	16.5
7-----	8.4	16	7.2	9.2	26	12	22	16.5	26	110	15	16
8-----	8.7	9.6	7.4	8.4	16	11	22	15	29	75	13	15.5
9-----	8.9	8.9	7.4	8.4	12.5	9.9	20	14.5	37	55	12.5	15.5
10-----	10.5	8.2	7.4	8.4	21	9.6	18.5	14	190	22	12	15.5
11-----	9.4	8.2	7.6	8.4	27	9.6	18	13.5	337	204	12	15
12-----	9.4	10	7.6	8.4	13	9.6	143	13	28	86	11.5	15
13-----	9.4	8.4	7.4	8.2	11	9.6	349	25	19	24	11	16
14-----	9.4	7.8	7.4	8.2	10.5	11	46	14.5	16	17	11	15
15-----	9.4	7.8	7.6	8.4	10	78	203	13	15	15.5	11	14
16-----	9.6	7.8	7.6	8.7	50	34	50	12.5	15	15.5	11	30
17-----	12.5	8.0	7.6	8.9	162	21	34	12	14	15	11	15
18-----	10.5	7.8	7.6	8.9	15	16.5	28	11.5	13.5	15	11	18.5
19-----	9.9	7.8	7.6	9.2	10	264	24	11	13	14.5	11	12.5
20-----	9.4	7.8	7.6	9.2	9.6	559	22	11	12.5	15	11	12.5
21-----	9.2	11.5	7.6	9.4	9.4	154	21	12	12.5	16	12	12.5
22-----	12	11	7.8	9.6	9.9	665	19	11	18.5	16.5	14	12
23-----	11	11.5	8.7	9.6	26	561	17.5	10.5	196	16	18	13
24-----	9.4	8.2	11	9.6	10.5	690	18	10.5	43	16	14	23
25-----	8.2	7.8	9.2	9.6	35	355	16.5	123	112	16	12.5	24
26-----	100	7.8	8.0	9.6	38	224	104	184	32	16.5	12.5	27
27-----	20	13.5	7.8	11	38	82	32	525	22	16.5	12.5	45
28-----	11.5	8.7	8.0	8.9	27	110	24	50	18	16.5	12.5	34
29-----	8.7	7.8	8.0	11	12	362	247	-----	16.5	16.5	12.5	16
30-----	8.0	7.6	8.9	9.6	10.5	390	185	-----	15	17	13	13.5
31-----	7.8	7.4	-----	8.7	-----	115	66	-----	14.5	-----	18	-----

Month	Discharge			Total run-off	
	Million gallons a day			Million gallons	Acre-feet
	Maximum	Minimum	Mean		
July-----	100	7.8	12.6	19.5	1,200
August-----	16	7.4	8.96	13.9	852
September-----	11	7.2	7.81	12.1	719
October-----	11.5	8.2	9.23	14.3	878
November-----	322	9.2	37.5	58.0	3,450
December-----	690	9.6	175	271	16,600
January-----	349	16.5	68.5	106	6,520
February-----	525	10.5	45.0	69.6	4,270
March-----	337	12.5	46.5	71.9	4,490
April-----	204	14.5	35.6	55.1	3,390
May-----	113	11	18.7	28.9	1,780
June-----	45	12	17.7	27.4	1,680
The year-----	690	7.2	40.4	62.5	45,200

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

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

DRAINAGE AREA.—3.4 square miles.

RECORDS AVAILABLE.—July, 1919, to June, 1930.

EXTREMES.—Maximum discharge during year, 2,100 million gallons a day (3.250 second-feet) Feb. 27 (gage height, 4.20 feet); minimum, 1.0 million gallons a day (1.6 second-feet) July 5, 6.

1919-1930: Maximum discharge, about 3,750 million gallons a day (5.800 second-feet) Jan. 16, 1921 (gage height, 6.70 feet); minimum, 0.6 million gallons a day (0.9 second-foot) May 21, 22, 1929.

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

Discharge, in million gallons a day, 1929-30

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1.....	1.1	3.2	2.5	9.6	4.3	55	4.8	4.9	15	15.5	17	2.4
2.....	1.1	3.2	2.3	11	4.0	169	25	4.5	23	30	17	4.5
3.....	1.2	2.9	2.3	11.5	2.3	20	15	3.3	11	11	16	12
4.....	1.1	5.3	2.3	17.5	17.5	13	5.7	3.0	8.6	9.1	21	41
5.....	1.0	13	2.3	30	25	7.1	4.2	2.4	7.5	27	48	7.5
6.....	1.1	13	1.9	20	25	5.2	2.9	1.8	25	31	10	3.6
7.....	1.2	10.5	1.8	7.1	8.3	4.2	2.5	2.2	23	55	5.3	2.6
8.....	1.5	4.8	1.8	11	5.7	3.2	2.3	2.4	36	48	3.9	2.2
9.....	1.5	3.8	3.2	7.1	6.1	2.7	2.1	2.2	51	42	3.6	1.8
10.....	1.3	3.2	2.5	5.2	14.5	2.3	2.1	2.2	81	27	3.3	1.6
11.....	4.4	3.5	2.1	3.8	13.5	1.9	1.9	2.0	69	118	3.0	3.2
12.....	3.5	4.5	2.1	3.2	5.7	1.9	11	2.0	17	50	3.0	3.4
13.....	2.1	4.5	1.9	2.5	4.5	1.8	44	4.6	9.7	17.5	2.4	13.5
14.....	1.8	3.5	1.6	2.3	3.2	2.8	4.2	3.3	7.5	12	2.4	5.3
15.....	1.9	7.0	1.6	2.3	2.7	46	63	2.4	5.7	8.6	2.4	17.5
16.....	22	10.5	1.8	2.5	4.1	5.2	6.1	2.2	4.9	5.7	3.0	18.5
17.....	10.5	5.2	1.6	3.8	38	3.5	3.9	2.0	4.2	4.9	2.8	6.5
18.....	3.5	3.8	1.9	2.9	10.5	3.2	3.3	1.8	3.6	3.9	2.8	12.5
19.....	2.9	17.5	2.5	2.9	6.1	50	2.8	1.6	3.3	3.9	2.8	6.1
20.....	2.5	13	1.9	2.5	4.8	159	2.8	1.5	3.0	4.5	8.6	9.7
21.....	12.5	36	1.5	2.1	3.8	75	2.4	2.0	2.8	7.5	18.5	7.0
22.....	45	13	1.5	1.8	4.2	190	2.0	2.0	15	6.1	17	6.5
23.....	14.5	8.9	1.5	1.6	8.9	160	1.8	1.8	92	4.5	17.5	18.5
24.....	6.1	5.7	1.5	1.6	6.1	183	3.0	9.0	46	3.6	4.9	31
25.....	4.9	4.2	1.5	1.5	33	53	4.5	20	41	3.3	3.3	23
26.....	165	3.2	16	1.5	18.5	29	66	86	12	2.6	2.8	17.5
27.....	25	15.5	5.7	1.6	14	9.3	5.7	398	8.1	2.2	2.4	28
28.....	15	8.1	5.2	1.9	17	19	3.7	16.5	6.1	2.0	2.4	18.5
29.....	5.7	4.5	32	1.8	7.1	80	109	-----	4.2	2.4	2.2	7.0
30.....	4.5	3.5	34	2.3	6.6	79	25	-----	3.6	6.8	1.8	8.6
31.....	4.2	2.9	-----	2.1	-----	13.5	9.0	-----	3.9	-----	1.6	-----

Month	Discharge			Total run-off		
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July.....	165	1.0	11.9	18.4	370	1,130
August.....	36	2.9	7.79	12.1	241	741
September.....	34	1.5	4.74	7.33	142	436
October.....	30	1.5	5.76	8.91	178	548
November.....	38	2.3	10.8	16.7	325	994
December.....	190	1.8	46.7	72.3	1,450	4,440
January.....	109	1.8	14.2	22.0	442	1,350
February.....	398	1.5	21.0	32.5	588	1,800
March.....	92	2.8	30.8	32.2	644	1,980
April.....	118	2.0	18.9	20.2	566	1,740
May.....	48	1.6	8.15	12.6	253	775
June.....	41	1.6	12.4	19.2	373	1,140
The year.....	398	1.0	15.3	23.7	5,570	17,100

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

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

DRAINAGE AREA.—3.3 square miles.

RECORDS AVAILABLE.—January, 1920, to June, 1930. August, 1910, to January, 1916, at site 2 miles downstream.

EXTREMES.—Maximum discharge during year, 2,150 million gallons a day (3,330 second-feet) Feb. 27 (gage height, 5.44 feet); minimum, 0.9 million gallons a day (1.4 second-feet) May 31, June 10.

1920-1930: Maximum discharge (estimated), 4,500 million gallons a day (6,960 second-feet) Jan. 16, 1921 (gage height, 8.44 feet); minimum, 0.7 million gallons a day (1.1 second-feet) Mar. 18-20, 1925.

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

Discharge, in million gallons a day, 1929-30

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	1.2	2.2		12.5	1.6	34	9.5	7.3	8.5	7.8	14.5	1.2
2	1.2	2.1		11	3.6	113	34	6.6	13.5	13	14	2.2
3	1.1	1.9		15.5	2.2	15.5	18	4.8	5.6	4.6	13	6.6
4	1.0	2.9		12.5	207	9.5	9.5	3.8	4.4	3.4	17	31
5	1.0	5.9	* 2.0	24	36	5.9	7.3	3.1	3.6	8.7	62	5.4
6	1.0	5.6		17	32	4.4	6.3	3.1	15	8.6	6.6	2.4
7	1.0	4.4		7.0	9.4	3.6	5.4	3.1	12.5	24	3.6	1.4
8	1.0	2.8		9.0	5.4	3.1	5.4	2.6	22	22	2.9	1.1
9	1.0	2.4		5.9	4.6	2.8	5.1	2.4	40	14	2.6	1.0
10	1.0	2.1	* 2.6	4.4	6.2	2.4	4.4	2.2	34	8.2	2.2	1.0
11	2.0	2.1		3.1	7.7	2.2	4.1	1.9	32	60	2.2	2.1
12	1.4	2.8		2.6	4.1	1.9	15	1.7	7.3	22	2.1	35
13	1.3	2.9		2.2	2.9	1.7	51	5.9	4.8	7.0	1.6	9.4
14	1.3	2.2		1.9	2.4	3.6	8.0	2.8	3.6	5.6	1.4	3.6
15	1.3	4.8	* 1.7	1.9	2.2	70	95	2.1	2.8	4.4	1.4	7.6
16	9.0	6.6		2.4	2.1	8.3	9.8	1.6	2.6	3.4	1.7	12
17	4.8	3.8		8.8	14.5	5.1	7.0	1.4	2.2	2.8	1.6	4.4
18	2.1	2.8		2.6	5.6	4.4	6.3	1.3	1.7	2.4	1.4	11
19	1.9	20	2.9	2.2	3.1	26	5.4	1.2	1.6	2.2	1.4	4.4
20	2.3	11	1.7	1.9	2.4	101	4.8	1.1	1.7	2.1	4.1	5.9
21	5.0	15.5	1.6	1.6	2.1	11	4.4	1.2	1.6	2.6	11	4.6
22	29	10	1.4	1.4	2.1	132	3.6	1.1	23	2.4	10	4.6
23	9.4	6.6	1.6	1.4	3.4	120	3.1	1.1	129	2.1	9.7	17
24	4.1	4.1	1.9	1.4	3.1	141	5.6	3.7	53	1.7	3.1	24
25	2.8	3.1	1.6	1.3	28	51	5.6	5.4	23	1.6	1.9	20
26	113	2.8	14	1.2	14.5	24	79	37	6.6	1.3	1.4	16.5
27	14		4.8	1.3	8.9	12.5	7.6	396	4.6	1.3	1.2	28
28	8.6	* 6	3.5	1.3	9.6	14	5.1	12	3.6	1.2	1.2	20
29	3.8		31	1.2	4.6	54	145		2.9	1.3	1.0	7.0
30	3.1	* 3.0	35	1.2	5.4	81	41		2.4	3.1	1.0	5.6
31	2.6			1.4		18.5	14		2.4		1.0	

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July	113	1.0	7.53	11.7	233	716
August	20	1.9	4.98	7.71	154	474
September	35		4.53	7.01	136	417
October	24	1.2	5.10	7.89	158	455
November	207	1.6	14.6	22.6	437	1,340
December	141	1.7	34.8	53.8	1,080	3,310
January	145	3.1	20.2	31.3	625	1,920
February	396	1.1	18.5	28.6	518	1,590
March	129	1.6	15.2	23.5	472	1,450
April	60	1.2	8.14	12.6	244	749
May	62	1.0	6.45	9.98	200	614
June	35	1.0	9.87	15.3	296	909
The year	306	1.0	12.5	19.3	4,560	14,000

* Estimated mean.

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

LOCATION.—Water-stage recorder in Waimea Canyon, $6\frac{1}{4}$ miles N. 16° E. of Waimea.

RECORDS AVAILABLE.—November, 1907, to June, 1915; March, 1916, to June, 1930.

EXTREMES.—Maximum discharge during year, 68 million gallons a day (105 second-feet) July 22, 26 (gage height, 4.25 feet); no flow occasionally when water was shut out of ditch.

1907–1915; 1916–1930: Maximum discharge, 71 million gallons a day (110 second-feet) Apr. 25, 1928 (gage height, 4.33 feet); no flow occasionally when water was shut out of ditch.

REMARKS.—Records good for ordinary stages except those estimated, which are fair; poor for extremely low stage. Intake on Waimea River $6\frac{1}{4}$ miles north of Waimea. Water used for irrigation of sugarcane at Kekaha. Regulated by head gates.

Discharge, in million gallons a day, 1929–30

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1.....	23	25	24	47	24	36	25	^a 20		33	39	30
2.....	23	24	23	50	39	27	36	20		36	39	36
3.....	23	24	23	36	28	36	39	20		36	39	39
4.....	24	24	28	56	25	36	39	26		36	39	56
5.....	24	32	24	50	25	36	39	28		36		56
6.....	23	44	23	53	26	36	36	26	^b 30	36		36
7.....	23	44	22	39		36	36	26		36	^b 36	33
8.....	24	30	22	41		36	39	26		36		32
9.....	24	28	23	36	^b 24	33	39	28		36		
10.....	25	26	24	32		32	39	28		36		
11.....	26	25	23	28			39	32		36	7.2	
12.....	33	29	22	25	29		36	32		36		
13.....	26	28	22	24	33	^b 30	32	32		36		
14.....	24	26	22	22	30		32	32		39		
15.....	24	25	22	22	29		30	30	^b 36	36		
16.....	35	36	22	23	29		32	32		36	32	^b 44
17.....	53	33	22	24	29	32	32	32		39	32	
18.....	33	26		25	33	36	32	32		36	32	
19.....	28	33		24	33	36	32	32		39	32	
20.....	25	50	^b 22	23	32	33	32	32	36	39	33	
21.....	29	53		22	29	36	^b 34	32	36	39	53	
22.....	56	50		22	29	36		32	36	39	50	
23.....	56	41		20	36	36		32	29	39	58	
24.....	41	32	34	20	33	36		32	36	39	44	56
25.....	30	26	30	20	33	36		36	29	39	36	56
26.....	50	26	36	20	33	36			29	39	33	56
27.....	56	32	39	28	36	36		^b 32	28	36	32	56
28.....	56	50	28	24	33	32			26	36	32	56
29.....	39	36	47	28	36	22			26	36	32	50
30.....	30	28	53	26	36	20			26	39	30	44
31.....	28	25		25		20			26		30	

Month	Discharge			Second-feet (mean)	Total run-off	
	Million gallons a day				Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July.....	56	23	32.7	50.6	1,010	3,110
August.....	53	24	32.6	50.4	1,010	3,100
September.....	53		26.3	40.7	790	2,420
October.....	56	20	30.2	46.7	935	2,870
November.....	39		29.9	46.3	898	2,750
December.....	36	20	32.5	50.3	1,010	3,090
January.....			35.2	54.5	1,090	3,350
February.....		20	29.5	45.6	826	2,530
March.....			31.8	49.2	987	3,080
April.....	39	33	37.0	57.2	1,110	3,410
May.....	58	7.2	35.5	54.9	1,100	3,380
June.....	56	30	44.9	69.5	1,350	4,130
The year.....	58	7.2	33.2	51.4	12,100	37,200

^a Estimated.^b Estimated mean.

KEKAHA DITCH BELOW TUNNEL NO. 12, NEAR WAIMEA KAUAI

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

RECORDS AVAILABLE.—April, 1908, to November, 1914; July, 1916, to June, 1930.

EXTREMES.—Maximum discharge during year, 51 million gallons a day (79 second-feet) June 25 (gage height, 4.14 feet); no flow May 10, 11.

1908-1914, 1916-1930: Maximum discharge, 70 million gallons a day (108 second-feet) Dec. 24, 1927 (gage height, 5.17 feet); no flow occasionally when water was shut out of ditch.

REMARKS.—Records good except those estimated, which are fair. Intake on Waimea River $6\frac{1}{2}$ miles north of Waimea. Water used for irrigation of sugarcane near Kekaha. Regulated by head gates.

Discharge, in million gallons a day, 1929-30

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	19	21		36	21	29	16.5	17.5	21	27	34	25
2	19	20		37	30	23	27	17.5	23	30	34	29
3	18.5	20		29	21	30	29	17.5	22	30	34	46
4	18.5	19		37	23	30	30	20	23	30	34	46
5	17.5	24		37	19	30	29	22	26	32	34	48
6	16.5			39	21	29	29	22	27	32	34	24
7	16.5			30	19	29	29	22	27	32	32	30
8	17.5			29	16.5	29	29	22	27	32	32	27
9	17.5			27	19	27	29	22	25	32	32	26
10	18.5			22	18.5	25	29	22	26	32	23	26
11	19			19	17.5	23	30	24	29	32	* 1.7	26
12	26			16.5	21	23	30	26	30	32	* 30	41
13	22	b 24	b 18	15	28	22	30	26	30	30	30	48
14	20			14	23	23	30	27	30	32	30	39
15	18.5			15	22	27	30	26	30	32	30	32
16	22			16	21	25	30	27	32	30	29	43
17	41			17.5	23	25	30	26	36	32	30	43
18	29			18.5	25	29	30	26	30	30	29	41
19	22			17.5	26	30	26	27	30	30	29	39
20	20			16.5	25	30	30	27	30	30	30	36
21	22			16	23	30	30	27	30	32	44	39
22	40			15	22	30	30	27	30	32	44	26
23	44			14	27	29	30	27	26	32	48	43
24	34			14	27	30	30	27	30	32	43	50
25	25	b 30		14	27	30	30	30	27	32	34	50
26	37			26	14	29	30	32	25	30	30	50
27	46			34	21	29	32	23	25	30	29	50
28	44			22	19	29	27	22	23	30	27	50
29	34			31	22	27	16.5	27	23	30	27	48
30	26			39	21	29	16.5	20	23	32	26	41
31	22			20		15	18.5		23	25		

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July	46	16.5	25.6	39.6	792	2,440
August			25.8	39.9	800	2,450
September	39		20.1	31.1	602	1,850
October	39	14	21.9	33.9	678	2,080
November	30	16.5	23.4	36.2	704	2,150
December	30	15	26.5	41.0	820	2,520
January	32	16.5	28.4	43.9	880	2,700
February	32	17.5	24.3	37.6	680	2,000
March	32	21	26.8	41.5	831	2,550
April	32	27	31.0	48.0	931	2,860
May	48	1.7	31.2	48.3	969	2,970
June	50	25	39.0	60.3	1,170	3,500
The year	50	1.7	27.0	41.8	9,860	30,200

* Partly estimated.

b Estimated mean.

c Estimated.

HANAPEPE RIVER AT KOULA, NEAR ELEELE, KAUAI

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

DRAINAGE AREA.—18.8 square miles.

RECORDS AVAILABLE.—August, 1910, to January, 1921; December, 1926, to June, 1930.

EXTREMES.—Maximum discharge during year, 1,180 million gallons a day (1,830 second-feet) July 26 (gage height, 5.92 feet); minimum, 10.2 million gallons a day (15.8 second-feet) July 1.

1910–1921, 1926–1930: Maximum discharge, at least 5,000 million gallons a day (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 (11.0 second-feet) Dec. 30, 31, 1913.

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

Discharge, in million gallons a day, 1929–30

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	10.5	19.4	18.0	50	28	30	33	21	25	17.2	18.5	42
2	10.5	18.5	22	53	43	34	43	16.8	43	14.0	21	16.3
3	11.4	22	16.8	45	25	18.0	23	15.5	20	13.0	28	63
4	11.2	23	15.0	47	342	17.6	16.3	14.6	13.3	13.0	22	130
5	11.2	29	14.3	153	169	18.0	18.5	14.3	13.3	13.0	76	34
6	11.4	24	18.0	102	169	16.8	14.3	14.3	13.3	14.5	22	17.6
7	11.7	25	13.3	57	94	16.3	13.6	14.3	14.0	32	15.0	15.5
8	11.7	16.8	15.8	61	75	15.9	13.6	14.0	51	48	14.3	15.0
9	11.7	16.3	14.3	51	70	15.0	14.0	14.0	99	101	14.3	14.6
10	11.7	18.5	13.6	87	61	14.3	13.6	14.0	34	42	13.3	14.3
11	22	18.0	14.6	29	49	14.3	13.6	14.0	23	71	14.3	17.6
12	12.0	20	14.6	21	26	14.6	17.8	14.0	16.8	79	13.6	53
13	12.4	17.6	14.6	19.4	24	14.3	18.0	15.5	15.5	30	13.6	33
14	14.0	15.0	14.6	18.5	28	14.3	14.6	14.3	14.6	136	14.3	18.0
15	15.9	53	15.0	17.6	22	57	49	14.3	15.0	31	14.6	22
16	44	35	15.5	29	21	17.6	16.3	14.0	14.3	19.4	14.0	30
17	27	18.5	15.0	22	20	14.6	25	13.3	14.0	16.3	13.3	21
18	14.6	16.3	15.0	24	19.9	14.0	34	13.6	13.3	14.6	14.0	110
19	13.6	42	15.5	18.9	18.9	13.6	31	14.0	13.0	14.6	13.3	51
20	15.9	53	15.5	18.9	18.0	38	31	13.6	13.0	14.3	19.4	91
21	28	66	15.0	17.2	17.6	20	31	13.6	13.0	13.6	24	43
22	98	70	14.3	16.3	17.6	46	23	13.0	32	13.6	36	30
23	75	59	14.6	15.9	17.2	25	12.4	12.7	57	13.6	67	53
24	26	29	15.0	15.5	16.3	43	17.2	59	55	13.0	18.9	95
25	56	22	16.9	15.5	49	31	38	15.0	68	13.0	15.0	70
26	548	18.5	60	15.5	44	17.2	143	34	23	12.7	14.3	47
27	121	43	21	25	36	15.5	28	218	17.2	12.7	13.6	67
28	69	22	16.3	20	39	15.9	16.3	40	14.6	13.3	14.3	69
29	36	15.5	52	18.5	36	33	151	-----	14.0	14.0	13.6	39
30	26	15.0	64	52	36	105	81	-----	13.3	14.6	13.3	47
31	22	18.6	-----	32	-----	51	36	-----	13.3	-----	13.0	-----

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	548	10.5	45.5	70.4	1,410	4,380
August	70	15.0	28.4	43.9	880	2,700
September	64	13.0	19.8	30.6	595	1,820
October	153	15.5	36.1	55.9	1,120	3,430
November	342	16.3	53.9	88.4	1,620	4,900
December	105	13.6	26.2	40.5	811	2,490
January	151	12.4	33.2	51.4	1,030	3,100
February	218	12.7	25.0	38.7	699	2,160
March	99	13.0	25.8	39.9	799	2,450
April	136	12.7	28.9	44.7	868	2,600
May	76	13.0	20.4	31.6	632	1,940
June	130	14.3	45.6	70.6	1,370	4,200
The year	548	10.5	32.4	50.1	11,800	36,300

• Estimated.

HANAPEPE RIVER AT MAKAI SIPHON, NEAR ELEELE, KAUAI

LOCATION.—Water-stage recorder on bridge at makai siphon, 2½ miles northeast of Eleele.

DRAINAGE AREA.—20.5 square miles.

RECORDS AVAILABLE.—December, 1929, to June, 1930.

EXTREMES.—Maximum discharge during period, 706 million gallons a day (1,090 second-feet) Feb. 27 (gage height, 4.10 feet); minimum, 11.5 million gallons a day (17.8 second-feet) Feb. 23.

REMARKS.—Records good for ordinary stages; poor for high stages. Hanapepe Ditch and several small ditches divert water from stream above station. Station was established Dec. 6, 1929.

Discharge, in million gallons a day, 1929-30

Day	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1.....		32	20	24	17	18.5	44
2.....		34	17.5	46	14.5	22	18.5
3.....		23	16	23	14	30	68
4.....		16	15	14.5	14	23	182
5.....		17	14.5	14	14.5	82	42
6.....	14	14	14	14.5	14	24	19.5
7.....	14	13.5	14	14.5	29	16.5	17
8.....	14	13	14	51	52	16.5	16.5
9.....	14	13	13.5	109	104	16	16
10.....	14	12.5	13.5	41	48	15	16
11.....	14	12.5	13.5	24	72	16	19
12.....	14	15.5	13	17	88	15.5	56
13.....	14	17	14.5	16	33	15	36
14.....	14.5	13.5	13	15	140	16	19.5
15.....	62	53	13	15.5	35	16	19
16.....	17	30	13	15	21	16	36
17.....	14.5	31	13	14.5	17.5	15	19.5
18.....	14	35	13	14	16.5	16	119
19.....	13.5	30	13	13.5	16	15	54
20.....	37	29	12.5	13.5	15.5	21	95
21.....	21	29	13	14	15	25	46
22.....	47	28	12	27	15	36	30
23.....	24	23	12	65	14.5	74	55
24.....	45	29	65	47	14.5	21	104
25.....	32	34	14.5	85	14.5	17	77
26.....	16	171	30	24	14.5	16	52
27.....	14.5	32	214	17.5	14.5	16	71
28.....	20	17	49	16	14.5	16	75
29.....	30	162	-----	15	15	16	42
30.....	116	97	-----	14.5	16	15	52
31.....	54	35	-----	14.5	-----	14.5	-----

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
December 6-31.....	116	13.5	27.1	41.9	704	2,160
January.....	171	12.5	35.9	55.5	1,110	3,420
February.....	214	12	24.8	38.4	693	2,130
March.....	109	13.5	27.4	42.4	849	2,610
April.....	140	14	30.8	47.7	624	2,840
May.....	82	14.5	22.3	34.5	692	2,120
June.....	132	16	48.9	75.7	1,470	4,560
The period (207 days).....	214	12	31.1	48.1	6,440	19,800

HANAPEPE DITCH BELOW INTAKE, NEAR ELEELE, KAUAI

LOCATION.—Water-stage recorder 1 mile below intake and 6 miles northeast of Eleele.

RECORDS AVAILABLE.—March to June, 1930.

EXTREMES.—Maximum discharge for period, 35 million gallons a day (54 second-feet) June 18, 20, 24 (gage height, 3.58 feet); no flow May 20, June 25.

REMARKS.—Records good. Ditch diverts water from Hanapepe River at intake 1 mile above station. Station was established Mar. 9, 1930.

Discharge, in million gallons a day, 1930-30

Day	Mar.	Apr.	May	June	Day	Mar.	Apr.	May	June
1		22	28	28	16	22	30	29	28
2		20	28	23	17	20	28	19	28
3		19	32	32	18	20	26	20	33
4		19	30	32	19	12	25	20	33
5		20	32	32	20	19	23	16	33
6		20	26	26	21	19	22	26	32
7		28	22	23	22	24	23	30	32
8		22	23	22	23	30	24	32	33
9	32	32	20	20	24	28	22	26	33
10	23	32	20	20	25	30	20	22	26
11	27	32	22	25	26	25	20	22	32
12	26	32	19	32	27	22	22	19	32
13	23	30	19	32	28	20	23	22	32
14	22	35	20	25	29	20	22	19	32
15	23	32	22	26	30	19	25	18.5	32
					31	20		19	

Month	Discharge			Total run-off		
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
March 9-31	32	19	23.3	36.1	537	1,645
April	33	19	25.2	39.0	757	2,329
May	32	16	23.0	35.6	712	2,169
June	33	20	29.0	44.9	869	2,676
The period (114 days)	33	16	25.2	39.0	2,880	8,829

* Partly estimated.

HANAPEPE DITCH AT KOULA, NEAR ELEELE, KAUAI

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, 1930.

EXTREMES.—Maximum discharge during year, 35 million gallons a day (54 second-feet) Feb. 28 (gage height, 3.06 feet); no flow for several days when water was shut out of ditch.

1910-1921, 1927-1930: Maximum discharge, 36 million gallons a day (56 second-feet) Apr. 10, 1918 (gage height, 3.18 feet); no flow occasionally, due to closing of head gates.

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

Discharge, in million gallons a day, 1929-30

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1.	17.5	23	• 22		• 21	3.8	7.6	24	23	21	23	15.5
2.	16	23				20	24	23	5.2	18.5	24	20
3.	16	24				17.5	21	21	18.5	17.5	27	24
4.	16	24				16	20	20	21	17.5	26	28
5.	16	26	• 25		• 9	13.5	14.5	18.5	21	18.5	28	28
6.	16	26				• 0	15	18.5	21	18.5	26	23
7.	15	17				0	15	17.5	23	26	21	20
8.	15	20				0	15	17.5	23	28	21	18.5
9.	15	20	• 18		• 0	15	17.5	18.5	30	30	30	17.5
10.	16	21				0	15	17.5	26	30	18.5	17.5
11.	20	21				4.0	15	17.5	26	30	20	20
12.		21				18.5	15	20	17.5	30	18.5	26
13.		21	• 21		• 16	18.5	15	20	21	28	17.5	24
14.		20				18.5	16	17.5	21	33	18.5	21
15.	• 18	26				17.5	21	17.5	23	30	20	21
16.		26				17.5	18.5	21	20	28	19.5	24
17.	23	24	• 25		• 16	17.5	7.0	16	20	26	17.5	23
18.	18.5	23				16	16	0	17.5	23	18.5	28
19.	16	26				16	16	0	17.5	21	18.5	28
20.	18.5	26				16	23	0	16	21	14	28
21.	21	26	• 18		• 18	16	23	0	17.5	18.5	20	26
22.	19	26				16	26	8.2	16	23	21	26
23.	12	26				16	24	16	17.5	28	20	28
24.	23	24				16	23	23	26	28	20	28
25.	22	24	• 22	• 24	• 22	21	26	20	30	18.5	20	18.5
26.	28	21				8.9	21	33	23	24	18.5	29
27.	21	24				3.0	18.5	26	33	21	18.5	28
28.	26					0	16.5	23	33	20	20	28
29.	26	• 22	• 24	• 22	• 22	0	5.3	30		18.5	18.5	28
30.	24					0	5.8	30		18.5	20	28
31.	24					5.4	28		18.5		17.5	

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July.....	28	12	19.0	29.4	590	1,810
August.....	26	17	23.1	35.7	717	2,200
September.....			18.1	28.0	543	1,670
October.....			22.4	34.7	694	2,120
November (22 days).....		0	15.4	23.8	338	1,040
December.....	28	3.8	16.7	25.8	517	1,590
January (27 days).....	33	0	20.2	31.3	545	1,670
February.....	33	16	19.9	30.8	558	1,710
March.....	30	5.2	21.8	33.7	675	2,070
April.....	33	17.5	23.0	35.6	690	2,120
May.....	28	14	21.0	32.5	650	2,000
June.....	28	15.5	24.0	37.1	722	2,210
The year (353 days).....	33	0	20.5	31.7	7,240	22,200

• Estimated mean.

• Estimated.

• Partly estimated.

HANAPEPE DITCH BELOW MAKAI SIPHON, NEAR ELEELE, KAUAI

LOCATION.—Water-stage recorder 60 feet south of lower end of makai siphon and 2½ miles northeast of Eleele.

RECORDS AVAILABLE.—December, 1929, to June, 1930.

EXTREMES.—Maximum discharge during period, 29 million gallons a day (45 second-feet) Dec. 20, Jan. 26, 29, Apr. 10, 14, 15 (gage height, 2.61 feet); no flow Jan. 16–24.

REMARKS.—Records good. Ditch diverts water from Hanapepe River at intake 5 miles above station. Station was established Dec. 6, 1929.

Discharge, in million gallons a day, 1929–30

Day	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1		6.6	23	• 22	21	22	15.5
2		22	15.5	• 5.0	18.5	22	19.5
3		21	19.5	• 17	17.5	25	24
4		19.5	19	• 20	17.5	24	27
5		14	18.5	• 20	17.5	27	27
6		17.5	18.5	• 20	18	25	24
7	14.5	17.5	18	• 22	24	21	21
8	14.5	17.5	18	• 26	25	21	19.5
9	14.5	17.5	17.5	• 28	27	19.5	18.5
10	14.5	17	17.5	• 26	27	18.5	18
11	14.5	17	17.5	25	27	19.5	21
12	15	18	• 17.5	22	27	18	25
13	15	19.5	• 19.5	21	25	17.5	25
14	15	17.5	• 17.5	18.5	28	18.5	22
15	19.5	23	• 17.5	21	27	19	22
16	18	0	• 17.5	19.5	27	18.5	24
17	17	0	• 16	18.5	24	17.5	22
18	16	0	• 17.5	18	22	18	27
19	16	0	• 17.5	18	21	17.5	27
20	22	0	• 16	18	21	18	27
21	22	0	• 17.5	18	19.5	22	27
22	24	0	• 16	21	21	24	27
23	22	0	• 17	25	19.5	25	27
24	25	2.0	• 24	25	18.5	24	28
25	22	28	• 19.5	27	18.5	21	18
26	21	28	• 22	24	18	19.5	27
27	19.5	27	• 28	21	18	18	27
28	17	24	• 28	19.5	18.5	19.5	28
29	5.4	28		18.5	18.5	18	27
30	6.0	28		18	19.5	17	27
31	5.3	27		18		17	

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
December (7–31).....	25	5.3	16.6	25.7	415	1,270
January (28 days).....	28	0	19.7	30.5	452	1,390
February.....	28	16	19.0	29.4	531	1,630
March.....	28	5.0	20.6	31.9	640	1,960
April.....	28	17.5	21.7	33.6	652	2,000
May.....	27	13	20.2	31.8	627	1,920
June.....	28	15.5	24.0	37.1	719	2,210
The period (198 days).....	28	0	20.4	31.6	4,040	12,400

• Estimated.

GEE DITCH AT MAKAI SIPHON, NEAR ELEELE, KAUAI

LOCATION.—Water-stage recorder 200 feet below makai siphon and 2½ miles northeast of Eleele.

RECORDS AVAILABLE.—December, 1929, to June, 1930.

EXTREMES.—Maximum discharge for period, 2.6 million gallons a day (4.0 second-feet) Feb. 27 (gage height, 2.01 feet); minimum, 0.1 million gallons a day (0.2 second-foot) Apr. 6.

REMARKS.—Records fair. Intake is 700 feet above station and diverts water from Hanapepe River. Station was established Dec. 3, 1929.

Discharge, in million gallons a day, 1929-30

Day	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1		0.7	0.4	0.7	0.8	1.0	1.4
2		.7	.4	.8	.6	1.0	1.1
3		.6	.5	.6	.6	1.2	1.6
4		.5	.6	.5	.6	.9	1.5
5	0.5	.5	.6	.5	.6	1.5	.7
6	.5	.4	.5	.5	.5	1.0	.3
7	.6	.5	.5	.5	.8	.8	.8
8	.6	.6	.5	.7	.9	.7	1.0
9	.6	.6	.5	.9	1.0	.7	.9
10	.6	.5	.5	.6	.8	.6	.9
11	.5	.5	.5	.6	.9	.7	1.6
12	.5	.6	.5	.5	.9	.6	1.6
13	.5	.7	.6	.5	.7	.6	1.4
14	.5	.5	.5	.6	.9	.6	1.1
15	1.1	.7	.5	.7	.6	.6	1.1
16	.6	.6	.5	.7	.5	.6	1.3
17	.6	.6	.5	.6	.5	.6	1.1
18	.5	.6	.5	.6	.5	.6	2.0
19	.5	.6	.5	.6	.5	.6	1.6
20	.8	.6	.5	.6	.5	.8	1.8
21	.7	1.1	.5	.6	.5	.9	1.2
22	.9	1.0	.4	.7	.7	1.1	1.6
23	.8	.9	.5	1.1	.7	1.5	1.2
24	1.0	.9	1.3	1.0	.6	.9	1.6
25	.9	.6	1.0	1.2	.6	.8	1.4
26	.6	.9	1.0	.8	.6	.7	1.2
27	.6	.6	1.3	.7	.6	.6	1.3
28	.5	.5	.7	.6	.7	.7	1.4
29	.9	.8		.6	.7	.6	1.2
30	1.1	.6		.6	.8	.7	1.3
31	.8	.5		.6		.8	

Month	Discharge			Total run-off		
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
December (5-31)	1.1	0.5	0.68	1.05	18.3	58
January	1.1	.4	.65	1.01	20.0	62
February	1.3	.4	.60	.93	16.8	52
March	1.2	.5	.67	1.04	20.8	64
April	1.0	.5	.67	1.04	20.2	62
May	1.5	.6	.81	1.25	25.0	77
June	2.0	.5	1.24	1.92	37.2	114
The period (208 days)	2.0	.4	.76	1.18	158	487

SOUTH FORK OF WAILUA RIVER, NEAR LIHUE, KAUAI, HAWAII

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 further upstream.

DRAINAGE AREA.—22.4 square miles.

RECORDS AVAILABLE.—December, 1911, to June, 1930.

EXTREMES.—Maximum discharge during year, 21,200 million gallons a day (32,800 second-feet) July 26 (gage height, 10.03 feet); minimum, 3.3 million gallons a day (5.1 second-feet) July 6.

1911-1930: Maximum discharge, 29,000 million gallons a day (44,900 second-feet) Jan. 16, 1920 (gage height, 11.25 feet); minimum, 1.2 million gallons a day (1.9 second-feet) May 3, 1926.

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

Discharge, in million gallons a day, 1929-30

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	3.8	84	18	14.5	38	34	61	107	86	16	6.0	4.3
2	3.7	78	16	12.8	32	122	228	95	77	28	6.4	4.5
3	3.8	78	18	13	35	46	142	88	62	21	6.9	12.5
4	3.7	77	14.5	11	957	34	99	84	56	15	7.2	75
5	3.4	53	17	427	338	41	88	70	51	13.5	57	9.2
6	3.4	48	15	258	284	39	78	61	48	35	27	4.7
7	4.2	40	12.5	129	151	83	71	55	43	50	8.3	4.1
8	3.7	26	112	139	163	80	65	52	33	55	6.0	3.9
9	4.3	77	47	108	140	19.5	64	38	133	163	6.3	3.8
10	3.7	49	18	96	129	80	62	23	39	96	5.3	3.7
11	4.5	68	12.5	81	120	28	52	38	27	156	5.1	4.6
12	4.1	42	12.5	71	96	28	58	29	30	174	4.7	4.2
13	3.9	23	12	61	81	26	68	18.5	15	90	4.7	5.3
14	4.1	19	11.5	48	78	24	52	12.5	10.5	559	4.6	4.8
15	4.0	46	11	22	76	28	161	15	22	102	4.6	4.6
16	5.5	45	10.5	42	68	16.5	60	33	42	61	4.6	4.9
17	6.1	25	10.5	41	62	28	44	20	20	39	4.6	4.9
18	4.6	40	11	32	56	14	43	9.8	8.9	56	4.6	18
19	3.9	51	11	26	48	13	38	9.4	8.1	46	4.5	6.9
20	3.8	40	11	41	32	110	13	7.7	22	48	4.2	9.6
21	3.9	34	10.5	28	26	88	10.5	7.2	45	37	4.7	7.1
22	16.5	61	14.5	14	15	157	10	8.0	48	8.8	6.0	10
23	14	42	11	13	17	121	21	11	175	8.5	18	15
24	5.8	25	12	14.5	17.5	139	256	124	96	7.7	6.1	4.7
25	26	42	12.5	14	58	88	708	27	126	6.0	4.9	5.9
26	410	20	12.5	13.5	76	67	1,190	102	75	8.6	4.6	5.1
27	375	124	19	13	53	60	217	582	46	6.3	3.9	4.8
28	202	23	11	13.5	60	55	140	143	38	6.3	3.7	24
29	140	15.5	12	83	48	61	331	44	44	6.3	3.7	6.3
30	110	15	34	61	38	150	295	38	38	6.1	3.6	19.5
31	98	27	31	81	88	120	120	14	14	3.8	3.8	3.8

Month	Discharge			Total run-off		
	Million gallons a day			Second-feet (mean)	Million gallons	Acres-feet
	Maximum	Minimum	Mean			
July	4,410	3.4	177	274	5,490	15,300
August	124	15.5	46.2	71.5	1,430	4,400
September	112	10.5	18.0	27.9	540	1,600
October	427	11	60.8	94.1	1,880	5,750
November	957	15	112	173	3,370	10,000
December	157	13	58.4	90.4	1,810	5,600
January	1,190	10	153	237	4,740	14,000
February	582	7.2	66.8	103	1,870	5,740
March	175	8.1	54.5	84.3	1,690	5,180
April	559	6.1	64.1	99.2	1,920	5,900
May	57	3.6	7.92	12.3	246	753
June	75	3.7	9.86	15.3	296	908
The year	4,410	3.4	68.8	207	25,300	77,600

NORTH FORK OF WAILUA RIVER AT ELEVATION 686 FEET, NEAR LIHUE, KAUAI

LOCATION.—Water-stage recorder $1\frac{1}{2}$ miles above intake of Kanaha Ditch and $7\frac{1}{2}$ miles northwest of Lihue.

DRAINAGE AREA.—6.6 square miles.

RECORDS AVAILABLE.—August, 1910, to June, 1930.

EXTREMES.—Maximum discharge during year, 1,200 million gallons a day (1,800 second-feet) Nov. 4 (gage height, 5.50 feet); minimum, 18.5 million gallons a day (29 second-feet) July 10.

1910-1930: Maximum discharge, 3,410 million gallons a day (5,280 second-feet) Dec. 24, 1927 (gage height, 8.46 feet); minimum, about 7.7 million gallons a day (11.9 second-feet) Apr. 27, 1928.

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

Discharge, in million gallons a day, 1929-30

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1.....	23	42	32	44	27	41	53	40	44	40	37	45
2.....	22	42	52	42	29	150	105	34	42	32	38	30
3.....	24	44	42	37	21	50	72	32	32	27	40	58
4.....	21	40	32	47	265	* 37	55	22	30	27	40	51
5.....	20	42	27	175	102	* 27	50	27	30	34	66	37
6.....	20	66	25	95	78	25	* 50	27	30	51	24	32
7.....	20	34	25	72	56	* 24	50	25	32	64	36	30
8.....	20	30	92	72	58	44	26	28	55	58	30	30
9.....	20	65	40	60	47	44	25	64	104	30	30	30
10.....	20	42	27	60	60	42	25	79	60	30	30	30
11.....	35	40	32	50	53	* 22	37	24	94	103	30	32
12.....	30	34	25	40	40	44	24	24	50	76	30	31
13.....	31	32	25	32	34	63	25	40	50	56	30	40
14.....	23	27	23	30	32	* 21	34	24	34	113	30	30
15.....	23	49	23	30	30	50	86	23	64	50	30	35
16.....	41	50	22	49	30	23	34	23	37	40	30	42
17.....	35	34	22	30	60	20	30	23	32	34	30	58
18.....	29	34	23	31	40	21	27	23	30	32	30	66
19.....	22	53	22	26	32	63	27	26	30	34	30	50
20.....	27	65	22	24	30	119	26	22	58	32	30	60
21.....	b 55	67	21	23	25	80	25	26	45	30	41	42
22.....		63	21	22	25	184	24	25	82	30	45	37
23.....		47	24	22	25	158	24	40	150	30	47	44
24.....		34	27	23	24	150	41	95	36	30	30	58
25.....		37	29	23	58	100	196	37	66	30	30	30
26.....	b 240	37	66	22	34	85	208	96	42	30	30	42
27.....		73	30	30	32	60	67	199	37	27	30	55
28.....		37	32	28	27	64	47	60	32	32	30	30
29.....		32	54	52	23	76	115	-----	30	30	30	45
30.....	* 56	26	63	32	27	105	75	-----	27	30	30	60
31.....	47	35	-----	25	-----	64	47	-----	26	-----	30	-----

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July.....	-----	20	64.1	99.2	1,990	6,100
August.....	73	27	43.9	67.9	1,360	4,180
September.....	92	21	33.3	51.5	998	3,070
October.....	175	22	43.3	67.0	1,340	4,130
November.....	295	21	47.9	74.1	1,440	4,410
December.....	184	20	62.2	96.2	1,920	5,960
January.....	208	24	59.5	92.1	1,840	5,650
February.....	190	22	39.8	61.6	1,110	3,430
March.....	159	27	40.8	77.1	1,540	4,740
April.....	113	27	45.5	70.4	1,380	4,180
May.....	66	30	33.8	52.3	1,050	3,250
June.....	81	30	44.3	68.5	1,330	4,000
The year.....	-----	20	47.4	73.3	17,300	53,100

* Partly estimated.

b Estimated mean.

KANAKA DITCH NEAR LIHUE, KAUAI

LOCATION.—Water-stage recorder a quarter of a mile above point where Kauai Electric Co.'s power line crosses ditch and $7\frac{1}{4}$ miles northwest of Lihue.

RECORDS AVAILABLE.—August, 1910, to June, 1930.

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

1910-1930: Maximum discharge recorded, 45 million gallons a day (70 second-feet) Dec. 24, 1927 (gage height, 3.22 feet); no flow occasionally when water was shut out of ditch.

REMARKS.—Daily-discharge record furnished by Lihue Plantation Co. Intake $8\frac{1}{2}$ 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 a day, 1929-30

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1.	6.0	0.4	6.9	6.6	6.7	5.6	4.8	5.1	5.3	5.6	6.7	13.9
2.	6.5	.5	6.8	6.9	6.7	5.5	5.2	5.2	5.3	5.4	6.7	12.9
3.	6.8	.6	6.4	7.0	6.6	5.2	5.2	5.2	5.2	5.3	7.1	14.0
4.	7.0	.6	6.4	6.9	4.3	5.3	5.7	5.3	5.1	5.0	6.7	7.6
5.	5.7	.8	6.5	6.2	.8	5.2	5.7	5.3	5.1	5.3	6.6	6.0
6.	5.8	.7	6.5	6.4	1.0	5.2	5.6	5.3	5.6	5.2	6.6	6.8
7.	6.1	.7	6.5	6.6	.9	5.3	5.5	5.3	3.4	5.2	6.8	6.7
8.	6.1	4.0	6.5	6.6	.8	5.1	5.4	5.2	.3	5.2	6.7	6.8
9.	6.7	6.8	6.3	6.7	.8	5.0	5.4	5.1	.3	5.3	6.6	10.1
10.	7.0	6.7	6.7	6.9	.9	5.0	5.2	5.0	.3	5.1	6.6	9.9
11.	9.9	6.6	6.5	6.7	.7	5.0	5.1	5.1	.3	5.3	6.7	6.6
12.	8.1	6.7	6.4	6.6	.7	5.0	5.2	5.1	4.0	5.1	7.8	6.8
13.	7.2	6.6	6.6	6.4	.5	5.1	5.3	5.0	5.0	5.3	7.8	6.6
14.	7.5	6.7	6.7	6.6	.5	5.2	5.2	5.2	5.2	5.5	7.7	6.6
15.	7.4	6.8	6.6	6.7	.6	5.5	1.5	5.3	5.7	5.1	7.8	6.8
16.	7.5	6.7	6.7	6.9	.5	5.1	.4	5.3	5.3	5.3	4.5	8.1
17.	7.4	6.6	6.9	7.1	.4	5.2	.4	5.2	5.3	5.3	7.4	7.6
18.	7.6	6.5	6.9	7.4	.4	5.3	.2	5.1	5.3	5.2	7.6	5.9
19.	7.5	6.6	6.8	7.2	1.5	5.4	.2	5.3	5.3	5.4	6.7	5.6
20.	7.7	6.5	6.6	7.0	5.2	5.2	3.6	5.3	5.2	5.4	9.8	5.4
21.	7.9	6.7	6.6	7.0	5.2	5.2	5.0	5.4	5.1	5.3	11.0	5.8
22.	8.0	6.9	6.6	7.0	5.4	5.7	5.0	5.5	5.6	5.3	14.0	5.4
23.	7.7	6.8	6.6	6.9	5.4	5.3	5.0	5.7	5.7	5.3	11.2	5.5
24.	7.7	6.7	6.6	6.9	5.3	5.1	5.1	5.6	4.9	5.3	9.4	5.8
25.	8.0	6.8	6.8	6.8	5.4	4.8	4.6	5.4	5.2	5.3	8.0	5.3
26.	4.4	6.8	6.9	6.6	5.2	5.1	4.7	5.3	4.9	5.3	11.1	5.3
27.	.8	6.9	6.4	6.8	5.2	5.2	5.0	5.5	5.1	5.2	11.7	5.4
28.	.9	6.8	6.7	6.6	5.3	5.3	5.0	5.3	5.3	5.1	12.1	5.4
29.	.6	6.8	6.5	6.6	5.3	5.4	5.2	5.3	5.3	4.8	11.3	5.3
30.	.7	6.7	6.5	6.4	5.4	5.4	5.1	5.3	5.3	5.8	11.3	5.3
31.	.4	6.7	6.6	6.6	5.0	5.0	5.1	5.3	5.3	5.3	11.4	5.3

Month	Discharge			Total run-off		
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July	9.9	0.4	6.08	9.41	188	578
August	6.9	.4	5.27	8.15	163	501
September	6.9	6.3	6.61	10.2	198	609
October	7.4	6.2	6.76	10.5	210	643
November	6.7	.4	3.12	4.83	93.6	287
December	5.7	4.8	5.22	8.08	162	497
January	5.7	.2	4.37	6.76	136	416
February	5.7	5.0	5.27	8.15	148	458
March	5.7	.3	4.52	6.99	140	430
April	5.8	4.8	5.27	8.15	158	485
May	14.0	4.5	8.50	13.2	263	809
June	14.0	5.3	7.18	11.1	216	661
The year	14.0	.2	5.69	8.80	2,080	6,370

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

LOCATION.—Water-stage recorder, 1,200 feet above confluence with North Fork and $7\frac{1}{4}$ miles northwest of Lihue.

DRAINAGE AREA.—6.2 square miles.

RECORDS AVAILABLE.—July, 1912, to June, 1930.

EXTREMES.—Maximum discharge during year, 2,580 million gallons a day (3,990 second-feet) July 26 (gage height, 9.01 feet); minimum, 10.9 million gallons a day (16.9 second-feet) July 6, 10, 19.

1912-1930: Maximum discharge, 3,340 million gallons a day (5,170 second-feet) Dec. 24, 1927 (gage height, 10.57 feet); minimum, 4.4 million gallons a day (6.8 second-feet) July 8, 13, 1926.

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

Discharge, in million gallons a day, 1929-30

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1.....	11.5	24			• 17	15.5	37	30	31	30	22	28
2.....	12	24		• 24	• 14	79	82	28	30	28	24	22
3.....	13	22			14	24	56	25	25	25	26	80
4.....	12	22	• 18		283	19	40	26	24	25	26	54
5.....	11.5	24		• 75	72	17.5	35	25	22	28	34	26
6.....	11.5	24			45	17	30	25	22	35	25	24
7.....	12	22		37	35	16	28	24	24	45	22	22
8.....	11.5	19	• 38	25	33	15.5	28	24	29	42	24	20
9.....	11.5	39		30	28	15.5	28	24	37	50	22	20
10.....	11.5	24		35	34	15	28	22	55	38	20	19
11.....	13	22		28	28	15	26	22	58	61	20	20
12.....	11.5	21	• 14	24	24	14.5	26	22	31	53	20	25
13.....	11.5	21		22	22	14	36	22	26	35	19	60
14.....	12			21	21	14	24	26	28	39	19	22
15.....	13			21	21	15.5	31	20	41	38	19	29
16.....	15.5		12.5	19	19	14	24	26	25	30	19	31
17.....	15.5		12.5	19	29	13.5	22	20	24	28	19	26
18.....	12.5		13	19	19	13	21	26	22	26	19	28
19.....	11.5		12.5	17	19	20	21	26	22	26	19	28
20.....	11.5		12.5	16	17.5	92	19	20	68	26	20	35
21.....	16.5		12.5	15	17	42	19	20	44	25	29	28
22.....	38	• 26	12.5	16	16	146	19	20	36	25	31	26
23.....	28		12.5	14.5	16	129	17.5	29	142	24	31	30
24.....	19		14	14	16	122	32	49	48	22	20	36
25.....	24		14	15	24	84	296	28	40	22	20	33
26.....	687			14.5	21	69	294	72	38	22	20	31
27.....	180			15	17	42	66	190	31	22	19	37
28.....	48		• 28	14	17	40	46	42	36	20	19	35
29.....	35			• 29	15	53	42		28	20	19	30
30.....	30			• 18	14.5	102	38		26	20	17.5	35
31.....	28					48	• 31		26		17.5	

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July.....	687	11.5	41.9	64.8	1,300	3,990
August.....			25.0	38.7	776	2,380
September.....			18.5	28.6	554	1,700
October.....		14	24.9	38.5	771	2,370
November.....	283	14	32.3	50.0	968	2,970
December.....	146	13	43.1	66.7	1,340	4,100
January.....	296	17.5	49.7	76.9	1,540	4,730
February.....	190	20	32.8	50.7	918	2,820
March.....	143	22	36.4	56.3	1,130	3,490
April.....	61	20	30.9	47.8	928	2,840
May.....	34	17.5	22.0	34.0	683	2,060
June.....	54	19	28.7	44.4	860	2,640
The year.....	687		32.2	49.8	11,800	36,100

• Estimated.

• Estimated mean.

• Partly estimated.

KAPAHU DITCH NEAR KEALIA, KAUAI

LOCATION.—Water-stage recorder 500 feet below intake and $4\frac{1}{2}$ miles west of Kealia.

RECORDS AVAILABLE.—April, 1909, to May, 1914; May, 1915, to June, 1930.

EXTREMES.—Maximum discharge during year, 142 million gallons a day (220 second-feet) Oct. 5 (gage height, 2.28 feet); no flow occasionally when water was shut out of ditch.

1909-1914, 1915-1930: Maximum discharge, 233 million gallons a day (361 second-feet) Mar. 31, 1923 (gage height, about 3.15 feet); no flow occasionally when water was shut out of ditch.

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

Discharge, in million gallons a day, 1929-30

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1.....	3.3	0	3.4	6.2	2.4	0.3	0.9	0	0.9	5.9	5.4	8.2
2.....	3.4	.78	9.1	4.8	2.5	1.3	.7	0	.3	10.5	5.5	2.6
3.....	4.0	.15	6.5	5.1	.4	.08	.55	0	.7	9.8	4.5	8.5
4.....	1.9	5.1	6.6	13	1.4	.08	.35	0	.9	13.5	1.8	15.5
5.....	3.5	8.3	6.2	55	.3	3.2	.15	0	.9	7.3	7.3	7.4
6.....	3.2	5.6	6.5	12	.15	3.1	.15	0	9.1	2.0	8.7	5.2
7.....	3.2	5.6	5.9	2.9	2.6	.15	.15	0	12.5	11.5	7.2	4.9
8.....	3.0	6.8	4.0	1.7	2.1	1.5	.15	1.6	7.7	9.8	4.5	2.1
9.....	3.4	10.5	3.9	0	6.2	.15	4.3	3.2	7.6	5.2	4.3	
10.....	3.2	7.7	9.5	0	6.8	.08	4.6	9.1	9.8	4.4	4.6	
11.....	5.7	2.6	*3.1	13	0	5.2	.08	6.5	2.8	8.3	1.4	4.3
12.....	3.1	7.6	8.6	0	4.4	.15	6.4	.4	3.7	4.8	5.2	
13.....	5.2	8.6	.9	0	4.2	1.1	7.6	.4	.7	4.3	7.1	
14.....	5.2	9.4	*3.2	4.2	6.7	4.3	.08	6.5	5.1	5.4	4.3	2.2
15.....	3.4	8.4	1.5	3.7	8.0	2.1	.15	6.8	.3	7.2	4.3	.4
16.....	2.1	6.6	2.6	6.8	8.0	4.9	1.5	8.0	.02	1.9	4.6	7.0
17.....	3.6	3.7	2.6	5.9	8.0	3.7	5.9	8.7	.02	7.5	4.0	9.8
18.....	3.0	2.9	2.9	5.5	10	4.3	7.6	8.8	.01	2.0	2.9	10.5
19.....	1.3	4.9	2.1	5.9	6.2	11	5.7	10	0	7.5	4.0	10.5
20.....	1.3	5.8	2.1	4.2	9.4	2.6	5.8	9.0	0	5.8	3.7	8.3
21.....	.4	*13.5	1.7	4.4	9.4	.9	5.3	11	0	7.5	7.7	3.3
22.....	1.3	13	.7	2.4	9.0	1.3	6.2	13	1.7	7.6	7.2	.7
23.....	9.0	6.2	2.1	3.2	5.1	1.1	4.8	9.9	.55	8.7	10.5	11.5
24.....	6.8	4.6	4.5	2.9	.9	1.1	1.3	12	.15	7.6	6.8	11.5
25.....	5.9	4.0	3.5	3.2	1.9	.9	18.5	12	.15	7.2	4.9	9.0
26.....	4.6	5.4	14.5	2.9	.9	.9	.55	8.3	.08	5.9	4.3	8.0
27.....	.08	5.2	4.0	1.7	.7	.9	.02	2.6	.15	1.8	4.3	6.9
28.....	.02	4.6	7.3	3.5	.55	1.1	.02	.9	.08	4.0	3.7	8.6
29.....	0	5.1	7.9	4.7	.55	1.1	0	-----	.15	4.3	4.0	2.3
30.....	0	5.4	24	2.9	.4	1.1	0	-----	.15	4.0	3.7	9.7
31.....	0	7.4	-----	3.6	-----	1.1	0	-----	3.3	-----	4.0	-----

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July (28 days).....	9.0	0	3.36	5.20	94.1	289
August (30 days).....	13.5	0	6.18	9.56	185	569
September.....	24	.7	5.03	7.78	161	463
October.....	55	.9	6.72	10.4	208	639
November (25 days).....	10	0	3.90	6.03	97.6	299
December.....	11	.08	2.61	4.04	80.9	248
January (28 days).....	18.5	0	2.38	3.68	66.7	205
February (21 days).....	13	0	7.55	11.7	158	487
March (28 days).....	12.5	0	2.17	3.36	60.8	186
April.....	13.5	.7	6.54	10.1	196	602
May.....	10.5	1.4	4.96	7.67	154	472
June.....	15.5	.4	6.67	10.3	200	614
The year (343 days).....	55	0	4.82	7.46	1,650	5,070

* Estimated mean.

† Partly estimated.

NOTE.—No flow July 29 to Aug. 1, Nov. 9-13, Jan. 29 to Feb. 7, and Mar. 19-21, due to artificial regulation.

ANAHOLA RIVER NEAR KEALIA, KAUAI

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

DRAINAGE AREA.—5.5 square miles.

RECORDS AVAILABLE.—August to November, 1910; and December, 1912, to June, 1930.

EXTREMES.—Maximum discharge during year, 1,820 million gallons a day (2,820 second-feet) Jan. 25 (gauge height, 10.32 feet); minimum, 2.4 million gallons a day (3.7 second-feet) Sept. 16, 17, 19, and 20.

1910, 1912-1930: Maximum discharge, that of Jan. 25, 1930; minimum, 1.4 million gallons a day (2.2 second-feet) Sept. 12-13, 1923.

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

Discharge, in million gallons a day, 1929-30

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1-----	11	* 7	* 6	4.7	3.5	6.7	16	9.2	15	11	5.4	5.5
2-----	11.5			3.5	3.4	23	112	8.5	11.5	8.9	6.1	4.7
3-----	11.5			4.4	3.2	6.7	83	9.0	10	7.2	5.7	9.7
4-----	6.5			3.7	12.5	177	6.2	29	12.5	9.2	7.7	5.4
5-----	2.9			3.4	121	32	5.8	19.5	8.1	8.5	7.9	6.9
6-----	2.7	* 3.2	* 3.2	28	14.5	5.5	15	7.4	8.1	19	5.1	4.5
7-----	3.2			12.5	16	5.3	13.5	7.4	7.7	26	5.0	4.2
8-----	3.0			4.8	10	14	5.1	12	7.2	12	26	4.8
9-----	3.4			4.1	11	8.4	5.1	11.5	7.2	12.5	25	4.8
10-----	3.2			3.0	19	19	5.1	10.5	9.3	30	12	4.7
11-----	20	6.4	3.2	8.2	13	5.1	9.0	7.7	14	17	5.0	4.7
12-----	4.7	6.0	3.4	6.2	8.0	5.1	8.7	7.4	7.7	17	4.8	5.0
13-----	3.5	5.8	3.0	5.3	7.4	5.1	18	8.8	5.9	8.8	4.6	12
14-----	3.7	5.5	2.9	5.1	7.0	5.1	8.4	7.2	8.5	26	4.5	4.8
15-----	3.4	8.2	2.7	5.1	6.4	5.5	8.0	6.8	196	25	4.5	12.5
16-----	6.9	18	2.6	4.9	6.2	5.3	7.0	6.5	20	7.7	4.5	16
17-----	7.9	6.0	2.7	4.4	54	5.1	6.7	6.3	14	7.0	4.5	7.9
18-----	3.5	5.3	2.9	4.4	10	4.9	6.7	6.5	11	6.6	4.6	5.2
19-----	3.0	6.0	2.6	4.9	8.2	8.4	6.4	9.1	10.5	6.6	4.6	5.2
20-----	3.2	5.3	2.6	4.2	10.5	86	7.4	6.1	59	6.6	4.5	8.6
21-----	7.5	15.5	2.7	3.8	7.2	16	6.7	18.5	16	6.3	5.4	6.5
22-----	18	8.7	2.7	3.8	7.6	59	6.0	21	11	5.9	9.5	5.2
23-----	10	9.7	3.0	3.8	9.2	43	21	37	116	5.7	11	7.7
24-----	4.7	5.3	3.4	3.5	9.7	34	62	57	19.5	5.6	5.0	9.3
25-----	3.9	5.1	4.9	3.5	16.5	23	252	19	13	5.6	4.7	7.7
26-----	* 280	7.4	9.4	3.4	13	34	120	62	11.5	5.2	4.8	6.2
27-----		13.5	3.8	4.0	18.5	14.5	29	195	10	5.2	4.5	10.5
28-----		8.2	3.7	3.7	11.5	17.5	17.5	30	9.2	5.2	4.2	8.2
29-----		4.7	17.5	17.5	7.4	28	14	-----	8.8	5.2	4.2	5.7
30-----		4.4	8.0	5.6	6.7	88	11	-----	8.3	5.1	4.2	8.4
31-----	* 5.0		-----	3.6	-----	30	9.8	-----	8.5	-----	4.4	-----

Month	Discharge			Total run-off		
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July-----	-----	2.7	24.6	38.1	763	2,340
August-----	18	4.4	7.57	11.7	235	730
September-----	17.5	2.6	4.32	6.68	130	398
October-----	121	3.4	10.8	16.7	335	1,030
November-----	177	3.2	17.6	27.2	529	1,620
December-----	88	4.9	19.3	29.9	597	1,840
January-----	252	6.0	30.9	47.8	957	2,940
February-----	195	6.1	21.3	33.0	598	1,830
March-----	196	5.9	22.7	35.1	703	2,160
April-----	26	5.1	11.1	17.2	334	1,020
May-----	11	4.2	5.22	8.08	162	497
June-----	16	4.0	7.27	11.2	218	669
The year-----	-----	2.6	15.2	23.5	5,560	17,100

* Estimated mean.

* Partly estimated.

* Estimated.

ANAHOLA DITCH ABOVE KANEHA RESERVOIR, NEAR KEALIA, KAUAI

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

RECORDS AVAILABLE.—May, 1915, to June, 1930.

EXTREMES.—Maximum discharge during year, 89 million gallons a day (138 second-feet) Jan. 25 (gage height, 4.95 feet); no flow occasionally when water was shut out of ditch.

1915-1930: Maximum discharge recorded, 130 million gallons a day (201 second-feet) Jan. 16, 1921 (gage height, 6.25 feet); no flow occasionally when water was shut out of ditch.

REMARKS.—Records good except those estimated, 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 a day, 1929-30

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1.	1.3	0		6.4	2.1	0	0	0	0	0	5.2	5.7
2.	1.3	0		5.2	1.95	0	0	0	0	0	5.5	2.4
3.	2.1	0		5.2	1.65	0	0	0	0	2.1	5.4	5.9
4.	1.5	0		8.4	5.1	0	0	0	0	4.4	3.7	5.8
5.	1.25	0	2.8	11	0	0	0	0	0	6.1	5.1	3.4
6.	1.1	0		1.0	0	0	0	1.85	0	6.9	3.3	2.5
7.	1.3	0	2.2	3.1	0	0	0	2.5	0	9.2	2.5	2.2
8.	1.2	0	2.9	7.9	0	0	0	2.4	0	8.9	4.1	2.0
9.	2.7	0	2.6	7.5	0	0	0	2.3	0	8.9	2.8	1.85
10.	1.4	0	2.1	4.0	0	0	0	2.3	0	8.3	2.2	1.75
11.	6.4	0	2.4	.03	0	.98	0	2.2	0	4.6	3.6	3.1
12.	2.3	0	3.0	0	0	1.95	0	2.0	0	3.9	2.1	4.3
13.	1.65	0	2.0	0	0	1.85	0	3.4	0	5.9	1.75	4.9
14.	2.9	2.1	1.85	2.5	0	1.75	0	2.1	0	8.5	1.65	3.1
15.	2.1	5.2	1.75	3.8	0	1.95	0	1.95	1.25	9.1	1.55	4.5
16.	4.7	5.9	1.65	4.0	0	1.95	0	1.85	0	6.9	1.55	4.8
17.	4.5	3.9	1.5	3.2	0	1.65	0	2.6	0	5.7	1.55	4.6
18.	2.1	4.0	2.0	3.0	0	1.65	0	3.5	0	4.8	2.3	3.8
19.	1.55	4.3	1.55	4.0	0	8.2	0	5.6	0	5.5	1.65	4.3
20.	1.85	3.4	1.4	2.9	0	4.9	0	2.2	0	4.9	1.85	4.6
21.	5.1	5.8	1.4	2.3	0	0	0	9.4	0	4.1	6.2	4.3
22.	6.8	5.7	1.3	2.0	0	0	1.25	11	0	5.4	8.0	3.9
23.	6.1	5.4	1.4	2.0	0	0	2.8	12	0	3.5	7.1	4.6
24.	4.4	3.7	1.75	1.85	0	0	.01	4.0	0	3.1	3.0	4.8
25.	3.3	3.7	3.9	2.2	0	0	3.5	3.3	0	3.3	2.8	4.5
26.	5.7	4.3	5.7	1.75	0	0	3.1	1.7	0	2.9	2.3	4.4
27.	0	5.0	3.3	2.2	0	0	1.75	0	0	2.6	1.85	4.5
28.	0	4.5	3.6	2.1	0	0	1.5	0	0	2.9	1.65	4.4
29.	0	3.0	8.2	1.05	0	0	.56	-----	0	2.9	1.55	4.3
30.	0		7.1	0	0	0	0	-----	0	3.2	1.55	4.5
31.	0	2.9		1.5	-----	0	0	-----	0	-----	1.55	-----

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July (26 days)	6.8	0	2.95	4.56	76.6	235
August (18 days)	5.9	0	4.21	6.51	75.7	233
September	8.2	1.3	2.78	4.30	83.4	256
October (28 days)	11	0	3.65	5.65	102	314
November (4 days)	5.1	0	2.70	4.18	10.8	33
December (19 days)	8.2	0	2.68	4.15	26.8	82
January (8 days)	3.5	0	1.81	2.80	14.5	44
February (21 days)	12	0	3.82	5.91	80.2	246
March (11 days)	1.25	0	1.25	1.93	1.25	4
April (28 days)	9.2	0	5.30	8.20	148	455
May	8.0	1.55	3.13	4.84	96.9	298
June	5.9	1.75	3.99	6.17	120	367
The year (235 days)	12	0	3.56	5.51	836	2,570

* Estimated mean.

NOTE.—No flow occasionally during July, August, October, November, December, January, February, March, and April, due to artificial regulations.

HANALEI RIVER AT ELEVATION 625 FEET, NEAR HANALEI, KAUAI

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

DRAINAGE AREA.—7.4 square miles.

RECORDS AVAILABLE.—January, 1914, to June, 1930.

EXTREMES.—Maximum discharge during year, 2,560 million gallons a day (3,960 second-feet) July 26 (gage height, 6.40 feet); minimum, 8.4 million gallons a day (13 second-feet) July 6.

1914-1930: Maximum discharge, 6,500 million gallons a day (10,100 second-feet) Jan. 16, 1921 (gage height, 7.50 feet); minimum 5.8 million gallons a day (9.0 second-feet) Apr. 28, May 1-3, 1926.

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

Discharge, in million gallons a day, 1929-30

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1.....	8.8	19	17	25	12	40	38	16	33	22	19	26
2.....	9.0	18.5	27	21	12	170	123	15	34	20	22	16
3.....	9.3	18.5	17.5	21	11.5	21	83	14.5	20	16.5	27	42
4.....	8.8	24	16	50	293	17.5	41	16	17.5	16.5	31	74
5.....	8.8	25	14.5	216	54	16	33	14	16.5	25	54	22
6.....	8.6	28	14	68	32	14.5	27	13.5	17	54	23	17.5
7.....	8.8	21	13.5	43	25	14	24	13	17.5	72	18.5	16
8.....	8.8	18.5	51	38	22	13.5	22	12.5	19.5	74	19	15
9.....	9.3	31	14.5	33	20	13	22	12	23	114	17	14.5
10.....	9.0	21	13	34		13	19	12	22	60	16.5	14.5
11.....	11.5	20	13.5	26		13	18	12	207	246	16	15.5
12.....	9.7	18.5	13	22		13	20	12	52	134	15.5	27
13.....	9.7	18	12	20	30	12.5	56	13	35	49	15	28
14.....	9.7	16.5	12	18.5		12.5	19	11.5	31	76	14.5	16
15.....	10	29	12	18.5		18	48	11	26	41	14.5	38
16.....	19.5	29	11.5	20		13	18	11	25	30	14.5	33
17.....	13	19	11	17	65	12	17	11	22	26	14	26
18.....	10	18	11.5	16	18.5	12	16	11	20	22	14.5	39
19.....	9.5	22	11.5	15.5	16.5	66	16	13	18.5	23	14.5	28
20.....	9.7	25	11	14.5	15.5	205	16	11	61	21	16	35
21.....	45	36	11	14	14.5	81	15	12	32	19.5	26	23
22.....	51	34	10.5	13.5	14.5	281	14.5	14	42	20	38	20
23.....	26	28	11	13	14.5	250	14.5	14.5	214	19.5	35	29
24.....	17.5	21	11.5	12.5	14	238	22	64	58	17	18.5	55
25.....	122	20	16.5	13	30	134	153	31	84	16.5	16.5	41
26.....	584	22	48	12	17	104	179	107	24	16	16	32
27.....	83	45	15.5	17	23	49	33	462	21	15.5	15	46
28.....	35	22	24	12.5	17.5	54	25	70	19	16.5	14.5	34
29.....	26	18.5	30	32	14.5	112	61		18	16	14	28
30.....	22	17.5	56	14.5	14.5	150	31		17	16.5	13.5	41
31.....	20	18.5		12.5		61	17		17.5		13.5	

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July.....	584	8.6	39.8	61.6	1,230	8,790
August.....	45	16.5	23.3	36.1	722	2,220
September.....	56	10.5	18.4	28.5	551	1,690
October.....	216	12	29.1	45.0	904	2,770
November.....	293	11.5	32.7	50.6	981	3,016
December.....	281	12	71.7	111	2,220	6,820
January.....	179	14.5	40.0	61.9	1,340	8,810
February.....	462	11	36.8	56.9	1,030	3,160
March.....	214	16.5	39.2	60.7	1,210	3,730
April.....	246	15.5	43.8	67.8	1,320	4,030
May.....	54	13.5	19.9	30.8	616	1,890
June.....	74	14.5	29.7	46.0	892	2,730
The year.....	584	8.6	35.4	54.8	12,900	39,600

* Estimated mean.

WAIOLI STREAM NEAR HANAIEI, KAUAI

LOCATION.—Water-stage recorder $2\frac{1}{2}$ miles south of Hanalei and 3 miles above mouth of stream.

DRAINAGE AREA.—1.6 square miles.

RECORDS AVAILABLE.—July, 1914, to June, 1930.

EXTREMES.—Maximum discharge during year, 662 million gallons a day (1,020 second-feet) July 26 (gage height, 5.24 feet); minimum, 5.0 million gallons a day (7.7 second-feet) Feb. 16-18.

1914-1930: Maximum discharge, 955 million gallons a day (1,480 second-feet) Dec. 19, 1916 (gage height, 6.15 feet); minimum, 2.0 million gallons a day (3.1 second-feet) July 22, 1914.

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

Discharge, in million gallons a day, 1929-30

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1.....	6.5	7.6	6.9	} • 17		15.5	14	6.2	21	28	21	19.5
2.....	6.7		7.6			34	46	5.9	18	17	22	12.5
3.....	8.9		7.3			10.5	42	8.5	13	11	21	20
4.....	6.9		6.7			8.8	21	13.5	16.5	16	24	28
5.....	6.5		6.3			7.3	18.5	7.9	12	22	21	13
6.....	6.4	•10	6.1	} • 18	11	6.8	12.5	6.5	23	37	14.5	10.5
7.....	8.1		6.1		12.5	6.6	10.5	5.9	20	36	10.5	9.2
8.....	7.2		14.5		10.5	6.3	8.7	5.8	31	96	10.5	8.7
9.....	7.7		7.2		8.9	6.1	7.0	5.6	40	88	9.6	8.5
10.....	6.7	8.7	6.1		44	6.1	6.7	5.6	45	30	9.7	8.3
11.....	8.7	11.5	6.8	} • 7.5	14.5	6.1	6.4	5.5	39	79	10	12.5
12.....	7.2	8.2	6.8		8.3	6.1	8.4	5.4	13.5	69	7.6	18
13.....	7.9	7.2	6.6		9.5	6.1	26	6.4	10.5	21	7.2	15.5
14.....	8.3	6.8	6.3		7.5	6.1	8.5	5.5	9.8	32	7.8	11.5
15.....	8.9	10.5	6.1		7.3	6.7	8.5	5.2	11	43	8.7	31
16.....	32	13.5	6.3	} • 6.5	50	6.5	6.1	5.1	9.2	18	7.6	17.5
17.....	13.5	7.8	6.5		50	6.3	5.6	5.1	8.7	14.5	7.3	13.5
18.....	8.9	7.5	6.3		14.5	11	5.5	13.5	8.5	12.5	8.2	13.5
19.....	7.2	12.5	6.2		10	58	5.7	8.9	8.5	18	8.7	12.5
20.....	8.9	12.5			11.5	148	8.5	5.9	13.5	14.5	11.5	13.5
21.....	22	34	} • 17	} • 7.5	7.8	31	5.8	30	11	14	17.5	11.5
22.....	24	26			12	100	5.2	15.5	10	21	11	13
23.....	17.5	16.5			12	83	5.1	29	24	14.5	21	16.5
24.....	11	9.6			8.3	64	6.4	43	12	11.5	11	25
25.....	21	8.0			13	46	47	43	13	19	11	22
26.....	171	34	} • 17	} • 7.5	10	40	34	126	10	12	9.6	24
27.....	33	24			41	15.5	11.5	190	8.8	10	8.7	30
28.....	17.5	12.5			16	30	7.7	25	8.3	10	8.7	19
29.....	13	9.0			9.8	92	7.7		8.8	9.8	8.2	16.5
30.....	9.8	7.5			8.5	128	8.5		7.5	17	7.8	20
31.....	8.5	7.3				26	6.7		15		10	

Month	Discharge			Total run-off		
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July.....	171	6.4	17.1	26.5	531	1,630
August.....	34	6.8	12.3	19.0	353	1,170
September.....			8.56	13.2	257	788
October.....			11.6	17.9	358	1,100
November.....			16.4	25.4	493	1,510
December.....	148	6.1	33.0	51.1	1,020	3,140
January.....	47	5.1	13.6	21.0	422	1,320
February.....	190	5.1	22.8	35.3	639	1,960
March.....	45	7.5	16.1	24.9	500	1,530
April.....	96	9.8	29.7	46.0	891	2,790
May.....	24	7.2	12.0	18.6	373	1,140
June.....	31	8.3	16.5	25.5	495	1,520
The year.....	190		17.4	26.9	6,360	19,500

• Estimated mean.

LUMAHAI RIVER NEAR HANAIEI, KAUAI

LOCATION.—Water-stage recorder 6 miles above mouth and $4\frac{1}{2}$ miles southwest of Hanalei.

DRAINAGE AREA.—7.1 square miles.

RECORDS AVAILABLE.—May, 1914, to October, 1917; July, 1920, to June, 1930.

EXTREMES.—Maximum discharge during year, 2,850 million gallons a day (4,410 second-feet) Feb. 27 (gage height, 6.50 feet); minimum recorded, 16.5 million gallons a day (26 second-feet) Sept. 20-23.

1914-1917; 1920-1930: Maximum discharge (estimated), 5,000 million gallons a day (7,740 second-feet) Sept. 11, 1922 (gage height, 9.41 feet); minimum, 13.6 million gallons a day (21 second-feet) May 15, 17, 1926.

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

Discharge, in million gallons a day, 1929-30

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1.....	19	29	22	51	18.5	109	73	30	107	118	84	58
2.....	19	27	23	41	18.5	489	148	29	100	73	96	36
3.....	23	31	21	46	18.5	70	136	29	60	44	96	66
4.....	19	36	19	64	227	47	71	30	60	59	88	137
5.....	19	61	19	202	50	37	57	28	50	112	173	50
6.....	19	72	18.5	83	38	29	46	26	92	229	69	37
7.....	21	51	17.5	51	33	27	41	26	80	291	48	33
8.....	19.5	37	150	50	32	25	37	26	141	278	45	31
9.....	21	35	41	28	23	34	25	192	329	41	29	29
10.....	19.5	33	43	145	22	32	25	331	134	39	29	29
11.....	31	40	35	59	21	30	25	398	715	39	36	36
12.....	22	32	30	32	21	34	25	80	343	34	54	54
13.....	21	29	19	32	21	105	26	56	103	33	52	52
14.....	21	26	19	21	39	24	45	69	33	37	37	37
15.....	23	41	28	29	24	51	24	43	80	34	124	124
16.....	87	48	151	21	34	24	37	54	30	96	96	96
17.....	43	33	264	20	30	23	34	47	29	51	51	51
18.....	26	29	65	38	28	23	33	43	31	58	58	58
19.....	22	40	402	27	22	30	49	32	46	46	46	46
20.....	24	42	906	30	22	31	47	42	57	57	57	57
21.....	69	108	255	26	29	30	47	68	45	45	45	45
22.....	121	73	1,130	26	30	34	47	106	49	49	49	49
23.....	68	51	830	26	40	99	43	89	60	60	60	60
24.....	39	34	673	28	113	48	38	43	114	114	114	114
25.....	67	29	375	74	303	51	48	40	96	96	96	96
26.....	619	72	127	174	34	37	35	103	103	103	103	103
27.....	150	51	41	1,170	32	38	32	120	120	120	120	120
28.....	74	37	33	138	30	33	31	85	85	85	85	85
29.....	47	29	512	43	29	33	29	65	65	65	65	65
30.....	37	26	452	45	28	61	28	79	79	79	79	79
31.....	32	25	136	33	50	32	32	32	32	32	32	32

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July.....	619	19	59.4	91.9	1,840	5,650
August.....	108	25	42.2	65.3	1,310	4,010
September.....	-----	-----	29.0	44.9	868	2,670
October.....	202	18.5	38.0	58.8	1,180	3,620
November.....	264	18.5	58.5	90.5	1,760	5,390
December.....	1,130	20	236	365	7,320	22,500
January.....	148	26	51.1	79.1	1,580	4,860
February.....	1,170	22	104	161	2,910	8,940
March.....	398	28	79.5	123	2,460	7,560
April.....	715	33	121	187	3,640	11,100
May.....	173	28	53.2	82.3	1,650	5,060
June.....	137	29	64.7	100	1,940	5,960
The year.....	1,170	-----	78.0	121	28,500	87,300

* Estimated.

* Estimated mean.

MISCELLANEOUS MEASUREMENTS

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

Miscellaneous discharge measurements on Kauai, 1929-30

Date	Stream	Tributary to or diverting from—	Locality	Second-foot	Million gallons a day
July 10	Hanapepe Ditch.....	Hanapepe River..	Hawaiian Sugar Co.'s weir near Eleele.	25.3	16.4
10	do.....	do.....	¼ mile above Hawaiian Sugar Co.'s weir near Eleele.....	24.4	15.8
12	Hanapepe Diversion Ditch B.	do.....	Near Eleele.....	3.19	2.06
16	do.....	do.....	do.....	5.32	3.44
12	Hanapepe Diversion Ditch C.	do.....	do.....	.406	.262
16	do.....	do.....	do.....	.713	.461
13	Hanapepe Diversion Ditch G.	do.....	Above taro patch near Eleele.....	.680	.439
20	do.....	do.....	do.....	.850	.549
27	do.....	do.....	do.....	1.42	.918
Sept. 27	do.....	do.....	do.....	1.18	.763
July 13	do.....	do.....	Below taro patch near Eleele.....	.220	.142
20	do.....	do.....	do.....	.320	.207
27	do.....	do.....	do.....	.979	.633
Sept. 27	do.....	do.....	do.....	.774	.500
Feb. 12	do.....	do.....	do.....	.377	.244
Mar. 26	do.....	do.....	do.....	.360	.233
July 17	Hanapepe Diversion Ditch H.	do.....	Near Eleele.....	2.24	1.45
19	do.....	do.....	do.....	1.33	.860
17	Hanapepe Diversion Ditch I.	do.....	do.....	3.09	2.00
19	do.....	do.....	do.....	1.23	.795
13	Hanapepe Diversion Ditch J.	do.....	do.....	7.43	4.80
17	do.....	do.....	do.....	13.1	8.47
19	do.....	do.....	do.....	7.28	4.71
17	do.....	do.....	McBride Plantation's gage, near Eleele.	13.7	8.85
19	do.....	do.....	do.....	7.86	5.08
27	do.....	do.....	do.....	17.6	11.4
16	Hanapepe Diversion Ditch L.	do.....	Near Eleele.....	2.45	1.58
18	do.....	do.....	do.....	1.89	1.22
16	Hanapepe Diversion Ditch M.	do.....	do.....	4.72	3.05
18	do.....	do.....	do.....	4.26	2.75
16	Hanapepe Diversion Ditch N.	do.....	do.....	11.1	7.17
18	do.....	do.....	do.....	2.80	1.81
13	Hanapepe River.....	Pacific Ocean.....	Above Hanapepe Diversion Ditch I, near Eleele.	16.0	10.3
28	do.....	do.....	do.....	18.6	12.0
13	do.....	do.....	Below Hanapepe Diversion Ditch J, near Eleele.	10.0	6.46
18	do.....	do.....	do.....	10.2	6.59
18	do.....	do.....	Above Hanapepe Diversion Ditch M, near Eleele.	9.39	6.07
18	do.....	do.....	Below Hanapepe Diversion Ditch M, near Eleele.	1.56	1.01

ISLAND OF OAHU

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

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

DRAINAGE AREA.—1.2 square miles.

RECORDS AVAILABLE.—May, 1913, to June, 1930.

EXTREMES.—Maximum discharge during year, 509 million gallons a day (788 second-feet) Dec. 22 (gage height, 6.23 feet); minimum, 0.3 million gallons a day (0.5 second-foot) Feb. 20.

1913-1930: Maximum discharge, about 985 million gallons a day (1,520 second-feet) Mar. 26, 1920 (gage height, 9.0 feet; determined from flood marks and comparison with record of left branch of North Fork of this stream); minimum, 0.09 million gallons a day or 0.15 second-foot Mar. 22, 1926.

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

Discharge, in million gallons a day, 1929-30

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	0.7	1.3	1.6	3.4	1.4	1.8	7.0	1.1	2.7	9.8	9.2	13.7
2	.7	1.0	2.8	7.0	17.6	13.5	28	1.1	2.1	4.1	2.2	7.8
3	.7	1.0	1.3	1.9	10.0	2.4	28	.9	2.0	1.6	1.9	19.7
4	.6	1.3	1.1	1.2	4.0	1.8	7.3	3.8	1.1	2.4	18.0	
5	.6	1.0	1.0	44	12.8	1.6	7.5	4.4	1.4	1.1	12.2	2.8
6	.6	.9	.9	4.7	2.5	1.4		4.4	1.1	3.6	2.3	1.8
7	.6	.8	.8	2.0	1.8	2.2	3.8	1.3	12.9	38	1.9	1.5
8	1.0	.8	.8	2.4	1.5	14.3	3.2	1.0	4.3	45	10.2	1.2
9	.6	29	.7	8.5	1.4	2.0	2.7	.9	13.9	79	2.5	1.1
10	23	4.7	.7	8.5	4.7	1.6	2.1	1.3	9.1	20	1.8	1.1
11	1.9	4.8	.7		4.2	1.4	1.8	.8	28	51	1.7	6.3
12	.6	2.1	.7	1.9	1.4	1.4	1.8	.8	4.3	35	1.6	40
13	.5	2.2	.7	1.9	1.3	1.3	1.8	.9	2.8	74	1.4	3.6
14	.4	1.4	.6		1.4	1.2	1.4	.8	2.5	21	1.7	2.2
15	.4	3.3	.6		2.0	6.9	2.6	.6	3.0	10.1	1.3	10.0
16	7.4	1.5	.6	1.2	1.4	28	1.2	.5	1.8	7.5	1.4	8.8
17	1.0	1.4	.6	1.1	20	2.3	1.1	.5	1.6	5.8	1.3	9.7
18	1.2	1.2	2.1	1.4	6.7	14.8	6.3	.4	1.3	4.6	4.7	7.9
19	.6	3.0	.6	1.0	2.0	135	1.1	.4	1.2	6.3	1.5	4.9
20	1.4		.5	1.0	1.7	20	3.2	.4	5.5	3.7	1.2	3.3
21	.6		.6	.9	1.4	12.9	1.0	.4	2.0	27	1.4	3.9
22	2.0	1.5	1.7	.8	1.4	104	.7	1.7	1.3	10.2	3.5	6.9
23	.9		1.4	.8	1.4	66	.7	28	8.1	13.7	1.8	5.2
24	.7		.9	.8	2.5	26	6.3	21	10.7	3.9	1.0	9.7
25	14.3		10.7	.8	1.8	19.3	28	2.0	46	3.2	.8	6.9
26	72	15	4.2	.9	1.7	18.8	10.8	44	4.7	2.8	.7	4.3
27	10.8		1.0	3.9	4.9	8.1	3.0	26	2.6	2.6	.6	2.8
28	5.5	1.5	.8	6.6	11.3	7.1	1.9	4.2	2.0	7.4	4.5	2.2
29	2.2		12.5	14.2	2.1	15.6	1.6		1.7	2.7	.8	7.2
30	1.4	1.4	3.2	1.2	1.7	36	1.4		1.5	3.8	.5	9.5
31	1.7	2.1		1.0		12.5	1.3		1.4		.5	

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July	72	0.4	5.05	7.81	157	480
August	29		3.05	4.72	94.7	280
September	12.5	.5	1.88	2.91	56.5	173
October	44	.8	4.22	6.53	181	401
November	20	1.3	4.33	6.70	130	399
December	135	1.2	18.7	28.9	581	1,780
January		.7	5.69	8.80	176	541
February	44	1.4	5.61	8.68	157	482
March	46	1.1	5.88	9.10	182	559
April	79	1.1	16.7	25.3	500	1,540
May	12.2	.5	2.60	4.02	80.5	247
June	40	1.1	7.47	11.6	224	688
The year	135	.4	6.77	10.5	2,470	7,580

• Estimated mean.

• Estimated.

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

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

DRAINAGE AREA.—1.5 square miles.

RECORDS AVAILABLE.—May, 1913, to June, 1930.

EXTREMES.—Maximum discharge during year, 1,270 million gallons a day (1,960 second-feet) Dec. 22 (gage height, 7.03 feet); minimum, 0.4 million gallons a day (0.6 second-foot) July 6, 7, 9, 10.

1913-1930: Maximum discharge, about 4,080 million gallons a day (6,310 second-foot) Jan. 14, 1923 (gage height, 10.3 feet); minimum, 0.1 million gallons a day (0.16 second-foot) Feb. 18, Mar. 5, 1920.

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

Discharge, in million gallons a day, 1929-30

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	0.5	2.2	2.5	4.9	2.5	2.4	9.2	1.9	3.6	10.2	6.6	12.3
2	.5	1.9	4.2	12.1	16.6	10.6	32	1.7	3.2	5.9	4.0	11.3
3	.4	2.0	2.0	3.9	11.6	2.7	24	1.6	3.8	2.7	3.4	23
4	.4	2.6	1.7	3.0	5.2	2.0	10.9	10.4	6.5	2.2	4.2	18.5
5	.4	1.7	1.4	31	11.8	1.8	12.2	7.2	2.6	2.1	18.8	5.4
6	.4	1.7	1.3	4.9	3.8	1.6	7.2	4.2	2.3	5.2	5.2	4.1
7	1.1	1.3	1.3	3.3	2.8	2.6	7.4	2.0	16.5	34	4.1	3.2
8	.7	8.9	1.3	5.1	2.4	16.6	6.4	1.6	9.0	50	14.0	3.0
9	.4	11.6	1.2	13.3	3.2	2.1	5.8	1.5	14.2	97	4.6	2.9
10	10.2	3.7	1.2	7.4	4.6	1.7	5.4	2.4	12.0	21	8.8	4.4
11	1.8	7.5	1.2	3.4	5.0	1.6	5.0	1.3	19.0	50	3.5	10.4
12	.6	2.6	1.2	2.7	2.1	1.4	4.8	1.2	5.6	38	3.6	36
13	.4	1.9	1.2	2.2	1.9	1.3	5.2	1.4	4.1	53	3.0	6.2
14	.5	1.9	1.1	2.0	2.0	1.3	4.1	1.1	3.8	16.8	3.4	5.4
15	.4	5.6	1.0	1.7	3.8	5.2	5.8	1.0	4.6	10.0	3.0	10.9
16	10.6	3.9	.8	1.7	2.0	22	4.0	.9	2.9	8.6	2.9	14.3
17	1.5	2.4	.8	1.6	22	2.9	3.8	.8	2.7	7.2	3.5	21
18	1.8	3.4	3.3	2.0	6.8	14.1	9.4	.9	2.5	6.2	7.2	17.8
19	.8	6.8	1.0	1.4	2.9	135	3.8	1.0	2.2	8.2	4.0	10.9
20	4.7	3.4	.8	1.3	2.5	18.5	7.4	.9	9.1	5.2	2.8	6.6
21	3.2	3.3	1.0	1.2	2.0	13.3	3.8	1.0	3.2	21	4.2	11.5
22	6.0	3.3	1.8	1.2	1.9	142	3.2	1.3	2.2	23	11.9	14.2
23	1.6	3.0	2.6	1.2	1.9	59	3.0	28	8.5	30	4.9	13.9
24	2.0	2.3	2.6	1.2	3.0	26	14.0	21	7.9	6	2.9	26
25	26	1.9	7.8	1.4	2.5	22	36	3.3	44	5.4	2.7	15.1
26	39	17.7	9.2	1.4	2.2	19.2	9.2	36	5.8	4.6	2.6	10.9
27	16.7	3.1	2.1	8.3	5.1	11.1	3.9	15.1	3.4	4.6	2.5	8.4
28	5.8	2.2	3.4	11.9	11.4	10.8	2.9	5.0	2.8	6.0	7.1	6.9
29	3.3	2.0	12.4	13.6	2.6	18.2	2.4	-----	2.5	4.1	2.4	15.0
30	2.4	3.4	5.5	2.8	2.1	37	2.2	-----	2.4	5.8	2.0	26
31	2.6	3.1	-----	2.1	-----	15.4	1.9	-----	2.2	-----	2.0	-----

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July	39	0.4	4.73	7.32	147	450
August	17.7	1.3	3.95	6.11	122	376
September	12.4	.8	2.63	4.07	78.9	242
October	31	1.2	5.01	7.75	155	477
November	22	1.9	5.01	7.75	150	461
December	142	1.3	20.0	30.9	621	1,900
January	36	1.9	8.27	12.8	256	787
February	36	.8	5.56	8.60	156	478
March	44	2.2	6.94	10.7	215	660
April	97	2.1	17.8	27.5	584	1,640
May	18.8	2.0	4.86	7.52	151	462
June	36	2.9	12.5	19.3	375	1,150
The year	142	.4	8.12	12.6	2,960	9,080

NORTH HALAWA STREAM NEAR AIEA, OAHU

LOCATION.—Water-stage recorder in North Halawa Gulch, 2.6 miles north of Kamehameha Highway and 3½ miles northeast of Aiea post office; 300 feet above sea level.

DRAINAGE AREA.—3.6 square miles.

RECORDS AVAILABLE.—August, 1929, to June, 1930.

EXTREMES.—Maximum discharge during period, 1,480 million gallons a day (2,290 second-feet) Dec. 22 (gage height, 10.47 feet); no flow several times during period.

REMARKS.—Records good. No diversions. Continuous records of rainfall are obtained at station. Established Aug. 6, 1929.

Discharge, in million gallons a day, 1929-30

Day	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1		1.5	0.04	0.14	0.3	5.9	2.0	1.5	2.6	0.5	0
2		.4	.03	3.1	7.1	96	1.1	1.9	4.4	1.0	0
3		.24	0	40	1.7	33	.8	1.7	1.5	.8	0
4		.19	0	3.9	.5	8.9	5.4	3.1	.9	.7	.6
5		.15	.02	15.6	.29	5.2	5.3	2.0	.5	.8	.29
6	0.05	.11	.04	4.5	.25	3.1	4.9	1.2	.5	.5	.14
7	.05	.10	0	2.6	2.8	2.0	1.7	3.7	18.3	.4	.12
8	.04	.08	0	1.2	9.5	5.9	1.0	11.4	32	.3	.10
9	.04	.08	0	.5	1.2	2.6	.5	8.2	31	.3	.08
10	.02	.06	0	.4	.3	1.7	.3	4.2	10.6	.28	.08
11	.04	.06	0	1.0	.3	1.3	.3	9.8	27	.26	.06
12	0	.05	0	.3	.27	1.1	.29	3.7	22	.25	.27
13	0	.04	0	.26	.24	1.0	11.9	2.2	8.8	.21	.28
14	0	0	0	.23	.22	.8	.9	2.3	4.7	.19	.3
15	0	0	0	.19	7.4	1.2	.3	2.4	3.1	.17	2.6
16	0	0	0	.2	41	.8	.26	.8	5.6	.15	2.8
17	0	0	0	38	6.8	.4	.23	.4	3.3	.15	7.9
18	0	0	0	9.5	17.8	1.0	.18	.3	1.8	.15	2.2
19	0	0	0	3.4	189	.8	.15	.28	3.8	.14	1.6
20	0	0	0	1.2	37	5.4	.13	23	2.2	.13	.8
21	0	0	0	.4	16.4	1.5	.11	3.3	18.2	.12	.29
22	0	0	0	.28	125	.9	10.0	1.1	6.4	.10	2.1
23	0	0	0	.8	105	.4	30	59	3.3	.09	2.0
24	0	0	0	.4	30	6.9	13.9	9.9	2.2	.09	3.6
25	0	0	0	.3	19.9	36	3.1	68	1.7	.08	1.7
26	18.6	0	0	.5	14.2	12.6	6.1	16.2	1.3	.06	.9
27	3.4	0	0	.4	6.4	4.7	5.2	5.6	1.1	.06	.4
28	.6	0	.01	7.4	4.2	2.6	2.4	3.1	.8	.04	.8
29	.23	0	1.7	1.3	6.1	1.8		2.0	.7	.04	1.0
30	27	0	.15	1.0	37	1.3		1.5	.5	.02	5.7
31	7.1		.15		14.0	2.7		1.1		0	

Month	Discharge			Total run-off		
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
August (26 days)	27	0	2.20	3.40	57.2	176
September	1.5	0	.102	.158	3.06	9
October	1.7	0	.069	.107	2.14	7
November	40	.14	4.63	7.16	139	426
December	189	.22	22.7	35.1	702	2,160
January	96	.4	8.05	12.5	250	766
February	30	.11	3.87	5.99	108	333
March	68	.28	8.22	12.7	255	782
April	32	.5	7.36	11.4	221	678
May	1.0	0	.261	1.404	8.08	25
June	7.9	0	1.27	1.96	38.2	117
The period	189	0	5.42	8.39	1,780	5,480

MOANALUA STREAM NEAR HONOLULU, OAHU

LOCATION.—Water-stage recorder $4\frac{1}{4}$ miles from mouth of stream and $5\frac{1}{4}$ miles north of Honolulu post office.

DRAINAGE AREA.—3.2 square miles.

RECORDS AVAILABLE.—June, 1926, to June, 1930.

EXTREMES.—Maximum discharge during year, 693 million gallons a day (1,070 second-feet) Jan. 2 (gage height, 6.93 feet); no flow for several periods during year.

1926-1930: Maximum discharge, 1,120 million gallons a day (1,730 second-feet) Mar. 16, Nov. 19, 1927 (gage height, 8.48 feet); no flow for several periods.

REMARKS.—Records poor. Water for domestic use diverted from stream 1 mile above station by 2-inch pipe. Continuous records of rainfall are obtained at station.

Discharge, in million gallons a day, 1929-30

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1.....	0	0	0.05	0	0	0	3.6	0.75	0.4	0.08	0.03	0
2.....	0	0	.02	0	0	.6	75	.45	.4	.15	.03	0
3.....	0	0	.02	0	1.3	.07	31	.25	.45	.05	.03	0
4.....	0	0	.02	0	.3	0	10.8	1.5	.75	.03	.02	0
5.....	0	0	.02	0	.3	0	7.6	1.15	.45	.02	.02	0
6.....	0	0	.02	0	.3	0	4.1	1.5	.2	.03	.02	0
7.....	0	0	.02	0	.25	0	2.6	.55	.75	3.3	.01	0
8.....	0	0	.02	0	.09	.3	1.6	.2	6.2	16.9	.01	.01
9.....	0	0	.01	0	.03	.02	1.15	.06	3.6	18.2	.01	.01
10.....	0	0	.01	0	.02	0	.9	.03	1.25	5.6	0	.01
11.....	0	0	.01	0	.01	0	.65	.03	5.9	31	0	.01
12.....	0	0	0	0	0	0	.5	.02	1.25	10.8	0	.01
13.....	0	0	0	0	0	0	.4	4.6	.9	4.8	0	.01
14.....	0	0	0	0	0	0	.2	1.05	.45	2.3	0	.01
15.....	0	0	0	0	0	2.4	.2	.35	.8	1.25	0	.01
16.....	0	0	0	0	0	* 3.2	.09	.1	.2	1.1	0	.01
17.....	0	0	0	0	3.2		.03	.04	.06	.8	0	.01
18.....	0	0	0	0	1.0		.05	.03	.03	.45	0	.01
19.....	0	0	0	0	.25	* 30	.03	.02	.02	.4	0	.01
20.....	0	0	0	0	.01		.3	.02	1.25	.25	0	.01
21.....	0	0	0	0	0		.25	.02	.7	.95	0	.01
22.....	0	0	0	0	0	* 36	.05	.01	.15	.65	0	.01
23.....	0	0	0	0	0		.03	12.4	14.9	.3	0	.01
24.....	0	0	0	0	0		5.6	7.5	1.8	.15	0	.01
25.....	0	0	0	0	0	* 13	34	10.5	39	.1	.01	0
26.....	0	.2	0	0	0	* 6	14.7	2.9	7.8	.1	.01	0
27.....	0	.03	0	0	0		3.6	1.1	1.45	.08	.01	0
28.....	0	0	0	0	0		3.0	1.9	1.05	.07	.01	0
29.....	0	0	0	0	0	2.6	1.35	.85	.6	.06	.01	0
30.....	0	.3	0	0	0	18.4	.8	-----	.35	.04	.01	0
31.....	0	.35	-----	0	-----	8.2	.8	-----	.15	-----	.01	-----

Month	Discharge			Total run-off		
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
August.....	0.35	0	0.028	0.043	0.88	3
September.....	.05	0	.007	.011	.22	1
October.....	0	0	0	0	0	0
November.....	3.2	0	.235	.364	7.06	22
December.....	-----	0	7.91	12.2	245	753
January.....	75	.03	6.58	10.2	204	626
February.....	12.4	.01	1.71	2.65	48.0	147
March.....	39	.02	3.01	4.66	93.3	286
April.....	31	.02	3.33	5.15	100	307
May.....	.03	0	.008	.012	.25	1
June.....	.01	0	.006	.009	.17	1
The year.....	75	0	1.91	2.96	699	2,150

* Estimated mean.

KALIHI STREAM NEAR HONOLULU, OAHU

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, 1930.

EXTREMES.—Maximum discharge during year, 932 million gallons a day (1,440 second-feet) Apr. 11 (gage height, 10.06 feet); minimum, 0.2 million gallons a day (0.3 second-foot) July 9, 12.

1913-1930: Maximum discharge, 1,250 million gallons a day (estimated) (1,930 second-feet) Jan. 16, 1921 (gage height, 14.0 feet; determined from flood marks); minimum, 0.1 million gallons a day (0.15 second-foot) Apr. 5, 1924, May 12-25, 1926.

REMARKS.—Records good for ordinary stages; poor for high stages and estimated periods. Water for domestic use diverted from stream above station.

Discharge, in million gallons a day, 1929-30

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1.....	0.4	1.0		0.9	a 1.2	1.9	9.5	3.5	4.3	3.9		
2.....	.4	1.0		1.0		9.3	b 120	3.1	4.0	3.3		a 1.0
3.....	.4	1.0		.7		3.5	45	3.0	3.8	2.8	a 2.2	1.0
4.....	.4	1.0	a 1.3	.6	a 7.5	2.5	22	4.3	4.6	2.5		1.1
5.....	.4	1.0		3.3		2.1	13.9	4.2	3.7	2.5		.6
6.....	.4	1.0		2.2	3.5	1.9	10.6	5.2	3.2	2.7	a 6	.5
7.....	.6	1.0	1.1	1.1	2.6	2.9	9.1	3.4	6.4	15.8		.5
8.....	.4	2.4	1.1	.9	2.0	4.4	7.9	3.0	15.9	29		.8
9.....	.4	2.9	1.0	1.0	1.9	2.5	7.2	2.6	8.5	22		.8
10.....	.4	1.8		1.3	1.8	2.1	6.3	2.5	5.3	9.1		.9
11.....	.3	1.9		1.0	1.8	1.9	5.6	2.3	10.7	55		1.0
12.....	.2	1.5		.9	1.6	1.8	5.3	2.2	5.1	12.2	a 2.4	2.2
13.....	.2	1.3		.8	1.5	1.8	4.8	5.1	4.1	7.8		1.3
14.....	.3	1.4	a 1.0	.7	1.8	1.7	4.3	2.7	4.7	6.2		1.9
15.....	.4	a 1.3		.7	1.8	13.0	4.8	2.2	4.0	5.3		1.8
16.....	1.7			.7	1.4	29	3.8	2.0	3.2	5.6		4.2
17.....	.7			.7	30	7.4	3.5	1.9	3.0	4.5		
18.....	.6			.7	8.2	49	3.8	1.8	2.7	3.8		
19.....	.5	a 1.5	.8	.7	4.5	b 100	3.2	1.8	2.7	4.0		a 1.8
20.....	.4		.8	.7	3.2	24	7.6	1.8	3.2	3.2		
21.....	.4		.8	.6	2.6	14.8	3.5	2.0	2.8	7.5		
22.....	.6		1.0	.6	2.3		3.0	4.0	4.8	4.8		
23.....	.5	a 3.2	1.0	.5	2.3	a 130	2.7	30	14.0	3.5		a 3.5
24.....	.4		.8	.5	2.2	40	13.8	15.9	5.4	3.1	a 1.1	
25.....	2.2		.8	.7	2.0	24	52	6.3	43	2.8		
26.....	5.2	a 2.6	1.1	.7	2.2	19.5	24	37	7.8	2.6		
27.....	2.6		.9		1.9	13.2	6.8	7.9	4.8	2.5		a 1.5
28.....	1.9		.7		4.7	11.2	5.1	5.4	3.7	2.5		
29.....	1.6		1.0	a 1.6	2.3	11.2	4.5		3.2	2.2		
30.....	1.2	b 3.5	.8		2.0	32	3.8		3.1	b 2.2		
31.....	1.1	b 1.5				13.2	4.0		3.0			

Month	Discharge			Total run-off		
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July.....	5.2	0.2	0.88	1.36	27.2	84
August.....			1.85	2.86	57.5	176
September.....			1.02	1.68	30.5	94
October.....		.5	1.04	1.61	32.2	99
November.....	30		3.90	6.03	117	359
December.....		1.7	22.6	35.0	702	2,150
January.....		2.7	13.6	21.0	421	1,290
February.....	37	1.8	6.00	9.28	168	516
March.....	43	2.7	6.41	9.92	199	610
April.....	55	2.2	7.83	12.1	235	721
May.....			2.09	3.23	64.9	199
June.....			1.57	2.43	47.0	145
The year.....		.2	5.76	3.91	2,100	6,440

a Estimated mean.

b Estimated.

c Partly estimated.

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

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

DRAINAGE AREA.—3.4 square miles.

RECORDS AVAILABLE.—October, 1913, to June, 1930.

EXTREMES.—Maximum discharge during year, 699 million gallons a day (1,080 second-feet) Jan. 2 (gage height, 5.93 feet); minimum, 0.8 million gallons a day (1.2 second-feet) July 21, 24.

1913-1930: Maximum discharge, 1,600 million gallons a day (2,480 second-feet) Jan. 16, 1921 (gage height, 8.74 feet; from flood marks); minimum, 0.06 million gallons a day (0.09 second-foot) Sept. 10, 11, 1925.

REMARKS.—Records fair for ordinary stages, poor for high stages and estimated periods. Reservoirs Nos. 2, 3, and 4 regulate flow, but diversion from them past station was discontinued in January, 1928. Honolulu waterworks diverts ground water from tunnels in drainage area.

Discharge, in million gallons a day, 1929-30

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1.....	0.9	0.95	2.0	1.9	1.8	3.2	46	9.9	9.3	8.8	7.6	4.7
2.....	.95	1.0	2.0	1.8	2.0	5.6	115	9.6	9.1	8.3	7.9	5.1
3.....	1.0	1.1	1.8	1.8	10.5	3.7	61	9.3	9.3	8.1	7.6	4.7
4.....	1.0	1.1	1.7	1.7	3.0	3.4	49	9.6	9.6	7.9	7.4	4.9
5.....	.95	1.2	1.6	10.5	3.3	3.3	46	9.6	9.1	7.9	10.5	4.0
6.....	.95	1.4	1.6	3.0	3.0	3.3	43	9.6	8.8	8.1	14.9	3.6
7.....	1.0	1.3	1.6	2.1	2.8	3.6	40	9.1	9.9	13.8	14.5	3.8
8.....	.95	1.5	1.6	2.0	2.6	4.3	40	9.1	11.3	17.8	10.4	3.2
9.....	.95	1.8	1.5	2.0	2.6	3.7	37	9.1	9.6	19.7	6.5	3.0
10.....	.95	1.5	1.5	2.2	2.5	3.4	34	10.2	12.2	11.0	6.3	2.9
11.....	.9	1.5	1.6	1.8	2.4	3.4	34	8.8	16.1	58	6.3	3.1
12.....	.9	1.5	1.6	1.8	2.4	3.3	32	8.1	9.5	15.6	6.7	3.4
13.....	.9	1.4	1.5	1.7	2.4	3.3	24	8.8	9.3	12.2	7.1	2.8
14.....	.9	1.3	1.4	1.6	2.5	3.3	10.5	8.6	8.8	11.3	7.1	2.7
15.....	.9	1.4	1.5	1.5	2.4	7.8	11.0	8.3	8.6	10.8	6.9	2.8
16.....	1.3	1.4	1.4	1.5	2.4	15.6	10.5	8.3	8.6	11.3	6.9	4.1
17.....	.9	1.3	1.4	1.5	7.6	7.4	10.2	8.3	8.6	10.5	5.7	3.8
18.....	.9	1.4	1.6	1.5	3.8	14.7	16.8	8.1	8.3	10.2	4.3	3.0
19.....	.9	1.5	1.4	1.6	3.2	78	21	8.1	8.3	10.5	4.0	2.8
20.....	.9	1.3	1.4	1.5	3.0	28	22	7.9	8.8	9.6	3.7	2.6
21.....	.85	1.5	1.4	1.5	2.9	27	17.5	8.3	8.3	15.4	3.6	2.7
22.....	1.0	2.8	1.7	1.5	3.0	136	8.8	8.6	8.1	12.6	3.6	3.3
23.....	.9	2.9	1.6	1.4	8.2	106	8.3	11.0	9.9	17.6	3.2	2.8
24.....	.85	1.7	2.8	1.5	3.0	48	12.5	10.2	8.6	16.8	3.3	7.0
25.....	1.7	1.6	2.2	1.6	3.0	55	26	9.1	20	28	3.3	2.8
26.....	2.9	3.0	2.3	1.6	3.2	49	23	18.0	10.2	37	3.2	2.7
27.....	1.6	2.2	1.7	6.6	3.0	49	11.6	10.5	9.3	20	8.3	2.5
28.....	1.2	1.8	1.9	3.4	3.8	46	10.8	9.9	8.8	8.1	3.9	2.4
29.....	1.1	1.6	2.4	3.2	3.2	46	10.5	-----	8.6	7.6	4.1	2.4
30.....	1.0	2.0	1.8	2.1	3.2	62	10.2	-----	8.6	7.6	4.7	2.6
31.....	1.0	1.8	-----	1.8	-----	46	10.2	-----	8.3	-----	4.6	-----

Month	Discharge			Total run-off		
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July.....	2.9	0.85	1.07	1.66	33.1	102
August.....	3.0	.95	1.60	2.48	49.8	152
September.....	2.8	1.4	1.72	2.66	51.5	158
October.....	10.5	1.4	2.30	3.56	71.2	219
November.....	10.5	1.8	3.26	5.04	97.7	300
December.....	136	3.2	28.1	43.5	872	2,670
January.....	115	8.3	27.5	42.5	852	2,620
February.....	18.0	7.9	9.43	14.6	264	810
March.....	20	8.1	9.74	15.1	302	927
April.....	58	7.6	14.7	22.7	442	1,350
May.....	14.9	3.2	6.23	9.64	193	593
June.....	7.0	2.4	3.39	5.25	102	312
The year.....	136	.85	9.13	14.1	3,330	10,200

WEST BRANCH OF MANOA STREAM NEAR HONOLULU, OAHU

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

DRAINAGE AREA.—1.1 square miles.

RECORDS AVAILABLE.—May, 1913, to January, 1921; August, 1925, to June, 1930.

EXTREMES.—Maximum discharge during year, 1,240 million gallons a day (1,920 second-foot) Apr. 11 (gage height, 4.56 feet); minimum, 0.1 million gallons a day (0.15 second-foot) July 3.

1913-1921, 1925-1930: Maximum stage, 10.4 feet Jan. 16, 1921, from flood marks (discharge estimated, 2,100 million gallons a day or 3,250 second-foot); minimum, about 0.05 million gallons a day (0.08 second-foot) Mar. 16, 22, 1926.

REMARKS.—Records fair for low stages until Jan. 3 and good thereafter; good for medium stages; poor for high stages and estimated periods. No diversions above station.

Discharge, in million gallons a day, 1929-30

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	0.2	0.8	1.7	0.8	0.6	0.8	8.1	0.95	1.0	1.0	1.0	0.7
2	.25		1.5	1.0	.9	3.7	26	.85	1.1	.95	1.6	.9
3	.2		1.2	1.0	26	1.1	13.2	.8	1.4	.8	1.4	1.1
4	.2		1.0	1.0	2.4	.9	7.2	.95	1.9	.7	1.8	1.2
5	.25		.9	29	3.8	.7	5.3	1.0	1.2	.65	2.1	.9
6	.25	1.0	.8	4.5	2.2	.7	3.3	.9	1.2	.8	1.3	.75
7	.5		.8	1.6	1.5	1.2	2.9	.7	3.8	8.4	1.1	.65
8	.4		.7	1.7	1.1	2.2	2.1	.7	5.8	14.0	1.2	.6
9	.3		.6	1.5	1.1	.8	1.6	.65	2.7	14.3	1.0	.6
10	.25	1.2	.6	1.9	1.0	.7	1.5	.65	1.4	4.5	.9	.8
11	.25	1.2	.9	1.2	1.1	.7	1.5	.6	4.9	61	.85	1.7
12	.25	1.0	.9	1.2	.9	.55	1.5	.55	1.7	14.5	.85	3.6
13	.25	.8	.8	1.0	.8	.5	1.2	.65	1.3	5.9	.8	1.5
14	.2	.8	.8	.9	1.1	.5	1.1	.6	1.3	3.7	.75	3.0
15	.2	.7	.7	.8	.8	9.0	1.2	.6	1.2	2.4	.7	5.7
16	1.5	.9	.6	.7	.7	25	1.0	.42	1.1	1.7	.6	10.3
17	.55	.9	.5	.6	11.4	3.1	1.1	.42	1.0	1.6	.6	5.4
18	.35	.7	1.0	.6	2.2	18.0	1.2	.38	.9	1.4	.55	2.5
19	.35	.8	.5	.7	1.3	108	1.0	.35	.9	1.5	.5	1.9
20	.4	.6	.5	.6	1.1	21	2.4	.42	1.6	1.2	.5	1.3
21	.4	.9	.4	.6	1.0	14.2	1.0	.6	.95	6.1	.5	2.4
22	.5	8.8	.7	.55	.8	76	.85	1.3	.9	2.4	2.7	5.8
23	.5	4.0	.55	.55	1.3	85	.8	5.7	2.7	1.4	.8	3.2
24	.4	1.5	.7	.55	1.2	30	3.5	2.5	1.1	1.2	.6	7.8
25	2.6	1.1	.6	.7	1.0	18.5	6.1	.9	6.3	1.2	.5	2.7
26	16.9	7.2	1.0	.7	1.1	8.1	6.3	3.9	2.6	1.1	.5	2.7
27	4.4	1.8	.6	20	1.1	.55	1.7	2.4	1.3	1.0	.5	2.4
28	2.0	1.2	.7	4.0	3.2	.9	1.2	1.2	1.1	1.1	.65	1.8
29	1.5	1.1	1.0	1.8	.9	30	1.1	-----	.95	1.0	.5	3.7
30	1.0	6.8	.7	.9	.9	61	.95	-----	.9	1.0	.5	4.4
31	.8	2.2	-----	.6	-----	11.3	.95	-----	.85	-----	.45	-----

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July	16.9	0.2	1.23	1.90	38.1	117
August	8.8	.6	1.77	2.74	55.0	168
September	1.7	.4	.798	1.23	24.0	74
October	29	.55	2.69	4.16	83.2	256
November	26	.6	2.48	3.84	74.5	228
December	108	.5	17.2	26.6	535	1,640
January	26	.8	3.51	5.43	109	334
February	5.7	.35	1.13	1.75	31.6	97
March	6.3	.85	1.85	2.85	57.0	175
April	61	.65	5.28	8.17	158	498
May	2.7	.45	.913	1.41	28.3	87
June	10.3	.6	2.73	4.22	82.0	251
The year	108	.2	3.50	5.42	1,280	3,910

* Estimated mean.

EAST BRANCH OF MANOA STREAM NEAR HONOLULU, OAHU

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

DRAINAGE AREA.—1.0 square mile.

RECORDS AVAILABLE.—May, 1913, to January, 1921; August, 1925, to June, 1930.

EXTREMES.—Maximum discharge during year, 570 million gallons a day (882 second-feet) Apr. 11 (gage height, 6.36 feet; from flood marks); minimum, 0.5 million gallons a day (0.75 second-foot) Dec. 14, 15.

1913-1921, 1925-1930: Maximum gage height (determined from flood marks), 10.4 feet Jan. 16, 1921 (discharge, estimated, 2,000 million gallons a day or 3,090 second-feet); minimum, 0.4 million gallons a day (0.6 second-foot) June 7, 8, 1926.

REMARKS.—Records fair for ordinary stages until Feb. 13 and good thereafter; poor for high stages. Water is diverted from stream above station by East Manoa Ditch.

Discharge, in million gallons a day, 1929-30

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1.....	0.75	1.0	1.5	1.1	0.8	0.8	5.8	2.5	3.4	2.2	2.6	2.4
2.....	.8	.9	1.4	1.1	1.4	2.8	22	2.2	2.8	2.1	2.8	2.5
3.....	.75	1.0	1.2	.8	7.6	1.0	17.2	2.0	2.5	1.8	2.7	2.5
4.....	.75	1.1	1.1	1.0	2.0	.8	9.4	2.8	3.4	1.6	3.4	2.6
5.....	.75	1.1	1.1	8.6	2.0	.75	7.0	3.4	2.0	1.6	2.9	2.5
6.....	.7	1.2	1.1	3.4	1.6	.75	4.8	3.7	1.7	2.2	2.5	2.1
7.....	.8	1.4	1.1	1.2	1.4	1.8	3.1	1.9	3.3	14.6	2.2	2.0
8.....	.75	1.2	1.1	1.1	1.1	1.4	2.5	1.6	5.4	16.8	2.4	2.0
9.....	.75	2.2	1.1	1.1	1.2	.75	2.0	1.6	2.9	11.6	2.4	2.1
10.....	.7	1.4	1.1	2.1	1.1	.75	1.8	1.5	2.7	6.0	2.4	2.2
11.....	.7	1.2	1.1	1.1	.8	.7	2.0	.9	6.1	46	2.4	2.2
12.....	.7	1.2	1.2	1.0	.75	.6	1.8	.75	2.8	7.0	2.4	3.7
13.....	.6	1.1	1.1	1.1	.75	.6	1.8	1.6	2.6	4.3	2.4	2.3
14.....	.6	1.0	.9	.8	1.0	.55	1.8	1.8	2.5	3.2	2.2	2.1
15.....	.6	1.0	.8	.75	.8	3.7	1.6	1.7	2.5	2.9	2.2	3.4
16.....	3.7	1.3	.8	.75	.75	8.6	1.5	1.7	2.2	2.7	2.1	8.0
17.....	.9	1.2	.8	.7	10.3	1.2	1.6	1.7	2.1	2.5	2.1	4.2
18.....	.75	1.1	.9	.7	2.4	6.1	1.8	1.7	2.0	2.4	2.1	2.8
19.....	.75	1.1	.75	.75	1.1	28	1.5	1.7	2.0	2.6	2.1	2.6
20.....	.8	.8	.75	.7	1.0	7.6	3.6	1.6	2.8	2.1	2.0	2.2
21.....	.8	.8	.75	.7	.8	6.6	1.6	2.2	2.1	8.5	2.0	2.2
22.....	.9	3.4	1.1	.6	.8	21	1.4	4.4	2.0	5.2	2.8	4.6
23.....	.75	3.9	.9	.6	1.1	25	1.4	16.8	4.6	3.5	2.4	2.7
24.....	.8	1.4	1.1	.6	.9	15.1	6.3	8.0	2.7	3.1	2.2	3.9
25.....	7.3	1.1	.9	.8	.8	12.6	5.8	3.2	9.2	2.7	2.2	2.2
26.....	8.4	6.4	1.1	.7	.9	10.6	7.7	9.9	4.2	2.7	2.2	2.7
27.....	2.2	1.6	.75	11.6	.8	6.6	3.1	6.3	2.7	2.7	2.2	2.6
28.....	1.4	1.2	.75	1.8	2.9	5.5	2.5	4.0	2.2	2.7	2.4	2.4
29.....	1.2	1.1	.8	1.1	.9	6.2	2.2	-----	1.7	2.7	2.2	3.6
30.....	1.1	4.0	.8	.9	.9	19.4	2.2	-----	1.6	2.7	2.1	4.0
31.....	1.1	1.8	.8	.9	-----	10.2	2.5	-----	1.7	-----	2.1	-----

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July.....	8.4	0.6	1.40	2.17	43.6	133
August.....	6.4	.8	1.62	2.51	50.2	154
September.....	1.5	.75	.995	1.54	29.8	92
October.....	11.6	.6	1.62	2.51	50.1	154
November.....	10.3	.7	1.69	2.61	50.6	156
December.....	28	.55	6.71	10.4	208	638
January.....	22	1.4	4.24	6.56	131	403
February.....	16.8	.75	3.33	5.15	93.2	286
March.....	9.2	1.6	2.98	4.61	92.4	284
April.....	46	1.6	5.76	8.91	173	530
May.....	3.4	2.0	2.36	3.65	73.1	225
June.....	8.0	2.0	2.91	4.50	87.3	268
The year.....	46	.55	2.97	4.60	1,080	3,320

* Estimated.

† Partly estimated.

EAST MANOA DITCH NEAR HONOLULU, OAHU

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

RECORDS AVAILABLE.—May, 1915, to December, 1916; January, 1918, to January, 1921; August, 1925, to June, 1930.

EXTREMES.—Maximum discharge during year, 21 million gallons a day (32 second-feet) Apr. 11 (gage height, 2.50 feet); minimum, 0.12 million gallons a day (0.19 second-foot) Aug. 16.

1915-16; 1918-1921; 1925-1930: Maximum discharge, about 26 million gallons a day (40 second-feet) Jan. 16, 1921 (gage height, 2.27 feet); no flow Aug. 26, 1927.

REMARKS.—Records good. Water diverted from East Manoa Stream about a quarter of a mile above station by means of crude-stone dam.

Discharge, in million gallons a day, 1929-30

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1.....	0.5	0.6	0.46	0.57	0.41	0.64	1.05	0.76	0.25	0.76	0.36	0.25
2.....	.6	.55	.50	.53	.55	1.2	1.3	.68	.60	.76	.46	.25
3.....	.55	.5	.46	.46	.98	.68	.81	.68	1.1	.76	.43	.22
4.....	.6	.5	.43	.46	.60	.57	.27	.76	1.3	.72	.53	.22
5.....	.55	.5	.41	1.05	.53	.57	.25	.80	1.15	.68	.46	.22
6.....	.5	.5	.38	.27	.43	.57	.55	.76	1.1	.68	.41	.22
7.....	.6	.55	.34	.29	.38	.96	1.0	.53	1.3	1.0	.41	.22
8.....	.5	.8	.36	.53	.38	1.15	1.0	.50	1.3	.88	.38	.22
9.....	.5	.76	.34	.46	.36	.64	1.05	.50	1.05	.63	.41	.27
10.....	.5	.71	.34	.57	.38	.53	1.1	.46	.60	.36	.41	.38
11.....	.5	.66	.34	.46	.38	.53	1.1	.43	.84	1.8	.41	.41
12.....	.45	.61	.41	.43	.38	.50	1.1	.43	.57	.36	.41	.50
13.....	.45	.56	.38	.43	.41	.53	1.05	.50	.57	.27	.41	.43
14.....	.45	.51	.46	.43	.83	.50	1.05	.50	.57	.27	.41	.41
15.....	.45	.46	.46	.50	.60	1.05	1.1	.46	.57	.27	.41	.36
16.....	.85	.36	.46	.53	.60	2.0	1.05	.46	.57	.36	.38	.43
17.....	.5	.34	.46	.50	2.3	1.05	1.05	.43	.53	.41	.36	.43
18.....	.5	.36	.46	.43	1.75	1.4	1.2	.38	.58	.38	.36	.38
19.....	.45	.43	.46	.46	.93	4.0	1.05	.36	.53	.41	.34	.34
20.....	.45	.50	.46	.46	.76	1.8	1.35	.38	.60	.46	.34	.27
21.....	.45	.53	.46	.46	.68	1.65	1.1	.46	.53	.72	.34	.41
22.....	.45	.75	.54	.43		2.8	1.0	.50	.50	.64	.31	.46
23.....	.45	1.1	.50	.41		2.2	1.0	.88	.59	.64	.31	.50
24.....	.45	.72	.56	.41		.36	1.15	.53	.46	.57	.31	.53
25.....	1.0	.68	.57	.46	.8	.29	.95	.34	.70	.50	.31	.43
26.....	1.4	1.6	.50	.46		.25	1.2	6.5	.41	.50	.31	.38
27.....	1.0	.88	.50	.99		.31	.84	.38	.38	.50	.31	.36
28.....	.8	.64	.46	.84		.49	.80	.29	.59	.50	.29	.36
29.....	.65	.57	.50	.57		1.2	.76		.72	.50	.31	.27
30.....	.6	.84	.46	.50	.72	2.6	.76		.76	.41	.27	.29
31.....	.6	.57		.43		1.4	.76		.76		.25	

Month	Discharge			Total run-off		
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July.....	1.4	0.45	0.590	0.913	18.3	56
August.....	1.6	.34	.634	.981	19.6	60
September.....	.57	.34	.447	.692	13.4	41
October.....	1.05	.27	.509	.788	15.8	48
November.....	2.3	.36	.725	1.12	21.7	67
December.....	4.0	.25	1.11	1.72	34.4	106
January.....	1.35	.25	.945	1.46	29.3	90
February.....	6.5	.29	.737	1.14	20.6	63
March.....	1.3	.25	.711	1.10	22.0	68
April.....	1.8	.27	.590	.913	17.7	54
May.....	.53	.25	.368	.569	11.4	35
June.....	.53	.22	.347	.537	10.4	32
The year.....	6.5	.22	.643	.995	235	720

• Partly estimated.

• Estimated.

• Estimated mean.

PUKELE STREAM NEAR HONOLULU, OAHU

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 4½ miles east of Honolulu post office.

DRAINAGE AREA.—1.2 square miles.

RECORDS AVAILABLE.—April, 1912, to September, 1913; June, 1926, to June, 1930.

EXTREMES.—Maximum discharge during year, 805 million gallons a day (1, 250 second-feet) Apr. 11 (gage height, 7.75 feet; from flood marks); minimum uncertain, owing to faulty record.

1912-13; 1926-1930: Maximum discharge, that of Apr. 11, 1930; minimum, 0.15 million gallons a day (0.25 second-foot) June 3, 1926.

REMARKS.—Records fair for ordinary stages; poor for high stages and estimated periods. 2-inch pipe diverts water from stream above station. Station destroyed by flood of Apr. 11, 1930. Records started again July 12, 1930.

Discharge, in million gallons a day, 1929-30

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1.....	0.2	0.4	0.5	0.2	0.06	0.45	6.0	1.1	1.55			
2.....	.2	.4	.5	.2	.07	.95	19.3	1.0	1.6			
3.....	.2	.4	.5	.15	.5	.65	15.2	1.0	1.6			
4.....	.2	.4	.5	.15		.6	7.1	.95	1.7	*1.0	*1.0	
5.....	.2	.4	.5	*3.2	*.5	.6	4.4	.9	1.7			
6.....	.2	.4	.5	.65		.6	3.4	1.1	1.7			0.2
7.....	.2	.4	.45	.35		.6	3.0	.85	1.7	*6.5		
8.....	.15	.4	.45	.3		.6	2.8	.9	1.6			
9.....	.15	.4	.45	.35		.55	2.5	.9	1.15	*2.2		
10.....	.2	.35	.4	.35		.55	2.5	.85	1.15		*.8	
11.....	.2	.35	.35	.35	*.4	.5	*2.1	.85	3.9	*12		
12.....	.15	.35	.35	.35		.5	*1.8	.85				*.3
13.....	.15	.3	.3	.35		.45	*1.55	.85				
14.....	.15	.3	.25	.3		.45	1.45	.8				
15.....	.2	.3	.25	.35		2.3	1.35	.8				
16.....	.2	.3	.25	.3		9.5	1.3	.8		*1.3		*1.4
17.....	.15	.3	.25	.3	*10	1.5	1.3	.75			*.5	
18.....	.15	.25	.25	.3	1.45	7.8	1.25	.75	*1.0			
19.....	.15	.2	.25	.25	.6	32	1.15	.75				.5
20.....	.2	.2	.25	.25	.6	8.6	2.4	.8				
21.....	.2	.15	*.2	.2	.6	7.1	1.25	.8		*4.0		
22.....	.2	.65	.2	.15	.6	28	1.25	1.05				
23.....	.15	1.85	.2	.1	.55	32	1.25	7.1			*.7	
24.....	.15	.3	.2	.1	.5	12.2	1.5	3.3				
25.....	.45	.25	.2	*.08	.5	9.3	1.3	1.15	*3.5	*1.1		*.8
26.....	1.95	1.05	.2	.06	.45	6.8	4.6	4.7				
27.....	.5	.5	.2	*.06	.45	5.1	1.45	2.9			*.3	
28.....	.4	.45	.2	*.06	.75	4.2	1.25	1.65	*1.0			
29.....	.4	.5	.2	*.06	.5	4.7	1.2	-----				
30.....	.4	.95	.2	.06	.45	21	1.15	-----				
31.....	.4	.6	-----	.05	-----	10.4	1.1	-----				

Month	Discharge			Total run-off		
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July.....	1.95	0.15	0.284	0.439	8.80	27
August.....	1.85	.15	.453	.701	14.0	43
September.....	.5	.2	.317	.490	9.50	29
October.....	3.2	.05	.322	.498	9.98	31
November.....	-----	.06	.951	1.47	28.5	88
December.....	32	.45	6.79	10.5	211	646
January.....	19.3	1.1	3.20	4.95	99.2	304
February.....	7.1	.75	1.43	2.21	40.1	123
March.....	-----	-----	1.43	2.21	44.4	136
April.....	-----	-----	2.39	3.70	71.7	220
May.....	-----	-----	.63	.98	19.5	60
June.....	-----	-----	.55	.85	16.6	51
The year.....	-----	.05	1.57	2.43	573	1,760

* Partly estimated.

* Estimated.

* Estimated mean.

WAIOMAO STREAM ABOVE PUKELE STREAM, NEAR HONOLULU, OAHU

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

DRAINAGE AREA.—1.0 square mile.

RECORDS AVAILABLE.—April, 1911, to December, 1912; June, 1926, to June, 1930.

EXTREMES.—Maximum discharge, during year, 461 million gallons a day or 713 second-feet Apr. 11 (gage height, 6.27 feet); no flow several times in July, September, and October.

1911-12; 1926-1930: Maximum discharge, that of Apr. 11, 1930; no flow when stream dries up.

REMARKS.—Records good for ordinary and medium stages; poor for very high stages. Honolulu waterworks diverts water from tunnels in drainage area.

Discharge, in million gallons a day, 1929-30

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1.....	0.15	0.3	0.35	0.1	0.07	0.65	3.3	0.6	1.1	0.65	0.4	0.1
2.....	.03	.25	.4	.15	.06	1.4	19.3	.5	1.0	.85	.55	.25
3.....	.02	.15	.5	.1	4.9	.75	14.4	.5	1.1	.65	.55	.2
4.....	.01	.2	.2	.15	.55	.6	5.3	.95	1.2	.5	.6	.1
5.....	0	.2	.15	3.0	.6	.5	*3.2	1.4	1.0	.5	.55	.2
6.....	0	.15	.1	.9	.5	.4	*2.3	2.2	.85	.55	.4	.15
7.....	0	.15	.1	.45	.4	.75	*2.0	.75	1.0	6.7	.45	.09
8.....	.06	.15	.09	.4	.35	1.3	*1.6	.65	2.0	7.5	.25	.15
9.....	.02	.2	.07	.25	.3	.65	*1.3	.4	1.6	4.5	.45	.15
10.....	.01	.15	.06	.7	.4	.5	*1.0	.5	1.4	2.0	.35	.07
11.....	.01	.15	.2	.4	.45	.4	*.7	.45	5.3	31	.25	.15
12.....	.06	.15	.15	.2	.3	.3	.55	.35	1.8	5.2	.35	.3
13.....	.03	.15	.08	.2	.25	.2	.55	.65	1.0	2.1	.3	.35
14.....	.01	.09	.06	.15	.35	.2	.55	.55	.85	1.4	.25	.35
15.....	0	.1	.04	.08	.25	3.9	.55	.45	.85	1.2	.15	.9
16.....	.6	.09	.02	.06	.2	14.4	.5	.4	.65	1.2	.25	2.4
17.....	.3	.1	.01	.04	10.1	2.6	.5	.4	.55	.85	.2	1.6
18.....	.1	.15	.01	.03	2.2	6.5	.8	.35	.4	.65	.15	.85
19.....	.06	.1	0	.02	.65	35	.5	.25	.5	.9	.2	.65
20.....	.04	.09	0	.01	.65	6.5	4.5	.25	.65	.75	.2	.45
21.....	.04	.09	0	.01	.5	5.3	1.1	.65	.45	3.9	.09	.35
22.....	.05	1.5	.15	.01	.45	29	.7	3.1	.4	1.5	.35	.85
23.....	.09	2.6	.15	0	.65	31	.6	11.9	1.5	.9	.35	.65
24.....	.05	.65	.25	0	.65	9.6	1.8	6.0	.75	.7	.25	.7
25.....	2.3	.45	.1	.03	.6	6.7	1.2	1.7	5.4	.6	.2	.5
26.....	3.8	4.2	.09	.06	.5	4.3	6.4	6.9	2.8	.5	.15	.5
27.....	1.4	1.4	.08	.2	.4	2.8	1.4	3.3	1.1	.5	.2	.45
28.....	.85	.7	.15	.3	1.7	2.1	1.0	1.7	.7	.45	.15	.35
29.....	.6	.45	.25	.15	.65	3.3	.85	-----	.65	.45	.2	.55
30.....	.45	.45	.15	.08	.65	18.1	.65	-----	.5	.4	.09	.7
31.....	.4	.6	-----	.08	-----	6.6	.65	-----	.5	-----	.1	-----

Month	Discharge			Total run-off		
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July.....	3.8	0	0.372	0.576	11.5	35
August.....	4.2	.09	.521	.806	16.2	50
September.....	.5	0	.132	.204	3.96	12
October.....	3.0	0	.268	.415	8.31	26
November.....	10.1	.06	1.01	1.56	30.3	93
December.....	35	.2	6.33	9.79	196	602
January.....	19.3	.5	2.57	3.98	79.8	244
February.....	11.9	.25	1.71	2.65	47.8	147
March.....	5.4	.4	1.28	1.98	39.6	122
April.....	31	.4	2.65	4.10	79.6	244
May.....	.6	.09	.290	.449	8.98	28
June.....	2.4	.07	.502	.777	15.1	46
The year.....	35	0	1.47	2.27	537	1,650

* Partly estimated.

MISCELLANEOUS MEASUREMENTS

A total of 613 measurements was made on the island of Oahu by J. F. Kunesh or under his supervision. These measurements are published in supplement to the report of the Board of Water Supply, city and county of Honolulu, to the legislature of the Territory of Hawaii, sixteenth regular session, under the title "Water Resources of the City of Honolulu, 1928-1930."

ISLAND OF MOLOKAI

HALAWA STREAM NEAR HALAWA, MOLOKAI

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

DRAINAGE AREA.—4.6 square miles.

RECORDS AVAILABLE.—August, 1917, to June, 1930.

EXTREMES.—Maximum discharge recorded during year, 983 million gallons a day (1,520 second-feet) Jan. 3 (gage height, 9.20 feet); minimum, 2.1 million gallons a day (3.2 second-feet) Sept. 10, 24.

1917-1930: Maximum discharge, about 1,550 million gallons a day (2,400 second-feet) Mar. 31, 1923 (gage height, 11.65 feet); minimum, 0.8 million gallons a day (1.2 second-feet) Oct. 13-15, 19, 1917.

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

REMARKS.—Records fair for ordinary stages; poor for high stages and estimated periods. 1-inch pipe line diverts water a quarter of a mile above station for domestic use of Halawa village.

Discharge, in million gallons a day, of Halawa Stream near Halawa, Molokai, 1929-30

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	
1	3.8	10	3.6	} * 6.5	6.2	24	13.5	} * 8	} * 14	10.5	9.7	20	
2	5.5	8.5	5.2		4.7	31	98			27	7.5	7.8	
3	4.0	11	9.0		116	13	209			7.5	8.2	8.9	
4	3.1	11.5	4.7		14	9.7	54			6.2	6.8	16	
5	2.7	7.2	3.6	} * 4.0	8.5	8.2	21	} * 13	} * 70	5.5	9.3	7.8	
6	2.6	8.2	2.9		6.5	21	13.5			20	5.5	6.5	
7	4.8	8.5	2.6		5.2	26	13			82	5.2	5.5	
8	4.0	6.2	2.3		4.7	9.3	11.5			82	4.7	5.2	
9	2.9	18.5	} * 32	4.5	6.8	8.5	} * 22	71	4.5	7.5			
10	2.9	17.5		4.7	6.2	7.8		} * 6.5	17.5	4.3	6.8		
11	7.1	16		} * 6	14.5	5.5			7.8	} 75	72	4.0	9.7
12	3.4	8.2			5.5	5.0			7.2		25	5.2	38
13	3.1	6.8	} * 3.1		4.7	} * 4.6	56		} * 22		14	4.7	11.5
14	2.9	5.5			4.3		10.5	10.5			6.8	11	
15	2.4	5.9		13.5	48		40	5.2		9.7			
16	35	9.8		} * 5	5.2		} * 22	12		} * 4.5	27	79	6.2
17	10	7.5	196		9.3	21		19.5	11.5		35		
18	6.8	5.9	80		67	8.9		11	14		12.5		
19	5.2	5.9	18		19.5	7.8		14	7.8		9.7		
20	4.7	5.2	} * 5.5	150	} * 60	11.5	} * 36	11	25	5.5	7.2		
21	6.5	7.5		19.5		11.5		9.3	72	6.2	6.2		
22	6.8	7.8		12.5		19.5		12	6.8	19.5	26	11.5	
23	5.9	6.2		195		53		12.5	7.2	12	29	17.5	
24	11	9.9	} * 4.4	43	56	8.2	} * 15	7.8	9.3	7.5	22		
25	31	6.2		147	62	32		38	8.2	6.2	10.5		
26	58	14		} * 7	52	44		22	29	7.5	6.2	49	
27	19	7.5			49	45		8.2	17.5	6.8	5.5	16	
28	10.5	5.2	} * 5.5		33	174	15	} * 32	8.2	6.2	12.5	10	
29	7.2	4.5			15.5	69	31		} * 8	6.8	5.9	6.2	37
30	6.2	4.0		5.5	38	48	6.5			5.9	4.7	26	
31	7.5	3.6		4.7	25	} * 42	6.2			4.5	---	---	

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July	58	2.4	9.24	14.3	286	879
August	18.5	3.6	8.39	13.0	260	798
September	---	---	4.74	7.33	142	436
October	---	---	9.38	14.5	291	892
November	196	4.3	48.9	75.7	1,470	4,500
December	---	---	37.4	57.9	1,160	3,560
January	209	7.2	29.2	45.2	905	2,780
February	---	---	12.6	19.5	352	1,080
March	---	---	26.9	41.6	835	2,560
April	82	5.5	26.4	40.8	792	2,430
May	29	4.0	8.10	12.5	251	771
June	49	5.2	16.2	25.1	435	1,490
The year	---	---	19.8	30.6	7,230	22,200

• Estimated mean.

WAIKOLU STREAM AT PIPE-LINE CROSSING NEAR KALAUPAPA, MOLOKAI

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

DRAINAGE AREA.—3.7 square miles.

RECORDS AVAILABLE.—June, 1919, to June, 1930.

EXTREMES.—Maximum discharge during year, 511 million gallons a day (791 second-feet) Jan. 2 (gage height, 3.97 feet); minimum uncertain.

1919-1930: Maximum discharge, 1,270 million gallons a day (1,960 second-feet) Dec. 24, 1920 (gage height, 10.20 feet); minimum, 1.3 million gallons a day (2.0 second-feet) Nov. 1-2, 1925, June 5, 1926.

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

Discharge, in million gallons a day, 1929-30

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1.....	5.3	* 5.0		4.6	4.4	21	13.9	8.0			9.1	13.9
2.....	4.8	5.0		5.0	4.6	38	62	6.9			9.1	13.9
3.....	4.6	5.7	5	4.6	37	12.8	136	6.1			8.7	17.1
4.....	4.6	7.3		4.4	8.2	8.4	19.2	7.3			9.1	23
5.....	4.6			4.1	5.0	6.9	9.8	13.3			21	13.3
6.....	4.6		3.9	4.1	4.4	6.6	12.6	9.8			13.9	13.3
7.....	4.6	* 6	4.4	4.1	4.1	10.6	10.4	7.3			13.3	13.3
8.....	4.6		4.4	4.8	3.9	7.3	9.1	6.6			13.3	13.3
9.....	4.6		4.4	13.4	3.9	6.9	8.4	6.2			12.7	13.3
10.....			4.4	6.9	6.5	6.2	8.4	6.2			12.7	
11.....			4.1	4.6	10.2	6.2	8.4	6.2			11.5	
12.....			4.1	4.4	4.4	6.2	9.1	6.2			12.1	
13.....			4.1	4.4	4.1	5.5	29	6.2			12.1	
14.....			4.1	5.0	6.5	6.0	8.4	6.2			12.7	
15.....			4.1	4.6	6.3		34	6.2			16.3	
16.....			4.1	4.6	4.4		9.7	6.2	11.5		13.9	
17.....			4.1	4.4	121		8.0	6.2	11.5		15.6	
18.....			4.4	4.4	23		28	6.2	11.5		14.4	13.9
19.....			4.4	4.4	6.2		11.0	6.2	11.5		13.9	12.7
20.....			4.4	4.6	74		8.7	6.2	11.5		14.4	12.1
21.....			4.4	4.8	7.3	33	8.7	24	11.5		14.4	11.5
22.....			4.6	4.8	16.2	13.6	9.1	30	11.5		13.9	12.1
23.....			4.6	4.8	81	70	8.4	40	11.5		13.9	17.1
24.....			4.8	4.8	19.0	63	8.0	10.4	11.0		13.9	17.1
25.....			5.5	* 4.6	100	55	8.4		26		14.4	13.3
26.....			5.0	* 4.6	30	50	8.4		26		13.9	37
27.....			4.8	* 4.4	19.3	31	8.7		13.9	10.4	14.4	18.0
28.....			3.8	* 4.4	61	15.3	8.4			9.8	17.1	13.3
29.....			4.8	* 4.4	16.8	64	8.7			9.8	15.0	18.7
30.....			4.8	* 4.4	36	43	35			9.1	13.9	22
31.....				4.4		21	11.5				13.9	

Month	Discharge			Total run-off	
	Million gallons a day			Million gallons	Acre-feet
	Maximum	Minimum	Mean		
July.....			6.11	9.45	581
August.....			6.68	10.3	636
September.....			4.55	7.04	419
October.....	13.4	4.1	4.90	7.58	466
November.....	121	3.9	24.3	37.6	2,240
December.....		5.5	27.7	42.9	2,640
January.....	136	8.0	18.3	28.3	1,740
February.....		6.1	11.9	18.4	1,020
March.....			24.7	38.2	2,350
April.....			37.4	57.9	3,440
May.....	21	8.7	13.5	20.9	1,280
June.....	37		16.0	24.8	1,470
The year.....			16.3	25.2	13,900

* Estimated.

* Estimated mean.

* Partly estimated.

WAIHANAU STREAM NEAR KALAUPAPA, MOLOKAI

LOCATION.—Water-stage recorder above upper end of Waihanau tunnel, $3\frac{1}{4}$ miles east of Kalaupapa and $3\frac{1}{2}$ miles southeast of Kalae.

DRAINAGE AREA.—1.1 square miles.

RECORDS AVAILABLE.—March to June, 1930.

EXTREMES.—Maximum discharge during period, 101 million gallons a day (156 second-feet) Apr. 7 (gage height, 3.95 feet); minimum, 0.30 million gallons a day (0.46 second-foot) June 9, 10.

REMARKS.—Records good for ordinary stages; poor for high stages and estimated periods. No diversions above station. Established Mar. 27, 1930.

Discharge, in million gallons a day, 1929-30

Day	Mar.	Apr.	May	June	Day	Mar.	Apr.	May	June
1.....		0.98	0.74	0.51	16.....		^a 32	0.53	6.6
2.....		6.4	.66	.51	17.....			2.7	1.25
3.....		1.3	.64	.39	18.....		^a 1.7	1.1	.7
4.....		.98	.64	.42	19.....			.56	.56
5.....		1.65	.66	.38	20.....			.51	.42
6.....		18.5	.56	.34	21.....		^a 4.4	.51	.4
7.....		29	.56	.34	22.....			.49	.8
8.....		26	.58	.32	23.....			.45	.6
9.....		9.5	.51	.32	24.....			.4	.56
10.....			.58	.45	25.....		^a 1.1	.39	.45
11.....		^a 11	.47	.51	26.....			.38	3.6
12.....			.68	1.65	27.....	1.75	^b .74	2.1	1.4
13.....			.56	.56	28.....	1.2	.74	1.6	1.68
14.....			.66	.79	29.....	.98	.74	.62	2.4
15.....		^a 3.2	.7	.72	30.....	.9	.79	.47	2.0
					31.....	.85		.44	

Month	Discharge			Total run-off		
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
March 27-31.....	1. 75	0. 85	1. 14	1. 76	5. 68	17
April.....	29	. 74	5. 90	9. 13	177	543
May.....	2. 7	. 38	. 724	1. 12	22. 4	69
June.....	6. 6	. 32	1. 02	1. 58	30. 6	94
The period (96 days).....	29	. 32	2. 46	3. 81	235	728

^a Estimated mean.

^b Partly estimated.

MISCELLANEOUS MEASUREMENTS

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

Miscellaneous discharge measurements on Molokai, 1929-30

Date	Stream	Tributary to—	Locality	Second-feet	Million gallons a day
Sept. 2	Waihanau Stream	Pacific Ocean	Upper end of Waihanau tunnel, near Kalae.	0.296	0.191
3	do.	do.	do.	.149	.096
Oct. 30	do.	do.	do.	.124	.080
Mar. 27	do.	do.	do.	2.32	1.50
Sept. 3	do.	do.	Kamiloloa-Kahunui boundary, near Kalae.	.005	.003
Mar. 27	do.	do.	do.	1.19	.77
June 18	do.	do.	do.	.209	.135
Mar. 27	do.	do.	Lower end of Waihanau tunnel, near Kalae.	2.09	1.35
Sept. 4	Keolewa Spring	Keolewa Stream	Elevation 1,670 feet, on land of Ioli.	.014	.009
4	do.	do.	Left branch of Keolewa Gulch, on land of Ioli, at elevation 1,980 feet, near Kalae.	0	0
4	Iiilika Spring	do.	Right branch of Keolewa Gulch, on land of Ioli, at elevation 1,850 feet, near Kalae.	.0014	.0009
3	Waileia Stream	Pacific Ocean	Kahunui boundary, near Kalae.	.026	.017
5	Waikolu Stream	do.	Elevation 1,030 feet, near Kalaupapa.	4.20	2.71
5	do.	do.	Elevation 1,300 feet, near Kalaupapa.	1.59	1.03

ISLAND OF MAUI

HONOKAHAU STREAM NEAR HONOKAHAU, MAUI

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

DRAINAGE AREA.—4.2 square miles.

RECORDS AVAILABLE.—March, 1913, to September, 1920; May, 1922, to June, 1930.

EXTREMES.—Maximum discharge during year, 868 million gallons a day (1,340 second-feet) Nov. 25 (gage height, 5.75 feet); minimum, 7.3 million gallons a day (11.3 second-feet) Nov. 14-17.

1913-1920, 1922-1930: Maximum discharge, 2,200 million gallons a day (3,400 second-feet) Feb. 13, 1924 (gage height, 7.92 feet); minimum, 6.2 million gallons a day (9.6 second-feet) June 30, 1926.

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

Discharge, in million gallons a day, 1929-30

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1.....	11.6	11.3	22	9.9	7.9	51	18.0	14.7	18.5	62	24	28
2.....	12.7	11.3	9.9	22	8.8	68	58	13.8	24	56	23	29
3.....	11.3	18.7	10.9	9.0	9.3	16.7	62	13.8	49	22	18	48
4.....	10.9	25	8.8	8.8	9.9	10.9	26	13.4	55	15.2	18.5	55
5.....	10.9	11.6	8.8	9.3	8.5	9.9	18.0	13.4	59	18.2	25	16.5
6.....	10.6	14.1	8.5	8.5	7.9	11.7	16.6	16.2	78	116	38	16
7.....	10.6	12.0	8.2	7.9	105	16.6	14.7	74	197	31	15	15
8.....	10.9	54	31	7.9	14.7	16.2	13.8	22	251	37	16	16
9.....	10.9	25	123	7.6	10.9	14.7	13.6	41	186	18.5	19	19
10.....	10.9	75	47	8.2	10.2	14.3	13.4	56	75	17.5	19	19
11.....	10.6	80	11.6	10.9	9.9	14.7	13.4	86	230	17.5	20	20
12.....	10.2	12.0	9.3	8.5	9.6	14.8	13.4	22	133	28	39	39
13.....	10.2	10.6	12.0	7.9	9.3	42	13.4	17.6	104	18.5	29	29
14.....	10.2	10.2	16.5	7.6	9.0	14.7	13.6	25	23	19.5	257	257
15.....	16.7	10.9	9.0	7.9	12.0	14.3	13.6	26	42	23	22	22
16.....	153	15.1	9.3	7.3	155	14.7	13.4	17.1	50	21	58	58
17.....	13.8	16.3	8.8	101	15.7	13.4	13.4	15.7	23	44	22	22
18.....	11.3	9.9	8.5	50	178	37	13.4	15.2	18	43	17	17
19.....	10.4	9.6	11.0	12.0	222	15.2	13.4	14.7	28	38	15	15
20.....	10.2	9.6	9.0	11.3	62	19.6	13.4	24	42	26	14	14
21.....	11.3	11.6	8.5	10.2	39	15.2	14.6	16.2	44	26	18.5	18.5
22.....	13.1	18.5	8.2	8.8	16.2	14.3	71	14.7	62	57	37	37
23.....	10.9	12.0	8.2	56	30	15.7	140	13.8	50	24	31	31
24.....	17.6	13.1	9.9	8.2	27	68	13.8	21	15.9	20	17.5	99
25.....	74	12.9	23	8.5	70	42	29	18.5	30	23	17	103
26.....	95	12.0	17.1	8.5	32	61	18.0	58	29	18	31	91
27.....	26	9.9	9.0	9.0	15.9	56	14.3	83	21	19	19	22
28.....	13.1	9.3	10.0	8.2	54	18.0	13.8	27	15.2	27	20	21
29.....	10.9	9.0	12.7	8.2	24	116	13.4	-----	14.3	18	16	136
30.....	10.9	9.3	8.5	7.9	25	133	102	-----	13.8	33	16	178
31.....	15.2	9.3	-----	7.9	-----	33	20	-----	13.8	-----	15	-----

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July.....	153	10.2	21.5	33.3	666	2,050
August.....	80	9.0	18.4	28.5	569	1,750
September.....	23	-----	10.5	16.2	314	967
October.....	123	7.9	15.3	23.7	473	1,460
November.....	101	7.3	21.0	32.5	631	1,930
December.....	222	9.0	51.7	80.0	1,600	4,920
January.....	102	13.4	23.6	36.5	730	2,250
February.....	140	13.4	25.3	39.1	708	2,170
March.....	86	13.8	30.2	46.7	938	2,870
April.....	251	15.2	66.8	103	2,010	6,150
May.....	57	15	25.4	39.3	786	2,420
June.....	257	14	49.5	76.6	1,490	4,560
The year.....	257	7.3	29.9	46.3	10,900	33,500

• Estimated mean.

HONOKAWAI DITCH NEAR LAHAINA, MAUI

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

RECORDS AVAILABLE.—July, 1912, to June, 1930.

EXTREMES.—Maximum discharge during year, 76 million gallons a day (118 second-feet) Aug. 11 (gage height, 2.87 feet); minimum, 1.1 million gallons a day (1.7 second-feet) Dec. 5.

1913-1930: Maximum discharge, that of Aug. 11, 1929; no flow occasionally when water is shut out of ditch.

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

Discharge, in million gallons a day, 1929-30

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan	Feb.	Mar.	Apr.	May	June
1.....	4.1	4.5	4.6	19	2.8	6.9	3.1	3.0	4.0	18	5.6	7.9
2.....	4.1	4.2	4.4	15.5	2.9	7.6	7.0	3.1	4.8	15.5	4.5	10
3.....	4.2	7.9	4.6	4.0	2.7	3.6	7.0	3.0	15.5	5.2	3.9	20
4.....	4.4	8.5	3.8	4.0	2.8	2.9	3.9	3.0	17	3.8	3.9	23
5.....	4.4	4.4	3.8	3.9	3.0	2.5	3.0	3.0	12	4.1	6.2	4.0
6.....	4.4	5.2	3.8	3.8	3.0	2.8	2.8	3.0	25	31	12.5	3.9
7.....	4.4	4.6	3.8	3.8	3.0	10.5	2.8	3.0	23	33	13.5	3.9
8.....	4.5	13.5	3.8	11.5	3.0	3.0	2.8	2.9	4.6	33	23	3.9
9.....	4.5	7.1	3.9	30	3.0	2.8	2.7	2.8	16	28	4.2	4.0
10.....	4.4	24	3.9	6.3	3.0	3.0	2.7	2.8	12.5	16	4.2	4.9
11.....	4.4	25	4.0	3.0	3.0	3.0	2.9	2.8	16	30	4.4	8.0
12.....	4.4	4.5	3.9	2.8	3.0	3.0	3.0	2.8	4.2	30	5.8	14.5
13.....	4.4	4.1	3.8	3.4	3.0	2.9	6.4	2.8	3.5	20	4.4	7.2
14.....	4.4	3.8	3.9	3.7	3.0	2.9	2.8	2.8	4.0	6.3	4.6	7.2
15.....	4.4	3.8	3.9	3.7	3.0	4.1	2.8	2.8	5.1	4.9	6.1	4.6
16.....	33	4.3	3.8	2.8	3.0	14.5	2.9	2.8	3.6	9.6	4.2	15
17.....	5.6	5.3	3.8	2.8	21	3.4	2.8	2.9	3.6	4.5	9.0	5.4
18.....	4.2	3.8	3.8	2.8	7.4	4.7	5.5	2.9	3.6	4.0	10	3.8
19.....	4.1	3.8	3.8	2.9	3.0	6.1	2.9	2.9	3.5	4.1	8.0	3.8
20.....	4.1	3.8	3.9	2.8	2.7	4.8	2.9	2.9	3.6	5.8	5.7	3.8
21.....	4.1	4.2	3.9	2.9	2.8	4.2	2.9	2.9	3.6	6.0	6.7	4.4
22.....	4.8	5.7	4.6	3.0	2.8	2.8	2.9	5.1	3.5	9.7	14	11.5
23.....	4.2	4.7	5.6	3.0	11	5.2	2.8	18	3.5	13	5.2	10
24.....	6.4	4.1	4.0	3.0	5.4	7.9	2.8	3.2	3.6	4.2	4.4	32
25.....	21	3.8	7.5	3.0	7.2	5.2	3.0	3.1	9.4	4.6	4.4	33
26.....	31	4.2	8.9	3.0	5.2	9.1	3.2	11	6.4	3.8	7.5	33
27.....	9.7	3.8	4.0	2.8	3.2	6.2	2.8	25	3.6	3.9	4.8	6.3
28.....	4.9	3.8	4.1	2.8	6.2	3.1	2.8	7.2	3.3	6.6	5.0	5.5
29.....	4.4	3.8	5.2	2.9	4.0	3.1	2.8	-----	3.2	3.8	4.4	28
30.....	4.2	3.8	3.8	2.9	4.9	3.1	15	-----	3.4	6.8	4.1	43
31.....	5.5	3.9	-----	2.8	-----	3.5	3.5	-----	3.5	-----	4.1	-----

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July.....	33	4.1	6.99	10.8	217	665
August.....	25	3.8	6.19	9.58	192	589
September.....	8.9	3.8	4.35	6.73	131	400
October.....	30	2.8	5.28	8.17	164	502
November.....	21	2.7	4.47	6.92	134	412
December.....	14.5	2.5	4.79	7.41	148	456
January.....	15	2.7	3.82	5.91	118	365
February.....	25	2.8	4.77	7.38	134	410
March.....	25	3.2	7.49	11.6	232	713
April.....	33	3.8	12.8	19.0	369	1,130
May.....	23	3.9	6.74	10.4	209	641
June.....	43	3.8	12.2	18.9	365	1,120
The year.....	43	2.5	6.61	10.2	2,410	7,400

• Estimated.

KANAHUA STREAM ABOVE PIPE-LINE INTAKE NEAR LAHAINA, MAUI

LOCATION.—Water-stage recorder 200 feet above intake of pipe line for Lahaina and Lahainaluna School and $2\frac{1}{4}$ miles northeast of Lahaina.

DRAINAGE AREA.—1.8 square miles.

RECORDS AVAILABLE.—February, 1916, to June, 1930.

EXTREMES.—Maximum discharge during year, 149 million gallons a day (231 second-feet) Nov. 25 (gage height, 3.58 feet); minimum, 2.0 million gallons a day (3.1 second-feet) Dec. 4-7.

1916-1930: Maximum discharge, 314 million gallons a day (486 second-feet) Nov. 26, 1918 (gage height, 3.79 feet); minimum, 1.6 million gallons a day (2.5 second-feet) Dec. 23-25, 1927.

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

Discharge, in million gallons a day, 1929-30

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1.....	3.3	2.9	2.8	2.8	2.4	9.0	2.9	2.8	4.0	8.4	4.9	7.9
2.....	3.5	2.9	2.8	4.9	3.8	6.9	10	2.4	6.4	6.0	5.4	6.6
3.....	3.3	3.5	2.8	2.4	2.6	2.8	4.5	2.4	15.5	5.8	3.7	9.7
4.....	3.3	4.8	2.6	2.4	2.6	2.2	3.1	2.4	22	2.8	3.5	11.5
5.....	3.3	3.1	2.4	2.4	2.4	2.2	2.9	2.4	17.5	2.9	7.9	3.3
6.....	3.3	3.3	2.4	2.4	2.4	2.0	2.9	2.4	20	13	7.5	3.3
7.....	3.3	3.1	2.4	2.6	2.4	3.4	2.9	2.4	17.5	19	5.8	3.1
8.....	3.3	5.0	2.6	7.4	2.4	2.4	2.8	2.4	4.3	19	10.5	3.1
9.....	3.3	3.8	2.6	11	2.2	2.4	2.8	2.4	9.3	13.5	4.3	2.9
10.....	3.3	16	2.6	4.2	2.4	2.4	2.8	2.4	5.7	6.6	5.1	4.2
11.....	3.3	11	3.5	2.8	2.4	2.4	2.8	2.4	5.7	16	4.6	8.0
12.....	3.3	3.1	2.6	2.6	2.2	2.4	3.2	2.4	3.1	24	8.6	9.0
13.....	3.3	3.1	2.6	4.1	2.2	2.4	6.4	2.4	2.9	8.4	4.9	4.4
14.....	3.3	3.1	2.4	3.3	2.2	2.4	2.9	2.4	3.3	4.0	11	5.1
15.....	4.0	3.1	2.6	2.6	2.4	4.3	2.9	2.4	4.0	3.3	7.6	3.3
16.....	18	4.4	2.4	2.9	2.4	25	2.9	2.2	2.9	4.0	5.6	8.5
17.....	3.7	3.5	2.4	2.6	3.9	3.5	2.8	2.2	2.6	3.5	12	3.5
18.....	3.1	3.1	2.4	2.4	2.9	9.4	6.6	2.2	2.6	3.5	7.7	2.8
19.....	3.1	3.1	2.4	2.4	2.4	14	2.9	2.2	2.6	3.3	4.9	2.9
20.....	3.1	3.1	2.4	2.4	2.2	4.9	2.8	2.2	2.6	3.3	6.5	2.8
21.....	5.1	3.5	2.4	2.4	2.2	3.3	2.6	2.2	2.6	3.3	5.3	3.1
22.....	4.9	3.3	2.6	2.4	2.2	2.9	2.6	2.2	2.6	4.5	6.7	7.5
23.....	3.1	3.3	2.4	2.4	3.2	2.8	2.4	5.7	2.6	7.7	4.3	8.6
24.....	3.8	3.1	2.4	2.4	4.2	3.5	2.4	2.6	2.8	3.7	3.5	11.5
25.....	5.5	3.1	3.1	2.4	13	3.1	2.4	2.4	6.7	4.9	3.3	14
26.....	10	3.1	4.3	2.4	5.5	3.4	2.8	7.2	5.7	3.7	5.9	15.5
27.....	5.9	2.9	2.8	2.4	2.6	4.0	2.4	28	2.8	3.5	4.0	4.7
28.....	3.3	2.9	3.5	2.6	2.4	4.7	2.4	6.6	2.6	4.0	5.8	6.7
29.....	2.9	2.8	3.1	2.4	2.2	23	2.4	-----	2.6	3.5	3.3	11.5
30.....	2.8	3.1	2.4	2.4	3.3	11	16	-----	4.8	3.3	3.3	14.5
31.....	2.9	2.9	-----	2.4	-----	3.3	4.1	-----	2.4	-----	3.1	-----

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July.....	18	2.8	4.25	6.58	132	404
August.....	16	2.8	3.97	6.14	123	378
September.....	4.3	2.4	2.69	4.16	80.7	248
October.....	11	2.4	3.14	4.86	97.2	299
November.....	13	2.2	3.05	4.72	91.6	281
December.....	25	2.0	5.53	8.56	171	526
January.....	16	2.4	3.75	5.80	116	357
February.....	28	2.2	3.72	5.76	104	320
March.....	22	2.4	6.15	9.52	190	585
April.....	24	2.8	7.13	11.0	214	656
May.....	12	3.1	5.82	9.00	180	554
June.....	15.5	2.8	6.75	10.4	202	621
The year.....	28	2.0	4.67	7.23	1,700	5,230

OLOWALU DITCH NEAR OLOWALU, MAU

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

RECORDS AVAILABLE.—August, 1911, to June, 1930.

EXTREMES.—Maximum discharge during year, 12.0 million gallons a day (18.6 second-foot Dec. 16 (gage height, 1.52 feet); minimum, 1.5 million gallons a day (2.3 second-foot) Sept. 7.

1911–1930: Maximum discharge, 18 million gallons a day (28 second-foot) Dec. 25, 1920 (gage height, 1.53 feet); no flow occasionally when water is shut out of ditch.

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

Discharge, in million gallons a day, 1929–30

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	2.5	3.2	2.1	1.6	2.3	8.0	7.3	8.7	8.4	8.7	7.6	5.2
2	2.4	3.0	2.0	2.1	} ^a 7	7.3	8.0	7.3	9.1	9.1	7.6	5.2
3	2.4	3.0	2.0	1.7		8.7	7.0	8.4	8.7	7.0	5.9	5.9
4	2.4	3.4	1.9	1.6	} ^a 2.5	4.9	6.2	8.7	8.0	6.6	8.0	5.9
5	2.4	3.0	1.8	1.6		3.8	5.9	5.9	8.7	7.3	6.2	6.2
6	2.3	2.8	1.8	1.6	} ^a 2.3	3.4	5.2	5.6	8.7	9.1	7.3	5.2
7	2.4	2.8	1.8	1.5		7.0	6.2	5.2	8.7	9.1	8.0	4.9
8	2.4	3.7	1.7	1.9	2.2	4.9	6.6	4.9	8.7	8.4	8.0	4.6
9	2.3	4.3	1.7	4.8	2.2	4.0	5.9	4.6	8.7	8.4	6.6	4.6
10	2.4	5.9	1.7	5.3	2.2	3.6	5.6	4.6	8.7	8.7	6.2	4.6
11	2.5	7.3	1.7	2.8	2.2	3.3	5.2	4.3	8.7	8.7	5.9	4.9
12	2.4	7.3	1.7	2.2	2.2	3.3	5.2	4.3	8.4	8.0	6.6	5.6
13	2.3	5.2	1.7	2.1	2.2	3.0	8.0	4.3	8.0	7.6	5.9	5.2
14	2.3	4.3	1.6	2.2	2.2	2.8	5.9	4.0	7.3	7.9	5.9	5.6
15	2.4	3.8	1.6	1.9	2.2	3.0	5.2	4.0	8.4	9.1	5.6	5.2
16	7.8	3.9	1.6	1.8	2.2	6.7	4.9	3.9	7.6	9.1	5.9	8.0
17	5.9	3.9	1.6	1.7	2.5	6.2	4.6	3.8	6.6	9.1	7.6	7.6
18	4.3	3.4	1.6	1.7	2.8	7.3	7.6	3.8	6.2	9.1	8.0	5.9
19	3.7	3.2	1.6	1.7	2.4	8.7	6.2	3.7	5.9	9.1	8.4	5.2
20	3.4	3.1	1.6	1.7	2.3	8.7	5.6	3.6	5.6	8.7	7.3	4.6
21	3.1	3.1	1.6	1.7	2.2	7.6	4.9	3.6	5.2	8.7	7.6	4.6
22	3.0	2.9	1.7	1.8	2.2	6.2	4.6	4.0	5.2	8.7	8.4	5.9
23	2.8	2.9	1.8	1.7	} ^a 4.0	5.6	4.6	8.7	5.2	8.7	8.7	7.0
24	2.8	2.8	1.8	1.7		5.9	4.3	7.6	6.2	8.7	7.0	8.7
25	4.9	2.8	2.1	1.6	3.0	6.2	4.6	5.6	8.4	8.7	6.6	8.7
26	7.3	3.0	2.2	1.7	6.8	5.9	5.2	6.6	8.7	8.7	7.0	8.7
27	7.0	2.8	1.7	1.7	4.3	6.6	4.3	8.4	8.4	8.7	6.2	8.7
28	4.6	2.7	1.8	} ^a 2.4	} ^a 3.8	5.2	4.0	8.7	8.0	8.4	5.6	5.7
29	3.8	2.6	1.8			8.4	4.3	-----	7.3	8.0	5.2	8.7
30	3.6	3.7	1.6	2.4	3.6	8.7	8.7	-----	7.0	8.0	4.9	8.7
31	3.5	2.3	-----	2.4	-----	8.7	8.7	-----	6.2	-----	4.6	-----

Month	Discharge				Total run-off	
	Million gallons a day			Second-foot (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July	7.8	2.3	3.46	5.35	107	329
August	7.3	2.3	3.62	5.60	112	344
September	2.2	1.6	1.76	2.72	52.9	162
October	5.3	1.5	2.10	3.25	65.0	200
November	6.8	2.2	2.82	4.36	84.6	260
December	8.7	2.8	5.86	9.07	182	557
January	8.7	4.0	5.88	9.10	182	559
February	8.7	3.6	5.49	8.49	154	472
March	8.7	5.2	7.53	11.7	234	716
April	9.1	7.3	8.57	13.3	257	789
May	8.7	4.6	6.77	10.5	210	644
June	8.7	4.6	6.35	9.82	191	585
The year	9.1	1.5	5.02	7.77	1,830	5,620

^a Estimated mean.

^b Partly estimated.

SURFACE WATER SUPPLY OF HAWAII, 1929-30

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

LOCATION.—Water-stage recorder at old diversion dam $2\frac{1}{4}$ miles above mouth and 2 miles northwest of Kipahulu.

DRAINAGE AREA.—5.8 square miles.

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

EXTREMES.—Maximum discharge during period, 1,260 million gallons a day (1,950 second-feet) July 16 (gage height, 11.69 feet); no flow several days during the period.

1927-1930: Maximum discharge, 3,340 million gallons a day (5,170 second-feet) Dec. 16, 1928 (gage height, 15.45 feet); no flow during dry periods.

REMARKS.—Records good for ordinary stages; poor for high stages. No diversions. Station discontinued Sept. 6, 1929.

Discharge, in million gallons a day, 1929-30

Day	July	Aug.	Sept.	Day	July	Aug.	Sept.	Day	July	Aug.	Sept.
1.....	0	9.0	0	11.....	4.2	69	-----	21.....	26	24	-----
2.....	0	1.5	0	12.....	0	1.2	-----	22.....	32	6.0	-----
3.....	0	19	3.0	13.....	0	.35	-----	23.....	21	.34	-----
4.....	0	71	0	14.....	0	.92	-----	24.....	28	3.6	-----
5.....	0	35	0	15.....	0	14.5	-----	25.....	24	.10	-----
6.....	0	5.8	0	16.....	239	1.7	-----	26.....	98	.37	-----
7.....	0	3.6	-----	17.....	7.2	26	-----	27.....	32	.38	-----
8.....	0	.35	-----	18.....	3.2	.74	-----	28.....	4.6	0	-----
9.....	0	.10	-----	19.....	3.2	62	-----	29.....	.78	0	-----
10.....	53	81	-----	20.....	30	25	-----	30.....	1.1	0	-----
								31.....	9.8	0	-----

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July.....	239	0	19	30.8	617	1,890
August.....	81	0	14.9	23.1	463	1,420
September 1-6.....	3.0	0	.50	.77	3.0	9

RIGHT BRANCH OF KAHALAWE STREAM NEAR KIPAHULU, MAUI

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

DRAINAGE AREA.—0.1 square mile.

RECORDS AVAILABLE.—February, 1927, to June, 1930.

EXTREMES.—Maximum discharge during year, 377 million gallons a day (583 second-feet) Mar. 14 (gage height, 10.22 feet); minimum, 0.15 million gallons a day (0.23 second-foot) Dec. 16.

1927-1930: Maximum discharge, that of Mar. 14, 1930; minimum, that of Dec. 16, 1929.

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

Discharge, in million gallons a day, 1929-30

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	1.1	2.8	1.3		1.1		0.9	1.5	1.8	1.5	2.9	2.1
2	1.6	1.6	1.8		1.2		0.9	1.1	1.6	1.9	1.0	2.7
3	.5	3.4	1.2		.9		4.7	1.0	3.6	3.4	1.4	4.7
4	.3	4.6	.9	*1.1	3.9		1.6	.9	1.8	1.1	1.3	5.3
5	.2	2.9	.6		1.5		1.1	.8	*3.2	1.0	3.4	1.4
6	.2	1.8	.6		.9	*3.5	.9	.7	8.2	3.5	3.5	1.1
7	.2	1.5	.6		.8		.9	.6	5.4	6.8	1.8	1.0
8	.2	1.5	.8		.8		.6	.5	2.1	10	1.4	1.0
9	.2	1.2	2.6		.8		.6	.5	2.1	12	.9	1.0
10	15	8.1	.8	*4.4	.7		.6	.7	4.8	9.7	.8	1.4
11	1.2	3.2	1.6		.6		.5	.6	1.8	22	.8	2.9
12	.6	1.5	.9		.6		.5	1.2	1.5	10.5	1.5	4.8
13	.5	1.2	.9		.5	*.3	.5	.5	2.0	3.6	1.2	3.2
14	.5	1.1	.6		.5		.4	.9	28	5.6	1.5	1.6
15	.8	1.8	.5		.9		1.0	1.1	6.9	4.3	1.0	1.6
16	12	5.2	.5	*.9	.6	19.5	.7	.9	18	3.9	2.5	3.8
17	1.0	4.7	.5		5.3	2.1	.3	.5	5.0	2.1	1.7	3.0
18	1.0	1.5	*.5		1.2	4.0	12	.4	2.4	1.9	1.8	1.8
19	.9	1.6			.7	18.5	1.5	.3	2.8	1.8	1.4	1.5
20	1.8	2.4			.8	2.5	.9	.3	7.2	1.6	.5	1.2
21	1.4	2.0			.9	1.0	3.0	.4	2.3	3.1	.4	3.1
22	1.4	1.4			.6	17	1.1	3.2	2.4	8.6	2.3	2.7
23	1.3	1.4	*.5		1.5	3.4	.6	13.5	1.8	3.0	1.6	3.2
24	3.3	2.5			2.6	1.6	.5	3.5	1.5	1.5	.6	6.0
25	4.4	1.1				1.2	1.8	10.5	7.7	1.5	.5	4.8
26	11.5	2.0		*.6		.9	1.9	3.9	2.7	1.0	1.2	8.0
27	4.1	2.8			*4.2	1.2	.7	5.8	1.8	1.2	.4	3.3
28	1.9	1.0				.8	.5	2.0	1.4	1.5	.5	2.0
29	1.4	.9	*2.0			5.1	.5		1.2	1.1	.4	6.5
30	1.6	.9				9.6	25		1.1	3.4	.5	12.5
31	3.3	.9				1.5	4.0		1.0		.4	

Month	Discharge			Total run-off	
	Million gallons a day			Million gallons	Acre-feet
	Maximum	Minimum	Mean		
July	15	0.2	2.45	3.79	233
August	8.1	.9	2.27	3.51	216
September			1.00	1.55	92
October			1.29	2.00	123
November		.5	1.84	2.85	169
December	19.5		4.18	6.47	398
January	25	.3	2.57	3.98	244
February	13.5	.3	2.06	3.19	177
March	28	1.0	4.34	6.71	413
April	22	1.0	4.47	6.92	412
May	3.5	.4	1.33	2.06	127
June	12.5	1.0	3.31	5.12	305
The year	28		2.60	4.02	2,910

* Estimated mean.

* Estimated.

* Partly estimated.

HANAWI STREAM NEAR NAHIKU, MAUI

LOCATION.—Water-stage recorder 200 feet above Koolau Ditch intake and trail, 1¼ miles southeast of Nahiku, and 4¼ miles southeast of Keanae.

DRAINAGE AREA.—0.8 square mile.

RECORDS AVAILABLE.—January, 1914, to January, 1916; November, 1921, to June, 1930.

EXTREMES.—Maximum discharge during year, 764 million gallons a day (1,180 second-feet) Dec. 18 (gage height, 8.56 feet); minimum, 1.8 million gallons a day (2.8 second-feet) Nov. 16.

1914-1916; 1921-1930: Maximum stage from flood marks, about 20 feet during flood of Jan. 18, 1916 (discharge not determined); minimum, 1.4 million gallons a day (2.2 second-feet) July 5, 8, 1926.

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

Discharge, in million gallons a day, 1929-30

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1.....	2.5	3.1	3.1	3.0	1.8	21	13	6.5	20	9.4	16.5	5.5
2.....	2.4	2.8	3.0	7.0	1.8	57	18	5.3	48	73	13	6.8
3.....	2.2	5.2	2.8	3.1	1.8	28	85	4.8	68	11.5	9.6	11.5
4.....	2.2	12.5	2.7	2.7	2.5	6.7	23	4.4	91	7.6	9.6	19
5.....	2.1	7.3	2.6	2.4	2.0	4.5	17	4.0	52	17	43	7.9
6.....	2.1	6.5	2.5	2.4	2.0	4.7	17.5	4.3	102	66	26	6.7
7.....	2.1	4.7	2.5	2.5	2.0	27	14	4.0	62	131	13	5.9
8.....	2.1	3.5	3.3	9.0	2.0	5.8	12	3.5	15	236	18.5	5.4
9.....	2.1	3.2	2.6	54	2.0	4.7	11	3.5	30	126	8.8	4.9
10.....	3.2	44	2.5	12	2.0	4.3	10.5	3.5	75	54	7.7	5.8
11.....	2.4	23	2.7	4.8	2.0	4.2	10.5	3.4	94	173	7.1	7.9
12.....	2.1	5.4	2.4	3.8	1.9	4.1	8.8	3.3	23	155	8.4	14
13.....	2.1	4.3	2.4	3.6	1.9	4.0	8.2	3.3	18.5	33	8.3	8.8
14.....	2.0	3.9	2.4	3.2	1.9	4.1	7.6	3.2	19.5	24	14	7.4
15.....	2.9	3.7	2.2	2.9	1.9	3.9	7.1	3.2	21	48	12.5	5.5
16.....	47	3.5	2.2	2.7	1.8	78	6.6	3.2	16	53	12	10.5
17.....	4.7	4.3	2.1	2.5	86	8.8	6.1	4.0	15	34	15.5	7.0
18.....	3.1	3.3	2.1	2.4	37	104	8.2	3.2	13	27	12.5	5.8
19.....	2.7	3.5	2.2	2.4	5.8	192	7.8	3.0	12	33	12	4.8
20.....	2.9	4.3	2.1	2.3	3.6	95	9.2	2.8	10.5	30	8.2	4.4
21.....	4.0	6.4	2.1	2.1	3.2	18.5	6.4	3.2	9.6	35	8.3	4.5
22.....	9.3	5.2	2.1	2.1	2.7	9.6	12	122	8.8	40	12.5	4.9
23.....	3.6	3.9	2.1	2.0	14	20	7.5	79	8.3	35	8.7	9.5
24.....	5.8	3.8	2.1	2.3	11	100	5.5	12.5	7.8	17	6.3	28
25.....	15	3.6	2.1	2.1	39	18.5	31	22	7.5	18.5	7.5	25
26.....	8.4	3.5	2.8	2.0	38	43	7.8	30	7.4	12	9.2	37
27.....	6.7	3.5	4.7	2.0	5.9	78	5.7	101	11.5	10.5	6.7	11.5
28.....	4.4	3.3	6.6	1.9	28	13	5.1	27	7.6	11	6.8	9.1
29.....	3.6	3.2	6.4	1.8	10.5	96	4.4	-----	6.7	10.5	5.7	65
30.....	3.5	3.2	3.1	1.8	7.7	116	180	-----	5.8	24	5.3	38
31.....	3.5	3.1	-----	1.8	-----	24	27	-----	5.5	-----	5.1	-----

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July	47	2.0	5.25	8.12	163	499
August	44	2.8	6.28	9.72	195	597
September	6.6	2.1	2.82	4.36	84.5	260
October	54	1.8	4.86	7.52	151	462
November	86	1.8	10.8	16.7	324	994
December	192	3.9	38.7	59.9	1,200	3,680
January	180	4.4	19.1	29.6	594	1,820
February	122	2.8	16.9	26.1	473	1,450
March	102	5.5	28.8	44.6	892	2,740
April	236	7.6	52.8	81.7	1,580	4,860
May	43	5.1	11.6	17.9	358	1,100
June	65	4.4	12.9	20.0	386	1,190
The year	236	1.8	17.5	27.1	6,400	19,700

• Partly estimated.

KAPAUOLA STREAM NEAR NAHIKU, MAUI

LOCATION.—Water-stage recorder 40 feet above intake to Koolau Ditch, 300 feet above ditch trail, 1¼ miles southwest of Nahiku, and 4 miles southeast of Keanae.

DRAINAGE AREA.—0.2 square mile.

RECORDS AVAILABLE.—November, 1921, to June, 1930.

EXTREMES.—Maximum discharge during year, 1,400 million gallons a day (2,170 second-feet) Dec. 18 (gage height, 7.39 feet); minimum, 0.8 million gallons a day (1.2 second-feet) Oct. 13, 16, 17.

1921-1930: Maximum discharge, that of Dec. 18, 1929; minimum, 0.6 million gallons a day (0.9 second-foot) July 5, 1926.

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

Discharge, in million gallons a day, 1929-30

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	1.5	1.8	1.6	1.8	1.0	19	11.5	4.1	22	8.9	17.5	3.5
2	1.5	1.8	1.6	7.5	.9	46	15	3.5	36	67	15	5.2
3	1.4	5.3	1.5	2.3	.9	19	65	2.9	47	13	8.8	9.8
4	1.2	19.5	1.4	1.5	1.3	7.4	11.5	2.6	72	6.8	7.9	16
5	1.2	11	1.4	1.3	1.0	5.1	8.5	2.4	49	14.5	38	5.8
6	1.2	7.5	1.4	1.3	.9	6.2	9.6	2.9	72	62	21	5.4
7	1.2	4.7	1.4	1.4	.9	26	7.9	2.9	48	113	12.5	4.0
8	1.1	2.8	1.9	9.8	.9	4.9	6.5	2.2	11	232	14.5	3.6
9	1.1	2.2	1.5	53	.8	4.0	5.8	2.0	30	98	8.7	3.4
10	2.0	49	1.4	13	.8	3.5	5.8	1.8	55	60	6.3	3.8
11	1.7	21	1.6	3.1	.9	3.1	6.5	1.8	79	156	5.6	5.7
12	1.2	4.3	1.4	2.1	.9	2.9	5.2	1.6	10.5	116	7.2	13
13	1.1	2.9	1.4	1.9	.8	2.3	4.9	1.6	8.3	19.5	6.6	8.6
14	1.1	2.7	1.3	1.9	.8	1.9	4.6	1.5	10.5	11	10	5.8
15	1.6	2.7	1.2	1.6	.8	1.6	4.1	1.4	14	24	13	3.8
16	47	2.7	* 1.1	1.6	.8	55	3.9	1.2	11	42	7.9	9.8
17	3.8	3.8	* 1.1	1.5	86	8.2	3.8	2.4	9.6	19	16	5.9
18	1.8	2.3	* 1.1	1.4	32	154	7.7	1.8	8.5	12.5	11	3.6
19	1.4	2.4	1.1	1.5	3.9	159	6.1	1.4	7.9	22	10.5	3.0
20	1.6	4.1	1.1	1.4	1.5	68	7.4	1.2	6.8	22	6.5	2.7
21	2.8	8.1	1.1	1.4	1.4	14.5	6.9	3.2	5.8	28	6.6	2.8
22	8.7	4.4	1.1	1.3	1.1	9.6	10	138	5.1	34	10.5	3.6
23	3.0	2.7	1.1	1.3	17	20	6.1	71	4.6	28	8.8	9.2
24	5.0	2.2	1.0	1.4	14	91	3.5	7.8	4.3	12.8	5.2	23
25	15	1.9	1.0	1.4	31	17	29	25	5.1	17.5	5.5	27
26	9.0	1.8	1.7	1.3	22	41	6.2	22	5.6	10.5	9.0	34
27	5.8	1.8	3.4	1.2	3.0	72	3.6	66	11	8.8	5.1	12
28	2.8	1.8	6.5	1.2	26	12	3.0	19.5	7.0	9.8	5.1	9.7
29	2.0	1.6	6.4	1.1	7.7	77	2.6	-----	4.9	8.1	3.8	59
30	1.8	1.6	2.1	1.1	6.8	94	153	-----	3.8	17	3.2	32
31	2.1	1.6	-----	1.0	-----	17	15	-----	3.4	-----	3.0	-----

Month	Discharge			Total run-off		
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July	47	1.1	4.31	6.67	134	410
August	49	1.6	5.94	9.19	184	565
September	6.5	1.0	1.76	2.72	52.9	162
October	53	1.0	4.02	6.22	125	382
November	86	.8	8.93	13.8	268	822
December	159	1.6	34.3	53.1	1,060	3,260
January	153	2.6	14.2	22.0	440	1,350
February	138	1.2	14.1	21.8	396	1,210
March	79	3.4	21.6	33.4	669	2,050
April	232	6.8	43.1	66.7	1,290	3,970
May	38	3.0	10.0	15.5	310	951
June	59	2.7	11.2	17.3	335	1,030
The year	232	.8	14.4	22.3	5,270	16,200

* Partly estimated.

* Estimated.

KOOLOU DITCH AT NAHIKU WEIR, NEAR NAHIKU, MAUI

LOCATION.—Water-stage recorder between Kapaula and Waiohue Streams, $3\frac{1}{4}$ miles southwest of Nahiku and 4 miles southeast of Keanae.

RECORDS AVAILABLE.—February, 1919, to June, 1930.

EXTREMES.—Maximum discharge during year, 58 million gallons a day (90 second-feet) Feb. 25 (gage height, 1.72 feet); no flow occasionally when water is shut out of ditch.

1919-1930: Maximum discharge, that of Feb. 25, 1930; no flow occasionally when intake gates are closed.

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 a day, 1929-30

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1.....	7.9	12.5	9.8	9.0	5.1	0	36	23	40	34	49	21
2.....	7.3	11.5	9.5	20	4.9	0	20	24	46	49	46	26
3.....	6.6	16	9.0	10	4.9	0	0	21	49	42	38	38
4.....	6.3	30	8.4	8.1	6.6	0	0	18.5	51	32	38	46
5.....	6.1	26	8.1	7.3	4.9	0	0	17	49	36	49	32
6.....	6.1	23	8.1	7.1	4.7	.15	0	18	53	49	49	28
7.....	5.9	18.5	7.9	7.3	4.5	.25	5.2	16.5	53	51	46	24
8.....	5.9	14.5	9.5	26	4.3	0	7.1	14.5	49	53	49	22
9.....	5.6	13	8.1	47	4.3	0	2.7	14	51	53	38	20
10.....	8.5	37	7.9	36	4.3	0	0	13	51	53	34	21
11.....	6.8	42	8.4	20	4.3	0	0	12.5	53	46	30	28
12.....	5.9	26	7.3	15.5	4.1	0	0	12	51	38	34	42
13.....	5.6	20	7.3	14	3.8	0	.65	11.5	49	36	32	34
14.....	5.4	18	7.1	13	3.8	6.0	0	11	49	44	38	30
15.....	6.9	17	6.8	11.5	3.8	12	.16	10.5	32	51	38	24
16.....	42	15.5	6.8	10.5	3.6	33	.56	10	26	53	36	38
17.....	16	19	* 5.6	9.5	27	28	0	13	26	53	46	30
18.....	10	14	* 5.6	9.3	46	36	0	11	28	51	44	24
19.....	8.4	14	5.6	9.3	21	42	0	9.5	40	53	42	21
20.....	9.3	16.5	5.6	8.4	13	40	0	9.0	38	53	34	19
21.....	12.5	23	5.6	7.9	10.5	34	0	12	36	53	34	19
22.....	23	20	5.6	7.3	9.0	28	17	51	32	53	42	20
23.....	13.5	15	5.4	7.1	31	28	22	49	30	41	36	32
24.....	13.5	13.5	5.4	7.9	30	40	17	42	28	49	30	49
25.....	36	13	5.4	7.3	6.1	32	38	40	28	51	30	53
26.....	34	13	8.1	6.8	.12	32	24	51	28	46	34	53
27.....	26	12	12.5	6.3	0	35	20	51	38	44	28	46
28.....	18.5	11	19	6.3	.73	34	19	46	30	46	28	40
29.....	15	10.5	17.5	6.1	0	46	17	-----	26	42	23	55
30.....	14	10	9.5	5.4	0	40	36	-----	22	49	22	55
31.....	14	10	-----	5.4	-----	38	24	-----	21	-----	20	-----

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July.....	42	5.4	13.1	20.3	408	1,260
August.....	42	10	17.9	27.7	554	1,700
September.....	19	5.4	8.21	12.7	246	756
October.....	47	5.4	12.0	18.6	373	1,140
November (27 days).....	46	0	9.86	15.3	266	817
December (20 days).....	46	0	29.2	45.2	564	1,790
January (18 days).....	38	0	17.0	26.3	306	939
February.....	51	9.0	22.6	35.0	632	1,940
March.....	53	21	33.8	60.0	1,200	3,690
April.....	53	32	46.8	72.4	1,400	4,310
May.....	49	20	36.7	56.8	1,140	3,490
June.....	55	19	33.0	51.1	990	3,040
The year (338 days).....	55	0	24.0	37.1	8,100	24,900

* Partly estimated.

WAIHOLE STREAM NEAR NAHIKU, MAUI

LOCATION.—Water-stage recorder 200 feet above intake to Koolau Ditch, 300 feet above ditch trail, 2¼ miles southwest of Nahiku, and 3¼ miles southeast of Keanae.

DRAINAGE AREA.—1.5 square miles.

RECORDS AVAILABLE.—October, 1921, to June, 1930.

EXTREMES.—Maximum discharge during year, 576 million gallons a day (891 second-feet) Dec. 18 (gauge height, 5.94 feet); minimum, 2.1 million gallons a day (3.2 second-feet) Nov. 15, 16, 17.

1921-1930: Maximum discharge, that of Dec. 18, 1929; minimum, 1.7 million gallons a day (2.6 second-feet) Apr. 11, 1926.

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

Discharge, in million gallons a day, 1929-30

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	3.5	4.0	3.6	3.4	2.6	13		4.7				
2	3.3	3.9	3.5	4.8	2.6	30		4.0				
3	3.1	5.1	3.4	3.2	2.5	13.5		3.7		* 13		
4	2.9	9.1	3.2	2.9	3.0	6.8	* 11	3.5			* 14	* 7
5	2.8	7.7	3.2	2.8	2.5	5.9		3.5				
6	2.8	5.3	3.2	2.9	2.4	10		3.7	* 30			
7	2.8	4.6	3.1	3.2	2.4	41		3.6				
8	2.7	4.5	5.3	7.9	2.4	6.1		3.4				5.0
9	2.7	4.6	3.3	2.9	2.3	5.6		3.3		* 55		5.0
10	3.9	25	3.2	8.0	2.3	5.1						5.4
11	3.0	14	3.3	4.4	2.3	4.8					* 6.5	7.3
12	2.7	5.6	3.1	4.1	2.3	4.5	* 4.8					8.9
13	2.7	5.3	3.0	4.2	2.2	4.2						6.6
14	2.6	5.3	2.9	4.2	2.2	4.1						5.8
15	3.6	5.4	2.8	4.0	2.1	3.9		* 2.8				5.1
16	23	5.4	2.6	3.9	2.1	27			* 8			9.5
17	3.7	6.2	2.6	3.7	46	5.4					* 10	6.2
18	3.1	5.0	2.6	3.7	16	91	7.8					5.3
19	2.9	4.8	2.6	3.7	3.6	91	7.1			* 15		4.8
20	3.3	4.8	2.6	3.5	3.2	38	7.7					4.7
21	3.4	6.4	3.6	3.3	2.8	10.5	4.8	4.4				5.0
22	5.5	5.4	2.5	3.2	2.7	8.3	10.5	81				5.5
23	3.7	4.6	2.5	3.1	17.5	18	5.7	51				7.5
24	4.0	4.4	2.4	3.4	6.8	44	4.6	9.5				16
25	11.5	4.2	2.4	3.2	16	8.4	20	38	* 6			17
26	8.4	4.1	3.4	3.0	13.5	24	5.3	52			* 5.5	20
27	5.6	4.0	4.0	2.9	4.0	32		48				8.5
28	4.4	3.9	5.6	2.8	22	8.3	* 3.7	29		* 10		9.0
29	4.0	3.8	3.8	2.7	6.6	22						36
30	4.0	3.7	3.3	2.7	6.4	30	63					25
31	4.5	3.6		2.7		* 15	7.9					

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July	23	2.6	4.52	6.99	140	430
August	25	3.6	5.93	9.18	184	564
September	5.6	2.4	3.19	4.94	95.6	294
October	29	2.7	4.53	7.01	140	431
November	46	2.1	6.84	10.6	205	630
December	91	3.9	20.4	31.6	631	1,940
January	63		9.05	14.0	280	861
February	81		13.5	20.9	377	1,160
March			15.0	23.2	466	1,430
April			23.2	35.9	695	2,140
May			9.16	14.2	284	871
June	36	4.7	9.27	14.3	278	853
The year		2.1	10.3	15.9	3,780	11,600

* Estimated mean.

* Estimated.

WEST KOPIILUOLA STREAM NEAR KEANAE, MAUI

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

DRAINAGE AREA.—3.9 square miles.

RECORDS AVAILABLE.—January, 1914, to September, 1917; October, 1921, to June, 1930.

EXTREMES.—Maximum discharge during year, 1,580 million gallons a day (2,440 second-feet) Jan. 30 (gage height, 7.42 feet); minimum, 1.9 million gallons a day (2.9 second-feet) Feb. 20, 21.

1914-1917; 1921-1930: Maximum discharge, about 2,000 million gallons a day (3,090 second-feet) Jan. 18, 1916 (gage height, 9.25 feet); minimum, 0.6 million gallons a day (0.9 second-foot) Sept. 15-17, 1917.

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

Discharge, in million gallons a day, 1929-30

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	3.5	3.4	3.4	4.2	2.4	54	8.4	7.6	62	10.5	20	5.3
2	3.1	3.4	3.4	13.5	2.4	102	11.5	5.5	108	112	20	5.8
3	2.8	10	3.1	4.6	2.4	64	85	4.7	129	} *22	10.5	10.5
4	2.6	36	3.0	3.8	3.3	15.5	23	4.1	174		9.7	18.5
5	2.6	16.5	2.9	2.5	2.4	8.8	10.5	3.8	113	} 240	72	5.5
6	2.6	12	2.9	2.5	2.4	12	13.5	4.6	158		32	* 6.2
7	2.6	7.5	2.9	3.4	2.2	34	8.4	4.0	96		14.5	* 5.0
8	2.6	12.5	9.6	16.5	2.2	6.4	6.4	3.3	20		18.5	* 4.7
9	2.5	7.0	3.5	26	2.2	5.8	5.3	3.1	49		8.9	4.6
10	4.2	82	2.9	21	2.2	5.3	6.4	2.9	90		7.3	5.0
11	3.3	43	3.3	5.9	2.3	5.0	5.0	2.8	136	} *32	6.5	8.2
12	2.4	8.1	2.9	4.7	2.2	4.9	4.1	2.7	19.5		8.7	13.5
13	2.4	6.0	2.8	4.4	2.2	4.7	3.8	2.6	10.5		7.3	6.7
14	2.3	5.0	2.7	3.9	2.2	4.4	3.4	2.5	10.5		14	6.0
15	5.3	5.0	2.6	3.5	2.1	4.2	3.3	2.3	13		13.5	4.8
16	69	5.0	2.4	3.4	2.1	108	3.1	2.2	10.5		10.5	12
17	5.2	5.4	2.3	3.3	147	19.5	2.9	3.8	8.9	} *28	20	6.0
18	3.5	4.4	2.3	3.2	72	257	10.5	2.4	7.5		12.5	4.7
19	3.1	4.7	2.3	3.4	9.6	316	7.7	2.1	6.4		11.5	4.2
20	3.4	5.7	2.2	3.3	5.6	137	8.1	2.0	5.7		7.3	4.0
21	4.8	9.8	2.2	3.1	5.0	20	4.6	5.9	5.3		7.8	4.6
22	12.5	5.9	2.2	2.9	4.1	7.3	9.7	226	4.8		15	5.2
23	3.8	4.7	2.2	2.9	30	24	4.2	131	4.7	} 32	8.7	11.5
24	6.7	4.4	2.1	3.4	33	156	3.0	11	4.2		6.4	37
25	23	4.2	2.1	2.9	76	23	33	43	6.0		8.2	52
26	10	4.0	4.6	2.7	73	84	5.0	21	7.5		11	66
27	6.4	3.8	6.0	2.6	11	136	3.8	176	12		9.2	6.2
28	4.6	3.6	13	2.5	54	12	3.1	41	6.7		9.2	6.2
29	3.9	3.4	11.5	2.4	22	136	2.8	-----	5.5		7.8	5.0
30	3.9	3.4	4.4	2.4	16	162	340	-----	4.7		23	4.7
31	3.9	3.4	-----	2.4	-----	25	43	-----	4.2		4.4	-----

Month	Discharge			Total run-off	
	Million gallons a day			Million gallons	Acre-feet
	Maximum	Minimum	Mean		
July	69	2.3	6.85	212	652
August	82	3.4	10.7	333	1,020
September	13	2.1	3.79	114	349
October	26	2.4	5.39	167	513
November	147	2.1	19.8	596	1,820
December	316	4.2	63.0	97.5	5,990
January	340	2.8	22.0	34.0	2,090
February	226	2.0	25.9	40.1	2,230
March	174	4.2	41.7	64.5	3,970
April	-----	7.8	77.4	120	7,130
May	72	4.4	13.2	20.4	1,260
June	101	4.0	16.8	26.0	1,550
The year	-----	2.0	25.5	39.5	28,600

* Estimated mean.

* Estimated.

* Partly estimated.

EAST WAILUAIKI STREAM NEAR KEANAE, MAUI

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

DRAINAGE AREA.—3.7 square miles.

RECORDS AVAILABLE.—December, 1913, to October, 1917, and July, 1922, to June, 1930.

EXTREMES.—Maximum discharge during year, 1,520 million gallons a day (2,350 second-feet) Jan. 30 (gage height, 8.75 feet); minimum, 2.2 million gallons a day (3.4 second-feet) Nov. 17.

1913-1917; 1922-1930: Maximum discharge, 1,900 million gallons a day (2,940 second-feet) Jan. 18, 1916 (gage height, 8.35 feet); minimum, 1.0 million gallons a day (1.6 second-feet) Oct. 22, 23, 1917, Aug. 1-2, 1922. Flood of Dec. 24, 1921, may have reached a higher stage, but owing to destruction of station no data are available for this peak.

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

Discharge, in million gallons a day, 1929-30

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1.....	3.5	4.8	3.5	4.3	^a 2.4	46	15	^b 12	43	^b 17.5	24	9.1
2.....	3.2	4.7	3.3	15	2.4	113	17		91	100	22	10.5
3.....	2.8	16	3.2	4.6	2.4	55	89		115	23	14	15.5
4.....	2.7	36	3.0	3.6	3.3	14	27		137	11	13.5	26
5.....	2.6	20	2.9	3.2	2.5	9.1	17	^c 7	95	34	62	10.5
6.....	2.6	14	2.9	3.2	2.4	9.3	20		138	143	37	9.8
7.....	2.7	9.1	3.0	3.3	2.3	41	15		90	216	20	9.1
8.....	2.6	47	18	17.5	2.4	7.4	11		^b 24	338	24	8.5
9.....	2.6	13.5	5.0		2.3	6.2	10.5		55	170	13.5	^b 7.9
10.....	4.3	115	3.6	^c 50	2.3	5.4	11.5		96	114	12	8.5
11.....	3.5	41			2.4	5.1	^b 10.5		115	223	11	12
12.....	2.7	8.5	3.0		2.3	4.8	^a 9.1		22	217	13.5	19
13.....	2.6	6.2	2.9		2.3	4.5	^a 8.5		^b 15	49	12	12
14.....	2.5	5.4	2.9		2.3	4.3	^a 7.7		14	19	19	9.8
15.....	7.6	5.4	2.8	^a 4.2	2.2	4.0	^b 6.9	^c 5	19	63	19.5	8.5
16.....	87	5.4	2.7		2.2	117	6.6		15	52	15.5	16.5
17.....	7.3	5.8	2.6		134	21	6.3		^b 12.5	25	25	10.5
18.....	4.6	4.6	2.6		68	224	18		^a 10.5	15	17	8.5
19.....	4.0	4.7	2.6		11	299	13.5		^a 9.8	24	16	7.6
20.....	4.8	5.8	2.6		5.4	171	16.5		9.8	27	12	7.0
21.....	6.8	10.5	2.6		5.0	45	10.5		9.8	31	12.5	7.7
22.....	15.5	6.6	2.6		4.2	13.5	19.5		^a 9.1	46	20	8.8
23.....	5.4	4.8	2.5		39	34	9.9		^a 9.1	34	13.5	16
24.....	9.3	4.3	2.5		40	178	7.0		^a 9.1	17	11	51
25.....	31	4.1	2.6	^c 2.8	62	36	50	^b 43	^b 9.8	24	13	52
26.....	14	4.0	7.0		75	76	10.5		41	12.5	15	15.5
27.....	9.8	3.8	9.8		11.5	140	7.8		18	12.5	10.5	19
28.....	6.6	3.6	15.5		61	19	6.9		^b 11	13.5	10.5	19
29.....	5.4	3.5	14		21	143	6.3		^a 9.8	12.5	9.1	101
30.....	5.4	3.5	4.7		15.5	183	265		^a 9.1	30	8.5	54
31.....	5.4	3.4				34	39		^a 8.5		7.9	

Month	Discharge			Total run-off		
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July.....	87	2.5	8.74	13.5	271	831
August.....	115	3.4	13.7	21.2	425	1,300
September.....	18	2.5	4.67	7.23	140	430
October.....			7.29	11.3	226	694
November.....	134	2.2	19.7	30.5	591	1,810
December.....	299	4.0	66.5	103	2,060	6,330
January.....	265	6.3	24.8	38.4	769	2,360
February.....	212		27.7	42.9	776	2,380
March.....	138		40.1	62.0	1,240	3,810
April.....	338	12.5	70.5	109	2,120	6,490
May.....	62	7.9	17.2	26.6	534	1,640
June.....	101	7.0	20.7	32.0	622	1,910
The year.....	338	2.2	26.8	41.5	9,770	30,000

^a Estimated.

^b Partly estimated.

^c Estimated mean.

WEST WAILUAIKI STREAM NEAR KEANAE, MAUI

LOCATION.—Water-stage recorder 500 feet above Koolau Ditch crossing and trail bridge and $2\frac{3}{4}$ miles south of Keanae post office.

DRAINAGE AREA.—3.6 square miles.

RECORDS AVAILABLE.—January, 1914, to October, 1917; November, 1921, to June, 1930.

EXTREMES.—Maximum discharge during year, 3,090 million gallons a day (4,780 second-feet) Jan. 30 (gage height, 11.78 feet); minimum, 0.8 million gallons a day (1.2 second-feet) Nov. 17.

1914-1917; 1921-1930: Maximum discharge (estimated), 4,500 million gallons a day (6,960 second-feet) Jan. 14, 1923 (gage height from flood marks, about 13.5 feet); minimum, 0.3 million gallon a day (0.45 second-foot) July 26, 1922.

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

Discharge, in million gallons a day, 1929-30

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1.....	3.1	4.2	2.9	5.1	1.1	64	20	14	58	17.5	33	8.3
2.....	2.4	3.9	2.9	23	1.0	159	22	10.5	122	129	30	9.5
3.....	1.7	14.5	2.4	6.0	1.1	69	116	8.3	161	31	18	15
4.....	1.4	49	2.0	4.0	2.7	22	35	7.1	191	15	15	28
5.....	1.3	29	1.7	3.2	1.4	12	22	6.5	123	44	75	10.5
6.....	1.2	19	1.7	2.9	1.1	26	26	7.5	201	193	41	11
7.....	1.5	12.5	2.2	3.2	1.0	352	21	7.0	112	325	22	8.9
8.....	1.4	69	24	21	1.0	8.5	13.5	5.6	32	748	28	7.9
9.....	1.1	16	8.6	144	.9	6.7	11	5.3	69	302	15	7.5
10.....	3.2	161	3.6	30	.9	5.6	11	4.9	139	153	12	8.3
11.....	1.4	64	3.3	9.1	1.1	5.1	9.7	4.6	182	400	10.5	11
12.....		13	2.6	6.3	1.0	4.7	7.9	4.4	30	334	13	21
13.....		8.9	2.1	6.0	.9	4.3	7.3	4.2	18	54	11.5	13.5
14.....		7.0	1.8	4.7	.9	4.2	6.5	3.9	16	25	19	11.5
15.....		6.8	1.7	4.0	.9	3.7	6.0	3.7	24	72	23	9.1
16.....	3.8	6.0	1.5	3.5	.8	152	5.4	3.6	18	71	18.5	19.5
17.....		6.7	1.4	2.9	219	31	5.0	6.1	14.5	35	27	12.4
18.....		5.3	1.3	2.6	80	550	21	4.4	11.5	19	19	9.3
19.....		5.3	1.2	2.9	15.5	532	16	3.3	9.5	29	19	7.7
20.....		6.6	1.1	2.5	7.5	256	20	2.8	8.3	32	13.5	6.8
21.....	11	15	1.1	2.4	7.9	41	12.5	4.0	7.5	41	13.5	7.5
22.....		8.8	.9	1.9	5.7	18	22	342	6.7	57	23	8.2
23.....		5.7	.9	1.7	65	45	11.5	253	6.7	44	16	19
24.....		5.0	.9	2.9	51	232	7.1	30	5.9	22	11.5	63
25.....		33	4.4	1.2	106	44	64	54	8.5	34	13.5	75
26.....	16.5	4.2	8.7	1.6	74	130	13	70	13	19	18.5	93
27.....	12.5	3.9	13.5	1.5	14.5	180	8.9	226	26	14	11	28
28.....	7.5	3.3	23	1.4	72	25	7.3	66	14	13	10	26
29.....	5.6	2.9	18	1.4	30	194	6.0	-----	9.3	12	8.3	131
30.....	5.4	3.2	5.9	1.2	23	249	485	-----	7.3	30	7.3	75
31.....	5.0	3.0	-----	1.1	-----	45	52	-----	6.7	-----	6.8	-----

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July.....	-----	-----	9.77	15.1	303	929
August.....	161	2.9	18.3	28.3	567	1,740
September.....	24	.9	4.80	7.43	144	442
October.....	144	1.1	9.87	15.3	306	939
November.....	219	.8	26.3	40.7	789	2,420
December.....	550	3.7	112	173	3,470	10,700
January.....	485	5.0	35.2	54.5	1,090	3,350
February.....	342	2.8	41.5	64.2	1,160	3,570
March.....	201	5.9	53.3	82.5	1,650	5,070
April.....	748	12	110	170	3,310	10,100
May.....	75	6.8	19.5	30.0	602	1,850
June.....	131	6.8	25.4	39.3	762	2,340
The year.....	748	.8	38.8	60.0	14,200	43,400

* Partly estimated.

* Estimated mean.

EAST WAILUANUI STREAM NEAR KEANAE, MAUI

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

DRAINAGE AREA.—0.5 square mile.

RECORDS AVAILABLE.—January, 1914, to October, 1917; November, 1921, to June, 1930.

EXTREMES.—Maximum discharge during year, 839 million gallons a day (1,300 second-feet) Dec. 18 (gage height, 5.92 feet); minimum, 0.2 million gallons a day (0.3 second-foot) Nov. 15, 16, 17.

1914-1917; 1921-1930; Maximum discharge, 1,050 million gallons a day (1,620 second-feet) Feb. 12, 1925 (gage height, 6.96 feet); minimum, 0.1 million gallons a day (0.2 second-foot) Apr. 11, 1926.

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

Discharge, in million gallons a day, 1929-30

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1.....	1.2	1.6	1.2	1.8	0.5	7.5	3.8	3.3	36	5.3	5.2	2.2
2.....	.9	1.4	1.1	4.6	.5	24	4.5			17.5	4.2	3.2
3.....	.7	4.2	.9	1.6	.5	10	36			4.9	3.0	5.7
4.....	.6	5.8	.8	1.3	.9	3.3	7.2			2.6	3.1	11.5
5.....	.6	5.9	.8	1.1	.4	2.4	4.9			5.9	6.6	3.0
6.....	.5	3.6	.8	1.1	.4	2.2	6.3	1.4	24	28	14.5	2.9
7.....	.6	2.4	.8	1.2	.4	48	4.2			45	5.5	2.3
8.....	.7	2.0	5.6	7.4	.4	3.1	3.0			71	7.8	2.1
9.....	.5	1.9	1.2	47	.4	2.1	2.4			36	3.5	2.0
10.....	1.4	24	.9	4.9	.3	1.9	2.6			29	2.6	2.3
11.....	.9	16	1.1	2.3	.4	1.8	2.3	.9	46	97	2.3	3.9
12.....	.6	2.8	.8	1.9	.4	1.7	1.9			5.6	21	4.3
13.....	.5	2.1	.8	1.9	.4	1.6	1.9			3.6	6.3	3.2
14.....	.5	1.9	.8	1.6	.4	1.4	1.6			4.3	4.9	7.6
15.....	3.7	2.0	.7	1.3	.3	1.3	1.6			5.3	19	7.4
16.....	27	1.8	.7	1.2	.3	18.5	1.4	.9	3.1	16	4.7	2.1
17.....	1.8	2.5	.7	1.1	32	3.2	1.3			8.5	10	
18.....	1.2	1.8	.6	1.0	17	120	3.2			4.2	6.8	
19.....	1.1	1.7	.6	1.2	2.6	77	5.1			2.1	9.5	
20.....	1.3	1.8	.6	1.0	1.6	40	6.1			1.9	9.4	
21.....	2.2	3.6	.6	.9	1.6	6.4	2.3	.28	1.7	13.5	3.5	14
22.....	5.0	2.5	.4	.8	1.1	4.0	14.5			1.6	19.5	
23.....	1.6	1.8	.4	.8	21	16	4.0			1.4	12	
24.....	2.6	1.7	.5	1.1	10	36	2.1			1.3	4.9	
25.....	15	1.6	.6	.9	5.4	7.7	19			1.9	6.0	
26.....	6.3	1.4	2.9	.8	9.4	14.5	3.0	.18	2.8	3.5	4.3	14
27.....	3.8	1.4	4.5	.8	2.4	32	2.1			4.6	3.0	
28.....	2.3	1.2	6.3	.7	24	5.6	1.9			2.0	4.0	
29.....	1.9	1.2	2.8	.7	7.3	27	1.8			1.7	3.1	
30.....	1.9	1.2	1.7	.6	4.2	39	100			1.4	11.5	
31.....	1.9	1.1	-----	.6	-----	6.7	15	-----	1.8	-----	1.8	-----

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July.....	27	0.5	2.93	4.53	90.8	279
August.....	24	1.1	3.42	5.29	106	325
September.....	6.3	.4	1.41	2.18	42.2	130
October.....	47	.6	3.07	4.75	95.2	292
November.....	32	.3	4.88	7.55	146	449
December.....	120	1.3	18.3	28.3	566	1,740
January.....	-----	1.3	8.61	13.3	267	819
February.....	-----	-----	8.08	12.5	226	694
March.....	-----	1.3	12.5	19.3	388	1,190
April.....	97	2.6	17.3	26.5	520	1,590
May.....	14.5	1.8	4.82	7.46	150	459
June.....	-----	-----	6.29	9.73	189	579
The year.....	120	.3	7.63	11.8	2,790	8,550

* Estimated mean.

† Estimated.

‡ Partly estimated.

WEST WAILUANUI STREAM NEAR KEANAE, MAUI

LOCATION.—Water-stage recorder 150 feet above Koolau Ditch crossing and intake and $2\frac{1}{4}$ miles south of Keanae post office.

DRAINAGE AREA.—0.7 square mile.

RECORDS AVAILABLE.—December, 1913, to October, 1917; July, 1922, to June, 1930.

EXTREMES.—Maximum discharge during year, 1,110 million gallons a day (1,720 second-feet) Jan. 30 (gage height, 7.20 feet); minimum, 0.3 million gallons a day (0.5 second-foot) Nov. 17.

1913-1917; 1922-1930: Maximum discharge, 1,220 million gallons a day (1,890 second-feet) Jan. 14, 1923 (gage height, 7.70 feet); minimum, 0.2 million gallons a day (0.3 second-foot) July 16-21, 1922.

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

Discharge, in million gallons a day, 1929-30

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1.	1.6	1.4	0.9	1.6	0.6	29	11	7.3	24	7.4	11	2.9
2.	1.3	1.4	.9	6.0	.5	59	10.5	4.4	58	44	12.5	3.9
3.	.9	3.9	.8	1.7	.6	42	42	3.1	76	14.5	7.8	6.9
4.	.8	15	.6	1.3	.8	13	17.5	2.6	87	6.2	7.0	13
5.	.8	10	.6	1.0	.5	6.5	10	2.2	62	12	21	4.6
6.	.8	5.7	.6	1.0	.4	7.6	12	2.7	85	55	20	5.0
7.	.8	4.0	.8	1.3	.4	38	9.2	2.4	52	99	10	4.6
8.	.8	46	8.0	9.2	.4	4.6	5.7	1.6	18.5	223	14	4.2
9.	.7	10	2.2	49	.4	3.1	4.6	1.5	24	95	6.8	3.0
10.	1.9	51	1.2	12.5	.4	2.8	4.2	1.4	48	60	5.5	2.9
11.	1.5	29	1.2	4.2	.4	2.4	3.6	1.4	66	119	4.6	4.5
12.	.8	6.8	1.0	3.1	.4	2.1	2.8	1.3	17.5	120	6.5	8.2
13.	.6	4.2	.8	2.8	.4	1.9	2.8	1.2	8.8	32	5.0	4.8
14.	.6	3.1	.8	2.4	.4	1.9	2.2	1.1	7.4	15.5	11	4.0
15.	3.6	2.9	.8	1.8	.4	1.7	2.1	1.1	12	24	7.6	3.4
16.	36	2.8	.8	1.7	.4	57	1.7	1.1	7.8	32	8.7	9.6
17.	3.1	3.2	.8	1.7	75	19	1.6	2.0	5.7	18	11	4.2
18.	1.5	2.5	.8	1.6	38	139	10.5	1.2	4.2	9.8	8.8	3.1
19.	1.1	2.4	.7	1.8	6.7	182	7.3	.8	3.4	16	8.9	2.8
20.	1.2	2.5	.6	1.4	2.8	95	8.7	.8	2.9	17.5	5.7	2.4
21.	2.2	5.7	.6	1.4	2.2	24	4.6	3.2	2.5	21	5.7	2.8
22.	5.6	3.4	.5	1.4	1.6	11.5	15.5	107	2.2	27	10.5	4.2
23.	1.5	2.2	.5	1.2	28	23	5.0	84	1.9	19	5.5	6.1
24.	3.3	2.1	.4	1.6	25	66	2.8	16	1.7	9.8	3.8	24
25.	15	1.7	.6	1.1	35	23	24	22	2.9	13.5	4.5	24
26.	7.3	1.5	3.6	1.0	31	40	4.8	38	5.1	7.5	5.6	29
27.	4.6	1.5	5.7	1.0	7.6	71	3.4	99	7.3	6.5	3.8	11
28.	2.8	1.2	8.0	.8	31	15.5	2.8	36	4.0	7.0	3.8	8.5
29.	2.1	1.1	4.4	.8	15	66	2.5	-----	2.9	5.7	3.1	41
30.	1.8	1.2	1.7	.7	11	86	169	-----	2.2	14.5	2.8	33
31.	1.7	.9	-----	.6	-----	25	25	-----	1.9	-----	2.2	-----

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July	36	0.6	3.49	5.40	108	332
August	51	.9	7.43	11.5	230	707
September	8.0	.4	1.70	2.63	50.9	157
October	49	.6	3.83	5.98	119	364
November	75	.4	10.6	16.4	317	976
December	182	1.7	37.4	57.9	1,160	3,560
January	169	1.6	13.9	21.5	429	1,320
February	107	.9	15.6	24.1	436	1,340
March	87	1.7	22.7	35.1	705	2,160
April	223	5.7	38.4	59.4	1,150	3,540
May	21	2.2	7.89	12.2	245	751
June	41	2.4	9.49	14.7	285	874
The year	223	.4	14.3	22.1	5,230	16,100

KOOLAU DITCH NEAR KEANAE, MAUI

LOCATION.—Water-stage recorder on west side of Keanae Valley $2\frac{3}{4}$ miles south-west of Keanae post office.

RECORDS AVAILABLE.—January, 1910, to December, 1912; November, 1917, to June, 1930.

EXTREMES.—Maximum discharge during year, 146 million gallons a day (226 second-feet) Jan. 30 (gage height, 5.47 feet); no flow occasionally when water is shut out of ditch.

1910–1912; 1917–1930: Maximum discharge, 175 million gallons a day (271 second-feet) Jan. 4, 1922 (gage height, 6.36 feet); no flow occasionally when water is shut out of ditch.

REMARKS.—Records excellent for ordinary stages, good for estimated periods, and fair for high stages. 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 a day, 1929–30

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	30.	36	28	39	*15.5	0	100	84	136	b 120	150	84
2	26	34	28	94	15.5	0	96	72	140		147	97
3	20	55	24	39	15.5	0	126	60	140		130	127
4	19	124	23	31	26	0	119	54	142		127	140
5	18	115	22	26	17	0	64	48	140		150	100
6	18	98	20	26	15.5	0	100	58	144	b 140	150	97
7	19	72	22	28	14.5	1.6	23	54	118		147	78
8	18	81	56	114	14.5	0	0	42	1.4		150	66
9	17	72	36	134	14.5	0	0	39	.9		127	63
10	43	118	24	117	13	0	0	38	.8		110	69
11	31	127	28	66	15.5	0	0	35	.8	b 140	100	83
12	19	86	22	51	14.5	0	0	34	.7		124	124
13	17	63	19	48	13	0	0	32	.7		110	104
14	17	57	19	42	13	0	0	31	.7		140	88
15	39	56	* 18	35	13	0	0	30	.7		134	72
16	130	52	b 17	32	12.5	108	4.8	30	.7	b 80	124	117
17	57	65		30	73	112	22	48	.7		147	92
18	32	48		27	137	123	65	35	.7		147	72
19	27	48		30	86	115	67	28	33		140	68
20	32	54		27	51	116	86	26			117	57
21	51	92	15.5	26	45	112	48	38	0	b 80	117	68
22	94	65	14.5	23	35	94	61	140			* 137	69
23	42	45	14.5	22	103	93	85	144			* 127	118
24	70	42	14.5	30	127	137	57	128			104	137
25	117	38	16.5	24	76	116	127	109			107	137
26	108	36	57	20	124	109	88	140		b 80	140	137
27	88	35	82	20	63	132	66	140			130	97
28	57	31	108	19	27	107	57	140			134	94
29	45	30	84	* 18	0	134	51				127	78
30	42	31	39	* 17	0	134	102				147	75
31	45	28		* 17		117	94				69	

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July	130	17	44.8	69.3	1,390	4,260
August	127	28	62.4	96.5	1,930	5,940
September	108	14.5	30.6	47.3	918	2,820
October	134		41.0	63.4	1,270	3,900
November (28 days)	137	0	42.5	65.8	1,190	3,650
December (17 days)	137	0	109	169	1,860	5,690
January (23 days)	126	0	74.2	115	1,710	5,240
February	144	26	66.3	103	1,860	5,700
March	144	.7	63.3	97.9	1,960	6,020
April			136	210	4,090	12,500
May	150	69	123	190	3,800	11,700
June	140	57	99.2	153	2,980	9,130
The year (341 days)		0	73.2	113	25,000	76,600

* Partly estimated.

b Estimated mean.

c Estimated.

HONOMANU STREAM NEAR KEANAE, MAUI

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

DRAINAGE AREA.—3.3 square miles.

RECORDS AVAILABLE.—November, 1913, to June, 1930.

EXTREMES.—Maximum discharge during year, 1,270 million gallons a day (1,960 second-feet) Dec. 18 (gage height, 9.25 feet); minimum, 0.1 million gallons a day (0.2 second-foot) Nov. 15, 16.

1913-1930: Maximum discharge, that of Dec. 18, 1929; minimum, 0.08 million gallons a day (0.12 second-foot) Mar. 24, 1928.

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

Discharge, in million gallons a day, 1929-30

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	2.3	2.2	2.8	3.6	0.5		9.4	5.0		12.5	32	6.8
2	2.4	2.1	2.5	2.1	.4		20	3.3	.65	79	22	7.5
3	1.3	8.3	2.4	3.0	.5	50	76	2.5		15.5	9.6	14
4	1.0	31	2.1	2.0	.9		17.5	2.3	116	5.4	8.0	25
5	.9	12.5	1.7	1.4	.5		9.4	2.0	87	24	49	7.3
6						6						
7	.7	15	1.5	1.3	.4		15.5	2.6	124	111	29	7.8
8	.9	7.7	1.9	1.6	.3	30	9.5	3.2	75	181	16.5	6.0
9	.9	13.5	2.2	16.5	.2		5.2	2.0	18	380	23	5.6
10	.7	7.4	2.0	103	.2		3.8	1.7	40	180	8.6	6.0
11	11	81	1.5	21	.2		3.5	1.6	83	88	6.4	7.3
12						3.3						
13	5.0	55	1.7	5.2	.2		3.3	1.6	95	154	5.6	8.4
14	1.3	7.1	1.6	3.4	.2		2.7	1.4	17.5	247	9.2	22
15	.9	4.6	1.5	3.3	.2		13.5	1.3	8.5	40	7.3	11.5
16	.8	3.8	1.3	3.2	.2	2.1	4.2	1.2	7.3	19	13.5	9.6
17	3.7	3.7	1.1	2.5	.2	1.8	2.7	1.2	16.5	27	18.5	6.6
18												
19	87	3.4	1.0	2.1	.1	60	2.4	1.2	10.5	46	12.5	17.5
20	6.8	6.1		1.7		15	2.0	1.8	6.3	24	24	10.5
21	2.9	4.0			80	187	8.9	4.2	10.5	12	12	6.4
22	2.2	3.4	.4	2.4		232	9.6	1.3	3.5	22	13	5.4
23	2.1	3.6		2.2		117	12	1.1	3.0	23	7.6	4.6
24					4.3							
25	5.4	10.5	.3	1.6		21	5.6	1.2	2.6	32	9.2	4.9
26	10	6.8	.2	1.3		7.9	18.5	164	2.3	34	21	6.9
27	3.4	8.7	.2	1.7		25	17.5	157	2.3	29	12.5	19.5
28	9.2	7.5	.2	1.8		119	3.5	19.5	1.9	13	7.3	48
29	28	3.7	2.4	1.7		24	30	10.5	2.8	25	8.2	53
30					40							
31	19.5	3.4	9.5	1.2		61	6.2	23	5.4	10.5	16	59
32	9.4	3.2	11.5	1.1	.6	90	3.7	136	7.9	7.8	6.6	18.5
33	4.6	2.5	16	1.0		13.5	2.9	38	14	8.8	6.0	15.5
34	3.2	2.2	11	.8		140	2.4		3.8	7.8	5.0	73
35	2.8	3.9	2.9	.6	44	132	91		2.6	21	4.5	56
36	2.6	7.5		.5		22	15.5		2.2		4.1	

Month	Discharge			Total run-off	
	Million gallons a day			Million gallons	Acre-feet
	Maximum	Minimum	Mean		
July	87	0.7	7.51	11.6	714
August	81	2.1	10.8	16.7	1,030
September	16	.2	2.82	4.36	260
October	103	.5	6.94	10.7	660
November		.1	16.0	24.8	1,470
December	232	1.8	49.4	76.4	4,700
January	91	2.0	13.5	20.9	1,280
February	164	1.1	21.0	32.5	1,980
March	124	1.9	31.1	48.1	2,960
April	380	5.4	62.6	96.9	5,760
May	49	4.1	13.8	21.4	1,310
June	73	4.6	18.3	28.3	1,690
The year	380	.1	21.1	32.6	23,600

* Estimated mean.

^b Estimated.

^c Partly estimated.

HAIPUAENA STREAM NEAR HUELO, MAUI

LOCATION.—Water-stage recorder 200 feet above inflow of Spreckels Ditch and $3\frac{3}{4}$ miles southeast of Kailua.

DRAINAGE AREA.—1.1 square miles.

RECORDS AVAILABLE.—October, 1913, to June, 1930.

EXTREMES.—Maximum discharge during year, at least 405 million gallons a day (62.7 second-foot) Dec. 18 (gage height, at least 5.12 feet); minimum, 0.8 million gallons a day (1.2 second-foot) Nov. 13, 15.

1913-1930: Maximum discharge, 582 million gallons a day (900 second-foot) Feb. 17, 1929 (gage height, 6.25 feet); minimum, 0.3 million gallons a day (0.5 second-foot) frequently during December, 1919.

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

Discharge, in million gallons a day, 1929-30

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	2.6	2.6	2.8	3.6	1.1	23			17	9.3	16	4.0
2	2.8	2.6	2.9	15	1.1	50			31	53	12	4.9
3	1.6	7.7	2.4	3.6	1.2	27			47	10.5	6.2	10.5
4	1.5	17.5	2.0	2.7	1.6	7.0			58	5.2	5.6	19
5	1.4	7.5	1.7	2.2	1.2	4.7	*15	*2.4	45	15.5	21	
6	1.5	8.9	1.6	2.1	1.2	6.1			69	74	19	
7	1.9	5.3	1.8	2.3	1.1	26			44	126	11.5	
8	1.4	6.2	1.7	13	1.2	4.6			11	199	16	
9	1.2	4.0	1.6		1.1	3.7			27	99	7.0	
10	8.8	59	1.3	*38	.9	3.2			58	53	5.0	
11	4.5	24	1.6		1.2	2.8		*1.7	65	96	4.3	
12	1.9	4.8	1.4		.9	2.6		*1.6	12	129	7.2	
13	1.5	3.6	1.4	*3.0	.8	2.6	*3.6	*1.6	6.8	19	5.8	
14	1.4	3.2	1.4		.8	2.4		*1.5	7.4	10	15	*6
15	5.3	3.1	1.3		.8	2.5		*1.4	11	17.5	14	
16	61	3.3	1.2		.9	39		1.5	7.2	25	8.9	
17	4.5	4.5	1.2		87	7.6		2.0	5.4	15	17.5	
18	2.8	3.4	1.1		28			1.7	4.3	7.4	11	
19	2.2	8.4	1.1		5.7			1.4	3.9	15	11.5	
20	2.2	3.4	1.1		3.8			1.3	3.5	16.5	6.4	
21	3.9	7.7	1.2		4.6			2.6	*3.1	19.5	6.6	
22	7.4	4.8	1.2	*1.7	2.9			121	2.9	23	13	
23	3.2	4.6	1.2		52			93	*2.8	20	8.7	
24	7.1	4.5	1.4		17.5			12	2.8	9.0	5.6	
25	22	3.3	1.8		18.5	*50	*10	8.7	3.9	15	5.8	
26	13	3.2	7.1		12.5			21	5.4	7.4	9.6	*26
27	7.6	3.3	8.4		4.6			64	12	5.5	4.6	
28	4.4	*3.2	12.5		32			19	5.5	7.0	4.2	
29	3.4	*2.3	9.8	*1.4	12				3.7	5.5	3.1	
30	3.4	3.4	4.0	*1.2	13.5				2.8	13.5	2.9	
31	3.1	4.3		1.2					2.4		2.5	

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July	61	1.2	6.15	9.52	190	585
August	59	2.3	7.18	11.1	223	683
September	12.5	1.1	2.71	4.19	81.2	250
October			5.21	8.06	161	496
November	87	.8	10.4	16.1	312	957
December		2.4	29.5	45.6	915	2,810
January			9.06	14.0	281	862
February	121	1.3	13.6	21.0	381	1,170
March	69	2.4	18.7	28.9	581	1,780
April	199	5.2	37.3	57.7	1,120	3,430
May	21	2.5	9.27	14.3	288	882
June			11.8	18.3	354	1,090
The year	199	.8	13.4	20.7	4,590	15,000

* Partly estimated.

* Estimated.

* Estimated mean.

SPRECKELS DITCH AT HAIPUAENA WEIR, NEAR HUELO, MAUI

LOCATION.—Water-stage recorder between Haipuaena and Puohokamoa Streams on Spreckels Ditch trail, $3\frac{1}{4}$ miles southeast of Kailua.

RECORDS AVAILABLE.—April, 1922, to February, 1930.

EXTREMES.—Maximum discharge during period, 85 million gallons a day (132 second-feet) Jan. 3 (gage height, 2.90 feet); no flow occasionally when water was entirely diverted to power plant.

1922-1930: Maximum discharge, that of Jan. 3, 1930; no flow occasionally when water was shut out of ditch.

REMARKS.—Records excellent except those estimated, which are poor. Regulated by gates and spillways. Since May, 1928, East Maui Irrigation Co.'s power plant has diverted continuously about 4 million gallons a day just above station. Spreckels Ditch diverts from all streams between Nuaailua and Kailua above Koolau Ditch east of Puohokamoa and below Koolau Ditch west of Puohokamoa. Station was discontinued Feb. 19, 1930.

Discharge, in million gallons a day, 1929-30

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.
1	4.5	4.3	2.4	8.0	-----	-----	15	8.5
2	5.0	3.4	2.9	22	-----	-----	19	5.6
3	1.65	8.0	2.5	5.8	-----	-----	42	5.6
4	1.1	25	1.1	3.2	-----	-----	22	5.3
5	.7	19	.7	1.95	-----	b 22	17	4.6
6	.35	19	a .6	2.0	-----	-----	21	7.6
7	.65	13.5	a 1.5	3.7	-----	-----	16	9.2
8	.75	13.5	1.5	24	-----	-----	10	4.1
9	.25	11	b 1.2	43	-----	-----	7.8	2.6
10	9.1	33	.35	22	-----	b 6.5	7.5	2.5
11	10	29	1.4	10.5	-----	-----	7.0	2.0
12	1.95	13	1.15	6.7	-----	-----	5.0	1.65
13	.8	8.7	2.1	5.9	-----	3.8	17	1.35
14	.55	6.7	.35	5.5	-----	3.1	8.1	1.15
15	5.9	6.4	.3	3.6	-----	2.5	6.4	1.0
16	38	5.9	.06	2.9	-----	28	5.2	1.25
17	12.5	11.5	0	2.5	b 40	18	4.3	3.3
18	5.6	6.4	.02	1.95	-----	34	10.5	2.6
19	3.7	5.9	.01	4.4	-----	28	12.5	1.0
20	3.4	5.6	0	2.5	-----	39	15.5	-----
21	10.5	18	.08	1.55	b 11	23	11	-----
22	19	12	0	1.0	-----	12.5	16	-----
23	7.8	8.9	.06	1.35	-----	23	16	-----
24	17	9.6	.09	2.4	-----	54	9.4	-----
25	30	4.9	1.4	2.0	-----	27	30	-----
26	24	4.3	15.5	.6	b 24	33	14.5	-----
27	18.5	3.9	17.5	.55	-----	43	9.9	-----
28	10.5	2.6	22	-----	-----	21	7.5	-----
29	6.8	1.95	15.5	-----	-----	55	5.9	-----
30	5.8	4.3	5.9	-----	-----	54	31	-----
31	5.9	10	-----	-----	-----	24	17	-----

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July	38	0.25	8.46	13.1	262	806
August	33	1.95	10.6	16.4	329	1,010
September (27 days)	22	0	3.64	5.63	98.2	302
October	-----	-----	-----	-----	-----	-----
November	-----	-----	-----	-----	-----	-----
December	55	2.5	23.5	36.4	728	2,240
January	42	4.3	14.1	21.8	437	1,340
February (19 days)	9.2	1.0	3.73	5.77	70.9	217

a Estimated mean.

b Partly estimated. Data insufficient for estimating discharges from Oct. 28 to Nov. 16.

SPRECKELS DITCH AT HAIPUAENA, NEAR HUELO, MAUI

LOCATION.—Water-stage recorder between Haipuaena and Puohokamoa Streams on Spreckels Ditch trail, $3\frac{1}{2}$ miles southeast of Kailua.

RECORDS AVAILABLE.—February to June, 1930.

EXTREMES.—Maximum discharge during period, 59 million gallons a day (91 second-feet) Feb. 25 (gage height, 4.48 feet); minimum, 7.4 million gallons a day (11.4 second-feet) Mar. 25.

REMARKS.—Records good. Regulated by gates and spillways. Spreckels Ditch diverts from all streams between Nuailua and Kailua above Koolau Ditch east of Puohokamoa and below Koolau Ditch west of Puohokamoa. Station established Feb. 25, 1930.

Discharge, in million gallons a day, 1929-30

Day	Feb.	Mar.	Apr.	May	June	Day	Feb.	Mar.	Apr.	May	June
1-----		* 29	24	27	16	16-----		21	27	22	25
2-----		* 37	35	26	20	17-----		18	21	28	21
3-----		* 45	25	20	24	18-----		15	14	26	15
4-----		48	19	21	27	19-----		14	25	26	12.5
5-----		38	24	33	17	20-----		11.5	28	20	11
6-----		42	39	29	16	21-----		10.5	29	21	13
7-----		37	42	25	13.5	22-----		9.6	30	26	14.5
8-----		28	34	27	12.5	23-----		9.0	29	24	26
9-----		34	26	21	13	24-----		7.9	22	19	34
10-----		38	27	18	16	25-----	25	12	27	18	34
11-----		39	33	16	18	26-----	29	18.5	21	24	34
12-----		27	30	22	26	27-----	45	27	17	18	25
13-----		21	17	19	21	28-----	33	20	22	17	22
14-----		20	17	26	20	29-----		15	19	13	37
15-----		25	17.5	26	15	30-----		11	26	12.5	34
						31-----		9.2		11	

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
March-----	48	7.9	23.8	36.8	737	2,260
April-----	42	14	25.6	39.6	766	2,369
May-----	33	11	22.0	34.0	682	2,090
June-----	37	11	21.1	32.6	653	1,946
The period-----	48	7.9	23.1	35.7	2,820	8,656

* Partly estimated.

PUOHOKAMOA STREAM NEAR HUELO, MAUI

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

DRAINAGE AREA.—2.6 square miles.

RECORDS AVAILABLE.—December, 1910, to June, 1930.

EXTREMES.—Maximum discharge during year, 920 million gallons a day (1,420 second-feet) Dec. 18 (gage height, 7.20 feet); minimum, 0.1 million gallons a day (0.2 second-foot) Nov. 17.

1910-1930: Maximum discharge, 1,100 million gallons a day (1,700 second-feet) Jan. 14, 1923 (gage height, 7.85 feet); minimum, that of Nov. 17, 1929.

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

Discharge, in million gallons a day, 1929-30

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	3.2	4.3	* 4.5	3.5	1.4	32	21	11.5	39	20	32	9.7
2	3.7	3.9		20	1.4	88	27	9.7	56	102	23	11.5
3	2.4	11		2.7	3.8	1.4	46	114	8.5	90	21	14.5
4	2.1	30		2.2	2.5	2.0	13.5	35	7.4	103	12.5	13.5
5	1.9	14	2.0	1.9	1.3	8.9	21	6.7	84	29	49	12.5
6	1.7	16	1.8	1.8	1.1	9.4	28	8.3	137	148	40	11
7	2.0	8.8	2.0	2.0	1.0	61	21	8.4	92	270	28	8.8
8	1.9	7.1	2.1	20	.9	10.5	15.5	5.9	25	365	39	7.9
9	1.6	6.2	1.9	165	.8	7.9	13.5	5.3	68	207	16.5	8.1
10	15.5	103	1.6	30	.8	6.7	12.5	4.9	124	114	13.5	10.5
11	6.9	62	1.9	9.2	1.0	5.7	11.5	4.6	138	199	11.5	10.5
12	2.9	10.5	1.7	6.4	.8	5.1	9.7	4.3	29	230	17	28
13	2.2	7.4	1.5	5.7	.6	4.7	25	4.1	18	43	13.5	17.5
14	1.9	6.2	1.2	5.2	.6	4.3	12.5	3.8	19.5	23	23	14.5
15	6.5	5.8	1.1	4.3	.4	3.9	9.7	3.6	23	35	32	8.9
16	120	* 5.2	1.0	3.9	.2	69	8.9	3.7	16.5	55	17	22
17	8.5	6.9	.9	3.5	153	15	8.3	4.2	13.5	35	42	13.5
18	5.0	* 5.2	.8	3.1	51	187	14	4.0	11.5	18	23	8.9
19	4.1	* 4.9	.7	4.0	10	208	15.5	3.3	9.7	36	26	7.1
20	3.9	* 4.9	.6	3.3	7.2	147	23	3.0	8.3	38	15.5	6.2
21	6.2	12	.7	2.9	8.9	38	14	6.7	7.4	42	15.5	7.0
22	14	7.4	.5	2.6	4.7	19.5	26	243	6.7	49	27	8.0
23	5.1	* 5.3	.4	2.5	104	47	21	180	6.1	44	19	26
24	10.5	* 6.1	.5	2.9	36	187	11.5	28	5.6	19.5	12.5	86
25	43		.7	2.6	27	41	48	23	6.9	30	12	86
26	24	* 5.5	9.4	2.3	23	70	16	50	11.5	18	22	90
27	13.5		11	2.1	8.6	133	27	114	25	14.5	11.5	26
28	7.4		18	1.9	64	27	* 9.5	44	11.5	15.5	10.5	20
29	5.6		11	1.8	23	182		8.3	7.9	13.5	8.6	115
30	5.1		3.4	1.6	22	178	69		6.1	32	7.8	98
31	4.9			1.6		39	21		5.3		6.9	

Month	Discharge			Total run-off		
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July.....	120	1.6	10.9	16.9	337	1,040
August.....	103		12.7	19.6	393	1,210
September.....	18	.4	3.08	4.77	92.3	284
October.....	165	1.6	10.4	16.1	324	989
November.....	153	.2	18.6	28.8	558	1,710
December.....	208	3.9	60.2	93.1	1,870	5,730
January.....	114	8.3	22.6	35.0	700	2,150
February.....	243	3.0	28.7	44.4	804	2,470
March.....	138	5.3	38.9	60.2	1,200	3,700
April.....	365	12.5	76.0	118	2,280	7,000
May.....	49	6.9	20.7	32.0	643	1,970
June.....	115	6.2	23.0	43.3	841	2,580
The year.....	365	.2	27.5	42.5	10,000	30,800

* Estimated mean.

† Partly estimated.

* Estimated.

PUOHOKAMOA INTAKE OF KOOLAU DITCH, NEAR HUELO, MAUI

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

RECORDS AVAILABLE.—March, 1922, to April, 1930.

EXTREMES.—Maximum discharge during period, 91 million gallons a day (141 second-feet) Dec. 24 (gage height, 3.10 feet); no flow occasionally when intake gate was closed.

1922-1930: Maximum discharge, that of Dec. 24, 1929; no flow when water was shut out of ditch.

REMARKS.—Records excellent for ordinary stages, good for high stages, and poor for estimated periods. Diverts water from Puohokamoa Stream into Koolau Ditch. Regulated by gates. Station discontinued Apr. 17, 1930.

Discharge, in million gallons a day, 1929-30

Day	July	Aug.	Sept.	Oct.	Dec.	Jan.	Feb.	Mar.	Apr.
1	5.4	9.7	2.8	8.1	0.2	28	16.5	30	36
2	5.4	9.6	2.8	14	.2	27	15.5	31	55
3	5.2	10	2.8	11	.2	33	15	34	39
4	5.1	11.5	2.8	4.2	.1	30	14	39	31
5	5.1	11	2.7	3.1	0	17	13	36	34
6	4.2	11	2.7	2.6	0	33	13.5	40	55
7	3.4	10.5	2.7	2.6	0	6.0	14	31	64
8	3.4	10.5	2.8	17	0	.1	12.5	.2	69
9	3.4	10.5	2.8	25	0	0	8.4	.2	55
10	10	18	2.7	0	0	.1	6.9	.3	50
11	15.5	20	2.7	0	0	.1	6.6	.3	64
12	2.7	16.5	2.7	0	0	.1	6.6	.3	64
13	2.6	16.5	2.7	0	0	.2	6.4	.2	35
14	2.6	12.5	2.6	0	0	.1	6.4	.1	32
15	3.9	9.6	2.7	0	0	.1	6.4	.1	32
16	43	9.6	2.6		14.5	.1	6.4	.2	39
17	18.5	9.9	2.7		20	5.3	6.8	.1	34
18	12	9.7	2.5		23	8.8	6.8	.2	
19	6.4	9.7	2.6		9.6	9.0	6.4	10	
20	6.6	9.6	2.6		16.5	9.4	6.3	19	
21	6.9	16.5	2.6	4.5	22	8.8	6.3	18	
22	19	16	2.6		19	13	27	15.5	
23	11	12.5	2.5		33	18	33	15	
24	16.5	12.5	2.5		49	19	25	12.5	
25	15	11.5	2.5		32	23	28	12	
26	19	10.5	10.5		31	20	30	13	
27	18	8.5	20		34	19	33	20	
28	15	8.1	14.5		28	16.5	30	23	
29	10	7.9	8.7		36	15.5		20	
30	10	9.0	8.1		36	20		18	
31	10	2.8			30	19		14	

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July	43	2.6	10.2	15.8	315	970
August	20	2.8	11.3	17.5	352	1,080
September	20	2.5	4.28	6.62	128	394
October						
November						
December (20 days)	49	0	21.7	33.6	434	1,330
January (30 days)	33	0	13.3	20.6	390	1,220
February	33	6.3	14.5	22.4	407	1,260
March	40	.1	14.6	22.6	453	1,390
April (17 days)	69	31	46.5	71.9	791	2,430

• Estimated.

• Estimated mean.

• Partly estimated. Data insufficient for estimating discharges from Oct. 29 to Nov. 30.

MANUEL LUIS DITCH AT PUOHOKAMOA GULCH, NEAR HUELO, MAUI

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

RECORDS AVAILABLE.—December, 1917, to June, 1930.

EXTREMES.—Maximum discharge during year, 45 million gallons a day (70 second-feet) Apr. 8 (gage height, 2.72 feet); minimum, 0.2 million gallons a day (0.3 second-foot) Sept. 14.

1917-1930: Maximum discharge, 116 million gallons a day (179 second-feet) Jan. 14, 1923 (gage height, 4.93 feet); minimum, 0.05 million gallons a day (0.08 second-foot) Mar. 3, 1920.

REMARKS.—Records good for low stages and fair above. Manuel Luis Ditch is an extension of Center Ditch and picks up water at 500 feet elevation between Kolea and Waikamoi Streams. Regulated by gates.

Discharge, in million gallons a day, 1929-30

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	0.3	0.7	0.4	0.7	0.6	15	14	2.3	20	18.5	25	1.3
2	.4	.6	.4	12	.6	20	10	1.5	27	20	21	3.2
3	.3	4.7	.4	.6	.6	17	23	1.3	29	25	14	12.5
4	.2	19	.3	.5	.8	3.3	18.5	1.2	29	9.6	11.5	24
5	.2	13.5	.3	.4	.8	3.2	8.5	1.2	25	13	26	5.9
6	.2	9.9	.3	.4	.8	6.6	9.6	1.7	29	30	22	4.4
7	.2	1.6	.2	.5	.7	21	5.3	1.5	26	30	21	1.0
8	.2	6.6	2.4	17	.7	7.6	2.2	1.0	14	30	25	.9
9	.2	2.0	.3	28	.7	3.6	1.8	.9	25	30	15.5	.9
10	6.3	23	.2	18.5	.7	1.9	1.9	.8	26	30	8.1	1.0
11	.8	24	.3	1.7	.6	1.5	1.7	.8	29	30	2.4	2.7
12	.3	4.3	.2	1.2	.5	1.3	1.2	.8	16.5	30	13	23
13	.2	1.4	.2	1.1	.5	1.1	5.1	.7	6.0	22	7.2	16
14	.2	1.1	.2	1.0	.5	1.0	1.3	.7	5.8	11.5	18.5	6.0
15	2.3	1.1	.3	.8	.5	.9	1.0	.7	18	14	22	1.0
16	28	1.0	.3	.8	.5	16.5	.9	.6	7.4	23	11.5	17
17	2.4	1.6	.2	.8	15.5	15.5	.8	1.1	3.4	17	25	11
18	.5	.8	.2	.8	27	24	5.7	.8	1.8	14	23	1.2
19	.4	.7	.2	1.0	8.4	27	5.0	.7	1.8	22	23	1.0
20	.4	.7	.2	.8	2.4	26	11.5	.6	1.7	24	12.5	.9
21	.5	5.8	.2	.8	1.8	15.5	1.5	1.3	1.6	27	14	1.1
22	9.7	1.3	.2	.8	1.3	6.6	6.9	29	1.5	27	18.5	1.3
23	.7	.5	.3	.7	20	8.8	6.5	29	1.4	25	18	20
24	4.1	.5	.3	.8	23	26	1.1	21	1.2	15.5	3.6	27
25	26	.5	.3	.7	7.5	20	21	14	2.8	18	2.0	27
26	15	.5	1.2	.8	21	18	6.8	22	5.6	11.5	15	28
27	7.2	.4	6.0	.8	4.7	25	1.6	27	23	9.1	1.4	24
28	1.2	.4	13.5	.7	24	15.5	1.5	24	5.6	14	2.5	18.5
29	1.0	.4	7.5	.7	20	27	1.3	-----	1.3	11.5	1.0	28
30	.8	.4	.5	.7	14	27	16.5	-----	1.2	22	1.1	27
31	.8	.4	-----	.7	-----	20	9.8	-----	1.1	-----	.8	-----

Month	Discharge			Total run-off	
	Million gallons a day			Million gallons	Acre-feet
	Maximum	Minimum	Mean		
July	28	0.2	3.58	5.54	941
August	24	.4	4.17	6.45	397
September	13.5	.2	1.25	1.93	115
October	28	.4	3.12	4.83	297
November	27	.5	6.69	10.4	616
December	27	.9	13.7	21.2	1,300
January	23	.8	6.56	10.1	624
February	29	.6	6.72	10.4	577
March	29	1.1	12.5	19.3	1,190
April	30	9.1	21.1	32.6	1,940
May	26	.8	13.7	21.2	1,300
June	28	.9	11.2	17.3	1,080
The year	30	.2	8.69	13.4	9,730

• Partly estimated.

• Estimated.

MANUEL LUIS DITCH WEST OF PUOHOKAMOA STREAM, NEAR HUELLO, MAUI

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 to June, 1930.

EXTREMES.—Maximum discharge during period, 50 million gallons a day (77 second-feet) sometime during period of missing record between Feb. 25 and Mar. 10 (gage height, 4.06 feet); minimum, 0.9 million gallons a day (1.4 second-feet) Mar. 31.

REMARKS.—Records good except those estimated, 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. Station established Feb. 25, 1930.

Discharge, in. million gallons a day, 1929-30

Day	Feb.	Mar.	Apr.	May	June	Day	Feb.	Mar.	Apr.	May	June
1			16.5	23	1.9	16		22	24	15	18
2			26	21	6.7	17		13.5	21	23	11.5
3			22	16	16.5	18		6.1	16.5	21	1.4
4			11	13.5	22	19		3.5	24	21	1.2
5			12	24	6.4	20		1.8	25	16	1.0
6		26	29	23	6.7	21		1.6	24	16.5	1.3
7			34	21	1.2	22		1.4	25	20	2.7
8			35	23	1.0	23		1.2	24	17	20
9			30	17	1.0	24		1.2	19	4.6	26
10			27	9.9	1.2	25	18	3.5	21	5.0	26
11		30	32	3.0	5.0	26		6.5	14	15	27
12		24	30	16	21	27	26	22	11	1.9	21
13		20	23	10	14.5	28		6.2	16	3.9	20
14		18.5	15	20	8.7	29		1.2	13.5	1.2	29
15		24	16.5	20	1.4	30		1.0	21	1.4	27
						31		.9		1.1	

Month	Discharge			Total run-off		
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
March		0.9	15.1	23.4	467	1,440
April	35	11	21.9	33.9	658	2,020
May	24	1.1	14.3	22.1	443	1,360
June	29	1.0	11.6	17.9	348	1,070
The year	35	.9	15.7	24.3	1,920	5,890

• Estimated mean.

• Partly estimated.

SPRECKELS DITCH AT WAHINEPEE, NEAR HUELO, MAUI

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

RECORDS AVAILABLE.—August, 1928, to June, 1930.

EXTREMES.—Maximum discharge during year, 69 million gallons a day (107 second-feet) Dec. 7 (gage height, 5.05 feet); no flow occasionally when water was shut out of ditch.

1928-30: Maximum discharge, that of Dec. 7, 1929; no flow occasionally when water was shut out of ditch.

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

Discharge, in million gallons a day, 1929-30

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	7.5	4.9	7.5	8.1	8.5	14.5	10.5	5.4	13.5	11.5	15.5	3.0
2	8.7	24.4	8.1	23	3.2	16	8.7	1.8	14	21	14	5.0
3	3.6	7.6	7.1	4.8	3.6	15.5	18	1.2	15	8.7	6.6	14
4	2.0	28	4.9	6.2	6.6	14	14.5	1.2	15.5	2.5	5.8	22
5	1.4	25	4.0	5.2	2.3	18	12	.9	14.5	9.4	16	8.8
6	2.2	24	3.6	5.2	8.8	21	14.5	3.7	16	26	14.5	3.5
7	4.4	18	5.0	7.0	2.6	5.9	17.5	4.9	15.5	29	13.5	7.0
8	3.8	15.5	5.6	26	2.5	0	17.5	.6	19.5	31	16	.4
9	2.9	13	4.8	32	2.2	0	17	3.2	26	18	8.1	8.5
10	12.5	27	8.6	24	2.0	0	19.5	3.5	28	12.5	5.2	6.2
11	8.6	29	5.4	7.2	3.1	.1	17.5	2.9	24	16	3.2	5.0
12	7.2	13.4	8.8	3.9	2.3	.8	14.5	2.5	22	14	10	22
13	5.4	5.5	8.4	3.9	1.7	5.7	26	2.0	28	10.5	6.0	11
14	4.6	5.7	2.8	4.8	1.8	8.7	18	1.7	26	9.4	14	7.0
15	12	7.5	2.4	4.5	1.7	8.1	14.5	1.4	18	8.8	14	1.1
16	30	7.1	2.2	3.2	1.5	9.4	13.5	1.7	21	16	8.1	16.5
17	8.9	14.5	2.0	2.4	17.5	6.3	6.5	3.8	25	14	17	9.4
18	3.6	6.8	1.8	1.6	29	7.7	10	3.6	24	6.2	15.5	2.9
19	5.7	6.1	1.6	5.5	13.5	1.3	12.5	1.6	13	14.5	15.5	1.4
20	5.8	5.4	1.4	2.9	6.8	.2	13.5	.7	1.8	15.5	8.1	.5
21	16	19.5	1.6	2.4	10.5	0	12.5	2.4	1.0	16	8.1	.9
22	19.5	9.4	1.4	2.7	1.5	0	10	26	1.0	17	12.5	1.6
23	7.7	7.0	1.2	3.1	20	2.7	10	29	.8	12	11.5	17
24	18.5	9.0	1.4	4.3	26	2.4	3.1	24	1.6	17	4.0	29
25	29	2.0	2.1	4.5	12	1.0	9.4	13.5	7.1	14.5	2.5	31
26	25	2.4	19.5	2.4	22	8.3	8.1	15	14	8.1	11.5	31
27	21	3.6	14.5	2.3	5.6	18	4.8	16	19.5	5.2	8.2	18
28	9.4	1.7	25	1.5	25	14.5	3.1	13.5	9.4	8.7	2.7	8.6
29	7.5	.8	21	1.1	14.5	19.5	1.6	-----	2.9	5.6	.5	29
30	6.0	8.1	6.5	2.7	14.5	19.5	9.7	-----	.2	14	.2	25
31	6.2	14.5	-----	3.9	-----	13.5	10.5	-----	.9	-----	.1	-----

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July	30	1.4	9.89	15.3	307	941
August	29	.8	11.1	17.2	344	1,060
September	25	1.2	5.84	9.04	175	538
October	32	1.1	6.83	10.6	212	650
November	29	1.5	8.76	13.6	263	807
December (26 days)	21	0	9.79	15.1	255	781
January	26	1.6	12.2	18.9	379	1,160
February	29	.6	6.70	10.4	188	576
March	28	.2	14.2	22.0	439	1,350
April	31	2.5	13.8	21.4	418	1,270
May	17	.1	9.14	17.1	233	870
June	31	.4	11.0	14.0	330	1,010
The year (360 days)	32	0	9.96	15.4	3,590	11,000

KOOLAU DITCH AT WAHINEPEA, NEAR HUELO, MAUI

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

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

EXTREMES.—Maximum discharge during period, 127 million gallons a day (196 second-feet) July 16 (gage height, 5.78 feet); minimum, 14 million gallons a day (22 second-feet) Nov. 2.

1922-1929: Maximum discharge, that of July 16, 1929; minimum, 1.4 million gallons a day (2.2 second-feet) Feb. 21, 1923.

REMARKS.—Records good. Completely regulated by gates and spillways. Koolau Ditch diverts water at elevation of 1,200 feet from all streams from Makapipi to Alo. Station discontinued Nov. 2, 1929.

Discharge, in million gallons a day, 1929-30

Day	July	Aug.	Sept.	Oct.	Nov.	Day	July	Aug.	Sept.	Oct.	Nov.
1.....	34	44	29	47	165	16.....	122	59	19.5	39	-----
2.....	31	42	29	96	158	17.....	77	75	19.5	36	-----
3.....	26	57	27	49	-----	18.....	44	54	18.5	34	-----
4.....	24	107	24	34	-----	19.....	32	64	18.5	37	-----
5.....	23	104	23	27	-----	20.....	34	60	17.5	-----	-----
6.....	21	96	22	26	-----	21.....	57	101	17.5	-----	-----
7.....	22	83	24	28	-----	22.....	96	83	17.5	-----	-----
8.....	21	80	47	105	-----	23.....	52	69	16.5	-----	-----
9.....	19.5	83	39	122	-----	24.....	82	54	16.5	-----	-----
10.....	51	107	25	116	-----	25.....	113	49	19	-----	-----
11.....	52	113	29	88	-----	26.....	108	44	72	-----	-----
12.....	21	101	24	64	-----	27.....	101	42	96	-----	-----
13.....	19.5	80	23	62	-----	28.....	70	38	107	-----	-----
14.....	18.5	67	21	52	-----	29.....	54	37	85	22	-----
15.....	34	64	20	42	-----	30.....	52	34	47	19.5	-----
						31.....	52	30	-----	17.5	-----

Month	Discharge			Total run-off		
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July.....	122	18.5	50.4	78.0	1,560	4,790
August.....	113	39	67.7	105	2,100	6,440
September.....	107	16.5	33.1	51.2	994	3,030
October.....	122	17.5	46.2	71.5	1,430	4,400
The period.....	122	16.5	49.5	76.6	6,080	18,700

* Estimated mean.

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ALO STREAM NEAR HUELO, MAUI

LOCATION.—Water-stage recorder just above Spreckels Ditch inflow and trail crossing and 2½ miles southeast of Kailua.

DRAINAGE AREA.—0.2 square mile.

RECORDS AVAILABLE.—December, 1910, to June, 1930.

EXTREMES.—Maximum discharge during year, 548 million gallons a day (848 second-foot) Dec. 7 (gage height, 4.28 feet); minimum, 0.3 million gallons a day (0.5 second-foot) Nov. 10, 13, 15-17.

1910-1930: Maximum discharge, 638 million gallons a day (987 second-foot) Dec. 9, 1916 (gage height, 4.35 feet); minimum, that of Nov. 10, 13, 15-17, 1929.

REMARKS.—Records poor. No diversions.

Discharge, in million gallons a day, 1929-30

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1.....				1.2	0.6	5.5	2.7	1.5	2.7		2.7	1.8
2.....				3.9	.5	17	6.5	1.3	2.4		2.3	2.6
3.....				1.1	.4	10.1	28	1.2	5.3	*4.2	1.8	4.1
4.....				.9	.6	2.9	4.0	1.1	7.3		1.8	10.8
5.....				.8	.4	2.2	4.1	1.0	8.0		2.6	2.2
6.....				.8	.4	13	6.5	1.7	16.5		4.4	1.9
7.....				.9	.4	61	2.8	1.5			2.4	1.5
8.....				23	.4	2.7	2.2	1.0			3.7	1.4
9.....				49	.3	2.1	1.8	.9			1.9	1.3
10.....				7.9	.4	1.8	1.8	.9			1.6	1.5
11.....				2.0	.5	1.6	1.6	.9			1.5	2.1
12.....				1.6	.4	1.5	1.4	.8	*8.5		2.4	3.9
13.....				1.5	.3	1.3	2.1	.7			2.0	2.5
14.....				1.3	.3	1.3	1.3	.7			6.6	2.3
15.....				1.2	.3	1.1	1.2	.7			3.7	1.5
16.....				1.1	.3	20	1.1	.7			5.8	5.0
17.....				1.0	52	2.4	1.1	.8			5.6	2.2
18.....				1.0	14.5	77	2.6	.8			6.5	1.6
19.....				1.1	2.1	53	4.1	.7			5.2	1.4
20.....				.5	1.0	3.2	20	.6			2.3	1.3
21.....				.6	.9	2.0	4.2	1.7			10.7	1.5
22.....				.5	.9	1.3	3.3	95			14.5	3.5
23.....				.8	49	19.1	2.0	75			8.9	2.2
24.....				.6	.9	7.1	19.1	1.4			3.1	1.7
25.....				.6	.9	7.8	5.8	19	*1.4		3.6	1.8
26.....				1.8	.7	4.2	10.5	2.0			2.2	2.9
27.....				2.2	.7	4.3	24	1.6			2.0	1.8
28.....				3.5	.7	32	12.5	1.4			3.3	1.9
29.....				1.7	.6	5.4	16.7	1.3			2.1	1.4
30.....				.9	.6	6.0	33	15			5.3	1.4
31.....				.6			4.3	2.4			1.3	

Month	Discharge				Total run-off	
	Million gallons a day			Second-foot (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July.....			3.70	5.72	115	352
August.....			2.00	3.09	61.9	190
September.....	3.5		.83	1.28	24.9	76
October.....	49	0.6	3.57	5.52	111	340
November.....	52	.3	6.58	10.2	197	606
December.....	77	1.1	14.5	22.4	450	1,380
January.....	28	1.1	4.31	6.67	134	410
February.....	95	.6	8.75	13.5	245	752
March.....			5.01	7.75	155	477
April.....			14.1	21.8	422	1,300
May.....	6.6	1.3	2.86	4.43	88.7	272
June.....	31	1.3	6.44	9.96	193	593
The year.....	95	.3	6.02	9.31	2,200	6,750

* Estimated mean.

WAIKAMOI STREAM ABOVE WAILOA DITCH, NEAR HUELO, MAUI

LOCATION.—Water-stage recorder 500 feet above intake of Wailoa Ditch, a quarter of a mile above Spreckels Ditch trail, and $2\frac{1}{2}$ miles southeast of Kailua.

DRAINAGE AREA.—4.4 square miles.

RECORDS AVAILABLE.—January, 1922, to June, 1930.

EXTREMES.—Maximum discharge during year, 1,110 million gallons a day (1,720 second-feet) Dec. 18 (gage height, 9.18 feet); minimum, 0.4 million gallons a day (0.6 second-foot) Nov. 16.

1922-1930: Maximum discharge, 1,360 million gallons a day (2,100 second-feet) Oct. 16, 1924 (gage height, 10.45 feet); minimum, 0.4 million gallons a day (0.6 second-foot) Nov. 16, 1929.

REMARKS.—Records good for ordinary stages, fair for estimated periods, and poor for high stages. Haleakala ranch and Kula pipe lines divert small amounts of water above station.

Discharge, in million gallons a day, 1929-30

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	2.1	2.5	2.0		0.7	40	12	6.7	32	14.5	30	5.4
2	2.8	2.2	1.6		.6	92	25	4.6	71	87	21	6.7
3	1.6	2.3	1.6		.7	53	101	8.8	108	21	10.5	15.5
4	1.4	32	1.3	*4.6	1.0	12.5	25	8.1	120	9.4	8.6	28
5	1.2	11.5	1.2		.7	7.4	12	2.7	79	21	53	9.0
6	1.1	12	1.0		.6	7.5	17	3.3	138	112	27	7.6
7	1.2	10	1.0		.6	34	13.5	4.0	32	189	20	5.4
8	1.3	4.6	1.1		.6	6.0	7.8	2.4	22	288	24	4.6
9	1.0	7.6	1.1	*44	.5	4.5	5.7	1.8	39	165	10.5	4.6
10	8.6	59	1.0		.5	3.7	4.8	1.5	80	80	7.2	5.8
11	7.0	82	1.1		.7	3.2	4.2	1.9	101	128	17.5	6.2
12	1.9	8.6	1.2		.5	2.8	3.2	1.2	24	205	9.2	24
13	1.4	5.0	1.0		.5	2.7	22	1.1	12.5	41	6.9	13.5
14	1.2	3.9	.9		.5	2.3	6.5	1.4	11	19.5	13.5	10.5
15	2.0	3.6	.8		.5	2.1	3.9	1.4	18	19.5	20	6.2
16	94	2.1	.8		.4	87	3.2	1.2	13	41	13.5	14
17	8.2	4.0	.7		107	19	2.9	1.3	8.2	25	28	11.5
18	3.5	3.4	.7		43	153	8.4	1.7	6.0	12	13.5	6.5
19	2.6	2.8	.7		6.2	196	10	1.4	5.2	24	16	4.7
20	2.4	2.6	.6	*1.6	3.9	108	12.5	1.0	4.1	26	9.4	3.9
21	4.1	5.8	.7		6.2	25	7.4	2.3	3.9	28	9.9	4.0
22	9.1	7.4	.6		2.9	9.4	7.5	14	3.6	30	21	4.2
23	3.9	3.5	.6		63	25	11.5	139	3.2	32	15	19
24	7.0	5.6	.7		38	119	3.9	25	2.9	14	7.4	53
25	27	3.6	.6		29	28	26	12	2.9	23	7.7	58
26	17	3.8			45	59	8.4	26	8.2	11.5	15	66
27	12.5	2.6			7.9	84	4.7	121	24	8.6	7.0	22
28	5.2	2.0	*9.5		45	17.5	3.9	40	11.5	11	5.8	15
29	3.5	1.6			59	147	3.0		6.4	8.2	4.5	32
30	3.0	1.4		.7	26	125	115		4.3	18	4.0	54
31	2.9	2.8		.7		27	30		3.4		3.5	

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July	94	1.0	7.80	12.1	242	742
August	82	1.4	9.77	15.1	303	929
September		.6	2.41	3.73	72.2	222
October		.7	6.32	9.78	196	601
November	107	4	16.4	25.4	492	1,510
December	196	2.1	43.5	75.0	1,506	4,610
January	115	2.9	16.8	26.0	522	1,600
February	139	1.0	15.2	23.5	427	1,310
March	138	2.9	38.3	52.3	1,050	3,220
April	298	8.2	57.4	88.8	1,720	5,280
May	53	3.5	14.3	22.9	460	1,410
June	82	3.9	19.0	29.4	571	1,750
The year	298	.4	20.7	32.0	7,560	23,200

* Estimated mean.

KAAIEA STREAM NEAR KAILUA, MAUI

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

DRAINAGE AREA.—0.5 square mile.

RECORDS AVAILABLE.—December, 1921, to June, 1930.

EXTREMES.—Maximum discharge during year, 519 million gallons a day (803 second-feet) Dec. 18 (gage height, 3.58 feet); minimum, 0.3 million gallons a day (0.5 second-foot) Nov. 16.

1921-1930: Maximum discharge, 900 million gallons a day (1,390 second-feet) Jan. 31, 1922 (gage height, 4.92 feet); minimum, 0.3 million gallons a day (0.5 second-foot) July 17, 1922, Mar. 22, 1927, Nov. 16, 1929.

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

Discharge, in million gallons a day, 1929-30

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	0.7	1.0	0.4	1.0	0.4		3.2	1.9	3.1	5.9	3.7	2.1
2	.8	.9	.4	3.7	.4		5.3	1.5	3.0	9.1	3.2	3.2
3	.6	1.5	.4	.9	.5		26	1.4	7.2	4.6	2.2	5.3
4	.5	2.3	.4	.7	.6		5.4	1.2	8.1	2.2	2.1	19.5
5	.5	1.2	.3	.6	.5		6.3	1.1	8.8	2.4	3.5	2.8
6	.5	.8	.3	.6	.4	12	6.0	1.9	18	19.5	6.4	2.1
7	.5	.5	.4	.7	.4		3.7	1.8	14	51	3.7	1.6
8	.5	.4	.4	6.6	.4		2.6	1.1	4.0	75	5.9	1.4
9	.4	.4	.4	42	.4		2.1	1.0	8.8	24	2.4	1.4
10	5.5	24	.4	7.1	.4		2.1	.9	20	13	2.1	2.1
11	1.0	13.5	.4	2.1	.6	1.4	2.1	.8	29	57	1.8	2.6
12	.6	.8	.4	1.5	.4	1.3	1.5	.7	4.5	12	3.5	4.8
13	.5	.6	.4	1.3	.4	1.0	2.7	.7	2.8	6.2	2.6	3.2
14	.5	.5	.4	1.1	.4	1.0	1.5	.7	5.9	3.2	7.3	3.0
15	19	.5	.4	.9	.3	.9	1.3	.7	4.8	12	5.8	1.8
16	29	.4	.4	.8	.3	18.5	1.2	.7	3.0	9.5	6.3	5.6
17	1.5	.6	.4	.7	48	3.0	1.1	.7	2.2	6.5	7.4	2.8
18	.9	.4	.4	.7	12.5	83	3.2	.7	1.8	3.0	6.8	1.9
19	.7	.4	.4	.9	2.1	66	4.9	.6	1.5	16	6.8	1.5
20	.7	.4	.4	.7	2.8	19.5	6.5	.6	1.4	10.5	3.0	1.3
21	1.0	1.2	.4	.6		4.9	2.6	4.0	1.2	11	2.8	1.6
22	5.1	.6	.4	.6	1.6	3.0	4.4	85	1.1	13	4.4	2.2
23	1.1	.4	.4	.6		9.7	4.1	72	1.0	9.4	3.0	5.9
24	2.3	.5	.4	.6		18.5	1.8	5.9	.9	3.7	2.1	27
25	18	.5	.4	.6		6.0	16.5	10	1.1	5.0	2.1	18.5
26	6.4	.4	1.7	.6	14	8.7	3.0	25	2.6	3.0	3.5	21
27	3.2	.4	2.2	.5		33	2.1	11	3.3	2.6	1.9	4.3
28	1.9	.4	3.7	.5		4.4	1.6	6.0	1.6	4.5	2.4	3.3
29	1.4	.3	2.0	.5		24	1.4		1.2	2.8	1.6	32
30	1.2	.3	.8	.5		34	17.5		1.0	6.6	1.5	30
31	1.2	.4		.5		5.3	3.3		.9		1.3	

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July	29	0.4	3.47	5.37	108	330
August	24	.3	1.82	2.82	56.5	173
September	3.7	.3	.67	1.04	20.2	62
October	42	.5	2.60	4.02	80.7	247
November	48	.3	6.25	9.67	187	575
December	83	.9	14.7	22.7	457	1,400
January	26	1.1	4.74	7.33	147	451
February	85	.6	8.56	13.2	240	736
March	29	.9	5.41	8.37	168	515
April	75	2.2	13.5	20.9	404	1,240
May	7.4	1.3	3.65	5.65	113	347
June	32	1.3	7.19	11.1	216	662
The year	83	.3	6.02	9.31	2,200	6,740

* Estimated mean.

SPRECKELS DITCH BELOW KAAIEA GULCH, NEAR HUELO, MAUI

LOCATION.—Water-stage recorder 1,000 feet below intake in Kaaiea Stream and $1\frac{1}{4}$ miles southeast of Kailua.

RECORDS AVAILABLE.—December, 1917, to January, 1930.

EXTREMES.—Maximum and minimum discharges during period not known, owing to missing gage-height record.

1917-1930: Maximum discharge, 110 million gallons a day (170 second-feet) Jan. 16, 1921 (gage height, 5.65 feet) and May 16, 1924 (gage height, 5.45 feet); no flow occasionally when water is turned out of ditch.

REMARKS.—Records poor. Spreckels Ditch diverts water for irrigation from all streams between Nuaailua and Kailua above Koolau Ditch east of Puohokamoa and below Koolau Ditch west of Puohokamoa. Station discontinued Jan. 26, 1930.

Discharge, in million gallons a day, 1929-30

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
1				0.2	0.3		
2				2.2	.3		
3				.3	.4		
4				.2	.6	* 3.9	
5		* 0.5		.1	.4		* 3.8
6				.1	.4		
7				.2	.2	* 3.5	
8	* 0.5		* 0.05	3.5	.2		
9				25	.2		
10				8.9	.2		
11		* 8		1.5	.7	* .6	
12				.9	.2		
13				.8			* .8
14				.6			
15			* .05	.5	* .2		
16	* 12		.05	.4			
17		* .2	.05	.4			
18			.1	.3	* 15		
19			.05	.7			
20			.05	.4			
21			.05	.3	* 1.2		
22			.05	.3			* 2.7
23			.1	.4			
24	* 1.8		.1	.6		* 10	
25			.1	.6			
26		* .05	.5	.4	* 7.5		
27			.9	.4			
28			1.9	.4			
29			1.2	.4			
30			.2	.4			
31				.3			

Month	Discharge			Total run-off	
	Million gallons a day			Million gallons	Acre-feet
	Maximum	Minimum	Mean		
July			1.87	2.89	178
August			.747	1.16	71
September	1.9		.205	.317	19
October	25	0.1	1.67	2.58	159
November			3.32	5.14	306
December			7.20	11.1	685
January 1-26			2.38	3.68	190
The period (210 days)			2.49	3.85	1,610

* Estimated mean.

* Estimated.

* Partly estimated.

CENTER DITCH BELOW KOLEA RESERVOIR, NEAR HUELO, MAUI

LOCATION.—Water-stage recorder 200 feet below intake from Kolea Reservoir spillway, half a mile below intake in Waikamoi Stream, and 1¼ miles south-east of Kailua.

RECORDS AVAILABLE.—March, 1918, to January, 1930.

EXTREMES.—Maximum discharge during period, 100 million gallons a day (155 second-feet) Dec. 7 (gage height, 5.90 feet); minimum, 0.3 million gallons a day (0.5 second-foot) Sept. 22-23.

1918-1930: Maximum discharge, that of Dec. 7, 1929; no flow Dec. 4, 1918, Jan. 16, 1919.

REMARKS.—Records good for ordinary stages; fair for extremely high stages and estimated periods. Center Ditch receives the flow of Manuel Luis Ditch and diverts water from all streams between Waikamoi and Kailua. Regulated by head gates and spillways. Station discontinued Jan. 25, 1930.

Discharge, in million gallons a day, 1929-30

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
1	1.2	2.5	1.4	5.5	0.9	33	20
2	1.4	2.4	1.4	11.5	1.0	59	22
3	.9	5.6	1.4	1.0	1.0	44	47
4	.7	26	1.0	.7	1.5	23	29
5	.7	20	1.0	.6	1.0	11.5	23
6	.7	15	.9	.7	.8	14.5	20
7	.8	6.2	.9	2.9	.8	44	23
8	.8	7.6	3.6	28	.8	18.5	16.5
9	.7	6.8	1.2	53	.7	15.5	12
10	8.8	37	.7	° 20		.8	13
11	4.0	41	1.1	° 3.5		1.3	12
12	.9	16	.7	° 3.5		.8	14
13	.7	6.9	.6	° 3.5		.7	12
14	.7	3.5	.6	2.6	.7	5.2	5.7
15	1.5	3.3	.5	2.3	.7	4.8	4.7
16	47	3.0	.4	2.1	.6	42	4.4
17	8.1	4.4	.4	2.0	43	24	3.7
18	1.9	2.6	.6	2.0	38	52	15
19	3.6	2.4	.4	2.1	12	45	21
20	6.2	2.4	.4	1.8	12.5	42	29
21	1.6	11.5	.4	1.6	6.4	34	12
22	18.5	4.2	.4	1.4	3.5	19	12
23	2.0	2.0	.4	1.4	40	28	15.5
24	7.7	2.0	.4	1.8	33	61	4.8
25	30	1.9	1.5	1.5	19.5	32	31
26	19.5	1.8	4.2	1.4	33	39	-----
27	16.5	1.6	12.5	1.2	12.5	39	-----
28	3.8	1.5	21	1.1	48	20	-----
29	3.0	1.4	6.1	1.1	38	61	-----
30	2.9	1.4	.9	1.0	31	62	-----
31	2.9	1.6	-----	1.0	-----	31	-----

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July	47	0.7	6.44	9.96	200	613
August	41	1.4	7.92	12.3	246	753
September	21	.4	2.23	3.45	67.0	205
October	53	.6	5.82	9.00	180	554
November	48	.6	12.8	19.8	384	1,180
December	62	4.8	30.8	47.7	955	2,930
January (25 days)	47	3.7	16.4	25.4	410	1,260
The period (290 days)	62	.4	11.7	18.1	2,440	7,500

° Estimated mean.

NAILIMUHALE STREAM NEAR HUELO, MAUI

LOCATION.—Water-stage recorder 200 feet above Wailoa Ditch intake, 700 feet above New Hamakua Ditch trail, and $1\frac{1}{4}$ miles south of Kailua.

DRAINAGE AREA.—2.8 square miles.

RECORDS AVAILABLE.—October, 1913, to June, 1918; August, 1919, to June, 1930.

EXTREMES.—Maximum discharge, 414 million gallons a day (641 second-feet) Apr. 8 (gage height, 5.50 feet); minimum, 1.8 million gallons a day (2.8 second-feet) Sept. 23, 25.

1913-1918; 1919-1930: Maximum discharge, 1,800 million gallons a day (2,790 second-feet) May 1, 1916 (gage height, 6.3 feet); minimum, 0.45 million gallons a day (0.7 second-foot) July 14, 1920.

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

Discharge, in million gallons a day, 1929-30

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	4.6	6.6	4.2	5.0	2.5		20	10.6	27	29	23	
2	4.7	6.1	4.1	22	2.4		27	8.4	33	50	16.4	
3	4.0	12.0	4.1	6.1	2.5		80	7.2	52	25	12.4	*17
4	3.6	28	3.6	4.4			35	6.4	58	13.2	12.0	
5	3.5	20	3.4	3.8			27	6.1	48	16.3	25	
6	3.3	16.0	3.4	3.5		*28	29	8.9	82	78	32	10.3
7	3.4	10.1	3.3	4.0			22	9.6	65	136	22	8.4
8	3.4	7.8	3.3	33			17.0	5.9	29	166	36	7.6
9	3.1	7.4	3.3	113			13.2	5.7	53	95	14.8	7.6
10	18.6	68	2.9	35			12.9	5.2	75	66	12.0	11.0
11	8.7	54	3.4	12.2	*2.2							
12	4.0	13.4	2.9	9.2		9.9	11.5	4.6	90	102	10.3	13.0
13	3.4	10.3	2.8	8.2		8.8	9.9	4.7	30		19.4	29
14	3.1	8.8	2.5	7.4		7.8	16.5	4.2	20		14.5	18.2
15	7.7	8.2	2.4	6.3		7.0	9.2	3.6	25		27	16.7
16						6.4	7.4	3.4	29		32	10.1
17	91	7.8	2.3	5.4		63	6.6	3.8	18.9	*55	23	23
18	10.8	9.5	2.3	4.8	*50	18.3	6.1	4.1	14.5		36	13.9
19	6.4	6.8	2.3	4.6		116	18.0	3.5	12.2		26	9.7
20	5.4	6.4	2.1	7.0	*12	123	24	3.0	10.6		30	8.0
21	5.0	6.1	2.0	4.6		82	29	2.9	9.5	45	15.0	7.0
22	6.4	17.3	2.2	4.1		32	12.4	9.5	8.0	42	14.2	8.0
23	21	9.7	2.0	3.8		17.3	21	*144	7.2	48	23	10.1
24	7.2	6.4	2.0	3.5		34	18.6	*115	6.6	42	15.6	30
25	12.0	5.9	2.2	*3.4		90	9.9	*32	5.9	20	11.0	74
26	54	6.1	2.1	*3.3		39	51	*36	7.8	27		69
27	34	5.5	8.4	*3.3	*30	46	15.3	*52	17.8	16.1		72
28	18.6	5.4	10.8	*3.1		87	*11.2	64	22	13.7		28
29	10.8	4.7	21	*2.9		25	*9.5	38	10.1	19.2	*9	19.9
30	8.8	4.4	13.7	2.9		94	8.0		7.2	13.9		96
31	8.0	4.4	4.8	2.8		98	45		5.9	32		94
31	7.6	4.4		2.7		34	20		5.2			

Month	Discharge			Total run-off		
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July	91	3.1	12.5	19.3	386	1,190
August	68	4.4	12.5	19.3	388	1,190
September	21	2.0	4.33	6.70	130	399
October	113	2.7	10.8	16.7	335	1,000
November			14.1	21.8	424	1,300
December	123	6.4	42.5	65.8	1,320	4,040
January	80	6.1	20.7	32.0	643	1,970
February	144	2.9	21.5	33.3	602	1,850
March	90	5.2	28.6	44.3	885	2,720
April	166	13.2	51.2	79.2	1,540	4,710
May	36		18.2	28.2	566	1,730
June	96	7.0	26.0	40.2	780	2,390
The year	166		21.9	33.9	8,000	24,500

* Estimated mean.

b Partly estimated

c Estimated.

KAILUA STREAM NEAR HUELO, MAUI

LOCATION.—Water-stage recorder just above Wailoa Ditch intake, 1¼ miles southwest of Kailua, and 2¼ miles south of Huelo.

DRAINAGE AREA.—3.0 square miles.

RECORDS AVAILABLE.—December, 1910, to June, 1918; July, 1919, to June, 1930.

EXTREMES.—Maximum discharge during year, 1,060 million gallons a day (1.640 second-foot) Dec. 18 (gage height, 8.65 feet); minimum, 0.9 million gallons a day (1.4 second-foot) Sept. 25.

1910-1918; 1919-1930: Maximum discharge, about 1,500 million gallons a day (2,300 second-foot) Feb. 1, 1922 (gage height, 10.5 feet; determined from flood marks); minimum, 0.07 million gallons a day (0.11 second-foot) June 27, 1921.

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

Discharge, in million gallons a day, 1929-30

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	3.0	2.8	2.3	2.0	1.2	43	18.0	9.9	35	17.7	26	6.3
2	3.0	2.5	2.2	15.1	1.2	111	30	9.3	92	102	19.2	8.5
3	2.9	3.6	2.2	3.3	1.2	66	137	5.4	125	27	12.7	17.7
4	2.8	22	1.9	2.0	1.4	15.6	40	4.7	134	13.3	11.0	33
5	2.6	9.9	1.9	1.6	1.2	9.3	20	4.3	93	16.5	51	10.1
6	2.8	8.9	1.9	1.4	1.1	8.4	24	4.9	176	124	37	8.5
7	2.8	7.8	1.8	1.5	1.1	47	21	5.6	109	260	26	6.8
8	2.8	4.3	1.7	11.5	1.1	7.9	17.6	3.8	31	371	38	5.8
9	2.8	5.3	1.6	138	1.1	5.6	11.4	3.4	46	211	14.8	5.6
10	7.9	94	1.6	32	1.1	4.7	9.3	3.2	119	111	11.0	7.7
11	6.9	81	1.4	6.8	1.2	4.2	8.2	2.9	142	161	9.3	7.7
12	3.2	9.9	1.4	4.3	1.0	3.5	7.2	2.8	36	243	15.0	25
13	2.8	6.3	1.4	3.4	1.0	3.4	17.2	2.6	17.2	69	11.7	15.1
14	2.8	5.1	1.3	2.9	1.0	3.2	8.7	2.5	15.6	28	22	12.4
15	4.2	4.5	1.2	2.5	1.0	2.8	6.3	2.5	21	25	27	7.7
16	129	4.2	1.1	2.3	1.0	104	5.4	2.5	13.7	54	18.1	13.2
17	9.9	4.2	1.1	1.9	117	20	4.9	2.5	10.1	34	34	10.1
18	4.5	3.5	1.1	1.9	65	146	14.4	2.6	8.5	16.0	17.2	7.4
19	3.4	3.5	1.0	2.8	9.1	228	14.4	2.3	7.4	36	17.6	6.3
20	2.9	3.4	1.0	2.0	9.2	138	16.8	2.2	6.5	36	11.4	5.2
21	3.4	7.6	1.0	1.7	10.1	45	9.3	2.9	5.8	32	11.4	5.4
22	6.9	5.6	1.0	1.6	4.9	15.6	9.2	201	5.2	32	17.5	6.0
23	3.5	3.8	1.0	1.6	89	26	14.2	207	4.7	36	14.8	22
24	4.6	4.0	1.0	1.7	60	162	6.3	37	4.3	16.8	9.3	75
25	30	3.8	.9	1.6	17.6	49	38	15.2	4.9	24	9.0	76
26	15.0	3.3	2.2	1.4	43	71	11.4	40	9.9	14.8	13.0	92
27	10.7	2.9	3.2	1.4	9.7	145	7.4	141	26	11.7	8.5	29
28	5.4	2.6	8.3	1.3	68	27	6.3	56	10.7	13.3	8.2	18.6
29	3.8	2.4	10.0	1.2	28	197	5.2	7.2	10.7	6.5	114	
30	3.5	2.3	2.4	1.2	29	169	93	5.4	19.5	5.8	84	
31	3.2	2.3	-----	1.2	-----	44	32	-----	4.7	-----	5.4	-----

Month	Discharge				Total run-off	
	Million gallons a day			Second-foot (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July	129	2.6	9.45	14.6	293	899
August	94	2.3	10.6	16.4	327	1,010
September	10.0	.9	2.07	3.20	62.1	191
October	138	1.2	8.23	12.7	255	783
November	117	1.0	19.2	29.7	578	1,770
December	228	2.8	62.0	95.9	1,920	5,900
January	137	4.9	21.4	33.1	664	2,040
February	207	2.2	27.9	43.2	780	2,400
March	176	4.3	42.8	66.2	1,830	4,076
April	371	10.7	72.2	112	2,170	6,650
May	51	5.4	17.4	26.9	539	1,660
June	114	5.2	24.7	38.2	742	2,270
The year	371	.9	26.5	41.0	9,660	29,600

• Partly estimated.

• Estimated.

HOOLAWALIEHI STREAM NEAR HUELO, MAUI

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

DRAINAGE AREA.—Not determined.

RECORDS AVAILABLE.—April, 1911, to June, 1930.

EXTREMES.—Maximum discharge recorded during year, 216 million gallons a day (334 second-feet) Dec. 7 (gage height, 3.79 feet); minimum, 1.7 million gallons a day (2.6 second-feet) July 14, 15.

1911–1930: Maximum discharge, 485 million gallons a day (750 second-feet) Nov. 21, 1921 (gage height, 4.82 feet); minimum, 0.2 million gallons a day (0.3 second-foot) June 8, 1926.

REMARKS.—Records poor. No diversions.

Discharge, in million gallons a day, 1929–30

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	2.0	2.3					7.0	* 5				
2	2.0	2.3				*13	8.6					
3	2.0	2.4					23		*11			
4	1.9	2.7					10.5			*4.2		*3.1
5	1.9	2.5		* 2.1		*7	8.1					
6			*2.2		*1.9			*2.4			*4.6	
7	1.8	2.5					6.7		*22			
8	1.8					*19	5.7					2.5
9	1.8	*2.2					4.4		*12			2.5
10	2.4			*3.5		*5	3.2					2.5
11		*0.5							*22	*36		
12	2.0					3.9	2.8					2.7
13	1.8			*2.9		3.5	3.0		7.8			4.4
14	1.8					3.2	3.3		5.7		*4.1	3.6
15	1.8				*1.8	2.8	2.4					3.8
16	1.8					2.4	2.2					2.8
17		*2.8										
18	10.1		*2.0	*2.3		24	2.1	*2.1	*4.0	*12		3.6
19	2.5					7.0					*5	3.0
20	2.1				*12	46		*6				2.7
21	2.1					46						2.5
22	2.0					21				10.7		2.4
23	2.0				*7.5							
24	2.0					13	*3.8			12.0		2.4
25	2.3					7.5		*42	*2.4	*10.4		2.5
26	2.1					10	*4.0				*3.7	3.4
27	2.1					11						11.0
28	5.9					7.8				*8		12.0
29		*2.6	*2.1	*2.0	*9		*8.5	*11				
30	4.0					11						15.0
31	3.2					18						7.7
32	2.7					10.5	2.8					6.1
33	2.4				*15	16	2.4		*2.3	*5	*2.5	21
34	2.4					24						21
35	2.4					10.5	*12					

Month	Discharge			Total run-off		
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July.....	10.1	1.8	2.55	3.95	78.9	243
August.....			3.04	4.70	94.1	289
September.....			2.09	3.23	62.8	192
October.....			2.60	4.02	80.6	247
November.....			5.74	8.88	172	528
December.....	46	2.4	13.1	20.3	407	1,260
January.....	23	2.1	6.15	9.52	191	585
February.....			6.83	10.6	191	587
March.....			7.46	11.5	231	710
April.....			13.7	21.2	410	1,260
May.....			4.03	6.24	125	383
June.....	21	2.4	5.43	8.40	163	500
The year.....			6.05	9.36	2,210	6,770

* Estimated mean.

† Partly estimated.

HOGLAWANUI STREAM NEAR HUELO, MAUI

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

DRAINAGE AREA.—Not determined.

RECORDS AVAILABLE.—December, 1910, to June, 1930.

EXTREMES.—Maximum discharge during year, 219 million gallons a day (339 second-feet) Dec. 18 (gage height, 5.00 feet); minimum, 0.4 million gallons a day (0.6 second-foot) Feb. 21.

1910-1930: Maximum discharge, about 550 million gallons a day (851 second-feet) Feb. 1, 1922 (gage height, 8.40 feet); minimum, 0.15 million gallons a day (0.2 second-foot) Oct. 25, 1917.

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

Discharge, in million gallons a day, 1929-30

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1.....				0.6	0.5	20	22	6.8	9.5	3.2	7.4	2.5
2.....		a 1.7		1.5	.5	33	22	5.0	10	15	6.0	3.0
3.....				.8	.6	26	51	2.5	20	5.7	5.2	4.8
4.....			a 1.1	.7	.7	14.8	31	2.1	25	3.2	4.8	7.1
5.....	a 1.5	a 2.5		.7	.6	9.8	20	1.8	22	2.6	6.0	3.7
6.....				.7	.6	8.8	18.5	2.0	49	19.5	8.2	3.0
7.....				.7	.6	47	15.5	2.2	36	65	8.0	2.5
8.....		a 1.7		2.4	.6	11.4	13	1.4	15.5	109	10.9	2.3
9.....				39	.6	8.5	9.6	1.2	14		6.4	2.1
10.....	a 2.2	a 18	a .8	9.5	.6	6.7	7.9	1.0	42		5.2	2.3
11.....				2.6	1.0	5.7	6.5	1.0	43	a 42	4.5	2.3
12.....				2.0	.6	4.8	5.3	.9	18.5		5.1	5.4
13.....	a 1.4	a 2.3		1.9	.5	4.1	7.7	.8	10.5		5.2	4.3
14.....				1.6	.5	3.6	4.1	.7	8.7		7.0	4.2
15.....				1.4	.5	3.2	3.3	.7	9.8		9.9	2.9
16.....	a 14			1.2	.5	41	3.0	.8	5.6		6.7	3.9
17.....				1.0	22	11.8	2.5	.6	4.2		10.7	3.4
18.....		a 1.7	a .7	1.0	16.5	47	9.7	.6	3.4	11.6	7.8	2.6
19.....				1.3	2.8	94	7.0	.5	2.9	21	7.6	2.2
20.....				.7	10.1	64	8.7	.5	2.5	17.8	5.6	2.0
21.....	a 1.9											
22.....		a 2.8		.7	4.0	36	5.4	.8	2.2	17.8	5.1	2.0
23.....				2.4	2.4	20	4.8	63	1.9	14.8	5.3	2.1
24.....			.6	a .6	35	26	7.0	84	1.7	16.2	5.1	4.9
25.....			.6		25	61	3.8	24	1.5	10.6	4.1	18.0
26.....	a 6	a 1.6	a .8	.5	11.8	35	19.5	9.8	1.7	10.2	3.8	18.4
27.....				.5	16.8	38	7.4	25	2.8	8.2	5.5	27
28.....	2.2			.5	9.4	66	5.2	24	3.6	6.8	3.5	11.4
29.....	1.9			.5	48	31	4.4	15.5	2.0	7.3	3.4	8.2
30.....	1.7		.6	.5	23	70	3.5		1.5	6.3	2.9	34
31.....	b 1.7			.5	16.5	70	23		1.3	6.9	2.6	34
				.5		37	15.5		1.1		2.3	

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July.....			2.91	4.50	90.3	277
August.....			2.95	4.56	91.4	281
September.....			.81	1.25	24.4	75
October.....	39		2.49	3.85	77.3	237
November.....	48	0.5	8.43	13.0	253	776
December.....	94	3.2	30.8	47.7	955	2,930
January.....	51	2.5	11.9	18.4	368	1,130
February.....	84	.5	9.97	15.4	279	857
March.....	49	1.1	12.0	18.6	373	1,140
April.....	109	2.6	21.8	33.7	653	2,010
May.....	10.9	2.3	5.86	9.07	182	557
June.....	34	2.0	7.55	11.7	226	695
The year.....	109		9.79	15.1	3,570	11,000

a Estimated mean.

b Estimated.

HONOPOU STREAM NEAR HUELO, MAUI, HAW.

LOCATION.—Water-stage recorder just above Wailoa Ditch crossing, $2\frac{1}{4}$ miles southwest of Kailua, and $2\frac{1}{4}$ miles southwest of Huelo; elevation about 1,250 feet.

DRAINAGE AREA.—1.0 square mile.

RECORDS AVAILABLE.—December, 1910, to June, 1930.

EXTREMES.—Maximum discharge during year, 152 million gallons a day (235 second-feet) Feb. 23 (gage height, 3.12 feet); minimum, 0.6 million gallons a day (0.9 second-foot) July 13, 14, 15.

1910-1930: Maximum discharge, 658 million gallons a day (1,020 second-feet) Feb. 1, 1922 (gage height, 5.50 feet); minimum, 0.15 million gallons a day (0.23 second-foot) July 14, 1920.

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

Discharge, in million gallons a day, 1929-30

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1.....	0.7	0.9	0.9	0.6	0.6	5.1	} ^a 3.5	5.8	5.8	2.9	3.3	1.8
2.....	.7	.9	.9	1.0	.6	5.8		5.1	2.7	2.9	1.9	
3.....	.7	1.0	.8	.7	.6	5.6		5.6	3.1	2.8	2.5	
4.....	.7	1.4	.8	.6	.6	4.4		6.6	2.3	2.5	3.7	
5.....	.6	1.2	.8	.6	.6	3.8		6.5	2.2	2.8	2.0	
6.....	.6	1.4	.8	.5	.6	8.4	} ^a 4.2	12.1	4.7	2.8	1.9	
7.....	.6	1.1	.7	.6	.6	23		11.8	15.7	2.6	1.7	
8.....	.6	1.0	.7	1.2	.6	5.7		7.8	36	3.3	1.7	
9.....	.6	1.0	.7	8.5	.6	4.6		7.7	20	2.5	1.6	
10.....	1.0	5.6	.7	3.1	.6	3.8		14.6	12.3	2.3	1.7	
11.....	.7	7.0	.6	1.5	.9	3.4	} ^a 2.4	16.4	19.0	2.3	1.8	
12.....	.6	1.9	.6	1.2	.7	3.2		9.1	14.3	2.5	3.1	
13.....	.6	1.6	.7	1.2	.6	2.9		6.8	9.8	2.3	2.3	
14.....	.6	1.5	.7	1.1	.6			6.4	7.2	3.3	2.5	
15.....	.7	1.5	.7	1.0	.6			5.8	8.0	3.0	1.8	
16.....	6.6	1.4	.7	1.0	.6		} ^a 5	4.4	8.9	3.4	2.3	
17.....	1.1	1.3	.7	.8	9.5			4.0	7.2	3.9	2.0	
18.....	.7	1.3	.6	.7	4.0			3.5	5.2	3.7	1.7	
19.....	.7	1.2	.6	1.0	1.3			3.3	10.4	3.8	1.6	
20.....	.7	1.3	.6	.7	7.0			3.0	7.5	3.0	1.5	
21.....	.7	1.6	.6	.7	2.0		} ^a 2.8	2.7	7.8	2.9	1.6	
22.....	.8	1.3	.6	.7	1.5			2.5	7.2	3.0	1.7	
23.....	.7	1.2	.6	.7	15.0			2.3	7.1	2.6	2.4	
24.....	.6	1.2	.6	.7	5.8			2.2	5.2	2.3	8.2	
25.....	2.7	1.3	.6	.7	5.4			2.4	5.1	2.3	6.8	
26.....	1.8	1.2	.7	.7	4.2		} ^a 7.5	3.3	4.1	2.9	10.4	
27.....	1.4	1.2	.7	.7	11.7			2.7	3.8	2.2	5.2	
28.....	1.2	1.1	.9	.7	17.8			2.2	3.8	2.1	4.4	
29.....	1.1	1.1	.9	.6	8.2			2.0	3.5	1.8	14.4	
30.....	1.0	1.0	.7	.6	6.2			1.9	3.9	1.7	15.3	
31.....	1.0	.9		.6				1.7		1.6		

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acro-feet
	Maximum	Minimum	Mean			
July.....	6.6	0.6	1.06	1.64	32.8	101
August.....	7.0	.9	1.57	2.43	48.6	149
September.....	.9	.6	.71	1.10	21.2	65
October.....	8.5	.5	1.13	1.75	35.0	108
November.....	17.8	.6	3.65	5.65	110	336
December.....			10.6	16.4	328	1,010
January.....			4.69	7.25	145	446
February.....			3.72	5.76	104	320
March.....	16.4	1.7	5.55	8.59	172	528
April.....	36	2.2	8.36	12.9	251	770
May.....	3.9	1.6	2.72	4.21	84.4	259
June.....	15.3	1.5	3.72	5.76	112	342
The year.....			3.95	6.11	1,440	4,430

^a Estimated mean.

^b Partly estimated.

WAILOA DITCH AT HONOPOU, NEAR HUELO, MAUI

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

RECORDS AVAILABLE.—November, 1922, to June, 1930.

EXTREMES.—Undetermined, owing to missing record.

1922-1928: Maximum discharge, 171 million gallons a day (265 second-feet) Apr. 6, 7, 1928 (gage height, 5.72 feet); minimum, 12.2 million gallons a day (18.9 second-feet) Jan. 13, 1927.

REMARKS.—Records fair. Discharges for Dec. 7 to Jan. 27 and Feb. 7 to June 30 estimated from a comparison with those taken from an average of twice daily readings of staff gage. 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 a day, 1929-30

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1.....	64	78	57	76	40	159	170	162	170	168	170	140
2.....	67	74	60	149	40	161	170	142	170	174	170	160
3.....	51	86	57	83	40	168	174	126	174	170	168	170
4.....	48	158	51	64	53	112	174	114	174	166	168	172
5.....	45	158	48	54	40	92	170	107	170	164	170	165
6.....	42	150	48	54	38	91	170	108	176	176	170	160
7.....	45	138	46	57	38	150	145	126	176	176	170	150
8.....	45	121	62	148	38	75	110	90	160	176	172	138
9.....	42	128	70	166	37	59	90	86	170	176	170	130
10.....	73	150	48	162	37	50	80	78	174	176	166	160
11.....	100	166	54	138	42	45	78	74	174	176	162	158
12.....	51	158	48	107	38	41	68	70	170	176	170	172
13.....	45	128	45	99	36	44	116	67	133	176	162	168
14.....	42	111	42	88	36	46	76	63	112	174	170	168
15.....	56	107	40	74	36	44	62	61	149	170	170	150
16.....	166	96	40	71	34	130	57	61	115	172	170	170
17.....	133	125	38	64	103	170	76	72	96	172	170	170
18.....	81	92	38	60	170	172	124	72	85	170	170	150
19.....	67	88	37	72	157	176	145	60	124	176	170	135
20.....	64	88	36	60	148	176	170	56	153	174	170	120
21.....	99	154	36	57	143	174	140	60	140	174	170	130
22.....	142	130	36	54	99	170	120	176	130	172	170	136
23.....	92	94	34	51	142	170	156	176	120	174	170	170
24.....	126	96	36	60	174	176	130	174	110	172	164	168
25.....	a 170	81	34	57	158	174	172	170	135	172	156	176
26.....	a 164	74	118	48	170	174	165	174	160	170	168	176
27.....	b 158	71	136	48	151	176	142	174	170	170	162	175
28.....	120	64	154	45	174	172	130	170	160	170	158	170
29.....	96	60	138	42	152	176	118	-----	136	170	140	176
30.....	88	60	80	42	146	176	160	-----	120	170	130	176
31.....	88	71	-----	40	-----	174	174	-----	105	-----	120	-----

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July.....	-----	42	86.1	133	2,670	8,190
August.....	166	60	108	167	3,860	10,300
September.....	154	34	58.9	91.1	1,770	5,420
October.....	166	40	77.1	119	2,390	7,530
November.....	174	34	90.3	140	2,710	8,310
December.....	176	41	131	203	4,070	12,560
January.....	174	57	130	201	4,030	12,400
February.....	176	56	110	170	3,070	9,450
March.....	176	85	146	226	4,510	13,000
April.....	176	164	172	266	5,170	15,800
May.....	172	120	164	254	5,090	15,600
June.....	176	120	159	246	4,760	14,600
The year.....	176	34	119	184	43,600	134,000

a Estimated.

b Partly estimated.

NEW HAMAKUA DITCH AT HONOPOU, NEAR HUELO, MAUI

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

RECORDS AVAILABLE.—January, 1918, to June, 1930.

EXTREMES.—Maximum discharge during year, 104 million gallons a day (161 second-foot) Dec. 7 (gage height, 5.06 feet); minimum, 0.1 million gallons a day (0.2 second-foot) Nov. 5-10, and 13-16.

1918-1930: Maximum discharge, 134 million gallons a day (207 second-foot) Aug. 5, 1926 (gage height, 5.98 feet); minimum, 0.07 million gallons a day (0.11 second-foot) Aug. 7, 1923.

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

Discharge, in million gallons a day, 1929-30

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1.....	0.5	2.8	0.5	0.5	0.1	30	49	9.4	66		58	8.0
2.....	.5	.8		32	.1	43	36	3.2	66		56	17.5
3.....	.4	29	.4	1.0	.1	44	75	1.2	74	• 16	32	43
4.....	.4	47	.4	.6	.1	7.2	70	.9	74		24	64
5.....	.4	32	.3	.4	.1	5.9	55	.8	72		52	23
6.....	.3	22	.3	.3	.1	6.5	53	1.4	83		69	56
7.....	.4	10.5	.3	.3	.1	57	43	1.7	77		80	53
8.....	.3	1.5	.3	41	.1	12.5	• 16	.7	28		83	61
9.....	.3	5.2	.3	79	.1	8.7		.6	45		80	38
10.....	10.3	47	.2	61	.1	7.0		.6	69		74	19.1
11.....	10.1	66	.3	6.5	.1	5.1	3.7	.5	77		80	10.5
12.....	.4	15.7	.3	1.2	.1	1.9	2.6	.5	34		77	34
13.....	.4	1.9	.3	1.0	.1	1.4	8.9	.5			74	30
14.....	.3	1.6	.3	.9	.1	1.2	4.1	.4	• 11		61	47
15.....	.3	1.4	.2	.7	.1	1.0	2.4	.4			57	57
16.....	72	1.3	.2	.4	.1	46	2.4	.4			74	34
17.....	13.2	2.5	.2	.3	38	39	4.0				72	64
18.....	1.5	1.2	.2	.2	75	60	32	.4	• 2.2		47	61
19.....	1.2	1.1	.2	.4	29	81	39	.3			71	60
20.....	1.0	1.0	.2	.3	33	75	62	.2			74	36
21.....	.9	17.3	.2	.2	4.5	51	12.2	.5			74	32
22.....	22	2.9	.2	.2	2.1	25	9.8	82			74	42
23.....	1.5	1.2	.2	.1	53	33	34	89	• .7		74	42
24.....	8.1	1.0	.3	.1	75	75	2.9	74			64	14.9
25.....	50	1.1	.2	.1	31	70	62	54			66	11.0
26.....	37	1.0	.6	.1	68	62	30	76			50	46
27.....	34	.8	2.8	.1	14.8	75	6.4	74	• 3.8		32	9.9
28.....	2.2	.7	23	.1	86	62	2.2	72			51	11.7
29.....	2.3	.6	29	.1	37	75	1.8				32	3.2
30.....	4.0	.5	.7	.1	25	78	39				55	1.0
31.....	4.3	.5		.1		73	34		• .7			.8

Month	Discharge				Total run-off	
	Million gallons a day			Second-foot (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July.....	72	0.3	9.05	14.0	280	861
August.....	66	.5	10.3	15.9	319	980
September.....	29	.2	2.10	8.25	63.0	193
October.....	79	.1	7.40	11.4	229	704
November.....	86	.1	19.1	29.6	573	1,760
December.....	81	1.0	39.1	60.5	1,210	3,720
January.....	75	1.8	24.9	38.5	773	2,370
February.....	89	.2	19.5	30.2	546	1,680
March.....	83	-----	26.7	41.3	828	2,540
April.....	83	-----	57.5	89.0	1,720	5,290
May.....	64	.8	35.4	54.8	1,100	3,370
June.....	82	.7	32.8	50.7	986	3,020
The year.....	89	.1	23.6	36.5	8,630	26,500

• Estimated mean.

SURFACE WATER SUPPLY OF HAWAII, 1929-30

LOWRIE DITCH AT HONOPOU GULCH, NEAR HUELO, MAUI

LOCATION.—Water-stage recorder a quarter of a mile below siphon across Honopou Stream and $1\frac{1}{2}$ miles northwest of Kailua.

RECORDS AVAILABLE.—February to June, 1930.

EXTREMES.—Maximum discharge during period, 68 million gallons a day (105 second-feet) Feb. 23 (gage height, 4.82 feet); minimum, 5 million gallons a day (7.7 second-feet) Feb. 25.

REMARKS.—Records good. Lowrie Ditch diverts water at elevation of 500 feet from all streams between Kailua and Halehaku Streams. Regulated by gates. Station established Feb. 15, 1930.

Discharge, in million gallons a day, 1929-30

Day	Feb.	Mar.	Apr.	May	June	Day	Feb.	Mar.	Apr.	May	June
1.		59	28	45	13	16.	8.6	45	57	27	40
2.		59	48	42	} 38	17.	8.6	37	50	50	35
3.		56	42	32		18.	9.8	28	45	48	13.5
4.		59	28	28		19.	14.5	22	50	50	12
5.		59	19	40	25	20.	9.2	18.5	50	32	11
6.		48	50	40	27	21.	10.5	16.5	53	42	12
7.		56	59	40	18	22.	59	16.5	50	42	13.5
8.		50	61	48	13.5	23.	61	16.5	53	42	45
9.		50	56	35	10.5	24.	31	15.5	50	19.5	59
10.		59	53	22	12	25.	27	17.5	48	13.5	59
11.		56	59	28	13.5	26.	61	21	45	39	61
12.		50	56	30	56	27.	61	42	35	12.5	59
13.		50	53	23	45	28.	59	28	42	16.5	50
14.		40	50	36	36	29.		13.5	35	12	61
15.	9.2	50	50	45	17.5	30.		12	42	11	61
						31.		11		10.5	

Month	Discharge			Total run-off	
	Million gallons a day			Million gallons	Acre-feet
	Maximum	Minimum	Mean		
February (14 days).....	61	8.6	30.7	47.5	1,330
March.....	59	11	37.5	58.0	3,570
April.....	61	19	47.2	73.0	4,350
May.....	50	10.5	32.3	50.0	3,070
June.....	61	10.5	33.1	51.2	3,050
The period (136 days).....	61	8.6	36.8	56.9	15,400

° Estimated mean.

° Estimated.

° Partly estimated.

HAIKU DITCH AT KAPALALAEA GULCH, NEAR HUELO, MAUI

LOCATION.—Water-stage recorder in open section of ditch just below tunnel between Honopou and Kapalalaea Gulches, 1½ miles northwest of Kailua.

RECORDS AVAILABLE.—February to June, 1930.

EXTREMES.—Maximum discharge during period, 83 million gallons a day (128 second-feet) Apr. 8 (gage height, 5.52 feet); minimum, 0.8 million gallons a day (1.2 second-feet) Feb. 20, 21.

REMARKS.—Records good. Haiku Ditch diverts water at elevation of 250 feet from all streams between Kailua Stream and Maliko Gulch. Regulated by gates. Station established Feb. 19, 1930.

Discharge, in million gallons a day, 1929-30

Day	Feb.	Mar.	Apr.	May	June	Day	Feb.	Mar.	Apr.	May	June
1.....		50	19.5	4.5	1.4	16.....		5.3	78	5.5	28
2.....		71	55	22	1.5	17.....		3.7	72	48	4.4
3.....		72	26	5.3	16	18.....		2.9	32	22	1.6
4.....		72	4.2	3.6	46	19.....	1.0	2.7	59	42	1.4
5.....		65	5.0	38	2.7	20.....	.9	2.3	66	3.6	1.3
6.....		72	67	26	2.0	21.....	1.2	2.1	74	9.2	1.4
7.....		72	79	31	1.3	22.....	66	1.9	76	14	1.5
8.....		38	79	43	1.1	23.....	74	1.8	74	17.5	25
9.....		27	79	4.3	1.0	24.....	74	1.7	49	1.3	63
10.....		63	76	1.9	1.1	25.....	70	1.9	52	1.1	68
11.....		67	79	2.2	1.3	26.....	76	2.7	18.5	22	74
12.....		41	79	14	38	27.....	72	25	5.9	9.5	48
13.....		9.3	79	7.6	15.5	28.....	72	4.0	11	1.4	6.7
14.....		7.3	62	14.5	7.3	29.....		1.8	5.2	1.1	78
15.....		25	22	40	1.8	30.....		1.7	32	1.1	79
						31.....		1.5		1.2	

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
February (10 days).....	76	0.9	50.7	78.4	507	1,530
March.....	72	1.5	28.3	40.7	815	2,500
April.....	79	4.2	50.5	78.1	1,520	4,650
May.....	48	1.1	14.8	22.9	458	1,410
June.....	79	1.0	20.6	31.9	619	1,900
The period (132 days).....	79	.9	29.7	46.0	3,920	12,000

MISCELLANEOUS MEASUREMENTS

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

Miscellaneous discharge measurements on Maui, 1929-30

Date	Stream	Locality	Second-feet	Million gallons a day
July 16	Honokahau Ditch.....	Napili.....	93.3	60.3
16	do.....	do.....	91.9	59.4
Nov. 8	do.....	Mahinahina.....	9.66	6.20
8	do.....	do.....	10.2	6.59
8	do.....	do.....	10.3	6.66
8	do.....	do.....	26.1	16.9
Feb. 19	Diversion of Spreckels Ditch.	East Maui Irrigation Co.'s penstock ditch at Puohokamoa power plant.	6.10	3.94

ISLAND OF HAWAII

WAILUKU RIVER AT PUKAMAUI, NEAR HILO, HAWAII

LOCATION.—Water-stage recorder at Pukamaui, three-quarters of a mile above Hilo Boarding School Ditch intake and 4 miles west of Hilo.

DRAINAGE AREA.—97.2 square miles.

RECORDS AVAILABLE.—April, 1923, to June, 1928; July, 1929, to June, 1930.

EXTREMES.—Maximum discharge during period, 2,300 million gallons a day (3,560 second-feet) Nov. 18 (gage height, 10.50 feet); no flow several times during year.

1923-1928, 1929-1930: Maximum discharge, 2,480 million gallons a day (3,840 second-feet) June 30, 1928 (gage height, 14.50 feet); no flow when Hilo waterworks takes all the water.

REMARKS.—Records good for ordinary stages, except those estimated, which are poor. High-stage records poor. Hilo waterworks diverts water for domestic use from pool at control. Regulated by this diversion.

Discharge, in million gallons a day, 1929-30

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1		2.3	6.3	0	0.05	12.5	36	2.1	46	1.7	286	* 22
2		1.5	6.7	0	0	9.3	25	1.5	110	1.1	73	* 24
3		1.5	4.0	1.4	0	7.4	31	1.3	132	.3	78	134
4		5.0	3.2	.9	10	6.5	23	1.1	73	.1	50	208
5		5.6	2.6	.4	4.2	5.8	19	.5	84	0	236	102
6		7.1	2.1	.2	1.7	5.4	15	.7	105	1.2	272	63
7		4.8	2.3	.1	.7	5.6	12	.7	63	.44	171	46
8		2.8	3.4	.1	.3	4.8	9.8	.5	46	.83	84	38
9		2.1	2.4	.3	.1	3.4	9.0	.5	43	* 398	96	27
10		53	1.9	6.9	0	1.3	8.6	.2	29	* 130	58	21
11		46	1.3	4.8	0	1.0	6.9	0	19.5	* 130	44	17.5
12		13	1.0	2.3	0	3.0	6.5	.1	12.5	* 283	34	45
13		8.8	.8	1.3	0	1.5	6.1	.6	11	* 283	33	46
14		6.8	.5	.9	0	2.1	5.4	5.0	115	* 73	63	23
15		7.4	.4	.4	0	1.7	5.0	4.4	210		46	19
16		8.4	.2	.2	0	1.4	4.6	1.6	96		32	15
17		21	0	.1	.7	3.2	4.0	.7	63		28	12.5
18		7.4	.5	0	510	28	4.2	.2	39		54	11.5
19		8.9	.7	0	* 78	65	3.6	0	50		23	10.5
20		12.5	0	0	28	50	3.8	0	50		20	9.5
21		10.5	0	2.7	10.5	18	7.6	0	50		33	9.3
22		12	0	5.0	12	17	6.5	0	29		54	9.3
23		7.2	0	1.0	10.5	30	8.6	0	20		84	29
24		6.3	0	0	56	16	5.6	0	14.5		46	182
25		5.0	0	0	81	11	6.1	0	10.5		37	117
26		4.4	.4	0	277	7.4	5.6	4.4	7.8		30	68
27		3.8	1.3	0	63	15	4.4	90	6.1		24	* 50
28	4.6	3.2	1.4	0	37	16	3.8	282	4.8		33	54
29	3.6	2.8	1.5	.2	24	32	3.2		4.2		44	10.5
30	3.0	2.8	1.1	.8	17	267	2.6		3.0		142	11
31	2.6	3.8		.8		69	2.4		2.1		* 12	

Month	Million gallons a day			Second-feet (mean)	Total run-off	
	Maximum	Minimum	Mean		Million gallons	Acre-feet
July 28-31	4.6	2.6	3.45	5.34	13.8	42
August	53	1.5	9.28	14.4	288	883
September	6.7	0	1.53	2.37	46.0	141
October	6.9	0	.99	1.53	30.8	94
November	510	0	40.9	63.3	1,230	3,770
December	267	1.0	23.1	35.7	717	2,200
January	36	2.4	9.51	14.7	295	905
February	282	0	14.2	22.0	398	1,220
March	210	2.1	50.0	77.4	1,550	4,760
April		0	73.7	123	2,360	7,340
May	286	10.5	66.7	103	2,070	6,350
June	405	9.3	69.3	107	2,080	6,380
The period (388 days)	510	0	32.9	50.9	11,100	34,100

* Estimated.

* Partly estimated.

* Estimated mean.

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

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

DRAINAGE AREA.—124.5 square miles.

RECORDS AVAILABLE.—July, 1928, to June, 1930.

EXTREMES.—Maximum discharge during year, 8,140 million gallons a day (12,600 second-feet) Nov. 18 (gauge height, 15.07 feet); minimum, 2.8 million gallons a day (4.3 second-feet) Nov. 17.

1928-1930: Maximum discharge, 18,500 million gallons a day (20,900 second-feet) Feb. 15, 1929 (gauge height, 17.50 feet); minimum, that of Nov. 17, 1929.

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

Discharge, in million gallons a day, 1929-30

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	7.3	16.0	35	6.6	6.2	43	152	9.6	154		1,100	79
2	11.8	14.4	30	6.5	5.0	32	100	9.0	388	13.9	300	79
3	8.0	14.7	18.5	10.8	4.2	26	100	8.4	518	11.6	316	538
4	6.0	34	14.9	8.2	53	23	74	7.5	265	10.6	172	1,080
5	5.4	36	12.2	6.6	18.5	20	60	7.0	345	10.0	1,070	454
6	5.2	34	11.2	6.2	10.2	18.5	48	6.3	448	12.4	1,170	243
7	4.5	26	13.7	5.7	7.8	26	38	6.8	206	158	658	175
8	4.2	17.0	21	5.7	6.6	18.5	34	6.0	154	619	365	142
9	7.6	14.2	15.7	6.3	6.0	14.9	30	6.0	152	1,690	376	100
10	98	263	12.5	35	5.2	12.0	28	5.2	105	471	197	73
11	58	136	10.2	19.1	4.3	13.1	23	4.8	78	371	152	63
12	19.2	43	9.2	10.9	3.6	22	22	4.7	57	1,330	114	150
13	13.0	28	8.8	8.2	3.3	13.2	20	5.9	60	1,170	105	162
14	10.8	26	7.8	7.5	3.0	12.0	17.0	12.0	964	710	184	92
15	9.8	32	7.3	6.5	3.0	10.8	15.7	10.4	704	329	142	76
16	382	27	6.8	5.6	3.1	10.2	14.9	6.5	401	183	100	60
17	138	84	7.6	5.8	5.6	22	13.9	4.8	221	142	98	54
18	43	34	26	5.2	2,140	135	14.3	4.4	123	105	168	48
19	28	38	11.0	4.8	270	184	13.4	4.3	162	82	194	40
20	21	51	8.4	4.4	118	156	14.2	4.5	162	73	142	38
21	49	46	7.0	16.4	73	59	23	4.0	139	100	118	34
22	30	48	6.3	35	48	69	17.8	4.0	88	204	118	96
23	36	30	6.3	10.0	37	94	28	4.2	66	324	114	115
24	30	26	5.7	6.5	159	54	15.7	5.1	51	162	82	813
25	23	22	5.7	5.7	253	36	17.4	4.3	40	128	66	208
26	24	18.5	7.3	5.4	1,090	28	18.5	19.0	32	100	60	265
27	31	16.5	9.6	4.5	216	68	14.7	1,000	26	84	48	185
28	23	14.9	11.0	4.2	128	49	13.0	643	23	110	43	210
29	18.5	13.7	12.5	14.6	80	115	11.4	22	22	142	38	2,090
30	16.7	13.4	9.4	9.6	57	1,310	10.0	18.5	921	40	1,050	
31	15.7	16.8		8.6		321	9.8	16.2			44	

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July	382	4.2	38.0	58.8	1,180	3,620
August	263	13.4	39.8	61.0	1,230	3,790
September	35	5.7	12.3	19.0	308	1,130
October	35	4.2	9.55	14.8	256	908
November	2,140	3.0	161	249	4,820	14,800
December	1,310	10.2	98.9	153	3,070	9,410
January	152	9.8	32.6	50.4	1,010	3,100
February	1,090	4.0	68.1	105	1,910	5,880
March	964	16.2	199	308	6,180	18,900
April	1,690	10.0	326	504	9,780	30,000
May	1,170	33	254	393	7,890	24,200
June	2,090	34	294	455	8,810	27,100
The year	2,140	3.0	128	198	46,500	143,000

SURFACE WATER SUPPLY OF HAWAII, 1929-30

KAPEHU STREAM AT PIIHONUA, NEAR HILO, HAWAII

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, 1930.

EXTREMES.—Maximum discharge during year, 2,710 million gallons a day (4.190 second-feet) Mar. 14 (gage height, 15.28 feet); minimum, 2.2 million gallons a day (3.4 second-feet) Feb. 21, 25, 26.

1928-1930: Maximum discharge, that of Mar. 14, 1930; minimum, that of Feb. 21, 25, 26, 1930.

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

Discharge, in million gallons a day, 1929-30

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1.....	5.5	6.4	10.2	3.8	*3.4	16.3	45	5.8	11.2	13.2	178	36
2.....	6.1	6.1	9.8	4.0		14.2	36	5.4	76	14.2	59	34
3.....	5.1	6.1	9.8	5.2		13.2	34	5.1	51	12.5	76	124
4.....	4.6	11.2	7.9	4.8	*14	12.2	27	5.2	45	11.5	45	252
5.....	4.4	11.2	6.4	3.8		11.2	23	4.4	62	11.2	166	104
6.....	4.3	10.5	6.2	4.1		11.2	19.6	4.2	84	13.2	196	67
7.....	4.3	7.9	7.4	4.5	*4.7	15.1	16.9	4.3	45	64	109	55
8.....	4.0	6.6	6.9	4.9		10.8	16.6	4.2	84	196	74	45
9.....	6.8	5.8	7.2	4.5		10.5	16.3	3.8	34	329	84	36
10.....	40	47	6.4	14.0	*4.7	10.0	15.1	3.7	27	106	51	29
11.....	16.8	21	5.9	7.2		10.0	13.8	3.6	21	108	45	27
12.....	6.4	11.0	5.5	4.6		10.8	13.0	3.5	19.6	311	36	45
13.....	6.2	9.3	5.4	4.3	3.8	8.6	12.2	3.8	19.6	268	39	51
14.....	6.2	3.6	5.1	4.1		7.7	11.5	4.2	298	175	54	32
15.....	6.2	10.0	5.2	3.6		7.2	11.0	3.3	185	80	42	29
16.....	61	11.1	5.0	3.3	3.8	7.2	10.5	3.0	94	55	34	25
17.....	22	21	4.9	3.4	3.8	10.0	9.8	3.0	67	42	34	28
18.....	10.2	9.5	9.4	3.1	203	42	10.2	2.9	48	36	56	24
19.....	8.1	10.5	5.8	3.0	40	39	9.5	2.8	55	32	63	19.6
20.....	7.4	11.2	5.2	3.0	16.9	48	10.5	2.7	51	29	45	18.2
21.....	12.5	13.1	4.8	15.8	13.2	23	12.2	2.6	39	32	42	17.5
22.....	9.0	12.2	4.4	16.5	11.2	23	9.5	2.5	34	50	42	16.9
23.....	10.9	9.5	4.5	5.4	10.0	23	14.5	2.5	29	82	39	47
24.....	10.0	9.0	4.4	4.4	28	17.8	9.0	3.7	25	48	32	210
25.....	7.9	7.9	4.5	4.1	16.6	15.1	10.8	2.3	22	39	27	101
26.....	7.2	7.7	5.5	4.0	189	13.0	10.2	12.7	21	34	27	67
27.....	8.8	7.9	5.9	4.0	42	29	7.7	177	18.9	32	24	51
28.....	7.4	8.8	6.1	4.2	29	17.5	6.9	112	16.9	36	24	80
29.....	6.9	8.4	5.4	7.9	23	39	6.2	-----	15.4	42	21	407
30.....	6.4	8.4	4.6	4.9	18.6	332	5.6	-----	14.8	192	25	183
31.....	6.4	9.3	-----	4.8	-----	86	5.8	-----	13.8	-----	24	-----

Month	Discharge			Total run-off		
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July.....	61	4.0	10.6	16.4	329	1,010
August.....	47	5.8	11.1	17.2	344	1,060
September.....	10.2	4.4	6.17	9.55	185	568
October.....	16.5	3.0	5.44	8.42	169	518
November.....	203	-----	24.4	37.8	732	2,250
December.....	332	7.2	30.1	46.6	934	2,860
January.....	45	5.6	14.8	22.9	460	1,410
February.....	177	2.3	14.1	21.8	394	1,210
March.....	298	11.2	51.8	80.1	1,610	4,930
April.....	329	11.2	83.3	129	2,500	7,670
May.....	196	21	58.5	90.5	1,810	5,570
June.....	407	16.9	75.2	116	2,260	6,920
The year.....	407	-----	32.1	49.7	11,700	36,000

* Estimated mean.

KONOLII STREAM NEAR HILO, HAWAII

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

DRAINAGE AREA.—8.3 square miles.

RECORDS AVAILABLE.—February, 1924, to June, 1930.

EXTREMES.—Maximum discharge during year, 1,800 million gallons a day (2,790 second-feet) Mar. 14 (gage height, 12.29 feet); minimum, 0.5 million gallons a day (0.8 second-foot) Oct. 21.

1924-1930: Maximum discharge, 3,060 million gallons a day (4,730 second-feet) Nov. 21, 1924 (gage height, 16.5 feet; estimated from flood marks), minimum, 0.1 million gallons a day (0.2 second-foot) Feb. 9, Apr. 14, 1926.

REMARKS.—Records good for ordinary stages except those estimated, which are poor; poor for high stages. No diversions above station.

Discharge, in million gallons a day, 1929-30

Day *	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1.....	1.4	3.7	* 5.7	1.3	1.3	5.4	17.0	2.2	61	2.7	* 100	14.2
2.....	3.7	3.4		1.2	1.0	4.3	11.2	1.8	184	4.1		20
3.....	2.3	3.0		2.3	1.0	3.5	15.1	1.4	175	3.7		167
4.....	1.6	9.3		1.8	12.0	3.0	11.2	1.3	79	3.4		276
5.....	1.2	14.2		1.3	5.4	2.8	9.5	1.1	140	3.3		57
6.....	1.0	16.0	* 1.8	1.2	3.0	3.2	9.0	1.0	175	6.1	225	34
7.....	.9	12.3		1.1	2.0	7.6	7.1	.9	72	112	84	18.0
8.....	.8	8.1		1.1	1.6	4.1	6.3	.9	42	203	31	12.0
9.....	.8	5.6		1.3	1.2	3.2	5.4	.9	31	321	53	8.1
10.....	42	186		9.7	1.0	2.8	4.5	.8	18.5	114	20	6.3
11.....	25	58	* .8	6.6	.9	3.4	4.1	.7	13.5	93	16.0	5.4
12.....	6.3	13.5		3.4	.8	3.5	3.7	.6	13.1	822	12.0	33
13.....	4.1	8.4		2.2	.6	2.8	3.4	.6	16.0	210	16.2	33
14.....	3.4	6.6		1.9	.6	2.3	2.8	.9	188	109	42	10.6
15.....	3.0	7.1		1.6	.6	2.0	2.7	1.2	202	46	44	8.4
16.....	139	6.2	* 1.9	1.2	.6	1.9	2.5	.9	96	20	15.0	6.6
17.....	42	18.5		1.1	4.3	9.6	2.2	.8	59	14.2	13.1	5.8
18.....	9.8	7.9		1.0	470	54	2.7	.8	21	11.2	38	5.8
19.....	6.1	8.4		.8	51	67	3.2	.6	27	9.5	41	5.2
20.....	4.5	13.5		.7	12.3	72	2.8		28	9.0	22	5.0
21.....	11.9	15.6	* 10	1.8	9.8	14.6	3.0		21	26	18.0	4.5
22.....	8.9			1.2	7.1	19.7	3.0	* .6	12.3	62	21	6.3
23.....	18.5			1.0	1.2	5.6	14.6		9.2	115	25	44
24.....	11.2			.9	.8	53	8.4		7.1	42	11.2	209
25.....	7.4			.6	78	6.8	2.3		5.8	28	8.4	80
26.....	6.6		* 4.2	1.1	.6	227	5.4	* 13.9	5.0	22	7.4	42
27.....	9.0			1.7	.6	31	61	2.7	464	4.5	13.9	5.8
28.....	6.8			2.3	.7	13.5	25	2.2	275	4.3	27	4.8
29.....	5.4			2.2	2.8	9.2	27	1.8		4.5	42	4.1
30.....	4.1			1.8	2.0	7.4	333	1.4		3.7	163	5.0
31.....	3.9			1.7			68	1.6		3.2		5.6

Month	Discharge			Total run-off	
	Million gallons a day			Million gallons	Acre-feet
	Maximum	Minimum	Mean		
July.....	139	0.8	12.7	19.6	1,210
August.....	186		15.6	24.1	1,480
September.....			1.97	3.05	181
October.....	9.7	.6	1.88	2.91	179
November.....	470	.6	33.8	52.3	3,110
December.....	333	1.9	27.2	42.1	2,590
January.....	17.0	1.4	4.97	7.69	473
February.....	464		27.7	42.9	2,380
March.....	202	3.2	55.5	85.9	5,280
April.....	322	2.7	71.9	111	6,620
May.....		4.1	45.2	69.9	4,300
June.....	440	4.5	59.7	92.4	5,500
The year.....	470		29.7	46.0	33,300

* Estimated mean.

° Partly estimated.

AWINI DITCH AT EAST HONOKAHEIKI GULCH, NEAR NIULII, HAWAII

LOCATION.—Water-stage recorder on Awini Ditch at flume across East Honokaheiki Gulch, $4\frac{1}{2}$ miles southeast of Niulii.

RECORDS AVAILABLE.—October, 1927, to June, 1930.

EXTREMES.—Maximum discharge during year, 30 million gallons a day (46 second-feet) Nov. 26 (gage height, 3.39 feet); no flow several days in September, October, and November.

1927-1930: Maximum discharge, 32 million gallons a day (50 second-feet) Dec. 28, 1927, Sept. 10, 1928 (gage height, 3.51 feet); no flow several days in September, October, and November, 1929.

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

Discharge, in million gallons a day, 1929-30

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	13.0	4.1	2.4	0	0	20	19.5	7.3	16.5	11	20	21
2	12.5	2.6	2.1	0	0	21	19	6.5	23	13.5	17.5	19.5
3	7.1	2.2	1.8	0	0	20	19.5	6.2	21	17	17.5	19.5
4	5.3	1.8	1.7	0	0	19	19	5.9	20	20	17	23
5	4.4	1.8	1.6	0	0	17	15	5.3	21	22	22	19.5
6	3.4	1.7	1.6	0	0	16.5	14	14.5	21	22	23	19
7	2.9	2.9	1.4	0	0	21	13	17	19	23	19	16.5
8	2.7	5.3	.9	0	0	17	15	16	18	22	18	17
9	2.5	5.8	.6	0	0	13	13.5	14.5	17.5	21	18	13.5
10	4.0	5.8	.3	.6	0	11	15	9.2	16	19.5	16.5	11.5
11	9.0	5.8	.16	.12	0	9.7	21	6.5	19.5	19.5	14.5	11
12	7.1	5.8	.12	0	0	8.0	15	5.4	18	18.5	14.5	22
13	5.5	5.3	.11	0	0	7.5	21	4.8	15	19	19.5	20
14	4.8	5.0	.08	0	0	6.4	18	6.8	14.5	17.5	21	19
15	6.0	4.8	.04	0	0	5.9	14.5	8.1	22	17	19.5	19.5
16	16.8	4.3	0	0	0	13	12	8.0	19	16	17	18
17	16.0	3.8	.70	0	0	19.5	11.5	5.9	15	16	17.5	16
18	8.5	3.4	1.2	0	12.5	21	11	7.9	13	16	23	15
19	5.8	3.0	.03	0	12.5	21	14.5	6.5	11.5	16	21	12
20	4.5	2.6	0	0	22	19	17.5	5.1	11.5	19	19	11.5
21	5.3	2.4	0	0	13.5	15.5	14.5	5.5	10.5	19	20	10
22	6.2	2.5	0	0	9.7	13.5	11.5	21	9.4	18	17	9.7
23	7.1	2.4	0	0	16	12	9.7	20	9.2	18	14.5	16
24	11.0	2.1	0	0	20	18	8.6	18	8.0	17.5	13.5	19
25	22	3.3	0	0	14.5	18	19.5	17.5	7.5	16	13	19
26	20	* 12.0	0	0	20	17.5	15	20	12	16	12	19
27	19.5	* 3.6	0	0	17.5	22	13.5	24	22	16	19	19
28	17.5	* 2.9	0	0	18	20	11	17	18	17	19.5	18
29	14.2	* 2.8	0	0	21	20	8.6	-----	14.5	17.5	18	24
30	10.8	* 3.0	0	0	22	21	8.0	-----	13	22	17	24
31	7.1	* 3.3	0	0	-----	20	7.5	-----	11.5	-----	16	-----

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July	22	2.5	9.11	14.1	282	867
August	12.0	1.7	3.81	5.89	118	362
September	2.4	0	.561	.868	16.8	52
October	.6	0	.023	.036	.72	2
November	22	0	7.31	11.3	219	673
December	22	5.9	16.3	25.2	504	1,550
January	21	7.5	14.4	22.3	446	1,370
February	24	4.8	11.1	17.2	310	954
March	23	7.5	15.7	24.3	488	1,490
April	23	11	18.1	28.0	542	1,670
May	23	12	17.9	27.7	554	1,760
June	24	9.7	17.4	26.9	522	1,600
The year	24	0	11.0	17.0	4,000	12,300

* Partly estimated.

† Estimated.

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

LOCATION.—Water-stage recorder on intake tunnel delivering water from East Honokaneiki Gulch to Awini Ditch on west side of the gulch, $4\frac{1}{2}$ miles south-east of Niulii.

RECORDS AVAILABLE.—October, 1927, to June, 1930.

EXTREMES.—Maximum discharge during year, 10.8 million gallons a day (16.7 second-feet) Mar. 27, Apr. 2 (gage height, 1.35 feet); no flow several days during September, October, and November, when gulch was dry.

1927-1930: Maximum discharge, that of Mar. 27 and Apr. 2, 1930; no flow several days during September, October, and November, 1929.

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

Discharge, in million gallons a day, 1929-30

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	2.1	0.15	0.31	0	0	7.1	1.8	1.3	1.5	5.5	3.5	4.5
2	.83	.13	.4	0	0	8.1	1.6	.77	1.4	8.0	3.3	4.0
3	.87	.13	.4	0	0	6.1	1.6	.51	1.9	5.1	3.1	3.5
4	.31	.13	.31	0	0	4.2	1.7	.46	1.75	3.3	1.9	8.6
5	.26	.15	.31	0	0	3.1	1.3	.41	2.7	3.9	7.1	3.6
6	.2	.13	.26	0	0	2.6	1.3	.97	2.4	4.6	6.1	3.5
7	.2	.15	.17	0	0	4.9	1.45	5.4	2.6	4.2	4.5	1.6
8	.2	.22	.15	0	0	2.0	2.6	2.5	2.1	4.5	3.4	1.65
9	.18	.26	.13	0	0	1.4	1.5	1.7	2.0	3.0	2.9	1.35
10	.18	4.7	.15	1.25	0	1.15	1.65	1.05	2.0	1.8	1.9	1.3
11	.4	3.7	.13	.53	0	.92	4.6	.67	2.9	2.1	1.65	1.3
12	.26	.53	.13	.26	0	.82	1.7	.46	1.9	2.5	1.45	1.35
13	.22	.31	.13	.22	0	.77	3.5	.41	1.65	1.7	3.8	3.3
14	.26	.22	.11	.22	0	.72	2.1	.32	1.6	1.4	3.8	3.3
15	.18	.31	.11	.2	0		1.3	.32	1.95	1.35	2.8	4.1
16	1.1	.22	.11	.2	0	1.4	.98	.36	1.65	1.35	1.5	2.9
17	1.55	.22	.11	.2	0		.77	.41	1.4	1.35	1.9	2.1
18	.48	.22	.18	.22	.13	1.4	.99	.87	1.75	1.35	6.3	1.7
19	.26	.2	.18	.04	.07	1.4	1.9	.87	1.9	4.8	2.9	1.4
20	.22		.07	0	5.3	2.1	.56	1.9	8.1	1.9	1.6	1.15
21	.31	.15	.09	0	5.0	4.2	1.5	.46	1.3	5.8	1.2	.81
22	.44		.09	0	2.1	2.6	1.15	2.2	1.5	6.1	1.65	.67
23	.31		.04	0	4.3	2.6	.87	.9	1.4	6.6	1.15	3.9
24	.46	.13	0	0	5.1	7.1	.77	.51	1.35	5.9	1.3	8.6
25	2.9	3.6	0	0	2.1	5.3	1.75	.46	1.3	4.0	1.8	6.1
26	1.05	2.5	0	0	5.2	4.7	1.35	2.6	4.3	4.0	1.25	6.1
27	.71	.77	0	0	2.9	6.0	1.1	4.7	8.1	3.3	2.2	3.3
28	.62	.53	0	0	4.3	3.0	.87	3.3	8.8	3.3	3.3	3.2
29	.4	.35	0	0	7.1	3.4	.87		2.2	3.3	2.8	9.7
30	.31	.31	0	0	6.6	5.1	1.45		1.65	3.6	1.5	8.1
31	.22	.31		0		3.0	2.1		1.35		.92	

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July	2.9	0.18	0.571	0.883	17.7	54
August	4.7	.13	.683	1.06	21.2	65
September	.4	0	.136	.210	4.07	12
October	1.25	0	.108	.167	3.34	10
November	7.1	0	1.67	2.58	50.2	154
December	8.1		.496	.752	15.1	45
January	4.6	.77	1.62	2.51	50.2	154
February	5.4	.32	1.27	1.96	35.4	109
March	8.1	1.3	2.18	3.37	67.7	207
April	8.1	1.35	3.86	5.97	116	355
May	7.1	.92	2.72	4.21	84.5	269
June	9.7	.67	3.56	5.51	107	323
The year	9.7	0	1.57	2.43	572	1,730

* Estimated mean.

KOHALA DITCH AT POLOLU, NEAR NIULII, HAWAII

LOCATION.—Water-stage recorder on open section of ditch in Pololu Valley just below boundary between Bishop Estate land of Honokane and Territorial land of Pololu, 2½ miles above mouth of Pololu Stream, and 4 miles south of Niulii.

RECORDS AVAILABLE.—August, 1927, to June, 1930.

EXTREMES.—Maximum discharge during year, 51 million gallons a day (79 second-foot) Aug. 10, Nov. 17 (gage height, 3.43 feet); minimum, 7.6 million gallons a day (11.8 second-foot) Nov. 16, 17.

1927-1930: Maximum discharge, 55 million gallons a day (85 second-foot) Dec. 6, 1928 (gage height, 3.66 feet); minimum, 1.2 million gallons a day (1.9 second-foot) Dec. 9, 1928.

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

Discharge, in million gallons a day, 1929-30

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1.....	24	13	14	9.0	8.2	31	25	22	27	31	24	33
2.....	20	13	18.5	9.0	8.2	31	25	20	29	35	24	35
3.....	18.5	13	16.5	9.0	8.2	31	25	18.5	27	33	25	35
4.....	16.5	12	15	9.1	8.0	29	25	17.5	27	33	25	35
5.....	16.5	10	13	9.0	8.0	29	25	16.5	27	31	29	38
6.....	16.5	10	13	8.6	8.0	27	25	16.5	27	31	27	33
7.....	17.5	15	13	9.0	8.0	29	24	29	27	29	25	31
8.....	17.5	18.5	12	9.4	7.8	27	25	30	27	29	25	35
9.....	17.5	15.0	9.8	10.5	8.0	24	24	29	27	29	29	29
10.....	16.5	33	9.6	16.5	8.0	21	24	22	27	29	31	25
11.....	22	39	9.8	11.5	8.2	20	25	20	31	31	29	25
12.....	17.5	27	9.6	9.6	8.2	18.5	25	17.5	29	33	27	35
13.....	16.5	21	9.6	9.4	7.8	17.5	27	16.5	29	31	33	37
14.....	16.5	16.5	9.3	9.3	7.8	17	25	15.5	27	31	35	
15.....	15.5	15.5	9.1	9.1	7.7	16.5	25	20	28	31	33	
16.....	24	15	9.1	9.3	7.7	25	24	18.5	27	29	31	
17.....	24	14	9.1	9.3	18	31	21	15.5	27	29	33	
18.....	24	14	9.1	9.0	41	33	24	17.5	25	29	33	
19.....	24	14	9.0	8.3	33	33	27	17.5	23	29	31	
20.....	24	14	9.0	8.2	32	31	27	15	23	33	29	
21.....	18	14	8.6	8.0	37	29	27	14	23	33	27	
22.....	18	13	8.8	8.0	29	27	23	33	22	31	29	23
23.....	18	13	9.3	7.8	31	24	21	33	21	33	31	35
24.....	18	13	9.3	8.0	37	29	21	33	20	33	29	37
25.....	24	22	9.1	8.0	29	29	25	29	18.5	31	27	37
26.....	24	31	9.1	8.3	37	29	25	29	22	31	25	39
27.....	24	21	9.1	8.0	33	29	22	29	35	30	24	37
28.....	24	15.5	9.2	8.0	31	27	23	27	33	25	25	35
29.....	14	14	9.0	8.0	33	27	21	29	29	24	31	37
30.....	14	14	9.0	8.0	31	27	22	22	25	24	29	29
31.....	14	14	-----	8.2	-----	27	27	-----	24	-----	29	-----

Month	Discharge				Total run-off	
	Million gallons a day			Second-foot (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July.....		14	18.3	28.3	566	1,740
August.....	39	10	17.0	26.3	527	1,620
September.....	18.5	8.6	10.6	16.4	317	976
October.....	16.5	7.8	9.05	14.0	280	861
November.....	41	7.7	19.3	29.9	580	1,780
December.....	33	16.5	26.6	41.2	826	2,530
January.....	27	21	24.3	37.6	754	2,310
February.....	33	14	22.2	34.3	622	1,910
March.....	35	18.5	26.2	40.5	814	2,490
April.....	35	24	30.3	46.9	910	2,790
May.....	35	24	28.5	44.1	884	2,710
June.....	39	23	33.3	51.5	1,000	3,070
The year.....	41	7.7	22.1	34.2	8,080	24,800

• Estimated mean.

KEHENA DITCH NEAR KOHALA, HAWAII

LOCATION.—Water-stage recorder at old Honokane weir, just below head of West Branch of Honokanenui Gulch and $8\frac{1}{2}$ miles southeast of Kohala.

RECORDS AVAILABLE.—December, 1917, to November, 1919; April, 1928, to June, 1930.

EXTREMES.—Maximum discharge during period, 116 million gallons a day (179 second-feet) Mar. 25-27 (gage height, 2.04 feet); no flow for several days during September, October, and November.

1917-1919; 1928-1930: Maximum discharge, that of Mar. 25-27, 1930; no flow at times.

REMARKS.—Records poor until Feb. 27, owing to poor work of observer; good thereafter. 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 a day, 1929-30

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	12	0.9	0.6	0	0	43	9.4		73	105	54	16
2	5.4	.8	1.4	0	0	27	5.0		44	48	62	17
3	2.0	.6	1.2	0	0	7.8	16.5		48	48	69	10.5
4	1.2	.6	.9	0	0	3.2	10	* 3.6	54	51	89	28
5	.9	.6	.6	0	0	1.8	5.5		44	77	44	11.5
6	.6	.6	.5	0	0	3.2	3.7		48	51	38	8.7
7	.6	3.2	0	0	0	2.6	2.8		58	42	15	7.5
8	.6	.8	0	0	0	1.6	7.8	* 17	77	43	6.7	4.2
9	.5	.8	0	0	0	1.1	3.5		85	44	7.2	2.8
10	1.1	.29	0	0	0	.8	2.4		93	54	4.5	1.8
11	3.2	24	0	0	0	.6	3.1		73	69	5.0	12
12	1.2	5.0	0	0	0	.4	2.4		69	58	4.8	36
13	.9	2.4	0	0	0	.4	34	* 2.2	93	48	13	19.5
14	1.2	1.4	0	0	0		10.5		101	85	26	18.5
15	6.4	1.1	0	0	0	* .4	4.0		72	101	19.5	13
16	33	.9	0	0	0		2.8		65	101	16	8.7
17	10	.8	0	0	7.7	* 20	2.0		93	105	25	5.3
18	3.2	.6	0	0	30	23	13.5		105	105	25	3.5
19	1.8	.5	0	0	17.5	31	8.9		105	93	11.5	2.6
20	1.2	.4	0	0		24	6.4	* 10	105	69	5.8	2.0
21	10.5	.6	0	0	* 15	7.1	4.2		101	81	3.7	2.2
22	3.7	1.4	0	0		3.7	2.8		105	54	17	5.7
23	2.4	.9	0	0	* 4.8	2.4	2.0		113	65	7.6	24
24	1.6	.5	0	0	* 8.7	16	1.4		113	69	3.5	38
25	5.1	5.2	0	0		12.5		* 36	113	85	2.6	28
26	4.0	8.4	0	0		16		* 14	113	93	2.2	27
27	9.5	2.4	0	0	* 13	36			76	101	2.0	16.5
28	3.5	1.2	0	0		33		* 5.5	65	97	5.4	22
29	1.8	.8	0	0		35			98	89	5.8	38
30	1.2	* 8	0	0	* 17.5	38			101	51	3.5	28
31	1.1	* 1.2		0		28	* 23		105		5.3	

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July.....	33	0.5	4.24	6.56	131	403
August.....	29	.4	3.64	5.63	113	346
September.....	1.4	0	.17	.26	5.2	16
October.....	0	0	0	0	0	0
November.....		0	6.54	10.1	196	602
December.....	43		14.2	22.0	440	1,350
January.....	34	1.4	7.66	11.9	238	729
February.....			14.1	21.8	394	1,210
March.....	113	44	84.0	130	2,600	7,990
April.....	105	42	72.7	112	2,180	6,690
May.....	89	2.0	19.3	29.9	600	1,840
June.....	38	1.8	15.3	23.7	458	1,410
The year.....	113	0	20.2	31.3	7,360	22,600

* Estimated mean.

* Partly estimated.

* 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 Hawaii, 1929-30

Date	Stream	Tributary to—	Locality	Second feet	Million gal- lons a day
Aug. 18	Walluku River	Pacific Ocean	1,000 feet above Pukamaui intake dam, near Hilo.	18.7	12.1
20	Awini Ditch	Kohala Ditch	Awini weir at Honokanenui Gulch	.99	.64
Dec. 21	do	do	do	31.7	20.5
Feb. 28	do	do	do	44.2	28.6
Mar. 1	do	do	do	19.1	12.3
1	do	do	do	25.3	16.4
1	do	do	do	28.8	18.6
May 8	do	do	do	29.5	19.1
Dec. 20	Waiakea Stream	Pacific Ocean	Middle flume house, near Mountain View.	.86	.56
20	do	do	Upper tunnel and middle flume house, near Mountain View.	4.02	2.60
20	do	do	Lower tunnel and middle flume house, near Mountain View.	1.28	.93
June 7	Waiakea Springs	do	150 feet below dam, at Hilo.	78.1	50.5
7	do	do	do	163	106
7	do	do	do	217	140
7	do	do	do	268	173
7	do	do	do	315	204
7	do	do	do	313	202
7	do	do	do	295	191
7	do	do	do	325	210
7	do	do	do	293	189
7	do	do	do	248	160
7	do	do	do	232	150
7	do	do	do	214	138
7	do	do	do	201	130
8	do	do	do	212	137
8	do	do	do	242	156
8	do	do	do	261	169
8	do	do	do	279	180
8	do	do	do	292	189
8	do	do	do	275	178
8	do	do	do	268	170
8	do	do	do	230	149
8	do	do	do	224	145
8	do	do	do	202	131
8	do	do	do	158	102
8	do	do	do	115	74.3
8	do	do	do	51.5	33.3
8	do	do	do	131	84.7

INDEX

A	Page		Page
Accuracy of data and computed results.....	6	Hanapepe River at Koula, near Eleele, Kauai.....	17
Acre-foot, definition of.....	4-5	at makai siphon, near Eleele, Kauai.....	18
Aiea, Oahu, North Halawa Stream near.....	36	discharge measurements of.....	33
Alo Stream near Huelo, Maui.....	76	Hanawi Stream near Nahiku, Maui.....	56
Anahola Ditch above Kaneha Reservoir, near Kealia, Kauai.....	29	Hawaii, gaging-station records on.....	90-98
Anahola River near Kealia, Kauai.....	28	Hilo, Hawaii, Honolili Stream near.....	93
Awini Ditch at East Honokaneiki Gulch, near Niulii, Hawaii.....	94	Kapehu Stream near.....	92
discharge measurements of.....	98	Wailuku River near.....	90-91
C		Honokahau Ditch, Maui, discharge measure- ments of.....	89
Center Ditch below Kolea Reservoir, near Huelo, Maui.....	80	Honokawai Ditch near Lahaina, Maui.....	51
Computations, results of, accuracy of.....	6	Honolili Stream near Hilo, Hawaii.....	93
Control, definition of.....	5	Honokahau Stream near Honokahau, Maui.....	50
Cooperation, record of.....	2-3	Honolulu, Oahu, East Branch of Manoa Stream near.....	
D		East Manoa Ditch near.....	
Data, accuracy of.....	6	Kalihi Stream near.....	38
explanation of.....	5-6	Moanalua Stream near.....	37
E		Nuuuanu Stream near.....	39
East Honokaneiki intake to Awini Ditch at East Honokaneiki Gulch, near Niulii, Hawaii.....	95	Pukele Stream near.....	43
East Manoa Ditch near Honolulu, Oahu.....	42	Waiomao Stream near.....	44
East Wailuiki Stream near Keanae, Maui.....	61	West Branch of Manoa Stream near.....	40
East Wailuanui Stream near Keanae, Maui.....	63	Honomanu Stream near Keanae, Maui.....	66
Eleele, Kauai, Gee Ditch near.....	22	Honopou Stream near Huelo, Maui.....	85
Hanapepe Ditch near.....	19-21	Hoolawalilili Stream near Huelo, Maui.....	83
Hanapepe River near.....	17-18	Hoolawanui Stream near Huelo, Maui.....	84
G		Huelo, Maui, Alo Stream near.....	76
Gee Ditch at makai siphon, near Eleele, Kauai.....	22	Center Ditch near.....	80
H		Haiku Ditch near.....	89
Haiku Ditch at Kapalalaea Gulch, near Huelo, Maui.....	89	Haipuaena Stream near.....	67
Haipuaena Stream near Huelo, Maui.....	67	Honopou Stream near.....	85
Halawa Stream near Halawa, Molokai.....	45-46	Hoolawalilili Stream near.....	83
Hanalei, Kauai, Hanalei River near.....	30	Hoolawanui Stream near.....	84
Lumaha'i River near.....	32	Kailua Stream near.....	82
Waloli Stream near.....	31	Koolau Ditch near.....	75
Hanalei River at elevation 625 feet, near Hanalei, Kauai.....	30	Lowrie Ditch near.....	88
Hanapepe Ditch at Koula, near Eleele, Kauai.....	20	Manuel Luis Ditch near.....	72-73
below intake, near Eleele, Kauai.....	19	Naililihaele Stream near.....	81
below makai siphon, near Eleele, Kauai.....	21	New Hamakua Ditch near.....	87
discharge measurements of.....	33	Puohokamoa intake near.....	71
Hanapepe Diversion Ditches, Kauai, dis- charge measurements of.....	33	Puohokamoa Stream near.....	70
		Spreckels Ditch near.....	68-69, 74, 79
		Waikamoi Stream near.....	77
		Wallosa Ditch near.....	86
		I	
		Iiilikai Spring, Molokai, discharge measure- ment of.....	49
		K	
		Kaaiea Stream near Kailua, Maui.....	78
		Kahalawe Stream, Right Branch of, near Kipahulu, Maui.....	55
		Kailua, Maui, Kaaiea Stream near.....	78
		Kailua Stream near Huelo, Maui.....	82
		Kalaupapa, Molokai, Waikolu Stream near.....	47-48

	Page		Page
Waikamoi Stream above Walloa Ditch, near Huelo, Maui.....	77	Waimea, Kauai, Kekaha Ditch near.....	15-16
Waikolu Stream at pipe-line crossing near Kalaupapa, Molokai.....	47	Koale Stream near.....	13
discharge measurements of.....	49	Kokee Ditch near.....	11
Waialea Stream, Molokai, discharge measurement of.....	49	Waiahulu Stream near.....	12
Walloa Ditch at Honopou, near Huelo, Maui.....	86	Waialae River at.....	14
Wallua River, East Branch of North Fork of, near Lihue, Kauai.....	26	Waimea River near.....	8-9
North Fork of, at elevation 650 feet, near Lihue, Kauai.....	24	Waimea River below Kekaha Ditch intake, near Waimea, Kauai.....	8-9
South Fork of, near Lihue, Kauai.....	23	Waiohue Stream near Nahiku, Maui.....	59
Walluku River above Hilo Boarding School Ditch intake, near Hilo, Hawaii.....	91	Waioli Stream near Hanalei, Kauai.....	31
at Pukamaui, near Hilo, Hawaii.....	90	Waiomao Stream above Pukele Stream, near Honolulu, Oahu.....	44
Waimea, Kauai, Kawaikoi Stream near.....	10	West Kopiliula Stream near Keanae, Maui.....	60
		West Walluaiki Stream near Keanae, Maui.....	62
		West Walluanui Stream near Keanae, Maui.....	64
		Work, division of.....	7
		scope of.....	3-4



