UNITED STATES DEPARTMENT OF THE INTERIOR
RAY LYMAN WILBUR, Secretary
GEOLOGICAL SURVEY
GEORGE OTIS SMITH, Director

Water-Supply Paper 655

SURFACE WATER SUPPLY *of* HAWAII

JULY 1, 1926, *to* JUNE 30, 1927

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

Prepared in cooperation with the
TERRITORY OF HAWAII

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SURFACE WATER SUPPLY OF HAWAII, JULY 1, 1926, TO JUNE 30, 1927

AUTHORITY FOR INVESTIGATIONS

This volume contains records of measurements of flow made on certain streams and ditches in the Territory of Hawaii during the year ending June 30, 1927. The data presented in this report were collected by the United States Geological Survey in cooperation with the Territory of Hawaii, under the general sanction of the organic law of the Geological Survey (20 Stat. L., p. 394), which contains the following paragraph:

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

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

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

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 the following acts providing (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.

Section 1 of Act 56 reads:

The board of agriculture and forestry is hereby authorized to create and maintain a division of hydrography for the investigation and determination of the water resources of the Territory by the gaging of streams and rainfall and other means, in cooperation with the United States Geological Survey or otherwise, and in furtherance thereof to take over and exercise the functions of the Territory in the conduct of the present hydrographic survey of the Territory.

Section 2 provides that this act shall take effect July 1, 1913.

Section 1 of Act 57 reads:

All revenues derived from water licenses issued by the Territory during the period beginning July 1, 1913, and ending June 30, 1915, whether by way of rentals or otherwise, shall constitute and be held as a special fund in the treasury of the Territory to be disbursed on warrants of the auditor issued on approved vouchers of the president of the board of commissioners of agriculture and forestry. Such moneys shall be apportioned and applied from time to time by the board of commissioners of agriculture and forestry, acting with the approval of the governor, equally between the division of forestry and the division of hydrography to the following general purposes, and not otherwise:

1. For the protection of forest reservations, established or set apart according to law, against damage by fire, animals, and otherwise by means of fences and any other means whatsoever, and for the expenditures of the division of forestry.

2. For the development and maintenance of the hydrographic survey throughout the Territory.

Each voucher against said fund shall designate the general purpose for which it is drawn.

Section 2 provides that this act also shall take effect July 1, 1913.

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

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

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

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

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

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

COOPERATION

COOPERATION WITH THE TERRITORY OF HAWAII

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

The principal features of this agreement are:

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

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

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

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

Unless otherwise stated, all data have been collected and are published under this cooperative agreement with the Territory of Hawaii, which has borne from 60 to 90 per cent of the cost thereof.

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

OTHER COOPERATION

Some of the data in this paper have been obtained in cooperation with the City and County of Honolulu, the County of Hawaii 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.

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

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

3. Assistance given in the collection of records, such as furnishing transportation, subsistence, 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., McBryde Sugar Co., East Kauai Water Co., Princeville Plantation Co., and American Factors (Ltd.); Island of Oahu, City and County of Honolulu, Honolulu Sewer and Water Commission, and B. P. Bishop Estate, Wahiawa Water Co.; Island of Maui—Pioneer Mill Co. and East Maui Irrigation Co.; Island of Hawaii, City of Hilo and C. Brewer & Co. (Ltd.).

SCOPE OF WORK

The investigations of the surface waters of the Territory are not complete nor do they include all the streams and ditches that might advantageously be studied. They include, however, as many of the streams and ditches on the four larger islands as the available appropriations would allow. It is essential that records of stream flow should be kept during a period of years long enough to determine within reasonable limits the range of flow from the maximum to the minimum. The length of such a period manifestly varies for different streams. Experience has shown that the records should be kept from 20 to 30 years, and sometimes longer.

In the performance of this work an effort is made to reach the highest degree of precision possible with a rational expenditure of time and money. In all engineering work there is a point beyond which refinement is needless and wasteful, and this statement applies with especial force to stream-measurement work in Hawaii. It has been found, however, that it is possible to obtain data which are sufficiently accurate, although many of those presented in this report are for periods too short to yield definite conclusions.

Special intensive investigations of the discharge of certain streams which are of major importance for domestic water supply, power, and irrigation have been made.

DEFINITION OF TERMS

The volume of water flowing in a stream—the "run-off" or "discharge"—is expressed in various terms, each of which has become associated more or less definitely with a certain class of work. These

terms may be divided into two groups: (1) Those that represent a rate of flow, as "second-feet," "gallons a minute," "gallons a day," "miner's inches," and "run-off in second-feet a square mile," and (2) those that represent the actual quantity of water, as "run-off in inches," "million gallons," and "acre-feet." Those used in this report may be defined as follows:

"Second-foot" is an abbreviation for cubic foot a second and is 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.

"Man's water" is an irrigator's term also in common use in Hawaii. It signifies the amount of water that one irrigator can properly handle in the field. It varies greatly, being dependent upon the condition of the furrows, the age of the crop, and the skill and individuality of the irrigator.

The following terms not in common use are here defined:

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

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

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

EXPLANATION OF DATA

The base data collected at gaging stations consist of records of stage, measurements of discharge, and general information used to supplement the gage heights and discharge measurements in determining the daily discharge. The records of stage used in computing discharge 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 weirs 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. If the base data are insufficient to determine the daily discharge, records of discharge measurements are published.

The description of the station gives—in addition to statements regarding location, records available, and equipment—information in regard to any condition that may affect the permanence of the stage-discharge relation, covering such subjects as shifting of control and backwater. It gives also information as to diversions that decrease the flow at the gage, artificial regulation, discharge corresponding to maximum and minimum recorded stages, object of station, utilization of water below station, and the accuracy of the records.

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

In the table of monthly discharge the column headed "Maximum" gives the flow for the day when the total discharge was greatest. This does not correspond to the rate of flow at the crest of the flood. The highest crest is given under the heading "Extremes of discharge." 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 in 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.

Owing to the volcanic formation of the Hawaiian Islands there is so wide a diversity in the character and porosity of the rocks of the drainage basins that a general relation between rainfall and run-off can not be determined. For this reason information concerning drainage areas has been omitted in the station descriptions.

ACCURACY OF FIELD DATA AND COMPUTED RESULTS

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

The accuracy paragraph in the description of the station gives information regarding the (1) permanence of the stage-discharge relation, (2) precision with which the discharge rating curve is defined, supplemented by a statement giving the number and distribution of discharge measurements made during year and range which they cover, (3) accuracy of gage-height record, (4) methods of applying daily gage height to rating table to obtain the daily discharge, and (5) general statement in regard to accuracy of record.

For the rating tables "very well defined" indicates in general, that the rating is probably accurate within 5 per cent; "well defined," within 10 per cent; "fairly well defined," within 15 per cent; "poorly defined," within 25 per cent; and "uncertain" may not be within 25 per cent. These notes are very general and are based on the plotting of the individual measurements with reference to the mean rating curve.

In the general statement of accuracy "excellent," "good," "fair," and "poor," indicate that the probable errors are within 5, 10, 15, and 25 per cent, respectively. When extensions of rating curves are "uncertain" the probable error may be greater than 25 per cent.

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 B. L. Bigwood and J. L. Lamson, office engineers, P. P. Livingston, K. N. Vaksvik, J. H. Hofmann, K. M. Kelley, Sam Wong, John Kaheaku, P. P. T. Goo, and Miss M. A. Davison. The manuscript has been prepared by J. L. Lamson and reviewed by M. H. Carson.

PUBLICATIONS

The following table gives by years the numbers of the papers on the surface-water supply of Hawaii containing data from 1903 to 1927, 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 is 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, 1903–1927

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

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

GAGING-STATION RECORDS

ISLAND OF KAUAI

WAIMEA RIVER BELOW KEKAHA DITCH INTAKE, NEAR WAIMEA, KAUAI

LOCATION.—In Waimea Canyon at camp No. 1, 500 feet below Kekaha ditch intake and 8 miles by trail north of Waimea.

RECORDS AVAILABLE.—July 24, 1921, to June 30, 1927.

EQUIPMENT.—Au continuous water-stage recorder on right bank. Discharge measurements made by wading or from cable 40 feet below gage. Datum lowered 3.85 feet on May 7, 1926.

CHANNEL AND CONTROL.—Bed composed of boulders. Right bank vertical rock wall 1,100 feet high. Left bank sloping and boulder strewn; not subject to overflow. Control composed of boulders; subject to shifts.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 2,030 million gallons a day, or 3,140 second-feet, at 8 p. m. February 15 (gage height from water-stage recorder, 16.20 feet; minimum discharge, no flow several days July to November.

1921–1927: Maximum discharge probably greater than 2,500 million gallons a day, or 3,870 second-feet, on July 12, 1923 (gage height, 14.62 feet; at this stage the recorder went out of adjustment); minimum discharge, that of July to November, 1926.

DIVERSIONS AND REGULATION.—Entire low flow, except leakage through dam, is diverted by Kekaha ditch about 500 feet above station. In April, 1925, Kokee ditch began diverting water from some of the tributaries. Diversions regulated by head gates.

OBJECT OF STATION.—To determine amount of flow not diverted into Kekaha ditch.

UTILIZATION.—Low-water flow used for irrigation of rice and taro.

ACCURACY.—Stage-discharge relation changed, presumably, at time of flood May 16. The two rating curves used are fairly well defined below 100 million gallons a day; extended above on basis of one discharge measurement at 192 million gallons a day. Curve used prior to May 16 checked very closely by two discharge measurements in December and one in March ranging from 22 to 84 million gallons a day. The change to other curve on May 16 is based on several discharge measurements made after June 30. Operation of water-stage recorder satisfactory, except as indicated in footnote to daily-discharge table. Daily discharge ascertained by applying to rating table mean daily gage height determined from recorder graph by inspection or, for days of considerable fluctuation, by averaging discharge for intervals of day. Records, except estimated ones, good for medium stages; all estimated records and extremely high and low stage records poor.

Discharge, in million gallons a day, of Waimea River below Kekaha ditch intake, near Waimea, Kauai, for the year ending June 30, 1927

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	0.01	0.00	0.7	0.0	0.0	0.04	19.6	0.5	3.3	46	0.6	14.6
2	.01	1.0	.05	.0	.0	.04	94	.5	1.6	35	.6	7.6
3	.01	.02	.01	.0	.0	.04	397	.5	22	26	.6	3.1
4	.02	.01	.00	.0	.0	.04	255	.5	202	25	.6	
5	.03	.00	.00	.0	.0	.04	58	.5	593	19.4	.6	
6	.03	.00	.00	.0	.0	.04	34	.4	587	.7	1.7	
7	.03	.01	.00	.0	.0	.04	21	.4	519	.7	3.2	
8	.03	.00	.00	.0	.0	.05	60	17.8	251	.6	92	
9	.03	.00	.00	.0	.0	14.3	24	64	165	.6	39	
10	.05	.00	.07	.0	.0	100	166	25	100	.6	28	
11	.04	.01	.3	.0	.0	27	45	29	54	.6	7.3	
12	.04	.03	.0	.0	.0	25	15.1	14.2	38	110	1.3	
13	.05	.03	.0	.0	.0	1.9	4.2	.1	60	181	3.6	
14	.04	.03	6.1	.0	272	5.6	1.7	.09	50	369	166	
15	.04	.03	14.8	.0	23	2.1	1.5	27	91	537	382	9.5
16	.1	.03	11.2	.0	6.5	.07	1.3	360	166	125	548	
17	22	.03	.04	.0	19.2	.04	1.2	106	65	56	589	
18	52	.03	.1	.0	.1	7.3	.9	56	25	41	218	
19	82	.02	6.0	.0	.2	.1	.5	37	15.7	45	81	
20	30	.02	.1	.0	.09	240	.4	27	8.0	22	36	
21	5.8	.01	.01	.0	.06	387	84	22	9.2	11.1	22	
22	47	.00	.00	.0	.04	92	64	16.5	197	3.8	95	
23	61	.00	.00	.0	.03	45	32	7.8	375	15.9	81	
24	9.2	.00	.00	.0	.02	182	37	2.9	159	57	32	
25	4.4	.01	76	.0	.02	219	211	3.5	101	9.1	14.6	
26	.6	.03	18.4	1.0	.03	114	138	3.6	81	1.4	10.0	17.5
27	.04	.03	48	.0	.04	42	46	5.8	76	.6	8.7	1.2
28	.01	.6	30	.0	.04	21	9.5	3.4	105	1.3	26	.4
29	.01	.08	.2	.0	.04	11.1	34	-------	76	.6	40	.4
30	.01	113	.0	.0	.04	9.6	9.1	-------	48	.6	25	.4
31	.00	2.8	-------	.0	-------	25	.8	-------	36	-------	8.1	-------

NOTE.—Discharge estimated July 21 and 22. Braced figure gives estimated mean discharge for period indicated. Estimates made from study of faulty gage-height record and by comparison with record of flow for Kekaha ditch at camp No. 1 and records of tributary streams.

Monthly discharge of Waimea River below Kekaha ditch intake, near Waimea, Kauai, for the year ending June 30, 1927

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July	82	0.00	10.1	15.6	315	961
August	113	.00	3.80	5.88	118	362
September	76	.00	7.07	10.9	212	651
October	1.0	.00	.032	.050	1.00	3
November	272	.00	10.7	16.6	321	985
December	387	.04	50.7	78.4	1,570	4,820
January	397	.4	60.2	93.1	1,870	5,730
February	360	.09	29.7	46.0	832	2,550
March	593	1.6	138	214	4,280	13,100
April	537	.6	58.1	89.9	1,740	5,350
May	589	.6	82.6	128	2,560	7,860
June	----------	.4	8.47	13.1	254	780
The year	593	.00	38.6	59.7	14,100	43,200

KAWAIKOI STREAM NEAR WAIMEA, KAUAI

LOCATION.—3 miles northeast of Knudsen's mountain house, Halemanu, and 21 miles by road and trail north of Waimea.

RECORDS AVAILABLE.—April 13, 1909, to July 11, 1917, and July 1, 1919, to June 30, 1927. No record of value from December 17, 1916, to July 3, 1919.

EQUIPMENT.—Stevens continuous water-stage recorder on left bank, about 400 feet above trail crossing. Discharge measurements made by wading or from cable about 300 feet downstream.

CHANNEL AND CONTROL.—One channel at all stages; straight for 100 feet above and below station. Banks high and wooded. Control composed of rock ledge and boulders; subject to shifts.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 1,320 million gallons a day, or 2,040 second-feet, at 3.30 a. m. March 5 (gage height from water-stage recorder, 10.35 feet); minimum discharge, 1.7 million gallons a day, or 2.6 second-feet, several hours November 11–13 (gage height, 1.30 feet).

1909–1927: Maximum stage recorded, from water-stage recorder, 15.2 feet December 18, 1916 (discharge not determined). Minimum discharge recorded, 1.3 million gallons a day, or 2.0 second-feet, for several hours September 15, 1921 (gage height, 1.28 feet).

DIVERSIONS AND REGULATION.—None.

OBJECT OF STATION.—To determine feasibility of diverting flood water into high-level (3,100 feet) ditch to serve Territorial lands now uncultivated on account of lack of irrigation.

UTILIZATION.—After it reaches Waimea River low water is used for power and irrigation.

ACCURACY.—Stage-discharge relation changed at time of flood December 20 and again, presumably, during flood of May 15–18 after which shifting-control method was used. The two rating curves used are well defined between 2 and 200 million gallons a day; extensions of curve, uncertain. These curves were checked very closely by four discharge measurements well distributed from September to January and ranging from 3 to 33 million gallons a day. Shifting-control method based on one discharge measurement made after June 30. Operation of water-stage recorder satisfactory, except as indicated in footnote to daily-discharge table. Daily

discharge ascertained by applying to rating table mean daily gage height determined from recorder graph by inspection or, for days of considerable fluctuation, by averaging discharge for intervals of day. Records good for ordinary stages July to January, except those estimated, which are poor. Records poor for February to June and for all extremely high stages.

Discharge, in million gallons a day, of Kawaikoi Stream near Waimea, Kauai, for the year ending June 30, 1927

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	2.4	3.4	3.7	4.5	2.3	2.3	5.6	4.4	4.1	21	5.5	12.6
2	2.2	18.3	3.2	3.6	2.2	2.2	136	4.1	28	11.5	5.0	10.0
3	2.2	14.2	2.7	3.2	2.6	2.2	237	4.0	26	7.1	4.7	11.8
4	2.2	5.7	2.7	2.9	2.6	9.1	90	3.7	114	5.6	4.3	14.0
5	2.1	11.8	4.0	2.9	2.2	9.6	29	3.5	265	5.1	4.4	13.7
6	2.2	6.9	3.7	3.3	2.1	3.7	17.0	3.4	119	4.7	6.9	20
7	2.2	4.0	2.9	3.2	2.2	2.6	16.4	3.3	89	4.2	7.1	26
8	2.2	3.3	15.0	2.9	2.1	2.5	24	3.5	37	4.1	26	34
9	2.2	2.9	16.5	3.3	2.0	6.1	13.2	16.7	24	12.1	22	23
10	2.6	2.9	12.0	3.0	1.9	14.6	59	11.1	15.5	5.6	11.5	13.4
11	2.2	2.7	7.3	2.6	1.8	14.6	16.1	8.8	11.0	4.1	7.1	8.6
12	1.9	2.5	4.0	2.4	1.7	10.2	9.6	7.8	15.5	119	5.0	6.9
13	2.2	2.4	3.2	2.3	51	4.5	7.6	4.4	28	87	17.5	6.2
14		2.5	4.3	2.3	209	3.7	6.5	3.5	17.0	255	77	5.6
15		3.7	7.8	2.2	14.4	3.6	5.8	92	10.8	189	265	5.3
16	17	9.2	3.6	2.2	32	2.9	5.5	60	31	42	353	21
17		12.9	2.6	2.2	17.2	2.5	5.1	12.4	14.2	42	378	22
18		5.5	2.4	2.1	19.3	2.3	4.8	7.6	8.0	55	95	47
19		3.3	4.2	2.1	17.8	2.3	4.5	6.2	6.3	37	48	12.8
20		2.7	3.6	2.0	7.1	140	4.2	5.5	5.6	17.7	28	7.3
21	4.7	17.2	2.6	2.2	5.2	85	36	5.0	5.1	14.0	21	5.8
22	84	10.7	2.2	2.3	4.3	14.2	52	4.5	160	11.8	26	5.3
23	29	4.3	2.6	10.8	3.7	6.5	16.7	4.4	87	57	39	5.1
24	9.5	5.1	3.4	7.7	3.4	16.7	12.2	18.6	24	37	24	13.8
25	23	7.7	59	46	3.2	29	44	7.3	15.2	12.6	15.2	93
26	8.2	5.0	22	18.3	2.9	28	19.0	5.0	13.4	9.6	12.9	21
27	5.5	10.5	48	4.8	2.7	8.2	9.8	4.2	11.0	8.0	11.0	9.1
28	4.7	7.5	13.8	6.9	2.6	8.6	6.5	3.8	37	7.6	17.4	23
29	4.2	6.1	6.7	3.9	2.5	7.6	6.3	-------	15.5	7.1	26	8.4
30	3.7	21	5.4	2.9	2.4	28	6.1	-------	9.1	6.0	13.4	6.5
31	3.4	6.5	-------	2.5	-------	9.8	4.8	-------	7.3	-------	10.3	-------

NOTE.—Braced figure gives mean discharge for period indicated; estimated by comparison with record of Koaie Stream; recorder not operating properly.

Monthly discharge of Kawaikoi Stream near Waimea, Kauai, for the year ending June 30, 1927

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July	84	1.9	10.6	16.4	328	1,010
August	21	2.4	7.17	11.1	222	682
September	59	2.2	9.17	14.2	275	844
October	46	2.0	5.27	8.15	164	501
November	209	1.7	14.2	22.0	426	1,310
December	140	2.2	15.6	24.1	483	1,480
January	237	4.2	29.4	45.5	910	2,800
February	92	3.3	11.4	17.6	319	980
March	265	4.1	40.4	62.5	1,250	3,840
April	255	4.1	36.6	56.6	1,100	3,370
May	378	4.3	51.2	79.2	1,590	4,870
June	93	5.1	17.1	26.5	512	1,570
The year	378	1.7	20.8	32.2	7,580	23,300

MOHIHI STREAM AT ELEVATION 3,500 FEET, NEAR WAIMEA, KAUAI

LOCATION.—At upper trail crossing at elevation 3,500 feet, 4 miles west of Kokee (6 miles by trail) and 24 miles by road and trail from Waimea.

RECORDS AVAILABLE.—August 12, 1919, to October 25, 1926, when station was discontinued. Fragmentary records at old station 2 miles downstream, from April 13, 1909, to December 31, 1912. Records of no value August 12, 1919, to June 12, 1920.

EQUIPMENT.—Stevens continuous water-stage recorder. Discharge measurements made by wading or from cable 260 feet below gage.

CHANNEL AND CONTROL.—One channel at all stages; straight for 300 feet above station and 100 feet below. Bed composed of mud and silt. Right bank sloping and covered with ferns and brush; subject to overflow for about 30 feet during extremely high stages. Left bank steep and fern-covered; not subject to overflow. Control at boulder rapids 60 feet below gage; subject to shifts caused by collection of débris.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 39 million gallons a day, or 60 second-feet, at 8 a. m. August 30 (gage height from water-stage recorder, 2.58 feet). A greater discharge may have occurred on December 30, when recorder was not operating. Minimum discharge recorded during year, no flow from midnight October 14 to end of record October 25; water all diverted by Kokee ditch.

1919–1926: Maximum discharge recorded, about 520 million gallons a day, or 805 second-feet, at 1.35 p. m. January 16, 1921 (gage height from water-stage recorder, 6.91 feet); minimum discharge, that of October 14–25, 1926.

DIVERSIONS AND REGULATION.—No diversions until October 7, 1926, when Kokee ditch began diverting all of ordinary flow. Mohihi Stream, which rises in the Alakai swamps, is a series of long pools and short rapids.

OBJECT OF STATION.—To determine feasibility of diverting flood water into high level (3,100 feet) ditch to serve Territorial lands now uncultivated on account of lack of irrigation.

UTILIZATION.—After it reaches Waimea River low-water flow is used for power and irrigation.

ACCURACY.—Stage-discharge relation permanent. Rating curve fairly well defined below 30 million gallons a day; extension above, uncertain. This curve checked closely at 1.5 and 0.7 million gallons a day by a discharge measurement in July and September. Operation of water-stage recorder very satisfactory. Daily discharge ascertained by applying to rating table mean daily gage height determined from recorder graph by inspection or, for days of considerable fluctuation, by averaging discharge for intervals of day. Records good.

Discharge, in million gallons a day, of Mohihi Stream at elevation 3,500 feet, near Waimea, Kauai, for the year ending June 30, 1927

Day	July	Aug.	Sept.	Oct.	Day	July	Aug.	Sept.	Oct.
1	0.3	0.4	1.2	1.4	16	3.0	0.3	1.0	0.00
2	.3	.8	1.0	1.0	17	2.3	.6	.6	.00
3	.3	1.7	.6	.6	18	4.7	.9	.5	.00
4	.3	1.0	.5	.5	19	3.5	.5	1.3	.00
5	.3	.6	1.5	.5	20	2.6	.4	.8	.00
6	.3	.5	1.0	.4	21	1.5	.6	.8	.00
7	.3	.4	.7	.4	22	7.8	2.3	.5	.00
8	.3	.4	.8	.2	23	8.5	.8	.4	.00
9	.3	.3	2.4	.2	24	3.2	.5	.5	.00
10	.3	.3	1.8	.1	25	2.2	.9	9.5	.00
11	.3	.3	1.1	.08	26	1.6	.8	6.4	
12	.3	.3	.8	.06	27	1.0	1.6	11.2	
13	.3	.3	.6	.03	28	.6	1.9	5.2	
14	.3	.3	.5	.01	29	.5	2.3	2.3	
15	.9	.3	2.5	.00	30	.4	13.3	1.6	
					31	.4	2.8		

Monthly discharge of Mohihi Stream at elevation 3,500 feet, near Waimea, Kauai, for the year ending June 30, 1927

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July	8.5	0.3	1.58	2.44	48.9	150
August	13.3	.3	1.24	1.92	38.4	118
September	11.2	.4	1.99	3.08	59.6	183
October (25 days)	1.4	.0	.219	.339	5.48	17
The period	13.3	.0	1.30	2.01	152	468

WAIAHULU STREAM NEAR WAIMEA, KAUAI

LOCATION.—In Waimea Canyon, half a mile above confluence with Koaie Stream and 8¾ miles north of Waimea.

RECORDS AVAILABLE.—February 25 to October 21, 1916; October 25, 1917, to June 30, 1918; and May 25, 1925, to June 30, 1927 (unreliable and fragmentary record July 1, 1918, to November 8, 1920, not published).

EQUIPMENT.—Stevens continuous water-stage recorder on right bank. Discharge measurements made by wading or from cable near gage.

CHANNEL AND CONTROL.—One channel at all stages; straight for 200 feet above and below gage; banks steep. Control composed of large boulders; fairly permanent.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 1,920 million gallons a day, or 2,970 second-feet, at 9.30 a. m. May 16 (gage height from water-stage recorder, 8.35 feet); minimum discharge, 5.8 million gallons a day, or 9.0 second-feet, several hours November 10–13 (gage height, 0.52 foot).

1915–1918; 1925–1927: Maximum stage from floodmarks, about 15 feet December 18, 1916 (discharge not determined). Minimum discharge recorded, that of November 10–13, 1926.

DIVERSIONS AND REGULATION.—Kokee ditch began diverting from some of the tributaries in April, 1925.

OBJECT OF STATION.—To determine feasibility of further development.

UTILIZATION.—Ordinary flow used for irrigation, power, and domestic supply.

ACCURACY.—Stage-discharge relation changed, presumably, at time of flood March 5. Rating curve used prior to March 5 well defined between 8 and 45 million gallons a day; extension above uncertain. This curve checked closely at 7 million gallons a day by a discharge measurement in October. The curve used after March 5 is poorly defined, being based on only two discharge measurements made after June 30. Operation of water-stage recorder satisfactory except as indicated in footnote to daily-discharge table. Daily discharge ascertained by applying to rating table mean daily gage height determined from recorder graph by inspection or, for days of considerable fluctuation, by averaging discharge for intervals of day. Records good for ordinary stages July to October; records November to June and all high-stage records poor.

Discharge, in million gallons a day, of Waiahulu Stream near Waimea, Kauai, for the year ending June 30, 1927

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	8.8	8.8	10.3	9.3	7.0	7.2	11.4	10.8	9.8	24	13.2	
2	8.6	8.8	9.0	9.0	6.8	7.2	126	10.3	9.8	19.6	12.8	
3	8.6	9.8	8.6	8.4	6.6	7.2	380	10.0	24	17.1	12.5	
4	8.4	10.6	8.6	8.1	6.4	7.2	168	9.8	129	15.5	12.2	
5	8.4	9.5	8.8	7.9	6.4	7.2	28	9.5	380	14.8	12.2	
6	8.4	8.9	8.8	7.9	6.2	7.2	21	9.0	338	14.1	11.9	
7	8.4	8.6	8.4	7.9	6.2	7.0	16.8	9.0	270	13.5	11.9	
8	8.4	8.4	8.6	8.4	6.2	7.7	18.6	18.0	84	13.2	12.7	
9	8.4	8.1	9.4	7.9	6.1	10.6	17.2	25	50	13.5	16.7	
10	8.6	8.1	11.9	7.9	6.1	15.4	95	19.4	39	14.4	15.2	
11	8.6	8.1	9.3	7.9	5.9	14.6	23	16.5	23	12.8	12.8	
12	8.1	7.9	8.4	7.8	5.9	9.8	16.8	14.8	18.2	154	11.6	
13	8.1	7.9	8.1	7.8	5.9	8.1	14.1	13.2	19.6	142	14.1	
14	8.4	7.9	7.7	7.8	266	7.9	12.8	11.1	21	359	110	
15	9.4	7.9	10.0	7.7	26	7.4	11.7	219	19.6	414	359	
16	18.9	7.9	9.8	7.7	13.3	7.2	11.4	233	42	66	571	20
17	30	8.1	8.6	7.7	19.4	7.0	11.1	38	28	36		
18	44	8.6	9.0	7.7	9.0	7.7	11.4	22	16.3	39	360	
19	28	8.8	9.5	7.4	15.4	7.4	10.3	16.8	14.1	34		
20	17.2	8.4	9.8	7.4	8.6	167	10.3	14.1	12.5	23		
21	12.5	8.1	8.6	7.9	7.0	204	26	12.8	15.0	18.7		
22	75	9.5	8.1	7.7	6.6	31	51	11.9	259	17.1		
23	51	10.0	7.9	7.7	6.6	16.5	26	11.4	245	48		
24	16.8	8.8	7.7	7.7	6.2	27	20	12.2	60	51		
25	12.2	8.4	46	12.4	6.2	53	46	11.7	54	18.7	36	
26	12.2	8.8	18.6	18.4	6.2	34	32	10.6	39	15.9		
27	10.3	8.8	39	9.3	6.4	17.2	22	10.0	33	14.8		
28	9.8	10.3	24	8.1	6.6	13.2	14.8	9.8	59	14.1		
29	9.3	10.6	11.9	7.4	6.8	11.7	13.2	-------	36	13.5		
30	9.0	27	10.0	7.2	7.0	13.2	13.5	-------	24	13.2		
31	8.8	16.3	-------	7.0	-------	14.8	11.7	-------	19.2	-------		-------

NOTE.—Discharge estimated May 16. Braced figures give estimated mean discharge for periods indicated. Estimates made by comparison with records of flow for Kawaikoi Stream and Kokee ditch; recorder not operating properly.

Monthly discharge of Waiahulu Stream near Waimea, Kauai, for the year ending June 30, 1927

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July	75	8.1	15.9	24.6	493	1,510
August	27	7.9	9.60	14.9	298	913
September	46	7.7	12.1	18.7	364	1,110
October	18.4	7.0	8.40	13.0	260	799
November	266	5.9	16.8	26.0	505	1,550
December	204	7.0	24.6	38.1	764	2,340
January	380	10.3	41.6	64.4	1,290	3,960
February	233	9.0	29.3	45.3	820	2,520
March	380	9.8	77.1	119	2,390	7,330
April	414	12.8	55.5	85.9	1,660	5,110
May	571	11.6	87.8	136	2,720	8,350
June			20.0	30.9	600	1,840
The year	571	5.9	33.3	51.5	12,200	37,300

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

LOCATION.—At elevation 3,700 feet, 4 miles east of Mohihi station, 1 mile below swamps, and 13 miles northeast of Waimea (27 miles by trail from Waimea by way of Kokee).

RECORDS AVAILABLE.—July 1, 1919, to June 30, 1927.

EQUIPMENT.—Stevens continuous water-stage recorder on left bank. Discharge measurements made by wading near gage or from cable 200 feet upstream.

CHANNEL AND CONTROL.—Channel covered with boulders and cobblestones and flanked by high banks; straight for 100 feet above gage and for 400 feet below. Control is bedrock across stream, forming low falls; right end is low and blocked by cobblestones and boulders, which may shift. Control too wide to be sensitive below medium stages.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 1,860 million gallons a day, or 2,880 second-feet, at 7 p. m. December 20 (gage height from water-stage recorder, 3.95 feet); minimum discharge, 1.5 million gallons a day, or 2.3 second-feet, several hours July 1–5, October 20–21, November 2–5, 9–12, and December 2–8 (gage height, 0.45 foot).

1919–1927: Maximum discharge recorded, about 3,750 million gallons a day, or 5,800 second-feet, January 16, 1921 (gage height from water-stage recorder, 6.70 feet); minimum discharge, 1.0 million gallons a day, or 1.6 second-feet, from 2 to 7 p. m. March 14, 1926 (gage height, 0.41 foot; somewhat questionable owing to intake trouble).

DIVERSIONS AND REGULATION.—None.

OBJECT OF STATION.—To determine amount of flood water available for storage for use in irrigating high-level lands above Waimea and Kehaha.

UTILIZATION.—After it reaches Waimea River low-water flow is used for power and irrigation.

ACCURACY.—Stage-discharge relation permanent during year. Rating curve well defined below 50 million gallons a day and fairly well defined 50 to 300 million gallons a day; was checked closely by three discharge measurements well distributed July to December and ranging from 3.6 to 11 million gallons a day. Operation of water-stage recorder frequently unsatisfactory, resulting in large gage-height corrections. Daily discharge ascertained by applying

to rating table mean daily gage height determined from recorder graph by inspection or, for days of considerable fluctuation, by averaging discharge for intervals of day. Records good July to November and poor December to June.

Discharge, in million gallons a day, of Koaie Stream at elevation 3,700 feet, near Waimea, Kauai, for the year ending June 30, 1927

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	1.6	6.2	16.5	3.6	1.8	1.6	8.1	3.6	2.4	8.1		
2	1.5	12.4	4.9	2.6	1.6	1.6	29	3.6	5.2	6.5		
3	1.5	8.1	2.8	2.2	1.5	1.5	158	3.6	17.0	5.7		
4	1.6	4.9	6.3	2.0	1.5	1.6	69	3.6	110	5.3	4.4	
5	1.6	3.6	7.0	1.8	1.6	1.8	26	3.3	261	4.5		
6	1.6	6.1	4.5	3.3	2.0	1.6	18.7	3.3	193	4.2		15
7	1.6	3.6	3.3	4.2	1.8	1.5	27	3.0	139	4.2		
8	1.6	3.6	3.4	3.3	1.8	2.0	29	7.3	56	4.2		
9	1.8	2.8	7.0	2.8	1.6	20	16.9	13.5	92	3.9		
10	2.4	2.6	5.7	2.6	1.6	33	46	4.9	10.9	3.6	15	
11	2.2	11.7	6.5	2.4	1.5	14.5	14.5	4.9	7.5	3.6		
12	2.4	4.5	3.6	2.0	1.5	7.4	11.5	4.5	8.1	20		9.7
13	2.2	2.8	2.6	1.8	6.9	6.1	8.6	3.6	17.8	44		8.1
14	2.2	2.4	15.6	2.0	87	6.1	7.0	3.3	17.8	124		6.5
15	4.2	2.2	8.9	2.0	7.7	4.2	5.7	95	41	208		7.0
16	12.2	4.4	3.6	1.8	19.4	2.8	5.3	45	68	18.2	140	9.1
17	7.0	7.5	2.6	1.8	10.0	2.4	5.7	10.3	15.3	11.5		10.9
18	9.7	5.3	2.2	1.8	6.7	2.0	6.1	6.5	9.7	15.9		29
19	8.8	3.0	2.2	1.8	7.9	2.2	6.1	4.9	7.5	16.8		11.5
20	37	2.4	4.0	1.6	3.9	232	15.5	4.2	6.1	10.3		7.5
21	5.4	7.5	6.8	1.6	2.8	147	35	3.6	5.3	7.5		6.1
22	17.4	7.2	3.0	1.6	2.2	26	22	3.3	13.6	6.1		5.3
23	18.6	3.3	3.6	2.4	2.0	16.1	17.3	2.8	220	10.9		5.3
24	11.5	3.0	8.8	2.2	2.0	103	15.6	3.6	30	16.3		7.6
25	13.9	6.4	46	6.2	1.8	92	103	3.3	15	9.1	18	42
26	5.7	4.5	14.5	9.2	1.8	34	55	2.8	14	6.1		15.3
27	3.6	7.6	36	3.3	2.0	15.3	13.7	2.4	12.2	5.7		10.9
28	2.8	13.5	10.8	2.6	1.8	11.5	8.6	2.4	16.1	6.1		9.7
29	2.6	9.7	4.5	2.0	1.8	10.3	27	-------	12.9	6.0		8.6
30	2.8	71	4.5	1.8	1.6	12.9	7.5	-------	8.1	5.5		8.1
31	2.6	7.0	-------	1.6	-------	12.2	4.9	-------	6.1	-------		-------

NOTE.—Discharge estimated Mar. 23–26 and Apr. 29 and 30. Braced figures give estimated mean discharge for periods indicated. Estimates made by comparison with record of flow for Kawaikoi Stream; gage-height record either faulty or missing.

Monthly discharge of Koaie Stream at elevation 3,700 feet, near Waimea, Kauai, for the year ending June 30, 1927

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July	37	1.5	6.18	9.56	192	588
August	71	2.2	7.77	12.0	241	739
September	46	2.2	8.39	13.0	252	772
October	9.2	1.6	2.64	4.08	81.9	251
November	87	1.5	6.30	9.75	189	580
December	232	1.5	26.7	41.3	826	2,540
January	158	4.9	26.6	41.2	823	2,530
February	95	2.4	9.15	14.2	256	786
March	261	2.4	46.4	71.8	1,440	4,410
April	208	3.6	20.1	31.1	602	1,850
May	-------	-------	42.0	65.0	1,300	4,000
June	42	5.3	12.8	19.8	383	1,180
The year	261	1.5	18.0	27.9	6,590	20,200

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

LOCATION.—At elevation 3,700 feet, 2 miles below swamps and 15 miles by trail northeast of Waimea by way of Kaholuamano.

RECORDS AVAILABLE.—January 26, 1920, to June 30, 1927. August 1, 1910, to January 25, 1916, at site 2 miles downstream.

EQUIPMENT.—Stevens continuous water-stage recorder on left bank. Discharge measurements made by wading near gage.

CHANNEL AND CONTROL.—Channel is rocky, boulder-strewn bed with steep, high banks; straight for 300 feet above and 100 feet below station. Control solid rock about 15 feet below well intake.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 1,580 million gallons a day, or 2,440 second-feet, at 11.30 p. m. March 5 (gage height, from water-stage recorder, 4.73 feet); minimum discharge, 0.8 million gallons a day, or 1.2 second-feet, from midnight November 26 to 7 a. m. November 29 and 10 a. m. December 6 to 11 a. m. December 8 (gage height, 0.84 foot).

1920–1927: Maximum discharge recorded, estimated 4,500 million gallons a day, or 6,960 second-feet, January 16, 1921 (gage height, from water-stage recorder, 8.44 feet); minimum discharge, 0.7 million gallons a day, or 1.1 second-feet, several hours March 18–20, 1925 (gage height, 0.80 foot).

DIVERSIONS AND REGULATION.—None.

OBJECT OF STATION.—To determine amount of flood water available for storage or for use in irrigating high-level lands above Waimea and Kekaha.

UTILIZATION.—After it reaches Waimea River low-water flow is used for irrigation.

ACCURACY.—Stage-discharge relation changed at time of flood August 30. The two rating curves used are fairly well defined between 1 and 150 million gallons a day; extensions beyond are uncertain. The curve used after August 30 was checked fairly well by four discharge measurements well distributed from September to March and one made shortly after June 30 ranging from 2.4 to 55 million gallons a day. Operation of water-stage recorder satisfactory, except as indicated in footnote to daily-discharge table. Daily discharge ascertained by applying to rating table mean daily gage height determined from recorder graph by inspection or, for days of considerable fluctuation, by averaging discharge for intervals of day Records good for ordinary stages except those estimated, which are fair; extremely low and high stage records, poor.

Discharge, in million gallons a day, of Waialae River at elevation 3,700 feet, near Waimea, Kauai, for the year ending June 30, 1927

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	1.3	4.5	6.0	2.6	1.2	0.9	2.6	3.5	2.4	3.2	2.2	10.5
2	1.2	8.8	3.0	2.2	1.2	.9	5.5	3.2	2.9	2.8	2.2	5.3
3	1.2	6.2	1.9	1.9	1.2	.9	92	3.0	10.5	2.5	2.0	5.3
4	1.3	3.3	3.2	1.6	1.2	.9	54	2.8	89	2.4	2.0	4.8
5	1.2	2.6	4.3	1.4	1.2	.9	18.6	2.8	370	2.4	3.2	3.9
6	1.2	3.8	2.8	3.0	1.2	.9	10.0	2.6	254	2.4	6.2	3.2
7	1.2	2.2	2.2	2.6	1.1	.8	17.8	2.5	185	2.4	4.4	5.3
8	1.2	1.8	2.0	2.2	1.1	2.7	25	15.6	44	2.4	69	40
9	1.2	1.5	3.6	2.0	1.1	33	6.8	13.0	24	2.4	13.0	31
10	1.3	1.4	3.2	1.8	1.1	38	41	4.6	8.0	2.2	16.6	6.2

Discharge, in million gallons a day, of Waialae River at elevation 3,700 feet, near Waimea, Kauai, for the year ending June 30, 1927—Continued

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
11	1.3	4.8	3.7	1.6	1.1	10.0	6.2	8.3	5.6	2.2	4.8	3.9
12	1.3	2.9	2.2	1.3	1.1	5.3	4.1	5.0	6.2	3.5	3.5	3.0
13	1.3	1.8	1.8	1.3	1.3	5.0	3.2	3.5	13.8	17.8	14.1	2.6
14	1.4	1.6	5.9	1.2	48	5.3	2.6	3.0	14.6	59	50	2.5
15	3.1	1.5	6.5	1.3	4.8	3.5	2.2		43	128	62	2.5
16	7.3	2.0	3.5	1.2	11.5	2.4	2.4	30	71	11.5	181	2.6
17	4.3	3.8	2.0	1.2	7.2	1.9	2.8		11.0	5.6	228	2.8
18	7.5	3.3	1.8	1.1	3.5	1.6	2.8		6.2	5.3	40	12.0
19	6.6	2.0	1.6	1.1	4.3	2.4	3.0		4.8	7.1	15.4	3.9
20	10.0	1.6	2.6	1.1	2.4	142	3.4		3.9	4.1	6.8	2.5
21	4.3	3.6	3.9	1.1	1.8	116	34	3.5	3.2	3.0	4.8	2.2
22	6.5	4.3	2.0	1.1	1.4	18.7	13.0		4.3	2.2	50	2.2
23	9.5	2.2	2.4	1.3	1.3	8.0	15.0		111	2.5	19.5	2.2
24	10.6	2.0	5.3	1.1	1.3	86	15.9	2.5	22	6.2	7.1	2.5
25	11.0	5.0	38	1.2	1.2	78	100	2.5	6.8	3.0	4.8	19.2
26	4.3	3.3	15.4	2.8	1.0	26	42	2.4	7.7	2.5	5.9	7.1
27	2.6	6.5	28	2.0	.8	6.8	10.5	2.4	9.7	3.2	4.8	4.3
28	2.0	11.4	8.7	1.6	.8	4.6	6.5	2.4	9.5	2.6	20	3.5
29	1.6	7.3	3.7	1.3	.9	3.7	20	-------	5.9	2.2	24	3.0
30	1.5	57	3.5	1.3	.9	4.1	5.9	-------	3.9	2.2	9.0	2.5
31	1.5	5.0	-------	1.3	-------	3.9	4.1	-------	3.0	-------	7.1	-------

NOTE.—Discharge estimated Feb. 13 and 14. Braced figures give estimated mean discharge for periods indicated. Estimates made by comparison with record of Koaie Stream; gage-height record either faulty or missing.

Monthly discharge of Waialae River at elevation 3,700 feet, near Waimea, Kauai, for the year ending June 30, 1927

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July	11.0	1.2	3.61	5.59	112	343
August	57	1.4	5.45	8.43	169	518
September	38	1.6	5.82	9.00	175	536
October	3.0	1.1	1.61	2.49	49.8	153
November	48	.8	3.61	5.59	108	332
December	142	.8	19.8	30.6	615	1,880
January	100	2.2	18.5	28.6	573	1,760
February	-------	2.4	7.02	10.9	197	603
March	370	2.4	43.8	67.8	1,360	4,170
April	128	2.2	9.96	15.4	299	917
May	228	2.0	28.5	44.1	883	2,710
June	40	2.2	6.75	10.4	202	621
The year	370	.8	13.0	20.1	4,740	14,500

KOKEE DITCH NEAR WAIMEA, KAUAI

LOCATION.—About 1,000 feet west of road and 10½ miles north of Waimea.

RECORDS AVAILABLE.—September 17, 1926, to June 30, 1927.

EQUIPMENT.—Stevens continuous water-stage recorder on left bank. Discharge measurements made from foot plank just below gage.

CHANNEL AND CONTROL.—Ditch cut in earth, straight above and below gage. Control is a sharp-crested 6-foot suppressed weir.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 65 million gallons a day, or 101 second-feet, at 9 a. m. May 16 (gage height

from water-stage recorder, 2.62 feet); minimum discharge, 2.4 million gallons a day, or 3.7 second-feet, several hours November 11–13 (gage height, 0.32 foot).

DIVERSIONS AND REGULATION.—Flow regulated by head gates.

OBJECT OF STATION.—This station measures water diverted from Territorial lands and leased to Kekaha Sugar Co.

UTILIZATION.—Water used for irrigation of sugar cane.

ACCURACY.—Stage-discharge relation permanent. Rating curve very well defined, based on weir formula and 14 discharge measurements covering a range from 5.5 to 58 million gallons a day; eight of these measurements were made during year. Operation of water-stage recorder satisfactory. Daily discharge ascertained by applying to rating table mean daily gage height determined from recorder graph by inspection or, for days of considerable fluctuation, by averaging discharge for intervals of day. Records excellent.

Kokee ditch, at elevation 3,400 feet, diverts water from all streams tributary to Waimea River east of and including Mohihi Stream for irrigation of the upper part of Kekaha Sugar Co.'s plantation.

Discharge, in million gallons a day, of Kokee ditch near Waimea, Kauai, for the year ending June 30, 1927

Day	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	------	6.3	3.0	3.5	8.1	7.1	7.6	31	13.3	16.1
2	------	5.2	2.8	3.4	32	6.8	16.0	25	12.6	14.7
3	------	4.5	3.2	3.3	19.9	6.6	33	19.8	12.0	17.2
4	------	4.2	3.5	6.3	36	6.3	47	17.4	11.5	17.4
5	------	4.1	3.0	13.1	34	6.2	53	15.6	11.4	17.4
6	------	4.4	2.8	5.7	21	5.8	54	14.2	13.7	22
7	------	4.4	2.7	4.1	17.4	5.7	35	13.5	14.3	28
8	------	4.0	2.7	4.1	28	5.9	35	13.1	30	31
9	------	4.1	2.6	10.4	16.1	13.5	27	22	27	24
10	------	4.0	2.6	24	39	19.3	18.2	15.4	18.6	15.4
11	------	3.5	2.4	13.9	23	11.8	19.8	12.6	13.1	12.2
12	------	3.3	2.4	17.4	14.2	12.2	22	26	11.4	11.0
13	------	3.3	5.6	8.3	11.6	7.7	32	56	26	10.3
14	------	3.3	37	6.9	10.3	6.3	26	60	46	9.9
15	------	3.2	12.8	6.9	9.3	15.4	19.8	43	56	9.3
16	------	3.2	25	5.7	8.8	41	30	42	49	18.8
17	4.1	3.0	18.3	4.8	8.4	24	25	34	55	21
18	4.0	2.9	12.8	4.4	8.3	15.4	15.4	24	56	37
19	5.4	2.9	21	4.1	7.6	12.6	13.3	35	47	14.9
20	5.2	2.8	8.8	8.7	7.1	11.0	12.0	27	32	10.5
21	4.4	2.9	6.6	38	29	10.1	11.4	26	27	9.2
22	3.8	3.2	5.6	19.1	41	9.3	31	22	34	8.7
23	3.8	9.2	5.2	9.7	23	8.8	48	33	40	8.6
24	4.8	9.9	5.2	18.9	16.1	21	44	40	28	15.4
25	29	25	5.0	20	31	12.2	32	22	21	50
26	24	19.8	4.7	24	23	9.2	31	18.7	18.7	22
27	30	6.0	4.4	12.0	14.2	8.3	27	17.4	17.4	11.8
28	19.6	8.1	4.2	11.2	9.9	7.7	39	16.1	24	23
29	9.0	5.0	4.0	9.9	9.2	------	31	15.6	26	11.0
30	7.3	3.7	3.7	26	9.5	------	22	14.2	17.4	9.5
31	------	3.2	------	13.4	7.9	------	21	------	16.1	------

Monthly discharge of Kokee ditch near Waimea, Kauai, for the year ending June 30, 1927

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
September (14 days)	30	3.8	11.0	17.0	154	473
October	25	2.8	5.57	8.62	173	530
November	37	2.4	7.45	11.5	224	686
December	38	3.3	11.7	18.1	361	1,110
January	41	7.1	18.5	28.6	574	1,760
February	41	5.7	11.7	18.1	327	1,010
March	54	7.6	28.3	43.8	878	2,690
April	60	12.6	25.7	39.8	772	2,370
May	56	11.4	26.6	41.2	826	2,530
June	50	8.6	17.6	27.2	527	1,620
The period	60	2.4	16.8	26.0	4,820	14,800

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

LOCATION.—In Waimea Canyon, half a mile below intake from Waimea River, 1,000 feet below Kekaha Sugar Co.'s weir, and 8 miles by trail north of Waimea.

RECORDS AVAILABLE.—October 26, 1917, to June 30, 1927. Staff gage at flume No. 4, 1 mile below intake, March 18, 1916, to August 2, 1917, and at weir, 1,000 feet above present site, November 8, 1907, to June 30, 1915.

EQUIPMENT.—Stevens continuous water-stage recorder on right bank. Discharge measurements made from plank across ditch about 500 feet above gage.

CHANNEL AND CONTROL.—Ditch is about 9 feet wide cut in soft lava rock and lined with concrete; straight for 1,000 feet above and 300 feet below gage. Control is concrete-lined section of ditch in tunnel; subject to shifts.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 61 million gallons a day, or 94 second-feet, at 2.30 a. m. January 21 (gage height from water-stage recorder, 3.98 feet); minimum discharge, 0.05 million gallons a day, or 0.1 second-foot, several hours March 5, 6, 11, and 13 (gage height, 0.72 foot).

1907–1927: Maximum discharge recorded, 67 million gallons a day, or 104 second-feet, January 4, 1921, and March 6, 1922; minimum discharge, no flow, occasionally, when water is shut out of ditch.

DIVERSIONS AND REGULATION.—Flow regulated by head gates.

OBJECT OF STATION.—To measure water diverted from Waimea River by ditch. Land and water owned by Territory and leased to Kekaha Sugar Co.

ACCURACY.—Stage-discharge relation changed, presumably, at time of high water September 19. The two rating curves used are well defined between 20 and 60 million gallons a day; extensions beyond, somewhat uncertain. Curve used prior to September 19 checked very closely at 33 million gallons a day by one discharge measurement. Curve used subsequent to September 19 checked very closely by four discharge measurements well distributed and covering a range from 19 to 48 million gallons a day. Operation of water-stage recorder satisfactory except as indicated in footnote to daily-dicharge table. Daily discharge ascertained by applying to rating table mean daily gage height determined from recorder graph by inspection or, for days of considerable fluctuation, by averaging discharge for intervals of day. Records good for ordinary stages except those estimated, which are fair; extremely low-stage records poor.

Kekaha ditch diverts water from Waimea River at a point 8 miles by trail north of Waimea, 500 feet above gaging station on Waimea River at camp No. 1, and at an elevation of about 550 feet. The course of the ditch is roughly parallel to the river for a distance downstream of 4 miles; here the ditch crosses the river and continues roughly parallel to it for 2½ miles to a point half a mile north of Waimea at an elevation of about 400 feet. Here at the lower end of the river valley the ditch swings eastward and continues roughly parallel to the coast line for a distance of about 10 miles.

Discharge, in million gallons a day, of Kekaha ditch at camp No. 1, near Waimea, Kauai, for the year ending June 30, 1927

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	26	19.0		30	19.8	19.8	11.8	34	24	24	39	
2	25	33		26	19.8	18.5	12.6	32	27	23	39	
3	25	32		25	18.5	18.5	18.5	29	32	25	36	
4	25	26	32	24	18.5	18.5	30	29	28	24	35	
5	25	22		23	18.5	19.8	36	28	13.6	26	39	
6	25			23	18.5	19.8	41	27	13.5	44	44	44
7	25		28	27	19.8	18.5	41	26	16.0	41	44	
8	25		28	25	19.8	21	41	30	14.5	41	44	
9	25		31	24	18.5	42	30	39	10.2	41	44	
10	27		38	23	18.5	44	15.8	31	10	41	44	
11	27		36	23	17.4	30	22	18.1	26	39	44	
12	25		32	21	18.5	24	30	36	33	39	41	
13	25		28	21	18.5	29	35	36	27	28	46	39
14	25		31	21	46	29	34	32	41	25	44	36
15	27		42	21	44	29	32	29	44	20	41	35
16	45		28	19.8	38	26	30	17.3	41	24	32	36
17	38		32	19.8	46	24	30	6.3	41	27	25	39
18	28		32	19.8	33	28	33	9.1	41	39	33	41
19	32	30	37	19.8	40	27	32	12.8	41	41	34	44
20	46		34	19.8	30	22	30	17.4	41	39	34	41
21	46		35	19.8	25	19.3	34	17.4	41	41	36	35
22	40		28	19.8	23	19.8	36	19.8	29	44	33	33
23	48		26	19.8	22	18.5	36	26	16.2	46	41	33
24	51		29	22	21	16.2	36	33	19.8	44		32
25	48		46	22	21	17.4	36	31	18.5	44		39
26	43		49	40	19.8	19.8	36	29	19.8	46		46
27	33		46	27	19.8	19.8	36	23	18.5	44	44	44
28	30		46	23	19.8	24	41	16.7	18.5	41		41
29	28		36	21	19.8	26	44	-------	18.5	41		39
30	24		30	19.8	18.5	28	41	-------	21	39		36
31	20		-------	19.8	-------	17.8	41	-------	23	-------		-------

NOTE.—Discharge estimated Mar. 10 and 11. Braced figures give estimated mean discharge for periods indicated. Estimates made by comparison with record of flow for this ditch below tunnel No. 12 near Waimea; recorder not operating.

Monthly discharge of Kekaha ditch at camp No. 1, near Waimea, Kauai, for the year ending June 30, 1927

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July	51	20	31.7	49.0	982	3,020
August	----------	19.0	29.4	45.5	912	2,800
September	49	26	34.0	52.6	1,020	3,130
October	40	19.8	22.9	35.4	710	2,180
November	46	17.4	24.4	37.8	731	2,250
December	44	16.2	23.7	36.7	735	2,250
January	44	11.8	32.3	50.0	1,000	3,070
February	39	6.3	25.5	39.5	715	2,190
March	44	----------	26.1	40.4	809	2,480
April	46	20	36.0	55.7	1,080	3,310
May	46	25	40.1	62.0	1,240	3,810
June	46	32	40.6	62.8	1,220	3,740
The year	51	6.3	30.6	47.3	11,200	34,200

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

LOCATION.—7 miles below intake from Waimea River, 2½ miles by trail from Waimea, and just above diversion for Waimea domestic supply.

RECORDS AVAILABLE.—July 15, 1921, to June 30, 1927. April 7, 1908, to November 30, 1914, and July 20, 1916, to July 15, 1921, at site half a mile downstream.

EQUIPMENT.—Stevens continuous water-stage recorder on right bank. Discharge measurements made from plank across ditch at gage.

CHANNEL AND CONTROL.—Channel cut in lava rock; fairly straight near gage. Control is section of ditch; not well defined; shifts occasionally.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 62 million gallons a day, or 96 second-feet, at 4.30 a. m. March 5 (gage height from water-stage recorder, 4.53 feet); minimum discharge, 8.9 million gallons a day, or 13.8 second-feet, from 3 to 4 p. m. January 2 (gage height, 1.72 feet).

1916–1927: Maximum discharge recorded, 64 million gallons a day, or 99 second-feet, at 8.30 a. m. December 22, 1921 (gage height from water-stage recorder, 4.40 feet); minimum discharge, no flow occasionally when water was shut out of ditch.

DIVERSIONS AND REGULATION.—Flow regulated by head gates.

OBJECT OF STATION.—To determine discharge above first important lateral, also determine ditch losses between intake and station. Territorial land and water.

UTILIZATION.—Water used for irrigation of sugar cane, rice, and taro and for domestic supply.

ACCURACY.—Stage-discharge relation very unstable during year. Shifting-control method used until February 15 and another change occurred, presumably, at time of high water March 14. Basic rating curves used fairly well defined above 15 million gallons a day; extension below somewhat uncertain. Prior to February 15 shifting-control method is based on five discharge measurements well distributed and covering a range from 15 to 43 million gallons a day. Curves used subsequent to February 15 checked very closely by one discharge measurement at 5 million gallons a day made March 4 and one at 31 million gallons a day made July 18, 1927. Operation of water-stage recorder satisfactory except as indicated in footnote to daily-discharge table. Daily discharge ascertained by applying to rating table mean daily gage height determined from recorder graph by inspection or, for days of considerable fluctuation, by averaging discharge for intervals of day. Records poor.

For description of ditch see Kekaha ditch at camp No. 1, near Waimea, Kauai (p. 21).

Discharge, in million gallons a day, of Kekaha ditch below tunnel No. 12, near Waimea, Kauai, for the year ending June 30, 1927

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	24	22	34	27	19.2	17.5	10.9	36		24	37	41
2	23	32	34	23	16.7	17.5	9.6	32		22	39	41
3	22	36	25	22	16.7	17.5	15.0	30		25	37	39
4	22	30	23	20	16.7	17.5	25	29		23	36	41
5	22	27	32	20	16.7	15.8	36	27		22	36	41
6	22	26	27	20	16.7	15.8	37	26		41	41	41
7	22	26	22	24	16.7	15.8	39	26	24	41	44	39
8	22	24	19.2	24	17.5	16.6	39	29		41	43	41
9	22	23	22	22	17.5	37	32	41		41	44	41
10	23	22	34	21	17.5	43	17.5	36		41	43	41
11	26	24	32	20	16.7	32	19.2	15.8		41	43	39
12	24	30	29	19.2	17.5	21	27	36		37	41	37
13	22	24	22	18.3	17.5	29	32	39	36	32	43	36
14	22	22	20	17.5	43	29	32	34	44	24	43	34
15	23	22	44	17.5	46	29	30	36	44	22	41	32

Discharge, in million gallons a day, of Kekaha ditch below tunnel No. 12, near Waimea, Kauai, for the year ending June 30, 1927—Continued

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
16	36	22	20	16.7	37	26	29	24	43	22	36	34
17	37	25	27	16.7	46	22	30		43	26	24	36
18	30	27	26	15.8	36	26	32		43	36	30	39
19	30	25	32	15.8	41	27	30		43	41	34	41
20		23	34	15.8	30	24	30		43	39	32	36
21	41	22	34	16.7	24	18.3	34		44	41	36	32
22		30	27	16.7	22	18.3	36	22	34	41	32	30
23		27	21	17.5	21	18.3	36		22	44	37	29
24	44	23	22	19.2	20	15.0	37		20	44	39	29
25	43	23	43	18.3	19.2	14.2	37		20	43	39	37
26	39	29	46	43	18.3	18.3	36		20	43	39	41
27	32	25	44	30	18.3	16.7	36		19.2	43	41	37
28	27	32	44	25	18.3	21	39		18.3	43	41	36
29	25	37	37	22	17.5	25	43	-------	20	41	41	34
30	24	39	29	22	17.5	26	41	-------	20	37	39	32
31	23	41	-------	22	-------	23	39	-------	22	-------	39	-------

NOTE.—Braced figures, which give mean discharge for periods indicated, estimated by comparison with record of this ditch at camp No. 1 near Waimea; recorder not operating or gage-height record faulty owing to obstructed intake to stilling well.

Monthly discharge of Kekaha ditch below tunnel No. 12, near Waimea, Kauai, for the year ending June 30, 1927

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July	44	22	28.9	44.7	895	2,750
August	41	22	27.1	41.9	840	2,580
September	46	19.2	30.2	46.7	905	2,780
October	43	15.8	20.9	32.3	649	1,990
November	46	16.7	23.3	36.1	699	2,150
December	43	14.2	22.4	34.7	693	2,130
January	43	9.6	31.2	48.3	966	2,970
February	41	15.8	27.2	42.1	761	2,340
March	44	18.3	28.6	44.3	886	2,720
April	44	22	35.4	54.8	1,060	3,260
May	44	24	38.4	59.4	1,190	3,650
June	41	29	36.9	57.1	1,110	3,400
The year	46	9.6	29.2	45.2	10,700	32,700

HANAPEPE RIVER AT KOULA, NEAR ELEELE, KAUAI

LOCATION.—Just below junction with Manuahi Stream, 500 feet below siphon at Koula, and 4 miles northeast of Eleele.

RECORDS AVAILABLE.—May 13, 1917, to January 22, 1921; and December 16, 1926, to June 30, 1927. August 16, 1910, to December 15, 1916, at site half a mile farther upstream.

EQUIPMENT.—Au continuous water-stage recorder on left bank. Discharge measurements made by wading near gage.

CHANNEL AND CONTROL.—One channel at all stages, fairly straight for 1,000 feet above and 300 feet below gage; right bank sloping and covered with brush, is overflowed at high stages; left bank nearly vertical; stream bed strewn with small boulders and gravel. Control is a riffle over small boulders; subject to shifts.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 1,710 million gallons a day, or 2,650 second-feet, at 12.15 p. m. December 22

(gage height from water-stage recorder, 7.25 feet); minimum discharge, 7.5 million gallons a day, or 11.6 second-feet, from noon December 15 to 9 p. m. December 16 (gage height, 0.41 foot).

1910–1921; 1926–1927: Maximum discharge recorded, at least 5,000 million gallons a day, or 7,740 second-feet, on December 18, 1916 (at old station above mouth of Manuahi Stream, gage height not known as station was destroyed by this flood); minimum discharge, 7.1 million gallons a day, or 11.0 second-feet, December 30 and 31, 1913 (gage height, 0.95 foot).

DIVERSIONS AND REGULATION.—Hanapepe ditch diverts water at a point about 3 miles above station. (Record of Hanapepe ditch not published in this report owing to insufficient available data for developing rating curve). This diversion is regulated by head gates.

OBJECT OF STATION.—To determine discharge of stream at boundary between fee-simple lands above and Territorial lands below.

UTILIZATION.—Low-water flow used for irrigation of rice and taro.

ACCURACY.—Stage-discharge relation permanent except from December 15 to January 20 when shifting-control method was used. Basic rating curve fairly well defined below 200 million gallons a day; extension above uncertain. This curve checked very closely at 52 and 24 million gallons a day by one discharge measurement in March and one shortly after June 30. Shifting-control method based on a discharge measurement of 8 and another of 17 million gallons a day. Operation of water-stage recorder very satisfactory during year. Daily discharge ascertained by applying to rating table mean daily gage height determined from recorder graph by inspection or, for days of considerable fluctuation, by averaging discharge for intervals of day. Records fair for ordinary stages; extremely high stage records poor.

Discharge, in million gallons a day, of Hanapepe River, at Koula, near Eleele, Kauai, for the year ending June 30, 1927

Day	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	------	15.5	48	11.6	57	39	102
2	------	14.1	61	11.4	49	18.4	73
3	------	124	35	17.4	37	12.5	68
4	------	158	22	120	17.5	15.7	51
5	------	78	19.2	626	18.4	30	39
6	------	58	17.5	541	14.8	40	34
7	------	88	17.0	394	14.1	36	40
8	------	121	46	220	17.9	169	104
9	------	78	49	305	15.9	88	142
10	------	96	25	121	16.6	114	63
11	------	45	19.7	94	16.6	43	44
12	------	27	22	83	13.4	34	36
13	------	24	24	88	24	94	30
14	------	21	13.4	78	88	210	26
15	------	17.9	85	108	174	180	28
16	7.6	17.9	100	244	38	456	35
17	7.9	27	34	109	48	576	27
18	15.7	16.2	18.4	78	38	250	90
19	10.6	28	15.2	48	22	134	34
20	69	71	14.4	37	16.2	94	26
21	172	150	14.1	31	13.4	63	22
22	405	44	12.7	32	12.5	266	21
23	121	44	12.5	262	12.2	192	24
24	180	46	12.5	118	11.9	110	20
25	188	178	11.9	83	11.6	94	47
26	120	225	11.6	99	11.1	78	27
27	73	94	11.6	103	16.3	58	22
28	63	78	11.6	88	43	88	21
29	31	165	------	63	20	116	22
30	18.4	78	------	56	54	83	21
31	16.2	54	------	50	------	83	------

Monthly discharge of Hanapepe River at Koula, near Eleele, Kauai, for the year ending June 30, 1927

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
December (16 days)	405	7.6	93.6	145	1,500	4,600
January	225	14.1	73.6	114	2,280	7,000
February	100	11.6	28.0	43.3	784	2,410
March	626	11.4	139	215	4,320	13,200
April	174	11.1	31.4	48.6	942	2,890
May	576	12.5	125	193	3,860	11,900
June	142	20	44.6	69.0	1,340	4,110
The period	626	7.6	76.3	118	15,000	46,100

SOUTH FORK OF WAILUA RIVER NEAR LIHUE, KAUAI

LOCATION.—One-third of a mile above Wailua Falls and about 5 miles northeast of Lihue. Prior to November 18, 1918, station was one-third of a mile farther upstream.

RECORDS AVAILABLE.—December 10, 1911, to June 30, 1927.

EQUIPMENT.—Stevens continuous water-stage recorder on right bank. Discharge measurements made from cable or by wading near gage.

CHANNEL AND CONTROL.—One channel at all stages; straight for 600 feet above and 300 feet below gage. Right bank steep and high, left bank slopes gently. Control composed of solid rock ledge; somewhat shifting owing to boulders lodging in water-worn grooves at left end of control.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 12,800 million gallons a day, or 19,800 second-feet, at 9.45 a. m. May 16 (gage height from water-stage recorder, 8.48 feet); minimum discharge, 1.7 million gallons a day, or 2.6 second-feet, from 3 to 7 p. m. December 4 (gage height, 1.15 feet).

1911–1927: Maximum discharge recorded, 29,000 million gallons a day, or 44,900 second-feet, at 7.25 a. m. January 16, 1920 (gage height from water-stage recorder, 11.25 feet); minimum discharge, 1.2 million gallons a day, or 1.9 second-feet, from 5 to 8 p. m. May 3, 1926 (gage height, 1.17 feet).

DIVERSIONS AND REGULATION.—Several diversions for irrigation and power development.

OBJECT OF STATION.—To determine feasibility of diversion for homesteads after stream enters Territorial lands.

UTILIZATION.—Water going to waste, except a small amount used for irrigation of rice and taro.

ACCURACY.—Stage-discharge relation changed at time of flood May 16. Rating curve used prior to May 16 well defined below 10 million gallons a day and poorly defined above; was checked closely by five discharge measurements well distributed and covering a range from 2 to 7 million gallons a day. Curve used subsequent to May 16 fairly well defined below 800 million gallons a day and was checked closely by four discharge measurements made shortly after June 30 and covering a range from 3 to 45 million gallons a day. Operation of water-stage recorder satisfactory during year. Daily discharge

ascertained by applying to rating table mean daily gage height determined from recorder graph by inspection or, for days of considerable fluctuation, by averaging discharge for intervals of day. Records prior to May 16 good for low stages and poor for high stages; subsequent records good.

Discharge, in million gallons a day, of South Fork of Wailua River near Lihue, Kauai, for the year ending June 30, 1927

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	2.8	3.6	11.3	9.0	3.5	2.0	28	54	4.1	60	100	214
2	2.9	3.6	9.9	7.4	3.5	2.0	34	85	4.1	56	58	172
3	3.2	3.5	5.6	5.5	3.5	1.9	222	60	3.9	40	44	156
4	3.3	3.2	7.8	5.4	3.6	1.8	309	49	64	36	39	126
5	3.1	3.3	9.1	6.1	3.3	1.8	65	42	730	34	62	108
6	2.9	2.9	7.8	4.9	2.9	1.8	55	36	1,010	27	48	92
7	2.8	2.8	6.2	3.8	2.9	1.8	73	31	358	15.8	30	108
8	2.6	2.5	5.3	3.6	2.7	2.4	149	66	205	48	135	208
9	2.7	2.3	5.5	3.6	2.5	4.8	117	89	320	50	88	256
10	2.9	2.5	19.2	3.6	2.5	8.0	126	51	166	40	154	116
11	2.9	73	13.2	3.3	2.5	63	55	43	97	33	59	90
12	3.2	4.4	15.4	3.2	2.5	43	46	36	81	492	46	78
13	3.3	3.2	11.0	3.2	2.7	17.1	35	28	83	322	378	63
14	3.5	2.7	352	3.1	29	11.2	28	18.6	59	1,020	838	41
15	3.6	2.7	195	3.3	8.7	7.8	22	131	59	1,310	445	25
16	8.9	3.3	73	3.2	9.0	3.3	9.9	143	196	261	2,040	43
17	7.5	3.2	61	3.2	14.5	6.2	13.3	28	94	274	908	34
18	10.2	2.8	41	3.3	5.1	3.2	6.6	14.8	96	196	758	144
19	8.4	2.5	40	3.2	3.1	3.3	24	14.8	49	125	420	46
20	5.1	2.3	40	3.2	2.6	55	34	13.6	40	88	279	22
21	5.1	8.5	36	3.6	2.5	235	247	14.1	35	72	191	10.6
22	3.9	5.4	26	3.6	2.3	483	94	5.7	37	66	316	13.8
23	4.9	2.9	18.1	3.3	2.2	111	142	4.4	498	60	390	12.0
24	5.5	2.6	22	3.5	2.2	85	102	4.6	242	58	249	13.3
25	4.6	14.2	37	34	2.1	114	196	4.3	156	38	234	31
26	4.1	4.6	21	21	2.2	69	370	4.1	153	10.3	178	32
27	4.4	3.6	25	7.5	2.6	44	162	3.6	140	316	146	17.6
28	4.3	3.1	26	4.7	2.5	20	123	3.6	118	313	167	12.5
29	4.3	6.4	14.6	3.9	2.2	29	247	-------	80	91	234	9.2
30	4.1	249	9.4	3.9	2.0	28	117	-------	58	108	167	9.0
31	3.8	15.9	-------	3.8	-------	29	80	-------	65	--------	167	-------

Monthly discharge of South Fork of Wailua River near Lihue, Kauai, for the year ending June, 30, 1927

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July	10.2	2.6	4.35	6.73	135	414
August	249	2.3	14.4	22.3	446	1,370
September	352	5.3	38.8	60.0	1,160	3,570
October	34	3.1	5.74	8.88	178	546
November	29	2.0	4.45	6.89	133	409
December	483	1.8	48.0	74.3	1,490	4,570
January	370	6.6	107	166	3,330	10,200
February	143	3.6	38.5	59.6	1,080	3,310
March	1,010	3.9	171	265	5,300	16,300
April	1,310	10.3	189	292	5,660	17,400
May	2,040	30	302	467	9,370	28,700
June	256	9.0	76.8	119	2,300	7,070
The year	2,040	1.8	83.8	130	30,600	93,900

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

LOCATION.—1½ miles above intake of Kanaha ditch and 7¾ miles (10 miles by road and trail) northwest of Lihue.

RECORDS AVAILABLE.—September 21, 1914, to June 30, 1927. August 1 to October 28, 1910, and December 28, 1910, to September 25, 1914, at old site at elevation 500 feet.

EQUIPMENT.—Stevens continuous water-stage recorder on right bank. Discharge measurements made by wading or from cable at gage.

CHANNEL AND CONTROL.—One channel at all stages; straight for 80 feet above and 50 feet below gage. Right bank steep and high; left bank slopes gently. Control composed of boulders; fairly permanent.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 1,370 million gallons a day, or 2,120 second-feet, at 5.45 a. m. April 15 (gage height, from water-stage recorder, 6.86 feet); minimum discharge, 9.3 million gallons a day, or 14.4 second-feet, at 1 p. m. November 23 (gage height, 0.26 foot).

1914–1927.—Maximum discharge recorded, 2,370 million gallons a day, or 3,670 second-feet, at 3.15 a. m. February 11, 1925 (gage height from water-stage recorder, 9.10 feet); minimum discharge, about 7.7 million gallons a day, or 11.9 second-feet, from 4 to 5 p. m. April 27, 1926 (gage height, 0.06 foot).

DIVERSIONS AND REGULATION.—Water is diverted from Hanalei River into this drainage basin by Hanalei Tunnel to compensate for water diverted out of the basin by North Wailua ditch.

OBJECT OF STATION.—To determine feasibility of further diversion above or near this elevation. Territorial land and water. Important in relation to water supply for homesteads.

UTILIZATION.—Normal flow used for irrigation of sugar cane.

ACCURACY.—Stage-discharge relation permanent during year. Rating curve well defined between 10 and 100 million gallons a day; extension above uncertain. This curve checked very closely by four discharge measurements well distributed during the year and covering a range from 15 to 50 million gallons a day. Operation of water-stage recorder satisfactory. Daily discharge ascertained by applying to rating table mean daily gage height determined from recorder graph by inspection or, for days of considerable fluctuation, by averaging discharge for intervals of day. Records good for ordinary stages; high-stage records poor.

Discharge, in million gallons a day, of North Fork of Wailua River at elevation 650 feet, near Lihue, Kauai, for the year ending June 30, 1927

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	15.3	23	69	21	18.4	14.0	28	32	16.3	38	112	77
2	15.1	19.8	34	27	17.8	13.8	69	41	20	32	76	69
3	17.2	19.4	27	22	19.0	13.6	232	28	29	28	63	58
4	16.9	17.2	72	21	18.7	15.8	157	23	100	26	75	56
5	15.1	22	79	21	16.9	14.9	88	23	305	40	72	63
6	14.9	17.2	49	29	18.1	14.0	70	26	288	26	81	50
7	18.5	22	31	24	16.6	13.8	98	26	159	23	81	62
8	15.1	15.8	31	20	15.8	31	154	31	157	51	135	91
9	17.2	14.9	31	20	15.1	42	117	29	198	29	90	120
10	15.6	15.6	64	19.4	14.9	63	103	24	88	32	133	43
11	33	95	63	18.7	14.9	93	55	26	56	27	67	34
12	16.0	24	34	17.2	18.1	37	43	21	41	150	102	31
13	14.7	18.4	69	16.6	26	26	54	32	38	143	256	29
14	16.3	18.1	213	16.6	125	22	34	17.2	43	423	311	35
15	18.1	17.2	139	16.0	27	22	27	87	52	541	226	38

Discharge, in million gallons a day, of North Fork of Wailua River at elevation 650 feet, near Lihue, Kauai, for the year ending June 30, 1927—Continued

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
16	31	22	62	15.8	25	25	35	56	134	141	401	61
17	23	21	46	15.6	21	22	29	23	60	168	310	49
18	28	16.9	42	16.0	22	21	25	19.6	58	162	216	92
19	16.6	16.0	34	15.3	19.8	46	75	18.4	41	110	152	43
20	68	15.8	63	15.1	16.2	93	112	17.4	42	81	122	46
21	17.8	44	34	16.0	16.0	175	104	16.5	37	72	92	43
22	21	22	27	17.5	15.6	276	57	15.4	40	62	222	43
23	54	16.6	28	18.7	14.6	99	113	15.1	176	86	225	46
24	27	21	54	21	14.9	140	74	18.7	106	84	144	46
25	25	42	77	169	14.9	130	154	16.0	106	58	126	67
26	18.4	25	43	54	14.9	83	162	14.8	147	54	99	40
27	17.2	25	72	28	15.1	46	65	15.3	105	189	50	39
28	16.9	36	38	25	14.9	43	72	14.6	72	201	61	34
29	20	51	30	22	14.2	37	116	-------	51	101	69	32
30	15.8	171	27	21	14.0	36	62	-------	46	113	60	32
31	14.9	45	-------	21	-------	32	37	-------	39	-------	68	-------

Monthly discharge of North Fork of Wailua River at elevation 650 feet, near Lihue, Kauai, for the year ending June 30, 1927

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July	68	14.7	21.7	33.6	674	2,060
August	171	14.9	30.6	47.3	950	2,910
September	213	27	56.1	86.8	1,680	5,160
October	169	15.1	25.8	39.9	800	2,450
November	125	14.0	21.2	32.8	635	1,950
December	276	13.6	56.1	86.8	1,740	5,340
January	232	25	84.5	131	2,620	8,040
February	87	14.6	26.0	40.2	727	2,230
March	305	16.3	91.9	142	2,850	8,740
April	541	23	110	170	3,290	10,100
May	401	50	139	215	4,300	13,200
June	120	29	523	80.9	1,570	4,820
The year	541	13.6	59.8	92.5	21,800	67,000

KANAHA DITCH NEAR LIHUE, KAUAI

LOCATION.—A quarter of a mile below point where Kauai Electric Co.'s power line crosses ditch and 6¾ miles (9 miles by road) northwest of Lihue.

RECORDS AVAILABLE.—March 5 to June 30, 1927. August 6, 1910, to July 25, 1921, at site about a third of a mile upstream and July 26, 1921, to March 3, 1926, at site about 1,000 feet upstream.

EQUIPMENT.—Stevens continuous water-stage recorder on left bank. Discharge measurements made near gage.

CHANNEL AND CONTROL.—Ditch emerges from tunnel just above gage, turns slightly to left just below, and enters semicircular iron flume about 15 feet below gage. The control is the end of the iron flume.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 41 million gallons a day, or 63 second-feet, at 1.30 a. m. September 14 (gage height from water-stage recorder, 3.06 feet); minimum discharge, 0.2 million gallons a day, or 0.3 second-foot, from 3 to 4 p. m. February 23 (gage height, 0.31 foot).

1910–1927: Maximum discharge recorded, that of September 14, 1926; minimum discharge, no flow, occasionally, when water was shut out of ditch.

DIVERSIONS AND REGULATION.—Flow regulated by head gates.

OBJECT OF STATION.—This station measures water diverted from North Fork of Wailua River and delivered to fee simple and Territorial lands leased to Lihue plantation. Territorial water.

UTILIZATION.—Water used for irrigation of sugar cane and for domestic supply.

ACCURACY.—Stage-discharge relation permanent during year. Rating curve, well defined between 1 and 25 million gallons a day, was checked closely by six discharge measurements well distributed during the year and covering a range from 0.5 to 15 million gallons a day. Operation of water-stage recorder fairly satisfactory during year. Daily discharge ascertained by applying to rating table mean daily gage height determined from recorder graph by inspection or, for days of considerable fluctuation, by averaging discharge for intervals of day. Records fair except those estimated, which are poor.

Kanaha ditch diverts from North Fork of Wailua River at a point 8½ miles above mouth of river, 9 miles north of Lihue, and at an elevation of about 600 feet. The course of the ditch is due east—almost parallel to the river—for a distance of about a third of a mile; it then turns sharply to the south and at a point 3 miles farther on it crosses South Fork of Wailua River and within a short distance joins Lihue ditch at an elevation of about 550 feet. Through Lihue ditch the water is carried around the base of Kilohana Crater and south for a distance of about 5 miles to a point near Lihue.

Discharge, in million gallons a day, of Kanaha ditch near Lihue, Kauai, for the year ending June 30, 1927

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	0.7	1.0	0.8	0.8	11.1	0.7	15.8	1.4	0.6	1.0	0.6	1.1
2	.7	.7	.8	.7	1.8	.6	18.1	1.4	.6	.7	.7	1.0
3	.8	.6	.7	1.0	1.1	.8	19.8	1.4	.6	5.4	.6	1.0
4	.7	.6	.8	1.1	.9	1.0	16.5	1.7	.6	14.2	.6	.8
5	4.5	3.5	.8	.8	1.0	1.0	18.1	1.6	.6	15.0	.7	.7
6	.7	2.3	.7	.7	1.0	.9	19.8	1.6	.7	15.0	.8	.7
7	.8	.8	.7	.6	.8	.8	21	1.6	.6	12.4	.7	.7
8	.8	.8	.6	.7	1.1	.9	23	1.6	.5	16.0	.7	.6
9	.7	.7	.8	1.0	1.2	9.8	22	1.4	.5	15.0	.6	.8
10	.6	.7	1.0	.9	.7	14.2	21	1.4	.5	15.8	.6	.9
11	6.8	11.7	.8	.8	.5	18.1	19.0	1.5	.5	14.8	.6	.7
12	3.2	1.3	.7	.8	1.2	16.5	9.1	1.0	.5	11.7	.7	.6
13	.7	.8	.6	1.0	1.6	15.0	1.7	.8	.5	2.5	.8	.6
14	.7	.6	7.0	1.0	1.7	5.1	9.1	.8	.7	4.2	4.4	.6
15	.7	.9	13.5	.8	.8	1.0	9.6	.8	.5	4.1	1.8	.5
16	7.1	1.2	13.5	.6	.8	4.8	1.1	.8	.4	1.6	3.6	.6
17	3.8	1.2	10.5	.6	.8	8.4	1.0	.7	.4	1.3	2.1	1.0
18	6.0	1.0	1.3	.6	.7	1.2	1.1	.6	.4	1.2	1.8	.8
19	2.8	1.0	1.2	.7	1.0	1.2	2.2	.6	.7	1.3	1.4	.6
20	10.1	1.0	1.0	.8	1.0	1.4	2.3	.8	1.0	1.1	1.2	.5
21	.7	8.7	.8	1.8	1.0	1.5	2.3	.5	.7	1.0	.9	.5
22	.8	1.4	1.0	2.5	1.0	3.0	2.3	.4	.7	.8	.8	.5
23	10.4	.8	1.3	2.5	.8	9.5	2.3	.4	.7	.8	.9	.5
24	7.6	.7	1.2	2.7	.7	15.0	2.2	.6	7.3	6.0	1.0	.5
25	1.0	7.6	1.2	10.9	.7	18.1	2.2	.6	16.5	7.3	1.4	.4
26	1.0	1.0	.8	15.0	1.1	11.6	2.0	.5	12.5	.7	1.2	.5
27		1.0	.8	15.0	1.2	8.7	1.8	.6	8.9	2.1	.8	4.9
28		7.2	.7	14.2	.9	16.5	1.7	.6	6.3	1.1	.7	5.6
29	1.0	15.0	.7	13.5	4.4	16.5	1.7	-------	4.9	.7	.6	5.5
30		19.0	.8	13.5	5.2	17.3	1.6	-------	1.2	.6	.7	6.1
31		5.0	-------	13.5	-------	16.5	1.4	-------	1.2	-------	1.1	-------

NOTE.—Braced figure gives mean discharge for period indicated, estimated from gage-height range line and by comparison with the record for North Fork of Wailua River; recorder clock stopped.

Monthly discharge of Kanaha ditch near Lihue, Kauai, for the year ending June 30, 1927

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July	10.4	0.6	2.56	3.96	79.4	244
August	19.0	.6	3.22	4.98	99.8	306
September	13.5	.6	2.24	3.47	67.1	206
October	15.0	.6	3.91	6.05	121	372
November	11.1	.5	1.59	2.46	47.8	146
December	18.1	.6	7.66	11.9	238	729
January	23	1.0	8.80	13.6	273	837
February	1.7	.4	.99	1.53	27.7	85
March	16.5	.4	2.33	3.61	72.3	222
April	16.0	.6	5.85	9.05	175	539
May	4.4	.6	1.13	1.75	35.1	108
June	6.1	.4	1.33	2.06	39.8	122
The year	23	.4	3.50	5.42	1,280	3,920

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

LOCATION.—1,200 feet above confluence with North Fork and 7¼ miles (9½ miles by road and trail) northwest of Lihue.

RECORDS AVAILABLE.—July 31, 1912, to June 30, 1927.

EQUIPMENT.—Stevens continuous water-stage recorder on right bank. Discharge measurements made by wading or from cable at gage.

CHANNEL AND CONTROL.—One channel at all stages; straight for 60 feet above and 400 feet below gage. Banks low and wooded. Control composed of boulders; subject to shifts.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 1,930 million gallons a day, or 2,990 second-feet, at 6 a. m. April 15 (gage height from water-stage recorder, 7.76 feet); minimum discharge, 4.4 million gallons a day, or 6.8 second-feet, several hours July 8–13 (gage height, 1.68 feet).

1912–1927: Maximum discharge recorded, 3,000 million gallons a day, or 4,640 second-feet, at 8 a. m. March 3, 1916 (gage height from water-stage recorder, 8.9 feet); minimum discharge, that of July 8–13, 1926.

DIVERSIONS AND REGULATION.—None.

OBJECT OF STATION.—To determine feasibility of diversion above this point. Territorial land and water.

UTILIZATION.—After joining North Fork of Wailua River ordinary flow is diverted for irrigation of sugar cane.

ACCURACY.—Stage-discharge relation practically permanent during year. Rating curve fairly well defined between 9 and 600 million gallons a day and was checked closely by three discharge measurements made in September, October, and January, and covering a range from 1 to 15 million gallons a day. Operation of water-stage recorder satisfactory except as indicated in footnote to daily-discharge table. Daily discharge ascertained by applying to rating table mean daily gage height determined from recorder graph by inspection or, for days of considerable fluctuation, by averaging discharge for intervals of day. Records good for ordinary stages and fair for high and low stages.

Discharge, in million gallons a day, of East Branch of North Fork of Wailua River near Lihue, Kauai, for the year ending June 30, 1927

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	5.2	8.8	26	16.6	11 1	9.2	19.6	34		31	41	48
2	5.4	9.2	16.6	16.6	10.2	9.2	61	35	16	28	33	47
3	6.9	8.7	14.0	15.1	11.1	8.8	345	31		25	28	42
4	6.3	8.0	17.2	15.1	10.2	8.3	157	27	41	24	28	40
5	5.6	9.6	58	13.6	9.2	9.2	58	25	79	39	31	31
6	4.9	8.3	26	13.0	10.4	8.8	36	23	110	24	28	28
7	4.7	8.3	18.2	13.0	10.2	8.3	36	21	69	21	28	35
8	4.5	7.6	16.6	12.1	9.7	10.1	52	22	44	27	46	52
9	5.6	6.9	18.2	12.1	9.2	18.7	45	20	55	22	38	52
10	5.9	6.6	29	11.6	8.3	27	58	18.2	52	19.6	48	33
11	6.3	8.0	33	12.1	8.3	38	31	18.2	37	23	28	28
12	5.6	6.9	22	11.1	10.2	18.0	28	16.9	31	308	50	26
13	4.7	6.6	47	9.7	18.1	13.0	27	16.1	29	232	77	24
14	5.6	6.6	486	9.7	141	12.1	19.6	15.6	27	606	295	22
15	5.9	6.9	92	9.2	27	11.1	17.7	38	24	804	204	22
16	12.1	10.2	50	8.8	21	23	20	19.6	60	170	458	27
17	14.8	9.2	39	8.3	17.2	17.7	17.2	15.6	38	138	265	25
18	10.2	7.3	45	8.8	15.1	16.1	15.1	14.6	36	112	168	48
19	6.3	6.6	38	8.0	14.0	40	20	14.0	28	72	104	23
20	6.3	6.3	31	8.0	13.0	44	56	13.5	27	51	72	20
21	5.6	15.7	26	8.0	12.1	203	84	13.5	25	43	55	18.9
22	6.8	11.4	22	8.0	11.6	188	47	13.0	37	36	77	17.7
23	26	7.6	22	8.0	11.1	69	63	13.5	106	46	97	17.7
24	15.1	8.8	28	9.0	10.6	49	43	14.0	70	43	64	18.1
25	11.1	12.5	42	170	10.6	46	68	12.5	90	28	54	26
26	8.3	13.5	25	45	10.2	38	102	12.1	63	26	46	17.7
27	8.3	14.6	29	22	11.1	31	54	11	75	190	40	16.6
28	7.6	16.1	25	16.6	10.2	28	46		84	91	49	16.1
29	10.1	25	20	13.5	9.2	24	72	-------	47	46	48	15.1
30	7.3	51	18.2	12.5	9.2	26	47	-------	38	39	40	15.1
31	6.6	22	-------	12.1	-------	24	36	-------	33	-------	45	-------

NOTE.—Braced figure gives mean discharge for period indicated, estimated by comparison with record of North Fork of Wailua River; recorder not operating.

Monthly discharge of East Branch of North Fork of Wailua River near Lihue, Kauai, for the year ending June 30, 1927

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July	26	4.5	7.92	12.3	246	754
August	51	6.3	11.4	17.6	355	1,090
September	486	14.0	46.0	71.2	1,380	4,240
October	170	8.0	18.0	27.9	557	1,710
November	141	8.3	16.3	25.2	490	1,500
December	203	8.3	34.7	53.7	1,080	3,300
January	345	15.1	57.5	89.0	1,780	5,470
February	38	----------	19.2	29.7	539	1,650
March	110	----------	48.5	75.0	1,500	4,610
April	804	19.6	112	173	3,360	10,300
May	458	28	86.6	134	2,680	8,240
June	52	15.1	28.4	43.9	852	2,610
The year	804	4.5	40.6	62.8	14,800	45,500

KAPAHI DITCH NEAR KEALIA, KAUAI

LOCATION.—500 feet below intake and 4 miles (by road) west of Kealia.

RECORDS AVAILABLE.—April 15, 1909, to May 2, 1914, and May 10, 1915, to June 30, 1927.

EQUIPMENT.—Stevens continuous water-stage recorder on right bank. Discharge measurements made by wading about 50 feet below gage.

CHANNEL AND CONTROL.—The ditch cut in earth is straight for about 50 feet above gage. Control about 5 feet below gage, is 20-foot sharp-crested rectangular weir with complete end contractions.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 136 million gallons a day, or 210 second-feet, at 10.15 a. m. October 25 (gage height from water-stage recorder, 2.21 feet); minimum discharge, no flow from 8.45 a. m. February 17 to 2 p. m. February 19; water shut out of ditch.

1915–1927: Maximum discharge recorded, 233 million gallons a day, or 361 second-feet, at 3 and 4 a. m. March 31, 1923 (gage height from water-stage recorder, about 3.15 feet; minimum discharge, no flow, occasionally, when water is shut out of ditch.

DIVERSIONS AND REGULATION.—Flow regulated by head gates.

OBJECT OF STATION.—To determine amount of water diverted by ditch. Water used by Territory and part is leased to Makee Sugar Co. Homesteads entitled to part of water.

UTILIZATION.—Water used for irrigation of sugar cane and for domestic supply.

ACCURACY.—Stage-discharge relation permanent during year. Rating curve, based on weir formula, is very well defined above 5 million gallons a day and was checked closely during first half of year by five discharge measurements covering a range from 1 to 5 million gallons a day. Operation of water-stage recorder satisfactory. Daily discharge ascertained by applying to rating table mean daily gage height determined from recorder graph by inspection or, for days of considerable fluctuation, by averaging discharge for intervals of day. Records good except those for extremely low stages, which are poor.

Kapahi ditch diverts from Kapaa River at a point 4 miles east of Kealia and mouth of river and at an elevation of about 400 feet. The general course of the ditch is eastward toward Kealia. It comprises about 6 miles of main ditch.

Discharge, in million gallons a day, of Kapahi ditch near Kealia, Kauai, for the year ending June 30, 1927

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	2.1	2.3	7.9	3.4	5.0	1.7	0.9	1.3	4.8	1.1	0.4	8.7
2	2.1	4.2	3.6	3.5	3.7	1.7	1.3	1.1	4.6	.15	13.6	10.3
3	3.0	2.9	2.8	1.5	2.9	1.9	2.1	.4	5.1	.15	13.1	11.4
4	1.1	2.9	3.6	2.6	1.3	1.5	1.1	6.7	3.7	.15	11.9	12.3
5	.9	2.4	15.5	2.6	1.9	1.1	.7	7.2	1.0	7.2	13.1	1.8
6	2.1	2.9	6.9	2.4	3.3	1.9	.7	.9	.08	8.3	14.5	7.2
7	2.1	3.2	4.7	3.0	.4	1.9	.7	4.1	.15	7.0	8.9	11.7
8	1.9	1.1	4.0	2.6	2.0	9.4	.9	3.0	.08	4.3	.08	13.1
9	2.8	2.4	7.6	2.7	1.9	11.0	2.1	7.0	.08	6.6	6.8	8.7
10	2.9	2.4	12.5	1.3	1.9	4.6	4.1	6.2	.08	7.6	9.0	8.3
11	.9	3.7	9.6	2.4	.9	4.6	1.5	5.5	.08	5.8	13.1	5.8
12	2.1	2.6	3.5	2.4	2.3	1.8	1.5	5.2	9.2	6.3	10.0	.9
13	2.1	2.4	8.4	2.4	3.5	2.9	1.5	2.6	5.1	.6	9.5	6.8
14	2.6	3.8	5.9	2.1	1.2	.7	1.5	4.6	5.3	.9	3.3	9.4
15	2.6	3.7	24	2.1	7.7	.6	1.5	4.0	5.5	.8	.15	9.8
16	6.2	5.4	12.9	2.4	4.8	.6	1.1	3.4	6.8	.3	1.1	9.0
17	12.3	3.6	8.0	.9	3.0	.7	1.3	.03	6.5	.3	.08	9.1
18	1.3	2.6	9.5	2.9	3.2	1.3	1.1	.00	3.7	.3	.15	5.8
19	2.1	2.4	14.0	2.1	3.2	.4	2.1	.9	7.3	.3	.3	.9
20	2.7	2.1	10.5	1.9	1.9	1.0	5.9	2.4	2.0	.3	.3	10.0
21	2.1	12.3	6.6	2.1	1.5	.6	3.1	4.0	8.0	.3	.15	8.6
22	4.2	2.7	4.9	1.7	2.1	.7	8.5	4.0	6.6	.3	.15	5.9
23	11.5	3.4	6.0	2.6	1.9	.6	.6	3.7	6.2	.3	.08	6.2
24	5.4	3.2	12.7	16.9	1.7	.7	.4	6.2	.15	.3	.02	5.1
25	1.1	4.5	12.5	61	1.7	.9	.4	6.0	.15	11.7	.02	6.0
26	2.4	7.1	1.5	6.9	1.9	.9	.4	5.0	.15	3.8	5.7	7
27	2.6	5.1	10.6	3.3	2.9	1.4	.3	2.4	.4	23	8.3	9.1
28	2.4	6.7	7.6	1.7	1.3	1.1	.3	4.1	.3	.3	6.3	10.3
29	6.9	10.7	5.9	1.8	1.5	1.9	.4	-------	.3	3.7	.6	9.8
30	2.6	30	4.2	1.8	1.3	1.1	.4	-------	1.5	4.0	7.3	9.4
31	2.1	10.3	-------	.3	-----	.9	.7	-------	2.1	-------	6.7	-----

Monthly discharge of Kapahi ditch near Kealia, Kauai, for the year ending June 30, 1927

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July	12.3	0.9	3.20	4.95	99.2	304
August	30	1.1	5.00	7.74	155	476
September	24	1.5	8.26	12.8	248	760
October	61	.3	4.75	7.35	147	452
November	7.7	.4	2.46	3.81	73.8	226
December	11.0	.6	2.00	3.09	62.1	190
January	8.5	.3	1.58	2.44	49.1	150
February	7.2	.00	3.65	5.65	102	314
March	9 2	08	3.13	4.84	97.0	298
April	23	.15	3.54	5.48	106	326
May	14.5	.02	5.31	8.22	165	505
June	13.1	.7	7.74	12.0	232	713
The year	61	.00	4.21	6.51	1,540	4,710

ANAHOLA RIVER NEAR KEALIA, KAUAI

LOCATION.—A quarter of a mile above dam at Kiokala and 4½ miles (6 miles by road and trail) northwest of Kealia.

RECORDS AVAILABLE.—August 22 to November 2, 1910, and December 30, 1912, to June 30, 1927. Fragmentary record December 15, 1910, to December 28, 1912, at dam a quarter of a mile below present site.

EQUIPMENT.—Stevens continuous water-stage recorder on right bank. Discharge measurements made by wading near gage.

CHANNEL AND CONTROL.—One channel at all stages; straight for 75 feet above and below gage. Right bank steep and high and covered with underbrush; left bank low for about 40 feet out from low-water channel, then rises abruptly. Control composed of boulders; subject to shifts during floods.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 900 million gallons a day, or 1,390 second-feet, at 11.30 a. m. April 27 (gage height from water-stage recorder, 7.20 feet); minimum discharge, 1.8 million gallons a day, or 2.8 second-feet, from 8 p. m. August 19 to 8 a. m. August 20 (gage height, 1.78 feet).

1910; 1912–1927: Maximum discharge recorded, 1,450 million gallons a day, or 2,240 second-feet, at 7.30 p. m. September 26, 1915 (gage height from water-stage recorder, 12.9 feet); minimum discharge, 1.4 million gallons a day, or 2.2 second-feet, several hours September 12–13, 1923 (gage height, 1.83 feet).

DIVERSIONS AND REGULATION.—Part of flow diverted 3 miles above station by Anahola ditch; see Anahola ditch above Kaneha Reservoir, near Kealia, Kauai (p. 35).

OBJECT OF STATION.—To determine feasibility of additional diversions for sugar-cane irrigation. Water owned by Territory and leased to Makee Sugar Co.

UTILIZATION.—Water used for irrigation of sugar cane.

ACCURACY.—Stage-discharge relation changed at times of floods January 20 and April 12; shifting-control method, based on one discharge measurement, used October 25 to December 10. The two rating curves used are well defined between 2 and 30 million gallons a day; extensions above uncertain. These curves checked closely by four discharge measurements well distributed during year and covering a range from 2 to 20 million gallons a day. Operation of water-stage recorder satisfactory except as indicated in footnote

to daily-discharge table. Daily discharge ascertained by applying to rating table mean daily gage height determined from recorder graph by inspection or, for days of considerable fluctuation, by averaging discharge for intervals of day. Records good for ordinary stages except those estimated, which are poor; extremely low and high stage records poor.

Discharge, in million gallons a day, of Anahola River near Kealia, Kauai, for the year ending June 30, 1927

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	2.6	2.4	2.5	3.9	5.6	2.7		9.2	4.4	12.4	18.4	23
2	2.5	2.4	2.4	4.0	4.9	2.5	46	16.7	4.5	11.6	14.7	14.4
3	2.8	2.6	2.2	3.7	5.6	2.4		9.7	5.2	7.7	13.4	15.1
4	2.7	2.7	3.2	3.4	4.9	2.4		8.7	29	6.9	12.1	17.1
5	2.4	2.6	13.8	3.2	4.2	2.5		8.0	43	6.3	10.3	12.1
6	2.2	2.6	3.5	3.1	14.3	2.4		7.5	31	5.9	9.7	10.3
7	2.1	2.2	2.6	3.0	6.2	2.2	13	7.1	11.6	5.5	9.2	13.7
8	2.1	2.2	2.5	3.0	5.3	4.0		7.1	8.0	5.2	15.9	28
9	2.2	2.2	3.5	3.1	4.4	5.9		6.7	7.5	5.2	10.9	23
10	2.4	2.2	4.7	2.8	4.2	12.7		6.3	8.2	4.9	15.9	12.4
11	2.5	2.6	4.7	2.7	3.9	34		6.1	6.3	8.8	9.2	10.3
12	2.2	2.4	3.5	2.6	3.7	8.8	11	5.7	5.9	139	11.1	8.4
13	2.0	2.1	2.7	2.6	7.1	4.9		5.5	5.7	120	26	6.7
14	2.2	2.1	63	2.5	48	4.2	9.7	5.3	5.2	197	199	6.9
15	2.2	2.4	11.8	2.5	5.3	3.7	8.7	8.0	5.0	146	122	6.0
16	3.6	3.2	5.1	2.5	4.6	5.2	10.4	8.8	8.8	46	239	7.6
17	14.2	2.5	4.6	2.6	4.0	5.1	9.7	5.3	7.6	90	113	7.1
18	3.2	2.0	6.2	2.5	4.7	4.2	7.6	5.0	9.8	56	61	35
19	2.5	1.9	12.0	2.4	4.6	45	7.4	4.9	5.7	31	37	7.6
20	2.2	1.9	5.8	2.4	3.5	19.7	23	4.7	5.2	16.5	26	6.7
21	2.1	3.9	5.1	2.2	3.2	53	56	4.5	4.9	13.4	20	6.2
22	2.7	3.2	4.2	2.4	3.0	31	35	4.4	102	11.5	19.2	6.0
23	29	2.2	5.9	3.1	3.0	11.8	25	4.4	46	21	24	6.2
24	5.8	2.6	7.3	46	3.0	9.4	14.7	14.1	33	19.0	24	7.2
25	3.5	3.4	5.3	19.6	2.8	9.2	21	5.3	27	8.9	16.5	11.4
26	3.0	3.2	4.9	25	2.8	7.4	37	4.7	13.7	8.7	14.7	6.7
27	3.0	2.6	8.7	12.4	3.1	6.2	14.4	4.4	23	139	13.7	5.8
28	4.7	2.5	6.4	9.4	2.8		11.6	4.2	38	49	14.7	6.9
29	4.4	7.4	4.6	6.9	2.7	6.5	29	-------	14.4	24	20	5.6
30	3.0	5.8	4.0	5.8	2.7		12.7	-------	10.5	18.4	14.4	5.1
31	2.5	3.0	-------	6.9	-------		9.9	-------	8.7	-------	17.4	-------

NOTE.—Braced figures give mean discharge for periods indicated, estimated by comparison with record of flow for East Branch of North Fork of Wailua River; recorder not operating.

Monthly discharge of Anahola River near Kealia, Kauai, for the year ending June 30, 1927

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July	29	2.0	4.02	6.22	124	382
August	7.4	1.9	2.81	4.35	87.0	267
September	63	2.2	7.22	11.2	217	665
October	46	2.2	6.39	9.89	198	608
November	48	2.7	5.94	9.19	178	547
December	53	2.2	10.6	16.4	328	1,010
January	-------	7.4	20.6	31.9	638	1,960
February	16.7	4.2	6.87	10.6	192	590
March	102	4.4	17.4	26.9	539	1,660
April	197	4.9	41.2	63.7	1,230	3,790
May	239	9.2	37.8	58.5	1,170	3,600
June	35	5.1	11.3	17.5	338	1,040
The year	239	1.9	14.4	22.3	5,240	16,100

ANAHOLA DITCH ABOVE KANEHA RESERVOIR, NEAR KEALIA, KAUAI

LOCATION.—At upper end of second tunnel (about a quarter of a mile) above Kaneha Reservoir, 7 miles from Kealia.

RECORDS AVAILABLE.—December 9, 1921, to June 30, 1927. May 29, 1915, to December 9, 1921, at site 100 feet upstream and at lower end of third tunnel above reservoir. Flow at the two stations not exactly comparable owing to occasional operation of check gate and spillway between.

EQUIPMENT.—Stevens continuous water-stage recorder on right bank. Discharge measurements made by wading at gage.

CHANNEL AND CONTROL.—Channel at gage is short straight stretch of open ditch cut in firm earth between two tunnels. Control is rock section of ditch in tunnel; probably permanent. Some backwater effect from reservoir below when reservoir is overflowing.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 80 million gallons a day, or 124 second-feet, at 11.30 a. m. October 25 (gage height, from water-stage recorder, 4.71 feet); minimum discharge, no flow several days January to June; water was shut out of ditch.

1915–1927: Maximum discharge recorded, 130 million gallons a day, or 201 second-feet, at 7.10 a. m. January 16, 1921 (gage height, 6.25 feet at old station); minimum discharge, no flow, occasionally, when water is shut out of ditch.

DIVERSIONS AND REGULATION.—Occasionally excess water diverted at gate and spillway about 50 feet upstream. Completely regulated by gates and spillways.

OBJECT OF STATION.—To determine amount of water diverted from Anahola River into Kaneha Reservoir. Water owned by Territory and leased to Makee Sugar Co.

UTILIZATION.—Water is stored in Kaneha Reservoir for irrigation of sugar cane and for domestic supply near Anahola and Kealia.

ACCURACY.—Stage-discharge relation permanent except from September 15 to October 25, when shifting-control method was used. Rating curve well defined between 1 and 15 million gallons a day; extension above uncertain. This curve checked very closely by four discharge measurements well distributed during year and covering a range from 1 to 2 million gallons a day. Shifting-control method based on one discharge measurement. Operation of water-stage recorder fairly satisfactory except as indicated in footnote to daily-discharge table. Daily discharge ascertained by applying to rating table mean daily gage height determined from recorder graph by inspection or, for days of considerable fluctuation, by averaging discharge for intervals of day. Records fair except those estimated, which are poor.

Anahola ditch diverts water from Anahola River at a point 3½ miles above gaging station and dam on the river at Kiokala and carries it southeastward for about half a mile to Kaneha Reservoir, where it is stored.

Discharge, in million gallons a day, of Anahola ditch above Kaneha Reservoir, near Kealia, Kauai, for the year ending June 30, 1927

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	1.4	1.8	3.8	2.8	1.9	1.4	-------	0.00	2.1	-------	0.0	0.0
2	1.4	2.0	2.3	2.8	2.5	1.4	-------	.00	3.4	-------	.0	.0
3	2.5	3.6	1.9	2.4	4.3	1.3	-------	.02	5.8	-------	.0	.0
4	1.6	2.0	4.5	2.2	3.5	1.3	-------	3.2	10.9	-------	.0	.0
5	1.3	2.3	10.3	2.0	2.2	1.5	-------	4.2	9.8	-------	.0	.0
6	1.2	2.0	3.5	1.8	6.6	1.4	-------	3.9	.1	-------	.0	.0
7	1.2	1.5	2.7	1.8	3.1	1.2	2.7	4.2	.08	-------	2.1	.0
8	1.2	1.4	2.9	1.9	2.5	4.0	.02	3.5	.07	-------	2.4	.0
9	1.7	1.5	4.9	2.2	2.2	7.4	.00	3.4	3.8	-------	.0	.0
10	1.8	1.4	6.4	1.8	1.8	5.4	.00				.0	.0
11	1.9	2.9	8.2	1.8	1.7	5.3	.00	2.0			.0	.5
12	1.3	1.4	4.4	1.7	1.9	-------	.00				.0	3.3
13	1.1	1.3	3.6	1.7	3.4	-------	.00				.0	4.0
14	1.6	1.5	15.4	1.6	12.4	-------	.00				.0	3.6
15	1.7	2.5	4.7	1.6	5.6	-------	.00	3.9	-------	-------	.0	3.5
16	7.3	5.0	3.4	1.5	4.8	-------	4.1	4.2	-------	-------	.0	8.2
17	10.5	1.8	3.8	1.6	3.5	-------	4.8				.0	6.8
18	2.2	1.4	4.9	1.6	4.8	-------	3.6				.0	11.8
19	1.5	1.2	8.2	1.4	4.1	-------	6.5			0.0	.0	4.9
20	3.5	1.2	4.9	1.2	2.4	-------	4.7	1.9		.0	.0	3.7
21	1.7	7.6	4.2	1.2	2.2	-------	11.3			.0	.0	3.4
22	3.1	3.5	2.9	1.2	2.0	-------	4.9			.0	.0	3.5
23	13.1	1.5	5.5	2.1	1.9	-------	.06			.0	.0	3.8
24	4.0	2.6	7.3	11.3	1.8	-------	.02			.0	.0	4.6
25	2.8	2.6	7.0	16.3	1.7	-------	.00			.0	.0	9.1
26	2.0	3.5	5.8	4.7	1.8	-------	.00	4.3		.0	.0	4.2
27	2.5	2.7	10.8	1.9	2.6	-------	.00			1.9	.0	4.1
28	6.9	3.2	5.6	.2	1.7	-------	.00				.0	5.7
29	4.2	9.1	3.8	.1	1.5	-------	.00	-------	-------	.1	.0	3.6
30	2.1	11.4	3.2	.1	1.4	-------	.00	-------	-------		.0	2.8
31	1.8	3.4	-------	.1	-------	-------	.00	-------	-------	-------	.0	-------

NOTE.—Discharge estimated Feb. 15 and May 1 and 2. Braced figures give estimated mean discharge for periods indicated. Estimates made from study of fragmentary gage-height record and by comparison with record of flow for Anahola River, recorder not operating. Data insufficient for estimating discharge Dec. 12 to Jan. 6 and Mar. 10 to Apr. 18.

Monthly discharge of Anahola ditch above Kaneha Reservoir, near Kealia, Kauai for the year ending June 30, 1927

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July	13.1	1.1	2.97	4.60	92.1	283
August	11.4	1.2	2.93	4.53	90.8	279
September	15.4	1.9	5.36	8.29	161	493
October	16.3	.1	2.47	3.82	76.6	235
November	12.4	1.4	3.13	4.84	93.8	288
February	-------	.0	2.78	4.30	77.7	239
May (2 days)	2.4	[a].0	.145	.224	4.50	14
June (20 days)	11.8	[a].0	3.17	4.90	95.1	292

[a] The whole month considered.

NOTE.—No water in ditch May 1–6 and May 9 to June 10 owing to artificial regulation.

HANALEI RIVER AT ELEVATION 625 FEET, NEAR HANALEI, KAUAI

LOCATION.—2 miles west of Kauai Electric Co.'s power line and 10 miles above mouth of stream.

RECORDS AVAILABLE.—July 20, 1921, to June 30, 1927. January 26, 1914, to July 20, 1921, at site 300 feet downstream.

EQUIPMENT.—Stevens continuous water-stage recorder on right bank. Discharge measurements made by wading near gage or from footbridge about 250 feet downstream.

CHANNEL AND CONTROL.—One channel at all stages. Bed composed of boulders; rough. Right bank steep and high; left bank slopes gently. Control composed of boulders; subject to shifts.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 5,650 million gallons a day, or 8,740 second-feet, at 9.45 p. m. January 20 (gage height from water-stage recorder, 8.28 feet); minimum discharge, 10.2 million gallons a day, or 15.8 second-feet, from 7 to 8 p. m. July 8 and 6 to 11 p. m. July 10 (gage height, 0.65 foot).

1914–1927: Maximum discharge recorded, 6,500 million gallons a day, or 10,100 second-feet, at 11.20 a. m. January 16, 1921 (gage height from water-stage recorder, 7.50 feet); minimum discharge, 5.8 million gallons a day, or 9.0 second-feet, several hours April 28 and May 1–3, 1926 (gage height, 0.50 foot).

DIVERSIONS AND REGULATION.—About July 1, 1925, Lihue Plantation Co. began diverting water 2 miles upstream through Hanalei Tunnel into North Fork of Wailua River Basin.

OBJECT OF STATION.—Record valuable in connection with high-level diversion to Territorial agricultural lands. Territorial water.

UTILIZATION.—Small part of flow used for irrigation of rice and taro and for domestic supply.

ACCURACY.—Stage-discharge relation changed at times of floods January 19 and April 14. The two rating curves used are well defined between 10 and 150 million gallons a day; extension above uncertain. These curves were checked closely in October, December, and March by three discharge measurements and by another measurement made soon after June 30, ranging from 11 to 25 million gallons a day. Operation of water-stage recorder very satisfactory except as indicated in footnote to daily-discharge table. Daily discharge ascertained by applying to rating table mean daily gage height determined from recorder graph by inspection or, for days of considerable fluctuation, by averaging discharge for intervals of day. Records good for ordinary stages except those estimated, which are poor; extremely high and low stage records poor.

Discharge, in million gallons a day, of Hanalei River at elevation 625 feet, near Hanalei, Kauai, for the year ending June 30, 1927

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	11.7			21	14.1	12.0	22	49	16.7	32	32	
2	11.4			19.2	13.7	12.0	143	54	23	30		
3	12.7			18.4	14.1	11.7	340	43	40	26		
4	11.7			18.1	13.4	13.0	148	41	126	24	28	
5	11.1			17.7	13.1	12.4	70	34	344	30		70
6	10.8			17.7	16.3	11.4	54	26	241	24		
7	11.1			18.1	18.7	11.1	56	25	134	22		
8	10.5			16.6	13.4	14.8	105	25	107	35		
9	11.7			16.2	12.7	21	64	26	195	23		103
10	10.8			16.2	12.4	37	77	21	71	14.0	44	60
11	12.7	30		15.1	12.4	88	43	26	51	17.7		50
12	11.1		34	14.4	13.4	26	35	22	50	151		45
13	10.8			14.4	47	18.4	38	18.0	53	160		42
14	12.0			14.8	138	16.6	31	22	40	437		31
15	13.7			14.1	28	17.0	30	68	47	763		35
16	23			13.4	24	20	25	37	160	141	340	20
17				12.7	20	18.4	25	23	49	150		26
18				12.7	23	17.3	23	22	47	126		68
19				12.4	19.6	29	49	21	35	70		26
20				11.7	18.1	124	295	20	36	38		40
21	60			11.7	15.8	215	93	20	28	30		38
22				11.7	15.5	214	56	19.5	56	26		37
23				15.5	15.8	78	99	19.2	195	69		37
24				18.2	14.4	115	56	28	80	40		39
25				182	14.1	96	123	19.7	95	24	55	55
26		32		39	13.7	54	170	18.6	128	20		38
27			55	21	16.7	38	92	17.5	58	97		37
28	24			18.4	13.1	33	88	16.9	74	118		36
29				16.2	12.7	28	124	-------	49	33		35
30				15.8	12.4	39	80	-------	32	40		35
31		-------		15.1	-------	29	56	-------	28	-------		-------

NOTE.—Braced figures give mean discharge for periods indicated, estimated by comparison with records of Hanalei Tunnel (furnished by Lihue Plantation Co.) and Lumahai River; recorder not operating.

Monthly discharge of Hanalei River at elevation 625 feet, near Hanalei, Kauai, for the year ending June 30, 1927

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimnm	Mean			
July	----------	10.5	28.4	43.9	881	2,700
August	----------	----------	30.7	47.5	952	2,920
September	----------	----------	38.9	60.2	1,170	3,580
October	182	11.7	21.9	33.9	680	2,080
November	138	12.4	20.8	32.2	625	1,910
December	215	11.1	47.4	73.3	1,470	4,510
January	340	22	87.4	135	2,710	8,310
February	68	16.9	27.9	43.2	782	2,400
March	344	16.7	86.7	134	2,690	8,250
April	763	14.0	93.7	145	2,810	8,630
May	----------	----------	93.4	145	2,900	8,890
June	----------	20	49.8	77.1	1,490	4,580
The year	763	10.5	52.5	81.2	19,160	58,800

WAIOLI STREAM NEAR HANALEI, KAUAI

LOCATION.—2½ miles (4 miles by trail) south of Hanalei and 3 miles above mouth of stream.

RECORDS AVAILABLE.—July 1, 1914, to June 30, 1927.

EQUIPMENT.—Stevens continuous water-stage recorder on left bank. Discharge measurements made by wading or from cable at gage.

CHANNEL AND CONTROL.—One channel at all stages; straight for 30 feet above and 20 feet below gage. Right bank steep; left bank slopes gently. Control composed of boulders; subject to shifts.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 752 million gallons a day, or 1,160 second-feet, at 7.15 p. m. April 12 (gage height from water-stage recorder, 5.54 feet); minimum discharge, 4.8 million gallons a day, or 7.4 second-feet, several hours October 21 and 22 (gage height, 1.36 feet).

1914–1927: Maximum discharge recorded, 955 million gallons a day, or 1,480 second-feet, at 6.30 a. m. December 19, 1916 (gage height from water-stage recorder, 6.15 feet); minimum discharge, 2.0 million gallons a day, or 3.1 second-feet, July 22, 1914 (gage height, 0.6 foot).

DIVERSIONS AND REGULATION.—None.

OBJECT OF STATION.—To determine feasibility of high-level diversions, in connection with Territorial Hanalei River project. Territorial land and water.

UTILIZATION.—Small part of flow is used for irrigation of rice and taro.

ACCURACY.—Stage-discharge relation changed at times of floods October 25 and April 12. The three rating curves used are fairly well defined below 60 million gallons a day; extension above uncertain. The two curves used prior to April 12 were checked very closely by five discharge measurements well distributed July to January and ranging from 5 to 30 million gallons a day. The curve used after April 12 is based on 10 discharge measurements made after June 30 and ranging from 8.7 to 30 million gallons a day. Operation of water-stage recorder satisfactory except as indicated in footnote to daily-discharge table. Daily discharge ascertained by applying to rating table mean daily gage height determined from recorder graph by inspection or, for days of considerable fluctuation, by averaging discharge for intervals of day. Records good for ordinary stages July to January, except those estimated; all records February to June, all estimated records, and all extremely high-stage records, poor.

Discharge, in million gallons a day, of Waioli Stream near Hanalei, Kauai, for the year ending June 30, 1927

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	5.8	9.2	14.6	6.8	7.9		10.6		15	22	16.7	29
2	5.5	8.2	6.8	6.2	7.5		230			19.4	11.7	22
3	5.9	9.6	6.3	6.0	9.3	6.5	318		29	12.0	10.0	25
4	6.2	6.6	10.0	5.9	7.7		73		202	10.1	11.7	25
5	5.5	10.0	11.1	6.2	6.8		30		210	9.0	13.6	18.8
6	6.6	6.6	7.1	9.3	10.5	5.9	23		148	9.0	14.4	
7	6.5	6.3	6.5	7.0	10.7	5.6	28		112	8.8	15.6	
8	5.6	5.5	9.6	6.2	10.8	5.6	34	8	61	8.4	56	24
9	7.5	5.3	12.4	6.3	8.4	5.5	19.0		60	8.4	27	
10	6.0	5.2	10.7	6.3	7.0	5.5	39		20	8.0	33	
11	5.3	7.5	7.9	5.6	6.5	16.5	17.2		15.0	10.2	14.7	
12	5.5	5.3	7.0	5.6	6.0	7.3	11.4		31	196	25	14
13	6.9	5.2	6.3	5.6		6.6	13.7		24	124	38	
14	10.2	8.7	8.2	5.6	120	5.8	10.4		21	220	147	
15	10.0	6.8	7.3	5.5		16.5	9.8	23	45	303	226	14.1
16	15.3	14.7	5.9	5.5		10.8	9.3	15.7	68	55	357	24
17	17.2	8.6	5.3	5.5		7.9	8.8		22	88	318	23
18	12.8	6.5	8.7	5.5	16	6.2	8.8		17.2	111	118	47
19	7.9	5.8	8.0	5.2		7.5	10.9		12.7	47	46	17.3
20	7.7	6.3	6.8	5.2		106	58		11.4	21	26	14.1
21	6.2	27	6.3	4.9		137	61		10.1	17.7	19.6	12.7
22	23	10.7	5.8	5.0		29	47	6.5	121	16.7	27	12.2
23	24	6.8	8.2	19.6		15.0	49		135	55	35	13.6
24	12.2	8.8	11.6	31		42	24		33	37	21	21
25	14.7	7.9	22	217		46	67		24	15.7	18.0	39
26	8.0	8.2	16.4	39	6.5	24	69		17.5	13.0	18.4	19.2
27	7.3	8.6	25	16.6		11.7	25		12.4	13.9	18.4	18.5
28	9.3	10.1	12.4	15.1		13.4	19.4		46	21	31	22
29	7.1	10.3	10.2	9.0		10.9	31	-------	18.5	12.2	40	15.4
30	6.2	41	8.2	8.6		39	17.2	-------	12.0	13.3	26	14.1
31	5.8	9.6	-------	9.3	-------	13.7	13.7	-------	10.1	-------	24	-------

NOTE.—Discharge estimated Sept. 17–18, Oct. 11–18, and Nov. 11 and 12. Braced figures give estimated mean discharge for periods indicated. Estimates made by comparison with record of flow for Lumahai River and from study of fragmentary gage-height record; gage-height record either faulty or missing.

Monthly discharge of Waioli Stream near Hanalei, Kauai, for the year ending June 30, 1927

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July	24	5.3	9.15	14.2	284	870
August	41	5.2	9.58	14.8	297	911
September	25	5.3	9.75	15.1	293	898
October	217	4.9	16.0	24.8	496	1,520
November	----------	----------	20.1	31.1	604	1,850
December	137	----------	20.4	31.6	633	1,940
January	318	8.8	44.7	69.2	1,390	4,250
February	----------	----------	8.17	12.6	229	702
March	210	10.1	50.9	78.8	1,580	4,840
April	303	8.0	50.2	77.7	1,510	4,620
May	357	10.0	58.2	90.0	1,800	5,540
June	----------	----------	20.4	31.6	613	1,880
The year	357	----------	26.6	41.2	9,730	29,800

LUMAHAI RIVER NEAR HANALEI, KAUAI

LOCATION.—6 miles above mouth and 10 miles by road and trail from Hanalei.

RECORDS AVAILABLE.—May 23, 1914, to October 11, 1917, and July 1, 1920, to June 30, 1927.

EQUIPMENT.—Stevens continuous water-stage recorder on right bank. Discharge measurements made by wading near gage or from cable just below gage.

CHANNEL AND CONTROL.—One channel at all stages; straight for 350 feet above and 150 feet below station. Bed composed of large boulders and cobblestones. Right bank high and vertical; left bank low, wooded, and sloping. Control composed of large boulders; subject to shifts.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 2,840 million gallons a day, or 4,390 second-feet, at 6.15 a. m. April 15 (gage height, from water-stage recorder, 6.49 feet); minimum discharge, 14.0 million gallons a day, or 22 second-feet, from 9 a. m. July 12 to 12.45 p. m. July 13 (gage height, 0.76 foot).

1914–1917; 1920–1927: Maximum discharge recorded, estimated 5,000 million gallons a day, or 7,740 second-feet, at 4.30 p. m. September 11, 1922, (gage height from water-stage recorder, 9.41 feet); minimum discharge, 13.6 million gallons a day, or 21 second-feet, several hours May 15 and 17, 1926 (gage height, 0.75 foot).

DIVERSIONS AND REGULATION.—None.

OBJECT OF STATION.—To determine feasibility of high-level diversions in cooperation with Territorial Hanalei River project.

UTILIZATION.—Small part of flow used for irrigation of rice and taro.

ACCURACY.—Stage-discharge relation probably permanent except from September 1 to December 20 when shifting-control method was used. Basic rating curve well defined between 20 and 75 million gallons a day and fairly well defined between 75 to 200 million gallons a day; extension above uncertain. This curve was checked very closely at 24 million gallons a day by a discharge measurement in January and again at 67 million gallons a day by another measurement soon after June 30. Shifting-control method based on two discharge measurements. Operation of water-stage recorder satisfactory except as indicated in footnote to daily-discharge table. Daily discharge ascertained by applying to rating table mean daily gage height determined from recorder graph by inspection or, for days of considerable fluctuation, by averaging discharge for intervals of day. Records fair for ordinary stages; extremely high stage records poor.

Discharge, in million gallons a day, of Lumahai River near Hanalei, Kauai, for the year ending June 30, 1927

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	16.2	35	148	31	24	15.7	30	32	24	40	39	77
2	15.7	33	46	28	23	15.7	427	29	63	36	31	64
3	16.2	30	34	26	26	15.3	1,040	27	71	30	29	58
4	15.7	24	55	24	23	24	274	24	491	27	32	61
5	15.3	35	52	28	22	19.9	94	22	851	26	34	50
6	16.8	24	39	30	24	16.8	68	21	519	24	41	52
7	16.2	22	33	26	22	16.2	73	19.9	399	23	58	104
8	15.3	18.9	42	26	22	15.7	103	20	174	22	194	129
9	19.7	18.4	51	25	20	16.8	66	21	248	22	87	114
10	15.7	17.8	53	22	19.4	22	111	19.4	74	21	112	
11	15.7	55	45	21	18.9	25	53	24	51	21	53	44
12	14.9	20	37	19.9	16.3	19.4	38	20	56	263	46	
13	17.7	18.9	31	19.4	252	18.4	42	18.4	60	302	94	
14	29	24	39	19.4	869	16.8	31	17.8	52	1,250	418	35
15	35	20	40	19.4	78	32	27	59	66	1,370	911	39
16	57	47	30	19.4	72	22	24	50	226	187	1,220	49
17	53	30	27	18.9	48	19.4	24	24	71	156	1,290	55
18	38	21	38	19.4	54	17.8	24	19.9	51	230	336	111
19	27	17.8	30	18.9	40	18.9	38	18.4	40	126	132	44
20	48	19.4	30	18.4	29	328	115	17.8	34	63	76	36
21	26	69	27	18.4	24	638	122	17.8	30	50	56	34
22	141	34	24	19.4	22	126	107	16.8	163	45	186	31
23	109	22	31	31	20	63	105	16.8	434	141	153	31
24	56	32	52	37	19.9	163	69	29	119	100	68	66
25	53	29	125	355	18.9	159	160	18.4	84	46	53	124
26	33	28	66	77	18.4	111	167	16.8	108	38	51	50
27	30	36	132	41	18.4	51	68	16.8	55	40	45	46
28	31	46	63	36	17.3	44	53	15.7	90	58	97	44
29	26	46	42	28	16.8	35	100	-------	55	35	91	35
30	21	153	40	26	16.2	76	51	-------	40	34	60	32
31	19.4	42	-------	27	-------	40	38	-------	34	-------	69	-------

NOTE.—Discharge estimated Dec. 6 and 7. Braced figure gives estimated mean discharge for period indicated. Estimates made from study of fragmentary gage-height record and by comparison with records of flow of Hanalei Tunnel (furnished by Lihue Plantation Co.) and Hanalei River; recorder not operating properly.

Monthly discharge of Lumahai River near Hanalei, Kauai, for the year ending June 30, 1927

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July	141	14.9	33.7	52.1	1,040	3,210
August	153	17.8	34.5	53.4	1,070	3,280
September	148	24	50.1	77.5	1,500	4,610
October	355	18.4	37.3	57.7	1,160	3,550
November	869	16.2	63.2	97.8	1,890	5,820
December	638	15.3	71.0	110	2,200	6,750
January	1,040	24	121	187	3,740	11,500
February	59	15.7	23.3	36.1	653	2,000
March	851	24	156	241	4,830	14,800
April	1,370	21	161	249	4,830	14,800
May	1,290	29	199	308	6,160	18,900
June	129	31	58.2	90.0	1,750	5,360
The year	1,370	14.9	84.5	131	30,800	94,600

MISCELLANEOUS DISCHARGE 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 during the year ending June 30, 1927

Date	Stream	Diverts from	Locality	Gage height (feet)	Discharge	
					Second-feet	Million gallons a day
July 16	Wailua ditch	North Fork of Wailua River	Near Lihue	3.88	58	37.5
Oct. 29	do	do	do	1.36	9.86	6.37
Dec. 2	do	do	do	2.86	37.6	24.3

ISLAND OF OAHU

MOANALUA STREAM NEAR HONOLULU, OAHU

LOCATION.—2¾ miles by private road northeast of main highway, 4¼ miles from mouth of stream, and 5¼ miles north of Honolulu post office.

RECORDS AVAILABLE.—June 25, 1926, to June 30, 1927.

EQUIPMENT.—Stevens continuous duplex water-stage recorder (with one of the two floats recording rainfall), on left bank. Discharge measurements made by wading near bridge. Velocity of approach measured by current meter and floats in weir basin.

CHANNEL AND CONTROL.—Channel straight for about 75 feet above and below gage. Stream bed composed of solid ledge, boulders, and gravel. Banks high and steep. The control is a sharp-edged orifice 0.5 foot high and 1 foot wide with its bottom edge at elevation 0.00 foot gage datum and a 16-foot sharp-crested weir 5 feet high with complete end contractions and crest at elevation 0.76 foot gage datum; both set in heavy concrete dam with broad-crested wing walls. Weir basin too small to prevent velocity of approach above medium stage and is subject to filling up during floods.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during period, 1,120 million gallons a day, or 1,730 second-feet, at 4 a. m. May 16 (gage height from water-stage recorder, 8.48 feet); minimum discharge, no flow several days June 25 to December 17, 1926, and several hours April 8–13.

DIVERSIONS AND REGULATION.—None.

OBJECT OF STATION.—To determine feasibility of using stream to augment water supply of City of Honolulu.

UTILIZATION.—Entire flow wastes into sea.

ACCURACY.—Stage-discharge relation changed when orifice was sealed April 13. Rating curve well defined below 50 million gallons a day by five discharge measurements and theoretical formulas; poorly defined above by velocity of approach measurements and theoretical formulas. Operation of water-stage recorder satisfactory except after March 7 when intake to stilling well was partly obstructed. Daily discharge ascertained by applying to rating table mean daily gage height determined from recorder graph by inspection or, for days of considerable fluctuation, by averaging discharge for intervals of day. Records good for ordinary stages prior to March 6 and poor thereafter; high-stage record poor.

Discharge, in million gallons a day, of Moanalua Stream near Honolulu, Oahu, for the period June 25, 1926, to June 30, 1927

Day	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	------	0.00	0.00	0.5	0.00	0.85	0.00	0.03	0.65	0.05	1.35	1.2	1.6
2	------	.00	.00	.1	.00	.55	.00	12.1	.85	.03	1.15	1.2	1.05
3	------	.00	.00	.02	.00	.09	.00	89	4.2	.04	.85	.85	2.1
4	------	.00	.00	.01	.00	.00	.00	23	1.7	.03	.55	.7	2.6
5	------	.00	3.8	.00	.00	.00	.00	5.6	.7	142	.35	.4	.85
6	------	.00	.05	.00	.00	.00	.00	2.6	.3	88	.35	1.05	1.4
7	------	.00	.00	.00	.00	.00	.00	2.1	.2	18.2	.15	1.05	1.4
8	------	.00	.00	.00	.00	.00	.00	10.4	.35	7.0	.02	8.0	.85
9	------	.00	.00	.00	.00	.00	.00	3.5	15.9	3.4	1.5	2.2	2.9
10	------	.00	.00	.00	.00	.00	.00	25	5.3	1.8	.65	4.9	1.4
11	------	.00	.00	.00	.00	.00	.00	7.0	3.4	1.45	.15	1.7	.85
12	------	.00	.00	.00	.00	.00	.00	3.6	2.3	1.1	.00	18.1	.4
13	------	.00	.00	5.1	.00	.00	.00	4.2	1.6	1.1	6.8	1.2	.3
14	------	.00	.00	.95	.00	13.7	.00	2.3	.9	1.0	24	1.2	.2
15	------	.00	.00	.09	.00	1.2	.00	1.3	.7	.65	39	17.4	.1
16	------	.00	.00	.00	.00	.3	.00	.7	22	22	8.8	258	.1
17	------	.00	.00	.00	.00	.07	.00	.35	2.6	7.9	14.3	42	.1
18	------	4.8	.00	.00	.00	.02	2.7	.15	.9	8.1	61	21	.05
19	------	.65	.00	.00	.00	.02	2.1	.15	.4	2.8	43	10.0	.05
20	------	.00	.00	.00	.00	.02	.65	.09	.2	1.35	29	5.6	.05
21	------	.00	.00	.00	.00	.00	.35	.15	.1	1.0	10.0	4.0	.05
22	------	.00	.00	.00	.00	.00	.2	3.4	.08	2.6	7.4	11.1	.05
23	------	.00	.00	.00	.00	.00	7.8	1.6	.07	55	4.3	13.6	.05
24	------	.00	.00	.00	4.1	.00	1.5	1.0	7.5	8.9	8.2	4.8	.05
25	0.00	.00	.00	.00	27	.00	.45	2.3	3.4	3.6	2.6	2.6	1.3
26	.00	.00	.00	.00	1.8	.00	.45	3.0	1.4	2.6	2.0	1.05	.05
27	.00	.00	.00	.00	1.15	.00	.25	2.1	.4	33	15.1	.6	.05
28	.00	.00	.00	.00	1.15	.00	.15	1.35	.1	45	3.2	.3	.05
29	.00	.00	.05	.00	1.15	.00	.08	3.6	------	4.1	2.1	.2	.05
30	.00	.00	47	.00	1.1	.00	.04	1.8	------	2.4	1.6	.2	.05
31	------	.00	1.45	------	.95	------	.03	1.0	------	1.45	------	1.6	------

Monthly discharge of Moanalua Stream near Honolulu, Oahu, for the period June 25, 1926, to June 30, 1927

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
1926						
June 25-30	0.00	0.00	0.00	0.00	0.00	0.00
1926-27						
July	4.8	.00	.176	.272	5.45	17
August	47	.00	1.69	2.61	52.4	161
September	5.1	.00	2.26	3.50	6.77	21
October	27	.00	1.24	1.92	38.4	118
November	13.7	.00	.561	.868	16.8	52
December	7.8	.00	.540	.836	16.8	51
January	89	.03	6.92	10.7	214	658
February	22	.07	2.79	4.32	78.2	240
March	142	.03	15.1	2.34	468	1,440
April	61	.00	9.65	14.9	289	888
May	258	.2	14.1	21.8	438	1,340
June	2.9	.05	.637	.986	19.1	59
The year	258	.00	4.50	6.96	1,640	5,040

KALIHI STREAM NEAR HONOLULU, OAHU

LOCATION.—At Kioi Pool, three-eighths of a mile upstream from Catholic orphanage, 3 miles up Kalihi Road from King Street car line, and 5 miles north of Honolulu post office.

RECORDS AVAILABLE.—September 6, 1913, to June 30, 1927.

EQUIPMENT.—Au 60-day fuzee recorder on right bank about 200 feet from Kalihi Road. Discharge measurements made by wading near gage.

CHANNEL AND CONTROL.—Channel is solid rock with steep, high banks. Water drops over a 10-foot fall into deep pool at gage. The control at outlet of this pool is solid rock, quite narrow for low and medium stages but overflows a much wider section above a stage of 6 feet. Low-water control improved by a low concrete dam.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 800 million gallons a day, or 1,240 second-feet, at 12.30 a. m. May 16 (gage height from water-stage recorder, 9.90 feet; possibly a higher stage was reached later in the day when recorder was not operating); minimum discharge, 0.5 million gallons a day, or 0.8 second-foot, several hours July 14–31 and August 18–24 (gage height, 0.80 foot).

1913–1927: Maximum discharge, 1,250 million gallons a day (estimated), or 1,930 second-feet, January 16, 1921 (gage height, 14.0 feet; determined from floodmarks); minimum discharge, 0.1 million gallons a day, or 0.15 second-foot, at 4 a. m. April 3, 1924 (gage height, 0.80 foot), and several hours May 12–25, 1926 (gage height, 0.69 foot).

DIVERSIONS AND REGULATION.—None until May, 1920, when the Catholic orphanage began diverting about 300 feet upstream from gaging station through 4-inch pipe (reduced to 1 inch at outlet) for domestic use. Between February 4 and June 7, 1924, city of Honolulu completed several tunnels about 1½ miles upstream and began diverting about 0.3 million gallons a day to supply upper Kalihi district.

OBJECT OF STATION.—To determine feasibility of using stream to augment water supply of city of Honolulu. Part of water rises on Territorial lands.

UTILIZATION.—Part of water used 400 feet below station for small power development. All of low flow is used farther downstream for irrigation of taro.

ACCURACY.—Stage-discharge relation changed November 10 when gravel bar was removed from control. The two rating curves used are fairly well defined below 150 million gallons a day; extension above uncertain. The curves were checked fairly well by 9 of the 12 discharge measurements fairly well distributed during the year and covering a range from 1 to 30 million gallons a day. Operation of water-stage recorder satisfactory except as indicated in footnote to daily-discharge table. Daily discharge ascertained by applying to rating table mean daily gage height determined from recorder graph by inspection or, for days of considerable fluctuation, by averaging discharge for intervals of day. Records good except for estimated periods, for which they are fair.

Discharge, in million gallons a day, of Kalihi Stream near Honolulu, Oahu, for the year ending June 30, 1927

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	0.9	0.6		0.9	5.9	0.8	1.4	3.3	3.8	5.0	5.9	6.0
2	.9	.7		1.1	2.8	.8	24	7.0	3.4	4.6	5.4	5.4
3	.8	.9		1.0	2.3	.8	40		3.3	4.0	6.7	5.9
4	.7	.7		1.4	2.1	.8	16.8	4.2	3.2	3.7	7.8	5.0
5	.7	8.8	1.5	1.6	2.2	1.0	7.1	3.6			7.4	4.6
6	.7	3.6		2.7	2.2	.8	5.2	3.2	16		7.6	7.1
7	.9	1.6		2.3	1.9	.7	5.0	2.8			11.1	5.2
8	.8	.9		1.9	1.7	.8	6.9	3.3	11.7		12.3	4.3
9	.9	.8		1.9	1.7	.9	5.7	6.5	8.7	6.1	7.4	5.0
10	.9	1.0		2.8	1.6	.9	28	4.8	6.6		9.2	3.8
11	.8	.9	3.4	1.8	1.3	.9	8.2	3.8	6.4		5.8	3.6
12	.7	.7		1.4	2.0	1.0	6.0	3.4	5.2		15.4	3.3
13	.6	.7		1.1	1.5	1.2	6.6	3.0	5.4		6.0	3.2
14	.5	.6		1.3	17.4	1.0	5.5	2.9	4.8		7.4	2.9
15	.5	.6		1.1	3.0	.8	4.8	2.9	4.4		33	2.8
16	.6	.7	1.1	1.0	2.5	.8	4.3	15.8	33	45		2.7
17	.5	1.0		1.0	2.0	.7	3.8	4.4	10.8		160	2.9
18	.6	.7		1.0	1.9	2.0	3.4	3.6	10.6			3.0
19	12.2	.5		1.0	1.8	1.7	3.2	3.2	6.2		13.4	2.7
20	1.6	.6		.9	1.6	1.9	3.4	2.9	5.2	38	11.2	2.5
21	.9	1.3		.9	1.6	2.5	6.2	2.8	4.6	15.8	9.6	2.0
22	.8	.9		.9	1.5	1.8	8.9	2.7	5.2	13.6	17.5	2.0
23	.8	.5	3.5	5.5	1.5	17.9	4.3	2.5	50	13.4	20	2.0
24	.7			32	1.3	3.6	5.0	16.1	8.0	20	9.1	2.5
25	.8				1.1	2.3	4.8	8.3	4.9	9.1	7.8	6.7
26	.6	1.7		5.3	1.2	2.0	4.9	6.2	3.4	12.2	6.9	2.7
27	.6			3.3	1.1	1.5	4.2	4.6	45	30		2.0
28	.7		1.1	2.7	1.0	1.2	3.8	4.0	39	9.5	5.2	2.2
29	.7		1.0	2.3	.9	1.1	5.2	-------	7.8	7.8		2.1
30	.6	46	1.0	2.1	.8	1.4	3.6	-------	6.0	6.7		2.0
31	.6		-------	2.9	-------	1.6	3.2	-------	5.2	-------	7.8	-------

NOTE.—Discharge estimated Jan. 29 and Feb. 8 and 9. Braced figures give estimated mean discharge for periods indicated. Estimates made by comparison with record of flow for West Branch of Manoa Stream; gage-height record either faulty or missing. Discharge Oct. 31 to Nov. 10 and Jan. 19–20 from gage heights corrected for backwater from one discharge measurement, study of gage-height graph, and engineer's notes.

Monthly discharge of Kalihi Stream near Honolulu, Oahu, for the year ending June 30, 1927

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July	12.2	0.5	1.12	1.73	34.6	106
August	----------	.5	5.67	8.77	176	539
September	----------	----------	2.38	3.68	71.4	219
October	----------	.9	3.84	5.94	119	365
November	17.4	.8	2.38	3.68	71.4	219
December	17.9	.7	1.85	2.86	57.2	176
January	40	1.4	7.85	12.1	243	747
February	16.1	2.5	4.96	7.67	139	426
March	50	3.2	11.6	17.9	360	1,100
April	----------	----------	17.3	26.8	518	1,590
May	----------	----------	24.3	37.6	752	2,310
June	7.1	2.0	3.60	5.57	108	331
The year	----------	.5	7.26	11.2	2,650	8,130

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

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

RECORDS AVAILABLE.—October 21, 1913, to June 30, 1927. No record January 17 to September 11, 1921.

EQUIPMENT.—Stevens continuous water-stage recorder on right bank about 20 feet from Pali road. Discharge measurements made by wading near gage.

CHANNEL AND CONTROL.—Channel straight for about 75 feet above and below gage. Stream bed is solid rock below control and filled with gravel and subject to dense growth of grass at and above control. Banks high and covered with vegetation. Control is two sharp-crested weirs with complete end contractions; one is 4 feet high and 2 feet wide with crest at elevation 0.04 foot gage datum, the other is 3 feet high and 12 feet wide with crest at elevation 1.08 feet gage datum. Weir basin is too small to prevent velocity of approach above medium stage.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 786 million gallons a day, or 1,220 second-feet, at 1.15 p. m. March 5 (gage height from water-stage recorder, 6.47 feet, affected by backwater); minimum discharge, 0.2 million gallons a day, or 0.3 second-foot, from 6 to 8 p. m. August 14 (gage height, 0.16 foot).

1913–1927: Maximum discharge recorded, 1,600 million gallons a day, or 2,480 second feet, January 16, 1921 (gage height from floodmarks, 8.74 feet); minimum discharge, 0.06 million gallons a day, or 0.09 second-foot, from 1 p. m. September 10 to 3 a. m. September 11, 1925 (gage height, 0.09 foot).

DIVERSIONS AND REGULATION.—Nuuanu Reservoirs Nos. 2, 3, and 4 are located above this gaging station and have a rated capacity of 7.3, 10.7, and 500 million gallons, respectively. The stream flow is regulated and diverted somewhat by this reservoir system and by several pipe lines for power development and domestic supply.

OBJECT OF STATION.—To determine flow of stream at this location in connection with investigation of water supply for City of Honolulu.

UTILIZATION.—This station measures the waste water and seepage from Reservoirs Nos. 2, 3, and 4 and from Luakaha Weir. Low flow used for irrigation.

ACCURACY.—Stage-discharge relation probably permanent during year except as indicated in footnote to daily-discharge table. Rating curve fairly well defined below 200 million gallons a day by 24 discharge measurements; extension above uncertain. Seven of the measurements were made during the year (one in February and six in May), cover a range from 1.5 to 63 million gallons a day, and check the curve fairly well. Operation of water-stage recorder satisfactory except as indicated in footnote to daily-discharge table. Daily discharge ascertained by applying to rating table mean daily gage height determined from recorder graph by inspection or, for days of considerable fluctuation, by averaging discharge for intervals of day. Records fair for medium stages, except during periods of backwater and periods estimated, for which they are poor; low and high stage records poor.

Discharge, in million gallons a day, of Nuuanu Stream below Reservoir No. 2 wasteway, near Honolulu, Oahu, for the year ending June 30, 1927

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	0.65	0.35	1.3	0.65	0.8	0.7	0.8	2.8	1.5	6.7	11.6	15.6
2	.65	.4	1.0	.65	.7	.65	7.1	3.6	1.1	5.9	11.3	13.7
3	.65	.4	.9	.6	.65	.65	30	3.4	1.2	5.5	11.3	14.5
4	.6	.35	.95	.6	.65	.65	12.2	2.6	1.3	5.1	11.0	13.0
5	.6	.8	.85	.65	.75	.65	3.2	2.4	56	4.9	10.8	12.6
6	.65	.5	.85	.75	.8	.65	2.7	2.2	7.4	4.6	9.2	14.5
7	.75	.4	.85	.65	.8	.55	3.3	2.2	5.1	4.5	11.2	12.6
8	.5	.3	.85	.55	.9	.55	7.8	2.6	5.9	4.1	13.0	11.9
9	.4	.3	.85	.55	.9	.55	3.2	3.6	4.6	10.8	10.2	13.3
10	.4	.3	.9	.7	.9	.6	15.3	2.7	4.1	8.0	11.3	11.3

Discharge, in million gallons a day, of Nuuanu Stream below Reservoir No. 2 wasteway, near Honolulu, Oahu, for the year ending June 30, 1927—Continued

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
11	0.35	0.3	0.8	0.6	0.9	0.6	5.1	2.6	4.5	5.7	10.2	10.5
12	.35	.3	.75	.5	1.1	.65	3.6	2.2	4.0	4.9	16.1	9.9
13	.35	.3	.8	.45	1.0	.65	4.5	2.0	4.1	8.1	9.9	9.9
14	.35	.25	.85	.5	4.3	.65	3.4	1.8	3.9	19.4	14.1	10.2
15	.4	.25	.75	.5	1.3	.6	3.0	1.8	3.9	30	29	10.5
16	.35	.3	.65	.5	1.3	.6	2.8	4.8	13.6	9.9	332	10.2
17	.4	.4	.65	.45	}	.6	2.6	1.9	7.3	24	85	9.9
18	.5	.3	.65	.45		1.8	2.6	1.7	8.2	81	43	9.6
19	.5	.3	.7	.45		1.0	2.4	1.5	5.0	38	27	9.6
20	.35	.3	.95	.5	} 1.2	.9	2.5	1.5	4.9	25	21	9.6
21	.35	.4	.8	.5		1.1	4.2	1.4	4.1	14.9	19.1	9.3
22	.35	.3	.75	.5		.95	7.4	1.3	3.9	13.3	27	8.8
23	.35	.3	.8	.5	}	.95	3.1	1.3	35	15.5	40	8.3
24	.35	.3	.85	1.3	.85	1.1	2.8	4.7	6.9	20	20	8.3
25	.35	.25	1.0	4.0	.85	.95	3.3	2.4	5.5	11.9	18.4	9.9
26	.3	.3	.9	.85	.85	.95	3.2	1.7	4.9	13.6	17.6	8.1
27	.35	.25	.8	.7	.85	.8	3.0	1.4	45	29	18.4	7.9
28	.35	.3	.8	.65	.8	.8	3.0	1.3	33	13.7	19.6	7.9
29	.3	11.8	.7	.65	.75	.8	4.1	-------	9.3	11.6	16.4	7.4
30	.3	27	.7	.6	.7	.75	3.0	-------	8.1	11.6	15.2	7.1
31	.3	2.4	-------	.6	-------	.8	2.6	-------	7.6	-------	16.8	-------

NOTE.—Braced figure gives mean discharge for period indicated, estimated by comparison with records of flow for West Branch of Manoa Stream and Kalihi Stream and from study of diversions and regulation; recorder not operating properly. Discharge July 1–14, September 6 to October 13, October 23 to November 16, March 5–19, and April 27 to May 21 from gage height corrected for backwater caused by grass in weir basin, the amount of backwater was determined from study of gage-height graph, engineer's notes, and diversions and regulation.

Monthly discharge of Nuuanu Stream below Reservoir No. 2 wasteway, near Honolulu, Oahu, for the year ending June 30, 1927

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July	0.75	0.3	0.432	0.668	13.4	41
August	27	.25	1.64	2.54	50.7	156
September	1.3	.65	.832	1.29	25.0	77
October	4.0	.45	.713	1.10	22.1	68
November	4.3	.65	1.06	1.64	31.8	98
December	1.8	.55	.781	1.21	24.2	74
January	30	.8	5.09	7.88	158	484
February	4.8	1.3	2.34	3.62	65.4	201
March	56	1.1	10.0	15.5	311	951
April	81	4.1	15.4	23.8	461	1,420
May	332	9.2	29.9	46.3	927	2,840
June	15.6	7.1	10.5	16.2	316	967
The year	332	.25	6.59	10.2	2,410	7,380

WEST BRANCH OF MANOA STREAM NEAR HONOLULU, OAHU

LOCATION.—75 feet above highway bridge, one-eighth mile above confluence with East Branch of Manoa Stream, and 4 miles northeast of Honolulu post office.

RECORDS AVAILABLE.—August 5, 1925, to June 30, 1927. From May 29, 1913, to May 4, 1914, at site about 75 feet downstream and May 5, 1914, to January 16, 1921, at site about 225 feet upstream.

EQUIPMENT.—Gurley 7-day water-stage recorder on left bank. Discharge measurements made by wading near gage or from highway bridge 75 feet downstream.

CHANNEL AND CONTROL.—Stream bed composed of gravel and boulders and is straight for 50 feet above and below gage. A low artificial concrete control 10 feet below gage makes a pool about 15 feet wide and extending upstream about 40 feet at ordinary stages; subject to filling up during floods. Above and below pool stream bed is quite steep. Banks covered with dense vegetation and subject to overflow at stage of about 9 feet.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, about 291 million gallons a day, or 450 second-feet at 8 a. m. May 16 (gage height from water-stage recorder, 8.02 feet; affected by backwater); minimum discharge about 0.1 million gallons a day, or 0.15 second-foot, from 6 p. m. August 19 to 8 a. m. August 20 (gage height, 3.59 feet; affected by backwater).

1913–1921; 1926–1927: Maximum stage, 10.4 feet, January 16, 1921. (Determined from floodmarks. Discharge estimated at 2,100 million gallons a day, or 3,250 second-feet.) Minimum discharge, about 0.05 million gallons a day, or 0.08 second-foot, from midnight March 16 to 7 p. m. March 22, 1926 (gage height, 3.45 feet).

DIVERSIONS AND REGULATION.—None above station.

OBJECT OF STATION.—To determine feasibility of using stream to augment water supply of City of Honolulu.

UTILIZATION.—Practically entire low-water flow of Manoa Stream is used for irrigation.

ACCURACY.—Stage-discharge relation changed May 30 when control was cleaned, otherwise permanent except as indicated in footnote to daily-discharge table. Rating curve used prior to May 30 fairly well defined between 1 and 60 million gallons and poorly defined beyond these limits. Curve based on 22 discharge measurements below 41 million gallons a day made during the period 1925 to 1927 when control was clean and one discharge measurement of 165 million gallons a day when control was not clean. Rating curve used subsequent to May 20 well defined between 1 and 30 million gallons a day by 13 discharge measurements, extended above and poorly defined below by 8 discharge measurements. Operation of water-stage recorder satisfactory except as indicated in footnote to daily-discharge table. Daily discharge ascertained by applying to rating table mean daily gage heights determined from recorder graph by inspection or, for days of considerable fluctuation, by averaging discharge for intervals of day. Records good for medium stages, except during periods of backwater for which they are poor; high and low stage records and estimated records poor.

Discharge, in million gallons a day, of West Branch of Manoa Stream near Honolulu, Oahu, for the year ending June 30, 1927

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	0.15		1.0	0.5	1.8	0.3	0.6	2.3	1.5	1.1	3.6	4.7
2	.2	0.4	.7	.9	.8	.35	6.4	3.3	.8	1.1	3.9	3.3
3	.5		.5	.7	.65	.3	28	2.3	.7	.9		5.0
4	.5		1.0	.45	.6	.25	8.0	1.3	1.0	.7		3.1
5	.4		.8	1.8	.5	1.1	3.0	1.2	12.8	.65	2.8	2.5
6		2.9	1.0	5.0	.45	.35	2.1	1.1	3.0	1.3		5.6
7			1.1	2.3	.5	.3	3.4	1.0	2.3	.7	5.2	2.9
8		.65	1.1	1.2	.5	.2	7.9	1.1	4.1	.7	8.0	2.1
9		.45	2.8	1.6	.5	.15	2.7	2.6	2.3	4.0	4.9	3.4
10	.4	.5	2.7	4.3	.4	.2	12.7	1.45	1.8	1.1	4.9	2.1
11		.6	1.6	1.45	.35	.25	3.4	1.2	3.2	.8	4.1	1.8
12		.4	2.4	1.1	1.3	.45	2.7	.8	2.0	.65	14.7	1.6
13		.35	2.0	.8	.8	.8	3.7	.6	2.1	1.9	6.5	1.6
14		.4	3.8	.7	7.5	.4	1.8	.5	1.8	3.7	4.0	1.45
15		.3	1.0	.5	1.6	.25	1.6	.5	1.3	17.7	32	1.45
16		.6	.65	.6	1.2	.25	1.45	2.6	5.6	4.4	90	1.45
17		.9	.5	.6	.9	.25	1.2	.65	3.1	11.4	34	2.2
18		.25	.6	.5	.8	3.6	1.1	.65	3.7	27		2.3
19		.1	2.9	.5	.9	1.3	1.1	.65	.9	15.8	7.7	1.6
20		.2	3.8	.5	.8	1.0	1.45	.6	.7	7.8	5.5	1.8
21		5.2	1.45	.5	.6	1.3	4.0	.5	.5	5.1	4.4	1.3
22	.3	1.8	1.0	.5	.45	.9	5.3	.5	.4	4.2	5.1	1.2
23		1.0	2.8	2.1	.45	1.8	2.3	.45	13.3	3.9	8.3	1.1
24		.5	2.3	8.4	.45	1.2	2.0	3.3	2.1	3.9	3.2	1.1
25		.45	4.7	12.1	.5	.9	3.1	1.4	1.4	2.3	2.3	3.4
26		.6	2.7	2.0	.65	1.1	2.9	1.9	1.2	5.3	1.8	1.1
27		1.5	2.0	1.2	.7	.8	2.3	1.0	8.0	16.1	2.3	1.0
28		1.0	1.2	1.1	.5	.65	2.4	1.0	11.4	3.6	2.5	.9
29		19.4	.8	.9	.35	.5	2.8	-------	2.0	3.1	2.5	.9
30		22	.65	.8	.3	.6	1.8	-------	1.2	2.9	2.0	.8
31		2.7	-------	1.0	-------	.9	1.6	-------	.9	-------	4.5	-------

NOTE.—Discharge estimated May 31. Braced figures give estimated mean discharge for periods indicated. Estimates made by comparison with the records of all near-by streams; gage-height record faulty or missing. Discharge July 1–2, August 8 to October 21, January 21 to February 11, and May 19–30 from gage heights corrected for backwater, the amount of which was determined from six discharge measurements and by comparison with records of flow for East Branch of Manoa Stream.

Monthly discharge of West Branch of Manoa Stream near Honolulu, Oahu, for the year ending June 30, 1927

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July	----------	----------	0.334	0.517	10.4	32
August	22	0.1	2.32	3.59	72.0	221
September	4.7	.5	1.72	2.66	51.6	158
October	12.1	.45	1.83	2.83	56.6	174
November	7.5	.3	.927	1.43	27.8	85
December	3.6	.15	.732	1.13	22.7	70
January	28	.6	4.03	6.24	125	383
February	3.3	.45	1.30	2.01	36.4	112
March	13.3	.4	3.13	4.84	97.1	298
April	27	.65	5.13	7.94	154	472
May	90	1.8	10.1	15.6	313	961
June	5.6	.8	2.16	3.34	64.8	199
The year	90	.1	2.82	4.36	1,030	3,160

EAST BRANCH OF MANOA STREAM NEAR HONOLULU, OAHU

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

RECORDS AVAILABLE.—May 29, 1913, to January 13, 1921, and August 18. 1925, to June 30, 1927.

EQUIPMENT.—Gurley 7-day water-stage recorder on right bank about 5 feet downstream from highway bridge. Discharge measurements made by wading near gage or from highway bridge just about gage.

CHANNEL AND CONTROL.—Channel straight for about 100 feet above and below gage. A low artificial concrete control 5 feet below gage makes a pool about 20 feet wide and extending upstream about 40 feet at ordinary stages; subject to filling up during floods. Stream bed composed of gravel and boulders, quite steep above pool but much flatter below. Banks are covered with vegetation and are high above gage but below gage right bank is overflowed at stage of about 7.5 feet.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 181 million gallons a day, or 280 second-feet, at 1.15 p. m. May 16 (gage height, from water-stage recorder, 6.35 feet; affected by backwater); minimum discharge, 0.45 million gallons a day, or 0.7 second-feet, several times July 14 to August 16 (gage height, 3.92 feet).

1913–1927: Maximum stage recorded from floodmarks, 10.4 feet January 16, 1921 (discharge, estimated 2,000 million gallons a day, or 3,090 second-feet); minimum discharge, 0.4 million gallons a day, or 0.6 second-foot, from 4 p. m. June 7 to 5 a. m. June 8, 1926 (gage height, 3.91 feet).

DIVERSIONS AND REGULATION.—East Manoa ditch diverts water about a quarter of a mile upstream, and city of Honolulu diverts about 0.4 million gallons a day from tunnels about half a mile upstream.

OBJECT OF STATION.—To determine feasibility of using stream to augment water supply of City of Honolulu.

UTILIZATION.—Practically entire flow of Manoa Stream is used for irrigation of rice and taro.

ACCURACY.—Stage-discharge relation permanent during year except as indicated in footnote to daily-discharge table. Rating curve well defined below 50 million gallons a day and poorly defined above. Eleven discharge measurements, made mostly in latter half of year and covering a range from 1 to 40 million gallons a day, check the curve closely. One measurement at 151 million gallons a day helped to define the extension and with five other measurements determined backwater correction during May. Operation of water-stage recorder satisfactory except as indicated in footnote to daily-discharge table. Daily discharge ascertained by applying to rating table mean daily gage height determined from recorder graph by inspection or, for days of considerable fluctuation, by averaging discharge for intervals of day. Records good for ordinary stages except for estimated periods, for which they are fair; high-stage records probably fair.

Discharge, in million gallons a day, of East Branch of Manoa Stream near Honolulu, Oahu, for the year ending June 30, 1927

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	0.55	0.75	1.1	1.1	3.2	0.9	1.1	1.7	1.7	1.4	2.5	3.8
2	.6	.8	1.0	1.2	1.2	.9	11.0	3.2	1.2	1.6	3.4	3.2
3	.6	.9	.9	1.1	1.0	.9	23	2.4	1.1	1.5	3.2	
4	.55	.55	1.4	1.1	.9		5.3	1.4	1.5	1.4	2.4	3.8
5	.6		1.1	1.3	.9	.8	3.1	1.2	5.5	1.4	2.2	3.8
6	.6	3.9	1.2	3.2	1.0		2.4	1.2	2.2	2.9	3.3	6.4
7	.75	.6	1.2	1.5	.75		2.8	1.1	1.9	1.6	3.9	4.5
8	.6	.55	1.1	1.1	.75	.7	5.1	1.2	3.9	1.2	4.8	4.0
9	.7	.5	2.0	1.2	.75		2.4	2.2		2.6	3.1	4.2
10	.7	.7	2.2	2.5	.6	.7	11.5	1.6	2.2	1.4	2.8	3.5
11	.7	.6	1.1	1.1	.5	.6	3.3	1.5		1.2	4.1	3.3
12	.55	.55	1.3	1.0	1.1	.8	2.8	1.1		1.2	13.0	3.1
13	.5	.5	1.4	.9	.8	1.0	5.2	1.0	1.9	4.2	4.0	3.1
14	.45	.5	2.3	.9	5.6	.75	2.2	1.0	1.6	6.2	4.1	2.8
15	.55	.5	1.5	.9	1.1	.7	1.9	1.0	1.5	20	12.8	2.8
16	.6	.75	1.4	.8	.8	.7	1.7	2.4	4.5	4.7	69	2.8
17	.55	.9	1.4	.7	.75	.7	1.7		3.2	18.0	21	3.5
18	.7	.6	1.2	.7	.75	4.2	1.7		3.6	39	16.6	2.4
19	.55	.6	3.7	.7	.8	1.7	1.6	.9	1.7	23	7.4	2.2
20	.5	.7	4.0	.7	.9	1.0	1.5		1.5	11.4	5.2	2.6
21	.5	3.6	1.7	.75	.9	1.1			1.2	5.2	4.7	2.4
22	.45	1.0	1.6	.9	.9	.9	3.6		1.1	5.6	9.2	2.4
23	.45	.7	2.2	5.0	.9	1.8				4.3	9.7	2.4
24	.5	.6	1.7	15.5	.9	1.2		1.6	4.9	4.6	4.7	2.6
25	.55	.55	2.3	17.5	.8	1.0				2.8	4.0	3.7
26	.45	.55	1.6	2.4	1.1	1.0	2.4		1.2	4.5	3.8	2.4
27	.55	.8	1.4	1.9	1.0	1.0			3.6	9.7	3.8	2.2
28	.5	.6	1.2	1.6	.9	1.0		1.3	7.1	4.4	3.5	2.0
29	.5	12.3	1.1	1.4	.9	1.0	1.9	----	1.7		3.8	2.0
30	.5	5.3	1.1	1.2	.9	1.2	1.4	-------	1.4	2.4	3.5	2.2
31	.55	1.5	-------	2.3	-------	1.4	1.1	-------		-------	4.5	-------

NOTE.—Discharge estimated Dec. 3 and Apr. 1 and 15. Braced figures give estimated mean discharge for periods indicated. Estimates made by comparison with records for West Branch of Manoa Stream and East Manoa ditch; gage-height record either faulty or missing. Discharge May 16 to June 1 from gage heights corrected for backwater, which was determined by six discharge measurements and study of engineer's notes.

Monthly discharge of East Branch of Manoa Stream near Honolulu, Oahu, for the year ending June 30, 1927

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July	0.75	0.45	0.561	0.868	17.4	53
August	12.3	.5	1.51	2.34	46.8	144
September	4.0	.9	1.61	2.49	48.4	148
October	17.5	.7	2.39	3.70	74.2	227
November	5.6	.5	1.11	1.72	33.4	102
December	4.2	----------	1.05	1.62	32.6	100
January	23	1.1	3.82	5.91	118	363
February	3.2	----------	1.41	2.18	39.6	121
March	7.1	----------	2.60	4.02	80.7	247
April	39	1.2	6.46	10.0	194	595
May	69	2.2	7.87	12.2	244	749
June	6.4	2.0	3.11	4.81	93.3	286
The year	69	----------	2.80	4.33	1,020	3,140

EAST MANOA DITCH NEAR HONOLULU, OAHU

LOCATION.—About 150 feet east of highway and gaging station on East Branch of Manoa Stream, a quarter of a mile below intake from East Branch of Manoa Stream, and 4 miles northeast of Honolulu post office.

RECORDS AVAILABLE.—May 24, 1915, to December 31, 1916, January 26, 1918, to January 16, 1921, and August 9, 1925, to June 30, 1927.

EQUIPMENT.—Gurley 7-day water-stage recorder on left bank. Discharge measurements made by wading or from foot plank near gage.

CHANNEL AND CONTROL.—Ditch in earth cut about 4 feet wide, is straight for about 100 feet above and 25 feet below gage; subject to obstruction from growth of grass. Control is thin-edged weir 2 feet high and 2 feet wide with complete end contractions set in wooden frame. Weir basin when clean is sufficient to prevent velocities of approach at ordinary stages but is subject to filling in with mud and grass.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 6.0 million gallons a day, or 9.3 second-feet, at 12.15 p. m. May 16 (gage height from water-stage recorder, 1.31 feet); minimum discharge uncertain owing to obstructed intake to stilling well.

1915–1917; 1918–1921; 1926–27: Maximum discharge recorded, about 26 million gallons a day, or 40 second-feet, at 3 a. m. January 16, 1921 (gage height from water-stage recorder, 2.27 feet); minimum discharge, 0.05 million gallons a day, or 0.08 second-foot, at 3 p. m. March 16, 1919 (gage height, 0.03 foot).

DIVERSIONS AND REGULATION.—Flow somewhat regulated by altering crude stone dam at intake.

OBJECT OF STATION.—To determine feasibility of using water to augment water supply for City of Honolulu.

UTILIZATION.—Water used for irrigation of rice and taro.

ACCURACY.—Stage-discharge relation probably permanent except as indicated in footnote to daily-discharge table. Rating curve, based on weir formulas, is well defined; and eight discharge measurements, made during November, December, January, and May and covering a range from 0.4 to 2.6 million gallons a day, check the curve fairly well. Operation of water-stage recorder satisfactory except for three days in May. Daily discharge ascertained by applying to rating table mean daily gage height determined from recorder graph by inspection or, for days of considerable fluctuation, by averaging discharge for intervals of day. Records good except those affected by backwater from obstructed weir basin, which are poor (see footnote to daily-discharge table).

Discharge, in million gallons a day, of East Manoa ditch near Honolulu, Oahu, for the year ending June 30, 1927

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	0.35	0.3	0.3	0.35	0.45	0.35	0.3	0.45	0.3	0.5	0.3	0.15
2	.35	.3	.25	.35	.45	.35	.6	.55	.25	.5	.35	.2
3	.35	.35	.25	.35	.45	.35	1.5	.5	.25	.5	.35	.2
4	.3	.3	.3	.35	.45	.35	.6	.35	.25	.5	.25	.15
5	.3	1.2	.3	.35	.4	.35	.35	.35	.3	.45	.25	.15
6	.3	.5	.3	.55	.35	.3	.3	.35	.25	.35	.35	.2
7	.3	.35	.35	.45	.35	.35	.25	.35	.2	.3	.3	.15
8	.3	.3	.35	.4	.35	.35	.35	.35	.3	.5	.4	.15
9	.3	.3	.35	.35	.3	.35	.3	.35	.25	.55	.35	.15
10	.35	.3	.45	.6	.3	.35	.7	.35	.25	.45	.3	.2
11	.4	.3	.3	.45	.3	.35	.45	.35	.4	.45	.4	.2
12	.4	.3	.3	.35	.5	.3	.4	.35	.3	.45	.8	.2
13	.4	.25	.25	.35	.45	.4	.45	.35	.35	.5	.2	.2
14	.4	.25	.3	.35	.5	.35	.35	.35	.3	.75	.25	.45
15	.35	.3	.25	.3	.25	.35	.35	.35	.3	.9	.8	.6

Discharge, in million gallons a day, of East Manoa ditch near Honolulu, Oahu, for the year ending June 30, 1927—Continued

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
16	0.35	0.3	0.2	0.25	0.5	0.35	0.3	0.45	0.4	0.25	2.4	0.6
17	.35	.3	.2	.25	.5	.35	.3	.35	.4	.9	.5	.75
18	.4	.3	.2	.25	.45	.65	.25	.3	.4	1.6	.4	.65
19	.45	.25	.3	.25	.4	.5	.25	.3	.25	1.05		.45
20	.35	.3	.4	.25	.4	.35	.35	.3	.3	.55	.4	.5
21	.35	.6	.25	.2	.4	.45	.65	.3	.45	.25		.4
22	.3	.2	.2	.2	.4	.4	.6	.3	.45	.2	.6	.35
23	.3	.15	.25	.3	.4	.45	.5	.3	.7	.3	.7	.3
24	.3	.15	.3	.8	.35	.35	.45	.5	.25	.4	.15	.3
25	.4	.15	.7	.8	.35	.3	.45	.4	.3	.3	.15	.55
26	.35	.15	.5	.25	.45	.3	.45	.35	.4	.35	.15	.45
27	.35	.2	.45	.2	.4	.3	.4	.3	.55	.5	.15	.45
28	.35	.2	.4	.2	.35	.3	.45	.3	.7	.25	.15	.45
29	.3	.8	.35	.2	.35	.3	.5	-------	.3	.35	.15	.45
30	.25	1.6	.35	.25	.35	.3	.45	-------	.3	.35	.15	.4
31	.25	.35	-------	.5	-------	.35	.45	-------	.5	-------	.2	-------

NOTE.—Braced figure gives mean discharge for period indicated, estimated by comparison with record of East Branch of Manoa Stream; recorder not operating. Discharge August 14 to September 30 from gage-height record corrected for backwater, which was determined from study of gage-height graph, engineer's notes, and comparison with record of flow for East Branch of Manoa Stream.

Monthly discharge of East Manoa ditch near Honolulu, Oahu, for the year ending June 30, 1927

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July	0.45	0.25	0.340	0.526	10.6	32
August	1.6	.15	.374	.579	11.6	36
September	.7	.2	.322	.498	9.65	30
October	.8	.2	356	.551	11.0	34
November	.5	.25	.397	.614	11.9	37
December	.65	.3	.361	.559	11.2	34
January	1.5	.25	.453	.701	14.0	43
February	.55	.3	.362	.560	10.2	31
March	.7	.2	.352	.545	10.9	34
April	1.6	.2	.508	.786	15.2	47
May	2.4	.15	.410	.634	12.7	39
June	.75	.15	.347	.537	10.4	32
The year	2.4	.15	.382	.591	139	429

PUKELE STREAM NEAR HONOLULU, OAHU

LOCATION.—About 200 feet upstream from Palolo belt-road bridge, five-eighths of a mile above confluence of Pukele and Waiomao Streams, which is the beginning of Palolo Stream, and about 4¾ miles east of Honolulu post office.

RECORDS AVAILABLE.—June 9, 1926, to June 30, 1927. From April 16, 1912, to September 30, 1913, at Mahoe Springs about one-eighth of a mile downstream (January 1 to September 30, 1913, not published).

EQUIPMENT.—Stevens continuous water-stage recorder on right bank. Discharge measurements made by wading near gage. Velocity of approach measured by current meter and floats in weir basin.

CHANNEL AND CONTROL.—Channel straight for about 50 feet above and below gage. Stream bed composed of solid ledge, boulders, and gravel. Banks high and steep. The control is a sharp-edged orifice 0.5 foot high and 1 foot wide with bottom edge at elevation 0.00 foot gage datum, and a sharp-crested weir 4 feet high and 9.96 feet long with complete end contractions and crest at elevation 0.76 foot gage datum; both set in heavy concrete dam with broad-crested wing wells. Weir basin too small to prevent velocity of approach above medium stage and is subject to filling up during floods.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during period, 360 million gallons a day, or 557 second-feet, at 4 p. m. May 16 (gage height from water-stage recorder, 6.13 feet); minimum discharge, 0.15 million gallons a day, or 0.25 second-foot, from 12.30 to 1.45 p. m. June 8, 1926 (gage height, 0.15 foot).

1912–1913; 1926–1927: Maximum discharge recorded, that of May 16, 1927; minimum discharge, that of June 8, 1926.

DIVERSIONS AND REGULATION.—A small amount of water is diverted by a 2-inch pipe for irrigation of small taro patch.

OBJECT OF STATION.—To determine feasibility of using stream to augment water supply of city of Honolulu.

UTILIZATION.—Practically entire low flow used for irrigation.

ACCURACY.—Stage-discharge relation permanent during period except as indicated in footnote to daily-discharge table. Rating curve well defined below 25 million gallons a day by three discharge measurements and theoretical formulas; poorly defined above by several velocity of approach measurements and theoretical formulas. Operation of water-stage recorder satisfactory, except as indicated in footnote to daily-discharge table. Daily discharge ascertained by applying to rating table mean daily gage height determined from recorder graph by inspection or, for days of considerable fluctuation, by averaging discharge for intervals of day. Records good for ordinary stages, except for periods estimated and periods of backwater, for which they are fair; high-stage records poor.

Discharge, in million gallons a day, of Pukele Stream near Honolulu, Oahu, for the period June 9, 1926, to June 30, 1927

Day	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	-------	0.4	0.15	0.35	0.2	1.3	0.35	0.25	0.6	0.65	0.8	0.3	
2	-------	.4	.15	.35	.2	.6	.35	7.7	2.3	.65	1.2	2.0	
3	-------	.35	.2	.35	.2	.55	.3	21	1.2	.6	.75	2.5	
4	-------	.35	.2	.35	.2	.55	.3	2.7	.65	.65	.7	.85	1.1
5	-------	.35	2.0	.35	.2	.5	.5	.9	.6	1.5	.65	.8	
6	-------	.3	.3	.35	.2	.5	.35	.8	.6	.6	.75	.85	
7	-------	.3	.25	.35	.2	.5	.3	.8	.6	.55	.65	1.3	1.5
8	-------	.3	.25	.35	.2	.45	.3	1.4	.65	.6	.6	2.7	1.4
9	0.2	.3	.25	.35	.2	.45	.3	.95		.55	1.3	1.6	1.3
10	.2	.25	.2	.3	.2	.4	.3	10.8		.55	.55	2.2	1.25
11	3.5	.25	.2	.25	.2	.4	.3	2.3		.55	.5	1.4	1.2
12	4.7	.25	.2	.25	.2	.4	.3	1.4		.55	.5	22	1.2
13	.6	.25	.2	.25	.2	.35	.3	2.2	.6	.5	1.7	4.0	1.1
14	10.8	.25	.2	.25	.2	5.4	.25	1.2		.5	7.2	5.6	1.05
15	8.6	.25	.2	.25	.2	.7	.25	1.1		.5	21	7.9	1.0
16	4.2	.2	.2	.25	.2	.6	.25	1.1		2.0	3.8		.95
17	2.4	.2	.2	.2	.2	.55	.25	1.0	.6	2.1	10.6	22	.85
18	1.7	.2	.2	.2	.2	.6	.25	.95	.55	1.6	35		.8
19	1.3	.2	.2	.2	.2	.6	.25	.85	.55	.9	19.1		.75
20	1.15	.2	.2	.2	.2	.6	.2	.8	.55	.65	9.6		.75
21	1.1	.2	.2	.2	.2	.6	.2	.75	.5	.6	4.1		.7
22	1.0	.2	.2	.2	.2	.55	.2	1.1	.5	.6	4.1	5.8	.7
23	.95	.2	.2	.2	.55	.5	.2	.7	.5	15.8	3.6		.7
24	.85	.2	.2	.2	10.3	.5	.2	.65	4.1	1.4	4.7		.7
25	.75	.15	.2	.2	12.9	.45	.2	.65	1.6	.95	1.7		.7
26	.65	.15	.2	.2	.7	.45	.2	.65	.8	.85	1.6		.65
27	.65	.15	.2	.2	.6	.4	.2	.65	.6	1.0	8.9		.65
28	.55	.15	.2	.2	.55	.4	.2	.65	.65	6.1	2.1	2.4	.65
29	.5	.15	3.6	.2	.6	.4	.2	.65	-------	1.7	.65		.65
30	.45	.15	3.7	.2	.6	.4	.2	.65	-------	1.3	.4		.65
31	-------	.15	.5	-------	.55	-------	.25	.65	-------	.85	-------		-------

NOTE.—Braced figures give mean discharge for periods indicated, estimated by comparison with records of East Branch of Manoa Stream and Waiomao Stream; gage-height record either faulty or missing. Discharge November 17 to December 1, March 23–24, and April 15 to May 11 from gage heights corrected for backwater determined by study of gage-height graph, engineer's notes, and by comparison with records or near-by streams; orifice completely or partly obstructed.

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Monthly discharge of Pukele Stream near Honolulu, Oahu, for the period June 9, 1926, to June 30, 1927

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
1926						
June 9–30	10.8	0.2	2.13	3.30	46.8	144
1926–27						
July	.4	.15	.239	.370	7.40	23
August	3.7	.15	.495	.766	15.4	47
September	.35	.2	.258	.399	7.75	24
October	12.9	.2	1.02	1.58	31.8	97
November	5.4	.35	.688	1.06	20.6	63
December	.5	.2	.265	.410	8.20	25
January	21	.25	2.19	3.39	68.0	208
February	4.1	.5	.839	1.30	23.5	72
March	15.8	.5	1.55	2.40	47.9	147
April	35	.4	4.96	7.67	149	457
May		.3	6.12	9.47	190	582
June		.65	.948	1.47	28.4	87
The year		.15	1.64	2.54	598	1,830

WAIOMAO STREAM ABOVE PUKELE STREAM, NEAR HONOLULU, OAHU

LOCATION.—300 feet west of road, 1 mile upstream from confluence of Waiomao and Pukele Streams, which is beginning of Palolo Stream, and 5 miles east of Honolulu post office.

RECORDS AVAILABLE.—June 9, 1926, to June 30, 1927. From April 8 to December 29, 1911, and May 15 to December 31, 1912, at site about 3,000 feet downstream.

EQUIPMENT.—Stevens continuous water-stage recorder on left bank. Discharge measurements made by wading near gage. Velocity of approach measured by current meter and floats in weir basin.

CHANNEL AND CONTROL.—Channel straight for about 50 feet above and below gage. Stream bed composed of solid ledge, boulders, and gravel. Banks high and steep. The control is a sharp-edged orifice 0.5 foot high and 1 foot wide with bottom edge at elevation 0.00 foot gage datum, and a sharp-crested 12-foot weir 4 feet high with complete end contractions and crest at elevation 0.51 foot gage datum; both set in heavy concrete dam with broad-crested wing walls. Weir basin too small to prevent velocity of approach above medium stage and is subject to filling up during floods.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during period, at least 440 million gallons a day, or 681 second-feet, on May 16 (gage height from floodmarks, at least 5.52 feet); minimum discharge, no flow from 6 p. m. July 27 to noon August 5 (gage height, below 0.00 foot).

1911–1912; 1926–1927: Maximum discharge recorded, that of May 16, 1927; minimum discharge that from July 27 to August 5, 1926.

DIVERSIONS AND REGULATION.—Diversion of about 0.2 million gallons a day by City of Honolulu since 1921 from tunnels about 1¾ miles upstream.

OBJECT OF STATION.—To determine feasibility of using stream to augment water supply of City of Honolulu.

UTILIZATION.—Practically entire flow of lower Palolo Stream used for irrigation.

ACCURACY.—Stage-discharge relation permanent during period except as indicated in footnote to daily-discharge table. Rating curve well defined below 10 million gallons a day by three discharge measurements and theoretical formulas; poorly defined above by several velocity of approach measurements and theoretical formulas. Operation on water-stage recorder satisfactory except as indicated in footnote to daily-discharge table. Daily discharge ascertained by applying to rating table mean daily gage height

determined from recorder graph by inspection or, for days of considerable fluctuation, by averaging discharge for intervals of day. Records good for ordinary stages, except for estimated periods and periods of backwater, for which they are fair; high-stage records poor.

Discharge, in million gallons a day, of Waiomao Stream above Pukele Stream, near Honolulu, Oahu, for the period June 9, 1926, to June 30, 1927

Day	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	-------	0.08	0.00	0.55	0.2	3.1	0.1	0.4	0.6	1.0	0.7	1.3	1.3
2	-------	.06	.00	.4	.15	1.3	.07	9.2	4.3	.6	.85	4.1	1.2
3	-------	.06	.00	.3	.15	1.0	.06	18.4	3.3	.5	.6	5.4	1.3
4	-------	.06	.00	.3	.15	.9	.06	3.5	1.2	.55	.5	1.8	1.2
5	-------	.04	2.4	.2	.2	.75	1.4	1.6	.7	2.2	.45	1.4	1.2
6	-------	.08	1.1	.25	.9	.7	.45	1.2	.55	1.1	.55	1.7	2.0
7	-------	.06	.55	.35	.55	.7	.25	1.0	.45	.7	.45	1.9	1.7
8	-------	.05	.4	.3	.3	.6	.15	1.7	.65	.65	.4	2.8	1.3
9	0.65	.08	.25	.2	.3	.5	.15	.85	1.7	.6	1.9	2.0	1.3
10	.3	.1	.2	.25	1.3	.4	.1	12.4		.5	.75	2.5	1.2
11	6.5	.15	.2	.15	.5	.35	.1	3.0		.7	.55	1.6	1.1
12	8.9	.05	.15	.15	.35	.75	.15	2.3		.8	.45	20	1.0
13	2.8	.03	.1	.3	.25	.65	.45	3.3	.6	1.2	1.6	5.1	1.2
14	12.7	.02	.08	.3	.2	5.2	.2	1.6		.65	7.9	3.8	1.1
15	8.8	.01	.06	.2	.2	1.2	.15	1.0		.5	24	7.7	1.0
16	5.0	.01	.06	.15	.2	1.0	.15	.65		1.6	5.8		.85
17	2.8	.02	.15	.15	.2	.85	.15	.55	.6	3.4	11.3	30	1.1
18	2.1	.02	.15	.09	.15	.7	.65	.45	.45	2.0	49		1.4
19	1.2	.07	.09	.1	.15	.7	.75	.4	.35	1.2	30		1.3
20	.75	.03	.15	.9	.1	.6	.35	.45	.35	.85	13.8		1.3
21	.55	.02	1.9	.35	.08	.55	.55	.65	.3	.55	4.6	8.0	.9
22	.4	.01	.55	.2	.07	.5	.35	1.6	.3	.5	4.3		.7
23	.3	.01	.25	.7	1.5	.35	.6	.7	.25	18.4	3.8		.65
24	.25	.01	.2	.65	14.0	.3	.5	.55	6.9	3.4	6.5		.65
25	.5	.01	.15	.6	23	.25	.35	1.2	4.2	1.6	2.3		1.2
26	.25	.01	.1	.55	2.2	.35	.35	1.1	2.3	1.0	2.5		.7
27	.2	.00	.35	.45	1.2	.4	.25	.65	1.2	1.8	10.2	3.0	.65
28	.2	.00	.2	.3	.8	.25	.2	.55	.75	6.8	2.5		.55
29	.15	.00	3.0	.25	.5	.25	.15	.7	-------	1.8	1.7		.55
30	.09	.00	4.1	.2	.25	.2	.45	.5	-------	1.1	1.4		.55
31	-------	.00	1.0	-------	.4	-------	1.1	.35	-------	.7	-------		------

NOTE.—Discharge estimated June 1. Braced figures give mean estimated discharge for periods indicated. Estimates made by comparison with record of flow for East Branch of Manoa Stream; gage-height record either faulty or missing. Discharge October 26 to November 2, November 15 to December 1, and March 23–24 from gage heights corrected for backwater, which was determined by study of gage graph, engineer's notes, and comparison with records for near-by streams; orifice completely or partly obstructed.

Monthly discharge of Waiomao Stream above Pukele Stream, near Honolulu, Oahu, for the period June 9, 1926, to June 30, 1927

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
1926						
June 9–30	12.7	0.09	2.52	3.90	55.4	170
1926–27						
July	.15	.00	.037	.057	1.15	4
August	4.1	.00	.577	.893	17.9	55
September	.9	.09	.328	.507	9.84	30
October	23	.07	1.63	2.52	50.5	155
November	5.2	.2	.845	1.31	25.4	78
December	1.4	.06	.346	.535	10.7	33
January	18.4	.35	2.34	3.62	72.5	223
February	6.9	.25	1.27	1.96	35.6	109
March	18.4	.5	1.90	2.94	59.0	181
April	49	.4	6.38	9.87	191	587
May	----------	1.3	7.87	12.2	244	749
June	2.0	.55	1.07	1.66	32.2	98
The year	----------	.00	2.06	3.19	750	2,300

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

LOCATION.—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.

RECORDS AVAILABLE.—May 29, 1913, to June 30, 1927.

EQUIPMENT.—Stevens continuous water-stage recorder on left bank. Discharge measurements made by wading near gage or from footbridge just above gage.

CHANNEL AND CONTROL.—Channel is straight for about 100 feet above and below gage. Below control stream bed is full of boulders and gravel, but for 75 feet above the large boulders have been removed. Banks are steep and covered with vegetation. The control is composed of large boulders; subject to shifts.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 818 million gallons a day, or 1,270 second-feet, at 9 p. m. March 5 (gage height from water-stage recorder, 7.79 feet); minimum discharge, 0.2 million gallons a day, or 0.3 second-foot, from noon to 7.45 p. m. December 4 (gage height, 0.97 foot).

1913–1927: Maximum discharge recorded, about 985 million gallons a day, or 1,520 second-feet, at 3 a. m. March 26, 1920 (gage height, 9.0 feet; determined from floodmarks and by comparison with record for Left Branch of North Fork of this stream); minimum discharge, 0.09 million gallons a day, or 0.15 second-foot, at 2.15 p. m. March 22, 1926 (gage height, 0.71 foot).

DIVERSIONS AND REGULATION.—None.

OBJECT OF STATION.—To determine amount of water taken from Territorial land by Wahiawa Water Co. All water comes from Territorial land.

UTILIZATION.—Wahiawa Water Co.'s tunnel diverts entire low-water flow of both Right and Left Branches of North Fork of Kaukonahua Stream for domestic water supply and irrigation in vicinity of Wahiawa. Nearly entire flow of North Fork, except that diverted, is stored in Wahiawa Reservoir for irrigation of sugar cane on Waialua plantation.

ACCURACY.—Stage-discharge relation changed at time of flood May 15 and shifting-control method was used July 1 to September 13, December 13 to March 5, and March 7 to May 15. Two rating curves used are fairly well defined below 150 million gallons a day; extension above uncertain. Five discharge measurements were made during year covering a range from 1.5 to 12 million gallons a day; one each in October and June check the rating very closely; and one each in August, March, and April along with comparison with record of Left Branch of North Fork of this stream are the basis for shifting-control method used. Operation of water-stage recorder satisfactory except as indicated in footnote to daily-discharge table. Daily discharge ascertained by applying to rating table, after correcting for shifting control, mean daily gage height determined from recorder graph by inspection or, for days of considerable fluctuation, by averaging discharge for intervals of day. Records good for ordinary stages, except for periods when shifting-control method was used, for which they are probably fair. High-stage and estimated records poor.

Discharge, in million gallons a day, of Right Branch of North Fork of Kaukonahua Stream near Wahiawa, Oahu, for the year ending June 30, 1927

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	0.25	4.2	7.0	1.4	1.9	0.2	0.65	4.9	1.0	5.0	10.9	26
2	.35		3.0	1.9	.6	.2	8.9	6.2	.7	5.0	12.3	10.2
3	.45		2.2	1.4	.4	.2	74	5.3	1.3	4.2	3.9	20
4	.25		5.6	1.1	.35	.2	11.0	3.0	8.0	3.7	11.6	9.4
5	.25	23	7.8	2.5	.3	9.5	3.5	2.5	168	3.5	8.7	8.8
6	.2	5.2	2.7	13.7	.3	.5	3.0	2.2	179	10.3	5.2	11.8
7	10.7	8.9	1.6	2.6	.35	.25	10.5	2.2	33	3.6	50	11.1
8	1.0	3.5	1.3	1.3	.25	.25	22	2.3	34	3.2	28	11.8
9	7.1	2.5	1.0	3.9	.25	.2	3.7	3.9	19.4	3.0	11.0	30
10	9.3	2.8	1.5	5.4	.25	.2	14.8	1.8	16.1	2.9	10.2	8.3
11	15.5	2.1	.85	2.6	.25	.35	3.2	1.6	21	2.7	6.0	6.9
12	1.7	1.6	11.5	1.6	2.3	16.2	2.4	1.3	12.3	3.4	17.4	6.1
13	1.0	1.3	51	1.1	1.0	6.2	5.5	1.2	8.3	12.2	6.0	5.4
14	.65	1.2	14.2	.9	35	.45	2.0	1.1	7.4	16.8	5.3	4.8
15	.5	.85	5.6	.75	1.8	.25	1.6	1.0	6.3	35	49	4.7
16	.65	1.0	3.5	.65	1.7	.25	1.3	8.2	50	7.5	174	4.4
17	2.5	2.7	2.7	.6	1.8	.65	1.1	1.4	22	28	110	4.9
18	3.6	1.0	2.3	.5	.75	80	.95	1.1	50	32	29	6.5
19	26	.6	2.0	.5	.65	8.0	.85	.95	10.5	26	15.0	3.8
20	13.4	.9	46	.45	.5	14.3	2.5	.85	8.3	14.7	11.3	4.2
21	2.2	7.9	6.2	.4	.4	29	6.5	.75	6.8	7.0	9.8	3.4
22	1.4	5.0	3.6	.4	.35	8.4	5.1	.7	6.2	6.0	24	5.0
23	6.0	1.0	5.5	2.6	.3	13.6	1.4	.65	8.1	5.7	19.5	3.2
24	2.0	.95	6.8	8.5	.3	4.2	2.7	2.3	5.2	7.0	33	5.8
25	3.5	.5	6.0	12.3	.25	9.7	17.7	1.8	4.7	4.1	10.9	14.8
26	1.2	.45	3.0	1.9	1.4	2.8	22	9.4	5.8	4.4	8.8	3.5
27	13.8	.65	2.4	.9	.9	1.7	5.9	1.5	15.4	34	8.7	3.6
28	2.8	5.6	2.1	.6	.3	1.4	10.0	.95	36	5.8	10.2	3.8
29	2.3	45	1.8	.5	.25	1.0	10.0	-------	6.0	4.5	19.8	3.0
30	1.4	32	1.7	.45	.25	2.0	8.2	-------	5.0	4.5	9.8	3.2
31	1.3	19.1	-------	.45	-------	1.4	3.8	-------	4.7	-------	16.5	-------

NOTE.—Discharge estimated Sept. 14 and 15. Braced figure gives estimated mean discharge for period indicated. Estimates made from study of fragmentary gage-height record and continuous rainfall record at Moanalua gaging station; recorder not operating all the time.

Monthly discharge of Right Branch of North Fork of Kaukonahua Stream near Wahiawa, Oahu, for the year ending June 30, 1927

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July	26	0.2	4.30	6.65	133	409
August	45	.45	6.26	9.69	194	596
September	51	.85	7.08	11.0	212	652
October	13.7	.4	2.38	3.68	73.8	226
November	35	.25	1.85	2.86	55.4	170
December	80	.2	6.89	10.7	214	655
January	74	.65	8.60	13.3	267	818
February	9.4	.65	2.54	3.93	71.0	218
March	179	.7	24.5	37.9	760	2,330
April	35	2.7	10.2	15.8	306	939
May	174	3.9	24.1	37.3	746	2,290
June	30	3.0	8.28	12.8	248	762
The year	179	.2	8.99	13.9	3,280	10,100

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

LOCATION.—About 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.

RECORDS AVAILABLE.—May 25, 1913, to June 30, 1927.

EQUIPMENT.—Stevens continuous water-stage recorder on left bank which replaced Au continuous water-stage recorder September 15. Discharge measurements made by wading near gage or from cable just below gage.

CHANNEL AND CONTROL.—Channel straight for 100 feet above and below gage. Stream bed composed of boulders and gravel. Banks steep and covered with brush. Control composed of large and small boulders; fairly permanent; probably subject to backwater from Right Branch at high stages.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 1,950 million gallons a day, or 3,020 second-feet, probably March 5 (gage height from range line on water-stage recorder when clock was stopped, 8.07 feet); minimum discharge is not known owing to faulty gage-height record.

1913–1927: Maximum discharge recorded, about 4,080 million gallons a day, or 6,310 second-feet, at 5 a. m. January 14, 1923 (gage height from water-stage recorder, 10.3 feet); minimum discharge, 0.1 million gallons a day, or 0.16 second-foot, at 4 a. m. February 18 and 11.30 p. m. March 5, 1920.

DIVERSIONS AND REGULATION.—None.

OBJECT OF STATION.—To determine amount of water diverted from Territorial land by Wahiawa Water Co. All water comes from Territorial lands.

UTILIZATION.—Wahiawa Water Co.'s tunnel diverts entire low-water flow of both Right and Left Branches of North Fork of Kaukonahua Stream for domestic water supply and irrigation in vicinity of Wahiawa. Nearly the entire flow of North Fork, except that diverted, is stored in Wahiawa Reservoir for irrigation of sugar cane on Waialua plantation.

ACCURACY.—Stage-discharge relation changed at times of floods August 5 and December 13. Two rating curves used, fairly well defined below 50 million gallons a day; extended above on basis of a slope determination at gage height 8.82 feet (discharge, 2,580 million gallons a day). Six discharge measurements, well distributed during the year and covering a range from 2 to 20 million gallons a day, check these curves closely. Operation of water-stage recorder very unsatisfactory as indicated in footnote to daily-discharge table. Daily discharge ascertained by applying to rating table mean daily gage height determined from recorder graph by inspection or, for days of considerable fluctuation, by averaging discharge for intervals of day. Records fair for ordinary stages except estimated periods, for which they are poor; high-stage records probably poor.

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Discharge, in million gallons a day, of Left Branch of North Fork of Kaukonahua Stream near Wahiawa, Oahu, for the year ending June 30, 1927

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1				5.0	5.2	0.7	1.4	5.8		6.2		
2		11		5.8	1.8	.6	15.7		2.4	7.0		
3				4.4	1.5	.6	98			4.9		
4	1.1			4.2	1.3	.6	22			4.4		
5		24		10.9	1.3	9.6	6.4			3.9		22
6			8	31	1.3	1.2	5.3		120	21		
7				9.5	1.3	.7	26			4.4	19	
8		7		5.0	1.2	.6	34			3.9		
9				9.7	1.2	.5	7.3			3.6		
10	2.4			14.3	1.0	.5	27			3.4		
11				6.0	1.0	.5	6.0		14	3.0		
12				4.2	3.7	11.3	5.3			6.1		
13				3.8	2.5	7.6	7.8			13.5		
14			28	3.0	35	.8	4.1			26		
15	5.5			2.9	2.7	.4	3.3		7.8	52		
16		4.2						4.9				
17			5.2	2.6	2.1	.4	2.9		45	11.0	130	
18			4.6	2.4	2.7	.6	2.3		22	39		
19			4.2	2.4	1.6	92	2.4		40	58		
20	1.5		6.2	2.5	1.5	9.9	2.2		11.6	34		
21		10	53	2.9	1.2	6.3	8.3		9.9	21		7
22			10.0		1.2	21	11.0		8.0	10.4		
23			6.9		1.0	11.3	10.1		8.8	9.6		
24			11.1		.9	17.8	3.4		11.0	9.0		
25		2.2	17.2	12	.8	5.3	9.9		6.6	10.7	22	
26	9.5		15.0		.8	10.7	34		5.6	5.6		
27			8.2		1.5	6.2	31		10.0	7.2		
28			6.6	2.2	1.3	2.2	9.0		39	65		
29			6.0	1.8	.8	1.8	9.3		40	10.5		
30		34	5.4	1.7	.8	1.6	14.3	-------	8.0	6.6		
31			5.0	1.5	.7	5.0	10.7	-------	6.4	6.0		
			-------	2.7	-------	3.0	5.5	-------	5.6	-------		-------

NOTE.—Discharge estimated Apr. 30. Braced figures give estimated mean discharge for periods indicated. Estimates made by comparison with record for Right Branch of North Fork; gage-height record either faulty or missing.

Monthly discharge of Left Branch of North Fork of Kaukonahua Stream near Wahiawa, Oahu, for the year ending June 30, 1927

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July			6.66	10.3	207	634
August			10.5	16.2	326	999
September			12.2	18.9	365	1,120
October		1.5	6.92	10.7	214	658
November	35	.7	2.70	4.18	80.9	249
December	92	.4	7.46	11.5	231	710
January	98	1.4	14.1	21.8	436	1,340
February			4.93	7.63	138	424
March			31.5	48.7	976	3,000
April	65	3.0	15.6	24.1	467	1,440
May			34.6	53.5	1,070	3,290
June			12.0	18.6	360	1,100
The year			13.4	20.7	4,870	15,000

MISCELLANEOUS DISCHARGE MEASUREMENTS

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

Miscellaneous discharge measurements on Oahu during the year ending June 30, 1927

Date	Stream	Locality	Discharge	
			Second-feet	Million gallons a day
July 22	Tunnels Nos. 12 and 13	Near Waianae	0.010	0.006
Do	Tunnel No. 14	do	.090	.058
Do	Tunnel No. 15	do	.45	.30
Do	Tunnel No. 16	do	.053	.034
Do	Tunnel No. 17 and spring No. 26.	do	.027	.018
Do	Tunnel No. 18	do	.060	.039
Do	Tunnels Nos. 16–20	do	.005	.003
Do	Tunnels Nos. 23–25	do	.016	.010
Do	Honua Stream	Below tunnel No. 12, near Waianae	.20	.15
Do	Kumaipo Stream	Near Waianae	.25	.15
Do	Hiu Stream	do	.027	.018
Do	Kumaipo Stream	Near tunnel No. 16, near Waianae	.2	.1
Do	Stream (unnamed)	At trail below tunnels Nos. 10 and 11, near Waianae.	.008	.006
July 23	Tunnel No. 1	Near Waianae	.036	.024
Do	Tunnel No. 2	do	.9	.55
Do	Tunnel No. 3	do	.06	.039
Do	Tunnels Nos. 4 and 5	do	.020	.013
Do	Tunnel No. 6 and spring No. 6.	do	.75	.5
Do	Tunnel No. 7	do	.074	.048
Do	Tunnel No. 8	do	.080	.052
Do	Tunnel No. 9	do	.20	.15
Do	Spring No. 1	do	.013	.008
Do	Spring No. 2	do	.008	.006
Do	Tunnels Nos. 3 and 4	do	.023	.015
Do	Tunnel No. 6	do	.020	.013
Do	Tunnel No. 7	do	.023	.015
Do	Stream (unnamed)	Between springs Nos. 3 and 4 and tunnels Nos. 3 and 4, near Waianae.	.008	.006
Sept. 8	Tunnel No. 11	Near Waianae	.008	.005
Do	Tunnels Nos. 12 and 13	do	.011	.007
Do	Tunnel No. 14	do	.060	.039
Do	Hiu Stream	Above horse trail near Waianae	.011	.007
Do	Tunnel No. 16	Near Waianae	.023	.015
Do	Kumaipo Stream	do	.074	.048
Do	Springs Nos. 23 and 24	do	.011	.007
Do	Honua Stream	100 feet above dam near Waianae	.013	.009
Do	Tunnel No. 18	Near Waianae	.008	.005
Do	Tunnel No. 15	do	.423	.273
Sept. 9	Tailrace ditch	At power house near Waianae	2.64	1.71
Do	Tunnel No. 6	Near Waianae	.751	.485
Do	Tunnel No. 9	do	.133	.086
Do	Tunnel No. 1	do	.067	.043
Do	Spring No. 1	do	.013	.009
Do	Tunnel No. 2	do	.008	.005
Do	Tunnel Nos. 3 and 4	do	.008	.005
Do	Tunnel No. 3	do	.099	.064
Do	Tunnels Nos. 4 and 5	do	.008	.005
Do	Springs Nos. 6 and 7	do	.023	.015
Do	Tunnel No. 7	do	.011	.007
Do	Tunnel No. 8	do	.032	.020
Do	Tunnel No. 2	do	.008	.005
Do	Hiu Stream	At road near Waianae	.008	.005
Oct. 7	Haiku Stream	Upper boundary of Coomb's upper Kuleana, near Heeia.	.85	.55
Do	do	At lower boundary of Coomb's upper Kuleana, near Heeia.	2.00	1.30
Nov. 17	Tunnel No. 6	Near Waianae	.700	.452
Do	Tunnel No. 9	do	.146	.094
Do	Tunnel No. 11	do	.008	.006
Do	Tunnels Nos. 12 and 13	do	.013	.009
Do	Tunnel No. 14	do	.090	.058
Do	Tunnel No. 15	do	.400	.259
Do	Tunnel No. 16	do	.032	.021
Do	Tunnel No. 17	do	.036	.024
Do	Tunnel No. 18	do	.047	.031
Do	Kumaipo Stream (mauka)	do	.779	.503
Do	Springs Nos. 23–25	do	.013	.009
Do	Hiu Stream (mauka)	do	.027	.018
Do	do	At road near Waianae	.053	.034
Do	Honua Stream	At dam near Waianae	.151	.098
Do	Tailrace ditch	At power house near Waianae	2.46	1.59

Miscellaneous discharge measurements on Oahu during the year ending June 30, 1927—Continued

Date	Stream	Locality	Discharge	
			Second-feet	Million gallons a day
Nov. 18	Tunnel No. 1	Near Waianae	0.027	0.018
Do	Tunnel No. 2	do	.005	.003
Do	Tunnel No. 3	do	.053	.034
Do	Tunnels Nos. 4 and 5	do	.004	.002
Do	Spring No. 1	do	.011	.007
Do	Spring No. 7	do	.053	.034
Do	Spring No. 8	do	.047	.031
Do	Spring No. 2	do	.004	.002
Do	Springs Nos. 3 and 4	do	.016	.010
Do	Springs Nos. 6 and 7	do	.027	.018
Do	Kumaipo Stream	At road near Waianae	.624	.403
May 7	Spring nearest road (leakage in Reservoir No. 4 dam).	Near Honolulu		.20
Do	Spring near spillway (leakage in Reservoir No. 4 dam).	do		.50

ISLAND OF MOLOKAI

HALAWA STREAM NEAR HALAWA, MOLOKAI

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

RECORDS AVAILABLE.—June 25, 1923, to June 30, 1927. For old station 500 feet upstream, August 28, 1917, to June 24, 1923.

EQUIPMENT.—Stevens continuous water-stage recorder on right bank. Discharge measurements made by wading.

CHANNEL AND CONTROL.—Recorder located at lower end of a pool about 60 feet long which is directly below steep rapids. One channel at all stages; banks not subject to overflow. Control formed of rocks and small boulders grouted in place; subject to slight shifts owing to encroachment of hono-hono grass.

EXTREMES OF DISCHARGE.—Maximum and minimum discharge during year are unknown owing to missing gage-height record.

1917–1927: Maximum discharge recorded, about 1,550 million gallons a day, or 2,400 second-feet, at 10 a. m. March 31, 1923 (gage height from water-stage recorder, 11.65 feet); minimum discharge, 0.8 million gallons a day, or 1.2 second-feet, October 13–15 and 19, 1917 (gage height on old gage, 0.35 foot).

DIVERSIONS AND REGULATION.—A 1-inch pipe line put in about July 1, 1925, diverts small amount of water for Halawa village.

OBJECT OF STATION.—To determine amount of water available for irrigation on leeward Molokai.

UTILIZATION.—Water used for irrigation of taro and for domestic supply.

ACCURACY.—Stage-discharge relation changed, presumably, at time of flood April 18. The two rating curves used are well defined from 2 to 30 million gallons a day; extended above on basis of one discharge measurement at 82 million gallons a day. Curve used prior to April 18 was checked very closely in September and November at 8.7 and 5.4 million gallons a day by two discharge measurements. Curve used after April 18 is based on nine discharge measurements made after June 30 and ranging from 3 to 25 million gallons a day. Operation of water-stage recorder fairly satisfactory except as indicated in footnote to daily-discharge table. Daily discharge ascertained by applying to rating table mean daily gage height determined from recorder graph by inspection or, for days of considerable fluctuation, by averaging discharge for intervals of day. Records fair for ordinary stages except those estimated, which are poor; extremely high and low stage records poor.

Discharge, in million gallons a day, of Halawa Stream near Halawa, Molokai, for the year ending June 30, 1927

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	1.8	7.5		5.9	18.2	2.8	4.3	16.5	15.6			
2	1.9	8.0		7.5	7.8	2.7	24	26	5.2			
3	1.8	54		5.0	5.6	2.5	218	10.4	5.0			12
4	2.4	8.1		5.2	5.0	2.5	28	6.8	30		6	
5	1.9	86		13.9	55	3.7	11.5	5.0	21			
6	2.0	14.2	5.5	42	19.2	4.1	11.5	4.6	22			
7	11.3	9.4		11.8	8.1	7.9	35	3.9	15.6	22		48
8	7.2	6.5		7.2	6.2	11.2	52	3.5	9.0		36	
9	39	5.0		15.2	5.2	8.8	10.1	7.0	9.0			
10	19.2	10.2		52	5.2	7.0	85	8.0	5.9			
11	22			13.0	4.6	7.5	22	3.9	6.2			
12	5.9			7.8	12.6	14.8	61	3.7	5.4		9.5	
13	5.9			6.2	41	87	36	3.1	14.4			
14	4.1		15	5.2	196	20	12.6	2.9	9.8			
15	3.4	7.5		4.6	20	11.5	9.0	2.9	5.2			
16	3.2			6.2	15.6	7.5	7.5	25	4.3	150	120	
17	10.3			8.7	18.0	5.9	6.2	5.0	198			
18	15.9			4.8	8.7	52	5.4	3.2	84			
19	4.8			3.5	6.8	91	5.0	2.8	13.0		20	7
20	4.8		42	3.2	5.6	23	9.6	2.9	11.5			
21	3.5	32		2.9	5.2	14.5	38	2.7	8.3			
22	10.2			2.8	4.6	11.2	21	2.5	8.2			
23	5.2		36	9.0	4.1	13.8	7.2	2.2	43			
24	3.5		10.8	49	3.9	9.4	7.8	29	11.2	55		
25	2.8		23	52	3.7	13.7	16.8	45	7.2		7	
26	2.5	7	10.8	21	6.2	24	18.1	22	5.6			
27	5.9		8.4	8.7	5.2	10.1	7.8	7.2	14.9			
28	20		9.4	27	3.7	10.8	6.2	10.4	47			
29	23		8.7	9.0	3.2	7.2	11.0	-------	28	11	30	
30	10.2		6.2	6.2	2.9	5.6	6.8	-------	8.7		21	
31	11.1		-------	38	-------	5.0	5.2	-------	23	-------	40	-------

NOTE.—Discharge estimated May 30 and 31. Braced figures give estimated mean daily discharge for periods indicated. Estimates made from study of fragmentary gage-height record and by comparison with record of flow for Papalaua Stream; gage-height record either faulty or missing.

Monthly discharge of Halawa Stream near Halawa, Molokai, for the year ending June 30, 1927

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July	39	1.8	8.60	13.3	267	818
August	----------	----------	14.0	21.7	435	1,330
September	----------	----------	15.8	24.4	474	1,450
October	52	2.8	14.7	22.7	454	1,400
November	196	2.9	16.9	26.1	507	1,560
December	91	2.5	16.1	24.9	499	1,530
January	218	4.3	25.8	39.9	800	2,450
February	45	2.2	9.58	14.8	268	823
March	108	4.3	19.5	30.2	605	1,860
April	----------	----------	62.7	97.0	1,880	5,770
May	----------	----------	21.2	32.8	658	2,020
June	----------	----------	10.6	16.4	317	976
The year	----------	1.8	19.6	30.3	7,160	22,000

PAPALAUA STREAM NEAR WAILAU, MOLOKAI

LOCATION.—A quarter of a mile above mouth, 2 miles east of Wailau landing, 5 miles by foot trail west of Halawa village, and 6½ miles due north of Pukoo village.

RECORDS AVAILABLE.—September 17, 1919, to June 30, 1927.

EQUIPMENT.—Stevens continuous water-stage recorder on right bank. Discharge measurements made by wading or from footbridge near gage.

CHANNEL AND CONTROL.—Bed rocky and boulder strewn. Banks high and rocky. Control composed of large boulders and gravel; subject to shifts.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 1,100 million gallons a day, or 1,700 second-feet, at 5 a. m. April 17 (gage height from water-stage recorder, 8.41 feet); minimum discharge, 0.9 million gallons a day, or 1.4 second-feet, from 12.15 to 5 a. m. July 1 and 5 p. m. July 5 to 4 a. m. July 6 (gage height, 0.73 foot).

1919–1927: Maximum discharge recorded, about 1,140 million gallons a day, or 1,760 second-feet, at 10.30 a. m. December 24, 1920 (gage height from water-stage recorder, 8.58 feet); minimum discharge, that of July 1, 5, and 6, 1926.

DIVERSIONS AND REGULATION.—None.

OBJECT OF STATION.—To determine amount of water in stream available for irrigation on leeward Molokai.

UTILIZATION.—Entire flow now wastes into sea.

ACCURACY.—Stage-discharge relation probably permanent during year. Rating curve well defined below 50 million gallons a day; extended above on basis of one old discharge measurement at 170 million gallons a day. This curve checked closely by two low-discharge measurements made during year and by eight made subsequently, ranging from 2 to 45 million gallons a day. Operation of water-stage recorder satisfactory except as indicated in footnote to daily-discharge table. Daily discharge ascertained by applying to rating table mean daily gage height determined from recorder graph by inspection or, for days of considerable fluctuation, by averaging discharge for intervals of day. Records fair for ordinary stages except those estimated, which are poor; extremely high stage records poor.

Discharge, in million gallons a day, of Papalaua Stream near Wailau, Molokai, for the year ending June 30, 1927

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	1.0	5.1	2.9			1.6	2.6		16.5	67	4.5	14.4
2	1.0	7.8	2.1	3.8		1.5	41	13	4.2	15.3	3.9	10.3
3	1.0	40	1.8			1.5	242		6.1	8.6	3.7	9.7
4	1.2	5.0	4.1			1.6	15.5		27	6.9	3.5	4.8
5	1.0	57	3.1		12	2.4	6.4	4.2	17.0	8.4	3.3	3.8
6	1.6	8.5	5.4			4.8	8.0		21	6.9	3.7	50
7	13.0	6.9	4.5	18		3.4	44	2.8	13.7	4.8	49	23
8	5.1	4.5	4.9			16.9	42	2.4	7.3	3.7	25	6.5
9	25	3.4	3.3		2.2	5.2	6.5	4.4	6.7	3.2	9.2	6.9
10	19.7	7.6	3.1		2.3	5.4		4.6	4.4	29	6.5	5.0
11	17.6	4.5	2.0		1.8	6.0	32	2.4	5.0	21	4.4	4.4
12	3.8	3.1	7.7		11.6	16.0		2.0	4.6	6.2	3.0	3.2
13	3.8	3.8	19.3		21	9.1		1.6	13.8	22	12.8	2.7
14	2.4	7.4	30		258	5.2		1.5	7.3	166	6.5	2.6
15	2.3	3.1	6.2		8.1	6.2		1.7	4.2	124	88	2.5
16	2.0	7.0	3.5		11.2	4.5		18.9	5.0	70	89	2.5
17	10.0	14.0	2.9	3.7	12.1	5.0	5	3.2	153	338	17.2	4.6
18	11.6	4.8	7.8		4.8	51		1.8	72	262	18.9	5.2
19	4.0	3.2	72		3.7	72		1.6	8.7	239	6.9	7.5
20	3.7	13.1	61		2.9	16.0		1.6	7.8	135	5.2	8.7
21	2.3	48	7.8		2.4	10.7	17	1.5	5.1	52		3.3
22	7.7	11.0	12.1		1.9	8.9		1.5	4.0	73		2.9
23	3.7	4.8	23		1.7	15.4		1.5	19.5	28		2.6
24	2.4	3.5	7.7		1.6	6.2		48	11.1	57	4.5	2.5
25	1.7	3.1	15.6		1.6	10.8		26	4.5	11.6		4.0
26	1.5	2.7	7.5	19	4.3	19.7	7	20	3.5	22		2.4
27	7.1	2.4	5.6		2.6	6.4		7.5	17.1	38	2.9	2.3
28	14.2	2.5	6.5		1.6	7.1		9.9	52	8.5	4.1	2.2
29	16.5	7.5	5.0		1.6	4.6		-------	20	6.5	12.6	2.0
30	7.2	6.8	4.0		1.6	4.2		-------	6.0	5.4	6.2	1.8
31	10.1	4.2	-------		-------	3.5		-------	8.2	-------	23	-------

NOTE.—Discharge estimated Sept. 29 and 30. Braced figures give estimated mean discharge for periods indicated. Estimates made from fragmentary gage-height record or by comparison with record for Halawa Stream; gage-height record either faulty or missing.

Monthly discharge of Papalaua Stream near Wailau, Molokai, for the year ending June 30, 1927

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July	25	1.0	6.62	10.2	205	630
August	57	2.4	9.88	15.3	306	940
September	72	1.8	11.4	17.6	342	1,050
October			10.9	16.9	339	1,040
November	258	1.6	15.2	23.5	457	1,400
December	72	1.5	10.7	16.6	333	1,020
January	242	2.6	22.8	35.3	707	2,170
February	48	1.5	7.79	12.1	218	669
March	153	3.5	17.9	27.7	556	1,700
April	338	3.2	61.3	94.8	1,840	5,640
May	89	2.9	14.2	22.0	440	1,350
June	50	1.8	6.81	10.5	204	627
The year	338	1.0	16.3	25.2	5,950	18,200

WAIAKEAKUA STREAM NEAR WAILAU, MOLOKAI

LOCATION.—Half a mile above confluence with Pulena Stream, 3 miles south of Wailau landing, and 4 miles northwest of Pukoo village.

RECORDS AVAILABLE.—October 30, 1919, to June 30, 1927.

EQUIPMENT.—Stevens continuous water-stage recorder on right bank. Discharge measurements made by wading or from footbridge at gage.

CHANNEL AND CONTROL.—Stream bed rocky and boulder strewn. Banks steep, high, and covered with vegetation. Control formed of boulders, cobblestones, and gravel; subject to shifts during floods.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 277 million gallons a day, or 429 second-feet, April 17 (gage height from water-stage recorder, 4.72 feet); minimum discharge, 1.8 million gallons a day, or 2.8 second-feet, from 4 p. m. to midnight November 11 (gage height, 1.12 feet).

1919–1927: Maximum discharge recorded, about 710 million gallons a day, or 1,100 second-feet, at 1.15 p. m. March 31, 1923 (gage height from water-stage recorder, 7.15 feet); minimum discharge, 1.3 million gallons a day, or 2.0 second-feet, March 7, 1920 (gage height, 0.92 foot).

DIVERSIONS AND REGULATION.—None.

OBJECT OF STATION.—To determine amount of water available for irrigation on leeward Molokai.

UTILIZATION.—Entire flow wastes into sea.

ACCURACY.—Stage-discharge relation changed at time of flood September 19. The two rating curves used are well defined below 150 million gallons a day; extension above uncertain. These curves were checked closely by four discharge measurements, which were made in August, September, and November and ranged from 2.3 to 6.3 million gallons a day, and fairly closely at 2.8 million gallons a day by a measurement made soon after June 30. Operation of water-stage recorder satisfactory except as indicated in footnote to daily-discharge table. Daily discharge ascertained by applying to rating table mean daily gage height determined from recorder graph by inspection or, for days of considerable fluctuation, by averaging discharge for intervals of day. Records good for ordinary stages except those estimated, which are poor; extremely high stage records poor.

Discharge, in million gallons a day, of Waiakeakua Stream near Wailau, Molokai, for the year ending June 30, 1927

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	2.4	3.5	3.1	3.4	3.0	2.2	3.5	9.3				
2	2.4	4.4	3.0	3.2	2.4	2.1	7.2	8.8				
3	2.4	23	2.9	2.8	2.3	2.0	122					
4	2.3	5.5	2.9	2.9	2.2	2.0	25				5.5	10
5	2.2	22	2.8	5.3	3.1	2.1	12.3					
6	2.7	7.0	3.1	13.4	2.5	2.0	10.7					
7	4.7	6.0	3.5	4.7	2.1	2.0	17.0			9		
8	3.4	4.8	3.9	3.6	2.0	3.6	29					
9	10.6	4.4	2.9	6.0	2.0	2.4	11.0		6			
10	7.3	4.7	2.7	12.5	2.0	2.6	29					
11	4.9	4.1	2.5	5.2	1.9	2.8	14.8					
12	3.5	3.6	2.9	4.1	3.1	5.0	12.6					
13	4.4	3.9	4.7	3.6	6.0	5.8	14.2	3.0			12	
14	3.3	5.4	6.9	3.3	55	3.3	7.8					
15	3.3	3.5	3.4	3.0	8.4	3.0	6.6					
16	3.1	4.3	2.8	3.4	10.4	2.7	5.7			65		
17	6.2	10.7	2.7	3.3	7.9	2.5	5.2					
18	5.5	5.0	3.1	2.7	4.9	13.5	4.9		30			
19	3.6	4.0	19.9	2.5	4.3	21	4.4					3.9
20	3.4	7.7	10.5	2.4	3.7	8.4	4.9					
21	3.0	23	4.6	2.3	3.5	6.3	6.1					
22	8.8	9.8	5.1	2.3	3.2	5.0	7.3					
23	3.3	6.3	10.5	6.1	3.0	5.2	4.7					
24	3.3	5.2	4.6	11.6	2.9	4.2	4.2					
25	3.0	4.6	7.4	5.9	2.8	7.7	4.9		8			
26	2.8	4.4	4.3	3.9	3.3	10.4	7.7	7		18	4.1	
27	3.4	4.1	4.0	3.0	2.7	6.8	4.6					
28	5.4	3.7	4.9	3.2	2.5	6.1	4.2					
29	6.5	4.0	4.2	2.8	2.3	4.7	7.9	-------				
30	3.7	4.0	3.4	2.7	2.2	4.3	4.6	-------				
31	4.8	3.5	-------	3.4	-------	3.9	4.2	-------		-------		-------

NOTE.—Braced figures give mean discharge for periods indicated, estimated by comparison with records for Halawa and Papalaua Streams; recorder not operating.

Monthly discharge of Waiakeakua Stream near Wailau, Molokai, for the year ending June 30, 1927

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July	10.6	2.2	4.18	6.47	130	398
August	23	3.5	6.78	10.5	210	645
September	19.9	2.5	4.77	7.38	143	439
October	13.4	2.3	4.47	6.92	138	425
November	55	1.9	5.25	8.12	158	483
December	21	2.0	5.02	7.77	156	478
January	122	3.5	13.2	20.4	408	1,260
February	----------	----------	4.15	6.42	116	357
March	----------	----------	9.10	14.1	282	866
April	----------	----------	26.9	41.6	808	2,480
May	----------	----------	7.94	12.3	246	755
June	----------	----------	5.32	8.23	160	490
The year	----------	1.9	8.10	12.5	2,960	9,080

PULENA STREAM NEAR WAILAU, MOLOKAI

LOCATION.—Half a mile above confluence with Waiakeakua Stream, 3 miles south of Wailau landing, and 4 miles northwest of Pukoo village.

RECORDS AVAILABLE.—October 30, 1919, to June 30, 1927.

EQUIPMENT.—Stevens continuous water-stage recorder on left bank. Discharge measurements made by wading near gage or from footbridge just below station.

CHANNEL AND CONTROL.—Channel rocky and boulder strewn. Banks steep, high, and fairly clean. Control composed of boulders and gravel; subject to shifts.

EXTREMES OF DISCHARGE.—Maximum and minimum discharges during year unknown owing to faulty or missing gage-height record.

1917–1927: Maximum discharge recorded, about 1,400 million gallons a day, or 2,170 second-feet, about noon December 24, 1920 (gage height from water-stage recorder, 11.5 feet); minimum discharge, 3.0 million gallons a day, or 4.6 second-feet, June 28 and July 14, 1920 (gage height, 0.89 foot).

DIVERSIONS AND REGULATION.—None.

OBJECT OF STATION.—To determine amount of water available for irrigation on leeward Molokai.

UTILIZATION.—Entire flow wastes into sea.

ACCURACY.—Stage-discharge relation probably permanent during year. Rating curve well defined between 4 and 20 million gallons a day and fairly well defined between 20 and 200 million gallons a day; extensions beyond, uncertain. This curve checked fairly closely in August, September, and December by three discharge measurements ranging from 7 to 12 million gallons a day and soon after June 30 by another measurement at 5.6 million gallons a day. Operation of water-stage recorder unsatisfactory owing to leaky float and slippage of float cable. Daily discharge ascertained by applying to rating table mean daily gage height determined from recorder graph by inspection or, for days of considerable fluctuation, by averaging discharge for intervals of day. Records poor.

Discharge, in million gallons a day, of Pulena Stream near Wailau, Molokai, for the year ending June 30, 1927

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	4.7	5.5	4.5	6.3	6.8	7.7	7.6	13.5	19.2	41		
2	5.0	13.3	4.3	6.1	5.9		17.7	10.6	10.3	22		
3	5.0	63	4.3	5.6	5.6		212	9.2	9.8	21		
4	4.8	11.7	4.5	5.9	5.5		71	8.4	24	17.0	11	
5	4.7	22	4.4	11.0	5.6		26	7.9	19.0	16.0		20
6	5.3	10.8	6.1	28	5.6		23	7.9	21	13.3		
7	7.5	9.5	6.8	12.3	5.5		34	7.7	20	12.6		
8	5.8	7.5	10.8	8.2	5.3		60	7.7	16.3	12.6		
9	12.2	6.3	6.8	10.8	5.3	7	25	25	13.3	12.3		
10	9.4	6.3	5.9	22	5.3		82	17.6	11.4	24		
11	8.0	5.6	5.8	11.7	5.3		36	17.4	13.3	16.2		
12	5.1	5.3	6.3	8.7	7.8		25	13.2	9.8	13.9	24	
13	8.1	6.3	7.0	7.5	7.0		23	10.0	12.3	12.6		
14	5.3	5.9	7.7	7.0	161		17.7	8.8	9.8	111		
15	5.9	5.1	7.5	6.6	26		13.9	14.0	8.7	45		
16	4.8	8.2	6.6	7.2	24		11.8	55	17.0	41		
17	8.7	13.6	6.8	7.2	19.6	5.9	10.6	17.7	58			
18	8.3	6.8	7.7	6.3	13.6	8.3	9.9	13.0	73			
19	5.0	5.8	22	6.2	11.7	21	9.4	11.1	23	190		10
20	4.7	16.5	17.0	6.1	10.6	11.1	9.9	9.8	18.1			
21	4.5	104	9.5	6.0	10.0	17.4	10.5	9.2	14.6			
22	17.9	18.6	10.4	6.6	9.5	9.2	10.6	8.7	13.4			
23	6.3	7.7	15.1	22	8.9	14.7	8.9	8.4	28			
24	5.0	5.5	7.8	53	8.7	9.8	8.4	9.9	23			
25	4.7	4.8	19.9	12.6	8.4	16.7	10.0	11.6	15.6		8	
26	4.5	4.5	11.6	7.9	9.5	24	16.7	16.5	13.6	34		
27	6.8	5.1	8.8	7.2	8.8	14.1	10.0	10.3	13.9			
28	5.3	4.8	12.9	7.9	8.4	13.2	12.3	10.6	17.4			
29	7.7	5.0	9.8	6.8	8.2	9.8	14.7	-------	21			
30	5.8	5.6	7.2	6.2	7.9	8.7	10.3	-------	14.6			
31	7.4	4.7	-------	6.6	-------	8.0	8.9	-------	13.0	-------	-------	-------

NOTE.—Braced figures give mean discharge for periods indicated, estimated by comparison with records for Papalaua and Waiakeakua Streams; recorder not operating.

Monthly discharge of Pulena Stream near Wailau, Molokai, for the year ending June 30, 1927

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July	17.9	4.5	6.59	10.2	204	627
August	104	4.5	13.1	20.3	405	1,250
September	22	4.3	8.86	13.7	266	816
October	53	5.6	10.8	16.7	334	1,030
November	161	5.3	14.4	22.3	431	1,330
December	----------	----------	9.83	15.2	305	935
January	212	7.6	27.3	42.2	847	2,600
February	55	7.7	13.2	20.4	371	1,130
March	73	8.7	19.2	29.7	595	1,830
April	----------	12.3	51.0	78.9	1,530	4,700
May	----------	----------	14.8	22.9	458	1,410
June	----------	----------	12.3	19.0	370	1,130
The year	----------	----------	16.8	26.0	6,120	18,800

PELEKUNU STREAM NEAR PELEKUNU, MOLOKAI

LOCATION.—Half a mile above confluence with Lanipuni Stream, 2 miles south of Pelekunu landing, 6 miles north of Kamalo village, and 12 miles by trail northwest of Pukoo village.

RECORDS AVAILABLE.—December 1, 1919, to June 30, 1927.

EQUIPMENT.—Stevens continuous water-stage recorder on right branch. Discharge measurement made by wading near gage or from footbridge about 1,000 feet downstream.

CHANNEL AND CONTROL.—Stream bed rocky with scattered boulders. Banks steep and rocky. Control, large boulders wedged into cleft in rock ledge; subject to shifts.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 380 million gallons a day, or 588 second-feet, at 3.30 p. m. April 18 (gage height from water-stage recorder, 7.50 feet); minimum discharge, 1.9 million gallons a day, or 2.9 second-feet, from 2 p. m. September 16 to 1 a. m. September 18 (gage height, 2.47 feet).

1919–1927: Maximum discharge recorded, about 1,020 million gallons a day, or 1,580 second-feet, at 10.30 a. m. December 24, 1920 (gage height from water-stage recorder, 8.35 feet); minimum discharge, 1.8 million gallons a day, or 2.8 second-feet, from 5 to 9 p. m. March 7 and July 13, 1920 (gage height, 1.65 feet).

DIVERSIONS AND REGULATION.—None.

OBJECT OF STATION.—To determine amount of water available for irrigation on leeward Molokai.

UTILIZATION.—Entire flow wastes into sea.

ACCURACY.—Stage-discharge relation permanent during year except July 1 to August 3, September 23 to October 5, and November 14 to January 3 when shifting-control method was used. Basic rating curve well defined between 2 and 20 million gallons a day; extensions beyond, uncertain. This curve checked closely in August, November, and February by three discharge measurements ranging from 3 to 9 million gallons a day and by another measurement of 17 million gallons a day made shortly after June 30. Shifting-control method based on three discharge measurements. Operation of water-stage recorder satisfactory except as indicated in footnote to daily-discharge table. Daily discharge ascertained by applying to rating table

mean daily gage height determined from recorder graph by inspection or, for days of considerable fluctuation, by averaging discharge for intervals of day. Records fair for ordinary stages except those estimated which are poor; extremely high stage records poor.

Discharge, in million gallons a day, of Pelekunu Stream near Pelekunu, Molokai, for the year ending June 30, 1927

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	2.2	2.6	2.7	2.6	4.2	3.9	4.1	7.7	14.2	8.3	7.0	12.4
2	2.2	6.6	2.6	2.4	3.4	3.9	4.1	7.3	8.1	11.6	6.4	9.2
3	2.2	25	2.5	2.0	3.3	3.8	158	6.3	7.9	9.8	5.9	7.2
4	2.1	5.8	2.4	2.2	3.2	3.7	74	5.3	18.4	7.4	5.7	5.3
5	2.0	8.4	2.3	6.4	3.2	3.7	28	4.9	13.8	6.6	5.3	4.7
6	2.2	5.1	2.6	19.5	3.0	3.4	19.5	4.5	13.7	6.0	5.7	23
7	2.6	4.5	2.6	7.6	2.8	3.4	24	4.2	12.6	5.6	10.2	16.3
8	2.2	3.8	3.2	4.4	2.7	3.6	43	4.1	11.1	5.3	13.9	9.0
9	3.9	3.4	2.6	5.4	2.6	3.3	20	22	9.6	5.5	10.6	14.0
10	2.6	3.4	2.3	14.5	2.6	3.2	44	12.4	9.8	6.2	7.0	7.2
11	2.6	3.0	2.2	6.3	2.6	3.1	61	11.7	9.6	10.6	5.0	5.9
12	2.1	2.8	2.1	4.6	4.0	4.1	24	8.4	7.9	7.1	5.0	5.2
13	3.3	3.1	2.3	3.9	3.9	3.9	18.5	6.6	10.2	7.0	6.1	4.6
14	2.0	2.8	2.1	3.6	149	3.3	13.3	5.8	7.2	70	5.2	4.1
15	2.1	2.6	2.0	3.2	37	3.2	10.7	13.7	6.2	41	46	4.6
16	1.9	2.9	1.9	3.7	29	3.0	9.2	58	9.9	43	50	4.7
17	5.0	3.4	1.9	3.4	19.0	2.9	8.1	18.8	13.1	88	21	4.8
18	3.3	2.6	1.9	2.9	12.6	2.9	7.2	11.8	35	194	20	4.2
19	2.2	2.3	4.0	2.7	10.3	2.9	6.6	9.2	13.3	143	14	4.8
20	1.9	4.6	4.3	2.6	8.4	3.0	6.3	7.8	10.1	87	7.5	5.0
21	1.9	36	2.6	2.5	7.4	11.5	6.2	6.9	8.1	52	}	3.6
22	9.4	9.5	2.8	2.8	6.6	4.4	7.4	6.3	7.7	38	}	3.1
23	2.9	5.4	4.4	10.3	6.2	6.0	5.8	6.0	14.6	28	}	2.8
24	2.4	4.4	2.6	46	5.7	5.7	5.3	13.3	13.9	39	6	4.4
25	2.2	3.9	9.8	13.0	5.4	18.4	6.3	10.9	8.3	22	}	5.9
26	1.9	3.6	5.5	7.1	5.4	21	14.9	14.7	7.4	16.3	}	2.8
27	2.5	3.8	3.4	5.6	4.9	8.6	8.0	9.9	7.4	14.1	4.6	3.0
28	1.9	4.2	4.8	6.2	4.6	9.4	6.9	9.9	16.6	10.6	6.2	2.6
29	2.7	3.1	3.2	4.6	4.4	5.8	11.5	-------	12.0	9.2	8.1	2.5
30	2.3	2.9	2.7	4.1	4.1	5.3	7.8	-------	9.4	8.1	6.6	2.4
31	2.9	2.8	-------	4.8	-------	4.5	6.2	-------	7.9	-------	9.1	-------

NOTE.—Discharge estimated May 18–20. Braced figure gives estimated mean discharge for period indicated. Estimates made from study of fragmentary gage-height record and by comparison with record for Papalaua Stream; recorder not operating properly.

Monthly discharge of Pelekunu Stream near Pelekunu, Molokai, for the year ending June 30, 1927

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July	9.4	1.9	2.70	4.18	83.6	257
August	36	2.3	5.75	8.90	178	547
September	9.8	1.9	3.77	5.83	92.3	347
October	46	2.0	6.78	10.5	211	645
November	149	2.6	12.0	18.6	362	1,100
December	21	2.9	5.45	8.43	169	518
January	158	4.1	21.6	33.4	670	2,050
February	58	4.1	11.0	17.0	308	945
March	35	6.2	11.5	17.8	355	1,090
April	194	5.3	33.3	51.5	1,000	3,070
May	50	----------	10.6	16.4	328	1,010
June	23	2.4	6.31	9.76	189	581
The year	194	1.9	10.8	16.7	3,950	12,200

LANIPUNI STREAM NEAR PELEKUNU, MOLOKAI

LOCATION.—Half a mile above junction with Pelekunu Stream, 2 miles south of Pelekunu landing, 6 miles north of Kamalo village, and 13 miles by trail northwest of Pukoo village.

RECORDS AVAILABLE.—December 1, 1919, to June 30, 1927.

EQUIPMENT.—Stevens continuous water-stage recorder on left bank. Discharge measurements made by wading near gage or from footbridge 200 feet downstream.

CHANNEL AND CONTROL.—Channel rocky and boulder strewn. Banks high and rocky. Control of boulders and gravel; subject to shifts.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 797 million gallons a day, or 1,230 second-feet at 5.15 a. m. November 14 (gage height from water-stage recorder, 4.73 feet); minimum discharge, 1.8 million gallons a day, or 2.8 second-feet, several hours November 10 and 11 (gage height, 0.43 foot).

1919–1927: Maximum discharge recorded, about 1,250 millions gallons a day, or 1,930 second-feet, at 10 a. m. December 24, 1920 (gage height from water-stage recorder, 5.90 feet); minimum discharge, that of November 10 and 11, 1926.

DIVERSIONS AND REGULATION.—None.

OBJECT OF STATION.—To determine amount of water available for irrigation on leeward Molokai.

UTILIZATION.—Entire flow wastes into sea.

ACCURACY.—Stage-discharge relation changed at times of floods August 2, September 19, and November 14. The four rating curves used are fairly well defined below 50 million gallons a day; extensions above based on one old discharge measurement at 156 million gallons a day. The curves used prior to November 14 were checked fairly well by three discharge measurements ranging from 2 to 11 million gallons a day. The curve used after November 14 is based on six discharge measurements ranging from 3 to 12 million gallons a day; one made in December, one in February, and the rest after June 30. Operation of water-stage recorder satisfactory except as indicated in footnote to daily-discharge table. Daily discharge ascertained by applying to rating table mean daily gage height determined from recorder graph by inspection or, for days of considerable fluctuations, by averaging discharge for intervals of day. Records fair for ordinary stages except those estimated, which are poor; extremely high stage records poor.

Discharge, in million gallons a day, of Lanipuni Stream near Pelekunu, Molokai, for the year ending June 30, 1927

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	2.3	3.3	3.9	4.3	3.8	3.4	3.6	6.1		5.6	6.1	12.2
2	2.4	7.6	3.9	3.9	3.5	3.2	50	5.0		6.9	5.7	9.6
3	2.7	30	3.9	3.8	3.3	3.2	231	4.5		5.5	5.7	7.7
4	2.5	6.7	3.8	3.9	3.3	3.5	39	4.2		4.8	5.9	6.6
5	2.4	9.1	3.8	10.2	3.5	3.4	11.0	4.0		4.3	5.6	6.1
6	2.8	5.9	4.1	24	3.3	3.2	10.0	4.0		4.0	6.1	29
7	3.3	5.3	4.3	8.6	3.1	3.2	25	3.9		3.9	7.0	15.6
8	2.8	4.7	4.6	5.7	3.0	3.4	28	3.7		3.7	15.1	8.5
9	5.3	4.5	4.0	6.4	3.0	3.4	9.0	7.6		4.0	9.9	11.2
10	3.6	4.6	3.9	6.5	3.0	3.5	35	5.5		5.7	7.9	7.2
11	3.4	4.3	3.7	5.2	3.0	3.4	13.4	4.8		8.4	6.4	6.4
12	2.7	4.3	3.7	4.5	3.7	4.2	16.6	4.2		4.7	7.2	5.9
13	3.2	4.8	3.8	4.3	3.9	3.9	10.9	4.0	8	14.7	7.4	5.7
14	2.8	4.3	3.7	4.0	220	3.6	7.0	3.9		65	10.5	5.4
15	3.1	4.0	3.4	3.8	15.7	3.6	5.9	4.0		58	145	5.9
16	2.8	5.0	3.3	4.4	13.7	3.4	5.5	17.5		30	58	5.7
17	6.9	5.5	3.3	4.4	8.8	3.2	5.0	5.1		133	16.6	6.8
18	3.6	4.3	3.7	3.7	5.9	3.2	4.8	4.5		209	17.2	5.9
19	2.8	3.9	9.6	3.4	5.2	3.2	4.7	4.2		188		7.1
20	2.6	9.9	7.6	3.3	4.7	3.2	4.8	4.0		88		6.7
21	2.6	55	3.7	3.3	4.3	7.8	6.0	4.0		33		5.3
22	10.4	11.2	6.8	3.3	4.0	3.6	5.0	3.9		33	9	4.8
23	3.4	6.7	7.5	6.5	3.9	5.0	4.3			24		4.7
24	3.1	5.6	4.8	16.5	3.7	3.9	4.3			37		6.4
25	3.1	5.2	8.6	5.6	3.7	9.6	6.4			14.2		6.6
26	2.7	5.0	5.4	4.5	4.0	13.1	12.6	8	4.6	10.7		4.8
27	3.4	5.2	5.0	4.6	3.7	6.2	5.5		4.7	9.3	6.0	4.8
28	3.0	5.3	5.7	7.1	3.6	5.5	6.6		12.9	7.7	9.4	4.5
29	4.4	4.6	4.8	4.5	3.5	4.3	7.2	-------	8.1	7.0	9.3	4.5
30	3.3	4.5	4.3	4.3	3.4	4.0	5.4	-------	5.4	6.6	8.5	4.5
31	3.7	4.1	-------	5.6	-------	3.7	4.6	-------	4.8	-------	10.8	-------

NOTE.—Braced figures give mean discharge for periods indicated, estimated from comparison with record for Pelekunu Stream; recorder not operating.

Monthly discharge of Lanipuni Stream near Pelekunu, Molokai, for the year ending June 30, 1927

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July	10.4	2.3	3.45	5.34	107	328
August	55	3.3	7.88	12.2	244	750
September	9.6	3.3	4.75	7.35	143	437
October	24	3.3	5.94	9.19	184	565
November	220	3.0	11.8	18.3	355	1,090
December	13.1	3.2	4.35	6.73	135	414
January	231	3.6	19.0	29.4	588	1,810
February	17.5	----------	5.74	8.88	161	493
March	----------	----------	7.76	12.0	240	738
April	209	3.7	34.3	53.1	1,030	3,160
May	145	----------	14.8	22.9	459	1,410
June	29	4.5	7.54	11.7	226	694
The year	231	2.3	10.6	16.4	3,870	11,900

WAIKOLU STREAM AT PIPE-LINE CROSSING NEAR KALAUPAPA, MOLOKAI

LOCATION.—At 300-foot elevation, 1 mile above mouth of stream and 4 miles southeast of Kalaupapa.

RECORDS AVAILABLE.—June 2, 1919, to June 30, 1927.

EQUIPMENT.—Stevens continuous water-stage recorder on right bank. Discharge measurements made by wading near gage.

CHANNEL AND CONTROL.—Stream bed composed of sand, gravel, and boulders. Right bank steep and rocky; left bank is overflowed at high stages. Control is concrete casing of 8-inch water main; not sensitive at low stages and subject to shifts caused by grass and flood damage and subsequent repairs.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 692 million gallons a day, or 1,070 second-feet, at 1.30 p. m. April 17 (gage height from water-stage recorder, 8.37 feet); minimum discharge 3.4 million gallons a day, or 5.3 second-feet, several hours September 10, 11, 16, November 29, 30, and December 1–21 (gage height, 4.18 feet).

1919–1927: Maximum discharge recorded, 1,270 million gallons a day, or 1,960 second-feet, at 10.30 a. m. December 24, 1920 (gage height from water-stage recorder, 10.20 feet); minimum discharge, 1.3 million gallons a day, or 2.0 second-feet, several hours November 1–2, 1925, and at 11 p. m. June 5, 1926 (gage height, 4.17 feet).

DIVERSIONS AND REGULATION.—Intake ditch for Kalaupapa water supply diverts about 2.5 million gallons a day at 500-foot elevation. Some of this water returns to stream just below station.

OBJECT OF STATION.—To determine amount of water available for proposed power and irrigation project for leper settlement and for irrigation on leeward Molokai.

UTILIZATION.—Part of water used for irrigation of taro; remainder wastes into sea.

ACCURACY.—Stage-discharge relation permanent during year. Rating curve fairly well defined below 50 million gallons a day; extension above uncertain. This curve checked very closely in September and February by two discharge measurements at 4.4 and 5.5 million gallons a day. Operation of water-stage recorder satisfactory except as indicated in footnote to daily-discharge table. Daily discharge ascertained by applying to rating table mean daily gage height determined from recorder graph by inspection or, for days of considerable fluctuation, by averaging discharge for intervals of day. Records fair for ordinary stages; extremely high stage records poor.

Discharge, in million gallons a day, of Waikolu Stream at pipe-line crossing near Kalaupapa, Molokai, for the year ending June 30, 1927

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	3.8	4.7	4.4	4.4	5.6	3.4	3.6	8.4	14.6	6.5	10.9	
2	3.8	7.6	4.4	4.4	5.0	3.4	45	7.6	7.2	8.4	10.5	
3	3.8	24	4.4	4.4	4.7	3.6	244	6.5	6.5	8.4	10.1	
4	3.6	5.9	4.4	4.4	4.4	3.6	33		12.4	7.2	10.1	
5	3.6	7.3	3.8	5.9	4.4	3.6	9.7	6	10.5	6.2	9.3	11
6	3.8	6.2	3.8	21	4.4	3.6	12.9		9.7	5.9	9.3	
7	3.8	5.3	3.8	9.3	4.4	3.6	20	5.6	9.7	5.9	10.5	
8	3.8	5.0	3.8	5.6	4.4	3.6	25	5.6	7.2	5.9	14.0	
9	3.8	4.7	4.1	5.9	4.4	3.6	8.0	23	8.0	9.7	11.4	
10	3.8	5.0	3.6	13.2	4.4	3.6	77	13.6	7.2	19.0	9.3	
11	3.8	4.7	3.4	8.1	4.4	3.4	15.8	10.1	7.2	16.0	8.8	
12	3.8	4.7	3.6	5.6	4.4	3.4	14.5	8.0	6.8	8.0		
13	3.8	5.0	3.8	5.3	4.4	3.4	11.4	6.5	9.7	49	8	
14	3.8	4.7	3.8	5.3	236	3.4	7.6	6.2	7.2	84		
15	3.8	4.7	3.8	5.0	12.2	3.4	6.8	14.6	5.9	41		
16	3.8	4.7	3.6	5.3	12.5	3.4	6.5	24	6.2	34		
17	6.5	4.7	3.6	5.9	12.3	3.4	6.5	8.4	8.4	189	32	
18	5.9	4.4	3.6	5.3	5.0	3.4	6.2	6.2	18.7	163		
19	4.4	4.7	3.6	5.0	4.4	3.6	6.5	5.9	6.5	142		
20	4.1	5.8	3.8	5.0	3.8	3.4	6.2	5.6	5.9	44		
21	3.8	44	3.8	4.7	3.8	3.8	6.2	5.6	5.6	21		8.5
22	13.3	10.5	4.4	5.0	3.8	4.4	6.5	5.6	5.6	25		
23	5.6	5.6	7.8	9.2	3.6	3.8	6.5	5.6	10.5	33		
24	4.4	5.0	4.4	29	3.6	5.3	6.2	18.8	13.2	27		
25	4.1	4.4	7.3	10.7	3.6	19.4	8.4	14.6	6.5	14.0	9	
26	3.8	4.4	5.9	5.3	3.6	22	16.6	15.9	6.5	12.9		
27	4.1	4.4	5.0	5.0	3.6	7.2	8.0	10.5	6.8	11.9		
28	3.8	4.4	5.0	7.9	3.6	9.0	8.4	12.9	21	11.9		
29	4.4	4.1	4.4	5.6	3.6	4.4	11.4	-------	15.3	11.4		
30	4.4	4.1	4.4	4.7	3.6	4.9	8.0	-------	7.2	10.9		
31	4.4	4.4	-------	6.2	-------	4.1	6.8	-------	6.5	-------		-------

NOTE.—Braced figures give mean discharge for periods indicated, estimated by comparison with record for Pelekunu Stream; recorder not operating.

Monthly discharge of Waikolu Stream at pipe-line crossing near Kalaupapa, Molokai, for the year ending June 30, 1927

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July	13.3	3.6	4.43	6.85	137	421
August	44	4.1	7.07	10.9	219	673
September	7.8	3.4	4.32	6.68	130	398
October	29	4.4	7.34	11.4	228	698
November	236	3.6	12.7	19.6	382	1,170
December	22	3.4	5.10	7.89	158	485
January	244	3.6	21.3	33.0	659	2,030
February	24	5.6	9.76	15.1	273	839
March	21	5.6	9.04	14.0	280	860
April	189	5.9	34.4	53.2	1,030	3,170
May			13.1	20.3	406	1,250
June			9.33	14.4	280	859
The year	244	3.4	11.5	17.8	4,180	12,900

ISLAND OF MAUI

HONOKAHAU STREAM NEAR HONOKAHAU, MAUI

LOCATION.—1,000 feet above intake of Honokahau ditch and 6 miles southeast of Honokahau (elevation, 910 feet).

RECORDS AVAILABLE.—March 7, 1913, to September 19, 1920; and May 2, 1922, to June 30, 1927. Staff gage readings at old site on diversion dam August 13 to December 31, 1911.

EQUIPMENT.—Stevens continuous water-stage recorder on right bank. Discharge measurements made by wading near gage or from footbridge 300 feet downstream.

CHANNEL AND CONTROL.—Bed of stream composed of small boulders and gravel. One channel at all stages; curved above and below gage. Left bank high and clean; right bank sloping and covered with vegetation. Control prior to March 5 composed of large boulders and coarse gravel; subject to shifts. Beginning March 10 the control is a masonry dam of parabolic longitudinal section.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 1,560 million gallons a day, or 2,410 second-feet, at 7.30 a. m. May 15 (gage height from water-stage recorder, 7.13 feet); minimum discharge unknown owing to water going below intake to stilling well.

1913–1920; 1922–1927: Maximum discharge recorded, 2,200 million gallons a day, or 3,400 second feet, at 6.40 a. m. February 13, 1924 (gage height from water-stage recorder, 7.92 feet); minimum discharge, 6.2 million gallons a day, or 9.6 second-feet, from 3.30 to 12 p. m. June 30, 1926 (gage height, 0.92 foot; affected by backwater).

DIVERSIONS AND REGULATION.—None above station. All ordinary stream flow and the inflow from two development tunnels below gage is diverted into Honokahau ditch 1,000 feet below station.

OBJECT OF STATION.—To determine resources of stream.

UTILIZATION.—Normal flow of stream diverted into Honokahau ditch for irrigation of sugar cane and for development of power.

ACCURACY.—Stage-discharge relation changed, presumably, at times of floods August 5 and October 4 and again March 5–10 when artificial control was being constructed. Also affected by shifting control July 1–7 and August

5–20. The two rating curves used prior to March 10 are fairly well defined below 40 million gallons a day; extensions above uncertain. The curve used after March 10 is well defined below 30 million gallons a day and extended above on basis of one discharge measurement at 83 million gallons a day and shape of previous extension. The curves used prior to March 10 were checked closely by four discharge measurements well distributed and ranging from 7 to 13 million gallons a day. Curve used after March 10 checked closely by one discharge measurement in April and four made after June 30 which range from 10 to 83 million gallons a day. Shifting-control method based on one discharge measurement made shortly before July 1 and another made August 12. Operation of water-stage recorder satisfactory except as indicated in footnote to daily-discharge table. Daily discharge ascertained by applying to rating table mean daily gage height determined from recorder graph by inspection or, for days of considerable fluctuation, by averaging discharge for intervals of day. Records for ordinary stages fair prior to March 10 and good subsequent to that date, except estimated records which are poor; extremely high stage records poor.

Discharge, in million gallons a day, of Honokahau Stream near Honokahau, Maui, for the year ending June 30, 1927

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	6.2	9.1	12.8	13.0	9.6	8.2	7.8		42	20	10.6	13.5
2	6.2	17.9	12.4	12.4	8.8	7.8	21		10.6	8.5	9.6	12.7
3	6.3	35	13.3	11.7	8.5	7.5	282		32	10.0	9.3	22
4	6.2	8.8	13.4	11.4	8.5	8.2			14.2	8.2	9.9	10.9
5	6.2	49	12.1	41	8.6					8.8	16.1	12.4
6	7.0	29	11.9	49	8.5					7.3	11.6	67
7	21	13.5	12.1	13.6	8.5			10	20	6.6	67	32
8	8.5	14.2	13.0	9.6	8.5	7.5				6.6	32	12.0
9	20	11.4	12.4	13.9	8.4		36			6.6	19.6	16.3
10	17.8	12.8	11.9	13.2	8.2					50	43	11.6
11	11.0	11.5	12.3	10.5	8.5				7.9	17.4	34	10.2
12	8.2	11.5	17.1	9.2	13.6	9.4			7.9	9.3	17.8	9.9
13	9.4	21	34	9.1	9.2	10.5		8.5	8.5	15.6	22	9.6
14	8.2	44	13.8	9.0	145	8.2		8.5	8.2	63	12.7	9.6
15	9.6	13.6	12.6	8.8	15.1			10.2	7.6	39	164	9.6
16	8.8	16.7	11.9	11.7	10.6	8		80	8.5	22	124	27
17	11.6	30	11.7	12.8	12.7			10.2	9.0	90	33	24
18	14.9	14.4	12.4	9.2	9.4	9.1		9.0	13.1	138	27	18.8
19	9.4	12.4	33	10.5	9.1	8.5		8.6	8.5	132	13.1	14.7
20	8.1	65	13.2	9.1	9.0	8.1		8.5	7.3	79	12.0	14.3
21	8.1	126	12.1	8.8	9.1	8.4		8.5	7.3	45	10.9	
22	21	40	13.3	8.6	8.8	8.6	15	8.4	7.1	67	20	
23	9.2	14.0	29	10.2	8.6	8.0		8.4	8.8	16.6	17.4	
24	8.3	13.0	14.2	18.2	8.6	7.5		27	7.6	26	14.8	
25	9.1	18.3	17.7	10.3	14.5	18.3		93	7.9	14.3	12.0	9.5
26	8.0	12.6	13.8	9.1	14.1			34	8.5	24	10.6	
27	8.3	13.0	16.5	8.8	9.2			13.8	7.3	37	15.6	
28	12.3	17.0	24	10.3	8.8	19		21	7.1	13.1	15.4	
29	14.4	21	13.8	9.2	8.5			-------	7.1	18.2	13.4	
30	9.6	14.4	12.4	8.8	8.2			-------	6.8	12.0	18.6	
31	10.0	13.0	-------	9.4	-------			-------	7.3	-------	12.7	-------

NOTE.—Discharge estimated Dec. 3, 4, 14, 20, 21, 23, 24, and Jan. 3. Braced figures give estimated mean discharge for periods indicated. Estimates made by comparison with records (furnished by Pioneer Mill Co.), for tributary and diversion tunnels below the gage and records for other streams on West Maui; gage-height record either faulty or missing.

Monthly discharge of Honokahau Stream near Honokahau, Maui, for the year ending June 30, 1927

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July	21	6.2	10.4	16.1	323	989
August	126	8.8	24.0	37.1	743	2,280
September	34	11.7	15.5	24.0	464	1,430
October	49	8.6	12.9	20.0	400	1,230
November	145	8.2	14.2	22.0	427	1,310
December	----------	----------	10.5	16.2	327	999
January	282	----------	31.0	48.0	962	2,950
February	93	----------	17.1	26.5	478	1,470
March	----------	6.8	12.5	19.3	388	1,190
April	138	6.6	33.7	52.1	1,010	3,100
May	164	9.3	27.4	42.4	850	2,610
June	67	----------	15.1	23.4	453	1,390
The year	282	----------	18.7	28.9	6,820	20,900

HONOKAWAI DITCH NEAR LAHAINA, MAUI

LOCATION.—75 feet below intake from Honokawai Stream, 2¼ miles above Pioneer Mill Co.'s power house, and 7½ miles northeast of Lahaina.

RECORDS AVAILABLE.—May 28, 1921, to June 30, 1927. At station 1½ miles downstream November 14, 1918, to May 27, 1921; at station half a mile downstream, on old ditch line, July 1, 1912, to December 31, 1917. Records not comparable.

EQUIPMENT.—Gurley 7-day water-stage recorder on left bank about 25 feet inside of tunnel portal. Records changed by employee of Pioneer Mill Co. Discharge measurements made from plank across ditch at gage.

CHANNEL AND CONTROL.—Concrete-lined ditch section in tunnel a quarter of a mile long; subject to backwater from collection of gravel at a point about 500 feet below gage where tunnel widens.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 44 million gallons a day, or 68 second-feet, at 9.45 a. m. May 15 (gage height from water-stage recorder, 2.28 feet); minimum discharge, unknown owing to doubtful gage-height corrections.

1912–1927: Maximum discharge recorded, 69 million gallons a day, or 107 second-feet, at 4.15 p. m. September 10, 1922 (gage height from water-stage recorder, 2.71 feet); minimum discharge, no flow, occasionally, when water is shut out of ditch.

DIVERSIONS AND REGULATION.—Completely regulated by head gates at intake. A diversion ditch 1½ miles below station takes care of excess flood waters when head gates are open.

OBJECT OF STATION.—Most of drainage area in Territorial lands. Data valuable in relation to Territorial lease to Pioneer Mill Co.

UTILIZATION.—Water used for development and irrigation of sugar cane.

ACCURACY.—Stage-discharge relation changed at time of high water October 7. The two rating curves used are fairly well defined between 2 and 15 million gallons a day; poorly defined beyond these limits. These curves were checked fairly well by six discharge measurements well distributed during year and ranging from 2 to 3 million gallons a day. Operation of water-stage recorder fairly satisfactory; rather doubtful gage-height corrections existed throughout the year. Daily discharge ascertained by applying to rating table mean daily gage height determined from recorder graph by inspection or, for days of considerable fluctuation, by averaging discharge for intervals of day. Records fair to poor.

Honokawai ditch diverts from Honokawai Stream at elevation about 1,570 feet. The water is carried southwestward through a tunnel about 1¼ miles long to elevation about 1,550 feet. Here the general course of the ditch changes to north of west and the water is carried down a small gulch to power house No. 1 at elevation about 950 feet and thence nearly due south to the vicinity of Lahaina where the water is used by the Pioneer Mill Co. for irrigation and development of sugar cane. The system comprises about 5½ miles of main ditch.

Discharge, in million gallons a day, of Honokawai ditch near Lahaina, Maui, for the year ending June 30, 1927

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	2.9	3.4	2.9	3.2	2.5	2.3	2.1	2.6	7.5	1.9	2.3	3.2
2	2.9	7.9	2.8	3.2	2.5	2.3	2.6	2.2	3.3	2.0	2.3	3.0
3	2.9	14.1	2.8	3.2	2.5	2.3	28	2.2	9.5	2.0	2.3	4.9
4	2.9	3.5	3.0	3.2	2.5	2.3	8.8	2.2	4.3	2.0	2.2	2.3
5	2.9	7.9	3.0	15.1	2.5	2.3	2.6	2.1	2.9	1.9	3.9	2.2
6	2.9	7.2	3.0	18.7	2.4	2.3	2.9	2.1	2.6	1.9	3.1	9.8
7	7.5	3.8	2.9	3.6	2.4	2.3	15.7	2.1	2.7	1.9	11.2	5.2
8	3.1	3.2	3.0	2.8	2.4	2.3	12.6	2.1	3.4	1.9	10.4	2.4
9	6.9	3.0	3.0	3.1	2.4	2.3	2.3	3.3	2.6	1.9	5.9	2.5
10	4.6	3.0	2.9	2.9	2.4	2.3	8.7	2.9	2.3	6.9	10.0	2.2
11	4.3	3.0	2.9	2.8	2.4	2.2	2.9	2.3	2.3	4.4	3.0	2.0
12	3.2	3.0	2.9	2.6	2.8	2.2	10.9	2.2	2.2	2.3	6.7	2.0
13	3.2	3.6	4.0	2.6	2.5	2.2	5.0	2.2	2.2	3.1	3.0	2.0
14	3.1	4.7	3.0	2.6	21	2.2	2.1	2.2	2.3	8.1	2.7	2.0
15	3.2	3.2	2.9	2.5	3.2	2.2	2.0	2.3	2.2	2.7	11.0	2.0
16	3.2	3.9	2.8	2.5	2.6	2.2	2.0	11.7	2.2	2.3	18.4	2.9
17	4.0	5.5	2.7	3.2	2.8	2.2	2.0	2.6	2.2	6.2	3.8	4.6
18	3.4	3.5	2.8	2.7	2.5	2.2	2.0	2.3	2.1	12.8	3.7	2.6
19	3.2	3.1	3.5	2.7	2.4	2.3	1.9	2.3	2.0	12.7	2.6	2.2
20	3.1	10.3	3.1	2.6	2.3	2.3	2.0	2.2	1.8	10.2	2.6	2.0
21	3.1	29	2.9	2.5	2.3	2.3	3.3	2.2	1.8	4.4	2.5	1.9
22	6.9	6.6	2.9	2.5	2.3	2.3	3.4	2.2	1.8	6.2	3.2	1.8
23	3.2	3.0	9.2	2.5	2.3	2.3	2.1	2.2	1.8	3.4	3.6	1.8
24	3.1	2.8	3.4	3.0	2.3	2.3	2.2	4.0	1.8	3.3	2.6	2.2
25	3.4	4.1	4.8	2.9	2.4	5.3	4.7	13.1	1.8	2.8	2.5	3.1
26	3.3	2.7	3.5	2.6	2.9	7.8	4.8	8.5	2.0	2.5	2.4	2.0
27	3.2	2.7	4.3	2.5	2.5	2.8	2.2	3.6	2.0	3.8	2.9	1.8
28	3.2	4.4	6.9	2.5	2.4	2.7	2.3	4.7	1.8	2.6	3.4	1.8
29	3.5	3.1	3.5	2.5	2.4	2.2	2.9	-------	1.8	2.7	3.6	2.5
30	3.3	3.4	3.3	2.5	2.4	2.1	2.1	-------	1.8	2.7	3.8	2.5
31	3.8	3.0	-------	2.5	-------	2.1	2.0	-------	1.8	-------	2.8	-------

Monthly discharge of Honokawai ditch near Lahaina, Maui, for the year ending June 30, 1927

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July	7.5	2.9	3.66	5.66	113	348
August	29	2.7	5.34	8.26	166	508
September	9.2	2.7	3.49	5.40	105	321
October	18.7	2.5	3.69	5.71	114	351
November	21	2.3	3.11	4.81	93.2	286
December	7.8	2.1	2.56	3.96	79.4	244
January	28	1.9	4.87	7.54	151	463
February	13.1	2.1	3.45	5.34	96.6	296
March	9.5	1.8	2.67	4.13	82.8	254
April	12.8	1.9	4.12	6.37	124	379
May	18.4	2.2	4.66	7.21	144	443
June	9.8	1.8	2.78	4.30	83.3	256
The year	29	1.8	3.70	5.72	1,350	4,150

KANAHA STREAM ABOVE PIPE-LINE INTAKE NEAR LAHAINA, MAUI

LOCATION.—200 feet above intake of pipe line supplying Lahaina and Lahainaluna school and 2½ miles northeast of Lahaina (elevation, 1,057 feet).

RECORDS AVAILABLE.—February 29, 1916, to June 30, 1927. From August 5, 1911, to January 18, 1916, at a station about 1 mile downstream.

EQUIPMENT.—Stevens continuous water-stage recorder on right bank. Discharge measurements made by wading near gage.

CHANNEL AND CONTROL.—One channel at all stages; fairly straight near gage; filled with large boulders; banks steep and high. An artificial masonry control of flat-parabolic, longitudinal section was constructed October 1–9. Prior to October 1 control was composed of large and small boulders, subject to shifts.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 114 million gallons a day, or 176 second-feet, at noon May 16 (gage height from water-stage recorder, 2.97 feet); minimum discharge, unknown owing to faulty gage-height record.

1916–1927: Maximum discharge recorded, 314 million gallons a day, or 486 second-feet, at 10.30 a. m. November 26, 1918 (gage height from water-stage recorder, 3.79 feet); minimum discharge, 1.8 million gallons a day, or 2.8 second-feet, August 9–11 and 17–19, 1920 (gage height, 0.92 foot) and at 11 p. m. November 14, 1921 (gage height, 0.93 foot).

DIVERSIONS AND REGULATION.—None.

OBJECT OF STATION.—Data valuable with relation to Territorial agreement with Pioneer Mill Co. pertaining to division of water.

UTILIZATION.—Water used for domestic supply, power development, and irrigation of sugar cane.

ACCURACY.—Stage-discharge relation changed October 1–9 when artificial control was being constructed. Rating curve used prior to October 1, fairly well defined between 1 and 15 million gallons a day; extended above on basis of one discharge measurement at 49 million gallons a day. This curve checked fairly well at 1.6 million gallons a day by two discharge measurements. Curve used after October 9 is based on five discharge measurements made October to February and two made after June 30 ranging from 2 to 9 million gallons a day. Operation of water-stage recorder fairly satisfactory except as indicated in footnote to daily-discharge table. Daily discharge ascertained by applying to rating table mean daily gage height determined from recorder graph by inspection or, for days of considerable fluctuation, by averaging discharge for intervals of day. Records fair to poor.

Discharge, in million gallons a day, of Kanaha Stream near Lahaina, Maui, for the year ending June 30, 1927

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	1.6	6.0	1.7	1.8			2.0	2.6	9.1	2.4	2.9	
2	1.6	13.1	1.7	1.8			2.0	2.6	3.8	2.4	2.9	
3	1.6	14.9	1.7	1.8			25	2.8	9.6	2.4	2.9	
4	1.6	2.0	1.7	1.7			9.0	2.6	6.1	2.4	2.9	
5	1.6	2.9	1.8		2.0		2.8	2.8	2.2	2.4	5.0	
6	1.9	2.5	1.8	12			5.1	2.8	1.8	2.2	5.7	3.8
7	2.6	2.7	1.8				11.0	2.8	4.4	2.2	10.0	
8	1.8	2.8	2.4			2.0	9.8	2.6	2.6	2.4	11.5	
9	2.6	1.9	2.0	2.6	2.0		2.4	5.1	2.0	2.4	6.9	
10	1.9	1.8	1.8	2.6	2.0		13.4	3.3	1.8	3.3	7.4	
11	2.1	1.8	1.8	2.2	2.0		3.4	2.2	1.7	5.0	3.3	2.8
12	1.6	1.8	1.8	2.0	2.8		3.8	2.2	1.8	3.1	3.7	2.8
13	2.1	1.9	3.2	2.0	2.2		3.5	2.2	1.8	3.3	3.1	2.8
14	1.6	2.0	1.9	2.2	5.5		2.0	2.0	1.8	6.3	3.1	2.8
15	1.8	1.8	1.8	2.2	2.8		1.8	3.2	1.8	3.7	9.8	2.8

Discharge, in million gallons a day, of Kanaha Stream near Lahaina, Maui, for the year ending June 30, 1927—Continued

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
16	1.7	2.9	1.8	2.4	2.4		1.8	16.2	1.8	2.8	15.6	3.7
17	2.6	2.8	1.8	2.8	2.2		1.8	2.6	1.7	4.6	4.0	5.3
18	1.9	1.9	2.0	2.0	2.0		1.8	2.2	1.8	9.3	5.2	3.5
19	1.7	1.8	9.7	2.8	2.0		1.8	2.0	1.7	6.6	3.1	2.9
20	1.6	9.9	1.8	2.0	2.0		1.8	1.8	1.4	4.0	2.9	2.8
21	1.6	40	1.6	2.0		2.0	1.8	1.8	1.6	2.9	2.8	2.8
22	4.1	4.4	1.6	2.0			2.0	1.8	1.7	3.7	3.5	2.6
23	2.0	2.0	7.2	2.0			2.0	1.8	2.4	2.9		2.8
24	1.9	1.9	2.9	3.6			2.2	2.0	2.2	2.8		4.8
25	2.0	2.5	12.3	2.4			8.3	7.2	2.4	2.8		5.3
26	1.6	1.8	2.4	2.0	2.1	15.1	5.2	10.7	2.6	2.8	3.3	2.8
27	1.6	2.4	12.1	1.8		4.2	2.4	4.6	2.6	2.8		2.8
28	1.6	3.7	7.7	2.0		2.4	2.2	3.9	2.6	2.9		2.6
29	1.6	1.9	2.5	1.8		1.7	2.8	-------	2.6	2.9		2.6
30	1.6	1.8	1.9	2.0		1.8	2.4	-------	2.6	3.1		2.8
31	3.7	1.8	-------	2.1	-------	1.8	2.6	-------	2.2	-------		-------

NOTE.—Discharge estimated Oct. 1–4, 9, and 31. Braced figures give estimated mean discharge for periods indicated. Estimates made from study of fragmentary gage-height record and by comparison with record for Honokawai ditch and other streams on West Maui; gage-height record either faulty or missing.

Monthly discharge of Kanaha Stream near Lahaina, Maui, for the year ending June 30, 1927

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July	4.1	1.6	1.96	3.03	60.8	186
August	40	1.8	4.63	7.16	143	440
September	12.3	1.6	3.27	5.06	98.2	301
October	-------	1.7	3.44	5.32	107	327
November	5.5	-------	2.23	3.45	66.9	205
December	15.1	-------	2.48	3.84	77.0	236
January	25	1.8	4.51	6.98	140	429
February	16.2	1.8	3.59	5.55	100	308
March	9.6	1.4	2.78	4.30	86.2	264
April	9.3	2.2	3.43	5.31	103	316
May	15.6	-------	4.77	7.38	148	454
June	-------	2.6	3.40	5.26	102	313
The year	40	-------	3.38	5.23	1,230	3,780

OLOWALU DITCH NEAR OLOWALU, MAUI

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

RECORDS AVAILABLE.—July 28, 1916, to June 30, 1927. Replaces old station in tailrace of power house, for which records are available August 12, 1911, to June 30, 1916.

EQUIPMENT.—Stevens continuous water-stage recorder on left bank. Discharge measurements made from banks of ditch, near gage (ditch only about 3 feet wide at measuring section).

CHANNEL AND CONTROL.—Channel about 3.5 feet wide, cut in earth and rock; straight for 50 feet above and below gage. Channel control; subject to shifts.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 8.9 million gallons a day, or 13.8 second-feet, at 11 a. m. October 22 (gage height from water-stage recorder, 1.23 feet; minimum discharge, unknown owing to uncertain gage-height record.

1916–1927: Maximum discharge recorded, 18 million gallons a day, or 28 second-feet at 3 a. m. December 25, 1920 (gage height from water-stage recorder, 1.53 feet); minimum discharge, no flow, occasionally, when water is shut out of ditch.

DIVERSION AND REGULATION.—Regulated by head gates.

OBJECT OF STATION.—Data valuable in relation to Territorial lease to Olowalu Co.

UTILIZATION.—Development of power and irrigation of sugar cane.

ACCURACY.—Stage-discharge relation practically permanent during year except as affected by backwater December 15 to January 10. Rating curve, fairly well defined, was checked fairly well by six discharge measurements well distributed during year. Operation of water-stage recorder satisfactory except as indicated in footnote to daily-discharge table. Daily discharge ascertained by applying to rating table mean daily gage height determined from recorder graph by inspection or, for days of considerable fluctuation, by averaging discharge for intervals of day. Records fair except those estimated, which are poor.

Olowalu ditch diverts from Olowalu Stream at elevation about 450 feet. The water is carried about 1 mile southwestward along the side of Olowalu Gulch to a point where it drops about 200 feet to a power house; thence it continues southwestward for about 1 mile to a point near Olowalu, where the water is used for irrigation of sugar cane by the Olowalu Co.

Discharge, in million gallons a day, of Olowalu ditch near Olowalu, Maui, for the year ending June 30, 1927

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	2.4	2.0	2.7	2.4	2.6	2.3	1.9	2.6	7.6	3.0	3.8	
2	2.4	2.5	2.6	2.3	2.3	2.3	1.9	2.6	7.0	3.5	3.8	
3	2.4	5.7	2.7	2.2	2.3	2.3	4.3	2.6	7.3	3.2	3.5	
4	2.3	2.7	2.6	2.2	2.1	2.3	5.9		7.0	2.9	3.5	
5	2.3	4.2	2.6	2.9	2.1	2.3	5.9		6.2	2.8	3.8	
6	2.4	3.5	2.6	4.7	2.1	2.2	5.0		5.3	2.7	3.8	
7	2.5	3.4	2.6	3.0	2.1	2.2	5.6	3.3	4.7	2.7	4.3	
8	2.4		2.6	2.5	2.1	2.2	7.6		4.4	2.6	5.9	
9	2.8	2.9	2.6	2.6	2.1	2.2	7.0		4.1	4.1	5.0	
10	2.5		2.5	3.0	2.1	2.1	6.4		3.8	4.0	6.2	
11	2.4	2.1	2.5	3.4	2.1	2.1	4.2		3.8	3.6	5.3	
12	2.3	2.2	2.5	2.5	2.1	2.1	7.3	2.8	3.4	5.6	5.0	
13	2.3	2.6	3.6	2.4	2.1	2.1	7.3	2.7	3.3	5.6	4.4	
14	2.2	2.5	2.7	2.3	5.6	2.1	7.0	2.6	3.2	7.6	4.4	
15	2.3	2.6	2.5	2.3	4.1	2.8	5.6	5.0	3.1	7.3	5.6	
16	2.3	3.1	2.3	2.6	2.9	2.1	4.7	6.4	3.1	5.9	7.6	5.5
17	2.3	2.9	2.3	2.9	2.8	2.1	4.1	5.7	3.2	5.2	7.6	
18	2.4	2.6	2.3	2.4	2.6	2.1	3.5	5.9	3.1	7.0	7.0	
19	2.3	2.6	3.8	2.5	2.5	2.4	3.3	4.4	3.0	5.3	6.2	
20	2.1	8.0	2.8	2.3	2.4	2.0	3.3	3.8	2.9	6.2	5.6	
21	2.1	8.0	2.4	2.3	2.4	1.9	3.2	3.3	2.8	5.9	4.7	
22	2.3	7.0	2.3	4.5	2.3	1.9	3.1	3.0	2.8	6.2	4.4	
23	2.2	5.0	3.0	3.5	2.3	1.9	3.0	2.9	4.2	5.6	4.4	
24	2.1	4.7	2.8	4.4	2.3	2.0	2.9	3.2	3.5	5.3	3.8	
25	2.1	3.5	2.5	4.1	2.7	2.1	2.8	7.3	3.2	5.3		
26	2.0	3.2	2.3	2.9	2.5	3.3	2.8	7.6	3.0	5.0		
27	1.9	3.0	2.5	2.6	2.5	2.3	2.8	6.6	3.0	5.0	5.5	
28	2.0	2.9	3.8	2.4	2.4	2.1	2.7	6.6	3.0	4.4		
29	2.2	2.8	3.0	2.3	2.3	2.0	2.7	-------	2.8	4.4		
30	2.2	2.8	2.5	2.3	2.3	1.9	2.6	-------	2.8	4.1		
31	2.0	2.6	-------	2.4	-------	1.9	2.6	-------	2.7	-------		-------

NOTE.—Braced figures give mean discharge for periods indicated, estimated from study of fragmentary gage-height record and by comparison with record for Kanaha Stream; recorder not operating.

Monthly discharge of Olowalu ditch near Olowalu, Maui, for the year ending June 30, 1927

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July	2.8	1.9	2.27	3.51	70.4	216
August	8.0	2.0	3.53	5.46	109	336
September	3.8	2.3	2.68	4.15	80.5	247
October	4.7	2.2	2.81	4.35	87.1	267
November	5.6	2.1	2.50	3.87	75.1	230
December	3.3	1.9	2.18	3.37	67.6	207
January	7.6	1.9	4.29	6.64	133	408
February	7.6	----------	4.07	6.30	114	350
March	7.6	2.7	3.98	6.16	123	379
April	7.6	2.6	4.73	7.32	142	435
May	7.6	3.5	5.10	7.89	158	485
June	----------	----------	5.50	8.51	165	506
The year	8.0	1.9	3.63	5.62	1,320	4,070

RIGHT BRANCH OF KAHALAWE STREAM NEAR KIPAHULU, MAUI

LOCATION.—At old ditch intake (elevation, 1,100 feet), and 2 miles north of Kipahulu.

RECORDS AVAILABLE.—February 20, 1927, when station was established, to June 30, 1927.

EQUIPMENT.—Stevens continuous water-stage recorder on left bank. Discharge measurements made by wading near gage or from footbridge just below gage.

CHANNEL AND CONTROL.—One channel at all stages; straight for 500 feet above gage and for 100 feet below; is rocky and has steep, high banks. The control is a masonry wall 38 feet long, about 3 feet high, 6 to 7 inches thick on top, practically level except for about 8 feet of the crest which dips in a shallow parabolic curve for a low-water section; considered permanent. Gage pool not large enough to prevent velocity of approach at high stages.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 240 million gallons a day, or 371 second-feet, at 11.30 p. m. April 11 (gage height from water-stage recorder, 9.55 feet); minimum discharge, 0.7 million gallons a day, or 1.1 second-feet from 10 a. m. February 22 to 5 p. m. February 24 (gage height, 7.55 feet).

DIVERSIONS AND REGULATION.—None.

OBJECT OF STATION.—Record valuable in determining the feasibility of diverting the stream for irrigation.

UTILIZATION.—Total flow wastes into sea.

ACCURACY.—Stage-discharge relation permanent. Rating curve well defined below 3 million gallons a day by four discharge measurements and extended above on basis of one discharge measurement at 14 million gallons a day and weir formula. Only two of these measurements were made during year. Operation of water-stage recorder mostly unsatisfactory causing large gage-height corrections. Daily discharge ascertained by applying to rating table mean daily gage height determined from recorder graph by inspection or, for days of considerable fluctuation, by averaging discharge for intervals of day. Records poor.

Discharge, in million gallons a day, of Right Branch of Kahalawe Stream near Kipahulu, Maui, for the year ending June 30, 1927

Day	Feb.	Mar.	Apr.	May	June	Day	Feb.	Mar.	Apr.	May	June
1		3.4	1.8	1.0	6.8	16		2.3	1.4	6.6	2.3
2		2.0	1.2	1.0	4.5	17		5.4	1.4	3.6	3.0
3		6.4	.9	.9	3.3	18		14.4	9.2	2.4	2.7
4		5.9	.9	1.5	2.4	19		1.8	3.0	1.9	1.8
5		3.0	1.0	1.5	2.1	20	0.9	1.5	3.0	1.6	2.1
6		7.9	.9	2.6	3.9	21	.8	1.4	1.5	1.6	1.5
7		3.2	.9	7.5	4.3	22	.7	1.2	5.0	2.4	1.4
8		2.7	.8	3.3	2.1	23	.7	1.1	1.8	2.3	1.4
9		2.3	6.4	2.3	2.4	24	1.0	2.0	1.5	2.4	1.4
10		1.8	12.6	4.4	2.3	25	4.3	1.0	1.2	2.4	1.5
11		1.9	16.3	1.5	2.0	26	6.4	5.7	2.9	1.6	1.2
12		1.8	15.3	1.8	1.8	27	1.6	6.0	4.0	1.5	1.2
13		1.6	6.3	2.9	1.6	28	2.8	1.6	1.4	2.4	1.4
14		1.4	1.9	1.8	1.6	29		1.1	1.8	2.4	1.5
15		1.2	1.6	2.7	2.0	30		1.0	1.8	3.6	1.9
						31		1.1		3.8	

Monthly discharge of Right Branch of Kahalawe Stream near Kipahulu, Maui, for the year ending June 30, 1927

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
February (9 days)	6.4	0.7	2.13	3.30	19.2	59
March	14.4	1.0	3.07	4.75	95.1	292
April	16.3	.8	3.66	5.66	110	337
May	7.5	.9	2.55	3.95	79.2	243
June	6.8	1.2	2.31	3.57	69.4	213
The period	16.3	.7	2.84	4.39	373	1,140

HANAWI STREAM NEAR NAHIKU, MAUI

LOCATION.—200 feet above Koolau ditch intake and trail, 1¾ miles southwest of Nahiku, 4¼ miles southeast of Keanae, and 11½ miles by road and trail west of Hana.

RECORDS AVAILABLE.—January 9, 1914, to January 6, 1916; and November 1, 1921, to June 30, 1927.

EQUIPMENT.—Stevens continuous water-stage recorder on left bank. Discharge measurements made by wading near gage or from footbridge 100 feet upstream.

CHANNEL AND CONTROL.—Channel at gage is a pool with nearly vertical rock walls. Control is rock ledge.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 348 million gallons a day, or 538 second-feet, at 7 a. m. November 14 (gage height, from water-stage recorder, 5.60 feet); minimum discharge, 1.4 million gallons a day, or 2.2 second-feet, from 1 to 3 p. m. July 5 and at noon July 8 (gage height, 0.17 foot).

1914–1916; 1921–1927: Maximum stage from floodmarks, about 20 feet during flood of January 18, 1916 (discharge not determined). Minimum discharge recorded, that of July 5 and 8, 1926.

DIVERSIONS AND REGULATION.—None.

OBJECT OF STATION.—To determine amount of water available for Koolau ditch in connection with Territorial water license to ditch company.

UTILIZATION.—Normal flow is diverted into Koolau ditch for irrigation of sugar cane.

ACCURACY.—Stage-discharge relation probably permanent during year. Rating curve fairly well defined between 2 and 100 million gallons a day; extension above uncertain. One discharge measurement made during year checks this curve closely at 3.6 million gallons a day. Operation of water-stage recorder satisfactory except as indicated in footnote to daily-discharge table. Daily discharge ascertained by applying to rating table mean daily gage height determined from recorder graph by inspection or, for days of considerable fluctuation, by averaging discharge for intervals of day. Records good for ordinary stages except those estimated, which are fair; high and low stage records poor.

Discharge, in million gallons a day, of Hanawi Stream near Nahiku, Maui, for the year ending June 30, 1927

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	1.4		5.0	3.6	2.3	2.1	2.5	4.8	16.8	3.1		
2	1.5	19	4.3	3.4	2.2	2.1	8.2	4.3	6.7	4.5		
3	1.4		4.0	3.2	2.2	2.1	164	4.0	66	4.2		
4	1.4		3.9	3.2	2.1	2.0	78	3.8	65	3.8		
5	1.4	17.4	3.7	8.2	2.1	2.0	12.0	3.5	19.7	3.6		6.5
6	1.4	4.0	3.6	16.9	2.1	2.0	9.8	3.4	97	3.5		
7	1.6	2.9	3.9	6.7	2.0	2.1	21	3.2	34	3.3	8	
8	1.4	2.7	3.6	4.7	2.0	2.0	18.8	3.1	14.0	3.1		
9	1.8	2.4	3.5	5.1	2.0	1.9	6.6	3.0	9.2	3.8		
10	1.7	2.3	3.4	4.7	2.0	1.9	5.7	3.0	5.7	3.4		
11	1.5	2.2	4.7	3.9	2.0	1.9	6.1	2.9	4.9	5.9		
12	1.4	2.2	3.5	3.5	2.2	2.0	31	2.8	4.6			
13	1.6	2.7	14.2	3.3	2.2	2.0	10.8	2.7	5.0	10		
14	1.6	17.2	4.9	3.2	135	1.9	8.6	2.6	5.7			
15	1.8	4.0	3.9	3.0	9.4	1.8	8.1	2.5	6.1			
16	1.6	3.3	3.6	2.9	4.4	1.8	7.7	2.5	8.2		30	
17	1.6	10.9	3.5	3.0	4.1	1.8	7.3	2.4	7.0			
18	1.5	4.8	3.4	2.9	3.2	2.0	7.0	2.4	8.1			
19	1.4	3.3	4.3	3.0	3.1	3.7	6.6	2.3	6.8	48	7.0	
20	1.5	13.2	3.9	2.8	2.9	2.2	6.2	2.2	6.4		5.7	
21	1.5	76	3.5	2.7	3.1	4.0	6.1	2.2	5.9		5.2	3.5
22	1.7	14.1	3.4	2.6	2.7	2.6	6.2	2.1	6.1			
23	1.6	5.9	3.3	2.6	2.5	14.5	5.3	2.1	5.7			
24	1.7	4.5	3.3	2.5	2.4	17.2	5.1	2.7	5.2			
25	1.7	5.1	3.9	2.6	2.7	38	9.8	43	4.9			
26	1.5	3.8	3.4	2.5	2.6	26	12.6	8.8	4.6	11	5.5	
27		3.6	4.1	2.4	2.4	6.0	7.0	4.5	4.5			
28		4.0	11.3	2.9	2.3	3.6	5.9	5.5	4.2			
29	1.6	4.3	4.8	2.6	2.2	3.1	6.1	-------	3.9			
30		4.5	4.0	2.4	2.2	2.7	5.5	-------	3.8			
31		6.7	-------	2.4	-------	2.6	4.9	-------	8.1	-------		-------

NOTE.—Braced figures give mean discharge for periods indicated, estimated by comparison with record of Kapaula Stream; recorder not operating.

Monthly discharge of Hanawi Stream near Nahiku, Maui, for the year ending June 30, 1927

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July	1.8	1.4	1.55	2.40	48.2	147
August	76	2.2	9.81	15.2	304	933
September	14.2	3.3	4.46	6.90	134	411
October	16.9	2.4	3.85	5.96	119	366
November	135	2.0	7.15	11.1	215	658
December	38	1.8	5.21	8.06	162	496
January	164	2.5	16.1	24.9	500	1,530
February	43	2.1	4.72	7.30	132	406
March	97	3.8	14.6	22.6	454	1,390
April		3.1	15.6	24.1	469	1,440
May			9.84	15.2	305	936
June			4.50	6.96	135	414
The year	164	1.4	8.16	12.6	2,980	9,130

KAPAULA STREAM NEAR NAHIKU, MAUI

LOCATION.—150 feet above Koolau ditch intake, 300 feet above ditch trail, 1¼ miles southwest of Nahiku and 4 miles southeast of Keanae.

RECORDS AVAILABLE.—November 1, 1921, to June 30, 1927.

EQUIPMENT.—Stevens continuous water-stage recorder on right bank. Discharge measurements made by wading or from footbridge at gage.

CHANNEL AND CONTROL.—Channel fairly straight for 75 feet above gage and curves to right over series of falls below. Banks nearly vertical for 20 feet with little vegetation. Control is rock ledge.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 828 million gallons a day, or 1,280 second-feet, at 3.30 p. m. April 17 (gage height, from water-stage recorder, 7.75 feet); minimum discharge, 0.6 million gallons a day, or 0.9 second-foot, from 2 to 8 p. m. July 5 (gage height, 0.39 foot).

1921–1927: Maximum discharge recorded, 930 million gallons a day, or 1,440 second-feet, at 2.45 a. m. December 13, 1921 (gage height, from water-stage recorder, 8.45 feet); minimum discharge, that of July 5, 1926.

DIVERSIONS AND REGULATION.—None.

OBJECT OF STATION.—To determine amount of water available for Koolau ditch in connection with Territorial water license to ditch company.

UTILIZATION.—Ordinary flow diverted into Koolau ditch for irrigation of sugarcane.

ACCURACY.—Stage-discharge relation probably permanent during year. Rating curve well defined between 1.5 and 30 million gallons a day; extension above uncertain. No discharge measurement made during year. Operation of water-stage recorder satisfactory except as indicated in footnote to daily-discharge table. Daily discharge ascertained by applying to rating table mean daily gage height determined from recorder graph by inspection or, for days of considerable fluctuation, by averaging discharge for intervals of day. Records probably good for ordinary stages except those estimated, which are fair; high and extremely low stage records poor.

Discharge, in million gallons a day, of Kapaula Stream near Nahiku, Maui, for the year ending June 30, 1927

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	0.7	1.4	3.8	2.2	1.4	1.2	1.4	2.9		5.8	3.4	4.7
2	.6	58	2.6	1.9	1.4	1.1	17.0	2.6		3.0	3.0	4.1
3	.6	38	2.0	1.8	1.2	1.1	276	2.3		2.9	2.7	5.2
4	.6	3.2	1.8	1.7	1.2	1.1	68	2.2		2.4	3.2	3.5
5	.6	30	1.8	7.2	1.2	1.1	10.9	1.9	38	2.2	4.4	3.4
6	.6	3.4	1.7	22	1.2	1.1	8.3			1.9	5.2	11.6
7	.9	2.1	1.9	5.2	1.1	1.2	30			1.8	13.0	7.7
8	.7	1.8	1.8	3.1	1.1	1.1	22			1.8	15.3	3.6
9	1.1	1.7	1.8	3.1	1.1	1.1	4.6			2.2	7.1	3.6
10	1.1	1.4	1.6	3.1	1.1	1.0	3.6			2.2	15.4	3.1
11	.9	1.2	1.9	2.4	1.1	1.0	3.6			5.7	4.4	2.6
12	.8	1.2	1.9	2.0	1.2	1.1	41			3.5	3.5	2.3
13	1.0	1.4	17.8	1.9	1.8	1.1	6.6			2.4	3.0	2.1
14	.8	19.5	3.5	1.8	142	1.0	3.8			23	2.9	2.0
15	1.0	3.6	2.8	1.8	4.7	1.0	3.0	1.5		12.4	56	2.0
16	1.0	2.7	1.8	1.8	2.3	1.0	2.7			39	58	3.3
17	.9	12.0	1.7	1.8	3.4	1.0	2.4		4.0	112	18.0	4.1
18	.8	4.7	1.7	1.8	2.0	1.2	2.4			40	5.8	2.8
19	.7	2.9	3.1	1.8	1.8	3.1	2.3			60	4.3	2.2
20	.7	24	2.2	1.8	1.7	1.4	2.3			120	3.5	2.0
21	.7	100	1.9	1.6	1.8	2.8	2.7			35	3.2	1.9
22	.8	15.5	1.8	1.5	1.7	1.8	3.5			24	3.9	1.8
23	.8	4.1	1.7	1.4	1.5	4.9	2.7			9.4	3.6	1.8
24	.8	3.4	1.7	1.4	1.4	10.2	2.6			17.3	3.2	1.8
25	1.0	3.8	2.0	1.4	1.6	39	9.8			7.9	2.9	1.8
26	.9	2.7	2.0	1.4	1.6	35	11.7	17	2.0	18.7	2.6	1.7
27	.8	2.7	3.2	1.4	1.4	5.7	4.7		2.1	8.6	2.4	1.6
28	1.0	3.1	28	1.5	1.4	3.0	3.9		2.0	5.1	2.8	1.6
29	.8	3.4	3.9	1.6	1.2	2.1	4.0	-------	2.0	4.4	3.6	1.6
30	.8	3.8	2.9	1.4	1.2	1.7	3.6	-------	1.9	4.1	4.3	1.6
31	1.0	5.6	-------	1.4	-------	1.5	2.9	-------	16.5	-------	3.8	-------

NOTE.—Braced figures give mean discharge for periods indicated, estimated by comparison with record for Hanawi Stream; recorder not operating.

Monthly discharge of Kapaula Stream near Nahiku, Maui, for the year ending June 30, 1927

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July	1.1	0.6	0.82	1.27	25.5	78
August	100	1.2	11.7	18.1	362	1,110
September	28	1.6	3.61	5.59	108	332
October	22	1.4	2.78	4.30	86.2	264
November	142	1.1	6.29	9.73	189	579
December	39	1.0	4.25	6.58	132	404
January	276	1.4	18.2	28.2	564	1,730
February	----------	----------	3.87	5.99	108	333
March	----------	----------	14.0	21.7	432	1,330
April	120	1.8	19.3	29.9	579	1,780
May	58	2.4	8.66	13.4	268	824
June	11.6	1.6	3.10	4.80	93.1	285
The year	276	.6	8.08	12.5	2,950	9,050

KOOLAU DITCH AT NAHIKU WEIR, NEAR NAHIKU, MAUI

LOCATION.—Between Kapaula and Waiohue Streams, 2 miles southwest of Nahiku, 4 miles southeast of Keanae, and 11 miles by road west of Hana.

RECORDS AVAILABLE.—February 12, 1919, to June 30, 1927. Gage readings made by East Maui Irrigation Co. available January 1, 1912, to February 11, 1919.

EQUIPMENT.—Stevens continuous water-stage recorder on right bank. Discharge measurements made from plank across ditch near gage.

CHANNEL AND CONTROL.—Ditch is straight for about 100 feet above and below gage. The control is rectangular sharp-crested weir 13.1 feet long and 2 feet high with complete end contractions. Weir basin is large enough to nearly eliminate velocity of approach.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 41 million gallons a day, or 63 second-feet, at 5.15 a. m. August 5 (gage height from water-stage recorder, 1.31 feet); minimum discharge, no flow from 7.45 to 11.15 a. m. July 1 and 9.15 to 11.15 a. m. September 21 (water shut out of ditch).

1919–1927: Maximum discharge recorded, 47.8 million gallons a day, or 74.0 second-feet, during morning of September 3, 1919 (gage height from water-stage recorder, 1.48 feet); minimum discharge. no flow, occasionally, when intake gates are closed.

DIVERSIONS AND REGULATION.—Flow completely regulated by gates and spillways above station.

OBJECT OF STATION.—To determine amount of water diverted through Koolau ditch from Territorial lands.

UTILIZATION.—Water used for irrigation of sugar cane.

ACCURACY.—Stage-discharge relation permanent during year. Rating curve, based on weir formulas, well defined above 5 million gallons a day and checked closely at 12 million gallons a day by one discharge measurement made during year. Operation of water-stage recorder satisfactory during year. Daily discharge ascertained by applying to rating table mean daily gage height determined from recorder graph by inspection or, for days of considerable fluctuation, by averaging discharge for intervals of day. Records excellent except for extremely low stages, which are good.

Koolau ditch, at elevation about 1,200 feet, diverts the ordinary flow of all streams on the windward side of the crater of Haleakala between Makapipi and Alo Streams, inclusive. The continuation of the ditch west of Alo Stream, called Wailoa ditch, diverts the ordinary flow of all streams between Waikamoi and Halehaku Streams, inclusive. The general course of the ditch is northwestward along the side of Haleakala. The water is carried to a point near Paia, where it is distributed for irrigation of sugar cane, the development of power, and for domestic supply on the plantations of Hawaiian Commercial & Sugar Co. and Maui Agricultural Co. The system comprises 18 miles of main ditch, which has a maximum carrying capacity of 145 million gallons a day; it is the most important of the East Maui Irrigation Co.'s ditches. Koolau ditch proper is about 8 miles long and has a carrying capacity of about 100 million gallons a day.

Discharge, in million gallons a day, of Koolau ditch at Nahiku Weir, near Nahiku, Maui, for the year ending June 30, 1927

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	2.2	5.4	17.4	11.6	6.1	6.8	9.3	17.1	26	22	21	24
2	2.3	28	14.6	10.4	5.9	6.3	11.8	15.6	22	16.0	19.9	23
3	2.3	28	12.9	9.8	5.6	6.3	29	14.6	38	14.6	19.2	26
4	2.2	10.6	11.6	9.3	5.9	6.1	22	13.6	38	13.2	19.9	21
5	2.2	30	10.7	19.7	5.6	5.9	34	12.5	36	12.3	22	19.9
6	2.3	17.1	10.1	34	5.6	6.3	32	12.0	38	11.3	24	29
7	3.4	12.3	10.7	22	5.4	6.3	32	11.3	38	10.7	30	28
8	2.8	11.0	10.1	16.7	5.4	5.6	34	10.7	36	10.1	34	21
9	4.5	9.8	9.5	16.4	5.4	5.6	26	10.1	34	11.6	32	21
10	4.5	9.3	9.0	16.0	5.1	5.4	23	9.5	28	10.7	32	19.2

Discharge, in million gallons a day, of Koolau ditch at Nahiku Weir, near Nahiku, Maui, for the year ending June 30, 1927—Continued

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
11	4.1	7.9	11.4	13.6	4.9	5.4	22	9.3	23	19.0	24	17.1
12	4.1	7.1	9.5	12.3	5.6	5.9	33	9.0	19.9	15.3	23	15.3
13	4.7	7.9	27	11.6	6.7	5.6	32	8.7	18.5	13.2	21	14.2
14	4.9	28	17.1	10.7	34	5.1	26	8.1	18.1	34	19.2	13.2
15	5.9	16.7	13.2	9.8	26	4.9	24	7.9	18.1	30	32	12.3
16	5.9	13.6	12.0	9.5	16.4	4.9	23	7.6	24	36	34	17.0
17	5.9	26	10.7	9.8	15.6	4.9	21	7.3	19.9	36	34	18.5
18	5.6	18.5	10.4	9.3	12.3	5.5	20	7.1	24	32	32	14.2
19	5.6	15.0	15.3	9.5	11.6	15.2	19.6	6.8	20	32	28	12.9
20	5.6	20	12.6	8.7	10.7	7.6	19.2	6.6	18.9	32	24	12.3
21	5.6	38	9.8	8.1	11.3	15.1	19.9	6.3	17.8	34	21	11.3
22	6.3	34	10.4	7.9	10.1	10.2	21	6.3	18.8	32	22	10.7
23	5.9	26	9.8	7.3	9.3	20	18.5	5.9	18.5	28	18.5	10.1
24	5.6	21	9.8	7.1	8.7	24	17.4	7.3	16.7	30	20	10.1
25	6.1	19.9	11.0	7.1	9.3	29	26	34	15.6	24	19.2	9.5
26	4.9	15.3	10.4	6.8	9.3	31	32	24	15.0	28	19.2	9.0
27	4.7	14.2	11.9	6.6	8.1	21	24	13.6	14.6	24	16.7	8.4
28	5.1	15.0	26	7.3	7.6	14.2	21	17.0	13.9	24	17.4	8.1
29	4.3	16.1	15.0	7.1	7.3	12.3	21	-------	12.9	24	18.9	8.1
30	4.3	16.0	13.2	6.6	7.1	10.7	19.9	-------	12.3	23	21	7.9
31	4.3	22	-------	6.3	-------	10.1	17.8	-------	19.2	-------	20	-------

Monthly discharge of Koolau ditch at Nahiku Weir, near Nahiku, Maui, for the year ending June 30, 1927

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July	6.3	2.2	4.45	6.89	138	423
August	38	5.4	18.1	28.0	560	1,720
September	27	9.0	12.8	19.8	383	1,180
October	34	6.3	11.3	17.5	349	1,080
November	34	4.9	9.60	14.9	288	884
December	31	4.9	10.4	16.1	323	980
January	34	9.3	23.6	36.5	731	2,25
February	34	5.9	11.4	17.6	320	980
March	38	12.3	23.0	35.6	714	2,190
April	36	10.1	22.8	35.3	683	2,100
May	34	16.7	23.8	36.8	739	2,260
June	29	7.9	15.7	24.3	472	1,450
The year	38	2.2	15.6	24.1	5,700	17,50?

WAIOHUE STREAM NEAR NAHIKU, MAUI

LOCATION.—200 feet above Koolau ditch intake, 300 feet above ditch trail, 2¼ miles southwest of Nahiku, and 3¼ miles southeast of Keanae.

RECORDS AVAILABLE.—October 9, 1921, to June 30, 1927.

EQUIPMENT.—Stevens continuous water-stage recorder on left bank. Discharge measurements made by wading near gage.

CHANNEL AND CONTROL.—One channel; straight for 150 feet above station and curved to left just below. Banks covered with brush are subject to overflow at high stages. Control for low stages is solid rock ledge; subject to scour at ends during high stages.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 544 million gallons a day, or 842 second-feet, at 2.30 p. m. April 17 (gage height from water-stage recorder, 5.63 feet); minimum discharge, unknown owing to missing gage-height record.

1921–1927: Maximum discharge recorded, that of April 17, 1927; minimum discharge, 1.7 million gallons a day, or 2.6 second-feet, at 10 p. m. April 11, 1926 (gage height, 0.52 foot).

DIVERSIONS AND REGULATION.—None.

OBJECT OF STATION.—To determine amount of water available for Koolau ditch in connection with Territorial water license to ditch company.

UTILIZATION.—Ordinary flow diverted into Koolau ditch for irrigation of sugar cane.

ACCURACY.—Stage-discharge relation permanent during year. Rating curve fairly well defined between 2.5 and 30 million gallons a day; extensions beyond these limits uncertain. This curve checked closely at 3 million gallons a day by two discharge measurements made in November and February. Operation of water-stage recorder satisfactory, except as indicated in footnote to daily-discharge table. Daily discharge ascertained by applying to rating table mean daily gage height determined from recorder graph by inspection or, for days of considerable fluctuation, by averaging discharge for intervals of day. Records good for ordinary stages, except those estimated, which are fair; high and extremely low stage records poor

Discharge, in million gallons a day, of Waiohue Stream near Nahiku, Maui, for the year ending June 30, 1927

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1			4.7	3.8	2.9		3.3	4.6	6.1	5.3	6.0	5.9
2			4.4	3.6	2.8		8.3	4.1	5.7	4.2	5.6	5.1
3		16	4.1	3.6	2.7		197	4.0	28	4.1	5.3	6.6
4			3.9	3.7	2.7		33		28	3.7	5.4	4.7
5		18.7	3.8	8.7	2.7		8.1		16.5	3.5	5.9	5.1
6		3.4	3.8	13.9	2.6		7.4	3.6	33	3.3	6.4	9.3
7		3.0	4.1	5.8	2.6		16.8		18.0	3.2	9.4	6.5
8		3.1	4.0	4.6	2.6		17.1	3.2	11.2	3.2	10.0	4.6
9	2.3	3.0	3.8	5.4	2.5		7.0	3.1	7.6	5.7	7.0	5.1
10		3.2	3.6	5.1	2.4		6.4	3.0	6.4	3.9	10.1	4.7
11		3.0	3.7	4.5	2.5		6.4	3.0	6.1	7.3	5.4	4.4
12		3.0	3.6	4.4	2.6	2.6	26	2.9	5.6	4.1	5.0	4.1
13		3.7	11.7	4.2	3.3		9.0	2.8	5.8	5.3	4.8	4.0
14		15.8	4.1	4.1	88		6.4	2.7	5.3	24	4.7	3.9
15		4.4	3.7	3.9	4.4		5.8	2.7	5.3	9.0	33	3.8
16		4.4	3.5	3.8	3.6		5.4	2.7	5.9	23	30	5.7
17		7.8	3.0	12.9	3.4		5.1	2.6	5.0	77	10.8	5.5
18		4.6	3.4	4.0	3.0		4.8	2.6	6.5	18.7	6.6	4.1
19		4.3	6.3	4.2	3.0		4.7	2.6	4.7	38	5.9	3.9
20		11.2	4.1	3.8	2.9		4.5	2.5	4.5	65	5.4	3.7
21		37	3.7	3.6	3.2		4.9	2.4	4.1	25	5.4	3.5
22		9.4	3.6	3.5	2.9		5.9	2.4	4.5	19.8	5.8	3.4
23		5.4	3.5	3.5	2.8	5.5	4.4	2.4	4.4	11.7	5.4	3.4
24	4.9	5.4	3.7	3.3		5.0	4.2	6.4	4.0	16.6	5.1	3.4
25		5.9	4.1	3.3		12.0	8.0	14.3	3.9	9.8	4.8	3.2
26		4.8	3.8	3.2	3.1	9.2	9.2	5.1	3.8	18.4	4.6	3.1
27		5.1	5.0	3.2		4.0	5.4	3.6	3.7	9.5	4.5	3.1
28		5.3	8.4	3.4		3.3	4.7	7.5	3.6	7.4	4.8	3.0
29		5.6	4.5	3.2		3.1	5.4	-------	3.5	7.0	5.3	3.2
30		5.1	4.0	3.1		3.0	4.8	-------	3.4	6.4	5.1	3.5
31		7.3	-------	3.1	-------	3.2	4.4	-------	15.3	-------	4.8	-------

NOTE.—Discharge estimated June 29 and 30. Braced figures give estimated mean discharge for periods indicated. Estimates made by comparison with record of East Wailuaiki Stream; recorder not operating.

Monthly discharge of Waiohue Stream near Nahiku, Maui, for the year ending June 30, 1927

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July			3.56	5.51	110	339
August	37	3.0	8.29	12.8	257	789
September	11.7	3.0	4.39	6.79	132	404
October	13.9	3.1	4.66	7.21	144	442
November	88		5.79	8.96	174	532
December	12.0		3.40	5.26	106	325
January	197	3.3	14.3	22.1	444	1,360
February	14.3	2.4	3.84	5.94	108	330
March	28	3.4	8.69	13.4	269	827
April	77	3.2	14.8	22.9	443	1,360
May	33	4.5	7.69	11.9	238	732
June	9.3	3.0	4.45	6.89	134	410
The year	197		7.01	10.8	2,560	7,850

WEST KOPILIULA STREAM NEAR KEANAE, MAUI

LOCATION.—600 feet above Koolau ditch crossing and highway bridge, 3½ miles by trail east of Upper Keanae, and 3 miles southeast of Keanae post office.

RECORDS AVAILABLE.—January 3, 1914, to September 17, 1917; and October 1, 1921, to June 30, 1927.

EQUIPMENT.—Stevens continuous water-stage recorder on left bank. Discharge measurements made by wading near gage or from footbridge 200 feet downstream.

CHANNEL AND CONTROL.—Recorder operates in a pool at foot of falls. Channel below is straight for 200 feet. Left bank is covered with vegetation and is overflowed at medium stages; right bank steep. Control composed of medium-sized boulders; subject to shifts.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 1,390 million gallons a day, or 2,150 second-feet, at 3 p. m. April 17 (gage height from water-stage recorder, 7.03 feet); minimum discharge, 2.2 million gallons a day, or 3.4 second-feet, from 11 p. m. February 23 to 5 a. m. February 24 (gage height, 1.18 feet).

1914–1917; 1921–1927: Maximum discharge recorded, about 2,000 million gallons a day, or 3,090 second-feet, at 5.30 a. m. January 18, 1916 (gage height from water-stage recorder, 9.25 feet); minimum discharge, 0.6 million gallons a day, or 0.9 second-foot September 15–17, 1917 (gage height, 0.6 foot).

DIVERSIONS AND REGULATION.—None.

OBJECT OF STATION.—To determine amount of water available for Koolau ditch in connection with Territorial water license to ditch company.

UTILIZATION.—Ordinary flow diverted into Koolau ditch for irrigation of sugar cane.

ACCURACY.—Stage-discharge relation changed at time of flood November 14 and shifting-control method used January 4 to April 17. Two rating curves used are fairly well defined between 2 and 40 million gallons a day; extended above on basis of one discharge measurement at 500 million gallons a day. Three discharge measurements, made during first half of year and covering a range from 4 to 12 million gallons a day, check these curves closely. Shifting-control method based on one discharge measurement of 3 million

gallons a day made in February. Operation of water-stage recorder satisfactory except as indicated in footnote to daily-discharge table. Daily discharge ascertained by applying to rating table mean daily gage height determined from recorder graph by inspection or, for days of considerable fluctuation, by averaging discharge for intervals of day. Records fair for ordinary stages, high-stage records probably poor.

Discharge, in million gallons a day, of west Kopiliula Stream near Keanae, Maui, for the year ending June 30, 1927

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1			6.2	5.4	4.2	4.1	4.7	3.9	29	6.2	10.0	7.4
2			5.4	4.9	3.7	4.0	18.6	3.4	21	4.5	9.0	6.6
3		55	5.0	4.4	3.5	3.9	570	3.2	98	4.8	8.6	7.8
4			4.9	4.4	3.4	3.9	118	3.1	70	4.1	9.3	5.8
5		40	4.5	15.6	3.3	3.8	21	3.0	18.9	3.6	10.6	6.2
6		8.5	4.4	26	3.2	4.3	12.8	2.9	71	3.3	11.3	15.1
7		5.9	5.0	8.5	3.1	4.0	24	2.9	32	3.1	20	11.6
8		5.7	4.7	6.2	3.0	3.6	23	2.8	14.7	3.0	20	6.2
9	3.2	4.7	4.3	7.7	3.0	3.6	8.6	2.7	9.8	9.7	14.1	6.7
10		4.4	3.9	6.0	3.0	3.5	6.6	2.7	6.8	4.1	22	6.0
11		3.8	3.9	5.2	3.1	3.6	6.4	2.7	6.1	6.8	10.8	5.5
12		3.6	3.8	4.7	3.3	4.0	34	2.6	5.6	7.2	9.3	5.2
13		6.2	16.5	4.6	4.2	3.8	9.3	2.5	6.0	4.8	8.6	5.0
14		31	5.7	4.5	260	3.4	6.8	2.5	5.2	21	8.2	4.8
15		6.2	4.6	4.3	22	3.4	6.0	2.4	5.2	17.3	74	4.8
16		6.5	4.4	4.3	10.8	3.3	5.4	2.5	5.8	46	63	8.4
17		21	4.2	6.9	11.0	3.4	5.0	2.5	5.0	162	30	8.0
18		8.3	4.2	5.5	7.2	3.8	4.7	2.5	5.8	58	14.1	5.5
19		6.5	7.6	5.7	6.7	5.3	4.5	2.5	4.3	116	10.4	5.2
20		28	4.9	4.4	6.2	3.5	4.3	2.4	4.1	190	8.6	5.2
21		139	4.2	4.2	6.8	6.0	5.3	2.4	3.8	53	8.2	4.6
22		29	3.9	4.3	5.5	3.9	5.3	2.3	4.0	38	8.8	4.3
23		10.7	3.7	4.2	5.1	10.3	4.0	2.3	3.9	22	7.8	
24	8	8.3	4.2	4.0	5.0	9.9	4.5	11.3	3.4	26	7.2	
25		8.1	5.7	4.2	6.0	48	9.8	66	3.3	19.8	6.6	
26		6.2	4.4	4.0	5.4	73	10.1	12.8	3.6	30	6.2	4.0
27		6.7	8.5	3.8	4.7	20	5.2	7.6	3.3	20	6.1	
28		6.9	26	4.9	4.5	10.6	4.7	11.0	3.1	15.8	6.8	
29		7.2	8.3	4.6	4.3	6.7	4.8	-------	3.0	13.2	7.0	
30		7.4	6.3	3.8	4.2	5.5	4.2	-------	2.9	11.3	7.2	
31		8.8	-------	4.1	-------	5.1	3.9	-------	13.1	-------	6.6	-------

NOTE.—Braced figures, which give mean discharge for periods indicated, estimated by comparison with record for East Wailuaiki Stream; recorder not operating properly.

Monthly discharge of West Kopiliula Stream near Keanae, Maui, for the year ending June 30, 1927

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July	----------	----------	5.52	8.54	171	525
August	139	3.6	20.9	32.3	649	1,990
September	26	3.7	6.11	9.45	183	563
October	26	3.8	5.98	9.25	185	569
November	260	3.0	14.0	21.7	419	1,290
December	73	3.3	8.88	13.7	275	845
January	570	3.9	30.8	47.7	956	2,930
February	66	2.3	6.12	9.47	171	526
March	98	2.9	15.2	23.5	472	1,450
April	190	3.0	30.8	47.7	925	2,840
May	74	6.1	14.5	22.4	450	1,380
June	15.1	----------	5.93	9.18	178	546
The year	570	----------	13.8	21.4	5,030	15,500

EAST WAILUAIKI STREAM NEAR KEANAE, MAUI

LOCATION.—1,000 feet above Koolau ditch crossing and trail, 3½ miles by trail east of Upper Keanae, and 3 miles southeast of Keanae post office.

RECORDS AVAILABLE.—December 21, 1913, to October 23, 1917; and July 1, 1922, to June 30, 1927. Fragmentary unpublished record, October 21, 1921, to June 30, 1922.

EQUIPMENT.—Stevens continuous water-stage recorder on left bank. Discharge measurements made by wading at intake to Koolau ditch or from footbridge 100 feet upstream from this intake.

CHANNEL AND CONTROL.—Recorder operates in pool at foot of 10-foot falls. Left bank steep and high; right bank sloping, is overflowed at extremely high stages. Control composed of boulders; subject to shifts.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 1,130 million gallons a day, or 1,750 second-feet, at 3.30 p. m. April 17 (gage height from water-stage recorder, 7.71 feet); minimum discharge, 2.2 million gallons a day, or 3.4 second-feet, for several hours July 5 and 6 (gage height, 0.37 foot).

1913–1917; 1922–1927: Maximum discharge recorded, 1,900 million gallons a day, or 2,940 second-feet, at 8 a. m. January 18, 1916 (gage height from water-stage recorder, 8.35 feet); minimum discharge, 1.0 million gallons a day, or 1.6 second-feet, October 22 and 23, 1917 (gage height, 0.50 foot) and from 11 p. m. August 1 to 1 a. m. August 2, 1922 (gage height, 0.37 foot).

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

DIVERSIONS AND REGULATION.—None.

OBJECT OF STATION.—To determine amount of water available for Koolau ditch in connection with Territorial water license to ditch company.

UTILIZATION.—Ordinary flow is diverted into Koolau ditch for irrigation of sugar cane.

ACCURACY.—Stage-discharge relation probably permanent during year. Rating curve fairly well defined between 3 and 150 million gallons a day; extension above uncertain. This curve checked closely at 3.5 million gallons a day by one discharge measurement made in February. Operation of water-stage recorder fairly satisfactory except as indicated in footnote to daily-discharge table. Daily discharge ascertained by applying to rating table mean daily gage height determined from recorder graph by inspection or, for days of considerable fluctuation, by averaging discharge for intervals of day. Records good for ordinary stages except those estimated, which are fair; high-stage records poor.

Discharge, in million gallons a day, of East Wailuaiki Stream near Keanae, Maui, for the year ending June 30, 1927

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	2.3	9.1	5.5	4.3	3.5	2.9	2.8	4.3	35	7.8	6.1	5.8
2	2.3	87	4.7	3.7	3.2	2.9	25	4.0	26	4.8	5.6	5.3
3	2.3	60	4.3	3.4	3.0	2.8	423	3.8	123	5.2	5.2	6.7
4	2.3	7.8	4.0	3.5	2.9	2.8	112	3.7	69	4.6	5.7	5.1
5	2.2	44	3.8	13.7	2.9	2.7	23	3.5	17.2	4.0	6.9	5.6
6	2.3	7.8	3.8	25	2.8	2.9	14.2	3.4	60	3.7	8.2	13.7
7	2.7	5.0	4.5	7.9	2.6	2.9	35	3.3	35	3.5	16.2	11.0
8	2.2	4.9	4.3	5.2	2.6	2.6	31	3.3	15.6	3.3	15.2	5.7
9	3.1	4.0	3.7	7.2	2.6	2.5	9.1	3.2	9.8	9.4	9.1	5.7
10	2.7	3.7	3.3	5.4	2.5	2.5	6.9	3.1	7.4	4.7	15.1	5.0
11	2.3	3.3	3.4	4.5	2.6	2.5	6.6	3.2	6.5	12.8	6.9	4.3
12	2.3	3.1	3.2	4.0	2.8	2.6	60	3.1	5.6	14.6	5.9	4.0
13	2.4	6.4	13.4	4.0	3.3	2.6	10.6	2.9	6.0	6.8	5.7	3.8
14	2.5	30	6.0	3.8	224	2.4	6.9	2.9	5.4	25	5.2	3.5
15	2.9	6.3	4.0	3.5	17.8	2.4	5.9	2.8	5.3	24	66	3.5

Discharge, in million gallons a day, of East Wailuaiki Stream near Keanae, Maui, for the year ending June 30, 1927—Continued

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
16	2.7	6.4	3.5	3.5	7.4	2.4	5.3	3.0	5.7	53	65	7.0
17	17.1	18.5	3.3	7.3	8.2	2.4	4.8	2.8	4.8	138	18.4	
18	8.4	8.2	3.2	4.9	5.0	2.5	4.5	2.8	5.8	49	8.5	
19	5.2	6.0	6.0	5.8	4.5	3.6	4.3	2.8	4.4	82	6.9	
20	4.7	32	3.8	3.9	4.2	2.4	4.1	2.6		178	6.0	
21	4.8	140	3.3	3.5	4.6	3.9	5.5	2.6		40	5.5	
22	7.1	24	3.2	3.6	3.6	2.6	6.3	2.6		28	5.8	
23	5.1	9.1	3.1	3.5	3.4	7.0	4.4	2.6	4.3	15.0	5.2	3.6
24	5.9	7.7	3.3	3.5	3.3	7.0	5.4	28		17.5	4.8	
25	7.0	7.8	5.3	4.0	4.0	37	12.0	89		12.6	4.4	
26	5.0	5.6	3.9	3.6	3.5	46	12.3	15.6		25	4.3	
27	5.7	6.0	6.1	3.3	3.2	12.9	6.0	7.9	4.3	14.9	4.2	
28	5.8	6.2	22	4.8	3.0	6.1	5.2	13.9	3.6	9.8	5.0	
29	5.2	6.2	6.7	4.2	3.0	4.0	5.3	-------	3.6	7.9	5.2	
30	5.1	6.3	4.9	3.3	2.9	3.3	4.7	-------	3.5	7.0	5.5	
31	6.4	7.4	-------	3.3	-------	3.0	4.3	-------	11.8	-------	4.9	-------

NOTE.—Discharge estimated July 17. Braced figures give estimated mean discharge for periods indicated. Estimates made from fragmentary gage-height record and by comparison with record for Waiohue Stream; recorder not operating properly.

Monthly discharge of East Wailuaiki Stream near Keanae, Maui, for the year ending June 30, 1927

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July	17.1	2.2	4.45	6.89	138	423
August	140	3.1	18.7	28.9	580	1,780
September	22	3.1	5.12	7.92	154	471
October	25	3.3	5.33	8.25	165	507
November	224	2.5	11.4	27.6	343	1,050
December	46	2.4	6.00	9.28	186	571
January	423	2.8	27.9	43.2	866	2,650
February	89	2.6	8.10	12.5	227	696
March	123	3.5	16.3	25.2	504	1,550
April	178	3.3	27.1	41.9	812	2,500
May	66	4.2	11.1	17.2	343	1,060
June	13.7	----------	4.87	7.54	146	448
The year	423	2.2	12.2	18.9	4,460	13,700

WEST WAILUAIKI STREAM NEAR KEANAE, MAUI

LOCATION.—500 feet above Koolau ditch crossing and trail bridge, 3 miles by trail east of Upper Keanae, and 2¾ miles south of Keanae post office.

RECORDS AVAILABLE.—January 1, 1914, to October 22, 1917, and November 1, 1921, to June 30, 1927.

EQUIPMENT.—Stevens continuous water-stage recorder on left bank. Discharge measurements made by wading near gage or from footbridge 90 feet downstream.

CHANNEL AND CONTROL.—Recorder operates in a pool at foot of falls. Flow at ordinary stages on left side of channel but at medium stages the sloping part of the right bank is overflowed. Left bank is nearly vertical, and high stages are confined by both banks. Stream bed below gage is covered with medium-sized boulders; subject to shifts.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 2,000 million gallons a day, or 3,090 second-feet, at 7.30 a. m. January 3 (gage height from water-stage recorder, 9.04 feet); minimum discharge, 1.1 million gallons a day, or 1.7 second-feet, from 3 to 8 p. m. July 5 (gage height, 0.50 foot).

1914–1917; 1921–1927: Maximum discharge recorded, estimated 4,500 million gallons a day, or 6,960 second-feet, at 1.45 p. m. January 14, 1923 (gage height from floodmarks, about 13.5 feet); minimum discharge, 0.3 million gallons a day, or 0.45 second-foot, from noon to 1 p. m. July 26, 1922 (gage height, 0.44 foot).

DIVERSIONS AND REGULATION.—None.

OBJECT OF STATION.—To determine amount of water available for Koolau ditch in connection with Territorial water license to ditch company.

UTILIZATION.—Ordinary flow is diverted into Koolau ditch for irrigation of sugar cane.

ACCURACY.—Stage-discharge relation probably permanent during year. Rating curve fairly well defined between 1 and 500 million gallons a day, was checked roughly at 2.5 million gallons a day by one discharge measurement in February. Operation of water-stage recorder satisfactory except as indicated in footnote to daily-discharge table. Daily discharge ascertained by applying to rating table mean daily gage height determined from recorder graph by inspection or, for days of considerable fluctuation, by averaging discharge for intervals of day. Records fair for ordinary stages; extremely low and high stage records poor.

Discharge, in million gallons a day, of West Wailuaiki Stream near Keanae, Maui, for the year ending June 30, 1927

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	1.5	6.6	6.2			2.8	3.4		57	19.2	7.9	7.1
2	1.6	110	5.3	4.6	4.0	2.6	46		46	5.9	6.8	7.0
3	1.4	80	4.8			2.5	1,020		176	8.3	6.0	8.4
4	1.2	11.6	4.5		3.6	2.6	173	4.5	100	5.8	6.7	6.7
5	1.2	54	4.0		3.5	2.2	36		28	4.4	8.1	8.2
6	1.4	12.0	4.0		3.1	2.4	19.4		73	3.7	9.9	25
7	2.2	7.3	5.0		2.9	2.5	40	2.8	50	3.1	22	20
8	1.3	6.8	5.1		2.7	1.9	39	2.6	22	2.8	23	9.6
9	2.8	5.5	4.1		2.5	1.7	12.8	2.5	13.8	5.1	13.1	9.8
10	2.1	5.0	3.5		2.2	1.7	9.0	2.4	10.2	4.6	23	8.1
11	1.4	4.2	3.5		2.7	1.7	8.4	2.5	8.4	9.1	10.4	6.8
12	1.4	3.8	3.3	13	2.8	1.9	72	2.8	7.3	20	8.9	6.4
13	1.7	7.9	19.2		2.9	1.8	16.0	2.1	7.6	10.1	9.1	5.7
14	2.0	32	9.3		455	1.5	9.4	1.8	6.7	50	8.6	5.4
15	2.8	9.0	5.1		31	1.4	7.4	1.7	6.2	41	119	6.0
16	2.5	8.4	4.1		10.7	1.4	6.4	2.2		82	72	12.8
17	35	26	3.6		14.8	1.4	5.7	1.9		281	34	13.4
18	10.8	12.1	3.4		7.3	1.6	5.1	1.7		86	14.1	
19	5.3	7.8	5.7		6.2	4.0	4.8	1.7		184	10.0	
20	2.8	39			5.8	1.7	4.5	1.5		345	7.8	
21	2.5	200			6.0	3.2	6.9	1.5	5.5	72	7.0	
22	6.6	39			4.8	2.0	6.2	1.4		50	7.1	
23	3.5	13.1			4.4	7.6	5.4	1.4		27	6.1	
24	3.8	9.8			4.1	6.8	7.7	48		31	5.3	5
25	4.2	9.6	6	5	4.9	37	13.2	131		21	4.9	
26	2.2	6.8			4.2	69	13.4	26		38	4.6	
27	3.0	7.1			3.6	21	7.3	13.4	4.5	24	4.6	
28	3.9	6.8			3.4	10.0	6.1	22	4.0	16.1	5.7	
29	2.8	6.7			3.1	5.7			4.4	12.2	6.1	
30	2.4	8.1			2.9	4.5	6.5		4.5	9.8	6.8	
31	3.8	8.0				3.9			145		6.0	

NOTE.—Braced figures give mean discharge for periods indicated, estimated by comparison with record for East Wailuanui Stream; recorder not operating or stilling-well intake partly obstructed.

Monthly discharge of West Wailuaiki Stream near Keanae, Maui, for the year ending June 30, 1927

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July	35	1.2	3.91	6.05	121	372
August	200	3.8	24.6	38.1	764	2,340
September		3.3	5.66	8.76	170	521
October			9.08	14.0	281	864
November	455	2.2	20.4	31.6	613	1,880
December	69	1.4	6.84	10.6	212	651
January	1,020	3.4	52.4	81.1	1,620	4,990
February	131	1.4	10.8	16.7	302	928
March	176	4.4	26.9	41.6	835	2,560
April	345	2.8	49.1	76.0	1,470	4,520
May	119	4.6	15.6	24.1	485	1,480
June	25		7.71	11.9	231	710
The year	1,020	1.2	19.5	30.2	7,100	21,800

EAST WAILUANUI STREAM NEAR KEANAE, MAUI

LOCATION.—125 feet above Koolau ditch intake, 250 feet above trail, 2¾ miles by trail east of Upper Keanae and 2½ miles south of Keanae post office.

RECORDS AVAILABLE.—November 23, 1921, to June 30, 1927. At site 500 feet upstream January 1, 1914, to October 24, 1917.

EQUIPMENT.—Stevens continuous water-stage recorder on left bank. Discharge measurements made by wading just above intake to Koolau ditch or from footbridge 500 feet above gage.

CHANNEL AND CONTROL.—Recorder operates in pool at base of 12-foot falls. Channel is fairly straight below gage and banks are nearly vertical. Control is rock ledge forming crest of 4-foot falls.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 549 million gallons a day, or 849 second-feet, at 3.45 p. m. April 17 (gage height from water-stage recorder, 4.47 feet); minimum discharge, 0.3 million gallons a day, or 0.5 second foot, from 3 to 8 p. m. July 5 (gage height, 0.31 foot).

1921–1927: Maximum discharge recorded, 1,050 million gallons a day, or 1,620 second-feet, at 4 p. m. February 12, 1925 (gage height from water-stage recorder, 6.96 feet); minimum discharge, 0.1 million gallons a day, or 0.2 second-foot, several hours April 11, 1926 (gage height, 0.28 foot).

DIVERSIONS AND REGULATION.—None.

OBJECT OF STATION.—To determine amount of water available for Koolau ditch in connection with territorial water license to ditch company.

UTILIZATION.—Ordinary flow diverted into Koolau ditch for irrigation of sugar cane.

ACCURACY.—Stage-discharge considered permanent during year. Rating curve well defined below 15 million gallons a day; extension above uncertain. This curve checked very well at 1.3 million gallons a day by a discharge measurement in February. Another discharge measurement at 42 million gallons a day made in August plots much less than the current rating curve and being unsupported is for the present disregarded. Operation of water-stage recorder satisfactory during year. Daily discharge ascertained by applying to rating table mean daily gage height determined from recorder graph by inspection or, for days of considerable fluctuation, by averaging discharge for intervals of day. Records good for ordinary stages; high-stage records poor.

Discharge, in million gallons a day, of East Wailuanui Stream near Keanae, Maui, for the year ending June 30, 1927

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	0.4	2.4	2.1	1.6	1.1	0.8	1.1	1.6	8.6	5.4	2.1	2.1
2	.5	11.9	1.8	1.4	1.0	.8	17.3	1.4	6.3	2.3	2.0	1.9
3	.4	15.1	1.7	1.2	.9	.7	189	1.3	22	2.1	1.8	3.0
4	.4	2.4	1.6	1.3	.9	.7	23	1.2	23	1.7	2.0	2.1
5	.4	26	1.4	8.9	.9	.6	5.0	1.1	5.0	1.4	2.4	2.4
6	.5	3.0	1.4	11.3	.8	.8	5.0	1.2	24	1.3	3.0	8.1
7	.8	2.0	1.6	3.5	.8	.7	15.9	1.2	14.7	1.2	9.1	5.4
8	.4	2.1	1.4	2.3	.8	.6	12.6	1.1	6.0	1.2	7.4	2.4
9	1.1	1.8	1.1	3.4	.8	.6	3.1	1.0	3.5	2.8	4.3	2.4
10	.9	1.7	1.0	2.3	.7	.6	2.3	1.0	2.4	1.6	9.2	2.1
11	.6	1.4	1.0	1.9	.8	.5	2.2	.9	2.1	1.8	3.0	1.9
12	.5	1.3	1.0	1.7	.9	.7	36	.9	1.9	2.0	2.3	1.7
13	.7	3.6	6.4	1.7	1.1	.6	5.0	.8	1.9	2.6	2.0	1.6
14	.6	24	1.6	1.6	74	.4	2.6	.8	1.7	21	1.8	1.6
15	.9	3.0	1.3	1.4	3.6	.4	2.1	.7	1.7	8.6	26	1.6
16	.9	2.8	1.1	1.4	2.1	.4	1.9	.8	1.7	24	26	3.5
17	.8	9.3	1.0	3.1	1.9	.5	1.7	.7	1.6	89	10.2	3.4
18	.5	3.0	1.0	4.1	1.4	.7	1.6	.6	1.9	23	3.6	1.8
19	.4	2.4	2.7	2.4	1.6	2.7	1.4	.6	1.4	30	2.8	1.6
20	.5	12.4	1.6	1.7	1.3	.8	1.3	.6	1.4	64	2.3	1.6
21	.5	40	1.2	1.4	1.7	1.6	2.5	.5	1.2	20	2.1	1.4
22	1.6	9.1	1.2	1.3	1.2	.9	2.0	.5	1.3	17.4	2.1	1.3
23	.7	3.1	1.1	1.4	1.2	3.3	1.6	.4	1.4	6.6	1.9	1.2
24	1.0	3.0	1.3	1.3	1.1	2.4	1.9	3.6	1.2	8.0	1.7	1.4
25	1.5	3.1	1.9	1.2	1.4	12.9	6.0	19.6	1.2	5.3	1.6	1.2
26	.7	2.0	1.6	1.2	1.3	7.9	5.6	5.3	1.4	9.7	1.4	1.0
27	.9	2.1	2.3	1.1	1.0	2.6	2.4	2.3	1.3	6.0	1.4	1.0
28	1.2	2.5	5.5	1.7	.9	1.8	2.0	5.2	1.1	4.0	1.7	.9
29	.8	2.4	2.0	1.4	.8	1.6	2.0	-------	1.2	3.1	1.9	1.2
30	.8	2.3	1.7	1.2	.8	1.3	1.8	-------	1.0	2.4	2.1	1.3
31	1.2	2.8	-------	1.2	-------	1.2	1.6	-------	8.6	-------	1.7	-------

Monthly discharge of East Wailuanui Stream near Keanae, Maui, for the year ending June 30, 1927

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July	1.6	0.4	0.74	1.14	23.1	70
August	40	1.3	6.58	10.2	204	626
September	6.4	1.0	1.79	2.77	53.6	165
October	11.3	1.1	2.34	3.62	72.6	223
November	74	.7	3.63	5.62	109	334
December	12.9	.4	1.68	2.60	52.1	160
January	189	1.1	11.6	17.9	360	1,100
February	19.6	.4	2.03	3.14	56.9	174
March	24	1.0	4.96	7.67	154	472
April	89	1.2	12.3	19.0	370	1,130
May	26	1.4	4.61	7.13	143	439
June	8.1	.9	2.14	3.31	64.1	197
The year	189	.4	4.55	7.04	1,660	5,090

WEST WAILUANUI STREAM NEAR KEANAE, MAUI

LOCATION.—150 feet above Koolau ditch crossing and intake, 2 miles by trail east of Upper Keanae, and 2¼ miles south of Keanae post office.

RECORDS AVAILABLE.—July 1, 1922, to June 30, 1927. At site 100 feet downstream December 19, 1913, to October 22, 1917.

EQUIPMENT.—Stevens continuous water-stage recorder on left bank. Discharge measurements made by wading near gage or from footbridge just above gage.

CHANNEL AND CONTROL.—One channel at low and medium stages and two at high stages. Straight for about 75 feet above gage and for 150 feet below. Stream is a series of falls and is boulder strewn. Left bank high; right bank is overflowed at high stages. Control is a broad-crested concrete structure roughly parabolic in shape; subject to shift owing to wear.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 448 million gallons a day, or 693 second-feet, at 7.15 a. m. January 3 (gage height from water-stage recorder, 4.44 feet); minimum discharge, 0.5 million gallons a day, or 0.8 second-foot, from 3 to 6 p. m. July 4 (gage height, 0.52 foot).

1923–1927: Maximum discharge recorded, 1,220 million gallons a day, or 1,890 second-feet, at 2.30 p. m. January 14, 1923 (gage height from water-stage recorder, 7.70 feet); minimum discharge, 0.2 million gallons a day, or 0.3 second-foot, several hours July 16–21, 1922 (gage height, 0.50 foot).

OBJECT OF STATION.—To determine amount of water available for Koolau ditch in connection with Territorial water license to ditch company.

UTILIZATION.—Ordinary flow diverted into Koolau ditch for irrigation of sugar cane.

ACCURACY.—Stage-discharge relation permanent during year. Rating curve well defined below 20 million gallons a day; extended above on basis of one discharge measurement at 60 million gallons a day. This curve checked very closely at 58 million gallons a day by one discharge measurement made in August. Operation of water-stage recorder fairly satisfactory except as indicated in footnote to daily-discharge table. Daily discharge ascertained by applying to rating table mean daily gage height determined from recorder graph by inspection or, for days of considerable fluctuation, by averaging discharge for intervals of day. Records good for ordinary stages except those estimated, which are fair; extremely high stage records poor.

Discharge, in million gallons a day, of West Wailuanui Stream near Keanae, Maui, for the year ending June 30, 1927

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	0.6			1.8	1.6	1.0	1.2	2.1	15.9	6.1	3.2	2.1
2	.7	} 19		1.7	1.3	.9	17.7	1.8	13.2	2.8	2.8	1.8
3	.6			1.5	1.1	.9	305	1.6	43	2.9	2.4	2.6
4	.6			1.4	1.1	.9	74	1.5	34	1.8	2.5	2.5
5	.6	28		9.5	1.0	.8	22	1.4	11.5	1.5	3.2	2.5
6	.8	5.2		14.1	.9	1.0	11.1	1.3	26	1.3	3.4	6.2
7	1.0	3.4		4.6	.8	.9	18.9	1.3	18.5	.9	8.9	7.6
8	.8	3.1		2.9	.8	.8	16.2	1.3	9.1	.9	9.3	2.9
9	1.7	2.5		4.4	.7	.8	6.5	1.1	6.0	1.9	5.2	2.5
10	1.4	2.4	} 2.4	3.4	.7	.8	4.8	.9	4.2	6.9	9.1	1.9
11	.6	1.9		2.8	.8	.8	4.0	1.1	3.4	7.2	4.0	1.7
12	.6	1.8		2.2	.8	.9	38	.9	2.9	6.6	2.8	1.5
13		5.5		2.1	3.7	.8	9.1	.8	2.9	5.0	2.6	1.3
14		21		1.9	144	.8	5.0	.8	2.6	20	2.8	1.2
15		4.6		1.7	12.9	.8	3.8	.7	2.6	15.6	29	1.1
16		4.6		1.7	4.8	.8	3.6	.8	2.6	28	22	3.2
17		12.7		3.5	4.4	.8	2.9	.7	2.2	73	18.2	3.2
18				5.0	2.5	.9	2.6	.8	2.9	54	5.7	1.4
19				3.2	2.5	3.5	2.4	.8	2.1	60	3.8	1.2
20			1.7	1.9	2.2	.8	2.4	.7	1.9	127	2.8	1.4
21		} 19	1.4	1.6	2.4	1.9	4.2	.6	1.7	31	2.1	1.2
22	1.6		1.3	1.6	1.5	.8	4.0	.6	1.9	24	2.2	1.0
23			1.1	1.6	1.4	3.8	2.6	.6	1.9	13.5	1.8	.9
24			1.3	2.2	1.4	2.2	3.4	23	1.6	14.3	1.7	1.2
25			2.6	3.3	1.7	11.8	8.6	34	1.4	14.3	1.6	1.0
26			1.7	1.9	1.5	20	8.3	9.4	1.5	15.7	1.4	.9
27			2.5	1.5	1.2	8.5	4.0	4.2	1.3	13.6	1.4	.8
28		} 3.4	7.7	2.2	1.0	3.8	3.1	8.7	1.0	7.5	1.5	.7
29			2.9	2.1	1.1	2.2	3.2	-------	1.1	5.7	2.1	.8
30			2.1	1.4	1.1	1.7	2.9	-------	.9	4.4	2.2	1.3
31			-------	1.5	-------	1.4	2.6	-------	9.2	-------	1.5	-------

NOTE.—Braced figures give mean discharge for periods indicated, estimated by comparison with records for East Wailuanui and West Wailuaiki Streams; recorder not operating.

Monthly discharge of West Wailuanui Stream near Keanae, Maui, for the year ending June 30, 1927

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July		0.6	1.30	2.01	40.4	124
August		1.8	10.1	15.6	314	961
September			2.40	3.71	71.9	221
October	14.1	1.4	2.97	4.60	92.2	283
November	144	.7	6.76	10.5	203	622
December	20	.8	2.51	3.88	77.8	239
January	305	1.2	19.3	29.9	598	1,840
February	34	.6	3.70	5.72	104	318
March	43	.9	7.45	11.5	231	709
April	127	.9	18.9	29.2	567	1,740
May	29	1.4	5.26	8.14	163	500
June	7.6	.7	1.99	3.08	59.6	183
The year	305	.6	6.91	10.7	2,520	7,740

KOOLAU DITCH NEAR KEANAE, MAUI

LOCATION.—5 feet above portal of tunnel in west side of Keanae Valley, a quarter of a mile above ditch foreman's house, and 3 miles southwest of Keanae post office.

RECORDS AVAILABLE.—January 1, 1910, to December 31, 1912, and November 2, 1917, to June 30, 1927.

EQUIPMENT.—Stevens continuous water-stage recorder on right bank close to ditch trail. Discharge measurements made from foot plank 20 feet above gage.

CHANNEL AND CONTROL.—Concrete-lined ditch; straight for 100 feet above gage and enters tunnel 5 feet below. Control is in tunnel; not well defined.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 145 million gallons a day, or 224 second-feet, at 9 a. m. January 3 (gage height from water-stage recorder, 5.43 feet); minimum discharge, no flow from 8.15 to 9.15 a. m. January 4, when water was turned out of ditch (gage height, 0.28 feet).

1910–1912; 1917–1927: Maximum discharge recorded, 175 million gallons a day, or 271 second-feet, at 7.15 p. m. January 4, 1922 (gage height from water-stage recorder, 6.36 feet); minimum discharge, no flow, occasionally, when water is shut out of ditch.

DIVERSIONS AND REGULATION.—Flow completely regulated by gates and spillways above station.

OBJECT OF STATION.—To determine amount of water diverted through ditch from Territorial lands.

UTILIZATION.—Water used for irrigation of sugar cane.

ACCURACY.—Stage-discharge relation permanent during year. Rating curve well defined below 100 million gallons a day; fairly well defined above. This curve checked very closely at 28 million gallons a day by one discharge measurement in February. Operation of water-stage recorder satisfactory except as indicated in footnote to daily-discharge table. Daily discharge ascertained by applying to rating table mean daily gage height determined from recorder graph by inspection or, for days of considerable fluctuation, by averaging discharge for intervals of day. Records excellent for ordinary stages; high-stage records fair.

For description of ditch see "Koolau ditch at Nahiku Weir, near Nahiku, Maui."

Discharge, in million gallons a day, of Koolau ditch near Keanae, Maui, for the year ending June 30, 1927

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	13.2	42	57	39	30	20	26	48	104	76		69
2	14.4	113	48	35	23	19.0	42	42	94	54		60
3	13.2	111	42	32	22	18.0	135	36	124	54		78
4	12.8	60	39	32	20	19.0	73	35	118	45		57
5	12.5	110	35	84	20	18.0	61	32	110	39		66
6	14.4	69	34	112	18.0	18.7	104	31	120	35		92
7	19.0	48	42	80	18.0	21	110	30	117	31		97
8	13.0	45	39	54	16.8	16.8	116	27	110	30		66
9	26	38	32	65	15.5	15.5	86	26	100	49		66
10	20	35	30	60	15.5	15.5	72	24	81	42	90	57
11	14.4	30	32	48	16.8	15.5	69	26	69	66		51
12	14.4	26	28	42	19.0	17.1	107	26	60	80		45
13	16.8	52	85	39	18.8	16.8	17.8	22	58	61		42
14	15.5	106	56	36	123	14.4	78	20	54	102		38
15	19.0	62	38	32	88	14.4	66	20	54	106		38
16	17.3	60	34	32	62	14.4	60	22	66	107		66
17	29	108	30	53	68	14.4	54	19.0	52	102		69
18	26	74	30	46	45	14.8	51	18.0	68	99		45
19	18.0	57	50	51	39	48	48	18.0	51	104		42
20	14.4	75	40	35	36	19.0	45	16.8	45	104	72	42
21	15.0	127	31	31	42	44	58	16.8	42	110	66	35
22	32	115	31	30	31	24	65	15.5	46	110	69	32
23	16.8	90	28	30	28	65	47	15.5	46	110	60	31
24	21	73	31	29	27	66	54	33	42	110	57	34
25	27	78	51	35	34	104	89	124	38	107	54	30
26	14.4	54	38	30	32	114	105	104	44	107	48	27
27	22	57	56	26	26	92	69	66	39		48	26
28	23	61	98	38	23	57	58	78	35		54	24
29	16.8	63	60	36	22	39	62	-------	34	100	60	30
30	16.8	63	48	26	20	32	54	-------	32		63	34
31	25	74	-------	29	-------	28	45	-------	64	-------	57	-------

NOTE.—Discharge estimated June 29 and 30. Braced figures give estimated mean discharge for periods indicated. Estimates made by comparison with record for this ditch at Wahinepe, near Huelo, Maui; recorder not operating.

Monthly discharge of Koolau ditch near Keanae, Maui, for the year ending June 30, 1927

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July	32	12.5	18.5	28.6	573	1,760
August	127	26	70.2	109	2,180	6,680
September	98	28	43.1	66.7	1,290	3,970
October	112	26	43.5	67.3	1,350	4,140
November	123	15.5	33.3	51.5	999	3,070
December	114	14.4	33.4	51.7	1,040	3,180
January	135	17.8	68.6	106	2,130	6,530
February	124	15.5	35.4	54.8	992	3,040
March	124	32	68.3	106	2,120	6,500
April	110	30	81.3	126	2,440	7,490
May	-------	48	78.0	121	2,420	7,420
June	97	24	49.6	76.7	1,490	4,570
The year	135	12.5	52.1	80.6	19,000	58,400

HONOMANU STREAM AT HAIKU-UKA BOUNDARY NEAR KAILIILI, MAUI

LOCATION.—At end of Haiku-uka boundary trail, 5½ miles by trail southeast of Kailiili.

RECORDS AVAILABLE.—October 9, 1919, to February 13, 1927 (fragmentary gage-height record valueless February 14, 1927, to April 20, 1928, when station was discontinued).

EQUIPMENT.—Stevens continuous water-stage recorder on left bank. Discharge measurements made by wading near gage or from footbridge just below gage.

CHANNEL AND CONTROL.—One channel at all stages; straight for 50 feet above and below station; narrows into a gorge below station. Control composed of 2-man boulders; subject to shifts.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 409 million gallons a day, or 633 second-feet, at 10.20 a. m. January 3 (gage height from water-stage recorder, 5.26 feet); minimum discharge, 0.2 million gallons a day, or 0.3 second-foot, from 3 to 9 p. m. July 5 (gage height, 0.66 foot).

1919–1927: Maximum discharge recorded, 1,290 million gallons a day, or 2,000 second-feet, at 2.45 p. m. January 14, 1923 (gage height from water-stage recorder, 9.93 feet); minimum discharge, 0.2 million gallons a day, or 0.3 second-foot, from 4 to 8 p. m. September 19, 1924 (gage height, 0.59 foot), and from 3 to 9 p. m. July 5, 1926 (gage height, 0.66 foot).

DIVERSIONS AND REGULATION.—None.

OBJECT OF STATION.—To determine discharge of stream at boundary between fee-simple land above and Territorial land below.

UTILIZATION.—Water picked up below gage by East Maui Irrigation Co.'s ditches for irrigation of sugar cane.

ACCURACY.—Stage-discharge relation changed at times of floods August 21 and November 14. The two rating curves used are poorly defined below 100 million gallons a day; extended above on basis of peak-flow comparison with the lower station on this stream. These curves checked fairly well by five discharge measurements, well distributed during period and covering a range from 0.3 to 1.5 million gallons a day. Operation of water-stage recorder fairly satisfactory prior to February 13; unsatisfactory thereafter. Daily discharge ascertained by applying to rating table mean daily gage height determined from recorder graph by inspection or, for days of considerable fluctuation, by averaging discharge for intervals of day. Records poor.

Discharge, in million gallons a day, of Honomanu Stream at Haiku-uka boundary near Kailiili, Maui, for the year ending June 30, 1927

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.
1	0.25	2.6	1.3	1.4	1.5	0.35	0.4	0.6
2	.25	87	1.0	1.4	.8	.35	13.3	.6
3	.25	42	.8	.9	.6	.3	246	.6
4	.2	2.0	1.4	.8	.6	.3	65	.6
5	.2	17.9	1.6	5.4	.6	.3	9.5	.5
6	.25	1.8	1.0	7.6	.5	.3	2.8	.4
7	.35	1.2	2.0	2.0	.4	.3	13.3	.4
8	.25	1.0	1.9	1.3	.4	.25	13.5	.4
9	1.0	1.2	1.2	2.0	.3	.25	1.9	.35
10	.6	1.1	.8	2.1	.3	.25	1.3	.35
11	.9	.8	.8	1.5	.3	.25	1.3	.4
12	.4	.6	.9	1.0	.3	.25	29	1.0
13	.35	1.0	4.6	.9	.3	.3	3.0	.6
14	.35	6.4	2.2	.8	140	.3	1.5	-------
15	.6	1.6	1.2	.8	5.2	.3	1.2	-------
16	.6	1.4	.8	.8	2.4	.25	1.0	-------
17	19.8	5.2	.6	1.8	4.2	.3	.9	-------
18	3.6	1.9	.7	2.5	1.1	.7	.8	-------
19	1.3	1.1	1.6	2.2	1.0	.7	.8	-------
20	.7	11.0	1.6	1.2	1.3	.5	.7	-------
21	1.1	110	1.0	.8	1.0	.4	6.0	-------
22	4.3	15.2	.7	1.1	.8	.5	2.5	-------
23	1.4	2.4	.6	1.5	.7	1.0	1.3	-------
24	1.1	1.6	.7	1.7	.6	.7	1.6	-------
25	1.1	1.7	4.8	1.5	.7	3.5	1.7	-------
26	.6	1.3	1.5	.9	.7	37	1.8	-------
27	4.1	1.3	3.1	.6	.6	5.7	1.2	-------
28	1.6	1.2	5.5	1.8	.5	1.6	.9	-------
29	.9	4.8	1.7	1.6	.4	.9	.9	-------
30	.8	7.6	1.3	1.2	.4	.6	.8	-------
31	.8	1.5	-------	1.5	-------	.5	.7	-------

Monthly discharge of Honomanu Stream at Haiku-uka boundary near Kailiili Maui, for the year ending June 30, 1927

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July	19.8	0.2	1.61	2.49	50.0	153
August	110	.6	10.9	16.9	337	1,040
September	5.5	.6	1.63	2.52	48.9	150
October	7.6	.6	1.70	2.63	52.6	162
November	140	.3	5.62	8.70	168	517
December	37	.25	1.91	2.96	59.2	182
January	246	.4	13.8	21.4	427	1,310
February (13 days)	1.0	.35	.523	.809	6.80	21
The period	246	.2	5.04	7.80	1,150	3,540

HONOMANU STREAM NEAR KEANAE, MAUI

LOCATION.—500 feet above Spreckels ditch intake and trail bridge, 2¼ miles by trail northwest of Upper Keanae, and 3 miles by road and trail southwest, of Keanae post office.

RECORDS AVAILABLE.—November 15, 1913, to June 30, 1927.

EQUIPMENT.—Stevens continuous water-stage recorder on left bank. Discharge measurements made by wading near gage or from cable 75 feet downstream.

CHANNEL AND CONTROL.—One channel at all stages; straight for 200 feet above and below gage; stream bed filled with large boulders and very rough. Right bank, vertical wall of rock; left bank, steep and high. Control composed of large boulders; subject to shifts.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 628 million gallons a day, or 972 second-feet, 9.45 a. m. January 3 (gage height from water-stage recorder, 6.02 feet); minimum discharge, 0.5 million gallons a day, or 0.8 second-foot, from 11 a. m. February 23 to 12.30 p. m. February 24 (gage height, 0.40 foot).

1913–1927: Maximum discharge recorded, 1,180 million gallons a day, or 1,830 second-feet, at 8 a. m. October 16, 1924 (gage height from water-stage recorder, 8.76 feet); minimum discharge, 0.17 million gallons a day, or 0.26 second-foot, July 14, 1920 (gage height, old datum, 1.77 feet).

DIVERSIONS AND REGULATION.—None.

OBJECT OF STATION.—Data valuable in relation to Territorial water licenses to ditch company.

UTILIZATION.—Ordinary flow is diverted by Spreckels ditch for irrigation of sugar cane.

ACCURACY.—Stage-discharge relation permanent during year. Rating curve fairly well defined below 500 million gallons a day; extension above uncertain. This curve based at lower end on one discharge mesurement made during year and three made subsequently, covering a range from 3 to 24 million gallons a day. Operation of water-stage recorder fairly satisfactory except as indicated in footnote to daily-discharge table. Daily discharge ascertained by applying to rating table mean daily gage height determined from recorder graph by inspection or, for days of considerable fluctuation, by averaging discharge for intervals of day. Records fair.

Discharge, in million gallons a day, of Honomanu Stream near Keanae, Maui, for the year ending June 30, 1927

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	1.0	8.0		3.6	4.0	1.5	1.6	2.7	38	7.8	21	
2	.9	91		3.7	2.1	1.4	2.8	2.3	30	6.3	8.6	
3	.9	58		2.5	1.7	1.4	376	2.1	100	6.4	4.9	
4	.9	6.3		2.2	1.5	1.4	133	2.0	35	4.0	5.5	
5	.9	45		18.6	1.7	1.4	27	1.9	10.6	2.4	8.4	
6	1.0	6.3	3.7	24	1.6	1.4	12.4	1.8	10.4	2.0	10.9	7
7	1.3	3.8		7.0	1.5	1.7	32	1.7	22	1.6	23	
8	1.0	4.1		4.0	1.4	1.4	31	1.3	8.8	1.4		
9	2.8	3.7		6.6	1.4	1.3	7.8	1.1	5.6	1.7		
10	1.9	3.6		6.1	1.4	1.3	5.6	1.0	4.2	10.9		
											13	
11	1.6	2.5		4.1	1.4	1.3	11.8	1.0	3.4	25		
12	1.3	2.0		3.0	1.4	1.3	72	2.2	3.1	12.6		
13	1.0	8.0		2.5	1.4	1.3	11.2	1.4	3.3	12.1		
14	1.2	23		2.4	179	1.3	6.3	1.0	3.1	20		
15	1.6	5.5		2.1	17.5	1.3	5.0	.9	2.7	27		
16	1.8	5.6	5.5	2.1	5.8	1.3	4.1	7.7	2.4	34	30	3.5
17	21	17.4		5.6	13.3	1.3	3.8	2.8	3.2	66		
18	7.9			8.3	4.3	1.7	3.3	1.3	6.1	47		
19	3.0			6.7	4.0	2.1	3.0	1.0	3.7	89		
20	1.3			3.0	5.4	1.4	2.9	.8	2.4	149	5.6	
21	2.6	38	2.7	2.4	4.3	1.4	14.8	.7	2.0	50	4.8	
22	13.5		2.1	2.4	3.1	1.3	8.9	.6	1.8	34	4.6	
23	3.6		2.0	3.7	2.6	4.0	5.2	.5	2.2	14.9	4.2	
24	4.6		2.1	3.5	2.3	2.6	7.0	37	2.3	19.5	3.8	
25	3.6		11.8	4.0	3.0	16.2	11.6	88	2.1	14.3	3.4	2.7
26	1.5		4.1	2.3	2.6	52	8.8	22	3.2	19.9	3.2	
27	8.6	6	9.6	1.8	2.2	15.9	5.0	7.1	2.7	14.8	3.1	
28	4.8		18.1	6.2	2.0	5.6	4.0	15.0	1.7	13.1	4.6	
29	2.1		5.2	4.7	1.8	2.9	3.7	-------	1.8	9.2	4.6	
30	1.7		3.8	3.1	1.6	2.0	3.2	-------	2.5	7.1	5.0	
31	2.8		-------	3.6	-------	1.8	2.8	-------	6.9	-------	3.6	-------

NOTE.—Discharge estimated Feb. 8. Braced figures give estimated mean discharge for periods indicated. Estimates made by comparison with record for Haipuaena Stream near Huelo; recorder not operating.

Monthly discharge of Honomanu Stream near Keanae, Maui, for the year ending June 30, 1927

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July	21	0.9	3.35	5.18	104	319
August	----------	2.0	18.4	28.5	570	1,750
September	18.1	----------	5.06	7.83	152	466
October	24	1.8	5.03	7.78	156	479
November	179	1.4	9.24	14.3	277	851
December	52	1.3	4.33	6.70	134	412
January	376	1.6	26.7	41.3	828	2,540
February	88	.5	7.46	11.5	209	641
March	100	1.7	10.6	16.4	327	1,010
April	149	1.4	24.1	37.3	723	2,220
May	----------	3.1	12.6	19.5	391	1,200
June	----------	----------	4.40	6.81	132	405
The year	376	.5	11.0	17.0	4,000	12,300

HAIPUAENA STREAM AT HAIKU-UKA BOUNDARY NEAR KAILIILI, MAUI

LOCATION.—About 50 feet upstream from Haiku-uka boundary trail and 5¾ miles by trail southeast of Kailiili.

RECORDS AVAILABLE.—June 3, 1922, to January 6, 1927 (station destroyed by landslide January 7, 1927). May 27, 1919, to June 2, 1922, at site 250 feet upstream.

EQUIPMENT.—Stevens continuous water-stage recorder on left bank. Discharge measurements made by wading near gage or from footbridge 25 feet downstream.

CHANNEL AND CONTROL.—One channel at all stages; straight for 50 feet above gage and 100 feet below. Artificial control composed of heavy boulders anchored with concrete; subject to shifts.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 62 million gallons a day, or 96 second-feet, at 5.45 a. m. November 14 (gage height from water-stage recorder, 3.02 feet); minimum discharge, 0.2 million gallons a day, or 0.3 second-foot, from 7 to 8.30 p. m. December 16 (gage height, 0.55 foot).

1919–1927: Maximum discharge recorded, 162 million gallons a day, or 251 second-feet, at 8.15 a. m. October 16, 1924 (gage height from water-stage recorder, 5.43 feet); minimum discharge, 0.1 million gallons a day, or 0.2 second-foot, from 6.15 to 9 p. m. September 19, 1924 (gage height, 0.52 foot).

DIVERSIONS AND REGULATION.—Low flow practically all diverted into Kula pipe line at elevation 4,200 feet (about 1½ miles above station).

OBJECT OF STATION.—To determine discharge of stream at boundary between fee-simple land above and Territorial lands below.

UTILIZATION.—Water diverted below into East Maui Irrigation Co.'s ditches for irrigation of sugar cane.

ACCURACY.—Stage-discharge relation permanent during year. Rating curve fairly well defined below 6 million gallons a day; extension above uncertain. This curve checked very closely at 0.4 million gallons by one discharge measurement in January. Operation of water-stage recorder satisfactory except as indicated in footnote to daily-discharge table. Daily discharge ascertained by applying to rating table mean daily gage height determined from recorder graph by inspection or, for days of considerable fluctuation, by averaging discharge for intervals of day. Records good for ordinary stages; high-stage records poor.

Discharge, in million gallons a day, of Haipuaena Stream at Haiku-uka boundary near Kailiili, Maui, for the year ending June 30, 1927

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
1	0.2	2.8	0.9	1.0		0.4	0.4
2	.2	25	.7	.9		.3	5.0
3	.2	14.2	.7	.7		.3	44
4	.2	1.9	1.4	.7		.3	15.8
5	.2	8.9	1.0	5.8		.3	6.0
6	.2	1.9	.8	7.3		.3	2.1
7	.4	1.3	1.6	1.6	0.5	.2	
8	.2	1.1	1.3	1.0		.2	
9	1.1	1.4	.8	1.8		.2	
10	.5	1.1	.7	1.5		.2	
11	.7	.9	.6	1.0		.2	
12	.4	.7	.7	.7		.2	
13	.3	1.5	3.1	.7		.2	
14	.3	6.0	1.3	.7	26	.2	
15	.5	1.4	.7		3.1	.2	
16	.4	1.7	.5		1.6	.2	
17	6.6	6.2	.5		3.3	.3	
18	2.7	1.8	.7		.8	.4	
19	1.0	1.1	1.4		.9	.4	
20	.6	9.1	1.1		1.1	.2	
21	1.0	26	.7		.8	.2	
22	4.9	6.8	.5		.7	.2	
23	1.3	1.8	.5	1.1	.6	.8	
24	1.0	1.3	.9		.5	.5	
25	.8	1.4	4.6		.6	3.3	
26	.5	1.0	1.0		.6	15.2	
27	3.3	1.0	3.1		.5	5.2	
28	1.6	.9	5.0		.4	1.4	
29	.7	4.8	1.2		.4	.6	
30	.7	4.3	.9		.4	.5	
31	.7	1.1				.4	

NOTE.—Braced figures give mean discharge for periods indicated, estimated by comparison with record for Honomanu Stream at Haiku-uka boundary; recorder not operating.

Monthly discharge of Haipuaena Stream at Haiku-uka boundary near Kailiili, Maui, for the year ending June 30, 1927

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July	6.6	0.2	1.08	1.67	33.4	103
August	26	.7	4.53	7.01	140	431
September	4.6	.5	1.30	2.01	38.9	120
October	5.8		1.42	2.20	44.1	135
November	26		1.63	2.52	48.8	150
December	15.2	.2	1.08	1.67	33.5	103
January (6 days)	44	.4	12.2	18.9	73.3	225
The period	44	.2	2.17	3.36	412	1,270

HAIPUAENA STREAM NEAR HUELO, MAUI

LOCATION.—200 feet above inflow of Spreckels ditch, 3¼ miles southeast of Kailua, and 7 miles by road and trail southeast of Huelo.

RECORDS AVAILABLE.—October 19, 1913, to June 30, 1927. Also records of combined flow of stream and Spreckels ditch at staff-gage station 600 feet below present site December 18, 1910, to September 30, 1913.

EQUIPMENT.—Stevens continuous water-stage recorder on right bank about 500 feet upstream from ditch trail. Discharge measurements made by wading near gage or from footbridge just below gage.

CHANNEL AND CONTROL.—One channel at all stages; straight for 200 feet above and below gage; right bank high with steep slope; left bank nearly vertical. Control composed of large boulders; subject to shifts.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 385 million gallons a day, or 596 second-feet, at 8 a. m. January 3 (gage height from water-stage recorder, 4.78 feet); minimum discharge unknown, owing to plugged intake to stilling well.

1913–1927: Maximum discharge recorded, 530 million gallons a day, or 820 second-feet, at 7.40 p. m. January 16, 1921 (gage height from water-stage recorder, 5.67 feet); minimum discharge, 0.3 million gallons a day, or 0.5 second-foot, frequently during December, 1919 (gage height, 0.20 foot).

DIVERSIONS AND REGULATION.—See under "diversions" in description of station of this stream at Haiku-uka boundary.

OBJECT OF STATION.—Data valuable in relation to water valuation appraisal under Territorial lease to ditch company.

UTILIZATION.—Ordinary flow diverted by ditches of East Maui Irrigation Co. for irrigation of sugar cane.

ACCURACY.—Stage-discharge relation changed at times of floods August 2 and November 14. The two rating curves used are fairly well defined below 100 million gallons a day; extensions above uncertain. These curves checked very closely by three discharge measurements made in September, December, and February and covering a range from 1.5 to 24 million gallons a day. Operation of water-stage recorder unsatisfactory owing to frequent plugging of intake to stilling well. Daily discharge ascertained by applying to rating table mean daily gage height determined from recorder grapy by inspection or, for days of considerable fluctuation, by averaging discharge for intervals of day. Records good for ordinary stages except those estimated, which are poor; extremely high stage records poor.

Discharge, in million gallons a day, of Haipuaena Stream near Huelo, Maui, for the year ending June 30, 1927

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1		5.9	3.5	3.2	a 3.3	1.4	1.6	2.4	30	8.1	a 10.2	3.2
2		51	3.1	3.1	a 2.3	1.4	18.8	2.4	15.9	4.6	4.7	a 3.3
3		48	2.8	2.6	2.1	a 1.4	243	2.4	66	5.3	3.1	4.1
4		6.7	2.8	2.6	1.9	1.4	54	a 1.9	28	3.6	3.5	3.1
5	1.2	45	3.4	17.1	2.2	1.3	12.1	1.8	8.2	a 2.7	5.4	4.0
6		7.0	3.0	24	a 1.9	1.7	7.2	1.8	9.7	a 2.1	6.6	18.7
7		4.8	3.8	7.3	a 1.8	a 1.7	24	a 1.7	16.2	1.8	18.8	12.4
8		a 4.8	3.8	4.3	a 1.6	a 1.0	24	a 1.4	7.4	1.7	14.6	4.0
9		4.2	2.7	6.3	a 1.6	a .9	5.5	1.4	4.7	1.7	8.7	3.6
10	1.9	4.4	2.3	5.4	a 1.6	1.0	3.9	1.4	3.7	4.2	a 19 4	3.1
11	1.7	3.3	2.3	a 3.9	a 1.8	1.0	3.7	1.4	3.0	17.4	a 6.0	2.7
12	1.5	2.8	2.6	a 3.1	a 2.0	a 1.3	68	1.8	2.8	6.2	5.8	2.4
13	1.4	8.6	8.2	a 3.1	a 1.6	a 1.3	10.4	1.4	2.8	4.7	a 6.3	2.1
14	1.4	25	a 4.7	a 2.6	117	a 1.1	4.5	1.4	2.7	19.4	4.2	2.1
15	a 1.8	7.0	a 2.7	2.5	8.2	a .9	3.5	1.4	2.4	20	50	2.1
16	a 1.4	7.2	a 2.2	2.5	3.4	a .9	2.9	5.3	2.3	33	35	5.8
17	7.6	19.0	2.2	a 5.0	6.2	a .9	2.5	2.2	3.0	64	15.2	a 5.8
18	3.5	7.5	2.5	6.0	2.5	a 1.4	2.4	1.5	a 5.8	32	6.2	2.8
19	2.1	5.2	10.8	a 6.0	2.6	a 5.1	2.1	1.4	3.2	68	4.5	a 3.1
20	1.4	24	4.0	a 3.2	2.8	a 1.3	2.1	1.4	a 2.7	92	3.6	3.6
21	1.4	86	2.7	a 2.3	2.8	a 1.7	9.8	a 1.3	a 1.8	29	3.2	2.5
22	21	21	2.6	2.6	2.1	a 1.2	7.7	1.1	1.8	22	3.0	2.1
23	2.9	7.0	a 2.4	3.1	2.0	2.7	3.0	1.2	2.4	9.8	2.8	1.8
24	a 4.0	5.4	2.8	2.8	1.9	2.0	3.8	18.2	a 2.2	13.7	2.6	2.0
25	4.3	6.2	9.6	3.6	2.5	11.8	8.5	60	a 2.0	8.9	a 2.3	2.0
26	a 2.5	4.0	4.0	2.4	a 2.2	30	7.6	14.8	3.1	12.3	a 2.4	1.9
27	a 8.0	4.0	a 7.7	2.2	1.8	9.0	3.8	5.4	a 2.4	9.6	2.4	1.9
28	3.9	4.6	a 12.9	a 5.8	1.8	3.7	3.1	8.4	1.9	7.8	a 3.1	2.1
29	2.1	7.6	4.4	a 3.8	a 1.7	2.3	2.8	-------	a 2.0	6.4	3.1	2.9
30	2.0	9.6	3.4	2.8	a 1.4	1.9	2.6	-------	1.9	a 5.0	3.7	2.8
31	2.7	4.4	-------	3.0	-------	1.7	2.3	-------	10.1	-------	2.6	-------

a Estimated.

NOTE.—Braced figures gives estimated mean discharge for period indicated. All estimates made from study of faulty gage-height record and by comparison with records of adjacent streams; intake to stilling well partly or completely obstructed.

Monthly discharge of Haipuaena Stream near Huelo, Maui, for the year ending June 30, 1927

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July	21	----------	2.95	4.56	91.3	281
August	86	2.8	14.6	22.6	451	1,390
September	12.9	2.2	4.20	6.50	126	387
October	24	2.2	4.78	7.40	148	455
November	117	1.4	6.29	9.73	189	579
December	30	.9	3.11	4.81	96.4	296
January	243	1.6	17.8	27.5	551	1,690
February	60	1.1	5.29	8.18	148	455
March	66	1.8	8.13	12.6	252	773
April	92	1.7	17.2	26.6	517	1,580
May	50	2.3	8.48	13.1	263	807
June	18.7	1.8	3.80	5.88	114	350
The year	243	.9	8.07	12.5	2,950	9,040

SPRECKELS DITCH AT HAIPUAENA WEIR, NEAR HUELO, MAUI

LOCATION.—Between Haipuaena and Puohokamoa Streams on Spreckels ditch trail, 3 miles southeast of Kailua, and 7 miles by road and trail southeast of Huelo.

RECORDS AVAILABLE.—April 23, 1922, to June 30, 1927. The East Maui Irrigation Co. obtained records at this station prior to April 23, 1922.

EQUIPMENT.—Stevens continuous water-stage recorder on right bank. Discharge measurements made by wading about 100 feet above gage.

CHANNEL AND CONTROL.—Recorder operates in weir basin 16 feet by 65 feet. Control is sharp-crested trapezoidal weir 6 feet long and 2 feet high with side slopes 1: 4; practically no velocity of approach.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 74 million gallons a day, or 114 second-feet, at 6 a. m. January 3 (gage height, from water-stage recorder, 2.71 feet); minimum, 2.0 million gallons a day, or 3.1 second-feet, from 11 p. m. July 5 to 1 a. m. July 6 (gage height, 0.29 foot).

1922–1927: Maximum discharge recorded, that of January 3, 1927; minimum discharge, no flow nearly entire time April 9–23, 1925, when water was shut out of ditch.

DIVERSIONS AND REGULATION.—Flow completely regulated by gates and spillways above station.

OBJECT OF STATION.—To determine amount of water diverted through ditch from Territorial lands.

UTILIZATION.—Water used for irrigation of sugar cane.

ACCURACY.—Stage-discharge relation permanent during year. Rating curve, based on weir formula, very well defined below 40 million gallons a day and fairly well defined above. Curves checked very closely at 4.7 million gallons a day by one discharge measurement made in February. Operation of water-stage recorder satisfactory except as indicated in footnote to daily-discharge table. Daily discharge ascertained by applying to rating table mean daily gage height determined from recorder graph by inspection or, for days of considerable fluctuation, by averaging discharge for intervals of day. Records excellent except those estimated, which are fair.

Spreckels ditch diverts water from all streams on the windward side of the crater of Haleakala between Nuaailua Gulch and Kailua Stream. It diverts above Koolau ditch as far as Puohokamoa Stream; from Puohokamoa Stream to Kailua Stream it diverts below Koolau (Wailoa), and New Hamakua ditches, and above Center ditch. At Kailua Stream the water is diverted into Lowrie ditch and carried to the vicinity of Paia for irrigation and development of sugar cane. Spreckels ditch proper is about 6 miles long and has a rated carrying capacity of 45 million gallons a day. It was originally one of the main irrigation ditches on East Maui, but with the completion of Koolau (Wailoa) and Haiku ditches it was abandoned west of Kailua Stream and became mainly a storm-water ditch east of Kailua Stream.

Discharge, in million gallons a day, of Spreckels ditch at Haipuaena Weir, near Huelo, Maui, for the year ending June 30, 1927

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	2.9	18.7			10.1	4.6	5.0	8.0	20	15.0	13.0	12.9
2	2.9	34			6.7	4.3	11.3	7.0	16.9	12.1	11.7	
3	2.7	34			5.8	4.2	44	6.4	25	13.4	10.2	
4	2.5	17.4		15	5.3	4.3	20	5.8	19.2	11.7	10.8	
5	2.2	30			5.6	3.9	15.5	5.5	13.8	9.5	12.1	
6	2.9	16.4			4.9	4.9	14.9	5.2	16.3	7.8	12.5	15
7	6.8	12.9			4.6	5.6	17.2	4.9	18.0	7.0	15.5	
8	3.1	13.8		12.1	4.2	3.8	16.9	4.6	15.3	6.4	15.3	
9	11.4	12.2		14.4	3.9	3.4	12.9	4.6	13.6	8.4	13.2	
10	7.7	12.5		14.5	3.8	3.3	11.1	4.3	11.7	11.1	15.3	
11	5.6	9.4		11.5	4.2	3.2	11.7	4.3	10.2	17.8	12.1	
12	4.8	8.3	9.5	9.7	5.3	3.6	34	6.1	9.0	15.7	12.1	
13	4.6	18.2		8.7	4.2	3.8	20	4.6	9.7	15.3	12.5	
14	4.1	27		8.5	35	3.1	14.7	4.1	9.0	20	11.5	
15	6.1	15.7		7.6	17.6	3.1	12.1	3.8	7.6	19.6	19.9	
16	5.7	15.9		7.8	12.8	2.8	10.4	10.6	7.3	21	17.6	11
17	13.4	27		11.8	18.1	2.8	9.2	7.5	8.0	21	14.0	
18	13.1			10.3	9.4	4.3	8.1	4.6	12.9	13.4	11.7	
19	8.2			17.2	10.1	7.4	7.6	4.1	8.8	17.3	11.1	
20	5.0	24		9.5	11.0	4.1	7.2	3.7	6.8	20	11.7	
21	4.8			7.6	11.1	7.1	18.0	3.6	6.1	13.1	12.7	
22	21			7.6	7.6	4.3	18.4	3.3	6.2	12.5	12.5	
23	11.3			9.4	6.7	9.8	11.3	3.3	8.5	11.0	11.1	
24	10.3		7.5	8.8	6.2	7.5	14.0	11.2	7.6	13.2	10.1	
25	13.0		16.1	10.2	9.7	20	19.1	28	6.4	11.9	9.4	7
26	6.8		10.4	7.3	8.7	29	19.3	19.3	9.3	12.9	8.7	
27	10.4	14		6.4	6.1	20	12.3	15.3	7.6	12.7	9.0	
28	15.9		16	12.6	5.5	12.1	10.8	16.5	5.9	12.9	12.4	
29	8.8			12.7	5.2	7.8	10.4	-------	6.8	12.5	15.1	
30	8.3			8.7	4.9	6.4	9.4	-------	8.3	11.7	14.4	
31	11.8		-------	9.2	-------	5.6	8.0	-------	13.0	-------	11.1	-------

NOTE.—Braced figures give mean discharge for periods indicated, estimated by comparison with records for Haipuaena and Puohokamoa Streams and for Puohokamoa intake to Koolau ditch; recorder not operating.

Monthly discharge of Spreckels ditch at Haipuaena Weir, near Huelo, Maui, for the year ending June 30, 1927

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July	21	2.2	7.68	11.9	238	731
August	----------	----------	18.7	28.9	579	1,780
September	----------	----------	10.6	16.4	316	976
October	----------	6.4	11.3	17.5	349	1,080
November	35	3.8	8.48	13.1	254	781
December	29	2.8	6.78	10.5	210	645
January	44	5.0	14.7	22.7	455	1,400
February	28	3.3	7.51	11.6	210	645
March	25	5.9	11.1	17.2	345	1,060
April	21	6.4	13.6	21.0	408	1,250
May	19.9	8.7	12.6	19.5	390	1,200
June	----------	----------	10.9	16.9	328	1,000
The year	44	2.2	11.2	17.3	4,080	12,500

PUOHOKAMOA STREAM NEAR HUELO, MAUI

LOCATION.—150 feet above Spreckels ditch inflow and trail crossing, 3 miles southeast of Kailua, and 7 miles by road and trail southeast of Huelo.

RECORDS AVAILABLE.—June 13, 1923, to June 30, 1927. December 18, 1910, to June 18, 1913, at site just below Spreckels ditch inflow.

EQUIPMENT.—Stevens continuous water-stage recorder on left bank. Discharge measurements made by wading near gage or from footbridge 200 feet upstream.

CHANNEL AND CONTROL.—One channel at all stages; straight for 100 feet above and below gage. Banks steep and high. Stream bed very rough and steep. Control composed of large boulders; subject to shifts.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 760 million gallons a day, or 1,180 second-feet, at 9.30 a. m. January 3 (gage height from water-stage recorder, 6.54 feet); minimum discharge, 1.3 million gallons a day, or 2.0 second-feet, from 10 a. m. to noon July 14 (gage height, 0.68 foot).

1910–1927: Maximum discharge recorded, 1,100 million gallons a day, or 1,700 second-feet, at 2.30 p. m. January 14, 1923 (gage height from water-stage recorder, 7.85 feet); minimum discharge, 0.4 million gallons a day, or 0.6 second-foot, October 26, 1917 (gage height, 0.25 foot).

DIVERSIONS AND REGULATION.—Kula pipe line diverts small amount of water above station at elevation 4,300 feet.

OBJECT OF STATION.—To furnish data for water valuation appraisal in connection with Territorial water license to ditch company.

UTILIZATION.—Ordinary flow is diverted by East Maui Irrigation Co.'s ditches for irrigation of sugar cane.

ACCURACY.—Stage-discharge relation changed February 8 and again, presumably, at time of flood April 17. The two rating curves used are fairly well defined below 50 million gallons a day; extensions above uncertain. These curves checked fairly well at 27 and 3 million gallons a day by two discharge measurements made in December and February and by another made shortly after June 30. Operation of water-stage recorder unsatisfactory as indicated in footnote to daily-discharge table. Daily discharge ascertained by applying to rating table mean daily gage height determined from recorder graph by inspection or, for days of considerable fluctuation, by averaging discharge for intervals of day. Records poor.

Discharge, in million gallons a day, of Puohokamoa Stream near Huelo, Maui, for the year ending June 30, 1927

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	1.8		6.6	3.8	3.8		2.4	5.2	58	19.6	20	8.2
2	1.7		5.6	3.8	3.0		2.4	4.8	27	8.9	14.2	8.2
3	1.7		5.2	2.7	2.8		475	4.5	12.8	10.4	9.6	11.1
4	1.5	60	5.2	2.7	2.7		123	4.2	57	7.0	10.4	8.2
5	1.4		6.1	34		3.0	28		19.5	5.8	15.6	8.9
6	1.5		4.8	46			18.6		22	4.8	15.9	35
7	2.8	8.9	6.6	11.8			55		39	4.2	112	35
8	1.7	7.6	7.0	6.6			64	3.3	18.0	3.8	37	11.1
9	4.6	7.5	4.8	9.7	2.7		16.0		12.3	3.7	20	9.6
10	3.0	7.8	3.8	8.9			12.0		10.5	4.4	39	8.2
11	2.5	5.2	3.6	6.1			11.1		8.9	31	14.9	7.0
12	1.9	4.8	3.8	4.8			159		8.2	13.4	21	6.1
13	1.8	15.8	12.0	4.2			33		8.3	8.9	17.5	5.2
14	1.4	49	6.9	3.8	236		14.9		8.1	32	12.0	4.8
15	2.2	11.2	4.2	2.8	28	2.2	12.0		7.0	33	105	4.8
16	1.9	11.1	3.0	2.8	8.9		9.6	2.8	6.8	60	194	10.6
17		35	2.4	4.8	13.6		8.2		7.5	112	42	12.5
18		12.2	2.7	6.6	7.0		7.6		12.3	74	18.3	6.6
19		8.2	16.7	9.8	5.6		7.0		7.8	148	13.9	5.2
20		46	6.3	3.8	8.7	3.9	6.6		6.3	223	11.1	7.9
21		183	3.8	2.8	6.6		24		5.7	77	9.6	5.6
22		44	3.0	3.2	5.2		18.6	1.6	5.7	58	8.9	4.5
23		14.9	3.0	3.8			8.2		7.0	28	7.6	3.8
24	5	11.3	3.3	3.3		5	9.7		6.8	39	7.0	4.2
25		12.2	12.4	4.1			21	125	5.9	25	6.6	4.2
26		7.6	4.8	2.4	5	52	20	34	7.2	30	6.1	3.3
27		7.6	9.8	2.1		15.0	9.6	13.3	6.1	26	6.1	2.8
28		8.6	18.4	7.2		6.9	7.6	16.6	4.6	19.4	8.1	2.8
29		11.7	6.6	5.9			7.6	-------	4.7	16.0	10.2	4.9
30		16.0	4.5	2.6		5	6.6	-------	4.7	13.9	10.3	6.0
31		8.2	-------	2.6	-------		5.2	-------	12.1	-------	7.0	-------

NOTE.—Discharge estimated Nov. 3, 4, Jan. 1 and 2. Braced figures give estimated mean discharge for periods indicated. Estimates made by comparison with records for the three branches of this stream at Haiku-uka boundary, Spreckels ditch at Haipuaena Weir, Puohokamoa intake to Koolau ditch, and Haipuaena Stream near Huelo; gage-height record either faulty or missing.

Monthly discharge of Puohokamoa Stream near Huelo, Maui, for the year ending June 30, 1927

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July	----------	1.4	3.50	5.42	108	333
August	183	4.8	29.5	45.6	915	2,810
September	18.4	2.4	6.23	9.64	187	574
October	46	2.1	7.08	11.0	220	674
November	236	----------	13.2	20.4	396	1,220
December	52	----------	5.39	8.34	167	513
January	475	----------	38.8	60.0	1,200	3,690
February	125	----------	9.39	14.5	263	807
March	58	4.6	13.8	21.4	428	1,310
April	223	3.7	38.0	58.8	1,140	3,500
May	194	6.1	26.8	41.5	831	2,550
June	35	2.8	8.54	13.2	256	786
The year	475	----------	16.8	26.0	6,110	18,800

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

LOCATION.—200 yards downstream from trail crossing and 5¼ miles by trail southeast of Kailiili.

RECORDS AVAILABLE.—October 9, 1919, to February 13, 1927, when station was discontinued.

EQUIPMENT.—Stevens continuous water-stage recorder on left bank. Discharge measurements made by wading near gage or from footbridge at gage.

CHANNEL AND CONTROL.—Bed of stream boulder strewn. Banks steep and high. Pool at station 20 feet wide by 35 feet long, clear and smooth. Control, large boulders; subject to shift during floods.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 43 million gallons a day, or 66 second-feet, at 6.15 a. m. January 3 (gage height from water-stage recorder, 5.63 feet); minimum discharge, 0.2 million gallons a day, or 0.3 second-foot, from 8 p. m. December 22 to 3 a. m. December 23 (gage height, 3.79 feet).

1919–1927: Maximum discharge recorded, about 102 million gallons a day, or 158 second-feet, March 22, 1920 (gage height, old datum, 3.27 feet; estimated by comparison with flow of West and Middle Branches of Puohokamoa Stream); minimum discharge, no flow several days in December, 1919, and July 14, 1920.

DIVERSIONS AND REGULATION.—None.

OBJECT OF STATION.—To determine discharge of stream at boundary between fee-simple land above and Territorial lands below.

UTILIZATION.—Water picked up below by East Maui Irrigation Co.'s ditches for irrigation of sugar cane.

ACCURACY.—Stage-discharge relation practically permanent during year. Rating curve fairly well defined below 10 million gallons a day; extension above uncertain. This curve checked roughly below 0.5 million gallons a day by four discharge measurements well distributed during period. Operation of water-stage recorder satisfactory. Daily discharge ascertained by applying to rating table mean daily gage height determined from recorder graph by inspection or, for days of considerable fluctuation, by averaging discharge for intervals of day. Records fair for medium stages; low and high stage records poor.

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Discharge, in million gallons a day, of East Branch of Puohokamoa Stream at Haiku-uka boundary near Kailiili, Maui, for the year ending June 30, 1927

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.
1	0.3	1.1	0.5	0.4	0.4	0.3	0.3	0.4
2	.3	5.8	.5	.4	.4	.3	2.4	.4
3	.2	4.6	.4	.3	.3	.3	23.0	.4
4	.2	.9	.4	.3	.3	.3	4.4	.4
5	.2	3.7	.4	2.0	.3	.3	1.6	.3
6	.3	.9	.4	2.1	.3	.3	1.2	.3
7	.3	.7	.6	.7	.3	.2	2.9	.3
8	.2	.6	.5	.5	.3	.2	2.6	.3
9	.4	.8	.4	.8	.3	.2	1.0	.3
10	.3	.7	.4	.5	.3	.2	.8	.3
11	.3	.5	.4	.5	.3	.2	.7	.3
12	.3	.5	.4	.4	.3	.2	6.6	.3
13	.2	.8	.6	.4	2.3	.2	1.3	.3
14	.3	1.8	.4	.4	11.5	.2	.9	-------
15	.3	.7	.3	.4	1.0	.2	.7	-------
16	.3	.9	.3	.4	.8	.2	.7	-------
17	.5	1.6	.3	.5	.8	.2	.6	-------
18	.4	.8	.3	1.1	.5	.2	.5	-------
19	.3	.6	.4	.6	.5	.2	.5	-------
20	.3	3.0	.4	.4	.5	.2	.5	-------
21	.6	8.6	.3	.4	.4	.2	1.0	-------
22	1.4	2.0	.3	.5	.4	.2	.8	-------
23	.4	1.0	.3	.4	.4	.3	.6	-------
24	.8	.8	.4	.4	.3	.2	.7	-------
25	.5	.8	.7	.4	.4	1.7	.9	-------
26	.3	.7	.4	.4	.3	2.6	1.0	-------
27	.8	.7	.8	.4	.3	.9	.6	-------
28	.5	.6	1.4	.8	.3	.5	.5	-------
29	.4	.7	.5	.5	.3	.4	.4	-------
30	.3	.8	.4	.4	.3	.3	.4	-------
31	.4	.5	-------	.4	-------	.3	.4	-------

Monthly discharge of East Branch of Puohokamoa Stream at Haiku-uka boundary near Kailiili, Maui, for the year ending June 30, 1927

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July	1.4	0.2	0.40	0.62	12.3	38
August	8.6	.5	1.55	2.40	48.2	147
September	1.4	.3	.46	.71	13.8	42
October	2.1	.3	.58	.90	18.1	55
November	11.5	.3	.84	1.30	25.1	77
December	2.6	.2	.39	.60	12.2	37
January	23	.3	1.95	3.02	60.5	186
February (13 days)	.4	.3	.33	.51	4.3	13
The period	23	.2	.85	1.32	194	595

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

LOCATION.—At trail crossing 200 feet above Haiku-uka boundary and 4¾ miles by trail southeast of Kailiili.

RECORDS AVAILABLE.—March 14, 1919, to February 13, 1927, when station was discontinued.

EQUIPMENT.—Stevens continuous water-stage recorder on left bank. Discharge measurements made by wading near gage or from footbridge just above gage.

CHANNEL AND CONTROL.—One channel at all stages; straight for 25 feet above and below control. Right bank vertical; left bank about 1½ on 1 slope. Stream bed composed of gravel and boulders. Control subject to shifts.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 97 million gallons a day, or 150 second-feet, at 6.45 a. m. January 3 (gage height from water-stage recorder, 7.02 feet); minimum discharge, 0.2 million gallons a day, or 0.3 second-foot, from 3 to 11 a. m. December 12 and from 3 to 8 p. m. December 16 (gage height, 4.07 feet).

1919–1927: Maximum discharge recorded, 207 million gallons a day, or 320 second-feet, at 5 p. m. March 22, 1920 (gage height from water-stage recorder, 8.47 feet); minimum discharge, 0.06 million gallons a day, or 0.09 second-foot, at noon December 22, 1919 (gage height, 3.91 feet), and from 7 to 9 p. m. July 14, 1920 (gage height, 4.06 feet).

DIVERSIONS AND REGULATION.—None.

OBJECT OF STATION.—To determine discharge of stream at boundary between fee-simple land above and Territorial lands below.

UTILIZATION.—Water picked up below gage by East Maui Irrigation Co.'s ditches for irrigation of sugar cane.

ACCURACY.—Stage-discharge relation practically permanent during year. Rating curve fairly well defined below 25 million gallons a day; extension above uncertain. One discharge measurement of 0.3 million gallons a day made in February plots much higher than the current rating, but being unsupported it is disregarded. Operation of water-stage recorder satisfactory except as indicated in footnote to daily-discharge table. Daily discharge ascertained by applying to rating table mean daily gage height determined from recorder graph by inspection or, for days of considerable fluctuation, by averaging discharge for intervals of day. Records fair for medium stages; low and high stage records poor.

Discharge, in million gallons a day, of Middle Branch of Puohokamoa Stream at Haiku-uka boundary near Kailiili, Maui, for the year ending June 30, 1927

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.
1	0.2	1.8	0.7	0.7	0.8	0.3	1.8	0.4
2	.2	23	.6	.6	.4	.3		.3
3	.2	14.1	.5	.4	.3	.3	62	.3
4	.2	1.6	1.0	.4	.3	.3	15.3	.3
5	.2	8.3	.9	3.9	.3	.2	4.1	.3
6	.2	1.6	.6	5.0	.3	.2	1.8	.3
7	.3	1.1	1.2	1.3	.3	.2	5.8	.3
8	.2	.8	1.0	.7	.3	.2	7.1	.3
9	.7	.9	.6	1.1	.3	.2	1.5	.3
10	.4	.7	.5	1.2	.2	.2	1.1	.2
11	.6	.6	.4	.8	.2	.2	1.1	.3
12	.3	.5	.4	.6	.2	.2	14.2	.6
13	.3	1.0	1.4	.5	.2	.2	2.4	.3
14	.3	3.9	1.1	.4	33	.2	1.2	-------
15	.4	1.2	.6	.4	2.3	.2	.9	-------
16	.4	1.2	.4	.4	1.3	.2	.7	-------
17	4.0	3.8	.3	.7	2.2	.2	.6	-------
18	1.9	1.4	.4	1.1	.7	.5	.6	-------
19	.9	.9	1.0	1.3	.7	.4	.5	-------
20	.5	7.6	.9	.6	.9	.3	.5	-------
21	.6	28	.5	.4	.6	.3	3.0	-------
22	3.0	5.7	.4	.5	.5	.3	1.7	-------
23	1.0	1.6	.3	.5	.4	.6	.6	-------
24	.8	1.1	.4	1.1	.4	.5	.7	-------
25	.7	1.0	2.8	.9	.5	2.4	.9	-------
26	.4	.8	.7	.4	.4		.9	-------
27	1.6	.8	1.9	.4	.4		.6	-------
28	1.2	.7	3.2	1.0	.4	2.5	.5	-------
29	.6	2.5	.9	.8	.3		.5	-------
30	.5	2.6	.6	.5	.3		.4	-------
31	.5	.9	-------	.5	-------		.4	-------

NOTE.—Braced figures give mean discharge for periods indicated, estimated by comparison with record for West Branch of Puohokamoa Stream; recorder not operating properly.

Monthly discharge of Middle Branch of Puohokamoa Stream at Haiku-uka boundary near Kailiili, Maui, for the year ending June 30, 1927

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July	4.0	0.2	0.75	1.16	23.3	71
August	28	.5	3.93	6.08	122	374
September	3.2	.3	.87	1.35	26.2	80
October	5.0	.4	.94	1.45	29.2	89
November	33	.2	1.65	2.55	49.4	152
December		.2	.78	1.21	24.1	74
January	62	.4	4.36	6.75	135	415
February (13 days)	.6	.2	.32	.50	4.2	13
The period	62	.2	1.81	2.80	413	1,270

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

LOCATION.—At trail crossing 500 feet above Haiku-uka boundary and 4 miles by trail southeast of Kailiili.

RECORDS AVAILABLE.—March 15, 1919, to June 30, 1927.

EQUIPMENT.—Stevens continuous water-stage recorder on left bank. Discharge measurements made by wading near gage or from footbridge 200 feet downstream.

CHANNEL AND CONTROL.—One channel at all stages; straight for 30 feet above and 50 feet below gage. Right bank vertical; left bank about 1 on 1½ slope. Stream bed, rock and gravel. Control composed of large boulders; subject to shifts.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 111 million gallons a day, or 172 second-feet, at 6.30 a. m. January 3 (gage height from water-stage recorder, 5.93 feet); minimum discharge, 0.1 million gallons a day, or 0.2 second-foot, several hours December 17 (gage height, 3.32 feet).

1919–1927: Maximum discharge recorded, estimated 250 million gallons a day, or 387 second-feet, at 5.30 p. m. March 22, 1920 (gage height, about 8 feet; estimated from faulty water-stage recorder graph); minimum discharge, 0.08 million gallons a day, or 0.12 second-foot, at 8.30 a. m. December 22 and 2 a. m. December 23, 1919 (gage height, 3.48 feet).

DIVERSIONS AND REGULATION.—Small amount of water diverted by Kula pipe line above station at elevation 4,300 feet.

OBJECT OF STATION.—To determine discharge of stream at boundary between fee-simple lands above and Territorial lands below.

UTILIZATION.—Water diverted by ditches of East Maui Irrigation Co. for irrigation of sugar cane.

ACCURACY.—Stage-discharge relation permanent during year. Rating curve fairly well defined below 20 million gallons a day; extension above uncertain. This curve checked closely at 0.3 and 0.7 million gallons a day by two discharge measurements made during year. Operation of water-stage recorder satisfactory except as indicated in footnote to daily-discharge table. Daily discharge ascertained by applying to rating table mean daily gage height determined from recorder graph by inspection or, for days of considerable fluctuation, by averaging discharge for intervals of day. Records fair for ordinary stages; high-stage records poor.

Discharge, in million gallons a day, of West Branch of Puohokamoa Stream at Haiku-uka boundary near Kailiili, Maui, for the year ending June 30, 1927

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	0.3	2.8	1.1	0.9	0.8	0.3	0.3	0.4	9.8	0.9	4.3	1.0
2	.4	28	.9	.9	.5	.3	4.2	.4	6.9	1.4	2.1	.9
3	.3	16.0	.8	.8	.4	.3	70	.4	27	1.4	1.4	1.0
4	.3	2.1	1.0	.6	.4	.3	16.3	.4	7.6	.8	1.5	1.0
5	.3	10.4	1.0	5.3	.4	.3	3.9	.3	2.4	.6	2.2	1.8
6	.4	2.0	.8	5.9	.3	.3	2.1	.3	2.2	.6	3.0	7.1
7	.4	1.4	1.5	1.7	.3	.3	6.8		4.5	.6	5.0	3.6
8	.3	1.3	1.4	1.0	.3	.3	7.3		2.0	.5	4.2	1.2
9	1.1	1.6	.9	1.7	.3	.3	1.7		1.3	.4	2.4	1.0
10	.6	1.4	.8	1.5	.3	.2	1.2		1.0	1.6	5.0	1.0
11	.6	1.0	.7	1.0	.3	.2	1.2	.3	.9	4.0	2.0	.9
12	.4	.8	.8	.8	.3	.3	162		.8	2.0	4.1	.8
13	.4	1.5	1.7	.8	.3	.3	2.5		.8	1.1	3.2	.8
14	.4	4.4	1.1	.8	38	.2	1.4		.8	2.7	1.9	.7
15	.6	.5	.8	.6	2.3	.2	1.0		.6	4.2	13.2	.7
16	.4	1.8	.6	.6	1.4	.1	.9	2.5	.6	7.1	7.0	1.3
17	3.4	4.4	.6	.9	2.2	.1	.8	.6	1.1	8.6	4.2	1.9
18	1.9	1.6	.8	1.7	.9	.2	.7	.4	1.6	6.6	2.4	.9
19	.8	1.2	1.1	1.4	1.0	.3	.6	.4	.8	20	1.7	1.4
20	.6	10.0	1.0	.8	1.1	.2	.6	.3	.6	29	1.5	1.4
21	.9	32	.8	.6	.8	.3	4.0	.3	.6	8.0	1.3	1.0
22	3.6	5.9	.6	.8	.7	.3	1.7	.3	.6	5.6	1.2	.8
23	1.0	2.2	.6	.7	.6	.5	.8	.3	.6	3.2	1.1	.7
24	1.4	1.7	.9	1.0	.6	.3	1.0	7.6	.6	4.2	1.0	.8
25	1.0	1.8	3.1	.9	.6	3.0	1.5	19.9	.6	3.2	.9	.8
26	.6	1.2	1.0	.5	.6	11.8	1.5	4.4	1.5	3.6	.8	.6
27	2.0	1.2	2.5	.5	.5	3.1	.8	1.5	.8	3.0	.8	.6
28	1.3	1.2	3.4	1.6	.4	1.1	.6	2.3	.5	2.8	1.0	.5
29	.8	3.3	1.2	1.0	.4	.6	.6	-------	.5	2.2	1.1	1.2
30	.6	2.9	.9	.8	.4	.4	.6	-------	.5	1.8	1.2	.8
31	.8	1.3	-------	.7	-------	.4	.5	-------	.6	-------	.9	-------

NOTE.—Braced figure gives mean discharge for period indicated; estimated by comparison with records or adjacent streams; recorder not operating properly.

Monthly discharge of West Branch of Puohokamoa Stream at Haiku-uka boundary near Kailiili, Maui, for the year ending June 30, 1927

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July	3.6	0.3	0.90	1.39	27.9	86
August	32	.8	4.84	7.49	150	460
September	3.4	.6	1.15	1.78	34.4	106
October	5.9	.5	1.25	1.93	38.8	119
November	38	.3	1.91	2.96	57.4	176
December	11.8	.1	.86	1.33	26.8	82
January	70	.5	4.95	7.66	153	471
February	19.9	-------	1.63	2.52	45.7	140
March	27	.5	2.60	4.02	80.7	247
April	29	.4	4.39	6.79	132	404
May	13.2	.8	2.70	4.18	83.6	257
June	7.1	.5	1.27	1.96	38.2	117
The year	70	.1	2.38	3.68	868	2,660

PUOHOKAMOA INTAKE OF KOOLAU DITCH NEAR HUELO, MAUI

LOCATION.—20 feet below intake on short feeder ditch from Puohokamoa Stream to Koolau ditch, 3 miles southeast of Kailua, and 7 miles by road and trail southeast of Huelo.

RECORDS AVAILABLE.—March 23, 1923, to June 30, 1927. East Maui Irrigation Co. previously obtained records at this site.

EQUIPMENT.—Au continuous water-stage recorder. Discharge measurements made from concrete stringers over weir basin or by wading in stream above intake.

CHANNEL AND CONTROL.—Control formed by 6-foot sharp-crested trapezoidal weir 21 feet below gage; some velocity of approach; permanent. Recorder operates in weir basin 14 feet by 40 feet. Below weir channel slope is very steep and enters Koolau ditch in tunnel.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 54 million gallons a day, or 84 second-feet, at 6 a. m. January 3 (gage height from water-stage recorder, 2.38 feet); minimum discharge, 1.7 million gallons a day, or 2.6 second-feet, from noon to 3.15 p. m. January 13 (gage height, 0.24 foot).

1922–1927: Maximum discharge recorded, 88 million gallons a day, or 136 second-feet at 8 a. m. October 22, 1922 (gage height from water-stage recorder, 3.04 feet); a higher discharge may have occurred during period of no record September 4–15, 1923. Minimum discharge recorded, 0.5 million gallons a day, or 0.8 second-foot, from 2 p. m. January 27 to 1.45 p. m. January 28, 1923 (gage height, 0.08 foot; water turned out of ditch).

DIVERSIONS AND REGULATION.—Entire flow of Spreckels ditch empties into Puohokamoa Stream about 400 feet above this station. Some of the water in Puohokamoa Stream that is wasted over diversion dam at this ditch intake is picked up by Spreckels ditch about 120 feet downstream or by Manuel Luis ditch three quarters of a mile downstream. Can be completely regulated by gates just above gage.

OBJECT OF STATION.—To determine amount of water diverted into ditch from Territorial lands.

UTILIZATION.—Water used for irrigation of sugar cane.

ACCURACY.—Stage-discharge relation permanent during year. Rating curve, based on discharge measurements and weir formulas, is well defined below 39 million gallons a day; extension above somewhat uncertain owing to flow over weir wing walls. This curve checked very well at 7.5 million gallons a day by one discharge measurement made in February. Operation of water-stage recorder very satisfactory during year. Daily discharge ascertained by applying to rating table mean daily gage height determined from recorder graph by inspection or, for days of considerable fluctuation, by averaging discharge for intervals of day. Records excellent for ordinary stages; high-stage records good.

Discharge, in million gallons a day, of Puohokamoa intake of Koolau ditch near Huelo, Maui, for the year ending June 30, 1927

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	5.4	26	18.9	15.4	15.2	7.9	7.6	14.1	32	28	24	22
2	5.4	33	15.4	15.2	10.3	7.6	13.6	12.5	30	22	24	22
3	5.0	34	13.9	12.3	8.8	7.1	39	10.8	36	24	18.9	26
4	4.7	26	13.6	11.7	8.7	7.2	30	10.3	32	18.9	22	20
5	4.3	33	16.6	28	9.6	6.8	25	9.4	28	15.4	25	24
6	5.2	26	12.3	32	8.3	7.4	24	8.8	30	11.9	26	31
7	11.7	23	17.8	26	7.6	10.6	26	8.5	32	10.5	31	30
8	5.5	23	18.9	20	7.1	6.4	26	8.1	28	9.6	31	24
9	19.3	20	12.8	25	6.6	6.0	24	7.6	25	11.0	28	23
10	12.3	22	10.6	24	6.3	5.7	22	7.2	22	14.4	31	22
11	9.6	15.4	10.3	18.9	6.9	5.7	22	7.1	18.9	25	25	17.8
12	7.9	13.2	11.0	15.4	8.8	6.0	32	9.6	16.6	26	25	15.2
13	7.8	25	26	14.3	7.1	6.6	15.4	7.4	17.8	25	26	13.6
14	6.4	32	18.9	13.2	34	5.4	26	6.4	16.6	32	23	12.1
15	10.3	25	12.5	12.1	30	5.1	23	6.0	13.6	32	33	14.7

Discharge, in million gallons a day, of Puohokamoa intake of Koolau ditch near Huelo, Maui, for the year ending June 30, 1927—Continued

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
16	8.3	26	10.8	11.9	23	4.8	18.9	15.2	13.0	33	33	24
17	15.5	31	9.2	20	26	4.8	16.6	12.4	14.8	33	30	26
18	21	26	10.3	17.8	17.8	7.0	14.7	7.1	25	32	26	17.8
19	13.0	23	22	23	16.6	13.0	13.6	6.1	15.4	33	24	17.8
20	7.8	26	19.8	14.7	22	6.8	13.0	5.5	12.1	38	23	20
21	6.9	36	13.2	11.7	20	12.1	25	5.5	10.5	32	22	15.4
22	29	32	11.2	12.4	14.3	7.1	28	5.1	10.6	32	20	12.1
23	18.2	28	10.8	14.7	11.9	18.1	18.9	5.0	15.4	28	17.8	10.6
24	15.0	25	12.4	13.9	11.2	11.9	23	12.6	13.9	31	16.6	11.9
25	21	25	26	16.6	16.9	28	30	36	11.4	28	15.0	11.0
26	10.1	20	17.8	11.0	16.6	31	30	31	16.8	30	13.6	9.2
27	13.6	22	25	9.7	11.0	27	23	26	14.0	28	15.0	8.5
28	23	24	30	25	9.7	20	18.9	28	10.1	26	20	7.8
29	12.8	22	22	19.7	9.0	12.5	18.9	-------	11.0	26	23	13.6
30	11.7	28	16.6	13.2	8.5	9.9	16.6	-------	12.5	24	23	12.3
31	18.4	23	-------	14.1	-------	8.7	14.3	-------	17.4	-------	17.8	-------

Monthly discharge of Puohokamoa intake of Koolau ditch near Huelo, Maui, for the year ending June 30, 1927

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July	29	4.3	11.8	18.3	366	1,120
August	36	13.2	25.6	39.6	794	2,440
September	30	9.2	16.2	25.1	487	1,490
October	32	9.7	17.2	26.6	533	1,640
November	34	6.3	13.7	21.2	410	1,260
December	31	4.8	10.5	16.2	324	999
January	39	7.6	21.9	33.9	679	2,080
February	36	5.0	11.8	18.3	329	1,010
March	36	10.1	19.4	30.0	602	1,850
April	38	9.6	25.3	39.1	760	2,330
May	33	13.6	23.6	36.5	733	2,250
June	31	7.8	17.8	27.5	535	1,640
The year	39	4.3	17.9	27.7	6,550	20,100

MANUEL LUIS DITCH AT PUOHOKAMOA GULCH, NEAR HUELO, MAUI

LOCATION.—In Puohokamoa Gulch at lower portal of tunnel between Haipuaena and Puohokamoa Streams, 3 miles southeast of Kailua and 6 miles by road and trail southeast of Huelo.

RECORDS AVAILABLE.—December 15, 1917, to June 30, 1927.

EQUIPMENT.—Stevens continuous water-stage recorder on right bank. Discharge based on weir formula.

CHANNEL AND CONTROL.—The control is a rectangular sharp-crested weir with complete end contractions, 4.5 feet long and 2.0 feet high, and located at outlet of tunnel. Weir basin is enlarged portion of tunnel; insufficient to prevent velocity of approach above medium stage.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 83 million gallons a day, or 128 second-feet, at 6.30 a. m. January 3 (gage height from water-stage recorder, 4.09 feet); minimum discharge, 0.2 million gallons a day, or 0.3 second-foot, from 4 p. m. to midnight February 23 (gage height, 0.08 foot).

1919–1927: Maximum discharge recorded, 116 million gallons a day, or 179 second-feet, at 2.10 p. m. January 14, 1923 (gage height from water-stage recorder, 4.93 feet); minimum discharge, 0.05 million gallons a day, or 0.08 second-foot, at 6.30 p. m. March 3, 1920 (gage height, 0.03 foot).

DIVERSIONS AND REGULATION.—This ditch is an extension of Center ditch and picks up water not diverted by ditches at higher elevations. The flow is regulated by gates at frequent intervals.

OBJECT OF STATION.—To determine amount of water diverted by ditch from areas involved under Territorial water license.

UTILIZATION.—Water used for irrigation of sugar cane.

ACCURACY.—Stage-discharge relation permanent during year. Rating curve, based on weir formulas, very well defined below 25 million gallons a day and fairly well defined above. Not checked by discharge measurements during year. Operation of water-stage recorder fairly satisfactory except as indicated in footnote to daily-discharge table. Daily discharge ascertained by applying to rating table mean daily gage height determined from recorder graph by inspection or, for days of considerable fluctuation, by averaging discharge for intervals of day. Records good except those estimated, which are poor.

Manuel Luis ditch, at elevation about 500 feet, diverts the flow of Kolea, Haipuaena, and Puohokamoa Streams below Koolau and Spreckels ditches and discharges into Waikamoi Stream. The water is then picked up by Center ditch (see Center ditch below Kolea Reservoir, near Huelo) and carried to Kailua Stream where it is diverted into Lowrie ditch (see Lowrie ditch at Opana Weir, near Huelo) and carried to the vicinity of Paia for use in irrigation and development of sugar cane on the plantation of Hawaiian Commercial & Sugar Co. The system comprises about 20 miles of main ditch. Manuel Luis ditch proper is about 1½ miles long and has a rated carrying capacity of about 30 million gallons a day.

Discharge, in million gallons a day, of Manuel Luis ditch at Puohokamoa Gulch near Huelo, Maui, for the year ending June 30, 1927

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	0.5	2.4	1.3	1.0	0.5	0.6	0.6	1.6	23	14.7	6.8	1.1
2	.5	31	1.0	.8	.4	.6	3.6	1.3	17.0	3.5	3.7	1.0
3	.5	31	.9	.7	.4	.6	67	1.1	35	3.0	.7	4.5
4	.4	2.2	.8	.7	.4	.5	34	1.0	30	1.7	1.5	.7
5	.4	28	.7	16.1	.5	.5	15.2	.9	20	1.9	6.6	.9
6	.4	5.5	.7	26	.5	1.5	17.2	.8	26	1.2	7.4	18.3
7	.9	1.8	1.0	6.9	.5	1.4	22	.6	29	1.1	27	17.8
8	.5	1.5	.9	1.3	.5	.6	30	.6	21	1.0	31	1.6
9	1.2	1.3	.6	4.5	.5	.5	9.8	.6	13.0	2.0	24	2.1
10	.7	1.3	.5	2.0	.5	.4	2.0	.5	2.9	1.5	27	1.5
11	.6	1.0	.5	1.3	.5	.4	1.6	.5	1.1	13.6	12.2	1.1
12	.5	.9	.5	1.1	.8	.5	37	.5	1.0	11.0	2.2	.9
13	.7	5.7	15.7	1.0	.7	.5	7.7		1.0	3.9	5.2	.9
14	.5	24	2.3	.9	45	.4	5.7		.9	28	5.0	.8
15	.7	39	.9	.8	13.2	.4	2.6	.6	.7	27	25	.8
16	.5	1.8	.9	.8	2.2	.3	1.9		.9	31	37	8.2
17	3.5	24	.7	2.0	5.2	.4	1.6		.7	34	25	7.4
18	1.4	6.9	.7	3.5	1.4	.5	1.3		2.8	29	16.0	1.0
19	.4	1.8	9.6	1.6	1.3	2.2	1.1	.3	.7	35	9.8	.8
20	.5	11.1	2.0	.7	1.2	.5	1.0	.3	.6	45	2.2	.8
21	.5	39	1.2	.6	1.6	1.6	13.7	.4	.5	33	1.3	.7
22	4.8	28	1.1	.6	1.0	.6	16.4	.3	1.0	31	1.2	.6
23	.7	10.8	1.0	.7	.9	6.6	2.4	.3	1.3	27	1.0	.6
24	.6	2.6	1.2	.7	.8	1.4	1.7	6.3	.7	29	.9	.6
25	.9	7.5	5.0	.6	1.2	17.4	18.2	37	.6	26	.7	.6
26	.5	1.6	1.1	.5	1.1	25	24	25	2.4	28	.6	.6
27	3.0	1.5	3.0	.6	.7	12.0	3.9	1.9	.9	26	.7	.5
28	2.0	2.7	17.4	1.4	.7	1.1	2.8	9.8	.7	19.2	.9	.5
29	.7	5.1	1.6	.7	.7	.8	3.5	-------	.8	14.8	1.2	.5
30	.6	8.7	1.1	.5	.6	.7	2.0	-------	.8	6.3	1.2	.5
31	1.4	4.2	-------	.5	-------	.7	1.6	-------	8.4	-------	.7	-------

NOTE.—Discharge estimated July 30, 31, May 16–19, and June 6. Braced figure gives estimated mean discharge for period indicated. Estimates made from study of faulty gage-height record and by comparison with record for Center ditch below Kolea Reservoir; recorder not working properly.

Monthly discharge of Manuel Luis ditch at Puohokamoa Gulch, near Huelo, Maui, for the year ending June 30, 1927

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July	4.8	0.4	1.00	1.55	31.0	95
August	39	.9	10.8	16.7	334	1,030
September	17.4	.5	2.53	3.91	75.9	233
October	26	.5	2.62	4.05	81.1	249
November	45	.4	2.83	4.38	85.5	261
December	25	.3	2.62	4.05	81.2	249
January	67	.6	11.4	17.6	353	1,080
February	37	----------	3.40	5.26	95.2	292
March	35	.5	7.92	12.3	245	753
April	45	1.0	17.6	27.2	529	1,620
May	37	.6	9.22	14.3	286	877
June	18.3	.5	2.60	4.02	77.9	239
The year	67	----------	6.23	9.64	2,270	6,980

KOOLAU DITCH AT WAHINEPE, NEAR HUELO, MAUI

LOCATION.—Between Puohokamoa and Waikamoi Streams, half a mile below Puohokamoa intake, 2½ miles southeast of Kailua, and 7 miles by road and trail from Huelo.

RECORDS AVAILABLE.—March 25, 1922, to June 30, 1927. East Maui Irrigation Co. previously obtained records at this location.

EQUIPMENT.—Stevens continuous water-stage recorder. Discharge measurements made from plank across tunnel at gage or across open ditch about 1,000 feet downstream.

CHANNEL AND CONTROL.—A long intake pipe connects stilling well with ditch in tunnel cut through rock. Channel control in rock tunnel.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 117 million gallons a day, or 181 second-feet, from 6 to 6.30 a. m. January 3 (gage height from water-stage recorder, 5.44 feet); minimum discharge, 8.9 million gallons a day, or 13.8 second-feet, at 3.15 p. m. January 13 (gage height, 0.87 foot).

1922–1927: Maximum discharge recorded, about 120 million gallons a day, or 186 second-feet, at 2 a. m. May 6, 1923 (gage height from faulty recorder graph, about 5.55 feet); minimum discharge. 3.6 million gallons a day,or 5.6 second-feet, from 5 to 6 a. m. April 1, 1925 (gage height, 0.34 foot).

DIVERSIONS AND REGULATION.—Completely regulated at various intake gates and spillways. One spillway at gage takes care of flood water through crosscut tunnel.

OBJECT OF STATION.—To determine amount of water diverted through Koolau ditch from Territorial lands.

UTILIZATION.—Water used for irrigation of sugar cane.

ACCURACY.—Stage-discharge relation permanent during year. Rating curve well defined between 25 and 80 million gallons a day; extension beyond somewhat uncertain. This curve checked very closely at 26 million gallons a day by one discharge measurement made in February. Operation of water-stage recorder satisfactory except as indicated in footnote to daily-discharge table. Daily discharge ascertained by applying to rating table mean daily gage height determined from recorder graph by inspection or, for days of considerable fluctuation, by averaging discharge for intervals of day. Records good for ordinary stages except those estimated which are poor; high and low stage records poor.

For description of ditch see Koolau ditch at Nahiku Weir, near Nahiku, Maui.

Discharge, in million gallons a day, of Koolau ditch at Wahinepe, near Huelo, Maui, for the year ending June 30, 1927

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1		68	78	54	44	27	34	59	110	100	101	9[illegible]
2		108	63	49	35	26	50	54	107	82	93	85
3		111	55	42	32	25	116	47	113	85	80	101
4		93	53	42	30	25	91	44	110	64	86	8[illegible]
5	18	111	50	93	30	24	84	42	110	54	99	91
6		99	46	110	29	27	110	38	110	47	104	104
7		72	63	101	27	31	110	37	110	42	110	11[illegible]
8		70	58	75	26	22	113	35	110	38	110	91
9		59	46	91	26	21	107	34	107	56	110	91
10		56	38	85	24	20	96	31	99	63	110	8[illegible]
11		44	43	67	23	20	91	31	85	91	104	7[illegible]
12		39	39	56	29	22	113	34	75	101	101	62
13		88	90	52	25	24	52	28	76	93	101	59
14		110	78	49	113	20	101	29	70	110	91	54
15		88	50	44	107	20	91	27	64	110	110	52
16		87	43	44	85	19.4	80	43	77	113	113	86
17		108	36	72	93	19.4	72	31	67	113	110	93
18		99	39	63	62	21	67	25	92	110	107	64
19		76	71	77	56	56	62	23	64	113	104	62
20	32	81	60	49	56	26	59	22	56	113	99	66
21		114	46	42	62	54	84	21	52	113	88	52
22		111	41	42	44	31	96	20	53	110	91	47
23		102	38	44	39	76	67	19.4	64	110	77	42
24		93	36	44	37	75	80	44	54	110	75	47
25		90	93	52	52	104	101	113	49	110	70	42
26		73	53	39	47	110	110	110	61	110	62	39
27		71	83	35	36	107	91	96	53	110	62	38
28		90	107	64	32	77	77	103	44	107	78	35
29		73	80	54	30	52	80	-------	44	107	83	44
30		99	62	38	29	42	70	-------	44	104	90	46
31		87	-------	42	-------	37	59	-------	69	-------	75	-------

NOTE.—Discharges estimated Aug. 16 to Sept. 26 and Feb. 14 and 15. Braced figures give estimated mean discharge for periods indicated. Estimates made by comparison with East Maui Irrigation Co.'s record of twice daily staff gage readings of this ditch at Waikamoi Weir about 1 mile downstream, and records of this ditch at Keanae and of Wailoa ditch at Honopou near Huelo; recorder not operating.

Monthly discharge of Koolau ditch at Wahinepe, near Huelo, Maui, for the year ending June 30, 1927

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July	----------	----------	28.4	43.9	880	2,700
August	114	39	86.1	133	2,670	8,190
September	107	36	57.9	89.6	1,740	5,330
October	110	35	58.4	90.4	1,810	5,560
November	113	23	45.3	70.1	1,360	4,170
December	110	19.4	40.7	63.0	1,260	3,870
January	116	34	84.3	130	2,610	8,020
February	113	19.4	44.3	68.5	1,240	3,810
March	113	44	77.4	120	2,400	7,360
April	113	38	93.0	144	2,790	8,560
May	113	62	93.4	145	2,890	8,890
June	110	35	67.6	105	2,030	6,220
The year	116	----------	64.9	100	23,700	72,700

WAIKAMOI STREAM ABOVE WAILOA DITCH, NEAR HUELO, MAUI

LOCATION.—250 feet above Wailoa ditch intake, one quarter of a mile above Spreckels ditch trail, 2½ miles southeast of Kailua, and 4 miles by road and trail southeast of Huelo.

RECORDS AVAILABLE.—January 28, 1922, to June 30, 1927.

EQUIPMENT.—Stevens continuous water-stage recorder on left bank. Discharge measurements made by wading near gage or from footbridge at gage.

CHANNEL AND CONTROL.—One channel at all stages. Banks high, steep, and covered with vegetation; not subject to overflow. Control composed of boulders and solid rock; subject to shifts.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 519 million gallons a day, or 803 second-feet, at 8.30 a. m. January 3 (gage height, from water-stage recorder, 5.98 feet); minimum discharge, 0.6 million gallons a day, or 0.9 second-foot, from 10 a. m. to noon July 5 (gage height, 0.69 foot).

1922–1927: Maximum discharge recorded, 1,360 million gallons a day, or 2,100 second-feet, at 9.45 a. m. October 16, 1924 (gage height, from water-stage recorder, 10.45 feet); minimum discharge, 0.5 million gallons a day, or 0.8 second-foot, from 11 a. m. to 7 p. m. March 21 and from 7 a. m. to 2 p. m. March 22, 1926 (gage height, 0.64 foot)

DIVERSIONS AND REGULATION.—A small amount of water is diverted by Haleakala ranch pipe line above station at elevation 5,300 feet and by Kula pipe line at elevation 4,300 feet.

OBJECT OF STATION.—To determine feasibility of additional diversions or flood storage; also to assist valuation appraisers in relation to Territorial water license to ditch company.

UTILIZATION.—Low water is all diverted below station by ditches of East Maui Irrigation Co. for irrigation of sugar cane.

ACCURACY.—Stage-discharge relation changed at time of flood April 19. The two rating curves used are well defined below 35 million gallons a day; extension above uncertain. Curve used prior to April 20, checked very closely at 1.7 and 2.4 million gallons a day by two discharge measurements made in November and March; curve used subsequent to April 19, checked very closely at 2.6 million gallons a day by a discharge measurement made shortly after June 30. Operation of water-stage recorder satisfactory during year. Daily discharge ascertained by applying to rating table mean daily gage height determined from recorder graph by inspection or, for days of considerable fluctuation, by averaging discharge for intervals of day. Records good for ordinary stages; high-stage records poor.

Discharge, in million gallons a day, of Waikamoi Stream above Wailoa ditch, near Huelo, Maui, for the year ending June 30, 1927

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	0.8	9.5	5.0	3.9	2.9	1.4	1.4	2.9	46	10.6	12.0	4.2
2	.8	99	4.0	4.2	2.1	1.3	8.2	2.4	28	6.5	10.3	4.4
3	.8	76	3.2	3.1	1.6	1.3	327	2.0	107	9.6	5.7	5.6
4	.7	10.6	3.1	2.6	1.4	1.3	98	1.9	40	5.6	5.8	4.3
5	.6	56	4.6	22	1.7	1.2	26	1.6	14.5	4.1	8.5	5.4
6	.8	11.5	3.2	36	1.3	1.6	12.5	1.4	13.1	2.9	10.8	27
7	2.0	7.6	4.9	11.3	1.1	1.6	31	1.3	24	2.3	27	21
8	.9	6.2	6.2	6.0	1.0	.9	45	1.2	12.0	2.0	23	6.4
9	3.9	5.4	3.9	7.2	.9	.9	10.3	1.2	7.2	2.2	12.0	5.1
10	2.3	5.6	2.4	7.6	.8	.8	6.6	1.1	5.5	3.6	24	4.5
11	2.1	4.0	2.1	6.0	1.0	.8	6.0	1.0	4.4	18.4	9.5	3.9
12	1.5	3.2	2.2	4.2	1.4	.9	81	1.4	3.7	10.6	10.3	3.4
13	1.2	7.6	6.9	3.4	1.1	1.1	19.8	1.3	3.9	6.2	9.9	3.0
14	.9	23	5.0	3.0	157	.8	8.1	.9	3.7	22	7.1	2.7
15	2.0	8.7	3.0	2.6	15.8	.7	5.8	.8	2.9	24	58	2.8
16	1.4	7.8	2.2	2.4	6.6	.8	4.6	8.1	2.4	41	38	5.9
17	2.7	21	1.7	3.9	11.6	.8	3.9	5.4	3.5	49	23	7.6
18	8.3	9.5	1.8	4.2	5.4	1.1	3.4	1.7	8.5	37	10.6	4.0
19	3.5	6.2	10.0	7.6	4.9	2.0	3.0	1.0	4.6	92	7.4	3.6
20	1.6	32	6.4	3.6	6.6	1.1	2.9	.9	2.9	125	6.0	5.1
21	1.2	136	4.0	2.4	5.2	2.1	17.5	.8	2.1	43	5.1	3.5
22	13.1	34	2.6	2.4	3.6	1.2	14.6	.7	2.1	31	4.8	2.8
23	6.3	11.3	2.3	3.0	2.9	3.7	5.6	.7	3.4	16.9	4.3	2.5
24	4.4	8.1	2.6	3.0	2.6	2.6	5.2	11.9	3.6	20	3.7	2.7
25	5.7	8.3	14.4	4.7	4.0	14.8	10.4	92	2.9	15.0	3.4	2.6
26	9.3	5.6	5.6	2.4	3.5	52	11.8	28	5.0	16.6	3.1	2.2
27	4.2	5.5	9.5	2.0	2.4	21	5.8	8.9	4.2	15.6	3.3	2.0
28	6.9	5.8	17.5	6.0	2.0	8.2	4.4	10.3	2.5	10.6	4.3	1.8
29	3.4	7.5	6.9	6.5	1.8	3.7	4.2	-------	2.6	9.3	4.9	3.0
30	2.6	14.1	4.6	3.0	1.5	2.4	3.6	-------	2.5	7.2	5.2	4.0
31	3.5	6.2	-------	2.6	-------	1.8	3.0	-------	9.0	-------	3.8	-------

Monthly discharge of Waikamoi Stream above Wailoa ditch, near Huelo, Maui, for the year ending June 30, 1927

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July	13.1	0.6	3.21	4.97	99.4	305
August	136	3.2	21.1	32.6	653	2,010
September	17.5	1.7	5.06	7.83	152	466
October	36	2.0	5.90	9.13	183	561
November	157	.8	8.52	13.2	256	784
December	52	.7	4.38	6.78	136	417
January	327	1.4	25.5	39.5	791	2,430
February	92	.7	6.89	10.7	193	592
March	107	2.1	12.2	18.9	378	1,160
April	125	2.0	22.0	34.2	660	2,030
May	58	3.1	11.8	18.3	365	1,120
June	27	1.8	5.23	8.09	157	482
The year	327	.6	11.0	17.0	4,020	12,400

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

LOCATION.—200 feet above Haiku-uka boundary trail, at elevation 3,020 feet, and 3¾ miles by trail southeast of Kailiili.

RECORDS AVAILABLE.—May 26, 1918, to June 30, 1927.

EQUIPMENT.—Stevens continuous water-stage recorder on left bank. Discharge measurements made by wading near gage or from footbridge just below gage.

CHANNEL AND CONTROL.—Channel has gravel and boulder bed with steep high banks of hardpan. Control is rough, broadcrested, concrete weir with low-water section about 0.7 foot lower than rest of structure; is drowned out at high stages and subject to shift due to filling in of weir basin.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 77 million gallons a day, or 119 second-feet, at 5.15 a. m. January 3 (gage height from water-stage recorder, 6.07 feet); minimum discharge, 0.3 million gallons a day, or 0.5 second-foot, several hours December 16–17 and February 23 (gage height, 3.92 feet).

1918–1927: Maximum discharge recorded, about 230 million gallons a day, or 356 second-foot, at 5.20 p. m. March 22, 1920 (gage height from water-stage recorder, 7.92 feet); minimum discharge, 0.07 million gallons a day, or 0.11 second-foot, April 15, 1919 (gage height, 3.77 feet).

DIVERSIONS AND REGULATION.—A little water is diverted above station by Kula pipe line.

OBJECT OF STATION.—To determine discharge of stream at boundary between fee-simple lands above and Territorial lands below.

UTILIZATION.—Water diverted by ditches of East Maui Irrigation Co. for irrigation of sugar cane.

ACCURACY.—Stage-discharge relation permanent during year. Rating curve well defined between 0.5 and 15 million gallons a day; extension above uncertain. This curve checked fairly well by two low stage measurements made during the year. Operation of water-stage recorder satisfactory except as indicated in footnote to daily-discharge table. Daily discharge ascertained by applying to rating table mean daily gage height determined from recorder graph by inspection or, for days of considerable fluctuation, by averaging discharge for intervals of day. Records good for ordinary stages, except those estimated, which are fair; extremely low and high stage records poor.

Discharge, in million gallons a day, of East Branch of Waikamoi Stream at Haiku-uka boundary near Kailiili, Maui, for the year ending June 30, 1927

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	0.3	3.0	0.9	0.9	0.9	0.4	0.4		5.8	0.7	3.5	0.9
2	.3	17.8	.7	1.0	.6	.4	5.2		6.9	1.4	1.7	.8
3	.3	11.8	.6	.7	.5	.4	51		20	1.4	1.1	.9
4	.3	1.7	1.0	.6	.4	.4	10.7		6.0	.9	1.3	.9
5	.3	8.3	.9	5.5	.4	.4	3.5		1.9	.6	2.0	1.8
6	.3	1.6	.6	5.6	.4	.4	2.1		2.1	.5	3.3	6.8
7	.4	1.1	1.4	1.7	.4	.3	7.8		4.6	.4	4.4	2.7
8	.3	1.0	1.3	1.0	.4	.3	6.0	0.4	1.7	.4	3.3	1.0
9	1.1	1.4	.7	1.7	.4	.3	1.5		1.2	.4	1.9	.8
10	.6	1.1	.5	1.5	.4	.3			.9	1.0	4.6	.8
11	.7	.8	.5	1.1	.4	.3	3.4		.7	4.1	1.6	.7
12	.4	.6	.5	.8	.4	.3			.6	1.9	3.3	.6
13	.4	1.4	1.5	.7	.4	.3			.6	1.1	2.3	.6
14	.4	4.0	1.0	.7	28	.3			.6	2.4	1.5	.5
15	.6	1.2	.6	.6	2.0	.3			.5	3.8	11.1	.5
16	.4	1.6	.5	.6	1.3	.3	.8	1.9	.4	6.1	5.5	1.2
17	2.1	3.7	.4	1.0	2.1	.3		.6	1.2	6.8	3.0	1.9
18	2.2	1.4	.6	1.7	.9	.4		.4	1.7	6.1	1.7	.8
19	.8	1.0	1.2	1.6	1.0	.4		.4	.7	15.7	1.3	1.4
20	.5	7.8	1.0	.7	1.3	.3		.3	.4	19.8	1.1	1.3
21	.8	22	.6	.6	.9	.4		.3	.4	6.6	1.0	.9
22	4.1	4.6	.5	.7	.7	.4		.3	.4	4.8	.9	.7
23	1.0	1.7	.4	.7	.6	.6		.3	.4	2.5	.9	.5
24	1.5	1.2	.9	1.1	.5	.5	1.9	7.5	.4	3.8	.8	.6
25	1.2	1.4	2.5	1.0	.7	4.0		14.0	.4	2.7	.7	.7
26	.5	1.0	1.0	.6	.6	9.2		3.6	1.9	3.2	.7	.5
27	1.9	.9	2.2	.6	.5	3.0		1.4	.6	2.5	.7	.5
28	1.3	.9	3.0	1.8	.5	1.3		3.8	.4	2.4	.8	.4
29	.7	2.6	1.2	1.2	.4	.6	.5	-------	.4	1.8	.9	1.2
30	.6	2.2	.9	.7	.4	.5		-------	.4	1.5	1.0	.8
31	.7	1.1	-------	.7	-------	.4		-------	.5	-------	.7	-------

NOTE.—Braced figures give mean discharge for periods indicated, estimated by comparison with record of West Branch of Waikamoi Stream; recorder not operating properly.

Monthly discharge of East Branch of Waikamoi Stream at Haiku-uka boundary near Kailiili, Maui, for the year ending June 30, 1927

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July	4.1	0.3	0.87	1.35	27.0	83
August	22	.6	3.61	5.59	112	343
September	3.0	.4	.99	1.53	29.6	91
October	5.6	.6	1.27	1.96	39.4	121
November	28	.4	1.61	2.49	48.4	148
December	9.2	.3	.89	1.38	27.7	85
January	51	----------	3.91	6.05	121	372
February	14.0	----------	1.46	2.26	40.8	125
March	20	.4	2.09	3.23	64.7	199
April	19.8	.4	3.58	5.54	107	330
May	11.1	.7	2.21	3.42	68.6	210
June	6.8	.4	1.12	1.73	33.7	103
The year	51	----------	1.97	3.05	720	2,210

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

LOCATION.—At Haiku-uka boundary trail (elevation, 3,000 feet) and 3¾ miles by trail southeast of Kailiili.

RECORDS AVAILABLE.—May 28, 1918, to June 30, 1927.

EQUIPMENT.—Stevens continuous water-stage recorder on right bank near trail. Discharge measurements made by wading near gage or from footbridge 35 feet upstream.

CHANNEL AND CONTROL.—Channel is solid rock with steep rock and hardpan banks. Control is solid-rock ledge.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year 342 million gallons a day, or 529 second-feet, at 7.30 a. m. January 3 (gage height from water-stage recorder, 3.70 feet); minimum discharge, 0.2 million gallons a day, or 0.3 second-foot, from 2 a. m. to 2 p. m. December 17 (gage height, 0.40 foot).

1918–1927: Maximum discharge recorded, about 2,020 million gallons a day, or 3,130 second-feet, at noon December 6, 1918 (gage height from water-stage recorder, 9.85 feet); minimum discharge, 0.2 million gallons a day, or 0.3 second-foot, several hours March 21–22, 1926, and 2 a. m. to 2 p. m. December 17, 1926.

DIVERSIONS AND REGULATION.—A small amount of water is diverted above station by Haleakala ranch pipe line at elevation 5,300 feet and by Kula pipe line at elevation 4,300 feet.

OBJECT OF STATION.—To determine discharge of stream at boundary between fee-simple lands above and Territorial lands below.

UTILIZATION.—Water diverted by ditches of East Maui Irrigation Co. for irrigation of sugar cane.

ACCURACY.—Stage-discharge relation probably permanent during year. Rating curve well defined below 200 million gallons a day; extension above uncertain. No discharge measurements were made during year. Operation of water-stage recorder satisfactory except as indicated in footnote to daily-discharge table. Daily discharge ascertained by applying to rating table mean daily gage height determined from recorder graph by inspection or, for days of considerable fluctuation, by averaging discharge for intervals of day. Records fair for ordinary stage; extremely high stage records poor.

Discharge, in million gallons a day, of West Branch of Waikamoi Stream at Haikuuka boundary near Kailiili, Maui, for the year ending June 30, 1927

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	0.4	3.2	1.4	1.1	0.9	0.5	0.5	0.6	27	0.9	6.4	0.9
2	.4	84	1.0	1.4	.7	.5	11.1	.5	17.6	2.6	4.0	.9
3	.4	46	.8	.9	.6	.4	220	.5	76	2.6	1.8	1.1
4	.3	3.5	1.0	.8	.6	.4	63	}	18.9	1.6	1.7	1.1
5	.3	21	1.5	8.1	.6	.4	12.6	}	5.4	1.1	2.5	1.5
6	.4	3.5	1.0	14.7	.6	.4	4.0	}	4.0	.8	3.9	13.3
7	.6	2.5	1.7	3.6	.5	.4	15.5	}	9.2	.7	9.4	8.2
8	.4	1.6	2.0	1.5	.5	.4	18.7	}	4.0	.7	10.6	1.6
9	1.0	1.4	1.3	1.7	.5	.3	2.7	} .5	2.3	.6	4.0	1.2
10	.8	1.2	.8	2.3	.4	.3	1.6	}	1.6	3.4	9.6	1.1
11	.8	1.1	.8	1.8	.4	.3	1.4	}	1.4	6.5	3.3	1.1
12	.6	.9	.7	1.1	.4	.4	36	}	1.3	4.0	2.5	.9
13	.5	1.4	1.4	.9	.4	.4	5.4	}	1.3	2.0	3.5	.9
14	.6	6.2	1.4	.9	112	.4	2.0	}	1.3	5.0	2.3	.7
15	.7	2.5	.9	.9	7.9	.3	1.3	}	1.2	8.2	18.1	.7
16	.6	2.0	.7	.8	1.8	.3	1.0	5.9	1.1	13.8	12.3	1.2
17	2.7	6.9	.7	.9	5.2	.2	.8	2.0	1.8	9.0	9.4	1.7
18	3.4	2.8	.8	1.5	1.5	.4	.8	.7	2.8	11.7	3.3	1.2
19	1.2	1.6	1.5	1.7	1.2	.5	.7	.6	1.6	55	2.1	1.3
20	.7	20	2.0	1.0	1.6	.4	.7	.5	1.2	77	1.6	1.3
21	.8	94	1.1	.8	1.2	.4	10.8	.4	.9	18.8	1.4	1.0
22	5.9	14.9	.7	.8	.9	.4	5.4	.4	.8	12.6	1.3	.8
23	2.4	3.3	.7	.7	.8	.6	1.5	.4	.7	6.6	1.2	.7
24	1.7	2.0	.8	1.3	.7	.6	1.5	13.9	.8	8.2	1.1	.7
25	1.3	1.7	7.3	1.3	.8	3.9	2.0	51	.7	6.0	1.0	.7
26	.8	1.3	1.7	.8	.8	35	2.0	12.1	1.6	6.0	.9	.7
27	1.8	1.2	4.0	.7	.7	10.3	1.0	2.7	1.1	6.6	.9	.6
28	2.0	1.1	6.6	2.0	.6	3.0	.8	3.6	.7	4.2	1.1	.6
29	1.0	2.3	2.1	1.5	.6	1.0	.7	-------	.7	3.0	1.1	1.1
30	.9	6.5	1.3	.9	.5	.7	.6	-------	.7	2.3	1.2	.9
31	.9	1.5	-------	.8	-------	.6	.6	-------	.8	-------	1.0	-------

NOTE.—Braced figures give mean discharge for period indicated, estimated by comparison with record for Middle Branch of Puohokamoa Stream; recorder not operating properly.

Monthly discharge of West Branch of Waikamoi Stream at Haiku-uka boundary near Kailiili, Maui, for the year ending June 30, 1927

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July	5.9	0.3	1.17	1.81	36.3	111
August	94	.9	11.1	17.2	343	1,060
September	7.3	.7	1.66	2.57	49.7	153
October	14.7	.7	1.91	2.96	59.2	182
November	112	.4	4.86	7.52	146	447
December	35	.2	2.07	3.20	64.1	197
January	220	.5	13.8	21.4	427	1,310
February	51	----------	3.64	5.63	102	313
March	76	.7	6.15	9.52	190	585
April	77	.6	9.38	14.5	282	864
May	18.1	.9	4.02	6.22	124	382
June	13.3	.6	1.66	2.57	49.7	153
The year	220	----------	5.13	7.94	1,870	5,760

ALO STREAM NEAR HUELO, MAUI

LOCATION.—300 feet above Spreckels ditch inflow and trail crossing, 2½ miles southeast of Kailua, and 4½ miles by road and trail southeast of Huelo.

RECORDS AVAILABLE.—December 18, 1910, to June 30, 1927.

EQUIPMENT.—Stevens continuous water-stage recorder on right bank. Discharge measurements made by wading or from footbridge at gage.

CHANNEL AND CONTROL.—Channel at gage is a fairly large pool at foot of rapids. Banks steep and high. Control, at outlet of pool, composed of rock ledge and large boulders; permanent.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 306 million gallons a day, or 473 second-feet, at 5 a. m. January 3 (gage height from water-stage recorder, 3.38 feet); minimum discharge, unknown owing to missing gage-height record.

1910–1927: Maximum discharge recorded, 638 million gallons a day, or 987 second-feet, at 7 p. m. December 9, 1916 (gage height from water-stage recorder, 4.35 feet); minimum discharge, 0.4 million gallons a day, or 0.6 second-foot, from 4 to 6 p. m. September 19, 1924, and several hours March 13–16, 1926 (gage height, 0.47 foot).

DIVERSIONS AND REGULATION.—None.

OBJECT OF STATION.—To furnish data for appraisal of water value under Territorial lease to ditch company.

UTILIZATION.—Ordinary flow diverted below station by ditches of East Maui Irrigation Co. for irrigation of sugar cane.

ACCURACY.—Stage-discharge relation probably permanent during year. Rating curve fairly well defined below 45 million gallons a day; extension above uncertain. A discharge measurement of 1.4 million gallons a day made in March plots much larger than this curve but, being unsupported, is disregarded since subsequent measurements check the curve closely. Operation of water-stage recorder very unsatisfactory as indicated in footnote to daily-discharge table. Daily discharge ascertained by applying to rating table mean gage height determined from recorder graph by inspection or, for days of considerable fluctuation, by averaging discharge for intervals of day. Records poor.

Discharge, in million gallons a day, of Alo Stream near Huelo, Maui, for the year ending June 30, 1927

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	0.5	2.6					0.9	1.8	5.2	10.0		1.9
2	.6	7.6		1.2			16.0	1.6	2.0	4.1		2.9
3	.5	11.2			1.0		160	1.4	3.9	3.4		
4	.5	2.0					17.8	1.2	18.4	2.1		
5	.5	41					4.0	1.2	3.2	2.1		4.9
6	.6	2.6			.5		3.6	1.1	10.4	1.5		
7	1.2			7.5	.5		15.0	1.0	6.6	1.3	6.5	
8	.6				.5		11.5	.9	3.4	1.2		
9	2.5				.5		2.9	.9	2.2	4.7		
10	1.0	1.8			.4		2.4	.7	1.8	1.2		
11	.7				.5		2.1	.7	1.5			
12	.7				.9		51	.7	1.3			
13	.8		1.3		.8	0.9	7.4	.6	1.5			
14	.6				83		2.7	.5	1.3			
15	.8				3.4		2.2	.5	1.2	12		
16	.6	6			1.9		1.8	1.1	1.2		15	
17	.6						1.5	.7	2.4			
18	.5						1.5	.5	2.7			
19	.5						1.3	.5	1.2		2.3	1.2
20	.5						1.2	.5	1.0		1.8	
21	.5	36		1.2	1.7		7.0	.5	1.0	34	1.7	
22	2.0						7.4	.4	1.1		1.5	
23	.7						1.8	.4	2.1		1.4	
24	.9						1.8	4.2	2.2		1.2	
25	1.0						8.0	19.4	1.2		1.1	
26	.6	3.4				13	7.1	5.7	3.0	7	1.0	
27	1.3		3.6				2.6	2.5	1.2		1.6	
28	1.5					1.4	2.4	5.4	1.0		2.2	
29	.8				1.1	1.2	2.6	-------	1.6		2.2	
30	.9					1.0	2.2	-------	1.3		2.1	
31	1.7		-------		-------	1.0	1.8	-------	19.5	-------	1.8	-------

NOTE.—Discharge estimated Aug. 6 and Dec. 28. Braced figures give estimated mean discharge for periods indicated. Estimates made by comparison with record for Waikamoa Stream near Huelo; recorder not operating.

Monthly discharge of Alo Stream near Huelo, Maui, for the year ending June 30 1927

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July	2.5	0.5	0.86	1.33	26.7	82
August	----------	----------	8.34	12.9	258	793
September	----------	----------	1.76	2.72	52.8	162
October	----------	----------	2.42	3.74	75.0	230
November	83	.4	3.98	6.16	119	366
December	----------	----------	2.10	3.25	65.2	200
January	160	.9	11.3	17.5	352	1,080
February	19.4	.4	2.02	3.13	56.6	174
March	19.5	1.0	3.47	5.37	108	330
April	----------	1.2	10.7	16.6	320	985
May	----------	1.0	5.58	8.63	173	531
June	----------	----------	2.02	3.13	60.6	186
The year	160	----------	4.56	7.06	1,670	5,120

KAAIEA STREAM NEAR KAILUA, MAUI

LOCATION.—700 feet above Hamakua ditch trail crossing and 1½ miles (3½ miles by road and trail) southeast of Kailua.

RECORDS AVAILABLE.—December 30, 1921, to June 30, 1927. No discharge data yet published.

EQUIPMENT.—Stevens continuous water-stage recorder on left bank. Discharge measurement made by wading near gage or from footbridge about 200 feet upstream.

CHANNEL AND CONTROL.—One channel at all stages; straight for about 100 feet above and 75 feet below gage. Stream bed composed of rock ledge, boulders, and gravel. Banks quite steep and covered with grass. Control is solid ledge about 20 feet below gage; probably permanent.

DIVERSIONS AND REGULATION.—None.

OBJECT OF STATION.—Data valuable in connection with Territorial water leases to ditch company.

UTILIZATION.—Ordinary flow of stream diverted below station for irrigation of sugar cane.

ACCURACY.—Data insufficient to determine stage-discharge relation.

The following discharge measurements were made:

December 27, 1926: Gage height, 0.60 foot; discharge. 2.26 million gallons a day, or 3.49 second-feet.

February 16, 1927: Gage height, 0.66 foot; discharge, 2.46 million gallons a day, or 3.81 second-feet.

SPRECKELS DITCH BELOW KAAIEA GULCH, NEAR HUELO, MAUI

LOCATION.—1,000 feet below intake in Kaaiea Stream and 2 miles by road and trail southeast of ditch superintendent's house at Kailua.

RECORDS AVAILABLE.—December 15, 1917, to June 30, 1927.

EQUIPMENT.—Stevens continuous water-stage recorder on left bank and close to ditch trail. Discharge measurements made by wading or from plank across ditch near gage.

CHANNEL AND CONTROL.—Ditch is straight for about 50 feet above and 20 feet below gage; cut in earth. During heavy rains channel control is subject to backwater effect from two small streams, which enter ditch a short distance downstream.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 85 million gallons a day, or 132 second-feet, at 3.15 a. m. April 14 (gage height from water-stage recorder, 4.58 feet); minimum discharge, 0.1 million gallons a day, or 0.2 second-foot, from 9 p. m. to midnight July 25 (gage height, 0.33 foot).

1917–1927: Maximum discharge recorded, 110 million gallons a day, or 170 second-feet, at 7.30 p. m. January 16, 1921 (gage height from water-stage recorder, 5.65 feet); and at 6.40 p. m. May 16, 1924 (gage height from water-stage recorder, 5.45 feet); minimum discharge, no flow, occasionally, when water is turned out of ditch.

DIVERSIONS AND REGULATION.—Ditch diverts water from a dozen or more streams east of Nailiilihaele Stream and is regulated by gates and spillways at frequent intervals.

OBJECT OF STATION.—To determine discharge of ditch at boundary between Territorial lands above and fee-simple lands below.

UTILIZATION.—Water used for irrigation of sugar cane.

ACCURACY.—Stage-discharge relation probably permanent during year. Rating curve well defined below 50 million gallons a day; extension above, somewhat uncertain. This curve checked fairly closely by two low discharge measurements made in February and March. Operation of water-stage recorder satisfactory except as indicated in footnote to daily-discharge table. Daily discharge ascertained by applying to rating table mean daily gage

height determined from recorder graph by inspection or, for days of considerable fluctuation, by averaging discharge for intervals of day. Records fair.

For description of ditch see "Spreckels ditch at Haipuaena Weir, near Huelo, Maui."

Discharge, in million gallons a day, of Spreckels ditch below Kaaiea Gulch, near Huelo, Maui, for the year ending June 30, 1927

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	0.2	0.4	1.3	0.6	0.2	0.2	0.4	0.7	2.1	9.5	0.6	0.9
2	.2		1.1	.6	.2	.2	2.0	.6	1.0	1.9	.6	1.0
3	.2		1.0	.6	.2	.2	35	.4	3.2	1.3	.5	1.6
4	.2	4.3	1.0	.5	.2	.2	12.8	.4	7.3	1.0	.5	.4
5	.2		.9	2.0	.2	.2	4.1	.3	1.7	.9	.4	.3
6	.2		.9	3.1	.2	.6	1.3	.2	4.5	.4	.5	1.5
7	.6	.9	1.0	.9	.2	.8	3.4	.3	2.9	.2	1.6	2.5
8	.4	.9	.9	.6	.2	.2	2.5	.3	1.3	.2	1.9	.5
9	.4	.8	.7	.7	.2	.2	1.3	.4	1.0	1.4	1.0	.6
10	.2	.9	.7	1.4	.2	.2	1.1	.3	.6	.3	2.3	.4
11	.2	.8	.6	.6	.2	.2	.9	.3	.6	4.8	.6	.3
12	.2	.7	.6	.6	.4	.2	13.8	.3	.5	1.1	1.0	.2
13	.2	1.2	5.0	.8	.4	.2	5.5	.3	.5	1.1	.8	.2
14	.2	5.9	.9	.9	23	.2	1.4	.4	.5	22	.7	.2
15	.4	1.0	.7	.8	1.3	.2	1.1	.4	.4	8.4	12.4	.2
16	.2	.9	.6	.5	.9	.2	.9	1.0	.5	19.4	8.4	1.1
17	.2	3.2	.6	.4	.6	.2	.6	.4	.4	12.8	3.8	.8
18	.2	1.3	.6	.4	.6	.3	.4	.3	.9	6.8	2.2	.4
19	.1	1.0	5.0	.4	.4	1.0	.3	.2	.4	8.4	1.5	.4
20	.1	1.9	1.2	.4	.4	.3	.4	.2	.4	28	1.3	.4
21	.1	7.3	.8	.3	.6	1.0	4.0	.3	.4	8.5	1.2	.4
22	.4	3.0	.7	.3	.3	.3	6.2	.2	.6	6.3	1.2	.4
23	.2	1.9	.7	.6	.3	2.3	1.0	.2	1.3	2.2	1.0	.4
24	.2	2.0	.7	.5	.2	.5	.7	.3	.6	10.4	.9	.3
25	.1	2.0	.9	.2	.4	1.1	2.4	5.9	.5	2.2	.7	.2
26	.1	1.4	.7	.2	.5	.7	3.2	2.6	1.6	3.2	.6	.2
27	.4	1.3	.7	.2	.3	.6	1.1	.6	.5	2.0	.6	.2
28	.5	1.5	1.3	1.6	.2	.6	1.1	.5	.4	1.1	.9	.2
29	.2	1.4	.9	.4	.2	.6	1.4	-------	.9	1.0	.9	.2
30	.2	1.6	.6	.2	.2	.6	.8	-------	.6	.9	1.0	.2
31	.3	1.8	-------	.2	-------	.5	.7	-------	8.6	-------	.7	-------

NOTE.—Discharge estimated September 13 and 19. Braced figure gives estimated mean discharge for period indicated. Estimates made by comparison with record for Alo Stream and study of faulty gage height record; recorder not operating properly.

Monthly discharge of Spreckels ditch below Kaaiea Gulch, near Huelo, Maui, for the year ending June 30, 1927

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July	0.6	0.1	0.24	0.37	7.5	23
August	-------	.4	2.21	3.42	68.5	210
September	5.0	.6	1.11	1.72	33.3	102
October	3.1	.2	.69	1.07	21.5	66
November	23	.2	1.11	1.72	33.4	102
December	2.3	.2	.48	.74	14.8	46
January	35	.3	3.61	5.59	112	343
February	5.9	.2	.65	1.01	18.3	56
March	8.6	.4	1.51	2.34	46.7	144
April	28	.2	5.59	8.65	168	515
May	12.4	.4	1.69	2.61	52.3	161
June	2.5	.2	.55	.85	16.6	51
The year	35	.1	1.62	2.51	593	1,820

CENTER DITCH BELOW KOLEA RESERVOIR, NEAR HUELO, MAUI

LOCATION.—200 feet below intake from Kolea Reservoir spillway, half a mile below intake in Waikamoi Stream 1¾ miles southeast of Kailua, and 3½ miles by trail southeast of Huelo.

RECORDS AVAILABLE.—May 1, 1922, to June 30, 1927. For station half a mile upstream at Waikamoi, March 6, 1918, to April 30, 1922.

EQUIPMENT.—Stevens continuous water-stage recorder on left bank close to trail. Discharge measurements made from bank across ditch or by wading near gage.

CHANNEL AND CONTROL.—Ditch cut in hardpan and rock, curved slightly at gage and sharply about 75 feet downstream. Channel control; subject to shifts.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 94 million gallons a day, or 145 second-feet, at 3.30 a. m. April 14 (gage height from water-stage recorder, 5.70 feet); minimum discharge, 1.1 million gallons a day, or 1.7 second-feet, several hours July 8–31 (gage height, 0.68 foot; affected by backwater).

1922–1927: Maximum discharge recorded, 94 million gallons a day, or 145 second-feet, at 6.15 p. m. August 27, 1925 (gage height, 5.41 feet) and at 3.30 a. m. April 14, 1927 (gage height, 5.70 feet); minimum discharge, 0.38 million gallons a day, or 0.59 second-foot, at noon February 19, 1923 (gage height, 0.49 foot).

DIVERSIONS AND REGULATION.—Ditch diverts water that rises below or passes Spreckels ditch. Flow regulated by head gates and spillways and by storage in Kolea Reservoir. The flow at this station is the same as that at the old station at Waikamoi except for occasional regulation by Kolea Reservoir.

OBJECT OF STATION.—Record of value in connection with Territorial lease to ditch company.

UTILIZATION.—Water used for irrigation of sugar cane.

ACCURACY.—Stage-discharge relation changed, presumably, July 31 and affected by débris in ditch during July and August. The two rating curves used are fairly well defined below 45 million gallons a day; extensions above somewhat uncertain. Curve used after July 31 based on nine discharge measurements covering a range from 2 to 41 million gallons a day, four of these measurements were well distributed during the year and ranged from 2 to 10 million gallons a day. Operation of water-stage recorder satisfactory except as indicated in footnote to daily-discharge table. Daily discharge ascertained by applying to rating table mean daily gage height determined from recorder graph by inspection or, for days of considerable fluctuation, by averaging discharge for intervals of day. Records good for ordinary stages except when affected by débris in ditch, for which they are poor; extremely high stage records fair.

Center ditch, at elevation about 500 feet, diverts below all other main ditches on the windward side of the crater of Haleakala between Waikamoi and Kailua Streams. It picks up the water from Manuel Luis ditch at Waikamoi Stream (see Manuel Luis ditch at Puohokamoa Gulch, near Huelo). At Kailua Stream the flow of the ditch is diverted into Lowrie ditch and carried to a point near Paia where it is used for irrigation of sugar cane. Center ditch proper is about 3 miles long and has a carrying capacity of 100 million gallons a day.

Discharge, in million gallons a day, of Center ditch below Kolea Reservoir, near Huelo, Maui, for the year ending June 30, 1927

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	1.6		6.5	4.4	3.3	2.1	2.6	5.5	39	31	13.7	7.3
2	1.6		4.8	4.0	2.6	2.0	7.2	4.7	24	11.4	11.8	6.1
3	1.4		4.4	3.7	2.5	2.0	85	4.1	67	11.2	2.5	15.3
4	1.3	2.4	4.2	3.4	2.5	2.0	64	3.8	44	6.5	5.7	5.3
5	1.3		4.1	22	2.5	2.0	25	3.4	27	6.3	16.2	6.3
6	1.3		4.0	44	2.4	4.3	25	3.3	33	4.4	16.6	31
7	2.2	9.6	4.8	18.5	2.2	4.4	38	3.2	37	3.8	34	32
8	1.2	8.7	4.8	6.9	2.2	2.1	47	2.9	27	3.5	35	7.7
9	3.0	6.9	4.0	12.7	2.1	2.0	20	2.8	23	8.4	27	7.9
10	1.7	6.9	3.4	9.8	2.1	1.9	10.3	2.6	12.0	5.5	42	5.9
11	1.4	5.2	3.3	6.3	2.3	1.9	8.3		5.3	27	23	4.7
12	1.3	7.1	3.2	5.2	3.2	2.0	61		4.2	22	8.3	5.7
13	1.6	17.5	22	4.7	2.9	2.1	26	2.4	4.2	15.9	14.0	7.5
14	1.3	31	6.3	4.4	68	1.8	14.9		4.1	55	8.5	6.5
15	2.1	18.2	2.3	4.1	30	1.7	8.9		3.3	44	57	4.0
16	1.4	9.8	3.0	4.1	9.8	1.6	6.7	4.5	4.2	58	52	14.6
17	5.8	34	1.9	7.7	16.0	1.8	5.5	2.0	3.4	58	42	14.9
18	3.6	17.0	1.8	12.8	5.7	1.9	4.8	1.6	10.0	47	27	4.1
19	1.4	8.1	17.9	9.6	5.0	6.6	4.4	1.5	5.5	61	21	3.8
20	1.2	18.1	5.0	4.2	4.7	2.1	4.1	1.4	7.6	78	11.2	4.0
21	1.2	76	2.6	3.5	5.7	4.9	22	1.8	2.5	54	7.5	3.0
22	9.1	45	2.2	6.4	4.0	2.3	27	1.4	2.3	46	7.7	2.6
23	1.7	24	2.0	4.1	8.2	13.8	7.5	1.4	6.0	35	6.1	2.5
24	1.4	12.0	2.0	4.1	2.9	5.5	7.2	5.5	2.8	45	5.5	2.5
25	2.3	17.4	12.0	3.8	3.8	24	20	67	2.4	33	4.8	2.4
26	1.2	7.3	4.7	3.3	3.5	40	31	35	6.4	35	4.4	2.2
27	3.8	6.9	9.1	3.2	2.8	22	11.9	9.7	3.3	33	4.7	2.0
28	5.2	14.8	29	8.8	2.4	5.5	6.7	17.1	2.5	27	5.5	2.0
29	1.7	12.4	7.5	5.2	2.3	3.4	8.1	-------	2.9	25	7.2	2.0
30	1.6	17.2	5.0	3.3	2.1	3.0	5.9	-------	2.6	17.5	8.6	2.3
31	2.2	12.2	-------	3.2	-------	2.8	5.0	-------	11.7	-------	4.7	-------

NOTE.—Discharge estimated July 27, 31, Sept. 25, Feb. 16, May 1–8, and 10–13. Braced figures give estimated mean discharge for periods indicated. Estimates made by comparison with record for Manuel Luis ditch and tributary streams; gage-height record either faulty or missing. Discharge July 1–31 and Aug. 7–11 from gage heights corrected for effect of débris in ditch, which was determined from one discharge measurement and study of engineer's notes and recorder graph.

Monthly discharge of Center ditch below Kolea Reservoir, near Huelo, Maui, for the year ending June 30, 1927

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July	9.1	1.2	2.23	3.45	69.1	212
August	76	5.2	14.8	22.9	458	1,410
September	29	1.8	6.26	9.69	188	576
October	44	3.2	7.79	12.1	241	741
November	68	2.1	6.99	10.8	210	644
December	40	1.6	5.66	8.76	176	538
January	85	2.6	20.0	30.9	621	1,900
February	67	1.4	7.08	11.0	198	608
March	67	2.3	13.9	21.5	430	1,320
April	78	3.5	30.3	46.9	908	2,790
May	57	2.5	17.3	26.8	535	1,650
June	32	2.0	7.27	11.2	218	669
The year	85	1.2	11.7	18.1	4,250	13,100

NAILILIHAELE STREAM NEAR HUELO, MAUI

LOCATION.—200 feet above Wailoa ditch intake, 700 feet above New Hamakua ditch trail 1½ miles south of Kailua, and 3 miles by road and trail southeast

RECORDS AVAILABLE.—October 8, 1913, to June 30, 1918, and August 6, 1919, to June 30, 1927. Also at old staff-gage station below New Hamakua ditch from December 9, 1910, to December 31, 1912.

EQUIPMENT.—Stevens continuous water-stage recorder on left bank. Discharge measurements made by wading or from footbridge near gage.

CHANNEL AND CONTROL.—One channel at all stages; straight for 100 feet above and below gage. Stream bed very rough and steep; banks high and covered with dense vegetation. Control composed of large boulders with low-water section improved with concrete; subject to shifts due to deposits of gravel.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 564 million gallons a day, or 873 second-feet, at 8.45 a. m. January 3 (gage height from water-stage recorder, 6.33 feet); minimum discharge, 2.0 million gallons a day, or 3.1 second-feet, from 10 a. m. to noon December 18 (gage height, 0.07 foot).

1913–1927: Maximum discharge recorded, 1,800 million gallons a day, or 2,790 second-feet, at 6.30 p. m. May 1, 1916 (gage height from water-stage recorder, 6.3 feet); minimum discharge, 0.45 million gallons a day, or 0.7 second-foot, from 11 a. m. to 7 p. m. July 14, 1920 (gage height, −0.52 foot).

DIVERSIONS AND REGULATION.—Low flow of left branch of this stream diverted above station by Old Hamakua ditch from about March 1, 1918, to February 28, 1922.

OBJECT OF STATION.—To determine feasibility of additional diversions or flood storage. Also to assist valuation appraisers in relation to Territorial water license to ditch company.

UTILIZATION.—Ordinary flow is diverted below station by ditches of East Maui Irrigation Co. for irrigation of sugar cane.

ACCURACY.—Stage-discharge relation practically permanent during year. Rating curve fairly well defined between 2 and 40 million gallons a day; extension above uncertain. This curve checked roughly in September, November, and February by three discharge measurements ranging from 5 to 14 million gallons a day. Operation of water-stage recorder very satisfactory except as indicated in footnote to daily-discharge table. Daily discharge ascertained by applying to rating table mean daily gage height determined from recorder graph by inspection or, for days of considerable fluctuation, by averaging discharge for intervals of day. Records fair for ordinary stages; high-stage records poor.

Discharge, in million gallons a day, of Nailiilihaele Stream near Huelo, Maui, for the year ending June 30, 1927

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	3.5	15.8	9.7	7.8	5.2	3.6	4.2	8.4	40	43	19.4	10.3
2	3.5	40	8.6	6.8	4.7	3.5	18.5	8.1	20	15.3	12.7	12.0
3	3.3	66	7.8	6.1	4.4	3.4	285	7.0	54	15.0	10.6	18.0
4	3.0	14.2	7.2	6.1	4.2	3.4	70	6.4	52	11.2	12.2	9.9
5	2.9	86	6.8	44	4.4	3.1	26	5.9	23	9.5	18.2	10.8
6	3.3	17.0	6.3	54	4.1	3.4	24	5.5	32	7.6	23	36
7	3.5	12.0	7.4	18.3	3.8	3.3	50	5.2	41	6.8	53	29
8	3.3	11.0	7.0	11.0	3.5	2.9	52	5.5	23	6.3	35	12.2
9	9.1	9.5	5.7	15.6	3.4	2.7	18.9	5.0	15.3	6.1	24	12.9
10	4.4	9.5	5.2	12.2	3.3	2.5	14.2	4.6	12.4	5.9	40	11.5
11	3.8	7.6	5.0	9.2	3.4	2.5	13.7	4.2	10.8	28	16.7	9.0
12	3.5	6.6	5.0	8.0	4.2	2.8	120	4.2	9.2	17.4	18.0	8.0
13	3.6	16.5	16.4	7.4	3.5	2.8	37	4.0	10.1	9.5	13.7	7.4
14	3.0	47	7.6	6.8	156	2.3	17.6	3.6	8.4	58	12.0	6.8
15	4.0	12.7	5.4	6.4	18.1	2.2	13.7	3.4	7.4	45	86	6.8

Discharge, in million gallons a day, of Nailiilihaele Stream near Huelo, Maui, for the year ending June 30, 1927—Continued

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
16	3.3	13.4	4.8	6.3	10.3	2.2	11.5	7.9	7.0	71	73	17.2
17	3.3	35	4.4	8.4	10.3	2.3	10.1	4.7	15.1	84	36	16.3
18	2.8	14.5	4.4	8.8	7.4	2.9	9.2	3.5	16.3	67	20	8.2
19	2.9	11.0	25	10.3	8.6	3.3	8.2	3.1	8.0	97	15.3	7.0
20	2.8	30	9.2	6.8	8.4		7.8	3.0	6.8	135	12.7	6.8
21	2.8	113	5.7	5.7	8.6		24	3.1	6.1	63	11.5	5.9
22	15.2	46	5.2	7.0	6.1	3.1	23	2.9	6.2	52	10.6	5.4
23	5.4	18.6	5.2	10.7	5.4		9.5	2.8	8.8	29	9.5	5.2
24	5.7	14.8	6.4	9.0	5.2		11.2	16.2	10.7	49	8.2	5.4
25	8.5	21	15.5	5.9	8.6	26	36	86	7.8	27	7.4	4.8
26	4.2	12.0	7.2	5.2	7.4	32	34	37	7.4	30	7.0	4.4
27	6.2	27	10.9	5.0	5.0	13.7	13.4	16.7	6.4	25	8.0	4.2
28	7.8	15.8	30	17.4	4.4	7.4	11.7	25	5.7	18.0	13.4	4.2
29	4.7	11.7	11.0	8.4	4.1	5.9	11.7	-------	7.2	16.7	12.7	5.0
30	4.8	15.0	8.4	5.9	3.8	5.0	10.3	-------	7.2	15.0	13.8	5.5
31	8.6	12.4	-------	5.5	-------	4.6	8.8	-------	18.1	-------	9.0	-------

NOTE.—Braced figures give mean discharge for period indicated, estimated by comparison with record for Kailua Stream near Huelo; recorder not operating properly.

Monthly discharge of Nailiilihaele Stream near Huelo, Maui, for the year ending June 30, 1927

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July	15.2	2.8	4.73	7.32	147	450
August	113	6.6	25.2	39.0	783	2,400
September	30	4.4	8.81	13.6	264	811
October	54	5.0	11.2	17.3	346	1,070
November	156	3.3	11.0	17.0	330	1,010
December	32	2.2	5.33	8.25	165	507
January	285	4.2	32.4	50.1	1,010	3,080
February	86	2.8	10.5	16.2	293	902
March	54	5.7	16.2	25.1	503	1,540
April	135	5.9	35.4	54.8	1,060	3,260
May	86	7.0	21.4	33.1	663	2,040
June	36	4.2	10.2	15.8	306	939
The year	285	2.2	16.1	24.9	5,870	18,000

KAILUA STREAM AT HAIKU-UKA BOUNDARY NEAR KAILIILI, MAUI

LOCATION.—At trail crossing 100 feet above Haiku-uka boundary and 2½ miles by trail southeast of Kailiili.

RECORDS AVAILABLE.—July 11, 1918, to June 30, 1927.

EQUIPMENT.—Stevens continuous water-stage recorder on left bank. Discharge measurements made by wading near gage or from footbridge just below gage.

CHANNEL AND CONTROL.—One channel at all stages; straight for 25 feet above and 50 feet below gage. Right bank low; left bank steep. Control for low stages is concrete slab, 1.5 feet thick, across stream 15 feet below gage; permanent. Control for high stages is crest of falls 100 feet below gage; may shift.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 210 million gallons a day, or 325 second-feet, at 6.30 a. m. January 3 (gage height from water-stage recorder, 4.90 feet); minimum discharge, 0.03 million gallons a day, or 0.05 second-foot, several hours July 3–17 (gage height, 0.61 foot).

1918–1927: Maximum discharge recorded, 386 million gallons a day, or 597 second-feet, at 8.30 a. m. October 16, 1924 (gage height from water-stage recorder, 7.83 feet); minimum discharge, 0.02 million gallons a day, or 0.03 second-foot, from 5 a. m. June 7 to 3 p. m. June 10 (gage height, 0.60 foot).

DIVERSIONS AND REGULATION.—None.

OBJECT OF STATION.—To determine discharge of stream at boundary between fee-simple lands above and Territorial lands below.

UTILIZATION.—Water picked up by East Maui Irrigation Co.'s ditches for irrigation of cane lands.

ACCURACY.—Stage-discharge relation probably permanent during year. Rating curve fairly well defined below 10 million gallons a day; extended above on basis of one discharge measurement at 72 million gallons a day. This curve checked roughly at 0.07 million gallons a day by one discharge measurement made in February. Operation of water-stage recorder satisfactory during year. Daily discharge ascertained by applying to rating table mean daily gage height determined from recorder graph by inspection or, for days of considerable fluctuation, by averaging discharge for intervals of day. Records fair for ordinary stages; extremely high stage records poor.

Discharge, in million gallons a day, of Kailua Stream at Haiku-uka boundary near Kailiili, Maui, for the year ending June 30, 1927

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	0.04	0.45	0.25	0.19	0.08	0.06	0.08	0.13	16.1	0.13	1.2	0.13
2	.04	40	.13	.19	.06	.06	4.2	.13	10.2	1.2	1.2	.13
3	.04	33	.13	.13	.05	.06	114	.13	46	1.6	.45	.13
4	.03	1.8	.13	.1	.05	.06	36	.1	12.1	.45	.45	.13
5	.03	12.4	.13	3.8	.05	.06	8.2	.1	3.0	.25	.6	.19
6	.03	1.6	.13	8.2	.05	.05	2.5	.1	2.0	.19	1.5	4.3
7	.04	.45	.13	1.4	.05	.04	8.1	.08	4.5	.13	4.1	3.4
8	.04	.25	.25	.35	.05	.04	13.8	.08	1.6	.13	4.0	.45
9	.05	.19	.19	.35	.05	.04	1.8	.08	.8	.1	1.4	.25
10	.05	.19	.13	.25	.04	.04	1.0	.08	.45	2.9	3.5	.19
11	.04	.13	.13	.25	.04	.04	.8	.08	.35	4.1	1.2	.19
12	.04	.13	.1	.19	.04	.04	24	.08	.25	2.2	.6	.13
13	.03	.19	.19	.1	.04	.04	3.7	.1	.25	1.0	.8	.1
14	.04	.6	.35	.1	56	.04	1.0	.08	.25	1.8	.45	.1
15	.04	.35	.25	.1	4.6	.03	.6	.06	.19	2.7	8.7	.1
16	.04	.25	.13	.08	.8	.03	.45	4.7	.19	5.7	4.4	.19
17	.04	1.8	.13	.08	1.6	.03	.35	.8	.25	5.4	3.2	.25
18	.5	.6	.1	.13	.35	.03	.19	.19	.6	6.3	1.2	.13
19	.19	.25	.45	.25	.25	.03	.13	.1	.35	38	.6	.1
20	.06	6.6	.8	.13	.35	.03	.13	.08	.19	46	.45	.1
21	.06	56	.35	.08	.13	.04	5.1	.08	.19	9.3	.35	.08
22	1.6	10.0	.13	.08	.08	.04	2.7	.06	.13	5.1	.35	.08
23	.35	1.8	.1	.06	.06	.05	.45	.06	.13	2.7	.35	.08
24	.25	.8	.1	.8	.05	.05	.35	5.8	.13	3.2	.25	.08
25	.19	.6	2.3	.8	.05	1.1	.6	29	.13	2.2	.19	.08
26	.08	.35	.6	.13	.06	19.6	.8	7.8	.13	1.8	.19	.06
27	.1	.25	.6	.1	.06	6.6	.25	1.6	.13	1.6	.19	.06
28	.13	.19	2.5	.25	.06	1.6	.19	2.0	.13	1.2	.19	.05
29	.1	.25	.6	.45	.06	.45	.19	-------	.13	1.0	.19	.08
30	.08	1.0	.25	.13	.06	.19	.13	-------	.13	.6	.19	.13
31	.08	.35	-------	.1	-------	.1	.13	-------	.13	-------	.13	-------

Monthly discharge of Kailua Stream at Haiku-uka boundary near Kailiili, Maui, for the year ending June 30, 1927

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July	1.6	0.03	0.143	0.221	4.43	14
August	56	.13	5.57	8.62	173	530
September	2.5	.1	.392	.607	11.8	36
October	8.2	.06	.624	.965	19.4	59
November	56	.04	2.18	3.37	65.3	20
December	19.6	.03	.989	1.53	30.7	9
January	114	.08	7.48	11.6	232	712
February	29	.06	1.92	2.97	53.7	165
March	46	.13	3.26	5.04	101	310
April	46	.1	4.97	7.69	149	458
May	8.7	.13	1.37	2.12	42.6	130
June	4.3	.05	.382	.591	11.5	35
The year	114	.03	2.45	3.79	894	2,740

KAILUA STREAM NEAR HUELO, MAUI

LOCATION.—400 feet above Wailoa ditch intake, 1¼ miles southwest of Kailua' and 2½ miles by road and trail south of Huelo.

RECORDS AVAILABLE.—December 8, 1910, to June 30, 1918, and July 1, 1919, to June 30, 1927.

EQUIPMENT.—Au continuous water-stage recorder replacing, on August 14, 1926, a Stevens continuous water-stage recorder on left bank. Discharge measurements made by wading near gage or from footbridge at gage.

CHANNEL AND CONTROL.—Channel at gage is a large, deep pool with high, sloping banks, at foot of low waterfall. Control at outlet of pool is solid rock ledge and large boulders; seldom shifts.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 730 million gallons a day, or 1,130 second-feet, at 9.15 a. m. January 3 (gage height from water-stage recorder, 7.35 feet); minimum discharge, 1.3 million gallons a day, or 2.0 second-feet, from midnight December 20 to 1.30 a. m. December 21 (gage height, 1.12 feet).

1910–1927: Maximum discharge recorded, about 1,500 million gallons a day, or 2,300 second-feet, at about 2 a. m. February 1, 1922 (gage height, 10.5 feet; determined from floodmarks); minimum discharge, 0.07 million gallons a day, or 0.11 second-foot, from 3 to 4 a. m. June 27, 1921 (gage height, 0.57 foot).

DIVERSIONS AND REGULATION.—Nearly all low-water flow diverted above station by Old Hamakua ditch from February 5, 1918, to February 28, 1922.

OBJECT OF STATION.—Data valuable in connection with Territorial water leases to ditch company.

UTILIZATION.—Ordinary flow of stream is diverted by ditches of East Maui Irrigation Co. for irrigation of sugar cane.

ACCURACY.—Stage-discharge relation permanent during year. Rating curve fairly well defined below 50 million gallons a day and extended above on basis of one discharge measurement at 273 million gallons a day. This curve checked closely at 83 and 2 million gallons a day by two discharge measurements made in August and February and again at 2 million gallons a day by one discharge measurement shortly after June 30. Operation of water-stage recorder fairly satisfactory except as indicated in footnote to daily-discharge table. Daily discharge ascertained by applying to rating table mean daily gage height determined form recorder graph by inspection or, for days of considerable fluctuation, by averaging discharge for intervals of day. Records poor.

Discharge, in million gallons a day, of Kailua Stream near Huelo, Maui, for the year ending June 30, 1927

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1			4.6	3.5	2.5	2.2	2.1	3.7	50	12.8	16.8	4.2
2		32	4.0	3.2	2.3	2.0	6.8	3.3	23	6.4	9.4	4.6
3				2.9	2.1	1.9	366	3.0	118	11.4	5.9	6.2
4		14.1		2.6	2.1	1.9	110	2.8	48	6.8	5.9	4.0
5		78		24	2.1	1.9	27	2.6	18.3	4.8	9.7	4.6
6		14.1		44	2.0	1.9	16.1	2.4	17.0	3.8	15.6	22
7		9.0		13.7	1.9	1.9	41	2.3	27	3.4	37	18.5
8		6.8		6.8	1.8	1.7	58	2.4	14.1	3.2	23	6.8
9		5.9		8.1	1.7	1.6	14.1	2.5	8.7	3.2	13.7	5.5
10		6.2	3.6	6.8	1.6	1.6	9.4	2.3	6.5	3.4	23	
11		4.8		5.3	1.7	1.6	7.8	2.3	5.3	16.3	11.1	3.7
12				4.2	1.9	1.6	120	2.1	4.4	12.2	9.4	
13		12		3.5	1.7	1.6	28	2.0	4.0	6.2	8.5	
14				3.2	190	1.5	11.4	1.9	3.8	32	8.0	2.9
15		7.8		3.0	22	1.4	8.4	1.9	3.3	26	61	2.9
16	2.5	7.4		2.9	8.7	1.4	6.2	8.1	2.9	49	47	5.9
17		17.6		3.4	10.4	1.4	5.1	5.2	7.9	70	21	7.4
18		9.0	2.1	3.4	5.9	1.4	4.4	2.5	9.0	53	12.2	3.8
19		5.7	7.6	6.6	5.5	1.5	3.7	2.1	4.4	121	9.0	3.0
20		27	4.5	3.4	7.4	1.4	3.4	1.9	3.2	132	8.1	2.9
21		168	2.9	2.8	5.3	1.9	14.9	1.9	3.0	50	6.8	2.8
22		44	2.3	3.3	4.0	1.4	19.2	1.8	3.0	30	6.2	2.4
23		14.5	2.3	3.6	3.3	2.3	5.7	1.8	3.2	18.3	5.3	2.3
24		10.0	2.3	5.2	3.0	1.6	5.9	10.9	3.4	24	4.6	2.3
25		11.1	9.1	4.2	4.0	13.3	14.3	109	3.3	15.3	4.2	2.2
26		7.1	3.8	3.0	3.4	44	16.5	32	3.2	14.1	3.7	2.2
27		6.2	5.4	2.5	2.8	18.6	7.1	11.8	3.0	13.3	4.0	2.0
28		7.1	17.7	5.9	2.4	7.4	5.3	13.7	2.8	10.0	4.5	2.0
29		5.9	6.5	6.2	2.3	3.5	5.1	-------	3.2	9.4	5.0	2.0
30		9.0	4.0	3.2	2.3	2.8	4.4	-------	3.3	8.4	6.5	2.0
31		5.9	-------	2.6	-------	2.3	3.8	-------	10.6	-------	5.2	-------

NOTE.—Discharge estimated May 12–14, May 23 to June 5, June 14–15, 18–21, and 25–30. Braced figures give estimated mean discharge for periods indicated. Estimates made by comparison with record for Nailiilihaele Stream and from study of faulty gage-height record; gage-height record missing or recorder not operating properly.

Monthly discharge of Kailua Stream near Huelo, Maui, for the year ending June 30, 1927

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July	----------	----------	2.50	3.87	77.5	238
August	168	----------	20.5	31.7	634	1,950
September	17.7	----------	4.44	6.87	133	409
October	44	2.5	6.35	9.82	197	604
November	190	1.6	10.3	15.9	308	948
December	44	1.4	4.27	6.61	132	406
January	366	2.1	30.7	47.5	951	2,920
February	109	1.8	8.58	13.3	240	737
March	118	2.8	13.6	21.0	421	1,290
April	132	3.2	25.7	39.8	770	2,370
May	61	3.7	13.3	20.6	411	1,270
June	22	2.0	4.74	7.33	142	436
The year	366	----------	12.1	18.7	4,420	13,600

HOOLAWALIILII STREAM NEAR HUELO, MAUI

LOCATION.—400 feet above New Hamakua ditch crossing, 2 miles southwest of Kailua, and 4 miles by road and trail west of Huelo.

RECORDS AVAILABLE.—April 6, 1911, to June 30, 1927.

EQUIPMENT.—Stevens continuous water-stage recorder on right bank. Discharge measurements made by wading near gage or from footbridge at gage.

CHANNEL AND CONTROL.—Channel at gage is a pool about 100 feet long and 20 feet wide formed by concrete control about 20 feet long at brink of falls over which water makes a drop of about 50 feet. Banks slope gently and are covered with dense growth of vegetation.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 217 million gallons a day, or 336 second-feet at 8.30 a. m. August 5 (gage height from water-stage recorder, 3.80 feet); minimum discharge, 1.0 million gallons a day, or 1.6 second-feet, from 11 a. m. July 19 to 3 a. m. July 22 (gage height, 0.59 foot).

1911–1927: Maximum discharge recorded, 485 million gallons a day, or 750 second-feet, at 11 a. m. November 21, 1921 (gage height from water-stage recorder, 4.82 feet); minimum discharge, 0.2 million gallons a day, or 0.3 second-foot from 6 p. m. to midnight June 8, 1926 (gage height, 0.46 foot).

DIVERSIONS AND REGULATION.—None.

OBJECT OF STATION.—To furnish data for appraisal of water value under Territorial lease to ditch company.

UTILIZATION.—All water during low and medium stages picked up below station by ditches of East Maui Irrigation Co. for irrigation of sugar cane.

ACCURACY.—Stage-discharge relation permanent during year. Rating curve well defined below 30 million gallons a day; extension above uncertain. This curve was checked closely at 1.7 million gallons a day by one discharge measurement made in November. Operation of water-stage recorder fairly satisfactory except as indicated in footnote to daily-discharge table. Daily discharge ascertained by applying to rating table mean daily gage height determined from recorder graph by inspection or, for days of considerable fluctuation, by averaging discharge for intervals of day. Records fair for medium stages; low and high stage records poor (see also footnote to daily-discharge table).

Discharge, in million gallons a day, of Hoolawaliilii Stream near Huelo, Maui, for the year ending June 30, 1927

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	1.7	2.0	2.6	2.2	2.4	2.2	2.0	3.0	5.5	14.5	4.8	2.8
2	1.6	5.2	2.4	1.8	2.0	2.0	2.6	2.8	3.7	5.1	4.1	2.8
3	1.4	7.8	2.3	1.6	2.2	2.0	75	2.8	4.4	4.8	3.7	3.5
4	1.2	3.7	2.3	1.6	2.0	2.0	19.5	2.6	8.7	4.4	3.7	3.0
5	1.2	24	2.2	3.3	2.0	2.0	8.6	2.4	5.4	3.9	3.7	2.8
6	1.2	4.6	2.2	8.2	1.8	1.8	6.4	2.4	6.4	3.5	3.7	4.1
7	2.3	3.7	2.2	3.7	1.8	1.8	9.1	2.3	6.4	3.3	6.6	4.6
8	1.8	3.5	2.2	2.8	1.8	1.8	10.2	2.2	5.4	3.3	6.1	3.7
9	2.0	2.8	2.2	3.3	1.8	1.8	6.1	2.2	4.8	3.0	4.8	3.5
10	1.8	2.6	2.0	3.5	1.8	1.6	4.8	2.2	4.6	2.8	5.8	3.5
11	1.7	2.6	2.0	3.3	1.8	1.6	4.6	2.0	4.1	3.5	4.4	3.3
12	1.6	2.4	2.0	3.0	1.8	1.6	30	2.0	3.9	3.3	5.2	3.0
13	1.6	2.6	2.3	2.6	2.0	1.6	15.2	2.0	3.7	3.0	4.1	2.8
14	1.6	4.3	2.0	2.3	38	1.4	7.7	1.8	3.7	15.1	3.9	2.8
15	1.4	3.0	1.8	2.2	7.0	1.4	6.1	1.7	3.7	9.3	14.2	2.6
16	1.2	2.6	1.8	2.2	4.6	1.4	4.8	2.3	3.5	17.0	11.2	3.9
17	1.1	3.9	1.7	2.2	3.9	1.4	4.1	2.2	4.2	18.6	8.0	3.5
18	1.1	2.8	1.7	2.2	3.5	1.4	3.7	2.2	3.9	16.4	6.4	3.3
19	1.1	2.6	2.3	2.2	3.5	1.4	3.3	2.2	3.5	20	5.1	3.0
20	1.0	3.5	2.0	2.2	2.8	1.2	3.3	2.2	3.0	48	4.8	2.8
21	1.0	14.9	1.7	2.2	2.8	1.6	4.3	2.2	3.0	18.6	4.4	2.8
22	1.8	7.7	1.6	2.3	2.4	1.4	5.7	2.2	2.8	13.5	3.9	2.6
23	1.7	4.8	1.6	2.4	2.4	1.6	3.5	2.2	3.0	9.6	3.7	2.6
24	1.4	4.4	1.6	2.8	2.4	1.6	3.3	2.3	4.4	15.1	3.5	2.6
25	1.4	4.4	1.7	2.4	2.6	2.3	4.4	7.3	3.0	9.0	3.3	2.6
26	1.2	3.5	1.7	2.4	2.4	2.3	6.4	4.6	2.8	8.0	3.0	2.6
27	1.6	3.5	1.7	2.3	2.3	2.0	4.1	3.7	2.6	7.0	3.0	2.6
28	1.8	3.5	2.6	3.8	2.3	2.0	3.9	3.9	2.6	5.8	3.0	2.6
29	1.8	3.3	2.4	3.9	2.2	2.0	3.7	-------	3.0	5.1	3.0	2.6
30	1.8	3.0	2.3	3.7	2.2	2.0	3.3	-------	2.6	4.8	3.0	2.6
31	1.8	2.8	-------	3.3	-------	2.0	3.0	-------	9.4	-------	3.0	-------

NOTE.—Discharge estimated December 26 and 27 from study of faulty gage-height record caused by obstructed intake to stilling well. Record somewhat doubtful during November, December, and June owing to partly obstructed intake to stilling well..

Monthly discharge of Hoolawaliilii Stream near Huelo, Maui, for the year ending June 30, 1927

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July	2.3	1.0	1.51	2.34	46.9	144
August	24	2.0	4.71	7.29	146	448
September	2.6	1.6	2.04	3.16	61.1	188
October	8.2	1.6	2.84	4.39	87.9	270
November	38	1.8	3.75	5.80	112	345
December	2.3	1.2	1.75	2.71	54.2	166
January	75	2.0	8.80	13.6	273	837
February	7.3	1.7	2.64	4.08	73.9	227
March	9.4	2.6	4.25	6.58	132	404
April	48	2.8	9.98	15.4	299	919
May	14.2	3.0	4.87	7.54	151	463
June	4.6	2.6	3.05	4.72	91.5	281
The year	75	1.0	4.19	6.48	1,530	4,690

HOOLAWANUI STREAM NEAR HUELO, MAUI

LOCATION.—200 feet above intake of Wailoa ditch, 2 miles southwest of Kailua, and 4 miles by trail west of Huelo (elevation, 1,240 feet).

RECORDS AVAILABLE.—December 12, 1910, to June 30, 1927.

EQUIPMENT.—Stevens continuous water-stage recorder on right bank. Discharge measurements made by wading near gage or from footbridge at gage.

CHANNEL AND CONTROL.—Stream drops over a low waterfall into large circular pool with gently sloping banks. Control for ordinary stages is narrow outlet of pool near the left bank; composed of boulders and subject to shift. At high stage the control becomes much wider by water overflowing the right bank, which is covered with dense growth of grass.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 238 million gallons a day, or 368 second-feet, at 7 a. m. January 3 (gage height from water-stage recorder, 5.05 feet; affected by backwater); minimum discharge, 0.9 million gallons a day, or 1.4 second-feet, from 6 p. m. February 23 to noon February 24 (gage height, 0.16 foot; affected by backwater).

1910–1927: Maximum discharge recorded, about 550 million gallons a day, or 851 second-feet, at 3 a. m. February 1, 1922 (gage height from water-stage recorder, 8.40 feet); minimum discharge, 0.15 million gallons a day, or 0.2 second-foot, at 7 p. m. October 25, 1917 (gage height, −0.19 foot).

DIVERSIONS AND REGULATION.—None.

OBJECT OF STATION.—To furnish data for appraisal of water value under Territorial lease to ditch company.

UTILIZATION.—All water during low and medium stages picked up below station by ditches of East Maui Irrigation Co. for irrigation of sugar cane.

ACCURACY.—Stage-discharge relation permanent during year except as affected by grass September to November and January to March. Basic rating curve well defined below 100 million gallons a day; extension above uncertain. This curve checked closely at 2 million gallons a day by a discharge measurement made shortly after June 30. Operation of water-stage recorder satisfactory during year. Daily discharge ascertained by applying to rating table mean daily gage height determined from recorder graph by inspection or, for days of considerable fluctuation, by averaging discharge for intervals of day. Records fair for ordinary stages except those affected by grass, which are poor; high-stage records poor.

Discharge, in million gallons a day, of Hoolawanui Stream near Huelo Maui, for the year ending June 30, 1927

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar	Apr.	May	June
1	1.8	2.2	5.3	2.2	1.6	2.4	1.4	5.9	15.1	20	12.5	4.2
2	1.8	8.4	4.8	2.1	1.4	2.2	8.1	5.0	5.9	5.9	8.2	4.5
3	1.7	28	4.4	1.8	1.4	2.1	165	4.4	19.4	6.2	7.1	5.5
4	1.6	5.1	4.2	1.7	1.4	2.1	70	4.0	24	5.0	6.9	4.0
5	1.6	41	3.9	11.3	1.4	1.9	33	3.5	12.1	4.5	7.2	3.9
6	1.8	9.7	3.8	21	1.2	1.8	24	3.1	13.2	3.8	8.3	8.1
7	2.1	6.6	4.0	7.7	1.2	1.8	38	2.9	13.2	3.3	21	9.4
8	1.6	5.6	3.6	4.7	1.0	1.7	46	2.6	9.4	3.1	15.4	5.0
9	2.2	4.9	3.2	5.8	1.0	1.6	24	2.4	6.9	2.9	10.4	5.2
10	1.7	4.4	2.9	4.5	.9	1.6	17.9	2.1	5.8	2.8	13.2	4.5
11	1.5	3.8	2.7	3.4	1.0	1.5	15.4	1.9	4.9	4.6	8.8	4.0
12	1.5	3.4	2.9	3.0	1.2	1.6	86	1.8	4.4	4.0	10.2	3.8
13	1.6	4.4	4.1	2.8	1.2	1.5	46	1.6	4.2	2.9	7.7	3.3
14	1.4	8.7	3.0	2.5	74	1.4	28	1.4	3.8	24	6.9	3.1
15	1.4	4.4	2.5	2.2	15.4	1.3	21	1.3	3.1	12.1	32	2.9
16	1.3	4.3	2.3	2.3	9.2	1.2	16.6	5.6	2.9	24	30	6.0
17	1.2	8.7	2.1	3.0	8.2	1.3	13.2	1.6	7.6	42	15.4	4.5
18	1.2	4.8	2.1	2.4	6.2	1.4	11.3	1.2	5.1	41	11.3	3.2
19	1.2	4.0	3.6	2.9	6.1	1.4	9.5	1.2	3.2	54	9.2	2.9
20	1.2	12.8	2.5	2.2	5.9	1.2	8.2	1.0	2.7	95	8.0	2.6
21	1.2	54	2.1	1.8	5.3	2.0	15.9	1.0	2.5	46	7.2	2.4
22	2.6	25	1.9	3.1	4.4	1.3	14.2	1.0	2.4	31	6.6	2.2
23	1.4	14.2	2.0	2.8	4.0	2.0	7.7	.9	2.9	22	6.1	2.1
24	1.3	11.5	2.1	3.0	3.8	1.4	8.5	3.6	7.9	28	5.5	2.1
25	1.6	11.3	3.1	2.0	4.8	4.5	17.8	29	3.3	16.6	4.9	2.0
26	1.2	8.3	2.1	1.8	4.0	8.2	21	10.6	2.5	15.4	4.7	1.8
27	1.4	7.7	2.8	1.6	3.3	4.6	11.0	5.1	2.1	13.2	4.8	1.8
28	1.4	8.0	7.8	5.3	3.0	2.2	9.5	6.1	2.1	11.0	5.0	1.7
29	1.2	6.8	3.4	2.6	2.8	1.8	8.5	-------	3.3	9.7	5.3	1.7
30	1.2	6.5	2.6	1.8	2.6	1.7	7.7	-------	2.5	8.5	5.3	1.7
31	1.6	5.9	-------	1.7	-------	1.5	6.3	-------	12.7	-------	4.2	-------

NOTE.—Discharge Sept. 29 to Nov. 13 and Jan. 3 to Mar. 31 obtained from gage heights corrected for backwater effect of grass on control, as determined from two discharge measurements, study of recorder graph, and by comparison with record of flow for adjacent streams.

Monthly discharge of Hoolawanui Stream near Huelo, Maui, for the year ending June 30, 1927

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July	2.6	1.2	1.53	2.37	47.5	146
August	54	2.2	10.8	16.7	334	1,030
September	7.8	1.9	3.26	5.04	97.8	300
October	21	1.6	3.77	5.83	117	359
November	74	.9	5.96	9.22	179	549
December	8.2	1.2	2.07	3.20	64.2	197
January	165	1.4	26.2	40.5	811	2,490
February	29	.9	3.99	6.17	112	343
March	24	2.1	6.81	10.5	211	648
April	95	2.8	18.8	29.1	562	1,730
May	32	4.2	9.98	15.4	309	949
June	9.4	1.7	3.67	5.68	110	338
The year	165	.9	8.10	12.5	2,950	9,080

HONOPOU STREAM NEAR HUELO, MAUI

LOCATION.—200 feet above New Hamakua ditch crossing, 2½ miles southwest of Kailua, and 4½ miles southwest of Huelo (elevation, 1,250 feet).

RECORDS AVAILABLE.—December 12, 1910, to June 30, 1927.

EQUIPMENT.—Stevens continuous water-stage recorder on left bank. Discharge measurements made by wading near gage or from footbridge at gage.

CHANNEL AND CONTROL.—One channel at all stages; straight for 50 feet above and below gage. Right bank is overflowed during floods; left bank steep and high. Control, an old iron weir set in concrete; subject to shifts due to growth of grass in weir basin.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 243 million gallons a day, or 376 second-feet, at 7.45 a. m. August 5 (gage height from water-stage recorder, 3.68 feet); minimum discharge, 0.4 million gallons a day, or 0.6 second-foot, from 4 p. m. to midnight July 30 (gage height, 0.16 foot) and from 11 a. m. September 25 to 4 a. m. September 27 (gage height, 0.12 foot).

1910–1927: Maximum discharge recorded, 658 million gallons a day, or 1,020 second-feet, at 3.25 a. m. February 1, 1922 (gage height from water-stage recorder, 5.50 feet); minimum discharge, 0.15 million gallons a day, or 0.23 second-foot, from 2 to 8 p. m. July 14, 1920 (gage height, 0.05 foot).

DIVERSIONS AND REGULATION.—None.

OBJECT OF STATION.—To furnish data for appraisal of water value under Territorial lease to ditch company.

UTILIZATION.—Ordinary flow is diverted below station by ditches of East Maui Irrigation Co. for irrigation of sugar cane.

ACCURACY.—Stage-discharge relation changed, presumably, at time of flood August 5, and affected by grass during August, September, November, and December. The two rating tables used are well defined by discharge measurements below 25 million gallons a day; extended above on basis of weir formula. These curves checked very closely at 0.8 million gallons a day by one discharge measurement made in February. Operation of water-stage recorder fairly satisfactory except as indicated in footnote to daily-discharge table. Daily discharge ascertained by applying to rating table mean daily gage height determined from recorder graph by inspection or, for days of considerable fluctuation, by averaging discharge for intervals of day. Records good except those estimated, which are fair.

Discharge, in million gallons a day, of Honopou Stream near Huelo, Maui, for the year ending June 30, 1927

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	0.9	0.7	1.8	0.8	0.8	1.3	0.7		3.8	14.7	4.6	1.8
2	.9	2.5	1.6	.8	.8	1.3	1.8		2.3	4.2	3.6	2.0
3	.8	3.4	1.5	.8	.8	1.3	83		3.0	3.8	3.2	2.3
4	.8	1.0	1.4	.8	.8	1.3			6.6	3.2	3.1	1.6
5	.7	24	1.3	2.9	.7	1.2	11		3.4	3.0	2.9	1.5
6	.7	3.2	1.2	5.0	.7	1.2			4.5	2.6	3.0	3.2
7	.9	2.4	1.2	2.0	.7	1.2			4.2	2.5	5.6	2.9
8	.7	2.1	1.1	1.5	.7	1.1			3.4	2.3	15.2	1.7
9	.9	1.9	1.0	2.1	.7	1.1	6	1.6	3.0	2.1	3.8	1.9
10	.7	1.8	.9	1.6	.7	1.1			2.7	2.1	4.4	1.8
11	.6	1.6	.9	1.4	.7	1.1			2.6	2.9	3.2	1.5
12	.6	1.5	.9	1.4	.7	1.0			2.4	2.4	3.6	1.4
13	.6	1.8	1.1	1.3	.8	1.0	16		2.3	2.0	3.0	1.4
14	.6	3.6	.8	1.3	37	.9			2.1	11.8	2.7	1.3
15	.6	1.6	.8	1.3	5.1	.8			1.9	6.5	11.0	1.2
16	.6	1.5	.7	1.3	3.6	.8			1.9	12.0	7.5	2.2
17	.6	3.1	.7	1.4	3.0	.8		.9	3.3	16.2	5.6	1.7
18	.6	1.6	.7	1.3	2.5	.8		.8	2.5	17.8	4.8	1.3
19	.5	1.4	.8	1.3	2.3	.8		.8	1.9	23	4.2	1.3
20	.5	3.3	.7	1.3	2.0	.7		.8	1.8	46	3.7	1.2
21	.5	14.8	.6	1.2	1.9	.9		.8	1.8	20	3.2	1.1
22	.9	6.2	.5	1.4	1.8	.7		.7	1.7	14.9	3.1	1.0
23	.6	4.4	.5	1.4	1.7	.8	2.8	.7	3.0	10.9	2.9	1.0
24	.5	4.2	.5	1.4	1.6	.8		1.0	6.1	13.6	2.6	1.0
25	.6	4.0	.6	1.1	2.0	1.7		5.5	2.4	8.3	2.4	.9
26	.5	2.9	.4	1.0	1.8	1.8		3.0	2.0	7.5	2.3	.9
27	.6	2.7	.5	.9	1.6	1.2		2.1	1.9	6.2	2.3	.9
28	.6	3.0	1.4	2.1	1.5	.8		2.3	1.9	5.4	2.1	.8
29	.5	2.4	.9	1.2	1.4	.8		-------	2.6	4.8	2.0	.8
30	.4	2.3	.8	1.0	1.4	.8		-------	1.9	4.3	2.0	.8
31	.6	2.1	-------	.9	-------	.7		-------	10.3	-------	1.9	-------

NOTE.—Braced figures give mean discharge for periods indicated, estimated by comparison with record of Hoolawaliilii Stream; recorder not operating. Discharge Aug. 14 to Sept. 28 and Nov. 19 to Dec. 29, obtained from gage height corrected for backwater effect of grass as determined from study of engineer's notes, recorder graph, and by comparison with records of adjacent streams.

Monthly discharge of Honopou Stream near Huelo, Maui, for the year ending June 30, 1927

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July	0.9	0.4	0.65	1.01	20.1	62
August	24	.7	3.65	5.65	113	347
September	1.8	.4	.93	1.44	27.8	85
October	5.0	.8	1.46	2.26	45.2	139
November	37	.7	2.73	4.22	81.8	251
December	1.8	.7	1.03	1.59	31.8	97
January	83	----------	7.87	12.2	244	749
February	5.5	.7	1.61	2.49	45.0	138
March	10.3	1.7	3.07	4.75	95.2	292
April	46	2.0	9.23	14.3	277	850
May	15.2	1.9	4.05	6.27	126	385
June	3.2	.8	1.48	2.29	44.4	136
The year	83	.4	3.15	4.87	1,150	3,530

WAILOA DITCH AT HONOPOU, NEAR HUELO, MAUI

LOCATION.—100 feet below intake of Honopou Stream, half a mile west of Lupi, 2½ miles west of Kailua, and 7 miles by road and trail from Huelo.

RECORDS AVAILABLE.—November 19, 1922, to June 30, 1927.

EQUIPMENT.—Stevens continuous water-stage recorder at outer end of an adit tunnel. Discharge measurements made from plank across ditch at adit tunnel or at concrete viaduct at Halehaku Gulch 1 mile below gage.

CHANNEL AND CONTROL.—Channel is concrete-lined ditch in tunnel. Channel control; permanent.

EXTREMES OF DISCHARGE.—Maximum discharge during year, 170 million gallons a day, or 263 second-feet, at 5 a. m. January 3 (gage height, 5.70 feet); minimum discharge, 12.2 million gallons a day, or 18.9 second-feet, at 1.15 p. m. January 13 (gage height, 0.94 foot).

1922–1927: Maximum discharge recorded, that of January 3, 1927; minimum discharge, that of January 13, 1927.

DIVERSIONS AND REGULATION.—This ditch, as a continuation of Koolau ditch, diverts the ordinary flow of all streams on windward side of Haleakala between Makapipi Stream and Halehaku Gulch; completely regulated by spillways and gates.

OBJECT OF STATION.—To determine total amount of water diverted through the Koolau-Wailoa ditch system from Territorial lands.

UTILIZATION.—Water used for irrigation of sugar cane, power development, and domestic supply.

ACCURACY.—Stage-discharge relation permanent during year. Rating curve well defined; was checked very closely at 54 million gallons a day by one discharge measurement made in February. Operation of water-stage recorder satisfactory except as indicated in footnote to daily-discharge table. Daily discharge ascertained by applying to rating table mean daily gage height determined from recorder graph by inspecton or, for days of considerable fluctuation, by averaging discharge for intervals of day. Records good.

Wailoa ditch, at elevation about 1,200 feet, diverts the ordinary flow of all streams on the windward side of the crater of Haleakala between Waikamoi and Halehaku Streams, inclusive. As the continuation of Koolau ditch it carries also the ordinary flow of all streams east of Waikamoi as far as Makapipi Stream. The Koolau-Wailoa system comprises about 18 miles of main ditch; Wailoa ditch

proper being about 10 miles long with a rated carrying capacity of 146 million gallons a day. The general course of the ditch is northwestward along the side of Haleakala. The water is carried to a point near Paia where it is distributed for the irrigation of sugar cane, and for power and domestic supply on the plantations of Hawaiian Commercial & Sugar Co. and Maui Agricultural Co. The Koolau-Wailoa system is the most important of the East Maui Irrigation Co.'s ditch lines and is the largest ditch system in the Hawaiian Islands.

Discharge, in million gallons a day, of Wailoa ditch at Honopou, near Huelo, Maui, for the year ending June 30, 1927

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	37	118		85	67	51	54	96	158	162	154	126
2	37	154		78	57	48	70	88	154	138	144	122
3	34	158		67	54	48	166	78	162	146	122	146
4	33	134		67	51	48	166	74	162	114	132	114
5	32	158		132	51	45	166	71	158	99	146	126
6	36	146		162	48	48	162	67	162	85	154	150
7	54	118		150	45	57	162	64	162	78	162	154
8	36	111		118	42	42	166	60	158	71	162	130
9	75	96		138	42	40	162	57	150	85	158	134
10	51	96		134	40	40	150	54	142	92	162	118
11	42	78		103	42	38	142	54	126	138	150	99
12	40	67		88	51	42	166	57	111	146	150	92
13	42	121		81	45	42	130	51	111	130	146	85
14	37	154		78	160	37	162	48	107	164	134	78
15	48	134	90	71	158	36	146	45	96	162	164	78
16	40	130		71	134	34	130	84	107	166	164	130
17	59	154		99	142	36	114	60	107	166	162	132
18	72	142		88	99	39	103	48	146	166	158	130
19	48	118		118	96	81	96	45	101	166	152	88
20	38	126		78	99	42	92	42	88	168	142	92
21	36	170		67	99	83	136	42	81	166	134	78
22	111	166		67	78	48	150	40	78	166	130	67
23	64	158		78	67	104	107	38	103	166	114	64
24	56			81	64	92	122	65	103	166	107	71
25	83			78	88	142	154	166	85	166	99	64
26	42			64	81	154	160	158		164	92	57
27	56	130		60	64	146	138	146		162	96	54
28	85			106	57	111	122	150	75	154	114	54
29	48		122	97	54	78	126	-------		154	126	64
30	48		96	67	54	64	111	-------		150	126	67
31	66		-------	67	-------	57	96	-------	102	-------	107	-------

NOTE.—Braced figures give mean discharge for periods indicated, estimated by comparison with record of this ditch at Wahinepe near Huelo; recorder not operating.

Monthly discharge of Wailoa ditch at Honopou, near Huelo, Maui, for the year ending June 30, 1927

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July	111	32	51.2	79.2	1,590	4,870
August	170	67	131	203	4,050	12,500
September	----------	----------	91.3	141	2,740	8,410
October	162	60	91.5	142	2,840	8,700
November	160	40	74.3	115	2,230	6,840
December	154	34	63.6	98.4	1,970	6,050
January	166	54	133	206	4,130	12,700
February	166	38	73.1	113	2,050	6,280
March	162	----------	116	179	3,600	11,000
April	168	71	142	220	4,260	13,100
May	164	92	138	214	4,260	13,100
June	154	54	98.8	153	2,960	9,100
The year	170	32	100	155	36,700	113,000

NEW HAMAKUA DITCH AT HONOPOU, NEAR HUELO, MAUI

LOCATION.—600 feet below Honopou Stream crossing, 15 feet above tunnel portal, 2½ miles west of Kailua, and 7 miles by road and trail from Huelo.

RECORDS AVAILABLE.—May 14, 1921, to June 30, 1927. January 25, 1918, to May 13, 1921, at site 300 feet upstream. Records comparable.

EQUIPMENT.—Stevens continuous water-stage recorder on right bank. Discharge measurements made by wading or from plank across ditch near gage.

CHANNEL AND CONTROL.—Sides and bottom of ditch composed of hardpan; fairly smooth. Channel straight for 25 feet above and about 1,000 feet below station. No well-defined control; stage-discharge relation affected by deposition of mud and gravel on ditch bottom and by caving of tunnel roof.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 134 million gallons a day, or 207 second-feet, at 7.30 a. m. August 5 (gage height from water-stage recorder, 5.98 feet); minimum discharge, 0.2 million gallons a day, or 0.3 second-foot, from 7 to 8 p. m. July 26 (gage height, −0.23 foot).

1918–1927: Maximum discharge recorded, that of August 5, 1926; minimum discharge, 0.07 million gallons a day, or 0.11 second-foot, from 6 to 10 a. m. August 7, 1923 (gage height, −0.23 foot).

DIVERSIONS AND REGULATION.—Ditch receives small amount of seepage and, during floods, the waste water from Wailoa ditch intakes. Flow regulated by gates and spillways.

OBJECT OF STATION.—To determine amount of water diverted from Territorial lands above to fee-simple lands below.

UTILIZATION.—Water used for irrigation of sugar cane.

ACCURACY.—Stage-discharge relation unstable October 6–27 and January 3 to June 30 owing to shifting-control conditions caused by accumulation of débris and subsequent cleaning of the ditch. Basic rating curve fairly well defined below 80 million gallons a day; extension above somewhat uncertain. Shifting-control method based on study of gage-height graph and three low-water discharge measurements, two measurements made during year and one shortly after June 30. Operation of water-stage recorder satisfactory except as indicated in footnote to daily-discharge table. Daily discharge ascertained by applying to rating table mean daily gage height determined from recorder graph by inspection or, for days of considerable fluctuation, by averaging discharge for intervals of day. Records fair.

New Hamakua ditch, at elevation about 500 feet, diverts from all streams on the windward side of Haleakala, below Wailoa ditch and between Waikamoi and Halehaku Streams inclusive. The water is carried to a point near Paia where it is distributed for the irrigation of sugar cane. The system comprises about 14 miles of main ditch and has a rated carrying capacity of 75 million gallons a day. Upon completion of Wailoa ditch New Hamakua ditch was abandoned west of Halehaku and became a storm-water ditch east of Halehaku.

Discharge, in million gallons a day, of New Hamakua ditch at Honopou, near Huelo, Maui, for the year ending June 30, 1927

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	0.8	1.1	4.7	3.2	2.0	1.9	1.6	2.0	50	62	5.2	0.5
2	.8	56	4.1	3.0	1.7	1.8	4.7	1.9	23	8.8	2.4	.6
3	.8	67	4.0	2.8	1.6	1.8	105	1.7	70	11.2	1.0	1.8
4	.7	11.6	4.0	2.7	1.5	1.7	78	1.5	62	2.4	1.1	.5
5	.7	56	3.8	33	1.5	1.7	44	1.5	37	3.2	1.9	.4
6	.8		3.8	65	1.5	1.5	37	1.4	51	1.6	2.6	6.2
7	1.7	5.5	3.9	24	1.4	3.1	39	1.3	62	1.4	17.1	7.0
8	1.0		4.0	3.2	1.4	1.9	67	1.3	33	1.2	10.6	.8
9	2.3		3.7	10.6	1.4	1.7	26	1.2	10.8	1.8	5.7	.6
10	1.2	4.3	3.6	5.4	1.3	1.6	7.6	1.2	3.8	1.4	9.1	.4
11	.8	4.0	3.5	3.2	1.2	1.5	4.0	1.1	1.3	25	2.9	1.3
12	.7	3.7	3.2	2.8	1.4	1.4	74	1.0	1.2	19.8	7.3	1.2
13	.9	12.8	19.8	2.6	2.2	1.4	56	1.0	1.2	4.4	1.8	1.0
14	.6	50	5.9	2.6	77	1.4	21	.9	1.2	55	.9	.9
15	.8	13.4	3.5	2.5	37	1.3	5.6	.8	1.0	23	38	.9
16	.7	7.3	3.2	2.3	6.6	1.2	3.7	2.7	1.0	51	34	15.3
17	.4	42	3.1	3.0	13.5	1.2	3.2	1.2	9.1	51	14.5	13.1
18	1.2	17.2	3.1	3.4	4.0	1.2	2.8	.9	11.3	49	7.1	1.1
19	.5	4.4	25	6.9	3.6	2.0	2.5	.8	1.0	28	3.2	.9
20	.4	20	5.2	2.6	3.2	1.5	2.3	.8	.9	57	1.5	.8
21	.3	87	3.8	2.3	3.2	4.2	25	.8	.8	31	1.0	.7
22	10.1	67	3.6	2.2	2.8	1.9	37	.7	.8	44	.8	.7
23	.5	30	3.4	2.8	2.5	13.0	2.6	.7	4.0	23	.8	.6
24	.3	10.8	3.2	4.6	2.3	3.0	2.3	7.5	4.5	42	.8	.6
25	.5	26	15.0	2.2	2.9	31	28	75	1.2	14.5	.7	.6
26	.2	5.1	3.6	2.1	2.8	38	50	57	3.2	13.8	.6	.5
27	2.1	4.9	5.8	1.9	2.3	26	6.2	11.2	1.0	8.6	.6	.5
28	1.0	12.4	42	18.3	2.1	3.9	2.5	23	.9	3.8	.8	.5
29	.5	8.6	6.7	4.9	2.1	2.0	6.1	-------	1.7	3.6	.6	.5
30	.6	21	3.4	2.3	2.0	1.8	2.2	-------	1.1	2.8	.8	.5
31	.5	9.0	-------	2.1	-------	1.7	2.0	-------	18.5	-------	.5	-------

NOTE.—Discharge estimated Aug. 1, 2, 4, and 5. Braced figure gives estimated mean discharge for period indicated. Estimates made by comparison with East Maui Irrigation Co.'s twice-daily staff gage readings on this ditch about half a mile upstream; recorder not operating.

Monthly discharge of New Hamakua ditch at Honopou, near Huelo, Maui, for the year ending June 30, 1927

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July	10.1	0.3	1.11	1.72	34.4	106
August	87	1.1	21.8	33.7	675	2,076
September	42	3.1	6.85	10.6	206	631
October	65	1.9	7.44	11.5	230	705
November	77	1.2	6.33	9.79	190	583
December	38	1.2	5.14	7.95	159	489
January	105	1.6	24.2	37.4	749	2,300
February	75	.7	7.22	11.2	202	620
March	70	.8	15.1	23.4	470	1,440
April	62	1.2	21.5	33.3	645	1,980
May	38	.5	5.67	8.77	176	539
June	15.3	.4	2.03	3.14	61.0	187
The year	105	.3	10.4	16.1	3,800	11,700

KAUHIKOA DITCH AT OPANA WEIR, NEAR HUELO, MAUI

LOCATION.—A short distance below crossing of Opana Stream and 8 miles by road west of Huelo post office.

RECORDS AVAILABLE.—January 1, 1910, to June 30, 1927.

EQUIPMENT.—Friez water-stage recorder. Discharge measurements made from plank across ditch below gage.

CHANNEL AND CONTROL.—Recorder operates in large pool. Control is a 25-foot sharp-crested weir.

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

DIVERSION AND REGULATION.—Regulated by gates at frequent intervals.

OBJECT OF STATION.—Opana Weir is one of four weirs which measure water diverted from Territorial lands through Kauhikoa, New Hamakua, Lowrie, and Haiku ditches by East Maui Irrigation Co.

UTILIZATION.—Water used for irrigation of sugar cane.

COOPERATION.—Daily-discharge record furnished by East Maui Irrigation Co.

Kauhikoa ditch at elevation about 900 feet, above Lowrie and Haiku ditches, diverts from all streams on the windward side of the crater of Haleakala between Halehaku and Maliko Streams, inclusive. The water is carried to a point near Paia and distributed for irrigation of sugar cane. The ditch comprises about 6 miles of main channel and has a carrying capacity of 90 million gallons a day. Kauhikoa ditch replaced Old Hamakua ditch west of Halehaku.

Discharge, in million gallons a day, of Kauhikoa ditch at Opana Weir, near Huelo, Maui, for the year ending June 30, 1927

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	1.1	4.3	2.8	1.6	1.1	1.3	1.9	5.9	51	53	24	4.0
2	1.1	72	2.5	1.4	1.0	1.3	19.5	5.8	40	25	75	4.2
3	1.1	68	2.3	1.3	.8	1.2	88	4.6	87	15.3	6.0	7.7
4	1.1	8.5	2.2	1.2	.8	1.2	87	4.1	75	7.1	6.0	3.6
5	.8	65	2.1	52	.8	1.2	68	3.9	49	6.8	9.7	3.4
6	.8	21	2.0	81	.8	1.4	62	3.5	66	5.2	13.6	29
7	1.1	2.5	2.1	26	.8	1.8	74	3.3	72	4.7	43	18.7
8	.9	2.1	2.2	2.4	.8	.9	83	3.1	40	4.4	31	4.6
9	1.5	2.1	1.9	12.3	.8	.8	46	2.9	14.7	5.3	20	4.6
10	1.0	2.1	1.8	4.4	.8	.8	22	2.6	5.4	4.4	27	4.0
11	1.0	1.8	1.8	2.2	.8	.8	21	2.4	3.0	41	16.3	4.4
12	.9	1.5	1.6	1.8	1.0	.8	95	2.2	2.8	18.4	28	3.9
13	1.0	12.9	29	1.8	2.0	.8	68	2.1	2.7	20	11.5	3.5
14	.9	51	3.2	1.7	92	.8	32	2.0	2.6	53	9.1	3.4
15	.8	6.9	1.9	1.6	47	.8	18.2	2.0	2.2	43	71	3.4
16	.8	8.8	1.8	1.5	6.8	.8	17.2	6.0	2.2	67	70	19.1
17	.8	57	1.5	2.2	19.3	.8	11.6	3.1	15.4	69	46	19.3
18	1.2	14.2	1.5	5.1	3.1	.8	10.2	2.0	11.5	42	31	3.8
19	.7	2.4	30	3.7	2.3	1.0	9.3	2.0	2.4	1.0	20	3.4
20	.6	79	2.9	1.7	1.1	.8	8.4	1.8	2.0	.3	8.9	3.3
21	.7	90	2.0	1.4	2.0	2.9	49	1.7	1.8	34	5.2	3.2
22	9.0	53	1.4	1.5	1.8	11.0	56	1.5	2.5	76	5.2	3.0
23	.6	31	2.2	3.8	1.8	1.4	38	1.4	10.7	59	4.8	3.0
24	.6	16.5	3.3	2.4	1.7	37	22	21	10.9	87	4.6	3.0
25	1.3	22	14.9	1.5	2.3	51	61	82	3.4	84	4.4	3.0
26	.6	3.6	1.5	1.2	2.0	25	60	59	4.4	41	4.3	2.7
27	1.7	3.5	12.3	1.1	1.7	3.0	10.8	18.1	2.5	31	4.4	2.6
28	1.4	14.8	43	24	1.5	2.5	6.1	39	3.1	17.0	4.5	2.6
29	.6	31	3.0	2.0	1.5	2.3	8.2	------	4.0	14.9	4.2	2.6
30	.6	16.5	1.8	1.3	1.4	1.0	7.0	-------	2.5	11.8	9.2	2.6
31	.8	7.6	-------	1.2	-------	2.0	6.3	-------	38	-------	4.0	-------

Monthly discharge of Kauhikoa ditch at Opana Weir, near Huelo, Maui, for the year ending June 30, 1927

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July	9.0	0.6	1.20	1.86	37.1	114
August	90	1.5	24.9	38.5	773	2,370
September	43	1.4	6.08	9.41	182	560
October	81	1.1	8.01	12.4	248	762
November	92	.8	6.72	10.4	202	619
December	51	.8	5.14	7.95	159	489
January	95	1.9	37.6	58.2	1,170	3,580
February	82	1.4	10.3	15.9	289	885
March	87	1.8	20.3	31.4	631	1,930
April	87	.3	31.4	48.6	942	2,890
May	75	4.0	20.1	31.1	622	1,910
June	29	2.6	5.99	9.27	180	551
The year	95	.3	14.9	23.1	5,440	16,700

LOWRIE DITCH AT OPANA WEIR, NEAR HUELO, MAUI

LOCATION.—A short distance west of Halehaku Gulch and 8 miles by road northwest of Huelo post office.

RECORDS AVAILABLE.—January 1, 1910, to March 31, 1927, when station was discontinued.

EQUIPMENT.—Friez water-stage recorder. Discharge measurements made from plank across ditch 100 feet downstream.

CHANNEL AND CONTROL.—Recorder operates in large pool. Control is a 16⅓-foot sharp-crested weir with end contractions.

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

DIVERSIONS AND REGULATION.—Regulated by gates at frequent intervals.

OBJECT OF STATION.—Opana Weir is one of four weirs which measure water diverted from Territorial lands through Kauhikoa, New Hamakua, Lowrie, and Haiku ditches by East Maui Irrigation Co.

UTILIZATION.—Water used for irrigation of sugar cane.

COOPERATION.—Daily-discharge record furnished by East Maui Irrigation Co.

Lowrie ditch at elevation about 500 feet, above Haiku ditch and below Wailoa and New Hamakua ditches, is a continuation of Manuel Luis and Center ditches and diverts from streams on the windward side of the crater of Haleakala between Kailua and Halehaku Streams, inclusive. At Kailua Stream it receives the combined flow of Manuel Luis and Center ditches. The water is carried to a point near Paia and distributed for the irrigation of sugar cane. The ditch comprises about 15 miles of main channel and has a carrying capacity of 65 million gallons a day. With the completion of Wailoa ditch, Lowrie ditch became mainly a storm-water ditch or reservoir feeder.

Discharge, in million gallons a day, of Lowrie ditch at Opana Weir, near Huelo, Maui, for the year ending June 30, 1927

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.
1	0.7	1.3	2.5	2.1	1.6	3.1	2.0	5.5	34
2	.8	27	2.0	2.0	1.4	3.0	5.6	5.1	17.9
3	.9	32	1.7	1.8	1.3	2.8	40	4.9	42
4	.8	5.0	1.5	1.8	1.3	2.7	33	4.6	47
5	1.0	46	1.3	16.4	1.3	2.4	26	4.5	27
6	1.0	16.0	2.1	27	1.3	2.7	16.8	4.7	36
7	1.5	4.7	2.6	9.4	1.3	3.4	24	4.5	42
8	1.2	3.6	2.5	3.0	1.3	2.2	30	4.5	21
9	1.6	2.9	2.0	5.7	1.3	2.2	15.9	5.4	14.0
10	1.2	2.8	1.8	6.0	1.3	2.1	19.5	4.8	9.0
11	.9	2.2	1.7	4.0	1.8	2.1	13.5	4.6	6.5
12	.9	2.0	1.8	3.2	2.2	2.1	36	5.1	5.9
13	1.3	2.4	15.3	2.7	4.8	2.1	26	5.4	6.3
14	1.2	15.1	3.3	2.7	36	2.0	14.0	5.0	5.9
15	1.2	7.2	2.0	2.6	16.5	2.0	9.4	4.8	5.8
16	1.2	4.6	1.7	2.5	9.0	2.0	7.7	9.2	5.8
17	1.2	26	1.6	2.7	8.4	2.6	7.2	6.0	7.2
18	1.2	7.8	1.6	2.8	5.0	2.4	6.6	5.0	6.9
19	.8	2.6	9.9	3.1	4.8	4.1	5.3	4.8	5.2
20	.8	12.7	4.6	2.1	4.7	3.2	4.8	4.7	5.2
21	.8	48	2.6	1.8	6.4	4.3	22	4.8	5.4
22	1.6	28	2.2	2.0	4.2	2.2	25	4.6	5.4
23	1.0	7.0	2.4	3.6	4.1	11.2	8.9	4.4	11.0
24	.9	5.1	2.2	3.0	3.8	3.6	7.6	10.0	17.7
25	.6	5.0	3.8	1.9	4.8	13.1	21	55	8.6
26	.3	4.0	2.4	1.8	4.4	17.9	26	37	7.5
27	1.3	3.7	3.2	1.8	3.8	9.9	8.1	8.3	6.4
28	2.0	5.1	14.6	4.3	3.5	2.2	6.2	12.2	14.1
29	1.1	5.4	3.1	2.4	3.2	1.2	7.0	-------	13.7
30	.8	6.2	2.1	1.6	3.2	1.0	5.5	-------	8.9
31	1.1	4.9	-------	1.5	-------	1.0	5.3	-------	21

Monthly discharge of Lowrie ditch at Opana Weir, near Huelo, Maui, for the yea ending June 30, 1927

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July	2.0	0.3	1.06	1.64	32.9	101
August	48	1.3	11.2	17.3	346	1,070
September	15.3	1.3	3.40	5.26	102	313
October	27	1.5	4.17	6.45	129	397
November	36	1.3	4.93	7.63	148	454
December	17.9	1.0	3.83	5.93	119	364
January	40	2.0	15.7	24.3	486	1,490
February	55	4.4	8.55	13.2	239	735
March	47	5.2	15.2	23.5	470	1,450
The period	55	.3	7.57	11.7	2,070	6,370

HAIKU DITCH AT MANAWAI GULCH, NEAR PEAHI, MAUI

Location.—In bottom of western branch of Manawai Gulch just west of Keaaula-Opana boundary, a quarter of a mile north of Peahi, and 8 miles by road northwest of Huelo.

Records available.—October 7, 1914, to June 30, 1927. January 1, 1910, to October 7, 1914, at Peahi Weir, on old Haiku ditch.

EQUIPMENT.—Friez water-stage recorder. Discharge measurements made from concrete footbridge across ditch.

CHANNEL AND CONTROL.—Control is submerged concrete weir across ditch. Station rated by engineers of East Maui Irrigation Co.; subject to shifts from gradual accumulation of débris on upstream side of control.

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

DIVERSIONS AND REGULATION.—Regulated by gates at frequent intervals.

OBJECT OF STATION.—To determine amount of water diverted from Territorial lands by East Maui Irrigation Co.

UTILIZATION.—Water used for irrigation of sugar cane.

COOPERATION.—Daily-discharge record furnished by East Maui Irrigation Co.

Haiku ditch, at elevation about 250 feet and below all other main ditches, diverts from all streams on the windward side of the crater of Haleakala between Kailua Stream and Maliko Gulch. The water is carried to a point near Paia and distributed for irrigation of sugar cane. The ditch comprises about 16 miles of main channel and has a carrying capacity of 87 million gallons a day. Haiku ditch replaced Spreckels ditch west of Kailua Stream.

Discharge, in million gallons a day, of Haiku ditch at Manawai Gulch, near Peahi, Maui, for the year ending June 30, 1927

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	2.6	8.5	11.6	8.3	6.0	5.9	6.3	16.4	47	50	74	25
2	2.7	66	10.0	7.9	5.2	5.7	18.4	15.1	37	26	37	25
3	2.5	62	9.0	6.9	5.0	5.4	100	13.4	79	23	28	42
4	2.2	14.1	8.8	6.8	5.0	5.4	99	12.3	69	19.4	33	21
5	2.1	73	8.1	37	4.9	5.3	61	11.7	43	23	45	31
6	2.8	29	8.0	58	4.5	9.3	48	11.3	53	19.2	52	65
7	4.6	17.8	8.8	24	4.1	9.6	69	10.6	58	17.8	75	58
8	2.6	19.2	7.9	12.5	3.9	5.3	83	16.2	36	22	75	23
9	5.1	19.0	6.6	22	3.8	4.8	35	16.2	30	27	70	29
10	3.3		5.8	25	3.7	4.8	31	15.1	21	27	73	20
11	2.5	13	5.6	23	4.6	4.8	29	14.3	16.8	56	48	30
12	3.0		5.6	20	7.8	5.2	97	13.7	14.6	31	56	28
13	2.9	29	27	13.6	8.4	4.6	81	18.1	16.8	32	40	15.8
14	2.9	52	9.9	13.0	73	4.2	46	17.3	18.5	81	30	14.7
15	3.8	29	6.4	12.1	40	4.1	35	15.1	18.5	74	83	12.5
16	2.8	23	15.5	12.0	22	4.0	30	11.6	22	82	76	31
17	6.6	44	17.2	13.4	22	4.7	26	8.0	25	86	75	25
18	4.1	19.9	11.8	17.1	17.2	5.1	23	8.2	30	91	72	13.2
19	2.0	14.9	30	12.5	19.0	12.2	21	9.4	22	94	58	12.3
20	1.8	38	18.2	8.2	21	5.0	19.8	10.3	25	94	39	12.0
21	2.1	73	13.2	7.3	29	12.3	54	10.1	24	86	32	10.3
22	10.6	36	12.6	10.4	22	6.0	43	9.7	26	84	30	9.8
23	3.4	19.4	11.0	10.8	22	28	20	9.6	15.3	83	26	9.8
24	2.8	36	10.6	10.9	22	15.1	18.5	18.8	14.8	82	24	9.8
25	3.2	31	18.3	7.3	18.4	32	45	81	10.1	79	22	9.8
26	1.8	20	9.0	6.2	16.0	39	51	44	13.5	80	20	8.3
27	6.7	7.8	17.6	6.2	10.2	26	23	17.8	10.6	76	21	7.9
28	7.3	17.7	37	15.8	7.5	10.0	21	33	15.2	73	25	7.6
29	3.4	20	12.4	10.8	6.8	7.6	22	-------	16.6	68	22	7.6
30	2.9	19.6	11.1	6.4	6.1	6.8	17.8	-------	11.4	52	25	7.8
31	4.2	18.6	-------	6.3	-------	6.6	16.4	-------	42	-------	21	-------

NOTE.—Braced figure gives mean discharge for period indicated. Estimated by U. S. Geol. Survey, by comparison with records for Kauhikoa and Lowrie ditches at Opana Weir; water-stage recorder not operating.

Monthly discharge of Haiku ditch at Manawai Gulch, near Peahi, Maui, for the year ending June 30, 1927

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July	10.6	1.8	3.59	5.55	111	342
August	73	7.8	28.9	44.7	896	2,750
September	37	5.6	12.8	19.8	385	1,180
October	58	6.2	14.6	22.6	452	1,390
November	73	3.7	14.7	22.7	441	1,350
December	39	4.0	9.83	15.2	305	935
January	100	6.3	41.6	64.4	1,290	3,960
February	81	8.0	17.4	26.9	488	1,500
March	79	10.1	28.4	43.9	882	2,700
April	94	17.8	57.9	89.6	1,740	5,330
May	83	20	45.4	70.2	1,410	4,320
June	65	7.6	20.7	32.0	622	1,910
The year	100	1.8	24.7	38.2	9,020	27,700

MISCELLANEOUS DISCHARGE MEASUREMENTS

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

Miscellaneous discharge measurements on Maui during the year ending June 30, 1927

Date	Stream	Locality	Gage height (feet)	Discharge	
				Second-feet	Million gallons a day
Aug. 12	Honokahau ditch	Near Honokahau	1.30	19.0	12.3
Aug. 13	Kamole by-pass	Near Paia	1.01	27.5	17.7
Do	do	do	1.10	32.5	21.0
Do	do	do	.90	23.0	14.9
Do	do	do	1.18	36.5	23.6
Sept. 22	Maniania ditch	Near Wailuku	2.80	10.1	6.53
Do	do	do	3.22	22.7	14.7
Do	do	do	3.05	18.1	11.7
Do	do	do	2.81	10.0	6.46
Do	do	do	2.65	7.38	4.77
Do	do	do	3.22	23.0	14.9
Do	do	do	3.02	17.5	11.3
Do	do	do	3.20	22.6	14.6
Do	Iao-Waikapu ditch	do	1.68	22.7	14.7
Do	do	do	1.71	23.2	15.0
Sept. 23	do	do	1.04	12.8	8.27
Do	South Waikapu ditch	Near Waikapu	1.01	5.30	3.43
Sept. 24	Honokahau ditch	Near Honokahau	1.38	21.4	13.8
Oct. 6	do	At station B-2, near Honokahau	1.99	32.3	20.9
Do	do	At B-9 flume, near Honokahau	1.79	17.9	11.6
Nov. 10	do	do	1.18	13.9	8.98
Nov. 17	Haiku ditch	At station 6, near Puunene	2.15	52.7	34.1
Do	do	At station 21, near Puunene	1.30	20.7	13.4
Nov. 18	Waihee ditch	At station 18, near Puunene	1.12	9.23	5.97
Do	do	At station 17, near Puunene	1.72	45.7	29.5
Do	Lowrie ditch	At station 3, near Puunene	.98	15.9	10.1
Nov. 19	Haiku ditch	At station 8, near Puunene		15.7	10.1
Do	do	At station 3, near Puunene	1.88	47.0	30.4
Nov. 20	Ditch station No. 77	Near Paia	.35	3.34	2.16
Do	do	do	.31	2.70	1.75
Do	Ditch station No. 72A	do	.10	.443	.286
Do	Ditch station No. 77	do	.212	1.57	1.01
Do	Ditch station No. 77A	do	.155	.930	.601
Do	do	do	.22	1.71	1.11
Jan. 13	Hanawi Stream	At elevation 500 feet	1.18	20.4	13.2
Jan. 19	Honolewa Stream	At highway bridge near Kipahulu		1.75	1.13
Do	Oheo Stream	200 feet above highway bridge near Kipahulu.		2.38	1.54
Do	Kahalawe Stream	At highway bridge near Kipahulu		2.48	1.60
Do	Kaili Stream	do		.968	.626
Do	Waieli Stream	do		1.22	.789
Do	Manamana Stream	do		2.15	1.39
Jan. 20	Hanawi Stream	At elevation 500 feet	1.12	16.7	10.8

Miscellaneous discharge measurements on Maui during the year ending June 30, 1927—Continued

Date	Stream	Locality	Gage height (feet)	Discharge	
				Second-feet	Million gallons a day
Feb. 5	Kaili Stream	At highway bridge near Kipahulu		1.08	0.698
Do	Kahalawe Stream	do		3.49	2.26
Do	Waieli Stream	do		1.68	1.09
Do	Oheo Stream	do		6.56	4.24
Do	Honolewa Stream	do		2.10	1.36
Do	Manamana Stream	do		3.11	2.01
Feb. 16	E. M. I. Co.'s station No. 4.	Keanae Valley	0.56	5.36	3.46
Do	E. M. I. Co.'s station No. 5.	do	.06	.297	.192
Do	do	do	.05	.238	.154
Do	Nuailua Stream	At elevation 500 feet		.740	.478
Do	Keanae Spring	Keanae Valley		3.63	2.35
Feb. 19	Left branch of Kahalawe Stream.	At old ditch level near Kipahulu		.470	.304
Feb. 20	Waieli Stream	At highway bridge near Kipahulu		.750	.485
Do	do	At elevation 1,500 feet		.864	.558
Do	Kaili Stream	do		.669	.432
Do	do	At highway bridge near Kipahulu		.693	.448
Do	Honolewa Stream	Old ditch level near Kipahulu		1.29	.834
Do	do	At highway bridge near Kipahulu		.991	.641
Do	Manamana Stream	At Hanapipe line intake		1.52	.982
Do	do	At highway bridge near Kipahulu		.646	.418
Feb. 23	Honokahau tunnel	At Honolua station, near Honokahau		11.8	7.63
Feb. 24	Honolua ditch	do		11.8	7.63
Feb. 25	Honokahau ditch	At Lahaina side B-9 flume, near Honokahau.		36.2	23.4
Feb. 28	Kahoma ditch	Near Lahaina		6.53	4.22
Do	do	do		6.27	4.05
Do	Honokahau ditch	At flume B-9, near Honokahau		15.6	10.1

ISLAND OF HAWAII

WAILUKU RIVER AT PUKAMAUI, NEAR HILO, HAWAII

LOCATION.—At Pukamaui, three-quarters of a mile above intake of Hilo Boarding School ditch and 4 miles west of Hilo.

RECORDS AVAILABLE.—April 24, 1923, to June 30, 1927. Also March 21, 1911, to July 21, 1913, and January 2 to June 30, 1918, at stations above Hilo Electric Co.'s power house, near Hilo; records not comparable.

EQUIPMENT.—Gurley 7-day water-stage recorder. Charts changed by employee of county engineer. Discharge measurements made by wading near gage.

CHANNEL AND CONTROL.—One channel at all stages. Banks high, about 1 on 4 slope. Stream bed composed of solid lava rock. Control, lava flow and is permanent between severe floods; forms large pool.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, unknown owing to missing gage-height record; minimum discharge, no flow, July 1 to 3 p. m. July 9, 1 p. m. July 11 to 1 p. m. July 12, and 10 a. m. July 15 to 9.45 p. m. July 17 (gage height, 5.00 feet or below).

1922–1927: Maximum discharge recorded, 1,570 million gallons a day, or 2,430 second-feet, at 6.30 p. m. December 18, 1923 (gage height from water-stage recorder, 11.48 feet); minimum discharge, no flow, from 7.45 a. m. June 11 to 1.30 a. m. June 12, 6 p. m. June 12 to 10.15 a. m. June 15 at 9 a. m. June 24, 4.30 p. m. June 26 to 3 p. m. July 9, 1 p. m. July 11 to 1 p. m. July 12, and 10 a. m. July 15 to 9.45 p. m. July 17, 1926, (gage height, 5.00 feet or below).

DIVERSIONS AND REGULATION.—Intake of Hilo waterworks diverts water from gage pool; diversions regulated by head gates.

OBJECT OF STATION.—To determine amount of water passing intake of Hilo waterworks and available to other users.

UTILIZATION.—Ordinary flow used for power and irrigation.

ACCURACY.—Stage-discharge relation permanent during year except as affected by shifting control December 7–14. Rating curve well defined below 25 million gallons a day; extension above, uncertain. This curve checked very closely by seven discharge measurements well distributed from July to February and ranging from 3 to 22 million gallons a day. Shifting-control method based on one discharge measurement made December 10. Operation of water-stage recorder satisfactory except as indicated in footnote to daily-discharge table. Daily discharge ascertained by applying to rating table mean daily gage height determined from recorder graph by inspection or, for days of considerable fluctuation, by averaging discharge for intervals of day. Records good for ordinary stages except those estimated, which are poor; high-stage records poor.

Discharge, in million gallons a day, of Wailuku River at Pukamaui, near Hilo, Hawaii, for the year ending June 30, 1927

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	0.00	1.9	133		7.8	1.6	19.0	26				
2	.00	1.8	51		6.6	1.5	15.5	20				
3	.00	4.9	33		5.9	1.3	156	17.8				
4	.00	28	27		5.3	1.2	148	17.8				
5	.00	8.4	20	28	5.8	1.1	130	14.4				
6	.00	8.1	15.5		7.9	3.0	82	12.2				48
7	.00	11.3	13.3		5.6	9.2	60	36				
8	.00	10.8	12.2		5.4	3.6	58	35				
9	.2	8.8	10.4		5.0	2.6	38	24				
10	.2	5.8	9.6	14.4	4.2	2.8	28	15.5	95			
11	.00	6.0	11.3	10.4	3.1	5.6	22	9.6				
12	.00	3.9	9.6	8.8	2.8	5.9	17.8	9.1				17.8
13	.1	4.6	25	8.0	2.8	8.8	14.4	8.2				13.3
14	.15	14.6	36	7.4	27	24	12.2	7.7				11.3
15	.00	12.8	20	6.8	13.8	48	10.4	7.3		50	26	9.6
16	.00	7.4	17.8	6.3	8.2	27	9.6	6.8				
17	3.0	11.0	13.3	7.8	6.4	15.2	16.6	6.6				
18	15.2	11.2	12.2	7.3	5.3	33	13.3	6.7				
19	16.4	8.8		6.3	4.7	18.5	11.3	5.9				
20	7.2	7.8		5.6	4.1	78	8.8	5.3				
21	5.6	997		5.1	4.2	164	27	4.9				
22	3.6	252		4.6	4.1	76	53	4.6				
23	3.2	84		4.1	3.4	287	76	4.2				
24	2.8	42		3.7	3.1	350	55	3.9				
25	2.1	35	30	25	2.8	194	166	3.7				
26	1.6	22		75	2.6	174	208	------	13			
27	1.4	20		107	2.3	140	94	-------				
28	.8	15.5		58	2.1	67	63	---- --				
29	.3	34		38	1.9	44	53	----- -				
30	.6	50		23	1.8	31	44	-------				
31	.45	284	-------	10.0	-------	24	33	-------	-------	-------	-------	-------

NOTE.—Discharge estimated Sept. 13, 14, and Dec. 24–26. Braced figures give estimated mean discharge for periods indicated. Estimates made from study of fragmentary gage-height record and by comparison with record of flow for Honolii Stream; gage-height record either faulty or missing.

Monthly discharge of Wailuku River at Pukamaui, near Hilo, Hawaii, for the year ending June 30, 1927

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July	16.4	0.00	2.09	3.23	64.9	199
August	997	1.8	64.9	100	2,010	6,170
September	-------	9.6	27.7	42.9	830	2,550
October	107	3.7	22.4	34.7	695	2,130
November	27	1.8	5.53	8.56	166	509
December	350	1.1	59.4	91.9	1,840	5,650
January	208	8.8	56.2	87.0	1,740	5,350
February	36	-------	-------	-------	313	-------
March	-------	-------	65.9	102	2,040	6,270
April	-------	-------	50.0	77.4	1,500	4,600
May	-------	-------	26.0	40.2	806	2,470
June	-------	-------	-------	-------	580	-------

HONOLII STREAM NEAR HILO, HAWAII

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

RECORDS AVAILABLE.—February 21, 1924, to June 30, 1927. June 1, 1911, to March 24, 1913, at site about 1,000 feet below mouth of Pohakupaa Stream and about 2 miles below present site.

EQUIPMENT.—Stevens continuous water-stage recorder on right bank. Discharge measurements made by wading near gage or from cable, 1,000 feet downstream. Cable is below Hilo Sugar Co.'s upper ditch so the flow of ditch is added to discharge measured at cable section.

CHANNEL AND CONTROL.—Stream bed rocky; free from weeds. Channel fairly straight for 100 feet above and 500 feet below gage. Both banks are steep. Control is solid rock, somewhat improved with short low concrete walls on either side; permanent.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 1,620 million gallons a day, or 2,510 second-feet, at 5.15 p. m. April 26 (gage height from water-stage recorder, 11.69 feet); minimum discharge, 0.4 million gallons a day, or 0.6 second-foot, from 9 a. m. July 2 to 7 a. m. July 3 (gage height, 4.23 feet).

1924–1927: Maximum discharge recorded, 3,060 million gallons a day, or 4,730 second-feet, at 2.15 p. m. November 21, 1924 (gage height estimated from floodmarks, 16.5 feet); minimum discharge, 0.1 million gallons a day, or 0.2 second-foot, from 7 a. m. to midnight February 9 and from 9 to 11 p. m. April 14, 1926 (gage height, 4.16 feet).

DIVERSIONS AND REGULATION.—None.

OBJECT OF STATION.—To determine characteristic flow of near-by streams, of which Honolii Stream is typical.

UTILIZATION.—Low flow used for fluming of sugar cane.

ACCURACY.—Stage-discharge relation permanent during year. Rating curve well defined below 40 million gallons a day; extension above, uncertain. This curve checked closely in August, November, and January by three discharge measurements ranging from 1 to 36 million gallons a day. Operation of water-stage recorder fairly satisfactory except as indicated in footnote to daily-discharge table. Daily discharge ascertained by applying to rating table mean daily gage height determined from recorder graph by inspection or, for days of considerable fluctuation, by averaging discharge for intervals of day. Records good for ordinary stages except those estimated, which are poor; high-stage records poor.

Discharge, in million gallons a day, of Honolii Stream near Hilo, Hawaii, for the year ending June 30, 1927

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	0.6	4.7	74	42	6.9	0.9	9	14.1	42	20	15.4	24
2	.5	4.4	24	32	5.0	.8		10.4	14.6	151	14.1	75
3	.6	11.2	14.1	13.3	3.7	.8		8.6	164	46	10.0	188
4	.8	23	11.6	13.3	3.0	.7		9.3	169	16.8	23	53
5	.8	12.0	10.0	15.3	9.2	7		6.9	160	11.2	16.8	21
6	.7	14.1	8.3	54	13.0	1.2	44	5.8	160	8.6	23	16.8
7	.6	16.9	7.3	26	6.6	6.6		53	190	6.6	34	18.6
8	.6	15.8	6.9	13.7	4.7	3.0		52	114	5.5	34	21
9	.9	11.2	5.5	11.6	3.9	2.8		27	95	6.0	18.6	19.7
10	1.5	7.6	4.4	10.8	3.4	5.9		11.2	32	157	40	15.0

Discharge, in million gallons a day, of Honolii Stream near Hilo, Hawaii, for the year ending June 30, 1927—Continued

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
11	1.4	6.1	5.2	8.6	3.2	11.2		8.0	21	30	17.2	11.2
12	1.4	4.4	5.0	8.0	3.0	9.0		6.1	16.8	30	10.8	11.6
13	1.7	5.6	13.1	6.9	3.2	18.2		5.0	18.6	103	9.7	8.3
14	2.5	25	16.2	5.8	128	15.5		4.4	54	127	9.3	7.3
15	2.1	23	9.3	4.4	34	43		3.9	82	81	23	6.1
16	1.7	12.5	8.6	3.9		22	8	3.4	76	40	60	5.5
17	12.2	41		6.2		13.9		3.0	35	26	52	5.5
18	39	32		7.3		30		3.0	67	30	17.2	5.5
19	38	19.1		5.8		12.8		2.6	29	19.1	12.0	4.4
20	23	29		4.2		77		2.3	16.4	13.3	9.7	3.9
21	12.7	900	26	3.7	9.5	230		2.0	11.6	21	8.6	3.2
22	6.9	120		3.2		127		1.9	9.3	19.7	28	2.9
23	7.3	29		2.8		200		1.7	9.3	14.1	44	2.5
24	4.7	16.4		2.8		260		1.6	12.5	11.2	50	2.9
25	3.2	17.2		90			70	1.5	9.3	11.6	70	2.9
26	2.1	10.8	12.0	35				1.6	9.7	225	28	2.6
27	1.9	11.2	59	21		48		2.3	13.5	90	15.9	2.3
28	1.9	9.7	44	10.0	1.1			2.5	19.7	24	15.0	1.9
29	2.0	25	16.8	8.3	1.1			-------	11.6	23	11.2	1.6
30	2.5	42	10.8	11.6	1.0		31	-------	12.9	27	12.5	1.7
31	2.3	220	-------	9.3	-------		19.7	-------	12.0	-------	12.5	-------

NOTE.—Discharge estimated Aug. 21, 22, Nov. 14, 15, 28, Dec. 2, 3, Dec. 21–24, and Mar. 5–12. Braced figures give estimated mean discharge for periods indicated. Estimates made by comparison with record of flow for Wailuku River near Hilo or records of rainfall; gage-height record either faulty or missing.

Monthly discharge of Honolii Stream near Hilo, Hawaii, for the year ending June 30, 1927

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July	39	0.5	5.75	8.90	178	547
August	900	4.4	55.5	85.9	1,720	5,280
September	-------	4.4	20.0	30.9	600	1,840
October	60	2.8	15.8	24.4	491	1,500
November	128	1.0	11.6	17.9	348	1,070
December	260	.7	46.1	71.3	1,430	4,390
January	-------	-------	36.5	55.5	1,130	3,470
February	53	1.5	9.11	14.1	255	783
March	190	9.3	54.4	84.2	1,690	5,180
April	225	5.5	46.5	71.9	1,390	4,280
May	70	8.6	24.0	37.1	746	2,280
June	188	1.6	18.2	28.2	545	1,680
The year	900	.5	28.8	44.6	10,500	32,300

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