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

Water-Supply Paper 615

# SURFACE WATER SUPPLY of HAWAII

## JULY 1, 1924, *to* JUNE 30, 1925

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Prepared in cooperation with the
TERRITORY OF HAWAII

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## AUTHORITY FOR INVESTIGATIONS

This volume contains records of measurements of flow made on streams and ditches in the Territory of Hawaii during the year ending June 30, 1925. The investigations leading to the report were made 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 by the legislature of the Territory of Hawaii was approved:

ACT 27

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 commis-

sioners 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 80 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 counties of Maui and 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 or by direct reimbursement to the field men.

[1] The U. S. Geol. Survey also cooperated with the Territory of Hawaii in mapping the islands. The whole of the islands of Kauai, Oahu, Lanai, and Molokai and parts of the islands of Hawaii and Maui have been mapped.

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

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

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

Cooperation in the collection of records for whose accuracy responsibility has not rested with the Geological Survey has been acknowledged in the descriptions of the stations. Special acknowledgment is due to the following individuals and companies cooperating under plans 1, 2, and 3: Island of Kauai—Kilauea Plantation, East Kauai Water Co., and Lihue Plantation Co.; Island of Oahu—Waianae Plantation and Wahiawa Water Co.; Island of Maui—Pioneer Mill Co. and East Maui Irrigation Co.

## 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 five 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.

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 which represent the actual quantity of water, as "run-off in

inches," "million gallons," and "acre-feet." Those used in this report may be defined as follows:

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

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

In the Territory of Hawaii the unit most commonly used in measuring water is the "million gallons." This is used with two meanings—(1) to indicate a rate of flow and (2) to express an actual quantity of water. In the former sense "million gallons a day" is inferred, 1,000,000 gallons of 231 cubic inches 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 million 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 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 TABLES

For each current-meter gaging station are given, in general, the following data: Description of station, list of discharge measurements, table of daily discharge, table of monthly and yearly discharge and run-off in acre-feet and million gallons.

All rates of flow are expressed as million gallons a day.

In addition to statements regarding the location and installation of current-meter stations, the descriptions give information in regard to any condition that may affect the constancy of the relation of gage height to discharge, covering such points as shifting controls and backwater; also information regarding diversions which decrease the total flow at the measuring section. Statements are also made regarding the utilization of the water, the maximum and minimum stage and discharge, and the accuracy of the data.

The discharge-measurement table gives the results of the discharge measurements made during the year, including the date, gage height, and discharge in second-feet and million gallons a day.

The table of daily discharge gives the discharge in million gallons a day corresponding to the observed gage height as determined from the rating table, the number of significant figures used (never more than three) varying with the size of the discharge.

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 which 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 various station descriptions.

## ACCURACY OF FIELD DATA AND COMPUTED RESULTS

The accuracy of stream flow data depends (1) on permanence of the relation between discharge and stage, (2) number, accuracy, and distribution of discharge measurements, and (3) on the accuracy of observations of stage and interpretation of data.

The accuracy recorded in the station description is based on the accuracy of the rating curve, the reliability of the gage-height record, and knowledge of local conditions. The use of "excellent," "good," "fair," or "poor," indicates that the probable errors are within 5, 10, 15, and 25 per cent, respectively.

It should be borne in mind that the observations in each succeeding year may be expected to throw new light on data already collected and 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, John McCombs, Karl Jetter, F. K. Walker, P. P. Livingston, K. N. Vaksvik, Sam Wong, John Kaheaku, W. W. Achuck, P. P. T. Goo, and Miss M. A. Davison. The manuscript was prepared by J. L. Lamson and was reviewed by M. H. Carson.

## PUBLICATIONS

The following table gives, by years, the numbers of the papers on the surface-water supply of Hawaii published from 1903 to 1925. The data for any particular station will be found in the reports covering the years during which the station was maintained (see list of gaging stations in Water-Supply Paper 595) except when publication is delayed owing to undeveloped rating curves. Occasionally data is revised and republished in later papers.

*Water-supply papers on surface-water supply of Hawaii, 1903–1925*

| Year | Water-Supply Paper | Year | Water-Supply Paper | Year | Water-Supply Paper |
|---|---|---|---|---|---|
| 1903 | [a] 77 | 1915–16 | 445 | 1920–21 | 535 |
| 1909–1911 [b] | 318 | 1916–17 | 465 | 1921–22 | 555 |
| 1912 [b] | 336 | 1917–18 | 485 | 1922–23 | 575 |
| 1913 [b] | 373 | 1918–19 | 515 | 1923–24 | 595 |
| 1913–1915 | 430 | 1919–20 | 516 | 1924–25 | 615 |

[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, 8 miles by trail north of Waimea, at camp No. 1, 500 feet below Kekaha ditch intake.

RECORDS AVAILABLE.—July 24, 1921, to June 30, 1925.

GAGE.—Au continuous water-stage recorder installed July 25, 1923. Prior to this date a Stevens continuous water-stage recorder was used.

DISCHARGE MEASUREMENTS.—Made by wading or from cable 40 feet below gage.

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; shifting.

EXTREMES OF DISCHARGE.—1923–24: Maximum discharge recorded, 2,250 million gallons a day, or 3,480 second-feet, at 6.45 p. m. December 23 (gage height, 14.16 feet); minimum discharge uncertain owing to deposit of silt in stilling well.

1924–25: Maximum discharge recorded during year, 1,140 million gallons a day, or 1,760 second-feet, at 2.15 p. m. March 23 (gage height, 7.91 feet); minimum discharge uncertain owing to deposits of silt in stilling well.

1921–1925: Maximum discharge recorded probably greater than 2,500 million gallons a day, or 3,870 second-feet, on January 12, 1923 (gage height at least 14.62 feet; at this stage the recorder went out of adjustment); minimum discharge, probably less than 0.2 million gallons a day, or 0.3 second-foot (occasionally uncertain owing to deposits of silt in stilling well).

DIVERSIONS.—Entire low flow, except leakage through dam, is diverted by Kekaha ditch about 500 feet above station. During April, 1925, Kokee ditch began diverting water from the tributaries of this river.

REGULATION.—By diversion only.

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

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

ACCURACY.—Stage-discharge relation changed by floods of July 24, 1923, and April 21 and November 10, 1924. Shifting-control method used July 24–26, 1923. Rating curves used prior to April 21, 1924, and subsequent to November 10, 1924, well defined below 250 million gallons a day; curve used for the intervening period poorly defined. Operation of water-stage recorder unsatisfactory. Daily discharge ascertained by applying to rating table mean daily gage height determined from recorder graph by inspection, corrected when necessary for shifting control or, for days of considerable fluctuation, by averaging discharge for intervals of day. Records good except for low and high stages, for which they are fair; at times the low-stage record is doubtful, owing to silt in the stilling well.

*Discharge measurements of Waimea River below Kekaha ditch intake, near Waimea, Kauai, during the years ending June 30, 1924 and 1925*

| Date | Gage height (feet) | Discharge | | Date | Gage height (feet) | Discharge | |
|---|---|---|---|---|---|---|---|
| | | Second-feet | Million gallons a day | | | Second-feet | Million gallons a day |
| 1923 | | | | 1924 | | | |
| July 26 | 1.14 | 3.56 | 2.30 | Feb. 2 | 0.88 | 0.29 | 0.19 |
| Sept. 11 | .66 | .246 | .159 | May 8 | .67 | 1.56 | 1.01 |
| Oct. 22 | 1.80 | 15.6 | 10.1 | June 7 | .55 | .882 | .570 |
| Nov. 1 | 2.31 | 56.7 | 36.6 | 1925 | | | |
| Dec. 21 | 2.38 | 69.6 | 45.0 | Apr. 27 | .45 | 2.20 | 1.42 |
| | | | | May 20 | .39 | 2.07 | 1.34 |

*Discharge, in million gallons a day, of Waimea River below Kekaha ditch intake, near Waimea, Kauai, for the years ending June 30, 1924 and 1925*

| Day | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1923–4 | | | | | | | | | | | | |
| 1 | 2.5 | 0.3 | 0.2 | 321 | 49 | 0.2 | 216 | | | | | 0.7 |
| 2 | .7 | .3 | .2 | 138 | 94 | .2 | | 0.4 | | | | .7 |
| 3 | .3 | .3 | .2 | 14.8 | 15.5 | .2 | | .4 | | | | .6 |
| 4 | .3 | .3 | .2 | .3 | 60 | .6 | | .4 | | | | .6 |
| 5 | .3 | 27 | .2 | .2 | 155 | 11.6 | | .4 | | | | .6 |
| 6 | 6.0 | .3 | .2 | .2 | 95 | 2.7 | | .4 | | 260 | | .6 |
| 7 | .8 | .3 | .2 | 9.7 | 130 | 90 | | | | 16.1 | | .6 |
| 8 | .3 | 6.0 | .9 | 2.6 | 39 | 4.6 | | | | | 1.0 | .5 |
| 9 | .3 | 7.0 | .2 | .4 | 11.3 | .2 | | | | | 1.0 | .5 |
| 10 | .3 | .3 | .2 | .3 | 52 | 309 | | | | | 1.0 | .5 |
| 11 | .3 | .2 | .2 | .2 | 47 | 211 | | 46 | | | 1.0 | .6 |
| 12 | .3 | 10.4 | .2 | .2 | .3 | 268 | | 174 | 8.5 | | 1.1 | .6 |
| 13 | | 2.8 | .2 | .2 | .3 | 291 | | 46 | | | 194 | .5 |
| 14 | | 7.3 | .2 | .2 | 20 | 407 | | 5.0 | | 135 | 76 | .5 |
| 15 | | 1.1 | .2 | .2 | 80 | 302 | | 2.2 | | 426 | 48 | .5 |
| 16 | | 4.6 | 44 | .2 | 14.5 | 281 | | 220 | 12.4 | 532 | 9.1 | |
| 17 | | .3 | 29 | .2 | .4 | 115 | | 49 | 17.6 | 140 | 2.0 | |
| 18 | | 52 | .3 | 19.3 | .2 | 113 | | 5.6 | | 63 | 1.6 | |
| 19 | 45 | 124 | 6.1 | 86 | .2 | 252 | | 3.0 | | 32 | 87 | |
| 20 | 8.6 | 46 | 13.1 | 12.9 | .2 | 168 | | 1.7 | 13.9 | [a]27 | 2.8 | |
| 21 | 92 | .7 | 99 | 2.0 | .2 | 52 | | 1.0 | 18.0 | 363 | 1.1 | |
| 22 | 16.1 | .3 | 159 | 8.4 | .2 | 27 | | | | 188 | 76 | |
| 23 | 188 | .2 | 15.7 | .3 | .2 | 410 | | | | | 41 | |
| 24 | 133 | .2 | .2 | .2 | .2 | 212 | | 20 | 17.8 | | 48 | |
| 25 | [a]13.8 | .2 | .2 | .2 | .2 | 237 | | 11.1 | | | 37 | |
| 26 | [a]1.5 | .2 | .2 | .2 | .2 | 166 | | 2.6 | | | 30 | 50 |
| 27 | .3 | .2 | .2 | 58 | .2 | | | 1.4 | | 156 | 9.8 | [a]5.9 |
| 28 | .3 | .2 | .2 | 408 | .2 | | | | | | 15.0 | [a]54 |
| 29 | .2 | .2 | .2 | 265 | .2 | | | | | | 2.3 | 77 |
| 30 | .3 | .2 | 13.6 | 53 | .2 | [a]190 | | | | | .9 | 49 |
| 31 | .3 | .2 | | 11.1 | | [a]165 | | | | | .8 | |
| 1924–25 | | | | | | | | | | | | |
| 1 | 12.0 | .9 | .9 | .6 | .6 | | | 1.6 | | 138 | 33 | 1.2 |
| 2 | | 1.1 | .8 | .6 | .6 | | | 1.5 | | 81 | 27 | 1.2 |
| 3 | | 1.0 | .8 | .6 | .6 | | | 1.9 | | 116 | 5.0 | 1.2 |
| 4 | | 1.0 | .7 | .6 | .6 | | | 1.9 | | 84 | 1.4 | 1.3 |
| 5 | | 1.0 | .7 | .6 | 113 | | | 1.5 | | 45 | 1.3 | 1.2 |
| 6 | | 1.0 | .7 | .6 | 39 | | | 1.5 | | 490 | 1.3 | 1.2 |
| 7 | | .9 | .7 | .6 | 5.5 | | | 1.5 | | 290 | 1.3 | 1.1 |
| 8 | | 1.1 | .7 | .6 | 9.1 | | [a]177 | 1.4 | | 118 | 1.4 | 1.1 |
| 9 | | 93 | .7 | 52 | .7 | | 236 | 136 | | 136 | 1.7 | 1.1 |
| 10 | [a]91 | 25 | .7 | 131 | 73 | | [a]218 | 90 | | 322 | 8.8 | 1.1 |
| 11 | 112 | 9.4 | .6 | 72 | 355 | | | 187 | | 164 | 3.0 | 1.0 |
| 12 | 127 | 3.1 | .7 | 115 | 61 | | | 105 | | 118 | 1.5 | 1.0 |
| 13 | 49 | 1.1 | .7 | 46 | [a]26 | | [a]230 | 62 | | 118 | 24 | 1.0 |
| 14 | 16.1 | 1.0 | .7 | 2.0 | | | | 13.7 | .9 | 78 | 22 | 1.0 |
| 15 | 74 | 1.0 | .7 | 77 | | | | | .9 | 78 | 20 | 1.1 |
| 16 | 40 | 2.5 | .6 | 45 | | | | | 1.1 | 45 | 10.0 | 1.1 |
| 17 | 3.5 | 1.5 | .7 | 56 | | | | | 1.1 | 33 | 1.4 | 1.1 |
| 18 | | .9 | .7 | 37 | | | | | 1.1 | 52 | 12.1 | 1.1 |
| 19 | 5.6 | .9 | .6 | .9 | | | | | 1.1 | 76 | 4.4 | 1.2 |
| 20 | | .9 | .6 | 1.4 | 179 | | | | 5.4 | | 1.3 | 1.1 |
| 21 | 202 | .9 | .6 | 5.8 | | | | | 93 | | 1.3 | 1.1 |
| 22 | 115 | .9 | .6 | 36 | | | | | 176 | | 1.2 | 1.1 |
| 23 | 23 | .8 | .6 | 2.5 | | | | | 470 | | 1.2 | 1.1 |
| 24 | 5.9 | .8 | .6 | .6 | | | | | 188 | | 1.2 | 1.1 |
| 25 | 1.9 | .8 | .6 | .7 | | | | | 56 | | 1.2 | 1.1 |
| 26 | 1.2 | .8 | .6 | .7 | | | | | 243 | | 1.2 | 1.1 |
| 27 | .9 | .9 | .7 | 3.6 | | | | | 340 | | 1.1 | 1.2 |
| 28 | .9 | 17.2 | .8 | 10.1 | | | 1.5 | | 715 | 1.5 | 1.1 | 10.3 |
| 29 | .9 | 1.0 | 2.0 | 33 | | | 1.5 | | 682 | 14.9 | 1.2 | 6.5 |
| 30 | 2.2 | 3.6 | 1.0 | 6.8 | | | 1.6 | | 505 | 31 | 1.3 | 48 |
| 31 | 1.1 | 1.0 | | .6 | | | 1.6 | | 195 | | 1.2 | |

[a] Discharge estimated from faulty gage height record.

NOTE.—Data insufficient for estimating missing periods; gage height faulty owing to silt in stilling well.

*Monthly discharge of Waimea River below Kekaha ditch intake, near Waimea, Kauai, for the years ending June 30, 1924 and 1925*

| Month | Discharge | | | | Total run-off | |
|---|---|---|---|---|---|---|
| | Million gallons a day | | | Second-feet (mean) | Million gallons | Acre-feet |
| | Maximum | Minimum | Mean | | | |
| 1923–24 | | | | | | |
| July | 188 | | | | | |
| August | 124 | 0.2 | 9.47 | 14.7 | 294 | 901 |
| September | 159 | .2 | 12.8 | 19.8 | 385 | 1,180 |
| October | 408 | .2 | 45.6 | 70.6 | 1,410 | 4,340 |
| November | 155 | .2 | 28.9 | 44.7 | 866 | 2,660 |
| December | 410 | | | | | |
| January | | | | | | |
| February | 220 | | | | | |
| March | 18.0 | | | | | |
| April | 532 | | | | | |
| May | 194 | | | | | |
| June | 77 | | | | | |
| 1924–25 | | | | | | |
| July | 202 | | | | | |
| August | 93 | .8 | 5.71 | 8.83 | 177 | 543 |
| September | 2.0 | .6 | .74 | 1.14 | 22.1 | 68 |
| October | 131 | .6 | 23.9 | 37.0 | 740 | 2,270 |
| November | 355 | | | | | |
| December | | | | | | |
| January | 236 | | | | | |
| February | 187 | | | | | |
| March | 715 | | | | | |
| April | 490 | | | | | |
| May | 33 | 1.1 | 6.29 | 9.73 | 195 | 599 |
| June | 48 | 1.0 | 3.17 | 4.90 | 95.0 | 292 |

### KAUAIKINANA STREAM NEAR WAIMEA, KAUAI

LOCATION.—1 mile east of Kokee, 12 miles north of Waimea (20 miles from Waimea by road), and 200 feet above old Kokee-Mohihi horse trail.

RECORDS AVAILABLE.—July 1, 1919, to May 12, 1925, when station was discontinued. Miscellaneous measurements 1911–1916.

GAGE.—Stevens continuous water-stage recorder.

DISCHARGE MEASUREMENTS.—Made by wading or from cable at gage.

CHANNEL AND CONTROL.—Rocky, boulder-strewn bed and high, rocky banks. Control composed of large boulders; subject to shift during high floods.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during period, 503 million gallons a day, or 778 second-feet, at 4.15 p. m. December 13 (gage height, 10.78 feet); minimum discharge, 0.1 million gallons a day, or 0.2 second-foot, several hours May 9–12 (gage height, 2.35 feet; affected by backwater).

1919–1925: Maximum discharge recorded, that of December 13, 1924; minimum, that of May 9–12, 1925.

DIVERSIONS.—None.

REGULATION.—None.

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

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

ACCURACY.—Stage-discharge relation changed during flood of July 21 and was affected by débris on control during April and May. Rating curve used prior to July 21 poorly defined, that used subsequently fairly well defined

below 20 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 and corrected for backwater when necessary or, for days of considerable fluctuation, by averaging discharge for intervals of day. Records fair except for high stages and those affected by débris on control, for which they are poor.

*Discharge measurements of Kauaikinana Stream near Waimea, Kauai, during the year ending June 30, 1925*

| Date | Gage height (feet) | Discharge | | Date | Gage height (feet) | Discharge | |
|---|---|---|---|---|---|---|---|
| | | Second-feet | Million gallons a day | | | Second-feet | Million gallons a day |
| Sept. 14 | 2.18 | 0.726 | 0.469 | Mar. 14 | 2.52 | 2.72 | 1.76 |
| Oct. 26 | 2.20 | .85 | .55 | Apr. 29 | 2.38 | .25 | .16 |
| Dec. 15 | 3.34 | 19.5 | 12.6 | | | | |

*Discharge, in million gallons a day, of Kauaikinana Stream near Waimea, Kauai, for the year ending June 30, 1925*

| Day | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1.7 | 1.0 | 0.7 | 0.6 | 0.6 | 1.2 | 3.0 | 1.9 | 1.4 | 2.0 | 0.2 |
| 2 | 1.3 | .8 | .7 | .6 | .6 | .9 | 3.6 | 1.9 | 1.4 | .7 | .2 |
| 3 | 1.1 | .8 | .7 | .6 | .6 | .8 | 3.2 | 1.9 | 1.3 | .6 | .1 |
| 4 | 1.0 | .7 | .6 | .6 | 1.0 | .7 | 3.0 | 1.9 | 1.3 | .6 | .1 |
| 5 | 1.0 | .7 | .6 | .6 | 5.6 | .7 | 2.7 | 1.8 | 1.3 | .6 | .1 |
| 6 | 1.0 | .7 | .6 | .6 | 2.1 | .7 | 2.6 | 1.7 | 1.3 | 15.8 | .1 |
| 7 | 1.0 | .7 | .6 | .6 | 1.0 | .7 | 2.6 | 1.7 | 1.3 | 7.2 | .1 |
| 8 | 1.0 | .7 | .6 | .6 | .8 | .6 | 10.9 | 1.7 | 1.3 | .7 | .1 |
| 9 | 1.1 | 1.3 | .6 | .6 | .7 | .6 | 18.3 | 6.2 | 1.2 | .7 | .1 |
| 10 | 5.4 | 1.0 | .6 | .6 | 1.3 | .7 | 16.8 | 2.7 | 1.2 | 1.0 | .1 |
| 11 | 4.5 | 1.2 | .6 | .7 | 9.5 | 14.7 | 5.9 | 6.8 | 1.2 | .7 | .1 |
| 12 | 4.4 | .9 | .6 | 1.0 | 1.6 | 8.3 | 17.4 | 3.5 | 3.9 | .6 | .1 |
| 13 | 2.8 | .8 | .6 | .7 | 1.2 | 54 | 9.1 | 2.9 | 2.3 | .6 | ------- |
| 14 | 3.2 | .7 | .6 | .6 | 1.0 | 35 | 7.5 | 2.0 | 2.1 | .6 | ------- |
| 15 | 4.6 | .7 | .6 | 2.4 | .8 | 14.4 | 5.9 | 1.9 | 1.4 | .6 | ------- |
| 16 | 3.0 | .7 | .6 | 1.5 | .8 | 19.0 | 5.2 | 1.8 | 1.3 | .6 | ------- |
| 17 | 1.8 | .7 | .6 | 1.0 | .7 | 14.4 | 4.4 | 1.7 | 1.2 | .5 | ------- |
| 18 | 1.9 | .7 | .6 | .8 | .7 | 18.9 | 4.1 | 1.6 | 1.2 | .4 | ------- |
| 19 | 2.1 | .7 | .6 | .7 | .7 | 9.3 | 3.8 | 1.6 | 1.2 | .2 | ------- |
| 20 | 1.6 | .7 | .6 | .6 | 8.4 | 15.0 | 3.4 | 1.6 | 1.9 | .2 | ------- |
| 21 | 8.6 | .7 | .6 | .8 | 7.0 | 11.1 | 3.2 | 1.6 | 8.6 | .2 | ------- |
| 22 | 2.4 | .7 | .6 | 2.3 | 2.3 | 7.2 | 3.0 | 1.6 | 5.1 | .2 | ------- |
| 23 | 1.4 | .7 | .6 | .8 | 1.4 | 5.8 | 3.0 | 1.6 | 19.0 | .2 | ------- |
| 24 | 1.2 | .7 | .6 | .7 | 1.2 | 5.8 | 2.8 | 1.5 | 4.7 | .2 | ------- |
| 25 | 1.0 | .7 | .6 | .7 | 1.1 | 8.0 | 2.7 | 1.5 | 1.0 | .2 | ------- |
| 26 | .9 | .7 | .6 | .6 | .9 | 5.7 | 2.5 | 1.4 | 6.5 | .2 | ------- |
| 27 | .9 | .7 | .6 | .6 | .8 | 4.5 | 2.4 | 1.4 | 4.2 | .2 | ------- |
| 28 | .8 | 1.7 | .6 | .6 | 4.2 | 4.0 | 2.3 | 1.4 | 31 | .2 | ------- |
| 29 | .8 | .8 | .6 | .7 | 1.3 | 3.6 | 2.2 | ------- | 33 | .2 | ------- |
| 30 | 1.0 | .7 | .6 | .7 | 1.0 | 3.4 | 2.1 | ------- | 10.0 | .2 | ------- |
| 31 | 1.0 | .7 | ------- | .6 | ------- | 3.2 | 2.0 | ------- | 5.6 | ------- | ------- |

NOTE.—Discharge Apr. 1 to May 12 determined from gage heights corrected for effect of débris on control from one discharge measurement, engineer's notes, and study of gage-height graph.

*Monthly discharge of Kauaikinana Stream near Waimea, Kauai, for the year ending June 30, 1925*

| Month | Discharge | | | | Total run-off | |
|---|---|---|---|---|---|---|
| | Million gallons a day | | | Second-feet (mean) | Million gallons | Acre-feet |
| | Maximum | Minimum | Mean | | | |
| July | 8.6 | 0.8 | 2.11 | 3.26 | 65.5 | 201 |
| August | 1.7 | .7 | .81 | 1.25 | 25.0 | 77 |
| September | .7 | .6 | .61 | .94 | 18.3 | 56 |
| October | 2.4 | .6 | .81 | 1.25 | 25.1 | 77 |
| November | 9.5 | .6 | 2.03 | 3.14 | 60.9 | 187 |
| December | 54 | .6 | 8.80 | 13.6 | 273 | 837 |
| January | 18.3 | 2.0 | 5.21 | 8.06 | 162 | 496 |
| February | 6.8 | 1.4 | 2.17 | 3.36 | 60.8 | 187 |
| March | 33 | 1.2 | 5.14 | 7.95 | 159 | 489 |
| April | 15.8 | .2 | 1.23 | 1.90 | 36.9 | 113 |
| May 1–12 | .2 | .1 | .12 | .19 | 1.4 | 4 |
| The period | 54 | .1 | 2.81 | 4.35 | 888 | 2,720 |

**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, 1925. No record of value December 17, 1916, to July 3, 1919.

GAGE.—Stevens continuous water-stage recorder installed August 4, 1919. Staff gage used April 13, 1909, to May 26, 1910; Friez water-stage recorder May 26, 1910, to October 11, 1911; Barrett and Lawrence water-stage recorder October 11, 1911, to August 4, 1919.

DISCHARGE MEASUREMENTS.—Made by wading or from cable near trail crossing 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; shifts slightly.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 1,670 million gallons a day, or 2,580 second-feet, at 5.30 p. m. December 13 (gage height, 12.11 feet); minimum discharge, 2.0 million gallons a day, or 3.1 second-feet, several hours October 4–6 (gage height, 1.33 feet).

1909–1925: Maximum stage recorded, 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.—None.

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.—Low water is used for power and irrigation after it reaches Waimea River.

ACCURACY.—Stage-discharge relation changed at time of floods July 21, August 27, and December 13. Two rating curves used are well defined between 2 and 200 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 those for estimated period, which are fair, and high-stage records, which are poor.

*Discharge measurements of Kawaikoi Stream near Waimea, Kauai, during the year ending June 30, 1925*

| Date | Gage height (feet) | Discharge | | Date | Gage height (feet) | Discharge | |
|---|---|---|---|---|---|---|---|
| | | Second-feet | Million gallons a day | | | Second-feet | Million gallons a day |
| July 21 | 3.98 | 231 | 149 | Mar. 14 | 1.94 | 12.8 | 8.27 |
| Do | 3.60 | 164 | 106 | June 2 | 1.54 | 6.12 | 3.98 |
| Sept. 14 | 1.41 | 4.30 | 2.78 | | | | |

*Discharge, in million gallons a day, of Kawaikoi Stream near Waimea, Kauai, for the year ending June 30, 1925*

| Day | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 14.6 | 13.7 | 9.9 | 3.4 | 4.3 | 28 | 16.3 | 6.3 | 4.4 | 38 | 26 | 4.2 |
| 2 | 6.8 | 9.1 | 6.7 | 2.5 | 3.7 | 13.2 | 35 | 6.3 | 4.4 | 27 | 14.3 | 4.1 |
| 3 | 5.0 | 9.3 | 5.0 | 2.2 | 3.6 | 10.5 | 21 | 6.2 | 4.2 | 25 | 10.5 | 4.0 |
| 4 | 4.5 | 6.5 | 3.9 | 2.2 | 3.6 | 8.8 | 18.0 | 5.8 | 4.1 | 21 | 8.2 | 4.2 |
| 5 | 4.4 | 5.5 | 3.3 | 2.1 | 39 | 7.9 | 13.2 | 5.6 | 4.1 | 34 | 7.1 | 4.1 |
| 6 | 4.4 | 5.3 | 3.2 | 2.1 | 15.9 | 7.3 | 13.2 | 5.3 | 4.0 | 226 | 6.3 | 4.1 |
| 7 | 4.2 | 5.1 | 2.9 | 2.2 | 8.3 | 6.7 | 18.4 | 5.1 | 4.0 | 100 | 6.0 | 4.0 |
| 8 | 9.0 | 13.4 | 2.9 | 2.3 | 9.3 | 6.3 | 131 | 5.3 | 3.8 | 48 | 10.4 | 3.7 |
| 9 | 7.6 | 44 | 2.9 | 2.2 | 5.2 | 5.7 | 146 | 96 | 3.7 | 79 | 18.9 | 3.5 |
| 10 | 91 | 19.2 | 2.6 | 10.1 | 8.8 | 6.5 | 118 | 24 | 3.7 | 128 | 26 | 3.2 |
| 11 | 52 | 21 | 2.3 | 24 | 75 | 123 | 34 | 64 | 3.7 | 62 | 10.8 | 3.0 |
| 12 | 52 | 11.0 | 2.5 | 26 | 13.2 | 54 | 151 | 45 | 11.8 | 61 | 19.2 | 2.9 |
| 13 | 23 | 6.9 | 4.3 | 10.3 | 8.6 | 285 | 135 | 22 | 8.2 | 54 | 21 | 2.8 |
| 14 | 24 | 5.5 | 2.9 | 7.1 | 6.7 | 139 | 50 | 11.0 | 10.7 | 34 | 9.1 | 2.8 |
| 15 | 45 | 4.7 | 2.5 | 53 | 5.7 | 64 | 29 | 8.6 | 5.3 | 51 | 7.6 | 13.4 |
| 16 | 23 | 6.9 | 3.9 | 25 | 5.0 | 68 | 22 | 7.3 | 4.0 | 26 | 6.5 | 4.8 |
| 17 | 11.0 | 6.5 | 2.9 | 39 | 4.5 | 58 | 17.4 | 6.5 | 3.5 | 29 | 9.8 | 4.0 |
| 18 | 13.0 | 6.3 | 2.3 | 11.7 | 4.2 | 72 | 15.2 | 6.2 | 3.3 | 37 | 22 | 10.0 |
| 19 | 19.0 | 4.8 | 2.2 | 7.8 | 3.7 | 27 | 16.1 | 5.8 | 3.2 | 30 | 9.6 | 17.5 |
| 20 | 9.2 | 4.2 | 2.2 | 21 | 153 | 44 | 13.7 | 5.6 | 24 | 16.4 | 6.9 | 5.6 |
| 21 | 102 | 6.1 | 2.2 | 20 | 95 | 34 | 17.4 | 5.3 | 96 | 14.6 | 6.5 | 4.0 |
| 22 | 30 | 6.0 | 2.2 | 38 | 25 | 22 | 12.1 | 5.1 | 63 | 12.4 | 6.9 | 3.4 |
| 23 | 18.0 | 4.4 | 2.2 | 8.8 | 14.3 | 16.4 | 10.3 | 5.1 | 152 | 20 | 6.3 | 5.0 |
| 24 | 12.9 | 3.7 | | 10.5 | 18.6 | 16.9 | 9.3 | 5.0 | 28 | 15.8 | 6.3 | 3.5 |
| 25 | 11.0 | 3.3 | | 13.6 | 12.9 | 35 | 8.8 | 4.8 | 31 | 11.3 | 5.5 | 3.0 |
| 26 | 9.1 | 3.0 | 3.6 | 11.8 | 9.3 | 18.0 | 8.2 | 4.7 | 147 | 9.8 | 5.1 | 2.7 |
| 27 | 8.0 | 29 | | 14.8 | 7.9 | 14.0 | 8.0 | 4.7 | 145 | 8.8 | 5.1 | 2.8 |
| 28 | 7.3 | 29 | | 16.2 | 81 | 11.8 | 7.5 | 4.5 | 419 | 8.6 | 6 2 | 14.9 |
| 29 | 6.9 | 8.2 | | 18.7 | 16.5 | 10.8 | 6.9 | ------- | 321 | 20 | 6.2 | 7.6 |
| 30 | 21 | 5.4 | | 9.3 | 16.9 | 9.8 | 6.7 | ------- | 165 | 16.1 | 6.0 | 21 |
| 31 | 12.6 | 7.2 | ------- | 5.5 | ------- | 10.8 | 6.5 | ------- | 80 | ------- | 4.8 | ------- |

NOTE.—Braced figure gives mean discharge for period indicated, estimated by comparison with record of Waiakoali Stream near Waimea, Kauai; gage-height record faulty.

*Monthly discharge of Kawaikoi Stream near Waimea, Kauai for the year ending June 30, 1925*

| Month | Discharge | | | | Total run-off | |
|---|---|---|---|---|---|---|
| | Million gallons a day | | | Second-feet (mean) | Million gallons | Acre-feet |
| | Maximum | Minimum | Mean | | | |
| July | 102 | 4.2 | 21.3 | 33.0 | 662 | 2,030 |
| August | 44 | 3.0 | 10.1 | 15.6 | 314 | 964 |
| September | 9.9 | | 3.44 | 5.32 | 103 | 316 |
| October | 53 | 2.1 | 13.7 | 21.2 | 423 | 1,300 |
| November | 153 | 3.6 | 22.6 | 35.0 | 679 | 2,080 |
| December | 285 | 5.7 | 39.8 | 61.6 | 1,230 | 3,790 |
| January | 151 | 6.5 | 36.0 | 55.7 | 1,120 | 3,420 |
| February | 96 | 4.5 | 13.8 | 21.4 | 387 | 1,190 |
| March | 419 | 3.2 | 56.9 | 88.0 | 1,770 | 5,420 |
| April | 226 | 8.6 | 42.1 | 65.1 | 1,260 | 3,880 |
| May | 26 | 4.8 | 10.4 | 16.1 | 321 | 985 |
| June | 21 | 2.7 | 5.79 | 8.96 | 174 | 533 |
| The year | 419 | 2.1 | 23.1 | 35.7 | 8,440 | 25,900 |

**WAIAKOALI STREAM NEAR WAIMEA, KAUAI**

LOCATION.—150 feet below Kokee-Mohihi trail, a quarter of a mile below old Waiakoali camp, and 12 miles northeast of Waimea (22 miles from Waimea by road and trail).

RECORDS AVAILABLE.—April 13, 1909, to December 4, 1912, and July 1, 1919, to June 2, 1925, when station was discontinued. Occasional measurements 1913 to 1917 reported as miscellaneous.

GAGE.—Stevens continuous water-stage recorder installed July 30, 1919. Staff gage April 13, 1909, to December 4, 1912.

DISCHARGE MEASUREMENTS.—Made by wading or from cable near trail.

CHANNEL AND CONTROL.—Channel a series of pools with mud and silt bottom divided by rapids over boulders and cobblestones. High, sloping banks covered with ferns and underbrush. Control, large boulders; shifts slightly.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during period, about 675 million gallons a day, or 1,040 second-feet, at 5.15 p. m. December 13 (gage height, 8.45 feet); minimum discharge, 0.9 million gallons a day, or 1.4 second-feet, several hours September 22 and October 7–9 (gage height, 1.36 feet).

1909–1925: Maximum discharge recorded, that of December 13, 1924; minimum discharge, 0.3 million gallons a day, or 0.45 second-foot, November 29, 1909 (gage height on old staff gage, 1.45 feet).

DIVERSIONS.—None.

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 during flood of December 13 and affected by a dam during May and June. Rating curve used prior to change well defined below 50 million gallons a day; curve used subsequent to

change poorly defined. 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 prior to December 13; subsequent records fair except those for estimated periods, which are poor.

*Discharge measurements of Waiakoali Stream near Waimea, Kauai, during the year ending June 30, 1925*

| Date | Gage height (feet) | Discharge | |
|---|---|---|---|
| | | Second-feet | Million gallons a day |
| July 21 | 3.27 | 56.2 | 36.3 |
| Sept. 13 | 1.38 | .957 | .619 |
| Dec. 17 | 2.39 | 12.3 | 7.95 |

*Discharge, in million gallons a day, of Waiakoali Stream near Waimea, Kauai, for the year ending June 30, 1925*

| Day | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 3.0 | 1.7 | 1.2 | 1.0 | 1.2 | 3.3 | 3.8 | 2.2 | 1.5 | 10.8 | | 1.0 |
| 2 | 1.8 | 1.8 | 1.2 | .9 | 1.1 | 2.4 | 5.4 | 2.2 | 1.5 | 8.1 | | |
| 3 | 1.6 | 1.6 | 1.2 | .9 | 1.0 | 1.8 | 5.3 | 2.1 | 1.4 | 7.1 | | |
| 4 | 1.4 | 1.6 | 1.1 | .9 | 1.2 | 1.6 | 4.8 | 2.1 | 1.4 | 6.5 | | |
| 5 | 1.3 | 1.4 | 1.0 | .9 | 12.3 | 1.5 | 3.7 | 2.0 | 1.4 | 9.5 | 2.1 | |
| 6 | 1.3 | 1.4 | 1.0 | .9 | 5.3 | 1.4 | 3.2 | 1.9 | 1.4 | 43 | | |
| 7 | 1.2 | 1.4 | .9 | .9 | 2.2 | 1.4 | 3.1 | 1.9 | 1.4 | 23 | | |
| 8 | 1.2 | 1.6 | .9 | .9 | 1.9 | 1.4 | 15.5 | 1.9 | 1.3 | 10.4 | | |
| 9 | 1.3 | 5.1 | .9 | .9 | 1.5 | 1.3 | 21 | 8.7 | 1.3 | 10.8 | | |
| 10 | 12.1 | 3.8 | .9 | 2.1 | 4.2 | 1.4 | 22 | 5.6 | 1.3 | 20 | | |
| 11 | 11.3 | 3.2 | .9 | 4.0 | 32 | 41 | 9.2 | 12.5 | 1.3 | 11.7 | | |
| 12 | 13.0 | 2.4 | .9 | 6.5 | 4.2 | 17.2 | 29 | 7.6 | 1.4 | 10.4 | | |
| 13 | 6.5 | 1.7 | .9 | 2.9 | 2.5 | 107 | 27 | 5.3 | 1.6 | 10.4 | 1.8 | |
| 14 | 4.2 | 1.4 | .9 | 1.6 | 1.9 | 45 | 10.4 | 3.1 | 1.7 | 8.1 | | |
| 15 | 6.9 | 1.4 | .9 | 5.8 | 1.6 | 14.9 | 7.1 | 2.5 | 1.5 | 8.6 | | |
| 16 | 5.1 | 1.4 | .9 | 4.8 | 1.4 | 15.2 | 6.1 | 2.2 | 1.3 | 6.6 | | |
| 17 | 2.6 | 1.5 | .9 | 6.6 | 1.3 | 15.4 | 5.2 | 2.1 | 1.3 | 5.7 | | |
| 18 | 2.5 | 1.3 | .9 | 2.8 | 1.2 | 21 | 4.7 | 1.9 | 1.3 | 6.6 | | |
| 19 | 4.4 | 1.2 | .9 | 1.6 | 1.2 | 8.6 | 4.4 | 1.8 | 1.2 | 6.7 | | |
| 20 | 2.6 | 1.2 | .9 | 1.4 | 23 | 8.6 | 4.1 | 1.8 | 2.7 | 5.0 | | |
| 21 | 26 | 1.2 | .9 | 2.1 | 23 | 9.8 | 3.8 | 1.7 | 11.5 | 4.5 | 2.0 | |
| 22 | 8.0 | 1.3 | .9 | 4.6 | 6.4 | 6.7 | 3.5 | 1.7 | 9.2 | 4.1 | | |
| 23 | 4.5 | 1.2 | .9 | 2.0 | 3.2 | 5.4 | 3.2 | 1.7 | 38 | 5.2 | | |
| 24 | 3.0 | 1.1 | .9 | 1.4 | 2.5 | 7.5 | 3.1 | 1.6 | 9.0 | 5.1 | | |
| 25 | 2.4 | 1.1 | .9 | 1.4 | 2.2 | 11.1 | 2.9 | 1.6 | 4.4 | 4.0 | | |
| 26 | 2.0 | 1.0 | .9 | 1.6 | 1.8 | 6.6 | 2.7 | 1.6 | 28 | 3.6 | | |
| 27 | 1.9 | 1.0 | 1.0 | 1.8 | 1.6 | 5.2 | 2.7 | 1.5 | 30 | 3.4 | 1.3 | |
| 28 | 1.8 | 3.6 | 1.0 | 1.5 | 7.7 | 4.6 | 2.5 | 1.5 | 93 | 3.2 | | |
| 29 | 1.8 | 1.6 | 1.0 | 1.7 | 3.4 | 4.1 | 2.5 | ------- | 58 | 3.5 | | |
| 30 | 1.7 | 1.3 | 1.2 | 1.8 | 2.2 | 3.8 | 2.4 | ------- | 30 | 4.0 | | |
| 31 | 1.7 | 1.2 | ------- | 1.3 | ------- | 3.7 | 2.3 | ------- | 17.4 | ------- | | |

NOTE.—Braced figures gives mean discharge for periods indicated estimated by comparison with record of Mohihi Stream at elevation 3,500 feet, near Waimea, Kauai, when gage-height record was affected by backwater from a dam.

*Monthly discharge of Waiakoali Stream near Waimea, Kauai, for the year ending June 30, 1925*

| Month | Discharge | | | | Total run-off | |
|---|---|---|---|---|---|---|
| | Million gallons a day | | | Second-feet (mean) | Million gallons | Acre-feet |
| | Maximum | Minimum | Mean | | | |
| July | 26 | 1.2 | 4.52 | 6.99 | 140 | 430 |
| August | 5.1 | 1.0 | 1.73 | 2.68 | 53.7 | 165 |
| September | 1.2 | .9 | .96 | 1.49 | 28.9 | 89 |
| October | 6.6 | .9 | 2.24 | 3.47 | 69.5 | 213 |
| November | 32 | 1.0 | 5.21 | 8.06 | 156 | 479 |
| December | 107 | 1.3 | 12.3 | 19.0 | 380 | 1,170 |
| January | 29 | 2.3 | 7.31 | 11.3 | 227 | 695 |
| February | 12.5 | 1.5 | 3.01 | 4.66 | 84.3 | 259 |
| March | 93 | 1.2 | 11.5 | 17.8 | 358 | 1,100 |
| April | 43 | 3.2 | 8.99 | 13.9 | 270 | 827 |
| May | | | 1.78 | 2.75 | 55.1 | 169 |
| June 1–2 | | | 1.00 | 1.55 | 2.0 | 6 |
| The period | 107 | | 5.41 | 8.37 | 1,820 | 5,600 |

**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 June 30, 1925. Fragmentary records at old station 2 miles downstream from April 13, 1909, to December 31, 1912. Records valueless August 12, 1919, to June 12, 1920.

GAGE.—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 for 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 shift through collection of débris.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 228 million gallons a day, or 353 second-feet, at 4.45 p. m. December 13 (gage height, 4.56 feet); minimum discharge, 0.3 million gallons a day, or 0.5 second-foot, several hours September 19–25 and October 6–8 (gage height, 0.80 foot).

1919–1925: Maximum discharge recorded, about 520 million gallons a day, or 805 second-feet, at 1.35 p. m. January 16, 1921 (gage height, 6.91 feet); minimum discharge, 0.2 million gallons a day, or 0.3 second-foot, from 4 to 6 p. m. July 16, 1921, 2 to 5 p. m. September 14, and noon to 3 p. m. September 15, 1921, and 8 p. m. August 7 to 2 a. m. August 8, 1922.

DIVERSIONS.—None.

REGULATION.—No artificial regulation. 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 idle 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 practically permanent during year. Rating curve rather poorly defined. 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.

*Discharge measurements of Mohihi Stream at elevation 3,500 feet, near Waimea, Kauai, during the year ending June 30, 1925*

| Date | Gage height (feet) | Discharge | | Date | Gage height (feet) | Discharge | |
|---|---|---|---|---|---|---|---|
| | | Second-feet | Million gallons a day | | | Second-feet | Million gallons a day |
| July 21 | 2.22 | 35.4 | 22.9 | Mar. 16 | 0.90 | 1.18 | 0.763 |
| Sept. 12 | .84 | .617 | .399 | Apr. 28 | 1.20 | 3.79 | 2.45 |
| Jan. 30 | 1.08 | 2.30 | 1.49 | June 3 | .95 | 1.65 | 1.07 |

*Discharge, in million gallons a day, of Mohihi Stream at elevation 3,500 feet, near Waimea, Kauai, for the year ending June 30, 1925*

| Day | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 4.1 | 1.7 | 1.2 | 0.5 | 1.2 | 5.1 | 4.2 | 1.4 | 0.7 | 15.0 | 4.9 | 0.9 |
| 2 | 2.0 | 1.8 | 1.1 | .4 | .9 | 3.1 | 8.2 | 1.4 | .7 | 8.6 | 4.5 | .8 |
| 3 | 1.2 | 1.6 | 1.0 | .4 | .8 | 2.1 | 9.6 | 1.4 | .7 | 7.9 | 3.3 | .8 |
| 4 | 1.0 | 1.4 | .8 | .4 | 1.0 | 1.5 | 8.0 | 1.3 | .7 | 8.8 | 2.6 | 1.4 |
| 5 | .8 | 1.2 | .6 | .4 | 14.5 | 1.2 | 4.5 | 1.2 | .7 | 5.8 | 2.2 | 1.3 |
| 6 | .7 | 1.1 | .5 | .3 | 7.0 | 1.0 | 3.5 | 1.1 | .6 | 58 | 1.8 | 1.1 |
| 7 | .6 | 1.1 | .5 | .3 | 5.0 | 1.0 | 3.6 | 1.0 | .6 | 40 | 1.7 | 1.0 |
| 8 | .7 | 2.1 | .5 | .3 | 5.1 | .8 | 24 | 1.0 | .6 | | 1.8 | .9 |
| 9 | 1.0 | 10.9 | .5 | .4 | 2.2 | .8 | 23 | 18.2 | .5 | | 1.9 | .8 |
| 10 | 15.2 | 6.0 | .5 | 9.0 | 7.2 | 1.0 | 29 | 9.3 | .5 | | 3.1 | .8 |
| 11 | 15.3 | 5.7 | .4 | 9.1 | 34 | 40 | 13.2 | 21 | .5 | 14 | 2.5 | .7 |
| 12 | 16.7 | 3.5 | .4 | 13.4 | 5.6 | 15.7 | 52 | 10.6 | .6 | | 2.6 | .6 |
| 13 | 7.7 | 2.0 | .4 | 5.6 | 3.3 | 44 | 35 | 6.9 | .9 | | 5.4 | .6 |
| 14 | 5.3 | 1.4 | .4 | 2.2 | 2.4 | 46 | 11.9 | 3.5 | 1.0 | | 2.8 | .6 |
| 15 | 8.8 | 1.2 | .4 | 6.9 | 1.9 | 16.1 | 7.9 | 2.5 | .7 | | 2.0 | 1.6 |
| 16 | 6.2 | 1.7 | .4 | 7.6 | 1.4 | 13.7 | 6.3 | 2.1 | .6 | | 1.7 | 1.5 |
| 17 | 3.1 | 1.9 | .4 | 9.6 | 1.1 | 23 | 5.0 | 1.7 | .5 | | 1.5 | 1.0 |
| 18 | 2.8 | 1.3 | .4 | 4.0 | 1.0 | 26 | 4.2 | 1.5 | .5 | | 2.7 | 1.2 |
| 19 | 5.1 | 1.0 | .3 | 2.1 | .8 | 9.4 | 3.9 | 1.4 | .5 | | 2.8 | 3.5 |
| 20 | 3.0 | .9 | .3 | 2.9 | 14.8 | 8.0 | 3.4 | 1.2 | 2.2 | | 2.0 | 2.1 |
| 21 | 24 | 1.0 | .4 | 4.4 | 24 | 10.4 | 3.2 | 1.1 | 15.7 | | 1.6 | 1.3 |
| 22 | 11.3 | 1.2 | .4 | 7.1 | 7.2 | 6.1 | 3.0 | 1.0 | 15.8 | 5 | 1.4 | 1.0 |
| 23 | 6.0 | .9 | .4 | 2.8 | 3.5 | 4.5 | 2.7 | 1.0 | 53 | | 1.2 | .8 |
| 24 | 3.9 | .8 | .4 | 1.8 | 2.8 | 11.0 | 2.4 | 1.0 | 15.9 | | 1.2 | .8 |
| 25 | 3.0 | .6 | .3 | 2.0 | 2.5 | 15.0 | 2.3 | .9 | 5.3 | | 1.1 | .6 |
| 26 | 2.4 | .6 | .4 | 2.3 | 1.9 | 7.1 | 2.2 | .8 | 28 | | 1.0 | .6 |
| 27 | 2.0 | .9 | .5 | 3.5 | 1.4 | 5.0 | 2.1 | .8 | 41 | | 1.0 | .6 |
| 28 | 1.9 | 5.1 | .6 | 2.3 | 7.5 | 4.1 | 1.9 | .8 | 100 | | 1.1 | 1.2 |
| 29 | 1.8 | 2.0 | .8 | 3.6 | 3.8 | 3.4 | 1.7 | ------- | 93 | 3.0 | 1.1 | 2.4 |
| 30 | 1.7 | 1.3 | 1.0 | 3.0 | 2.5 | 3.0 | 1.7 | ------- | 43 | 3.5 | 1.2 | 6.0 |
| 31 | 1.8 | 1.2 | ------- | 1.7 | ------- | 2.9 | 1.5 | ------- | 24 | ------- | 1.1 | ------- |

NOTE.—Braced figures give mean discharge for periods indicated; estimated by comparison with record of Waiakoali Stream near Waimea, Kauai, when recorder was not operating.

*Monthly discharge of Mohihi Stream at elevation 3,500 feet, near Waimea, Kauai, for the year ending June 30, 1925*

| Month | Discharge | | | | Total run-off | |
|---|---|---|---|---|---|---|
| | Million gallons a day | | | Second-feet (mean) | Million gallons | Acre-feet |
| | Maximum | Minimum | Mean | | | |
| July | 24 | 0.6 | 5.20 | 8.05 | 161 | 494 |
| August | 10.9 | .6 | 2.10 | 3.25 | 65.1 | 200 |
| September | 1.2 | .3 | .54 | .84 | 16.2 | 50 |
| October | 13.4 | .3 | 3.56 | 5.51 | 110 | 338 |
| November | 34 | .8 | 5.61 | 8.68 | 168 | 516 |
| December | 46 | .8 | 10.7 | 16.6 | 332 | 1,020 |
| January | 52 | 1.5 | 9.20 | 14.2 | 285 | 875 |
| February | 21 | .8 | 3.47 | 5.37 | 97.1 | 298 |
| March | 100 | .5 | 14.5 | 22.4 | 449 | 1,380 |
| April | 58 | | 10.9 | 16.9 | 328 | 1,010 |
| May | 5.4 | 1.0 | 2.15 | 3.33 | 66.8 | 205 |
| June | 6.0 | .6 | 1.28 | 1.98 | 38.5 | 118 |
| The year | 100 | .3 | 5.80 | 8.97 | 2,120 | 6,500 |

**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, 1925.

GAGE.—Stevens continuous water-stage recorder installed September 5, 1919.

DISCHARGE MEASUREMENTS.—Made by wading or from cable 200 feet above gage.

CHANNEL AND CONTROL.—Channel covered with boulders and cobblestones and flanked by high banks; straight for 100 feet above and 400 feet below gage. 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 very sensitive at low stages.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 692 million gallons a day, or 1,070 second-feet at 9.45 a. m. July 21 (gage height, 2.45 feet); minimum discharge, 0.8 million gallons a day, or 1.2 second-feet, from 3 to 8 p. m. March 18 and 5 to 11 p. m. March 19 (gage height, 0.38 foot).

1919–1925: Maximum discharge recorded, about 3,750 million gallons a day, or 5,800 second-feet, January 16, 1921 (gage height, 6.70 feet); minimum discharge, that of March 18 and 19, 1925.

DIVERSIONS.—None.

REGULATION.—None.

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

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

ACCURACY.—Stage-discharge relation changed at times of floods July 21, October 10, and January 12. The three rating curves used are fairly well defined between 1 and 100 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 high stages, which are fair.

*Discharge measurements of Koaie Stream at elevation 3,700 feet, near Waimea, Kauai, during the year ending June 30, 1925*

| Date | Gage height (feet) | Discharge | | Date | Gage height (feet) | Discharge | |
|---|---|---|---|---|---|---|---|
| | | Second-feet | Million gallons a day | | | Second-feet | Million gallons a day |
| July 22 | 1.20 | 141 | 91.1 | Jan. 29 | 0.46 | 2.42 | 1.56 |
| Sept. 12 | .42 | 2.39 | 1.54 | Mar. 16 | .40 | 1.43 | .93 |
| Oct. 24 | .57 | 8.00 | 5.17 | June 3 | .58 | 6.61 | 4.27 |
| Dec. 16 | .64 | 12.5 | 8.08 | | | | |

*Discharge, in million gallons a day, of Koaie Stream at elevation 3,700 feet, near Waimea, Kauai, for the year ending June 30, 1925*

| Day | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 6.8 | 3.2 | 3.6 | 3.0 | 4.9 | 14.0 | 25 | 1.5 | 1.2 | 12.1 | 14.2 | 2.8 |
| 2 | 3.9 | 3.2 | 3.4 | 2.3 | 4.3 | 6.3 | 31 | 1.5 | 1.1 | 6.1 | 7.8 | 3.6 |
| 3 | 3.2 | 4.4 | 3.0 | 2.3 | 3.9 | 4.3 | 46 | 1.3 | 1.1 | 42 | 5.3 | 6.9 |
| 4 | 3.0 | 3.4 | 2.3 | 2.6 | 5.5 | 4.1 | 29 | 1.3 | 1.3 | 11.6 | 3.9 | 8.6 |
| 5 | 2.8 | 4.1 | 2.2 | 2.3 | 46 | 3.7 | 15.8 | 1.2 | 1.5 | 46 | 3.0 | 5.7 |
| 6 | 2.8 | 3.8 | 2.1 | 2.5 | 11.4 | 3.3 | 14.0 | 1.2 | 1.6 | 137 | 2.8 | 4.9 |
| 7 | 2.8 | 4.0 | 2.0 | 2.6 | 16.8 | 3.3 | 22 | 1.1 | 1.3 | 42 | 2.6 | 3.6 |
| 8 | 5.4 | 11.0 | 2.0 | 2.6 | 7.0 | 3.0 | 93 | 1.1 | 1.2 | 12.2 | 3.3 | 3.0 |
| 9 | 6.9 | 51 | 2.1 | 59 | 4.3 | 2.8 | 90 | 36 | 1.1 | 35 | 4.5 | 3.0 |
| 10 | 31 | 12.2 | 2.1 | 98 | 43 | 3.3 | 64 | 18.6 | 1.0 | 74 | 5.3 | 3.0 |
| 11 | 37 | 7.5 | 2.0 | 55 | 69 | 110 | 21 | 55 | 1.0 | 21 | 4.2 | 2.8 |
| 12 | 50 | 5.0 | 1.8 | 66 | 6.6 | 28 | 82 | 19.0 | .9 | 16.1 | 5.2 | 2.6 |
| 13 | 18.3 | 3.4 | 1.7 | 24 | 4.9 | 38 | 66 | 9.8 | 1.1 | 16.9 | 7.4 | 3.3 |
| 14 | 10.0 | 3.4 | 1.6 | 7.6 | 4.3 | 67 | 11.4 | 4.2 | 1.1 | 10.3 | 4.2 | 3.0 |
| 15 | 39 | 5.4 | 1.7 | 43 | 3.9 | 21 | 7.0 | 3.0 | .9 | 8.6 | 3.3 | 6.0 |
| 16 | 14.4 | 12.1 | 1.6 | 30 | 3.7 | 10.4 | 5.3 | 2.6 | .9 | 6.5 | 2.8 | 3.9 |
| 17 | 7.3 | 4.4 | 1.6 | 31 | 3.3 | 32 | 4.2 | 2.2 | .9 | 6.2 | 3.0 | 3.7 |
| 18 | 5.5 | 3.2 | 1.5 | 10.2 | 3.2 | 42 | 3.6 | 2.0 | .8 | 18.5 | 11.8 | 5.3 |
| 19 | 6.7 | 2.6 | 1.5 | 6.3 | 3.2 | 9.4 | 3.3 | 1.8 | .8 | 13.4 | 5.7 | 8.1 |
| 20 | 5.5 | 2.5 | 1.5 | 11.6 | 42 | 8.3 | 3.3 | 1.6 | 1.6 | 5.3 | 3.9 | 4.2 |
| 21 | 106 | 2.8 | 1.6 | 11.4 | 47 | 11.2 | 3.3 | 1.5 | 21 | 3.9 | 3.6 | 2.8 |
| 22 | 52 | 3.6 | 1.6 | 24 | 10.6 | 5.9 | 3.0 | 1.5 | 50 | 3.6 | 3.9 | 2.4 |
| 23 | 8.2 | 2.8 | 1.7 | 7.3 | 5.5 | 4.6 | 3.0 | 1.6 | 149 | 11.9 | 3.6 | 2.4 |
| 24 | 4.4 | 2.3 | 1.6 | 5.2 | 4.6 | 27 | 2.6 | 1.3 | 16.0 | 6.2 | 3.3 | 2.0 |
| 25 | 3.6 | 2.1 | 1.8 | 5.9 | 4.3 | 25 | 2.4 | 1.3 | 8.7 | 3.9 | 3.0 | 1.8 |
| 26 | 3.4 | 2.0 | 4.2 | 8.6 | 4.1 | 7.3 | 2.4 | 1.2 | 56 | 3.3 | 2.8 | 1.6 |
| 27 | 3.2 | 2.2 | 12.0 | 16.4 | 3.9 | 5.2 | 2.0 | 1.2 | 73 | 2.8 | 2.6 | 1.8 |
| 28 | 3.8 | 3.2 | 4.1 | 19.9 | 16.1 | 4.6 | 2.0 | 1.2 | 226 | 3.0 | 2.8 | 16.6 |
| 29 | 4.1 | 9.0 | 12.5 | 36 | 5.5 | 4.1 | 1.8 | ------ | 152 | 13.5 | 5.3 | 7.0 |
| 30 | 3.6 | 7.3 | 4.1 | 11.2 | 5.2 | 3.7 | 1.6 | ------ | 148 | 8.1 | 4.9 | 47 |
| 31 | 3.4 | 3.4 | ------ | 5.9 | ------ | 3.7 | 1.5 | ------ | 33 | ------ | 3.3 | ------ |

*Monthly discharge of Koaie Stream at elevation 3,700 feet, near Waimea, Kauai, for the year ending June 30, 1925*

| Month | Discharge | | | | Total run-off | |
|---|---|---|---|---|---|---|
| | Million gallons a day | | | Second-feet (mean) | Million gallons | Acre-feet |
| | Maximum | Minimum | Mean | | | |
| July | 106 | 2.8 | 14.8 | 22.9 | 458 | 1,410 |
| August | 51 | 2.0 | 6.15 | 9.52 | 190 | 585 |
| September | 12.5 | 1.5 | 2.88 | 4.46 | 86.5 | 266 |
| October | 98 | 2.3 | 19.8 | 30.6 | 614 | 1,880 |
| November | 69 | 3.2 | 13.3 | 20.6 | 398 | 1,220 |
| December | 110 | 2.8 | 16.7 | 25.8 | 516 | 1,590 |
| January | 93 | 1.5 | 21.4 | 33.1 | 662 | 2,030 |
| February | 55 | 1.1 | 6.31 | 9.76 | 177 | 543 |
| March | 226 | .8 | 30.8 | 47.7 | 955 | 2,930 |
| April | 137 | 2.8 | 20.0 | 30.9 | 601 | 1,840 |
| May | 14.2 | 2.6 | 4.62 | 7.15 | 143 | 440 |
| June | 47 | 1.6 | 5.78 | 8.94 | 173 | 532 |
| The year | 226 | .8 | 13.6 | 21.0 | 4,970 | 15,300 |

### 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, 1925, at present site; August 1, 1910, to January 25, 1916, at old site 2 miles downstream.

GAGE.—Stevens continuous water-stage recorder.

DISCHARGE MEASUREMENTS.—Made by wading.

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

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, about 1,200 million gallons a day, or 1,860 second-feet, at 1 p. m. July 21 (gage height, 4.25 feet); minimum discharge, 0.7 million gallons a day, or 1.1 second-feet, several hours March 18–20 (gage height, 0.80 foot).

1920–1925: Maximum discharge recorded, estimated 4,500 million gallons a day, or 6,960 second-feet, January 16, 1921 (gage height, 8.44 feet); minimum discharge, that of March 18–20, 1925.

DIVERSIONS.—None.

REGULATION.—None.

OBJECT OF STATION.—To determine amount of flood water available for storage 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 times of floods of December 11 and March 30. The three rating curves used are fairly well defined between 3 and 150 million gallons a day; poorly defined above and below. 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 very low and high stages and estimated periods for which they are poor.

*Discharge measurements of Waialae River at elevation 3,700 feet, near Waimea, Kauai, during the year ending June 30, 1925*

| Date | Gage height (feet) | Discharge | | Date | Gage height (feet) | Discharge | |
|---|---|---|---|---|---|---|---|
| | | Second-feet | Million gallons a day | | | Second-feet | Million gallons a day |
| July 23 | 1.16 | 12.8 | 8.27 | Mar. 15 | 0.83 | 1.36 | 0.88 |
| Sept. 12 | .83 | 1.94 | 1.25 | May 1 | 1.24 | 15.2 | 9.82 |
| Oct. 24 | .97 | 4.45 | 2.88 | June 4 | 1.07 | 6.64 | 4.29 |
| Jan. 29 | .92 | 3.12 | 2.02 | | | | |

*Discharge, in million gallons a day, of Waialae River at elevation 3,700 feet, near Waimea, Kauai, for the year ending June 30, 1925*

| Day | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 6.2 | 2.2 | 2.9 | 2.2 | 3.2 | 7.6 | 25 | 1.8 | | 13.6 | 12.4 | 1.6 |
| 2 | 2.7 | 2.1 | 2.5 | 1.8 | 2.7 | 5.1 | 32 | 1.6 | | 6.8 | 6.5 | 2.8 |
| 3 | 1.9 | 2.1 | 1.9 | 1.8 | 2.4 | 3.5 | 57 | 1.6 | | 47 | 4.1 | 4.3 |
| 4 | 1.7 | 1.8 | 1.8 | 1.8 | 9.6 | 2.9 | 24 | 1.5 | | 13.0 | 2.8 | 5.3 |
| 5 | 1.6 | 2.2 | 1.7 | 1.8 | 53 | 2.4 | 12.9 | 1.5 | | 9.8 | 2.0 | 3.7 |
| 6 | 1.6 | 2.4 | 1.6 | 1.8 | 10.7 | 2.2 | 12.9 | 1.4 | | 133 | 1.6 | 3.0 |
| 7 | 1.5 | 2.2 | 1.6 | 1.8 | 9.4 | 2.1 | 22 | 1.4 | | 40 | 1.6 | 2.0 |
| 8 | 2.0 | 6.2 | 1.6 | 1.9 | 6.4 | 1.9 | 82 | 1.4 | 1.3 | 10.0 | 2.0 | 1.8 |
| 9 | 3.8 | 54 | 1.6 | 71 | 3.5 | 1.8 | 75 | 26 | | 25 | 2.4 | 1.8 |
| 10 | 34 | 8.4 | 1.6 | 98 | 55 | 4.3 | 57 | 15.7 | | 86 | 3.5 | 1.4 |
| 11 | 34 | 6.2 | 1.5 | 57 | 111 | 150 | 21 | 57 | | 21 | 2.6 | 1.3 |
| 12 | 47 | 4.0 | 1.4 | 54 | 8.0 | 23 | 66 | 18.1 | | 10.0 | 2.5 | 1.1 |
| 13 | 19.9 | 2.5 | 1.4 | 18.1 | 6.6 | 21 | 51 | 9.2 | | 11.5 | 3.5 | 1.2 |
| 14 | 7.7 | 2.2 | 1.3 | 7.6 | 5.1 | 66 | 12.9 | 4.3 | | 7.7 | 2.4 | 1.2 |
| 15 | 30 | 3.5 | 1.3 | 40 | 3.8 | 15.7 | 8.8 | 3.1 | 1.0 | 7.1 | 1.8 | 3.2 |
| 16 | 15.6 | 9.1 | 1.3 | 24 | 3.2 | 6.9 | 7.3 | 2.4 | .9 | 5.6 | 1.4 | 2.0 |
| 17 | 6.9 | 3.5 | 1.3 | 17.7 | 2.7 | 47 | 5.9 | 2.0 | .9 | 4.8 | 1.4 | 2.2 |
| 18 | 4.8 | 2.4 | 1.3 | 6.6 | 2.2 | 37 | 5.7 | 1.8 | .8 | 17.4 | 5.3 | 2.6 |
| 19 | 5.7 | 1.9 | 1.3 | 4.6 | 2.1 | 10.4 | 4.8 | 1.6 | .7 | 16.8 | 3.2 | 5.9 |
| 20 | 5.4 | 1.8 | 1.3 | 5.4 | 13.5 | 10.3 | 4.3 | 1.5 | 1.1 | 5.0 | 2.2 | 2.5 |
| 21 | 113 | 2.4 | 1.3 | 5.4 | 31 | 12.0 | 4.3 | 1.5 | 18.8 | 3.7 | 2.4 | 1.8 |
| 22 | 69 | 2.7 | 1.3 | 10.2 | 8.0 | 6.9 | 4.0 | | 62 | 3.0 | 2.5 | 1.4 |
| 23 | 9.5 | 1.9 | 1.4 | 4.3 | 4.3 | 4.8 | 3.5 | | 202 | 14.5 | 2.0 | 1.2 |
| 24 | 5.1 | 1.8 | 1.4 | 3.2 | 3.5 | 66 | 3.1 | | 18.2 | 6.6 | 1.8 | 1.1 |
| 25 | 3.8 | 1.7 | 1.5 | 3.3 | 3.0 | 26 | 2.7 | 1.5 | 7.3 | 3.7 | 1.4 | 1.1 |
| 26 | 3.2 | 1.7 | 1.9 | 4.3 | 2.7 | 13.2 | 2.6 | | 44 | 2.8 | 1.3 | 1.1 |
| 27 | 2.7 | 1.8 | 6.0 | 8.0 | 2.4 | 7.3 | 2.7 | | 63 | 2.5 | 1.6 | 1.1 |
| 28 | 3.0 | 2.4 | 3.2 | 15.2 | 8.6 | 5.9 | 2.4 | | 221 | 2.5 | 1.6 | 13.9 |
| 29 | 3.3 | 7.4 | 7.3 | 29 | 4.3 | 4.8 | 2.1 | ------- | 199 | 13.3 | 4.0 | 6.2 |
| 30 | 2.7 | 5.8 | 3.2 | 7.7 | 3.3 | 4.3 | 2.0 | ------- | 202 | 7.0 | 3.5 | 42 |
| 31 | 2.2 | 3.2 | ------- | 4.0 | ------- | 4.0 | 2.0 | ------- | 41 | ------- | 2.2 | ------- |

NOTE.—Discharge July 23, Feb. 21, and Mar. 15 estimated because of incomplete record. Braced figures give mean discharge for periods indicated; estimated from fragmentary gage-height record and by comparison with record of Koaie Stream at elevation 3,700 feet, near Waimea, Kauai.

*Monthly discharge of Waialae River at elevation 3,700 feet, near Waimea, Kauai, for the year ending June 30, 1925*

| Month | Discharge | | | | Total run-off | |
|---|---|---|---|---|---|---|
| | Million gallons a day | | | Second-feet (mean) | Million gallons | Acre-feet |
| | Maximum | Minimum | Mean | | | |
| July | 113 | 1.5 | 14.6 | 22.6 | 452 | 1,390 |
| August | 54 | 1.7 | 4.95 | 7.66 | 154 | 471 |
| September | 7.3 | 1.3 | 2.02 | 3.13 | 60.7 | 186 |
| October | 98 | 1.8 | 16.6 | 25.7 | 514 | 1,580 |
| November | 111 | 2.1 | 12.8 | 19.8 | 385 | 1,180 |
| December | 150 | 1.8 | 18.6 | 28.8 | 576 | 1,770 |
| January | 82 | 2.0 | 20.0 | 30.9 | 619 | 1,900 |
| February | 57 | ------- | 5.96 | 9.22 | 167 | 512 |
| March | 221 | ------- | 35.5 | 54.9 | 1,100 | 3,380 |
| April | 133 | 2.5 | 18.4 | 28.5 | 551 | 1,690 |
| May | 12.4 | 1.3 | 2.89 | 4.47 | 89.5 | 275 |
| June | 42 | 1.1 | 4.06 | 6.28 | 122 | 374 |
| The year | 221 | ------- | 13.1 | 20.3 | 4,790 | 14,700 |

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

LOCATION.—Half a mile below intake 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, 1925. Staff at flume No. 4, 1 mile below intake, March 18, 1916, to August 2, 1917; weir 1,000 feet above present site November 8, 1907, to June 30, 1915.

AGE.—Stevens continuous water-stage recorder; installed July 26, 1923, replacing Gurley printing water-stage recorder used since July 12, 1921. Vertical staff gage 900 feet upstream prior to July 12, 1921.

DISCHARGE MEASUREMENTS.—Made from upper end of covered section of ditch.

CHANNEL AND CONTROL.—Ditch 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; permanent.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 64 million gallons a day, or 99 second-feet, at 1 p. m. October 29 (gage height 4.06 feet); may have gone higher during periods when recorder was not operating. Minimum discharge recorded during year, 0.9 million gallons a day, or 1.4 second-feet, from 11 p. m. December 20 to 9 p. m. December 21 (gage height, 0.58 foot).

1907–1925: 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.

DIVERSION.—None above station. Numerous diversions near Waimea and Kekaha.

REGULATION.—By head gates.

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

UTILIZATION.—Water used for irrigation of sugar cane and for domestic supply along the coastal plain east of Waimea and Kekaha.

ACCURACY.—Stage-discharge relation permanent during year. Rating curve well defined between 20 and 60 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 excellent except for estimated periods, for which they are fair.

Kekaha ditch diverts water from Waimea River at a point 8 miles by trail north of Waimea, 500 feet above gaging station on 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 about 4½ miles where it crosses river and then continues roughly parallel to it for a distance of about 2½ miles to a point about 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 measurements of Kekaha ditch at camp No. 1, near Waimea, Kauai, during the year ending June 30, 1925*

| Date | Gage height (feet) | Discharge | | Date | Gage height (feet) | Discharge | |
|---|---|---|---|---|---|---|---|
| | | Second-feet | Million gallons a day | | | Second-feet | Million gallons a day |
| Sept. 10 | 2.48 | 42.6 | 27.5 | Apr. 27 | 3.57 | 82.7 | 53.5 |
| Jan. 27 | 3.28 | 67.0 | 43.3 | May 20 | 3.18 | 66.8 | 43.2 |
| Mar. 13 | 3.15 | 67.4 | 43.6 | | | | |

*Discharge, in million gallons a day, of Kekaha ditch at camp No. 1, near Waimea, Kauai, for the year ending June 30, 1925*

| Day | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 55 | 41 | | | 34 | 58 | 42 | 41 | 32 | 50 | 58 | 31 |
| 2 | 43 | | | | 32 | 52 | 47 | 39 | 32 | 44 | 58 | 31 |
| 3 | 37 | | | | 30 | 43 | 33 | 39 | 32 | 50 | 58 | 34 |
| 4 | 33 | | | | 40 | ------- | 33 | 38 | 31 | 55 | 51 | 45 |
| 5 | 32 | | | | 51 | ------- | 53 | 38 | 32 | 53 | 46 | 36 |
| 6 | 31 | | | | 55 | ------- | 51 | 37 | 32 | 55 | 41 | 36 |
| 7 | 31 | | | | 53 | ------- | 53 | 37 | 32 | 55 | 41 | 32 |
| 8 | 34 | | | | 53 | ------- | 55 | 37 | 30 | 55 | 43 | 31 |
| 9 | 43 | | | | 41 | ------- | 53 | 51 | 30 | 58 | 51 | 30 |
| 10 | 49 | | | | 48 | ------- | 51 | 55 | 30 | 58 | 58 | 30 |
| 11 | 55 | | | | 41 | ------- | 53 | 53 | 30 | 55 | 53 | 29 |
| 12 | 55 | | | 40 | 52 | ------- | 53 | 55 | 33 | 55 | 48 | 29 |
| 13 | 55 | | | | 53 | ------- | 51 | 55 | 43 | 58 | 58 | 28 |
| 14 | 55 | | | | 51 | ------- | 55 | 58 | 39 | 58 | 51 | 29 |
| 15 | 55 | 42 | 28 | | 43 | | 53 | 51 | 34 | 58 | 40 | 32 |
| 16 | 55 | | | | 39 | 22 | 55 | 46 | 31 | 58 | 32 | 34 |
| 17 | 58 | | | | 37 | | 55 | 41 | 30 | 58 | 39 | 30 |
| 18 | 53 | | | | 36 | | 55 | 39 | 29 | 58 | 53 | 33 |
| 19 | 55 | | | | 34 | | 55 | 38 | 29 | 58 | 53 | 38 |
| 20 | 52 | | | | 46 | 7.3 | 55 | 37 | 39 | 55 | 41 | 37 |
| 21 | 46 | | | | 55 | 3.9 | 55 | 36 | 52 | 53 | 38 | 31 |
| 22 | 51 | | | | 55 | 25 | 55 | 38 | 58 | 53 | 34 | 29 |
| 23 | 53 | | | | 55 | 25 | 53 | 38 | 52 | 55 | 33 | 28 |
| 24 | 48 | | | 38 | 53 | 25 | 53 | 34 | 44 | 58 | 33 | 27 |
| 25 | 45 | | | 39 | 48 | 33 | 48 | 34 | 40 | 58 | 32 | 27 |
| 26 | 41 | | | 41 | 41 | 41 | 48 | 33 | 58 | 55 | 31 | 26 |
| 27 | 39 | | | 52 | 38 | 43 | 46 | 33 | 54 | 53 | 31 | 26 |
| 28 | 38 | | | 48 | 55 | 46 | 46 | 32 | 53 | 51 | 31 | 33 |
| 29 | 39 | | | 58 | 55 | 41 | 43 | ------- | 51 | 53 | 32 | 48 |
| 30 | 46 | | | 55 | 46 | 39 | 43 | ------- | 53 | 58 | 40 | 41 |
| 31 | 41 | | ------- | 41 | ------- | 39 | 41 | ------- | 53 | ------- | 33 | ------- |

NOTE.—Braced figures give mean discharge for periods indicated, estimated by comparison with record of this ditch below tunnel No. 12 near Waimea, Kauai, and from incomplete gage-height record; recorder not operating properly during these periods. Data insufficient for making estimate Dec. 4–14.

*Monthly discharge of Kekaha ditch at camp No. 1, near Waimea, Kauai, for the year ending June 30, 1925*

| Month | Discharge | | | | Total run-off | |
|---|---|---|---|---|---|---|
| | Million gallons a day | | | Second-feet (mean) | Million gallons | Acre-feet |
| | Maximum | Minimum | Mean | | | |
| July | 58 | 31 | 45.9 | 71.0 | 1,420 | 4,370 |
| August | ---------- | ---------- | 42.0 | 65.0 | 1,300 | 3,990 |
| September | ---------- | ---------- | 28.0 | 43.3 | 840 | 2,580 |
| October | ---------- | ---------- | 41.7 | 64.5 | 1,290 | 3,960 |
| November | 55 | 30 | 45.7 | 70.7 | 1,370 | 4,200 |
| January | 55 | 33 | 49.7 | 76.9 | 1,540 | 4,730 |
| February | 58 | 32 | 41.5 | 64.2 | 1,160 | 3,570 |
| March | 58 | 29 | 39.3 | 60.8 | 1,220 | 3,740 |
| April | 58 | 44 | 55.0 | 85.1 | 1,650 | 5,070 |
| May | 58 | 31 | 43.3 | 67.0 | 1,340 | 4,120 |
| June | 48 | 26 | 32.4 | 50.1 | 971 | 2,980 |

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

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

RECORDS AVAILABLE.—July 15, 1921, to June 30, 1925. Aprii 7, 1908, to November 30, 1914, and July 20, 1916, to July 15, 1921, at site half a mile downstream.

GAGE.—Stevens continuous water-stage recorder installed July 20, 1923, replacing Gurley printing water-stage recorder used since July 15, 1921. Vertical staff gage half a mile downstream used prior to July 15, 1921.

DISCHARGE MEASUREMENTS.—Made from plank at gage.

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

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 53 million gallons a day, or 82 second-feet, from 7 p. m. February 12 to 5 a. m. February 13 (gage height, 4.06 feet); minimum discharge, no flow when water was shut out of ditch part of December 14, 20, and 21.

1916–1925: Maximum discharge recorded, 64 million gallons a day, or 99 second-feet, at 8.30 a. m. December 22, 1921 (gage height, 4.40 feet); no flow occasionally, when water was shut out of ditch.

DIVERSIONS.—Small amount of water is diverted above station for domestic supply and occasionally for irrigation of rice and taro.

REGULATION.—By head gates.

OBJECT OF STATION.—To determine discharge above first important lateral and 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 practically permanent except from March to May when affected by moss. Rating curve well defined above 10 million gallons a day. 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 good except for period affected by moss and estimated periods, for which they are fair.

For description of Kekaha ditch see under "Kekaha ditch at camp No. 1, near Waimea, Kauai."

*Discharge measurements of Kekaha ditch below tunnel No. 12, near Waimea, Kauai, during the year ending June 30, 1925*

| Date | Gage height (feet) | Discharge | | Date | Gage height (feet) | Discharge | |
|---|---|---|---|---|---|---|---|
| | | Second-feet | Million gallons a day | | | Second-feet | Million gallons a day |
| July 26 | 3.06 | 53.9 | 34.8 | Jan. 26 | 3.38 | 61.4 | 39.7 |
| Sept. 11 | 2.23 | 33.0 | 21.3 | Mar. 12 | 2.27 | 34.4 | 22.2 |
| Oct. 22 | 3.61 | 70.8 | 45.8 | Apr. 26 | 3.95 | 74.4 | 48.1 |
| Dec. 14 | .545 | .20 | .13 | Apr. 30 | 4.05 | 75.8 | 49.0 |
| Do | .525 | .19 | .13 | June 5 | 2.88 | 48.9 | 31.5 |
| Do | .52 | .19 | .13 | | | | |

*Discharge, in million gallons a day, of Kekaha ditch below tunnel No. 12, near Waimea, Kauai, for the year ending June 30, 1925*

| Day | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 44 | 36 | 32 | 24 | 32 | } 44 | 36 | 36 | 27 | 44 | 50 | 27 |
| 2 | 39 | 34 | 30 | 21 | 29 | | 41 | 36 | 27 | 39 | 50 | 27 |
| 3 | 32 | 34 | 27 | 19.2 | 27 | | 26 | 36 | 27 | 43 | 50 | 30 |
| 4 | 29 | 32 | 25 | 19.2 | 30 | ------- | 25 | 34 | 26 | 46 | 46 | 38 |
| 5 | 27 | 30 | 22 | 18.3 | 43 | ------- | 43 | 34 | 26 | 44 | 41 | 32 |
| 6 | 26 | 32 | 22 | 18.3 | 48 | ------- | 43 | 34 | 26 | 48 | 37 | 30 |
| 7 | 25 | 30 | 21 | 19.2 | 46 | ------- | 44 | 34 | 26 | 48 | 36 | 29 |
| 8 | 26 | 42 | 21 | 20 | 46 | ------- | 46 | 34 | 24 | 48 | 37 | 26 |
| 9 | 36 | 48 | 21 | 24 | 39 | ------- | 48 | 43 | 22 | 48 | 43 | 25 |
| 10 | 40 | 48 | 21 | 47 | 41 | ------- | 46 | 52 | 22 | 48 | 48 | 25 |
| 11 | 46 | 48 | 20 | 37 | 39 | ------- | 46 | 50 | 22 | 48 | 48 | 23 |
| 12 | 46 | 46 | 20 | 43 | 48 | ------- | 46 | 52 | 22 | 46 | 43 | 23 |
| 13 | 44 | 36 | 20 | 43 | 48 | ------- | 46 | 52 | 36 | 46 | 50 | 23 |
| 14 | 44 | 30 | 20 | 41 | 46 | ------- | 48 | 52 | 30 | 46 | 46 | 23 |
| 15 | 44 | 32 | 20 | 41 | 41 | 15.0 | 46 | 46 | 27 | 46 | 37 | 26 |
| 16 | 44 | 40 | 20 | 44 | 36 | 13.4 | 46 | 43 | 23 | 46 | 27 | 30 |
| 17 | 44 | 39 | 20 | 44 | 32 | 14.7 | 46 | 39 | 22 | 46 | 34 | 26 |
| 18 | 41 | 32 | 20 | 44 | 29 | 25 | 46 | 36 | 22 | 46 | 44 | 29 |
| 19 | 43 | 29 | 19.2 | 37 | } | 21 | 44 | 34 | 22 | 46 | 48 | 33 |
| 20 | 41 | 27 | 18.3 | 36 | } | 5.9 | 44 | 33 | 27 | 46 | 39 | 34 |
| 21 | 39 | 25 | 18.3 | 43 | } | 3.5 | 44 | 32 | 41 | 43 | 34 | 27 |
| 22 | 44 | 29 | 18.3 | 43 | } | 22 | 44 | 34 | 46 | 43 | 30 | 25 |
| 23 | 43 | 29 | 18.3 | 41 | } | 22 | 43 | 34 | 46 | 44 | 30 | 23 |
| 24 | 41 | 25 | 18.3 | 32 | } 42 | 26 | 43 | 32 | 39 | 48 | 29 | 22 |
| 25 | 37 | 23 | 18.3 | 32 | } | 32 | 41 | 30 | 32 | 48 | 28 | 22 |
| 26 | 34 | 22 | 19.2 | 34 | } | 36 | 41 | 30 | 46 | 46 | 27 | 21 |
| 27 | 32 | 22 | 32 | 41 | } | 37 | 39 | 29 | 46 | 44 | 26 | 21 |
| 28 | 30 | 45 | 32 | 41 | } | 39 | 37 | 29 | 50 | 44 | 25 | 24 |
| 29 | 32 | 36 | 32 | 48 | } | 37 | 37 | ------- | 50 | 44 | 26 | 48 |
| 30 | 36 | 41 | 34 | 48 | } | 36 | 36 | ------- | 50 | 48 | 35 | 37 |
| 31 | 37 | 32 | ------- | 39 | ------- | 34 | 36 | ------- | 48 | ------- | 30 | ------- |

NOTE.—Braced figures give mean discharge for periods indicated, estimated by comparison with record for this ditch at camp No. 1 near Waimea, Kauai; recorder not operating during these periods. Data insufficient for making estimate Dec. 3–14. Large gage-height corrections cast some doubt on record from February to June when recorder was not operating properly.

*Monthly discharge of Kekaha ditch below tunnel No. 12, near Waimea, Kauai, for the year ending June 30, 1925*

| Month | Discharge | | | | Total run-off | |
|---|---|---|---|---|---|---|
| | Million gallons a day | | | Second-feet (mean) | Million gallons | Acre-feet |
| | Maximum | Minimum | Mean | | | |
| July | 46 | 25 | 37.6 | 58.2 | 1,170 | 3,580 |
| August | 48 | 22 | 34.0 | 52.6 | 1,050 | 3,230 |
| September | 34 | 18.3 | 22.7 | 35.1 | 680 | 2,090 |
| October | 48 | 18.3 | 34.9 | 54.0 | 1,080 | 3,320 |
| November | ------- | 27 | 40.1 | 62.0 | 1,200 | 3,690 |
| January | 48 | 25 | 41.8 | 64.7 | 1,300 | 3,980 |
| February | 52 | 29 | 37.9 | 58.6 | 1,060 | 3,250 |
| March | 50 | 22 | 32.3 | 50.0 | 1,000 | 3,070 |
| April | 48 | 39 | 45.7 | 70.7 | 1,370 | 4,200 |
| May | 50 | 25 | 37.9 | 58.6 | 1,170 | 3,600 |
| June | 48 | 21 | 27.6 | 42.7 | 829 | 2,540 |

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

LOCATION.—One-third of a mile above Waiehu Falls and 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, 1925.

GAGE.—Stevens continuous water-stage recorder installed November 19, 1918; Friez water-stage recorder December 19, 1911, to November 8, 1928. Staff gage December 10–16, 1911.

DISCHARGE MEASUREMENTS.—Made from cable or by wading.

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

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 17,100 million gallons a day, or 26,500 second-feet, at 3.40 a. m. February 11 (gage height, 9.34 feet); minimum discharge, 4.0 million gallons a day, or 6.2 second-feet, from 5 to 8 p. m. February 7 (gage height, 0.91 foot).

1911–1925: Maximum discharge recorded, 29,000 million gallons a day, or 44,900 second-feet, at 7.25 a. m. January 16, 1920 (gage height, 11.25 feet); minimum discharge, 2.8 million gallons a day, or 4.3 second-feet, at 6 p. m. October 7, 1918 (gage height, 2.06 feet on old gage).

DIVERSIONS.—Several diversions above station for irrigation and development of power.

REGULATION.—By diversions above station only.

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, presumably, at time of flood October 10. Rating curves used well defined between 5 and 200 million gallons a day and fairly well defined between 200 and 1,500 million gallons a day. Operation of water-stage recorder not 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 for periods of estimate, for which they are fair.

*Discharge measurements of South Fork of Wailua River near Lihue, Kauai, during the year ending June 30, 1925*

| Date | Gage height (feet) | Discharge | | Date | Gage height (feet) | Discharge | |
|---|---|---|---|---|---|---|---|
| | | Second-feet | Million gallons a day | | | Second-feet | Million gallons a day |
| July 16 | 1.32 | 17.6 | 11.4 | Mar. 8 | 0.96 | 7.33 | 4.74 |
| Oct. 21 | 1.90 | 63.4 | 41.0 | Apr. 22 | 1.47 | 22.4 | 14.5 |
| Dec. 9 | .96 | 6.58 | 4.25 | May 31 | 1.32 | 16.3 | 10.5 |

*Discharge, in million gallons a day, of South Fork of Wailua River near Lihue, Kauai, for the year ending June 30, 1925*

| Day | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 14.8 | 6.3 | 6.4 | 6.6 | 10.0 | 8.7 | 73 | 4.7 | 7.7 | ------- | 151 | 11.2 |
| 2 | 8.3 | 10.8 | 6.4 | 29 | 6.6 | 13.2 | 138 | 5.0 | 7.5 | ------- | 126 | 19.7 |
| 3 | 8.1 | 33 | 6.1 | 104 | 5.7 | 7.3 | 165 | 6.1 | 7.3 | ------- | 95 | 35 |
| 4 | 8.3 | 7.7 | 5.7 | 17.0 | 24 | 9.7 | 143 | 4.9 | 6.4 | ------- | 53 | 49 |
| 5 | 7.4 | 57 | 5.6 | 19.5 | 98 | 6.0 | 120 | 4.6 | 6.0 | ------- | 42 | 82 |
| 6 | 6.6 | 17.7 | 5.4 | 19.4 | 47 | 6.3 | 95 | 4.4 | 5.4 | ------- | 34 | 42 |
| 7 | 6.8 | 8.3 | 5.4 | 8.3 | 17.3 | 5.4 | 92 | 4.2 | 4.8 | ------- | 28 | 28 |
| 8 | 6.8 | 19.0 | 5.1 | 20 | 11.4 | 5.0 | 140 | 4.1 | 4.6 | ------- | 40 | 28 |
| 9 | 10.0 | 84 | 5.1 | 39 | 8.9 | 4.7 | 140 | 14.8 | | ------- | 30 | 38 |
| 10 | 35 | 58 | 5.1 | 943 | 49 | 5.4 | 178 | 25 | | ------- | 25 | 17.7 |
| 11 | 64 | 105 | 4.9 | 487 | 294 | 198 | 110 | 1,680 | | ------- | 19.6 | 22 |
| 12 | 62 | 30 | 4.8 | 507 | 66 | 100 | 134 | 140 | | ------- | 33 | 32 |
| 13 | 21 | 13.1 | 4.9 | 186 | 61 | 36 | 171 | 78 | | ------- | 30 | 31 |
| 14 | 9.3 | 14.3 | 5.3 | 96 | 41 | 52 | 92 | 39 | | ------- | 16.6 | 15.6 |
| 15 | 24 | 16.6 | 5.0 | 82 | 24 | 34 | 72 | 24 | | ------- | 12.2 | 15.3 |
| 16 | 18.4 | 24 | 5.1 | 81 | 18.5 | 25 | 63 | 16.6 | 4.8 | ------- | 9.1 | 9.1 |
| 17 | 8.3 | 11.6 | 5.1 | 243 | 15.6 | 27 | 42 | 12.5 | | ------- | 8.2 | 17.8 |
| 18 | 7.0 | 7.7 | 5.1 | 81 | 13.3 | 63 | 39 | 12.2 | | ------- | 70 | 16.0 |
| 19 | 6.6 | 7.7 | 5.3 | 59 | 10.0 | 29 | 38 | 10.0 | | ------- | 50 | 16.9 |
| 20 | 7.6 | 7.4 | 5.4 | 54 | 9.7 | 25 | 26 | 9.5 | | ------- | 25 | 10.2 |
| 21 | 373 | 7.7 | 5.4 | 48 | 22 | 21 | 32 | 9.1 | | ------- | 40 | 28 |
| 22 | 308 | 8.8 | 5.4 | 47 | 13.7 | 16.6 | 23 | 8.9 | | 16.2 | 19.2 | 22 |
| 23 | 64 | 7.4 | 5.6 | 32 | 10.2 | 17.7 | 21 | 12.5 | ------- | 415 | 43 | 60 |
| 24 | 28 | 6.4 | 5.6 | 27 | 8.4 | 14.9 | 18.1 | 9.7 | ------- | 120 | 36 | 23 |
| 25 | 16.8 | 6.4 | 24 | 29 | 9.1 | 65 | 18.1 | 9.3 | ------- | 59 | 21 | 12.5 |
| 26 | 11.9 | 6.4 | 26 | 20 | 7.5 | 29 | 18.9 | 8.6 | ------- | 42 | 14.0 | 8.9 |
| 27 | 25 | 6.4 | 19.1 | 18.5 | 6.3 | 16.2 | 19.2 | 8.2 | ------- | 154 | 18.3 | 7.1 |
| 28 | 37 | 6.6 | 7.9 | 12.4 | 5.5 | 14.0 | 10.0 | 7.8 | ------- | 128 | 11.4 | 28 |
| 29 | 14.2 | 6.6 | 8.1 | 36 | 6.8 | 12.2 | 7.5 | ------- | ------- | 116 | 19.8 | 40 |
| 30 | 9.1 | 6.6 | 8.8 | 22 | 5.4 | 11.2 | 6.3 | ------- | ------- | 92 | 16.2 | 275 |
| 31 | 6.6 | 6.4 | ------- | 13.0 | ------- | 13.3 | 5.3 | ------- | ------- | ------- | 12.0 | ------- |

NOTE.—Owing to partly plugged intake operation of water-stage recorder unsatisfactory Nov. 19–20, Nov. 25–30, Dec. 1, 3, 5–9, Jan. 27–29, Feb. 12–28, and Mar. 9–22; discharge estimated from study of faulty gage-height record and comparison with records of near-by streams. Water-stage recorder did not operate Mar. 23 to Apr. 21, and data are insufficient for making estimate.

*Monthly discharge of South Fork of Wailua River near Lihue, Kauai, for the year ending June 30, 1925*

| Month | Discharge | | | | Total run-off | |
|---|---|---|---|---|---|---|
| | Million gallons a day | | | Second-feet (mean) | Million gallons | Acre-feet |
| | Maximum | Minimum | Mean | | | |
| July | 373 | 6.6 | 39.8 | 61.6 | 1,230 | 3,790 |
| August | 105 | 6.3 | 19.8 | 30.6 | 615 | 1,890 |
| September | 26 | 4.8 | 7.44 | 11.5 | 223 | 685 |
| October | 943 | 6.6 | 109 | 169 | 3,390 | 10,400 |
| November | 294 | 5.4 | 30.9 | 47.8 | 926 | 2,840 |
| December | 198 | 4.7 | 28.8 | 44.6 | 892 | 2,740 |
| January | 178 | 5.3 | 72.6 | 112 | 2,250 | 6,910 |
| February | 1,680 | 4.1 | 77.6 | 120 | 2,170 | 6,670 |
| May | 151 | 8.2 | 37.1 | 57.4 | 1,150 | 3,520 |
| June | 275 | 7.1 | 34.7 | 53.7 | 1,040 | 3,200 |

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

LOCATION.—1½ miles above intake of Kanaha ditch and 10 miles northwest of Lihue.

RECORDS AVAILABLE.—September 21, 1914, to June 30, 1925. Records available for old station at elevation 500 feet, August 1 to October 28, 1910, and December 28, 1910, to September 25, 1914.

GAGE.—Stevens continuous water-stage recorder.

DISCHARGE MEASUREMENTS.—Made by wading or from cable.

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, about 2,370 million gallons a day, or 3,670 second-feet, at 3.15 a. m. February 11 (gage height, 9.10 feet); minimum discharge, 9.7 million gallons a day, or 15.0 second-feet, several hours February 7 and 8 (gage height, 0.30 foot).

1914–1925: Maximum discharge recorded, that of February 11, 1925; minimum discharge, that of February 7 and 8, 1925.

DIVERSIONS.—None.

REGULATION.—None.

OBJECT OF STATION.—To determine feasibility of 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 below 100 million gallons a day; extended above. 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-stage records poor.

*Discharge measurements of North Fork of Wailua River at elevation 650 feet, near Lihue, Kauai, during the year ending June 30, 1925*

| Date | Gage height (feet) | Discharge | | Date | Gage height (feet) | Discharge | |
|---|---|---|---|---|---|---|---|
| | | Second-feet | Million gallons a day | | | Second-feet | Million gallons a day |
| July 16 | 0.99 | 40.8 | 26.4 | Jan. 21 | 0.62 | 21.2 | 13.7 |
| Sept. 6 | .71 | 25.6 | 16.5 | Mar. 9 | .61 | 22.5 | 14.5 |
| Oct. 18 | 1.23 | 58.8 | 38.0 | Apr. 22 | .54 | 19.9 | 12.9 |
| Dec. 10 | .50 | 19.3 | 12.5 | May 31 | .42 | 16.9 | 10.9 |

*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, 1925*

| Day | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 23 | 26 | 19.0 | 15.6 | 22 | 26 | 37 | 10.5 | 15.6 | | 36 | 24 |
| 2 | 19.4 | 54 | 17.8 | 63 | 20 | 16.3 | 35 | 10.8 | 15.3 | | | 15.9 |
| 3 | 19.4 | 28 | 16.6 | 44 | 19.4 | 22 | 64 | 10.5 | 16.0 | | | 29 |
| 4 | 19.0 | 28 | 17.2 | 21 | 39 | 15.3 | 46 | 10.2 | 19.5 | | | 20 |
| 5 | 17.2 | 60 | 16.9 | 22 | 65 | 14.7 | 33 | 10.1 | 15.3 | | 26 | 38 |
| 6 | 17.8 | 28 | 16.5 | 20 | 29 | 15.3 | 28 | 10.0 | 14.7 | | | 16.6 |
| 7 | 17.5 | 28 | 16.0 | 30 | 24 | 13.6 | 36 | 9.8 | 14.7 | | | 15.5 |
| 8 | 28 | 32 | 18.4 | 24 | 21 | 13.1 | 40 | 9.9 | 14.0 | | | 15.8 |
| 9 | 22 | 84 | 16.6 | 53 | 19.0 | 12.4 | 44 | 24 | 14.0 | 60 | | 18.6 |
| 10 | 47 | 38 | 16.3 | 245 | 49 | 15.3 | 58 | 28 | 14.0 | | | 12.9 |
| 11 | 47 | 54 | 15.6 | 169 | 116 | 96 | 36 | 302 | 13.8 | | | 13.8 |
| 12 | 54 | 30 | 15.3 | 134 | 42 | 26 | 72 | 58 | 16.9 | | | 26 |
| 13 | 31 | 26 | 15.3 | 68 | 33 | 29 | 52 | 38 | | | | 12.5 |
| 14 | 28 | 33 | 15.3 | 44 | 27 | 31 | 33 | 30 | | | | 11.5 |
| 15 | 38 | 36 | 15.1 | 48 | 24 | 19.0 | 26 | 26 | | | | 12.4 |
| 16 | 27 | 32 | | 48 | 22 | 17.9 | 21 | 23 | 16 | | | 10.8 |
| 17 | 26 | 24 | | 84 | 21 | 21 | 18.4 | 21 | | | | 15.9 |
| 18 | 24 | 22 | | 41 | 19.8 | 23 | 17.8 | 19.8 | | | | 11.5 |
| 19 | 27 | 21 | | 40 | 19.0 | 14.2 | 16.0 | 19.0 | | | 22 | 12.5 |
| 20 | 23 | 21 | 15 | 42 | 53 | 13.6 | 14.9 | 18.4 | | 28 | | 10.7 |
| 21 | 131 | 24 | | 32 | 50 | 12.9 | 14.7 | 17.8 | | | | 19.5 |
| 22 | 112 | 19.4 | | 40 | 28 | 12.0 | 13.8 | 24 | 46 | | | 13.3 |
| 23 | 41 | 18.7 | | 28 | 23 | 11.5 | 13.1 | 18.4 | | 102 | | 31 |
| 24 | 32 | 19.0 | | 27 | 24 | 20 | 12.5 | 17.2 | | 21 | | 13.1 |
| 25 | 28 | 18.1 | 44 | 29 | 21 | 17.0 | 12.0 | 16.6 | | 15.6 | | 11.7 |
| 26 | 26 | 17.5 | 26 | 28 | 19.0 | 14.5 | 11.6 | 16.3 | | 14.2 | | 11.1 |
| 27 | 51 | 17.8 | 28 | 26 | 18.4 | 11.4 | 11.2 | 15.8 | | 32 | | 11.4 |
| 28 | 40 | 22 | 16.6 | 28 | 27 | 10.8 | 11.1 | 16.3 | 130 | 30 | | 21 |
| 29 | 28 | 30 | 20 | 48 | 18.4 | 10.6 | 12.4 | ------- | | 34 | | 19.1 |
| 30 | 24 | 21 | 16.8 | 34 | 21 | 12.6 | 11.0 | ------- | | 33 | | 111 |
| 31 | 22 | 22 | ------- | 26 | ------- | 11.0 | 10.6 | ------- | | ------- | | ------- |

NOTE.—Discharge estimated Dec. 13–15 and Jan. 5. Braced figures give estimated mean discharge for periods indicated. Estimates made by comparison with records of near-by streams and from incomplete gage-height record.

*Monthly discharge of North Fork of Wailua River at elevation 650 feet, near Lihue, Kauai, for the year ending June 30, 1925*

| Month | Discharge | | | | Total run-off | |
|---|---|---|---|---|---|---|
| | Million gallons a day | | | Second-feet (mean) | Million gallons | Acre-feet |
| | Maximum | Minimum | Mean | | | |
| July | 131 | 17.2 | 35.2 | 54.5 | 1,090 | 3,350 |
| August | 84 | 17.5 | 30.1 | 46.6 | 934 | 2,870 |
| September | 44 | ------- | 17.8 | 27.5 | 534 | 1,640 |
| October | 245 | 15.6 | 51.7 | 80.0 | 1,600 | 4,910 |
| November | 116 | 18.4 | 31.1 | 48.1 | 934 | 2,870 |
| December | 96 | 10.6 | 19.3 | 29.9 | 599 | 1,840 |
| January | 72 | 10.6 | 27.8 | 43.0 | 862 | 2,650 |
| February | 302 | 9.8 | 29.7 | 46.0 | 831 | 2,550 |
| March | ------- | ------- | 43.6 | 67.5 | 1,350 | 4,150 |
| April | ------- | ------- | 47.0 | 72.7 | 1,410 | 4,330 |
| May | ------- | ------- | 23.2 | 35.9 | 720 | 2,210 |
| June | 111 | 10.7 | 20.2 | 31.3 | 606 | 1,860 |
| The year | 302 | ------- | 31.4 | 48.6 | 11,500 | 35,200 |

### KANAHA DITCH NEAR LIHUE, KAUAI

LOCATION.—300 feet below point where Kauai Electric Co.'s power line crosses ditch and 9 miles north of Lihue.

RECORDS AVAILABLE.—July 26, 1921, to June 30, 1925. August 6, 1910, to July 25, 1921, at site 800 feet upstream.

GAGE.—Stevens continuous water-stage recorder installed January 26, 1923. Gurley printing water-stage recorder at same location used July 25, 1921, to January 25, 1923. Vertical staff gage, 800 feet upstream, prior to July 25, 1921.

DISCHARGE MEASUREMENTS.—Made from footbridge at gage.

CHANNEL AND CONTROL.—Channel cut in conglomorate and clay; straight for 300 feet above and 10 feet below gage, where ditch turns sharply into three-fourths mile tunnel. Control composed of soft lava rock; shifting probably due to caving in of tunnel roof.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 27 million gallons a day, or 42 second-feet, at 11 p. m. February 10 (gage height, 3.97 feet); minimum discharge, between May 1 and 30, recorder not operating properly and intake may have been plugged (gage height, 0.57 foot).

1910–1925: Maximum discharge recorded, that of February 10, 1925; minimum discharge, ditch dry occasionally.

DIVERSIONS.—All diversions below station.

REGULATION.—By head gates.

OBJECT OF STATION.—To determine discharge of ditch, which diverts water from river and delivers it to fee simple and Territorial lands leased to Lihue plantation. Territorial water. Important station relative to North Wailua homesteads.

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

ACCURACY.—Stage-discharge relation not permanent owing in part to construction operations in tunnel below. Three fairly well defined rating curves used. Operation of water-stage recorder satisfactory except during July, August, September, and 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 poor.

Kanaha ditch diverts from North Fork of Wailua River at a point about 8½ miles above mouth of river, 9 miles north of Lihue, and at an elevation of about 600 feet. The ditch runs due east, almost parallel to the river, for a distance of about a third of a mile, and then turns sharply to the south. About 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, then south for 5 miles to the vicinity of Lihue.

*Discharge measurements of Kanaha ditch near Lihue, Kauai, during the year ending June 30, 1925*

| Date | Gage height (feet) | Discharge | | Date | Gage height (feet) | Discharge | |
|---|---|---|---|---|---|---|---|
| | | Second-feet | Million gallons a day | | | Second-feet | Million gallons a day |
| July 16 | 3.12 | 31.3 | 20.2 | Jan. 21 | 2.32 | 19.2 | 12.4 |
| Sept. 6 | 2.60 | 25.2 | 16.3 | Mar. 9 | 2.44 | 23.0 | 14.9 |
| Oct. 18 | 2.43 | 23.2 | 15.0 | Apr. 22 | 2.40 | 22.5 | 14.5 |
| Dec. 10 | 2.72 | 28.0 | 18.1 | | | | |

*Discharge, in million gallons a day, of Kanaha ditch near Lihue, Kauai, for the year ending June 30, 1925*

| Day | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | | | 16.9 | 16.2 | 16.2 | 13.6 | 9.0 | 13.9 | 14.7 | 16.9 | 12.5 |
| 2 | | | | 20 | 16.9 | 13.9 | 14.6 | 9.0 | 13.9 | 13.9 | | 15.4 |
| 3 | | | 15 | 20 | 16.9 | 14.7 | 14.6 | 9.0 | 14.7 | 14.7 | | 16.4 |
| 4 | | | | 18.5 | 17.7 | 12.0 | 13.8 | 8.4 | 16.9 | 13.9 | | 16.9 |
| 5 | | | | 18.5 | 16.9 | 13.2 | 13.8 | 7.8 | 14.7 | 13.9 | | 19.2 |
| 6 | | | 16.2 | 19.2 | 16.9 | 13.9 | 13.1 | 7.8 | 13.9 | 14.7 | | 16.9 |
| 7 | | | 15.4 | 20 | 16.9 | 12.5 | 13.1 | 7.8 | 13.9 | 14.7 | | 16.2 |
| 8 | | | 16.9 | 20 | 16.2 | 11.8 | 13.1 | 8.2 | 13.2 | 13.9 | | 16.2 |
| 9 | | 17 | 16.2 | 21 | 16.2 | 11.0 | 13.1 | 16.0 | 13.9 | 13.9 | | 16.9 |
| 10 | | | 15.4 | 20 | 16.9 | 13.3 | 13.8 | 16.6 | 15.4 | 14.7 | | 14.7 |
| 11 | | | 15.4 | 17.7 | 16.2 | 16.4 | 13.1 | 7.3 | 15.4 | 13.9 | | 15.4 |
| 12 | | | 15.4 | 16.9 | 15.4 | 18.0 | 13.1 | 7.0 | 16.9 | 13.2 | | 15.6 |
| 13 | | | 16.2 | 16.2 | 15.4 | 17.2 | 13.8 | 15.8 | 16.2 | 13.9 | | 14.7 |
| 14 | | | 15.4 | 15.4 | 16.2 | 18.8 | 13.1 | 17.7 | 15.4 | 13.9 | | 13.2 |
| 15 | | | 15.4 | 15.4 | 16.2 | 17.2 | 13.1 | 16.2 | 15.4 | 13.9 | | 13.9 |
| 16 | | | 15.4 | 15.4 | 16.2 | 16.4 | 13.1 | 14.7 | 14.7 | 13.9 | | 12.5 |
| 17 | 20 | | 15.4 | 16.2 | 16.2 | 16.4 | 13.1 | 13.9 | 14.7 | 13.9 | | 15.4 |
| 18 | 20 | | 15.4 | 14.7 | 15.4 | 17.2 | 12.4 | 13.2 | 14.7 | 13.9 | | 13.2 |
| 19 | 20 | | 14.7 | 14.7 | 15.4 | 15.6 | 12.4 | 12.5 | 14.7 | 13.2 | | 13.9 |
| 20 | | | 15.4 | 14.7 | 16.9 | 14.2 | 11.7 | 13.9 | 16.2 | 13.9 | | 11.8 |
| 21 | | | 14.7 | 14.7 | 16.2 | 13.4 | 12.4 | 15.4 | 16.9 | 13.2 | | 16.9 |
| 22 | | | 14.7 | 14.7 | 14.7 | 12.6 | 11.7 | 16.9 | 20 | 13.9 | | 16.2 |
| 23 | | | 14.7 | 13.9 | 14.7 | 11.9 | 11.0 | 16.2 | 18.5 | 18.2 | | 18.5 |
| 24 | | 15 | 15.4 | 13.9 | 15.4 | 13.9 | 10.3 | 14.7 | 16.2 | 15.4 | | 15.4 |
| 25 | 18 | | 18.0 | 13.9 | 15.4 | 15.6 | 10.3 | 14.7 | 15.4 | 14.7 | | 13.2 |
| 26 | | | 17.7 | 13.9 | 15.4 | 14.2 | 9.7 | 14.7 | 16.9 | 14.7 | | 12.5 |
| 27 | | | 17.7 | 16.2 | 14.7 | 11.9 | 9.0 | 13.9 | 19.2 | 16.2 | | 12.5 |
| 28 | | | 16.2 | 17.7 | 16.2 | 11.2 | 9.0 | 14.7 | 16.2 | 16.2 | | 16.2 |
| 29 | | | 17.7 | 17.7 | 14.7 | 10.4 | 10.7 | | 14.7 | 16.2 | | 16.9 |
| 30 | | | 18.5 | 16.2 | 15.4 | 11.2 | 9.7 | | 13.2 | 16.2 | | 18.5 |
| 31 | | | | 16.2 | | 11.2 | 9.0 | | 13.9 | | | |

NOTE.—Braced figures give mean discharge for periods indicated, estimated from incomplete gage-height record and by comparison with record for North Fork of Wailua River; gage-height record either faulty or missing. No gage-height record July 1–16 and May 2–31, and data are insufficient for estimating discharge.

*Monthly discharge of Kanaha ditch near Lihue, Kauai, for the year ending June 30, 1925*

| Month | Discharge | | | | Total run-off | |
|---|---|---|---|---|---|---|
| | Million gallons a day | | | Second-feet (mean) | Million gallons | Acre-feet |
| | Maximum | Minimum | Mean | | | |
| July | | | | | | |
| August | | | 16.0 | 24.8 | 497 | 1,520 |
| September | 18.5 | | 15.8 | 24.4 | 474 | 1,460 |
| October | 21 | 13.9 | 16.8 | 26.0 | 520 | 1,600 |
| November | 17.7 | 14.7 | 16.0 | 24.8 | 480 | 1,470 |
| December | 18.8 | 10.4 | 14.1 | 21.8 | 437 | 1,340 |
| January | 14.6 | 9.0 | 12.2 | 18.9 | 378 | 1,160 |
| February | 17.7 | 7.0 | 12.6 | 19.5 | 353 | 1,080 |
| March | 20 | 13.2 | 15.5 | 24.0 | 480 | 1,470 |
| April | 18.2 | 13.2 | 14.5 | 22.4 | 436 | 1,340 |
| June | 19.2 | 11.8 | 15.3 | 23.7 | 458 | 1,400 |

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

LOCATION.—1,200 feet above confluence with North Fork and 8 miles north of Lihue.

RECORDS AVAILABLE.—July 31, 1912, to June 30, 1925.

GAGE.—Stevens continuous water-stage recorder installed December 31, 1914. Staff gage 800 feet below, July 31, 1912, to September 30, 1914.

DISCHARGE MEASUREMENTS.—Made by wading or from cable.

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; shifting.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, about 1,660 million gallons a day, or 2,570 second-feet, at 3.15 a. m. February 11 (gage height, 7.23 feet); minimum discharge, 6.9 million gallons a day, or 10.7 second-feet, from 4 to 7 p. m. March 18 (gage height, 1.76 feet).

1912–1925: Maximum discharge recorded, about 3,000 million gallons a day, or 4,640 second-feet, at 8 a. m. March 3, 1916 (gage height, 8.9 feet); minimum discharge, 7.0 million gallons a day, or 10.8 second-feet, February and March, 1915 (gage height, 1.60 feet) and from 4 p. m. September 12 to 9.30 a. m. September 13, 1923 (gage height, 1.73 feet).

DIVERSIONS.—None.

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 changed during flood of October 10. The two rating curves used are fairly well defined between 9 and 600 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 those estimated, which are fair, and those for February and March, which are poor.

*Discharge measurements of East Branch of North Fork of Wailua River near Lihue, Kauai, during the year ending June 30, 1925*

| Date | Gage height (feet) | Discharge | | Date | Gage height (feet) | Discharge | |
|---|---|---|---|---|---|---|---|
| | | Second-feet | Million gallons a day | | | Second-feet | Million gallons a day |
| Sept. 6 | 1.82 | 17.2 | 11.1 | Jan. 21 | 2.02 | 30.0 | 19.4 |
| Oct. 18 | 2.08 | 37.5 | 24.1 | Apr. 22 | 1.97 | 25.5 | 16.5 |

*Discharge, in million gallons a day, of East Branch of North Fork of Wailua River near Lihue, Kauai, for the year ending June 30, 1925*

| Day | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 16.7 | 16.2 | 14.0 | 10.8 | 14.0 | 17.2 | | 13.0 | 10.2 | 29 | 42 | 14.6 |
| 2 | 14.0 | 19.6 | 12.7 | 26 | 13.0 | 16.6 | | 13.0 | 9.7 | 24 | 35 | 17.7 |
| 3 | 14.0 | 17.8 | 12.2 | 27 | 12.1 | 15.1 | | 13.0 | 10.2 | 31 | 28 | 17.7 |
| 4 | 13.6 | 14.5 | 11.7 | 14.0 | 19.6 | 13.5 | | 12.5 | 11.1 | 24 | 24 | 20 |
| 5 | 12.7 | 29 | 11.7 | 13.1 | 34 | 12.5 | | 12.1 | 9.7 | 23 | 22 | 32 |
| 6 | 13.1 | 17.2 | 11.3 | 12.2 | 19.6 | 12.5 | | 11.6 | 8.8 | 77 | 20 | 22 |
| 7 | 13.6 | 17.8 | 10.8 | 12.2 | 15.1 | 12.1 | | 11.1 | 8.8 | 68 | 19.6 | 20 |
| 8 | 15.6 | 24 | 10.8 | 11.3 | 13.5 | 11.1 | | 11.1 | 8.3 | 38 | 22 | 19.6 |
| 9 | 14.0 | 54 | 10.8 | 14.5 | 12.5 | 10.6 | | 29 | 8.0 | 54 | 18.2 | 17.7 |
| 10 | 27 | 36 | 10.4 | 117 | 23 | 14.0 | | 31 | 8.0 | 98 | 18.2 | 16.1 |
| 11 | 33 | 31 | 9.9 | 99 | 58 | 61 | [a]40 | 328 | 8.0 | 51 | 17.7 | 15.6 |
| 12 | 38 | 24 | 9.5 | 87 | 56 | 34 | | 51 | 9.7 | 43 | 22 | 15.6 |
| 13 | 23 | 20 | 9.5 | 37 | 34 | 72 | | 33 | 9.2 | 43 | 22 | 15.6 |
| 14 | 18.4 | 19.4 | 9.5 | 26 | 24 | 62 | | 25 | 8.0 | 32 | 17.2 | 14.6 |
| 15 | 24 | 20 | 9.5 | 28 | 19.6 | | | 22 | 7.6 | 29 | 16.1 | 15.1 |
| 16 | 19.4 | 20 | 9.5 | 30 | 17.2 | | | 18.9 | 7.6 | 26 | 15.1 | 13.5 |
| 17 | 17.8 | 16.7 | 9.5 | 41 | 15.6 | 28 | | 17.7 | 7.6 | 23 | 16.1 | 17.7 |
| 18 | 16.2 | 16.2 | 9.5 | 25 | 15.1 | | | 16.1 | 7.6 | 25 | 33 | 15.6 |
| 19 | 18.9 | 15.6 | 9.2 | 26 | 14.0 | | | 15.1 | 7.6 | 24 | 24 | 16.6 |
| 20 | 16.2 | 15.0 | 9.2 | 24 | 58 | | | 14.0 | 8.8 | 21 | 20 | 14.6 |

[a] This figure includes Jan. 21 also.

*Discharge, in million gallons a day, of East Branch of North Fork of Wailua River near Lihue, Kauai, for the year ending June 30, 1925*—Continued

| Day | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 21 | 127 | 16.2 | 9.2 | 21 | 59 | | | 13.5 | 9.9 | 18.9 | 21 | 53 |
| 22 | 58 | 14.0 | 9.2 | 32 | 29 | | 19.6 | 13.0 | 12.1 | 17.7 | 17.2 | 22 |
| 23 | 31 | 13.6 | 9.2 | 18.9 | 21 | | 18.2 | 12.5 | 28 | 139 | 30 | 27 |
| 24 | 24 | 13.6 | 9.2 | 18.2 | 21 | | 17.2 | 12.1 | 17.2 | 36 | 24 | 18.9 |
| 25 | 20 | 13.1 | 12.4 | 18.9 | 17.7 | | 16.6 | 11.1 | 11.1 | 28 | 19.6 | 16.1 |
| 26 | 18.4 | 12.2 | 13.1 | 17.2 | 16.1 | 9 | 15.6 | 11.1 | 14.6 | 24 | 17.7 | 14.6 |
| 27 | 24 | 12.2 | 16.2 | 17.2 | 15.1 | | 15.1 | 10.2 | 30 | 26 | 17.2 | 15.1 |
| 28 | 23 | 14.0 | 10.8 | 16.1 | 23 | | 14.6 | 10.6 | 110 | 38 | 15.6 | 24 |
| 29 | 18.4 | 14.0 | 13.6 | 21 | 15.1 | | 15.1 | ------- | 79 | 38 | 19.6 | 24 |
| 30 | 16.2 | 12.7 | 11.3 | 19.6 | 14.6 | | 14.0 | ------- | 82 | 34 | 16.1 | 59 |
| 31 | 15.0 | 13.6 | ------- | 15.6 | ------- | | 13.5 | ------- | 47 | ------- | 14.8 | ------- |

NOTE.—Braced figures give mean discharge for periods indicated, estimated by comparison with records of flow for Hanalei River and other near-by streams; gage-height record either faulty or missing.

*Monthly discharge of East Branch of North Fork of Wailua River near Lihue, Kauai, for the year ending June 30, 1925*

| Month | Discharge | | | | Total run-off | |
|---|---|---|---|---|---|---|
| | Million gallons a day | | | Second-feet (mean) | Million gallons | Acre-feet |
| | Maximum | Minimum | Mean | | | |
| July | 127 | 12.7 | 24.3 | 37.6 | 754 | 2,310 |
| August | 54 | 12.2 | 19.1 | 29.6 | 593 | 1,820 |
| September | 16.2 | 9.2 | 10.8 | 16.7 | 325 | 999 |
| October | 117 | 10.8 | 28.9 | 44.7 | 897 | 2,750 |
| November | 59 | 12.1 | 24.0 | 37.1 | 720 | 2,210 |
| December | ---------- | ---------- | 10.4 | 16.1 | 631 | 1,940 |
| January | ---------- | ---------- | 32.2 | 49.8 | 1,000 | 3,070 |
| February | 328 | 10.2 | 28.3 | 43.8 | 792 | 2,430 |
| March | 110 | 7.6 | 19.9 | 30.8 | 615 | 1,890 |
| April | 139 | 17.7 | 39.4 | 61.0 | 1,180 | 3,630 |
| May | 42 | 14.8 | 21.5 | 33.3 | 665 | 2,040 |
| June | 59 | 13.5 | 20.9 | 32.3 | 626 | 1,920 |
| The year | 328 | ---------- | 24.1 | 37.3 | 8,800 | 27,000 |

### KAPAHI DITCH NEAR KEALIA, KAUAI

LOCATION.—500 feet below intake and 5 miles west of Kealia.

RECORDS AVAILABLE.—April 15, 1909, to May 2, 1914; May 10, 1915, to June 30, 1925.

GAGE.—Stevens continuous water-stage recorder installed March 4, 1920. Stevens 8-day water-stage recorder used May 10, 1915, to March 3, 1920. Watson recorder used prior to May 10, 1915.

DISCHARGE MEASUREMENTS.—Made by 20-foot sharp-crested weir immediately below gage and by wading in ditch 50 feet below gage.

CHANNEL AND CONTROL.—Channel straight for 50 feet above weir.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 61 million gallons a day, or 94 second-feet, from noon to 1 p. m. June 21 (gage height, 1.29 feet); minimum discharge, no flow for several hours when water was shut out of ditch October 22, January 6–10, and March 20 and 25.

1915–1925: Maximum discharge recorded, 233 million gallons a day, or 361 second-feet, at 3 and 4 a. m. March 31, 1923 (gage height, about 3.15 feet); minimum discharge, no flow, occasionally, when water is turned out of ditch.

DIVERSIONS.—All diversions below station.

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 practically permanent during year. Rating curve well defined. 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.

Kapahi ditch diverts from Kapaa River at a point about 4 miles east of Kealia and mouth of the 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 measurements of Kapahi ditch near Kealia, Kauai, during the year ending June 30, 1925*

| Date | Gage height (feet) | Discharge | |
|---|---|---|---|
| | | Second-feet | Million gallons a day |
| Jan. 20 | 0.12 | 2.16 | 1.40 |
| Mar. 8 | .30 | 9.41 | 6.08 |
| Apr. 21 | .33 | 12.2 | 7.89 |

*Discharge, in million gallons a day, of Kapahi ditch near Kealia, Kauai, for the year ending June 30, 1925*

| Day | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 6.8 | 9.0 | 8.3 | 6.2 | 5.9 | 8.0 | 2.4 | 5.2 | 7.2 | 1.9 | 13.0 | 6.5 |
| 2 | 7.6 | 12.2 | 7.6 | 20 | 3.7 | 10.7 | 3.2 | 6.8 | 7.2 | 1.9 | 6.8 | 10.1 |
| 3 | 6.9 | 11.4 | 7.2 | 17.0 | 6.2 | 9.8 | 3.4 | 6.8 | 7.6 | 1.9 | 2.0 | 10.1 |
| 4 | 1.7 | 9.4 | 6.6 | 8.0 | 9.1 | 8.3 | 3.4 | 6.2 | 9.4 | 1.1 | 7.4 | 11.4 |
| 5 | 6.4 | 23 | 6.6 | 7.6 | 4.6 | 7.6 | 3.4 | 5.9 | 7.6 | .9 | 7.6 | 17.7 |
| 6 | 6.7 | 12.7 | 6.8 | 7.2 | 3.7 | 8.0 | 1.3 | 5.5 | 6.8 | 1.1 | 6.8 | 10.3 |
| 7 | 7.6 | 13.1 | 6.5 | 7.2 | 3.4 | 5.5 | ------- | 5.9 | 6.8 | .7 | 6.8 | 5.9 |
| 8 | 10.7 | 17.7 | 7.2 | 6.5 | 3.4 | 6.8 | ------- | 6.2 | 6.5 | .9 | 8.7 | 8.3 |
| 9 | 7.6 | 16.1 | 6.5 | 11.1 | 3.4 | 6.5 | ------- | 13.0 | 6.2 | 1.1 | 7.2 | 8.6 |
| 10 | 17.2 | 4.3 | 6.2 | 35 | 3.7 | 9.3 | 1.3 | 13.3 | 5.5 | 1.1 | 7.6 | 7.6 |
| 11 | 22 | 11.1 | 5.9 | 18.6 | 3.4 | 7.3 | 2.0 | 5.0 | 5.5 | .9 | 7.6 | 7.2 |
| 12 | 11.3 | 11.4 | 5.7 | 3.4 | 5.6 | 3.4 | 2.4 | 3.4 | 5.9 | 1.1 | 11.9 | 7.8 |
| 13 | 2.6 | 12.3 | 5.5 | 2.9 | 3.7 | 3.7 | 2.1 | 3.4 | 6.2 | 1.5 | 10.3 | 8.0 |
| 14 | 8.0 | 11.4 | 5.5 | 2.6 | 3.4 | 3.2 | 1.8 | 3.4 | 5.5 | 2.9 | 7.2 | 6.8 |
| 15 | 5.7 | 14.4 | 5.2 | 2.6 | 3.4 | 2.6 | 1.8 | 3.4 | 5.5 | 2.9 | 6.8 | 7.6 |
| 16 | 10.0 | 12.7 | 5.2 | 2.6 | 3.4 | 2.6 | 1.8 | 3.4 | 5.5 | 2.9 | 6.5 | 6.8 |
| 17 | 8.7 | 10.3 | 5.2 | 2.9 | 3.4 | 2.9 | 1.6 | 3.4 | 5.7 | 2.9 | 7.1 | 12.8 |
| 18 | 8.7 | 9.4 | 4.9 | 2.9 | 3.4 | 2.6 | 1.6 | 3.2 | 5.9 | 4.0 | 9.6 | 8.7 |
| 19 | 10.8 | 9.4 | 4.9 | 2.9 | 3.2 | 2.6 | 1.6 | 3.4 | 5.9 | 4.3 | 8.0 | 9.3 |
| 20 | 4.8 | 9.4 | 5.2 | 3.2 | 3.4 | 2.9 | 1.5 | 5.5 | 3.7 | 7.4 | 7.0 | 7.2 |
| 21 | 5.2 | 9.8 | 5.2 | 3.2 | 2.9 | 2.9 | 1.5 | 4.3 | 10.2 | 8.0 | 8.7 | 28 |
| 22 | 2.1 | 9.0 | 5.2 | 2.2 | 2.9 | 2.9 | 1.5 | 2.6 | 9.4 | 6.5 | 7.2 | 14.0 |
| 23 | 6.2 | 8.7 | 5.2 | 2.4 | 2.9 | 2.9 | 1.3 | 4.9 | 14.9 | 9.3 | 9.6 | 18.7 |
| 24 | 7.4 | 8.3 | 5.2 | 2.4 | 2.9 | 2.6 | 1.3 | 6.8 | 9.0 | 8.5 | 8.8 | 9.0 |
| 25 | 6.6 | 8.0 | 8.4 | 2.4 | 4.0 | 2.6 | 1.3 | 6.8 | 5.8 | 8.7 | 7.2 | 7.2 |
| 26 | 6.5 | 6.8 | 7.6 | 2.1 | 7.2 | 2.4 | 4.1 | 6.8 | 9.6 | 7.6 | 7.6 | 5.9 |
| 27 | 2.6 | 6.8 | 8.3 | 7.4 | 7.2 | 2.6 | 5.5 | 6.8 | 14.2 | 13.1 | 8.0 | 7.2 |
| 28 | 8.3 | 8.0 | 6.5 | 7.2 | 4.9 | 2.6 | 5.5 | 7.6 | 26 | 15.0 | 6.8 | 10.3 |
| 29 | 9.0 | 7.2 | 9.9 | 6.8 | 3.7 | 2.6 | 5.2 | ------- | 4.9 | 13.3 | 9.0 | 11.4 |
| 30 | 9.0 | 6.8 | 6.5 | 6.8 | 3.7 | 2.4 | 4.9 | ------- | 4.2 | 12.3 | 8.0 | 6.9 |
| 31 | 8.3 | 8.1 | ------- | 6.5 | ------- | 2.1 | 3.3 | ------- | 1.5 | ------- | 6.8 | ------- |

NOTE.—Water shut out of ditch Jan. 7–9.

*Monthly discharge of Kapahi ditch near Kealia, Kauai, for the year ending June 30, 1925*

| Month | Discharge | | | | Total run-off | |
|---|---|---|---|---|---|---|
| | Million gallons a day | | | Second-feet (mean) | Million gallons | Acre-feet |
| | Maximum | Minimum | Mean | | | |
| July | 22 | 1.7 | 7.84 | 12.1 | 243 | 746 |
| August | 23 | 4.3 | 10.6 | 16.4 | 328 | 1,010 |
| September | 9.9 | 4.9 | 6.36 | 9.84 | 191 | 585 |
| October | 35 | 2.1 | 7.09 | 11.0 | 220 | 675 |
| November | 9.1 | 2.9 | 4.19 | 6.48 | 126 | 386 |
| December | 10.7 | 2.1 | 4.61 | 7.13 | 143 | 438 |
| January (28 days) | 5.5 | 1.3 | 2.57 | 3.98 | 72.0 | 221 |
| February | 13.3 | 2.6 | 5.68 | 8.79 | 159 | 488 |
| March | 26 | 1.5 | 7.61 | 11.8 | 236 | 724 |
| April | 15.0 | .7 | 4.86 | 7.52 | 146 | 447 |
| May | 13.0 | 2.0 | 7.86 | 12.2 | 244 | 748 |
| June | 28 | 5.9 | 9.91 | 15.3 | 297 | 912 |
| The year | 35 | .7 | 6.64 | 10.3 | 2,400 | 7,380 |

### ANAHOLA RIVER NEAR KEALIA, KAUAI

LOCATION.—A quarter of a mile above dam at Kiokala and 6 miles northwest of Kealia.

RECORDS AVAILABLE.—August 22 to November 2, 1910, and December 30, 1912, to June 30, 1925. Fragmentary record December 15, 1910, to December 28, 1912, at dam a quarter of a mile below present site.

GAGE.—Stevens continuous water-stage recorder installed March 14, 1920. Friez water-stage recorder used August 22 to November 2, 1910, and December 28, 1912, to March 7, 1920.

DISCHARGE MEASUREMENTS.—Made by wading.

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; permanent for low and medium stages; shifts during floods.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 436 million gallons a day, or 675 second-feet, at midnight February 10 (gage height, 5.31 feet); minimum discharge, 2.0 million gallons a day, or 3.1 second-feet, several times during September and October (gage height, 1.70 feet).

1910; 1912–1925: Maximum discharge recorded, from extension of rating curve, 1,450 million gallons a day, or 2,240 second-feet, at 7.30 p. m. September 26, 1915 (gage height, 12.9 feet); minimum discharge, 1.4 million gallons a day, or 2.2 second-feet, for several hours September 12–13 (gage height, 1.83 feet).

DIVERSIONS.—Part of flow diverted 3 miles above station.

REGULATION.—None except by diversions.

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

UTILIZATION.—Water used for irrigation of sugar cane.

ACCURACY.—Stage-discharge relation remained fairly permanent during year. Rating curve used fairly well defined below 20 million gallons a day and poorly defined above. 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; poor for estimated period and for high stages.

*Discharge measurements of Anahola River near Kealia, Kauai, during the year ending June 30, 1925*

| Date | Gage height (feet) | Discharge | | Date | Gage height (feet) | Discharge | |
|---|---|---|---|---|---|---|---|
| | | Second-feet | Million gallons a day | | | Second-feet | Million gallons a day |
| July 15 | 2.08 | 16.6 | 10.7 | Jan. 20 | 1.93 | 9.52 | 6.15 |
| Sept. 9 | 1.72 | 3.21 | 2.07 | Mar. 8 | 1.81 | 6.36 | 4.11 |
| Oct. 21 | 1.88 | 8.19 | 5.29 | Apr. 21 | 1.89 | 8.29 | 5.36 |
| Dec. 9 | 1.79 | 5.55 | 3.59 | May 27 | 1.81 | 5.66 | 3.66 |

*Discharge, in million gallons a day, of Anahola River near Kealia, Kauai, for the year ending June 30, 1925*

| Day | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 4.5 | 4.3 | 3.2 | 2.2 | 3.7 | 7.3 | 12.5 | 4.3 | 4.5 | 7.6 | 15.7 | 3.4 |
| 2 | 3.7 | 4.1 | 2.8 | 14.8 | 3.4 | 7.3 | 11.8 | 4.8 | 4.5 | 5.8 | 10.4 | 3.5 |
| 3 | 3.9 | 4.5 | 2.7 | 7.0 | 3.2 | 6.0 | 9.6 | 4.5 | 4.1 | 11.8 | 7.0 | 3.5 |
| 4 | 3.9 | 3.5 | 2.7 | 3.0 | 8.6 | 4.5 | 7.6 | 4.5 | 4.8 | 6.6 | 5.6 | 3.7 |
| 5 | 3.7 | 14.1 | 2.5 | 3.0 | 11.2 | 4.1 | 6.0 | 4.5 | 4.3 | 5.2 | 5.2 | 4.5 |
| 6 | 3.9 | 4.5 | 2.5 | 2.7 | 9.9 | 4.1 | 5.8 | 4.5 | 4.1 | 34 | 5.0 | 4.1 |
| 7 | 4.1 | 5.0 | 2.3 | 2.5 | 9.2 | 3.7 | 7.0 | 4.5 | 3.9 | 22 | 5.2 | 3.7 |
| 8 | 4.1 | 5.6 | 2.5 | 2.2 | 6.6 | 3.7 | 9.5 | 5.1 | 3.9 | 10.4 | 5.4 | 4.1 |
| 9 | 3.7 | 14.8 | 2.3 | 2.8 | 5.8 | 3.4 | 8.9 | 22 | 3.7 | 28 | 5.0 | 4.3 |
| 10 | 17.4 | 8.0 | 2.3 | 21 | 10.4 | 5.4 | 8.9 | 33 | 3.7 | 32 | 5.2 | 3.5 |
| 11 | 18.1 | 9.8 | 2.3 | 39 | 57 | 55 | 6.8 | 104 | 3.5 | 14.9 | 5.0 | 3.2 |
| 12 | 11.4 | 4.5 | 2.3 | 24 | 47 | 24 | 26 | 28 | 6.1 | 12.4 | 8.2 | 3.4 |
| 13 | 5.4 | 3.9 | 2.5 | 5.4 | 26 | 40 | 33 | 14.5 | 5.2 | 15.3 | 5.6 | 3.4 |
| 14 | 5.0 | 3.7 | 2.5 | 3.7 | 15.3 | 36 | 19.3 | 10.1 | 3.9 | 9.5 | 4.3 | 3.2 |
| 15 | 6.8 | 3.7 | 2.5 | 3.4 | 12.0 | 14.5 | 13.1 | 8.3 | 3.5 | 10.1 | 4.1 | 5.2 |
| 16 | 5.4 | 3.5 | 2.5 | 6.7 | 10.1 | 10.7 | 9.8 | 7.6 | 3.7 | 7.3 | 3.9 | 3.4 |
| 17 | 4.5 | 3.4 | 2.3 | 37 | 8.9 | 9.5 | 8.0 | 8.1 | 3.7 | 6.3 | 4.1 | 4.1 |
| 18 | 4.1 | 3.5 | 2.3 | 6.8 | 7.8 | 11.0 | 8.3 | 6.8 | 3.4 | 7.0 | 8.7 | 4.1 |
| 19 | 7.2 | 3.0 | 2.3 | 15.8 | 7.3 | 7.6 | 7.6 | 5.8 | 3.5 | 6.3 | 7.8 | 5.0 |
| 20 | 4.3 | 3.4 | 2.3 | 7.3 | 25. | 6.8 | 6.8 | 5.6 | 3.5 | 5.8 | 4.5 | 3.5 |
| 21 | 30 | 3.4 | 2.2 | 5.4 | 8.6 | 6.3 | 7.3 | 5.2 | 11.4 | 5.6 | 4.5 | 22 |
| 22 | 9.6 | 3.2 | 2.3 | 8.6 | 5.6 | 5.8 | 6.6 | 10.1 | 6.3 | 5.4 | 4.1 | 7.3 |
| 23 | 5.6 | 3.0 | 2.3 | 4.8 | 4.8 | 5.6 | 6.0 | 7.0 | 5.8 | 31 | 18.3 | } |
| 24 | 5.4 | 2.8 | 2.2 | 4.8 | 5.6 | 5.4 | 5.6 | 5.8 | 4.5 | 8.3 | 5.4 | } |
| 25 | 5.2 | 2.7 | 2.5 | 4.3 | 7.0 | 5.4 | 5.4 | 5.2 | 3.5 | 5.8 | 4.3 | } |
| 26 | 4.5 | 2.7 | 2.8 | 4.3 | 6.6 | 5.2 | 5.2 | 5.0 | 4.1 | 5.4 | 4.1 | } 8 |
| 27 | 4.3 | 2.8 | 3.2 | 4.1 | 6.0 | 4.8 | 5.0 | 4.8 | 10.1 | 7.3 | 3.9 | } |
| 28 | 5.2 | 4.8 | 2.5 | 4.1 | 18.8 | 4.5 | 4.8 | 5.2 | 38 | 13.9 | 3.5 | } |
| 29 | 5.6 | 3.0 | 2.8 | 11.2 | 7.6 | 4.5 | 4.3 | ------- | 21 | 7.8 | 4.1 | } |
| 30 | 4.3 | 2.8 | 2.5 | 7.5 | 6.6 | 4.5 | 4.1 | ------- | 19.5 | 8.9 | 3.7 | } |
| 31 | 4.1 | 3.2 | ------- | 4.3 | ------- | 5.0 | 4.1 | ------- | 14.7 | ------- | 3.4 | ------- |

NOTE.—Braced figure, which gives mean discharge for period indicated, estimated by comparison with record of flow for Halaulani Stream because water-stage recorder was not operating.

*Monthly discharge of Anahola River near Kealia, Kauai, for the year ending June 30, 1925*

| Month | Discharge | | | | Total run-off | |
|---|---|---|---|---|---|---|
| | Million gallons a day | | | Second-feet (mean) | Million gallons | Acre-feet |
| | Maximum | Minimum | Mean | | | |
| July | 30 | 3.7 | 6.74 | 10.4 | 209 | 641 |
| August | 14.8 | 2.7 | 4.68 | 7.24 | 145 | 446 |
| September | 3.2 | 2.2 | 2.50 | 3.87 | 74.9 | 230 |
| October | 39 | 2.2 | 8.83 | 13.7 | 274 | 840 |
| November | 57 | 3.2 | 12.2 | 18.9 | 366 | 1,120 |
| December | 55 | 3.4 | 10.4 | 16.1 | 322 | 987 |
| January | 33 | 4.1 | 9.18 | 14.2 | 285 | 874 |
| February | 104 | 4.3 | 12.1 | 18.7 | 339 | 1,040 |
| March | 38 | 3.4 | 7.11 | 11.0 | 220 | 676 |
| April | 34 | 5.2 | 11.9 | 18.4 | 358 | 1,100 |
| May | 18.3 | 3.4 | 5.97 | 9.24 | 185 | 568 |
| June | | 3.2 | 5.67 | 8.77 | 170 | 522 |
| The year | 104 | 2.2 | 8.07 | 12.5 | 2,950 | 9,040 |

**ANAHOLA DITCH ABOVE KANEHA RESERVOIR, NEAR KEALIA, KAUAI**

LOCATION.—At upper end of second tunnel above Kaneha Reservoir, 7 miles from Kealia.

RECORDS AVAILABLE.—December 9, 1921, to June 30, 1925. At station 100 feet upstream at lower end of third tunnel above reservoir, May 29, 1915, to December 9, 1921. Flow at the two stations not exactly comparable owing to occasional operation of check gate and spillway between.

GAGE.—Stevens continuous water-stage recorder. At old station 100 feet upstream a Friez recorder was used from May 29 to June 26, 1915, a Stevens 8-day recorder from June 26, 1915, to April 10, 1920, and a Stevens continuous recorder from April 10, 1920, to December 9, 1921.

DISCHARGE MEASUREMENTS.—Made by wading.

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, 17.2 million gallons a day, or 27 second-feet, at 8.30 a. m. July 21 (gage height, 2.23 feet); minimum discharge, no flow several days during November and December when water was shut out of ditch.

1915–1925: Maximum discharge recorded, 130 million gallons a day, or 201 second-feet, at 7.10 a. m. January 16, 1921 (gage height at old station 6.25 feet); minimum discharge, no flow, occasionally, when water is turned out of ditch so it does not flow into reservoir.

DIVERSIONS.—None except that occasionally excess water is diverted through spillway 50 feet above station.

REGULATION.—By operation of head gates and spillway gates.

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 changed, presumably, at time of high water July 21. The two rating curves used are fairly well defined between 1 and 15 million gallons a day. Operation of water-stage recorder satisfactory except as noted 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.

Anahola ditch diverts water from Anahola River at a point about 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 measurements of Anahola ditch above Kaneha Reservoir, near Kealia, Kauai, during the year ending June 30, 1925*

| Date | Gage height (feet) | Discharge | | Date | Gage height (feet) | Discharge | |
|---|---|---|---|---|---|---|---|
| | | Second-feet | Million gallons a day | | | Second-feet | Million gallons a day |
| July 15 | 1.63 | 11.6 | 7.50 | Jan. 20 | 1.16 | 1.66 | 1.07 |
| Sept. 9 | 1.20 | 1.98 | 1.28 | Mar. 8 | 1.18 | 1.51 | .98 |
| Oct. 21 | 1.52 | 7.26 | 4.69 | Apr. 21 | 1.35 | 4.00 | 2.59 |
| Dec. 9 | 1.27 | 3.00 | 1.94 | May 27 | 1.33 | 3.80 | 2.46 |

*Discharge, in million gallons a day, of Anahola ditch above Kaneha Reservoir, near Kealia, Kauai, for the year ending June 30, 1925*

| Day | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 4.2 | 3.8 | 2.1 | 1.0 | 3.4 | 5.3 | 4.4 | 1.6 | 1.8 | 3.2 | 3.8 | |
| 2 | 3.4 | 4.8 | 1.8 | 7.3 | 2.9 | 4.5 | 6.1 | 1.9 | 1.8 | 3.1 | 3.8 | |
| 3 | 3.6 | 3.4 | 1.8 | 4.9 | 2.6 | 4.5 | 7.3 | 1.8 | 1.7 | 3.4 | 3.5 | |
| 4 | 3.5 | 3.2 | 1.7 | 3.0 | 5.3 | 3.1 | 3.9 | 1.6 | 2.8 | 3.3 | 3.3 | |
| 5 | 3.1 | 7.4 | | | .8 | 2.8 | 4.0 | 1.4 | 1.7 | 3.1 | 3.0 | |
| 6 | 3.4 | 3.7 | 1.5 | | ------- | 2.9 | 2.9 | 1.4 | 1.4 | 2.3 | 2.6 | |
| 7 | 4.2 | 5.9 | | | ------- | 2.4 | 4.9 | 1.4 | 1.2 | 2.8 | 2.5 | |
| 8 | 4.7 | 7.5 | | | ------- | 2.2 | 5.5 | 1.5 | 1.2 | 4.1 | 3.1 | |
| 9 | 3.2 | 9.2 | 1.3 | | ------- | 2.0 | .2 | 6.2 | 1.1 | 3.6 | 2.6 | |
| 10 | 9.2 | 7.6 | 1.2 | | ------- | 3.3 | .2 | 6.5 | 1.1 | .6 | 3.1 | |
| 11 | 10.8 | 6.5 | 1.1 | | ------- | 1.7 | .1 | 3.0 | 1.1 | .05 | 2.9 | 1.3 |
| 12 | 9.4 | 4.3 | 1.2 | | ------- | ------- | .1 | 3.8 | 1.6 | ------- | 3.8 | |
| 13 | 6.6 | 3.5 | 1.4 | 7.5 | ------- | 3.7 | ------- | 5.3 | 1.9 | ------- | 3.2 | |
| 14 | 6.1 | 3.4 | 1.2 | | .05 | 3.1 | ------- | 4.9 | 1.1 | ------- | 2.5 | |
| 15 | 7.6 | 3.5 | 1.1 | | ------- | .2 | .3 | 4.4 | 1.1 | 2.6 | 2.1 | |
| 16 | 6.1 | 4.3 | 1.1 | | ------- | .1 | 2.3 | 3.8 | 1.1 | 3.9 | 1.9 | |
| 17 | 4.4 | 2.9 | .9 | | ------- | .1 | 1.7 | 3.3 | 1.0 | 3.8 | 1.8 | |
| 18 | 4.1 | 2.9 | .9 | | ------- | .15 | 1.6 | 3.1 | .9 | 4.0 | 3.3 | |
| 19 | 7.0 | 2.6 | .8 | | .8 | .8 | 1.4 | 2.8 | 1.0 | 3.7 | 3.5 | |
| 20 | 4.4 | 3.0 | .8 | | 5.7 | 1.1 | 1.4 | 2.5 | 1.2 | 3.2 | 2.4 | |
| 21 | 9.9 | 3.0 | .8 | | 2.8 | .9 | 2.0 | 2.3 | 2.8 | 2.8 | 3.1 | |
| 22 | 7.6 | 2.8 | .8 | 7.6 | 1.6 | .8 | 1.4 | 2.6 | 3.3 | 2.5 | 2.3 | |
| 23 | 4.6 | 2.0 | .8 | 4.5 | 3.1 | .8 | 1.4 | 2.6 | 3.9 | 4.0 | 7.2 | |
| 24 | 4.0 | 1.8 | .8 | 5.0 | .7 | .6 | 1.8 | 2.1 | 3.3 | 3.5 | 3.8 | |
| 25 | 3.8 | 1.8 | 1.4 | 4.5 | ------- | .6 | 2.1 | 1.9 | 1.8 | 3.2 | 2.9 | |
| 26 | 2.9 | 1.8 | 3.3 | 4.0 | ------- | .6 | 2.0 | 1.8 | 3.3 | 2.9 | 2.4 | 3.3 |
| 27 | 4.2 | 3.5 | 2.8 | 3.5 | ------- | .6 | 1.9 | 1.7 | 4.0 | 3.5 | 2.6 | |
| 28 | 5.8 | 2.9 | 1.2 | 4.8 | ------- | .6 | 1.9 | 1.8 | 1.4 | 3.7 | | |
| 29 | 4.4 | 2.0 | 2.7 | 6.5 | ------- | .6 | 1.8 | ------- | ------- | 3.5 | 1.3 | |
| 30 | 3.5 | 2.0 | 1.2 | 6.4 | 2.3 | 1.1 | 1.8 | ------- | 2.3 | 3.8 | | |
| 31 | 3.1 | 3.1 | ------- | 4.3 | ------- | 1.6 | 1.6 | ------- | 3.3 | ------- | | |

NOTE.—Braced figures give mean discharge for period indicated, estimated from incomplete gage-height record and comparison with record of Anahola River near Kealia, Kauai. Water shut out of ditch Nov. 6–13, 15–18, 25–29, Dec. 12, Jan. 13–14, Mar. 29, and Apr. 12–14.

*Monthly discharge of Anahola ditch above Kaneha Reservoir, near Kealia, Kauai, for the year ending June 30, 1925*

| Month | Discharge | | | | Total run-off | |
|---|---|---|---|---|---|---|
| | Million gallons a day | | | Second-feet (mean) | Million gallons | Acre-feet |
| | Maximum | Minimum | Mean | | | |
| July | 10.8 | 2.9 | 5.25 | 8.12 | 163 | 500 |
| August | 9.2 | 1.8 | 3.87 | 5.99 | 120 | 369 |
| September | 3.3 | .8 | 1.41 | 2.18 | 42.2 | 130 |
| October | ---------- | 1.0 | 6.28 | 9.72 | 195 | 598 |
| November (13 days) | 5.7 | .05 | 2.47 | 3.82 | 32.0 | 98 |
| December (30 days) | 5.3 | .1 | 1.76 | 2.72 | 52.8 | 162 |
| January (29 days) | 7.3 | .1 | 2.34 | 3.62 | 68.0 | 209 |
| February | 6.5 | 1.4 | 2.82 | 4.36 | 79.0 | 242 |
| March (30 days) | 4.0 | .9 | 1.91 | 2.96 | 57.2 | 176 |
| April (27 days) | 4.1 | .05 | 3.12 | 4.83 | 84.2 | 258 |
| May | 7.2 | ---------- | 2.85 | 4.41 | 88.2 | 271 |
| June | ---------- | ---------- | 1.97 | 3.05 | 59.0 | 181 |
| The year | ---------- | ---------- | 3.05 | 4.72 | 1,040 | 3,190 |

### HALAULANI STREAM NEAR KILAUEA, KAUAI

LOCATION.—3½ miles south of Kilauea and 1½ miles above confluence with Pohakuhanu Stream.

RECORDS AVAILABLE.—April 29, 1922, to June 30, 1925.

GAGE.—Stevens continuous water-stage recorder.

DISCHARGE MEASUREMENTS.—Made by wading or from footbridge at gage.

CHANNEL AND CONTROL.—Recorder located on pool at foot of low falls. Stream bed composed of small gravel and boulders. Right bank vertical; left bank sloping and covered with dense vegetation. Control composed of boulders dividing the stream into two channels at ordinary stages; shifts, especially in left channel.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 234 million gallons a day, or 362 second-feet, at 3.30 a. m. February 11 (gage height, 3.46 feet); minimum discharge, 0.5 million gallon a day, or 0.8 second-foot, at 6 p. m. December 29 (gage height, 0.62 foot).

1922–1925: Maximum discharge recorded, about 405 million gallons a day, or 627 second-feet, at 5.10 a. m. March 31, 1923 (gage height, 4.75 feet); minimum discharge, that of December 29, 1924.

DIVERSIONS.—None.

REGULATION.—None.

OBJECT OF STATION.—To determine feasibility of using water for domestic supply and development of power. This stream is typical of a number of small streams along this mountain side.

ACCURACY.—Stage-discharge relation changed, presumably, at times of floods October 17 and January 13. Three rating curves used are poorly defined. 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.

*Discharge measurements of Halaulani Stream near Kilauea, Kauai, during the year ending June 30, 1925*

| Date | Gage height (feet) | Discharge | | Date | Gage height (feet) | Discharge | |
|---|---|---|---|---|---|---|---|
| | | Second-feet | Million gallons a day | | | Second-feet | Million gallons a day |
| Sept 20 | 0.62 | 2.23 | 1.44 | Jan. 23 | 0.69 | 2.17 | 1.40 |
| Oct. 31 | .78 | 1.93 | 1.25 | Mar. 11 | .59 | 1.29 | .83 |
| Dec. 13 | .80 | 2.33 | 1.51 | Apr. 23 | 1.01 | 7.67 | 4.96 |

*Discharge, in million gallons a day, of Halaulani Stream near Kilauea, Kauai, for the year ending June 30, 1925*

| Day | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr | May | June |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1.6 | 2.2 | 1.9 | 1.6 | 1.3 | 1.4 | 2.6 | 1.1 | 0.9 | 2.2 | 2.6 | 1.1 |
| 2 | 1.5 | 2.4 | 2.0 | 5.0 | 1.2 | 1.6 | 3.0 | 1.1 | .9 | 2.1 | 2.0 | 1.3 |
| 3 | 1.5 | 2.3 | 1.8 | 2.7 | 1.2 | 1.3 | 2.3 | 1.1 | .9 | 3.9 | 1.6 | 1.2 |
| 4 | 1.5 | 2.0 | 1.7 | 2.1 | 1.3 | .9 | 1.5 | 1.1 | 1.1 | 2.3 | 1.4 | 1.3 |
| 5 | 1.4 | 4.0 | 1.7 | 2.4 | 1.4 | .8 | 1.4 | 1.1 | .9 | 1.9 | 1.3 | 1.4 |
| 6 | 1.5 | 2.4 | 1.7 | 2.1 | 1.2 | .8 | 1.4 | 1.0 | .9 | 6.3 | 1.3 | 1.4 |
| 7 | 1.4 | 2.4 | 1.7 | 2.0 | 1.2 | .7 | 2.1 | 1.0 | .9 | 4.2 | 1.3 | 1.3 |
| 8 | 2.0 | 3.2 | 1.8 | 2.0 | 1.0 | .7 | 3.6 | 1.0 | .9 | 2.4 | 1.4 | 1.4 |
| 9 | 1.5 | 5.6 | 1.7 | 2.6 | .9 | .6 | 3.3 | 3.4 | .8 | 8.4 | 1.4 | 1.6 |
| 10 | | 5.2 | 1.7 | 10.8 | 1.4 | .8 | 2.8 | 4.0 | .8 | 8.6 | 1.4 | 1.2 |
| 11 | | 3.7 | 1.7 | 15.4 | 10.6 | 16.0 | 1.7 | 47 | .9 | 3.9 | 1.3 | 1.1 |
| 12 | | 2.7 | 1.7 | 8.2 | 2.8 | 4.1 | 4.5 | 6.3 | 2.0 | 2.8 | 1.4 | 1.1 |
| 13 | | 2.4 | 1.7 | 3.9 | 1.8 | 8.4 | | 3.1 | 1.1 | 2.4 | 1.3 | 1.1 |
| 14 | 4.1 | 2.2 | 1.7 | 3.1 | 1.3 | 7.8 | | 2.0 | .9 | 2.0 | 1.3 | 1.0 |
| 15 | | 2.1 | 1.7 | 3.1 | 1.2 | 2.4 | | 1.6 | .9 | 2.0 | 1.2 | 1.1 |
| 16 | | 2.4 | 1.6 | 5.1 | 1.1 | 1.7 | | 1.4 | .9 | 1.7 | 1.2 | 1.0 |
| 17 | | 2.0 | 1.6 | 19.0 | 1.0 | 1.5 | | 1.3 | .9 | 1.6 | 1.4 | 1.3 |
| 18 | | 2.0 | 1.6 | 2.8 | .9 | 1.7 | | 1.3 | .9 | 1.9 | 2.2 | 1.2 |
| 19 | 2.3 | 1.9 | 1.6 | 1.9 | .9 | 1.2 | | 1.2 | .8 | 1.6 | 1.5 | 1.3 |
| 20 | 1.8 | 2.0 | 1.6 | 1.7 | 3.8 | .9 | | 1.2 | .9 | 1.5 | 1.4 | 1.2 |
| 21 | 11.5 | 2.0 | 1.6 | 1.5 | 1.3 | .8 | 1.5 | 1.2 | 1.1 | 1.4 | 1.4 | 4.2 |
| 22 | 3.3 | 1.8 | 1.6 | 1.9 | 1.0 | .7 | | 1.2 | 1.6 | 1.3 | 1.3 | 1.7 |
| 23 | 2.4 | 1.7 | 1.6 | 1.3 | .9 | .7 | | 1.1 | 1.8 | 5.7 | 3.7 | 1.5 |
| 24 | 2.1 | 1.6 | 1.6 | 1.2 | .9 | .6 | | 1.1 | 1.4 | 2.2 | 1.8 | 1.3 |
| 25 | 1.9 | 1.6 | 2.0 | 1.4 | .8 | .6 | | 1.1 | 1.1 | 1.6 | 1.1 | 1.2 |
| 26 | 1.7 | 1.6 | 2.4 | 1.3 | .8 | .6 | | 1.0 | 1.5 | 1.4 | 1.3 | 1.2 |
| 27 | 1.8 | 1.7 | 2.4 | 1.2 | .8 | .6 | | 1.0 | 2.4 | 1.9 | 1.2 | 1.2 |
| 28 | 2.0 | 2.1 | 1.8 | 1.2 | 1.8 | .6 | | 1.0 | 7.7 | 1.7 | 1.1 | 2.2 |
| 29 | 2.2 | 1.8 | 2.0 | 2.5 | .8 | .5 | | ------- | 7.7 | 2.0 | 1.3 | 2.0 |
| 30 | 2.0 | 1.7 | 1.7 | 2.1 | 1.0 | .6 | | ------- | 6.9 | 2.0 | 1.1 | 5.6 |
| 31 | 1.9 | 1.7 | ------- | 1.4 | ------- | .6 | 1.2 | ------- | 3.6 | ------- | 1.1 | ------- |

NOTE.—Braced figure gives mean discharge for periods indicated, estimated by comparison with record of flow for Anahola River.

*Monthly discharge of Halaulani Stream near Kilauea, Kauai, for the year ending June 30, 1925*

| Month | Discharge | | | | Total run-off | |
|---|---|---|---|---|---|---|
| | Million gallons a day | | | Second-feet (mean) | Million gallons | Acre-feet |
| | Maximum | Minimum | Mean | | | |
| July | ---------- | ---------- | 2.83 | 4.38 | 87.7 | 269 |
| August | 5.6 | 1.6 | 2.40 | 3.71 | 74.4 | 228 |
| September | 2.4 | 1.6 | 1.76 | 2.72 | 52.9 | 162 |
| October | 19.0 | 1.2 | 3.69 | 5.71 | 114 | 351 |
| November | 10.6 | .8 | 1.59 | 2.46 | 47.6 | 146 |
| December | 16.0 | .5 | 2.01 | 3.11 | 62.2 | 191 |
| January | ---------- | ---------- | 1.88 | 2.91 | 58.4 | 179 |
| February | 47 | 1.0 | 3.25 | 5.03 | 91.0 | 279 |
| March | 7.7 | .8 | 1.81 | 2.80 | 56.0 | 172 |
| April | 8.6 | 1.3 | 2.83 | 4.38 | 84.9 | 261 |
| May | 3.7 | 1.1 | 1.49 | 2.31 | 46.3 | 142 |
| June | 5.6 | 1.0 | 1.56 | 2.41 | 46.7 | 143 |
| The year | 47 | ---------- | 2.25 | 3.48 | 822 | 2,520 |

### HANALEI RIVER AT ELEVATION 625 FEET, NEAR HANALEI, KAUAI

LOCATION.—2 miles west of Kauai Electric Co.'s power line and 10 miles south of Hanalei. Trail to station leaves power line at pole No. 334.

RECORDS AVAILABLE.—January 26, 1914, to June 30, 1925.

GAGE.—Stevens continuous water-stage recorder; moved 300 feet upstream on July 20, 1921. Datum of recorder in use prior to July 20, 1921, raised 6.0 feet January 15, 1915.

DISCHARGE MEASUREMENTS.—Made by wading or from footbridge.

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; shifts during floods.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, about 2,100 million gallons a day, or 3,250 second-feet, at 1.30 a. m. on February 11 (gage height, 7.05 feet); minimum discharge, 22 million gallons a day, or 34 second-feet, from 8 p. m. to midnight March 18 (gage height, 0.92 foot).

1914–1925: Maximum discharge recorded, from extension of rating curve, 6,500 million gallons a day, or 10,100 second-feet, at 11.20 a. m. January 16, 1921 (gage height at old site, 7.50 feet); minimum discharge, 14 million gallons a day, or 22 second-feet, January 6 and 10, 1918 (gage height, 0.35 foot).

DIVERSIONS.—None.

REGULATION.—None.

OBJECT OF STATION.—To determine feasibility of 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 during flood of July 21 and again, presumably, during flood of December 13. Rating curve used July 21 to December 13 fairly well defined from 30 to 150 million gallons a day and the one used prior and subsequent to this period is fairly well defined below 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 fair.

*Discharge measurements of Hanalei River at elevation 625 feet, near Hanalei, Kauai, during the year ending June 30, 1925*

| Date | Gage height (feet) | Discharge | | Date | Gage height (feet) | Discharge | |
|---|---|---|---|---|---|---|---|
| | | Second-feet | Million gallons a day | | | Second-feet | Million gallons a day |
| July 17 | 1.26 | 57.7 | 37.3 | Feb. 27 | 1.02 | 37.8 | 24.4 |
| Sept. 8 | 1.07 | 50.2 | 32.4 | June 1 | 1.08 | 43.5 | 28.1 |

*Daily discharge, in million gallons a day, of Hanalei River at elevation 625 feet, near Hanalei, Kauai, for the year ending June 30, 1925*

| Day | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 32 | 40 | 34 | 32 | 37 | 50 | 60 | 27 | 25 | 58 | 70 | 29 |
| 2 | 29 | 50 | 32 | 70 | 37 | 40 | 55 | 27 | 25 | 50 | 65 | 36 |
| 3 | 29 | 43 | 32 | 56 | 34 | 46 | 71 | 27 | 25 | 92 | 47 | 50 |
| 4 | 29 | 38 | 29 | 37 | 43 | 37 | 89 | 25 | 27 | 56 | 40 | 39 |
| 5 | 27 | 60 | 29 | 37 | 68 | 37 | 65 | 25 | 25 | 56 | 37 | 54 |
| 6 | 27 | 40 | 29 | 34 | 40 | 37 | 50 | 25 | 23 | 149 | 34 | 35 |
| 7 | 29 | 43 | 29 | 34 | 37 | 34 | 55 | 25 | 23 | 102 | 34 | 34 |
| 8 | 39 | 50 | 32 | 32 | 34 | 34 | 95 | 27 | 23 | 66 | 40 | 32 |
| 9 | 32 | 118 | 32 | 75 | 32 | 32 | 115 | 72 | 23 | 99 | 37 | 38 |
| 10 | 63 | 69 | 29 | 261 | 46 | 40 | 106 | 118 | 23 | 136 | 34 | 29 |
| 11 | 62 | 61 | 29 | 175 | 192 | 138 | 71 | 338 | 23 | 75 | 34 | 32 |
| 12 | 66 | 46 | 27 | 153 | 69 | 62 | 117 | 87 | 25 | 66 | 40 | 34 |
| 13 | 44 | 40 | 27 | 88 | 53 | 122 | 157 | 57 | 23 | 66 | 34 | 29 |
| 14 | 37 | 50 | 27 | 61 | 43 | 93 | 86 | 44 | 23 | 50 | 32 | 29 |
| 15 | 62 | 50 | 27 | 74 | 40 | 56 | 62 | 37 | 23 | 47 | 29 | 29 |
| 16 | 40 | 50 | 27 | 75 | 37 | 46 | 47 | 34 | 23 | 44 | 29 | 27 |
| 17 | 37 | 40 | 27 | 113 | 34 | 52 | 44 | 32 | 23 | 50 | 32 | 33 |
| 18 | 34 | 37 | 27 | 61 | 34 | 51 | 40 | 32 | 23 | 57 | 55 | 29 |
| 19 | 37 | 37 | 27 | 68 | 34 | 37 | 40 | 29 | 23 | 44 | 34 | 32 |
| 20 | 32 | 34 | 27 | 62 | 144 | 34 | 37 | 29 | 25 | 37 | 34 | 27 |
| 21 | 173 | 40 | 27 | 53 | 114 | 34 | 37 | 27 | 39 | 34 | 37 | 48 |
| 22 | 114 | 34 | 27 | 61 | 57 | 32 | 32 | 29 | 55 | 32 | 32 | 32 |
| 23 | 61 | 32 | 27 | 43 | 46 | 29 | 32 | 27 | 146 | 170 | 52 | 47 |
| 24 | 50 | 32 | 27 | 43 | 46 | 29 | 29 | 27 | 56 | 57 | 37 | 32 |
| 25 | 43 | 32 | 49 | 46 | 40 | 32 | 29 | 27 | 36 | 44 | 32 | 27 |
| 26 | 40 | 32 | 39 | 50 | 37 | 29 | 29 | 25 | 63 | 40 | 32 | 27 |
| 27 | 62 | 34 | 52 | 43 | 37 | 27 | 29 | 25 | 82 | 55 | 29 | 29 |
| 28 | 50 | 37 | 34 | 46 | 61 | 27 | 27 | 27 | 253 | 70 | 29 | 42 |
| 29 | 43 | 45 | 45 | 64 | 40 | 27 | 27 | ------- | 195 | 72 | 35 | 37 |
| 30 | 37 | 34 | 34 | 50 | 40 | 27 | 27 | ------- | 187 | 60 | 29 | 117 |
| 31 | 37 | 34 | ------- | 43 | ------- | 27 | 27 | ------- | 89 | ------- | 27 | ------- |

*Monthly discharge of Hanalei River at elevation 625 feet, near Hanalei, Kauai, for the year ending June 30, 1925*

| Month | Discharge | | | | Total run-off | |
|---|---|---|---|---|---|---|
| | Million gallons a day | | | Second-feet (mean) | Million gallons | Acre-feet |
| | Maximum | Minimum | Mean | | | |
| July | 173 | 27 | 48.3 | 74.7 | 1,500 | 4,590 |
| August | 118 | 32 | 44.6 | 69.0 | 1,380 | 4,240 |
| September | 52 | 27 | 31.3 | 48.4 | 940 | 2,880 |
| October | 261 | 32 | 69.0 | 107 | 2,140 | 6,570 |
| November | 192 | 32 | 53.5 | 82.8 | 1,610 | 4,930 |
| December | 138 | 27 | 45.1 | 69.8 | 1,400 | 4,290 |
| January | 157 | 27 | 57.6 | 89.1 | 1,790 | 5,480 |
| February | 338 | 25 | 47.5 | 73.5 | 1,330 | 4,080 |
| March | 253 | 23 | 54.1 | 83.7 | 1,680 | 5,150 |
| April | 170 | 32 | 67.8 | 105 | 2,030 | 6,240 |
| May | 70 | 27 | 37.5 | 58.0 | 1,160 | 3,570 |
| June | 117 | 27 | 37.2 | 57.6 | 1,120 | 3,420 |
| The year | 338 | 23 | 49.5 | 76.6 | 18,100 | 55,400 |

### WAIOLI STREAM NEAR HANALEI, KAUAI

LOCATION.—3 miles above mouth of stream and 4 miles south of Hanalei.

RECORDS AVAILABLE.—July 1, 1914, to June 30, 1925. Data from December 19, 1916, to June 30, 1918, have been revised in Water-Supply Paper 515.

GAGE.—Stevens continuous water-stage recorder.

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; shifting.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 450 million gallons a day, or 696 second-feet, at 5.30 p. m. December 13 (gage height, 4.50 feet); minimum discharge, 5.9 million gallons a day, or 9.1 second-feet, several hours September 19 and 20 (gage height, 1.42 feet).

1914–1925: Maximum discharge recorded, from extension of rating curve, 955 million gallons a day, or 1,480 second-feet, at 6.30 a. m. December 19, 1916 (gage height, 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.—None.

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 during flood of March 28. Rating curve used prior to this date well defined between 6 and 60 million gallons a day and the one used subsequently is poorly defined. 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 low and medium stages prior to March 28; other records poor.

*Discharge measurements of Waioli Stream near Hanalei, Kauai, during the year ending June 30, 1925*

| Date | Gage height (feet) | Discharge | | Date | Gage height (feet) | Discharge | |
|---|---|---|---|---|---|---|---|
| | | Second-feet | Million gallons a day | | | Second-feet | Million gallons a day |
| Sept. 19 | 1.42 | 11.4 | 7.37 | Mar. 6 | 1.43 | 9.61 | 6.21 |
| Oct. 29 | 2.27 | 70.2 | 45.4 | Apr. 25 | 1.62 | 18.3 | 11.8 |
| Jan. 24 | 1.48 | 10.2 | 6.59 | May 30 | 1.70 | 24.0 | 15.5 |

*Discharge, in million gallons a day, of Waioli Stream near Hanalei, Kauai, for the year ending June 30, 1925*

| Day | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 8.8 | 12.0 | 8.2 | 6.6 | 8.4 | 18.6 | 18.1 | 6.6 | 6.2 | 28 | 24 | 9.5 |
| 2 | 7.1 | 15.2 | 7.9 | 9.6 | 7.7 | 10.1 | 29 | 6.8 | 6.4 | 18.6 | 23 | 12.2 |
| 3 | 7.0 | 11.2 | 7.1 | 7.8 | 7.3 | 8.6 | 31 | 7.0 | 6.5 | 38 | 15.0 | 19.9 |
| 4 | 7.1 | 8.7 | 7.0 | 6.6 | 7.1 | 7.5 | 22 | 6.8 | 8.9 | 21 | 11.7 | 14.7 |
| 5 | 7.1 | 18.5 | 7.0 | 7.0 | 7.5 | 7.1 | 16.8 | 6.6 | 6.5 | 20 | 10.9 | 17.8 |
| 6 | 7.9 | 9.3 | 7.1 | 6.8 | 7.1 | 7.3 | 15.4 | 6.5 | 6.0 | 79 | 10.5 | 11.9 |
| 7 | 8.0 | 12.6 | 7.0 | 7.1 | 9.1 | 6.8 | 22 | 6.4 | 6.5 | 52 | 10.5 | 11.2 |
| 8 | 12.8 | 15.0 | 7.3 | 6.5 | 7.9 | 6.8 | 75 | 7.0 | 6.5 | 32 | 29 | 10.9 |
| 9 | 8.6 | 42 | 7.0 | 15.7 | 7.0 | 6.5 | 50 | 60 | 6.5 | 78 | 22 | 9.7 |
| 10 | 42 | 24 | 6.6 | 47 | 6.8 | 6.4 | 42 | 22 | 6.4 | 80 | 19.0 | 9.1 |
| 11 | 30 | 19.0 | 6.4 | 42 | 35 | 48 | 24 | 88 | 6.5 | 38 | 16.2 | 9.1 |
| 12 | 22 | 11.4 | 6.6 | 31 | 10.0 | 24 | 50 | 40 | 6.6 | 32 | 18.2 | 13.3 |
| 13 | 12.4 | 9.0 | 6.6 | 13.0 | 8.6 | 67 | 89 | 16.0 | 6.5 | 28 | 14.7 | 10.0 |
| 14 | 16.3 | 8.6 | 6.4 | 10.6 | 7.1 | 47 | 28 | 9.5 | 6.5 | 17.8 | 11.9 | 10.0 |
| 15 | 25 | 9.8 | 6.5 | 17.8 | 6.8 | 20 | 21 | 8.0 | 6.6 | 28 | 11.2 | 15.1 |
| 16 | 14.3 | 11.8 | 6.8 | 37 | 6.6 | 12.0 | 12.4 | 7.0 | 6.8 | 20 | 10.5 | 9.7 |
| 17 | 10.1 | 7.9 | 6.4 | 83 | 6.5 | 13.6 | 9.3 | 6.8 | 6.6 | 27 | 15.8 | 14.2 |
| 18 | 11.2 | 8.2 | 6.0 | 15.2 | 6.4 | 15.4 | 9.0 | 6.8 | 6.6 | 23 | 21 | 13.0 |
| 19 | 14.6 | 7.1 | 5.9 | 17.7 | 6.2 | 8.8 | 8.8 | 6.6 | 6.4 | 18.8 | 13.1 | 11.9 |
| 20 | 9.3 | 7.1 | 6.0 | 18.6 | 102 | 7.9 | 13.8 | 6.6 | 9.7 | 14.4 | 12.9 | 9.7 |

*Discharge, in million gallons a day, of Waioli Stream near Hanalei, Kauai, for the year ending June 30, 1925*—Continued

| Day | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 21 | 66 | 11.1 | 7.0 | 13.4 | 44 | 7.3 | 11.3 | 6.5 | 28 | 11.7 | 12.5 | 11.9 |
| 22 | 30 | 7.5 | 6.6 | 22 | 13.8 | 7.0 | 8.0 | 6.5 | 39 | 10.5 | 11.2 | 9.7 |
| 23 | 14.7 | 6.8 | 6.4 | 10.1 | 9.0 | 6.8 | 7.3 | 6.5 | 88 | 55 | 26 | 11.8 |
| 24 | 11.2 | 6.8 | 6.2 | 11.7 | 8.8 | 6.6 | 7.0 | 6.5 | 26 | 16.6 | 13.8 | 10.0 |
| 25 | 10.4 | 6.6 | 14.4 | 13.2 | 7.9 | 6.5 | 6.8 | 6.5 | 22 | 12.2 | 10.7 | 9.3 |
| 26 | 8.4 | 6.6 | 16.6 | 11.7 | 7.0 | 6.2 | 6.8 | 6.5 | 46 | 11.7 | 12.7 | 9.1 |
| 27 | 14.6 | 16.6 | 11.7 | 11.2 | 7.0 | 6.2 | 7.7 | 6.5 | 61 | 14.4 | 10.9 | 10.0 |
| 28 | 12.4 | 14.8 | 10.2 | 12.4 | 68 | 6.0 | 7.1 | 6.2 | 134 | 14.1 | 10.5 | 30 |
| 29 | 11.4 | 10.0 | 11.3 | 19.9 | 12.4 | 6.0 | 7.0 | ------- | 150 | 19.4 | 14.0 | 18.6 |
| 30 | 11.2 | 8.0 | 7.1 | 14.2 | 17.3 | 6.4 | 6.8 | ------- | 113 | 22 | 12.1 | 62 |
| 31 | 9.8 | 8.8 | ------- | 9.5 | ------- | 6.8 | 6.8 | ------- | 42 | ------- | 10.0 | ------- |

*Monthly discharge of Waioli Stream near Hanalei, Kauai, for the year ending June 30, 1925*

| Month | Discharge | | | | Total run-off | |
|---|---|---|---|---|---|---|
| | Million gallons a day | | | Second-feet (mean) | Million gallons | Acre-feet |
| | Maximum | Minimum | Mean | | | |
| July | 66 | 7.0 | 15.5 | 24.0 | 482 | 1,480 |
| August | 42 | 6.6 | 12.0 | 18.6 | 372 | 1,140 |
| September | 16.6 | 5.9 | 7.78 | 12.0 | 233 | 716 |
| October | 83 | 6.5 | 17.9 | 27.7 | 556 | 1,710 |
| November | 102 | 6.2 | 15.5 | 24.0 | 466 | 1,430 |
| December | 67 | 6.0 | 13.6 | 21.0 | 421 | 1,290 |
| January | 89 | 6.8 | 21.6 | 33.4 | 669 | 2,050 |
| February | 88 | 6.2 | 13.7 | 21.2 | 383 | 1,170 |
| March | 150 | 6.0 | 28.5 | 44.1 | 884 | 2,710 |
| April | 80 | 10.5 | 29.4 | 45.5 | 881 | 2,700 |
| May | 29 | 10.0 | 15.0 | 23.2 | 466 | 1,430 |
| June | 62 | 9.1 | 14.2 | 22.0 | 425 | 1,310 |
| The year | 150 | 5.9 | 17.1 | 26.5 | 6,240 | 19,100 |

### 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, 1925.

GAGE.—Stevens continuous water-stage recorder.

DISCHARGE MEASUREMENTS.—Made by wading or from cable.

CHANNEL AND CONTROL.—One channel at all stages; straight from 350 feet above to 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; shifting.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 1,920 million gallons a day, or 2,970 second-feet, at 10.30 a. m. March 28 (gage height, 5.40 feet); minimum discharge, 16.4 million gallons a day, or 25 second-feet, for several hours March 17–20 (gage height, 0.86 foot).

1914–1917; 1920–1925; 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, 9.41 feet); minimum discharge, that of March 17–20, 1925.

DIVERSIONS.—None.

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 permanent during year. Rating curve used well defined between 20 and 75 million gallons a day and fairly well defined between 75 and 200 million gallons a day. Operation of water-stage recorder satisfactory except as noted 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 for high stages, which are fair to poor.

*Discharge measurements of Lumahai River near Hanalei, Kauai, during the year ending June 30, 1925*

| Date | Gage height (feet) | Discharge | | Date | Gage height (feet) | Discharge | |
|---|---|---|---|---|---|---|---|
| | | Second-feet | Million gallons a day | | | Second-feet | Million gallons a day |
| July 29 | 1.15 | 50.4 | 32.6 | Jan. 25 | 1.02 | 38.5 | 24.8 |
| Sept. 23 | .94 | 31.1 | 20.1 | Apr. 24 | 1.37 | 78.8 | 50.9 |
| Oct. 30 | 1.30 | 62.8 | 40.6 | May 29 | 1.31 | 68.9 | 44.5 |

*Discharge, in million gallons a day, of Lumahai River near Hanalei, Kauai, for the year ending June 30, 1925*

| Day | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 41 | 38 | 32 | 23 | 33 | 59 | 50 | 22 | 20 | 84 | 73 | 26 |
| 2 | 32 | 43 | 31 | 27 | 29 | 40 | 77 | 22 | 20 | 59 | 58 | 29 |
| 3 | 29 | 38 | 28 | 34 | 28 | 36 | 89 | 22 | 20 | 95 | 45 | 48 |
| 4 | 28 | 33 | 27 | 25 | 27 | 31 | 64 | 20 | 24 | 58 | 37 | 38 |
| 5 | 27 | 48 | 26 | 24 | 29 | 28 | 50 | 20 | 20 | 97 | 34 | 43 |
| 6 | 28 | 33 | 26 | 23 | 27 | 26 | 44 | 19.8 | 19.8 | 499 | 32 | 35 |
| 7 | 28 | 40 | 25 | 25 | 44 | 25 | 59 | 20 | 18.8 | 236 | 31 | 31 |
| 8 | 45 | 54 | 27 | 23 | 34 | 24 | 261 | 22 | 18.6 | 107 | 40 | 31 |
| 9 | 32 | 209 | 25 | 59 | 26 | 23 | 234 | 268 | 18.0 | 178 | 48 | 31 |
| 10 | 172 | 76 | 24 | 249 | 25 | 23 | 202 | 91 | 18.0 | 303 | 44 | 27 |
| 11 | 122 | 59 | 24 | 159 | 112 | 114 | 83 | 403 | 17.6 | 132 | 38 | 26 |
| 12 | 104 | 44 | 24 | 141 | 40 | 102 | 283 | 160 | 17.6 | 116 | 48 | 30 |
| 13 | 59 | 37 | 23 | 67 | 42 | 195 | 367 | 79 | 17.6 | 107 | 45 | 27 |
| 14 | 59 | 36 | 23 | 44 | 30 | 219 | 96 | 46 | 17.6 | 70 | 36 | 28 |
| 15 | 90 | 38 | 23 | 67 | 27 | 97 | 64 | 37 | 17.2 | 75 | 32 | 44 |
| 16 | 59 | 46 | 23 | 87 | 26 | 50 | 48 | 32 | 16.8 | 54 | 30 | 27 |
| 17 | 44 | 34 | 23 | 215 | 24 | 47 | 40 | 29 | 16.8 | 62 | 39 | 36 |
| 18 | 44 | 33 | 22 | 61 | 23 | 83 | 36 | 28 | 16.8 | 75 | 57 | 34 |
| 19 | 52 | 30 | 22 | 63 | 22 | 40 | 35 | 26 | 16.8 | 61 | 37 | 36 |
| 20 | 36 | 29 | 22 | 76 | 268 | 33 | 41 | 25 | 25 | 46 | 32 | 28 |
| 21 | 273 | 39 | 23 | 66 | 505 | 30 | 42 | 24 | 90 | 39 | 32 | 44 |
| 22 | 133 | 29 | [a] 22 | 115 | 123 | 28 | 31 | 23 | 138 | 35 | 29 | 29 |
| 23 | 59 | 28 | [a] 21 | 49 | 52 | 26 | 28 | 23 | 371 | 141 | 50 | 30 |
| 24 | 43 | 27 | 20 | 44 | 44 | 25 | 26 | 22 | 87 | 53 | 35 | 26 |
| 25 | 42 | 27 | 36 | 45 | 37 | 25 | 26 | 22 | 61 | 41 | 29 | 24 |
| 26 | 37 | 26 | 40 | 44 | 32 | 23 | 25 | 22 | 205 | 36 | 30 | 23 |
| 27 | 40 | 67 | 49 | 43 | 28 | 23 | 24 | 21 | 316 | 39 | 29 | 26 |
| 28 | 37 | 54 | 31 | 46 | 204 | 22 | 23 | 22 | 968 | 47 | 27 | 65 |
| 29 | 33 | 38 | 45 | 78 | 58 | 22 | 23 | ------- | 765 | 60 | 33 | 48 |
| 30 | 36 | 32 | 27 | 47 | 44 | 22 | 22 | ------- | 542 | 62 | 29 | 223 |
| 31 | 34 | 34 | ------- | 38 | ------- | 22 | 22 | ------- | 179 | ------- | 26 | ------- |

[a] Estimated from incomplete gage-height record.

*Monthly discharge of Lumahai River near Hanalei, Kauai, for the year ending June 30, 1925*

| Month | Discharge | | | | Total run-off | |
|---|---|---|---|---|---|---|
| | Million gallons a day | | | Second-feet (mean) | Million gallons | Acre-feet |
| | Maximum | Minimum | Mean | | | |
| July | 273 | 27 | 61.2 | 94.7 | 1,900 | 5,820 |
| August | 209 | 26 | 45.1 | 69.8 | 1,400 | 4,290 |
| September | 49 | 20 | 27.1 | 41.9 | 814 | 2,500 |
| October | 249 | 23 | 68.0 | 105 | 2,110 | 6,470 |
| November | 505 | 22 | 68.1 | 105 | 2,040 | 6,270 |
| December | 219 | 22 | 50.4 | 78.0 | 1,560 | 4,800 |
| January | 367 | 22 | 81.1 | 125 | 2,520 | 7,720 |
| February | 403 | 19.8 | 56.1 | 86.8 | 1,570 | 4,820 |
| March | 968 | 16.8 | 132 | 204 | 4,100 | 12,600 |
| April | 499 | 35 | 102 | 158 | 3,070 | 9,410 |
| May | 73 | 26 | 38.2 | 59.1 | 1,180 | 3,640 |
| June | 223 | 23 | 39.8 | 61.6 | 1,190 | 3,660 |
| The year | 968 | 16.8 | 64.3 | 99.5 | 23,500 | 72,000 |

### MISCELLANEOUS DISCHARGE MEASUREMENTS

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

*Miscellaneous discharge measurements on Kauai during year ending June 30, 1925*

| Date | Stream | Tributary to— | Locality | Gage height (feet) | Discharge | |
|---|---|---|---|---|---|---|
| | | | | | Second-feet | Million gallons a day |
| Sept. 20 | Kalihiwai ditch | Kalihiwai River | Near Kilauea, Kauai | 0.72 | 8.59 | 5.55 |
| 26 | do | do | do | .88 | 11.3 | 7.30 |
| Feb. 21 | Kaapoko Stream | Hanalei River | Near Hanalei, 20 feet below fall No. 1. | | 3.89 | 2.51 |
| Do | do | do | At falls No. 2, near Hanalei. | | .549 | .355 |
| Do | do | do | At falls No. 3, near Hanalei. | | 5.17 | 3.34 |
| Feb. 26 | do | do | At falls No. 1, near Hanalei. | | 4.20 | 2.71 |
| Do | do | do | At falls No. 2, near Hanalei. | | .483 | .312 |
| Do | do | do | At falls No. 3, near Hanalei. | | 4.86 | 3.14 |
| Feb. 27 | Hanalei River | Pacific Ocean | Below Hanalei ditch intake, near Hanalei. | | 15.9 | 10.3 |
| Do | Kaapoko Stream | Hanalei River | Near Hanalei, 200 feet above junction with Hanalei River. | | 14.6 | 9.44 |

## ISLAND OF OAHU

### KALIHI STREAM NEAR HONOLULU, OAHU

LOCATION.—At Kioi Pool, three-eighths of a mile above 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, 1925.

GAGE.—Au 60-day fuzee recorder installed July 7, 1924. Other gages were used as follows: Gurley printing recorder December 4, 1913, to June 25, 1918; Gurley 7-day water-stage recorder June 25, 1918, to March 17, 1923, and June 3 to September 20, 1923; Au continuous water-stage recorder March 18 to June 2, 1923; and Stevens continuous water-stage recorder September 21, 1923, to July 7, 1924.

DISCHARGE MEASUREMENTS.—Made by wading.

CHANNEL AND CONTROL.—Water drops over a 10-foot fall into pool at gage. Channel is solid rock, with steep, high banks; two channels above gage height of 6.0 feet. High-water control, solid rock; low-water control, concrete dam completed January 11, 1919; shifts owing to deposition of gravel in pool above.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 534 million gallons a day, or 826 second-feet, at 6 p. m. October 10 (gage height, 8.36 feet); minimum discharge, 0.5 million gallons a day, or 0.8 second-foot, frequently during July (gage height, 0.80 foot).

1913–1925: Maximum discharge recorded, 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, 0.69 foot).

DIVERSIONS.—At a dam about 300 feet above the station, the Catholic orphanage diverts water for domestic use into a 4-inch pipe (which is reduced by several stages to 1 inch at the outlet). Dam was installed May, 1920. Prior to this there were no diversions above station. During the period February 4 to June 7, 1924, the Honolulu water department completed several development tunnels about 1½ miles above station, which now supply water for upper Kalihi district. One of these tunnels diverts the entire low flow of a small tributary stream, and it is possible that others divert ground water which formerly reached the stream.

REGULATION.—By diversion only.

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 diverted 400 feet below station for development of power; remaining low-water flow is diverted farther downstream for irrigation of taro.

ACCURACY.—Stage-discharge relation probably permanent during year except as indicated in footnote to daily-discharge table. Rating curve fairly well defined below 150 million gallons a day; extension above this quantity uncertain. Operation of water-stage recorders 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 except for estimated periods, for which they are poor.

The following discharge measurement was made:

December 23, 1924: Gage height, 1.03 feet; discharge, 4.21 second-feet or 2.72 million gallons a day.

*Discharge, in million gallons a day, of Kalihi Stream near Honolulu, Oahu, for the year ending June 30, 1925*

| Day | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.9 | 0.7 | 2.4 | 1.0 | 2.5 | 1.7 | 1.8 | 1.4 | | 3.1 | 5.2 | |
| 2 | .8 | .7 | 1.3 | 1.0 | 2.2 | 1.6 | 1.5 | 1.3 | | 2.7 | 6.8 | 7 |
| 3 | .7 | .7 | 1.0 | .9 | 2.3 | 1.6 | 1.6 | 1.2 | | 3.3 | 3.6 | |
| 4 | .6 | .6 | 1.0 | .9 | 2.2 | 1.5 | 1.3 | 1.2 | | 3.3 | | |
| 5 | .6 | .6 | 1.0 | 1.0 | 1.8 | 1.5 | 1.4 | 1.1 | | 6.3 | | 8.2 |
| 6 | .6 | .5 | 1.0 | .9 | 1.7 | 1.4 | 1.3 | 1.0 | | 12.0 | | 4.0 |
| 7 | .6 | .6 | 1.0 | .9 | 1.6 | 1.7 | 1.3 | 1.4 | | 9.1 | | 8.2 |
| 8 | .7 | .5 | .9 | .9 | 1.6 | 1.9 | 1.6 | 1.7 | 2.0 | 4.8 | | 5.6 |
| 9 | .9 | 3.3 | .9 | 1.0 | 1.6 | 1.8 | 1.3 | 10.8 | | 3.6 | | 4.4 |
| 10 | .7 | 1.8 | .9 | 26 | 1.6 | 1.7 | 1.2 | 23 | | 6.5 | | 3.6 |
| 11 | .8 | 1.4 | .9 | 7.1 | 1.5 | 7.8 | 1.2 | 12.6 | | 4.0 | | 3.1 |
| 12 | .8 | 1.2 | .9 | 3.2 | 14.8 | 21 | 1.8 | 3.6 | | 3.1 | | 6.6 |
| 13 | .7 | 1.2 | .9 | 1.8 | 2.4 | 2.4 | 8.1 | 3.4 | | 2.7 | | 3.4 |
| 14 | .6 | 1.1 | .9 | 1.5 | 2.3 | 2.0 | 2.5 | 2.7 | | 2.4 | | 2.9 |
| 15 | .6 | 1.3 | .9 | 1.6 | 2.1 | 4.4 | 1.8 | 2.5 | 1.3 | 2.3 | | 2.8 |
| 16 | .6 | 1.8 | .8 | 3.6 | 1.7 | 3.0 | 1.6 | 2.2 | 1.2 | 2.2 | | 2.7 |
| 17 | .7 | 1.8 | .7 | 9.6 | 1.6 | 14.6 | 1.5 | 2.0 | | 3.7 | 3.8 | 2.7 |
| 18 | .7 | 4.6 | .7 | 3.0 | 1.5 | 20 | 1.4 | 1.9 | 1.4 | 2.5 | | 3.3 |
| 19 | 1.5 | 1.7 | .7 | 2.2 | 1.5 | 3.6 | 1.3 | 1.8 | | 2.3 | | 9.4 |
| 20 | 1.6 | 1.5 | .7 | 3.0 | 2.7 | 5.8 | 2.4 | 1.7 | | 2.3 | | 6.3 |
| 21 | 5.4 | 1.6 | .7 | 2.4 | 14.9 | 3.3 | 1.6 | 1.6 | 4.8 | 2.0 | | 3.3 |
| 22 | 2.5 | 1.2 | .7 | 29 | 3.6 | 2.5 | 1.5 | | 2.3 | 2.2 | | 2.8 |
| 23 | 1.0 | 1.1 | .7 | 6.9 | 2.2 | 2.1 | 1.5 | | | 10.7 | | 2.6 |
| 24 | .9 | 1.0 | .7 | 4.3 | 1.7 | 2.0 | 2.5 | | | 2.4 | | 2.5 |
| 25 | .9 | 1.0 | 4.5 | 8.0 | 1.8 | 1.9 | 1.4 | 2.2 | 2.3 | 1.9 | | 2.3 |
| 26 | .8 | 1.0 | 7.0 | 4.2 | 1.6 | 1.8 | 1.3 | | | 10.2 | | 2.5 |
| 27 | .9 | 1.0 | 3.1 | 3.3 | 1.5 | 1.6 | 1.2 | | | 7.5 | | 2.3 |
| 28 | .8 | .9 | 1.6 | 2.8 | 10.0 | 1.6 | 1.2 | | | 4.2 | | 2.2 |
| 29 | .7 | 1.0 | 1.2 | 2.6 | 2.7 | 1.6 | 6.5 | | 6.5 | 6.9 | | 9.6 |
| 30 | .9 | 1.0 | 1.0 | 2.8 | 2.0 | 1.5 | 2.1 | | 21 | 3.8 | | 3.8 |
| 31 | .8 | 1.4 | | 3.0 | | 1.4 | 1.6 | | 4.4 | | | |

NOTE.—Braced figures give mean discharge for periods indicated, estimated by comparison with record of flow for Nuuanu Stream; water-stage recorder not operating.

*Monthly discharge of Kalihi Stream near Honolulu, Oahu, for the year ending June 30, 1925*

| Month | Discharge | | | | Total run-off | |
|---|---|---|---|---|---|---|
| | Million gallons a day | | | Second-feet (mean) | Million gallons | Acre-feet |
| | Maximum | Minimum | Mean | | | |
| July | 5.4 | 0.6 | 1.01 | 1.56 | 31.3 | 96 |
| August | 4.6 | .5 | 1.28 | 1.98 | 39.8 | 122 |
| September | 7.0 | .7 | 1.36 | 2.10 | 40.7 | 125 |
| October | 29 | .9 | 4.53 | 7.01 | 140 | 431 |
| November | 14.9 | 1.5 | 3.11 | 4.81 | 93.2 | 286 |
| December | 21 | 1.4 | 3.95 | 6.11 | 122 | 375 |
| January | 8.1 | 1.2 | 1.95 | 3.02 | 60.3 | 185 |
| February | 23 | 1.0 | 3.41 | 5.28 | 95.5 | 293 |
| March | 21 | | 3.00 | 4.64 | 93.1 | 285 |
| April | 12.0 | 1.9 | 4.47 | 6.92 | 134 | 411 |
| May | | | 3.94 | 6.10 | 122 | 375 |
| June | | 2.2 | 4.64 | 7.18 | 139 | 427 |
| The year | 29 | .5 | 3.05 | 4.72 | 1,110 | 3,410 |

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 January 16, 1921, and September 12, 1921, to June 30, 1925. Station rebuilt September, 1921, after destruction by flood of January 16, 1921.

GAGE.—Stevens continuous water-stage recorder installed September 21, 1923. Gurley weekly water-stage recorder at same location September 12, 1921, to September 20, 1923, and at same location as old inclined staff, April 12, 1918, to August 7, 1920. Friez weekly water-stage recorder used August 7, 1920, to January 16, 1921. Datum practically unchanged.

DISCHARGE MEASUREMENTS.—Made by wading in weir basin. Low-water discharge measured by 2-foot sharp-crested weir with end contractions. High-water discharge measured by 12-foot sharp-crested weir with end contractions, which, with flow over small weir, gives total flood discharge. Both weirs set in concrete. Crest of small weir is 1 foot lower than that of large weir. The weirs were reconstructed April 10–27, 1914, and September 12, 1921, but original dimensions were maintained.

CHANNEL AND CONTROL.—Channel originally in solid rock; has filled in considerably with gravel and silt and occasionally becomes choked with dense growths of grass; straight for about 75 feet above and below weir. Banks high and covered with vegetation.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 77 million gallons a day, or 119 second-feet, at 12.30 a. m. February 11 (gage height, 2.57 feet); minimum discharge uncertain owing to backwater effect from growth of grass in weir basin.

1913–1925: Maximum discharge recorded, 1,600 million gallons a day, or 2,480 second-feet, January 16, 1921 (gage height, by leveling to floodmarks, 8.74 feet); minimum discharge, 0.07 million gallons a day, or 0.11 second-foot, at 6 a. m. July 7, 1922 (gage height, 0.10 foot).

DIVERSIONS.—Most of low and medium stage flow is diverted above station for domestic supply and for development of power.

REGULATION.—Amount diverted above station varies.

OBJECT OF STATION.—To determine amount of water in the stream at this point in connection with investigation of water supply for city of Honolulu, Territorial land and water.

UTILIZATION.—Station measures waste water and seepage from reservoirs Nos. 2, 3, and 4 and the Luakaha Weir. This waste water is used for irrigation.

ACCURACY.—Stage-discharge relation probably permanent during year except as affected by backwater from dense growth of hono hono grass in weir basin. This backwater effect was present nearly the entire year, and the amount of backwater is rather uncertain most of the time. The basic rating curve is well defined below 200 million gallons a day by measurements and extended above this quantity by weir formulas. 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; gage-height record was corrected, when necessary, for backwater effect from grass in weir basin. Records poor for low stages and fair for medium and high stages.

No discharge measurements were made at this station during the year.

*Discharge, in million gallons a day, of Nuuanu Stream below Reservoir No. 2 wasteway, near Honolulu, Oahu, for the year ending June 30, 1925*

| Day | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.9 | 0.6 | 0.45 | 0.55 | 0.4 | 0.55 | 1.0 | 0.35 | 0.5 | 1.1 | 1.2 | 1.2 |
| 2 | .7 | .65 | .4 | .4 | .4 | .5 | .9 | .35 | .5 | .75 | 1.3 | 1.0 |
| 3 | .65 | .55 | .4 | .4 | .35 | .6 | .75 | .35 | .5 | .9 | 1.2 | 4.9 |
| 4 | .7 | .5 | .4 | .5 | .35 | .4 | .6 | .35 | .6 | .7 | 1.1 | 2.2 |
| 5 | .65 | .5 | .4 | .65 | .4 | .4 | .65 | .3 | .5 | 3.7 | 1.2 | 2.9 |
| 6 | .55 | .45 | .4 | .5 | .4 | .35 | .65 | .3 | .45 | 3.8 | .9 | 1.6 |
| 7 | .55 | .45 | .4 | .5 | .35 | .35 | .65 | .35 | .45 | 2.6 | .85 | 2.2 |
| 8 | .8 | .45 | .4 | .35 | .35 | .4 | .6 | .35 | .4 | 1.5 | .85 | 2.5 |
| 9 | .65 | .75 | .4 | .55 | .35 | .35 | .55 | 1.0 | .45 | 1.3 | .95 | 1.8 |
| 10 | .6 | .55 | .35 | .5 | .35 | .3 | .5 | 6.4 | .4 | 2.1 | 2.0 | 1.5 |
| 11 | .6 | .65 | .35 | .55 | .4 | 1.2 | .5 | 9.8 | .55 | 1.2 | 1.2 | 1.3 |
| 12 | .55 | .6 | .35 | .6 | .5 | 6.8 | .8 | 1.3 | .65 | 1.0 | 1.2 | 4.2 |
| 13 | .55 | .55 | .4 | .55 | .4 | .85 | 2.6 | 1.2 | .65 | .9 | 1.1 | 1.6 |
| 14 | .45 | .65 | .4 | .45 | .4 | .65 | 1.1 | 1.0 | .5 | .8 | 1.0 | 1.5 |
| 15 | .5 | .65 | .4 | .4 | .4 | .8 | .7 | .85 | .45 | .85 | .95 | 1.3 |
| 16 | .45 | .65 | .4 | .55 | .4 | .9 | .55 | .65 | .4 | .9 | .9 | 1.1 |
| 17 | .45 | .6 | .4 | .65 | .4 | 1.1 | .55 | .55 | .4 | 1.2 | 1.8 | 1.1 |
| 18 | .5 | .65 | .4 | .65 | .4 | 11.0 | .55 | .55 | .4 | 1.0 | 1.5 | 1.4 |
| 19 | .55 | .55 | .35 | .55 | .4 | 1.7 | .55 | .6 | .4 | .95 | 1.0 | 1.4 |
| 20 | .5 | .55 | .35 | .6 | .75 | 1.5 | .55 | .65 | .4 | .9 | .9 | 1.3 |
| 21 | 1.7 | .5 | .4 | .6 | 8.1 | 1.2 | .5 | .6 | .65 | .85 | .9 | 1.2 |
| 22 | 1.4 | .5 | .35 | 1.2 | 1.4 | 1.0 | .45 | .65 | .95 | .9 | 1.3 | 1.2 |
| 23 | .65 | .5 | .35 | .9 | .8 | .95 | .45 | .65 | .75 | 1.8 | 1.1 | 1.1 |
| 24 | .55 | .45 | .4 | .8 | .65 | .8 | .4 | .55 | .55 | 1.1 | 1.1 | .9 |
| 25 | .7 | .4 | .85 | 3.4 | .5 | .8 | .4 | .55 | .45 | .9 | 1.0 | .9 |
| 26 | .65 | .45 | .9 | .85 | .5 | .85 | .4 | .5 | .6 | 1.1 | 1.0 | 1.0 |
| 27 | .9 | .5 | .8 | .65 | .35 | .65 | .4 | .5 | .5 | 1.3 | .95 | .95 |
| 28 | .9 | .4 | .6 | .55 | 1.8 | .7 | .35 | .5 | 3.0 | 1.2 | .95 | .9 |
| 29 | .75 | .5 | .5 | .55 | .95 | .7 | .5 | ------- | 2.5 | 2.3 | .9 | 2.0 |
| 30 | .65 | .45 | .45 | .45 | .75 | .6 | .4 | ------- | 7.5 | 1.3 | .9 | 1.2 |
| 31 | .6 | .45 | ------- | .4 | ------- | .65 | .4 | ------- | 1.5 | ------- | 1.4 | ------- |

*Monthly discharge of Nuuanu Stream below Reservoir No. 2 wasteway, near Honolulu, Oahu, for the year ending June 30, 1929*

| Month | Discharge | | | | Total run-off | |
|---|---|---|---|---|---|---|
| | Million gallons a day | | | Second-feet (mean) | Million gallons | Acre-feet |
| | Maximum | Minimum | Mean | | | |
| July | 1.7 | 0.45 | 0.687 | 1.06 | 21.3 | 65 |
| August | .75 | .4 | .537 | .831 | 16.6 | 51 |
| September | .9 | .35 | .447 | .692 | 13.4 | 41 |
| October | 3.4 | .35 | .671 | 1.04 | 20.8 | 64 |
| November | 8.1 | .35 | .798 | 1.23 | 24.0 | 74 |
| December | 11.0 | .3 | 1.28 | 1.98 | 39.6 | 122 |
| January | 2.6 | .35 | .644 | .996 | 20.0 | 61 |
| February | 9.8 | .3 | 1.13 | 1.75 | 31.8 | 97 |
| March | 7.5 | .4 | .919 | 1.42 | 28.5 | 87 |
| April | 3.8 | .7 | 1.36 | 2.10 | 40.9 | 126 |
| May | 2.0 | .85 | 1.12 | 1.73 | 34.6 | 106 |
| June | 4.9 | .9 | 1.64 | 2.54 | 49.4 | 151 |
| The year | 11.0 | .3 | .934 | 1.45 | 341 | 1,040 |

### 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 at confluence of Right and Left Branches (two main branches) of North Fork of Kaukonahua Stream, 8 miles northeast of Wahiawa.

RECORDS AVAILABLE.—May 29, 1913, to June 30, 1925.

GAGE.—Stevens continuous water-stage recorder.

DISCHARGE MEASUREMENTS.—Made by wading or from footbridge 20 feet upstream from gage.

CHANNEL AND CONTROL.—Channel is a straight stretch 200 feet long that has been cleared of boulders. Banks steep and flow well distributed and confined. Natural control of large boulders has been improved somewhat for low-water stages.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 786 million gallons a day, or 1,220 second-feet, October 16 (gage height, 7.63 feet); minimum discharge, 0.2 millions gallon a day, or 0.3 second-foot, from 6 to 8 p. m. September 23 (gage height, 1.09 feet).

1913–1925: 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 of Left Branch of North Fork of this stream); minimum discharge, 0.2 million gallons a day, or 0.3 second-foot, March 24 and 28, 1914, and 6 to 8 p. m. September 23, 1924.

DIVERSIONS.—None.

REGULATION.—None.

OBJECT OF STATION.—To determine amount of water taken from Territorial lands by Wahiawa Water Co. Water rises on Territorial lands.

UTILIZATION.—Wahiawa Water Co.'s ditch diverts entire low-water flow of both Right and Left Branches of North Fork of Kaukonahua Stream for domestic water supply and irrigation near Wahiawa. All water, except the low flow, from North Fork is impounded in Wahiawa Reservoir for irrigation of sugar cane on Waialua plantation.

ACCURACY.—Stage-discharge relation permanent except during backwater period in October. Rating curve rather poorly defined below 150 million gallons a day; extended above. 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 fair except for high stages, for which they are poor

*Discharge measurements of Right Branch of North Fork of Kaukonahua Stream near Wahiawa, Oahu, during the year ending June 30, 1925*

| Date | Gage height (feet) | Discharge | | Date | Gage height (feet) | Discharge | |
|---|---|---|---|---|---|---|---|
| | | Second-feet | Million gallons a day | | | Second-feet | Million gallons a day |
| Sept. 2 | 1.37 | 1.70 | 1.10 | Jan. 21 | 1.48 | 2.33 | 1.51 |
| Oct. 21 | 1.87 | 6.20 | 4.00 | Apr. 22 | 1.38 | 1.94 | 1.25 |
| Dec. 4 | 1.50 | 3.35 | 2.17 | | | | |

*Discharge, in million gallons a day, of Right Branch of North Fork of Kaukonahua Stream near Wahiawa, Oahu, for the year ending June 30, 1925*

| Day | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1.5 | 3.3 | 1.4 | 0.4 | 3.1 | | 11.1 | 0.8 | 0.6 | 4.1 | 6.6 | ------- |
| 2 | 1.3 | 4.1 | | 2.7 | 2.6 | 4.6 | 7.3 | .8 | .6 | 3.2 | 8.0 | ------- |
| 3 | 3.2 | 2.4 | 1.0 | .9 | 2.3 | | 3.6 | .7 | | 22 | 6.0 | ------- |
| 4 | 1.2 | 1.7 | .9 | 1.6 | 2.2 | 1.8 | 2.0 | .6 | | 6.5 | 3.0 | ------- |
| 5 | 1.0 | 2.3 | .8 | 4.6 | 2.1 | 1.6 | 2.7 | .6 | 4.6 | 16.1 | 14.7 | ------- |
| 6 | .8 | 1.3 | .7 | .8 | 3.4 | 1.4 | 1.8 | .6 | | 10.5 | ------- | 7.7 |
| 7 | .8 | 1.2 | .7 | .6 | 1.9 | 1.6 | 1.3 | .6 | | 18.0 | ------- | 19.8 |
| 8 | 3.1 | 3.1 | .6 | 1.8 | 1.7 | 1.4 | 1.9 | .7 | 15.3 | 5.7 | ------- | 18.0 |
| 9 | 1.7 | 11.0 | .6 | 15.6 | 1.6 | 1.1 | 3.3 | 15.2 | 1.1 | 4.9 | ------- | 12.7 |
| 10 | 1.2 | 1.7 | .5 | 25 | 1.6 | 1.0 | 1.7 | 34 | .7 | 4.9 | ------- | 8.8 |
| 11 | 1.3 | 1.7 | .5 | 147 | 1.4 | 5.6 | 1.3 | 80 | 1.7 | 3.9 | ------- | 7.6 |
| 12 | | 1.1 | .5 | 24 | 3.3 | 10.9 | 1.8 | 7.1 | 1.0 | 3.2 | ------- | 28 |
| 13 | 3.0 | 1.4 | .5 | | 1.6 | 1.6 | 10.6 | 6.0 | 1.1 | 2.7 | ------- | 8.1 |
| 14 | | 2.9 | .4 | | 1.3 | 1.3 | 2.4 | 3.9 | .7 | 2.3 | ------- | 6.5 |
| 15 | | 6.4 | .4 | | 1.6 | 1.2 | 1.5 | 3.2 | .6 | 2.0 | ------- | 7.1 |
| 16 | 2.9 | 5.6 | .4 | 17 | 1.0 | 1.0 | 1.3 | 2.3 | .6 | 1.8 | ------- | 5.0 |
| 17 | 2.1 | 3.8 | .4 | | .9 | 2.1 | 1.1 | 1.9 | .6 | 1.8 | ------- | 4.5 |
| 18 | 1.3 | 3.2 | .3 | | .8 | 9.7 | 1.0 | 1.7 | .5 | 1.7 | ------- | 6.2 |
| 19 | 2.2 | 1.7 | .3 | | .8 | 1.4 | .9 | 1.4 | .4 | 1.7 | ------- | 10.2 |
| 20 | 1.2 | 1.7 | .3 | | 12.9 | 43 | 12.1 | 1.3 | .4 | 1.4 | ------- | 10.6 |
| 21 | 57 | 1.8 | .3 | 3.9 | 30 | 5.0 | 2.0 | 1.2 | 3.3 | 1.3 | ------- | 14.0 |
| 22 | 15.1 | 1.6 | .3 | 21 | 3.4 | 2.3 | 1.2 | 1.3 | 22 | 13.1 | ------- | 7.2 |
| 23 | 4.7 | | .3 | 6.8 | 1.9 | 1.8 | 1.1 | 1.2 | 32 | 16.8 | ------- | 6.9 |
| 24 | 3.8 | | 1.5 | 4.6 | 1.5 | 1.6 | 1.5 | 1.0 | 5.6 | 2.4 | ------- | 4.5 |
| 25 | 3.6 | | 31 | 17.6 | 1.4 | 1.4 | 1.0 | .8 | 2.9 | 1.7 | ------- | 3.7 |
| 26 | 3.7 | | 9.5 | 7.5 | 1.2 | 1.3 | 1.0 | .8 | 4.7 | 13.2 | ------- | 3.4 |
| 27 | 4.3 | 1.4 | 2.1 | 6.0 | 1.0 | 1.2 | .8 | .7 | 2.9 | 7.7 | ------- | 7.4 |
| 28 | 9.8 | | .8 | 3.7 | 7.3 | 1.0 | .8 | .6 | 10.2 | 4.1 | ------- | 3.9 |
| 29 | 3.3 | | .6 | 3.1 | 1.5 | 1.0 | 2.8 | ------- | 32 | 9.0 | ------- | 4.0 |
| 30 | 3.8 | | .5 | 5.2 | 1.3 | .9 | 2.7 | ------- | 18.0 | 10.3 | ------- | 54 |
| 31 | 2.6 | | ------- | 8.3 | ------- | .8 | 1.2 | ------- | 5.0 | ------- | ------- | ------- |

NOTE.—Discharge estimated Oct. 21, Nov. 30, Mar. 8, Apr. 29, and May 2 and 3. Braced figures give estimated mean discharge for periods indicated. Estimates made by comparison with record of Left Branch of North Fork of Kaukonahua Stream and from study of incomplete gage-height record when recorder was not operating properly. Discharge October 21 to November 22 obtained from gage heights corrected for backwater effect determined from one discharge measurement, study of recorder graph, and by comparison with record of Left Branch of North Fork of Kaukonahua Stream. Data insufficient for making estimate May 6 to June 5.

*Monthly discharge of Right Branch of North Fork of Kaukonahua Stream near Wahiawa, Oahu, for the year ending June 30, 1925*

| Month | Discharge | | | | Total run-off | |
|---|---|---|---|---|---|---|
| | Million gallons a day | | | Second-feet (mean) | Million gallons | Acre-feet |
| | Maximum | Minimum | Mean | | | |
| July | 57 | ---------- | 4.85 | 7.50 | 150 | 462 |
| August | 11.0 | ---------- | 2.50 | 3.87 | 77.6 | 238 |
| September | 31 | 0.3 | 1.98 | 3.06 | 59.5 | 183 |
| October | 147 | .4 | 14.5 | 22.4 | 449 | 1,380 |
| November | 30 | .8 | 3.29 | 5.09 | 98.6 | 303 |
| December | 43 | .8 | 3.86 | 5.97 | 120 | 368 |
| January | 12.1 | .8 | 2.80 | 4.33 | 86.8 | 266 |
| February | 80 | .6 | 6.11 | 9.45 | 171 | 525 |
| March | 32 | ---------- | 6.05 | 9.36 | 188 | 575 |
| April | 22 | 1.3 | 6.60 | 10.2 | 198 | 608 |

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

LOCATION.—100 feet above intake of Wahiawa Water Co.'s tunnel which is at confluence of Right and Left Branches (two main branches) of North Fork of Kaukonahua Stream, 8 miles northeast of Wahiawa.

RECORDS AVAILABLE.—May 25, 1913, to June 30, 1925.

GAGE.—Au continuous water-stage recorder installed June 7, 1923. Prior to that date Stevens continuous recorder was used.

DISCHARGE MEASUREMENTS.—Made by wading.

CHANNEL AND CONTROL.—Channel straight for 100 feet above and below gage; fairly uniform in cross section with high wooded banks; one channel at all stages. Stream bed composed of boulders and gravel. Control composed of large boulders; fairly permanent.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 2,870 million gallons a day, or 4,440 second-feet, at 11.45 a. m. October 16 (gage height, 9.12 feet); minimum discharge not known as recorder did not register extreme low stages owing to mud in stilling well.

1913–1925: Maximum discharge recorded, about 4,080 million gallons a day, or 6,310 second-feet, at 5 a. m. January 14, 1923 (gage height, 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.—None.

REGULATION.—None.

OBJECT OF STATION.—To determine amount of water diverted from Territorial land by Wahiawa Water Co. Water all rises on Territorial lands.

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

ACCURACY.—Stage-discharge relation changed, presumably, at time of flood October 11. The two rating curves used are fairly well defined below 100 million gallons a day; extension above this quantity based on a slope determination at gage height 8.82 feet (discharge, 2,580 million gallons a day). 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 good except those estimated, which are probably fair.

*Discharge measurements of Left Branch of North Fork of Kaukonahua Stream near Wahiawa, Oahu, during the year ending June 30, 1925*

| Date | Gage height (feet) | Discharge | | Date | Gage height (feet) | Discharge | |
|---|---|---|---|---|---|---|---|
| | | Second-feet | Million gallons a day | | | Second-feet | Million gallons a day |
| Sept. 2 | 1.20 | 4.07 | 2.63 | Mar. 8 | 1.58 | 13.5 | 8.79 |
| Oct. 21 | 1.37 | 6.24 | 4.03 | Apr. 22 | 1.18 | 3.07 | 1.98 |
| Jan. 21 | 1.26 | 4.45 | 2.88 | | | | |

*Discharge, in million gallons a day, of Left Branch of North Fork of Kaukonahua Stream near Wahiawa, Oahu, for the year ending June 30, 1925*

| Day | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 4.1 | 9.1 | 2.9 | 1.3 | 3.9 | 1.7 | 12.6 | 1.2 | 0.8 | 4.5 | 9.2 | ------- |
| 2 | 2.6 | 12.5 | 2.8 | 2.2 | 3.3 | 9.2 | 10.0 | 1.0 | | 4.0 | 11.9 | ------- |
| 3 | 4.3 | 7.2 | 2.5 | 5.7 | 2.9 | 4.3 | 5.8 | 1.0 | 5.4 | 14.8 | 9.2 | ------- |
| 4 | 2.2 | 4.4 | 2.2 | 6.4 | 2.7 | 1.9 | 2.6 | .9 | 17.8 | 5.4 | 5.5 | ------- |
| 5 | 1.9 | 6.7 | 1.9 | 7.1 | 2.4 | 1.6 | 2.8 | .8 | 3.4 | 17.3 | 27 | ------- |
| 6 | 1.9 | 3.8 | 1.8 | 2.1 | 3.0 | 1.4 | 2.4 | .8 | 2.8 | 12.9 | 6.0 | ------- |
| 7 | 1.8 | 3.6 | 1.8 | 1.6 | 2.2 | 1.4 | 1.6 | .9 | 2.0 | 16.5 | ------- | ------- |
| 8 | 4.4 | 18.0 | 1.7 | 11.4 | 1.9 | 1.4 | 3.8 | 1.6 | 16.2 | 6.0 | ------- | ------- |
| 9 | 3.0 | 22 | 1.6 | 10.9 | 1.9 | 1.2 | 4.4 | 18.0 | | 6.4 | ------- | ------- |
| 10 | 2.1 | 7.2 | 1.5 | 30 | 1.9 | 1.2 | 3.2 | 44 | | 7.6 | ------- | ------- |
| 11 | 1.9 | 9.1 | 1.5 | 215 | 1.7 | 4.4 | 1.9 | 152 | | | ------- | |
| 12 | 9.4 | 5.4 | 1.5 | 12.7 | 3.7 | 11.6 | 2.9 | 8.7 | | | ------- | |
| 13 | 3.6 | 6.4 | 1.6 | 6.2 | 1.9 | 1.6 | 13.5 | 6.9 | | | ------- | |
| 14 | 2.1 | 6.9 | 1.4 | 4.4 | 1.9 | 1.2 | 2.9 | 4.9 | 1.2 | | ------- | |
| 15 | 5.8 | 12.9 | 1.5 | 7.3 | 3.0 | 1.2 | 2.0 | 4.2 | | | ------- | |
| 16 | 11.0 | 13.1 | 1.3 | 120 | 1.5 | 1.2 | 1.7 | | | 2.8 | ------- | |
| 17 | 12.1 | 9.0 | .8 | 28 | 1.3 | 2.6 | 1.5 | | | | ------- | |
| 18 | 4.0 | 12.8 | .6 | 7.6 | 1.2 | 8.2 | 1.3 | | | | ------- | |
| 19 | 6.6 | 6.6 | .6 | 5.3 | 1.2 | 1.4 | 1.2 | | | | ------- | |
| 20 | 3.1 | 5.6 | .6 | 5.1 | 12.2 | 58 | 18.6 | | | | ------- | 14 |
| 21 | 60 | 5.2 | .6 | 4.8 | 31 | 4.6 | 3.0 | | 7.4 | | ------- | |
| 22 | 23 | 4.4 | .6 | 24 | 3.8 | 2.3 | 1.9 | 1.8 | 23 | 14.0 | ------- | |
| 23 | 7.4 | 4.0 | .5 | 10.3 | 2.3 | 1.9 | 1.6 | | 18.8 | 13.5 | ------- | |
| 24 | 5.6 | 4.2 | .8 | 8.2 | 1.9 | 1.6 | 2.6 | | 5.0 | 4.2 | ------- | |
| 25 | 5.8 | 3.6 | 29 | 20 | 1.7 | 1.5 | 1.5 | | 4.0 | 3.9 | ------- | |
| 26 | 6.9 | 3.2 | 20 | 12.4 | 1.6 | 1.4 | 1.4 | | 5.6 | 15.4 | ------- | |
| 27 | 7.8 | 3.2 | 4.3 | 7.8 | 1.4 | 1.2 | 1.2 | | 5.5 | 7.8 | ------- | |
| 28 | 13.3 | 3.4 | 2.2 | 5.3 | 9.4 | 1.2 | 1.2 | | 11.8 | 4.7 | ------- | |
| 29 | 5.2 | 3.2 | 1.8 | 4.1 | 2.0 | 1.0 | 5.1 | ------- | 33 | 16.7 | ------- | |
| 30 | 6.5 | 2.7 | 1.4 | 8.9 | 1.8 | 1.0 | 2.5 | ------- | 25 | 18.6 | ------- | |
| 31 | 4.4 | 2.9 | ------- | 12.3 | ------- | .9 | 1.4 | ------- | 7.1 | ------- | ------- | ------- |

NOTE.—Discharge estimated Mar. 3, 5–8, 21, 24–28, and Apr. 1 and 2. Braced figures give estimated mean discharge for periods indicated. Estimates made by comparison with record of Right Branch of North Fork of Kaukonahua Stream and study of incomplete and faulty gage-height record when recorder clock was stopped or float resting on mud in stilling well. Data insufficient for making estimate May 7 to June 5.

*Monthly discharge of Left Branch of North Fork of Kaukonahua Stream near Wahiawa, Oahu, for the year ending June 30, 1925*

| Month | Discharge | | | | Total run-off | |
|---|---|---|---|---|---|---|
| | Million gallons a day | | | Second-feet (mean) | Million gallons | Acre-feet |
| | Maximum | Minimum | Mean | | | |
| July | 60 | 1.8 | 7.54 | 11.7 | 234 | 717 |
| August | 22 | 2.7 | 7.17 | 11.1 | 222 | 682 |
| September | 29 | .5 | 3.11 | 4.81 | 93.3 | 286 |
| October | 215 | 1.3 | 19.6 | 30.3 | 608 | 1,870 |
| November | 31 | 1.2 | 3.75 | 5.80 | 113 | 346 |
| December | 58 | .9 | 4.36 | 6.75 | 135 | 415 |
| January | 18.6 | 1.2 | 3.87 | 5.99 | 120 | 369 |
| February | 152 | ---------- | 9.65 | 14.9 | 270 | 830 |
| March | 33 | ---------- | 6.77 | 10.5 | 210 | 644 |
| April | 18.6 | ---------- | 7.50 | 11.6 | 225 | 690 |

### 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, 1925*

| Date | Stream | Tributary to— | Locality | Discharge | |
|---|---|---|---|---|---|
| | | | | Second-feet | Million gallons a day |
| Sept. 12 | Tunnel No. 6 | Waianae Stream | Waianae | 0.028 | 0.018 |
| 12 | Mouth of tunnel No. 6 | do | do | .770 | .498 |
| 12 | Tunnel No. 7 | do | do | .028 | .018 |
| 12 | Tunnel No. 3 | do | do | .051 | .033 |
| 12 | Tunnel No. 4 | do | do | .058 | .038 |
| 12 | First stream on Lualualei side of tunnel No. 3. | do | do | .023 | .015 |
| 13 | Tunnel No. 2 | do | do | 1.13 | .730 |
| 13 | Tunnel No. 1 | do | do | .034 | .022 |
| 13 | First spring below tunnel No. 1. | do | do | .018 | .012 |
| 13 | Second spring 300 feet from main channel. | do | do | .003 | .002 |
| 13 | Tunnel No. 7 | do | do | .071 | .046 |
| 13 | Tunnel No. 8 | do | do | .144 | .093 |
| 13 | Tunnel No. 9 | do | do | .045 | .029 |
| 13 | Tunnel No. 11 | do | do | .158 | .102 |
| 13 | Tunnel No. 12 | do | do | .010 | .006 |
| 13 | Tunnel No. 13 | do | do | .010 | .006 |
| 13 | Tunnel No. 14 | do | do | .086 | .056 |
| 13 | Left branch of Kalalua tunnel No. 11. | do | do | .023 | .015 |
| 13 | Kukaki | do | do | .034 | .022 |
| 16 | Tunnel No. 16 | do | do | .008 | .005 |
| 16 | Waianae | Pacific Ocean | do | .360 | .230 |
| 16 | Tunnel No. 15 | Waianae Stream | do | .460 | .300 |
| 16 | Power house | do | do | 3.20 | 2.07 |
| 16 | Kukaki Springs Nos. 3 and 4. | do | do | .018 | .012 |
| 16 | Springs Nos. 23 to 25, below Kumaipo. | do | do | .022 | .014 |
| 16 | Kumaipo | do | do | .034 | .022 |
| 16 | Tunnel No. 18 | do | do | .052 | .034 |
| 16 | Hiu | do | do | .014 | .009 |
| 16 | Kumaipo | do | do | .031 | .020 |
| Oct. 15 | Tunnel No. 2 | do | do | 1.12 | .724 |
| 15 | Tunnel No. 6 | do | do | .811 | .524 |
| 15 | Spring No. 6 | do | do | .020 | .013 |
| 15 | Spring No. 7 | do | do | .033 | .021 |
| 15 | First stream on Mountain House side of coffee house. | do | do | .033 | .021 |
| 15 | Kukaki Springs Nos. 3 and 4. | do | do | .024 | .016 |
| 15 | Tunnel No. 1 | do | do | .028 | .018 |
| 15 | Spring No. 1 | do | do | .013 | .008 |
| 15 | Spring No. 2 | do | do | .016 | .010 |
| 15 | Tunnel No. 3 | do | do | .063 | .041 |
| 15 | Tunnel No. 4 | do | do | .052 | .034 |
| 15 | Tunnel No. 7 | do | do | .035 | .023 |
| 15 | Tunnel No. 8 | do | do | .173 | .112 |
| 15 | Tunnel No. 9 | do | do | .028 | .018 |
| 16 | Tunnel No. 14 | do | do | .082 | .053 |
| 16 | Tunnel No. 12 | do | do | .007 | .005 |
| 16 | Tunnel No. 18 | do | do | .066 | .043 |
| 16 | Spring No. 19 | do | do | .006 | .004 |
| 16 | Springs Nos. 16-18 | do | do | .046 | .030 |
| 16 | Springs Nos. 23-25 | do | do | .028 | .018 |
| 16 | Springs Nos. 12-15 | do | do | .022 | .014 |
| 16 | Hiu | do | do | .026 | .017 |
| 16 | Tunnel No. 11 | do | do | .225 | .145 |
| Oct. 16 | Tunnel No. 15 | do | do | .284 | .184 |
| " 16 | New tunnel No. 16 | do | do | .002 | .001 |
| Jan. 28 | Tunnel No. 1 | do | do | .023 | .015 |
| 28 | Tunnel No. 2 | do | do | 1.26 | .814 |
| 28 | Tunnel No. 3 | do | do | .060 | .039 |
| 28 | Tunnel No. 4 | do | do | .060 | .039 |
| 28 | Tunnel No. 6 | do | do | .811 | .524 |
| 28 | Tunnel No. 7 | do | do | .042 | .027 |
| 28 | Tunnel No. 8 | do | do | .129 | .083 |
| 28 | Tunnel No. 9 | do | do | .013 | .008 |
| 29 | Tunnel No. 11 | do | do | .090 | .058 |
| 29 | Tunnels Nos. 12 and 13 | do | do | .082 | .053 |
| 29 | Tunnel No. 14 | do | do | .140 | .090 |
| 29 | Tunnel No. 15 | do | do | .385 | .249 |
| 29 | Tunnel No. 16 | do | do | .047 | .030 |
| 29 | Tunnel No. 18 | do | do | .074 | .048 |
| 28 | Spring No. 1 | do | do | .011 | .007 |

*Miscellaneous discharge measurements on Oahu during the year ending June 30, 1925*—Continued

| Date | Stream | Tributary to— | Locality | Discharge | |
|---|---|---|---|---|---|
| | | | | Second-feet | Million gallons a day |
| Jan. 28 | Spring No. 2 | Waianae Stream | Waianae | 0.020 | 0.013 |
| 28 | Springs Nos. 3 and 4 | do | do | .020 | .013 |
| 28 | Spring No. 6 | do | do | .012 | .008 |
| 28 | Spring No. 7 | do | do | .034 | .022 |
| 29 | Springs Nos. 12–15 | do | do | .023 | .015 |
| 29 | Springs Nos. 16–18 | do | do | .053 | .034 |
| 29 | Springs Nos. 19 and 20 | do | do | .042 | .027 |
| 29 | Springs Nos. 23–25 | do | do | .021 | .014 |
| 29 | Hiu | do | do | .008 | .005 |
| 29 | Waianae | Pacific Ocean | do | .642 | .415 |
| Mar. 4 | Tunnel No. 1 | Waianae Stream | Near Waianae | .021 | .014 |
| 5 | Tunnel No. 2 | do | do | 1.15 | .743 |
| 4 | Tunnel No. 3 | do | do | .036 | .023 |
| 4 | Tunnel No. 4 | do | do | .047 | .030 |
| 4 | Tunnel No. 6 | do | do | .79 | .511 |
| 5 | Tunnel No. 7 | do | do | .036 | .023 |
| 5 | Tunnel No. 8 | do | do | .063 | .041 |
| 5 | Tunnel No. 9 | do | do | .129 | .083 |
| 5 | Tunnel No. 11 | do | do | .060 | .039 |
| 5 | Tunnels Nos. 12 and 13 | do | do | .074 | .048 |
| 5 | Tunnel No. 14 | do | do | .060 | .039 |
| 5 | Tunnel No. 16 | do | do | .042 | .027 |
| 5 | Tunnel No. 18 | do | do | .053 | .034 |
| 4 | Spring No. 1 | do | do | .010 | .006 |
| 4 | Spring No. 2 | do | do | .012 | .008 |
| 4 | Springs Nos. 3–5 | do | do | .016 | .010 |
| 4 | Spring No. 6 | do | do | .011 | .007 |
| 4 | Spring No. 7 | do | do | .023 | .015 |
| 5 | Springs Nos. 12–15 | do | do | .004 | .003 |
| Apr. 15 | Tunnel No. 1 | do | do | .016 | .010 |
| 15 | Tunnel No. 2 | do | do | 1.11 | .717 |
| 16 | Tunnel No. 3 | do | do | .016 | .010 |
| 16 | Tunnel No. 4 | do | do | .032 | .021 |
| 15 | Tunnel No. 6 | do | do | .702 | .454 |
| 15 | Tunnel No. 7 | do | do | .027 | .018 |
| 15 | Tunnel No. 8 | do | do | .047 | .030 |
| 15 | Tunnel No. 9 | do | do | .090 | .058 |
| 16 | Tunnel No. 11 | do | do | .032 | .021 |
| 16 | Tunnels Nos. 12 and 13 | do | do | .008 | .005 |
| 16 | Tunnel No. 14 | do | do | .090 | .058 |
| 16 | Tunnel No. 15 | do | do | .355 | .229 |
| 16 | Tunnel No. 16 | do | do | .036 | .023 |
| 16 | Tunnel No. 18 | do | do | .044 | .028 |
| 15 | Springs Nos. 3 and 4 | do | do | .005 | .003 |
| 15 | Spring No. 6 | do | do | .020 | .013 |
| 15 | Spring No. 7 | do | do | .011 | .007 |
| 16 | Springs Nos. 12–15 | do | do | .008 | .005 |
| 16 | Springs Nos. 23–25 | do | do | .013 | .008 |
| May 14 | Tunnel No. 1 | do | do | .036 | .023 |
| 14 | Tunnel No. 2 | do | do | 1.10 | .711 |
| 14 | Tunnel No. 3 | do | do | .060 | .039 |
| 14 | Tunnel No. 4 | do | do | .202 | .131 |
| 14 | Tunnel No. 6 | do | do | 1.00 | .646 |
| 14 | Tunnel No. 7 | do | do | .067 | .043 |
| 14 | Tunnel No. 8 | do | do | .032 | .021 |
| 14 | Tunnel No. 9 | do | do | .216 | .140 |
| 15 | Tunnel No. 11 | do | do | .053 | .034 |
| 15 | Tunnel No. 12 | do | do | .002 | .001 |
| 15 | Tunnel No. 13 | do | do | .008 | .005 |
| 15 | Tunnel No. 14 | do | do | .082 | .053 |
| 15 | Tunnel No. 15 | do | do | .506 | .327 |
| 15 | Tunnel No. 16 | do | do | .060 | .039 |
| 15 | Tunnel No. 18 | do | do | .109 | .070 |
| 14 | Spring No. 1 | do | do | .008 | .005 |
| 14 | Spring No. 2 | do | do | .027 | .018 |
| 14 | Springs Nos. 3 and 4 | do | do | .032 | .021 |
| 14 | Spring No. 6 | do | do | .023 | .015 |
| 14 | Spring No. 7 | do | do | .027 | .018 |
| 15 | Spring No. 8 | do | do | .002 | .001 |
| 15 | Springs Nos. 12–15 | do | do | .016 | .010 |
| 15 | Springs Nos. 23–25 | do | do | .013 | .008 |
| 15 | Power plant tailrace | do | do | 3.10 | 2.00 |
| 15 | Honua | do | do | .436 | .282 |
| 14 | Kumaipo (makai) | do | do | .163 | .105 |
| 15 | Kumaipo (mauka) | do | do | .234 | .151 |
| 14 | Hiu (makai) | do | do | .036 | .023 |

*Miscellaneous discharge measurements on Oahu during the year ending June 30, 1925*—Continued

| Date | Stream | Tributary to— | Locality | Discharge | |
|---|---|---|---|---|---|
| | | | | Second-feet | Million gallons a day |
| May 15 | Hiu (mauka) | Waianae Stream | Waianae | 0.023 | 0.015 |
| June 25 | Tunnel No. 1 | do | do | .034 | .022 |
| 25 | Tunnel No. 2 | do | do | 1.24 | .801 |
| 25 | Tunnel No. 3 | do | do | .078 | .050 |
| 25 | Tunnel No. 4 | do | do | .095 | .061 |
| 25 | Tunnel No. 6 | do | do | 1.09 | .704 |
| 25 | Tunnel No. 7 | do | do | .070 | .045 |
| 25 | Tunnel No. 8 | do | do | .034 | .022 |
| 25 | Tunnel No. 9 | do | do | .145 | .094 |
| 25 | Tunnel No. 18 | do | do | .078 | .050 |
| 25 | Spring No. 1 | do | do | .010 | .006 |
| 25 | Spring No. 2 | do | do | .021 | .014 |
| 25 | Springs Nos. 3 and 4 | do | do | .025 | .016 |
| 25 | Spring No. 6 | do | do | .015 | .010 |
| 25 | Spring No. 7 | do | do | .029 | .019 |
| 25 | Honua | do | do | .095 | .061 |
| 25 | Kumaipo | do | do | .044 | .028 |
| 25 | Hiu | do | do | .018 | .012 |
| 26 | Tunnel No. 11 | do | do | .025 | .016 |
| 26 | Tunnels Nos. 12 and 13 | do | do | .018 | .012 |
| 26 | Tunnel No. 14 | do | do | .086 | .056 |
| 26 | Tunnel No. 15 | do | do | .407 | .263 |
| 26 | Tunnel No. 16 | do | do | .039 | .025 |
| 26 | Springs Nos. 12–15 | do | do | .021 | .014 |
| 26 | Springs Nos. 23–25 | do | do | .021 | .014 |
| 26 | Hiu | do | do | .025 | .016 |
| 26 | Kumaipo | do | do | .114 | .074 |
| 26 | Power-plant tailrace | do | do | 3.14 | 2.03 |

## 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 school house.

RECORDS AVAILABLE.—June 25, 1923, to June 30, 1025. For old station 500 feet upstream, August 28, 1917, to June 24, 1923.

GAGE.—Stevens continuous water-stage recorder at both old and new sites.

DISCHARGE MEASUREMENTS.—Made by wading.

CHANNEL AND CONTROL.—Recorder situated 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; shifts slightly owing to encroachment of hono-hono grass.

At old location stream was confined to one channel at all stages; straight for 150 feet above and 100 feet below gage. Control composed of large boulders; shifting.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 521 million gallons a day, or 806 second-feet, at 5.20 a. m. December 12 (gage height, 7.61 feet); minimum discharge, 2.0 million gallons a day, or 3.1 second-feet, September 19 and 20 (gage height, 1.00 foot).

1917–1925: Maximum discharge recorded, about 1,550 million gallons a day or 2,400 second-feet at 10 a. m. March 31, 1923 (gage height, 11.65 feet); minimum discharge, 0.8 million gallons a day, or 1.2 second-feet October 13–15 and 19, 1917 (gage height, 0.35 foot, on old gage).

DIVERSIONS.—None.

REGULATION.—None.

OBJECT OF STATION.—To determine feasibility of water-supply project for Halawa village and amount of water available for irrigation on leeward side of Molokai.

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

ACCURACY.—Stage-discharge relation permanent. Rating curve well defined below 100 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 high stages and estimated periods, for which they are fair.

*Discharge measurements of Halawa Stream near Halawa, Molokai, during the year ending June 30, 1925*

| Date | Gage height (feet) | Discharge | | Date | Gage height (feet) | Discharge | |
|---|---|---|---|---|---|---|---|
| | | Second-feet | Million gallons a day | | | Second-feet | Million gallons a day |
| July 9 | 1.54 | 23.7 | 15.3 | Mar. 11 | 1.43 | 16.8 | 10.9 |
| Aug. 27 | 1.25 | 7.65 | 4.94 | June 2 | 1.44 | 15.9 | 10.3 |
| Dec. 4 | 1.33 | 12.0 | 7.76 | | | | |

*Discharge, in million gallons a day, of Halawa Stream near Halawa, Molokai, for the year ending June 30, 1925*

| Day | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | 12.3 | 4.7 | 5.6 | 9.9 | 12.2 | 10.3 | 5.6 | 5.1 | 16.1 | 20 | 9.0 |
| 2 | | 18.4 | 4.0 | 7.0 | 7.8 | 15.6 | 10.5 | 4.7 | 6.0 | 14.2 | 29 | 12.8 |
| 3 | | 11.6 | 3.9 | 11.0 | 6.7 | 12.0 | 5.8 | 4.2 | 20 | 14.9 | 19.3 | 63 |
| 4 | | 16.6 | 3.4 | 6.7 | 6.0 | 7.8 | 5.1 | 4.0 | 17.7 | 14.4 | 11.2 | 23 |
| 5 | 8.5 | 11.6 | 3.2 | 17.0 | 5.6 | 6.5 | 6.5 | 3.7 | 7.0 | 48 | 9.0 | 19.8 |
| 6 | | 7.8 | 3.2 | 7.5 | 4.9 | 5.6 | 5.8 | 3.5 | 6.0 | 40 | 7.8 | 20 |
| 7 | | 6.3 | 6.0 | 6.3 | 5.4 | 5.8 | 4.4 | 4.2 | 4.9 | 54 | 7.2 | 28 |
| 8 | | 15.3 | 4.6 | 7.2 | 4.7 | 5.4 | 5.4 | 4.9 | 6.1 | 14.4 | 6.7 | 19.8 |
| 9 | | 18.4 | 3.4 | 6.7 | 21 | 6.0 | 6.7 | 22 | 6.3 | 16.1 | 10.3 | 40 |
| 10 | 8.1 | 14.4 | 3.0 | 12.7 | 6.3 | 4.7 | 14.6 | 116 | 4.4 | 20 | 58 | 22 |
| 11 | 7.0 | 14.7 | 3.0 | 16.4 | 4.7 | 4.2 | 6.7 | 96 | 23 | 19.6 | 14.0 | 14.4 |
| 12 | 4.7 | 8.4 | 2.8 | 14.0 | 71 | 119 | | 54 | 11.6 | 10.9 | 8.4 | 57 |
| 13 | 4.7 | 7.2 | 3.0 | 13.0 | 16.3 | 22 | | 95 | 13.9 | 11.2 | 10.7 | 16.3 |
| 14 | 3.9 | 10.5 | 2.7 | 11.6 | 18.3 | 10.2 | | 52 | 6.0 | 8.4 | 9.6 | 22 |
| 15 | 6.4 | 7.0 | 2.6 | 10.7 | 7.5 | 8.7 | 8.0 | 60 | 5.4 | 7.2 | 7.2 | 37 |
| 16 | 23 | 13.4 | 2.4 | 35 | 6.0 | 7.2 | | 25 | 4.6 | 8.7 | 6.5 | 16.3 |
| 17 | 14.5 | 18.1 | 2.6 | 28 | 6.3 | 6.7 | 4.4 | 13.3 | 5.4 | 46 | 12.3 | 14.0 |
| 18 | 7.8 | 19.1 | 2.4 | 15.9 | 5.6 | 17.2 | 4.0 | 9.9 | 16.2 | 13.6 | 48 | 11.9 |
| 19 | 9.0 | 8.1 | 2.1 | 12.2 | 4.7 | 7.2 | 3.9 | 8.4 | 8.7 | 9.6 | 14.8 | 51 |
| 20 | 9.2 | 9.0 | 2.2 | 26 | 70 | 7.7 | 12.5 | 7.0 | 23 | 9.3 | 9.9 | 22 |
| 21 | 124 | 12 2 | 3.3 | 33 | 131 | 37 | 6.5 | 6.5 | 31 | 7.8 | 11.2 | 16.3 |
| 22 | 48 | 7.5 | 3.1 | 72 | 14.6 | 8.4 | 4.4 | 6.7 | 46 | 27 | 31 | 13.6 |
| 23 | 12.2 | 7.0 | 2.6 | 55 | 8.7 | 6.3 | 6.6 | 6.0 | 17.8 | 11.9 | 46 | 21 |
| 24 | 9.6 | 6.3 | 2.6 | 62 | 7.0 | 5.6 | 7.0 | 5.4 | 10.9 | 9.3 | 15.6 | 10.5 |
| 25 | 8.4 | 6.7 | 79 | 46 | 9.0 | 4.9 | 4.6 | 4.7 | 8.7 | 7.5 | 10.2 | 9.0 |
| 26 | 13.6 | 5.8 | 111 | 16.3 | 6.5 | 4.6 | 3.9 | 4.9 | 22 | 54 | 13.7 | 8.1 |
| 27 | 12 2 | 5.8 | 32 | 14.0 | 5.4 | 4.7 | 3.4 | 16.8 | 34 | 82 | 9.0 | 10.2 |
| 28 | 12.4 | 5.1 | 10.9 | 9.9 | 30 | 4.2 | 3.2 | 8.0 | 29 | 27 | 8.7 | 9.0 |
| 29 | 7.5 | 4.6 | 10.2 | 9.6 | 19.4 | 4.0 | 56 | ------- | 31 | 19.8 | 8.1 | 9.3 |
| 30 | 11.5 | 4.4 | 7.0 | 32 | 9.6 | 4.0 | 32 | ------- | 40 | 16.3 | 9.6 | 16.7 |
| 31 | 8.4 | 5.6 | ------- | 20 | ------- | 3.9 | 7.8 | ------- | 12.6 | ------- | 18.4 | ------- |

NOTE.—Braced figures give mean discharge for the period indicated, estimated by comparison with record of flow for Papalaua Stream; recorder not operating.

*Monthly discharge of Halawa Stream near Halawa, Molokai, for the year ending June 30, 1929*

| Month | Discharge | | | | Total run-off | |
|---|---|---|---|---|---|---|
| | Million gallons a day | | | Second-feet (mean) | Million gallons | Acre-feet |
| | Maximum | Minimum | Mean | | | |
| July | 124 | ---------- | 14.3 | 22.1 | 443 | 1,360 |
| August | 19.1 | 4.4 | 10.3 | 15.9 | 319 | 980 |
| September | 111 | 2.1 | 10.9 | 16.9 | 327 | 1,000 |
| October | 72 | 5.6 | 20.7 | 32.0 | 640 | 1,970 |
| November | 131 | 4.7 | 17.7 | 27.4 | 530 | 1,630 |
| December | 119 | 3.9 | 12.2 | 18.9 | 379 | 1,160 |
| January | 56 | ---------- | 9.10 | 14.1 | 282 | 865 |
| February | 116 | 3.5 | 23.3 | 36.1 | 652 | 2,000 |
| March | 46 | 4.4 | 15.6 | 24.1 | 484 | 1,490 |
| April | 82 | 7.2 | 22.0 | 34.0 | 659 | 2,020 |
| May | 58 | 6.5 | 16.2 | 25.1 | 501 | 1,540 |
| June | 63 | 8.1 | 21.4 | 33.1 | 643 | 1,970 |
| The year | 131 | ---------- | 16.1 | 24.9 | 5,860 | 18,000 |

### 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, 1925.

GAGE.—Stevens continuous water-stage recorder; installed May 22, 1920. Prior to this date Gurley printing water-stage recorder.

DISCHARGE MEASUREMENTS.—Made by wading or from suspension footbridge near station.

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

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 507 million gallons a day, or 783 second-feet, at 2.30 a. m. December 12 (gage height, 5.42 feet); minimum discharge, 1.3 million gallons a day, or 2.0 second-feet, several hours September 19 and 20 (gage height, 0.67 foot).

1919–1925: 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, 8.58 feet); minimum discharge, 1.0 million gallons a day, or 1.6 second-feet, February 26 and 27, 1920 (gage height, 1.02 feet).

DIVERSIONS.—None.

REGULATION.—None.

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

UTILIZATION.—Entire flow now wastes into sea.

ACCURACY.—Stage-discharge relation not permanent. Basic rating curve fairly well defined below 50 million gallons a day; used directly July 1–20 and September 27 to June 30; shifting-control method used for intervening period. 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; necessary corrections to gage height were made when shifting-control method was used. Records fair.

*Discharge measurements of Papalaua Stream near Wailau, Molokai, during the year ending June 30, 1929*

| Date | Gage height (feet) | Discharge | | Date | Gage height (feet) | Discharge | |
|---|---|---|---|---|---|---|---|
| | | Second-feet | Million gallons a day | | | Second-feet | Million gallons a day |
| Aug. 27 | 1.30 | 9.55 | 6.17 | Dec. 7 | 1.06 | 5.47 | 3.54 |
| Oct. 17 | 1.95 | 38.0 | 24.6 | June 2 | 1.33 | 11.1 | 7.17 |

*Discharge, in million gallons a day, of Papalaua Stream near Wailau, Molokai for the year ending June 30, 1925*

| Day | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 11.2 | 10.9 | 2.5 | 2.9 | | | | 2.2 | 2.2 | 9.3 | 17.7 | 7.1 |
| 2 | 5.9 | 12.4 | 2.2 | 4.6 | | | | 2.1 | 3.4 | 8.5 | 16.0 | 9.7 |
| 3 | 5.4 | 7.4 | 2.0 | 6.5 | | | | 2.1 | 15.7 | 9.5 | 14.4 | 55 |
| 4 | 4.5 | 12.9 | 1.8 | 4.6 | | | | 2.1 | 10.6 | 6.5 | 6.5 | 16.1 |
| 5 | 3.8 | 6.8 | 1.7 | 14.5 | | | | 2.1 | 3.8 | 34 | 5.4 | 16.6 |
| 6 | 2.6 | 4.4 | 1.7 | 4.4 | | | | 2.0 | 2.5 | 22 | 4.6 | 13.5 |
| 7 | 2.6 | 3.4 | 4.1 | 4.6 | | | | 2.2 | 2.2 | 37 | 3.9 | 20 |
| 8 | 6.5 | 12.1 | 2.3 | 3.8 | | | | 2.2 | 2.2 | 8.1 | 4.1 | 13.4 |
| 9 | 7.4 | 12.9 | 1.8 | 4.6 | | | | 26 | 2.2 | 9.7 | 9.7 | 24 |
| 10 | 7.2 | 8.3 | 1.6 | 18.8 | | | 4.8 | 104 | 2.2 | 12.9 | 44 | 14.0 |
| 11 | 4.9 | 11.4 | 1.6 | 10.2 | | | | 30 | 18.7 | 14.4 | 7.8 | 7.9 |
| 12 | 3.6 | 4.6 | 1.6 | 8.7 | | | | 50 | 10.3 | 6.8 | 5.2 | 39 |
| 13 | 3.9 | 5.2 | 1.6 | 10.2 | | | | 52 | 8.6 | 8.1 | 8.6 | 8.3 |
| 14 | 2.6 | 7.7 | 1.5 | 5.1 | | | | 25 | 2.8 | 4.9 | 6.1 | 17.1 |
| 15 | 5.1 | 4.6 | 1.5 | 7.5 | | | | 32 | 2.4 | 4.2 | 4.5 | 23 |
| 16 | 25 | 12.9 | 1.4 | 31 | 13 | 8.5 | | 8.1 | 2.1 | 5.9 | 3.5 | 9.0 |
| 17 | 11.3 | 12.4 | 1.5 | 17.0 | | | | 5.1 | 2.1 | 41 | 16.6 | 8.3 |
| 18 | 8.0 | 14.5 | 1.4 | 9.7 | | | | 3.7 | 3.1 | 11.4 | 32 | 6.8 |
| 19 | 8.0 | 5.1 | 1.3 | 6.8 | | | | 2.9 | 4.4 | 6.1 | 8.8 | 35 |
| 20 | 12.8 | 5.9 | 1.4 | 33 | | | 7.3 | 2.5 | 13.5 | 6.5 | 7.6 | 10.6 |
| 21 | 110 | 8.3 | 1.6 | 18.2 | | | 3.0 | 2.2 | 24 | 4.5 | 8.5 | 7.4 |
| 22 | 36 | 4.4 | 1.5 | 51 | | | 2.1 | 2.4 | 30 | 17.0 | 33 | 7.6 |
| 23 | 6.5 | 4.2 | 1.5 | 33 | | | 4.3 | 2.3 | 12.9 | 7.2 | 27 | 12.9 |
| 24 | 5.6 | 3.8 | 2.8 | 60 | | | 4.1 | 2.2 | 6.1 | 5.9 | 11.9 | 5.4 |
| 25 | 4.8 | 3.9 | 56 | 23 | | | 2.3 | 2.2 | 4.2 | 4.2 | 6.8 | 4.4 |
| 26 | 10.6 | 3.1 | 104 | 9.9 | | | 2.1 | 2.2 | 14.0 | 44 | 9.8 | 3.7 |
| 27 | 11.4 | 4.8 | 13.8 | 8.5 | | | 2.1 | 4.5 | 23 | 30 | 5.7 | 5.9 |
| 28 | 9.2 | 3.6 | 7.1 | 5.7 | | | 2.1 | 3.0 | 18.7 | 11.4 | 5.6 | 5.4 |
| 29 | 4.6 | 2.6 | 5.9 | 6.1 | | | 21 | ------- | 18.9 | 13.7 | 5.1 | 4.9 |
| 30 | 8.8 | 2.5 | 3.5 | 23 | | | 13.3 | ------- | 29 | 10.9 | 8.7 | 13.1 |
| 31 | 4.8 | 3.0 | ------- | 14.3 | ------- | | 3.2 | ------- | 6.6 | ------- | 14.2 | ------- |

NOTE.—Braced figures give mean discharge for the periods indicated, estimated by comparison with record of Halawa Stream because recorder was not operating properly.

*Monthly discharge of Papalaua Stream near Wailau, Molokai, for the year ending, June 30, 1925*

| Month | Discharge | | | | Total run-off | |
|---|---|---|---|---|---|---|
| | Million gallons a day | | | Second-feet (mean) | Million gallons | Acre-feet |
| | Maximum | Minimum | Mean | | | |
| July | 110 | 2.6 | 11.4 | 17.6 | 355 | 1,090 |
| August | 14.5 | 2.5 | 7.10 | 11.0 | 220 | 675 |
| September | 104 | 1.3 | 7.81 | 12.1 | 234 | 719 |
| October | 60 | 2.9 | 14.9 | 23.1 | 461 | 1,420 |
| November | ---------- | ---------- | 13.0 | 20.1 | 390 | 1,200 |
| December | ---------- | ---------- | 8.50 | 13.2 | 264 | 809 |
| January | ---------- | ---------- | 5.10 | 7.89 | 158 | 485 |
| February | 104 | 2.0 | 13.5 | 20.9 | 379 | 1,160 |
| March | 30 | 2.1 | 9.75 | 15.1 | 302 | 928 |
| April | 44 | 4.2 | 13.9 | 21.5 | 416 | 1,280 |
| May | 44 | 3.5 | 11.7 | 18.1 | 363 | 1,110 |
| June | 55 | 3.7 | 14.2 | 22.0 | 425 | 1,300 |
| The year | 110 | ---------- | 10.9 | 16.9 | 3,970 | 12,200 |

### 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, 1925.

GAGE.—Stevens continuous water-stage recorder.

DISCHARGE MEASUREMENTS.—Made by wading or from footbridge at station.

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

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, about 270 million gallons a day, or 418 second-feet, at 2 a. m. December 12 (gage height, 4.67 feet); minimum discharge, 1.9 million gallons a day, or 2.9 second-feet, several hours September 19 (gage height, 1.13 feet).

1919–1925: Maximum discharge recorded, about 710 million gallons a day, or 1,100 second-feet, at 1.15 p. m. March 31, 1923 (gage height, 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.—None.

REGULATIONS.—None.

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

UTILIZATION.—Small amount being used for irrigation of taro. Most of flow wastes into sea.

ACCURACY.—Stage-discharge relation changed at time of flood July 21. Two rating curves used well defined between 2 and 80 million gallons a day and fairly well defined between 80 and 180 million gallons a day; extension uncertain below 2 and above 180 million gallons a day. Operation of water-stage recorder satisfactory except during parts of February, March, and April. 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; extreme low-stage records and high-stage records are only fair.

*Discharge measurements of Waiakeakua Stream near Wailau, Molokai, during the year ending June 30, 1925*

| Date | Gage height (feet) | Discharge | | Date | Gage height (feet) | Discharge | |
|---|---|---|---|---|---|---|---|
| | | Second-feet | Million gallons a day | | | Second-feet | Million gallons a day |
| July 11 | 1.26 | 5.65 | 3.65 | Mar. 13 | 1.28 | 4.93 | 3.19 |
| Oct. 19 | 1.40 | 7.72 | 4.99 | June 3 | 2.30 | 48.9 | 31.6 |
| Dec. 5 | 1.40 | 7.59 | 4.91 | | | | |

*Discharge, in million gallons a day, of Waiakeakua Stream near Wailau, Molokai, for the year ending June 30, 1929*

| Day | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 6.5 | 5.7 | 3.2 | 4.6 | 6.8 | 7.4 | 6.3 | 3.3 | | 10.9 | 10.8 | 5.4 |
| 2 | 4.0 | 8.6 | 3.2 | 4.3 | 5.9 | 9.4 | 4.4 | 3.2 | | 8.0 | 12.1 | 5.2 |
| 3 | 3.6 | 6.1 | 2.9 | 4.2 | 5.4 | 7.0 | 4.2 | 2.9 | | 8.8 | 8.6 | 19.2 |
| 4 | 3.5 | 8.5 | 2.8 | 4.4 | 4.9 | 5.5 | 3.9 | 2.8 | | 9.5 | 6.6 | 10.0 |
| 5 | 3.4 | 6.1 | 2.7 | 6.4 | 4.4 | 5.0 | 4.0 | 2.7 | | | 5.9 | 11.7 |
| 6 | 3.3 | 4.9 | 2.7 | 4.3 | 4.2 | 4.7 | 3.6 | 2.7 | 4.7 | | 5.5 | 11.0 |
| 7 | 3.3 | 4.4 | 3.2 | 3.7 | 4.0 | 4.7 | 3.6 | 3.1 | | | 4.9 | 13.9 |
| 8 | 3.6 | 6.8 | 2.6 | 3.6 | 3.7 | 4.6 | 3.9 | 3.2 | | | 5.3 | 10.2 |
| 9 | 4.0 | 9.1 | 2.4 | 4.0 | 5.5 | 4.4 | 4.2 | 9.7 | | | 5.7 | 14.7 |
| 10 | 3.9 | 8.6 | 2.2 | 4.6 | 3.5 | 4.0 | 5.4 | 28 | | | 14.0 | 9.5 |
| 11 | 4.1 | 7.9 | 2.3 | 4.4 | 3.3 | 3.9 | 5.4 | 17.6 | | | 6.4 | 7.4 |
| 12 | 3.6 | 5.5 | 2.2 | 4.9 | 8.6 | 42 | 8.0 | 12.4 | | | 5.5 | 22 |
| 13 | 3.4 | 5.0 | 2.3 | 6.1 | 5.2 | 9.0 | 5.2 | 24 | 3.4 | 13 | 5.9 | 9.0 |
| 14 | 3.3 | 6.0 | 2.2 | 4.2 | 5.0 | 6.8 | 4.2 | 14.2 | 3.0 | | 5.0 | 12.4 |
| 15 | 4.1 | 4.9 | 2.1 | 4.6 | 3.6 | 6.6 | 3.7 | 10.5 | 2.8 | | 4.6 | 17.4 |
| 16 | 11.0 | 6.3 | 2.1 | 14.1 | 3.4 | 5.9 | 3.5 | 7.0 | 2.8 | | 4.3 | 9.0 |
| 17 | 7.1 | 11.5 | 2.0 | 7.6 | 3.6 | 7.1 | 3.4 | 5.7 | 3.3 | | 8.1 | 8.8 |
| 18 | 5.6 | 8.2 | 2.0 | 5.7 | 3.2 | 9.6 | 3.3 | 5.0 | 3.0 | | 14.5 | 7.4 |
| 19 | 6.1 | 5.4 | 2.0 | 4.7 | 3.0 | 5.7 | 3.4 | 4.4 | 3.5 | | 7.8 | 18.5 |
| 20 | 8.7 | 5.2 | 2.0 | 7.0 | 40 | 14.4 | 4.3 | 4.2 | 8.2 | | 6.3 | 8.2 |
| 21 | 56 | 5.5 | 2.6 | 7.6 | 78 | 14.4 | 3.4 | 3.9 | 10.2 | | 5.9 | 7.0 |
| 22 | 24 | 4.7 | 2.0 | 15.3 | 13.9 | 7.0 | 3.3 | 3.9 | 9.8 | | 12.4 | 7.0 |
| 23 | 10.2 | 4.3 | 2.0 | 18.2 | 8.8 | 6.1 | 4.2 | 3.6 | 6.1 | 5.4 | 15.8 | 8.2 |
| 24 | 8.0 | 3.9 | 2.4 | 30 | 7.0 | 5.5 | 3.6 | | 4.7 | 5.0 | 8.8 | 5.7 |
| 25 | 6.8 | 3.6 | 20 | 20 | 6.4 | 5.0 | 3.2 | | 4.3 | 4.6 | 6.6 | 5.2 |
| 26 | 6.4 | 3.7 | 50 | 11.0 | 5.4 | 4.7 | 3.0 | 3.9 | 10.5 | 14.5 | 6.6 | 5.0 |
| 27 | 6.4 | 3.7 | 13.8 | 8.4 | 4.9 | 4.6 | 3.0 | | 16.2 | 11.8 | 5.5 | 6.4 |
| 28 | 5.9 | 3.5 | 7.4 | 7.2 | 9.6 | 4.4 | 3.0 | | 12.0 | 7.8 | 5.2 | 4.7 |
| 29 | 5.0 | 3.3 | 6.3 | 7.0 | 8.9 | 4.3 | 5.5 | ------- | 19.5 | 9.8 | 5.2 | 4.3 |
| 30 | 7.8 | 3.4 | 4.9 | 15.8 | 7.2 | 4.2 | 7.8 | ------- | 15.2 | 7.6 | 5.4 | 5.9 |
| 31 | 5.4 | 3.4 | ------- | 9.8 | ------- | 4.3 | 3.5 | ------- | 8.4 | ------- | 8.9 | ------- |

NOTE.—Braced figures give mean daily discharge for periods indicated, estimated by comparison with records of Pulena and Papulaua Streams near Wailau, Molokai; gage-height record either faulty or missing for these periods.

*Monthly discharge of Waiakeakua Stream near Wailau, Molokai, for the year ending June 30, 1925*

| Month | Discharge | | | | Total run-off | |
|---|---|---|---|---|---|---|
| | Million gallons a day | | | Second-feet (mean) | Million gallons | Acre-feet |
| | Maximum | Minimum | Mean | | | |
| July | 56 | 3.3 | 7.68 | 11.9 | 238 | 730 |
| August | 11.5 | 3.3 | 5.73 | 8.87 | 178 | 545 |
| September | 50 | 2.0 | 5.35 | 8.28 | 160 | 493 |
| October | 30 | 3.6 | 8.31 | 12.9 | 258 | 791 |
| November | 78 | 3.0 | 9.24 | 14.3 | 277 | 851 |
| December | 42 | 3.9 | 7.49 | 11.6 | 232 | 713 |
| January | 8.0 | 3.0 | 4.24 | 6.56 | 131 | 403 |
| February | 28 | ---------- | 7.05 | 10.9 | 198 | 606 |
| March | 19.5 | ---------- | 6.56 | 10.1 | 203 | 624 |
| April | ---------- | ---------- | 11.3 | 17.5 | 338 | 1,040 |
| May | 15.8 | 4.3 | 7.55 | 11.7 | 234 | 718 |
| June | 22 | 4.3 | 9.68 | 15.0 | 290 | 891 |
| The year | 78 | ---------- | 7.50 | 11.6 | 2,740 | 8,400 |

**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, 1925.

GAGE.—Stevens continuous water-stage recorder.

DISCHARGE MEASUREMENTS.—Made by wading or from footbridge near station.

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

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, about 790 million gallons a day, or 1,220 second-feet, at 3.30 a. m. December 12 (gage height, 7.00 feet); minimum discharge, 5.0 million gallons a day, or 7.7 second-feet, from 3 p. m. February 6 to 5 a. m. February 7 (gage height, 0.83 foot).

1919–1925: Maximum discharge recorded, about 1,400 million gallons a a day, or 2,170 second-feet, about noon December 24, 1920 (gage height, 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).

DIVERSION.—None.

REGULATION.—None.

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

UTILIZATION.—Small amount of flow used for irrigation of taro. Most of flow wastes into sea.

ACCURACY.—Stage-discharge relation changed at time of flood December 12. Two rating curves used fairly well defined between 4 and 20 million gallons a day and poorly defined between 20 and 100 million gallons a day; extensions below 4 and above 100 million gallons a day uncertain. 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 ordinary stages; high-stage records poor.

*Discharge measurements of Pulena Stream near Wailau, Molokai, during the year ending June 30, 1925*

| Date | Gage height (feet) | Discharge | | Date | Gage height (feet) | Discharge | |
|---|---|---|---|---|---|---|---|
| | | Second-feet | Million gallons a day | | | Second-feet | Million gallons a day |
| July 11 | 0.93 | 14.0 | 9.05 | Apr. 23 | 1.17 | 20.8 | 13.4 |
| Oct. 19 | 1.06 | 19.0 | 12.3 | June 3 | 2.38 | 117 | 75.6 |
| Mar. 12 | .87 | 7.94 | 5.13 | | | | |

*Discharge, in million gallons a day, of Pulena Stream near Wailau, Molokai, for the year ending June 30, 1925*

| Day | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 13.8 | 15.6 | 9.9 | 11.9 | 16.4 | 25 | 19.1 | 5.6 | 6.6 | 37 | 36 | 10.9 |
| 2 | 9.1 | 23 | 9.9 | 10.7 | 13.8 | 24 | 12.8 | 5.5 | 6.8 | 25 | 30 | 12.2 |
| 3 | 8.0 | 16.8 | 9.1 | 10.7 | 12.9 | 21 | 9.2 | 5.3 | 11.1 | 30 | 19.7 | 45 |
| 4 | 7.8 | 19.8 | 8.5 | 12.0 | 12.2 | 15.6 | 9.0 | 5.3 | 15.9 | 25 | 14.5 | 25 |
| 5 | 8.0 | 15.3 | 8.5 | 21 | 11.6 | 13.9 | 9.0 | 5.1 | 7.7 | 39 | 12.5 | 33 |
| 6 | 7.6 | 12.6 | 9.1 | 11.0 | 11.3 | 12.9 | 7.5 | 5.1 | 6.6 | 54 | 11.2 | 26 |
| 7 | 8.8 | 11.3 | 12.4 | 9.9 | 11.0 | 12.9 | 7.5 | 5.8 | 6.1 | 104 | 10.1 | 34 |
| 8 | 12.3 | 12.2 | 8.5 | 9.6 | 10.7 | 12.2 | 14.1 | 6.6 | 6.6 | 41 | 13.6 | 24 |
| 9 | 10.2 | 30 | 8.0 | 9.6 | 13.9 | 11.6 | 17.3 | 18.0 | 5.9 | 30 | 13.9 | 28 |
| 10 | 12.2 | 23 | 7.6 | 11.6 | 10.7 | 11.0 | 29 | 40 | 5.8 | 38 | 28 | 20 |
| 11 | 10.3 | 25 | 7.6 | 11.6 | 10.2 | 10.4 | 13.8 | 16.9 | 7.7 | 34 | 13.8 | 14.9 |
| 12 | 10.4 | 16.0 | 7.1 | 10.7 | 11.7 | 160 | 23 | 17.3 | 6.6 | 25 | 10.9 | 47 |
| 13 | 13.6 | 16.4 | 7.6 | 13.6 | 10.9 | 32 | 17.2 | 52 | 8.2 | 22 | 10.6 | 21 |
| 14 | 8.5 | 16.2 | 7.3 | 10.2 | 11.4 | 18.8 | 12.2 | 34 | 5.8 | 15.6 | 9.8 | 34 |
| 15 | 16.4 | 14.9 | 7.1 | 12.6 | 9.4 | 20 | 9.8 | 25 | 5.6 | 18.9 | 8.7 | 54 |

*Discharge, in million gallons a day, of Pulena Stream near Wailau, Molokai, for the year ending June 30, 1925*—Continued

| Day | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 16 | 26 | 38 | 7.1 | 56 | 9.1 | 26 | 8.7 | 15.3 | 5.3 | 22 | 8.2 | 25 |
| 17 | 19.3 | 40 | 7.3 | 24 | 9.6 | 51 | 7.9 | 11.9 | 5.5 | 75 | 18.3 | 23 |
| 18 | 18.8 | 23 | 6.9 | 15.3 | 8.8 | 64 | 7.5 | 10.1 | 5.6 | 44 | 24 | 19.8 |
| 19 | 21 | 16.8 | 6.7 | 12.9 | 8.5 | 24 | 7.5 | 9.0 | 6.3 | 25 | 13.2 | 45 |
| 20 | 27 | 18.0 | 7.1 | 15.4 | 89 | 75 | 9.0 | 7.9 | 24 | 20 | 10.4 | 20 |
| 21 | 167 | 18.4 | 10.0 | 17.6 | 224 | 104 | 7.0 | 7.5 | 34 | 15.3 | 10.1 | 15.3 |
| 22 | 80 | 13.5 | 7.1 | 26 | 55 | 32 | 6.6 | 8.5 | 30 | 14.9 | 19.6 | 13.5 |
| 23 | 31 | 12.6 | 6.9 | 36 | 27 | 22 | 8.2 | 7.0 | 16.0 | 13.2 | 22 | 12.5 |
| 24 | 25 | 12.2 | 9.5 | 81 | 21 | 16.8 | 7.2 | 6.6 | 10.9 | 11.9 | 14.5 | 10.4 |
| 25 | 18.4 | 11.9 | 43 | 94 | 22 | 14.2 | 6.3 | 6.3 | 10.4 | 10.4 | 10.9 | 9.5 |
| 26 | 15.6 | 13.2 | 125 | 34 | 16.4 | 12.5 | 6.1 | 6.3 | 43 | 22 | 10.9 | 11.3 |
| 27 | 14.2 | 15.3 | 46 | 24 | 14.5 | 11.2 | 5.8 | 9.6 | 86 | 18.5 | 9.8 | 22 |
| 28 | 13.2 | 11.6 | 22 | 17.5 | 19.1 | 10.4 | 5.8 | 6.6 | 60 | 13.8 | 10.4 | 11.2 |
| 29 | 12.6 | 10.7 | 17.1 | 17.5 | 23 | 9.5 | 7.9 | ------- | 82 | 35 | 9.8 | 9.5 |
| 30 | 24 | 9.9 | 13.2 | 36 | 30 | 9.0 | 9.4 | ------- | 59 | 21 | 10.6 | 15.6 |
| 31 | 14.2 | 10.2 | ------- | 24 | ------- | 8.7 | 6.1 | ------- | 27 | ------- | 14.2 | ------- |

*Monthly discharge of Pulena Stream near Wailau, Molokai, for the year ending June 30, 1925*

| Month | Discharge | | | | Total run-off | |
|---|---|---|---|---|---|---|
| | Million gallons a day | | | Second-feet (mean) | Million gallons | Acre-feet |
| | Maximum | Minimum | Mean | | | |
| July | 167 | 7.6 | 22.1 | 34.2 | 684 | 2,100 |
| August | 40 | 9.9 | 17.5 | 27.1 | 543 | 1,670 |
| September | 125 | 6.7 | 15.4 | 23.8 | 463 | 1,420 |
| October | 94 | 9.6 | 22.8 | 35.3 | 708 | 2,170 |
| November | 224 | 8.5 | 25.2 | 39.0 | 755 | 2,320 |
| December | 160 | 8.7 | 28.8 | 44.6 | 892 | 2,740 |
| January | 29 | 5.8 | 10.6 | 16.4 | 328 | 1,010 |
| February | 52 | 5.1 | 12.9 | 20.0 | 360 | 1,110 |
| March | 86 | 5.3 | 19.9 | 30.8 | 618 | 1,900 |
| April | 104 | 10.4 | 30.0 | 46.4 | 900 | 2,760 |
| May | 36 | 8.2 | 14.8 | 22.9 | 460 | 1,410 |
| June | 54 | 9.5 | 23.1 | 35.7 | 693 | 2,130 |
| The year | 224 | 5.1 | 20.3 | 31.4 | 7,400 | 22,700 |

### 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, 1925.

GAGE.—Stevens continuous water-stage recorder.

DISCHARGE MEASUREMENTS.—Made by wading or from suspension footbridge 1,000 feet below station.

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

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 321 million gallons a day, or 497 second-feet, at 4 a. m. December 12 (gage height, 7.12 feet); minimum discharge, 2.2 million gallons a day, or 3.4 second-feet, from 2 p. m. September 19 to 1 a. m. September 20 (gage height, 2.76 feet).

1919–1925: Maximum discharge recorded, about 1,020 million gallons a day, or 1,580 second-feet, at 10.20 a. m. December 24, 1920 (gage height, 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.—None.

REGULATION.—None.

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

UTILIZATION.—Small amount of water used for irrigation of taro. Most of flow wastes into sea.

ACCURACY.—Stage-discharge relation changed during flood of December 12. Rating curves well defined between 2 and 20 million gallons a day and poorly defined above. 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 estimated periods; high-stage records fair.

*Discharge measurements of Pelekunu Stream near Pelekunu, Molokai, during the year ending June 30, 1925*

| Date | Gage height (feet) | Discharge | | Date | Gage height (feet) | Discharge | |
|---|---|---|---|---|---|---|---|
| | | Second-feet | Million gallons a day | | | Second-feet | Million gallons a day |
| July 12 | 2.90 | 5.76 | 3.72 | Apr. 22 | 3.15 | 16.3 | 10.5 |
| Dec. 8 | 2.98 | 7.58 | 4.90 | June 4 | 3.70 | 35.2 | 22.8 |
| Mar. 10 | 2.74 | 5.12 | 3.31 | | | | |

*Discharge, in million gallons a day, of Pelekunu Stream near Pelekunu, Molokai, for the year ending June 30, 1925*

| Day | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 4.6 | 5.2 | 3.6 | | 7.2 | 11.1 | 16.4 | 3.7 | 3.6 | | 20 | 7.5 |
| 2 | 3.2 | 7.6 | 3.4 | | 6.1 | 8.8 | 12.6 | 3.6 | 3.7 | | 16.3 | 8.9 |
| 3 | 3.0 | 5.4 | 3.1 | | 5.4 | 7.7 | 7.2 | 3.4 | 6.9 | | 11.2 | 25 |
| 4 | 2.8 | 6.4 | 3.1 | | 4.9 | 6.3 | 6.8 | 3.4 | 8.4 | | 9.0 | 18.2 |
| 5 | 2.8 | 5.1 | 3.0 | | 4.5 | 5.7 | 7.0 | 3.3 | 4.0 | | 7.9 | 19.0 |
| 6 | 2.7 | 4.2 | 3.3 | | 4.4 | 5.4 | 5.5 | 3.3 | 3.4 | | 7.0 | 16.0 |
| 7 | 3.1 | 3.8 | 4.9 | | 4.1 | 5.1 | 5.5 | 3.4 | 3.3 | | 6.2 | 15.2 |
| 8 | 5.2 | 3.8 | 3.2 | 3.5 | 4.2 | 4.9 | 13.5 | 3.8 | 3.6 | | 10.2 | 13.2 |
| 9 | 3.6 | 8.2 | 3.0 | | 4.5 | 4.6 | 25 | 6.9 | 3.3 | | 9.7 | 14.9 |
| 10 | 4.7 | 4.8 | 2.7 | | 3.9 | 4.5 | 30 | 12.8 | 3.1 | | 14.9 | 11.9 |
| 11 | 3.7 | 5.9 | 2.6 | | 3.8 | 4.5 | 16.3 | 5.2 | 3.6 | 18 | 7.9 | 9.2 |
| 12 | 4.7 | 4.1 | 2.6 | | 6.9 | 80 | 22 | 14.8 | 3.9 | | 6.6 | 21 |
| 13 | 5.6 | 3.8 | 2.6 | | 4.4 | 23 | 18.8 | 32 | 5.7 | | 6.6 | 11.6 |
| 14 | 3.4 | 4.2 | 2.7 | | 4.1 | 15.2 | 13.8 | 19.5 | 3.3 | | 5.9 | 21 |
| 15 | 9.2 | 4.4 | 2.6 | | 3.7 | 16.6 | 10.9 | 15.5 | 3.2 | | 5.5 | |
| 16 | 10.1 | 19.4 | 2.4 | 14 | 3.7 | 27 | 9.0 | 10.2 | 3.0 | | 5.3 | |
| 17 | 6.5 | 15.4 | 2.5 | | 3.7 | 40 | 7.9 | 8.1 | 3.2 | | 13.4 | |
| 18 | 6.7 | 7.4 | 2.4 | 5.2 | 3.4 | 44 | 7.0 | 6.6 | 3.2 | | 11.9 | |
| 19 | 5.8 | 5.6 | 2.3 | 4.6 | 3.3 | 22 | 6.4 | 5.9 | 3.7 | | 6.8 | |
| 20 | 9.0 | 5.7 | 2.4 | 9.7 | 75 | 48 | 6.8 | 5.3 | 16.4 | | 5.5 | |
| 21 | 58 | 5.7 | 3.6 | 8.4 | 150 | 68 | 5.7 | 4.8 | 19.5 | | 5.3 | |
| 22 | 19.6 | 4.4 | 2.5 | 12.4 | 42 | 26 | 5.2 | 7.8 | | 10.6 | 8.1 | 16 |
| 23 | 9.7 | 4.1 | 2.4 | 14.3 | 18.9 | 18.5 | 5.9 | 4.8 | 10 | 9.4 | 8.1 | |
| 24 | 8.8 | 4.2 | 3.9 | 36 | 13.5 | 14.6 | 5.2 | 4.4 | | 8.1 | 5.9 | |
| 25 | 6.5 | 4.1 | | 39 | 12.1 | 12.2 | 4.7 | 4.0 | | 7.0 | 5.2 | |
| 26 | 5.4 | 4.4 | | 16.9 | 9.0 | 10.2 | 4.4 | 3.8 | | 9.2 | 5.2 | |
| 27 | 4.8 | 5.2 | 19 | 11.4 | 7.2 | 9.0 | 4.2 | 3.8 | 25 | 14.7 | 5.0 | |
| 28 | 4.4 | 4.1 | | 8.1 | 13.8 | 8.1 | 4.1 | 3.6 | | 9.2 | 5.9 | |
| 29 | 4.4 | 4.2 | | 7.7 | 13.2 | 7.4 | 5.0 | ------- | | 25 | 5.7 | |
| 30 | 6.1 | 3.8 | | 15.7 | 12.4 | 6.8 | 5.2 | ------- | | 16.0 | 5.7 | |
| 31 | 4.6 | 3.7 | ------- | 10.4 | ------- | 6.4 | 4.0 | ------- | | ------- | 7.8 | ------- |

NOTE.—Braced figures give mean discharge for periods indicated; estimated by comparison with record of flow of Lanipuni Stream when recorder was not operating properly.

*Monthly discharge of Pelekunu Stream near Pelekunu, Molokai, for the year ending June 30, 1925*

| Month | Discharge | | | | Total run-off | |
|---|---|---|---|---|---|---|
| | Million gallons a day | | | Second-feet (mean) | Million gallons | Acre-feet |
| | Maximum | Minimum | Mean | | | |
| July | 58 | 2.7 | 7.51 | 11.6 | 233 | 714 |
| August | 19.4 | 3.7 | 5.75 | 8.90 | 178 | 547 |
| September | | 2.3 | 6.16 | 9.53 | 185 | 567 |
| October | 39 | | 9.38 | 14.5 | 291 | 892 |
| November | 150 | 3.3 | 15.1 | 23.4 | 453 | 1,390 |
| December | 80 | 4.5 | 18.4 | 28.5 | 572 | 1,750 |
| January | 30 | 4.0 | 9.74 | 15.1 | 302 | 927 |
| February | 32 | 3.3 | 7.42 | 11.5 | 208 | 637 |
| March | | 3.0 | 10.2 | 15.8 | 317 | 973 |
| April | | 7.0 | 16.2 | 25.1 | 487 | 1,500 |
| May | 20 | 5.0 | 8.25 | 12.8 | 256 | 785 |
| June | | | 15.6 | 24.1 | 469 | 1,440 |
| The year | 150 | 2.3 | 10.8 | 16.7 | 3,950 | 12,100 |

### 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, 1925.

GAGE.—Stevens continuous water-stage recorder.

DISCHARGE MEASUREMENTS.—Made by wading or from suspension footbridge 200 feet below gage.

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

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 312 million gallons a day, or 483 second-feet, about midnight November 20 (gage height, 3.02 feet); minimum discharge, 2.6 million gallons a day, or 4.0 second-feet, from 7 to 11 a. m. September 23 (gage height, 0.60 foot).

1919–1926: Maximum discharge recorded, about 1,250 million gallons a day, or 1,930 second-feet, at 10 a. m. December 24, 1920 (gage height, 5.90 feet); minimum discharge, 1.9 million gallons a day, or 2.9 second-feet, at 3.30 p. m. July 13, 1920 (gage height, 0.68 foot), and at 3 p. m. November 18, 1921 (gage height, 0.12 foot).

DIVERSIONS.—None.

REGULATION.—None.

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

UTILIZATION.—Small amount of water used for irrigation of taro. Most of flow wastes into sea.

ACCURACY.—Stage-discharge relation changed November 21, December 12, and June 15. The three rating curves used are fairly well defined below 50 million gallons a day and poorly defined above. 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 measurements of Lanipuni Stream near Pelekunu, Molokai, during the year ending June 30, 1925*

| Date | Gage height (feet) | Discharge | | Date | Gage height (feet) | Discharge | |
|---|---|---|---|---|---|---|---|
| | | Second-feet | Million gallons a day | | | Second-feet | Million gallons a day |
| July 12 | 0.70 | 6.13 | 3.96 | Mar. 10 | 0.64 | 4.34 | 2.81 |
| Dec. 8 | .72 | 7.31 | 4.72 | June 4 | 1.26 | 28.8 | 18.6 |

*Discharge, in million gallons a day, of Lanipuni Stream near Pelekunu, Molokai, for the year ending June 30, 1925*

| Day | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 5.0 | | 3.8 | 3.8 | | | 8.6 | 3.2 | 3.6 | 14.3 | 16.5 | 6.0 |
| 2 | 3.8 | | 3.8 | 3.6 | | | 6.8 | 3.2 | 3.3 | 10.5 | 9.7 | 6.4 |
| 3 | 3.4 | | 3.6 | 3.4 | | | 4.7 | 3.1 | 6.4 | 11.5 | 6.6 | 22 |
| 4 | 3.6 | | 3.4 | 3.8 | | | 4.6 | 3.2 | 5.6 | 9.3 | 5.5 | 14.3 |
| 5 | 3.4 | | 3.3 | 5.4 | | 6.5 | 4.7 | 3.2 | 3.8 | 16.8 | 5.2 | 12.4 |
| 6 | 3.3 | | 3.6 | 3.6 | | | 4.1 | 3.2 | 3.3 | 21 | 4.8 | 9.4 |
| 7 | 3.9 | | 4.3 | 3.3 | | | 4.4 | 3.3 | 3.3 | 44 | 4.4 | 10.4 |
| 8 | 6.7 | | 3.3 | 3.2 | | 4.8 | 7.7 | 3.7 | 3.7 | 11.9 | 5.2 | 4.8 |
| 9 | 4.2 | | 3.2 | 3.1 | | 4.5 | 9.0 | 9.9 | 3.3 | 9.7 | 6.2 | 9.7 |
| 10 | 4.6 | | 3.1 | 3.3 | 4.7 | 4.4 | 17.9 | 18.1 | 3.2 | 15.1 | 11.7 | 8.0 |
| 11 | 4.0 | | 3.1 | 3.2 | | 4.3 | 7.2 | 5.3 | 3.4 | 13.9 | 6.1 | 6.1 |
| 12 | | | 3.1 | 3.4 | | 44 | 13.4 | 19.9 | 3.4 | 10.3 | 5.0 | 12.9 |
| 13 | | | 3.1 | 3.4 | | 7.0 | 14.3 | 29 | 3.6 | 10.3 | 5.0 | 7.4 |
| 14 | | | 3.2 | 3.2 | | 5.3 | 7.4 | 12.5 | 3.2 | 7.0 | 4.7 | 24 |
| 15 | | | 3.1 | 3.6 | | 5.0 | 5.7 | 12.2 | 3.1 | 9.1 | 4.4 | 31 |
| 16 | 6.0 | 5.5 | 3.0 | 24 | | 4.7 | 5.0 | 6.4 | 3.0 | 10.8 | 4.2 | 12.0 |
| 17 | | | 3.1 | 6.6 | | 4.6 | 4.6 | 5.3 | 3.1 | 41 | 9.2 | 10.4 |
| 18 | | | 2.8 | 4.8 | | 8.3 | 4.2 | 4.8 | 4.0 | 18.5 | 12.5 | 10.8 |
| 19 | | | 2.8 | 4.2 | | 4.7 | 4.2 | 4.6 | 4.0 | 10.3 | 6.2 | 30 |
| 20 | | | 3.0 | 11.3 | | 11.4 | 4.7 | 4.1 | 11.3 | 8.2 | 5.0 | 11.4 |
| 21 | | | 3.7 | 7.2 | | 13.7 | 4.1 | 4.1 | 17.4 | 6.4 | 5.0 | 9.2 |
| 22 | | | 2.8 | 15.7 | | 6.1 | 3.8 | 4.2 | 13.7 | 6.2 | 11.2 | 8.3 |
| 23 | | | 2.7 | 16.1 | | 5.2 | 4.2 | 3.8 | 6.6 | 5.5 | 8.5 | 8.1 |
| 24 | | | 4.0 | 43 | 32 | 4.7 | 4.0 | 3.7 | 5.0 | 5.3 | 5.9 | 7.3 |
| 25 | 11 | | 11.8 | 23 | | 4.6 | 3.7 | 3.6 | 4.7 | 4.8 | 5.0 | 6.9 |
| 26 | | | 50 | 10.0 | | 4.2 | 3.6 | 3.6 | 11.9 | 6.2 | 5.0 | 8.6 |
| 27 | | | 11.4 | 6.8 | | 4.2 | 3.4 | 3.4 | 38 | 7.2 | 5.0 | 17.4 |
| 28 | | | 6.9 | 5.2 | | 4.1 | 3.7 | 3.3 | 17.1 | 5.9 | 5.2 | 8.1 |
| 29 | | | 5.0 | 4.7 | 11 | 4.0 | 4.0 | ------- | 28 | 14.9 | 5.0 | 7.1 |
| 30 | 5.0 | 4.1 | 4.2 | 9.1 | | 3.8 | 3.7 | ------- | 27 | 8.8 | 5.2 | 10.2 |
| 31 | | 4.0 | ------- | 6.2 | ------- | 4.0 | 3.3 | ------- | 9.4 | ------- | 5.9 | ------- |

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

*Monthly discharge of Lanipuni Stream near Pelekunu, Molokai, for the year ending June 30, 1925*

| Month | Discharge | | | | Total run-off | |
|---|---|---|---|---|---|---|
| | Million gallons a day | | | Second-feet (mean) | Million gallons | Acre-feet |
| | Maximum | Minimum | Mean | | | |
| July | ---------- | ---------- | 6.90 | 10.7 | 214 | 656 |
| August | ---------- | ---------- | 5.41 | 8.37 | 168 | 514 |
| September | 50 | 2.7 | 5.61 | 8.68 | 168 | 516 |
| October | 43 | 3.1 | 8.10 | 12.5 | 251 | 770 |
| November | ---------- | ---------- | 12.6 | 19.5 | 378 | 1,160 |
| December | 44 | ---------- | 7.00 | 10.8 | 217 | 666 |
| January | 17.9 | 3.3 | 5.96 | 9.22 | 185 | 567 |
| February | 29 | 3.1 | 6.71 | 10.4 | 188 | 577 |
| March | 38 | 3.0 | 8.40 | 13.0 | 260 | 799 |
| April | 44 | 4.8 | 12.5 | 19.3 | 375 | 1,150 |
| May | 16.5 | 4.2 | 6.61 | 10.2 | 205 | 629 |
| June | 31 | 4.8 | 11.7 | 18.1 | 351 | 1,080 |
| The year | ---------- | ---------- | 8.11 | 12.5 | 2,960 | 9,080 |

### 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, 1925.

GAGE.—Stevens continuous water-stage recorder.

DISCHARGE MEASUREMENTS.—Made by wading.

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 and is permanent, except for slight changes caused by flood damage and subsequent repairs.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 391 million gallons a day, or 605 second-feet, at 4.30 a. m. December 12 (gage height, 7.11 feet); minimum discharge, 4.1 million gallons a day, or 6.3 second-feet, frequently February 21 to March 6 (gage height, 4.21 feet).

1919–1925: Maximum discharge recorded, about 1,270 million gallons a day, or 1,960 second-feet, at 10.30 a. m. December 24, 1920 (gage height, 10.20 feet); minimum discharge, 2.8 million gallons a day, or 4.3 second-feet, from 6 to 8 a. m. September 26, 1921 (gage height, 3.92 feet).

DIVERSIONS.—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.

REGULATION.—By diversion only.

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

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

ACCURACY.—Stage-discharge relation permanent. Rating curve poorly defined. 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 for estimated periods, for which they are poor.

*Discharge measurements of Waikolu Stream at pipe-line crossing near Kalaupapa, Molokai, during the year ending June 30, 1925*

| Date | Gage height (feet) | Discharge | |
|---|---|---|---|
| | | Second-feet | Million gallons a day |
| Aug. 28 | 4.28 | 10.9 | 7.40 |
| Oct. 17 | 4.30 | 9.66 | 6.24 |
| Apr. 21 | 4.30 | 9.63 | 6.22 |

*Discharge, in million gallons a day, of Waikolu Stream at pipe-line crossing near Kalaupapa, Molokai, for the year ending June 30, 1925*

| Day | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | 5.9 | 5.3 | 5.3 | 5.6 | | 8.4 | 5.0 | 4.4 | 18.8 | 16.0 | 7.2 |
| 2 | | 9.7 | 5.3 | 5.0 | 5.3 | | 10.9 | 5.0 | 4.4 | 11.4 | 11.9 | 10.1 |
| 3 | | 7.2 | 5.0 | 5.0 | 5.0 | | 6.2 | 4.7 | 4.7 | 10.5 | 7.6 | 18.6 |
| 4 | | 6.8 | 5.0 | 5.0 | 5.0 | | 5.6 | 4.7 | 5.6 | 7.2 | 6.8 | 13.4 |
| 5 | | 7.2 | 4.7 | 5.0 | 5.0 | 8.0 | 5.6 | 4.7 | 4.7 | 10.9 | 6.8 | 11.9 |
| 6 | | 5.9 | 5.0 | 5.0 | 5.0 | | 5.6 | 4.7 | 4.7 | 26 | 6.5 | 11.4 |
| 7 | 5.0 | 5.6 | 5.0 | 5.0 | 5.0 | | 5.3 | 4.7 | 5.0 | 38 | 6.2 | 9.3 |
| 8 | | 5.6 | 5.3 | 5.0 | 5.0 | 6.5 | 11.2 | 4.7 | 4.7 | 9.7 | 6.5 | 9.3 |
| 9 | | 5.6 | 5.3 | 5.0 | 5.3 | 6.2 | 27 | 9.2 | 5.3 | 8.0 | 10.1 | 10.5 |
| 10 | | 5.9 | 5.0 | 5.0 | 5.3 | 6.2 | 25 | 21 | 5.0 | 17.8 | 23 | 8.8 |
| 11 | | 5.9 | 5.3 | 5.0 | 5.0 | 5.9 | 8.0 | 6.8 | 5.0 | 22 | 10.1 | 7.6 |
| 12 | | 6.2 | 5.0 | 4.7 | 8.2 | 66 | 19.0 | 43 | 5.0 | 10.9 | 7.2 | 11.9 |
| 13 | 6.2 | 5.6 | 5.3 | 4.7 | 6.5 | 10.5 | 8.8 | 49 | 5.6 | 11.9 | 6.8 | 8.0 |
| 14 | 5.6 | 5.6 | 5.3 | 4.7 | 5.3 | 8.4 | 6.5 | 17.2 | 5.3 | 7.2 | 7.6 | 31 |
| 15 | 10.6 | 5.9 | 5.3 | 4.7 | 5.3 | 8.8 | 5.3 | 15.0 | 5.0 | 10.1 | 6.8 | 29 |
| 16 | 13.0 | 44 | 5.0 | 25 | 5.3 | 26 | 5.3 | 6.8 | 4.7 | 16.0 | 6.8 | 9.7 |
| 17 | 8.8 | 18.8 | 5.0 | 9.0 | 5.3 | 31 | 5.0 | 5.3 | 5.0 | 52 | 10.1 | 8.4 |
| 18 | 10.3 | 7.2 | 5.0 | 5.9 | 5.3 | 28 | 5.0 | 5.3 | 6.2 | 21 | 16.0 | 8.8 |
| 19 | 10.9 | 6.2 | 5.0 | 5.3 | 5.3 | 12.4 | 5.0 | 5.0 | 6.2 | 11.9 | 8.4 | 27 |
| 20 | 15.1 | 5.9 | 5.0 | 14.1 | 128 | 35 | 5.3 | 5.0 | 12.5 | 8.4 | 6.8 | 9.3 |
| 21 | 47 | 6.8 | 5.3 | 12.2 | 150 | 46 | 5.0 | 4.7 | 16.0 | 6.8 | 6.8 | 8.8 |
| 22 | 10.5 | 6.5 | 5.0 | 20 | | 8.4 | 5.0 | 5.0 | 18.8 | 6.8 | 8.4 | 7.2 |
| 23 | 6.5 | 5.6 | 5.3 | 16.7 | | 6.8 | 5.0 | 5.0 | 7.2 | 6.5 | 10.5 | 6.8 |
| 24 | 7.3 | 5.6 | 5.6 | 40 | | 6.2 | 5.0 | 4.7 | 5.9 | 6.5 | 7.2 | 6.8 |
| 25 | 6.8 | 5.6 | 12.7 | 24 | | 6.2 | 5.0 | 4.7 | 5.3 | 6.2 | 6.8 | 6.5 |
| 26 | 5.9 | 5 6 | 41 | 7 2 | 12 | 5.9 | 5.0 | 4.7 | 14.5 | 6.5 | 6.8 | 7.2 |
| 27 | 5.6 | 9.9 | 11.2 | 7.2 | | 5.3 | 5.0 | 4.7 | 51 | 9.3 | 6.5 | 13.0 |
| 28 | 5.6 | 6.2 | 6.5 | 5.3 | | 5.3 | 5.0 | 4.4 | 17.2 | 10.1 | 7.2 | 8.4 |
| 29 | 5.6 | 5.6 | 5.9 | 5.0 | | 5.3 | 5.0 | ------- | 49 | 18.4 | 7.2 | 8.0 |
| 30 | 8.4 | 5.6 | 5.3 | 8.9 | | 5.3 | 5.0 | ------- | 33 | 11.4 | 6.8 | 12.9 |
| 31 | 6.5 | 5.6 | ------- | 8.8 | ------- | 5.3 | 5.0 | ------- | 7.6 | ------- | 8.0 | ------- |

NOTE.—Braced figures give estimated mean discharge for the period indicated; estimates made by comparison with record of Pelekunu Stream and from incomplete gage height record.

*Monthly discharge of Waikolu Stream at pipe-line crossing near Kalaupapa, Molokai, for the year ending June 30, 1925*

| Month | Discharge | | | | Total run-off | |
|---|---|---|---|---|---|---|
| | Million gallons a day | | | Second-feet (mean) | Million gallons | Acre-feet |
| | Maximum | Minimum | Mean | | | |
| July | 47 | ---------- | 8.26 | 12.8 | 256 | 786 |
| August | 44 | 5.6 | 7.91 | 12.2 | 245 | 753 |
| September | 41 | 4.7 | 6.86 | 10.6 | 206 | 632 |
| October | 40 | 4.7 | 9.31 | 14.4 | 289 | 886 |
| November | 150 | 5.0 | 16.3 | 25.2 | 489 | 1,500 |
| December | 66 | 5.3 | 13.3 | 20.6 | 413 | 1,270 |
| January | 27 | 5.0 | 7.71 | 11.9 | 239 | 733 |
| February | 49 | 4.4 | 9.45 | 14.6 | 265 | 812 |
| March | 51 | 4.4 | 10.8 | 16.7 | 334 | 1,030 |
| April | 52 | 6.2 | 13.9 | 21.5 | 418 | 1,280 |
| May | 23 | 6.2 | 8.72 | 13.5 | 270 | 829 |
| June | 31 | 6.5 | 11.6 | 17.9 | 347 | 1,060 |
| The year | 150 | ---------- | 10.3 | 15.9 | 3,770 | 11,600 |

## ISLAND OF MAUI

### HONOKAHAU STREAM NEAR HONOKAHAU, MAUI

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

RECORDS AVAILABLE.—March 7, 1913, to September 19, 1920, and May 2, 1922, to June 30, 1925. Staff gage readings at old site on diversion dam August 13 to December 31, 1911.

GAGE.—Stevens continuous water-stage recorder.

DISCHARGE MEASUREMENTS.—Made by wading or from cable 600 feet below gage.

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 composed of large boulders and coarse gravel; shifts during extremely high stages.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 1,260 million gallons a day, or 1,950 second-feet, at 6.30 a. m. October 16 (gage height, 6.13 feet); minimum discharge, 9.2 million gallons a day, or 14.2 second-feet, from 5 to 6 p. m. February 12 (gage height, 1.04 feet).

1913–1920; 1922–1925: Maximum discharge recorded, 2,200 million gallons a day, or 3,400 second-feet, at 6.40 a. m. February 15, 1924 (gage height, 7.92 feet); minimum discharge, that of February 12, 1925.

DIVERSIONS.—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.

REGULATION.—None.

OBJECT OF STATION.—To determine resources of stream.

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

ACCURACY.—Stage-discharge relation very unstable during year and changed, presumably, on July 21, September 26, February 9, and March 27. The three rating curves used are poorly defined below 40 million gallons a day; extended above. 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 poor.

*Discharge measurements of Honokahau Stream near Honokahau, Maui, during the year ending June 30, 1925*

| Date | Gage height (feet) | Discharge | | Date | Gage height (feet) | Discharge | |
|---|---|---|---|---|---|---|---|
| | | Second-feet | Million gallons a day | | | Second-feet | Million gallons a day |
| Sept. 15 | 1.02 | 20.3 | 13.1 | May 14 | 1.18 | 24.9 | 16.1 |
| Dec. 31 | 1.14 | 18.0 | 11.6 | June 23 | 1.26 | 30.6 | 19.8 |
| Feb. 14 | 1.43 | 25.7 | 16.6 | | | | |

*Discharge, in million gallons a day, of Honokahau Stream near Honokahau, Maui, for the year ending June 30, 1925*

| Day | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 16.5 | 58 | 14.4 | 11.0 | 13.1 | 31 | 33 | 11.8 | 9.6 | 40 | 37 | 19.2 |
| 2 | 12.3 | 28 | 15.1 | 10.8 | 12.9 | 21 | 20 | 11.8 | 10.0 | 21 | 20 | 18.4 |
| 3 | 12.0 | 18.4 | 13.8 | 10.8 | 12.5 | 16.0 | 13.4 | 11.6 | 39 | 17.4 | 28 | 70 |
| 4 | 11.3 | 39 | 13.4 | 134 | 12.3 | 13.6 | 13.6 | 11.6 | 16.2 | 26 | 17.4 | 86 |
| 5 | 11.0 | 20 | 13.2 | 16.4 | 12.0 | 13.4 | 14.0 | 11.6 | 13.2 | 51 | 36 | 37 |
| 6 | 11.0 | 15.1 | 13.2 | 11.3 | 11.8 | 13.1 | 13.6 | 11.6 | 9.9 | 27 | 18.2 | 35 |
| 7 | 15.8 | 14.8 | 18.0 | 10.8 | 11.8 | 13.1 | 13.1 | 11.6 | 9.6 | 72 | 17.1 | 25 |
| 8 | 15.9 | 32 | 13.6 | 10.6 | 12.3 | 12.9 | 25 | 12.3 | 9.5 | 18.7 | 16.6 | 35 |
| 9 | 11.1 | 60 | 13.2 | 10.6 | 14.4 | 12.7 | 31 | 62 | 9.4 | 33 | 16.9 | 25 |
| 10 | 14.3 | 38 | 13.2 | 13.6 | 12.5 | 12.7 | 23 | 116 | 9.6 | 34 | 22 | 23 |
| 11 | 11.3 | 37 | 13.2 | 12.3 | 12.3 | 12.7 | 23 | 12.1 | 14.4 | 39 | 17.4 | 17.9 |
| 12 | 12.5 | 17.6 | 13.2 | 11.4 | 12.3 | 64 | 20 | 10.8 | 9.7 | 19.2 | 18.8 | 41 |
| 13 | 12.6 | 15.3 | 13.2 | 14.0 | 12.3 | 15.8 | 15.0 | 17.4 | 20 | 29 | 27 | 16.9 |
| 14 | 11.1 | 14.8 | 13.2 | 10.6 | 12.3 | 13.6 | 13.4 | 19.0 | 9.7 | 17.1 | 17.4 | 42 |
| 15 | 16.5 | 16.1 | 13.2 | 16.1 | 12.3 | 13.6 | 12.7 | 12.1 | 9.5 | 28 | 16.9 | 71 |

*Discharge, in million gallons a day, of Honokahau Stream near Honokahau, Maui, for the year ending June 30, 1925*—Continued

| Day | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 16 | 88 | 46 | 13.2 | 294 | 12.3 | 14.0 | 12.3 | 10.8 | 9.4 | 28 | 16.4 | 18.2 |
| 17 | 28 | 41 | 13.0 | 15.8 | 12.3 | 13.1 | 12.3 | 10.2 | 9.4 | 175 | 39 | 19.5 |
| 18 | 27 | 23 | 13.0 | 24 | 12.3 | 32 | 12.0 | 9.9 | 45 | 34 | 59 | 27 |
| 19 | 22 | 17.5 | 12.8 | 21 | 12.3 | 13.8 | 19.1 | 9.9 | 21 | 19.5 | 39 | 53 |
| 20 | 94 | 14.8 | 13.0 | 21 | 98 | 79 | 20 | 9.7 | 23 | 16.9 | 16.9 | 43 |
| 21 | 128 | 16.2 | 21 | 23 | 324 | 103 | 14.3 | 9.6 | 46 | 16.1 | 16.1 | 40 |
| 22 | 75 | 14.2 | 13.0 | 77 | 48 | 16.0 | 12.5 | 9.6 | 43 | 23 | 114 | 40 |
| 23 | 18.2 | 14.0 | 12.8 | 75 | 16.0 | 13.8 | 18.8 | 9.6 | 13.2 | 19.2 | 35 | 20 |
| 24 | 15.8 | 13.8 | 39 | 128 | 14.3 | 13.6 | 23 | 9.6 | 10.9 | 16.6 | 21 | 17.9 |
| 25 | 16.1 | 14.2 | 41 | 51 | 13.8 | 13.1 | 12.7 | 9.6 | 10.9 | 15.3 | 17.7 | 16.6 |
| 26 | 15.3 | 14.2 | 345 | 18.5 | 13.4 | 13.1 | 12.3 | 9.6 | 36 | 64 | 18.4 | 30 |
| 27 | 45 | 14.6 | 41 | 16.9 | 13.4 | 12.9 | 12.0 | 10.4 | 121 | 57 | 17.1 | 32 |
| 28 | 25 | 14.0 | 14.7 | 14.3 | 34 | 12.9 | 15.8 | 10.0 | 58 | 22 | 19.0 | 34 |
| 29 | 18.2 | 14.4 | 13.4 | 13.8 | 31 | 12.7 | 15.6 | ------- | 87 | 37 | 17.9 | 18.5 |
| 30 | 57 | 14.2 | 11.4 | 25 | 57 | 12.7 | 12.3 | ------- | 45 | 18.7 | 22 | 71 |
| 31 | 18.2 | 13.8 | ------- | 15.6 | ------- | 12.6 | 12.0 | ------- | 20 | ------- | 23 | ------- |

*Monthly discharge of Honokahau Stream near Honokahau, Maui, for the year ending June 30, 1925*

| Month | Discharge | | | | Total run-off | |
|---|---|---|---|---|---|---|
| | Million gallons a day | | | Second-feet (mean) | Million gallons | Acre-feet |
| | Maximum | Minimum | Mean | | | |
| July | 128 | 11.0 | 28.6 | 44.3 | 886 | 2,720 |
| August | 60 | 13.8 | 23.4 | 36.2 | 724 | 2,220 |
| September | 345 | 11.4 | 27.5 | 42.5 | 824 | 2,530 |
| October | 294 | 10.6 | 36.7 | 56.8 | 1,140 | 3,490 |
| November | 324 | 11.8 | 30.0 | 46.4 | 899 | 2,760 |
| December | 103 | 12.6 | 21.5 | 33.3 | 668 | 2,050 |
| January | 33 | 12.0 | 16.8 | 26.0 | 521 | 1,600 |
| February | 116 | 9.6 | 16.8 | 26.0 | 472 | 1,450 |
| March | 121 | 9.4 | 25.7 | 39.8 | 798 | 2,450 |
| April | 175 | 15.3 | 34.5 | 53.4 | 1,030 | 3,180 |
| May | 114 | 16.1 | 26.4 | 40.8 | 818 | 2,510 |
| June | 86 | 16.6 | 34.8 | 53.8 | 1,040 | 3,200 |
| The year | 345 | 9.4 | 26.9 | 41.6 | 9,820 | 30,200 |

### HONOKAWAI DITCH NEAR LAHAINA, MAUI

LOCATION.—75 feet below intake on Honokawai Stream, 25 feet inside of ditch tunnel, 2¼ miles above Pioneer Mill Co.'s power house, and 7½ miles northeast of Lahaina.

RECORDS AVAILABLE.—May 28, 1921, to June 30, 1925. 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.

GAGE.—Gurley 7-day graph water-stage recorder; installed April 15, 1919. Stevens continuous recorder November 14, 1918, to April 15, 1919. Staff gage prior to November 14, 1918.

DISCHARGE MEASUREMENTS.—Made from plank across ditch.

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 where tunnel widens, about 500 feet below gage.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 43 million gallons a day, or 66 second-feet, at 6 a. m. October 16 (gage height, 2.07 feet); minimum discharge, no flow, from 8 a. m. to 8.15 p. m. February 22, when water was shut out of ditch (gage height, 0.00 foot).

1912–1925: Maximum discharge recorded, 69 million gallons a day, or 107 second-feet, at 4.15 p. m. September 10, 1922 (gage height, 2.71 feet); minimum, no flow occasionally when water is shut out of ditch.

DIVERSIONS.—Flood-water diversion ditch 1½ miles below station diverts part of flood when flood gates are open. Gates 30 feet above station may also be used to divert flood water.

REGULATION.—By head gates and by flood gates noted under "Diversions."

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, presumably, at times of floods August 16 and November 20. The two rating curves used are well defined between 3 and 15 million gallons a day; extensions beyond these limits uncertain. Operation of water-stage recorder satisfactory except for short period in November. 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 integrating recorder graph with discharge integrator. Records good except for high stages, for which they are fair.

Honokawai ditch diverts from Honokawai Stream at elevation about 1,570 feet. The water is carried southwest 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 measurements of Honokawai ditch near Lahaina, Maui, during the year ending June 30, 1925*

| Date | Gage height (feet) | Discharge | | Date | Gage height (feet) | Discharge | |
|---|---|---|---|---|---|---|---|
| | | Second-feet | Million gallons a day | | | Second-feet | Million gallons a day |
| July 30 | 0.88 | 20.5 | 13.2 | Feb. 13 | 0.41 | 7.94 | 5.13 |
| Sept. 16 | .30 | 5.03 | 3.25 | May 13 | .34 | 6.95 | 4.49 |
| Feb. 13 | .41 | 7.81 | 5.05 | May 13 | .34 | 7.20 | 4.65 |

*Discharge, in million gallons a day, of Honokawai ditch near Lahaina, Maui, for the year ending June 30, 1925*

| Day | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 6.0 | 12.0 | 3.5 | 3.5 | 3.3 | 10.6 | 11.5 | 4.0 | 3.8 | 11.7 | 9.6 | 6.5 |
| 2 | 4.3 | 8.5 | 3.5 | 3.5 | 3.5 | 4.4 | 6.2 | 4.0 | 3.8 | 6.0 | 5.8 | 5.9 |
| 3 | 4.2 | 6.0 | 3.5 | 3.4 | 3.5 | 4.6 | 4.2 | 3.9 | 14.7 | 5.0 | 6.0 | 17.9 |
| 4 | 4.2 | 11.0 | 3.5 | 8.9 | 3.7 | 4.1 | 4.2 | 3.9 | 7.1 | 8.9 | 4.8 | 27 |
| 5 | 4.2 | 5.6 | 3.5 | 6.1 | 3.5 | 4.1 | 4.4 | 3.9 | 5.0 | 13.4 | 7.4 | 13.9 |
| 6 | 4.2 | 4.9 | 3.5 | 4.7 | 3.5 | 4.1 | 4.2 | 3.9 | 4.0 | 7.5 | 5.3 | 11.3 |
| 7 | 7.5 | 4.7 | 4.2 | 4.2 | 3.5 | 4.1 | 4.0 | 3.9 | 3.9 | 19.5 | 4.8 | 6.6 |
| 8 | 7.6 | 6.2 | 3.5 | 4.1 | 3.5 | 4.1 | 9.7 | 3.7 | 4.0 | 5.2 | 4.4 | 6.0 |
| 9 | 4.6 | 14.7 | 3.5 | 3.9 | 3.5 | 4.1 | 13.7 | 10.7 | 4.0 | 10.1 | 4.6 | 7.8 |
| 10 | 5.3 | 9.5 | 3.5 | 3.9 | 3.6 | 4.1 | 10.5 | 24 | 4.0 | 10.9 | 6.4 | 7.6 |
| 11 | 4.6 | 9.8 | 3.5 | 4.3 | 3.6 | 4.1 | 9.4 | 4.7 | 4.0 | 10.2 | 5.0 | 5.1 |
| 12 | 4.6 | 5.0 | 3.5 | 4.2 | 3.6 | 13.6 | 8.6 | 4.6 | 4.1 | 5.1 | 4.4 | 14.6 |
| 13 | 5.4 | 4.6 | 3.5 | 5.2 | 3.6 | 5.0 | 6.8 | 5.3 | 8.6 | 6.2 | 6.6 | 4.8 |
| 14 | 4.6 | 4.4 | 3.5 | 3.6 | 3.6 | 4.2 | 4.4 | 6.7 | 3.9 | 4.7 | 4.3 | 10.7 |
| 15 | 7.3 | 4.7 | 3.5 | 4.9 | 3.6 | 4.2 | 4.2 | 5.1 | 4.0 | 7.5 | 4.1 | 22 |
| 16 | 19.1 | 16.5 | 3.5 | 19.2 | | 4.2 | 4.1 | 5.2 | 4.0 | 9.4 | 4.1 | 5.5 |
| 17 | 7.9 | 13.8 | 3.4 | 7.3 | 3.6 | 4.2 | 4.1 | 4.6 | 4.0 | 30 | 8.7 | 5.4 |
| 18 | 11.3 | 4.6 | 3.4 | 6.7 | | 9.6 | 4.1 | 4.0 | 11.9 | 10.2 | 12.8 | 7.4 |
| 19 | 6.4 | 3.5 | 3.5 | 7.1 | | 4.4 | 4.9 | 3.9 | 9.4 | 5.8 | 6.6 | 14.0 |
| 20 | 13.0 | 3.5 | 3.5 | 5.7 | 12.8 | 10.0 | 5.9 | 3.9 | 12.6 | 4.7 | 4.3 | 4.8 |

*Discharge, in million gallons a day, of Honokawai ditch near Lahaina, Maui, for the year ending June 30, 1925*—Continued

| Day | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 21 | 26 | 3.6 | 4.4 | 6.4 | 40 | 20 | 5.0 | 3.9 | 18.8 | 4.4 | 4.2 | 4.6 |
| 22 | 16.1 | 3.5 | 3.6 | 12.3 | 13.1 | 5.2 | 4.1 | 2.3 | 20 | 4.6 | 19.6 | 4.6 |
| 23 | 5.2 | 3.5 | 3.6 | 14.6 | 5.8 | 4.7 | 4.9 | 3.7 | 6.6 | 4.8 | 8.4 | 5.0 |
| 24 | 4.6 | 3.5 | 8.9 | 24 | 4.7 | 4.4 | 6.4 | 3.7 | 4.8 | 4.2 | 5.1 | 4.7 |
| 25 | 4.6 | 3.5 | 10.8 | 11.7 | 4.3 | 4.3 | 4.0 | 3.7 | 4.5 | 4.2 | 4.4 | 4.6 |
| 26 | 4.6 | 3.5 | 21 | 4.1 | 4.1 | 4.2 | 4.0 | 3.7 | 18.6 | 12.4 | 4.3 | 6.9 |
| 27 | 8.8 | 3.5 | 5.2 | 4.2 | 4.1 | 4.1 | 4.0 | 3.8 | 29 | 10.9 | 4.3 | 13.1 |
| 28 | 6.9 | 3.5 | 4.5 | 3.5 | 7.3 | 4.1 | 4.2 | 3.8 | 13.4 | 5.8 | 5.0 | 12.3 |
| 29 | 6.7 | 3.5 | 4.1 | 3.3 | 8.6 | 4.0 | 4.5 | ------- | 12.9 | 10.8 | 4.9 | 5.2 |
| 30 | 13.5 | 3.5 | 3.7 | 7.2 | 21 | 4.0 | 4.0 | ------- | 11.4 | 5.2 | 6.0 | 25 |
| 31 | 5.5 | 3.5 | ------- | 3.9 | ------- | 4.0 | 4.0 | ------- | 6.1 | ------- | 7.0 | ------- |

NOTE.—Braced figure give mean discharge for period indicated; estimated from faulty gage-height record.

*Monthly discharge of Honokawai ditch near Lahaina, Maui, for the year ending June 30, 1925*

| Month | Discharge | | | | Total run-off | |
|---|---|---|---|---|---|---|
| | Million gallons a day | | | Second-feet (mean) | Million gallons | Acre-feet |
| | Maximum | Minimum | Mean | | | |
| July | 26 | 4.2 | 7.70 | 11.9 | 239 | 733 |
| August | 16.5 | 3.5 | 6.20 | 9.59 | 192 | 590 |
| September | 21 | 3.4 | 4.68 | 7.24 | 140 | 431 |
| October | 24 | 3.3 | 6.73 | 10.4 | 209 | 640 |
| November | 40 | 3.3 | 6.44 | 9.96 | 193 | 593 |
| December | 20 | 4.0 | 5.64 | 8.73 | 175 | 536 |
| January | 13.7 | 4.0 | 5.75 | 8.90 | 178 | 547 |
| February | 24 | 2.3 | 5.09 | 7.88 | 142 | 437 |
| March | 29 | 3.8 | 8.61 | 13.3 | 267 | 819 |
| April | 30 | 4.2 | 8.64 | 13.4 | 259 | 796 |
| May | 19.6 | 4.1 | 6.23 | 9.64 | 193 | 593 |
| June | 27 | 4.6 | 9.69 | 15.0 | 291 | 892 |
| The year | 40 | 2.3 | 6.79 | 10.5 | 2,480 | 7,610 |

### 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, at elevation 1,057 feet.

RECORDS AVAILABLE.—February 29, 1916, to June 30, 1925. From August 5, 1911, to January 18, 1916, at a station about a mile downstream. This stream was called Lahainaluna Stream in water-supply papers prior to Water-Supply Paper 575.

GAGE.—Stevens continuous water-stage recorder installed August 27, 1919, to replace Gurley printing water-stage recorder previously used. Gage datum raised 0.48 foot on June 21, 1923.

DISCHARGE MEASUREMENTS.—Made by wading.

CHANNEL AND CONTROL.—One channel at all stages; fairly straight near gage; filled with large boulders; banks steep and high. Control composed of large boulders; fairly permanent. Control stabilized to some extent by grouting on June 21, 1923.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, about 120 million gallons a day, or 186 second-feet at 7.15 p. m. March 27 (gage height, 33.3 feet); minimum discharge uncertain owing to plugged intake to stilling well.

1916–1925: Maximum discharge recorded, 314 million gallons a day, or 486 second-feet, at 10.30 a. m. November 26, 1918 (gage height, 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.—None.

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 permanent during year. Rating curve well defined between 2 and 15 million gallons a day; extension above and below these limits uncertain. Operation of water-stage recorder satisfactory until March 29. 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 fair.

*Discharge measurements of Kanaha Stream above pipe-line intake, near Lahaina, Maui, during the year ending June 30, 1925*

| Date | Gage height (feet) | Discharge | | Date | Gage height (feet) | Discharge | |
|---|---|---|---|---|---|---|---|
| | | Second-feet | Million gallons a day | | | Second-feet | Million gallons a day |
| July 29 | 0.42 | 3.14 | 2.03 | Mar. 27 | 0.90 | 16.8 | 10.9 |
| Sept. 16 | .46 | 3.56 | 2.30 | May 12 | .66 | 6.42 | 4.15 |
| Dec. 30 | .48 | 3.69 | 2.38 | June 24 | .51 | 4.07 | 2.63 |

*Discharge, in million gallons a day, of Kanaha Stream above pipe-line intake near Lahaina, Maui, for the year ending June 30, 1925*

| Day | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 4.5 | 3.9 | 2.3 | 2.3 | 2.4 | 6.3 | 8.7 | 2.5 | 2.2 |
| 2 | 2.2 | 4.2 | 2.6 | 2.2 | 2.3 | 2.4 | 5.8 | 2.5 | 2.4 |
| 3 | 2.1 | 2.6 | 2.2 | 2.2 | 2.3 | 2.2 | 2.6 | 2.5 | 6.8 |
| 4 | 2.1 | 5.2 | 2.2 | 6.0 | 2.3 | 2.2 | 2.9 | 2.5 | 5.0 |
| 5 | 2.0 | 2.3 | 2.2 | 2.6 | 2.3 | 2.2 | 2.6 | 2.5 | 2.6 |
| 6 | 2.0 | 2.1 | 2.4 | 2.2 | 2.2 | 2.2 | 2.6 | 2.4 | 2.3 |
| 7 | 6.3 | 2.1 | 7.6 | 2.2 | 2.2 | 2.2 | 2.4 | 2.4 | 2.2 |
| 8 | 5.1 | 2.2 | 2.4 | 2.2 | 2.2 | 2.2 | 10.6 | 2.4 | 2.2 |
| 9 | 2.4 | 7.9 | 2.2 | 2.2 | 2.2 | 2.2 | 16.4 | 7.5 | 2.2 |
| 10 | 3.8 | 4.4 | 2.2 | 2.2 | 2.2 | 2.2 | 10.4 | 12.0 | 2.2 |
| 11 | 2.2 | 4.3 | 2.2 | 2.2 | 2.2 | 2.2 | 5.4 | 2.6 | 2.2 |
| 12 | 4.8 | 2.2 | 2.2 | 2.2 | 2.2 | 13.2 | 3.3 | 2.5 | 2.8 |
| 13 | 3.1 | 2.1 | 2.2 | 2.6 | 2.2 | 2.6 | 4.9 | 2.4 | 5.4 |
| 14 | 2.4 | 2.1 | 2.2 | 2.2 | 2.2 | 2.3 | 2.9 | 2.6 | 2.2 |
| 15 | 7.0 | 3.5 | 2.2 | 2.6 | 2.1 | 2.4 | 2.6 | 2.5 | 2.1 |
| 16 | 6.7 | 26 | 2.2 | 27 | 2.1 | 2.6 | 2.6 | 2.4 | 2.1 |
| 17 | 3.3 | 10.6 | 2.3 | 2.6 | 2.1 | 2.8 | 2.6 | 2.4 | 2.1 |
| 18 | 7.1 | 2.7 | 2.3 | 2.6 | 2.1 | 7.4 | 2.6 | 2.4 | 4.5 |
| 19 | 3.9 | 2.4 | 2.2 | 2.6 | 2.1 | 2.5 | 2.3 | 2.3 | 6.5 |
| 20 | 12.1 | 2.3 | 2.3 | 2.4 | 6.2 | 14.5 | 3.8 | 2.3 | 17.4 |
| 21 | 13.2 | 2.4 | 5.2 | 2.7 | 30 | 23 | 3.0 | 2.3 | 10.0 |
| 22 | 7.5 | 2.2 | 2.4 | 6.4 | 5.6 | 3.1 | 2.6 | 2.3 | 16.3 |
| 23 | 2.2 | 2.2 | 2.5 | 6.4 | 2.4 | 2.6 | 2.7 | 2.3 | 3.0 |
| 24 | 2.2 | 2.2 | 3.5 | 26 | 2.3 | 2.5 | 2.9 | 2.3 | 2.4 |
| 25 | 2.4 | 2.3 | 6.8 | 15.1 | 2.2 | 2.4 | 2.6 | 2.3 | 2.4 |
| 26 | 2.1 | 2.3 | 39 | 3.0 | 2.2 | 2.4 | 2.5 | 2.3 | 35 |
| 27 | 2.3 | 2.4 | 12.0 | 3.8 | 2.2 | 2.4 | 2.5 | 2.4 | 44 |
| 28 | 2.4 | 2.3 | 4.8 | 2.4 | 2.8 | 2.4 | 2.6 | 2.3 | 14.8 |
| 29 | 3.6 | 2.8 | 3.0 | 2.4 | 3.0 | 2.3 | 2.7 | ------- | 24 |
| 30 | 11.5 | 2.4 | 2.4 | 4.2 | 10.2 | 2.3 | 2.5 | ------- | ------- |
| 31 | 2.4 | 2.3 | ------- | 2.6 | ------- | 2.4 | 2.5 | ------- | ------- |

NOTE.—Data insufficient for making estimate March 30 to June 30 as gage-height record was faulty owing to intake to stilling well being plugged.

*Monthly discharge of Kanaha Stream above pipe-line intake near Lahaina, Maui, for the year ending June 30, 1925*

| Month | Discharge | | | | Total run-off | |
|---|---|---|---|---|---|---|
| | Million gallons a day | | | Second-feet (mean) | Million gallons | Acre-feet |
| | Maximum | Minimum | Mean | | | |
| July | 13.2 | 2.0 | 4.42 | 6.84 | 137 | 420 |
| August | 26 | 2.1 | 3.90 | 6 03 | 121 | 371 |
| September | 39 | 2.2 | 4.41 | 6.82 | 132 | 406 |
| October | 27 | 2.2 | 4.85 | 7.50 | 150 | 461 |
| November | 30 | 2.1 | 3.70 | 5 72 | 111 | 341 |
| December | 23 | 2.2 | 4.08 | 6.31 | 127 | 389 |
| January | 16.4 | 2 3 | 4.10 | 6.34 | 127 | 390 |
| February | 12.0 | 2.3 | 2.93 | 4.53 | 82.1 | 252 |
| March | 44 | 2.1 | | | | |

**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, 1925. Replaces old station in tailrace of power house, for which records are available August 12, 1911, to June 30, 1916.

GAGE.—Stevens continuous water-stage recorder installed June 9, 1919, to replace staff gage installed July 28, 1916.

DISCHARGE MEASUREMENTS.—Made by wading.

CHANNEL AND CONTROL.—Channel about 3.5 feet wide cut in earth and rock; straight for 50 feet above and below gage. Control not well defined.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 9.1 million gallons a day, or 14.1 second-feet, at 11.30 a. m. March 12 and from 2 to 3 a. m. March 22 (gage height, 1.15 feet); minimum discharge, 1.1 million gallons a day, or 1.7 second-feet, at midnight December 20 (gage height, −0.14 foot).

1916–1925: Maximum discharge recorded, 18 million gallons a day, or 28 second-feet, at 3 a. m. December 25, 1920 (gage height, 1.53 feet); minimum discharge, no flow, occasionally, when water is shut out of ditch.

DIVERSIONS.—None.

REGULATION.—By head gates.

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

UTILIZATION.—After passing through power house water is used for irrigation of sugar cane. A small amount is sometimes diverted for irrigation at higher levels and does not pass through power house.

ACCURACY.—Stage-discharge relation changed December 20 and April 26. The two rating curves used fairly well defined between 2 and 10 million gallons a day. Operation of water-stage recorder satisfactory except for three days in December. 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.

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 Olowalu Co.

*Discharge measurements of Olowalu ditch near Olowalu, Maui, during the year ending June 30, 1925*

| Date | Gage height (feet) | Discharge | | Date | Gage height (feet) | Discharge | |
|---|---|---|---|---|---|---|---|
| | | Second-feet | Million gallons a day | | | Second-feet | Million gallons a day |
| July 31 | 1.00 | 11.3 | 7.30 | Feb 14 | 0.62 | 8.0. | 5 18 |
| Sept. 16 | .44 | 3.57 | 2.31 | May 15 | .58 | 6.61 | 4.27 |
| Oct. 14 | .18 | 4.06 | 2.62 | June 22 | .75 | 9.04 | 5.84 |
| Dec. 30 | .68 | 9.18 | 5.93 | | | | |

*Discharge, in million gallons a day, of Olowalu ditch near Olowalu, Maui, for the year ending June 30, 1925*

| Day | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 4.1 | 7.0 | 3.8 | 3.4 | 4.1 | 7.3 | 5.9 | 3.8 | 3.3 | 4.6 | 7.6 | 5.0 |
| 2 | 3.8 | 7.6 | 3.8 | 3.0 | 3.8 | 5.8 | 5.6 | 3.6 | 3.3 | 4.0 | 7.3 | 5.0 |
| 3 | 3.8 | 6.6 | 3.8 | 2.8 | 3.5 | 4.7 | 5.2 | 3.6 | 4.6 | 5.0 | 7.0 | 6.6 |
| 4 | 3.5 | 7.0 | 3.5 | 3.5 | 3.4 | 4.1 | 4.9 | 3.5 | 4.2 | 5.9 | 6.2 | 7.3 |
| 5 | 3.5 | 7.3 | 3.5 | 3.2 | 3.4 | 3.8 | 4.9 | 3.5 | 3.7 | 6.6 | 6.2 | 7.3 |
| 6 | 3.5 | 5.9 | 3.5 | 2.8 | 3.2 | 3.8 | 4.6 | 3.4 | 3.5 | 6.6 | 5.9 | 7.3 |
| 7 | 4.2 | 5.3 | 3.8 | 2.7 | 3.0 | 3.5 | 4.6 | 3.4 | 3.5 | 7.6 | 5.6 | 7.6 |
| 8 | 4.6 | 5.6 | 3.5 | 2.6 | 3.0 | 3.4 | 5.4 | 3.5 | 3.5 | 7.3 | 5.3 | 7.2 |
| 9 | 3.8 | 7.0 | 3.5 | 2.6 | 3.0 | 3.3 | 5.9 | 4.1 | 3.2 | 7.0 | 5.0 | 6.2 |
| 10 | 3.8 | 8.0 | 3.5 | 2.6 | 3.7 | 3.2 | 5.2 | 7.3 | 3.4 | 7.0 | 5.3 | 6.2 |
| 11 | 3.5 | 7.6 | 3.5 | 2.6 | 3.3 | 3.2 | 6.6 | 4.9 | 3.8 | 7.0 | 5.0 | 5.9 |
| 12 | 3.8 | 6.2 | 3.4 | 2.5 | 3.2 | 4.1 | 6.6 | 4.3 | 4.0 | 6.6 | 4.7 | 6.6 |
| 13 | 3.8 | 5.6 | 3.4 | 2.5 | 3.0 | 4.1 | 6.3 | 4.9 | 5.9 | 6.6 | 5.0 | 5.6 |
| 14 | 3.5 | 5.0 | 3.5 | 2.4 | 2.9 | 5.3 | 5.9 | 5.6 | 4.3 | 6.2 | 4.7 | 5.6 |
| 15 | 3.8 | 5.0 | 3.8 | 2.4 | 2.8 | 6.0 | 5.2 | 4.9 | 3.9 | 6.2 | 4.5 | 7.0 |
| 16 | 6.4 | 6.2 | 3.8 | 5.2 | 2.8 | 5.9 | 4.9 | 4.6 | 3.7 | 6.6 | 4.4 | 7.3 |
| 17 | 6.9 | 8.0 | 3.8 | 5.4 | 2.8 | 6.6 | 4.6 | 4.3 | 3.6 | 8.0 | 6.1 | 7.0 |
| 18 | 5.5 | 7.0 | 3.8 | 6.2 | 2.8 | 5.9 | 4.3 | 4.0 | 4.7 | 6.6 | 8.0 | 7.0 |
| 19 | 6.2 | 5.6 | 3.8 | 5.3 | 2.6 | 5.3 | 4.7 | 3.8 | 7.0 | 5.9 | 8.0 | 7.0 |
| 20 | 5.4 | 5.3 | 3.8 | 4.4 | 3.5 | 4.7 | 5.2 | 3.8 | 8.0 | 5.9 | 6.6 | 6.6 |
| 21 | 8.0 | 5.0 | 4.6 | 4.7 | 7.6 | 3.7 | 4.6 | 3.6 | 8.0 | 5.6 | 5.6 | 5.9 |
| 22 | 8.4 | 4.7 | 3.5 | 6.4 | 7.6 | 5.6 | 4.6 | 3.5 | 8.7 | 5.6 | 7.6 | 5.6 |
| 23 | 8.0 | 4.7 | 2.6 | 7.6 | 7.3 | 6.6 | 4.9 | 3.5 | 7.3 | 5.9 | 8.0 | 5.3 |
| 24 | 6.6 | 4.4 | 2.2 | 7.6 | 5.9 | 4.9 | 4.9 | 3.4 | 6.2 | 6.2 | 8.0 | 5.0 |
| 25 | 6.6 | 4.4 | 2.6 | 7.6 | 5.0 | 4.0 | 4.3 | 3.3 | 5.9 | 5.9 | 7.0 | 4.7 |
| 26 | 5.0 | 4.1 | 5.7 | 7.3 | 4.1 | 3.4 | 4.3 | 3.3 | 8.0 | 6.4 | 5.9 | 4.9 |
| 27 | 5.4 | 4.1 | 4.8 | 6.6 | 3.8 | 3.0 | 4.0 | 3.5 | 8.4 | 8.0 | 5.3 | 6.2 |
| 28 | 5.8 | 4.1 | 3.9 | 5.6 | 4.0 | } | 4.0 | 3.5 | 4.4 | 8.0 | 5.0 | 6.2 |
| 29 | 4.7 | 4.1 | 3.9 | 5.0 | 4.8 | 2.9 | 4.0 | ------- | 5.7 | 8.0 | 5.0 | 5.6 |
| 30 | 7.6 | 4.1 | 4.1 | 4.7 | 6.0 | } | 3.8 | ------- | 6.2 | 7.6 | 5.3 | 7.0 |
| 31 | 7.2 | 3.8 | ------- | 4.4 | ------- | 5.6 | 3.8 | ------- | 4.6 | ------- | 5.0 | ------- |

NOTE.—Braced figure gives mean discharge for period indicated; estimated by comparison with record of flow for near-by streams.

*Monthly discharge of Olowalu ditch near Olowalu, Maui, for the year ending June 30 1925*

| Month | Discharge | | | | Total run-off | |
|---|---|---|---|---|---|---|
| | Million gallons a day | | | Second-feet (mean) | Million gallons | Acre-feet |
| | Maximum | Minimum | Mean | | | |
| uly | 8.4 | 3.5 | 5.18 | 8 01 | 161 | 493 |
| August | 8.0 | 3.8 | 5.69 | 8.80 | 176 | 541 |
| September | 5.7 | 2.2 | 3.69 | 5.71 | 111 | 340 |
| October | 7.6 | 2.4 | 4.37 | 6.76 | 136 | 416 |
| November | 7.6 | 2.6 | 4.00 | 6.19 | 120 | 368 |
| December | 7.3 | ---------- | 4.50 | 6.96 | 140 | 428 |
| January | 6.6 | 3.8 | 4.96 | 7.67 | 154 | 472 |
| February | 7.3 | 3.3 | 4.01 | 6.20 | 112 | 345 |
| March | 8.7 | 3.2 | 5.11 | 7.91 | 158 | 486 |
| April | 8.0 | 4.0 | 6.48 | 10.0 | 194 | 597 |
| May | 8.0 | 4.4 | 6.00 | 9.28 | 186 | 571 |
| June | 7.6 | 4.7 | 6.25 | 9.67 | 188 | 575 |
| The year | 8.7 | 2.2 | 5.03 | 7.78 | 1,840 | 5,630 |

### HANAWI STREAM NEAR NAHIKU, MAUI

LOCATION.—200 feet above Koolau ditch intake and trail, 2 miles southwest of Nahiku post office, 6½ miles east of Upper 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, 1925.

GAGE.—Stevens continuous water-stage recorder.

DISCHARGE MEASUREMENTS.—Made from footbridge 100 feet above gage or by wading.

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

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, about 605 million gallons a day, or 936 second-feet, at 8.45 a. m. October 16 (gage height, 7.48 feet); minimum discharge, 1.8 million gallons a day, or 2.8 second-feet, several hours July 5 and 6 (gage height, 0.27 foot).

1914–1916; 1921–1925: Maximum stage recorded, about 20 feet during flood of January 18, 1916 (discharge not determined). Minimum discharge recorded, 1.5 million gallons a day, or 2.3 second-feet for several hours July 16, 17, 20, and 21, 1922 (gage height, 0.20 foot).

DIVERSIONS.—None above station.

REGULATION.—None.

OBJECT OF STATION.—To determine amount of water diverted into 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 permanent during year. Rating curve fairly well defined between 2 and 150 million gallons a day; extension above 150 million gallons a day uncertain. 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 ordinary stages, except for estimated periods, for which they are fair; high-stage records fair.

The following discharge measurements were made:

July 21, 1924: Gage height, 2.68 feet; discharge, 119 second-feet, or 76.9 million gallons a day.

September 7, 1924: Gage height, 0.50 foot; discharge, 3.05 second-feet, or 1.97 million gallons a day.

*Discharge, in million gallons a day, of Hanawi Stream near Nahiku, Maui, for the year ending June 30, 1925*

| Day | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2.1 | 6.2 | 3.5 | 3.5 | 5.6 | 25 | 2.8 | | 2.1 | 37 | 13.0 | 4.3 |
| 2 | 2.1 | 7.2 | 3.5 | 3.1 | 5.6 | 8.7 | | | 2.1 | 28 | 13.5 | 4.2 |
| 3 | 2.1 | 4.5 | 3.4 | 3.0 | 5.7 | 7.8 | 2.7 | | 3.0 | 21 | 8.8 | 11.6 |
| 4 | 2.0 | 9.1 | 3.2 | 3.0 | 5.7 | 7.0 | 3.2 | | 2.7 | 24 | 7.8 | 29 |
| 5 | 1.9 | 6.8 | 3.2 | 2.7 | 5.6 | 6.4 | 4.6 | 2.4 | 2.1 | 30 | 8.8 | 13.0 |
| 6 | 1.9 | 4.5 | 3.2 | 2.7 | 5.3 | 6.1 | 6.5 | | 2.0 | 28 | 7.7 | 9.6 |
| 7 | 2.0 | 3.8 | 3.4 | 2.9 | 5.1 | 5.6 | 5.1 | | 2.1 | 73 | 7.2 | 7.2 |
| 8 | 2.9 | 6.5 | 3.1 | 2.5 | 4.9 | 5.3 | 66 | | 2.0 | 26 | 6.8 | 5.9 |
| 8 | 2.2 | 8.4 | 3.0 | 4.2 | 4.8 | 5.0 | 102 | | 1.9 | 24 | 7.3 | 5.5 |
| 10 | 2.0 | 12.0 | 2.9 | 2.9 | 4.4 | 4.8 | 62 | | 2.1 | 28 | 8.7 | 5.0 |
| 11 | 2.0 | 11.0 | 2.9 | 3.7 | 4.2 | 4.6 | 8.8 | [a]8.5 | 4.0 | 32 | 7.1 | 4.5 |
| 12 | 2.3 | 6.2 | 2.7 | 3.2 | 4.0 | 47 | 5.1 | | 2.2 | 19.7 | 6.6 | 5.8 |
| 13 | 2.3 | 4.8 | 2.7 | 3.3 | 3.9 | 8.3 | 4.1 | | 2.0 | 19.7 | 6.4 | 5.1 |
| 14 | 2.2 | 4.1 | 2.6 | 2.8 | 3.7 | 5.0 | 3.6 | | 2.0 | 15.0 | 5.6 | 9.6 |
| 15 | 3.9 | 4.1 | 2.5 | 2.8 | 3.5 | 4.5 | 3.5 | | 1.9 | 30 | 5.7 | 19.4 |

[a] This figure includes Feb. 16–18 also.

*Discharge, in million gallons a day, of Hanawi Stream near Nahiku, Maui, for the year ending June 30, 1925*—Continued

| Day | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 16 | 13.3 | 16.5 | 2.5 | 129 | 3.4 | 4.3 | 3.2 | | 1.9 | 57 | 5.3 | 7.3 |
| 17 | 7.0 | 17.1 | 2.5 | 7.1 | 3.2 | 4.0 | 3.1 | | 1.9 | 141 | 6.4 | 6.3 |
| 18 | 6.5 | 9.6 | 2.4 | 9.1 | 3.1 | | | | 19.2 | 42 | 11.6 | 7.2 |
| 19 | 4.8 | 6.4 | 2.3 | 11.5 | 3.0 | | | 2.9 | 19.2 | 22 | 9.2 | 8.2 |
| 20 | 21 | 5.0 | 2.2 | 6.5 | 59 | | | 2.8 | 73 | 14.0 | 6.2 | 5.6 |
| 21 | 55 | 5.0 | 2.4 | 9.6 | 306 | | | 2.7 | 100 | 12.0 | 5.5 | 4.9 |
| 22 | 10.2 | 4.5 | 2.2 | 19.6 | 89 | | | 2.5 | 41 | 12.0 | 17.9 | 4.5 |
| 23 | 4.7 | 3.9 | 2.2 | 28 | 10.3 | | | 2.5 | 10.1 | 12.0 | 8.2 | 4.2 |
| 24 | 3.6 | 3.8 | 3.5 | 51 | 7.3 | | | 2.4 | 5.9 | 13.0 | 6.3 | 3.9 |
| 25 | 3.2 | 3.7 | 10.7 | 23 | 5.9 | 2.8 | 3.0 | 2.3 | 4.8 | 12.0 | 5.3 | 3.8 |
| 26 | 3.2 | 3.8 | 148 | 7.7 | 5.1 | | | 2.2 | 57 | 12.0 | 4.8 | 5.2 |
| 27 | 2.9 | 4.0 | 43 | 7.0 | 4.9 | | | 2.2 | 165 | 11.2 | 4.5 | 7.2 |
| 28 | 2.6 | 3.6 | 7.2 | 5.5 | 7.1 | | | 2.1 | 75 | 10.3 | 5.8 | 24.7 |
| 29 | 3.1 | 3.7 | 5.0 | 6.4 | 8.8 | | | ------- | 157 | 13.5 | 5.3 | 7.7 |
| 30 | 4.7 | 3.5 | 3.9 | 6.4 | 29 | | | ------- | 96 | 10.3 | 5.0 | 44 |
| 31 | 3.5 | 3.5 | ------- | 5.7 | ------- | | | ------- | 15.2 | ------- | 5.0 | ------- |

NOTE.—Braced figures give mean discharge for periods indicated; estimated by comparison with record of Kapaula Stream near Nahiku, Maui.

*Monthly discharge of Hanawi Stream near Nahiku, Maui, for the year ending June 30, 1925*

| Month | Discharge | | | | Total run-off | |
|---|---|---|---|---|---|---|
| | Million gallons a day | | | Second-feet (mean) | Million gallons | Acre-feet |
| | Maximum | Minimum | Mean | | | |
| July | 55 | 1.9 | 5.91 | 9.14 | 183 | 562 |
| August | 17.1 | 3.5 | 6.35 | 9.82 | 197 | 604 |
| September | 148 | 2.2 | 9.53 | 14.7 | 286 | 877 |
| October | 129 | 2.5 | 12.2 | 18.9 | 379 | 1,160 |
| November | 306 | 3.0 | 20.6 | 31.9 | 617 | 1,890 |
| December | 47 | ------- | 6.41 | 9.92 | 199 | 610 |
| January | 102 | ------- | 10.7 | 16.6 | 331 | 1,020 |
| February | ------- | ------- | 4.60 | 7.12 | 129 | 395 |
| March | 165 | 1.9 | 28.3 | 43.8 | 876 | 2,690 |
| April | 141 | 10.3 | 27.7 | 42.9 | 830 | 2,550 |
| May | 17.9 | 4.5 | 7.53 | 11.7 | 233 | 716 |
| June | 44 | 3.8 | 9.46 | 14.6 | 284 | 871 |
| The year | 306 | ------- | 12.4 | 19.2 | 4.540 | 13,900 |

### KAPAULA STREAM NEAR NAHIKU, MAUI

LOCATION.—150 feet above Koolau ditch intake, 300 feet above ditch trail, 2½ miles southwest of Nahiku post office, and 6 miles east of Upper Keanae.

RECORDS AVAILABLE.—November 1, 1921, to June 30, 1925.

GAGE.—Stevens continuous water-stage recorder.

DISCHARGE MEASUREMENTS.—Made by wading or from suspension footbridge at gage.

CHANNEL AND CONTROL.—One channel at all stages; fairly straight for 75 feet above gage and curving to right over a series of falls below. Banks nearly perpendicular for 20 feet with little vegetation. Control is rock ledge; permanent.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, about 694 million gallons a day, or 1,070 second-feet, at 9.30 a. m. October 16 (gage-height, 7.29 feet); minimum discharge, 1.2 million gallons a day, or 1.9 second-feet, for several hours July 4–7, September 20–24, March 3, and March 16–18 (gage height, 0.50 foot).

1921–1925: Maximum discharge from extension of rating curve, about 868 million gallons a day, or 1,340 second-feet, at 2.45 a. m. December 13, 1921 (gage height, 8.45 feet); minimum discharge, 0.9 million gallons a day, or 1.4 second-feet for several hours July 15–18, 20, and 21, 1922 (gage height, 0.45 foot).

DIVERSIONS.—None above station.

REGULATION.—None.

OBJECT OF STATION.—To determine amount of water diverted into 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 between 1.5 and 30 million gallons a day; extension above 30 million gallons a day uncertain. Operation of water-stage recorder satisfactory except as indicated in footnote to daily-discharge table. 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 only fair.

The following discharge measurements were made:

September 7, 1924: Gage height, 0.56 foot; discharge, 2.54 second-feet, or 1.64 million gallons a day.

April 4, 1925: Gage height, 1.41 feet; discharge, 35.8 second-feet, or 23.1 million gallons a day.

*Discharge, in million gallons a day, of Kapaula Stream near Nahiku, Maui, for the year ending June 30, 1925*

| Day | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1.3 | | | 2.0 | 2.9 | 24 | 1.5 | 1.4 | 1.3 | 39 | 14.0 | 3.1 |
| 2 | 1.4 | | | 1.8 | 2.4 | 3.8 | 2.1 | 1.4 | 1.3 | 28 | 13.6 | 2.8 |
| 3 | 1.4 | | | 1.6 | 2.2 | 3.1 | 1.8 | 1.4 | 1.6 | 15.4 | 6.1 | 13.5 |
| 4 | 1.3 | | 2.0 | 1.8 | 2.0 | 2.7 | 2.0 | 1.4 | 1.8 | 18.2 | 5.2 | 35 |
| 5 | 1.3 | | | 1.7 | 1.9 | 2.4 | 3.1 | 1.4 | 1.6 | 28 | 7.8 | 11.0 |
| 6 | 1.2 | | | 1.7 | 1.8 | 2.3 | 5.5 | 1.4 | 1.4 | 25 | 5.6 | 7.4 |
| 7 | 1.3 | | | 1.8 | 1.7 | 2.2 | 10.9 | 1.4 | 1.4 | 76 | 5.4 | 4.3 |
| 8 | 1.6 | | 1.7 | 1.6 | 1.8 | 2.1 | 53 | 1.4 | 1.4 | 23 | 5.2 | 3.5 |
| 9 | 1.6 | | 1.6 | 3.2 | 1.8 | 2.1 | 73 | 6.5 | 1.3 | 25 | 5.8 | 3.0 |
| 10 | 1.4 | | 1.6 | 2.0 | 1.7 | 2.0 | 41 | 35 | 1.4 | 38 | 9.8 | 2.9 |
| 11 | 1.4 | 7.0 | 1.6 | 2.8 | 1.8 | 1.9 | 10.7 | 4.9 | 3.0 | 41 | 5.8 | 2.7 |
| 12 | 1.4 | | 1.5 | 2.3 | 1.8 | 33 | 4.4 | 5.4 | 1.8 | 22 | 5.4 | 3.9 |
| 13 | 1.6 | | 1.4 | 2.2 | 1.7 | 7.0 | 3.6 | 3.2 | 1.5 | 22 | 5.1 | 3.4 |
| 14 | 1.6 | | 1.4 | 1.8 | 1.7 | 3.0 | 3.4 | 11.8 | 1.4 | 13.7 | 4.0 | 10.1 |
| 15 | 4.0 | | 1.4 | 1.7 | 1.7 | 2.6 | 3.1 | 4.9 | 1.4 | 40 | 4.1 | 32 |
| 16 | 16.8 | | 1.4 | 109 | 1.7 | 2.2 | 2.8 | 2.9 | 1.2 | 69 | 4.1 | 5.4 |
| 17 | 6.0 | | 1.4 | 4.2 | 1.7 | 2.0 | 2.4 | 2.1 | 1.2 | 132 | 5.4 | 4.1 |
| 18 | 6.6 | | 1.4 | 7.3 | 1.7 | 1.9 | 2.1 | 1.8 | 28 | 42 | 14.2 | 4.8 |
| 19 | 4.2 | | 1.4 | 13.7 | 1.6 | 1.9 | 2.0 | 1.7 | 32 | 23 | 8.7 | 6.8 |
| 20 | 33 | | 1.3 | 6.2 | 64 | 1.8 | 2.4 | 1.7 | 66 | 12.7 | 4.4 | 3.9 |
| 21 | 50 | | 1.4 | 13.3 | 271 | 1.7 | 2.7 | 1.6 | 90 | 9.9 | 3.8 | 3.1 |
| 22 | 10.8 | | 1.3 | 29 | 65 | 1.7 | 2.2 | 1.6 | 33 | 8.4 | 23 | 2.7 |
| 23 | 3.8 | | 1.3 | 38 | 4.7 | 1.6 | 2.4 | 1.5 | 8.6 | 7.5 | 7.4 | 2.3 |
| 24 | | | 2.0 | 58 | 3.4 | 1.5 | 2.2 | 1.4 | 4.1 | 7.3 | 4.7 | 2.2 |
| 25 | | | 13.5 | 26 | 2.7 | 1.5 | 1.8 | 1.4 | 4.2 | 6.9 | 3.6 | 2.2 |
| 26 | | 2.6 | 139 | 4.9 | 2.4 | 1.5 | 1.8 | 1.4 | 66 | 8.1 | 3.1 | 2.7 |
| 27 | 2.3 | | 25 | 4.9 | 2.2 | 1.4 | 1.6 | 1.4 | 129 | 6.5 | 2.9 | 6.1 |
| 28 | | | 5.0 | 3.9 | 4.8 | 1.4 | 1.7 | 1.3 | 62 | 5.9 | 3.8 | 36 |
| 29 | | | 3.0 | 5.4 | 6.3 | 1.4 | 1.7 | ------- | 128 | 12.3 | 4.1 | 6.0 |
| 30 | | | 2.3 | 4.9 | 35 | 1.4 | 1.6 | ------- | 80 | 7.1 | 4.0 | 52 |
| 31 | | | ------- | 3.5 | ------- | 1.4 | 1.5 | ------- | 15.2 | ------- | 4.0 | ------- |

NOTE.—Braced figures give mean discharge for periods indicated; estimated by comparison with record of flow for Hanawi Stream near Nahiku, Maui.

*Monthly discharge of Kapaula Stream near Nahiku, Maui, for the year ending June 30, 1925*

| Month | Discharge | | | | Total run-off | |
|---|---|---|---|---|---|---|
| | Million gallons a day | | | Second-feet (mean) | Million gallons | Acre-feet |
| | Maximum | Minimum | Mean | | | |
| July | 50 | ---------- | 5.59 | 8.65 | 173 | 532 |
| August | ---------- | ---------- | 5.44 | 8.42 | 169 | 517 |
| September | 139 | ---------- | 7.56 | 11.7 | 227 | 696 |
| October | 109 | 1.6 | 11.7 | 18.1 | 362 | 1,110 |
| November | 271 | 1.6 | 16.6 | 25.7 | 497 | 1,530 |
| December | 33 | 1.4 | 3.89 | 6.02 | 120 | 370 |
| January | 73 | 1.5 | 8.13 | 12.6 | 252 | 773 |
| February | 35 | 1.3 | 3.74 | 5.79 | 105 | 321 |
| March | 129 | 1.2 | 24.9 | 38.5 | 772 | 2,370 |
| April | 132 | 5.9 | 27.1 | 41.9 | 813 | 2,500 |
| May | 23 | 2.9 | 6.58 | 10.2 | 204 | 626 |
| June | 52 | 2.2 | 9.30 | 14.4 | 279 | 856 |
| The year | 271 | ---------- | 10.9 | 16.9 | 3,970 | 12,200 |

**KOOLAU DITCH AT NAHIKU WEIR, NEAR NAHIKU, MAUI**

LOCATION.—Between Kapaula and Waiohue Streams, three-quarters of a mile southwest of Nahiku post office, 6 miles east of Upper Keanae, and 12 miles by road and trail west of Hana.

RECORDS AVAILABLE.—February 12, 1919, to June 30, 1925. Gage readings made by East Maui Irrigation Co. available January 1, 1912, to February 11, 1919.

GAGE.—Stevens continuous water-stage recorder since April 27, 1922, when the Geological Survey began operating the station. Prior to that date Friez 7-day water-stage recorder was used, but discharge record was determined from twice-daily staff gage readings made by East Maui Irrigation Co.'s ditchman.

DISCHARGE MEASUREMENTS.—Made by weir at gage (see under "Channel and control") or from plank across ditch near gage.

CHANNEL AND CONTROL.—Open concrete-lined ditch below weir. Gage operates in weir basin into which the water discharges from a tunnel. Control formed by sharp-crested rectangular weir, 13.1 feet long, installed February 12, 1919; has complete end contractions and a free fall at all stages; velocity of approach negligible.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 41 million gallons a day, or 63 second-feet, at 8.30 a. m. November 21 (gage height, 1.33 feet); minimum discharge, no flow from 12.45 p. m. September 26 to 9.30 a. m. September 27, when intake gates were closed.

1919–1925: Maximum discharge recorded, 47.8 million gallons a day, or 74.0 second-feet, in morning of September 3, 1919 (gage height, 1.48 feet); minimum, no flow, occasionally, when intake gates are closed.

DIVERSIONS.—None near station except spillways.

REGULATION.—By gates at intervals.

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. Weir rating curve well defined. 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.

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 the irrigation of sugar cane, the development of power, and for domestic use on the plantations of Hawaiian Commercial & Sugar Co., and Maui Agricultural Co. The system comprises about 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.

No discharge measurements were made at this station during the year.

*Discharge, in million gallons a day, of Koolau ditch at Nahiku Weir, near Nahiku, Maui, for the year ending June 30, 1925*

| Day | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 5.1 | 21 | 10.4 | 13.6 | 17.8 | 34 | 8.4 | 9.0 | 6.8 | 30 | 36 | 14.6 |
| 2 | 5.1 | 24 | 10.1 | 11.6 | 17.1 | 26 | 9.8 | 8.7 | 6.6 | 30 | 36 | 14.2 |
| 3 | 4.9 | 18.9 | 9.8 | 10.7 | 16.4 | 23 | 7.9 | 8.1 | 8.1 | 30 | 32 | 30 |
| 4 | 4.9 | 26 | 9.3 | 10.7 | 15.6 | 21 | 8.4 | 7.6 | 8.4 | 32 | 28 | 36 |
| 5 | 4.7 | 26 | 9.0 | 9.8 | 15.3 | 19.9 | 12.3 | 7.3 | 7.3 | 32 | 32 | 34 |
| 6 | 4.7 | 19.9 | 8.7 | 9.5 | 14.6 | 20 | 16.6 | 7.1 | 6.8 | 32 | 28 | 30 |
| 7 | 4.7 | 16.4 | 8.7 | 9.5 | 13.9 | 18.9 | 14.3 | 6.8 | 6.8 | 34 | 26 | 24 |
| 8 | 6.8 | 23 | 8.1 | 8.4 | 13.6 | 18.1 | 30 | 6.8 | 6.6 | 34 | 26 | 21 |
| 9 | 5.9 | 26 | 7.6 | 16.2 | 13.6 | 17.4 | 32 | 9.7 | 6.3 | 34 | 26 | 18.9 |
| 10 | 4.9 | 28 | 7.3 | 11.3 | 12.6 | 16.0 | 30 | 30 | 6.6 | 34 | 29 | 17.1 |
| 11 | 4.9 | 28 | 7.3 | 15.0 | 11.9 | 15.0 | 24 | 20 | 13.6 | 34 | 25 | 15.6 |
| 12 | 5.2 | 24 | 6.8 | 12.3 | 11.3 | 26 | 17.8 | 17.0 | 9.0 | 34 | 24 | 20 |
| 13 | 5.6 | 19.6 | 6.8 | 12.0 | 10.7 | 26 | 15.6 | 15.1 | 7.9 | 34 | 23 | 18.1 |
| 14 | 5.4 | 16.7 | 6.6 | 9.8 | 10.4 | 17.4 | 15.0 | 22 | 7.3 | 34 | 19.9 | 23 |
| 15 | 10.1 | 16.0 | 6.3 | 9.3 | 10.1 | 15.3 | 14.6 | 17.8 | 6.8 | 34 | 19.6 | 36 |
| 16 | 27 | 19.8 | 6.1 | 32 | 9.5 | 13.9 | 12.9 | 12.9 | 6.6 | 34 | 18.5 | 24 |
| 17 | 20 | 26 | 5.9 | 23 | 9.0 | 12.9 | 12.3 | 11.0 | 6.3 | 36 | 21 | 21 |
| 18 | 17.4 | 28 | 5.6 | 28 | 8.7 | 12.3 | 11.3 | 9.8 | 14.4 | 34 | 34 | 22 |
| 19 | 14.2 | 24 | 5.4 | 28 | 8.4 | 11.6 | 11.0 | 9.0 | 25 | 34 | 30 | 25 |
| 20 | 21 | 20 | 5.4 | 21 | 17.0 | 11.0 | 12.3 | 8.7 | 32 | 34 | 22 | 19.2 |
| 21 | 34 | 19.2 | 5.4 | 26 | 38 | 10.7 | 12.6 | 8.4 | 32 | 34 | 19.2 | 16.7 |
| 22 | 32 | 17.1 | 5.1 | 29 | 34 | 10.1 | 12.0 | 7.9 | 32 | 36 | 33 | 15.6 |
| 23 | 22 | 15.3 | 5.1 | 34 | 28 | 9.5 | 12.6 | 7.9 | 30 | 34 | 28 | 14.6 |
| 24 | 17.4 | 13.9 | 8.9 | 36 | 22 | 9.0 | 12.3 | 7.3 | 24 | 34 | 23 | 13.9 |
| 25 | 14.6 | 12.9 | 26 | 34 | 18.5 | 8.7 | 11.3 | 7.1 | 19.6 | 34 | 19.2 | 12.9 |
| 26 | 13.6 | 12.9 | 17.1 | 28 | 17.1 | 8.4 | 10.7 | 7.1 | 32 | 34 | 17.1 | 16.4 |
| 27 | 12.3 | 12.9 | 19.1 | 24 | 15.3 | 7.9 | 10.1 | 7.1 | 32 | 32 | 15.6 | 23 |
| 28 | 11.3 | 11.6 | 28 | 21 | 19.4 | 7.6 | 10.7 | 6.8 | 32 | 32 | 17.1 | 34 |
| 29 | 11.3 | 11.6 | 21 | 22 | 24 | 7.1 | 10.7 | ------- | 32 | 34 | 16.7 | 28 |
| 30 | 17.5 | 11.0 | 16.4 | 22 | 31 | 6.6 | 9.8 | ------- | 32 | 34 | 17.1 | 36 |
| 31 | 14.6 | 10.7 | ------- | 19.2 | ------- | 6.8 | 9.3 | ------- | 30 | ------- | 17.4 | ------- |

*Monthly discharge of Koolau ditch at Nahiku Weir, near Nahiku, Maui, for the year ending June 30, 1925*

| Month | Discharge | | | | Total run-off | |
|---|---|---|---|---|---|---|
| | Million gallons a day | | | Second-feet (mean) | Million gallons | Acre-feet |
| | Maximum | Minimum | Mean | | | |
| July | 34 | 4.7 | 12.4 | 19.2 | 383 | 1,180 |
| August | 28 | 11.0 | 19.4 | 30.0 | 600 | 1,840 |
| September | 28 | 5.1 | 10.1 | 15.6 | 303 | 931 |
| October | 36 | 8.4 | 19.3 | 29.9 | 597 | 1,830 |
| November | 38 | 8.4 | 16.8 | 26.0 | 505 | 1,550 |
| December | 34 | 6.6 | 15.1 | 23.4 | 468 | 1,440 |
| January | 32 | 7.9 | 14.1 | 21.8 | 439 | 1,350 |
| February | 30 | 6.8 | 10.9 | 16.9 | 304 | 933 |
| March | 32 | 6.3 | 17.0 | 26.3 | 527 | 1,620 |
| April | 36 | 30 | 33.4 | 51.7 | 1,000 | 3,080 |
| May | 36 | 15.6 | 24.5 | 37.9 | 759 | 2,330 |
| June | 36 | 12.9 | 22.5 | 34.8 | 675 | 2,070 |
| The year | 38 | 4.7 | 18.0 | 27.9 | 6,560 | 20,200 |

### WAIOHUE STREAM NEAR NAHIKU, MAUI

LOCATION.—200 feet above Koolau ditch intake, 300 feet above ditch trail, 4 miles southwest of Nahiku post office, and 5 miles east of Upper Keanae.

RECORDS AVAILABLE.—October 9, 1921, to June 30, 1925.

GAGE.—Stevens continuous water-stage recorder.

DISCHARGE MEASUREMENTS.—Made by wading.

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

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, about 495 million gallons a day, or 766 second-feet, at 10.15 a. m. October 16 (gage height, 5.30 feet); minimum discharge, 2.3 million gallons a day, or 3.6 second-feet, at 5.30 p. m. July 7 (gage height, 0.62 foot).

1921–1925: Maximum discharge recorded, about 630 million gallons a day, or 975 second-feet, at 3 a. m. December 13, 1921 (gage height, 6.23 feet); minimum discharge, 1.9 million gallons a day, or 2.9 second-feet, for several hours July 15–23, 1922 (gage height, 0.55 foot).

DIVERSIONS.—None above station.

REGULATION.—None.

OBJECT OF STATION.—To determine amount of water diverted into 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 between 2.5 and 30 million gallons a day; extension above 30 million gallons a day uncertain. 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 and high stages, for which they are fair.

*Discharge measurements of Waiohue Stream near Nahiku, Maui, during the year ending June 30, 1925*

| Date | Gage height (feet) | Discharge | |
|---|---|---|---|
| | | Second-feet | Million gallons a day |
| July 22 | 1.01 | 10.1 | 6.53 |
| Apr. 2 | 1.36 | 26.4 | 17.1 |
| May 22 | 1.42 | 27.8 | 18.0 |

*Discharge, in million gallons a day, of Waiohue Stream near Nahiku, Maui, for the year ending June 30, 1925*

| Day | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2.5 | 8.4 | 4.2 | 3.4 | 6.1 | | | 3.2 | 3.0 | 24 | | 5.0 |
| 2 | 2.5 | 6.8 | 4.1 | 3.5 | 5.6 | 7.5 | 3.9 | 3.2 | 2.9 | 17.2 | | 5.0 |
| 3 | 2.5 | 5.6 | 4.0 | 3.5 | 5.1 | | 3.2 | 3.2 | 3.6 | 14.4 | | 15.0 |
| 4 | 2.4 | 12.3 | 3.9 | 3.9 | 4.8 | | 3.5 | 3.0 | 3.4 | 15.9 | | 22 |
| 5 | 2.4 | 7.2 | 3.7 | 3.6 | 4.6 | | 4.1 | 3.0 | 3.1 | 18.1 | | 10.8 |
| 6 | 2.4 | 5.4 | 3.8 | 3.6 | 4.5 | | 4.0 | 2.9 | 2.9 | 14.8 | | 7.6 |
| 7 | 2.4 | 5.1 | 3.7 | 3.9 | 4.2 | 4.4 | 4.0 | 2.9 | 3.0 | 35 | | 6.1 |
| 8 | 3.2 | 9.6 | 3.4 | 3.5 | 4.1 | | 14.8 | 2.9 | 2.7 | 13.6 | | 5.8 |
| 9 | 2.6 | 9.2 | 3.3 | 5.0 | 4.0 | | 23 | 7.4 | 2.7 | 15.1 | | 5.8 |
| 10 | 2.5 | 8.2 | 3.2 | 3.7 | 3.8 | | 15.0 | 19.6 | 3.0 | 20 | | 5.4 |
| 11 | 2.4 | 8.8 | 3.2 | 4.7 | 3.6 | | 5.9 | 4.6 | 5.5 | 2.1 | 7.0 | 5.0 |
| 12 | 2.7 | 6.1 | 3.1 | 4.0 | 3.5 | | 5.6 | 14.7 | 3.6 | 14.0 | | 6.8 |
| 13 | 2.7 | 5.4 | 3.1 | 3.9 | 3.5 | | 5.3 | 5.3 | 2.9 | 14.0 | | 5.9 |
| 14 | 2.6 | 5.1 | 3.0 | 3.5 | 3.4 | 6.5 | 5.1 | 6.4 | 2.8 | 10.6 | | 9.9 |
| 15 | 3.7 | 5.6 | 2.9 | 3.4 | 3.3 | | 5.0 | 4.7 | 2.7 | 22 | | 14.5 |
| 16 | 10.8 | 11.2 | 2.8 | 66 | 3.2 | | 4.7 | 3.9 | 2.7 | 32 | | 5.9 |
| 17 | 5.5 | 10.6 | 2.8 | 4.7 | 3.2 | | 4.6 | 3.7 | 2.6 | 60 | | 5.8 |
| 18 | 4.6 | 13.0 | 2.7 | 7.2 | 3.2 | | 4.4 | 3.6 | 15.4 | 22 | | 6.4 |
| 19 | 3.7 | 6.9 | 2.7 | 7.8 | | | 4.4 | 3.5 | 10.7 | 15.4 | | 6.4 |
| 20 | 19.1 | 6.2 | 2.6 | 4.9 | | | 4.6 | 3.5 | 25 | 12.4 | | 5.4 |
| 21 | 17.5 | 6.1 | 2.7 | 8.1 | 38 | | 4.2 | 3.5 | 47 | 10.6 | | 5.0 |
| 22 | 7.7 | 5.6 | 2.6 | 15.6 | | | 4.3 | 3.5 | 14.5 | 9.2 | | 4.6 |
| 23 | 4.7 | 5.3 | 2.6 | 18.2 | | | 4.4 | 3.4 | 6.4 | 8.0 | 7.4 | 4.5 |
| 24 | 4.6 | 5.0 | 4.3 | 30 | | 3.4 | 4.0 | 3.3 | 5.1 | 7.4 | 6.1 | 4.4 |
| 25 | 4.6 | 4.8 | 8.0 | 16.7 | | | 3.7 | 3.2 | 5.6 | 6.8 | 5.4 | 4.2 |
| 26 | 5.0 | 4.8 | 88 | 7.6 | | | 3.7 | 3.2 | 29 | 7.6 | 5.3 | 6.0 |
| 27 | 4.7 | 5.0 | 10.6 | 7.6 | | | 3.6 | 3.1 | 67 | 6.2 | 5.1 | 6.0 |
| 28 | 4.6 | 4.6 | 4.6 | 6.8 | 11 | | 3.7 | 3.1 | 28 | 6.8 | 5.3 | 16.4 |
| 29 | 5.1 | 4.6 | 3.8 | 8.0 | | | 3.6 | ------- | 72 | 7.0 | 5.1 | 7.3 |
| 30 | 6.3 | 4.5 | 3.5 | 7.2 | | | 3.4 | ------- | 37 | | 5.8 | 30 |
| 31 | 5.0 | 4.2 | ------- | 6.6 | ------ | | 3.3 | ------- | 14.0 | ------- | 5.9 | ------- |

NOTE.—Braced figures give mean discharge for periods indicated; estimated by comparison with record of flow for East Wailuaiki Stream near Keanae, Maui.

*Monthly discharge of Waiohue Stream near Nahiku, Maui, for the year ending June 30, 1925*

| Month | Discharge | | | | Total run-off | |
|---|---|---|---|---|---|---|
| | Million gallons a day | | | Second-feet (mean) | Million gallons | Acre-feet |
| | Maximum | Minimum | Mean | | | |
| July | 19.1 | 2.4 | 4.94 | 7.64 | 153 | 470 |
| August | 13.0 | 4.2 | 6.81 | 10.5 | 211 | 648 |
| September | 88 | 2.6 | 6.56 | 10.1 | 197 | 604 |
| October | 66 | 3.4 | 9.04 | 14.0 | 280 | 860 |
| November | ---------- | 3.2 | 13.2 | 20.4 | 395 | 1,210 |
| December | ---------- | ---------- | 4.62 | 7.15 | 143 | 440 |
| January | 23 | 3.2 | 5.51 | 8.53 | 171 | 524 |
| February | 19.6 | 2.9 | 4.70 | 7.27 | 132 | 404 |
| March | 72 | 2.6 | 13.9 | 21.5 | 430 | 1,320 |
| April | 60 | 6.2 | 16.3 | 25.2 | 488 | 1,500 |
| May | ---------- | 5.1 | 6.63 | 10.3 | 205 | 630 |
| June | 30 | 4.2 | 8.30 | 12.8 | 249 | 764 |
| The year | ---------- | 2.4 | 8.37 | 13.0 | 3,050 | 9,370 |

### WEST KOPILIULA STREAM NEAR KEANAE, MAUI

LOCATION.—600 feet above Koolau ditch crossing and highway bridge, 4½ miles by trail east of Upper Keanae, and 7 miles east of Keanae post office.

RECORDS AVAILABLE.—January 3, 1914, to September 17, 1917, and October 1, 1921, to June 30, 1925.

GAGE.—Stevens continuous water-stage recorder at same datum as Friez recorder used prior to September 17, 1917.

DISCHARGE MEASUREMENTS.—Made from suspension footbridge 200 feet below gage or by wading.

CHANNEL AND CONTROL.—Channel at gage is pool at foot of falls but is straight for 200 feet below gage and divided above. Stream bed composed of loose boulders. Left bank covered with vegetation and subject to overflow; right bank steep. Control composed of medium-sized boulders; shifts during floods.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, about 1,390 million gallons a day, or 2,150 second-feet, at 8 a. m. October 16 (gage height, 7.03 feet); minimum discharge 1.9 million gallons a day, or 2.9 second feet, several hours July 5 and 11 (gage height, 1.23 feet).

1914–1917; 1921–1925: 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, 9.25 feet); minimum discharge, 0.6 million gallons a day, or 0.8 second-foot, September 15–17, 1917 (gage height, 0.6 foot).

DIVERSIONS.—None.

REGULATION.—None.

OBJECT OF STATION.—To determine amount of water diverted into 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, presumably, at time of flood March 27. Two rating curves used fairly well defined between 2 and 700 million gallons a day; extension above 700 million gallons a day uncertain. 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 and high stages, for which they are fair.

*Discharge measurements of West Kopiliula Stream near Keanae, Maui, during the year ending June 30, 1925*

| Date | Gage height (feet) | Discharge | |
|---|---|---|---|
| | | Second-feet | Million gallons a day |
| July 22 | 1.98 | 20.9 | 13.5 |
| Sept. 8 | 1.39 | 4.49 | 2.90 |
| Jan. 3 | 1.40 | 4.81 | 3.11 |

*Discharge, in million gallons a day, of West Kopiliula Stream near Keanae, Maui, for the year ending June 30, 1925*

| Day | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2.1 | 8.6 | 3.5 | 3.7 | 5.4 | | | 3.0 | 2.9 | 81 | 16.0 | 6.3 |
| 2 | 2.1 | 8.0 | 3.4 | 3.4 | 5.0 | 18 | 3.9 | 3.0 | 2.9 | 60 | 15.7 | 6.5 |
| 3 | 2.2 | 5.4 | 3.2 | 3.2 | 4.7 | | 3.1 | 2.9 | 4.5 | 24 | 9.0 | 17.9 |
| 4 | 2.0 | 12.3 | 3.0 | 3.6 | 4.4 | | 3.9 | 2.8 | 3.8 | 24 | 8.5 | 42 |
| 5 | 1.9 | 6.7 | 2.9 | 3.2 | 4.1 | | 5.2 | 2.8 | 3.0 | 38 | 11.0 | 15.2 |
| 6 | 2.1 | 4.6 | 3.1 | 3.2 | 3.9 | 4.2 | 8.7 | 2.7 | 2.7 | 38 | 8.8 | 11.7 |
| 7 | 2.2 | 4.2 | 3.4 | 3.2 | 3.7 | | 12.3 | | 2.8 | 133 | 8.1 | 8.3 |
| 8 | 3.3 | 9.1 | 3.9 | 2.9 | 3.7 | | 135 | | 2.6 | 38 | 8.5 | 7.2 |
| 9 | 2.3 | 11.3 | 2.9 | 3.6 | 3.7 | | 210 | | 2.7 | 27 | 9.0 | 7.0 |
| 10 | 2.1 | 15.4 | 2.7 | 3.0 | 3.4 | | 109 | | 3.5 | 43 | 13.1 | 6.3 |
| 11 | 2.0 | 17.8 | 2.7 | 3.7 | 3.2 | | 25 | | 6.1 | 57 | 9.6 | 5.7 |
| 12 | 2.8 | 8.5 | 2.6 | 3.2 | | | 9.8 | | 3.1 | 28 | 9.4 | 7.6 |
| 13 | 2.9 | 6.0 | 2.6 | 3.1 | | | 7.5 | 11 | 2.9 | 29 | 8.8 | 7.2 |
| 14 | 2.6 | 5.0 | 2.6 | 2.8 | | 14 | 5.9 | | 2.6 | 19.9 | 7.4 | 17.0 |
| 15 | 7.8 | 5.6 | 2.5 | 3.9 | 3.1 | | 5.3 | | 2.6 | 50 | 8.3 | 42 |
| 16 | 21 | 41 | 2.5 | 244 | | | 4.8 | | 2.5 | 109 | 7.5 | 10.7 |
| 17 | 7.7 | 37 | 2.5 | 10.7 | | | 4.6 | | 2.6 | 243 | 9.6 | 8.8 |
| 18 | 11.7 | 15.1 | 2.4 | 9.6 | | | 4.2 | | 49 | 80 | 18.0 | 10.6 |
| 19 | 6.1 | 7.7 | 2.4 | 19.9 | | | 4.7 | | 53 | 42 | 12.7 | 11.9 |
| 20 | 53 | 6.2 | 2.4 | 11.3 | | | 5.3 | 3.8 | 157 | 19.9 | 8.1 | 7.5 |
| 21 | 90 | 6.4 | 2.6 | 19.9 | 120 | | 4.7 | 3.6 | 180 | 15.6 | 7.7 | 7.0 |
| 22 | 18.9 | 5.2 | 2.3 | 43 | | | 4.6 | 3.4 | 60 | 12.8 | 30 | 6.3 |
| 23 | 6.7 | 4.8 | 2.3 | 65 | | | 4.7 | 3.5 | 13.8 | 11.3 | 12.2 | 6.0 |
| 24 | 4.4 | 4.7 | 4.3 | 98 | | 3.4 | 4.2 | 3.4 | 8.1 | 10.4 | 9.0 | 5.7 |
| 25 | 3.9 | 4.3 | 14.5 | 46 | | | 3.8 | 3.2 | 7.2 | 9.4 | 7.5 | 5.3 |
| 26 | 3.7 | 4.6 | 267 | 12.0 | | | 3.7 | 3.1 | 109 | 10.1 | 7.0 | 9.6 |
| 27 | 3.4 | 4.7 | 61 | 9.0 | | | 3.5 | 3.0 | 311 | 8.3 | 6.8 | 11.8 |
| 28 | 3.2 | 3.9 | 9.6 | 7.1 | 9.0 | | 3.7 | 2.9 | 147 | 8.3 | 10.2 | 52 |
| 29 | 4.3 | 4.0 | 5.8 | 8.5 | | | 3.6 | ------- | 302 | 13.0 | 7.9 | 12.4 |
| 30 | 7.7 | 3.7 | 4.8 | 7.3 | | | 3.3 | ------- | 134 | 9.2 | 7.7 | 69 |
| 31 | 4.7 | 3.6 | ------- | 6.2 | ------- | | 3.1 | ------- | 36 | ------- | 7.4 | ------- |

NOTE.—Braced figures give mean discharge for periods indicated; estimated from comparison with records of East Wailuaiki Stream near Keanae, Maui.

*Monthly discharge of West Kopiliula Stream near Keanae, Maui, for the year ending June 30, 1925*

| Month | Discharge | | | | Total run-off | |
|---|---|---|---|---|---|---|
| | Million gallons a day | | | Second-feet (mean) | Million gallons | Acre-feet |
| | Maximum | Minimum | Mean | | | |
| July | 90 | 1.9 | 9.38 | 14.5 | 291 | 892 |
| August | 41 | 3.6 | 9.21 | 14.2 | 285 | 876 |
| September | 267 | 2.3 | 14.4 | 22.3 | 431 | 1,320 |
| October | 244 | 2.8 | 21.5 | 33.3 | 667 | 2,050 |
| November | ---------- | ---------- | 31.7 | 49.0 | 952 | 2,920 |
| December | ---------- | ---------- | 7.05 | 10.9 | 218 | 670 |
| January | 210 | 3.1 | 19.8 | 30.6 | 615 | 1,890 |
| February | ---------- | ---------- | 6.79 | 10.5 | 190 | 583 |
| March | 311 | 2.5 | 52.3 | 80.9 | 1,620 | 4,970 |
| April | 243 | 8.3 | 43.1 | 66.7 | 1,290 | 3,970 |
| May | 30 | 6.8 | 10.3 | 15.9 | 320 | 984 |
| June | 69 | 5.3 | 14.8 | 22.9 | 442 | 1,360 |
| The year | ---------- | ---------- | 20.1 | 31.1 | 7,330 | 22,500 |

### EAST WAILUAIKI STREAM NEAR KEANAE, MAUI

LOCATION.—1,000 feet above Koolau ditch crossing and trail, 3¾ miles east of Upper Keanae, and 6¼ miles east of Keanae post office.

RECORDS AVAILABLE.—December 21, 1913, to October 23, 1917, and July 1, 1922, to June 30, 1925. Fragmentary unpublished record October 21, 1921, to June 30, 1922.

GAGE.—Stevens continuous water-stage recorder; used at both old and new stations except for period December 21, 1913, to April 17, 1914, when Friez recorder was operated. Station was reestablished on October 21, 1921, at old location; flood of December 24, 1921, destroyed station and shifted channel; station moved upstream a short distance on April 25, 1922; landslide on May 1, 1922, demolished shelter; shelter repaired and recorder reinstalled July 9, 1922.

DISCHARGE MEASUREMENTS.—Made by wading 1,000 feet below gage near ditch intake or from footbridge 100 feet above ditch intake.

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

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 1,120 million gallons a day, or 1,730 second-feet, at 9 a. m. October 16 (gage height, 7.67 feet); minimum discharge, 2.7 million gallons a day, or 4.2 second-feet, from 9 p. m. March 8 to 6 a. m. March 9 (gage height, 0.48 foot).

1913–1917; 1922–1925; Maximum discharge recorded, from extension of rating curve, 1,900 million gallons a day, or 2,940 second-feet, at 8 a. m. January 18, 1916 (gage height, 8.35 feet); minimum discharge, 1.0 million gallons a day, or 1.6 second-feet, October 22 and 23, 1917 (gage height, 0.5 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 been the highest on record but, owing to destruction of station and loss of recorder, no data are available for determining the crest discharge.

DIVERSIONS.—None above station.

REGULATION.—None.

OBJECT OF STATION.—To determine amount of water diverted into 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 changed, presumably at time of flood October 16. Two rating curves used fairly well defined below 150 million gallons a day; extension above uncertain. 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 for high stages, for which they are fair.

*Discharge measurements of East Wailuaiki Stream near Keanae, Maui, during the year ending June 30, 1925*

| Date | Gage height (feet) | Discharge | | Date | Gage height (feet) | Discharge | |
|---|---|---|---|---|---|---|---|
| | | Second-feet | Million gallons a day | | | Second-feet | Million gallons a day |
| July 21 | 3.20 | 164 | 106 | Jan. 3 | 0.62 | 3.98 | 2.57 |
| Sept. 8 | .61 | 5.55 | 3.59 | Apr. 2 | 2.23 | 47.3 | 30.6 |
| Jan. 3 | .62 | 4.71 | 3.04 | May 22 | 2.86 | 114 | 73.7 |

*Discharge, in million gallons a day, of East Wailuaiki Stream near Keanae, Maui, for the year ending June 30 1925*

| Day | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2.8 | 12.2 | 4.2 | 4.1 | 5.7 | 41 | 4.0 | 3.2 | 2.9 | 56 | 15.3 | 6.7 |
| 2 | 2.7 | 11.9 | 4.0 | 3.7 | 5.3 | 7.8 | 5.0 | 3.1 | 3.0 | 50 | 15.9 | 6.7 |
| 3 | 2.8 | 7.4 | 3.8 | 3.4 | 4.8 | 6.3 | 3.5 | 3.0 | 4.9 | 19.0 | 9.8 | 18.8 |
| 4 | 2.6 | 18.3 | 3.6 | 3.8 | 4.6 | 5.4 | 4.5 | 3.0 | 4.4 | 21 | 9.2 | 44 |
| 5 | 2.6 | 10.4 | 3.5 | 3.3 | 4.3 | 4.9 | 6.1 | 2.9 | 3.2 | 30 | 12.2 | 16.0 |
| 6 | 2.7 | 6.6 | 3.6 | 3.2 | 4.2 | 4.6 | 9.6 | 2.9 | 2.9 | 27 | 9.8 | 11.8 |
| 7 | 2.8 | 5.8 | 4.2 | 3.2 | 4.0 | 4.4 | 13.4 | 2.9 | 2.9 | 121 | 9.1 | 9.1 |
| 8 | 4.3 | 13.2 | 3.5 | 2.9 | 4.0 | 4.2 | 111 | 2.9 | 2.8 | 28 | 8.9 | 7.9 |
| 9 | 3.2 | 16.4 | 3.3 | 3.4 | 4.0 | 4.0 | 173 | 10.1 | 2.9 | 23 | 9.8 | 7.5 |
| 10 | 2.7 | 20 | 3.1 | 3.0 | 3.6 | 3.9 | 89 | 50 | 3.9 | 34 | 13.3 | 6.8 |
| 11 | 2.6 | 23 | 3.1 | 3.8 | 3.5 | 3.8 | 18.5 | 9.7 | 8.0 | 46 | 11.0 | 6.4 |
| 12 | 3.5 | 10.4 | 3.0 | 3.3 | 3.4 | 54 | 9.1 | 19.8 | 3.7 | 21 | 9.8 | 8.2 |
| 13 | 4.7 | 7.2 | 2.9 | 3.3 | 3 3 | 24 | 7.2 | 7.8 | 3.1 | 21 | 9.1 | 7.6 |
| 14 | 3.5 | 6.3 | 2.9 | 2.9 | 3.2 | 7.1 | 6.1 | 32 | 3.0 | 15.0 | 7.9 | 21 |
| 15 | 11.7 | 7.1 | 2.8 | 3.5 | 3.1 | 5.1 | 6.2 | 12.2 | 2.9 | 41 | 8.5 | 40 |
| 16 | 28 | 37 | 2.7 | 198 | 3.0 | 4.3 | 5.1 | 6.8 | 2.8 | 92 | 7.9 | 10.4 |
| 17 | 10.6 | 63 | 2.9 | 11.9 | 3.0 | 4.0 | 4.7 | 5.0 | 2.9 | 221 | 9.8 | 9.1 |
| 18 | 16.3 | 19.8 | 2.7 | 10.2 | 2.9 | 3.8 | 4.3 | 4.3 | 58 | 63 | 17.8 | 10.8 |
| 19 | 7.9 | 9.9 | 2.6 | 21 | 2.9 | 3.8 | 5.2 | 3.8 | 41 | 30 | 13.5 | 12.0 |
| 20 | 53 | 7.9 | 2.8 | 9.8 | 91 | 3.5 | 5.5 | 3.5 | 134 | 16.0 | 9.1 | 7.9 |
| 21 | 77 | 7.6 | 3.0 | 23 | 482 | 4.1 | 5.4 | 3.3 | 142 | 13.3 | 8.5 | 7.2 |
| 22 | 23 | 6.4 | 2.6 | 38 | 130 | 3.7 | 4.7 | 3.2 | 62 | 11.8 | 35 | 6.8 |
| 23 | 8.1 | 5.7 | 2.6 | 52 | 12.3 | 3.3 | 5.2 | 3.2 | 14.9 | 10.4 | 12.6 | 6.3 |
| 24 | 5.9 | 5.5 | 4.9 | 89 | 7.8 | 3.2 | 4.6 | 3.2 | 9.1 | 9.8 | 9.8 | 5.8 |
| 25 | 5.0 | 5.1 | 21 | 39 | 6.2 | 3.0 | 3.9 | 3.0 | 7.9 | 9.1 | 8.5 | 5.5 |
| 26 | 4.8 | 5.5 | 235 | 11.8 | 5.4 | 3.0 | 3.7 | 3.0 | 91 | 9.8 | 7.9 | 11.0 |
| 27 | 4.2 | 5.6 | 63 | 9.1 | 4.8 | 3.0 | 3.5 | 2.9 | 249 | 8.5 | 7.6 | 12.7 |
| 28 | 3.8 | 4.6 | 11.5 | 7.2 | 6.9 | 2.9 | 4.0 | 2.9 | 138 | 7.9 | 10.6 | 54 |
| 29 | 5.1 | 4.6 | 6.6 | 8.2 | 10.2 | 2.9 | 3.8 | ------- | 207 | 13.8 | 8.5 | 11.7 |
| 30 | 11.3 | 4.2 | 4.7 | 7.4 | 44 | 2.8 | 3.4 | ------- | 129 | 9.1 | 7.9 | 70 |
| 31 | 6.7 | 4.1 | ------- | 6.3 | ------- | 2.9 | 3.3 | ------- | 28 | ------- | 7.6 | ------- |

*Monthly discharge of East Wailuaiki Stream near Keanae, Maui, for the year ending June 30, 1925*

| Month | Discharge | | | | Total run-off | |
|---|---|---|---|---|---|---|
| | Million gallons a day | | | Second-feet (mean) | Million gallons | Acre-feet |
| | Maximum | Minimum | Mean | | | |
| July | 77 | 2.6 | 10.5 | 16.2 | 326 | 1,000 |
| August | 63 | 4.1 | 12.0 | 18.6 | 373 | 1,140 |
| September | 235 | 2.6 | 14.0 | 21.7 | 420 | 1,290 |
| October | 198 | 2.9 | 19.1 | 29.6 | 593 | 1,820 |
| November | 482 | 2.9 | 29.1 | 45.0 | 873 | 2,680 |
| December | 54 | 2.8 | 7.57 | 11.7 | 235 | 720 |
| January | 173 | 3.3 | 17.3 | 26.8 | 536 | 1,650 |
| February | 50 | 2.9 | 7.63 | 11.8 | 214 | 656 |
| March | 249 | 2.8 | 44.2 | 68.4 | 1,370 | 4,210 |
| April | 221 | 7.9 | 36.0 | 55.7 | 1,080 | 3,310 |
| May | 35 | 7.6 | 11.0 | 17.0 | 342 | 1,050 |
| June | 70 | 5.5 | 15.3 | 23.7 | 460 | 1,410 |
| The year | 482 | 2.6 | 18.7 | 28.9 | 6,820 | 20,900 |

**WEST WAILUAIKI STREAM NEAR KEANAE, MAUI**

LOCATION.—500 feet above Koolau ditch crossing and trail bridge, 3 miles east of Upper Keanae, and 5½ miles east of Keanae post office.

RECORDS AVAILABLE.—January 1, 1914, to October 22, 1917, and November 1, 1921, to June 30, 1925.

GAGE.—Stevens continuous water-stage recorder. Datum unchanged.

DISCHARGE MEASUREMENTS.—Made from suspension footbridge 90 feet below station or by wading.

CHANNEL AND CONTROL.—Gage on a pool at base of a fall. Control at outlet of pool composed of boulders and rock ledge; permanent. Banks are nearly vertical rock walls; not subject to overflow.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, about 2,560 million gallons a day, or 3,960 second-feet, at 10.15 a. m. October 16 (gage height, 10.46 feet); minimum discharge, 1.2 million gallons a day, or 1.9 second-feet, several hours July 5 and 6 (gage height, 0.54 foot).

1914–1917; 1921–1925: 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.—None above station.

REGULATION.—None.

OBJECT OF STATION.—To determine amount of water diverted into 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 permanent during year. Rating curve fairly well defined below 500 million gallons a day; extension above this quantity uncertain. 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 ordinary stages; high-stage records poor.

The following discharge measurements were made:

September 8, 1924: Gage height, 0.78 foot; discharge, 5.19 second-feet, or 3.35 million gallons a day.

April 3, 1925: Gage height, 1.82 feet; discharge, 47.5 second-feet, or 30.7 million gallons a day.

*Discharge, in million gallons a day, of West Wailuaiki Stream near Keanae, Maui, for the year ending June 30, 1925*

| Day | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1.8 | 12.3 | 4.2 | 5.4 | 6.0 | 61 | 4.4 | 3.1 | 2.7 | 91 | 17.7 | 6.4 |
| 2 | 1.6 | 12.9 | 4.1 | 4.6 | 5.4 | 10.8 | 5.1 | 2.9 | 2.9 | 67 | 17.2 | 6.2 |
| 3 | 1.8 | 8.8 | 3.9 | 4.1 | 5.0 | 7.9 | 3.7 | 2.9 | 5.0 | 26 | 9.6 | 19.6 |
| 4 | 1.4 | 16.8 | 3.5 | 4.3 | 4.6 | 6.4 | 4.4 | 2.7 | 5.4 | 25 | 9.0 | 51 |
| 5 | 1.3 | 11.3 | 3.4 | 3.9 | 4.4 | 5.8 | 6.0 | 2.6 | 3.4 | 45 | 12.2 | 19.4 |
| 6 | 1.7 | 7.4 | 3.6 | 3.5 | 4.1 | 5.3 | 11.9 | 2.4 | 2.6 | 41 | 9.4 | 14.2 |
| 7 | 1.7 | 6.5 | 5.3 | 3.6 | 3.9 | 4.9 | 22 | 2.4 | 2.5 | 166 | 8.4 | 9.6 |
| 8 | 3.7 | 13.6 | 3.9 | 2.9 | 3.7 | 4.5 | 168 | 2.5 | 2.2 | 42 | 8.6 | 7.9 |
| 9 | 2.5 | 18.3 | 3.3 | 3.4 | 3.9 | 4.1 | 277 | 13.5 | 2.6 | 34 | 9.6 | 7.3 |
| 10 | 1.8 | 25.0 | 2.9 | 3.1 | 3.5 | 4.1 | 133 | 68 | 3.8 | 48 | 17.1 | 6.2 |
| 11 | 1.8 | 31 | 2.9 | 4.1 | 3.3 | 3.9 | 26 | 14.2 | 7.9 | 67 | 12.1 | 5.7 |
| 12 | 3.4 | 13.8 | 2.6 | 3.5 | 3.1 | 75 | 12.6 | 55 | 4.0 | 34 | 10.0 | 7.6 |
| 13 | 5.5 | 9.0 | 2.5 | 3.5 | 2.9 | 35 | 9.2 | 10.5 | 2.9 | 32 | 10.0 | 7.6 |
| 14 | 4.4 | 7.3 | 2.4 | 2.8 | 2.8 | 9.4 | 7.4 | 37 | 2.4 | 21 | 8.1 | 22 |
| 15 | 15.4 | 7.9 | 2.2 | 3.5 | 2.7 | 6.1 | 8.8 | 18.8 | 2.4 | 54 | 9.4 | 54 |
| 16 | 30 | 47 | 2.0 | 439 | 2.6 | 5.1 | 6.4 | 9.6 | 2.2 | 133 | 8.4 | 13.8 |
| 17 | 12.5 | 56 | 2.2 | 18.5 | 2.5 | 4.5 | 5.8 | 6.7 | 2.8 | 402 | 11.3 | 10.0 |
| 18 | 23 | 20 | 1.9 | 12.8 | 2.4 | 4.1 | 5.1 | 5.5 | 107 | 87 | 22 | 12.6 |
| 19 | 10.5 | 12.0 | 1.7 | 28 | 2.2 | 4.0 | 6.2 | 4.8 | 55 | 42 | 14.9 | 15.6 |
| 20 | 85 | 9.2 | 1.9 | 11.9 | 177 | 3.6 | 6.6 | 4.2 | 217 | 21 | 9.6 | 11.6 |
| 21 | 105 | 9.0 | 2.9 | 34 | 1,180 | 4.2 | 6.4 | 3.9 | 234 | 15.9 | 9.6 | 9.2 |
| 22 | 30 | 7.4 | 2.2 | 48 | 219 | 3.9 | 5.3 | 3.6 | 106 | 12.8 | 43 | 7.0 |
| 23 | 10.6 | 6.4 | 1.8 | 76 | 18.6 | 3.4 | 6.0 | 4.5 | 21 | 11.1 | 17.9 | 6.2 |
| 24 | 7.6 | 6.1 | 3.3 | 127 | 10.8 | 3.1 | 5.3 | 3.6 | 11.7 | 9.6 | 11.5 | 5.4 |
| 25 | 6.4 | 5.7 | 24 | 65 | 8.1 | 2.9 | 4.5 | 3.1 | 10.1 | 8.2 | 8.8 | 5.1 |
| 26 | 5.8 | 6.1 | 488 | 17.0 | 6.8 | 2.7 | 4.2 | 2.9 | 142 | 8.8 | 7.9 | 11.3 |
| 27 | 5.1 | 6.1 | 120 | 12.2 | 6.0 | 2.6 | 3.9 | 2.8 | 485 | 7.3 | 7.6 | 15.2 |
| 28 | 4.6 | 5.0 | 16.2 | 8.8 | 8.9 | 2.5 | 4.5 | 2.6 | 207 | 7.0 | 12.3 | 68 |
| 29 | 6.1 | 4.9 | 9.4 | 9.4 | 13.6 | 2.4 | 4.4 | ------- | 437 | 15.9 | 9.0 | 16.9 |
| 30 | 17.0 | 4.4 | 6.5 | 8.2 | 55 | 2.2 | 3.7 | ------- | 170 | 9.0 | 7.8 | 86 |
| 31 | 9.4 | 4.2 | ------- | 6.8 | --------- | 2.5 | 3.5 | ------- | 42 | ------- | 7.4 | ------- |

*Monthly discharge of West Wailuaiki Stream near Keanae, Maui, for the year ending June 30, 1925*

| Month | Discharge | | | | Total run-off | |
|---|---|---|---|---|---|---|
| | Million gallons a day | | | Second-feet (mean) | Million gallons | Acre-feet |
| | Maximum | Minimum | Mean | | | |
| July | 105 | 1.3 | 13.5 | 20.9 | 418 | 1,280 |
| August | 56 | 4.2 | 13.3 | 20.6 | 411 | 1,260 |
| September | 488 | 1.7 | 24.5 | 37.9 | 735 | 2,260 |
| October | 439 | 2.8 | 31.6 | 48.9 | 979 | 3,000 |
| November | 1,180 | 2.2 | 59.1 | 91.4 | 1,770 | 5,440 |
| December | 75 | 2.2 | 9.61 | 14.9 | 298 | 914 |
| January | 277 | 3.5 | 25.2 | 39.0 | 781 | 2,400 |
| February | 68 | 2.4 | 10.6 | 16.4 | 296 | 909 |
| March | 485 | 2.2 | 74.3 | 115 | 2,300 | 7,070 |
| April | 402 | 7.0 | 52.8 | 81.7 | 1,580 | 4,860 |
| May | 43 | 7.4 | 12.2 | 18.9 | 377 | 1,160 |
| June | 86 | 5.1 | 18.0 | 27.9 | 539 | 1,650 |
| The year | 1,180 | 1.3 | 28.7 | 44.4 | 10,500 | 32,200 |

**EAST WAILUANUI STREAM NEAR KEANAE, MAUI**

LOCATION.—125 feet above Koolau ditch intake, 250 feet above trail, 2½ miles east of Upper Keanae, and 5 miles east of Keanae post office.

RECORDS AVAILABLE.—November 23, 1921, to June 30, 1925. For station 500 feet upstream, January 1, 1914, to October 24, 1917.

GAGE.—Stevens continuous water-stage recorder.

DISCHARGE MEASUREMENTS.—Made by wading just above ditch intake or from suspension footbridge 500 feet above gage.

CHANNEL AND CONTROL.—One channel at all stages. Control is rock ledge at outlet of pool formed at foot of 12-foot falls; permanent.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, about 1,050 million gallons a day, or 1,620 second-feet, at 4 p. m. February 12 (gage height, 6.96 feet); minimum discharge, 0.4 million gallons a day, or 0.6 second-foot, several hours July 4–7 and September 19–23 (gage height, 0.33 foot).

1921–1925: Maximum discharge recorded, that of February 12, 1924; minimum discharge, 0.2 million gallons a day, or 0.3 second-foot, several hours July 16, 17, 20, and 21, 1922 (gage height, 0.30 foot).

DIVERSIONS.—None above station.

REGULATION.—None.

OBJECT OF STATION.—To determine amount of water diverted into 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 below 20 million gallons a day; extension above this quantity uncertain. 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.

The following discharge measurements were made:

September 8, 1924: Gage height, 0.41 foot; discharge, 1.55 second-feet, or 1 million gallons a day.

May 23, 1925: Gage height, 0.63 foot; discharge, 7.03 second-feet, or 4.54 million gallons a day.

*Discharge, in million gallons a day, of East Wailuanui Stream near Keanae, Maui, for the year ending June 30, 1925*

| Day | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.6 | 5.1 | 1.2 | 1.6 | 2.0 | 13.4 | 1.2 | 1.0 | 0.8 | 8.7 | 7.5 | 2.1 |
| 2 | .5 | 4.6 | 1.2 | 1.3 | 1.9 | 2.8 | 1.9 | 1.0 | .7 | 6.7 | 6.3 | 2.1 |
| 3 | .7 | 2.8 | 1.1 | 1.3 | 1.7 | 2.3 | 1.1 | 1.0 | 1.7 | 2.7 | 2.3 | 13.3 |
| 4 | .5 | 9.2 | 1.0 | 1.6 | 1.6 | 2.0 | 1.6 | 1.0 | 1.3 | 7.6 | 3.1 | 28 |
| 5 | .5 | 4.6 | .9 | 1.2 | 1.4 | 1.8 | 2.1 | .9 | .8 | 10.5 | 5.2 | 9.0 |
| 6 | .5 | 2.6 | 1.0 | 1.1 | 1.4 | 1.6 | 3.3 | .8 | .8 | 5.8 | 3.3 | 6.0 |
| 7 | .6 | 2.3 | 1.3 | 1.1 | 1.3 | 1.6 | 2.9 | .8 | .8 | 30 | 2.8 | 3.5 |
| 8 | 1.7 | 12.0 | 1.1 | .9 | 1.3 | 1.3 | 11.4 | .9 | .7 | 7.2 | 2.7 | 3.0 |
| 9 | .9 | 7.4 | 1.0 | 1.2 | 1.2 | 1.3 | 8.2 | 6.6 | .8 | 7.2 | 2.8 | 2.6 |
| 10 | .6 | 7.0 | .9 | 1.0 | 1.0 | 1.2 | 11.2 | 25 | 1.6 | 9.0 | 4.1 | 2.3 |
| 11 | .5 | 6.3 | .9 | 1.4 | 1.0 | 1.2 | 4.6 | 4.1 | 5.4 | 14.8 | 2.4 | 2.0 |
| 12 | 1.2 | 3.1 | .8 | 1.2 | 1.0 | 8.0 | 2.8 | 40 | 1.6 | 6.6 | 2.4 | 3.0 |
| 13 | 1.4 | 2.4 | .8 | 1.2 | 1.0 | 2.8 | 2.3 | 6.6 | 1.1 | 6.0 | 2.2 | 2.9 |
| 14 | 1.2 | 2.1 | .8 | 1.0 | 1.0 | 1.6 | 1.9 | 8.2 | 1.0 | 4.0 | 1.8 | 9.6 |
| 15 | 3.6 | 2.6 | .7 | 1.4 | 1.0 | 1.4 | 3.8 | 4.1 | .9 | 11.7 | 1.8 | 17.3 |
| 16 | 13.9 | 5.0 | .6 | 49 | .9 | 1.3 | 2.0 | 2.3 | .8 | 18.3 | 1.8 | 3.8 |
| 17 | 4.4 | 7.9 | .7 | 3.0 | .8 | 1.3 | 1.9 | 2.0 | .9 | 44 | 2.8 | 3.1 |
| 18 | 4.3 | 8.6 | .6 | 6.4 | .8 | 1.2 | 1.7 | 1.8 | 35 | 11.9 | 8.6 | 4.4 |
| 19 | 2.4 | 4.0 | .5 | 8.7 | .8 | 1.1 | 1.9 | 1.4 | 7.1 | 5.6 | 6.0 | 4.5 |
| 20 | 20 | 2.6 | .6 | 4.1 | 60 | 1.0 | 2.1 | 1.3 | 12.1 | 3.6 | 2.4 | 2.8 |
| 21 | 18.3 | 2.4 | .8 | 5.7 | 211 | 1.1 | 1.9 | 1.2 | 41 | 2.8 | 2.4 | 2.4 |
| 22 | 7.2 | 2.0 | .5 | 17.9 | 25 | .9 | 1.8 | 1.1 | 17.9 | 2.3 | 14.8 | 2.1 |
| 23 | 2.6 | 1.9 | .5 | 19.6 | 3.5 | .9 | 2.0 | 1.0 | 5.6 | 2.0 | 4.7 | 2.0 |
| 24 | 2.0 | 1.8 | 1.5 | 31 | 2.6 | .9 | 1.9 | .9 | 2.9 | 1.8 | 3.1 | 1.9 |
| 25 | 1.9 | 1.7 | 8.5 | 12.8 | 2.1 | .8 | 1.6 | .8 | 2.4 | 1.6 | 2.6 | 1.8 |
| 26 | 1.8 | 1.7 | 83 | 4.0 | 1.8 | .8 | 1.4 | .8 | 14.0 | 1.9 | 2.4 | 5.2 |
| 27 | 1.6 | 1.8 | 15.2 | 3.3 | 1.7 | .8 | 1.3 | .8 | 42 | 1.3 | 2.3 | 5.0 |
| 28 | 1.4 | 1.4 | 3.1 | 2.6 | 2.7 | .8 | 1.6 | .8 | 24 | 1.3 | 3.3 | 23 |
| 29 | 2.2 | 1.4 | 2.0 | 3.3 | 3.5 | .8 | 1.4 | ------- | 40 | 4.2 | 2.5 | 4.2 |
| 30 | 3.4 | 1.2 | 1.8 | 2.8 | 18.0 | .7 | 1.2 | ------- | 32 | 1.8 | 2.4 | 34 |
| 31 | 2.1 | 1.2 | ------- | 2.3 | ------- | .8 | 1.2 | ------- | 6.3 | ------- | 2.6 | ------- |

*Monthly discharge of East Wailuanui Stream near Keanae, Maui, for the year ending June 30, 1925*

| Month | Discharge | | | | Total run-off | |
|---|---|---|---|---|---|---|
| | Million gallons a day | | | Second-feet (mean) | Million gallons | Acre-feet |
| | Maximum | Minimum | Mean | | | |
| July | 20 | 0.5 | 3.37 | 5.21 | 104 | 321 |
| August | 12.0 | 1.2 | 3.89 | 6.02 | 121 | 370 |
| September | 83 | .5 | 4.49 | 6.95 | 135 | 413 |
| October | 49 | .9 | 6.29 | 9.73 | 195 | 598 |
| November | 211 | .8 | 11.8 | 18.3 | 355 | 1,090 |
| December | 13.4 | .7 | 1.92 | 2.97 | 59.5 | 183 |
| January | 11.4 | 1.1 | 2.81 | 4.35 | 87.2 | 268 |
| February | 40 | .8 | 4.22 | 6.53 | 118 | 363 |
| March | 42 | .7 | 9.81 | 15.2 | 304 | 933 |
| April | 44 | 1.3 | 8.10 | 12.5 | 243 | 745 |
| May | 14.8 | 1.8 | 3.72 | 5.76 | 115 | 354 |
| June | 34 | 1.8 | 6.90 | 10.7 | 207 | 635 |
| The year | 211 | .5 | 5.60 | 8.66 | 2,040 | 6,270 |

**WEST WAILUANUI STREAM NEAR KEANAE, MAUI**

LOCATION.—150 feet above Koolau ditch crossing and intake, 2 miles east of Upper Keanae, and 4½ miles east of Keanae post office.

RECORDS AVAILABLE.—July 1, 1922, to June 30, 1925; December 19, 1913, to October 22, 1917, at point about 100 feet downstream. Records for July, 1922, to June, 1925, are in this paper.

GAGE.—Stevens continuous water-stage recorder.

DISCHARGE MEASUREMENTS.—Made by wading 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 and 150 feet below gage. 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, 705 million gallons a day, or 1,090 second-feet, at 8.30 a. m. October 16 (gage height, 5.58 feet); minimum discharge, 0.3 million gallons a day, or 0.5 second-foot, for several hours July 4–6.

1922–1925: Maximum discharge recorded, 1,220 million gallons a day, or 1,890 second-feet, at 2.30 p. m. January 14, 1923 (gage height, 7.70 feet); minimum discharge, 0.2 million gallons a day, or 0.3 second-foot, for several hours July 16–21, 1922 (gage height, 0.50 foot).

DIVERSIONS.—None.

REGULATION.—None.

OBJECT OF STATION.—To determine amount of water diverted into 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 several times July 10, 1922, to January 14, 1923, and shifting-control method was used. Another change occurred at time of flood March 30, 1925. Two rating curves used are fairly well defined below 100 million gallons a day; extension above this quantity uncertain. Operation of water-stage recorder satisfactory except as indicated in footnote to daily-discharge tables. 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 doubtful July 10, 1922, to January 14, 1923, when shifting-control method was used; subsequent records are good for ordinary stages except for estimated periods, for which they are fair; high-stage records poor.

*Discharge measurements of West Wailuanui Stream near Keanae, Maui, during the years ending June 30, 1923–1925*

| Date | Gage height (feet) | Discharge | | Date | Gage height (feet) | Discharge | |
|---|---|---|---|---|---|---|---|
| | | Second-feet | Million gallons a day | | | Second-feet | Million gallons a day |
| 1922 | | | | 1924 | | | |
| July 10 | 0.54 | 0.6 | 0.4 | Feb. 28 | 0.95 | 7.8 | 5.1 |
| Sept. 18 | 1.06 | 7.3 | 4.7 | Apr. 17 | .91 | 6.1 | 3.9 |
| 1923 | | | | June 4 | .64 | 1.1 | .7 |
| Jan. 10 | .90 | 4.4 | 2.8 | July 22 | 1.10 | 14.4 | 9.31 |
| Apr. 12 | .93 | 6.5 | 4.2 | Sept. 8 | .64 | 2.51 | 1.62 |
| July 2 | .70 | 1.85 | 1.2 | 1925 | | | |
| Oct. 2 | .62 | 1.3 | .85 | Apr. 3 | 1.16 | 14.9 | 9.63 |
| | | | | May 23 | 1.02 | 12.6 | 8.14 |

*Discharge, in million gallons a day, of West Wailuanui Stream near Keanae, Maui, for the years ending June 30, 1923–1925*

| Day | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1922–23 | | | | | | | | | | | | |
| 1 | | 0.2 | 0.3 | | 1.0 | 2.1 | 0.4 | 1.4 | 1.6 | 57 | 5.4 | 3.6 |
| 2 | | .3 | .5 | | 1.0 | 1.5 | .7 | 1.3 | 1.6 | 95 | 5.9 | 2.5 |
| 3 | | 2.5 | .4 | | 1.0 | 1.5 | 3.0 | 1.2 | 2.9 | 7.7 | 6.1 | 3.6 |
| 4 | | .6 | 1.2 | | 4.8 | 1.4 | 1.3 | 1.1 | 2.3 | 9.4 | 3.9 | 4.1 |
| 5 | | .4 | 1.6 | | 34 | 1.1 | .7 | 1.1 | 1.5 | 7.2 | 5.4 | 2.5 |
| 6 | 0.2 | .4 | .7 | | 62 | 1.1 | .8 | 1.0 | 1.8 | 3.9 | 13.6 | 2.0 |
| 7 | | .6 | 2.4 | | 50 | 1.1 | 1.0 | 1.0 | 3.2 | 23 | 3.9 | 1.8 |
| 8 | | 4.4 | .8 | | 46 | .9 | 1.6 | .9 | 88 | 13.1 | 3.1 | 1.6 |
| 9 | | 7.0 | 6.4 | | 7.4 | .8 | 1.8 | 22 | 124 | 5.0 | 2.9 | 1.3 |
| 10 | | 5.4 | 45 | 3.8 | 4.3 | .8 | 4.2 | 41 | 32 | 3.7 | 2.3 | 1.2 |
| 11 | .2 | 8.5 | 17.4 | | 3.9 | .8 | 34 | 7.0 | 8.8 | 13.2 | 2.0 | 1.1 |
| 12 | .2 | 3.6 | 5.7 | | 3.9 | .8 | 117 | 3.7 | 4.3 | 5.0 | 1.8 | 2.9 |
| 13 | .2 | 1.4 | 3.1 | | 9.4 | .8 | 43 | 3.6 | 3.1 | 3.7 | 1.6 | 2.2 |
| 14 | .2 | 1.0 | 2.0 | | 4.1 | .7 | 307 | 2.3 | 2.3 | 5.0 | 1.3 | 3.9 |
| 15 | .2 | .9 | 4.3 | | 4.3 | .6 | 289 | 1.9 | 5.3 | 2.9 | 1.4 | 2.8 |
| 16 | .2 | .8 | 1.3 | | 10.3 | .6 | 42 | 1.6 | 4.6 | 2.5 | 2.9 | 5.7 |
| 17 | .2 | .7 | 1.2 | | 5.2 | .5 | 180 | 1.4 | 3.3 | 5.2 | 3.3 | 6.4 |
| 18 | .2 | .7 | 5.1 | | 3.9 | .5 | 184 | 1.3 | 2.8 | 13.6 | 2.3 | 3.1 |
| 19 | .2 | 3.2 | | | 3.4 | .5 | 63 | 11.4 | 2.0 | 8.5 | 2.3 | 2.3 |
| 20 | .2 | .8 | | | 2.6 | .4 | 103 | 3.6 | 1.6 | 7.7 | 2.2 | 2.1 |
| 21 | .2 | .7 | | .8 | 2.6 | .4 | 41 | 6.4 | 1.4 | 4.3 | 2.3 | 2.0 |
| 22 | .2 | .7 | | 53 | 2.0 | .4 | 22 | 19.8 | 8.6 | 4.6 | 4.5 | 2.8 |
| 23 | .2 | .6 | | 8.9 | 1.6 | .4 | 8.3 | 7.3 | 23 | 3.3 | 3.4 | 1.8 |
| 24 | .2 | .5 | 2.4 | 5.4 | 1.5 | .4 | 5.0 | 2.9 | 12.4 | 2.6 | 3.3 | 1.5 |
| 25 | 1.2 | .5 | | 3.6 | 51 | .4 | 3.7 | 2.2 | 10.5 | 2.6 | 11.3 | 1.4 |
| 26 | .4 | .5 | | 3.4 | 21 | .5 | 3.1 | 2.2 | 5.9 | 21 | 4.6 | 1.6 |
| 27 | .3 | .4 | | 2.1 | 5.9 | .4 | 2.5 | 2.3 | 32 | 21 | 3.9 | 1.4 |
| 28 | .4 | .4 | | 1.8 | 3.1 | .3 | 2.2 | 1.9 | 8.3 | 8.3 | 3.1 | 1.5 |
| 29 | .2 | .6 | | 2.8 | 2.3 | .3 | 2.0 | ------- | 4.6 | 7.4 | 2.3 | 2.1 |
| 30 | .2 | .4 | | 1.3 | 1.9 | .4 | 2.0 | ------- | 3.3 | 10.8 | 3.4 | 1.5 |
| 31 | .2 | .4 | ------- | 1.3 | ------- | .4 | 1.9 | ------- | 65 | ------- | 5.7 | ------- |
| 1923–24 | | | | | | | | | | | | |
| 1 | 1.4 | 1.3 | .7 | .8 | 7.4 | .8 | 8.8 | .6 | 11.8 | 1.0 | 9.6 | 1.0 |
| 2 | 1.2 | 1.2 | .6 | .7 | 5.0 | 2.2 | 5.2 | .6 | 17.5 | 1.0 | 6.6 | 1.0 |
| 3 | 1.9 | 1.4 | .7 | .8 | 3.3 | 11.6 | 5.1 | .6 | 15.0 | 1.3 | 4.6 | 1.0 |
| 4 | 2.2 | 4.0 | .6 | .8 | 12.5 | 16.2 | 6.3 | .6 | 14.1 | 1.0 | 3.6 | .8 |
| 5 | 1.5 | 2.9 | .6 | 1.6 | 90 | 3.4 | 2.9 | .5 | 6.4 | 1.2 | 2.9 | .9 |
| 6 | 1.8 | 1.4 | 1.2 | 2.2 | 21 | 12.9 | 2.5 | .5 | 4.8 | 1.0 | 2.5 | .9 |
| 7 | 2.3 | 3.7 | .7 | .7 | 8.8 | 51 | 2.2 | .5 | 3.6 | 4.4 | 2.3 | .8 |
| 8 | 3.4 | 2.1 | .6 | .6 | 6.4 | 8.8 | 1.9 | .5 | 3.3 | 27 | 2.0 | .6 |
| 9 | 12.8 | 1.4 | .9 | .5 | 5.9 | 4.8 | 2.0 | .4 | 2.5 | 17.0 | 1.8 | .6 |
| 10 | 6.9 | 1.4 | .6 | .5 | 5.2 | 10.4 | 1.8 | .4 | 2.2 | 23 | 1.5 | .6 |
| 11 | 4.6 | 2.3 | .6 | .4 | 5.2 | 9.0 | 2.3 | .5 | 2.5 | 7.7 | 1.1 | .6 |
| 12 | 5.4 | 10.6 | 50 | .4 | 32 | 25 | 2.9 | 40 | 2.2 | 19.3 | 1.1 | .6 |
| 13 | 11.5 | 3.4 | 8.7 | .4 | 21 | 48 | 3.7 | 253 | 2.6 | 9.6 | 67 | 1.9 |
| 14 | 7.2 | 2.2 | 2.5 | .4 | 5.9 | 24 | 3.6 | 206 | 2.3 | 20 | 132 | .8 |
| 15 | 7.2 | 1.8 | 1.8 | .8 | 5.2 | 112 | 2.8 | 40 | 1.8 | 39 | 16.8 | .7 |
| 16 | 4.1 | 1.5 | 1.3 | .4 | 3.9 | 137 | 2.1 | 8.0 | 1.6 | 7.7 | 13.0 | .9 |
| 17 | 4.1 | 7.5 | 1.1 | .3 | 3.1 | 76 | 2.0 | 4.3 | 2.3 | 4.1 | 7.6 | 2.6 |
| 18 | 3.3 | 31 | 1.6 | .8 | 2.5 | 157 | 1.9 | 2.6 | 2.3 | 7.2 | 5.7 | .6 |
| 19 | 4.6 | 5.2 | 99 | 27 | 2.1 | 86 | 1.8 | 2.3 | 17.8 | 6.6 | 3.6 | .6 |
| 20 | 4.6 | 3.3 | 16.6 | 11.8 | 1.8 | 37 | 1.6 | 1.8 | 4.1 | 3.3 | 2.6 | .6 |
| 21 | 4.1 | 2.3 | 5.4 | 5.8 | 1.6 | 12.6 | 1.5 | 1.3 | 2.3 | 2.5 | 2.1 | .5 |
| 22 | 54 | 1.9 | 5.0 | 5.1 | 1.5 | 7.4 | 1.3 | 1.2 | 1.9 | 9.5 | 2.0 | .6 |
| 23 | 19.1 | 1.6 | 2.6 | 2.3 | 1.3 | 5.0 | 1.2 | 14.7 | 1.6 | 3.4 | 1.6 | .5 |
| 24 | 5.4 | 1.3 | 2.1 | 1.6 | 1.2 | 3.7 | 1.1 | 94 | 1.6 | 2.3 | 1.8 | .5 |
| 25 | 3.7 | 1.2 | 1.6 | 1.3 | 1.1 | 3.1 | .9 | 30 | 1.3 | 2.1 | 2.9 | .8 |
| 26 | 2.8 | 1.1 | 1.4 | 1.1 | 1.2 | 2.5 | .8 | 15.4 | 1.2 | 22 | 2.2 | .6 |
| 27 | 2.2 | 1.0 | 1.3 | 166 | 1.1 | 2.3 | .8 | 12.5 | 1.1 | 72 | 1.3 | .6 |
| 28 | 2.3 | 1.0 | 1.2 | 74 | 1.2 | 2.0 | .7 | 4.8 | 1.2 | 25 | 1.1 | .6 |
| 29 | 2.2 | .8 | 1.1 | 98 | .9 | 1.9 | .7 | 4.8 | 1.4 | 10.7 | 1.0 | .5 |
| 30 | 1.9 | 1.0 | 1.0 | 28 | .8 | 2.2 | .7 | ------- | 1.2 | 17.4 | 1.0 | .5 |
| 31 | 1.8 | .9 | ------- | 8.8 | ------- | 16.7 | .7 | ------- | 1.0 | ------- | 1.0 | ------- |
| 1924–25 | | | | | | | | | | | | |
| 1 | .6 | 6.5 | 3.4 | 1.5 | 2.1 | 18.9 | 1.1 | .8 | .7 | 39 | 11.2 | |
| 2 | .5 | 6.1 | 3.9 | 1.1 | 1.6 | 3.6 | 1.8 | .8 | .7 | 34 | 9.8 | |
| 3 | .4 | 4.1 | 1.5 | 1.0 | 1.5 | 2.5 | .9 | .8 | 2.2 | 14.3 | 5.0 | 10 |
| 4 | .4 | 10.2 | .9 | 1.3 | 1.3 | 1.9 | 1.4 | .7 | 1.4 | 13.9 | 5.0 | |
| 5 | .3 | 5.7 | .8 | 1.0 | 1.1 | 1.4 | 2.2 | .7 | .8 | 19.9 | 8.1 | |

*Discharge, in million gallons a day, of West Wailuanui Stream near Keanae, Maui, for the years ending June 30, 1923–1925*—Continued

| Day | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1924–25 | | | | | | | | | | | | |
| 6 | 0.4 | 3.7 | 1.0 | 0.8 | 1.1 | 1.2 | 3.3 | 0.7 | 0.6 | 18.1 | 5.5 | |
| 7 | .4 | 3.3 | 1.2 | .8 | 1.1 | 1.1 | 3.5 | .7 | .7 | 62 | 5.0 | |
| 8 | 1.3 | 8.3 | .8 | .6 | 1.1 | 1.0 | 78 | .7 | .7 | 23 | 5.0 | |
| 9 | .7 | 8.4 | .8 | .8 | 1.0 | 1.0 | 126 | 6.6 | .7 | 15.1 | 5.5 | |
| 10 | .5 | 9.8 | .8 | .6 | .9 | .9 | 65 | 26 | 1.6 | 19.9 | 6.8 | |
| 11 | .4 | 9.2 | .8 | 1.1 | .9 | .8 | 14.6 | 5.4 | 5.7 | 26 | 5.5 | |
| 12 | .9 | 5.1 | .7 | .9 | .9 | 34 | 5.9 | 24 | 1.4 | 16.1 | 5.2 | |
| 13 | 1.2 | 3.6 | .6 | .8 | .9 | 15.7 | 3.7 | 5.4 | 1.0 | 15.1 | 5.0 | |
| 14 | .8 | 2.9 | .6 | .6 | .8 | 3.3 | 2.6 | 8.9 | .8 | 11.1 | 4.0 | |
| 15 | 3.2 | 3.6 | .5 | 1.1 | .8 | 1.6 | 4.6 | 6.3 | .7 | 19.0 | 4.2 | |
| 16 | 12.3 | 10.7 | .5 | 150 | .7 | 1.2 | 2.3 | 2.9 | .8 | 40 | 3.8 | |
| 17 | 4.6 | 18.0 | .6 | 9.7 | .7 | 1.0 | 2.1 | 2.2 | .9 | 137 | 5.5 | |
| 18 | 5.4 | 9.2 | .6 | 7.8 | .6 | 1.0 | 1.6 | 1.6 | 28 | 46 | 30 | 10 |
| 19 | 2.9 | 5.7 | .5 | 10.3 | .6 | .9 | 2.1 | 1.2 | 12.2 | 25 | 9.1 | |
| 20 | 34 | 3.7 | .5 | 3.9 | 68 | .8 | 2.2 | 1.2 | 82 | 13.1 | 5.0 | |
| 21 | 48 | 3.6 | .7 | 8.0 | 340 | 1.0 | 1.8 | 1.2 | 88 | 8.8 | 4.6 | |
| 22 | 15.4 | 2.8 | .5 | 19.7 | 87 | .7 | 1.6 | 1.2 | 37 | 7.8 | 17.9 | |
| 23 | 5.0 | 2.5 | .5 | 30 | 10.6 | .8 | 1.9 | 1.1 | 9.6 | 6.8 | | |
| 24 | 3.4 | 2.3 | 1.4 | 51 | 4.6 | .7 | 1.6 | 1.1 | 5.2 | 5.0 | | |
| 25 | 2.8 | 2.2 | 8.5 | 28 | 2.8 | .7 | 1.2 | 1.0 | 3.7 | 4.6 | | |
| 26 | 2.5 | 2.6 | 170 | 7.7 | 2.1 | .7 | 1.1 | .8 | 46 | 4.6 | 4.4 | |
| 27 | 2.2 | 3.1 | 46 | 5.0 | 1.6 | .6 | 1.0 | .8 | 171 | 3.2 | | |
| 28 | 2.2 | 2.8 | 6.9 | 3.6 | 2.9 | .6 | 1.2 | .6 | 99 | 3.2 | | |
| 29 | 4.0 | 3.4 | 3.1 | 3.9 | 3.7 | .6 | 1.2 | ------- | 134 | 7.7 | | |
| 30 | 6.9 | 2.9 | 2.0 | 3.3 | 17.2 | .6 | 1.1 | ------- | 71 | 4.0 | | |
| 31 | 3.9 | 3.3 | ------- | 2.3 | ------- | .7 | .9 | ------- | 25 | ------- | | ------- |

NOTE.—Braced figures give mean discharge for periods indicated; estimated by comparison with record of flow for East Wailuanui Stream near Keanae, Maui.

*Monthly discharge of West Wailuanui Stream near Keanae, Maui, for the years ending June 30, 1923–1925*

| Month | Discharge | | | | Total run-off | |
|---|---|---|---|---|---|---|
| | Million gallons a day | | | Second-feet (mean) | Million gallons | Acre-feet |
| | Maximum | Minimum | Mean | | | |
| 1922–23 | | | | | | |
| July | 1.2 | ---------- | 0.25 | 0.39 | 7.7 | 24 |
| August | 8.5 | 0.2 | 1.58 | 2.44 | 49.1 | 151 |
| September | 45 | .3 | 4.27 | 6.61 | 128 | 393 |
| October | 53 | ---------- | 5.17 | 8.00 | 160 | 492 |
| November | 62 | 1.0 | 11.8 | 18.3 | 355 | 1,090 |
| December | 2.1 | .3 | .74 | 1.14 | 22.8 | 70 |
| January | 307 | .4 | 47.5 | 73.5 | 1,470 | 4,510 |
| February | 41 | .9 | 5.53 | 8.56 | 155 | 475 |
| March | 124 | 1.4 | 15.2 | 23.5 | 472 | 1,450 |
| April | 95 | 2.5 | 12.6 | 19.5 | 378 | 1,160 |
| May | 13.6 | 1.3 | 3.92 | 6.07 | 121 | 373 |
| June | 6.4 | 1.1 | 2.48 | 3.84 | 74.3 | 226 |
| The year | 307 | ---------- | 9.30 | 14.4 | 3,400 | 10,400 |
| 1923–24 | | | | | | |
| July | 54 | 1.2 | 6.18 | 9.56 | 192 | 588 |
| August | 31 | .8 | 3.35 | 5.18 | 104 | 318 |
| September | 99 | .6 | 7.10 | 11.0 | 213 | 654 |
| October | 166 | .3 | 14.3 | 22.1 | 444 | 1,360 |
| November | 90 | .8 | 8.67 | 13.4 | 260 | 798 |
| December | 157 | .8 | 28.8 | 44.6 | 892 | 2,740 |
| January | 8.8 | .7 | 2.38 | 3.68 | 73.8 | 226 |
| February | 253 | .4 | 25.6 | 39.6 | 742 | 2,280 |
| March | 17.8 | 1.0 | 4.40 | 6.81 | 136 | 419 |
| April | 72 | 1.0 | 12.3 | 19.0 | 369 | 1,130 |
| May | 132 | 1.0 | 9.87 | 15.3 | 306 | 939 |
| June | 2.6 | .5 | .79 | 1.22 | 23.8 | 73 |
| The year | 253 | .3 | 10.3 | 15.9 | 3,760 | 11,500 |

*Monthly discharge of West Wailuanui Stream near Keanae, Maui, for the years ending June 30, 1923–1925*—Continued

| Month | Discharge | | | | Total run-off | |
|---|---|---|---|---|---|---|
| | Million gallons a day | | | Second-feet (mean) | Million gallons | Acre-feet |
| | Maximum | Minimum | Mean | | | |
| 1924–25 | | | | | | |
| July | 48 | 0.3 | 5.40 | 8.36 | 168 | 514 |
| August | 18.0 | 2.2 | 5.46 | 8.45 | 169 | 520 |
| September | 170 | .5 | 8.69 | 13.4 | 261 | 800 |
| October | 150 | .6 | 11.6 | 17.9 | 358 | 1,100 |
| November | 340 | .6 | 18.7 | 28.9 | 560 | 1,720 |
| December | 34 | .6 | 3.27 | 5.06 | 102 | 312 |
| January | 126 | .9 | 11.0 | 17.0 | 340 | 1,040 |
| February | 26 | .6 | 3.76 | 5.82 | 105 | 323 |
| March | 171 | .6 | 26.9 | 41.6 | 833 | 2,560 |
| April | 137 | 3.2 | 22.1 | 34.2 | 663 | 2,040 |
| May | 30 | ---------- | 6.65 | 10.3 | 206 | 633 |
| June | ---------- | ---------- | 10.0 | 15.5 | 300 | 921 |
| The year | 340 | .3 | 11.1 | 17.2 | 4,060 | 12,500 |

### 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, 1925.

GAGE.—Stevens continuous water-stage recorder installed November 4, 1922. Gurley printing recorder used June 23 to November 3, 1922; Friez recorder used November 2, 1917, to June 23, 1922. Gage was moved to present site on March 25, 1922. East Maui Irrigation Co. has obtained staff gage readings at this site since about 1904.

DISCHARGE MEASUREMENTS.—Made from plank 20 feet above gage.

CHANNEL AND CONTROL.—Concrete-lined ditch; straight for 100 feet above gage. Control not well defined but permanent as ditch enters long tunnel 5 feet below gage.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 134 million gallons a day, or 207 second-feet, at 5.30 p. m. February 18 (gage height, 5.19 feet); minimum discharge, no flow when water was shut out of ditch from 9 a. m. March 28 to 11 a. m. March 29, 2 a. m. March 30 to 8 a. m. April 5, and 4 p. m. April 5 to 7 a. m. April 9.

1910–1912; 1917–1925: Maximum discharge recorded, 175 million gallons a day, or 271 second-feet, at 7.15 p. m. January 4, 1922 (gage height, 6.36 feet); minimum discharge, no flow, occasionally when water is shut out of ditch.

DIVERSIONS.—None in vicinity of station except spillways.

REGULATION.—By gates at intervals.

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

UTILIZATION.—Water used for irrigation of sugarcane.

ACCURACY.—Stage-discharge relation permanent during year. Rating curve well defined. 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.

For description of ditch see under Koolau ditch at Nahiku Weir, near Nahiku, Maui.

The following discharge measurements were made:

July 23, 1924: Gage height, 3.42 feet; discharge, 120 second-feet, or 77.6 million gallons a day.

April 1, 1925: Gage height, 0.29 foot; no flow at this stage.

*Discharge, in million gallons a day, of Koolau ditch near Keanae, Maui, for the year ending June 30, 1925*

| Day | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 16.8 | 89 | 34 | 42 | 57 | 110 | 30 | 26 | 20 | ------- | 105 | 54 |
| 2 | 15.5 | 92 | 34 | 35 | 51 | 75 | 41 | 24 | 20 | ------- | 108 | 54 |
| 3 | 16.8 | 69 | 31 | 32 | 48 | 63 | 27 | 23 | 38 | ------- | 84 | 98 |
| 4 | 15.5 | 109 | 28 | 37 | 45 | 54 | 34 | 23 | 36 | ------- | 80 | 117 |
| 5 | 14.4 | 95 | 27 | 31 | 42 | 51 | 48 | 22 | 24 | 1.4 | 98 | 110 |
| 6 | 15.5 | 64 | 29 | 28 | 42 | 48 | 69 | 20 | 19.0 | ------- | 82 | 102 |
| 7 | 15.5 | 54 | 35 | 31 | 38 | 45 | 61 | 20 | 20 | ------- | 78 | 81 |
| 8 | 33 | 89 | 27 | 26 | 37 | 42 | 111 | 20 | 19.0 | ------- | 78 | 69 |
| 9 | 21 | 105 | 24 | 40 | 38 | 39 | 114 | 38 | 19.0 | 18.1 | 82 | 66 |
| 10 | 15.5 | 117 | 23 | 31 | 35 | 36 | 114 | 116 | 26 | 28 | 94 | 57 |
| 11 | 15.5 | 116 | 23 | 46 | 32 | 35 | 107 | 80 | 68 | 31 | 83 | 51 |
| 12 | 23 | 89 | 22 | 36 | 31 | 86 | 76 | 67 | 31 | 26 | 80 | 73 |
| 13 | 34 | 69 | 20 | 35 | 28 | 95 | 60 | 63 | 22 | 23 | 78 | 63 |
| 14 | 26 | 60 | 19.0 | 28 | 28 | 56 | 51 | 103 | 20 | 19.0 | 63 | 84 |
| 15 | 65 | 66 | 19.0 | 32 | 26 | 45 | 56 | 85 | 19.0 | 27 | 69 | 117 |
| 16 | 112 | 94 | 18.0 | 107 | 24 | 39 | 45 | 58 | 18.0 | 28 | 66 | 92 |
| 17 | 86 | 120 | 18.0 | 80 | 24 | 35 | 42 | 45 | 19.0 | 31 | 82 | 78 |
| 18 | 85 | 117 | 16.8 | 99 | 23 | 34 | 36 | 38 | 55 | 57 | 112 | 81 |
| 19 | 67 | 90 | 16.8 | 109 | 22 | 32 | 44 | 34 | 116 | 84 | 100 | 94 |
| 20 | 74 | 72 | 16.8 | 79 | 51 | 30 | 48 | 31 | 120 | 91 | 75 | 69 |
| 21 | 115 | 69 | 20 | 101 | 96 | 32 | 45 | 28 | 120 | 100 | 68 | 63 |
| 22 | 107 | 57 | 16.8 | 105 | 92 | 28 | 38 | 27 | 110 | 100 | 112 | 54 |
| 23 | 75 | 51 | 15.5 | 111 | 90 | 26 | 46 | 27 | 89 | 94 | 101 | 51 |
| 24 | 60 | 48 | 34 | 120 | 72 | 24 | 41 | 26 | 80 | 91 | 81 | 45 |
| 25 | 51 | 45 | 106 | 110 | 60 | 23 | 34 | 23 | 68 | 84 | 66 | 42 |
| 26 | 48 | 45 | 117 | 100 | 51 | 23 | 32 | 22 | 118 | 90 | 60 | 54 |
| 27 | 45 | 50 | 108 | 92 | 45 | 22 | 30 | 22 | 127 | 78 | 60 | 94 |
| 28 | 39 | 39 | 96 | 72 | 67 | 20 | 35 | 20 | 29 | 73 | 78 | 110 |
| 29 | 44 | 39 | 66 | 82 | 89 | 20 | 34 | ------- | .5 | 102 | 66 | 88 |
| 30 | 88 | 36 | 48 | 76 | 112 | 19.0 | 28 | ------- | ------- | 84 | 64 | 108 |
| 31 | 60 | 35 | ------- | 63 | ------- | 20 | 27 | ------- | ------- | ------- | 65 | ------- |

NOTE.—No flow on days for which no discharge is recorded.

*Monthly discharge of Koolau ditch near Keanae, Maui, for the year ending June 30, 1925*

| Month | Discharge | | | | Total run-off | |
|---|---|---|---|---|---|---|
| | Million gallons a day | | | Second-feet (mean) | Million gallons | Acre-feet |
| | Maximum | Minimum | Mean | | | |
| July | 115 | 14.4 | 48.4 | 74.9 | 1,500 | 4,600 |
| August | 120 | 35 | 73.9 | 114 | 2,290 | 7,030 |
| September | 117 | 15.5 | 37.0 | 57.2 | 1,110 | 3,400 |
| October | 120 | 26 | 65.0 | 101 | 2,020 | 6,190 |
| November | 112 | 22 | 49.9 | 77.2 | 1,500 | 4,590 |
| December | 110 | 19.0 | 42.2 | 65.3 | 1,310 | 4,010 |
| January | 114 | 27 | 51.7 | 80.0 | 1,600 | 4,920 |
| February | 116 | 20 | 40.4 | 62.5 | 1,130 | 3,470 |
| March (29 days) | 127 | .5 | 50.7 | 78.4 | 1,470 | 4,510 |
| April (23 days) | 102 | 1.4 | 59.2 | 91.6 | 1,360 | 4,180 |
| May | 112 | 60 | 81.2 | 126 | 2,520 | 7,730 |
| June | 117 | 42 | 77.3 | 120 | 2,320 | 7,120 |
| The year (356 days) | 127 | .5 | 56.5 | 87.4 | 20,100 | 61,800 |

### HONOMANU STREAM AT HAIKU-UKA BOUNDARY NEAR KAILIILI, MAUI

LOCATION.—At end of Haiku-uka boundary trail, 8 miles east of Kailiili.

RECORDS AVAILABLE.—October 9, 1919, to June 30, 1925.

GAGE.—Stevens continuous water-stage recorder.

DISCHARGE MEASUREMENTS.—Made from suspension footbridge or by wading.

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, not known owing to backwater effect from jam below gage, probably occurred at 8.45 a. m. October 16 (gage height, 13.03 feet); minimum discharge, 0.2 million gallons a day, or 0.3 second-foot, from 4 to 8 p. m. September 19 (gage height, 0.59 foot).

1919–1925: Maximum discharge recorded, about 1,290 million gallons a day, or 2,000 second-feet, at 2.45 p. m. January 14, 1923 (gage height, 9.93 feet); minimum discharge, that of September 19, 1924.

DIVERSIONS.—None.

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 changed, presumably, at times of floods October 16 and March 27. The three rating curves used are rather poorly defined below 100 million gallons a day; above this quantity the extension, which is based on peak-flow comparison with the lower station on this stream, is uncertain. 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 fair except estimated and high-stage records, which are poor.

*Discharge measurements of Honomanu Stream at Haiku-uka boundary near Kailiili, Maui, during the year ending June 30, 1925*

| Date | Gage height (feet) | Discharge | |
|---|---|---|---|
| | | Second-feet | Million gallons a day |
| Sept. 14 | 0.66 | 0.520 | 0.336 |
| Feb. 16 | 1.04 | 2.32 | 1.50 |
| May 16 | 1.00 | 3.83 | 2.48 |

*Discharge, in million gallons a day, of Honomanu Stream at Haiku-uka boundary near Kailiili, Maui, for the year ending June 30, 1925*

| Day | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.5 | 1.6 | 0.3 | 0.6 | | | 0.8 | 0.5 | 0.6 | 70 | 5.9 | 1.9 |
| 2 | .7 | 2.2 | .4 | .5 | | | 1.3 | .5 | .6 | 28 | 5.3 | 1.8 |
| 3 | .9 | 1.1 | .5 | .4 | | | .8 | .5 | 2.8 | 8.3 | 3.6 | 12.8 |
| 4 | .4 | 2.0 | .4 | 22 | | | .8 | .4 | 2.5 | 15.5 | 4.2 | 15.9 |
| 5 | .3 | 2.3 | .3 | 2.2 | 1.0 | 4.1 | .8 | .4 | 1.0 | 23 | 6.1 | 6.6 |
| 6 | .3 | 1.0 | .4 | .6 | | | 1.8 | .4 | .7 | 24 | 3.1 | 5.0 |
| 7 | .3 | .7 | 1.4 | .4 | | | 7.9 | .4 | .6 | 88 | 2.4 | 2.9 |
| 8 | .4 | 3.6 | .5 | .3 | | | 113 | .4 | .5 | 15.9 | 2.4 | 2.3 |
| 9 | .5 | 5.8 | .3 | .3 | | | 154 | 13.1 | .5 | 19.1 | 3.8 | 2.1 |
| 10 | .4 | 4.8 | .3 | .3 | .8 | | 32 | 51 | .6 | 24 | 9.0 | 2.0 |
| 11 | .3 | 8.5 | .3 | 11.1 | .7 | | 6.6 | 3.5 | 1.5 | 32 | 4.7 | 1.8 |
| 12 | .5 | 2.0 | .2 | 1.9 | .6 | | 3.0 | 1.3 | 1.4 | 14.6 | 3.7 | 2.9 |
| 13 | 1.3 | 1.0 | .2 | .8 | | | 2.0 | 2.4 | .7 | 13.2 | 4.5 | 3.4 |
| 14 | 1.0 | 1.0 | .3 | .5 | | | 1.3 | 5.0 | .6 | 7.6 | 3.1 | 15.0 |
| 15 | 9.5 | 1.0 | .2 | 1.2 | | | 1.1 | 2.5 | .5 | 7.7 | 3.4 | 29 |
| 16 | 9.7 | 32 | .2 | 220 | .5 | 2.3 | 1.0 | 1.6 | .4 | 66 | 3.0 | 4.5 |
| 17 | 4.7 | 21 | .2 | | | | .9 | 1.2 | .4 | 159 | 3.8 | 2.6 |
| 18 | 9.5 | 2.6 | .2 | | | | .8 | .9 | 23 | 41 | 9.8 | 4.4 |
| 19 | 2.3 | 1.5 | .2 | 9.0 | | | 2.3 | .8 | 29 | 14.5 | 5.2 | 7.6 |
| 20 | 39 | 1.0 | .2 | | | | 2.2 | .7 | 92 | 7.3 | 3.2 | 10.1 |
| 21 | 58 | 1.4 | .6 | | | | 1.9 | .6 | 122 | 12.5 | 3.1 | 3.8 |
| 22 | 9.4 | 1.0 | .3 | | | | 1.2 | .6 | 29 | 16.9 | 20 | 2.4 |
| 23 | 1.7 | .6 | .2 | | | .8 | 1.4 | .6 | 4.4 | 6.3 | 10.1 | 2.3 |
| 24 | 1.0 | .6 | .7 | 30 | 65 | .6 | 1.0 | .5 | 2.1 | 4.2 | 3.9 | 2.1 |
| 25 | .8 | .5 | 9.8 | | | .6 | .8 | .5 | 1.8 | 2.9 | 7.7 | 1.7 |
| 26 | .9 | .5 | 233 | | | .6 | .7 | .4 | 80 | 3.5 | 4.7 | 2.9 |
| 27 | 26 | .6 | 46 | | | .5 | .6 | .6 | 244 | 5.1 | 3.0 | 6.6 |
| 28 | 3.9 | .5 | 3.4 | | | .5 | .7 | .7 | 86 | 3.5 | 4.7 | 42 |
| 29 | 4.3 | .4 | 1.6 | 1.2 | 20 | .5 | .8 | ------- | 204 | 10.9 | 3.0 | 6.8 |
| 30 | 14.0 | .3 | .8 | | | .5 | .6 | ------- | 74 | 3.5 | 2.4 | 32 |
| 31 | 2.1 | .3 | ------- | | ------- | .5 | .6 | ------- | 15.6 | ------- | 2.1 | ------- |

NOTE.—Discharge estimated Oct. 16 and Nov. 10–12. Braced figures give estimated mean discharge for periods indicated. Estimates made by comparison with record of Honomanu Stream near Keanae.

*Monthly discharge of Honomanu Stream at Haiku-uka boundary near Kailiili, Maui, for the year ending June 30, 1925*

| Month | Discharge | | | | Total run-off | |
|---|---|---|---|---|---|---|
| | Million gallons a day | | | Second-feet (mean) | Million gallons | Acre-feet |
| | Maximum | Minimum | Mean | | | |
| July | 58 | 0.3 | 6.60 | 10.2 | 205 | 628 |
| August | 32 | .3 | 3.34 | 5.17 | 103 | 317 |
| September | 233 | .2 | 10.1 | 15.6 | 303 | 931 |
| October | ---------- | .3 | 15.0 | 23.2 | 464 | 1,420 |
| November | ---------- | ---------- | 19.8 | 30.6 | 595 | 1,820 |
| December | ---------- | .5 | 2.38 | 3.68 | 73.7 | 226 |
| January | 154 | .6 | 11.1 | 17.2 | 345 | 1,060 |
| February | 51 | .4 | 3.29 | 5.09 | 92.0 | 282 |
| March | 244 | .4 | 33.0 | 51.1 | 1,020 | 3,140 |
| April | 159 | 2.9 | 24.9 | 38.5 | 748 | 2,300 |
| May | 20 | 2.1 | 5.00 | 7.74 | 155 | 475 |
| June | 42 | 1.7 | 7.91 | 12.2 | 237 | 728 |
| The year | ---------- | .2 | 11.9 | 18.4 | 4,340 | 13,300 |

**HONOMANU STREAM NEAR KEANAE, MAUI**

LOCATION.—500 feet above Spreckels ditch intake and trail bridge and 6 miles south of Keanae post office.

RECORDS AVAILABLE.—November 15, 1913, to June 30, 1925.

GAGE.—Stevens continuous water-stage recorder. Datum raised 1.345 feet on May 12, 1922.

DISCHARGE MEASUREMENTS.—Made by wading or from footbridge at gage.

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; fairly permanent.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, about 1,180 million gallons a day, or 1,830 second-feet, at 8 a. m. October 16 (gage height, 8.76 feet); minimum discharge, 0.6 million gallons a day, or 0.9 second-foot, from 6 p. m. September 19 to 1 a. m. September 21 (gage height, 0.48 foot).

1913–1925: Maximum discharge recorded, that of October 16, 1924; minimum discharge, 0.17 million gallons a day, or 0.26 second-foot, on July 14, 1920 (gage height, old datum, 1.77 feet).

DIVERSION.—None.

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 uncertain above. 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; fair to poor above 500 million gallons a day.

*Discharge measurements of Honomanu Stream near Keanae, Maui, during the year ending June 30, 1925*

| Date | Gage height (feet) | Discharge | |
|---|---|---|---|
| | | Second-feet | Million gallons a day |
| July 23 | 1.08 | 8.38 | 5.42 |
| Sept. 9 | .65 | 1.94 | 1.25 |
| Feb. 18 | .72 | 2.65 | 1.71 |

*Discharge, in million gallons a day, of Honomanu Stream near Keanae, Maui, for the year ending June 30, 1925*

| Day | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1.2 | 7.1 | 1.7 | 2.5 | 3.4 | 44 | 1.9 | 1.1 | 0.9 | 76 | 11.7 | 3.7 |
| 2 | 1.4 | 8.5 | 2.0 | 2.1 | 3.1 | 5.8 | 3.5 | 1.0 | .9 | 34 | 10.8 | 3.5 |
| 3 | 2.3 | 4.8 | 2.2 | 1.8 | 2.9 | 3.8 | 1.8 | .9 | 6.5 | 13.2 | 6.0 | 22 |
| 4 | 1.2 | 9.3 | 1.7 | 26 | 2.6 | 2.9 | 1.8 | .9 | 5.3 | 21 | 6.7 | 36 |
| 5 | 1.0 | 8.9 | 1.5 | 6.2 | 2.3 | 2.3 | 1.7 | .9 | 1.9 | 34 | 13.4 | 13.6 |
| 6 | 1.0 | 4.4 | 1.7 | 2.2 | 2.3 | 2.1 | 4.5 | .9 | 1.1 | 29 | 7.2 | 9.6 |
| 7 | 1.0 | 3.5 | 4.2 | 1.6 | 2.1 | 1.9 | 9.4 | .7 | 1.0 | 114 | 5.2 | 5.6 |
| 8 | 1.9 | 12.7 | 2.1 | 1.5 | 2.2 | 1.7 | 110 | .8 | .9 | 23 | 5.2 | 4.4 |
| 9 | 1.5 | 17.0 | 1.4 | 1.4 | 3.3 | 1.6 | 153 | 18.0 | .9 | 26 | 7.0 | 3.8 |
| 10 | 1.2 | 17.1 | 1.3 | 1.4 | 2.7 | 1.5 | 72 | 68 | 1.8 | 32 | 15.5 | 3.4 |
| 11 | 1.0 | 20 | 1.2 | 15.3 | 2.3 | 1.3 | 13.4 | 7.7 | 5.6 | 42 | 8.6 | 3.0 |
| 12 | 2.5 | 7.9 | 1.1 | 5.5 | 1.8 | 10.7 | 6.2 | 2.9 | 2.9 | 21 | 7.3 | 4.8 |
| 13 | 4.3 | 4.5 | 1.0 | 2.8 | 1.6 | 13.1 | 4.3 | 6.1 | 1.3 | 19.1 | 7.7 | 5.9 |
| 14 | 3.0 | 3.8 | .9 | 1.7 | 1.5 | 3.0 | 3.0 | 11.8 | .9 | 11.2 | 5.8 | 19.4 |
| 15 | 19.6 | 4.8 | .9 | 4.7 | 1.4 | 2.0 | 2.3 | 5.8 | .8 | 32 | 6.5 | 46 |

*Discharge, in million gallons a day, of Honomanu Stream near Keanae, Maui, for the year ending June 30, 1925*—Continued

| Day | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 16 | 26 | 45 | 0.8 | 276 | 1.2 | 1.7 | 2.0 | 3.8 | 0.7 | 77 | 6.0 | 8.2 |
| 17 | 11.8 | 41 | .8 | 11.8 | 1.2 | 1.6 | 1.8 | 2.3 | .7 | 207 | 8.1 | 5.4 |
| 18 | 19.0 | 10.4 | .8 | 11.8 | 1.1 | 1.4 | 1.5 | 1.9 | 40 | 55 | 18.9 | 8.2 |
| 19 | 7.3 | 6.2 | .7 | 21 | 1.1 | 1.2 | 5.8 | 1.6 | 36 | 22 | 11.0 | 13.6 |
| 20 | 60 | 4.5 | .7 | 11.8 | 84 | 1.1 | 4.3 | 1.5 | 100 | 11.4 | 6.7 | 13.2 |
| 21 | 87 | 5.6 | 2.4 | 19.5 | 481 | 8.5 | 4.2 | 1.3 | 160 | 15.0 | 6.8 | 6.2 |
| 22 | 22 | 4.2 | 1.3 | 39 | 104 | 2.2 | 2.3 | 1.2 | 44 | 19.1 | 36 | 4.1 |
| 23 | 5.8 | 3.3 | .9 | 48 | 11.2 | 1.2 | 3.6 | 1.2 | 10.0 | 9.4 | 17.3 | 3.6 |
| 24 | 3.5 | 3.0 | 2.4 | 84 | 6.8 | 1.1 | 2.6 | 1.0 | 5.0 | 6.2 | 7.4 | 3.4 |
| 25 | 3.0 | 2.9 | 25 | 41 | 4.0 | .9 | 1.7 | .9 | 3.5 | 4.6 | 9.9 | 2.9 |
| 26 | 3.0 | 2.7 | 332 | 9.6 | 2.9 | .9 | 1.5 | .9 | 79 | 5.4 | 8.5 | 7.3 |
| 27 | 30 | 3.0 | 76 | 6.7 | 2.4 | .9 | 1.3 | .9 | 293 | 7.0 | 5.7 | 13.0 |
| 28 | 9.6 | 2.3 | 10.3 | 4.8 | 61 | .9 | 1.7 | 1.2 | 105 | 5.4 | 10.4 | 59 |
| 29 | 8.2 | 2.1 | 5.4 | 5.0 | 11.0 | .8 | 1.9 | ------- | 251 | 16.5 | 5.8 | 11.7 |
| 30 | 27 | 1.8 | 3.2 | 4.6 | 52 | .8 | 1.4 | ------- | 99 | 5.8 | 4.5 | 51 |
| 31 | 6.9 | 1.7 | ------- | 4.0 | ------- | .8 | 1.1 | ------- | 22 | ------- | 4.3 | ------- |

*Monthly discharge of Honomanu Stream near Keanae, Maui, for the year ending June 30, 1925*

| Month | Discharge | | | | Total run-off | |
|---|---|---|---|---|---|---|
| | Million gallons a day | | | Second-feet (mean) | Million gallons | Acre-feet |
| | Maximum | Minimum | Mean | | | |
| July | 87 | 1.0 | 12.1 | 18.7 | 374 | 1,150 |
| August | 45 | 1.7 | 8.84 | 13.7 | 274 | 841 |
| September | 332 | .7 | 16.3 | 25.2 | 488 | 1,500 |
| October | 276 | 1.4 | 21.8 | 33.7 | 675 | 2,070 |
| November | 481 | 1.1 | 28.7 | 44.4 | 860 | 2,640 |
| December | 44 | .8 | 3.99 | 6.17 | 124 | 380 |
| January | 153 | 1.1 | 13.8 | 21.4 | 428 | 1,310 |
| February | 68 | .7 | 5.26 | 8.14 | 147 | 452 |
| March | 293 | .7 | 41.3 | 63.9 | 1,280 | 3,930 |
| April | 207 | 4.6 | 33.1 | 51.2 | 994 | 3,050 |
| May | 36 | 4.3 | 9.42 | 14.6 | 292 | 896 |
| June | 59 | 2.9 | 13.2 | 20.4 | 396 | 1,210 |
| The year | 481 | .7 | 17.4 | 26.9 | 6,330 | 19,400 |

### HAIPUAENA STREAM AT HAIKU-UKA BOUNDARY NEAR KAILIILI, MAUI

LOCATION.—50 feet upstream from Haiku-uka boundary trail and 7½ miles by trail east of Kailiili.

RECORDS AVAILABLE.—June 3, 1922, to June 30, 1925, at present site; May 27 1919, to June 2, 1922, at site 250 feet upstream. Records comparable.

GAGE.—Stevens continuous water-stage recorder.

DISCHARGE MEASUREMENTS.—Made from suspension footbridge or by wading.

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; shifts owing to deposition of gravel in pool above.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year about 162 million gallons a day, or 251 second-feet, at 8.15 a. m. October 16 (gage height, 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 (gage height, 0.52 foot).

1919–1925: Maximum discharge recorded, that of October 16, 1924; minimum discharge, 0.06 million gallons a day, or 0.09 second-foot, at 1.30 p. m. May 27, 1920 (gage height, 0.15 foot).

DIVERSIONS.—Low flow practically all diverted into Kula pipe line at elevation 4,200 feet (about 1½ miles above station).

REGULATION.—None.

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 the irrigation of sugar cane.

ACCURACY.—Stage-discharge relation changed, presumably, at times of floods July 20 and October 16. The three rating curves used are fairly well defined below 6 million gallons a day; extensions above uncertain. 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 below 6 million gallons a day; high-stage records fair to poor.

*Discharge measurements of Haipuaena Stream at Haiku-uka boundary near Kailiili, Maui, during the year ending June 30, 1925*

| Date | Gage height (feet) | Discharge | |
|---|---|---|---|
| | | Second-feet | Million gallons a day |
| July 29 | 0.80 | 1.90 | 1.23 |
| Sept. 14 | .59 | .430 | .278 |
| May 17 | 1.08 | 4.74 | 3.06 |

*Discharge, in million gallons a day, of Haipuaena Stream at Haiku-uka boundary near Kailiili, Maui, for the year ending June 30, 1925*

| Day | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.3 | 2.4 | 0.7 | 0.9 | 0.8 | 7.8 | 0.5 | 0.3 | 0.4 | 19.2 | 4.4 | 1.3 |
| 2 | .5 | 2.9 | .8 | .8 | .7 | 1.4 | .7 | .3 | .4 | 13.0 | 3.9 | 1.3 |
| 3 | .7 | 1.6 | .9 | .7 | .6 | 1.0 | .5 | .3 | 2.4 | 5.0 | 2.9 | 7.9 |
| 4 | .3 | 2.8 | .7 | 6.8 | .6 | .8 | .4 | .2 | 2.0 | 6.8 | 2.8 | 10.0 |
| 5 | .2 | 3.2 | .6 | 1.5 | .5 | .8 | .4 | .2 | .5 | 12.6 | 4.6 | 4.6 |
| 6 | .2 | 1.5 | .8 | .7 | .5 | .7 | 1.1 | .2 | .4 | 10.4 | 2.5 | 3.3 |
| 7 | .2 | 1.2 | 2.0 | .6 | .5 | .6 | 4.4 | .2 | .3 | 28 | 1.9 | 1.9 |
| 8 | .4 | 4.5 | .8 | .5 | .5 | .6 | 28 | .2 | .3 | 8.9 | 1.9 | 1.5 |
| 9 | .4 | 6.8 | .5 | .5 | .7 | .5 | 33 | 6.1 | .3 | 9.7 | 3.1 | 1.5 |
| 10 | .3 | 5.9 | .5 | .6 | .5 | .5 | 17.4 | 17.1 | .4 | 12.7 | 6.5 | 1.4 |
| 11 | .2 | 8.3 | .5 | 6.1 | .5 | .5 | 3.4 | 1.7 | .7 | 15.3 | 3.7 | 1.3 |
| 12 | .7 | 2.7 | .4 | 1.7 | .4 | 5.8 | 1.4 | .6 | .6 | 9.1 | 2.8 | 2.2 |
| 13 | 1.2 | 1.7 | .3 | 1.1 | .4 | 3.4 | 1.0 | 1.6 | .4 | 9.1 | 3.3 | 2.5 |
| 14 | 1.0 | 1.5 | .3 | .8 | .4 | .7 | .8 | 3.4 | .3 | 5.6 | 2.5 | 8.0 |
| 15 | 8.1 | 1.6 | .3 | 2.0 | .4 | .6 | .7 | 1.5 | .2 | 12.4 | 2.7 | 14.2 |
| 16 | 9.4 | 14.6 | .3 | 42 | .3 | .6 | .7 | .9 | .2 | 23 | 2.2 | 2.8 |
| 17 | 4.4 | 10.4 | .3 | 2.4 | .3 | .5 | .6 | .7 | .2 | 40 | 3.1 | 1.7 |
| 18 | 7.3 | 3.3 | .2 | 2.0 | .3 | .4 | .5 | .6 | 8.9 | 16.5 | 7.6 | 3.4 |
| 19 | 2.4 | 2.2 | .2 | 4.7 | .3 | .4 | 1.9 | .5 | 9.7 | 9.0 | 3.9 | 5.4 |
| 20 | 13.2 | 1.6 | .2 | 2.8 | 17.1 | .4 | 1.4 | .5 | 28 | 4.6 | 2.1 | 4.9 |
| 21 | 20 | 2.3 | 1.1 | 5.5 | 61 | 5.5 | 1.1 | .4 | 28 | 5.5 | 2.0 | 2.3 |
| 22 | 6.8 | 1.6 | .5 | 10.5 | 15.7 | .6 | .7 | .4 | 13.6 | 7.9 | 11.4 | 1.5 |
| 23 | 1.9 | 1.2 | .3 | 13.9 | 2.1 | .4 | .9 | .4 | 3.0 | 3.9 | 6.0 | 1.6 |
| 24 | 1.4 | 1.1 | 1.4 | 21 | 1.4 | .4 | .6 | .4 | 1.4 | 2.7 | 2.2 | 1.4 |
| 25 | 1.2 | 1.1 | 8.9 | 10.8 | 1.0 | .3 | .5 | .4 | 1.1 | 2.2 | 3.3 | 1.2 |
| 26 | 1.5 | 1.1 | 52 | 1.9 | .8 | .3 | .4 | .3 | 22 | 2.5 | 2.6 | 2.1 |
| 27 | 9.5 | 1.1 | 11.2 | 1.3 | .7 | .3 | .4 | .6 | 45 | 3.5 | 2.0 | 4.9 |
| 28 | 3.2 | .9 | 2.8 | 1.1 | 2.3 | .3 | .5 | .5 | 22 | 2.7 | 3.1 | 18.5 |
| 29 | 2.9 | .8 | 1.6 | 1.2 | 2.8 | .3 | .5 | ------- | 42 | 7.4 | 1.9 | 4.6 |
| 30 | 10.4 | .7 | 1.1 | 1.1 | 17.4 | .3 | .4 | ------- | 22 | 2.7 | 1.6 | 14.6 |
| 31 | 2.5 | .7 | ------- | .9 | ------- | .3 | .4 | ------- | 7.8 | ------- | 1.4 | ------- |

*Monthly discharge of Haipuaena Stream at Haiku-uka boundary near Kailiili, Maui, for the year ending June 30, 1925*

| Month | Discharge | | | | Total run-off | |
|---|---|---|---|---|---|---|
| | Million gallons a day | | | Second-feet (mean) | Million gallons | Acre-feet |
| | Maximum | Minimum | Mean | | | |
| July | 20 | 0.2 | 3.64 | 5.63 | 113 | 346 |
| August | 14.6 | .7 | 3.01 | 4.66 | 93.3 | 286 |
| September | 52 | .2 | 3.07 | 4.75 | 92.2 | 283 |
| October | 42 | .5 | 4.79 | 7.41 | 148 | 455 |
| November | 61 | .3 | 4.38 | 6.78 | 132 | 404 |
| December | 7.8 | .3 | 1.19 | 1.84 | 37.0 | 114 |
| January | 33 | .4 | 3.39 | 5.25 | 105 | 323 |
| February | 17.1 | .2 | 1.45 | 2.24 | 40.5 | 124 |
| March | 45 | .2 | 8.53 | 13.2 | 264 | 812 |
| April | 40 | 2.2 | 10.4 | 16.1 | 312 | 957 |
| May | 11.4 | 1.4 | 3.42 | 5.29 | 106 | 325 |
| June | 18.5 | 1.2 | 4.46 | 6.90 | 134 | 411 |
| The year | 61 | .2 | 4.32 | 6.68 | 1,580 | 4,840 |

### HAIPUAENA STREAM NEAR HUELO, MAUI

LOCATION.—200 feet above inflow of Spreckels ditch and 7 miles by trail east of Huelo.

RECORDS AVAILABLE.—October 19, 1913, to June 30, 1925; 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.

GAGE.—Stevens continuous water-stage recorder installed June 16, 1914, to replace original Friez recorder.

DISCHARGE MEASUREMENTS.—Made by wading or from footbridge.

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; fairly permanent.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 498 million gallons a day, or 771 second-feet, at 8 a. m. October 16 (gage height, 5.53 feet); minimum, uncertain owing to obstructed intake to stilling well.

1913–1925: Maximum discharge recorded, 530 million gallons a day, or 820 second-feet at 7.40 p. m. January 16, 1921 (gage height, 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.—See under "Diversions" in description of station on this stream at Haiku-uka boundary.

REGULATION.—None.

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, presumably, at times of floods, July 21 and March 27. The two rating curves used are fairly well defined below 100 million gallons a day; extension uncertain above. 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 days and high stages for which they are fair.

*Discharge measurements of Haipuaena Stream near Huelo, Maui, during the year ending June 30, 1925*

| Date | Gage height (feet) | Discharge | | Date | Gage height (feet) | Discharge | |
|---|---|---|---|---|---|---|---|
| | | Second-feet | Million gallons a day | | | Second-feet | Million gallons a day |
| July 23 | 0.92 | 9.02 | 5.83 | Feb. 20 | 0.60 | 3.52 | 2.27 |
| Sept. 9 | .55 | 3.07 | 1.98 | Apr. 4 | 1.04 | 11.0 | 7.11 |
| Sept. 25 | 1.30 | 20.5 | 13.2 | | | | |

*Discharge, in million gallons a day, of Haipuaena Stream near Huelo, Maui, for the year ending June 30, 1925*

| Day | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1.6 | 8.1 | 2.6 | 3.2 | 3.5 | 28 | 2.7 | 2.2 | 1.7 | 36 | 11.9 | 4.2 |
| 2 | 1.7 | 8.6 | a 2.9 | 2.8 | 3.2 | 5.9 | 4.3 | a 1.9 | 1.8 | 22 | 11.1 | 4.3 |
| 3 | 2.4 | 5.6 | a 2.8 | 2.6 | 2.9 | 4.6 | a 2.1 | 1.7 | 6.2 | 10.2 | 7.0 | 19.2 |
| 4 | 1.8 | 11.5 | a 2.4 | 11.7 | 2.8 | 3.9 | a 2.1 | 1.7 | 5.2 | 15.0 | 7.0 | 35 |
| 5 | 1.7 | 9.0 | 2.3 | 4.4 | 2.7 | 3.3 | 2.8 | 1.6 | 2.5 | 24 | 11.4 | 14.5 |
| 6 | 1.8 | 5.3 | a 2.3 | 2.7 | 2.6 | 3.1 | 4.5 | 1.6 | 2.0 | 17.6 | 7.5 | 10.4 |
| 7 | 1.8 | 4.7 | a 4.7 | 2.4 | 2.4 | 2.8 | 7.5 | 1.6 | 1.9 | 63 | 6.5 | 6.5 |
| 8 | 2.9 | 10.9 | a 2.9 | 2.2 | 2.4 | 2.7 | 50 | 1.7 | 1.8 | 16.0 | 6.7 | 5.2 |
| 9 | 2.7 | 12.6 | a 2.0 | 2.3 | 3.2 | 2.5 | 60 | 16.9 | 1.8 | 18.8 | 7.4 | 4.6 |
| 10 | 1.6 | 12.6 | 1.8 | 2.2 | 2.8 | 2.3 | 36 | 43 | 3.3 | 24 | 12.5 | 3.9 |
| 11 | 1.5 | 14.9 | 1.7 | 9.4 | 2.4 | 2.2 | 10.2 | 6.8 | 6.8 | 30 | 8.6 | 3.6 |
| 12 | 2.8 | 7.6 | 1.6 | 4.6 | a 2.0 | 7.6 | 5.8 | 3.8 | 3.3 | 15.9 | 7.1 | 5.8 |
| 13 | 4.3 | 5.3 | 1.5 | 3.0 | 2.0 | 8.9 | 4.8 | 6.2 | 2.4 | 15.0 | 7.4 | 6.6 |
| 14 | 3.1 | 4.7 | 1.5 | 2.4 | 1.8 | 3.0 | 3.9 | 10.0 | 2.1 | 9.8 | 5.6 | 17.0 |
| 15 | 16.4 | 5.8 | 1.4 | 3.7 | 1.7 | 2.6 | 3.2 | 5.8 | 1.9 | 24. | 6.0 | 34 |
| 16 | 21 | 23 | 1.4 | 123 | 1.7 | 2.5 | 2.9 | 4.2 | 1.7 | 50 | 5.6 | 8.0 |
| 17 | 9.9 | 24 | 1.4 | 8.1 | 1.6 | 2.5 | 2.8 | 3.2 | 1.7 | 106 | 7.8 | 6.5 |
| 18 | 11.6 | 10.0 | 1.3 | 9.0 | 1.6 | 2.4 | 2.6 | 2.8 | 29 | 32 | 16.9 | 8.5 |
| 19 | 6.3 | 6.7 | 1.3 | 13.9 | 1.6 | 2.3 | 5.0 | 2.5 | 23 | 16.0 | 11.4 | 12.6 |
| 20 | 37 | 5.3 | 1.3 | 8.0 | 52 | 2.3 | 4.4 | 2.3 | 50 | 9.2 | 6.7 | 8.5 |
| 21 | 46 | 5.6 | 2.9 | 14.0 | 216 | 7.8 | 4.4 | 2.1 | 88 | 9.2 | 6.2 | 5.8 |
| 22 | 16.4 | 4.7 | 1.8 | 27 | 48 | 2.7 | 3.2 | 2.0 | 31 | 10.8 | 28 | 4.4 |
| 23 | 6.4 | 4.0 | 1.4 | 32 | 7.9 | 2.1 | 4.4 | 2.0 | 10.2 | 6.7 | 14.2 | 4.0 |
| 24 | 4.6 | 3.8 | 6.0 | 57 | 5.6 | 1.8 | 3.6 | 1.8 | 6.2 | 5.0 | 6.8 | 3.7 |
| 25 | 4.0 | 3.4 | 16.0 | 27 | 4.2 | 1.7 | 2.9 | 1.7 | 5.1 | 4.3 | 6.1 | 3.3 |
| 26 | 3.8 | 3.4 | 158 | 8.1 | 3.5 | 1.6 | 2.8 | 1.7 | 46 | 5.9 | 6.1 | 6.1 |
| 27 | 11.2 | 3.5 | 32 | 6.4 | 3.1 | 1.6 | 2.8 | 1.7 | 128 | 5.2 | 4.6 | 10.5 |
| 28 | 7.0 | 3.0 | 7.7 | 5.0 | 5.7 | 1.6 | 3.1 | 2.2 | 43 | 4.9 | 8.0 | 43 |
| 29 | 4.7 | 2.9 | 5.1 | 5.1 | 8.8 | 1.6 | 2.9 | ------- | 124 | 12.9 | 5.2 | 10.0 |
| 30 | 16.3 | 2.6 | 3.8 | 5.0 | 35 | 1.6 | 2.5 | ------- | 56 | 5.9 | 4.9 | 41 |
| 31 | 6.0 | 2.5 | ------- | 4.1 | ------- | 1.6 | 2.3 | ------- | 14.2 | ------- | 4.8 | ------- |

a Estimated from faulty gage-height record owing to obstructed intake to stilling well.

*Monthly discharge of Haipuaena Stream near Huelo, Maui, for the year ending June 30, 1925*

| Month | Discharge | | | | Total run-off | |
|---|---|---|---|---|---|---|
| | Million gallons a day | | | Second-feet (mean) | Million gallons | Acre-feet |
| | Maximum | Minimum | Mean | | | |
| July | 46 | 1.5 | 8.40 | 13.0 | 260 | 799 |
| August | 24 | 2.5 | 7.60 | 11.8 | 236 | 723 |
| September | 158 | 1.3 | 9.19 | 14.2 | 276 | 846 |
| October | 123 | 2.2 | 13.3 | 20.6 | 412 | 1,270 |
| November | 216 | 1.6 | 14.5 | 22.4 | 435 | 1,330 |
| December | 28 | 1.6 | 3.91 | 6.05 | 121 | 372 |
| January | 60 | 2.1 | 8.15 | 12.6 | 252 | 775 |
| February | 43 | 1.6 | 4.88 | 7.55 | 137 | 420 |
| March | 126 | 1.7 | 22.6 | 35.0 | 702 | 2,150 |
| April | 106 | 4.3 | 20.8 | 32.2 | 625 | 1,920 |
| May | 28 | 4.6 | 8.61 | 13.3 | 267 | 819 |
| June | 43 | 3.3 | 11.7 | 18.1 | 351 | 1,080 |
| The year | 216 | 1.3 | 11.2 | 17.3 | 4,070 | 12,500 |

SPRECKELS DITCH AT HAIPUAENA WEIR, NEAR HUELO, MAUI

LOCATION.—Between Haipuaena and Puohakamoa Streams on Spreckels ditch trail 7 miles southeast of Huelo.

RECORDS AVAILABLE.—April 23, 1922, to June 30, 1925. The East Maui Irrigation Co. obtained records of this station prior to April 23, 1922.

GAGE.—Stevens continuous water-stage recorder installed May 26, 1922, to replace Friez 7-day recorder used since April 23, 1922.

DISCHARGE MEASUREMENTS.—Made by weir just below gage or by current meter at section 90 feet above weir.

CHANNEL AND CONTROL.—Control formed by 6-foot sharp-crested trapezoidal weir with side slopes 1:4; permanent. Recorder operates in weir basin 16 by 65 feet.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 65 million gallons a day, or 101 second-feet, at 8 a. m. October 16 (gage height, 2.56 feet); minimum discharge, no flow, nearly entire time April 9–23 when water was shut out of ditch.

1922–1925: Maximum discharge recorded, 65 million gallons a day, or 101 second-feet at 11 a. m. September 10, 1922 (gage height, 2.57 feet) at 4.30 a. m. February 13 and at 8 a. m. October 16, 1924 (gage height, 2.56 feet); minimum discharge, that of April 9–23, 1925.

DIVERSIONS.—Ditch diverts water from a dozen or more streams east of Nailiilihaele Stream.

REGULATION.—By head gates at intake in Haipuaena Stream.

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

UTILIZATION.—Water used for irrigation of sugar cane.

ACCURACY.—Stage-discharge relation permanent during year. Weir rating curve well defined below 40 million gallons a day and fairly well defined above. 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.

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 Puohakamoa Stream; from Puohakamoa 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 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.

One discharge measurement was made during year:

April 4, 1925: Gage height, 1.18 feet; discharge, 25.3 second-feet, or 16.4 million gallons a day.

*Discharge, in million gallons a day, of Spreckels ditch at Haipuaena Weir, near Huelo, Maui, for the year ending June 30, 1925*

| Day | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 4.2 | 18.0 | 6.5 | 8.5 | 9.5 | 25 | 7.6 | 4.5 | 3.9 | 30 | 24 | 13.4 |
| 2 | 4.2 | 17.8 | 7.0 | 7.3 | 8.7 | 14.2 | 11.5 | 4.2 | 4.1 | 28 | 24 | 14.5 |
| 3 | 6.4 | 14.7 | 7.3 | 6.7 | 7.8 | 11.3 | 6.1 | 3.9 | 13.0 | 20 | 18.2 | 25 |
| 4 | 4.2 | 22 | 6.1 | 14.9 | 7.3 | 9.7 | 6.8 | 3.8 | 13.0 | 21 | 17.8 | 30 |
| 5 | 3.6 | 18.2 | 5.5 | 12.3 | 6.8 | 8.5 | 8.5 | 3.6 | 6.8 | 27 | 22 | 24 |
| 6 | 3.7 | 13.2 | 6.0 | 7.5 | 6.4 | 7.5 | 12.7 | 3.4 | 3.1 | 25 | 18.7 | 22 |
| 7 | 3.8 | 12.5 | 11.0 | 6.5 | 6.1 | 6.8 | 12.2 | 3.4 | 1.6 | 32 | 16.7 | 17.6 |
| 8 | 9.2 | 19.6 | 6.7 | 5.5 | 6.0 | 6.4 | 15.5 | 3.6 | 1.6 | 19.5 | 17.6 | 15.5 |
| 9 | 6.4 | 22 | 5.2 | 5.9 | 8.8 | 5.9 | 21 | 11.7 | 1.6 | 6.2 | 19.6 | 14.7 |
| 10 | 4.6 | 22 | 4.6 | 5.5 | 7.3 | 5.5 | 20 | 26 | 2.8 | ------- | 23 | 12.5 |
| 11 | 4.1 | 23 | 4.3 | 15.3 | 6.1 | 5.3 | 15.9 | 11.0 | 7.4 | ------- | 20 | 11.1 |
| 12 | 6.9 | 16.3 | 3.8 | 11.9 | 5.3 | 13.1 | 13.6 | 4.8 | 3.1 | ------- | 18.5 | 17.4 |
| 13 | 11.7 | 13.1 | 3.8 | 8.8 | 4.9 | 14.9 | 11.7 | 6.2 | 2.0 | ------- | 19.3 | 16.5 |
| 14 | 9.5 | 11.9 | 3.7 | 6.1 | 4.6 | 8.3 | 10.1 | 13.0 | 3.9 | ------- | 16.5 | 21 |
| 15 | 19.6 | 14.2 | 3.6 | 10.2 | 4.3 | 6.2 | 8.5 | 7.2 | 4.5 | ------- | 17.6 | 30 |
| 16 | 26 | 22 | 3.4 | 20 | 4.2 | 5.9 | 7.5 | 5.0 | 4.1 | ------- | 16.3 | 19.3 |
| 17 | 19.0 | 14.0 | 3.6 | 10.8 | 3.9 | 5.6 | 7.2 | 3.8 | 3.8 | .2 | 19.8 | 17.6 |
| 18 | 20 | 20 | 3.3 | 19.6 | 3.8 | 5.0 | 6.1 | 4.5 | 6.1 | ------- | 26 | 18.9 |
| 19 | 14.8 | 15.5 | 2.9 | 22 | 3.8 | 4.8 | 11.0 | 6.2 | 22 | ------- | 23 | 22 |
| 20 | 21 | 13.2 | 3.2 | 17.2 | 18.7 | 4.6 | 12.1 | 5.8 | 27 | ------- | 17.4 | 14.9 |
| 21 | 30 | 14.5 | 9.1 | 20 | 36 | 12.3 | 11.1 | 5.3 | 31 | .1 | 17.0 | 16.1 |
| 22 | 22 | 12.1 | 4.9 | 24 | 15.8 | 6.7 | 8.7 | 5.0 | 18.9 | .1 | 28 | 13.1 |
| 23 | 13.7 | 11.0 | 3.8 | 26 | 10.8 | 4.6 | 11.6 | 4.9 | 15.1 | 10.0 | 23 | 12.3 |
| 24 | 11.5 | 10.2 | 9.1 | 29 | 11.9 | 4.2 | 10.1 | 4.5 | 15.5 | 14.5 | 16.9 | 10.8 |
| 25 | 10.4 | 9.5 | 26 | 21 | 11.5 | 3.8 | 6.8 | 4.2 | 14.5 | 13.6 | 16.5 | 9.4 |
| 26 | 10.2 | 9.2 | 34 | 16.1 | 9.4 | 3.7 | 6.1 | 3.9 | 29 | 16.9 | 14.4 | 13.6 |
| 27 | 15.8 | 9.7 | 17.2 | 15.1 | 8.0 | 3.6 | 5.6 | 3.8 | 34 | 15.8 | 13.0 | 21 |
| 28 | 14.6 | 8.0 | 16.5 | 13.1 | 13.4 | 3.3 | 7.0 | 4.6 | 19.8 | 15.5 | 20 | 31 |
| 29 | 11.5 | 7.6 | 13.2 | 13.6 | 18.7 | 3.3 | 7.0 | ------- | 28 | 24 | 15.9 | 19.8 |
| 30 | 23 | 6.7 | 10.1 | 13.2 | 28 | 3.2 | 5.5 | ------- | 18.9 | 17.6 | 16.1 | 30 |
| 31 | 15.1 | 6.5 | ------- | 11.3 | ------- | 3.4 | 4.9 | ------- | 16.9 | ------- | 15.5 | ------- |

NOTE.—No flow on days for which no discharge is given.

*Monthly discharge of Spreckels ditch at Haipuaena Weir, near Huelo, Maui, for the year ending June 30, 1925*

| Month | Discharge | | | | Total run-off | |
|---|---|---|---|---|---|---|
| | Million gallons a day | | | Second-feet (mean) | Million gallons | Acre-feet |
| | Maximum | Minimum | Mean | | | |
| July | 30 | 3.6 | 12.3 | 19.0 | 381 | 1,170 |
| August | 23 | 6.5 | 14.5 | 22.4 | 448 | 1,380 |
| September | 34 | 2.9 | 8.18 | 12.7 | 245 | 753 |
| October | 29 | 5.5 | 13.7 | 21.2 | 425 | 1,300 |
| November | 36 | 3.8 | 9.93 | 15.4 | 298 | 914 |
| December | 25 | 3.2 | 7.31 | 11.3 | 227 | 695 |
| January | 21 | 4.9 | 10.0 | 15.5 | 310 | 951 |
| February | 26 | 3.4 | 6.14 | 9.50 | 172 | 527 |
| March | 34 | 1.6 | 12.2 | 18.9 | 377 | 1,160 |
| April (20 days) | 32 | .1 | 16.8 | 26.0 | 337 | 1,030 |
| May | 28 | 13.0 | 19.1 | 29.6 | 592 | 1,820 |
| June | 31 | 9.4 | 18.5 | 28.6 | 555 | 1,700 |
| The year (355 days) | 36 | .1 | 12.3 | 19.0 | 4,370 | 13,400 |

### PUOHAKAMOA STREAM NEAR HUELO, MAUI

LOCATION.—150 feet above Spreckels ditch inflow and trail crossing and 7 miles east of Huelo.

RECORDS AVAILABLE.—June 13, 1913, to June 30, 1925; December 18, 1910, to June 18, 1913, at station 150 feet downstream.

GAGE.—Stevens continuous water-stage recorder installed November 23, 1917, replacing Barrett and Lawrence water-stage recorder installed June 13, 1913. Old staff gage station was 150 feet downstream at trail bridge below inflow from Spreckels ditch.

DISCHARGE MEASUREMENTS.—Made by wading or from footbridge 200 feet above gage. Inflow of Spreckels ditch must be deducted from measurements made at trail bridge at old station.

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; shifts slightly.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 815 million gallons a day, or 1,260 second-feet, at 1.45 a. m. October 16 (gage height, 6.85 feet); minimum discharge, uncertain owing to intake to stilling well being plugged.

1910–1925: Maximum discharge recorded from extension of rating curve, 1,100 million gallons a day, or 1,700 second-feet, at 2.30 p. m. January 14, 1923 (gage height, about 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.—Kula pipe line diverts small amount of water above station at elevation 4,300 feet.

REGULATION.—None.

OBJECT OF STATION.—To furnish data for water valuation appraisal in connection with territorial water license to ditch company.

UTILIZATION.—Ordinary flow of stream is diverted by East Maui Irrigation Co.'s ditches for irrigation of sugar cane.

ACCURACY.—Stage-discharge relation changed, presumably, at time of flood September 26. Rating curves poorly defined and extensions above 50 million gallons a day are based on the flow of the branches of this stream at Haiku-uka boundary and on adjacent streams. 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 good for medium stages except for periods of estimate, for which they are fair; low-stage records are fair and high-stage records are poor.

The following discharge measurements were made:

September 9, 1924: Gage height, 1.15 feet; discharge, 4.93 second-feet, or 3.19 million gallons a day.

May 20, 1925: Gage height, 2.18 feet; discharge, 19.8 second-feet, or 12.8 million gallons a day.

*Discharge, in million gallons a day, of Puohakamoa Stream near Huelo, Maui, for the year ending June 30, 1925*

| Day | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2.5 | 18.4 | 3.8 | 6.0 | | 69 | 3.8 | 2.5 | 2.3 | 57 | 22 | 9.0 |
| 2 | 2.6 | 18.4 | 4.2 | 5.2 | | 15.0 | 8.2 | 2.3 | 2.4 | 60 | 18.2 | 9.0 |
| 3 | 3.8 | 12.0 | 4.5 | 4.8 | | 11.6 | 15.0 | 2.0 | 9.2 | 26 | 12.4 | 43 |
| 4 | 2.6 | 26 | 4.0 | 15.9 | | 9.6 | 3.6 | 1.8 | 9.7 | 34 | 10.9 | 88 |
| 5 | 2.1 | 19.0 | 3.8 | 6.9 | | 8.4 | 4.5 | 1.5 | 3.8 | 52 | 22 | 30 |
| 6 | 2.2 | 11.1 | 3.7 | 4.8 | 4.4 | 7.4 | 8.1 | 1.3 | 2.6 | 31 | 13.2 | 20 |
| 7 | 2.1 | 9.6 | 6.6 | 4.5 | | 6.9 | 12.0 | 1.2 | 2.5 | 126 | 11.6 | 14.1 |
| 8 | 5.0 | 25 | 3.8 | 3.6 | | 6.4 | 92 | 1.1 | 2.5 | 34 | 10.8 | 11.6 |
| 9 | 3.7 | 27 | 3.2 | 3.6 | | 6.0 | 106 | 20 | 2.2 | 39 | 13.2 | 10.2 |
| 10 | 2.7 | 28 | 2.9 | 3.3 | | 5.6 | 77 | 109 | 3.2 | 52 | 22 | 9.0 |
| 11 | 1.9 | 35 | 2.9 | 17.4 | | 5.2 | 19.8 | 12.9 | 11.2 | 60 | 14.2 | 7.9 |
| 12 | 3.0 | 14.9 | 2.8 | 6.8 | 3.4 | 14.9 | 11.6 | 7.9 | 4.5 | 32 | 11.6 | 12.4 |
| 13 | 7.3 | 11.1 | 2.5 | 5.2 | 3.5 | 17.0 | 9.0 | 13.6 | 3.1 | 28 | 11.6 | 14.0 |
| 14 | 4.5 | 8.9 | 2.4 | 4.2 | 3.4 | 6.9 | 7.4 | 22 | 2.1 | 18.5 | 10.2 | 35 |
| 15 | 28 | 11.5 | 2.4 | 82 | 3.4 | 6.0 | 6.4 | 11.6 | 2.0 | 50 | 11.6 | 68 |

*Discharge, in million gallons a day, of Puohakamoa Stream near Huelo, Maui, for the year ending June 30, 1925*—Continued

| Day | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 16 | 56 | 49 | 2.3 | | 3.1 | 5.6 | 5.6 | 8.4 | 1.8 | 101 | 10.2 | 15.4 |
| 17 | 19.0 | 61 | 2.2 | | 3.2 | 5.2 | 5.2 | 6.0 | 1.8 | 230 | 14.3 | 13.2 |
| 18 | 27 | 23 | 2.0 | | 3.2 | 4.5 | 4.5 | 5.2 | 64 | 73 | 30 | 17.2 |
| 19 | 13.0 | 13.9 | 2.0 | | 3.0 | 4.0 | 8.0 | 4.5 | 40 | 35 | 19.2 | 22 |
| 20 | 11.2 | | 1.9 | | 142 | 3.8 | 7.9 | 4.2 | 99 | 19.2 | 12.4 | 13.2 |
| 21 | 89 | | 4.5 | | 475 | 11.6 | 7.9 | 3.4 | 158 | 17.0 | 12.4 | 10.9 |
| 22 | 43 | | 4.0 | | 106 | 5.6 | 5.4 | 3.2 | 115 | 16.0 | 59 | 9.0 |
| 23 | 13.7 | | 2.2 | 44 | 19.0 | | 7.7 | 2.9 | 22 | 13.2 | 26 | 8.4 |
| 24 | 10.4 | | 4.2 | | 14.1 | | 6.4 | 2.6 | 13.2 | 10.9 | 14.1 | 7.4 |
| 25 | 8.2 | 5.5 | 35 | | 11.6 | | 4.5 | 2.6 | 10.9 | 10.2 | 12.4 | 6.9 |
| 26 | 7.6 | | 341 | | 9.6 | 3.6 | 4.2 | 2.4 | 75 | 13.2 | 12.4 | 12.9 |
| 27 | 26 | | 66 | | 8.4 | | 3.3 | 2.2 | 242 | 10.9 | 10.2 | 21 |
| 28 | 13.1 | | 15.0 | | 14.6 | | 3.8 | 2.7 | 119 | 10.2 | 17.1 | 95 |
| 29 | 9.8 | | 10.2 | | 20 | | 4.2 | ------- | 250 | 26 | 10.9 | 19.8 |
| 30 | 36 | | 7.4 | | 103 | | 3.3 | ------- | 162 | 10.9 | 10.9 | 93 |
| 31 | 12.0 | | ------- | | ------- | | 2.8 | ------- | 38 | ------- | 10.2 | ------- |

NOTE.—Discharge estimated July 1–12, Sept. 4–6, 9–12, 21–23, Nov. 12–20, Dec. 19, 20, Jan. 31, Feb. 1–8, 21–28, Mar. 1, 2, 6–9, and 13–17. Braced figures give estimated mean discharge for periods indicated. Estimates were made by comparison with records of the three branches of this stream at Haiku-uka boundary, Spreckels ditch at Haipuaena Weir, and Puohakamoa intake to Koolau ditch; gage-height record either missing or faulty at low-stages because intake to stilling well was plugged during these periods.

*Monthly discharge of Puohakamoa Stream near Huelo, Maui, for the year ending June 30, 1925*

| Month | Discharge | | | | Total run-off | |
|---|---|---|---|---|---|---|
| | Million gallons a day | | | Second-feet (mean) | Million gallons | Acre-feet |
| | Maximum | Minimum | Mean | | | |
| July | 89 | ---------- | 15.1 | 23.4 | 469 | 1,440 |
| August | 61 | ---------- | 15.8 | 24.4 | 489 | 1,500 |
| September | 341 | 1.9 | 18.4 | 28.5 | 553 | 1,700 |
| October | ---------- | 3.3 | 28.3 | 43.8 | 878 | 2,700 |
| November | 475 | ---------- | 33.3 | 51.5 | 998 | 3,060 |
| December | 69 | ---------- | 8.66 | 13.4 | 269 | 824 |
| January | 106 | ---------- | 15.1 | 23.4 | 469 | 1,440 |
| February | 109 | ---------- | 9.32 | 14.4 | 261 | 801 |
| March | 250 | ---------- | 47.6 | 73.6 | 1,480 | 4,530 |
| April | 230 | 10.2 | 43.2 | 66.8 | 1,300 | 3,980 |
| May | 59 | 10.2 | 16.0 | 24.8 | 497 | 1,530 |
| June | 95 | 6.9 | 24.7 | 38.2 | 742 | 2,280 |
| The year | 475 | ---------- | 23.0 | 35.6 | 8,400 | 25,800 |

**EAST BRANCH OF PUOHAKAMOA STREAM AT HAIKU-UKA BOUNDARY NEAR KAILIILI, MAUI**

LOCATION.—On left bank of stream 200 yards downstream from trail crossing and 7 miles by trail southeast of Kailiili.

RECORDS AVAILABLE.—October 9, 1919, to June 30, 1925.

GAGE.—Stevens continuous water-stage recorder. Datum lowered 3.50 feet on April 16, 1920.

DISCHARGE MEASUREMENTS.—Made by wading or from suspension footbridge 5 feet below 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, about 55 million gallons a day, or 85 second-feet, at 7.15 p. m. March 27 (gage height, 5.90 feet); minimum discharge about 0.1 million gallons a day, or

0.2 second-foot, several hours July 4–6 and 11 and September 19 (gage height, 3.87 feet).

1919–1925: 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 records for West and Middle Branches of Puohakamoa Stream); minimum discharge, no flow, several days in December, 1919, and July 14, 1920.

DIVERSIONS.—None.

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 changed, presumably, at time of flood November 21. Rating curves used fairly well defined below 10 million gallons a day, extended above. 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 ordinary stages.

One discharge measurement was made during year:

September 14, 1924: Gage height, 3.90 feet; discharge, 0.270 second-foot, or 0.175 million gallons a day.

*Discharge, in million gallons a day, of East Branch of Puohakamoa Stream at Haiku-uka boundary near Kailiili, Maui, for the year ending June 30, 1925*

| Day | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.1 | 0.7 | 0.3 | 0.3 | 0.4 | 3.2 | 0.4 | 0.4 | 0.3 | 3.4 | 1.6 | 0.7 |
| 2 | .1 | .8 | .3 | .3 | .3 | .9 | .6 | .3 | .3 | 2.9 | 1.4 | .7 |
| 3 | .1 | .5 | .3 | .3 | .3 | .7 | .4 | .3 | 1.1 | 1.7 | 1.0 | 2.2 |
| 4 | .1 | .8 | .2 | .3 | .3 | .6 | .4 | .3 | .7 | 2.9 | .9 | 3.7 |
| 5 | .1 | .7 | .2 | .2 | .2 | .5 | .4 | .3 | .4 | 3.0 | 2.2 | 1.6 |
| 6 | .1 | .4 | .3 | .2 | .2 | .5 | .9 | .3 | .3 | 2.2 | 1.1 | 1.3 |
| 7 | .1 | .4 | .4 | .2 | .2 | .5 | 1.2 | .3 | .3 | 7.1 | .9 | 1.0 |
| 8 | .2 | 1.0 | .3 | .2 | .2 | .5 | 5.0 | .3 | .3 | 2.2 | .9 | .9 |
| 9 | .1 | 1.5 | .2 | .2 | .3 | .4 | 6.5 | 2.2 | .3 | 3.6 | 1.1 | .8 |
| 10 | .1 | 1.5 | .2 | .2 | .3 | .4 | 4.3 | 4.6 | .3 | 3.4 | 2.0 | .7 |
| 11 | .1 | 1.4 | .2 | .4 | .3 | .4 | 1.5 | .8 | .6 | 3.6 | 1.1 | .7 |
| 12 | .4 | .7 | .2 | .2 | .2 | .9 | .9 | .6 | .4 | 2.1 | 1.1 | .9 |
| 13 | .4 | .5 | .1 | .2 | .2 | .8 | .9 | 1.1 | .3 | 2.1 | 1.0 | 1.1 |
| 14 | .4 | .4 | .1 | .1 | .2 | .4 | .7 | 1.4 | .3 | 1.4 | 1.0 | 2.5 |
| 15 | 1.6 | .5 | .1 | .5 | .2 | .4 | .6 | 1.0 | .3 | 3.4 | 1.0 | 3.6 |
| 16 | 2.2 | 2.8 | .1 | 12.1 | .2 | .4 | .5 | .7 | .2 | 6.0 | .9 | 1.1 |
| 17 | .8 | 2.4 | .1 | .6 | .2 | .4 | .5 | .5 | .2 | 12.1 | 1.2 | 1.0 |
| 18 | 1.6 | .9 | .1 | .6 | .1 | .3 | .5 | .5 | 4.8 | 4.2 | 2.0 | 1.8 |
| 19 | .6 | .6 | .1 | 1.6 | .1 | .3 | 1.2 | .4 | 2.9 | 2.3 | 1.3 | 1.4 |
| 20 | 3.8 | .5 | .1 | .8 | 6.0 | .3 | .8 | .4 | 4.6 | 1.7 | 1.0 | 1.3 |
| 21 | 3.9 | .6 | .3 | 1.4 | 26 | .5 | .7 | .4 | 10.9 | 1.5 | 1.0 | 1.0 |
| 22 | 1.4 | .5 | .1 | 2.5 | 4.6 | .4 | .6 | .4 | 3.5 | 1.3 | 3.1 | .8 |
| 23 | .6 | .4 | .1 | 2.9 | 1.2 | .4 | .7 | .3 | 1.3 | 1.1 | 1.5 | .8 |
| 24 | .5 | .4 | .3 | 5.5 | 1.0 | .3 | .5 | .3 | 1.0 | 1.0 | 1.1 | .7 |
| 25 | .4 | .4 | 1.4 | 2.2 | .8 | .3 | .5 | .3 | .9 | .9 | .9 | .7 |
| 26 | .4 | .4 | 17.2 | .8 | .7 | .3 | .4 | .3 | 4.7 | .9 | .9 | 1.3 |
| 27 | .6 | .4 | 4.3 | .6 | .6 | .3 | .4 | .4 | 14.3 | .9 | .9 | 1.8 |
| 28 | .5 | .3 | .8 | .5 | 1.0 | .3 | .4 | .4 | 4.8 | .9 | 1.6 | 5.1 |
| 29 | .8 | .3 | .5 | .5 | 1.2 | .3 | .4 | ------ | 16.3 | 1.9 | 1.0 | 1.4 |
| 30 | 1.5 | .3 | .4 | .5 | 6.1 | .3 | .4 | ------ | 7.2 | 1.0 | .9 | 4.5 |
| 31 | .6 | .3 | ------ | .4 | ------ | .3 | .4 | ------ | 2.1 | ------ | .8 | ------ |

*Monthly discharge of East Branch of Puohakamoa Stream at Haiku-uka boundary near Kailiili, Maui, for the year ending June 30, 1925*

| Month | Discharge | | | | Total run-off | |
|---|---|---|---|---|---|---|
| | Million gallons a day | | | Second-feet (mean) | Million gallons | Acre-feet |
| | Maximum | Minimum | Mean | | | |
| July | 3.9 | 0.1 | 0.78 | 1.21 | 24.2 | 74 |
| August | 2.8 | .3 | .75 | 1.16 | 23.3 | 72 |
| September | 17.2 | .1 | .98 | 1.52 | 29.3 | 90 |
| October | 12.1 | .1 | 1.20 | 1.86 | 37.3 | 114 |
| November | 26 | .1 | 1.79 | 2.77 | 53.6 | 164 |
| December | 3.2 | .3 | .53 | .82 | 16.5 | 51 |
| January | 6.5 | .4 | 1.08 | 1.67 | 33.6 | 103 |
| February | 4.6 | .3 | .70 | 1.08 | 19.5 | 60 |
| March | 16.3 | .2 | 2.77 | 4.29 | 85.9 | 264 |
| April | 12.1 | .9 | 2.76 | 4.27 | 82.7 | 254 |
| May | 3.1 | .8 | 1.24 | 1.92 | 38.4 | 118 |
| June | 5.1 | .7 | 1.57 | 2.43 | 47.1 | 144 |
| The year | 26 | .1 | 1.35 | 2.09 | 491 | 1,510 |

**MIDDLE BRANCH OF PUOHAKAMOA STREAM AT HAIKU-UKA BOUNDARY NEAR KAILIILI, MAUI**

LOCATION.—At trail crossing 200 feet above Haiku-uka boundary and 6¾ miles southeast of Kailiili.

RECORDS AVAILABLE.—March 14, 1919, to June 30, 1925. Records for the period March 14 to June 30, 1919, published in Water-Supply Paper 555.

GAGE.—Stevens continuous water-stage recorder.

DISCHARGE MEASUREMENTS.—Made by wading or from suspension bridge 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 probably shifting.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, about 185 million gallons a day, or 286 second-feet, at 9.30 a. m. March 29 (gage height, 8.50 feet); minimum discharge, 0.3 million gallons a day, or 0.5 second-foot, at 4 a. m. December 31 and several hours March 18 (gage height, 4.13 feet).

1919–1925: Maximum discharge recorded, 207 million gallons a day, or 320 second-feet at 5 p. m. March 22, 1920 (gage height, 8.47 feet); minimum discharge, 0.06 million gallons a day, or 0.09 second-feet, 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.—None.

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 the irrigation of sugar cane.

ACCURACY.—Stage-discharge relation permanent during year. Rating curve rather poorly defined; extended above 25 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 fair for ordinary stages.

The following discharge measurements were made:

July 28, 1924: Gage height, 4.44 feet; discharge, 2.35 second-feet, or 1.52 million gallons a day.

September 14, 1924: Gage height, 4.19 feet; discharge, 0.520 second-feet, or 0.336 million gallons a day.

*Discharge, in million gallons a day, of Middle Branch of Puohakamoa Stream at Haiku-uka boundary near Kailiili, Maui, for the year ending June 30, 1925*

| Day | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.5 | 1.6 | 0.6 | 0.9 | 0.8 | 9.4 | 0.5 | 0.4 | 0.4 | 15.1 | 2.2 | 0.7 |
| 2 | .7 | 2.0 | .7 | .8 | .7 | 1.6 | .6 | .3 | .4 | 7.5 | 2.0 | .7 |
| 3 | 1.0 | 1.2 | .7 | .8 | .6 | 1.2 | .5 | .3 | 1.6 | 2.7 | 1.3 | 5.2 |
| 4 | .5 | 1.8 | .6 | 4.4 | .6 | 1.0 | .5 | .3 | 1.8 | 5.6 | 1.3 | 7.2 |
| 5 | .4 | 2.2 | .6 | 1.5 | .5 | .8 | .4 | .3 | .6 | 7.1 | 2.4 | 3.2 |
| 6 | .4 | 1.2 | .6 | .8 | .5 | .7 | .8 | .3 | .5 | 5.8 | 1.3 | 2.2 |
| 7 | .4 | .9 | 1.3 | .7 | .5 | .7 | 2.8 | .3 | .4 | 23 | 1.0 | 1.2 |
| 8 | .5 | 2.7 | .7 | .6 | .5 | .6 | 18.9 | .3 | .4 | 5.0 | .9 | 1.0 |
| 9 | .6 | 3.8 | .5 | .6 | .6 | .6 | 23 | 4.3 | .4 | 6.9 | 1.3 | .9 |
| 10 | .5 | 3.4 | .5 | .6 | .5 | .6 | 13.5 | 14.1 | .4 | 7.8 | 3.1 | .8 |
| 11 | .4 | 4.7 | .4 | 3.6 | .5 | .5 | 2.8 | 1.8 | .6 | 10.7 | 1.7 | .7 |
| 12 | .6 | 1.9 | .4 | 1.4 | .4 | 2.4 | 1.5 | .8 | .6 | 4.8 | 1.2 | 1.2 |
| 13 | 1.2 | 1.2 | .4 | .9 | .4 | 2.8 | 1.0 | 1.0 | .4 | 4.6 | 1.4 | 1.3 |
| 14 | .9 | 1.1 | .4 | .7 | .4 | .8 | .9 | 3.2 | .3 | 2.7 | 1.1 | 5.6 |
| 15 | 5.0 | 1.1 | .4 | 1.3 | .3 | .6 | .7 | 1.5 | .3 | 7.8 | 1.2 | 9.9 |
| 16 | 6.1 | 10.0 | .4 | 38 | .3 | .8 | .6 | .9 | .3 | 18.5 | 1.1 | 1.9 |
| 17 | 3.0 | 7.7 | .4 | 1.6 | .3 | .6 | .6 | .7 | .3 | 40 | 1.4 | 1.2 |
| 18 | 4.7 | 2.2 | .4 | 1.6 | .3 | .5 | .6 | .6 | 8.1 | 13.5 | 2.4 | 1.2 |
| 19 | 2.2 | 1.5 | .3 | 3.5 | .3 | .4 | 1.0 | .5 | 8.8 | 5.5 | 1.8 | 3.6 |
| 20 | 10.4 | 1.2 | .4 | 1.9 | 14.3 | .4 | .9 | .5 | 19.5 | 2.6 | 1.2 | 2.4 |
| 21 | 11.9 | 1.4 | .7 | 4.3 | 67 | 2.8 | 1.0 | .4 | 29 | 2.7 | 1.2 | 1.4 |
| 22 | 4.7 | 1.1 | .5 | 7.3 | 15.4 | .8 | .7 | .4 | 10.6 | 2.9 | 7.0 | 1.0 |
| 23 | 1.5 | .9 | .4 | 9.6 | 2.4 | .5 | .8 | .4 | 2.4 | 1.9 | 3.7 | [a] 1.0 |
| 24 | 1.1 | .9 | .7 | 17.7 | 1.7 | .4 | .6 | .4 | 1.4 | 1.4 | 1.6 | [a] .8 |
| 25 | .9 | .8 | 5.5 | 8.5 | 1.2 | .4 | .5 | .3 | 1.2 | 1.2 | 1.8 | [a] .6 |
| 26 | .9 | .8 | 52 | 2.1 | 1.0 | .3 | .5 | .3 | 16.1 | 1.3 | 1.8 | 1.1 |
| 27 | 5.2 | .9 | 13.4 | 1.3 | .9 | .3 | .4 | .4 | 45 | 1.8 | 1.2 | 2.8 |
| 28 | 2.2 | .7 | 2.5 | 1.1 | 1.6 | .3 | .5 | .4 | 17.5 | 1.4 | 1.9 | 15.5 |
| 29 | 19.6 | .7 | 1.5 | 1.1 | 2.5 | .3 | .5 | ------- | 47 | 3.8 | 1.2 | 2.8 |
| 30 | 5.5 | .6 | 1.1 | 1.1 | 13.7 | .3 | .4 | ------- | 22 | 1.3 | 1.0 | 11.6 |
| 31 | 1.7 | .6 | ------- | .9 | ------- | .3 | .4 | ------- | 4.5 | ------- | .9 | ------- |

[a] Estimated by comparison with records of flow of East and West Branches of Puohakamoa Stream at Haiku-uka boundary near Kailiili.

*Monthly discharge of Middle Branch of Puohakamoa Stream at Haiku-uka boundary near Kailiili, Maui, for the year ending June 30, 1925*

| Month | Discharge | | | | Total run-off | |
|---|---|---|---|---|---|---|
| | Million gallons a day | | | Second-feet (mean) | Million gallons | Acre-feet |
| | Maximum | Minimum | Mean | | | |
| July | 19.6 | 0.4 | 3.07 | 4.75 | 95.2 | 292 |
| August | 10.0 | .6 | 2.03 | 3.14 | 62.8 | 193 |
| September | 52 | .3 | 2.97 | 4.60 | 89.0 | 273 |
| October | 38 | .6 | 3.91 | 6.05 | 121 | 372 |
| November | 67 | .3 | 4.36 | 6.75 | 131 | 401 |
| December | 9.4 | .3 | 1.09 | 1.69 | 33.7 | 103 |
| January | 23 | .4 | 2.53 | 3.91 | 78.4 | 241 |
| February | 14.1 | .3 | 1.26 | 1.95 | 35.4 | 109 |
| March | 47 | .3 | 7.83 | 12.1 | 243 | 745 |
| April | 40 | 1.2 | 7.23 | 11.2 | 217 | 666 |
| May | 7.0 | .9 | 1.76 | 2.72 | 54.6 | 168 |
| June | 15.5 | ---------- | 3.02 | 4.67 | 30.7 | 278 |
| The year | 67 | .3 | 3.43 | 5.31 | 1,250 | 3,840 |

**WEST BRANCH OF PUOHAKAMOA STREAM AT HAIKU-UKA BOUNDARY NEAR KAILIILI, MAUI**

LOCATION.—At trail crossing 500 feet above Haiku-uka boundary and 6½ miles by trail southeast of Kailiili.

RECORDS AVAILABLE.—March 15, 1919, to June 30, 1925. Records for the period March 15 to June 30, 1919, published in Water-Supply Paper 555.

GAGE.—Stevens continuous water-stage recorder.

DISCHARGE MEASUREMENTS.—Made by wading or from suspension bridge 200 feet below gage.

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; shifts occasionally.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 196 million gallons a day, or 303 second-feet, at 9 a. m. October 16 (gage height, 7.15 feet); minimum discharge, 0.3 million gallons a day, or 0.5 second-foot, several hours September 24 (gage height, 3.45 feet).

1919–1925: Maximum discharge estimated 250 million gallons a day, or 387 second-feet, at 5.30 p. m. March 22, 1920 (gage height, about 8 feet); 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.—Small amount of water diverted by Kula pipe line above station at elevation 4,300 feet.

REGULATION.—None.

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 and extended above. 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 ordinary stages.

The following discharge measurements were made:

September 14, 1924: Gage height, 3.47 feet; discharge, 0.600 second-foot, or 0.388 million gallons a day.

May 16, 1925: Gage height, 3.70 feet; discharge, 2.58 second-feet, or 1.67 million gallons a day.

*Discharge, in million gallons a day, of West Branch of Puohakamoa Stream at Haiku-uka boundary near Kailiili, Maui, for the year ending June 30, 1925*

| Day | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.4 | 2.3 | 0.6 | 0.8 | 1.1 | 14.3 | 0.8 | 0.5 | 0.6 | 19.3 | 3.2 | 1.2 |
| 2 | .4 | 2.6 | .8 | .7 | 1.0 | 2.6 | 1.2 | .4 | .6 | 8.5 | 2.8 | 1.1 |
| 3 | .5 | 1.5 | .7 | .7 | .9 | 2.2 | .8 | .4 | 2.7 | 3.7 | 1.8 | 6.8 |
| 4 | .4 | 2.5 | .6 | 3.7 | .9 | 1.6 | .6 | .4 | 2.0 | 8.0 | 1.6 | 9.5 |
| 5 | .3 | 2.6 | .6 | 1.2 | .8 | 1.3 | .6 | .4 | .8 | 8.8 | 3.9 | 3.8 |
| 6 | .4 | 1.4 | .6 | .8 | .8 | 1.2 | 1.4 | .4 | .6 | 7.8 | 1.9 | 3.0 |
| 7 | .4 | 1.1 | 1.2 | .6 | .8 | 1.1 | 3.5 | .4 | .6 | 28 | 1.5 | 1.9 |
| 8 | .5 | 3.2 | .6 | .6 | .8 | 1.0 | 26 | .4 | .5 | 5.9 | 1.5 | 1.5 |
| 9 | .5 | 4.5 | .4 | .6 | 1.0 | 1.0 | 32 | 6.2 | .6 | 9.4 | 2.2 | 1.4 |
| 10 | .4 | 4.5 | .4 | .6 | .8 | 1.0 | 17.0 | 17.9 | .6 | 10.0 | 4.6 | 1.2 |
| 11 | .4 | 5.6 | .4 | 4.2 | .8 | .8 | 3.7 | 2.0 | 1.1 | 11.5 | 2.3 | 1.1 |
| 12 | .7 | 2.2 | .4 | 1.4 | .7 | 3.6 | 2.0 | 1.2 | .8 | 5.6 | 1.9 | 1.8 |
| 13 | 1.1 | 1.5 | .4 | 1.0 | .6 | 4.2 | 1.5 | 2.2 | .6 | 5.5 | 1.9 | 2.0 |
| 14 | .8 | 1.2 | .4 | .7 | .6 | 1.5 | 1.2 | 3.6 | .5 | 3.4 | 1.8 | 6.6 |
| 15 | 6.0 | 1.3 | .4 | 1.3 | .6 | 1.0 | 1.0 | 2.2 | .4 | 9.9 | 2.1 | 12.5 |
| 16 | 7.5 | 13.2 | .3 | 52 | .6 | 1.2 | .9 | 1.5 | .4 | 23 | 1.8 | 2.5 |
| 17 | 3.0 | 9.7 | .3 | 2.9 | .6 | 1.1 | .8 | 1.0 | .4 | 48 | 2.5 | 1.8 |
| 18 | 5.7 | 2.7 | .3 | 2.7 | .6 | .8 | .8 | .8 | 11.0 | 14.6 | 5.2 | 3.0 |
| 19 | 2.2 | 1.8 | .3 | 4.5 | .6 | .8 | 1.8 | .8 | 11.9 | 5.9 | 2.7 | 4.2 |
| 20 | 13.7 | 1.4 | .3 | 2.8 | 17.2 | .8 | 1.6 | .7 | 25 | 3.2 | 1.8 | 2.7 |
| 21 | 17.6 | 1.6 | .8 | 5.4 | 97 | 4.4 | 1.5 | .6 | 40 | 3.2 | 1.9 | 1.8 |
| 22 | 5.0 | 1.2 | .4 | 9.5 | 22 | 1.4 | 1.0 | .6 | 10.4 | 3.9 | 8.8 | 1.4 |
| 23 | 1.8 | 1.0 | .3 | 11.7 | 3.2 | 1.0 | 1.2 | .6 | 2.6 | 2.2 | 4.2 | 1.4 |
| 24 | 1.3 | .9 | .8 | 23 | 2.5 | .8 | .9 | .6 | 1.7 | 1.7 | 2.0 | 1.2 |
| 25 | 1.0 | .8 | 5.6 | 10.6 | 1.8 | .8 | .8 | .6 | 1.6 | 1.5 | 2.1 | 1.0 |
| 26 | 1.1 | .8 | 63 | 3.0 | 1.4 | .7 | .6 | .5 | 21 | 1.8 | 2.0 | 2.2 |
| 27 | 7.5 | .9 | 14.6 | 2.3 | 1.2 | .6 | .6 | .6 | 59 | 2.4 | 1.8 | 3.8 |
| 28 | 2.3 | .8 | 2.6 | 1.7 | 2.3 | .6 | .7 | .6 | 18.9 | 1.7 | 3.2 | 18.5 |
| 29 | 2.7 | .8 | 1.6 | 1.8 | 3.7 | .6 | .8 | ------- | 57 | 5.2 | 1.8 | 3.3 |
| 30 | 6.6 | .6 | 1.0 | 1.8 | 16.8 | .6 | .6 | ------- | 25 | 1.8 | 1.5 | 14.3 |
| 31 | 1.9 | .6 | ------- | 1.4 | ------- | .5 | .6 | ------- | 5.3 | ------- | 1.3 | ------- |

*Monthly discharge of West Branch of Puohakamoa Stream at Haiku-uka boundary near Kailiili, Maui, for the year ending June 30, 1925*

| Month | Discharge | | | | Total run-off | |
|---|---|---|---|---|---|---|
| | Million gallons a day | | | Second-feet (mean) | Million gallons | Acre-feet |
| | Maximum | Minimum | Mean | | | |
| July | 17.6 | 0.3 | 3.04 | 4.70 | 94.1 | 289 |
| August | 13.2 | .6 | 2.48 | 3.84 | 76.8 | 236 |
| September | 63 | .3 | 3.36 | 5.20 | 101 | 309 |
| October | 52 | .6 | 5.03 | 7.78 | 156 | 479 |
| November | 97 | .6 | 6.12 | 9.47 | 184 | 564 |
| December | 14.3 | .5 | 1.78 | 2.75 | 55.1 | 169 |
| January | 32 | .6 | 3.50 | 5.42 | 108 | 333 |
| February | 17.9 | .4 | 1.72 | 2.66 | 48.1 | 148 |
| March | 59 | .4 | 9.81 | 15.2 | 304 | 934 |
| April | 48 | 1.5 | 8.85 | 13.7 | 265 | 814 |
| May | 8.8 | 1.3 | 2.57 | 3.98 | 79.6 | 244 |
| June | 18.5 | 1.0 | 3.95 | 6.11 | 118 | 364 |
| The year | 97 | .3 | 4.36 | 6.75 | 1,590 | 4,880 |

**PUOHAKAMOA INTAKE OF KOOLAU DITCH NEAR HUELO, MAUI**

LOCATION.—20 feet below intake of short feeder canal from Puohakamoa Stream to Koolau ditch, 7 miles southeast of Huelo.

RECORDS AVAILABLE.—March 23, 1922, to June 30, 1925. East Maui Irrigation Co. previously obtained records at this site.

GAGE.—An continuous water-stage recorder installed July 23, 1924. Stevens continuous water-stage recorder used prior to this date.

DISCHARGE MEASUREMENTS.—Made in short channel between Puohakamoa Stream and head gates in Koolau ditch. When all water is being diverted into ditch measurements may be made by wading in stream about 300 feet 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, which is 14 by 40 feet. Below weir channel slopes downward at 30° entering Koolau ditch in tunnel.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 49 million gallons a day, or 76 second-feet, at 6.30 a. m. November 21 (gage height, 2.27 feet); minimum discharge, no flow from 2 a. m. April 1 to 6.30 a. m. April 4, when water was shut out of intake.

1922–1925: Maximum discharge recorded, 88 million gallons a day, or 136 second-feet at 8 a. m. October 22, 1922 (gage height, 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.—During high water Spreckels ditch intake 120 feet downstream takes water wasted at this intake above.

REGULATION.—Entire flow of Spreckels ditch empties into Puohakamoa Stream about 400 feet above station. During ordinary stages station measures all water carried by this ditch and the stream.

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 well defined below 39 million gallons a day; extension above this quantity

subject to some uncertainty owing to the fact that the weir wing walls are over-topped. Operation of water-stage recorder satisfactory except as noted 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 except for estimated periods, for which they are probably good.

No discharge measurements were made at this station during year.

*Discharge, in million gallons a day, of Puohakamoa intake of Koolau ditch near Huelo, Maui, for the year ending June 30, 1925*

| Day | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 6.8 | 25 | 9.6 | | | | | 7.1 | 6.3 | 0.0 | 22 | 18.9 |
| 2 | 6.9 | 24 | 11.2 | | | | | 6.6 | 6.6 | .0 | 22 | 18.9 |
| 3 | 10.3 | 24 | 11.7 | | | | | 6.0 | 15.7 | .0 | 20 | 23 |
| 4 | 6.9 | 28 | 10.3 | | | | 17 | 5.7 | 20 | 21 | 20 | 23 |
| 5 | 5.8 | 25 | 9.6 | | | | | 5.2 | 11.0 | 31 | 22 | 22 |
| 6 | 6.0 | 23 | 9.9 | | 12 | | | 4.8 | 5.8 | 30 | 22 | 20 |
| 7 | 6.0 | 23 | 18.9 | 13 | | | | 4.7 | 4.2 | 34 | 20 | 20 |
| 8 | 15.0 | 26 | 11.2 | | | | 31 | 4.8 | 4.2 | 28 | 20 | 18.9 |
| 9 | 10.5 | 28 | 8.5 | | | | 31 | 16.1 | 3.9 | 26 | 22 | 18.9 |
| 10 | 7.4 | 28 | 7.6 | | | 18 | 28 | 26 | 7.4 | 30 | 22 | 18.9 |
| 11 | 6.1 | 28 | 7.3 | | | | 25 | 17.8 | 20 | 30 | 22 | 17.8 |
| 12 | 10.0 | 25 | 6.8 | | 8.8 | | 23 | 11.2 | 7.8 | 26 | 22 | 20 |
| 13 | 20 | 23 | 6.4 | | 8.5 | | 20 | 14.1 | 5.2 | 26 | 25 | 20 |
| 14 | 15.2 | 22 | 6.3 | | 8.1 | | 16.6 | 23 | 6.1 | 22 | 24 | 22 |
| 15 | 24 | 24 | 6.0 | | 7.8 | | 14.1 | 18.9 | 6.6 | 26 | 20 | 23 |
| 16 | 31 | 28 | 5.7 | | 7.4 | | 12.3 | 13.0 | 6.0 | 32 | 20 | 20 |
| 17 | 26 | 26 | 5.7 | | 7.2 | | 11.4 | 9.6 | 5.7 | 36 | 22 | 20 |
| 18 | 26 | 25 | 5.4 | | 7.1 | | 9.9 | 9.6 | 10.2 | 30 | 23 | 20 |
| 19 | 25 | 23 | 5.0 | | 6.9 | | 17.8 | 10.6 | 28 | 26 | 22 | 20 |
| 20 | 26 | 22 | 5.0 | | 16.7 | 13 | 20 | 9.6 | 31 | 23 | 20 | 18.9 |
| 21 | 32 | 22 | 14.1 | | 40 | | 16.6 | 8.8 | 31 | 20 | 20 | 18.9 |
| 22 | 30 | 17.8 | 8.1 | 26 | | | 15.0 | 8.3 | 25 | 18.9 | 23 | 18.9 |
| 23 | 24 | 16.6 | 6.1 | | | | 18.9 | 7.9 | 23 | 16.6 | 22 | 17.8 |
| 24 | 22 | 15.2 | 9.8 | | | | 15.4 | 7.2 | 22 | 7.1 | 20 | 17.8 |
| 25 | 18.9 | 13.6 | | | 26 | | 11.4 | 6.9 | 20 | 4.3 | 20 | 16.6 |
| 26 | 17.8 | 13.4 | | | | 7.5 | 10.3 | 6.4 | 25 | 4.3 | 18.9 | 17.8 |
| 27 | 23 | 13.0 | 26 | | | | 9.4 | 6.1 | 28 | 4.3 | 18.9 | 20 |
| 28 | 22 | 10.8 | | | | | 11.9 | 7.4 | 8.9 | 16.2 | 20 | 24 |
| 29 | 20 | 10.5 | | | | | 10.6 | ------- | .9 | 23 | 18.9 | 20 |
| 30 | 26 | 9.6 | | | | | 8.8 | ------- | .0 | 20 | 18.9 | 24 |
| 31 | 23 | 9.6 | ------- | | ------- | | 7.8 | ------- | .0 | ------- | 18.9 | ------- |

NOTE.—Discharge estimated Sept. 21–24, Nov. 12 and 21. Braced figures give estimated mean discharge for periods indicated. Estimates made by comparison with records of Puohakamoa Stream near Huelo and Spreckels ditch at Haipuaena Weir and a study of the intervening inflow.

*Monthly discharge of Puohakamoa intake of Koolau ditch near Huelo, Maui, for the year ending June 30, 1925*

| Month | Discharge | | | | Total run-off | |
|---|---|---|---|---|---|---|
| | Million gallons a day | | | Second-feet (mean) | Million gallons | Acre-feet |
| | Maximum | Minimum | Mean | | | |
| July | 32 | 5.8 | 17.7 | 27.4 | 550 | 1,690 |
| August | 28 | 9.6 | 21.0 | 32.5 | 652 | 2,000 |
| September | ---------- | 5.0 | 12.1 | 18.7 | 362 | 1,110 |
| October | ---------- | ---------- | 20.1 | 31.1 | 624 | 1,920 |
| November | ---------- | ---------- | 16.2 | 25.1 | 484 | 1,490 |
| December | ---------- | ---------- | 14.1 | 21.8 | 438 | 1,350 |
| January | 31 | 7.8 | 16.6 | 25.7 | 515 | 1,580 |
| February | 26 | 4.7 | 10.1 | 15.6 | 283 | 870 |
| March (29 days) | 31 | .9 | 13.6 | 21.0 | 396 | 1,210 |
| April (27 days) | 36 | 4.3 | 22.7 | 35.1 | 612 | 1,880 |
| May | 25 | 18.9 | 21.0 | 32.5 | 652 | 2,000 |
| June | 24 | 16.6 | 20.0 | 30.9 | 600 | 1,840 |
| The year (361 days) | 36 | .9 | 17.1 | 26.5 | 6,170 | 18,900 |

### MANUEL LUIS DITCH AT PUOHAKAMOA GULCH, NEAR HUELO, MAUI

LOCATION.—In Puohakamoa Gulch at lower portal of tunnel between Haipuaena and Puohakamoa Streams, 6 miles east of Huelo.

RECORDS AVAILABLE.—December 15, 1917, to June 30, 1925.

GAGE.—Stevens continuous water-stage recorder.

DISCHARGE MEASUREMENTS.—Made by rectangular sharp-crested weir, 4.5 feet long set in concrete, with full contractions.

CHANNEL AND CONTROL.—Weir basin 25 feet long, 8.3 feet wide, and 1.9 feet deep below crest of weir; made by enlarging tunnel.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 100 million gallons a day, or 155 second-feet, at 9 p. m. March 27 (gage height, 4.53 feet); minimum discharge, 0.1 million gallons a day, or 0.2 second-foot, from 5 to 9 p. m. July 11 (gage height, 0.05 foot).

1919–1925: Maximum discharge recorded, 116 million gallons a day, or 179 second-feet, at 2.10 p. m. January 14, 1923 (gage height, 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.—Ditch is an extension of Center ditch and picks up water not diverted by ditches at higher elevations.

REGULATION.—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. Weir rating curve well defined. 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 integrating gage-height graph with discharge integrator. Records excellent.

Manuel Luis ditch, at elevation about 500 feet, diverts the flow of Kolea, Haipuaena, and Puohakamoa 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 30 million gallons a day.

No discharge measurements were made at this station during the year.

*Discharge, in million gallons a day, of Manuel Luis ditch at Puohakamoa Gulch, near Huelo, Maui, for the year ending June 30, 1925*

| Day | July | Aug. | Sept. | Oct. | Nov. | Jan. | Feb. | Mar. | Apr. | May | June |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.2 | 14.2 | 0.6 | 1.2 | 1.6 | ------ | 0.3 | 0.4 | 16.7 | 21 | 1.5 |
| 2 | .3 | 14.7 | .6 | .9 | 1.3 | 2.5 | .3 | .4 | 16.4 | 20 | 1.7 |
| 3 | .3 | 3.9 | .6 | .8 | 1.1 | .6 | .3 | 4.6 | 6.7 | 6.3 | 23 |
| 4 | .3 | 22 | .5 | 7.2 | 1.0 | .6 | .3 | 1.8 | 9.0 | 4.4 | 33 |
| 5 | .2 | 16.0 | .4 | 1.4 | .9 | 1.1 | .3 | .6 | 27 | 17.2 | 26 |
| 6 | .2 | 2.6 | .4 | .7 | .7 | 4.7 | .2 | .4 | 21 | 6.6 | 19.4 |
| 7 | .2 | 2.1 | .6 | .7 | .7 | 6.2 | .2 | .5 | 35 | 4.5 | 6.6 |
| 8 | .5 | 17.3 | .5 | .6 | .7 | 41 | .3 | .5 | 18.8 | 3.2 | 3.1 |
| 9 | .4 | 21 | .3 | 1.1 | .7 | 42 | 9.4 | .4 | 15.9 | 7.0 | 2.8 |
| 10 | .2 | 25 | .3 | .7 | .6 | 36 | 36 | 1.4 | 31 | 13.8 | 2.1 |

*Discharge, in million gallons a day, of Manuel Luis ditch at Puohakamoa Gulch, near Huelo, Maui, for the year ending June 30, 1925*—Continued.

| Day | July | Aug. | Sept. | Oct. | Nov. | Jan. | Feb. | Mar. | Apr. | May | June |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 11 | 0.2 | 26 | 0.3 | 6.4 | 0.6 | 24 | 10.2 | 11.4 | 32 | 8.8 | 1.7 |
| 12 | 1.6 | 12.1 | .3 | 1.5 | .5 | 5.3 | 5.4 | 1.1 | 28 | 6.0 | 6.8 |
| 13 | 1.6 | 3.3 | .3 | 1.0 | .5 | 1.4 | 5.9 | .5 | 26 | 5.4 | 6.2 |
| 14 | .3 | 2.1 | .3 | .7 | .4 | 1.0 | 19.9 | .4 | 17.1 | 1.6 | 14.8 |
| 15 | 13.5 | 4.4 | .3 | 2.2 | .4 | 1.1 | 9.1 | .4 | 28 | 2.0 | 32 |
| 16 | 29 | 19.0 | .2 | 49 | .4 | .7 | 1.9 | .4 | 36 | 1.5 | 11.1 |
| 17 | 14.2 | 31 | .2 | 12.8 | .3 | .6 | 1.2 | .4 | 47 | 7.7 | 5.2 |
| 18 | 14.2 | 23 | .2 | 20 | .3 | .6 | .9 | 13.8 | 35 | 27 | 9.1 |
| 19 | 6.8 | 10.9 | .2 | 23 | .3 | 2.7 | .9 | 28 | 31 | 18.7 | 16.1 |
| 20 | 17.8 | 3.1 | .2 | 8.8 | ------- | 1.3 | .8 | 35 | 25 | 4.0 | 8.5 |
| 21 | 38 | 4.0 | .4 | 18.7 | ------- | 1.2 | .7 | 43 | 24 | 3.0 | 2.6 |
| 22 | 27 | 1.9 | .3 | 26 | ------- | .6 | .6 | 32 | 26 | 29 | 1.6 |
| 23 | 6.8 | 1.5 | .2 | 35 | ------- | 1.7 | .6 | 15.1 | 14.0 | 23 | 1.3 |
| 24 | 2.4 | 1.3 | 4.4 | 41 | ------- | .7 | .6 | 5.4 | 4.3 | 7.5 | 1.1 |
| 25 | 1.8 | 1.2 | 26 | 33 | ------- | .5 | .5 | 2.1 | 2.4 | 4.3 | 1.0 |
| 26 | 1.6 | 1.0 | 59 | 18.8 | ------- | .5 | .5 | 32 | 7.9 | 3.4 | 6.2 |
| 27 | 8.3 | 1.3 | 30 | 12.5 | ------- | .4 | .5 | 51 | 2.1 | 1.9 | 15.4 |
| 28 | 5.1 | .9 | 14.1 | 3.4 | ------- | .5 | .4 | 31 | 1.8 | 7.7 | 33 |
| 29 | 3.2 | .8 | 3.3 | 6.3 | ------- | .6 | ------- | 44 | 18.7 | 2.4 | 12.6 |
| 30 | 21 | .7 | 1.6 | 4.5 | ------- | .4 | ------- | 35 | 4.8 | 2.8 | 32 |
| 31 | 3.6 | .6 | ------- | 2.2 | ------- | .4 | ------- | 11.8 | ------- | 3.4 | ------- |

NOTE.—Data insufficient for making estimate November 20 to January 1 owing to either faulty or missing gage-height record.

*Monthly discharge of Manuel Luis ditch at Puohakamoa Gulch, near Huelo, Maui, for the year ending June 30, 1925*

| Month | Discharge | | | | Total run-off | |
|---|---|---|---|---|---|---|
| | Million gallons a day | | | Second-feet (mean) | Million gallons | Acre-feet |
| | Maximum | Minimum | Mean | | | |
| July | 38 | 0.2 | 7.12 | 11.0 | 221 | 678 |
| August | 31 | .6 | 9.32 | 14.4 | 289 | 887 |
| September | 59 | .2 | 4.89 | 7.57 | 147 | 450 |
| October | 49 | .6 | 11.0 | 17.0 | 342 | 1,050 |
| January | 42 | .4 | 5.84 | 9.04 | 181 | 555 |
| February | 36 | .2 | 3.86 | 5.97 | 108 | 332 |
| March | 51 | .4 | 13.1 | 20.3 | 405 | 1,240 |
| April | 47 | 1.8 | 20.3 | 31.4 | 609 | 1,870 |
| May | 29 | 1.5 | 8.87 | 13.7 | 275 | 844 |
| June | 33 | 1.0 | 11.2 | 17.3 | 338 | 1,030 |

### KOOLAU DITCH AT WAHINEPE, NEAR HUELO, MAUI

LOCATION.—Between Puohakamoa and Waikamoi Streams, half a mile below Puohakamoa intake, and 7 miles southeast of Huelo.

RECORDS AVAILABLE.—March 25, 1922, to June 30, 1925. East Maui Irrigation Co. previously obtained records at this location.

GAGE.—Stevens continuous water-stage recorder.

DISCHARGE MEASUREMENTS.—Made from plank across ditch.

CHANNEL AND CONTROL.—Ditch section in rock tunnel; permanent.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 113 million gallons a day, or 175 second-feet, at 8 a. m. September 26 (gage height, 5.39 feet); this discharge occurs as the mean for several days during the year due to using mean gage heights to nearest tenth-foot. Minimum discharge recorded during year, 3.6 million gallons a day, or 5.6 second-feet, from 5 to 6 a. m. April 1 (gage height, 0.34 foot).

1922–1925: Maximum discharge recorded, about 120 million gallons a day, or 186 second-feet at 2 a. m. May 6, 1923 (gage height, about 5.55 feet); minimum discharge, that of April 1, 1925.

DIVERSIONS.—Flood water diverted at gage through a cross-cut channel and at Puohakamoa intake half a mile upstream. Other flood water waste gates along course of ditch.

REGULATION.—Complete regulation by intake gates and by flood water waste gates.

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; extended beyond these limits. Operation of water-stage recorder not satisfactory 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 and high and low stages, for which they are fair.

For description of this ditch see Koolau ditch at Nahiku Weir, near Nahiku, Maui.

One discharge measurement made during year.

July 25, 1924: Gage height, 3.65 feet; discharge, 102 second-feet, or 65.9 million gallons a day.

*Discharge, in million gallons a day, of Koolau ditch at Wahinepe, near Huelo, Maui, for the year ending June 30, 1925*

| Day | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 23 | 100 | 44 | | | | | 36 | 28 | 6.6 | 104 | 70 |
| 2 | 22 | 104 | 44 | | | | | 35 | 28 | 8.1 | 104 | 72 |
| 3 | 27 | 93 | 42 | | | | | 34 | 62 | 8.1 | 99 | 101 |
| 4 | 22 | 103 | 38 | | | | | 32 | 62 | 24 | 93 | 110 |
| 5 | 20 | 107 | 37 | | | | 60 | 30 | 37 | 35 | 104 | 110 |
| 6 | 20 | 88 | 38 | | 60 | | | 28 | 28 | 31 | 99 | 107 |
| 7 | 20 | 77 | 54 | | | | | 28 | 29 | 38 | 93 | 100 |
| 8 | 45 | 99 | 38 | 48 | | | 110 | 28 | 27 | 38 | 93 | 88 |
| 9 | 34 | 107 | 33 | | | 70 | 110 | 47 | 27 | 62 | 97 | |
| 10 | 23 | 110 | 31 | | | | 110 | 113 | 46 | 80 | 104 | |
| 11 | 21 | 110 | 31 | | | | 110 | 99 | 94 | 86 | 99 | |
| 12 | 29 | 107 | 30 | | | | 101 | 79 | 49 | 72 | 96 | |
| 13 | 60 | 93 | 29 | | | | 85 | 82 | 34 | 70 | 99 | |
| 14 | 42 | 80 | 28 | | | | 72 | 110 | 29 | 56 | 85 | |
| 15 | 82 | 88 | 27 | | | | 71 | 104 | 27 | 75 | 88 | |
| 16 | 110 | 104 | 26 | | 38 | | 59 | 82 | 25 | 85 | 83 | |
| 17 | 102 | 110 | 26 | | | | 56 | 62 | 25 | 94 | 100 | |
| 18 | 98 | 110 | 25 | | | | 49 | 52 | 60 | 92 | 107 | 90 |
| 19 | 90 | 104 | 24 | | | | 63 | 47 | 113 | 107 | 107 | |
| 20 | 84 | 93 | 24 | | | | 72 | 42 | 113 | 104 | 97 | |
| 21 | 110 | 93 | 37 | | | | 70 | 39 | 113 | 104 | 91 | |
| 22 | 110 | 80 | 27 | | | | 53 | 37 | 110 | 101 | 110 | |
| 23 | 99 | 70 | 24 | | | | 70 | 36 | 107 | 101 | 107 | |
| 24 | 80 | 67 | 35 | 100 | | 34 | 62 | 34 | 101 | 93 | 101 | |
| 25 | 70 | 62 | 110 | | 95 | | 47 | 32 | 93 | 88 | 91 | |
| 26 | 67 | 59 | 113 | | | | 44 | 30 | 113 | 93 | 87 | |
| 27 | 72 | 64 | | | | | 42 | 29 | 113 | 83 | 78 | |
| 28 | 70 | 52 | 95 | | | | 46 | 30 | 37 | 85 | 100 | |
| 29 | 59 | 52 | | | | | 48 | ------- | 12.0 | 104 | 86 | |
| 30 | 107 | 47 | | | | | 42 | ------- | 10.6 | 96 | 84 | 107 |
| 31 | 87 | 44 | ------- | | ------- | | 38 | ------- | 6.7 | ------- | 84 | ------- |

NOTE.—Discharge estimated July 28 and September 9–11. Braced figures show estimated mean discharge for periods indicated. Estimates made from study of incomplete gage height record and by comparison with the records of Koolau ditch near Keanae, Puohakamoa intake of Koolau ditch near Huelo, and other near-by streams.

*Monthly discharge of Koolau ditch at Wahinepe, near Huelo, Maui, for the year ending June 30, 1925*

| Month | Discharge | | | | Total run-off | |
|---|---|---|---|---|---|---|
| | Million gallons a day | | | Second-feet (mean) | Million gallons | Acre-feet |
| | Maximum | Minimum | Mean | | | |
| July | 110 | 20 | 61.5 | 95.2 | 1,900 | 5,850 |
| August | 110 | 44 | 86.4 | 134 | 2,680 | 8,220 |
| September | 113 | 24 | 46.5 | 71.9 | 1,400 | 4,280 |
| October | ---------- | ---------- | 74.8 | 116 | 2,320 | 7,120 |
| November | ---------- | ---------- | 65.1 | 101 | 1,950 | 5,990 |
| December | ---------- | ---------- | 53.7 | 83.1 | 1,670 | 5,110 |
| January | 110 | ---------- | 66.1 | 102 | 2,050 | 6,290 |
| February | 113 | 28 | 51.3 | 79.4 | 1,440 | 4,410 |
| March | 113 | 6.7 | 56.8 | 87.9 | 1,760 | 5,400 |
| April | 107 | 6.6 | 70.7 | 109 | 2,120 | 6,510 |
| May | 110 | 78 | 95.8 | 148 | 2,970 | 9,120 |
| June | ---------- | ---------- | 91.8 | 142 | 2,760 | 8,450 |
| The year | ---------- | 6.6 | 68.5 | 106 | 25,000 | 76,800 |

**WAIKAMOI STREAM ABOVE WAILOA DITCH, NEAR HUELO, MAUI**

LOCATION.—250 feet above Wailoa ditch intake, one-fourth mile from Spreckels ditch trail, and 4½ miles southeast of Huelo.

RECORDS AVAILABLE.—January 28, 1922, to June 30, 1925. All previous records for station revised and published in this paper.

GAGE.—Stevens continuous water-stage recorder.

DISCHARGE MEASUREMENTS.—Made from suspension footbridge at gage or by wading.

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; may shift occasionally.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 1,360 million gallons a day, or 2,100 second-feet, at 9.45 a. m. October 16 (gage height, 10.45 feet); minimum discharge, 0.8 million gallons a day, or 1.2 second-feet, 7 a. m. to 5 p. m. October 10 (gage height, 0.78 foot).

1921–1925: Maximum discharge recorded same as given above; minimum discharge, 0.5 million gallons a day, or 0.8 second-foot, 9 a. m. July 4, 1922 (gage height, 0.47 foot).

DIVERSIONS.—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.

REGULATION.—By diversion only.

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 by ditches of East Maui Irrigation Co. for irrigation of sugar cane.

ACCURACY.—Stage-discharge relation changed, presumably, at time of flood September 25, 1924. Rating curve used previous to this flood was revised and all previous records are republished in this paper. The two rating curves well defined below 35 million gallons a day; extension above this quantity uncertain. Operation of water-stage recorder satisfactory except as indicated in footnote to daily-discharge table. Daily discharge for year ending June 30, 1925, ascertained by applying to rating table mean daily gage height determined from recorder graph by inspection or, for days of

considerable fluctuation, by integrating gage-height record with discharge integrator. Daily discharge previous to this year ascertained, below gage height of 1.0 foot (discharge, 2.9 million gallons a day), by applying to rating table mean daily gage height determined from recorder graph by inspection; above gage height of 1.0 foot, by integrating gage-height record with discharge integrator. Record good for ordinary stages except for estimated periods and high stages, for which they are fair.

*Discharge measurements of Waikamoi Stream above Wailoa ditch, near Huelo, Maui, during the year ending June 30, 1925*

| Date | Gage height (feet) | Discharge | | Date | Gage height (feet) | Discharge | |
|---|---|---|---|---|---|---|---|
| | | Second-feet | Million gallons a day | | | Second-feet | Million gallons a day |
| Sept. 11 | 0.73 | 2.06 | 1.33 | Apr. 4 | 1.62 | 17.3 | 11.2 |
| Sept. 25 | 1.84 | 26.1 | 16.9 | May 20 | 1.49 | 10.9 | 7.04 |
| Feb. 20 | 1.08 | 3.16 | 2.04 | | | | |

*Discharge, in million gallons a day, of Waikamoi Stream above Wailoa ditch, near Huelo, Maui, for the years ending June 30, 1922–1925*

| Day | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1921–22 | | | | | | | | | | | | |
| 1 | | | | | | | | 206 | 43 | 1.8 | 4.4 | 2.5 |
| 2 | | | | | | | | 171 | 27 | 2.2 | 4.7 | 2.2 |
| 3 | | | | | | | | 88 | 58 | 5.3 | 8.6 | 2.1 |
| 4 | | | | | | | | 30 | 26 | 8.2 | 22 | 1.9 |
| 5 | | | | | | | | 17.4 | 104 | 31 | 14.8 | 1.7 |
| 6 | | | | | | | | 12.1 | 154 | 23 | 8.8 | 1.6 |
| 7 | | | | | | | | 11.3 | 238 | 25 | 6.6 | 1.4 |
| 8 | | | | | | | | 7.9 | 242 | 10.4 | 7.7 | 1.6 |
| 9 | | | | | | | | 29 | 136 | 23 | 4.4 | 1.8 |
| 10 | | | | | | | | 24 | 212 | 12.1 | 4.3 | 1.6 |
| 11 | | | | | | | | 14.2 | 84 | 15.6 | 8.3 | 1.5 |
| 12 | | | | | | | | 28 | 41 | 12.6 | 4.9 | 2.6 |
| 13 | | | | | | | | 11.9 | 25 | 12.5 | 3.4 | 2.8 |
| 14 | | | | | | | | 7.9 | 19.8 | 8.3 | 2.7 | 1.7 |
| 15 | | | | | | | | 6.6 | 12.9 | 6.1 | 2.3 | 1.5 |
| 16 | | | | | | | | 5.3 | 9.3 | 9.0 | 2.0 | 1.4 |
| 17 | | | | | | | | 4.4 | 14.5 | 9.8 | 2.0 | 1.2 |
| 18 | | | | | | | | 3.9 | 11.5 | 5.3 | 2.0 | 1.1 |
| 19 | | | | | | | | 3.6 | 7.3 | 4.3 | 2.2 | 1.1 |
| 20 | | | | | | | | 3.2 | 5.5 | 8.4 | 4.9 | 1.2 |
| 21 | | | | | | | | 27 | 5.1 | 12.2 | 2.6 | 1.5 |
| 22 | | | | | | | | 16.3 | 4.3 | 11.5 | 2.1 | 1.3 |
| 23 | | | | | | | | 8.2 | 3.7 | 7.6 | 3.1 | 1.1 |
| 24 | | | | | | | | 12.1 | 3.5 | 5.4 | 4.8 | 1.0 |
| 25 | | | | | | | | 6.4 | 3.1 | 7.0 | 3.2 | 1.0 |
| 26 | | | | | | | | 6.4 | 2.8 | 4.6 | 1.6 | .9 |
| 27 | | | | | | | | 34 | 2.6 | 3.2 | 9.6 | .8 |
| 28 | | | | | | | 142 | 209 | 2.3 | 25 | 10.2 | .8 |
| 29 | | | | | | | 32 | | 2.1 | 30 | 7.0 | .8 |
| 30 | | | | | | | 256 | | 2.1 | 5.8 | 3.7 | .7 |
| 31 | | | | | | | 375 | | 2.0 | | 2.9 | |
| 1922–23 | | | | | | | | | | | | |
| 1 | 0.7 | 1.0 | 1.3 | 2.6 | 3.5 | 4.6 | 1.1 | 6.3 | 5.9 | 61 | 11.1 | 10.1 |
| 2 | .6 | 1.6 | 1.8 | 3.6 | 3.3 | 4.3 | 3.3 | 3.7 | 4.7 | 88 | 11.1 | 4.7 |
| 3 | .6 | 10.3 | 2.1 | 40 | 3.5 | 4.3 | 11.3 | 2.6 | 24 | 11.2 | | 4.2 |
| 4 | .6 | 4.7 | 4.4 | 21 | 29 | 3.7 | 7.5 | 2.2 | 25 | 7.9 | | 10.5 |
| 5 | .8 | 2.0 | 14.3 | 31 | 99 | 2.8 | 2.7 | 2.0 | 6.0 | 10.2 | | 10.1 |
| 6 | .6 | 1.5 | 6.3 | 20 | 108 | 3.0 | 2.8 | 2.0 | 4.8 | 6.3 | 5.0 | 4.6 |
| 7 | .6 | 3.6 | 10.0 | 17.0 | 102 | 2.8 | 3.4 | 1.8 | 4.9 | 24 | | 3.4 |
| 8 | .6 | 13.5 | 4.3 | 7.8 | 34 | 2.2 | 5.0 | 1.7 | 91 | 28 | | 3.1 |
| 9 | 1.1 | 22 | 14.3 | 5.2 | 11.6 | 2.0 | 19.1 | 34 | 141 | 7.9 | | 2.8 |
| 10 | .8 | 17.6 | 116 | 4.0 | 8.0 | 1.8 | 11.0 | 98 | 71 | 5.8 | | 2. |

*Discharge, in million gallons a day, of Waikamoi Stream above Wailoa ditch, near Huelo, Maui, for the years ending June 30, 1922–1925*—Continued

| Day | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1922-23 | | | | | | | | | | | | |
| 11 | 0.8 | 34 | 50 | 8.3 | 9.3 | 1.7 | 40 | 17.4 | 17.3 | 27 | | 2.2 |
| 12 | 1.0 | 13.5 | 15.4 | 7.5 | 14.0 | 1.7 | 128 | 6.5 | 10.6 | 16.0 | | 3.0 |
| 13 | .8 | 5.0 | 7.6 | 3.9 | 18.9 | 2.6 | 56 | 9.1 | 6.3 | 6.3 | | 4.9 |
| 14 | .7 | 3.4 | 5.4 | 2.9 | 12.6 | 2.1 | 370 | 5.2 | 5.1 | 7.2 | | 5.7 |
| 15 | .6 | 3.1 | 12.5 | 22 | 10.2 | 1.6 | 429 | 3.7 | 4.5 | 4.6 | 5.0 | 5.8 |
| 16 | .7 | 2.7 | 5.8 | 36 | 37 | 1.4 | 51 | 3.2 | 4.0 | 3.8 | | 13.7 |
| 17 | .7 | 2.3 | 4.8 | 6.0 | 15.0 | 1.4 | 209 | 2.8 | 3.7 | 5.6 | | 18.5 |
| 18 | 1.0 | 2.5 | 23 | 5.4 | 8.1 | 1.3 | 195 | 2.5 | 4.0 | 15.6 | | 7.1 |
| 19 | 1.5 | 10.3 | 10.0 | 4.2 | 6.6 | 1.3 | 71 | 15.5 | 4.5 | 12.2 | 4.4 | 4.5 |
| 20 | .9 | 4.0 | 10.9 | 3.2 | 5.5 | 1.2 | 151 | 9.6 | 3.3 | 15.9 | 3.6 | 3.7 |
| 21 | .7 | 2.3 | 9.1 | 4.6 | 5.4 | 1.2 | 34 | 9.5 | 2.6 | 9.5 | 5.0 | 3.4 |
| 22 | .9 | 2.1 | 5.5 | 80 | 4.8 | 1.1 | 26 | 8.5 | 7.2 | 7.1 | 7.5 | 13.0 |
| 23 | .7 | 1.7 | 3.8 | 20 | 3.5 | 1.1 | 11.3 | 38 | 48 | 4.9 | 6.5 | 7.2 |
| 24 | 1.0 | 1.7 | 3.2 | 12.8 | 3.2 | 1.0 | 8.3 | 11.4 | 40 | 3.7 | 7.2 | 3.5 |
| 25 | 5.4 | 1.4 | 3.4 | 11.8 | 67 | 1.7 | 6.3 | 8.2 | 14.7 | 4.4 | 40 | 2.9 |
| 26 | 4.6 | 1.8 | 2.7 | 13.2 | 43 | 2.1 | 5.3 | 27 | 10.0 | 30 | 11.7 | 3.1 |
| 27 | 1.6 | 1.4 | 3.7 | 6.6 | 15.1 | 1.3 | 4.7 | 17.8 | 62 | 16.5 | 9.8 | 2.7 |
| 28 | 3.5 | 1.3 | 2.8 | 4.9 | 7.0 | 1.2 | 3.9 | 8.5 | 22 | 10.1 | 6.1 | 3.4 |
| 29 | 1.6 | 2.4 | 2.1 | 6.0 | 5.1 | 1.0 | 3.5 | ------- | 8.3 | 10.1 | 5.6 | 4.1 |
| 30 | 1.1 | 2.7 | 1.8 | 4.2 | 4.1 | 1.1 | 3.1 | ------- | 6.0 | 24 | 8.0 | 4.3 |
| 31 | 1.1 | 1.6 | ------- | 4.2 | ------- | 1.1 | 2.8 | ------- | 5.5 | ------- | 11.4 | ------- |
| 1923-24 | | | | | | | | | | | | |
| 1 | 3.2 | 4.2 | 2.1 | 1.8 | 12.4 | 1.7 | 20 | 1.4 | 18.4 | 2.4 | 17.7 | 2.3 |
| 2 | 3.0 | 2.8 | 1.7 | 1.7 | 9.0 | 3.0 | 13.3 | 1.3 | 29 | 2.1 | 10.8 | 2.3 |
| 3 | 5.3 | 2.8 | 1.6 | 1.7 | 6.1 | 22 | 14.5 | 1.2 | 35 | 2.8 | 7.1 | 2.2 |
| 4 | 7.1 | 5.5 | 1.4 | 2.8 | 5.2 | 47 | 18.1 | 1.5 | 27 | 3.4 | 5.4 | 2.0 |
| 5 | 3.7 | 10.2 | 1.4 | 2.6 | 112 | 7.9 | 5.8 | 1.3 | 12.8 | 2.4 | 4.8 | 2.0 |
| 6 | 3.8 | 3.4 | 1.7 | 7.7 | 31 | 22 | 4.8 | 1.3 | 8.1 | 2.1 | 4.3 | 1.7 |
| 7 | 4.4 | 7.0 | 2.5 | 4.0 | 14.1 | 104 | 3.8 | 1.3 | 5.8 | 11.6 | 4.5 | 1.5 |
| 8 | 8.1 | 8.5 | 1.5 | 2.3 | 9.3 | 17.6 | 3.4 | 1.7 | 5.4 | 32 | 4.0 | 1.4 |
| 9 | 33 | 3.7 | 2.2 | 1.8 | 9.6 | 8.1 | 4.6 | 1.3 | 4.2 | 26 | 3.3 | 1.4 |
| 10 | 14.6 | 3.0 | 1.4 | 1.5 | 8.0 | 25 | 3.2 | 1.1 | 3.7 | 29 | 3.4 | 1.3 |
| 11 | 9.7 | 5.8 | 1.2 | 1.4 | 9.7 | 47 | 5.5 | 1.0 | 4.5 | 10.8 | 4.4 | 1.5 |
| 12 | 10.0 | 26 | 83 | 1.4 | 54 | 36 | 6.4 | 55 | 4.4 | 16.7 | 3.4 | 1.4 |
| 13 | 23 | 8.1 | 40 | 1.3 | 47 | 47 | 8.5 | 319 | 6.5 | 10.1 | 83 | 3.7 |
| 14 | 13.4 | 5.4 | 6.4 | 1.2 | 10.1 | 42 | 13.7 | 262 | 7.6 | 35 | 160 | 4.7 |
| 15 | 15.8 | 3.8 | 3.6 | 2.8 | 8.1 | 124 | 5.9 | 47 | 4.0 | 47 | 20 | 2.7 |
| 16 | 8.3 | 5.0 | 2.6 | 2.8 | 8.6 | 141 | 4.3 | 13.0 | 3.4 | 9.9 | 16.0 | 11.9 |
| 17 | 10.8 | 4.8 | 2.2 | 1.5 | 5.3 | 88 | 3.6 | 10.3 | 2.9 | 9.8 | 10.2 | 14.6 |
| 18 | 6.2 | 92 | 2.6 | 1.3 | 4.8 | 148 | 3.3 | 6.0 | 3.3 | 11.8 | 6.7 | 4.2 |
| 19 | 12.8 | 15.9 | 146 | 53 | 3.7 | 96 | 3.1 | 4.9 | 41 | 6.4 | 5.4 | 2.3 |
| 20 | 10.0 | 7.2 | 39 | 32 | 3.4 | 38 | 2.8 | 3.8 | 10.0 | 5.7 | 4.4 | 2.0 |
| 21 | 7.5 | 5.1 | 17.1 | 14.1 | 3.3 | 15.5 | 2.5 | 3.4 | 4.5 | 4.6 | 3.6 | 1.7 |
| 22 | 107 | 3.8 | 9.6 | 17.3 | 3.1 | 9.8 | 2.3 | 2.9 | 3.4 | 12.3 | 3.4 | 1.5 |
| 23 | 44 | 3.5 | 5.6 | 7.5 | 4.0 | 7.4 | 2.1 | 32 | 2.8 | 9.7 | 3.3 | 1.4 |
| 24 | 10.8 | 2.9 | 4.0 | 4.3 | 3.0 | 6.3 | 2.0 | 83 | 3.6 | 5.7 | 5.6 | 1.3 |
| 25 | 6.4 | 2.6 | 3.1 | 4.6 | 2.5 | 5.3 | 1.8 | 38 | 3.8 | 4.3 | 12.0 | 2.7 |
| 26 | 5.0 | 2.4 | 2.9 | 3.8 | 2.4 | 4.7 | 1.7 | 26 | 2.9 | 32 | 5.2 | 2.2 |
| 27 | 4.3 | 2.1 | 2.8 | 182 | 2.4 | 4.0 | 1.6 | 22 | 2.5 | 83 | 4.4 | 1.5 |
| 28 | 4.4 | 2.0 | 2.7 | 86 | 3.0 | 3.4 | 1.5 | 9.9 | 3.9 | 30 | 3.1 | 1.3 |
| 29 | 4.2 | 1.9 | 2.3 | 153 | 2.4 | 3.3 | 1.4 | 10.1 | 5.6 | 17.7 | 2.5 | 1.1 |
| 30 | 3.5 | 1.8 | 2.1 | 54 | 1.9 | 3.5 | 1.4 | ------- | 3.5 | 32 | 2.1 | 1.1 |
| 31 | 3.9 | 3.7 | ------- | 14.0 | ------ | 26 | 1.4 | ------- | 2.9 | ------- | 2.1 | ------- |
| 1924-25 | | | | | | | | | | | | |
| 1 | 1.2 | 10.1 | 2.0 | 2.1 | 4.1 | 53 | 2.5 | 1.6 | 1.4 | 73 | | 4.6 |
| 2 | 1.2 | 10.6 | 2.0 | 1.6 | 3.6 | 8.3 | 4.3 | 1.4 | 1.6 | 49 | | 4.6 |
| 3 | 2.2 | 6.6 | 2.3 | 1.4 | 3.2 | 6.8 | 2.7 | 1.4 | 6.3 | 17.2 | | 32 |
| 4 | 1.4 | 12.3 | 1.8 | 16.5 | 3.0 | 5.2 | 2.4 | 1.3 | 7.8 | 24 | | 55 |
| 5 | 1.1 | 10.8 | 1.6 | 6.1 | 2.7 | 4.1 | 2.5 | 1.2 | 3.0 | 45 | | 23 |
| 6 | 1.1 | 6.0 | 1.6 | 1.9 | 2.5 | 3.6 | 4.4 | 1.1 | 1.8 | 31 | | 16.2 |
| 7 | 1.1 | 4.8 | 4.1 | 1.3 | 2.4 | 3.2 | 7.7 | 1.1 | 1.6 | | | 9.0 |
| 8 | 2.0 | 11.8 | 2.3 | 1.1 | 2.3 | 2.9 | 117 | 1.2 | 1.6 | | 9 | 6.6 |
| 9 | 1.8 | 17.0 | 1.6 | 1.0 | 3.0 | 2.7 | 166 | 14.7 | 1.4 | | | 5.6 |
| 10 | 1.4 | 17.4 | 1.4 | .9 | 2.5 | 2.4 | 89 | 75 | 2.5 | | | 4.9 |
| 11 | 1.2 | 22 | 1.3 | 11.6 | 2.2 | 2.3 | 18.4 | 9.9 | 5.8 | 55 | | 4.2 |
| 12 | 1.7 | 8.7 | 1.2 | 5.7 | 1.8 | 12.0 | 8.8 | 4.5 | 3.0 | | | 7.0 |
| 13 | 5.3 | 5.6 | 1.1 | 2.7 | 1.6 | 23 | 5.6 | 8.2 | 2.1 | | | 7.2 |
| 14 | 2.8 | 5.1 | 1.1 | 1.6 | 1.4 | 4.6 | 4.4 | 16.0 | 1.6 | | | 23 |
| 15 | 18.8 | 17.5 | 1.1 | 1.8 | 1.4 | 3.1 | 3.8 | 7.5 | 1.4 | | | 67 |

*Discharge, in million gallons a day, of Waikamoi Stream above Wailoa ditch, near Huelo, Maui, for the years ending June 30, 1922–1925*—Continued

| Day | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1924-25 | | | | | | | | | | | | |
| 16 | 37 | 50 | 1.0 | 284 | 1.3 | 3.4 | 3.2 | 5.5 | 1.3 | | | 12.2 |
| 17 | 14.7 | 35 | 1.0 | 14.2 | 1.2 | 3.3 | 3.0 | 3.5 | 1.2 | | | 7.9 |
| 18 | 21 | 11.1 | 1.0 | 11.8 | 1.1 | 2.5 | 2.6 | 2.9 | 35 | 55 | 9 | 9.3 |
| 19 | 10.3 | 7.2 | .9 | 15.9 | 1.1 | 2.2 | 4.2 | 2.5 | 37 | | | 22 |
| 20 | 50 | 5.7 | .9 | 9.3 | 80 | 2.0 | 4.6 | 2.3 | 111 | | | 9.1 |
| 21 | 82 | 6.4 | 2.1 | 21 | | 23 | 4.6 | 2.1 | 164 | | 6.8 | 8.6 |
| 22 | 28 | 5.1 | 1.5 | 39 | 120 | 5.0 | 3.1 | 1.9 | 66 | | 39 | 5.5 |
| 23 | 8.3 | 3.9 | 1.1 | 53 | | 2.8 | 4.4 | 1.8 | 14.9 | | 23 | 4.9 |
| 24 | 5.6 | 3.5 | 2.1 | 95 | | 2.1 | 3.4 | 1.6 | 7.7 | | 9.4 | 4.2 |
| 25 | 4.3 | 3.2 | 16.8 | 53 | 5.2 | 1.6 | 2.5 | 1.5 | 6.1 | 11 | 7.7 | 3.5 |
| 26 | 3.8 | 3.0 | 251 | 12.2 | 4.4 | 1.5 | 2.2 | 1.4 | 83 | | 7.9 | 16.3 |
| 27 | 26 | 3.2 | 82 | 8.6 | 3.8 | 1.4 | 2.0 | 1.4 | 264 | | 6.3 | 16.8 |
| 28 | 13.6 | 2.6 | 8.8 | 6.5 | 7.4 | 1.4 | 2.2 | 1.8 | 114 | | 11.8 | 79 |
| 29 | 6.9 | 2.3 | 4.9 | 6.1 | 11.4 | 1.3 | 2.4 | ------- | 247 | | 7.0 | 19.3 |
| 30 | 29 | 2.0 | 2.8 | 6.1 | 66 | 1.2 | 2.0 | ------- | 115 | | 6.1 | 69 |
| 31 | 9.1 | 2.0 | ------- | 5.0 | ------- | 1.3 | 1.7 | ------- | 29 | ------- | 5.5 | ------- |

NOTE.—Discharge estimated Jan. 4, 1925. Braced figures give estimated mean discharge for periods indicated. Estimates made by comparison with records of flow for East and West branches of Waikamoi Stream at Haiku-uka boundary, near Kailiili Maui.

*Monthly discharge of Waikamoi Stream above Wailoa ditch, near Huelo, Maui, for the years ending June 30, 1922–1925*

| Month | Discharge | | | | Total run-off | |
|---|---|---|---|---|---|---|
| | Million gallons a day | | | Second-feet (mean) | Million gallons | Acre-feet |
| | Maximum | Minimum | Mean | | | |
| 1921-22 | | | | | | |
| January 28–31 | 375 | 32 | 201 | 311 | 805 | 2,470 |
| February | 209 | 3.2 | 35.9 | 55.5 | 1,010 | 3,080 |
| March | 242 | 2.0 | 48.5 | 75.0 | 1,500 | 4,620 |
| April | 31 | 1.8 | 11.5 | 17.8 | 346 | 1,060 |
| May | 22 | 2.0 | 5.93 | 9.18 | 184 | 564 |
| June | 2.8 | .7 | 1.48 | 2.29 | 44.4 | 136 |
| The period | 375 | .7 | 25.3 | 39.1 | 3,890 | 11,900 |
| 1922-23 | | | | | | |
| July | 5.4 | .6 | 1.22 | 1.89 | 37.9 | 116 |
| August | 34 | 1.0 | 5.77 | 8.93 | 179 | 549 |
| September | 116 | 1.3 | 11.9 | 18.4 | 358 | 1,100 |
| October | 80 | 2.6 | 13.5 | 20.9 | 420 | 1,290 |
| November | 108 | 3.2 | 23.2 | 35.9 | 697 | 2,140 |
| December | 4.6 | 1.0 | 1.99 | 3.08 | 61.7 | 189 |
| January | 429 | 1.1 | 60.5 | 93.6 | 1,880 | 5,760 |
| February | 98 | 1.7 | 12.8 | 19.8 | 359 | 1,100 |
| March | 141 | 2.6 | 21.5 | 33.3 | 668 | 2,050 |
| April | 88 | 3.7 | 16.2 | 25.1 | 485 | 1,490 |
| May | 40 | ------- | 7.39 | 11.4 | 229 | 703 |
| June | 18.5 | 2.2 | 5.75 | 8.90 | 173 | 530 |
| The year | 429 | .6 | 15.2 | 23.5 | 5,540 | 17,000 |
| 1923-24 | | | | | | |
| July | 107 | 3.0 | 13.1 | 20.3 | 407 | 1,250 |
| August | 92 | 1.8 | 8.29 | 12.8 | 257 | 788 |
| September | 146 | 1.2 | 13.2 | 20.4 | 396 | 1,220 |
| October | 182 | 1.2 | 21.5 | 33.3 | 667 | 2,050 |
| November | 112 | 1.9 | 13.3 | 20.6 | 399 | 1,230 |
| December | 148 | 1.7 | 37.2 | 57.6 | 1,150 | 3,540 |
| January | 20 | 1.4 | 5.43 | 8.40 | 168 | 516 |
| February | 319 | 1.0 | 33.2 | 51.4 | 963 | 2,950 |
| March | 41 | 2.5 | 8.92 | 13.8 | 276 | 848 |
| April | 83 | 2.1 | 16.9 | 26.1 | 508 | 1,560 |
| May | 160 | 2.1 | 13.7 | 21.2 | 426 | 1,310 |
| June | 14.6 | 1.1 | 2.76 | 4.27 | 82.9 | 254 |
| The year | 319 | 1.0 | 15.6 | 24.1 | 5,710 | 17,500 |

*Monthly discharge of Waikamoi Stream above Wailoa ditch, near Huelo, Maui, for the years ending June 30, 1922–1925*—Continued

| Month | Discharge | | | | Total run-off | |
|---|---|---|---|---|---|---|
| | Million gallons a day | | | Second-feet (mean) | Million gallons | Acre-feet |
| | Maximum | Minimum | Mean | | | |
| 1924–25 | | | | | | |
| July | 82 | 1.1 | 12.7 | 19.6 | 394 | 1,210 |
| August | 50 | 2.0 | 10.1 | 15.6 | 312 | 959 |
| September | 251 | .9 | 13.5 | 20.9 | 404 | 1,240 |
| October | 284 | .9 | 22.5 | 34.8 | 698 | 2,140 |
| November | | 1.1 | 23.4 | 36.2 | 701 | 2,150 |
| December | 53 | 1.2 | 6.23 | 9.64 | 193 | 593 |
| January | 166 | 1.7 | 15.7 | 24.3 | 488 | 1,500 |
| February | 75 | 1.1 | 6.30 | 9.25 | 176 | 541 |
| March | 264 | 1.2 | 43.2 | 66.8 | 1,340 | 4,110 |
| April | | | 37.3 | 57.7 | 1,120 | 3,430 |
| May | 39 | | 10.0 | 15.5 | 310 | 953 |
| June | 79 | 3.5 | 18.6 | 28.8 | 558 | 1,710 |
| The year | 284 | .9 | 18.3 | 28.3 | 6,690 | 20,500 |

**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, 5½ miles east of Kailiili.

RECORDS AVAILABLE.—May 26, 1918, to June 30, 1925.

GAGE.—Stevens continuous water-stage recorder.

DISCHARGE MEASUREMENTS.—Made by wading or from suspension footbridge just above control.

CHANNEL AND CONTROL.—Channel has gravel and boulder bed with steep high banks of hardpan. Control is broad-crested concrete weir, completed June 3, 1922; permanent for low stages but drowned out at high stages.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, about 147 million gallons a day, or 227 second-feet, at 9.45 a. m. March 27 (gage-height, 7.07 feet); minimum discharge, 0.2 million gallons a day, or 0.3 second-foot, several hours July 7 (gage height, 3.92 feet).

1918–1925: Maximum discharge recorded, about 230 million gallons a day, or 356 second-feet, at 5.20 p. m. March 22, 1920 (gage height, 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.—A little water is diverted above station by Kula pipe line.

REGULATION.—None.

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 15 million gallons a day; extension above uncertain. Operation of water-stage recorder satisfactory during year. 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 fair for ordinary stages; poor for high stages.

*Discharge measurements of East Branch of Waikamoi Stream at Haiku-uka boundary near Kailiili, Maui, during the year ending June 30, 1925*

| Date | Gage height (feet) | Discharge | |
|---|---|---|---|
| | | Second-feet | Million gallons a day |
| Sept. 14 | 3.94 | 0.470 | 0.304 |
| May 16 | 4.14 | 2.04 | 1.32 |
| May 16 | 4.14 | 1.67 | 1.08 |

*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, 1925*

| Day | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.3 | 1.8 | 0.4 | 0.5 | 0.7 | 7.5 | 0.4 | 0.3 | 0.3 | 10.0 | 2.4 | 0.7 |
| 2 | .5 | 1.8 | .5 | .4 | .6 | 1.4 | 1.0 | .3 | .3 | 7.5 | 2.0 | .6 |
| 3 | .6 | 1.0 | .4 | .4 | .6 | 1.2 | .5 | .3 | 2.4 | 2.7 | 1.2 | 5.4 |
| 4 | .3 | 2.0 | .4 | .9 | .4 | .8 | .4 | .3 | 1.7 | 6.4 | 1.0 | 8.2 |
| 5 | .3 | 1.8 | .4 | .7 | .4 | .7 | .4 | .3 | .6 | 6.7 | 3.3 | 3.2 |
| 6 | .3 | .8 | .6 | .4 | .4 | .6 | 1.2 | .3 | .4 | 5.2 | 1.2 | 2.3 |
| 7 | .3 | .6 | 1.3 | .4 | .4 | .5 | 3.0 | .3 | .4 | 17.7 | .8 | 1.2 |
| 8 | .3 | 2.5 | .5 | .3 | .4 | .5 | 14.7 | .3 | .3 | 4.2 | .9 | .9 |
| 9 | .4 | 3.8 | .4 | .3 | .5 | .4 | 17.1 | 4.5 | .3 | 7.6 | 1.6 | .8 |
| 10 | .3 | 3.3 | .3 | .3 | .5 | .4 | 10.3 | 12.0 | .4 | 8.1 | 4.0 | .8 |
| 11 | .3 | 4.0 | .3 | 2.6 | .4 | .4 | 3.0 | 1.4 | .8 | 8.8 | 1.6 | .7 |
| 12 | .8 | 1.5 | .3 | .9 | .4 | 2.4 | 1.5 | .7 | .7 | 4.6 | 1.2 | 1.4 |
| 13 | 1.1 | 1.0 | .3 | .7 | .4 | 2.3 | 1.1 | 1.8 | .4 | 4.5 | 1.4 | 1.6 |
| 14 | .6 | .8 | .3 | .5 | .3 | .7 | .8 | 3.6 | .3 | 2.5 | 1.2 | 5.7 |
| 15 | 5.3 | .8 | .3 | 1.5 | .3 | .5 | .7 | 1.7 | .3 | 8.3 | 1.5 | 9.3 |
| 16 | 6.0 | 10.0 | .3 | 28 | .3 | .6 | .6 | 1.1 | .3 | 15.5 | 1.2 | 1.7 |
| 17 | 2.2 | 4.8 | .3 | 1.4 | .3 | .5 | .6 | .7 | .3 | 28 | 2.0 | 1.2 |
| 18 | 4.8 | 1.8 | .3 | 1.8 | .3 | .4 | .5 | .5 | 8.6 | 10.6 | 4.2 | 2.6 |
| 19 | 1.6 | 1.2 | .3 | 3.4 | .3 | .4 | 1.5 | .4 | 7.0 | 4.5 | 2.0 | 3.6 |
| 20 | 8.5 | .9 | .3 | 1.9 | 12.8 | .4 | 1.2 | .4 | 13.4 | 2.2 | 1.2 | 1.9 |
| 21 | 10.0 | 1.4 | .6 | 3.9 | 51 | 2.3 | 1.1 | .4 | 24 | 2.1 | 1.2 | 1.2 |
| 22 | 3.5 | .8 | .3 | 7.1 | 10.6 | .6 | .7 | .4 | 8.9 | 1.9 | 6.8 | .8 |
| 23 | 1.2 | .6 | .3 | 7.9 | 1.7 | .4 | .9 | .4 | 2.2 | 1.4 | 2.8 | .8 |
| 24 | .8 | .6 | 1.0 | 14.5 | 1.4 | .4 | .6 | .3 | 1.4 | 1.1 | 1.4 | .7 |
| 25 | .6 | .6 | 4.9 | 6.3 | .9 | .3 | .5 | .3 | 1.1 | .9 | 1.4 | .6 |
| 26 | .7 | .6 | 41 | 1.6 | .7 | .3 | .4 | .3 | 12.4 | 1.1 | 1.3 | 1.8 |
| 27 | 4.4 | .6 | 7.5 | 1.3 | .6 | .3 | .4 | .4 | 32 | 1.9 | 1.1 | 3.7 |
| 28 | 1.6 | .5 | 2.0 | .9 | 1.9 | .3 | .4 | .4 | 13.4 | 1.2 | 2.6 | 14.0 |
| 29 | 1.7 | .4 | 1.1 | 1.2 | 2.5 | .3 | .4 | ------- | 35 | 4.1 | 1.2 | 2.5 |
| 30 | 4.2 | .4 | .6 | 1.2 | 13.6 | .3 | .4 | ------- | 17.3 | 1.2 | .9 | 10.9 |
| 31 | 1.2 | .4 | ------- | .9 | ------- | .3 | .3 | ------- | 4.3 | ------- | .8 | ------- |

*Monthly discharge of East Branch of Waikamoi Stream at Haiku-uka boundary near Kailiili, Maui, for the year ending June 30, 1925*

| Month | Discharge | | | | Total run-off | |
|---|---|---|---|---|---|---|
| | Million gallons a day | | | Second-feet (mean) | Million gallons | Acre-feet |
| | Maximum | Minimum | Mean | | | |
| July | 10.0 | 0.3 | 2.09 | 3.23 | 64.7 | 199 |
| August | 10.0 | .4 | 1.71 | 2.65 | 53.1 | 163 |
| September | 41 | .3 | 2.25 | 3.48 | 67.5 | 207 |
| October | 28 | .3 | 3.04 | 4.70 | 94.1 | 289 |
| November | 51 | .3 | 3.52 | 5.45 | 106 | 324 |
| December | 7.5 | .3 | .92 | 1.42 | 28.4 | 87 |
| January | 17.1 | .3 | 2.15 | 3.33 | 66.6 | 204 |
| February | 12.0 | .3 | 1.22 | 1.89 | 34.1 | 105 |
| March | 35 | .3 | 6.17 | 9.55 | 191 | 587 |
| April | 28 | .9 | 6.08 | 9.41 | 182 | 560 |
| May | 6.8 | .8 | 1.85 | 2.86 | 57.4 | 176 |
| June | 14.0 | .6 | 3.03 | 4.69 | 90.8 | 279 |
| The year | 51 | .3 | 2.84 | 4.39 | 1,040 | 3,180 |

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

LOCATION.—At Haiku-uka boundary trail at elevation 3,000 feet, 5 miles east of Kailiili.

RECORDS AVAILABLE.—May 28, 1918, to June 30, 1925.

GAGE.—Stevens continuous water-stage recorder.

DISCHARGE MEASUREMENTS.—Made by wading or from suspension footbridge 35 feet above gage.

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, about 974 million gallons a day, or 1,510 second-feet, at 10.15 a. m. October 16 (gage height, 6.28 feet); minimum discharge, 0.3 million gallons a day, or 0.5 second-foot, several hours July 11 and 12 (gage height, 0.42 foot).

1918–1925: Maximum discharge recorded, about 2,020 million gallons a day, or 3,130 second-feet, at noon December 6, 1918 (gage height, 9.85 feet); minimum discharge, 0.06 million gallons a day, or 0.09 second-foot, at 8.30 p. m. December 22, 1919 (gage height, 0.33 foot).

DIVERSIONS.—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.

REGULATION.—None.

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 200 million gallons a day; extension above uncertain. 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 and high stages, for which they are fair.

One discharge measurement made during year:

September 14, 1924: Gage height, 0.44 foot; discharge, 0.540 second-foot, or 0.349 million gallons a day.

*Discharge, in million gallons a day, of West Branch of Waikamoi Stream at Haiku-uka boundary near Kailiili, Maui, for the year ending June 30, 1925*

| Day | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.5 | 3.2 | 0.6 | 1.0 | 1.3 | 30 | 0.6 | 0.6 | 0.7 | 56 | 4.8 | 1.4 |
| 2 | .6 | 3.8 | .7 | .9 | 1.1 | 3.0 | 1.3 | .6 | .7 | 26 | 4.6 | 1.2 |
| 3 | .8 | 1.8 | .7 | .8 | 1.0 | 2.5 | .8 | .5 | 2.6 | 6.8 | 2.8 | 14.6 |
| 4 | .6 | 2.5 | .6 | 19.1 | .9 | 1.6 | .8 | .5 | 2.9 | 15.1 | 2.5 | 20 |
| 5 | .5 | 3.8 | .6 | 3.6 | .8 | 1.2 | .7 | .5 | .9 | 21 | 4.6 | 7.9 |
| 6 | .5 | 1.8 | .6 | 1.2 | .8 | 1.1 | 1.4 | .5 | .7 | 17.7 | 2.2 | 5.9 |
| 7 | .4 | 1.3 | 1.2 | .9 | .8 | 1.1 | 4.9 | .5 | .6 | 74 | 1.5 | 3.0 |
| 8 | .5 | 3.6 | .7 | .8 | .8 | 1.0 | 100 | .6 | .6 | 13.8 | 1.3 | 2.0 |
| 9 | .6 | 7.3 | .6 | .7 | .8 | .8 | 156 | 11.6 | .6 | 18.0 | 1.7 | 1.6 |
| 10 | .5 | 8.8 | .5 | .7 | .8 | .8 | 67 | 43 | .6 | 24 | 6.1 | 1.6 |
| 11 | .4 | 11.9 | .4 | 10.1 | .7 | .8 | 9.3 | 3.5 | .8 | 30 | 4.2 | 1.3 |
| 12 | .7 | 3.7 | .4 | 3.8 | .7 | 6.9 | 3.8 | 1.4 | .7 | 13.4 | 1.8 | 2.0 |
| 13 | 1.3 | 1.8 | .4 | 1.6 | .7 | 15.4 | 2.0 | 3.3 | .6 | 13.4 | 2.3 | 2.6 |
| 14 | .9 | 2.0 | .4 | 1.1 | .6 | 1.7 | 1.5 | 6.0 | .4 | 7.9 | 2.5 | 17.8 |
| 15 | 11.7 | 1.7 | .4 | 1.8 | .6 | | 1.3 | 2.8 | .4 | 21 | 2.5 | 32 |
| 16 | 16.8 | 32 | .4 | 220 | .6 | | 1.1 | 1.7 | .4 | 56 | 2.1 | 4.9 |
| 17 | 7.0 | 25 | .4 | 7.0 | .6 | 1.7 | 1.0 | 1.1 | .3 | 142 | 2.6 | 2.7 |
| 18 | 11.8 | 3.8 | .4 | 3.5 | .5 | | .9 | 1.0 | 11.7 | 44 | 9.8 | 4.8 |
| 19 | 4.4 | 2.3 | .3 | 5.9 | .5 | | 1.7 | .8 | 28 | 16.2 | 4.2 | 9.3 |
| 20 | 36 | 1.6 | .3 | 4.0 | 41 | | 1.5 | .8 | 81 | 6.3 | 2.3 | 4.8 |

*Discharge, in million gallons a day, of West Branch of Waikamoi Stream at Haiku-uka boundary near Kailiili, Maui, for the year ending June 30, 1925*—Con.

| Day | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 21 | 53 | 2.0 | 0.8 | 10.2 | 276 | | 1.6 | 0.8 | 116 | 6.0 | 2.0 | 3.5 |
| 22 | 13.0 | 1.7 | .6 | 19.1 | 65 | | 1.1 | .8 | 29 | 11.6 | 15.0 | 2.0 |
| 23 | 3.0 | 1.3 | .4 | 27 | 5.2 | 1.7 | 1.3 | .7 | 5.2 | 5.3 | 10.0 | 1.7 |
| 24 | 1.7 | 1.2 | .8 | 56 | 2.5 | | 1.1 | .7 | 2.0 | 2.7 | 3.2 | 1.6 |
| 25 | 1.3 | 1.1 | 8.0 | 28 | 1.6 | | .8 | .7 | 1.6 | 1.8 | 3.0 | 1.2 |
| 26 | 1.4 | 1.0 | 202 | 4.8 | 1.3 | .4 | .8 | .6 | 54 | 2.0 | 3.2 | 2.2 |
| 27 | 21 | 1.0 | 50 | 2.8 | 1.2 | .4 | .7 | .7 | 210 | 3.8 | 2.3 | 6.6 |
| 28 | 6.9 | .9 | 4.5 | 2.1 | 2.5 | .4 | .7 | .7 | 92 | 3.0 | 4.5 | 50 |
| 29 | 3.3 | .7 | 2.3 | 1.8 | 4.0 | | .8 | ------- | 182 | 11.0 | 2.5 | 8.3 |
| 30 | 17.7 | .7 | 1.3 | 1.7 | 36 | .4 | .7 | ------- | 76 | 3.0 | 1.8 | 38 |
| 31 | 3.9 | .7 | ------- | 1.5 | ------- | | .7 | ------- | 13.8 | ------- | 1.6 | ------- |

NOTE.—Discharge estimated Jan. 1. Braced figures give estimated mean discharge. Estimates made by comparison with record for East Branch of Waikamoi Stream at Haiku-uka boundary near Kailiili, Maui.

*Monthly discharge of West Branch of Waikamoi Stream at Haiku-uka boundary near Kailiili, Maui, for the year ending June 30, 1925*

| Month | Discharge | | | | Total run-off | |
|---|---|---|---|---|---|---|
| | Million gallons a day | | | Second-feet (mean) | Million gallons | Acre-feet |
| | Maximum | Minimum | Mean | | | |
| July | 53 | 0.4 | 7.18 | 11.1 | 223 | 684 |
| August | 32 | .7 | 4.39 | 6.79 | 136 | 417 |
| September | 202 | .3 | 9.38 | 14.5 | 281 | 863 |
| October | 220 | .7 | 14.3 | 22.1 | 444 | 1,360 |
| November | 276 | .5 | 15.0 | 23.2 | 451 | 1,380 |
| December | 30 | ---------- | 2.87 | 4.44 | 89.0 | 273 |
| January | 156 | .6 | 11.9 | 18.4 | 368 | 1,130 |
| February | 43 | .5 | 3.11 | 4.81 | 87.0 | 267 |
| March | 210 | .3 | 29.6 | 45.8 | 917 | 2,810 |
| April | 142 | 1.8 | 22.4 | 34.7 | 673 | 2,060 |
| May | 15.0 | 1.3 | 3.73 | 5.77 | 116 | 354 |
| June | 50 | 1.2 | 8.55 | 13.2 | 256 | 787 |
| The year | 276 | ---------- | 11.1 | 17.2 | 4,040 | 12,400 |

### ALO STREAM NEAR HUELO, MAUI

LOCATION.—300 feet above Spreckels ditch inflow and trail crossing and 5 miles east of Huelo.

RECORDS AVAILABLE.—December 18, 1910, to June 30, 1925.

GAGE.—Stevens continuous water-stage recorder installed April 5, 1920, to replace Friez water-stage recorder installed June 18, 1914. Prior to June 18, 1914, vertical staff at trail bridge 300 feet downstream from present site. Datum lowered 0.05 foot May 19, 1922.

DISCHARGE MEASUREMENTS.—Made by wading or from footbridge at gage.

CHANNEL AND CONTROL.—Channel at gage in 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, about 295 million gallons a day, or 456 second-feet, at 7 a. m. November 21 (gage height, 3.34 feet); minimum discharge, 0.4 million gallons a day, or 0.6 second-foot, from 4 to 6 p. m. September 19 (gage height, 0.47 foot).

1910–1925: Maximum discharge recorded, about 638 million gallons a day, or 987 second-feet, at 7 p. m. December 9, 1916 (gage height, 4.35 feet); minimum discharge, that of September 19, 1924.

DIVERSIONS.—None.

REGULATION.—None.

OBJECT OF STATION.—To furnish data for appraisal of water value 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 permanent during year. Rating curve fairly well defined below 45 million gallons a day; extension above uncertain. Operation of water-stage recorder satisfactory except from July to September. 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 poor.

*Discharge measurements of Alo Stream near Huelo, Maui, during the year ending June 30, 1925*

| Date | Gage height (feet) | Discharge | |
|---|---|---|---|
| | | Second-feet | Million gallons a day |
| Jan. 7 | 0.69 | 2.33 | 1.51 |
| Feb. 20 | .61 | 1.42 | .918 |
| Apr. 4 | .94 | 5.65 | 3.65 |

*Discharge, in million gallons a day, of Alo Stream near Huelo, Maui, for the year ending June 30, 1925*

| Day | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | | | 1.4 | 1.6 | 7.2 | 1.0 | 0.7 | 0.6 | 8.4 | 6.2 | 2.2 |
| 2 | | | | 1.2 | 1.4 | 2.0 | 2.1 | .7 | .6 | 5.3 | 4.4 | 3.0 |
| 3 | | | | 1.1 | 1.3 | 1.8 | .8 | .7 | 2.0 | 4.6 | 2.3 | 17.3 |
| 4 | | | | 3.6 | 1.2 | 1.4 | 1.1 | .7 | 1.3 | 4.9 | 2.3 | 21 |
| 5 | | | | 1.8 | 1.1 | 1.3 | 1.3 | .6 | .8 | 9.5 | 3.8 | 8.8 |
| | | | 0.9 | | | | | | | | | |
| 6 | | | | 1.1 | 1.0 | 1.2 | 2.2 | .6 | .5 | 5.2 | 2.0 | 6.9 |
| 7 | 0.6 | | | 1.0 | 1.0 | 1.1 | 1.6 | .6 | .6 | 10.7 | 2.0 | 3.8 |
| 8 | | | | 1.0 | 1.0 | 1.0 | 7.1 | .6 | .6 | 4.0 | 2.2 | 2.9 |
| 9 | | | | 1.1 | 1.1 | 1.0 | 6.7 | 11.3 | .5 | 4.5 | 2.2 | 2.6 |
| 10 | | | | 1.0 | .9 | .9 | 4.8 | 22 | 1.5 | 6.0 | 2.5 | 2.1 |
| | | 4.1 | | | | | | | | | | |
| 11 | | | .6 | 5.6 | .8 | .8 | 3.7 | 2.7 | 5.4 | 8.4 | 1.8 | 1.8 |
| 12 | | | .5 | 1.6 | .7 | 2.7 | 2.1 | 2.0 | 1.0 | 4.8 | 1.9 | 4.6 |
| 13 | | | .5 | 1.3 | .7 | 2.0 | 1.7 | 5.8 | .8 | 4.7 | 2.7 | 3.5 |
| 14 | | | .5 | 1.0 | .6 | 1.0 | 1.5 | 3.9 | .7 | 3.0 | 1.7 | 7.5 |
| 15 | | | .5 | 2.2 | .6 | .9 | 1.4 | 2.2 | .6 | 8.2 | 1.8 | 13.8 |
| 16 | | | .5 | 51 | .6 | .8 | 1.2 | 1.6 | .6 | 11.3 | 1.6 | 3.2 |
| 17 | | | .5 | 3.1 | .6 | .7 | 1.2 | 1.4 | .6 | 31 | 3.5 | 2.7 |
| 18 | | | .5 | 9.7 | .6 | .7 | 1.1 | 1.2 | 10.8 | 7.8 | 9.6 | 3.1 |
| 19 | | | .5 | 5.8 | .5 | .7 | 1.8 | 1.2 | 5.0 | 4.7 | 8.9 | 3.3 |
| 20 | | | .5 | 3.7 | 55 | .7 | 1.5 | 1.0 | 7.2 | 3.1 | 2.6 | 2.0 |
| 21 | 6.0 | | .8 | 3.5 | 120 | 1.0 | 1.2 | .9 | 43 | 2.6 | 2.2 | 1.8 |
| 22 | | | .5 | 14.3 | 12.4 | .7 | 1.3 | .9 | 13.3 | 2.2 | 16.0 | 1.6 |
| 23 | | | .5 | 19.6 | 2.8 | .6 | 1.9 | .8 | 4.2 | 1.8 | 6.0 | 1.5 |
| 24 | | | 2.6 | 29 | 2.0 | .6 | 1.4 | .7 | 2.6 | 1.6 | 3.2 | 1.4 |
| 25 | | | 6.9 | 12.7 | 1.6 | .5 | 1.0 | .7 | 2.1 | 1.4 | 2.4 | 1.2 |
| | | 1.2 | | | | | | | | | | |
| 26 | | | 95 | 4.5 | 1.4 | .5 | 1.0 | .7 | 13.0 | 4.1 | 2.0 | 2.6 |
| 27 | | | 11.5 | 3.6 | 1.3 | .5 | .9 | .6 | 36 | 1.5 | 1.9 | 3.0 |
| 28 | | | 3.0 | 2.5 | 3.4 | .5 | 1.0 | .6 | 9.5 | 1.4 | 3.2 | 19.8 |
| 29 | | | 2.1 | 2.5 | 2.4 | .5 | 1.0 | ------- | 29 | 4.4 | 2.0 | 3.0 |
| 30 | | | 1.6 | 2.9 | 10.0 | .5 | .8 | ------- | 19.5 | 1.8 | 2.9 | 31 |
| 31 | | | ------- | 1.9 | ------- | .5 | .8 | ------- | 5.4 | ------- | 3.0 | ------- |

NOTE.—Braced figures give mean discharge for periods indicated; estimated by comparison with record for Waikamoi Stream above Wailoa ditch, near Huelo, Maui.

*Monthly discharge at Alo Stream near Huelo, Maui, for the year ending June 30 1925*

| Month | Discharge | | | | Total run-off | |
|---|---|---|---|---|---|---|
| | Million gallons a day | | | Second-feet (mean) | Million gallons | Acre-feet |
| | Maximum | Minimum | Mean | | | |
| July | | | 3.91 | 6.05 | 121 | 372 |
| August | | | 3.07 | 4.75 | 95.2 | 292 |
| September | 95 | | 4.62 | 7.15 | 139 | 425 |
| October | 51 | 1.0 | 6.33 | 9.79 | 196 | 602 |
| November | 120 | .5 | 7.65 | 11.8 | 230 | 705 |
| December | 7.2 | .5 | 1.17 | 1.81 | 36.3 | 111 |
| January | 7.1 | .8 | 1.88 | 2.91 | 58.2 | 179 |
| February | 22 | .6 | 2.41 | 3.73 | 67.4 | 207 |
| March | 43 | .5 | 7.07 | 10.9 | 219 | 673 |
| April | 31 | 1.4 | 5.76 | 8.91 | 173 | 531 |
| May | 16.0 | 1.6 | 3.57 | 5.52 | 111 | 340 |
| June | 31 | 1.2 | 6.10 | 9.44 | 183 | 562 |
| The year | 120 | | 4.46 | 6.90 | 1,630 | 5,000 |

SPRECKELS DITCH BELOW KAAIEA GULCH, NEAR HUELO, MAUI

LOCATION.—1,000 feet below intake in Kaaiea Stream and 2½ miles by trail southeast of ditch superintendent's house at Kailua.

RECORDS AVAILABLE.—December 15, 1917, to June 30, 1925.

GAGE.—Stevens continuous water-stage recorder.

DISCHARGE MEASUREMENTS.—Made from plank at gage.

CHANNEL AND CONTROL.—Ditch section below gage. During heavy rains stage-discharge relation is affected by two small streams which enter ditch a short distance below gage.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 76 million gallons a day, or 117 second-feet, at 5.30 a. m. November 21 (gage height, 4.23 feet); minimum discharge, 0.05 million gallons a day, or 0.08 second-feet, from 7 to 8 a. m. December 15 (gage height, 0.30 foot).

1917–1925: Maximum discharge recorded, 110 million gallons a day, or 170 second-feet, at 7.30 p. m. January 16, 1921 (gage height, 5.65 feet) and at 6.40 p. m. May 16, 1924 (gage height, 5.45 feet); minimum discharge, no flow, occasionally when water is turned out of ditch.

DIVERSIONS.—Ditch diverts water from a dozen or more streams east of Nailiilihaele.

REGULATION.—By gates 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 except during period March 27 to April 17 when shifting-control method was used. Rating curve fairly well defined below 50 million gallons a day; extended above. Operation of water-stage recorder satisfactory except for part of December and January. Daily discharge ascertained by applying to rating table mean daily gage height determined from recorder graph by inspection and corrected as necessary during shifting-control period or, for days of considerable fluctuation, by averaging discharge for intervals of day. Records fair.

For description of this ditch see Spreckels ditch at Haipuaena Weir, near Huelo, Maui.

The following discharge measurements were made:

February 18, 1925: Gage height, 0.47 foot; discharge, 0.93 second-foot, or 0.60 million gallons a day.

April 1, 1925: Gage height, 0.94 foot; discharge, 10.4 second-feet, or 6.70 million gallons a day.

*Discharge, in million gallons a day, of Spreckels ditch below Kaaiea Gulch, near Huelo, Maui, for the year ending June 30, 1925*

| Day | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.1 | 1.3 | 0.4 | 0.7 | 0.9 | 6.7 | | 0.2 | 0.4 | 6.6 | 1.3 | 0.6 |
| 2 | .1 | 1.1 | .4 | .6 | .7 | 1.1 | | .2 | .3 | 7.6 | 1.2 | .6 |
| 3 | .1 | 1.2 | .4 | .6 | .4 | 1.1 | | .2 | .7 | 2.6 | .4 | 6.0 |
| 4 | .1 | 2.4 | .4 | 1.9 | .2 | .9 | 0.6 | .2 | .6 | 2.6 | .4 | 3.0 |
| 5 | .1 | 1.6 | .4 | .7 | .4 | .6 | | .2 | .4 | 5.9 | .6 | 2.4 |
| 6 | .1 | .9 | .4 | .3 | .4 | .5 | | .2 | .4 | 3.9 | .6 | 2.6 |
| 7 | .1 | .9 | .4 | .3 | .4 | .4 | | .2 | .6 | 7.6 | .5 | 1.7 |
| 8 | .2 | 2.4 | .3 | .2 | .4 | .4 | 7.2 | .2 | .4 | 3.7 | .4 | 1.6 |
| 9 | .1 | 1.3 | .2 | .4 | .4 | .4 | 12.8 | 2.1 | .4 | 2.9 | .6 | 1.6 |
| 10 | .1 | 1.5 | .2 | .4 | .4 | .4 | 11.8 | 10.2 | .4 | 6.9 | .6 | 1.3 |
| 11 | .1 | 1.9 | .2 | 4.0 | .4 | .3 | 2.5 | 1.6 | 1.6 | 8.2 | .5 | 1.2 |
| 12 | .1 | 1.1 | .2 | .6 | .4 | 1.4 | .8 | 1.5 | .5 | 3.2 | .4 | 2.4 |
| 13 | .2 | 1.0 | .2 | .4 | .4 | .8 | .2 | 2.1 | .4 | 3.4 | .4 | 1.3 |
| 14 | .1 | .9 | .2 | .4 | .3 | .3 | .1 | 2.1 | .4 | 1.7 | .3 | 2.7 |
| 15 | .4 | .9 | .2 | .5 | .3 | .2 | .4 | 1.3 | .2 | 4.9 | .2 | 8.8 |
| 16 | 2.8 | 1.4 | .2 | 15.1 | .2 | .2 | .7 | .9 | .2 | 7.4 | .2 | 1.6 |
| 17 | .6 | 1.8 | .2 | 4.0 | .2 | | .6 | .6 | .2 | 9.6 | .4 | 1.3 |
| 18 | 1.6 | 1.0 | .2 | 4.2 | .2 | | .6 | .6 | 10.8 | 6.7 | 3.1 | 1.3 |
| 19 | .7 | 1.1 | .2 | 2.2 | .2 | | .6 | .5 | 2.4 | 4.0 | 1.9 | 2.2 |
| 20 | 7.6 | .9 | .2 | 1.4 | 10.1 | | .6 | .4 | 5.3 | 1.3 | .5 | .9 |
| 21 | 11.0 | .9 | .4 | 2.4 | 37 | | .6 | .4 | 17.1 | 1.0 | .4 | .9 |
| 22 | 5.4 | .7 | .2 | 5.3 | 10.1 | | .4 | .4 | 10.5 | 1.4 | 2.3 | .8 |
| 23 | 1.7 | .6 | .2 | 9.8 | 2.4 | | .6 | .4 | 2.0 | .6 | .9 | .7 |
| 24 | 1.3 | .6 | .9 | 15.2 | 1.9 | .2 | .6 | .4 | 1.0 | .6 | .7 | .6 |
| 25 | 1.1 | .6 | 3.3 | 9.9 | 1.3 | | .4 | .3 | .6 | .3 | .8 | .6 |
| 26 | 1.0 | .6 | 28 | 3.4 | 1.1 | | .4 | .3 | 2.9 | 1.5 | .8 | .9 |
| 27 | 1.0 | .6 | 8.3 | 2.5 | .9 | | .3 | .4 | 13.9 | .4 | .6 | 1.2 |
| 28 | .9 | .6 | 2.2 | 1.6 | 1.3 | | .4 | .3 | 12.0 | .2 | .8 | 6.4 |
| 29 | .8 | .6 | 1.3 | 1.4 | 1.0 | | .4 | ------- | 15.7 | 1.0 | .6 | .6 |
| 30 | 1.5 | .6 | .9 | 1.8 | 4.5 | | .4 | ------- | 17.2 | .4 | .8 | 10.4 |
| 31 | .6 | .4 | ------- | 1.3 | ------- | | .3 | ------- | 6.6 | ------- | .9 | ------- |

NOTE.—Braced figures give mean discharge for periods indicated; estimated by comparison with record of Alo Stream near Huelo, Maui, because recorder was not operating properly.

*Monthly discharge of Spreckels ditch below Kaaiea Gulch, near Huelo, Maui, for the year ending June 30, 1925*

| Month | Discharge | | | | Total run-off | |
|---|---|---|---|---|---|---|
| | Million gallons a day | | | Second-feet (mean) | Million gallons | Acre-feet |
| | Maximum | Minimum | Mean | | | |
| July | 11.0 | 0.1 | 1.34 | 2.07 | 41.6 | 128 |
| August | 2.4 | .4 | 1.08 | 1.67 | 33.4 | 102 |
| September | 28 | .2 | 1.71 | 2.65 | 51.2 | 157 |
| October | 15.2 | .2 | 3.02 | 4.67 | 93.5 | 287 |
| November | 37 | .2 | 2.63 | 4.07 | 78.8 | 242 |
| December | 6.7 | ------- | .60 | .93 | 18.7 | 57 |
| January | 12.8 | .1 | 1.55 | 2.40 | 47.9 | 147 |
| February | 10.2 | .2 | 1.01 | 1.56 | 28.4 | 87 |
| March | 17.2 | .2 | 4.07 | 6.30 | 126 | 387 |
| April | 9.6 | .2 | 3.60 | 5.57 | 108 | 332 |
| May | 3.1 | .2 | .78 | 1.21 | 24.1 | 74 |
| June | 10.4 | .6 | 2.27 | 3.51 | 68.2 | 209 |
| The year | 37 | .1 | 1.97 | 3.05 | 720 | 2,210 |

### 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, and 3½ miles by trail east of Huelo.

RECORDS AVAILABLE.—May 1, 1922, to June 30, 1925. For station half a mile upstream at Waikamoi March 6, 1918, to April 30, 1922; see "Regulation" below.

GAGE.—Stevens continuous water-stage recorder.

DISCHARGE MEASUREMENTS.—Made from plank just above gage or by wading.

CHANNEL AND CONTROL.—Channel slightly curved at gage and sharply curved about 75 feet below. Bed composed of rock and hardpan. Control formed by excavated ditch section; shifts.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 84 million gallons a day, or 130 second-feet, from 9.15 to 11.15 p. m. March 27 (gage height, 5.00 feet; may have gone higher during period of no record); minimum discharge, 1.2 million gallons a day, or 1.9 second-feet, several hours February 4–7 (gage height, 0.70 foot).

1922–1925: Maximum discharge recorded, 84 million gallons a day, or 130 second-feet, at 5 a. m. January 12, 1923 (gage height, 5.02 feet); minimum discharge, 0.38 million gallons a day, or 0.6 second-foot, at noon February 19, 1923 (gage height, 0.49 foot).

DIVERSIONS.—Ditch diverts water that rises below or passes Spreckels ditch.

REGULATION.—Flow regulated by head gates and by release of water from Kolea Reservoir. The flow at this station is the same as that at the old station at Waikamoi except for the occasional addition of water from Kolea Reservoir.

OBJECT OF STATION.—The discharge at this station less the discharge at the Manuel Luis ditch station gives amount of water diverted from Territorial lands under water license No. 974.

UTILIZATION.—Water used for irrigation of sugar cane.

ACCURACY.—Stage-discharge relation permanent during year. Rating curve fairly well defined below 45 million gallons a day; extended above. 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.

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 (see Manuel Luis ditch at Puohakamoa Gulch, near Huelo) at Waikamoi Stream. 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 measurements of Center ditch below Kolea Reservoir, near Huelo, Maui, during the year ending June 30, 1925*

| Date | Gage height (feet) | Discharge | |
|---|---|---|---|
| | | Second-feet | Million gallons a day |
| July 20 | 0.94 | 6.03 | 3.90 |
| Sept. 6 | .82 | 3.44 | 2.22 |
| Apr. 1 | 2.33 | 42.3 | 27.3 |

*Discharge, in million gallons a day, of Center ditch below Kolea Reservoir, near Huelo, Maui, for the year ending June 30, 1925*

| Day | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1.4 | 19.9 | 2.6 | 5.7 | ------- | 46 | 1.8 | 1.4 | 1.9 | 48 | 29 | 5.7 |
| 2 | 1.4 | 22 | 2.6 | 4.7 | ------- | 13.6 | 6.2 | 1.3 | 2.1 | 42 | 32 | 6.2 |
| 3 | 1.4 | 13.6 | 2.5 | 3.8 | ------- | 7.0 | 2.0 | 1.3 | 8.8 | 24 | 17.3 | 32 |
| 4 | 1.4 | 35 | 2.2 | ------- | ------- | 4.3 | 2.4 | 1.3 | 7.5 | 18.7 | 11.3 | 56 |
| 5 | 1.4 | 25 | 2.1 | ------- | ------- | 2.9 | 2.9 | 1.2 | 2.6 | 39 | 28 | 21 |
| 6 | 1.4 | 9.4 | 2.1 | ------- | ------- | 2.7 | 9.5 | 1.2 | 2.2 | 23 | 16.5 | 13.9 |
| 7 | 1.4 | 10.2 | 2.8 | ------- | ------- | 2.6 | 6.5 | 1.3 | 2.5 | 72 | 16.2 | 12.2 |
| 8 | 2.4 | 26 | 2.2 | ------- | ------- | 10.3 | 63 | 1.3 | 2.2 | 25 | 13.5 | 9.4 |
| 9 | 1.8 | 28 | 2.0 | ------- | ------- | 2.3 | 71 | 7.4 | 1.9 | 23 | 17.0 | 9.4 |
| 10 | 1.5 | 32 | 1.8 | ------- | 2.6 | 2.0 | 55 | 58 | 2.9 | 37 | 23 | 7.9 |
| 11 | 1.4 | 34 | 1.8 | ------- | 5.9 | 1.8 | 28 | 21 | 16.5 | 49 | 20 | 6.9 |
| 12 | 3.1 | 22 | 1.6 | ------- | 6.5 | 15.1 | 14.0 | 10.7 | 4.1 | 22 | 13.5 | 16.9 |
| 13 | 4.4 | 10.8 | 1.5 | ------- | 2.0 | 22 | 5.5 | 10.3 | 1.9 | 22 | 15.5 | 11.1 |
| 14 | 1.6 | 8.1 | 1.4 | ------- | 2.0 | 3.8 | 3.6 | 29 | 1.7 | 17.1 | 7.3 | 22 |
| 15 | 16.5 | 11.2 | 1.4 | ------- | 1.9 | 2.3 | 4.6 | 18.0 | 1.7 | 34 | 8.1 | 64 |
| 16 | 41 | 30 | 1.3 | ------- | 1.8 | 2.0 | 2.7 | 7.6 | 1.6 | 58 | 7.0 | 23 |
| 17 | 20 | 44 | 1.4 | ------- | 1.7 | 1.8 | 2.4 | 5.4 | 1.6 | 77 | 15.5 | 15.1 |
| 18 | 25 | 28 | 1.3 | ------- | 1.7 | 1.7 | 2.1 | 4.7 | 16.1 | 58 | 34 | 16.7 |
| 19 | 12.7 | 21 | 1.3 | ------- | ------- | 3.9 | 5.3 | 4.0 | 38 | 36 | 28 | 26 |
| 20 | 22 | 10.1 | 1.3 | ------- | ------- | 7.0 | 4.4 | 3.6 | 72 | 24 | 13.2 | 14.8 |
| 21 | 54 | 11.7 | 1.6 | ------- | ------- | 6.6 | 9.8 | 8.2 | 65 | 23 | 10.3 | 9.4 |
| 22 | 40 | 10.4 | 1.4 | ------- | ------- | 1.9 | 1.8 | 2.7 | 39 | 24 | 42 | 5.7 |
| 23 | 17.6 | 9.9 | 1.3 | ------- | ------- | 1.6 | 4.7 | 2.5 | 22 | 19.9 | 34 | 8.2 |
| 24 | 9.4 | 5.9 | 4.8 | ------- | ------- | 1.6 | 2.2 | 2.5 | 16.4 | 12.3 | 18.8 | 8.2 |
| 25 | 7.7 | 5.6 | 32 | ------- | 7.1 | 3.2 | 1.7 | 2.2 | 8.8 | 8.8 | 10.2 | 3.6 |
| 26 | 7.4 | 5.0 | 52 | ------- | 5.2 | 1.4 | 1.6 | 2.0 | 60 | 20 | 13.1 | 7.2 |
| 27 | 17.7 | 5.5 | 43 | ------- | 3.9 | 1.4 | 1.5 | 2.1 | 79 | 9.4 | 10.9 | 23 |
| 28 | 13.0 | 4.0 | 26 | ------- | 11.2 | 1.3 | 1.6 | 1.8 | 75 | 8.1 | 17.6 | 53 |
| 29 | 7.0 | 3.6 | 11.8 | ------- | 24 | 1.3 | 1.9 | ------- | 72 | 32 | 9.0 | 26 |
| 30 | 31 | 3.1 | 7.0 | ------- | 43 | 1.3 | 1.6 | ------- | 74 | 13.9 | 8.8 | 56 |
| 31 | 9.4 | 2.8 | ------- | ------- | ------- | 1.3 | 1.4 | ------- | 40 | ------- | 9.8 | ------- |

NOTE.—Gage-height record either faulty or missing Oct. 4 to Nov. 9 and 11–24; data insufficient for making estimate.

*Monthly discharge of Center ditch below Kolea Reservoir, near Huelo, Maui, for the year ending June 30, 1925*

| Month | Discharge | | | | Total run-off | |
|---|---|---|---|---|---|---|
| | Million gallons a day | | | Second-feet (mean) | Million gallons | Acre-feet |
| | Maximum | Minimum | Mean | | | |
| July | 54 | 1.4 | 12.2 | 18.9 | 377 | 1,160 |
| August | 44 | 2.8 | 16.4 | 25.4 | 508 | 1,560 |
| September | 52 | 1.3 | 7.27 | 11.2 | 218 | 669 |
| December | 46 | 1.3 | 5.74 | 8.88 | 178 | 546 |
| January | 71 | 1.4 | 10.4 | 16.1 | 323 | 990 |
| February | 58 | 1.2 | 7.64 | 11.8 | 214 | 657 |
| March | 79 | 1.6 | 23.9 | 37.0 | 741 | 2,270 |
| April | 77 | 8.1 | 30.7 | 47.5 | 920 | 2,820 |
| May | 42 | 7.0 | 17.8 | 27.5 | 550 | 1,690 |
| June | 64 | 3.6 | 19.7 | 30.5 | 590 | 1,810 |

### NAILILIHAELE STREAM NEAR HUELO, MAUI

LOCATION.—200 feet above Wailoa ditch intake, 700 feet above New Hamakua ditch trail, and 3 miles south of Huelo.

RECORDS AVAILABLE.—October 8, 1913, to June 30, 1918, and August 6, 1919, to June 30, 1925. Also at old staff-gage stations below New Hamakua ditch from December 9, 1910, to December 31, 1912.

GAGE.—Stevens continuous water-stage recorder on left bank.

DISCHARGE MEASUREMENTS.—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 vegetation. Control composed of large boulders; low-water section improved with concrete November 23, 1924.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 440 million gallons a day, or 681 second-feet, at 8 p. m. March 29 (gage height from water-stage recorder, 5.50 feet). A higher discharge may have occurred October 16 when recorder was not operating properly. Minimum discharge recorded during year, 3.1 million gallons a day, or 4.8 second-feet, from 2 to 3 a. m. February 9 (gage height, 0.17 foot). A lower discharge may have occurred prior to November 23 when stage was below intake to stilling well.

1913–1925: 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.—Low flow of left branch of stream diverted above station by Old Hamakua ditch from about March 1, 1918, to February 28, 1922.

REGULATION.—None.

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 undefined prior to November 23; permanent thereafter during year. Rating curve well defined between 2 and 40 million gallons a day; extension above uncertain. Operation of water-stage recorder unsatisfactory prior to January 4 but satisfactory 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 good for ordinary stages and poor for high stages.

*Discharge measurements of Nailiilihaele Stream near Huelo, Maui, during the year ending June 30, 1925*

| Date | Gage height (feet) | Discharge | | Date | Gage height (feet) | Discharge | |
|---|---|---|---|---|---|---|---|
| | | Second-feet | Million gallons a day | | | Second-feet | Million gallons a day |
| Jan. 5 | 0.46 | 12.3 | 7.95 | May 19 | 1.18 | 45.7 | 29.5 |
| Feb. 23 | .28 | 7.19 | 4.65 | May 19 | 1.09 | 39.7 | 25.7 |

*Discharge, in million gallons a day, of Nailiilihaele Stream near Huelo, Maui, for the year ending June 30, 1925*

| Day | Jan. | Feb. | Mar. | Apr. | May | June | Day | Jan. | Feb. | Mar. | Apr. | May | June |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 7 | 4.2 | 3.6 | 48 | 30 | 12.0 | 16 | 7.6 | 10.1 | 4.0 | 72 | 11.2 | 21 |
| 2 | | 4.1 | 3.6 | 44 | 24 | 13.2 | 17 | 7.2 | 8.2 | 3.8 | 123 | 20 | 18.3 |
| 3 | | 3.8 | 12.5 | 30 | 15.0 | 59 | 18 | 6.3 | 7.0 | 51 | 58 | 46 | 22 |
| 4 | | 3.6 | 10.0 | 31 | 13.3 | 90 | 19 | 8.8 | 6.1 | 33 | 35 | 30 | 26 |
| 5 | 6.8 | 3.5 | 5.4 | 52 | 21 | 48 | 20 | 9.8 | 5.7 | 58 | 23 | 15.0 | 15.0 |
| 6 | 12.8 | 3.4 | 4.1 | 32 | 15.0 | 34 | 21 | 7.2 | 5.4 | 128 | 19.2 | 14.2 | 13.2 |
| 7 | 9.6 | 3.4 | 4.1 | 78 | 13.9 | 21 | 22 | 6.5 | 5.0 | 58 | 15.8 | 66 | 11.7 |
| 8 | 55 | 3.4 | 4.1 | 33 | 13.0 | 17.6 | 23 | 10.8 | 4.8 | 24 | 13.4 | 28 | 10.8 |
| 9 | 53 | 23 | 4.1 | 33 | 14.8 | 15.8 | 24 | 9.0 | 4.7 | 16.7 | 12.2 | 17.0 | 9.5 |
| 10 | 42 | 73 | 8.6 | 47 | 22 | 13.4 | 25 | 6.3 | 4.4 | 14.2 | 10.8 | 13.9 | 8.6 |
| 11 | 24 | 13.0 | 26 | 56 | 14.2 | 11.7 | 26 | 5.7 | 4.1 | 59 | 19.5 | 12.4 | 15.3 |
| 12 | 13.9 | 9.0 | 8.0 | 34 | 14.1 | 22 | 27 | 5.2 | 4.1 | 127 | 11.0 | 12.2 | 26 |
| 13 | 11.0 | 16.4 | 5.7 | 32 | 13.7 | 20 | 28 | 5.7 | 4.0 | 59 | 9.7 | 20 | 91 |
| 14 | 9.5 | 26 | 4.6 | 21 | 11.0 | 39 | 29 | 5.5 | ------ | 147 | 30 | 13.4 | 23 |
| 15 | 8.4 | 13.8 | 4.2 | 45 | 12.4 | 72 | 30 | 4.8 | ------ | 96 | 12.9 | 15.6 | 95 |
| | | | | | | | 31 | 4.4 | ------ | 36 | ------ | 15.0 | ------ |

NOTE.—Data insufficient for estimating discharge July 1 to Dec. 31; stage-discharge relation undefined July 1 to Nov. 23 and gage-height record faulty the whole period. Braced figure gives mean discharge for period indicated; estimated by comparison with record of Kailua Stream near Huelo, Maui.

*Monthly discharge of Nailiilihaele Stream near Huelo, Maui, for the year ending June 30, 1925*

| Month | Discharge | | | | Total run-off | |
|---|---|---|---|---|---|---|
| | Million gallons a day | | | Second-feet (mean) | Million gallons | Acre-feet |
| | Maximum | Minimum | Mean | | | |
| January | 55 | | 12.4 | 19.2 | 385 | 1,180 |
| February | 73 | 3.4 | 9.90 | 15.3 | 277 | 851 |
| March | 147 | 3.6 | 33.0 | 51.1 | 1,020 | 3,140 |
| April | 123 | 9.7 | 36.0 | 55.7 | 1,080 | 3,310 |
| May | 66 | 11.0 | 19.3 | 29.9 | 597 | 1,840 |
| June | 95 | 8.6 | 29.8 | 46.1 | 895 | 2,740 |

### KAILUA STREAM AT HAIKU-UKA BOUNDARY NEAR KAILIILI, MAUI

LOCATION.—At trail crossing 100 feet above Haiku-uka boundary and 1½ miles by horse trail southeast of Kailiili.

RECORDS AVAILABLE.—July 11, 1918, to June 30, 1925.

GAGE.—Stevens continuous water-stage recorder. Datum raised 3.58 feet on February 23, 1923.

DISCHARGE MEASUREMENTS.—Made by wading or from footbridge just below gage.

CHANNEL AND CONTROL.—One channel at all stages; straight for 25 feet above and 50 feet below bridge. 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, about 386 million gallons a day, or 597 second-feet, at 8.30 a. m. October 16 (gage height, 7.83 feet); minimum discharge, 0.03 million gallons a day, or 0.05 second-foot, several hours January 8, February 5, 7, and 8 (gage height, 0.61 foot).

1918–1925: Maximum discharge recorded that of October 16, 1924; minimum discharge, about 0.002 million gallons a day, or 0.003 second-foot, at 1 a. m. and 1.50 p. m. December 22, 1919, and 2.20 p. m. July 13, 1920.

DIVERSIONS.—None.

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 sugar cane.

ACCURACY.—Stage-discharge relation permanent during year. Rating curve fairly well defined below 80 million gallons a day; extension above uncertain. Operation of water-stage recorder satisfactory except during part of August and September. 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 and high stages, for which they are fair.

The following discharge measurements were made:

September 14, 1924: Gage height, 0.64 foot; discharge, 0.078 second-foot, or 0.050 million gallons a day.

May 16, 1925: Gage height, 0.71 foot; discharge, 0.748 second-foot, or 0.483 million gallons a day.

*Discharge, in million gallons a day, of Kailua Stream at Haiku-uka boundary near Kailiili, Maui, for the year ending June 30, 1925*

| Day | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.06 | 1.2 | | 0.25 | 0.25 | 18.8 | 0.1 | 0.05 | 0.05 | 30 | 1.8 | 0.35 |
| 2 | .06 | 1.2 | | .2 | .2 | 1.6 | .2 | .04 | .05 | 21 | 1.8 | .25 |
| 3 | .08 | .6 | | .15 | .2 | 1.0 | .15 | .04 | .15 | 4.6 | 1.0 | 6.6 |
| 4 | .06 | .6 | | 10.3 | .15 | .35 | .1 | .04 | .45 | 7.3 | .6 | 14.1 |
| 5 | .06 | 1.0 | | 3.1 | .1 | .35 | .08 | .04 | .1 | 16.4 | 1.3 | 3.5 |
| 6 | .06 | .45 | | .45 | .1 | .2 | .15 | .04 | .08 | 9.6 | .6 | 2.2 |
| 7 | .05 | .35 | 0.1 | .25 | .08 | .15 | 1.4 | .04 | .06 | 47 | .35 | 1.0 |
| 8 | .06 | | | .15 | .08 | .2 | 48 | .03 | .06 | 11.0 | .35 | .6 |
| 9 | .06 | | | .15 | .1 | .15 | 67 | 2.3 | .05 | 9.8 | .6 | .45 |
| 10 | .06 | | | .1 | .1 | .15 | 34 | 25 | .05 | 15.9 | 3.0 | .35 |
| 11 | .05 | | | 3.3 | .08 | .15 | 4.0 | 1.5 | .06 | 20 | 1.8 | .35 |
| 12 | .06 | | | 1.8 | .08 | 5.7 | 1.2 | 1.1 | .06 | 7.5 | .8 | .6 |
| 13 | .2 | | .08 | .35 | .08 | 6.1 | .45 | 1.6 | .05 | 6.3 | .6 | .6 |
| 14 | .15 | | .08 | .15 | .08 | .8 | .25 | 3.2 | .05 | 3.5 | .6 | 7.5 |
| 15 | 7.2 | | .06 | .5 | .08 | .35 | .2 | .8 | .05 | 11.5 | .6 | 22 |
| 16 | 13.5 | | .06 | 94 | .06 | 1.0 | .1 | .35 | .05 | 34 | .6 | 2.8 |
| 17 | 4.1 | | .06 | 4.1 | .06 | .5 | .08 | .2 | .05 | 79 | 1.0 | 1.0 |
| 18 | 8.4 | | .05 | 1.4 | .05 | .25 | .08 | .15 | 8.7 | 27 | 3.4 | 2.0 |
| 19 | 2.7 | 2.6 | .04 | 1.6 | .05 | .2 | .15 | .08 | 10.3 | 11.3 | 1.8 | 4.4 |
| 20 | 19.9 | | .04 | 1.3 | 19.1 | .25 | .15 | .08 | 52 | 3.7 | .8 | 1.6 |
| 21 | 38 | | .08 | 3.8 | 132 | 14.1 | .15 | .08 | 57 | 2.7 | .6 | 1.2 |
| 22 | 10.7 | | .06 | 9.8 | 31 | 1.2 | .08 | .08 | 32 | 5.7 | 5.6 | .6 |
| 23 | 1.6 | | .06 | 13.8 | 2.8 | .45 | .15 | .06 | 3.0 | 2.8 | 4.2 | .35 |
| 24 | .6 | | .08 | 38 | 1.2 | .25 | .08 | .06 | 1.0 | 1.6 | 1.4 | .25 |
| 25 | .35 | | 2.0 | 20 | .6 | .2 | .08 | .06 | .45 | .8 | .8 | .2 |
| 26 | .35 | | 101 | 2.8 | .35 | .15 | .06 | .06 | 30 | .8 | .8 | .7 |
| 27 | 10.7 | | 33 | 1.2 | .2 | .15 | .06 | .05 | 101 | 1.6 | .6 | 1.7 |
| 28 | 5.1 | | 4.0 | .8 | .7 | .15 | .06 | .05 | 45 | 1.4 | 1.5 | 29 |
| 29 | 1.5 | | 1.2 | .6 | 1.6 | .15 | .06 | ------- | 99 | 5.8 | .6 | 4.1 |
| 30 | 12.2 | | .45 | .6 | 22 | .1 | .06 | ------- | 48 | 1.4 | .45 | 23 |
| 31 | 2.4 | | ------- | .35 | ------- | .08 | .06 | ------- | 9.8 | ------- | .35 | ------- |

NOTE.—Braced figures give mean discharge for periods indicated; estimated by comparison with record of this stream near Huelo, Maui.

*Monthly discharge of Kailua Stream at Haiku-uka boundary near Kailiili, Maui, for the year ending June 30, 1925*

| Month | Discharge | | | | Total run-off | |
|---|---|---|---|---|---|---|
| | Million gallons a day | | | Second-feet (mean) | Million gallons | Acre-feet |
| | Maximum | Minimum | Mean | | | |
| July | 38 | 0.05 | 4.53 | 7.01 | 140 | 431 |
| August | ---------- | ---------- | 2.19 | 3.39 | 67.8 | 208 |
| September | 101 | ---------- | 4.79 | 7.41 | 144 | 441 |
| October | 94 | .1 | 6.95 | 10.8 | 215 | 661 |
| November | 132 | .05 | 7.12 | 11.0 | 214 | 655 |
| December | 18.8 | .08 | 1.78 | 2.75 | 55.2 | 169 |
| January | 67 | .06 | 5.12 | 7.92 | 159 | 487 |
| February | 25 | .03 | 1.33 | 2.06 | 37.2 | 114 |
| March | 101 | .05 | 16.1 | 24.9 | 499 | 1,530 |
| April | 79 | .8 | 13.4 | 20.7 | 401 | 1,230 |
| May | 5.6 | .35 | 1.30 | 2.01 | 40.3 | 124 |
| June | 29 | .2 | 4.44 | 6.87 | 133 | 409 |
| The year | 132 | ---------- | 5.77 | 8.93 | 2,100 | 6,460 |

### KAILUA STREAM NEAR HUELO, MAUI

LOCATION.—400 feet above Wailoa ditch intake and 1 mile south of Huelo.

RECORDS AVAILABLE.—December 8, 1910, to June 30, 1918, and July 1, 1919, to June 30, 1925.

GAGE.—Stevens continuous water-stage recorder installed March 7, 1918, replacing Barrett and Lawrence water-stage recorder installed October 8, 1913, at same location and datum as original staff gage.

DISCHARGE MEASUREMENTS.—Made by wading 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, about 968 million gallons a day, or 1,500 second-feet, at 7.45 a. m. October 16 (gage height, 8.31 feet); minimum discharge, 1.2 million gallons a day, or 1.9 second-feet, at 4.15 p. m. December 30 (gage height, 1.09 feet).

1910–1925: 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 determined from floodmarks as 10.5 feet; 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.—Nearly all low-water flow diverted by Old Hamakua ditch above station from February 5, 1918, to February 28, 1922.

REGULATION.—By diversions only.

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 well defined between 1.5 and 300 millions gallons a day; extension uncertain above and below. Operation of water-stage recorder satisfactory except as indicated in footnote to daily-daischarge 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 and high stages, for which they are poor.

*Discharge measurements of Kailua Stream near Huelo, Maui, during the year ending June 30, 1925*

| Date | Gage height (feet) | Discharge | |
|---|---|---|---|
| | | Second-feet | Million gallons a day |
| July 26 | 1.42 | 6.31 | 4.08 |
| Jan. 5 | 1.34 | 4.42 | 2.86 |
| Mar. 31 | 2.24 | 57.2 | 37.0 |

*Discharge, in million gallons a day, of Kailua Stream near Huelo, Maui, for the year ending June 30, 1925*

| Day | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1.7 | 10.8 | 2.4 | 3.8 | 5.9 | 65 | 2.6 | 2.3 | 2.0 | 80 | | 9.0 |
| 2 | 1.7 | 12.9 | 2.4 | 3.2 | 4.8 | 12.2 | 4.6 | 2.2 | 2.0 | 59 | | 8.4 |
| 3 | 1.7 | 8.1 | 2.4 | 2.6 | 4.2 | 8.7 | 3.2 | 2.1 | 5.6 | 25 | | 37 |
| 4 | 1.7 | 14.4 | 2.3 | 17.6 | 4.0 | 5.9 | 3.3 | 1.9 | 7.4 | 34 | | 83 |
| 5 | 1.6 | 12.2 | 2.2 | 9.0 | 3.5 | 5.1 | 3.2 | 1.8 | 3.4 | 53 | | 30 |
| 6 | 1.6 | 7.4 | 2.1 | 3.8 | 3.4 | 4.4 | 5.5 | 1.8 | 2.5 | 29 | | 21 |
| 7 | 1.6 | 5.7 | | 2.9 | 3.3 | 3.7 | 5.3 | 1.8 | 2.5 | 135 | | 14.5 |
| 8 | 2.1 | 9.7 | | 2.5 | 3.0 | 3.7 | 109 | 1.8 | 2.4 | 35 | | 12.5 |
| 9 | 2.0 | 11.1 | | 2.3 | 3.4 | 3.3 | 146 | 18.0 | 2.2 | 41 | | 11.1 |
| 10 | 1.6 | 15.7 | 2.0 | 2.3 | 2.8 | 2.9 | 87 | 77 | 3.2 | 52 | 13 | 9.0 |
| 11 | 1.4 | 19.6 | | 4.4 | 2.8 | 2.6 | 19.2 | 9.0 | 8.6 | 62 | | 7.4 |
| 12 | 1.6 | 12.5 | | 5.9 | 2.4 | 13.2 | 10.8 | 6.7 | 3.7 | 30 | | 11.4 |
| 13 | 4.4 | 8.1 | 1.8 | 3.3 | 2.4 | 16.5 | 6.8 | 13.4 | 3.3 | 26 | | 11.1 |
| 14 | 2.3 | 6.5 | 1.8 | 2.5 | 2.3 | 5.1 | 5.3 | 21 | 2.5 | 18.8 | | 27 |
| 15 | 11.2 | 6.5 | 1.7 | 2.6 | 2.5 | 3.8 | 4.4 | 9.7 | 2.2 | 50 | | 81 |
| 16 | 41 | 16.4 | 1.6 | 256 | 2.4 | 4.2 | 3.7 | | 2.1 | 115 | | 18.3 |
| 17 | 13.7 | 78 | 1.6 | 18.8 | 2.2 | 3.5 | 3.3 | | 1.9 | 219 | | 13.3 |
| 18 | 14.8 | 16.1 | 1.6 | 18.3 | 2.2 | 3.0 | 2.9 | | 47 | 77 | | 13.4 |
| 19 | 10.8 | 9.7 | 1.6 | 17.4 | 2.1 | 2.8 | 3.9 | | 30 | 34 | | 22 |
| 20 | 60 | 6.8 | 1.4 | 11.1 | 81 | 2.6 | 4.8 | 3.0 | 122 | 19.6 | 10.4 | 12.5 |
| 21 | 98 | 6.8 | 1.6 | 17.0 | 434 | 23 | 3.7 | | 179 | 17.4 | 9.7 | 11.1 |
| 22 | 31 | 5.5 | 1.4 | 42 | 109 | 5.7 | 3.4 | | 109 | 17.8 | 39 | 9.4 |
| 23 | 10.4 | 4.6 | 1.4 | 52 | 17.8 | 3.7 | 4.8 | 2.3 | 21 | 14.1 | 21 | 8.7 |
| 24 | 5.9 | 4.2 | 1.6 | 122 | 10.8 | 3.4 | 4.0 | 2.2 | 12.5 | 11.8 | 12.5 | 7.8 |
| 25 | 5.1 | 3.8 | 12.2 | 66 | 7.8 | 2.9 | 3.3 | 2.1 | 9.4 | 10.0 | 10.8 | 9.4 |
| 26 | 4.0 | 3.4 | 305 | 16.5 | 5.7 | 2.8 | 2.9 | 2.1 | 74 | 12.9 | 10.0 | 11.2 |
| 27 | 23 | 3.3 | 85 | 12.2 | 4.8 | 2.5 | 2.5 | 2.0 | 265 | 11.8 | 9.4 | 18.3 |
| 28 | 16.6 | 3.0 | 14.5 | 9.0 | 7.6 | 2.3 | 2.5 | 2.0 | 126 | 12.3 | 14.9 | 96 |
| 29 | 6.2 | 2.8 | 8.4 | 8.4 | 13.7 | 2.3 | 2.3 | ------- | 282 | 27 | 11.1 | 23 |
| 30 | 21 | 2.6 | 5.3 | 8.4 | 80 | 2.2 | 2.3 | ------- | 158 | 15 | 11.4 | 93 |
| 31 | 10.4 | 2.4 | ------- | 6.2 | ------- | 2.0 | 2.3 | ------- | 39 | ------- | 10.0 | ------- |

NOTE.—Discharge estimated Apr. 30. Braced figures give estimated mean discharge for periods indicated. Estimates made by comparison with records of this stream at Haiku-uka boundary near Kalliili and other near-by streams.

*Monthly discharge of Kailua Stream near Huelo, Maui, for the year ending June 30, 1925*

| Month | Discharge | | | | Total run-off | |
|---|---|---|---|---|---|---|
| | Million gallons a day | | | Second-feet (mean) | Million gallons | Acre-feet |
| | Maximum | Minimum | Mean | | | |
| July | 98 | 1.4 | 13.2 | 20.4 | 410 | 1,260 |
| August | 78 | 2.4 | 10.7 | 16.6 | 331 | 1,010 |
| September | 305 | 1.4 | 15.8 | 24.4 | 475 | 1,460 |
| October | 256 | 2.3 | 24.2 | 37.4 | 750 | 2,300 |
| November | 434 | 2.1 | 27.7 | 42.9 | 832 | 2,550 |
| December | 65 | 2.0 | 7.26 | 11.2 | 225 | 690 |
| January | 146 | 2.3 | 15.1 | 23.4 | 469 | 1,440 |
| February | 77 | ---------- | 7.29 | 11.3 | 204 | 627 |
| March | 282 | 1.9 | 49.4 | 76.4 | 1,530 | 4,700 |
| April | 219 | 10.0 | 44.8 | 69.3 | 1,340 | 4,130 |
| May | ---------- | ---------- | 13.5 | 20.9 | 417 | 1,280 |
| June | 96 | 7.4 | 24.7 | 38.2 | 741 | 2,270 |
| The year | 434 | 1.4 | 21.2 | 32.8 | 7,730 | 23,700 |

### HOOLAWALIILII STREAM NEAR HUELO, MAUI

LOCATION.—400 feet above New Hamakua ditch crossing and 4 miles by trail west of Huelo.

RECORDS AVAILABLE.—April 6, 1911, to June 30, 1925.

GAGE.—Stevens continuous water-stage recorder installed June 19, 1914, at same location and datum as original staff gage. Datum lowered 0.52 foot May 14, 1922.

DISCHARGE MEASUREMENTS.—Made by wading 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, about 216 million gallons a day, or 334 second-feet, at 10.15 a. m. October 16 (gage height, 3.79 feet); minimum discharge, 1.4 million gallons a day, or 2.2 second-feet, several hours November 19 and 20 (gage height, 0.65 foot).

1911–1925: Maximum discharge recorded, about 485 million gallons a day, or 750 second-feet, at 11 a. m. November 21, 1921 (gage height, 4.82 feet); minimum discharge, 0.5 million gallons a day, or 0.8 second-foot, at 9 p. m. December 11, 1919 (gage height, 0.02 foot).

DIVERSIONS.—None.

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 by ditches of East Maui Irrigation Co. for irrigation of sugar cane.

ACCURACY.—Stage-discharge relation changed at time of flood November 21. Two rating curves used well defined below 30 million gallons a day; extensions above this quantity based on a slope determination at 333 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 fair.

*Discharge measurements of Hoolawaliilii Stream near Huelo, Maui, during the year ending June 30, 1925*

| Date | Gage height (feet) | Discharge | | Date | Gage height (feet) | Discharge | |
|---|---|---|---|---|---|---|---|
| | | Second-feet | Million gallons a day | | | Second-feet | Million gallons a day |
| Sept. 26 | 1.40 | 32.9 | 21.3 | May 18 | 0.80 | 7.60 | 4.91 |
| Feb. 21 | .68 | 3.83 | 2.47 | June 19 | .78 | 6.68 | 4.32 |
| Mar. 30 | 1.22 | 28.0 | 18.1 | | | | |

*Discharge, in million gallons a day, of Hoolawaliilii Stream near Huelo, Maui, for the year ending June 30, 1925*

| Day | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1.5 | 3.8 | 2.1 | 3.2 | 2.5 | 6.8 | 2.3 | 2.1 | 2.2 | 8.6 | 3.7 | 3.7 |
| 2 | 1.5 | 3.8 | 2.1 | 2.8 | 2.2 | 4.5 | 2.6 | 2.1 | 2.2 | 7.4 | 3.9 | 3.5 |
| 3 | 1.5 | 3.2 | 2.1 | 2.8 | 2.2 | 4.1 | 2.2 | 2.0 | 2.3 | 6.4 | 3.0 | 9.8 |
| 4 | 1.5 | 6.0 | 2.1 | 5.0 | 2.1 | 3.7 | 2.3 | 2.0 | 2.3 | 5.8 | 2.8 | 12.8 |
| 5 | 1.5 | 4.5 | 2.1 | 3.6 | 1.9 | 3.7 | 2.3 | 2.0 | 2.2 | 6.7 | 2.6 | 9.6 |
| 6 | 1.5 | 3.6 | 2.1 | 3.1 | 1.9 | 3.5 | 2.6 | 2.0 | 2.2 | 6.4 | 2.6 | 8.0 |
| 7 | 1.5 | 3.4 | 2.1 | 2.8 | 1.8 | 3.3 | 2.4 | 2.0 | 2.2 | 9.0 | 2.4 | 6.4 |
| 8 | 1.6 | 4.2 | 2.1 | 2.7 | 1.8 | 3.3 | 4.4 | 2.0 | 2.2 | 6.4 | 2.4 | 5.4 |
| 9 | 1.5 | 3.6 | 2.1 | 2.6 | 1.7 | 3.0 | 4.6 | 3.3 | 2.2 | 5.4 | 2.4 | 4.8 |
| 0 | 1.5 | 4.2 | 1.8 | 2.6 | 1.6 | 2.8 | 4.6 | 5.3 | 2.2 | 6.4 | 2.6 | 4.4 |
| 11 | 1.4 | 4.5 | 1.8 | 3.1 | 1.6 | 2.8 | 3.9 | 3.3 | 3.6 | 8.2 | 2.3 | 4.1 |
| 12 | 1.5 | 3.6 | 1.7 | 2.6 | 1.5 | 5.0 | 3.5 | 2.8 | 2.6 | 5.8 | 2.3 | 4.8 |
| 13 | 1.5 | 3.2 | 1.7 | 2.6 | 1.6 | 3.7 | 3.3 | 3.4 | 2.3 | 5.8 | 2.3 | 4.1 |
| 14 | 1.5 | 3.1 | 1.6 | 2.5 | 1.5 | 3.0 | 3.0 | 3.7 | 2.3 | 4.6 | 2.2 | 5.6 |
| 15 | 1.7 | 3.2 | 1.6 | 2.5 | 1.5 | 3.0 | 3.0 | 2.8 | 2.2 | 5.4 | 2.2 | 10.9 |

*Discharge, in million gallons a day, of Hoolawaliilii Stream near Huelo, Maui, for the year ending June 30, 1925*—Continued

| Day | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 16 | 3.9 | 4.6 | 1.5 | 27 | 1.4 | 2.8 | 3.0 | 2.6 | 2.2 | 8.0 | 2.0 | 5.8 |
| 17 | 2.4 | 6.2 | 1.5 | 4.7 | 1.4 | 2.8 | 3.0 | 2.6 | 2.0 | 16.6 | 2.2 | 4.8 |
| 18 | 2.4 | 4.5 | 1.5 | 4.9 | 1.4 | 2.6 | 2.6 | 2.4 | 2.8 | 11.2 | 4.6 | 4.8 |
| 19 | 2.5 | 3.8 | 1.5 | 3.7 | 1.4 | 2.6 | 3.0 | 2.4 | 3.3 | 7.4 | 5.6 | 4.4 |
| 20 | 9.9 | 3.6 | 1.5 | 3.2 | 19.2 | 2.6 | 2.8 | 2.3 | 8.2 | 5.4 | 3.5 | 4.1 |
| 21 | 12.5 | 3.6 | 1.6 | 2.9 | 95 | 3.0 | 2.6 | 2.3 | 18.5 | 4.6 | 3.3 | 3.9 |
| 22 | 7.2 | 3.4 | 1.7 | 5.2 | 18.0 | 2.6 | 2.6 | 2.3 | 13.2 | 4.1 | 7.0 | 3.7 |
| 23 | 4.2 | 3.1 | 1.7 | 7.4 | 9.3 | 2.6 | 2.8 | 2.3 | 6.7 | 3.7 | 4.8 | 3.8 |
| 24 | 3.6 | 2.9 | 2.0 | 16.3 | 6.7 | 2.6 | 2.8 | 2.2 | 4.8 | 3.3 | 3.9 | 3.3 |
| 25 | 3.1 | 2.8 | 2.6 | 11.2 | 5.4 | 2.4 | 2.6 | 2.2 | 4.4 | 3.0 | 3.7 | 3.3 |
| 26 | 2.9 | 2.6 | 30 | 5.8 | 4.6 | 2.4 | 2.4 | 2.2 | 6.9 | 3.9 | 3.3 | 3.5 |
| 27 | 2.9 | 2.5 | 10.1 | 4.7 | 4.1 | 2.4 | 2.4 | 2.2 | 20 | 3.0 | 3.3 | 3.7 |
| 28 | 3.1 | 2.4 | 5.1 | 3.6 | 4.5 | 2.4 | 2.4 | 2.2 | 13.8 | 2.8 | 3.7 | 12.3 |
| 29 | 3.1 | 2.2 | 4.2 | 3.2 | 4.1 | 2.3 | 2.3 | ------- | 18.2 | 3.5 | 3.5 | 5.1 |
| 30 | 3.6 | 2.1 | 3.4 | 3.1 | 6.4 | 2.3 | 2.3 | ------- | 18.7 | 3.0 | 3.9 | 18.0 |
| 31 | 3.2 | 2.1 | ------- | 2.7 | ------- | 2.3 | 2.0 | ------- | 10.2 | ------- | 4.1 | ------- |

*Monthly discharge of Hoolawaliilii Stream near Huelo, Maui, for the year ending June 30, 1925*

| Month | Discharge | | | | Total run-off | |
|---|---|---|---|---|---|---|
| | Million gallons a day | | | Second-feet (mean) | Million gallons | Acre-feet |
| | Maximum | Minimum | Mean | | | |
| July | 12.5 | 1.4 | 3.01 | 4.66 | 93.2 | 286 |
| August | 6.2 | 2.1 | 3.56 | 5.51 | 110 | 338 |
| September | 30 | 1.5 | 3.30 | 5.11 | 99.0 | 304 |
| October | 27 | 2.5 | 4.97 | 7.69 | 154 | 473 |
| November | 95 | 1.4 | 7.01 | 10.8 | 201 | 645 |
| December | 6.8 | 2.3 | 3.13 | 4.84 | 96.9 | 297 |
| January | 4.6 | 2.0 | 2.86 | 4.43 | 88.6 | 272 |
| February | 5.3 | 2.0 | 2.54 | 3.93 | 71.0 | 218 |
| March | 20 | 2.0 | 6.10 | 9.44 | 189 | 580 |
| April | 16.6 | 2.8 | 6.06 | 9.38 | 182 | 558 |
| May | 7.0 | 2.0 | 3.29 | 5.09 | 102 | 313 |
| June | 18.0 | 3.3 | 6.08 | 9.41 | 182 | 560 |
| The year | 95 | 1.4 | 4.33 | 6.70 | 1,580 | 4,840 |

### HOOLAWANUI STREAM NEAR HUELO, MAUI

LOCATION.—200 feet above intake of Wailoa ditch and 5 miles by trail west of Huelo at elevation 1,240 feet.

RECORDS AVAILABLE.—December 12, 1910, to June 30, 1925.

GAGE.—Stevens continuous water-stage recorder installed June 20, 1914, 200 feet upstream from original staff, which it replaced.

DISCHARGE MEASUREMENTS.—Made by wading or from footbridge at gage.

CHANNEL AND CONTROL.—Stream drops over a low waterfall into a large circular pool with gently sloping banks. Control at outlet of pool composed of boulders; shifts during severe floods.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, about 292 million gallons a day, or 452 second-feet, at 10 a. m. October 16 (gage height, 5.73 feet); minimum discharge, 0.7 million gallons a day, or 1.1 second-feet, from 5 to 8 p. m. July 11 (gage height, 0.09 foot).

1910–1925: Maximum discharge recorded, about 550 million gallons a day, or 851 second-feet, at 3 a. m. February 1, 1922 (gage height, 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.—None.

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 by ditches of East Maui Irrigation Co. for irrigation of sugar cane.

ACCURACY.—Stage-discharge relation permanent during year. Rating curve well defined below 100 million gallons a day; extension above uncertain. Operation of water-stage recorder satisfactory except during part of March. 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 except during estimated period and high stages, for which they are probably fair.

*Discharge measurements of Hoolawanui Stream near Huelo, Maui, during the year ending June 30, 1925*

| Date | Gage height (feet) | Discharge | | Date | Gage height (feet) | Discharge | |
|---|---|---|---|---|---|---|---|
| | | Second-feet | Million gallons a day | | | Second-feet | Million gallons a day |
| July 24 | 0.58 | 5.83 | 3.77 | Jan. 6 | 0.52 | 4.32 | 2.79 |
| Sept. 26 | 2.75 | 117 | 75.6 | Feb. 21 | .40 | 3.08 | 1.99 |

*Discharge, in million gallons a day, of Hoolawanui Stream near Huelo, Maui, for the year ending June 30, 1925*

| Day | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.8 | 4.8 | 1.7 | 4.0 | 7.1 | 21 | 2.1 | 1.7 | 1.6 | 28 | 7.5 | 4.3 |
| 2 | .8 | 4.8 | 1.6 | 3.4 | 6.2 | 11.0 | 3.0 | 1.6 | 1.6 | 25 | 7.1 | 4.2 |
| 3 | .8 | 3.9 | 1.6 | 3.0 | 5.6 | 8.7 | 2.0 | 1.5 | 2.8 | 19.2 | 5.5 | 15.7 |
| 4 | .8 | 7.3 | 1.4 | 7.3 | 5.1 | 7.2 | 2.1 | 1.5 | 2.8 | 16.0 | 5.1 | 33 |
| 5 | .8 | 5.3 | 1.4 | 6.1 | 4.7 | 6.2 | 2.1 | 1.5 | | 22 | 5.1 | 19.1 |
| 6 | .8 | 4.1 | 1.4 | 3.5 | 4.4 | 5.5 | 3.4 | 1.4 | | 17.3 | 4.9 | 14.2 |
| 7 | .8 | 3.8 | 1.4 | 3.3 | 4.1 | 5.0 | 2.9 | 1.4 | | 38 | 4.8 | 10.8 |
| 8 | 1.0 | 4.6 | 1.2 | 2.9 | 4.0 | 4.5 | 14.1 | 1.4 | | 22 | 4.3 | 9.0 |
| 9 | .8 | 4.1 | 1.2 | 2.6 | 4.0 | 4.0 | 18.5 | 4.3 | | 17.8 | 4.7 | 7.9 |
| 10 | .7 | 4.5 | 1.1 | 2.6 | 3.4 | 3.6 | 15.6 | 23 | | 22 | 5.4 | 6.8 |
| 11 | .7 | 6.1 | 1.1 | 4.0 | 3.2 | 3.4 | 11.3 | 4.3 | | 26 | 4.9 | 6.1 |
| 12 | .9 | 4.2 | 1.0 | 3.0 | 3.0 | 8.8 | 7.7 | 3.4 | 2.0 | 17.9 | 4.3 | 7.5 |
| 13 | 1.0 | 3.5 | 1.0 | 2.5 | 2.8 | 6.5 | 6.2 | 4.7 | | 16.6 | 4.7 | 6.4 |
| 14 | .8 | 3.2 | 1.0 | 2.2 | 2.7 | 4.2 | 5.0 | 7.3 | | 13.2 | 4.4 | 12.4 |
| 15 | 1.6 | 3.8 | .9 | 2.4 | 2.3 | 3.6 | 4.2 | 4.8 | | 15.8 | 4.0 | 26 |
| 16 | 2.5 | 9.5 | .9 | 68 | 2.2 | 3.6 | 3.8 | 3.8 | | 29 | 3.5 | 10.6 |
| 17 | 2.7 | 13.8 | .9 | 16.6 | 2.1 | 3.2 | 3.4 | 3.3 | | 60 | 4.5 | 8.8 |
| 18 | 2.8 | 6.5 | .8 | 13.2 | 1.9 | 3.1 | 3.0 | 3.0 | | 40 | 9.3 | 8.3 |
| 19 | 2.4 | 5.4 | .8 | 11.0 | 1.8 | 2.9 | 3.7 | 2.7 | | 24 | 8.1 | 9.3 |
| 20 | 16.3 | 4.7 | .8 | 8.8 | 29 | 2.8 | 3.8 | 2.5 | | 16.6 | 5.3 | 7.1 |
| 21 | 22 | 4.5 | 1.0 | 9.2 | 156 | 5.8 | 2.9 | 2.3 | | 13.2 | 4.8 | 6.2 |
| 22 | 10.6 | 3.9 | .8 | 17.1 | 53 | 4.1 | 2.9 | 2.2 | | 10.8 | 13.0 | 5.6 |
| 23 | 5.6 | 3.4 | .8 | 21 | 22 | 2.6 | 3.4 | 2.1 | | 8.7 | 8.7 | 5.3 |
| 24 | 4.5 | 3.2 | 1.2 | 47 | 14.2 | 2.5 | 3.3 | 2.0 | | 7.5 | 6.3 | 4.7 |
| 25 | 4.0 | 2.9 | 2.1 | 35 | 10.4 | 2.3 | 2.6 | 1.8 | 28 | 6.6 | 5.6 | 4.2 |
| 26 | 3.4 | 2.8 | 67 | 19.2 | 8.5 | 2.1 | 2.3 | 1.8 | | 7.7 | 5.1 | 4.9 |
| 27 | 5.4 | 2.6 | 24 | 14.2 | 7.1 | 2.1 | 2.1 | 1.7 | | 5.9 | 4.8 | 7.1 |
| 28 | 4.8 | 2.2 | 9.7 | 10.8 | 8.2 | 1.9 | 2.2 | 1.7 | | 5.3 | 5.8 | 30 |
| 29 | 3.8 | 2.1 | 6.3 | 9.5 | 8.3 | 1.9 | 2.1 | ------- | | 9.5 | 4.0 | 11.1 |
| 30 | 5.4 | 1.9 | 4.8 | 9.0 | 25 | 1.8 | 1.8 | ------- | | 6.1 | 5.4 | 40 |
| 31 | 3.9 | 1.8 | ------- | 7.9 | ------- | 1.8 | 1.8 | ------- | 32 | ------- | 5.0 | ------- |

NOTE.—Braced figures give mean discharge for periods indicated; estimated by comparison with record of Honopou Stream near Huelo, Maui.

*Monthly discharge of Hoolawanui Stream near Huelo, Maui, for the year ending June 30, 1925*

| Month | Discharge | | | | Total run-off | |
|---|---|---|---|---|---|---|
| | Million gallons a day | | | Second-feet (mean) | Million gallons | Acre-feet |
| | Maximum | Minimum | Mean | | | |
| July | 22 | 0.7 | 3.65 | 5.65 | 113 | 347 |
| August | 13.8 | 1.8 | 4.49 | 6.95 | 139 | 427 |
| September | 67 | .8 | 4.70 | 7.27 | 141 | 432 |
| October | 68 | 2.2 | 11.9 | 18.4 | 370 | 1,140 |
| November | 156 | 1.8 | 13.7 | 21.2 | 412 | 1,260 |
| December | 21 | 1.8 | 4.76 | 7.36 | 148 | 453 |
| January | 18.5 | 1.8 | 4.69 | 7.25 | 145 | 446 |
| February | 23 | 1.4 | 3.38 | 5.23 | 94.7 | 291 |
| March | | | 12.2 | 18.9 | 379 | 1,160 |
| April | 60 | 5.3 | 18.9 | 29.2 | 568 | 1,740 |
| May | 13.0 | 3.5 | 5.67 | 8.77 | 176 | 540 |
| June | 40 | 4.2 | 11.6 | 17.9 | 347 | 1,060 |
| The year | 156 | | 8.31 | 12.9 | 3,030 | 9,300 |

### HONOPOU STREAM NEAR HUELO, MAUI

LOCATION.—200 feet above New Hamakua ditch crossing and 6 miles west of Huelo, at elevation 1,250 feet.

RECORDS AVAILABLE.—December 12, 1910, to June 30, 1925.

GAGE.—Stevens continuous water-stage recorder, installed June 19, 1914, at same site as original staff gage.

DISCHARGE MEASUREMENTS.—Made by wading 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 owing to growth of grass in weir basin.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 317 million gallons a day, or 490 second-feet, at 10.15 a. m. October 16 (gage height, 4.09 feet); minimum discharge, 0.3 million gallons a day, or 0.5 second-foot, from 2 to 8 p. m. July 11 (gage height, 0.13 foot).

1910–1925: Maximum discharge recorded, 658 million gallons a day, or 1,020 second-feet, at 3.25 a. m. February 1, 1922 (gage height, 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.—None.

REGULATION.—None.

OBJECT OF STATION.—To furnish data for appraisal of water value under Territorial lease to ditch company.

UTILIZATION.—Ordinary flow is diverted by ditches of East Maui Irrigation Co. for irrigation of sugar cane.

ACCURACY.—Stage-discharge relation changed, presumably, December 31. Rating curve used prior to change well defined below 25 million gallons a day and fairly well defined above. Rating curve used subsequent to change poorly defined. Operation of water-stage recorder satisfactory except during part of March. 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 fair.

The following discharge measurements were made:

September 26, 1924: Gage height, 1.29 feet; discharge, 31.0 second-feet, or 19.9 million gallons a day.

March 30, 1925: Gage height, 1.37 feet; discharge, 29.0 second-feet, or 18.9 million gallons a day.

*Discharge, in million gallons a day, of Honopou Stream near Huelo, Maui, for the year ending June 30, 1925*

| Day | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.4 | 1.5 | 1.0 | 1.5 | 2.3 | 4.4 | 0.7 | 0.7 | 0.7 | 6.8 | 2.4 | 1.4 |
| 2 | .4 | 1.5 | .9 | 1.4 | 2.1 | 3.0 | 1.0 | .7 | .7 | 5.4 | 2.1 | 1.4 |
| 3 | .4 | 1.2 | .8 | 1.2 | 1.9 | 2.6 | .7 | .7 | .9 | 4.8 | 1.8 | 4.9 |
| 4 | .4 | 2.7 | .8 | 3.6 | 1.7 | 2.3 | .7 | .7 | .8 | 4.4 | 1.6 | 7.4 |
| 5 | .4 | 1.6 | .7 | 1.8 | 1.6 | 2.1 | .7 | .6 | .7 | 5.3 | 1.6 | 4.9 |
| 6 | .4 | 1.4 | .7 | 1.4 | 1.5 | 1.9 | 1.1 | .6 | .6 | 4.4 | 1.6 | 4.1 |
| 7 | .4 | 1.4 | .7 | 1.2 | 1.3 | 1.8 | .8 | .6 | .6 | 6.2 | 1.5 | 3.2 |
| 8 | .5 | 1.7 | .7 | 1.2 | 1.3 | 1.7 | 2.4 | .6 | .6 | 4.8 | 1.4 | 2.9 |
| 9 | .4 | 1.5 | .6 | 1.1 | 1.3 | 1.6 | 2.8 | 1.5 | .6 | 4.4 | 1.4 | 2.6 |
| 10 | .4 | 1.6 | .6 | 1.1 | 1.2 | 1.5 | 2.0 | 6.8 | .7 | 4.8 | 1.6 | 2.3 |
| 11 | .4 | 2.0 | .6 | 1.5 | 1.1 | 1.4 | 1.7 | 1.2 | 1.5 | 5.8 | 1.3 | 2.0 |
| 12 | .4 | 1.4 | .6 | 1.1 | 1.0 | 3.5 | 1.5 | 1.1 | .7 | 4.1 | 1.3 | 2.4 |
| 13 | .4 | 1.3 | .6 | 1.0 | 1.0 | 1.9 | 1.3 | 1.2 | .6 | 4.0 | 1.4 | 1.9 |
| 14 | .4 | 1.2 | .5 | .9 | .9 | 1.5 | 1.2 | 1.4 | .6 | 3.4 | 1.2 | 3.3 |
| 15 | .5 | 1.4 | .5 | 1.0 | .8 | 1.5 | 1.2 | 1.1 | .6 | 4.2 | 1.2 | 6.2 |
| 16 | 2.6 | 2.8 | .5 | 32 | .7 | 1.5 | 1.1 | 1.0 | .6 | 5.1 | 1.2 | 3.1 |
| 17 | .7 | 3.4 | .5 | 4.7 | .7 | 1.3 | 1.1 | 1.0 | .5 | 12.7 | 1.4 | 2.6 |
| 18 | 1.0 | 1.9 | .4 | 4.3 | .7 | 1.2 | 1.1 | .9 | 1.0 | 9.1 | 2.8 | 2.8 |
| 19 | .9 | 1.8 | .4 | 3.1 | .6 | 1.1 | 1.2 | .9 | 1.3 | 6.4 | 2.2 | 2.3 |
| 20 | 6.8 | 1.7 | .4 | 2.6 | 18.4 | 1.1 | 1.1 | .9 | } 8.5 | 5.0 | 1.4 | 2.1 |
| 21 | 7.0 | 1.8 | .5 | 2.6 | 119 | 1.6 | 1.0 | .8 | | 4.3 | 1.3 | 1.8 |
| 22 | 3.4 | 1.5 | .4 | 4.4 | 19.3 | 1.1 | 1.0 | .8 | | 3.6 | 3.1 | 1.8 |
| 23 | 1.9 | 1.5 | .4 | 6.2 | 9.2 | 1.0 | 1.2 | .8 | 3.5 | 3.1 | 1.9 | 1.6 |
| 24 | 1.6 | 1.4 | .5 | 14.6 | 5.9 | 1.0 | 1.2 | .8 | 2.6 | 2.8 | 1.7 | 1.6 |
| 25 | 1.5 | 1.3 | 1.5 | 10.8 | 4.1 | .9 | 1.0 | .8 | 2.3 | 2.5 | 1.6 | 1.5 |
| 26 | 1.3 | 1.2 | 19.6 | 6.6 | 3.2 | .8 | .9 | .8 | } 9.5 | 2.9 | 1.5 | 1.6 |
| 27 | 1.4 | 1.2 | 6.9 | 5.0 | 2.6 | .7 | .8 | .7 | | 2.1 | 1.5 | 1.8 |
| 28 | 1.3 | 1.2 | 2.6 | 4.0 | 2.9 | .7 | .8 | .7 | | 1.9 | 1.7 | 8.6 |
| 29 | 1.4 | 1.1 | 1.9 | 3.6 | 2.4 | .7 | .8 | ------- | | 2.8 | 1.5 | 2.9 |
| 30 | 1.6 | 1.0 | 1.7 | 3.2 | 3.5 | .7 | .8 | ------- | | 1.9 | 1.7 | 12.3 |
| 31 | 1.2 | 1.0 | ------- | 2.8 | ------- | .6 | .7 | ------- | 8.8 | ------- | 1.6 | ------- |

NOTE.—Braced figures give mean discharge for periods indicated; estimated by comparison with record of Hoolawaliili Stream near Huelo.

*Monthly discharge of Honopou Stream near Huelo, Maui, for the year ending June 30, 1925*

| Month | Discharge | | | | Total run-off | |
|---|---|---|---|---|---|---|
| | Million gallons a day | | | Second-feet (mean) | Million gallons | Acre-feet |
| | Maximum | Minimum | Mean | | | |
| July | 7.0 | 0.4 | 1.35 | 2.09 | 41.8 | 128 |
| August | 3.4 | 1.0 | 1.59 | 2.46 | 49.2 | 151 |
| September | 19.6 | .4 | 1.62 | 2.51 | 48.5 | 149 |
| October | 32 | .9 | 4.24 | 6.56 | 132 | 404 |
| November | 119 | .6 | 7.14 | 11.0 | 214 | 657 |
| December | 4.4 | .6 | 1.57 | 2.43 | 48.7 | 150 |
| January | 2.8 | .7 | 1.15 | 1.78 | 35.6 | 109 |
| February | 6.8 | .6 | 1.09 | 1.69 | 30.4 | 93 |
| March | ------- | .5 | 3.37 | 5.21 | 104 | 321 |
| April | 12.7 | 1.9 | 4.63 | 7.16 | 139 | 427 |
| May | 3.1 | 1.2 | 1.66 | 2.57 | 51.5 | 158 |
| June | 12.3 | 1.4 | 3.31 | 5.12 | 99.3 | 305 |
| The year | 119 | .4 | 2.72 | 4.21 | 994 | 3,050 |

### WAILOA DITCH AT HONOPOU, NEAR HUELO, MAUI

LOCATION.—100 feet below intake of Honopou Stream, half a mile west of Lupi, and 7 miles southwest of Huelo.

RECORDS AVAILABLE.—November 19, 1922, to June 30, 1925.

GAGE.—Stevens continuous water-stage recorder.

DISCHARGE MEASUREMENTS.—Made from plank across ditch at mouth of adit tunnel through which recorder operates or in concrete viaduct at Halehaku Gulch 1 mile below gage.

CHANNEL AND CONTROL.—Concrete-lined ditch in tunnel.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, 169 million gallons a day, or 261 second-feet, at 6.30 p. m. November 20 and 5.30 a. m. November 21 (gage height, 5.67 feet); minimum discharge, 34 million gallons a day, or 53 second-feet, from 8 p. m. July 5 to 6 a. m. July 6 and at 8 a. m. July 7 (gage height, 1.88 feet).

1922–1925: Maximum discharge recorded, that of November 20 and 21, 1924; minimum discharge, that of July 5 and 6, 1925.

DIVERSIONS.—This ditch as a continuation of Koolau ditch diverts the ordinary flow of all streams on windward Haleakala between Makapipi Stream and Halehaku Gulch.

REGULATION.—Flow regulated by 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 and for development of power and domestic supply.

ACCURACY.—Stage-discharge relation permanent during year. Rating curve well defined. Operation of water-stage recorder satisfactory except during part of May and June. 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 integrating recorder graph with discharge integrator. Records excellent except for periods estimated, for which they are 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 measurements of Wailoa ditch at Honopou, near Huelo, Maui, during the year ending June 30, 1925*

| Date | Gage height (feet) | Discharge | |
|---|---|---|---|
| | | Second-feet | Million gallons a day |
| July 24 | 4 69 | 196 | 127 |
| July 27 | 3 67 | 144 | 93.1 |
| Sept. 10 | 2.41 | 73 3 | 47.4 |

*Discharge, in million gallons a day, of Wailoa ditch at Honopou, near Huelo, Maui for the year ending June 30, 1925*

| Day | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 38 | 145 | 67 | 92 | 114 | 162 | 64 | 54 | 45 | 143 | 154 | 117 |
| 2 | 37 | 150 | 67 | 81 | 107 | 150 | 98 | 51 | 45 | 153 | 154 | 122 |
| 3 | 42 | 138 | 64 | 74 | 96 | 138 | 60 | 48 | 86 | 117 | 146 | 154 |
| 4 | 37 | 152 | 57 | 92 | 92 | 118 | 66 | 48 | 100 | 119 | 142 | 166 |
| 5 | 34 | 146 | 54 | 105 | 85 | 107 | 81 | 45 | 60 | 162 | 150 | 162 |
| 6 | 34 | 134 | 54 | 74 | 81 | 96 | 121 | 45 | 48 | 158 | 146 | 162 |
| 7 | 36 | 122 | 77 | 71 | 78 | 92 | 98 | 42 | 48 | 166 | | 158 |
| 8 | 66 | 140 | 57 | 60 | 74 | 85 | 162 | 42 | 45 | 166 | | 150 |
| 9 | 50 | 150 | 51 | 71 | 82 | 81 | 162 | 63 | 45 | 158 | | 146 |
| 10 | 38 | 154 | 48 | 64 | 71 | 74 | 162 | 162 | 65 | 162 | | 130 |
| 11 | 36 | 154 | 48 | 101 | 67 | 71 | 158 | 140 | 130 | 162 | | 114 |
| 12 | 47 | 146 | 45 | 90 | 60 | 122 | 146 | 110 | 77 | 162 | 150 | 149 |
| 13 | 87 | 134 | 42 | 81 | 57 | 137 | 126 | 119 | 57 | 158 | | 137 |
| 14 | 58 | 118 | 42 | 64 | 57 | 103 | 107 | 154 | 48 | 146 | | 154 |
| 15 | 105 | 129 | 40 | 73 | 54 | 85 | 100 | 142 | 45 | 154 | | 166 |
| 16 | 156 | 149 | 40 | 162 | 54 | 81 | 88 | 118 | 42 | 162 | | |
| 17 | 131 | 162 | 40 | 153 | 51 | 74 | 85 | 92 | 42 | 166 | | 150 |
| 18 | 140 | 154 | 38 | 158 | 48 | 67 | 74 | 81 | 77 | 162 | | |
| 19 | 132 | 146 | 37 | 158 | 48 | 64 | 92 | 71 | 154 | 162 | 154 | |
| 20 | 126 | 134 | 37 | 146 | 83 | 60 | 108 | 67 | 162 | 158 | 146 | 150 |
| 21 | 166 | 138 | 54 | 154 | 166 | 117 | 98 | 60 | 166 | 158 | 138 | 142 |
| 22 | 162 | 118 | 40 | 156 | 166 | 71 | 76 | 57 | 166 | 158 | 158 | 118 |
| 23 | 146 | 107 | 37 | 162 | 162 | 60 | 104 | 57 | 158 | 154 | 154 | 111 |
| 24 | 123 | 99 | 53 | 166 | 154 | 54 | 94 | 54 | 154 | 150 | 150 | 99 |
| 25 | 111 | 92 | 144 | 166 | 138 | 51 | 74 | 51 | 141 | 142 | 142 | 92 |
| 26 | 103 | 88 | 160 | 162 | 118 | 51 | 67 | 48 | 162 | 154 | 138 | 103 |
| 27 | 106 | 96 | 162 | 158 | 103 | 48 | 64 | 48 | 166 | 142 | 126 | |
| 28 | 126 | 81 | 154 | 146 | 120 | 48 | 68 | 48 | 166 | 138 | 150 | 160 |
| 29 | 97 | 78 | 138 | 146 | 154 | 45 | 70 | ------- | 162 | 154 | 138 | |
| 30 | 154 | 71 | 107 | 146 | 162 | 42 | 60 | ------- | 162 | 146 | 140 | |
| 31 | 134 | 67 | ------- | 134 | ------- | 45 | 54 | ------- | 138 | ------- | 136 | ------- |

NOTE.—Braced figures give mean discharge for periods indicated; estimated by comparison with records of Koolau ditch at Wahinepe near Huelo and tributary streams.

*Monthly discharge of Wailoa ditch at Honopou, near Huelo, Maui, for the year ending June 30, 1925*

| Month | Discharge | | | | Total run-off | |
|---|---|---|---|---|---|---|
| | Million gallons a day | | | Second-feet (mean) | Million gallons | Acre-feet |
| | Maximum | Minimum | Mean | | | |
| July | 166 | 34 | 92.2 | 143 | 2,860 | 8,770 |
| August | 162 | 67 | 126 | 195 | 3,890 | 11,900 |
| September | 162 | 37 | 68.5 | 106 | 2,050 | 6,300 |
| October | 166 | 60 | 118 | 183 | 3,670 | 11,200 |
| November | 166 | 48 | 96.7 | 150 | 2,900 | 8,910 |
| December | 162 | 42 | 83.8 | 130 | 2,600 | 7,980 |
| January | 162 | 54 | 96.4 | 149 | 2,990 | 9,170 |
| February | 162 | 42 | 75.6 | 117 | 2,120 | 6,500 |
| March | 166 | 42 | 102 | 158 | 3,160 | 9,700 |
| April | 166 | 117 | 153 | 237 | 4,590 | 14,100 |
| May | ------- | 126 | 147 | 227 | 4,560 | 14,000 |
| June | 166 | 92 | 141 | 218 | 4,240 | 13,000 |
| The year | ------- | 34 | 109 | 169 | 39,600 | 122,000 |

### NEW HAMAKUA DITCH AT HONOPOU, NEAR HUELO, MAUI

LOCATION.—600 feet below Honopou Stream crossing, 15 feet above tunne portal, and 7 miles by road and trail west of Huelo.

RECORDS AVAILABLE.—May 14, 1921, to June 30, 1925. January 25, 1918, to May 13, 1921, from station 300 feet upstream. Records comparable.

GAGE.—Stevens continuous water-stage recorder.

DISCHARGE MEASUREMENTS.—Made from lehua logs across ditch just above gage or by wading 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, 123 million gallons a day, or 190 second-feet, at 11 a. m. October 16 (gage height, 5.6 feet); minimum discharge, 0.2 million gallons a day, or 0.3 second-foot from 8 to 11 p. m. September 23 (gage height, −0.18 foot).

1918–1926: Maximum discharge recorded, 124 million gallons a day, or 192 second-feet at 2.40 a. m. February 1, 1922 (gage height, 6.15 feet affected by backwater); 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.—Ditch receives small amount of seepage and, during floods, the waste water from Wailoa ditch intakes.

REGULATION.—Flow regulated by gates.

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 changed at time of flood November 19. The two rating curves used fairly well defined below 80 million gallons a day; extended above. 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 fair.

New Hamakua ditch, at elevation about 500 feet, diverts from all streams on the windward side of Haleakala, below Wailoa ditch, 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 measurements of New Hamakua ditch at Honopou, near Huelo, Maui, during the year ending June 30, 1925*

| Date | Gage height (feet) | Discharge | |
|---|---|---|---|
| | | Second-feet | Million gallons a day |
| July 24 | 0.28 | 3.76 | 2.43 |
| Sept. 10 | −.05 | .950 | .614 |
| Jan. 6 | 1.12 | 15.3 | 9.87 |

*Discharge, in million gallons a day, of New Hamakua ditch at Honopou, near Huelo, Maui, for the year ending June 30, 1925*

| Day | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.2 | 26 | 1.4 | 2.5 | 3.6 | 58 | 0.4 | 0.2 | 0.3 | 42 | 44 | 1.2 |
| 2 | .2 | 26 | 1.3 | 2.2 | 3.2 | 14.0 | 5.4 | .2 | .3 | 30 | 44 | 1.6 |
| 3 | .2 | 10.2 | 1.2 | 2.0 | 2.8 | 6.3 | .6 | .2 | 7.8 | 14.7 | 15.5 | 56 |
| 4 | .2 | 44 | 1.2 | 27 | 2.5 | 2.3 | .7 | .2 | 9.3 | 15.3 | 8.6 | 81 |
| 5 | .2 | 21 | 1.1 | 7.5 | 2.3 | 2.0 | .6 | .2 | .6 | 61 | 31 | 73 |
| 6 | .2 | 12.2 | 1.0 | 2.0 | 2.1 | 2.0 | 4.6 | .2 | .5 | 31 | 14.1 | 62 |
| 7 | .2 | 17.0 | .9 | 1.6 | 1.9 | 1.9 | .8 | .2 | .4 | 82 | 10.1 | 32 |
| 8 | .3 | 29 | .8 | 1.4 | 1.8 | 1.5 | 60 | .2 | .4 | 35 | 4.0 | 10.7 |
| 9 | .2 | 28 | .7 | 1.2 | 1.7 | 1.2 | 64 | 9.4 | .3 | 21 | 14.9 | 6.3 |
| 10 | .2 | 39 | .6 | 1.2 | 1.3 | 1.1 | 62 | 67 | .3 | 69 | 25 | 2.4 |
| 11 | .2 | 45 | .6 | 14.2 | 1.2 | 1.0 | 47 | 18.9 | 17.8 | 76 | 21 | 2.1 |
| 12 | .2 | 19.3 | .6 | 4.6 | 1.2 | 24 | 12.6 | 2.7 | .5 | 46 | 8.6 | 25 |
| 13 | 2.2 | 7.9 | .6 | 1.8 | 1.0 | 19.6 | 1.6 | 8.0 | } | 44 | 13.0 | 8.9 |
| 14 | .2 | 3.0 | .5 | 1.4 | 1.0 | 3.7 | .9 | 38 | | 8.0 | 2.1 | 36 |
| 15 | 3.0 | 8.2 | .5 | 1.4 | .9 | 1.0 | .7 | 11.6 | .4 | 37 | 5.0 | 78 |
| 16 | 25 | 32 | .5 | 82 | .8 | .8 | .6 | 2.7 | } | 79 | 1.8 | 39 |
| 17 | 8.0 | 54 | .4 | 21 | .8 | .7 | .5 | 1.2 | | 92 | 15.6 | 18.9 |
| 18 | 3.4 | 30 | .4 | 47 | .7 | .6 | .4 | 1.0 | 22 | 87 | 56 | 18.0 |
| 19 | .6 | 18.3 | .4 | 45 | .6 | .6 | 2.0 | .9 | 43 | 73 | 50 | 43 |
| 20 | 2.0 | 9.2 | .3 | 18.4 | 30 | .6 | 3.1 | .8 | 74 | 41 | 14.2 | 10.0 |
| 21 | 2.3 | 9.0 | .4 | 38 | 111 | 6.0 | .7 | .8 | 8.7 | 26 | 6.4 | 6.2 |
| 22 | 2.1 | 4.1 | .3 | 64 | 94 | 4.5 | .6 | .7 | 84 | 23 | 63 | 1.6 |
| 23 | 2.1 | 2.2 | .3 | 96 | 46 | .6 | 2.6 | .6 | 50 | 16.3 | 49 | 1.5 |
| 24 | 2.1 | 2.0 | 3.4 | 99 | 15.2 | .5 | .8 | .6 | 19.8 | 11.1 | 22 | 1.3 |
| 25 | 2.2 | 1.9 | 38 | 89 | 5.6 | .4 | .4 | .5 | 6.2 | 5.9 | 7.5 | 1.2 |
| 26 | 2.1 | 1.8 | 94 | 53 | 3.7 | .6 | .4 | .5 | 59 | 30 | 60 | 5.7 |
| 27 | 11.2 | 1.8 | 66 | 32 | 2.4 | .8 | .3 | .4 | 93 | 6.1 | 1.5 | 35 |
| 28 | 11.7 | 1.6 | 28 | 14.2 | 14.4 | .7 | .3 | .4 | 89 | 4.3 | 23 | 80 |
| 29 | 2.6 | 1.5 | 10.4 | 12.8 | 23 | .9 | .4 | ------- | 81 | 42 | 6.3 | 25 |
| 30 | 42 | 1.5 | 3.2 | 16.3 | 56 | .5 | .3 | ------- | 93 | 2.2 | 6.6 | 86 |
| 31 | 9.6 | 1.4 | ------- | 7.0 | ------- | .3 | .3 | ------- | 35 | ------- | 9.2 | ------- |

NOTE.—Discharge estimated July 16, 17, and 24. Braced figures give estimated mean discharge for period indicated. Estimates made by comparison with records of near-by streams.

*Monthly discharge of New Hamakua ditch at Honopou, near Huelo, Maui, for the year ending June 30, 1925*

| Month | Discharge | | | | Total run-off | |
|---|---|---|---|---|---|---|
| | Million gallons a day | | | Second-feet (mean) | Million gallons | Acre-feet |
| | Maximum | Minimum | Mean | | | |
| July | 42 | 0.2 | 4.42 | 6.84 | 137 | 420 |
| August | 54 | 1.4 | 16.4 | 25.4 | 508 | 1,560 |
| September | 94 | .3 | 8.63 | 13.4 | 259 | 795 |
| October | 99 | 1.2 | 26.0 | 40.2 | 807 | 2,480 |
| November | 111 | .6 | 14.4 | 22.3 | 433 | 1,330 |
| December | 58 | .3 | 5.12 | 79.2 | 159 | 487 |
| January | 64 | .3 | 8.89 | 13.8 | 276 | 846 |
| February | 67 | .2 | 6.01 | 9.30 | 168 | 516 |
| March | 93 | .3 | 25.7 | 39.8 | 798 | 2,450 |
| April | 92 | 2.2 | 38.4 | 59.4 | 1,150 | 3,530 |
| May | 63 | 1.5 | 19.3 | 29.9 | 599 | 1,840 |
| June | 86 | 1.2 | 28.3 | 43.8 | 849 | 2,600 |
| The year | 111 | .2 | 16.8 | 26.0 | 6,140 | 18,900 |

### 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, 1925.

GAGE.—Friez water-stage recorder.

DISCHARGE MEASUREMENTS.—By 25-foot sharp-creasted weir, and by current meter from plank across ditch 100 feet below gage.

CHANNEL AND CONTROL.—Large pool at weir.

EXTREMES OF DISCHARGE.—See monthly discharge table.

DIVERSIONS.—None.

REGULATION.—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.

ACCURACY.—Records good.

COOPERATION.—Daily discharge record copied from records of East Maui Irrigation Co.

Kauhikoa ditch at elevation about 900 feet diverts from all streams on the windward side of the crater of Haleakala between Halehaku and Maliko Streams inclusive, above Lowrie and Haiku ditches. The water is carried to the vicinity of 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, 1925*

| Day | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.7 | 46.2 | 1.4 | 6.6 | 8.5 | 36.2 | 2.5 | 1.7 | 1.6 | 82.0 | 72.0 | 3.2 |
| 2 | .8 | 43.0 | 1.3 | 2.0 | 7.6 | 35.7 | 7.7 | 1.7 | 1.3 | 88.0 | 59.0 | 3.5 |
| 3 | .6 | 15.3 | 1.3 | 1.4 | 5.3 | 36.3 | 2.4 | 1.6 | 26.0 | 41.0 | 35.0 | 84.0 |
| 4 | .6 | 69.1 | 1.2 | 26.1 | 4.9 | 20.9 | 2.4 | 1.5 | 4.2 | 52.0 | 15.3 | 97.0 |
| 5 | .6 | 33.7 | 1.3 | 7.7 | 4.4 | 10.2 | 2.3 | 1.4 | 1.6 | 92.0 | 44.0 | 91.0 |
| 6 | .6 | 9.3 | 1.4 | 2.2 | 4.1 | 6.2 | 8.1 | 1.3 | 1.7 | 75.0 | 28.0 | 82.0 |
| 7 | .8 | 3.0 | 1.2 | 1.1 | 3.8 | 6.0 | 13.1 | 1.5 | 1.4 | 75.0 | 17.2 | 55.0 |
| 8 | .9 | 41.3 | 1.2 | .7 | 3.7 | 5.1 | 92.7 | 1.5 | 1.4 | 36.0 | 10.9 | 32.0 |
| 9 | .8 | 53.0 | 1.1 | .5 | 3.6 | 4.6 | 95.8 | 28.8 | 1.3 | 41.0 | 25.0 | 19.2 |
| 10 | .8 | 62.7 | 1.0 | .8 | 3.1 | 4.4 | 94.4 | 84.9 | 4.7 | 56.0 | 55.0 | 4.7 |
| 11 | .7 | 70.8 | 1.0 | 27.0 | 2.8 | 4.5 | 94.0 | 24.2 | 29.0 | 55.0 | 26.0 | 4.4 |
| 12 | 2.4 | 31.3 | 1.0 | 4.9 | 2.8 | 64.6 | 51.6 | 5.2 | 1.9 | 54.0 | 21.0 | 48.0 |
| 13 | 3.6 | 6.1 | 1.0 | 2.0 | 2.7 | 79.7 | 35.0 | 20.0 | 1.6 | 53.0 | 21.0 | 23.0 |
| 14 | 1.0 | 2.6 | 1.0 | 1.8 | 2.2 | 51.8 | 21.4 | 59.7 | 1.4 | 44.0 | 4.4 | 62.0 |
| 15 | 25.3 | 11.0 | 1.0 | 12.4 | 2.2 | 31.5 | 21.2 | 25.1 | 1.2 | 58.0 | 9.3 | 93.0 |
| 16 | 40.8 | 64.4 | 1.0 | 77.9 | 2.2 | 27.4 | 4.2 | 4.4 | 1.4 | 56.0 | 3.7 | 63.0 |
| 17 | 9.3 | 78.6 | 1.0 | 58.7 | 1.9 | 16.0 | 3.6 | 2.6 | 1.3 | 56.0 | 39.0 | 42.0 |
| 18 | 34.1 | 57.1 | 1.0 | 81.3 | 1.7 | 12.9 | 3.1 | 2.2 | 38.0 | 56.0 | 78.0 | 53.0 |
| 19 | 15.3 | 29.4 | 1.0 | 76.9 | 1.3 | 8.6 | 8.7 | 2.2 | 78.0 | 56.0 | 59.0 | 59.0 |
| 20 | 47.5 | 11.1 | 1.0 | 44.4 | 53.4 | 5.5 | 3.8 | 2.0 | 96.0 | 55.0 | 23.0 | 25.0 |
| 21 | 91.0 | 13.3 | 1.0 | 63.2 | 95.6 | 66.2 | 3.0 | 2.0 | 97.0 | 56.0 | 18.1 | 9.6 |
| 22 | 58.4 | 3.0 | .9 | 86.6 | 93.5 | 11.8 | 4.1 | 1.9 | 93.0 | 54.0 | 86.0 | 4.0 |
| 23 | 24.2 | 2.0 | .9 | 92.7 | 94.0 | 4.0 | 7.5 | 1.8 | 84.0 | 48.0 | 63.0 | 4.0 |
| 24 | 6.2 | 1.8 | 10.4 | 92.8 | 83.1 | 3.3 | 3.6 | 1.7 | 69.0 | 38.0 | 39.0 | 3.4 |
| 25 | 3.8 | 1.7 | 55.2 | 95.1 | 54.1 | 2.9 | 2.6 | 1.6 | 46.0 | 21.0 | 17.4 | 5.0 |
| 26 | 3.0 | 1.8 | 95.3 | 90.8 | 34.3 | 2.5 | 2.6 | 2.7 | 94.0 | 55.0 | 11.2 | 10.9 |
| 27 | 18.0 | 1.9 | 87.7 | 68.0 | 10.4 | 2.2 | 2.2 | 11.2 | 97.0 | 13.7 | 3.9 | 23.0 |
| 28 | 16.4 | 1.7 | 59.3 | 40.8 | 25.5 | 2.2 | 2.2 | 1.8 | 95.0 | 9.6 | 33.0 | 83.0 |
| 29 | 10.1 | 1.6 | 27.1 | 40.7 | 36.9 | 2.2 | 2.4 | ------- | 97.0 | 69.0 | 10.9 | 59.0 |
| 30 | 64.0 | 1.6 | 21.3 | 39.1 | 35.9 | 2.2 | 2.0 | ------- | 93.0 | 36.0 | 18.1 | 89.0 |
| 31 | 10.0 | 1.6 | ------- | 13.6 | ------- | 2.4 | 1.7 | ------- | 76.0 | ------- | 18.5 | ------- |

*Monthly discharge of Kauhikoa ditch at Opana Weir, near Huelo, Maui, for the year ending June 30, 1925*

| Month | Discharge | | | | Total run-off | |
|---|---|---|---|---|---|---|
| | Million gallons a day | | | Second-feet (mean) | Million gallons | Acre-feet |
| | Maximum | Minimum | Mean | | | |
| July | 91.0 | 0.6 | 15.9 | 24.6 | 492 | 1,500 |
| August | 78.6 | 1.6 | 24.9 | 38.5 | 771 | 2,370 |
| September | 95.3 | .9 | 12.7 | 19.6 | 382 | 1,170 |
| October | 95.1 | .5 | 37.4 | 57.9 | 1,160 | 3,560 |
| November | 95.6 | 1.3 | 22.8 | 35.3 | 686 | 2,100 |
| December | 79.7 | 2.2 | 18.4 | 28.5 | 570 | 1,750 |
| January | 95.8 | 1.7 | 19.4 | 30.0 | 602 | 1,850 |
| February | 84.9 | 1.3 | 10.7 | 16.6 | 299 | 917 |
| March | 97.0 | 1.2 | 39.9 | 61.7 | 1,240 | 3,790 |
| April | 92.0 | 9.6 | 52.7 | 81.5 | 1,580 | 4,850 |
| May | 86.0 | 3.7 | 31.1 | 48.1 | 965 | 2,960 |
| June | 97.0 | 3.2 | 41.2 | 63.7 | 1,230 | 3,790 |
| The year | 97.0 | .5 | 27.3 | 42.2 | 9,980 | 30,600 |

### 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 June 30, 1925.

GAGE.—Friez water-stage recorder.

DISCHARGE MEASUREMENTS.—Made by sharp-crested weir 16⅓ feet long, with bottom and end contractions, and by current meter from plank across ditch 100 feet below gage.

CHANNEL AND CONTROL.—Large pool back of weir.

EXTREMES OF DISCHARGE.—See monthly-discharge table.

DIVERSIONS.—None.

REGULATION.—By gates at frequent intervals.

OBJECT OF STATION.—Opana Weir is one of four weirs that 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.

ACCURACY.—Records good.

COOPERATION.—Daily-discharge record copied from records of East Maui Irrigation Co.

Lowrie ditch at elevation about 500 feet, a continuation of Manuel Luis and Center ditches, diverts from streams on the windward side of the crater of Haleakala between Kailua and Halehaku Streams, inclusive, below Wailoa and New Hamakua ditches, and above Haiku ditch. At Kailua Stream it receives the combined flow of Manuel Luis and Center ditches. The water is carried to the vicinity of 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, 1925*

| Day | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 3.2 | 14.8 | 4.4 | 7.0 | 11.5 | 15.3 | 1.1 | 0.9 | 0.9 | 13.9 | 14.4 | 1.8 |
| 2 | 3.4 | 13.7 | 3.8 | 6.4 | 10.3 | 12.6 | 1.2 | .8 | .9 | 12.2 | 11.6 | 1.9 |
| 3 | 3.2 | 9.2 | 3.4 | 6.6 | 9.4 | 8.7 | .9 | .6 | 1.8 | 4.1 | 4.4 | 15.9 |
| 4 | 2.8 | 13.7 | 3.3 | 9.4 | 8.6 | 3.4 | 1.1 | .7 | 1.5 | 12.4 | 2.7 | 49 |
| 5 | 2.4 | 16.0 | 3.4 | 8.2 | 7.9 | 2.1 | 1.0 | .7 | 1.1 | 28 | 8.8 | 40 |
| 6 | 2.4 | 8.9 | 3.6 | 7.6 | 7.4 | 1.8 | .8 | .7 | 1.2 | 18.4 | 5.0 | 25 |
| 7 | 2.8 | 5.6 | 3.7 | 6.8 | 6.9 | 1.6 | .8 | .8 | 1.3 | 31 | 3.9 | 11.2 |
| 8 | 3.2 | 14.2 | 3.2 | 5.2 | 6.8 | 1.7 | 16.1 | .8 | 1.2 | 16.1 | 3.3 | 5.0 |
| 9 | 2.7 | 11.6 | 2.9 | 5.2 | 6.5 | 1.6 | 23 | 7.1 | 1.0 | 18.3 | 3.8 | 4.5 |
| 10 | 2.6 | 21 | 2.8 | 4.1 | 6.0 | 1.4 | 17.6 | 23 | 1.4 | 34 | 8.8 | 4.2 |
| 11 | 2.4 | 17.3 | 3.0 | 10.1 | 6.7 | 1.3 | 12.8 | 5.2 | 1.9 | 37 | 4.3 | 4.2 |
| 12 | 3.0 | 10.9 | 2.9 | 4.9 | 7.6 | 10.6 | 4.4 | 2.4 | 1.4 | 21 | 2.1 | 11.0 |
| 13 | 2.6 | 8.6 | 2.9 | 9.4 | 5.4 | 8.3 | 2.1 | 2.6 | 1.1 | 19.4 | 2.6 | 6.0 |
| 14 | 2.7 | 6.8 | 2.8 | 5.5 | 4.8 | 2.1 | 1.6 | 6.5 | .8 | 9.5 | 1.6 | 18.3 |
| 15 | 3.4 | 9.2 | 2.4 | 7.0 | 4.9 | 1.6 | 1.3 | 4.6 | .7 | 23 | 1.6 | 41 |
| 16 | 5.9 | 12.4 | 2.4 | 35 | 4.5 | 2.2 | 1.2 | 2.1 | .8 | 40 | 1.3 | 9.5 |
| 17 | 1.4 | 12.0 | 2.4 | 16.6 | 4.4 | 1.7 | 1.1 | 1.8 | .8 | 50 | 3.8 | 6.5 |
| 18 | 3.7 | 11.2 | 2.1 | 25 | 4.2 | 1.8 | 1.0 | 1.6 | 3.7 | 40 | 22 | 6.5 |
| 19 | 2.3 | 12.2 | 2.0 | 22 | 2.8 | 1.3 | 1.3 | 1.6 | 4.4 | 26 | 7.6 | 5.7 |
| 20 | 23 | 7.8 | 2.6 | 13.8 | 19.5 | 1.4 | 1.3 | 1.4 | 40 | 14.7 | 1.8 | 3.5 |
| 21 | 43 | 7.2 | 2.8 | 19.4 | 44 | 7.4 | 1.2 | 1.4 | 55 | 10.3 | 1.6 | 1.9 |
| 22 | 24 | 5.5 | 2.4 | 34 | 9.3 | 2.4 | 1.0 | 1.2 | 44 | 9.7 | 38 | 3.0 |
| 23 | 16.0 | 5.9 | 2.4 | 50 | 3.9 | 1.3 | 1.2 | 1.2 | 8.8 | 7.5 | 24 | 2.9 |
| 24 | 9.7 | 7.0 | 3.0 | 41 | 4.1 | 1.3 | 1.0 | 1.0 | 3.5 | 5.3 | 8.8 | 3.2 |
| 25 | 7.7 | 5.0 | 8.4 | 30 | 3.0 | 1.3 | .8 | .7 | 2.1 | 3.8 | 1.1 | 26 |
| 26 | 6.6 | 4.7 | 38 | 25 | 3.6 | 1.2 | .7 | 1.0 | 19.6 | 13.6 | 4.7 | 59 |
| 27 | 8.3 | 4.8 | 35 | 22 | 3.1 | 1.1 | .8 | .9 | 33 | 3.7 | 5.9 | 59 |
| 28 | 9.9 | 4.4 | 16.5 | 16.6 | 6.9 | 1.1 | .8 | .9 | 22 | 3.4 | 5.8 | 60 |
| 29 | 8.4 | 4.6 | 10.2 | 17.3 | 14.2 | 1.1 | .5 | ------- | 24 | 16.2 | 2.5 | 60 |
| 30 | 13.3 | 4.3 | 8.0 | 17.1 | 18.3 | 1.0 | .6 | ------- | 23 | 4.5 | 2.7 | 61 |
| 31 | 6.7 | 4.1 | ------- | 13.2 | ------- | 1.0 | .5 | ------- | 13.3 | ------- | 2.7 | ------- |

*Monthly discharge of Lowrie ditch at Opana Weir, near Huelo, Maui, for the year ending June 30, 1925*

| Month | Discharge | | | | Total run-off | |
|---|---|---|---|---|---|---|
| | Million gallons a day | | | Second-feet (mean) | Million gallons | Acre-feet |
| | Maximum | Minimum | Mean | | | |
| July | 43 | 1.4 | 7.51 | 11.6 | 233 | 714 |
| August | 21 | 4.1 | 9.50 | 14.7 | 295 | 904 |
| September | 38 | 2.0 | 6.22 | 9.62 | 187 | 573 |
| October | 50 | 4.1 | 16.2 | 25.1 | 501 | 1,540 |
| November | 44 | 2.8 | 8.55 | 13.2 | 256 | 787 |
| December | 15.3 | 1.0 | 3.31 | 5.12 | 103 | 315 |
| January | 23 | .5 | 3.25 | 5.03 | 101 | 309 |
| February | 23 | .6 | 2.65 | 4.10 | 74.2 | 228 |
| March | 55 | .7 | 10.2 | 15.8 | 316 | 970 |
| April | 50 | 3.4 | 18.2 | 28.2 | 547 | 1,680 |
| May | 38 | 1.1 | 6.88 | 10.6 | 213 | 654 |
| June | 61 | 1.8 | 2.02 | 3.13 | 607 | 1,860 |
| The year | 61 | .5 | 9.40 | 14.5 | 3,430 | 10,500 |

### 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, 1925, at present site. January 1, 1910, to October 7, 1914, at Peahi Weir, on old Haiku ditch.

GAGE.—Friez water-stage recorder, installed about October 21, 1914. Daily staff gage readings prior to that date.

DISCHARGE MEASUREMENTS.—Made from concrete footbridge across ditch.

CHANNEL AND CONTROL.—Control is submerged concrete weir across ditch, installed between October 21 and November 18, 1914; rated by engineers of East Maui Irrigation Co. Shifts slightly on account of gradual accumulation of tunnel débris on upstream side of control.

EXTREMES OF DISCHARGE.—See monthly-discharge table.

DIVERSIONS.—None.

REGULATION.—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.

ACCURACY.—Records good.

COOPERATION.—Daily-discharge record copied from records of East Maui Irrigation Co.

Haiku ditch, at elevation about 250 feet, diverts from all streams on the windward side of the crater of Haleakala, below all other main ditches, between Kailua Stream and Maliko Gulch. The water is carried to the vicinity of Paia and distributed for irrigation of sugar cane. The ditch comprises about 16 miles of main channel and has a rated 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, 1925*

| Day | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 4.1 | 38 | 8.2 | 24 | 21 | 91 | 9.1 | 6.8 | 8.6 | 70 | 57 | 11.8 |
| 2 | 4.8 | 31 | 7.6 | 25 | 19.0 | 59 | 16.9 | 6.6 | 8.9 | 69 | 50 | 13.1 |
| 3 | 4.1 | 27 | 7.6 | 22 | 17.6 | 42 | 12.6 | 6.3 | 16.5 | 52 | 29 | 75 |
| 4 | 4.6 | 66 | 6.8 | 26 | 16.2 | 30 | 12.7 | 6.1 | 15.5 | 52 | 24 | 91 |
| 5 | 4.6 | 49 | 6.2 | 13.0 | 14.3 | 27 | 11.9 | 5.8 | 13.7 | 86 | 38 | 68 |
| 6 | 4.5 | 30 | 6.0 | 24 | 13.4 | 26 | 17.4 | 5.6 | 10.4 | 64 | 25 | 44 |
| 7 | 4.8 | 33 | 6.9 | 17.1 | 12.7 | 28 | 17.6 | 5.1 | 9.9 | 95 | 32 | 22 |
| 8 | 5.6 | 47 | 5.5 | 11.6 | 25 | 44 | 81 | 6.8 | 9.0 | 58 | 40 | 14.8 |
| 9 | 4.0 | 47 | 5.1 | 11.7 | 26 | 46 | 91 | 22 | 8.0 | 58 | 44 | 14.0 |
| 10 | 3.6 | 47 | 4.9 | 9.7 | 22 | 19.0 | 90 | 65 | 10.6 | 95 | 53 | 13.8 |
| 11 | 3.4 | 55 | 4.7 | 37 | 22 | 12.4 | 67 | 32 | 34 | 94 | 44 | 15.9 |
| 12 | 5.6 | 32 | 4.3 | 24 | 28 | 63 | 29 | 28 | 24 | 75 | 31 | 23 |
| 13 | 6.7 | 31 | 4.1 | 23 | 13.1 | 44 | 15.9 | 33 | 10.7 | 68 | 26 | 13.3 |
| 14 | 4.2 | 32 | 3.6 | 18.0 | 9.0 | 12.9 | 13.3 | 48 | 7.9 | 42 | 16.7 | 43 |
| 15 | 24 | 37 | 3.0 | 24 | 8.6 | 10.8 | 13.8 | 31 | 7.2 | 72 | 17.0 | 80 |
| 16 | 60 | 53 | 2.8 | 86 | 8.7 | 10.8 | 11.9 | 20 | 6.8 | 92 | 15.4 | 21 |
| 17 | 38 | 67 | 3.0 | 57 | 8.4 | 10.7 | 9.8 | 16.8 | 6.8 | 94 | 35 | 17.6 |
| 18 | 33 | 39 | 2.8 | 65 | 7.2 | 10.7 | 14.3 | 26 | 32 | 92 | 61 | 30 |
| 19 | 21 | 28 | 2.8 | 55 | 7.0 | 22 | 26 | 28 | 48 | 82 | 44 | 44 |
| 20 | 51 | 18.9 | 2.7 | 35 | 46 | 34 | 25 | 26 | 70 | 57 | 17.8 | 41 |
| 21 | 94 | 29 | 3.1 | 46 | 101 | 31 | 32 | 28 | 82 | 50 | 23 | 19.1 |
| 22 | 70 | 35 | 2.3 | 77 | 93 | 12.0 | 26 | 26 | 72 | 48 | 77 | 12.2 |
| 23 | 26 | 32 | 2.4 | 90 | 58 | 13.7 | 18.4 | 18.9 | 48 | 38 | 46 | 13.4 |
| 24 | 21 | 28 | 7.5 | 90 | 47 | 11.2 | 10.1 | 11.4 | 31 | 30 | 25 | 16.7 |
| 25 | 17.6 | 12.0 | 35 | 89 | 35 | 10.2 | 9.9 | 10.6 | 24 | 26 | 18.2 | 11.0 |
| 26 | 15.9 | 10.8 | 88 | 64 | 38 | 9.8 | 8.4 | 9.8 | 78 | 50 | 19.5 | 27 |
| 27 | 39 | 10.6 | 66 | 38 | 34 | 9.3 | 7.7 | 9.6 | 84 | 24 | 30 | 58 |
| 28 | 39 | 9.3 | 26 | 30 | 43 | 8.8 | 8.8 | 9.4 | 82 | 23 | 47 | 93 |
| 29 | 41 | 8.7 | 16.2 | 40 | 60 | 8.7 | 9.1 | ------- | 79 | 60 | 31 | 83 |
| 30 | 44 | 8.2 | 17.1 | 30 | 91 | 8.0 | 8.1 | ------- | 80 | 29 | 34 | 100 |
| 31 | 22 | 7.8 | ------- | 24 | ------- | 7.4 | 7.1 | ------- | 68 | ------- | 24 | ------- |

*Monthly discharge of Haiku ditch at Manawai Gulch, near Peahi, Maui, for the year ending June 30, 1925*

| Month | Discharge | | | | Total run-off | |
|---|---|---|---|---|---|---|
| | Million gallons a day | | | Second-feet (mean) | Million gallons | Acre-feet |
| | Maximum | Minimum | Mean | | | |
| July | 94 | 3.4 | 23.3 | 36.1 | 721 | 2,210 |
| August | 67 | 7.8 | 32.2 | 49.8 | 999 | 3,070 |
| September | 88 | 2.3 | 12.1 | 18.7 | 362 | 1,110 |
| October | 90 | 9.7 | 39.6 | 61.3 | 1,230 | 3,760 |
| November | 101 | 7.0 | 31.5 | 48.7 | 945 | 2,900 |
| December | 91 | 7.4 | 24.9 | 38.5 | 773 | 2,370 |
| January | 91 | 7.1 | 23.6 | 36.5 | 732 | 2,250 |
| February | 65 | 5.1 | 19.6 | 30.3 | 549 | 1,680 |
| March | 84 | 6.8 | 35.0 | 54.2 | 1,090 | 3,330 |
| April | 95 | 23 | 61.5 | 95.2 | 1,840 | 5,660 |
| May | 77 | 15.4 | 34.7 | 53.7 | 1,070 | 3,300 |
| June | 100 | 11.0 | 37.7 | 58.3 | 1,130 | 3,470 |
| The year | 101 | 2.3 | 31.4 | 48.6 | 11,400 | 35,100 |

#### 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, 1925*

| Date | Stream | Tributary to— | Locality | Gage height (feet) | Discharge | |
|---|---|---|---|---|---|---|
| | | | | | Second-feet | Million gallons a day |
| May 13 | Honokahau tunnels. | Honokahau Stream | Puukolii, Lahaina | 2.37 | 32.4 | 20.9 |
| 25 | Oheo | Pacific Ocean | At elevation, 1,680 feet, near Kipahulu. | | 3.02 | 1.95 |
| 25 | West Branch of Kahalawe. | Kahalawe Stream | At elevation 1,850 feet, near Kipahulu. | | .290 | .187 |
| 25 | East Branch of Kahalawe. | do | At elevation 1,800 feet, near Kipahulu. | | 2.27 | 1.47 |
| 26 | Manamana | Pacific Ocean | At elevation 1,100 feet, near Hana. | | 4.33 | 2.80 |
| 26 | Honolewa | do | do | | 5.66 | 3.66 |
| 27 | Alelele | do | At elevation 1,000 feet, near Kipahulu. | | 1.11 | .717 |
| 28 | Kaili | do | At elevation 1,350 feet, near Kipahulu. | | 2.33 | 1.51 |
| 28 | Waieli | do | At elevation 1,200 feet, near Kipahulu. | | 1.61 | 1.04 |
| 28 | Kahalawe | do | At elevation 1,150 feet, near Kipahulu. | | 2.78 | 1.80 |

## ISLAND OF HAWAII

#### 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, 1925. About 1,000 feet downstream from Pohakupaa Stream and about 2 miles below present site, June 1, 1911, to March 24, 1913.

GAGE.—Stevens continuous water-stage recorder.

DISCHARGE MEASUREMENTS.—Made by wading at or below control 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 and free from weeds. Channel fairly straight for 100 feet above and 500 feet below gage. Banks are steep. Control is solid rock with short low concrete walls on either side, permanent.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year, about 3,060 million gallons a day, or 4,730 second-feet, at 2.15 p. m. November 21 (gage height, estimated from floodmarks at 16.5 feet); minimum discharge, 0.2 million gallons a day, or 0.3 second-foot, from 1 to 5.30 p. m. March 3 (gage height, 4.17 feet).

1924–25: Maximum discharge recorded, that of November 21, 1924; minimum discharge, that of March 3, 1925.

DIVERSIONS.—None above station.

REGULATION.—None.

OBJECT OF STATION.—To determine characteristic flow of near-by streams, of which Honolii is typical.

UTILIZATION.—All of 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. Operation of water-stage recorder satisfactory except during January and February. 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 measurements of Honolii Stream near Hilo, Hawaii, during the year ending June 30, 1925*

| Date | Gage height (feet) | Discharge | | Date | Gage height (feet) | Discharge | |
|---|---|---|---|---|---|---|---|
| | | Second-feet | Million gallons a day | | | Second-feet | Million gallons a day |
| July 6 | 4.46 | 4.73 | 3.06 | Dec. 14 | 5.20 | 54.2 | 35.0 |
| Sept. 17 | 4.29 | 1.23 | .795 | Feb. 28 | 4.19 | .290 | .187 |
| Nov. 4 | 4.46 | 5.12 | 3.31 | | | | |

*Discharge, in million gallons a day, of Honolii Stream near Hilo, Hawaii, for the year ending June 30, 1925*

| Day | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.9 | 7.6 | 3.9 | 4.4 | 4.4 | 90 | 1.1 | ------- | 0.2 | 67 | 28 | 12.0 |
| 2 | .9 | 12.9 | 3.5 | 3.5 | 3.9 | 18.2 | 1.5 | ------- | .2 | 95 | 48 | 11.2 |
| 3 | 4.0 | 8.0 | 3.2 | 3.4 | 3.4 | 11.2 | 1.5 | ------- | .2 | 139 | 28 | 42 |
| 4 | 3.0 | 93 | 2.8 | 82 | 3.2 | 7.6 | 4.0 | ------- | .6 | 109 | 19.7 | 206 |
| 5 | 3.5 | 44 | 3.0 | 56 | 2.8 | 6.6 | 6.3 | ------- | 1.1 | 118 | 53 | 59 |
| 6 | 3.2 | 18.6 | 3.0 | 17.7 | 50 | 5.8 | 66 | ------- | 2.3 | 30 | 44 | 26 |
| 7 | 2.5 | 12.5 | 3.9 | 9.0 | 39 | 5.5 | 111 | ------- | 8.4 | 74 | 66 | 15.0 |
| 8 | 4.4 | 30 | 3.9 | 6.9 | 11.2 | 4.4 | 119 | ------- | 9.1 | 44 | 37 | 11.6 |
| 9 | 5.5 | 29 | 3.2 | 6.6 | 10.0 | 3.7 | ------- | ------- | 6.4 | 23 | 58 | 10.8 |
| 10 | 5.5 | 31 | 3.0 | 6.6 | 6.1 | 4.2 | ------- | ------- | 3.2 | 24 | 26 | 11.2 |
| 11 | 4.2 | 28 | 2.3 | 15.0 | 4.7 | 3.7 | ------- | ------- | 78 | 26 | 23 | 11.6 |
| 12 | 3.0 | 18.6 | 2.0 | 121 | 3.9 | 3.7 | ------- | ------- | 109 | 20 | 44 | 24 |
| 13 | 11.8 | 13.3 | 1.9 | 46 | 3.5 | 46 | ------- | ------- | 61 | 18.2 | 23 | 26 |
| 14 | 33 | 13.7 | 1.6 | 24 | 3.5 | 40 | ------- | ------- | 12.8 | 16.8 | 14.6 | 24 |
| 15 | 40 | 9.7 | 1.4 | 25 | 6.6 | 12.0 | ------- | ------- | 7.0 | 17.7 | 12.9 | 22 |

*Discharge, in million gallons a day, of Honolii Stream near Hilo, Hawaii, for the year ending June 30, 1925*—Continued

| Day | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 16 | 66 | 71 | 1.1 | 669 | 4.2 | 7.3 | ------- | ------- | 27 | 138 | 11.2 | 19.1 |
| 17 | 86 | 116 | .9 | 53 | 3.5 | 5.5 | ------- | ------- | 34 | 333 | 9.3 | 12.5 |
| 18 | 23 | 62 | .8 | 62 | 3.0 | 4.4 | ------- | ------- | 13.3 | 288 | 16.4 | 10.4 |
| 19 | 10.8 | 35 | .8 | 132 | 2.6 | 3.9 | ------- | ------- | 207 | 80 | 15.0 | 19.8 |
| 20 | 6.9 | 18.2 | .7 | 56 | 2.3 | 3.4 | ------- | ------- | 378 | 27 | 12.0 | 11.2 |
| 21 | 81 | 12.9 | .8 | 21 | 1,370 | 3.0 | ------- | ------- | 128 | 16.4 | 14.6 | 8.3 |
| 22 | 67 | 9.7 | .8 | 12.9 | 420 | 2.8 | ------- | ------- | 63 | 17.2 | 33 | 6.3 |
| 23 | 23 | 8.0 | .8 | 12.9 | 35 | 2.3 | ------- | ------- | 122 | 17.2 | 55 | 6.3 |
| 24 | 11.2 | 7.3 | .8 | 9.0 | 16.8 | 2.0 | ------- | ------- | 83 | 15.0 | 19.1 | 4.7 |
| 25 | 7.3 | 6.3 | 7.3 | 11.2 | 10.8 | 1.7 | ------- | ------- | 49 | 12.0 | 12.9 | 3.7 |
| 26 | 5.8 | 8.0 | 89 | 8.6 | 7.3 | 1.6 | ------- | ------- | 130 | 9.3 | 10.4 | 4.2 |
| 27 | 5.2 | 6.1 | 153 | 10.8 | 6.3 | 1.5 | ------- | ------- | 752 | 9.0 | 11.4 | 8.4 |
| 28 | 4.7 | 6.9 | 19.1 | 8.6 | 5.5 | 1.4 | ------- | 0.2 | 341 | 10.8 | 12.5 | 24 |
| 29 | 7.2 | 6.9 | 9.7 | 8.0 | 5.8 | 1.3 | ------- | ------- | 154 | 62 | 12.5 | 18.4 |
| 30 | 6.6 | 5.2 | 6.3 | 8.3 | 71 | 1.1 | ------- | ------- | 416 | 28 | 21 | 298 |
| 31 | 5.2 | 4.7 | ------- | 6.1 | --------- | 1.0 | ------- | ------- | 116 | ------- | 18.2 | ------- |

NOTE.—No gage-height record during period when discharge is not given, and data insufficient for making estimate.

*Monthly discharge of Honolii Stream near Hilo, Hawaii, for the year ending June 30, 1925*

| Month | Discharge | | | | Total run-off | |
|---|---|---|---|---|---|---|
| | Million gallons a day | | | Second-feet (mean) | Million gallons | Acre-feet |
| | Maximum | Minimum | Mean | | | |
| July | 86 | 0.9 | 17.5 | 27.1 | 542 | 1,660 |
| August | 116 | 4.7 | 24.3 | 37.6 | 754 | 2,310 |
| September | 153 | .7 | 11.2 | 17.3 | 334 | 1,030 |
| October | 669 | 3.4 | 48.9 | 75.7 | 1,520 | 4,650 |
| November | 1,370 | 2.3 | 70.7 | 109 | 2,120 | 6,510 |
| December | 90 | 1.0 | 9.90 | 15.3 | 307 | 942 |
| March | 752 | .2 | 107 | 166 | 3,310 | 10,200 |
| April | 333 | 9.0 | 62.8 | 97.2 | 1,880 | 5,780 |
| May | 66 | 9.3 | 26.1 | 40.4 | 810 | 2,490 |
| June | 298 | 3.7 | 32.3 | 50.0 | 968 | 2,970 |

### 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, 1925. Records at station above Hilo Electric Co.'s power house near Hilo, from March 21, 1911, to July 21, 1913, and January 2 to June 30, 1918, not comparable. Revised records for year ending June 30, 1924, are included in this paper.

GAGE.—Gurley 7-day graph water-stage recorder inspected by the Hawaii County engineer.

DISCHARGE MEASUREMENTS.—Made by wading near gage.

CHANNEL AND CONTROL.—One channel at all stages. Banks high, sloping about 1:4. Stream bed composed of solid lava rock. Control, lava flow and is permanent between severe floods; forms large pool.

EXTREMES OF DISCHARGE.—1923–1924: Maximum discharge recorded during year, 1,570 million gallons a day, or 2,430 second-feet, at 6.30 p. m. December 18 (gage height, 11.48 feet); minimum discharge, 2.6 million gallons a day, or 4.0 second-feet, from 4 a. m. to 2 p. m. February 12 (gage height, 1.08 feet).

1924–1925: Maximum discharge recorded during year, 1,190 million gallons a day, or 1,840 second-feet, at 11.30 p. m. November 21 (gage height, 10.13 feet); minimum discharge, no flow at 1.30 p. m. September 4 (gage height, 0.25 foot).

1922–1925: Maximum discharge recorded, that of December 18, 1923; minimum discharge, that of September 4, 1924.

DIVERSIONS.—Intake of Hilo waterworks diverts water from gage pool.

REGULATION.—None except by diversions.

OBJECT OF STATION.—To determine the amount of water passing intake of Hilo waterworks and available to other users.

UTILIZATION.—For power.

ACCURACY.—Stage-discharge relation changed, presumably, at time of flood August 18, 1923. Two rating curves used fairly well defined below 40 million gallons a day; extension above uncertain. 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 measurements of Wailuku Stream at Pukamaui, near Hilo, Hawaii, during the year ending June 30, 1925*

| Date | Gage height (feet) | Discharge | |
|---|---|---|---|
| | | Second-feet | Million gallons a day |
| July 30 | 1.83 | 20.0 | 12.9 |
| Feb. 19 | .68 | 3.12 | 2.02 |
| Feb. 24 | .78 | 6.31 | 4.08 |

*Discharge, in million gallons a day, of Wailuku River at Pukamaui, near Hilo, Hawaii, for the years ending June 30, 1924 and 1925*

| Day | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1923–24 | | | | | | | | | | | | |
| 1 | 16.6 | 15.0 | ------ | 15.4 | 114 | ------ | 26 | 3.9 | 40 | 9.9 | 40 | 8.8 |
| 2 | 14.2 | 15.0 | ------ | 14.7 | a 58 | ------ | 30 | 3.9 | 38 | 10.8 | 45 | 7.8 |
| 3 | 15.8 | 14.2 | ------ | 13.4 | 40 | ------ | 21 | 3.9 | 36 | 9.4 | 56 | 7.3 |
| 4 | 15.8 | 12.6 | ------ | 17.5 | 31 | ------ | 18.6 | 3.7 | 62 | 9.6 | 47 | 7.0 |
| 5 | 21 | 12.6 | ------ | 13.4 | 45 | 35 | 16.4 | 3.6 | 42 | 8.4 | 44 | 6.4 |
| 6 | 25 | 11.9 | ------ | 12.5 | 36 | 99 | 15.4 | 3.4 | a 31 | 8.7 | 49 | 6.0 |
| 7 | 26 | 11.9 | ------ | 13.4 | 30 | 140 | 15.4 | 3.3 | a 42 | 7.7 | 47 | 6.0 |
| 8 | 23 | 11.2 | ------ | 13.4 | 33 | 51 | 13.4 | 3.2 | a 40 | 8.4 | 35 | a 5.5 |
| 9 | 23 | 10.5 | ------ | 12.5 | 35 | 33 | 12.5 | 3.1 | a 28 | 35 | a 33 | 5.0 |
| 10 | 34 | 9.8 | ------ | 10.8 | ------ | 25 | 12.5 | 3.0 | 22 | 45 | a 30 | 5.1 |
| 11 | 22 | 10.5 | ------ | a 10.8 | ------ | 21 | 11.6 | 2.8 | 18.6 | 35 | a 30 | 8.1 |
| 12 | 24 | 15.8 | ------ | a 9.3 | ------ | 17.5 | 11.6 | 2.8 | 17.5 | 31 | a 35 | 5.8 |
| 13 | 33 | 16.6 | ------ | 8.4 | ------ | 26 | 10.8 | 8.7 | 17.5 | 19.8 | 25 | 7.7 |
| 14 | 39 | 13.4 | ------ | 8.4 | ------ | 30 | 10.8 | 12.5 | a 15.4 | 106 | 22 | 8.8 |
| 15 | 34 | 11.9 | ------ | 8.4 | ------ | 21 | 9.9 | 11.6 | a 13.4 | 652 | 22 | 7.7 |
| 16 | 28 | 11.2 | ------ | 8.6 | ------ | 281 | 9.4 | 9.6 | 11.6 | 281 | 22 | 10.8 |
| 17 | 25 | 12.7 | ------ | 8.1 | ------ | 208 | 9.2 | 6.0 | 11.6 | 197 | 19.8 | 9.6 |
| 18 | 24 | ------ | ------ | 7.1 | ------ | 564 | 8.3 | 5.5 | 11.6 | 243 | 19.8 | 9.0 |
| 19 | 30 | ------ | ------ | a 12.8 | ------ | 255 | 7.0 | 5.0 | 10.8 | 157 | 51 | 7.3 |
| 20 | 26 | ------ | ------ | a 18.6 | ------ | 106 | 6.8 | 4.4 | 9.9 | 64 | 36 | 7.0 |
| 21 | 20 | ------ | ------ | 18.6 | ------ | 60 | 6.4 | 3.9 | 9.4 | 53 | 26 | 6.4 |
| 22 | 89 | ------ | ------ | 27 | ------ | ------ | 6.2 | 3.7 | 9.0 | 38 | 18 | 5.9 |
| 23 | 77 | ------ | ------ | 21 | ------ | ------ | 5.9 | 5.0 | 8.6 | 31 | | 5.7 |
| 24 | 42 | ------ | ------ | 17.5 | ------ | ------ | 5.7 | 70 | 8.0 | 26 | | 5.2 |
| 25 | 30 | ------ | ------ | 33 | ------ | ------ | 5.4 | 114 | 8.3 | a 22 | | 4.8 |

a Estimated.

*Discharge, in million gallons a day, of Wailuku River at Pukamaui, near Hilo, Hawaii, for the years ending June 30, 1924 and 1925*—Continued

| Day | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1923–24 | | | | | | | | | | | | |
| 26 | 26 | | | 16.4 | | | 4.9 | 79 | 11.6 | a 22 | | 4.5 |
| 27 | 23 | | | 15.4 | | | 4.7 | 60 | 13.4 | 92 | | 4.2 |
| 28 | 20 | | | 106 | | | 4.7 | 49 | 25 | 49 | | 3.8 |
| 29 | 19.1 | | | 268 | | 31 | 4.4 | a 45 | 18.6 | 44 | 18 | 3.6 |
| 30 | 18.2 | | | 208 | | 26 | 4.2 | | 12.5 | 49 | | 3.2 |
| 31 | 17.4 | | | 157 | | 26 | 4.0 | | 10.8 | | | |
| 1924–25 | | | | | | | | | | | | |
| 1 | 3.0 | 12.5 | a 7.0 | 18.6 | 3.5 | 62 | 1.3 | 4.1 | .6 | 114 | 42 | |
| 2 | 2.8 | 16.4 | a 6.0 | 16.4 | 3.2 | | 1.3 | 3.3 | .5 | 122 | 58 | |
| 3 | 6.0 | 11.6 | 2.7 | 17.5 | 1.8 | 16 | 1.3 | 3.0 | .4 | 148 | | |
| 4 | 5.0 | 60 | .7 | 47 | 1.4 | | | 2.7 | .4 | 148 | | 44 |
| 5 | 5.1 | 42 | 2.0 | 70 | 1.6 | 12.5 | | 2.6 | .4 | | 60 | |
| 6 | 4.9 | 22 | 3.2 | 45 | 31 | 10.8 | | 1.3 | a 3.2 | | | |
| 7 | 4.7 | 18.6 | 4.4 | 30 | 44 | 9.6 | | 1.3 | | | | 28 |
| 8 | 4.3 | 33 | 4.1 | 24 | 13.4 | 8.4 | | 1.8 | 4.2 | 38 | | 24 |
| 9 | 4.4 | 30 | 3.5 | 24 | 10.8 | 7.4 | | 2.0 | a 3.2 | | | 22 |
| 10 | 5.4 | 30 | 3.5 | 21 | 7.1 | 6.8 | | 2.0 | 1.4 | | 38 | 21 |
| 11 | 4.7 | 24 | 3.4 | 53 | 5.5 | 6.2 | 76 | 4.6 | 9.9 | | 36 | 19.8 |
| 12 | 3.8 | 17.5 | 3.3 | 122 | 4.5 | a 5.8 | 45 | 2.6 | 33 | . 47 | 49 | 30 |
| 13 | 5.8 | 15.4 | | 88 | 4.0 | a 15.5 | 31 | 2.0 | 36 | 49 | 31 | 24 |
| 14 | 11.6 | 17.5 | | 58 | 3.8 | a 24 | 25 | 1.7 | 9.4 | 58 | 22 | |
| 15 | 14.4 | 14.4 | | 56 | 7.0 | a 13.4 | 21 | 1.9 | 4.8 | 67 | 19.8 | |
| 16 | 25 | 40 | | a 836 | a 4.2 | 9.2 | 15.4 | 1.2 | 8.6 | 64 | 17.5 | |
| 17 | 49 | 70 | | a 127 | 4.5 | 7.3 | 12.5 | .7 | 28 | 268 | 14.4 | |
| 18 | 18.6 | 47 | | 70 | 2.8 | 6.6 | 9.9 | .4 | 13.4 | 255 | 22 | 26 |
| 19 | 10.8 | 35 | | 96 | 2.1 | 6.4 | 8.7 | .4 | 60 | 130 | 18.6 | |
| 20 | 8.6 | 22 | 2.2 | 64 | 1.6 | 6.0 | 7.4 | .4 | 255 | 58 | 17.5 | |
| 21 | 35 | 17.5 | 2.1 | | 542 | | 6.4 | .4 | 114 | 38 | 16.4 | |
| 22 | 40 | 13.4 | 1.7 | 22 | 446 | | 6.2 | .4 | a 70 | 36 | 30 | |
| 23 | 19.8 | 12.5 | 1.6 | | a 96 | 3.8 | 6.0 | .6 | 114 | 35 | 47 | 17.5 |
| 24 | 12.5 | 12.5 | 1.6 | | a 51 | | 4.9 | .8 | 106 | 28 | 22 | 14.4 |
| 25 | 9.6 | 10.8 | 1.5 | | 33 | | 4.2 | .7 | 70 | a 22 | 16.4 | 13.4 |
| 26 | 8.3 | 10.8 | 1.3 | 16 | 22 | | 2.4 | .7 | 106 | a 17.5 | 14.4 | 12.5 |
| 27 | a 5.8 | 9.3 | 1.2 | | 17.5 | 1.6 | 2.2 | .6 | 446 | a 16.4 | 18.6 | 15.4 |
| 28 | a 9.9 | 9.3 | 49 | 16.4 | 14.4 | 1.6 | 3.2 | .6 | 396 | 19.8 | 17.5 | 30 |
| 29 | 11.6 | 8.8 | 30 | 13.4 | 12.5 | 1.6 | 30 | | | 64 | 17.5 | 28 |
| 30 | 11.6 | 7.8 | 21 | 11.6 | 33 | 1.5 | 9.9 | | 240 | 45 | 26 | 337 |
| 31 | 9.9 | a 7.4 | | 6.6 | | 1.4 | 5.8 | | | | | |

a Estimated.

NOTE.—Braced figures give estimated mean discharge for periods indicated. All estimates made from study of fragmentary gage-height record and by comparison with record of flow of Honolii Stream near Hilo; gage-height record either faulty or missing. Data insufficient to make estimate for periods when no discharge is given; recorder not operating.

*Monthly discharge of Wailuku River at Pukamaui, near Hilo, Hawaii, for the years ending June 30, 1924 and 1925*

| Month | Discharge | | | | Total run-off | |
|---|---|---|---|---|---|---|
| | Million gallons a day | | | Second-feet (mean) | Million gallons | Acre-feet |
| | Maximum | Minimum | Mean | | | |
| 1923–24 | | | | | | |
| July | 89 | 14.2 | 28.4 | 43.9 | 881 | 2,700 |
| October | 268 | 7.1 | 36.3 | 56.2 | 1,130 | 3,450 |
| January | 30 | 4.0 | 10.7 | 16.6 | 333 | 1,020 |
| February | 114 | 2.8 | 18.4 | 28.5 | 534 | 1,640 |
| March | 62 | 8.0 | 21.1 | 32.6 | 654 | 2,010 |
| April | 652 | 7.7 | 78.8 | 122 | 2,360 | 7,250 |
| May | 56 | | 29.5 | 45.6 | 915 | 2,810 |
| June | 10.8 | 3.2 | 6.47 | 10.0 | 194 | 596 |
| 1924–25 | | | | | | |
| July | 49 | 2.8 | 12.0 | 18.6 | 372 | 1,140 |
| August | 70 | 7.4 | 22.5 | 34.8 | 699 | 2,140 |
| October | 836 | 6.6 | 66.7 | 103 | 2,070 | 6,350 |
| November | 542 | 1.4 | 47.5 | 73.5 | 1,430 | 4,370 |
| December | 62 | 1.4 | 9.56 | 14.8 | 296 | 909 |
| February | 4.6 | .4 | 1.60 | 2.48 | 44.8 | 137 |
| March | 446 | .4 | 84.5 | 131 | 2,620 | 8,040 |
| April | 268 | 16.4 | 70.5 | 109 | 2,120 | 6,490 |
| May | | 14.4 | 34.1 | 52.8 | 1,060 | 3,240 |
| June | 337 | 12.5 | 37.8 | 58.5 | 1,140 | 3,480 |

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