MISCELLANEOUS USGS FLOW MEASUREMENTS FOR ALL STREAMS

000031

DEPARTMENT OF THE INTERIOR
FRANKLIN K. LANE, Secretary

UNITED STATES GEOLOGICAL SURVEY
GEORGE OTIS SMITH, Director

Water-Supply Paper 445

SURFACE WATER SUPPLY OF HAWAII

JULY 1, 1915 TO JUNE 30, 1916

NATHAN C. GROVER, Chief Hydraulic Engineer
G. K. LARRISON, District Engineer

Prepared in cooperation with the
TERRITORY OF HAWAII

WASHINGTON
GOVERNMENT PRINTING OFFICE
1917

Monthly discharge of Lowrie ditch at Opana weir, near Huelo, Maui, for year ending June 30, 1916.

Month.	Discharge.				Total run-off.	
	Million gallons per day.			Second-feet (mean).	Million gallons.	Acre-feet.
	Maximum.	Minimum.	Mean.			
July	56.5	37.1	51.2	79.2	1,590	4,870
August	54.6	25.4	38.9	60.2	1,210	3,700
September	55.9	24.2	44.6	69.0	1,340	4,110
October	55.7	52.5	54.7	84.5	1,700	5,200
November	56.9	1.6	40.6	62.3	1,220	3,740
December	58.5	.8	41.4	64.1	1,280	3,940
January 1–24	56.7	4.9	26.2	40.5	628	1,930
February 7, 9–29	49.4	.2	23.9	37.0	526	1,610
March	59.5	20.8	45.5	70.4	1,410	4,330
April	60.2	14.1	45.0	69.6	1,350	4,140
May	59.7	23.4	50.2	77.7	1,560	4,780
June	59.6	55.1	58.0	89.7	1,740	5,340
The period	60.2	.2	44.1	68.2	15,600	47,700

HAIKU DITCH AT PEAHI WEIR, NEAR HUELO, MAUI.

LOCATION.—In Peahi about 8 miles by road northwest of Huelo post office.
RECORDS AVAILABLE.—January 1, 1910, to June 30, 1916.
GAGE.—Friez water-stage recorder.
DISCHARGE MEASUREMENTS.—Made by sharp-crested weir, 16⅓ feet long, with bottom and end contractions.
CHANNEL AND CONTROL.—Large pool at weir.
EXTREMES OF DISCHARGE.—See monthly discharge table.
DIVERSIONS.—None above station
REGULATION.—By gates at frequent intervals.
UTILIZATION.—Irrigation of sugar cane.
ACCURACY.—Records good.
COOPERATION.—Daily discharge record copied from records of East Maui Irrigation Co.

Daily discharge, in million gallons, of Haiku ditch at Peahi weir, near Huelo, Maui, for the year ending June 30, 1916.

Date.	July.	Aug.	Sept.	Oct	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.
1	66.5	1.8	1.2	72.9	74.9	8.3	33.5	36.3	4.5	11.2	55.6	83.5
2	52.5	1.8	1.4	71.3	79.1	14.2	11.2	32.2	50.1	4.0	22.2	78.9
3	24.3	7.6	45.6	74.0	78.3	9.3	15.4	29.6	34.3	3.3	22.0	78.6
4	24.5	18.2	63.6	59.8	74.6	53.8	19.6	28.9	15.6	3.0	22.9	79.6
5	53.4	2.7	13.9	43.8	71.1	11.1	63.3	52.1	26.5	2.8	22.0	80.1
6	69.8	2.0	3.5	43.4	71.2	67.3	87.7	75.5	3.7	2.7	22.0	73.6
7	68.1	1.8	13.8	47.8	62.3	60.2	75.0	44.0	13.4	2.6	22.0	66.1
8	57.9	1.8	2.3	42.2	60.0	21.6	66.2	31.8	26.9	2.4	22.0	69.9
9	71.5	1.6	1.6	47.3	70.1	54.9	19.9	19.7	3.1	2.3	21.8	56.4
10	48.8	1.5	1.9	62.8	77.6	28.0	25.8	3.7	28.3	31.3	38.5	47.5
11	22.1	1.9	59.6	61.1	78.0	8.0	70.4	13.5	12.0	7.7	69.6	60.2
12	27.0	46.7	58.0	38.3	75.5	6.4	68.0	13.1	3.6	3.1	71.7	69.1
13	16.8	20.6	23.8	29.0	71.6	5.5	65.5	8.2	45.1	2.2	73.7	68.4
14	14.0	2.9	19.2	24.8	69.6	4.9	62.2	18.3	86.7	2.8	72.5	81.1
15	9.5	2.8	16.8	51.0	70.3	5.1	55.3	15.6	81.2	32.5	68.8	75.1
16	48.0	2.0	9.5	55.1	60.8	12.7	42.2	8.8	78.3	17.3	64.7	69.0
17	83.6	1.6	8.0	25.8	66.1	5.6	33.3	4.3	66.0	14.7	65.9	67.5
18	78.2	13.5	2.6	55.7	73.1	10.9	42.6	3.9	36.0	65.1	71.4	68.4
19	60.6	6.3	2.3	66.7	74.3	49.3	78.1	3.8	18.5	61.1	69.6	66.5
20	29.9	14.3	9.0	75.0	72.8	51.8	54.1	3.8	6.7	63.2	70.7	72.9
21	31.1	4.7	2.3	77.5	70.4	70.9	41.6	3.8	7.0	80.8	73.0	80.8
22	30.6	2.2	36.3	63.0	70.2	84.0	21.9	3.6	68.2	55.2	72.7	72.2
23	23.8	1.8	27.7	69.4	42.5	40.7	20.2	3.4	78.2	65.9	73.0	65.4
24	2.7	8.2	54.2	63.2	51.2	34.6	29.9	3.3	34.7	71.2	72.1	68.5
25	25.7	17.8	62.6	64.8	53.8	10.3	34.4	3.2	50.4	73.0	70.8	68.9
26	15.8	3.1	59.6	68.2	17.4	87.3	35.9	3.3	27.3	51.5	59.7	81.2
27	15.6	2.4	75.7	66.8	20.4	82.6	44.3	40.4	20.4	29.8	58.1	77.8
28	4.1	1.7	59.3	79.3	39.1	55.6	40.7	18.3	30.2	26.2	73.2	81.4
29	2.7	1.7	78.8	73.2	23.5	67.9	37.7	5.0	28.2	18.7	77.8	66.9
30	2.3	1.4	73.8	73.5	8.6	70.1	38.5	.....	31.3	46.1	73.4	64.2
31	1.9	1.4	.....	72.3	.....	63.1	41.5	.....	26.6	.....	74.0	.....

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Monthly discharge of Haiku ditch at Peahi weir, near Huelo, Maui, for year ending June 30, 1916.

Month.	Discharge.				Total run-off.	
	Million gallons per day.			Second-feet (mean).	Million gallons.	Acre-feet.
	Maximum.	Minimum.	Mean.			
July	83.6	1.9	35.0	54.2	1,090	3,330
August	46.7	1.4	6.45	9.98	200	614
September	78.8	1.2	30.3	46.9	908	2,790
October	79.3	24.8	58.7	90.8	1,820	5,586
November	79.1	8.6	60.9	94.2	1,830	5,610
December	87.3	4.9	37.3	57.7	1,160	3,550
January	87.7	11.2	44.4	68.7	1,380	4,220
February	75.5	3.2	18.0	27.8	522	1,600
March	86.7	3.1	33.6	50.2	1,040	3,200
April	80.8	2.2	28.3	43.8	849	2,610
May	77.8	21.8	56.4	87.3	1,750	5,370
June	83.5	47.5	71.3	110	2,140	6,560
The year	87.7	1.2	40.1	62.0	14,700	45,000

MISCELLANEOUS MEASUREMENTS.

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

Miscellaneous measurements on Maui for the year ending June 30, 1916.

Date.	Stream.	Locality.	Gage height (feet).	Discharge.	
				Second-feet.	Million gallons per day.
July 20	Kahakuloa	Just below confluence of main forks, about 3 miles above mouth.	0.96	2.9	1.9
Sept. 22	....do	....do			
July 23	Left branch of Iao.	Just above confluence with right branch, 3 miles west of Wailuku.	1.90	32	
Aug 22	....do	....do	.74	12	
Sept. 28	....do	....do			
Nov. 27	....do	....do	.66	9.6	
Aug. 17	South Waiehu ditch (upper).	Intake near Wailuku	1.60	73	6.2
	....do		.80	14	47
Dec. 27	....do	....do	.77	5.3	8.9
Mar. 4	....do	....do			3.4
Aug. 21	Oopuola	Just above old Spreckels ditch crossing, 2 miles east of Huelo.	.60	2.2	
Apr. 15	....do	....do	.60	.77	1.4
Aug. 22	Iao	Just below confluence of main branches, 3 miles west of Wailuku.	1.08	1.0	.5
Sept. 27	....do	....do	1.75	8.4	.65
28	....do	....do	.79	25	5.4
28	....do	....do			16
Dec. 23	....do	....do	1.30	68	
Apr. 25	North Waiehu	....do	1.72	121	44
May 22	....do	Below upper diversion near Wailuku	2.35	302	78
Feb. 2	Kahoma	....do	1.15	57	195
		500 feet above development tunnel, and 100 feet above upper dam, near Lahaina.	1.22		37
5	....do	....do	1.10	2.0	1.0
5	Springs	20 feet above Kahoma development tunnel near Lahaina.		.55	1.3
May 22	Second diversion from South Waiehu.	50 feet below intake near Wailuku		.45	.35
				.2	.3
				1.65	.1
22	Third diversion from South Waiehu.	....do		.65	1.1
					.45

000083

DEPARTMENT OF THE INTERIOR
FRANKLIN K. LANE, Secretary

UNITED STATES GEOLOGICAL SURVEY
GEORGE OTIS SMITH, Director

Water-Supply Paper 430

SURFACE WATER SUPPLY OF HAWAII

JULY 1, 1913, TO JUNE 30, 1915

NATHAN C. GROVER, Chief Hydraulic Engineer
G. K. LARRISON, District Engine

Prepared in cooperation with the
Territory of Hawaii

WASHINGTON
GOVERNMENT PRINTING OFFICE
1917

Monthly discharge of Haiku ditch at Peahi weir, near Huelo, Maui, Jan. 1, 1913, to June 30, 1915—Continued.

Month.	Discharge.				Total run-off.	
	Million gallons per day.			Second-feet (mean).	Million gallons.	Acre-feet.
	Maximum.	Minimum	Mean.			
1914–15.						
July	61.1	34.8	53.8	83.2	1,670	5,120
August	65.2	3.9	51.6	79.8	1,600	4,910
September	55.4	30.6	52.3	80.9	1,570	4,820
October	66.-	2.1	48.5	75.0	1,500	4,610
November 1–12, 15–30	84.0	1.8	49.5	76.6	1,380	4,250
December	75.9	8.7	48.4	74.9	1,500	4,600
January	64.1	2.4	13.4	20.7	416	1,270
February	81.3	2.3	38.8	60.0	1,090	3,330
March	77.8	2.2	25.2	39.0	782	2,400
April	86.8	2.0	42.0	65.0	1,260	3,870
May	81.4	2.9	23.5	36.4	730	2,240
June	87.8	2.5	26.5	41.0	794	2,440
The period (363 days)	87.8	1.8	39.4	61.0	14,300	43,900

MISCELLANEOUS 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 years ending June 30, 1914–15.

Date.	Stream.	Locality.	Gage height (feet).	Discharge.	
				Second-feet.	Million gallons per day.
1913.					
July 21	Lower springs	Kalepo Gulch near Kaupo		0.44	0.28
21	Upper springs	....do		.22	.14
21	Manawainui	Above large springs, near Kaupo		1.22	.79
21	....do	Below large springs, near Kaupo		2.03	1.31
22	Alelele	Near Kipahulu		.36	.23
22	Oheo	Trail bridge near Kipahulu		1.17	.76
22	Puaaluu	....do		2.24	1.45
22	Halalawe	....do		1.86	1.20
22	Honolewa	....do		1.29	.83
22	Kaili	....do		1.88	1.22
23	Makapipi	Koolau ditch intake, near Nahiku		1.71	1.10
23	East Wailuaiki	Koolau ditch intake, near Keanae		7.0	4.5
Sept. 30	Lahainaluna ditch	At intake, near Lahaina		2.8	1.8
30	Lahainaluna	Above intakes, near Lahaina		4.5	2.9
1914.					
Feb. 25	Tributary to Iao	Confluence 75 feet below gaging station on Iao Stream.		1.29	.83
Aug. 6	Honokahau ditch	100 feet below intake from Honolua stream		17.3	11.2
6	....do	....do	0.88	16.8	10.9
6	....do	....do	.85	29.6	19.1
6	....do	....do	1.36	39.0	25.2
6	....do	....do	1.58	53.8	34.8
6	....do	....do	2.02	64.0	41.4
22	Spreckels ditch	Old gage No. 4 above confluence with Puohakamoa Stream.	2.27	4.65	3.0
			.38		
1915.					
May 17	Small stream	40 feet above main spring just below Potter's lot, Haiku homesteads.		.69	.45
17	....do	100 feet below main spring just below Potter's lot, Haiku homesteads.		1.43	.92
June 13	Tributary to Iao	Confluence, 75 feet below gaging station on Iao Stream.		3.4	2.2
15	Spreckels ditch	Old gage No. 4 above confluence with Puohakamoa Stream.	1.10	18.7	12.1

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MISCELLANEOUS MEASUREMENTS ON THE ISLAND OF MOLOKAI.

The results of a few measurements of discharge of streams on the island of Molokai are listed in the following table:

Miscellaneous discharge measurements on Molokai in 1914.

Date.	Stream.	Locality.	Gage height (feet).	Discharge.	
				Second-feet.	Million gallons per day.
Feb. 12	East Branch of Pelekunu.	Elevation 400 feet, 600 feet above confluence with west branch.		6.2	
12	West Branch of Pelekunu.	Elevation 370 feet, 200 feet above confluence with east branch.		12.4	
13	East Branch of Wailau.	Elevation 500 feet, 300 feet above confluence with west branch.		5.8	3.7
13	West Branch of Wailau.	Elevation 500 feet, 500 feet above confluence with east branch.		13.7	8.8
14	South Branch of Halawa.	Elevation 800 feet, above falls, about 3 miles above Halawa.		5.0	3.2
14	North Branch of Halawa.	Elevation 400 feet, 2,000 feet above confluence with south branch.		2.3	1.5
15	Keopukalua	Elevation 1,000 feet, 300 feet above intake of pipe to Brown's ranch.		.19	.12
15	Honohuiwai	Elevation 1,100 feet, 1,000 feet below ditch intake and just below spring feeder.		.58	.37
15	....do	Elevation 1,150 feet, 50 feet above ditch intake, 3 miles above Tollefson's house.		.59	.38
16	Puniuohua	Elevation 1,900 feet, 3 miles above H. Bowen's house.		.13	.08

EVAPORATION RECORDS.

METHODS OF MEASUREMENT.

Records of evaporation from water surfaces obtained thus far in the Hawaiian Islands have been very unsatisfactory, and the accuracy of those heretofore printed is considered low.

In 1910 and 1911 records were obtained from nine stations on the islands of Kauai, Oahu, and Hawaii. Records of evaporation under roof were also obtained at two stations. In 1912 and 1913 the records obtained were so inconsistent and unreliable that they were not published. A careful study of the records obtained at Hoaeae, or Robinson station, Oahu, has eliminated several sources of error and these records are now considered worthy of publication.

The gage used in measuring evaporation consists of a circular galvanized-iron pan, 10 inches deep and about 18 inches in diameter. Readings are made from the surface of the water to the top of a sharp point extending about 2 inches above the bottom in the center of the pan. The pan is filled with water to about 3 inches from the top, water being added or taken out from time to time, according to the amount of evaporation and the rainfall. Rainfall records are obtained at the station, and the amount of rainfall is

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U. S. GEOLOGICAL SURVEY
SET # 1

DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY
GEORGE OTIS SMITH, DIRECTOR

WATER-SUPPLY PAPER 373

WATER RESOURCES OF HAWAII

1913

BY

G. K. LARRISON

WASHINGTON
GOVERNMENT PRINTING OFFICE
1915

Discharge measurements of Honopou Stream near Huelo, Maui, in 1913.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
June 5	C. T. Bailey	0.10	1.55	Nov. 19	C. T. Bailey	0.79	19.5
Aug. 27	E. O. Christiansen	20	3.01				

Daily discharge, in second-feet, of Honopou Stream near Huelo, Maui, for 1912–13.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1912.												
1	3.3	0.9	7.0	5.1	4.2	1.9	1.5	1.2	1.0	1.0	5.3	4.2
2	3.3	.9	8.3	4.4	4.2	1.7	1.5	1.0	2.8	1.5	4.2	13
3	2.9	.9	8.0	6.5	4.0	1.5	2.0	1.0	1.7	.9	7.2	25
4	2.9	.9	6.8	32	5.[illegible]	1.5	2.8	.9	2.8	.6	4.2	12
5	2.6	.9	6.2	21	3.[illegible]	1.5	1.9	.9	1.5	.6	3.3	7.8
6	2.6	.8	6.0	13	3.[illegible]	1.5	1.7	.9	1.5	.6	3.3	7.0
7	2.6	.8	6.0	18	3.[illegible]	1.4	1.9	.9	2.2	.6	2.9	7.2
8	2.4	.9	5.1	19	3.[illegible]	1.4	1.7	.9	1.7	.6	2.6	6.5
9	2.2	1.9	6.2	18	3.[illegible]	1.4	4.6	.9	1.5	.6	19	4.6
10	2.2	1.2	5.5	13	2.9	2.2	1.9	1.4	1.2	.6	8.6	5.1
11	1.9	1.2	12	12	2.8	1.9	2.6	2.2	1.2	.6	7.0	4.6
12	1.9	1.2	9.2	11	2.6	1.9	1.9	1.2	1.0	.6	5.1	4.2
13	1.9	3.3	12	9.2	2.6	1.9	1.9	1.2	1.0	.6	4.6	3.7
14	1.9	2.0	8.6	11	2.4	1.7	1.7	1.5	.9	49	4.2	3.7
15	1.7	1.4	7.5	11	2.2	1.9	1.7	3.7	.9	1.2	3.7	3.5
16	1.7	1.2	6.0	9.2	2.0	1.9	1.7	1.9	.9	.9	8.0	3.5
17	1.5	1.0	6.2	8.0	2.0	1.5	1.5	1.2	.9	.6	9.5	4.2
18	1.5	.9	11	7.5	2.0	1.5	1.5	1.0	.9	.6	12	4.2
19	1.4	2.9	6.5	7.0	2.0	1.5	1.5	.9	.8	.6	10	7.5
20	1.2	3.7	6.5	8.3	2.2	1.5	1.5	.9	.9	.6	7.8	5.1
21	1.2	6.0	5.5	6.5	2.0	1.5	1.5	.9	.8	2.9	6.2	14
22	1.2	7.5	5.1	5.5	1.9	1.5	1.4	1.9	.8	3.5	6.0	16
23	1.2	4.8	4.6	6.5	1.7	1.4	1.4	.9	.8	3.3	5.5	16
24	2.0	4.2	4.2	5.8	1.9	2.9	1.9	.9	.8	2.6	5.1	10
25	1.5	4.0	3.7	5.5	1.5	1.9	1.9	.9	.6	2.2	5.5	8.9
26	1.5	4.2	3.7	6.5	2.6	1.7	1.5	.8	.6	2.4	5.1	8.0
27	1.4	3.5	3.5	5.8	3.5	1.7	1.4	.8	.6	10	5.1	7.0
28	1.2	10	3.3	5.1	2.9	1.7	1.7	.8	.6	12	4.2	7.5
29	1.2	6.5	3.3	5.1	2.9	1.5	1.5	.9	.9	4.2	3.5	7.0
30	1.0	.....	3.7	4.6	2.0	1.5	1.2	.9	1.5	5.1	3.3	6.0
31	1.0	.....	4.4	.....	2.2	.....	1.2	.9	.....	8.3	.....	5.1
1913.												
1	5.5	2.2	2.0	5.5	4.6	1.4	3.7	1.2	1.5	0.9	6.9	7.0
2	4.6	2.2	1.9	3.3	4.2	1.2	8.6	1.2	1.5	.9	.9	6.5
3	4.2	2.0	1.9	2.6	4.0	1.2	4.6	1.2	1.5	.9	2.9	7.0
4	3.5	1.9	1.7	2.6	3.7	2.2	4.6	1.2	1.4	.9	3.5	36
5	3.3	1.9	1.7	2.4	3.3	1.5	4.2	1.0	1.2	.9	2.2	29
6	3.1	33	1.5	2.2	3.3	1.4	4.8	1.2	1.2	1.2	2.2	22
7	2.9	3.3	1.7	2.2	3.1	1.5	4.0	3.7	1.2	1.4	1.9	16
8	5.1	2.6	1.5	2.0	2.9	1.4	3.7	1.5	1.2	5.3	17	17
9	5.1	2.2	2.2	2.4	2.6	1.5	3.5	1.2	1.2	1.9	22	13
10	5.3	2.2	1.5	2.0	2.6	1.9	3.3	1.2	1.[illegible]	1.5	20	11
11	4.4	2.0	1.5	15	2.4	1.2	3.1	1.0	1.2	1.2	16	9.2
12	3.7	1.9	1.4	8.0	2.6	4.2	2.9	10	1.2	1.2	24	8.9
13	22	1.9	1.2	29	2.4	3.7	2.9	3.3	1.2	3.7	11	7.5
14	16	1.9	1.2	15	2.6	2.9	2.9	2.9	1.0	2.2	11	10
15	26	1.9	3.7	23	3.7	2.6	2.8	6.8	.9	1.5	9.8	16
16	20	2.0	2.9	2.	2.9	2.2	2.6	3.5	1.2	1.4	8.3	8.6
17	6.5	1.9	2.9	3.	3.3	1.9	2.2	3.1	1.9	1.2	7.5	9.2
18	5.3	4.2	2.9	15	2.6	1.5	2.2	2.8	3.3	1.2	14	12
19	5.1	19	2.2	15	2.6	1.5	2.0	2.6	2.0	1.2	22	8.3
20	4.6	3.7	2.2	11	2.2	1.5	2.0	2.6	1.2	1.0	15	7.2
21	3.7	3.3	2.6	13	1.9	1.5	1.9	2.6	1.2	1.0	15	6.5
22	3.3	3.1	4.6	9.2	1.7	1.5	1.9	2.2	1.0	1.0	10	6.0
23	3.3	2.9	2.6	8.0	1.7	1.5	1.7	2.0	.9	1.0	9.2	5.5
24	2.9	2.8	2.0	7.8	1.9	1.5	1.7	1.9	.9	.9	12	5.1
25	2.9	2.6	2.6	11	1.9	1.5	1.5	1.9	.9	.9	14	5.1
26	2.8	2.4	1.9	7.0	2.4	1.9	1.5	1.9	.9	.9	15	4.6
27	2.6	2.2	1.9	8.6	1.9	4.4	1.5	2.0	.9	.9	13	4.2
28	2.6	2.2	2.8	6.5	1.7	2.9	1.5	1.9	.9	.9	11	3.7
29	2.4	.....	2.2	5.8	1.5	2.2	1.4	1.9	.9	.9	8.6	3.3
30	2.2	.....	2.2	5.1	1.5	1.6	1.4	1.5	.9	.9	8.0	3.1
31	2.2	.....	6.5	.....	1.5	.....	1.2	1.9	.....	.9	.....	3.1

960000

Monthly discharge of Honopou Stream near Huelo, Maui, for 1912–13.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
1912.					
January	3.3	1.0	1.87	115	B.
February	10	.8	2.95	170	B.
March	12	3.3	6.31	388	B.
April	32	4.4	10.0	595	A.
May	5.1	1.5	2.77	170	B.
June	2.9	1.4	1.68	100	B.
July	4.6	1.2	1.79	110	B.
August	3.7	.8	1.17	71.9	B.
September	2.8	.6	1.18	70.2	C.
October	49	.6	3.85	237	C.
November	19	2.6	6.07	361	B
December	25	3.5	7.81	480	B
The year	49	0.6	3.95	2,870	
1913.					
January	26	2.2	6.04	371	B.
February	33	1.9	4.12	229	C.
March	6.5	1.2	2.31	142	B.
April	31	2.0	9.54	568	B.
May	4.6	1.5	2.62	161	B.
June	4.6	1.2	2.06	123	B.
July	8.6	1.2	2.83	174	B.
August	10	1.0	2.42	149	B.
September	3.3	.9	1.26	75	B.
October	5.3	.9	1.35	83	B.
November	24	.9	10.9	649	A.
December	36	3.1	10.1	621	A.
The year	36	0.9	4.62	3,340	

MISCELLANEOUS MEASUREMENTS.

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

Miscellaneous discharge measurements on Maui for 1913.

Date.	Stream.	Locality.	Gage height.	Discharge.
			Feet.	*Sec.-ft.*
Mar. 15	South Waiehu	Wailuku	0.60	0.69
Apr. 9	Waikapu (North Fork)[a]	Old shops below tunnel portal	.....	2.68
9	....do	300 feet above junction with South Fork.	.....	2.73
16	Olowalu	Olowalu	.....	
16	Olowalu ditch No. 2	....do	.89	51.6
June 5	Nailihaele	Huelo	1.35	16.9
7	New Hamakua ditch, Gage No. 5	....do	.81	2.16
7	New Hamakua ditch, Gage No. 4	....do	4.80	42.4
7	New Hamakua ditch, Gage No. 3	....do	4.65	37.0
7	New Hamakua ditch, Gage No. 1	....do	2.30	31.6
June 18	Halehaku	Halehaku Weir, Huelo	2.80	34.3
July 21	Lower Springs	Huelo	.86	73.0
21	Upper Springs	Kalepo Gulch, near Kaupo	.25	2.63
21	Manawainui	....do	.....	.44
21	....do	Below large springs, near Kaupo	.....	.22
		Above large springs, near Kaupo	.....	2.03
July 22	Aldele	Near Kipahulu	.....	1.22
22	Ohio	Wooden bridge near Kipahulu	.....	.36
22	Puaaluu	....do	.....	1.17
22	Haalawe	....do	.....	2.24
22	Honolewa	....do	.....	1.86
22	Kaili	....do	.....	1.29
23	Malapipi	....do	.....	1.88
23	East Wailuaiki	Near Kearae	.....	1.71
Sept. 30	Lahainaluna ditch	....do	.....	7.00
30	....do	At Intake near Lahaina	.....	2.76
Apr. 14	Kahoma	Above Intake near Lahaina	.....	4.48
Aug. 19	....do	Near Lahaina	1.16	9.21
		....do	.62	.19

[a] Tributary to Waikapu Stream.

DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY
GEORGE OTIS SMITH, DIRECTOR

WATER-SUPPLY PAPER 318

WATER RESOURCES OF HAWAII

1909–1911

PREPARED UNDER THE DIRECTION OF M. O. LEIGHTON

BY

W. F. MARTIN AND C. H. PIERCE

WASHINGTON
GOVERNMENT PRINTING OFFICE
1913

000087

Monthly discharge of Honokahau ditch at Honokawai weir, near Lahaina, Maui, for 1910–11.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
1910.				
January	33	17	26.8	1,650
February	32	10	24.0	1,330
March	33	15	25.6	1,570
April	33	19	26.2	1,560
May	32	19	24.4	1,500
June	32	24	29.1	1,730
July	32	23	27.1	1,670
August	32	18	28.5	1,750
September	29	.8	23.9	1,420
October	31	7.5	24.7	1,520
November	30	16	22.3	1,330
December	32	21	28.3	1,740
The year	33	0.8	25.9	18,800
1911.				
January	32	24	28.7	1,760
February	33	27	30.9	1,720
March	32	24	26.6	1,640
April	32	21	27.0	1,610
May	32	24	29.0	1,780
June	32	28	30.8	1,830
July	31	23	27.3	1,680
August	31	17	26.7	1,640
September	32	20	29.1	1,730
October	31	24	27.2	1,670
November	31	23	26.4	1,570
December	29	21	24.8	1,520
The year	33	17	27.9	20,200

MISCELLANEOUS MEASUREMENTS ON WEST MAUI.

The following miscellaneous measurements have been made on West Maui. Measurements of the streams, ditches, and development tunnels are arranged in clockwise order, beginning at the Waihee Stream on the northeast. Some measurements have been made of water coming from the ditches of various pumping plants.

Miscellaneous measurements on streams and ditches in West Maui in 1910–11.

Date.	Stream or ditch.	Tributary to or diversion from—	Locality.	Gage height.	Discharge.
				Feet.	*Sec.-ft.*
1910. Dec. 29	Waihee Stream	Pacific Ocean	Gage above intake of Waihee canal, near Waihee.	2.15	72
1911. Aug. 22	....do	....do	....do		
24	South Waiehu Stream	North Waiehu Stream.	Gage at T. Burlem's house, near Wailuku.	2.15 .60	68 27
1910. Feb. 17	Iao Stream	Pacific Ocean	Above gaging station near Wailuku.		35.0
Apr. 28	....do	....do	....do		49.4
29	....do	....do	Below gaging station near Wailuku.		56.0
29	Culvert Creek	Iao Stream	Mouth, below Iao gaging station near Wailuku.		1.85
Nov. 12	Waikapu Stream	Pacific Ocean	Above South Side ditch intake near Waikapu.	[a] .63	5.8
17	....do	....do	....do	[a] .65	7.8
1911. Aug. 23	....do	....do	....do		
July 20	Kauaula Stream	....do	1,000 feet above Pilani ditch near Lahaina.	[a] .70	8.1
Aug. 4	Honokawai Stream	....do	Below junction with Amalu stream, near Kaanapali.		12.4 .16

[a] Regular station about 1 mile below.

830000

Miscellaneous measurements on streams and ditches in West Maui in 1910–11—Con.

Date.	Stream or ditch.	Tributary to or diversion from—	Locality.	Gage height.	Discharge.
				Feet.	*Sec.-ft.*
1911. Oct. 17	Amalu Stream	Honokawai Stream	Aboveditch intake, just above junction with Honokawai Stream, near Lahaina.	1.90	2.67
1910. Nov. 7	Waihee canal	Waihee Stream	Near second tunnel below intake near Waihee.		53
9	....do	....do	....do		
1911. Jan. 27	....do	....do	....do		55
Aug. 22	....do	....do	....do		
22	....do	....do	....do		52
1910. Nov. 7	....do	....do	10 feet above chute to Spreckels's ditch near Waihee.		50 50
1911. Aug. 22	....do	....do	20 feet below chute to Spreckels's ditch near Waihee.		29.9
22	....do	....do	....do		
1910. Dec. 26	....do	....do	At flume in Wailuku Sugar Co.'s field No. 38 near Waihee.		26.5 49.1
Nov. 9	Native ditch (south side).	....do	Siphon crossing Iao Stream near Wailuku.		45.4
1911. Jan. 27	....do	....do	Bridge below ditchman's house near Waihee.	.79	5.6
1910. Nov. 9	Kipuna ditch (north side).	....do	....do	1.14	14.9
Dec. 26	Kilana Auwai (north side).	Iao Stream	Near intake above Waihee	.81	2.5
26	Waldbrige ditch (south side).	....do	Near intake above Wailuku	.25	2.9
Nov. 14	Kama Auwai (south side).	....do	....do	.38	4.6
Dec. 27	....do	....do	Near intake above Waluku	.47	1.16
27	....do	....do	....do	1.60	22.4
1911. Jan. 4	....do	....do	....do	1.70	24.4
1910. Dec. 26	Third ditch (north side).	....do	....do	1.90	27.7
Nov. 11	Palama ditch	Waikapu Stream	....do	.42	3.07
1911. July 25	Launiupoko ditch	Launiupoko Stream	Reservoir near Lahaina		1.20
20	Pilani ditch	Kauaula Stream	500 feet above weir near Lahaina.	[a] .65	9.8
Oct. 16	Kauaula ditch	....do	Near Lahaina	.21	0.9
18	Lahainaluna ditch	Lahainaluna Stream	Below tail-water from power house at Lahainaluna School.		2.0
Aug. 2	Lahaina waterworks ditch.	....do	Intake about 1 mile above Lahainaluna School, near Lahaina.		5.1
2	....co	....do	Filtering station above Lahainaluna School, near Lahaina.	[b] 4.01	1.04
3	Old Kahoma ditch	Kahoma Stream	Flume below weir tunnel entrance near Lahaina.		4.6
July 23	....do	....do	....do		7.0
23	....do	....do	Reservoir near Lahaina		6.1
26	Honokawai ditch	Honokawai Stream	Below Honokawai power house.	[a] .58	8.1
16	Honokahau ditch	Honokahau Stream	Flume No. 4 near Honokahau		31.2
17	....do	Honokahau and Honolua streams.	Just below Honolua Stream, near Honokahau.	2.50	36.7
17	....do	....do	Makupea flume near Honokahau.	[c] .65	33.4
17	....do	....do	Waiaolali near Honokahau	2.31	31.6
17	....do	....do	Napili flume near Honokahau	[d] .68	30.7
17	....do	....do	Alaeloa flume near Honokahau.		29.5

[a] Head over 5-foot weir.
[b] Distance to water surface from reference mark on board, 30 feet above filtering station.
[c] Distance from mauka edge of flume, opposite nail, to water surface.
[d] Distance from top of mauka side of Napili flume to water surface.

630000

DEPARTMENT OF THE INTERIOR
FRANKLIN K. LANE, Secretary

UNITED STATES GEOLOGICAL SURVEY
GEORGE OTIS SMITH, Director

Water-Supply Paper 465

SURFACE WATER SUPPLY OF HAWAII

JULY 1, 1916, TO JUNE 30, 1917

NATHAN C. GROVER, Chief Hydraulic Engineer
G. K. LARRISON, District Engineer

Prepared in cooperation with the
TERRITORY OF HAWAII

WASHINGTON
GOVERNMENT PRINTING OFFICE
1918

Monthly discharge of Lowrie ditch at Opana weir, near Huelo, Maui, for year ending June 30, 1917.

Month.	Discharge.				Total run-off.	
	Million gallons per day.			Second-feet (mean).	Million gallons.	Acre-feet.
	Maximum.	Minimum.	Mean.			
July	59.2	50.4	57.6	89.1	1,790	5,480
August	59.8	55.8	58.6	90.7	1,820	5,570
September	59.1	6.7	53.1	82.2	1,590	4,890
October	57.6	41.0	51.8	80.1	1,610	4,930
November	59.2	40.0	52.9	81.8	1,590	4,870
December	59.5	1.6	40.3	62.4	1,250	3,830
January	58.9	17.0	39.7	61.4	1,230	3,780
February	52.9	10.3	21.6	33.4	604	1,860
March	55.8	27.0	39.7	61.4	1,230	3,780
April	61.0	31.9	47.4	73.3	1,420	4,360
May	58.1	35.4	52.4	81.1	1,620	4,990
June	56.7	25.6	44.1	68.2	1,320	4,060
The year	61.0	1.6	46.8	72.4	17,100	52,400

HAIKU DITCH AT PEAHI WEIR, NEAR HUELO, MAUI.

LOCATION.—In Peahi about 8 miles by road northwest of Huelo post office.

RECORDS AVAILABLE.—January 1, 1910, to June 30, 1917.

GAGE.—Friez water-stage recorder.

DISCHARGE MEASUREMENTS.—Made by sharp-crested weir, 16⅓ feet long, with bottom and end contractions.

CHANNEL AND CONTROL.—Large pool at weir.

EXTREMES OF DISCHARGE.—See monthly-discharge table.

DIVERSIONS.—None above station.

REGULATION.—By gates at frequent intervals.

UTILIZATION.—Irrigation of sugar cane.

ACCURACY.—Records good.

COOPERATION.—Daily-discharge record copied from records of East Maui Irrigation Co.

Daily discharge, in million gallons, of Haiku ditch at Peahi weir near Huelo, Maui, for the year ending June 30, 1917.

Date.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.
1	60.1	71.9	63.9	59.2	54.2	55.5	26.8	2.0	1.4	0.9	82.6	13.7
2	62.2	77.7	63.3	58.3	50.3	64.6	18.3	2.0	1.2	.9	80.3	46.4
3	70.4	80.6	60.6	29.9	68.6	76.3	20.6	2.0	.9	3.3	71.4	36.3
4	69.9	73.3	48.5	28.3	69.7	72.8	70.9	1.9	.9	4.4	53.0	31.3
5	79.1	75.5	49.5	22.1	84.3	58.4	71.0	1.7	.9	34.1	25.3	32.2
6	69.1	71.2	62.4	5.4	76.3	46.9	62.2	1.2	.9	6.5	36.8	58.2
7	47.8	58.9	70.0	4.6	58.7	46.8	69.4	1.0	.9	3.5	28.9	20.2
8	30.6	53.9	77.3	5.1	61.1	42.9	27.9	1.0	2.3	3.1	32.6	54.9
9	23.1	44.1	69.4	6.6	37.4	32.2	6.3	1.0	.9	2.6	22.3	59.5
10	39.6	42.2	69.8	4.7	36.4	76.8	2.8	1.0	.9	2.6	11.2	20.9
11	68.4	65.2	61.4	3.7	34.5	72.9	4.8	1.0	.9	52.1	12.6	55.2
12	59.7	66.2	54.0	10.2	24.8	53.2	2.7	1.0	.9	20.5	32.4	55.1
13	80.1	68.1	46.2	7.1	8.0	65.9	2.6	1.0	.9	8.2	20.8	16.4
14	74.1	87.7	37.4	3.4	6.1	59.6	2.4	1.3	.9	25.3	32.4	14.4
15	74.7	74.1	44.5	4.3	8.5	55.3	2.4	1.2	1.0	38.2	35.1	16.0
16	78.3	68.9	43.9	4.7	81.7	54.5	2.3	1.1	.9	23.9	35.1	25.7
17	85.2	69.7	34.1	54.7	78.3	74.9	2.3	1.1	.9	36.6	67.4	10.6
18	76.7	68.4	39.6	45.1	47.2	81.5	2.1	1.1	.9	30.5	77.1	12.5
19	73.8	71.4	62.6	24.5	28.6	71.3	2.3	1.1	.9	14.2	54.9	9.4
20	61.2	71.4	74.1	15.1	30.0	67.9	2.2	1.1	.9	37.9	21.0	8.2
21	51.8	69.3	53.7	5.4	26.8	68.9	2.2	1.2	.9	20.4	37.0	7.5
22	32.0	68.0	51.0	14.3	7.2	70.2	2.0	1.3	.9	22.9	29.1	26.1
23	26.8	62.8	67.8	30.9	5.8	75.1	1.7	1.3	.9	44.4	55.9	13.1
24	23.1	65.3	67.0	13.0	19.7	45.1	1.6	1.3	.9	31.3	66.5	11.4
25	26.9	56.7	65.8	4.4	26.6	30.0	1.6	1.3	.9	18.5	42.3	10.7
26	34.4	55.7	62.9	54.9	39.6	28.4	1.5	1.3	.9	9.5	17.3	9.1
27	61.6	53.0	48.3	66.7	45.9	30.2	1.3	1.2	.9	8.3	13.6	24.9
28	68.4	58.9	38.6	66.7	68.5	29.9	1.1	1.3	.9	27.5	15.9	37.6
29	49.6	51.9	31.7	54.8	57.5	28.9	1.1	.....	.9	84.4	13.1	23.4
30	66.3	46.9	31.6	77.3	75.7	29.6	1.5	.....	.9	81.1	23.5	26.1
31	85.5	60.3	.....	69.3	.....	37.6	1.6	.....	.9	.....	17.1	.....

Monthly discharge of Haiku ditch, at Peahi weir near Huelo, Maui, for year ending June 30, 1917.

Month.	Discharge.				Total run-off.	
	Million gallons per day.			Second-feet (mean).	Million gallons.	Acre-feet.
	Maximum.	Minimum.	Mean.			
July	85.5	23.1	58.4	90.4	1,810	5,560
August	87.7	42.2	65.0	101	2,010	6,180
September	77.3	31.6	55.0	85.1	1,650	5,060
October	77.3	3.4	28.0	43.3	867	2,660
November	84.3	5.8	43.9	67.9	1,320	4,040
December	81.5	28.4	55.0	85.1	1,700	5,230
January	71.0	1.1	13.5	20.9	420	1,280
February	2.0	1.0	1.29	2.00	36	111
March	2.3	.9	.97	1.50	30	92
April	84.4	.9	23.3	36.1	698	150
May	82.6	11.2	37.6	58.2	1,170	580
June	59.5	7.5	26.2	40.5	787	110
The year	87.7	.9	34.5	53.1	12,500	38,400

MISCELLANEOUS MEASUREMENTS.

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

Miscellaneous measurements on Maui for the year ending June 30, 1917.

Date.	Stream.	Locality.	Gage height (feet).	Discharge.	
				Second-feet.	Million gallons per day.
July 28	Olowalu ditch	In tailrace of power house	0.70	7.6	4.9
July 24	North Waiehu	¼ mile below intake of North Waiehu ditch.	.85	.3	.2
Aug. 12	....do	....do			
Sept. 15	....do	....do	.54	.35	.25
Oct. 16	....do	....do	.53	.21	.15
Dec. 13	....do	....do	.48	.12	.08
Jan 26	....do	....do	.94	.98	.65
Feb. 16	....do	....do	.59	.34	.22
May 24	....do	....do	.33	.05	.03
Dec. 11	Spreckels ditch	Just east of Puohakamoa Stream	.71	.37	.24
				33.3	5

ISLAND OF HAWAII.

UPPER HAMAKUA DITCH AT PUUALALA AND RESERVOIR NO. 3 WEIRS, NEAR KUKUIHAELE, HAWAII.

LOCATION.—Puualala weir is in Lalakea tract, adjacent to forest reserve and close to Kaala Mountain and Pacific sugar mill fence. Reservoir No. 3 weir is on a branch from main ditch just before it enters reservoir No. 3, about 1 mile south of Puualala or main weir.

RECORDS AVAILABLE.—January 1, 1913, to June 30, 1917. Records given herewith show the combined flow of the main ditch and its diversion to reservoir No. 3 which occurs above the main weir.

GAGE.—Watson water-stage recorder at each weir.

DISCHARGE MEASUREMENTS.—Made by sharp-crested weirs with good stilling basins above.

EXTREMES OF DISCHARGE.—See monthly-discharge table.

DIVERSIONS.—This ditch diverts all natural run-off from upper headwaters of Waipio Gulch.

UTILIZATION.—Irrigation of sugar cane and domestic supply.

ACCURACY.—Records good.

COOPERATION.—Records furnished by the Hawaiian [illegible]

U.S. GEOLOGICAL SURVEY
SET #1

DEPARTMENT OF THE INTERIOR
FRANKLIN K. LANE, Secretary

UNITED STATES GEOLOGICAL SURVEY
GEORGE OTIS SMITH, Director

Water-Supply Paper 485

SURFACE WATER SUPPLY OF HAWAII

JULY 1, 1917, TO JUNE 30, 1918

NATHAN C. GROVER, Chief Hydraulic Engineer
C. T. BAILEY, Acting District Engineer

Prepared in cooperation with the
TERRITORY OF HAWAII

WASHINGTON
GOVERNMENT PRINTING OFFICE
1919

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HAIKU DITCH AT PEAHI WEIR, NEAR HUELO, MAUI.

LOCATION.—In Peahi, about 8 miles by road northwest of Huelo post office.
RECORDS AVAILABLE.—January 1, 1910, to June 30, 1918.
GAGE.—Friez water-stage recorder.
DISCHARGE MEASUREMENTS.—Made by sharp-crested weir, 15⅓ feet long, with bottom and end contractions.
CHANNEL AND CONTROL.—Large pool at weir.
EXTREMES OF DISCHARGE.—See monthly-discharge table.
DIVERSIONS.—None.
REGULATION.—By gates at frequent intervals.
UTILIZATION.—Irrigation of sugar cane.
ACCURACY.—Records good.
COOPERATION.—Daily-discharge record copied from records of East Maui Irrigation Co.

Daily discharge, in million gallons, of Haiku ditch at Peahi weir, near Huelo, Maui, for the year ending June 30, 1918.

Day.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.
1	13.0	1.5	1.1	0.8	0.7	60.3	11.1	79.7	43.2	67.6	4.0	26.0
2	8.9	1.8	1.1	.8	.7	35.2	2.1	67.6	39.8	84.1	4.0	21.6
3	7.3	1.4	1.0	.8	.9	33.6	14.7	34.3	34.7	39.4	4.0	12.8
4	14.8	1.5	1.0	.8	18.1	23.8	37.3	13.8	38.7	16.8	3.8	17.4
5	35.4	1.1	1.0	.8	14.8	8.8	15.6	34.9	39.0	16.8	11.6	18.4
6	15.9	1.1	1.0	.7	7.0	5.4	2.7	32.7	36.8	24.1	58.4	18.0
7	7.0	1.2	.9	.7	32.2	9.2	.5	29.9	53.2	23.5	34.4	19.8
8	5.5	1.2	.9	.7	29.3	7.1	8.0	19.7	76.4	25.3	24.3	18.9
9	5.4	1.2	.9	.7	28.4	1.3	55.8	76.6	38.8	26.9	12.9	15.2
10	5.5	1.2	.9	.7	1.7	.9	12.0	79.8	51.2	28.1	65.1	64.4
11	2.1	1.1	.8	.7	1.1	.8	71.5	59.6	28.5	18.0	39.9	70.9
12	1.6	1.2	.8	.7	.7	3.0	51.8	38.4	25.9	14.6	25.6	88.1
13	1.6	4.5	.8	.7	.7	18.8	13.7	35.4	46.5	13.6	82.1	82.9
14	1.8	2.9	.8	.7	.7	20.5	11.4	27.4	62.4	13.5	85.2	34.5
15	1.7	1.3	.8	.8	.6	32.4	18.4	19.1	68.8	13.1	20.3	66.3
16	1.6	1.2	.8	.7	.6	2.2	56.8	13.6	78.6	13.0	81.5	87.8
17	1.6	1.2	.8	.7	.6	.9	9.0	24.7	71.1	12.9	71.7	78.1
18	1.5	1.1	.8	.7	.6	.8	4.8	24.3	72.9	12.4	42.2	34.9
19	3.9	1.1	.8	.7	.6	.7	5.5	22.8	63.8	12.8	22.4	31.9
20	1.3	1.1	.8	.7	.8	22.3	53.7	27.2	63.8	12.9	15.6	37.7
21	1.2	1.1	.8	.7	.6	10.0	10.1	24.9	55.4	23.0	9.7	39.7
22	1.4	40.8	.8	.7	6.4	68.4	16.3	27.4	38.3	45.8	23.3	53.4
23	22.8	34.5	.8	.7	40.7	53.8	38.1	29.2	22.8	67.6	13.1	63.0
24	3.5	12.8	.8	.7	59.7	17.2	25.5	28.6	27.0	7.3	33.7	19.7
25	1.4	7.2	.8	.7	45.5	7.9	45.9	28.3	83.9	3.8	83.4	47.7
26	1.4	1.6	.8	.7	38.4	1.7	26.1	33.6	74.1	3.4	43.3	55.6
27	1.4	1.4	.8	.7	13.3	1.4	22.8	36.5	57.6	2.9	79.2	42.0
28	1.6	1.2	.8	.7	16.0	1.9	14.7	42.3	54.4	13.3	38.1	26.1
29	1.5	1.1	.8	.7	25.5	14.8	15.5	.....	56.0	66.4	36.0	30.0
30	1.6	1.1	.8	.8	81.7	.7	76.3	.....	55.0	4.8	64.1	21.1
31	1.5	1.1	.....	.7	.....	.7	75.7	.....	65.3	.....	33.3	.....

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Monthly discharge of Haiku ditch at Peahi weir, near Huelo, Maui, for the year ending June 30, 1918.

Month.	Discharge. Millions gallons per day. Maximum.	Minimum.	Mean.	Second-feet (mean).	Total run-off. Million gallons.	Acre-feet.
July	35.4	1.2	5.70	8.82	177	54
August	40.8	1.1	4.32	6.68	134	41
September	1.1	.8	.86	1.33	26	79
October	.8	.7	.72	1.1	22	68
November	81.7	.6	15.6	24.1	469	1,440
December	68.4	.7	15.5	24.0	466	1,430
January	76.3	1.5	26.6	41.2	824	2,530
February	79.8	13.6	36.2	56.0	1,010	3,100
March	88.8	22.8	54.4	84.2	1,690	5,180
April	84.1	2.9	24.3	37.6	728	2,240
May	88.1	3.8	40.8	63.1	1,270	3,880
June	88.1	12.8	41.4	64.1	1,240	3,810
The year	88.8	.6	22.1	34.2	8,060	24,800

MISCELLANEOUS MEASUREMENTS.

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

Miscellaneous measurements on Maui during the year ending June 30, 1918.

Date.	Stream.	Locality.	Gage height (feet).	Discharge. Second-feet.	Million gallons per day.
July 21	Waihee	Near Waihee	2.20	42	27
24	West Wailuanui	Near Keanae	.80	3.0	1.9
Aug. 24	....do	....do	.75	2.7	1.8
Feb. 7	Koula	Near Lahaina	.54	4.9	3.1
Dec. 11	Spreckels ditch	Above Puohakamoa stream, near Huelo.	.....	33	22
Mar. 27	Old Hamakua ditch	250 feet below Oanui intake of Kailua stream, near Huelo.	.....	51	1
27	.....do	150 feet above Hoolawaliili Stream, near Huelo.	.....	32	21
27	Middle Halawa	Kailua side of Hoolawanui, 25 feet above Old Hamakua ditch intake near Huelo.	.....	.1	.06
27	Branch of Waipio	First stream east of Hoolawaliili, 150 feet above New Hamakua ditch intake near Huelo.	.....	.1	.25
27	.....do	Second stream east of Hoolawaliili, 30 feet above New Hamakua ditch intake near Huelo.	.....	.35	.25
27	.....do	Third stream east of Hoolawaliili, 30 feet above New Hamakua ditch intake near Huelo.	.....	.25	.15
27	Huelo stream	75 feet above New Hamakua ditch, near Huelo.	.....	1.4	.9
27	Branch of Huelo	At trail crossing near Huelo. No water diverted into New Hamakua ditch.	.....	1.05	.7
27	Branch of Hoolua	First stream west of first camp west of Kailua, 50 feet above New Hamakua ditch near Huelo.	.....	.5	.35
27	.....do	First wasteway west of Kailua, 100 feet above New Hamakua ditch near Huelo.	.....	.2	.15
27	Honavana	25 feet above New Hamakua ditch, near Huelo.	.....	.95	.6
27	Branch of Honawana	6 feet above New Hamakua ditch, near Huelo.	.....	.6	.4
28	Branch of Nailiilihaele	100 feet above New Hamakua ditch, near ditchman's house near Huelo.	.....	.4	.25
28	Branch of Papaea	First stream west of Nailiilihaele, 50	.....	.25	.15

Miscellaneous measurements on Maui during the year ending June 30, 1918—Continued.

Date.	Stream.	Locality.	Gage height (feet).	Discharge. Second-feet.	Discharge. Million gallons per day.
Mar. 28	Branch of Papaea	Second stream west of Naililihaele, at camp, 125 feet above New Hamakua ditch, near Huelo.		0.5	0.3
28	do	Third stream west of Naililihaele, 10 feet above New Hamakua ditch, near Huelo.		.5	.3
28	West branch Oopuola	200 feet above New Hamakua ditch, near Huelo.		.6	.4
28	Branch of Oopuola	20 feet above trail crossing and intake, near Huelo.		.6	.4
28	Main Oopuola	200 feet above New Hamakua ditch near Huelo.		1.75	1.1
28	Branch of Makanale	50 feet above New Hamakua ditch, near Huelo.		.11	.07
28	Main branch of Makanale	20 feet above fall and intake into tunnel of New Hamakua ditch, at Korean camp, near Huelo.		.45	.3
28	Koaiea	Under trail bridge below New Hamakua ditch, near Huelo. No water diverted into ditch.		5.0	3.2
28	Branch of Kolea	Under trail bridge, near Huelo		.3	.2
28	Left branch of Kolea	30 feet above New Hamakua ditch, near Huelo. Right branch not measured, estimated the same.		.65	.45
28	Right branch of Alo	20 feet above Spreckels ditch, near Huelo.		.55	.35
28	Branch of Puohakamoa	First tributary, 75 feet above Spreckels ditch, near Huelo.		.5	.35
Apr. 4	Puohakamoa	500 feet above Haiku-uka boundary		10.6	6.8
5	do	do		6.9	4.5
15	do	do		5.4	3.5
16	do	do		4.4	2.8
4	East branch of Waikamoi	At trail crossing near Haiku-uka boundary.		8.3	5.4
5	do				
15	do				
16	do			4.4	2.9
4	West branch of Waikamoi	do		4.3	3.1
5	do	do		3.3	2.1
15	do	do		18	12
16	do	do		15	9.5
4	Naililihaele No. 1	do		14	9.0
5	do	do		6.5	4.2
15	do	do		.75	.5
16	do	do		.5	.35
4	Naililihaele No. 2	do		.5	.3
5	do	do		.4	.25
15	do	do		1.75	1.15
16	do	do		1.65	1.05
4	Naililihaele No. 3	do		1.7	1.1
5	do	do		.85	.55
15	do	do		.25	.15
16	do	do		.14	.09
4	Naililihaele No. 4	do		.25	.15
5	do	do		.15	.1
15	do	do		.75	.5
16	do	do		.5	.35
4	Kailua	do		.45	.3
5	do	do		.4	.25
15	do	do		11	7
16	do	do		8.5	5.5
18	Halenaku	do		7.9	5.1
18	do	125 feet above Kouhikoa ditch, near Huelo.		4.2	2.7
19	Kapaloalaca	150 feet above intake to side ditch, near Huelo.		.35	.2
19	Lowrie ditch	Just above Lowrie ditch flume, near Huelo.		1.6	1.1
19	Waihee ditch	Above tunnel with outfall into Halawa stream, near Huelo.		8.2	5.3
		In wasteway above gate in ditch, 1,000 feet above Lowrie ditch, near Huelo.		7.7	5.0
				2.9	1.9

NOTE.—Streams 50 to 75 per cent above normal Mar. 27 due to showers night of Mar. 26. Streams slightly above normal Mar. 28 due to light showers night of Mar. 27.

630003

ISLAND OF MOLOKAI.

HALAWA STREAM NEAR HALAWA, MOLOKAI.

LOCATION.—250 feet below confluence of two main branches, 2 miles above mouth of stream and Halawa school house.

RECORDS AVAILABLE.—July 1, 1917, to June 30, 1918.

GAGE.—Stevens water-stage recorder.

DISCHARGE MEASUREMENTS.—Made by wading.

CHANNEL AND CONTROL.—One channel at all stages; straight for 150 feet above and 100 feet below gage; banks high and steep. Control composed of large boulders; fairly permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded, 7.5 feet at 8 a. m. April 1 (discharge, from extension of rating curve, 730 million gallons per day, or 1,130 second-feet); minimum stage recorded, 0.35 foot October 13–15 and (discharge, 0.8 million gallons per day, or 1.2 second-feet).

DIVERSIONS.—None.

REGULATION.—None.

UTILIZATION.—For irrigation of taro and for domestic supply.

ACCURACY.—Stage-discharge relation permanent except for change made by flood of March 11. Rating curves applicable as follows: August 28 to March 11 well defined between 2.0 and 15 million gallons per day; March 12 to June 30 well defined between 4.0 and 100 million gallons per day. Rating curves fairly well defined outside of limits given. Operation of water-stage recorder unsatisfactory; no record July 1 to August 27, August 30 to September 9, September 11 to October 7, October 20–26, October 28 to November 4, November 6–18, and February 19–23. Records good within above limits of rating curves, when water-stage recorder was operating. Records poor when discharge was estimated.

Discharge measurements of Halawa Stream near Halawa, Molokai, during the year ending June 30, 1918.

[Made by H. A. R. Austin.]

Date.	Gage height (feet).	Discharge. Second-feet.	Discharge. Million gallons per day.	Date.	Gage height (feet).	Discharge. Second-feet.	Discharge. Million gallons per day.
Nov. 19	0.51	2.3	1.5	Mar. 12	1.98	84	55
19	.52	2.7	1.7	Apr. 22	1.69	59	38
20	.48	2.1	1.4	22	1.54	49	32
Jan. 21	1.06	12.7	8.2	23	1.45	29	19
22	.99	10.4	6.7	June 3	.75	11.1	7.2

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DEPARTMENT OF THE INTERIOR
HUBERT WORK, Secretary

UNITED STATES GEOLOGICAL SURVEY
GEORGE OTIS SMITH, Director

Water-Supply Paper 515

SURFACE WATER SUPPLY OF HAWAII

JULY 1, 1918, TO JUNE 30, 1919

NATHAN C. GROVER, Chief Hydraulic Engineer
C. T. BAILEY and JAMES E. STEWART
Acting District Engineers

Prepared in cooperation with the
TERRITORY OF HAWAII

WASHINGTON
GOVERNMENT PRINTING OFFICE
1923

Monthly discharge of Lowrie ditch at Opana weir, near Huelo, Maui, for the year ending June 30, 1919.

Month.	Discharge. Million gallons per day. Maximum.	Minimum.	Mean.	Second-feet (mean).	Total run-off. Million gallons.	Acre-feet.
July	59.9	56.9	57.6	89.1	1,790	5,480
August	59.1	55.7	57.5	89.0	1,780	5,470
September	57.6	25.4	43.9	67.9	1,320	4,040
October	55.0	20.1	30.9	47.8	957	2,940
November	56.8	32.3	49.8	77.1	1,490	4,580
December	57.2	45.5	55.5	85.9	1,720	5,280
January	58.8	26.6	44.2	68.4	1,370	4,200
February	55.9	34.2	48.3	74.7	1,350	4,150
March (27 days)	56.6	.9	49.7	76.9	1,340	4,120
April	55.5	30.5	46.1	71.3	1,380	4,240
May	57.3	34.6	50.3	77.8	1,560	4,790
June	44.0	17.3	26.3	40.7	789	2,420
The year (361 days)	59.9	.9	46.7	72.3	16,800	51,700

HAIKU DITCH AT PEAHI WEIR, NEAR HUELO, MAUI.

LOCATION.—In Peahi, 3 miles by road northwest of Huelo post office.
RECORDS AVAILABLE.—January 1, 1910, to June 30, 1919.
GAGE.—Friez water-stage recorder.
DISCHARGE MEASUREMENTS.—Made by sharp-crested weir, 16⅔ feet long with bottom and end contractions.
CHANNEL AND CONTROL.—Large pool at weir.
EXTREMES OF DISCHARGE.—See monthly-discharge table.
DIVERSIONS.—None.
REGULATION.—By gates at frequent intervals.
UTILIZATION.—Irrigation of sugar cane.
ACCURACY.—Records good.
COOPERATION.—Daily-discharge record copied from records of East Maui Irrigation Co.

Daily discharge, in million gallons, of Haiku ditch at Peahi weir, near Huelo, Maui, for the year ending June 30, 1919.

Day.	July.	Aug	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.
1	79.4	80.7	34.3	3.9	40.2	3.7	21.8	23.2	3.4	18.3	55.8	7.2
2	93.9	74.7	41.5	3.8	50.2	9.9	12.8	18.1	16.6	4.0	27.4	2.1
3	89.6	80.8	15.7	3.9	18.0	81.3	12.2	18.7	8.0	3.6	19.1	2.0
4	88.1	73.9	6.8	3.8	49.0	72.9	37.7	18.8	3.5	3.3	9.8	2.0
5	95.4	66.3	6.6	3.8	35.9	72.9	13.9	15.8	17.8	3.1	77.7	1.9
6	59.6	69.6	7.7	4.0	45.5	77.2	9.4	3.4	79.7	2.8	70.5	1.9
7	40.2	61.1	6.4	3.9	24.7	57.9	4.8	2.7	78.6	2.5	50.4	1.8
8	82.1	64.0	18.8	3.8	10.0	51.4	3.5	2.6	74.9	2.5	49.9	1.8
9	95.0	46.3	12.5	3.8	5.2	48.5	3.2	41.9	74.6	2.5	69.7	1.8
10	89.4	47.1	6.2	3.8	4.0	48.5	3.2	28.2	86.4	2.5	36.3	1.8
11	88.4	29.6	5.8	3.8	50.7	48.5	12.0	9.4	81.8	2.5	25.4	2.0
12	89.7	57.0	5.1	3.8	86.9	50.3	9.0	34.6	86.3	2.5	29.5	1.8
13	89.6	66.1	5.0	7.7	81.0	44.9	3.1	15.3	80.8	2.3	16.1	1.7
14	86.1	78.0	4.9	4.3	40.3	55.2	2.8	18.3	67.0	2.0	8.1	1.7
15	89.7	67.7	4.9	3.8	36.0	85.8	2.8	18.2	54.4	2.0	3.4	1.7
16	81.9	88.8	4.9	3.8	45.9	76.5	2.8	12.6	70.4	21.7	2.5	1.8
17	78.6	88.8	4.9	3.3	17.9	85.4	2.3	2.0	68.6	43.6	3.6	1.9
18	51.2	88.8	6.0	3.5	4.2	78.0	2.8	2.0	47.2	21.1	70.3	1.8
19	50.5	88.8	29.3	3.3	4.9	82.9	2.8	2.0	46.3	7.4	32.4	1.8
20	53.2	88.8	4.8	33.5	3.8	82.3	2.8	49.6	47.7	6.0	18.0	1.6
21	81.8	85.0	4.8	9.6	3.6	86.1	2.7	16.0	18.2	17.7	27.8	1.6
22	76.2	86.7	4.7	3.7	3.6	88.2	3.2	33.9	61.2	64.0	5.9	1.5
23	89.2	83.7	9.5	3.7	3.5	80.2	9.3	19.4	78.9	70.3	10.3	1.5
24	92.8	81.8	8.0	3.6	3.5	65.7	20.8	19.2	88.7	71.4	3.2	1.5
25	93.2	76.9	12.0	3.6	3.5	64.5	27.4	25.6	85.7	64.4	3.0	1.5
26	91.7	42.1	7.3	25.7	3.5	32.6	7.6	3.4	85.7	61.1	2.8	1.5
27	90.8	47.2	7.6	12.5	5.7	42.8	45.7	2.8	86.0	53.6	2.7	1.5
28	97.3	52.6	3.8	7.2	44.8	23.7	45.4	2.5	66.6	40.0	2.4	2.2
29	93.9	55.6	7.2	6.1	44.8	7.0	37.2	.....	54.9	30.0	2.2	2.0
30	92.6	48.9	36.9	43.3	4.4	10.3	11.5	.....	28.6	9.3	2.1	1.6

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Monthly discharge of Haiku ditch at Peahi weir, near Huelo, Maui, for the year ending June 30, 1919.

Month.	Discharge. Million gallons per day. Maximum.	Minimum.	Mean.	Second-feet (mean).	Total run-off. Million gallons.	Acre-feet.
July	97.3	40.2	82.6	128	2,560	7,860
August	88.8	29.6	68.2	106	2,110	6,490
September	41.5	3.8	11.1	17.2	334	1,020
October	43.3	3.6	7.90	12.2	245	752
November	86.9	3.5	25.8	39.9	775	2,380
December	88.2	3.7	56.8	87.9	1,760	5,400
January	45.7	2.3	13.2	20.4	409	1,260
February	49.6	2.0	16.4	25.4	460	1,410
March	88.7	3.4	57.7	89.3	1,790	5,500
April	71.4	2.0	21.3	33.0	638	1,960
May	77.7	1.9	23.9	37.0	740	2,270
June	7.2	1.5	1.95	3.02	58.5	180
The year	97.3	1.5	32.6	50.4	11,900	36,500

MISCELLANEOUS MEASUREMENTS.

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

Miscellaneous measurements on Maui during the year ending June 30, 1919.

Date.	Stream.	Locality.	Discharge. Second-feet.	Million gallons per day.
Apr. 19	Waihee ditch	1,000 feet above Lowrie ditch, near Huelo	2.9	1.9
May 26	Honomanu	Haiku-uka boundary	.95	.60
27	Kolea	Just east of Honomanu ditchman's house, near Huelo.	1.45	.95
27	Ulawina	(Tributary to Kolea). Just above intake of Honomanu ditch.	.55	
27	First stream west of Honomanu stream.	Just below intake of Honomanu ditch	.50	.30
27	New Wailua	First gulch east of Honomanu stream, just below trail.	.30	.20
27	Second tributary east of Honomanu.	300 feet above trail	.70	.45
Mar. 10	Koolau ditch at Alo division weir.	Huelo	167	108
Apr. 18	.....do	.....do	63	40.5
Mar. 12	Koolau ditch at Nahiku weir.	Nahiku	15.8	10.2
Apr. 20	.....do	.....do	20.9	13.5
June 19	.....do	.....do	8.6	5.6

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DEPARTMENT OF THE INTERIOR
HUBERT WORK, Secretary

UNITED STATES GEOLOGICAL SURVEY
GEORGE OTIS SMITH, Director

Water-Supply Paper 516

SURFACE WATER SUPPLY OF HAWAII
JULY 1, 1919, TO JUNE 30, 1920

NATHAN C. GROVER, Chief Hydraulic Engineer
JAMES E. STEWART, District Engineer

Prepared in cooperation with the
TERRITORY OF HAWAII

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WASHINGTON
GOVERNMENT PRINTING OFFICE
1924

MISCELLANEOUS MEASUREMENTS.

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

Miscellaneous measurements on Maui during the year ending June 30, 1920.

Date.	Stream.	Locality.	Gage height (feet).	Discharge.	
				Second-feet.	Million gallons per day.
July 17	Spreckels ditch	Haipuaena weir, near Huelo, Maui	7 5/6 in.	9.7	6.3
Oct. 6	Koolau ditch	Alo division weir, near Huelo, Maui	2.02	171	111
Jan. 10	do	Alo division weir, near Huelo, Maui	.80	39.5	25.5
Mar. 6	Kailua Stream	Elevation 330 feet, near Huelo, Maui		.01	.005
6	Nailiilihaele Stream	Elevation 335 feet, near Huelo, Maui			.005
6	Pa Stream	Elevation 330 feet, near Huelo, Maui		.04	.03
6	Papaaea Stream	Elevation 335 feet, near Huelo, Maui		.02	.01
6	Koalea Stream	Elevation 330 feet, near Huelo, Maui		.15	.09
7	West Punaluu Stream	Elevation 340 feet, near Huelo, Maui		.08	.05
7	Punaluu East Spring	Near Huelo, Maui		.06	.04
7	Kolea Stream	Elevation 370 feet, near Huelo, Maui		.1	.08
7	Wahinepe Stream	Near Huelo, Maui		.2	.1
7	Waikamoi Stream	Elevation 440 feet, near Huelo, Maui		.15	.1
7	Haipuaena Stream	Elevation 360 feet, near Huelo, Maui		.05	.03
7	Puohakamoa Stream	Near Huelo, Maui		.25	.15
8	Honomanu Stream	Near Keanae, Maui		1.8	1.15
27	Waihee ditch	Below spillway into lower ditch, near Wailuku, Maui.		37.5	24.4
27	do	Above all laterals, near Wailuku, Maui		38	24.7
Apr. 7	Koolau ditch	Nahiku weir, near Nahiku, Maui	1.22	57	37
18	Waihee ditch	Waihee flume, near Wailuku, Maui	1.19	33.5	21.6
18	do	Near Wailuku, Maui	1.54	28	18.0
18	do	do	1.52	27	17.5

ISLAND OF MOLOKAI.

HALAWA STREAM NEAR HALAWA, MOLOKAI.

LOCATION.—250 feet below confluence of two main branches, 2 miles above mouth of stream and Halawa schoolhouse.

RECORDS AVAILABLE.—August 28, 1917, to June 30, 1920.

GAGE.—Stevens continuous water-stage recorder.

DISCHARGE MEASUREMENTS.—Made by wading.

CHANNEL AND CONTROL.—One channel at all stages; straight for 150 feet above and 100 feet below gage; banks high and steep. Control composed of large boulders; fairly permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year 9.75 feet, 8.15 a. m. January 17 (discharge, 1,070 million gallons per day or 1,660 second-feet). Minimum stage recorded during year 0.02 foot, from 4 p. m. October 27 to 7 a. m. October 28, and 7 a. m. February 29 (discharge, 1 million gallons per day, or 1.6 second-feet).

1917–1920: Maximum stage recorded in January, 1920. Minimum stage recorded 0.35 foot, October 13–15 and 19, 1917 (discharge, 0.8 million gallons per day or 1.2 second-feet).

DIVERSIONS.—None.

REGULATION.—None.

OBJECT OF STATION.—To determine feasibility of water-supply project for Halawa village

UTILIZATION.—For irrigation of taro and for domestic supply.

ACCURACY.—Stage-discharge relation permanent throughout the year. Rating curve well defined below 80 million gallons per day. Operation of water-stage recorder unsatisfactory. Records good when recorder was operating and fair for estimated periods.

160000

Discharge measurements of Halawa Stream near Halawa, Molokai, during the year ending June 30, 1920.

Date.	Made by—	Gage height (feet).	Discharge.	
			Second-feet.	Million gallons per day.
Aug. 6	A. H. Wong	1.04	24.1	15.6
Nov. 5	do	.02	1.15	.75
Dec. 9	J. E. Stewart	1.63	61	39.5
26	B. F. Rush	.26	5.6	3.6
Feb. 11	do	.26	4.0	2.6
22	do	.11	3.2	2.1
Mar. 19	do	1.12	22	14.2
May 2	do	.35	3.6	2.3

Daily discharge, in million gallons, of Halawa Stream near Halawa, Molokai, for the year ending June 30, 1920.

Day.	July.	Aug.	Sept.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.
1	16.8	24	95	.....	1.1	4.2	.....	1.9	.....	3.2	6.8
2	18.5	18.6	17.4	.....	1.1	3.0	.....	1.4	.....	3.0	11.9
3	6.2	13.7	134	.....	1.1	2.8	.....	1.1	.....	3.0	16.1
4	6.2	18.0	25	.....	4.2	4.9	.....	1.1	.....	2.8	7.2
5	5.5	36	15.3	.....	2.2	3.9	.....	1.6	.....	2.8	4.5
6	5.2	14.8	12.4	4.8	1.0	37	.....	1.2	.....	2.6	3.5
7	4.8	63	14.5	9.0	1.1	9.9	.....	1.1	.....	2.4	2.7
8	4.4	43	15.0	1.1	1.1	4.0	.....	16.3	5.6	2.2	2.0
9	4.5	17.7	16.2	1.1	.....	2.8	.....	5.8	4.8	2.7	1.8
10	13.3	26	16.2	1.1	.....	2.6	.....	5.7	4.4	2.5	2.1
11	9.3	14.5	16.2	2.2	.....	2.7	.....	88	3.9	2.2	2.5
12	7.2	11.0	9.1	1.3	.....	2.7	.....	122	5.4	4.6	2.3
13	7.4	28	7.4	4.6	.....	2.7	.....	26	7.2	2.7	2.6
14	7.4	18.6	7.1	2.3	.....	2.5	.....	8.9	4.4	2.2	4.3
15	15.0	14.8	6.5	50	.....	2.8	.....	5.5	3.8	3.4	15.2
16	7.4	11.0	5.9	3.5	.....	2.6	.....	6.1	7.8	3.2	8.6
17	5.9	12.2	5.6	1.3	.....	107	2.0	6.9	4.5	2.9	14.4
18	4.7	8.9	.....	1.1	.....	16.0	2.1	39	3.9	6.1	6.8
19	5.0	7.4	.....	1.1	.....	18.1	1.7	30	38	2.7	6.9
20	42	6.6	.....	1.1	.....	5.4	1.7	36	17.5	3.7	5.8
21	38	8.0	.....	1.1	.....	3.7	1.4	71	5.4	2.5	2.9
22	14.8	9.7	.....	1.1	.....	12.8	1.4	108	4.2	2.7	3.2
23	8.2	14.9	.....	1.0	.....	5.3	1.4	62	97	2.8	3.9
24	7.1	8.7	.....	1.0	.....	4.4	1.3	.....	14.0	2.9	2.9
25	46	6.3	.....	1.0	.....	3.4	1.3	.....	7.1	2.5	2
26	13.4	16.4	.....	1.0	2.3	2.8	1.2	.....	5.8	2.1	2
27	45	12.6	.....	1.0	2.5	3.2	1.1	.....	5.4	1.9	2.8
28	31	12.0	.....	1.0	5.2	2.8	1.1	.....	4.4	1.8	3.0
29	11.7	7.9	.....	1.1	43	2.4	1.0	.....	4.1	1.8	3.4
30	27	8.0	.....	1.1	20.0	2.5	.....	.....	3.6	1.7	9.9
31	18.6	134	.....	.....	8.9	2.7	.....	.....	.....	1.7	.....

NOTE.—Recorder not working properly and discharge estimated in million gallons per day as follows: Sept. 18–25, 3.; Sept. 26–30, 2.6; Oct. 1–10, 26; Oct. 11–25, 2.1; Oct. 26–31, 2.6; Nov. 1–5, 3.3 Mar. 24–26, 40; Mar. 27–31, 3.8; and Apr. 1–7, 11. Estimates made by comparison with records of discharge of other Molokai streams. Feb. 17–23 discharge computed from daily staff gage readings.

860000

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

Water-Supply Paper 655

SURFACE WATER SUPPLY *of* HAWAII

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

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

Prepared in cooperation with the
TERRITORY OF HAWAII

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WASHINGTON : 1930

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Monthly discharge of Haiku ditch at Manawai Gulch, near Peahi, Maui, for the year ending June 30, 1927

Month	Discharge				Total run-off	
	Million gallons a day			Second-feet (mean)	Million gallons	Acre-feet
	Maximum	Minimum	Mean			
July	10.6	1.8	3.59	5.55	111	342
August	73	7.8	28.9	44.7	896	2,750
September	37	5.6	12.8	19.8	385	1,180
October	58	6.2	14.6	22.6	452	1,390
November	73	3.7	14.7	22.7	441	1,350
December	39	4.0	9.83	15.2	305	935
January	100	6.3	41.6	64.4	1,290	3,960
February	81	8.0	17.4	26.9	488	1,500
March	79	10.1	28.4	43.9	882	2,700
April	94	17.8	57.9	89.6	1,740	5,330
May	83	20	45.4	70.2	1,410	4,320
June	65	7.6	20.7	32.0	622	1,910
The year	100	1.8	24.7	38.2	9,020	27,700

MISCELLANEOUS DISCHARGE MEASUREMENTS

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

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

Date	Stream	Locality	Gage height (feet)	Discharge	
				Second-feet	Million gallons a day
Aug. 12	Honokahau ditch	Near Honokahau	1.30	19.0	12.3
Aug. 13	Kamole by-pass	Near Paia	1.01	27.5	17.7
Do	do	do	1.10	32.5	21.0
Do	do	do	.90	23.0	14.9
Do	do	do	1.18	36.5	23.6
Sept. 22	Maniania ditch	Near Wailuku	2.80	10.1	6.53
Do	do	do	3.22	22.7	14.7
Do	do	do	3.05	18.1	11.7
Do	do	do	2.81	10.0	6.46
Do	do	do	2.65	7.38	4.77
Do	do	do	3.22	23.0	14.9
Do	do	do	3.02	17.5	11.3
Do	Iao-Waikapu ditch	do	3.20	22.6	14.6
Do	do	do	1.68	22.7	14.7
Sept. 23	do	do	1.71	23.2	15.0
Do	South Waikapu ditch	Near Waikapu	1.04	12.8	8.27
Sept. 24	Honokahau ditch	Near Honokahau	1.01	5.30	3.43
Oct. 6	do	At station B-2, near Honokahau	1.38	21.4	13.8
Do	do	At B-9 flume, near Honokahau	1.99	32.3	20.9
Nov. 10	do	do	1.79	17.9	11.6
Nov. 17	Haiku ditch	At station 6, near Puunene	1.18	13.9	8.98
Do	do	At station 21, near Puunene	2.15	52.7	34.1
Nov. 18	Waihee ditch	At station 18, near Puunene	1.30	20.7	13.4
Do	do	At station 17, near Puunene	1.12	9.23	5.97
Do	Lowrie ditch	At station 3, near Puunene	1.72	45.7	29.5
Nov. 19	Haiku ditch	At station 8, near Puunene	.98	15.9	10.1
Do	do	At station 3, near Puunene		15.7	10.1
Nov. 20	Ditch station No. 77	Near Paia	1.38	47.0	30.4
Do	do	do	.35	3.34	2.16
Do	Ditch station No. 72A	do	.31	2.70	1.75
Do	Ditch station No. 77	do	.10	.443	.286
Do	Ditch station No. 77A	do	.212	1.57	1.01
Do	do	do	.55	.930	.601
Jan. 13	Hanawi Stream	At elevation 500 feet	.22	1.71	1.11
Jan. 19	Honolewa Stream	At highway bridge near Kipahulu	1.18	20.4	13.2
Do	Oheo Stream	200 feet above highway bridge near Kipahulu.		1.75	1.13
Do	Kahalawe Stream	At highway bridge near Kipahulu		2.38	1.54
Do	Kaili Stream	do		2.48	1.60
Do	Waieli Stream	do		.968	.626
Do	Manamana Stream	do		1.22	.789
Jan. 20	Hanawi Stream	At elevation 500 feet		2.15	1.39

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

Date	Stream	Locality	Gage height (feet)	Discharge	
				Second-feet	Million gallons a day
Feb. 5	Kaii Stream	At highway bridge near Kipahulu		1.08	0.698
Do	Kalalawe Stream	do		3.49	2.26
Do	Waieli Stream	do		1.68	1.09
Do	Oheo Stream	do		6.56	4.24
Do	Manamana Stream	do		2.10	1.36
Feb. 16	E. M. I. Co.'s station No. 4.	Keanae Valley		3.11	2.01
Do	E. M. I. Co.'s station No. 5.	do	0.56	5.36	3.46
Do	do	do	.06	.297	.192
Do	Nualua Stream	do			
Do	Keanae Spring	At elevation 500 feet	.05	.238	.154
Feb. 19	Left branch of Kahalave Stream.	Keanae Valley		.740	
		At old ditch level near Kipahulu		3.63	2.
Feb. 20	Waieli Stream	At highway bridge near Kipahulu		.470	
Do	do	At elevation 1,500 feet		.750	.485
Do	Kaii Stream	do		.864	.558
Do	do	At highway bridge near Kipahulu		.669	.432
Do	Honslewa Stream	Old ditch level near Kipahulu		.693	.448
Do	do	At highway bridge near Kipahulu		1.29	.834
Do	Manmana Stream	At Hanapipe line intake		.991	.641
Feb. 23	do	At highway bridge near Kipahulu		1.52	.982
Feb. 24	Honokahau tunnel	At Honolua station, near Honokahau		.646	.418
Feb. 25	Hondua ditch	do	11.8	7.63	
	Honokahau ditch	At Lahaina side B-9 flume, near Honokahau.	11.8	7.63	
Feb. 28	Kahoma ditch	Near Lahaina	36.2	23.4	
Do	do	do	6.53	4.22	
Do	Honokahau ditch	At flume B-9, near Honokahau	6.27	4.05	
			15.6	10.1	

ISLAND OF HAWAII

WAILUKU RIVER AT PUKAMAUI, NEAR HILO, HAWAII

LOCATION.—At Pukamaui, three-quarters of a mile above intake of Hilo Boarding School ditch and 4 miles west of Hilo.

RECORDS AVAILABLE.—April 24, 1923, to June 30, 1927. Also March 21, 1911, to July 21, 1913, and January 2 to June 30, 1918, at stations above Hilo Electric Co.'s power house, near Hilo; records not comparable.

EQUIPMENT.—Gurley 7-day water-stage recorder. Charts changed by employee of county engineer. Discharge measurements made by wading near gage.

CHANNEL AND CONTROL.—One channel at all stages. Banks high, about 1 on 4 slope. Stream bed composed of solid lava rock. Control, lava flow and is permanent between severe floods; forms large pool.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during year unknown owing to missing gage-height record; minimum discharge, no flow, July 1 to 3 p. m. July 9, 1 p. m. July 11 to 1 p. m. July 12, and 10 a. m. July 15 to 9.45 p. m. July 17 (gage height, 5.00 feet or below).

1922–1927: Maximum discharge recorded, 1,570 million gallons a day, or 2,430 second-feet, at 5.30 p. m. December 18, 1923 (gage height from water-stage recorder, 11.48 feet); minimum discharge, no flow, from 7.45 a. m. June 11 to 1.30 a. m. June 12, 6 p. m. June 12 to 10.15 a. m. June 15 at 9 a. m. June 24, 4.30 p. m. June 26 to 3 p. m. July 9, 1 p. m. July 11 to 1 p. m. July 12, and 10 a. m. July 15 to 9.45 p. m. July 17, 1926, (gage height, 5.00 feet or below).

DIVERSIONS AND REGULATION.—Intake of Hilo waterworks diverts water from gage pool; diversions regulated by head gates.

OBJECT OF STATION.—To determine amount of water passing intake of Hilo waterworks and available to other users.

UTILIZATION.—Ordinary flow used for power and irrigation.

660000

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

GEOLOGICAL SURVEY
W. C. MENDENHALL, Director

Water-Supply Paper 885

SURFACE WATER SUPPLY *of* HAWAII

JULY 1, 1938, *to* JUNE 30, 1939

CARL G. PAULSEN, Acting Chief Hydraulic Engineer
MAX H. CARSON, District Engineer

Prepared in cooperation with the
TERRITORY OF HAWAII

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MISCELLANEOUS DISCHARGE MEASUREMENTS

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

Miscellaneous discharge measurements on Maui during fiscal year July 1938 to June 1939

Date	Stream	Tributary to-	Locality	Discharge: Second-feet	Discharge: Million gallons a day
May 8	Makamakaole.....	Pacific Ocean.....	At gaging station site near Waihee.	1.70	1.10
19	....do.....	....do.....	....do.....	7.53	4.87
22	....do.....	....do.....	....do.....	1.90	1.23
27	....do.....	....do.....	....do.....	1.76	1.14
June 3	....do.....	....do.....	....do.....	1.89	1.22
8	....do.....	....do.....	....do.....	1.72	1.11
10	....do.....	....do.....	....do.....	1.62	1.05
16	....do.....	....do.....	....do.....	2.58	1.67
17	....do.....	....do.....	....do.....	2.17	1.40
22	....do.....	....do.....	Just upstream from confluence with right branch and downstream from station site, near Waihee.	1.74	1.12
22	Right Branch.....	Makamakaole Stream.	Just upstream from confluence with Makamakaole Stream, near Waihee.	.349	.226
22	Second Right Branch.	Right Branch.....	Just upstream from confluence with right branch of Makamakaole Stream, near Waihee.	.155	.100
May 8	Marshall ditch	Kanesfield.....	At gaging station site near Waihee.	.340	.220
19	....do.....	....do.....	....do.....	.267	.173
22	....do.....	....do.....	....do.....	1.02	.659
27	....do.....	....do.....	....do.....	1.31	.847
June 16	....do.....	....do.....	....do.....	1.01	.653
May 23	Kahakuloa.....	Pacific Ocean	At altitude 1,400 feet, near Honokohau.	5.33	3.44
23	....do.....	....do.....	At altitude 1,350 feet, near Honokohau.	8.77	5.67
23	....do.....	....do.....	At altitude 1,100 feet, near Honokohau.	7.71	4.98
23	....do.....	....do.....	At altitude 700 feet, near Honokohau.	8.16	5.27
June 7	....do.....	....do.....	At gaging station site near Honokohau.	13.7	8.85
16	....do.....	....do.....	....do.....	10.5	6.79
28	....do.....	....do.....	....do.....	5.98	3.86

10000

Waiakea Stream at middle flume house, near Mountain View

Location.- Parshall flume and concrete dam control, lat. 19°38'25", long. 155°04'55", at middle flume house, 800 feet upstream from Olaa Sugar Co.'s main flume and 7/8 miles northwest of Mountain View.
Records available.- September 1930 to June 1939.
Extremes.- Maximum discharge during year, 81 million gallons a day (125 second-feet) Mar. 2 (gage height, 3.69 feet), from rating curve based on weir formulas, minimum, 1.55 million gallons a day (2.40 second-feet) Oct. 29.
1930-39: Maximum discharge, 149 million gallons a day (231 second-feet) July 21, 1931 (gage height, 4.70 feet), from rating curve based on weir formulas; no flow at times, when tunnels and stream cease flowing during very dry periods.
Remarks.- Records excellent except those for period of faulty gage heights, Apr. 15 to May 15, which were computed on basis of records for stations on all nearby streams and are poor. No diversions. Large part of flow comes from three tunnels. Water is used for fluming sugarcane.

Rating table, fiscal year 1938-39 (gage height, in feet, and discharge, in million gallons a da

0.5	1.70	1.2	6.4	3.0	39
.6	2.25	1.6	9.9	3.5	65
.7	2.85	2.0	14.6		
.9	4.1	2.5	23.5		

Discharge, in million gallons, fiscal year July 1938 to June 1939

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	7.6	5.4	6.8	2.55	4.2	3.85	9.0	14.3	8.1	6.0	14	2.
2	7.2	4.6	6.4	2.45	3.25	3.7	8.1	16.0	31.5	6.0	13	2.
3	7.2	4.7	6.4	2.6	2.8	3.4	7.2	15.3	27.5	6.0	12	5.
4	7.2	4.4	12.1	2.5	3.6	3.15	6.8	14.0	34	5.6	10	5.
5	7.5	4.3	6.4	5.5	3.4	2.9	6.4	12.7	38	5.6	11	4.
6	8.1	4.8	6.0	10.2	3.15	2.95	6.0	10.9	45	5.6	9.5	4.
7	8.1	5.3	6.0	7.6	5.4	3.05	13.0	15.6	48	10.0	9.0	6.
8	8.1	4.6	5.6	7.6	6.1	13.9	16.0	15.8	46	8.9	8.8	5.
9	7.6	4.4	5.4	8.1	7.4	12.1	17.7	17.4	43	10.7	8.4	4.
10	7.6	4.1	5.6	9.0	7.2	12.5	28	40	35.5	10.0	8.0	4.
11	7.6	5.6	5.1	8.6	12.1	14.0	32	35.5	27.5	10.9	7.5	4.
12	7.2	4.3	4.9	8.1	18.9	16.0	32	34	22.5	9.9	7.0	4.
13	8.8	4.1	4.7	7.6	21.5	15.3	26	27.5	18.6	10.4	6.5	5.
14	8.1	3.9	4.5	7.2	27.5	14.0	20.5	21.5	14.0	9.9	5.8	4.
15	8.1	3.8	4.3	6.8	27.5	12.1	17.6	17.6	12.1	10	5.4	5.
16	8.2	4.3	4.1	6.4	22.5	10.4	24	14.0	10.9	12	5.1	5.
17	7.6	3.9	3.95	6.5	18.6	9.4	21.5	11.5	10.4	16	4.4	6.
18	7.6	4.1	3.7	6.0	16.0	8.6	25	10.4	9.4	18	4.1	6.
19	7.2	5.4	4.1	5.6	13.3	10.8	23.5	9.4	9.0	20	4.0	6.
20	7.2	7.0	3.5	5.2	11.5	14.2	22.5	8.6	8.1	19	3.95	6.
21	6.4	6.4	3.35	4.8	9.9	26	20.5	7.6	7.6	17	3.9	6.
22	6.0	6.0	3.15	4.4	9.0	30.5	18.6	6.8	7.2	15	3.6	6.
23	5.6	6.4	2.95	4.1	8.1	34	16.8	6.8	6.8	13	3.35	8.
24	5.3	9.3	2.85	3.85	7.2	32	14.6	6.8	6.4	17	3.1	7.
25	4.9	9.0	3.1	3.6	6.4	26	13.3	6.4	6.0	17	2.95	7.
26	4.7	8.1	3.8	3.4	6.0	20.5	14.0	8.4	6.0	16	2.8	7.
27	4.3	8.1	3.05	3.15	5.2	16.8	13.3	9.2	5.6	15	2.	6.
28	4.0	7.6	2.9	3.05	4.7	15.3	11.5	8.6	5.3	14	2	6.
29	3.85	7.6	2.8	2.85	4.2	12.7	10.9	-	5.6	13	2.	7.
30	4.2	7.2	2.85	2.75	4.2	10.9	10.4	-	5.6	12	2.	7.
31	8.1	6.8	-	2.6	-	10.4	14.9	-	6.0	-	2.3	-

Month	Million gallons a day: Maximum	Minimum	Mean	Second-feet (mean)	Total run-off: Million gallons	Acre-feet
July	8.6	3.85	6.81	10.5	211	648
August	9.3	3.8	5.66	8.75	175	535
September	12.1	2.65	4.67	7.23	140	430
October	10.2	2.45	5.31	8.22	165	506
November	27.5	2.8	10.0	15.5	301	923
December	34	2.9	13.6	21.0	421	1,290
Calendar year 1938	44	2.45	9.98	15.4	3,640	11,180
January	32	3.0	16.8	26.0	521	1,600
February	40	3.4	15.1	23.4	422	1,300
March	48	5.3	18.3	28.3	567	1,740
April	20	5.6	12.0	18.6	360	1,100
May	14	2.3	6.10	9.44	189	580
June	8.6	2.1	5.82	9.00	174	536
Fiscal year 1938-39	48	2.1	9.99	15.5	3,050	11,190

Compilation of Records of Surface Waters of Hawaii through June 1950

Prepared under the direction of J. V. B. WELLS, *Chief, Surface Water Branch*

GEOLOGICAL SURVEY WATER-SUPPLY PAPER 1319

000102

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6030. Kaluanui ditch at Puuomalei, near Hamakuapoko

Location.--Lat 20°52'24", long 156°13'55", just on the east side (revised) of Maliko Gulch, one half a mile west of Kokomo, and 3.8 miles southeast of Hamakuapoko.

Gage.--Sharp-crested weir. Altitude of gage is 1,400 ft (from topographic map).

Extremes.--1910-12: Maximum daily discharge, 5.8 mgd (9.0 cfs) Feb. 28, Oct. 1-6, 1911; no flow at times.

Remarks.--Regulation by gates and wasteways. Kaluanui ditch diverts from Opana Gulch at elevation of 2,500 ft. It collects water from several small streams above Puuomalei.

Cooperation.--Records furnished by the East Maui Irrigation Co.

Monthly and yearly diversion, in million gallons

Fiscal year	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	The year
1910	-	-	-	-	-	-	54.0	60.8	93.3	98.2	119	135	-
1911	153	140	83.4	117	75.9	114	108	124	143	138	146	138	1,490
1912	98.1	61.6	136	124	98.2	142	96.5	82.1	122	127	93.2	58.4	1,240
1913	32.5	16.2	35.5	60.8	100	124	-	-	-	-	-	-	-

6040. Iao Stream near Wailuku

Location.--Lat 20°53'12", long 156°32'20", 0.2 mile downstream from confluence of main forks and 3 miles west of Wailuku.

Drainage area.--6.0 sq mi, approximately.

Gage.--Water-stage recorder. Altitude of gage 860 ft (from topographic map).

Extremes.--1910-15: Maximum discharge (revised), 840 mgd (1,300 cfs) Mar. 29, 1914 (gage height, 5.9 ft); minimum, 5.0 mgd (7.7 cfs) Oct. 31, 1913.

Remarks.--No diversion above station.

Monthly and yearly mean discharge, in cubic feet per second

Fiscal year	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	The year
1910	-	-	-	-	-	-	-	-	-	-	-	53.8	-
1911	66.2	137	88.1	78.4	49.6	128	128	190	48.2	88.6	102	119	101
1912	64.9	68.7	127	57.2	49.9	39.1	24.5	72.9	96.6	97.2	43.1	35.8	66.2
1913	38.5	32.4	26.9	38.4	51.2	44.0	-	77.5	52.1	-	-	85.2	-
1914	33.1	45.8	19.2	13.6	107	85.4	94.5	18.7	25.1	73.0	167	-	-
1915	-	-	195	115	-	-	50.4	124	-	-	-	-	-

Monthly and yearly mean discharge, in million gallons a day

Fiscal year	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	The year
1910	-	-	-	-	-	-	-	-	-	-	-	34.8	-
1911	42.8	88.5	56.9	50.7	32.1	82.7	82.7	123	31.2	57.3	65.9	76.9	65.4
1912	41.9	57.3	82.1	37.0	32.3	25.3	15.8	47.1	62.4	62.8	27.9	23.1	42.8
1913	24.9	20.9	17.4	24.8	33.1	28.4	-	50.1	33.7	-	-	55.1	-
1914	21.4	29.6	12.4	8.77	69.4	55.2	61.1	12.1	16.2	47.2	108	-	-
1915	-	-	126	74.6	-	-	32.6	80.1	-	-	-	-	-

Monthly and yearly runoff, in million gallons

Fiscal year	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	The year
1910	-	-	-	-	-	-	-	-	-	-	-	1,040	-
1911	1,330	2,740	1,710	1,570	963	2,560	2,560	3,440	967	1,720	2,040	2,310	23,910
1912	1,300	1,780	2,460	1,150	969	784	490	1,370	1,930	1,880	865	693	15,670
1913	772	648	522	769	993	880	-	1,400	1,040	-	-	1,650	-
1914	664	417	372	272	2,080	1,710	1,890	338	502	1,420	3,350	-	-
1915	-	-	3,780	2,310	-	-	1,010	2,240	-	-	-	-	-

Summary of yearly discharge

Year	WSP	Fiscal year ending June 30							Calendar year	
		Momentary maximum discharge			Minimum day		Mean		Runoff in million gallons	Mean		Runoff in million gallons
		Mgd	Cfs	Date	Mgd	Cfs	Mgd	Cfs		Mgd	Cfs	
1910	318	-	-	-	-	-	-	-	-	-	-	-
1911	318	‡660	‡1,020	Feb. 10, 1911	10	16	65.4	101	23,910	58.9	91.1	21,500
1912	336	‡450	‡696	Sept.21, 1911	13.2	20.5	42.8	66.2	15,670	32.3	50.0	11,820
1913	373	‡690	‡1,070	May 14, 1913	-	-	-	-	-	-	-	-
1914	430	*840	*1,300	Mar. 29, 1914	-	-	-	-	-	-	-	-
1915	430	-	-	-	-	-	-	-	-	-	-	-

* Revised.
‡ Not previously published.

0001103

6050. Maniania ditch near Wailuku

Location.--Lat 20°53'12", long 156°32'20", on left bank 800 ft below intake and 2.1 miles west of Wailuku Post Office.

Gage.--Staff gage. Altitude of gage is 740 ft (from topographic map).

Extremes.--1910-13: Maximum daily discharge, 22 mgd (34 cfs) Sept. 18, 1913; minimum daily, 3.2 mgd (5.0 cfs) Feb. 20, 1912, Feb. 19-21, 1913.

Remarks.--Maniania ditch diverts from Iao Stream a quarter of a mile below the Iao Stream gaging station; flow regulated at intake.

Monthly and yearly diversion, in million gallons

Fiscal year	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	The year
1911	-	-	-	-	-	336	271	290	378	375	397	375	
1912	431	490	480	418	459	532	429	353	429	446	499	504	5,440
1913	492	460	368	492	427	470	391	244	434	468	478	515	5,240
1914	550	531	442	-	-	-	-	-	-	-	-	-	-

6080. North Waiehu Stream near Wailuku 1/

Location.--Lat 20°54'48", long 156°32'03", on right bank 50 ft above intake of North Waiehu ditch, 2.5 miles west of Waiehu, and 2.5 miles northwest of Wailuku.

Drainage area.--0.90 sq mi.

Gage.--Staff gage. Altitude of gage is 880 ft (from topographic map).

Extremes.--1912-15: Maximum discharge observed, 300 mgd (460 cfs) Sept. 6, 1914 (gage height, 4.08 ft), from rating curve extended above 11 mgd; minimum recorded, 1.6 mgd (2.5 cfs) Mar. 25-31, 1915.

Remarks.--No diversion above station.

Monthly and yearly mean discharge, in cubic feet per second

Fiscal year	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	The year
1913	‡4.74	4.36	4.40	6.10	6.12	4.83	4.25	5.17	4.76	5.41	4.58	5.10	‡4.98
1914	4.30	4.41	4.35	4.49	6.62	7.64	7.63	8.08	7.90	8.32	10.9	17.0	7.40
1915	17.2	17.2	28.2	15.2	14.3	17.8	10.4	9.18	4.35	10.1	12.5	8.15	15.7
1916	8.18	5.96	6.53	8.99	7.47	7.78	-	-	-	-	-	-	-

‡ Not previously published; partly estimated on basis of records for nearby streams.

Monthly and yearly mean discharge, in million gallons a day

Fiscal year	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	The year
1913	‡3.06	2.82	2.84	3.94	3.96	3.12	2.75	3.34	3.08	3.50	2.96	3.30	‡3.22
1914	2.78	2.85	2.81	2.90	4.28	4.92	4.93	3.93	4.59	5.38	7.05	11.0	4.78
1915	11.1	11.1	18.2	9.81	9.26	11.0	6.70	5.93	2.81	6.51	8.08	5.27	8.83
1916	5.29	3.85	4.22	5.81	4.44	5.03	-	-	-	-	-	-	-

‡ Not previously published; partly estimated on basis of records for nearby streams.

Monthly and yearly runoff, in million gallons

Fiscal year	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	The year
1913	‡95	87	85	122	119	97	85	94	95	105	92	99	‡1,100
1914	86	86	84	90	128	152	153	110	142	161	219	328	1,740
1915	343	346	547	304	278	341	208	166	87	195	251	158	3,220
1916	164	120	127	180	133	156	-	-	-	-	-	-	-

‡ Not previously published; partly estimated on basis of records for nearby streams.

1/ Records collected at station of same name January to December 1911, at site a quarter of a mile downstream, are not equivalent and are published in this report as North Waiehu Stream below North Waiehu ditch, near Wailuku.

Summary of yearly discharge, of North Waiehu Stream near Wailuku

Year	WSP	Fiscal year ending June 30								Calendar year		
		Maximum discharge observed			Minimum day		Mean		Runoff in million gallons	Mean		Runoff in million gallons
		Mgd	Cfs	Date	Mgd	Cfs	Mgd	Cfs		Mgd	Cfs	
1913	a336	-	-	-	-	-	-	-	-	-	-	-
1914	430	#68	#105	June 13, 1914	2.6	4.0	#3.22	#4.98	#1,180	3.20	5.07	1,200
1915	430	300	460	Sept. 6, 1914	1.6	2.5	8.83	13.7	3,220	5.33	8.25	1,940
1916	445	-	-	-	-	-	-	-	-	-	-	-

\# Not previously published.
a Also WSP 373.

6090. North Waiehu ditch near Wailuku

Location.--Lat 20°54'49", long 156°31'49", on left bank a quarter of a mile downstream from intake, 2.4 miles west of Waiehu, and 2.4 miles northwest of Wailuku.

Gage.--Staff gage. Altitude of gage is 840 ft (from topographic map). Dec. 1, 1910, to Dec. 31, 1911, staff gage near same site at different datum.

Extremes.--1910-11, 1916-17: Maximum daily discharge, 11 mgd (17 cfs) Dec. 23-25, 1916; no flow at times.

Remarks.--Flow regulated by headgates. Water used for irrigation of cane lands.

Monthly and yearly diversion, in million gallons

Fiscal year	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	The year
1911	-	-	-	-	-	-	-	-	-	-	-	-	-
1912	47	56	72	60	70	37	18	27	30	60	45	37	-
						72	-	-	-	-	-	-	-
1916	-	-	-	-	-	-	-	-	-	-	-	-	-
1917	154	128	107	105	100	119	97	89	109	99	129	153	-
											107	99	1,310

6095. North Waiehu Stream below North Waiehu ditch, near Wailuku 1/

Location.--Lat 20°54'47", long 156°31'49", on left bank one quarter of a mile below ditch intake, 2.4 miles (revised) west of Waiehu, and 2.4 miles northwest of Wailuku.

Drainage area.--0.9 sq mi, approximately.

Gage.--Staff gage. Altitude of gage is 730 ft (from topographic map). Prior to July 17, 1912 staff gage near same site at different datum.

Extremes.--1911: Maximum discharge observed, 16.2 mgd (25 cfs) May 29, 1911 (gage height, 3.5 ft); minimum observed, 0.9 mgd (1.4 cfs) on several days during March and April 1911.

Remarks.--North Waiehu ditch diverts water at intake one quarter of a mile upstream.

Monthly and yearly mean discharge, in cubic feet per second

Fiscal year	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	The year
1911	-	-	-	-	-	-	-	-	-	-	-	-	-
1912	4.07	3.95	4.54	3.22	3.36	3.27	-	6.27	4.49	2.32	3.20	3.92	-
							-	-	-	-	-	-	-

1/ Formerly published as North Waiehu Stream near Wailuku.

Monthly and yearly mean discharge, in million gallons a day

Fiscal year	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	The year
1911	-	-	-	-	-	-	-	-	-	-	-	-	-
1912	2.63	2.55	2.93	2.08	2.17	2.11	-	4.05	2.90	1.50	2.07	2.53	-
							-	-	-	-	-	-	-

Monthly and yearly runoff, in million gallons

Fiscal year	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	The year
1911	-	-	-	-	-	-	-	-	-	-	-	-	-
1912	82	79	88	64	65	65	-	113	90	45	64	76	-
							-	-	-	-	-	-	-

00014

6100. South Waiehu Stream near Wailuku

Location.--Lat 20°54'33", long 156°32'15", on left bank 2.5 miles northwest of Wailuku and 2.8 miles southwest of Waiehu.

Drainage area.--0.7 sq mi, approximately.

Gage.--Staff gage. Altitude of gage is 870 ft (from topographic map). Prior to Apr. 22, 1913, staff gages at various sites 200-500 ft upstream at different datums.

Extremes.--1910-17: Maximum discharge not determined, probably occurred Jan. 18, 1916; minimum observed, 1.4 mgd (2.2 cfs) July 2, 1913.

Remarks.--Small ditch above station diverts about 0.2 mgd for irrigation of taro.

Monthly and yearly mean discharge, in cubic feet per second

Fiscal year	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	The year
1911	-	-	-	-	-	8.15	15.0	16.0	9.23	10.1	21.3	9.10	-
1912	8.11	8.14	25.2	7.01	8.00	6.72	-	-	-	-	-	-	-
1913	-	-	-	-	-	-	-	-	-	-	-	-	-
1914	2.96	3.51	4.32	3.33	7.07	9.93	12.0	6.36	10.7	14.4	43.9	17.2	-
1915	19.6	30.6	-	-	13.4	13.8	9.11	9.90	8.40	10.7	8.39	8.82	-
1916	8.31	7.04	7.35	11.1	12.1	8.74	-	-	-	-	9.89	7.95	-
1917	8.17	8.43	8.48	7.94	7.66	7.55	6.28	6.58	7.13	-	-	-	-

Monthly and yearly mean discharge, in million gallons a day

Fiscal year	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	The year
1911	-	-	-	-	-	5.27	9.69	10.3	5.97	6.53	13.8	5.88	-
1912	5.24	5.26	16.3	4.53	5.17	4.34	-	-	-	-	-	-	-
1913	-	-	-	-	-	-	-	-	-	-	-	-	-
1914	1.91	2.27	2.79	2.15	4.57	6.42	7.76	4.11	6.90	9.30	28.4	11.1	7.34
1915	12.7	19.8	-	-	8.68	8.91	5.89	6.40	5.43	6.89	5.42	5.71	-
1916	5.37	4.55	4.75	7.13	7.82	5.65	-	-	-	-	6.39	5.14	-
1917	5.28	5.45	5.48	5.13	4.95	4.88	4.06	4.29	4.61	-	-	-	-

Monthly and yearly runoff, in million gallons

Fiscal year	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	The year
1911	-	-	-	-	-	163	301	288	185	196	426	176	-
1912	162	163	489	140	155	134	-	-	-	-	-	-	-
1913	-	-	-	-	-	-	-	-	-	-	-	-	-
1914	59	70	84	67	137	199	241	115	214	279	881	332	2,680
1915	393	613	-	-	260	276	183	179	168	207	168	171	-
1916	167	141	142	222	235	175	-	-	-	-	198	154	-
1917	164	169	164	159	149	151	126	119	143	-	-	-	-

Summary of yearly discharge

Year	WSP	Fiscal year ending June 30								Calendar year		
		Maximum discharge observed			Minimum day		Mean		Runoff in million gallons	Mean		Runoff in mill gall
		Mgd	Cfs	Date	Mgd	Cfs	Mgd	Cfs		Mgd	Cfs	
1911	318	-	-	-	-	-	-	-	-	-	-	-
1912	373	-	-	-	-	-	-	-	-	-	-	-
1913	430	-	-	-	-	-	-	-	-	7.69	11.9	2,810
1914	430	77	119	May 18, 1914	1.5	2.3	7.34	11.4	2,680	-	-	-
1915	430	-	-	-	-	-	-	-	-	5.91	9.14	2,160
1916	445	-	-	-	-	-	-	-	-	-	-	-
1917	465	-	-	-	-	-	-	-	-	-	-	-

Note.--Records of gage heights and discharge measurements published in WSP 336 are not equivalent with the other streamflow data collected at this station.

6110. South Waiehu ditch near Wailuku

Location.--Lat 20°54'33", long 156°32'15", on right bank of wooden flume 60 ft below intake, 2.5 miles (revised) northwest of Wailuku, and 2.8 miles southwest of Waiehu.

Gage.--Staff gage. Altitude of gage is 860 ft (from topographic map).

Extremes.--1913: Maximum daily discharge, 12.3 mgd (19 cfs) Feb. 8, 1913; minimum daily, 1.55 mgd (2.4 cfs) Sept. 14, 15, 12, 1913.

Remarks.--South Waiehu ditch diverts from South Waiehu Stream about 300 ft below stream gaging station; flow regulated by headgate and wasteway.

Monthly and yearly diversion, in million gallons

Fiscal year	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	The year
1913	-	-	-	-	-	-	62	96	68	95	79	58	-
1914	61	71	69	60	84	103	-	-	-	-	-	-	-

6120. Waihee River near Waihee 1/

Location.--Lat 20°56'20", long 156°32'58", 300 ft upstream from intake of Waihee Canal, 2.4 miles west of Waihee, and 4.3 miles northwest of Wailuku.

Drainage area.--3.9 sq mi, approximately.

Gage.--Water-stage recorder. Altitude of gage is 620 ft (from topographic map). Prior to Aug. 17, 1915, at datum 2.0 ft lower.

Extremes.--1913-17: Maximum discharge, 3,200 mgd (4,950 cfs) Jan. 18, 1916 (gage height, 9.0 ft), from rating curve extended above 400 mgd; minimum, 21 mgd (32 cfs) Aug. 5, 1913.

Remarks.--Normal flow of stream increased by development tunnels above station.

Monthly and yearly mean discharge, in cubic feet per second

Fiscal year	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	The year
1913	-	-	-	-	-	-	-	-	-	76.3	69.1	76.6	-
1914	70.1	53.6	50.6	41.6	98.7	78.8	75.6	47.8	47.8	94.5	137	183	81.7
1915	134	147	286	175	178	134	76.7	127	90.2	-	-	-	-
1916	-	62.2	-	-	123	-	-	-	-	78.6	208	119	-
1917	92.1	104	78.9	73.5	80.9	126	63.6	53.5	68.5	75	63.7	64.5	79.4

Monthly and yearly mean discharge, in million gallons a day

Fiscal year	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	The year
1913	-	-	-	-	-	-	-	-	-	49.3	44.0	49.5	-
1914	45.3	36.6	32.7	26.9	63.8	50.9	48.5	30.9	30.9	61.1	88.3	118	52.8
1915	86.6	94.7	185	113	115	86.4	49.6	77.9	58.3	-	-	-	-
1916	-	40.2	-	-	79.4	-	-	-	-	50.8	133	77.0	-
1917	59.5	67.5	51.0	47.5	52.3	81.7	41.1	34.6	44.3	48.5	44.4	41.7	51.3

Monthly and yearly runoff, in million gallons

Fiscal year	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	The year
1913	-	-	-	-	-	-	-	-	-	1,480	1,360	1,480	-
1914	1,400	1,140	982	833	1,920	1,580	1,500	864	953	1,830	2,740	3,550	19,300
1915	2,690	2,940	5,550	3,500	3,460	2,680	1,540	2,180	1,810	-	-	-	-
1916	-	1,240	-	-	2,380	-	-	-	-	1,520	4,110	2,310	-
1917	1,840	2,090	1,530	1,470	1,570	2,530	1,270	969	1,370	1,460	1,380	1,250	18,700

Summary of yearly discharge

Year	WSP	Fiscal year ending June 30								Calendar year		
		Momentary maximum discharge			Minimum day		Mean		Runoff in million gallons	Mean		Runoff in million gallons
		Mgd	Cfs	Date	Mgd	Cfs	Mgd	Cfs		Mgd	Cfs	
1913	373	-	-	-	-	-	-	-	-	-	-	-
1914	430	‡1,060	‡1,640	Sept. 2, 1913	24	37	52.8	81.7	19,300	88.4	137	32,260
1915	430	*1,750	*2,710	Sept. 6, 1914	-	-	-	-	-	-	-	-
1916	445	‡3,200	‡4,950	Jan. 18, 1916	-	-	-	-	-	-	-	-
1917	465	‡2,600	‡4,020	Mar 9, 1917	23	36	51.3	79.4	18,700	-	-	-

* Revised.
‡ Not previously published.

1/ Previously published as Waihee Stream.

C07000

6130. Waihee Canal near Waihee

Location.--Lat 20°56'36", long 156°32'45", on right bank 0.8 mile downstream from intake, 1.7 miles west of Waihee, and 4.2 miles northwest of Wailuku.

Supplemental records available.--January to December 1912, gage heights and discharge measurements only.

Gage.--Staff gage. Altitude of gage is 600 ft (from topographic map).

Extremes.--1910-11: Maximum daily discharge, 72 mgd (111 cfs) Apr. 18, 1911; no flow Dec. 9, 10, 1910, Mar. 22, Apr. 3-5, 1911.

Remarks.--Waihee Canal diverts from Waihee River; flow regulated by intake gates.

Monthly and yearly diversion, in million gallons

Fiscal year	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	The year
1911	-	-	-	-	-	964	982	533	871	797	1,550	1,220	-
1912	1,480	1,300	1,620	1,650	1,350	1,160	-	-	-	-	-	-	-

6135. Waihee Canal at Waiale weir, near Wailuku

Location.--Lat 20°53'00", long 156°30'48", about 1,000 ft downstream from siphon across Iao Valley and half a mile west of Wailuku.

Gage.--Water-stage recorder and sharp-crested weir. Altitude of gage is 450 ft (from topographic map).

Extremes.--1911-12: Maximum daily discharge, 56.4 mgd (87.3 cfs) Apr. 14, 1912; no flow at times.

Remarks.--Flow regulated by gates above station.

Cooperation.--Records of discharge furnished by Wailuku Sugar Co., 1911 and Hawaiian Commercial and Sugar Co., 1912.

Monthly and yearly diversion, in million gallons

Fiscal year	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	The year
1911	-	-	-	-	-	-	985	739	815	730	1,070	1,150	-
1912	1,090	1,090	1,120	1,100	1,200	1,220	415	432	629	864	552	477	10,200
1913	514	390	328	433	485	622	-	-	-	-	-	-	-

6140. Waihee River at dam, near Waihee 1/

Location --Lat 20°56'20", long 156°32'58", on right bank at dam at intake of Waihee Canal 2.4 miles west of Waihee, and 4.3 miles northwest of Wailuku.

Drainage area.--3.9 sq mi, approximately.

Gage.--Staff gage. Altitude of gage is 605 ft (from topographic map).

Extremes --1910-12: Maximum discharge observed, 1,000 mgd (1,550 cfs) Sept. 23, 1911 (gage height, 4.5 ft); no flow many times.

Remarks.--Records do not include water diverted by Waihee Canal.

Monthly and yearly mean discharge, in cubic feet per second

Fiscal year	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb	Mar.	Apr.	May	June	The year
1911	-	-	-	-	-	136	148	83 5	64.0	125	144	105	-
1912	71.3	94.4	164	51.8	58.2	21.0	1.49	29 4	72.0	99.0	22.9	25.1	57.7
1913	39.5	10.4	1.47	14.0	39.0	16.8	-	-	-	-	-	-	-

Monthly and yearly mean discharge, in million gallons a day

Fiscal year	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	The year
1911	-	-	-	-	-	87.9	95.7	54.0	41	80.8	93.1	67.9	-
1912	46.1	51.0	106	33.5	37.6	13.6	.963	19.0	46.5	64.0	14.8	16.2	37.3
1913	24.9	6.72	.950	9.05	25.2	10.9	-	-	-	-	-	-	-

Monthly and yearly runoff, in million gallons

Fiscal year	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	The year
1911	-	-	-	-	-	2,720	2,970	1,510	1,280	2,420	3,010	2,040	-
1912	1,430	1,890	3,380	1,040	1,130	421	29.8	550	1,440	1,940	459	486	14,000
1913	771	207	28.4	280	756	337	-	-	-	-	-	-	-

Summary of yearly discharge, of Waihee River at dam, near Waihee

Year	WSP	Fiscal year ending June 30								Calendar year		
		Maximum discharge observed			Minimum day		Mean		Runoff in million gallons	Mean		Runoff in million gallons
		Mgd	Cfs	Date	Mgd	Cfs	Mgd	Cfs		Mgd	Cfs	
1911	318	-	-	-	0	0	-	-	-	61.1	94.5	22,300
1912	336	#1,000	#1,550	Sept.23, 1911	0	0	37.3	57.7	14,000	19.9	30.8	7,280

Not previously published.

6150. Spreckels ditch near Waihee

Location.--Lat 20°56'46", long 156°32'25", on right bank just upstream from inflow from first diversion from Waihee Canal, 500 ft downstream from intake, 2 miles west of Waihee.

Gage.--Staff gage. Altitude of gage is 380 ft (from topographic map). Prior to Sept. 7, 1912, at different datum.

Extremes.--1910-13: Maximum daily discharge, 96 mgd (149 cfs) Sept. 20, 1911; no flow occasionally.

Remarks.--Ditch diverts water from Waihee River below Waihee Canal. Flow regulated by headgates.

Monthly and yearly diversion, in million gallons

Fiscal year	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	The year
1911	-	-	-	-	-	797	415	949	533	897	787	915	-
1912	763	1,130	1,800	1,400	77[illegible]	197	45	345	629	693	278	175	8,230
1913	338	204	56	215	36[illegible]	256	197	246	273	462	237	237	3,090
1914	187	176	53	-	-	-	-	-	-	-	-	-	-

6160. Spreckels ditch at Waiale weir, near Wailuku

Location.--Lat 20°52'28", long 156°29'57", just above Waiale Reservoir, 1.2 miles southeast of Wailuku Post Office.

Gage.--Water-stage recorder and Cippoletti weir. Altitude of gage is 230 ft (from topographic map).

Extremes.--1910-11: Maximum daily discharge, 60 mgd (92 cfs) Nov. 28, 1911; minimum daily, 6 mgd (10 cfs) Jan. 7, 1910.

Remarks.--Station measured all water taken from West Maui by Hawaiian Commercial and Sugar Co. Waters derived from Waihee, Waiehu and Iao Streams. Flow regulated by gates.

Cooperation.--Records of discharge furnished by Hawaiian Commerical and Sugar Co.

Monthly and yearly diversion, in million gallons

Fiscal year	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	The year
1910	-	-	-	-	-	-	488	507	936	769	926	672	-
1911	679	805	624	629	572	783	694	848	778	909	1,170	1,220	9,810
1912	927	861	1,140	1,020	897	536	-	-	-	-	-	-	-

6170. Left Branch Makamakaole Stream near Waihee

Location.--Lat 20°57'35", long 156°32'55", on left bank at intake to Marshall Ranch diversion ditch, 0.2 mile upstream from mouth, 2.8 miles south of Kahakuloa village, and 3 miles northwest of Waihee.

Drainage area.--0.4 sq mi, approximately.

Gage.--Water-stage recorder and combined orifice and concrete control. Altitude of gage is 1,500 ft (by barometer).

Average discharge.--11 years (1939-50) 1.86 mgd (2.88 cfs).

Extremes.--1939-50: Maximum discharge, 287 mgd (444 cfs) Apr. 2, 1948 (gage height, 4.98 ft), from rating curve extended above 20 mgd by test on model of station site; minimum, 0.43 mgd (0.66 cfs) Jan. 10, 11, 1946.

Remarks.--Marshall Ranch diversion ditch diverts water from gage pool for stock water.

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Monthly and yearly mean discharge, in cubic feet per second, of Left Branch Makamakaole Stream near Waihee

Fiscal year	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	The year
1940	1.98	2.15	3.16	2.49	3.25	2.95	2.80	2.71	2.10	1.42	4.07	1.84	[illegible]
1941	1.34	3.5[illegible]	2.69	3.71	4.35	4.01	4.22	[illegible].83	5.79	3.88	3.09	2.74	[illegible]
1942	2.61	4.1[illegible]	2.97	10.1	3.37	3.13	1.72	2.99	17.5	7.58	3.22	1.83	[illegible]
1943	2.32	2.9[illegible]	2.32	2.82	1.69	3.05	3.19	1.95	7.01	5.07	2.57	1.49	[illegible]
1944	2.10	1.84	1.33	1.15	.851	1.66	.853	1.83	3.82	3.05	1.34	1.25	[illegible]
1945	1.39	1.43	1.03	2.65	2.83	2.37	1.09	.992	1.75	4.38	2.04	.998	[illegible]
1946	.984	1.45	.916	.894	1.09	2.71	6.16	1.93	1.51	1.59	.898	1.17	[illegible]
1947	3.16	1.06	1.22	.856	3.79	8.09	5.40	2.09	3.33	3.47	4.46	1.62	[illegible]
1948	1.54	1.67	2.37	1.67	1.96	2.71	6.85	3.31	4.21	8.74	2.46	1.67	[illegible]
1949	2.58	1.90	1.64	2.10	1.78	3.68	3.59	3.25	2.55	2.80	2.41	1.76	[illegible]
1950	2.14	1.69	1.16	1.08	2.66	1.87	3.96	3.42	3.30	8.00	3.42	2.03	[illegible]

Monthly and yearly mean discharge, in million gallons a day

Fiscal year	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	The year
1940	1.28	1.39	2.04	1.61	2.10	2.55	1.81	1.75	1.36	0.920	2.63	1.19	[illegible]
1941	.868	2.31	1.74	2.40	2.81	2.59	2.73	1 18	3.74	2.51	2.00	1.77	[illegible]
1942	1.69	2.66	1.92	6.53	2.18	2.02	1.11	1.93	11.3	4.90	2.08	1.18	[illegible]
1943	1.50	1.92	1.50	1.82	1.09	1.97	2.06	1.26	4.53	3.28	1.66	.960	[illegible]
1944	1.36	1.19	.862	.728	.550	1.07	.551	1.18	2.47	1.97	.863	.811	[illegible]
1945	.901	.927	.663	1.70	1.83	1.53	.707	.641	1.13	2.83	1.32	.645	[illegible]
1946	.636	.963	.592	.578	.706	1.75	3.98	1.25	.974	1.03	.579	.753	[illegible]
1947	2.04	.696	.788	.553	2.45	5.23	3.49	1.35	2.15	2.24	2.88	1.05	[illegible]
1948	.997	1.08	1.53	1.08	1.27	1.75	4.43	2.14	2.72	5.65	1.59	1.08	[illegible]
1949	1.67	1.23	1.06	1.36	1.15	2.38	2.32	2.10	1.65	1.81	1.56	1.14	[illegible]
1950	1.38	1.09	.749	.697	1.72	1.21	2.56	2.21	2.13	5.17	2.21	1.31	[illegible]

Monthly and yearly runoff, in million gallons

Fiscal year	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	The year
1940	39.5	43.1	61.1	49.8	63.0	79.1	56.2	50.8	42.2	27.6	81.7	35.8	630
1941	26.9	71.5	52.2	74.5	84.3	80.3	84.6	35.1	116	75.3	62.0	53.2	814
1942	52.3	82.6	57.5	202	65.2	62.6	34.5	54.0	351	147	64.6	35.3	1,210
1943	46.5	59.5	45.0	56.4	32.6	61.0	63.8	35.2	140	98.3	51.6	28.8	719
1944	42.3	36.8	25.9	22.6	16.5	33.1	17.1	34.1	76.6	59.1	26.8	24.3	415
1945	27.9	28.7	19.9	52.6	54.9	47.3	21.9	17.9	34.9	85.0	41.0	19.4	451
1946	19.7	29.8	17.8	17.9	21.2	54.1	123	35.0	30.2	31.0	18.0	22.6	420
1947	63.1	21.6	23.6	17.1	73.4	162	108	37.9	66.7	67.3	89.3	31.4	761
1948	30.9	33.5	45.9	33.5	38.2	54.2	137	62.0	84.4	170	49.4	32.4	772
1949	51.8	38.0	31.6	42.1	34.4	73.7	72.0	58.7	51.2	54.2	48.3	34.1	590
1950	42.8	33.9	22.5	21.6	51.6	37.6	79.3	61.9	66.0	155	68.4	39.3	680

Summary of yearly discharge

Year	WSP	Fiscal year ending June 30								Calendar year		
		Momentary maximum discharge			Minimum day		Mean		Runoff in million gallons	Mean		Runoff million gallon
		Mgd	Cfs	Date	Mgd	Cfs	Mgd	Cfs		Mgd	Cfs	
1940	905	88	136	May 12, 1940	0.64	0.99	1.72	2.66	630	1.87	2.89	684
1941	935	90	139	Nov. 20, 1940	.57	.88	2.23	3.45	814	2.59	4.01	944
1942	965	189	292	Mar. 8, 1942	.71	1.10	3.31	5.12	1,210	2.71	4.19	987
1943	985	275	425	Mar. 18, 1943	.58	.90	1.97	3.05	719	1.63	2.52	595
1944	1015	92	142	Feb. 20, 1944	.44	.68	1.13	1.75	415	1.28	1.98	469
1945	1045	126	195	Apr. 7, 1945	.52	.80	1.24	1.92	451	1.04	1.61	391
1946	1065	272	421	Jan. 22, 1946	.43	.66	1.15	1.78	420	1.70	2.63	621
1947	1095	163	252	Dec. 22, 1946	.47	.73	2.09	3.23	761	1.75	2.71	637
1948	1125	287	444	Apr. 2, 1948	.55	.85	2.11	3.26	772	2.21	3.42	805
1949	1155	106	164	Mar. 13, 1949	.50	.77	1.62	2.51	590	1.45	2.24	529
1950	1185	113	175	Apr. 19, 1950	.52	.80	1.86	2.88	680	-	-	-

6177. Kahakuloa Stream at altitude 1,380 ft, near Honokohau 1/

Location.--Lat 20°57'08", long 156°34'24", on right bank 400 ft downstream from forks, 3.0 miles upstream from mouth, and 5.2 miles southeast of Honokohau.

Drainage area.--1.5 sq mi, approximately.

Gage.--Water-stage recorder. Altitude of gage is 1,380 ft (from topographic map).

Extremes.--Not determined.

Remarks.--No diversion above station.

1/ Formerly published as Kahakuloa Stream near Honokohau.

Monthly and yearly mean discharge, in cubic feet per second, of Kahakuloa Stream at altitude 1,380 ft, near Honokohau

Fiscal year	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	The year
1913	-	-	-	-	-	-	-	5.21	-	-	6.94	9.14	-
1914	4.73	-	-	-	-	-	-	-	-	-	-	-	-
1915	-	-	-	13.6	-	-	-	-	-	-	-	-	-

Monthly and yearly mean discharge, in million gallons a day

Fiscal year	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	The year
1913	-	-	-	-	-	-	-	3.37	-	-	4.49	5.91	-
1914	3.06	-	-	-	-	-	-	-	-	-	-	-	-
1915	-	-	-	8.82	-	-	-	-	-	-	-	-	-

Monthly and yearly runoff, in million gallons

Fiscal year	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	The year
1913	-	-	-	-	-	-	-	94.3	-	-	139	177	-
1914	94.7	-	-	-	-	-	-	-	-	-	-	-	-
1915	-	-	-	273	-	-	-	-	-	-	-	-	-

6180. Kahakuloa Stream near Honokohau 1/

Location.--Lat 20°58'55", long 156°33'25", on right bank 0.5 mile downstream from Kapuna Stream, 1.3 miles south of Kahakuloa, 2 miles west of Puu Makawana, and 4.3 miles southeast of Honokohau.

Drainage area.--3.4 sq mi, approximately.

Gage.--Water-stage recorder and concrete control. Altitude of gage is 330 ft (from topographic map).

Average discharge.--5 years (1940-43, 1948-50) 12.9 mgd (20.0 cfs).

Extremes.--1939-43, 1947-50: Maximum discharge, 1,990 mgd (3,080 cfs) Dec. 14, 1942 (gage height, 7.02 ft, control then in use), from rating curve extended above 55 mgd by test on model of station site; minimum, 2.5 mgd (3.9 cfs) Oct. 31, 1949.

Remarks.--No diversion above station.

Monthly and yearly mean discharge, in cubic feet per second

Fiscal year	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	The year
1940	-	13.1	15.5	12.3	20.7	18.6	11.4	15.0	10.8	8.18	18.3	11.2	-
1941	9.78	25.7	15.2	15.6	18.6	18.3	23.7	8.65	37.3	20.4	22.0	17.0	19.5
1942	15.6	29.6	18.1	49.7	16.6	16.6	9.42	18.6	133	40.8	21.4	12.5	32.0
1943	16.2	17.6	14.5	12.7	10.4	26.6	17.9	11.4	49.7	33.4	18.3	9.58	20.0
1944	15.4	-	-	-	-	-	-	-	-	-	-	-	-
1948	-	-	-	15.2	13.1	17.0	*33.0	17.0	26.8	39.3	16.1	11.4	-
1949	17.2	14.2	10.4	13.6	10.2	19.0	17.8	13.1	8.53	16.9	10.2	9.21	13.4
1950	12.1	10.4	5.79	5.77	19.6	11.4	15.3	15.4	20.0	35.9	20.0	10.8	15.2

* Revised.

Monthly and yearly mean discharge, in million gallons a day

Fiscal year	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	The year
1940	-	8.48	9.99	7.93	13.4	12.0	7.34	9.67	6.98	5.29	11.8	7.24	-
1941	6.32	16.6	9.82	10.7	12.0	11.8	15.3	5.59	24.1	13.2	14.2	11.0	12.6
1942	10.1	19.1	11.7	32.1	10.7	10.7	6.09	12.0	85.8	26.4	13.8	8.07	20.7
1943	10.5	11.4	9.38	8.18	6.75	17.2	11.6	7.39	32.1	21.6	11.8	6.19	12.9
1944	9.94	-	-	-	-	-	-	-	-	-	-	-	-
1948	-	-	-	9.81	8.47	11.0	*21.3	11.0	17.3	25.4	10.4	7.35	-
1949	11.1	9.19	6.69	3.77	6.62	12.3	11.5	8.44	5.51	10.9	6.58	5.95	8.65
1950	7.81	6.69	3.74	5.73	12.7	7.36	9.87	9.96	12.9	23.2	12.9	6.96	9.80

* Revised.

1/ Records collected at station of same name January 1913 to December 1914, at site 1 mile upstream, are not equivalent and are published in this report as Kahakuloa Stream at altitude 1,380 ft, near Honokohau.

Monthly and yearly runoff, in million gallons, of Kahakuloa Stream near Honokohau

Fiscal year	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	The year
1940	-	263	300	246	402	373	228	280	216	159	366	217	-
1941	196	514	295	331	359	367	474	156	746	396	441	330	4,520
1942	315	592	350	994	320	332	189	327	2,660	792	429	242	7,550
1943	326	353	281	254	202	532	358	267	996	648	365	186	4,710
1944	308	-	-	-	-	-	-	-	-	-	-	-	-
1948	-	-	-	304	254	340	*661	319	537	761	323	220	-
1949	345	285	201	272	198	382	355	226	171	528	204	178	3,160
1950	242	207	112	116	380	228	306	279	401	695	400	209	3,580

* Revised.

Summary of yearly discharge

Year	WSP	Fiscal year ending June 30								Calendar year		
		Momentary maximum discharge			Minimum day		Mean		Runoff in million gallons	Mean		Runoff in million gallons
		Mgd	Cfs	Date	Mgd	Cfs	Mgd	Cfs		Mgd	Cfs	
1940	905	364	563	May 12, 1940	-	-	-	-	-	9.64	14.9	3,52
1941	935	861	1,330	Nov. 20, 1940	2.4	3.7	12.6	19.5	4,600	14.9	23.1	5,45
1942	965	851	1,320	Mar. 9, 1942	4.1	6.3	20.7	32.0	7,550	18.1	28.0	6,600
1943	985	1,990	3,080	Dec. 14, 1942	2.9	4.5	12.9	20.0	4,710	-	-	-
1944	985	-	-	-	-	-	-	-	-	-	-	-
1948	1125	*780	*1,210	Jan. 26, 1948	-	-	-	-	-	*12.3	*19.0	*4,51
1949	1155	*208	*322	Dec. 24, 1948	3.05	4.72	8.65	13.4	3,160	7.56	11.7	2,76
1950	1185	370	572	Feb. 18, 1950	2.65	4.10	9.80	15.2	3,580	-	-	-

* Revised.

Note.--Figures of daily discharge for January 25, 26, 1948, published in WSP 1125, revised to 88 mgd and 251 mgd respectively.

6190. Kahakuloa Stream at Kahakuloa, near Wailee

Location.--Lat 20°59'35", long 156°33'05", on left bank at outskirts of Kahakuloa, 5 miles northwest of Wailee and 8 miles (revised) northwest of Wailuku.

Drainage area.--4.0 sq mi, approximately.

Gage.--Staff gage. Altitude of gage is 40 ft (from topographic map).

Extremes.--1912-13: Maximum discharge observed during period, 95 mgd (147 cfs) Feb. 6, 1913 (gage height, 2.65 ft); minimum observed, 1.9 mgd (3 cfs) on many days during January, February 1913.

Remarks.--A large portion of normal flow diverted into taro fields and into ditches above station.

Monthly and yearly mean discharge, in cubic feet per second

Fiscal year	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	The year
1913	-	-	6.01	12.2	12.7	9.75	6.0	16.1	7.5	-	-	-	-

Monthly and yearly mean discharge, in million gallons a day

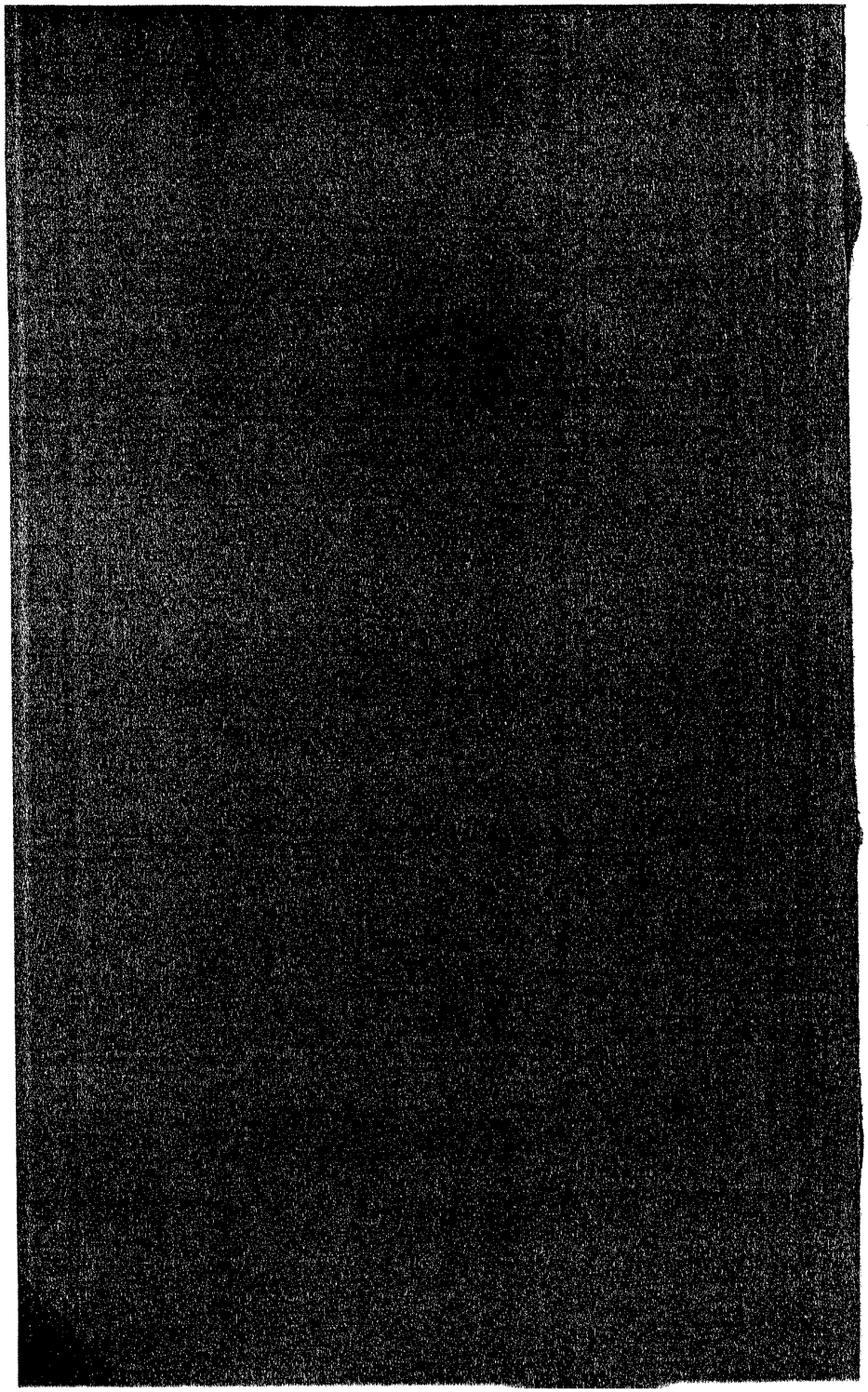
Fiscal year	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	The year
1913	-	-	3.88	7.89	8.21	6.30	3.9	10.4	4.8	-	-	-	-

Monthly and yearly runoff, in million gallons

Fiscal year	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	The year
1913	-	-	116	244	247	195	120	291	151	-	-	-	-

Note.--Records of daily discharge published in WSP 373.

0001047



Surface Water Supply of Hawaii 1956–58

Prepared under the direction of J. V. B. WELLS, *Chief, Surface Water Branch*

GEOLOGICAL SURVEY WATER-SUPPLY PAPER 1569

Prepared in cooperation with the Territory of Hawaii

0001103

UNITED STATES GOVERNMENT PRINTING OFFICE, WASHINGTON : 1960

As the number of streams on which streamflow information is likely to be desired far exceeds the number of stream-gaging stations feasible to operate at one time, the Geological Survey collects limited streamflow data at sites other than stream-gaging stations. When limited streamflow data are collected on a systematic basis over a period of years for use in hydrologic analyses, the site at which the data are collected is called a partial-record station. Data collected at these partial-record stations are usable in low-flow or flood-flow analyses, depending on the type of data collected. In addition, discharge measurements are made at other sites not included in the partial-record program. These measurements are generally made in times of drought or flood to give better areal coverage to those events. Those measurements and others collected for some special reason are called measurements at miscellaneous sites.

Records collected at partial-record stations are generally presented in two tables. However, no records at low-flow partial-record stations are available for the 1957-58 fiscal years. A table of annual maximum discharge at crest-stage stations is given first, followed by a table of measurements made at miscellaneous sites for both low flow and high flow.

Crest-stage partial-record stations

The following table contains annual maximum discharges for crest-stage stations. A crest-stage gage is a device which will register the peak stage occurring between inspections of the gage. A stage-discharge relation for each gage is developed from discharge measurements made by indirect measurements of peak flow or by current meter. The date of the maximum discharge is not always certain but is usually determined by comparison with nearby continuous-record stations, weather records, or local inquiry. Only the maximum discharge for each fiscal year is given. Information on some lower floods may have been obtained but is not published herein. The years given in the period of record represent fiscal years for which the annual maximum has been determined. The maximum discharge for each year since the crest-stage gage was established is given. The peak discharge for some years may have been published in a previous report as a measurement of discharge. Figures given herein supersede all previous figures of peak discharge for the floods listed.

Annual maximum discharge at crest-stage partial-record stations

Station No.	Station name	Location	Drainage area (sq mi)	Period of record	Annual maximum		
					Date	Gage height (feet)	Discharge[a]
		Island of Kauai					
280	Waimea River below Kekaha ditch intake.	Lat 22°02'40", long 159°38'35", on right bank, 500 ft below Kekaha ditch intake, 6½ miles north of Waimea, and 6.9 miles northwest of Kekaha.	45.0	1956-58	11-11-55	16.85	7,760 (12,000)
					10-29-56	-	(†)
					12- 1-57	22.7	15,800 (24,400)
		Island of Oahu					
2113	Makaleha Stream near Waialua.	Lat 21°33'56", long 158°09'24", on left bank, 1.9 miles southwest of Sugar Mill, Waialua.	4.24	1958	3- 5-58	4.46	(†)
2115	Makua Stream at Makua.	Lat 21°32'05", long 158°13'25", on left bank, 0.55 mile northeast of cemetery, Makua.	4.07	1958	2-28-58	5.44	317 (490)
2117	Kaupuni Stream near Waianae.	Lat 21°27'46", long 158°09'55", on right bank, 1.8 miles northeast of cemetery, Waianae.	4.39	1958	3- 5-58	5.28	(†)
2122	Mailliili Stream at Lualualei Naval Reservation near Waianae.	Lat 21°27'54", long 158°08'05", on right downstream side of bridge at Lualualei Naval Reservation, 3.4 miles east of cemetery, Waianae.	1.76	1958	3- 5-58	2.58	(†)
2124	Awawamui Stream near Barbers Point Naval Air Station.	Lat 21°20'36", long 158°06'04", on left downstream side of bridge on Farrington Highway, 3.1 miles north of Barbers Point Lighthouse, Barbers Point Naval Air Station.	1.16	1958	1958	3.51	(†)
2125	Honouliuli Stream near Waipahu.	Lat 21°22'40", long 158°02'10", on left upstream side at Farrington Highway bridge, 1.85 miles west of Post Office, Waipahu.	11.0	1956-58	1956	2.72	(†)
					1957	1.10	(†)
					3- 5-58	5.74	1,230 (1,900)
2126	Waikele Stream at Schofield Barracks.	Lat 21°28'5", long 158°03'40", on right bank, 1,100 ft south of National Cemetery, Schofield Barracks.	5.05	1958	3- 5-58	6.63	(†)
2127	Waikakalaua Stream near Wahiawa.	Lat 21°27'50", long 158°01'38", on right bank, 2.4 miles southeast of Post Office, Wahiawa.	7.14	1958	12- 6-57	9.42	388 (601)
2165	Waimaro Flood Channel at Pearl City.	Lat 21°23'55", long 157°58'16", on left bank, 0.6 mile above mouth at Pearl City.	2.59	1956-58	2-26-56	1.44	(†)
					1957	.75	(†)
					3- 5-58	1.79	(†)
2285	Moanalua Stream at altitude 100 ft, near Honolulu.	Lat 21°22'00", long 157°53'57", at left end of bridge in Moanalua Golf Course, 4.55 miles northwest of Post Office, Honolulu.	4.16	1958	3- 5-58	7.50	(†)
2295	Waolani Stream at Honolulu.	Lat 21°20'00', long 157°51'04", on right downstream side of bridge on Wylie St., at Honolulu.	1.28	1958	3- 5-58	-	(†)

† Discharge not determined.
a Discharge figures opposite date are in million gallons a day; figures in parentheses immediately below are in cubic feet per second.

0001609

Annual maximum discharge at crest-stage partial-record stations--Continued

Station No.	Station name	Location	Drainage area (sq mi)	Period of record	Annual maximum		
					Date	Gage height (feet)	Discharge[a]
		Island of Oahu--Continued					
2375	Kauoa Stream at Honolulu.	Lat 21°19'18", long 157°51'03", on left upstream side of bridge, 1.2 miles northwest of Post Office at Honolulu.	1.52	1958	11-20-57	0.94	(†)
2472	Waialae-Nui Gulch at Honolulu.	Lat 21°16'51", long 157°47'04", on right bank, 75 ft downstream from Kalanianaole Highway at Honolulu.	1.75	1958	3- 5-58	7.56	(†)
2475	Wailupe Stream at Aina Haina.	Lat 21°17'46", long 157°45'29", on right downstream side of bridge on Ani St., 1.0 mile upstream from Kalanianaole Highway at Aina Haina.	2.35	1958	3- 5-58	5.87	1,340 (1,920)
2479	Kuliouou Stream at Kuliouou.	Lat 21°17'44", long 157°43'33", at footbridge, 0.4 mile upstream from Kalanianaole Highway at Kuliouou.	1.21	1958	3- 5-58	-	(†)
2488	Pacific Ocean tributary at Waimanalo.	Lat 21°20'31", long 157°42'39", on left bank at culvert on Hihimanu St., 0.8 mile northwest of Post Office, Waimanalo.	1.21	1958	3- 5-58	4.37	594 (594)
2605	Meunawili Stream near Kailua.	Lat 21°22'47", long 157°45'48", at right upstream side of abandoned highway bridge, 1.7 miles southwest of Post Office, Kailua.	5.62	1958	3- 5-58	11.08	(†
2745	Kemahala Stream at Kaneohe.	Lat 21°25'15", long 157°47'46", at upstream side of Wailele Street Bridge, 0.5 mile downstream from Kamehameha Highway at Kaneohe.	.79	1958	3- 5-58	5.57	1,120 (1,750)
2952	Waikane Stream at Waikane.	Lat 21°29'38", long 157°51'10", on left bank, 200 ft downstream from Kamehameha Highway bridge at Waikane.	2.60	1958	11-20-57	5.29	(†)
2959	Makaua Stream at Kaaawa.	Lat 21°33'36", long 157°51'24", on left downstream side of Kamehameha Highway bridge at Kaaawa.	.53	1958	3- 5-58	2.17	(†)
3045	Kahuanui Stream near Hauula.	Lat 21°35'55", long 157°54'25", at left downstream side of abandoned railroad bridge, 1.2 miles southeast of cemetery, Hauula.	2.12	1958	1958	-	(†)
3105	Malaekahana Stream near Kahuku.	Lat 21°39'21", long 157°57'38", on left bank, 1.3 miles south of Sugar Mill, Kahuku.	2.94	1959	12- 6-57	7.33	(†)
3110	Olo Stream near Kahuku.	Lat 21°41'32", long 157°59'48", on right bank, 2.9 miles west of Sugar Mill, Kahuku.	2.22	1958	12- 6-57	4.90	492 (762)
3400	Anaulu Stream near Haleiwa.	Lat 21°35'28", long 158°04'45", on right bank, 2.5 miles east of Waialua School, Haleiwa.	11.9	1958	3- 5-58	7.10	1,600 (2,480)
3500	Opaeula Stream near Haleiwa.	Lat 21°35'08", long 158°05'58", on left bank, 0.5 mile southeast of Haleiwa, 0.6 mile upstream from bridge on Kamehameha Highway, and 2.1 miles northeast of Waialua. Prior to Oct. 27, 1957, at site 0.3 mile downstream at different datum.	5.96	1956-58	2-25-56	12.9	2,600 (4,120)
					11-21-56	4.62	440 (680)
					12- 6-57	6.1	750 (1,150)
		Island of Maui					
6070	Iao Stream at Wailuku.	Lat 20°53'38", long 156°30'27", on right bank, 560 ft upstream from Market Street Bridge at Wailuku and 1.9 miles from mouth.	68.24	1952-58	1-19-52	3.56	1,910 (2,960)
					3- 4-53	2.52	1,180 (1,830)
					1- 5-54	2.36	806 (1,250)
					7-28-54	2.26	450 (696)
					12-20-55	5.66	2,620 (4,050)
					8-17-56	2.78	750 (1,160)
					8-30-57	5.16	2,220 (3,430)

† Discharge not determined.
a Discharge figures opposite date are in million gallons a day; figures in parentheses immediately below are in cubic feet per second.
b Revised.

United States Department of the Interior
Geological Survey - Water Resources Division

SURFACE WATER RECORDS OF HAWAII AND OTHER PACIFIC AREAS

1961

Prepared under the direction of H. S. Leak, District Engineer,
Surface Water Branch, in cooperation with the State of
Hawaii and other agencies

Copies of this report may be obtained from
District Engineer, Surface Water Branch
U. S. Geological Survey
Room 330, 1100 Ward St.
Honolulu 14, Hawaii

000110

Annual maximum discharge at crest-stage partial-record stations

Station No.	Station name	Location	Drainage area (sq mi)	Period of record	Annual maximum			
					Date	Gage height (feet)	Discharge (xxxx) MGD	CFS
		ISLAND OF MAUI						
40-6070.	Iao Stream at Wailuku.	Lat 20°53'38", long 156°30'27", 560 ft upstream from Market Street bridge at Wailuku and 1.9 miles above mouth.	8.24	1952-61	10-17-60	2.38	500	774
		ISLAND OF GUAM						
40-8010.	La Sa Fua River near Umatac.	Lat 13°18'25" N, long 144°39'45" E, 0.6 mile northeast of Umatac, 3.1 miles north of Merizo, and 5.5 miles south of Agat.	1.93	1953-61	10-19-60	5.50		1,050
8620.	Lonfit River near Ordot.	Lat 13°26'05" N, long 144°45'10" E, just upstream from Sigua River, 0.9 mile south of Ordot, 2.6 miles south of Agana and 3.5 miles southeast of Asan.	3.1	1951-61	8-20-60	16.66		2,150

000111

United States Department of the Interior
Geological Survey - Water Resources Division

WATER RESOURCES DATA
FOR
HAWAII AND OTHER PACIFIC AREAS
1965

Part 1: Surface Water Records

Prepared in cooperation with

Hawaii Department of Land and Natural Resources,
Division of Water and Land Development
Government of Guam
Government of American Samoa
City and County of Honolulu
Corps of Engineers, U.S. Army

Copies of this report may be obtained from
District Chief, Water Resources Division
U.S. Geological Survey
Room 330, First Insurance Bldg.
1100 Ward Avenue
Honolulu, Hawaii 96814

000112

DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Measurements at miscellaneous sites

Measurements of streamflow at points other than gaging stations or partial-record stations are given in the following table.

Discharge measurements made at miscellaneous sites during fiscal year 1965

Stream	Tributary to	Location	Measured previously (fiscal years)	Measurements		
				Date	Discharge	
					Mgd	Cfs
Island of Kauai						
Kawaikoi Stream tributary	Kawaikoi Stream	Lat 22°08'05", long 159°37'29", at mouth, 100 ft below Kawaikoi Stream gaging station, and 12.5 miles north of Waimea.	1963	5-25-65	0.67	1.03
Island of Oahu						
Makiki ditch	Pacific Ocean	Lat 21°17'40", long 157°50'15", 1,500 ft south of Washington School and 2 miles southeast of Honolulu Post Office.		3-25-65	.24	.37
Manoa Stream	Pacific Ocean	Lat 21°17'38", long 157°49'03", 0.5 mile east of St. Louis College and 3.1 miles southeast of Honolulu Post Office.	1964	3-25-65	5.03	7.78
Unnamed Stream	Pacific Ocean	Lat 21°25'08", long 157°46'03", at Kaneohe Bay Drive 0.1 mile east of Kaneohe Yacht Club, 1.1 miles west of Kainalu School, and 4.1 miles southwest of Makapu Point.		5- 2-65	∱110	∱170
Unnamed Stream	Pacific Ocean	Lat 21°24'48", long 157°46'53", at Kokokahi YWCA camp in Kokokahi on Kaneohe Bay Drive and 1.0 mile east of Castle High School.		5- 2-65	∱189	∱292
Kawa Stream tributary	Kawa Stream	Lat 21°24'12", long 157°47'25", at Mokulele Drive, 0.4 mile southeast of Castle High School, and 0.8 mile east of junction of Kamehameha Highway and Kaneohe Bay Drive.		5- 2-65	∱582	∱900
Haiku Stream	Pacific Ocean	Lat 21°25'15", long 157°49'02", at new Kahaluu cut-off highway, 700 ft downstream from Iolekaa Stream, and 0.8 mile southwest of Heeia.		5- 2-65	∱3,620	∱5,600
Kahaluu Stream	Pacific Ocean	Lat 21°26'33", long 157°50'45", at point opposite cul-de-sac on Nanahiva Place, 0.6 mile east of Ahuimanu Ranch, and 1.4 miles southwest of Kahaluu.		5- 2-65	∱2,890	∱4,470
Waihee Stream tributary	Waihee Stream	Lat 21°27'22", long 157°50'15", 60 ft below bridge on Ahilama Road, 0.7 mile southwest of Kahaluu, and 1.0 mile northwest of Ahuimanu Ranch.		5- 2-65	∱1,530	∱2,370
Kaalaea Stream	Pacific Ocean	Lat 21°28'19", long 157°51'21", 1.0 mile south of Waiahole School and 1.4 miles northwest of Kahaluu.		5- 2-65	∱2,040	∱3,160
Island of Maui						
Kalialinui Gulch tributary	Kalialinui Gulch	Lat 20°49'02", long 156°19'44", at Highway 37, 1.1 miles south of north junction of Highways 37 and 377, and 2.8 miles west of Olinda Prison Camp.		7-23-64	∱520	∱805
Kaluapulani Gulch	Kalialinui Gulch	Lat 20°48'35", long 156°18'35", at Highway 377, 1.5 miles west of Olinda Prison Camp, and 2.2 miles southeast of north junction of Highways 37 and 377.		7-23-64	∱177	∱274
Kaluapulani Gulch tributary No. 2	Kaluapulani Gulch	Lat 20°49'04", long 156°18'32", at Highway 377, 1.6 miles northwest of Olinda Prison Camp, and 1.6 miles southeast of north junction of Highways 37 and 377.		7-23-64	∱182	∱282
Kalialinui Gulch	Pacific Ocean	Lat 20°52'50", long 156°26'06", 370 ft above bridge on Hanson Road, 0.2 mile southwest of junction of Hanson Road and Haleakala Highway, and 0.5 mile northeast of Puunene Hospital.		7-23-64	∱189	∱292
Waiehu Stream	Pacific Ocean	Lat 20°55'17", long 156°29'33", between Kahikili Highway and Waiehu Beach Road, 0.2 mile above mouth, and 2.1 miles north of Wailuku Post Office.		2- 4-65	∱1,140	∱1,760

∱ Peak flow.

Stream	Tr
Wailuku River	Pac
Wailuku River	Pac
Wailuku River tributary	Wai
West Branch Honokane Iki Stream	Hon S
East Branch Honokane Nui Stream	Hon S
Kawaa Springs	Pac
Ninole Springs	Pac
Nagata-gawa	Hiz

000113

United States Department of the Interior
Geological Survey - Water Resources Division

WATER RESOURCES DATA
FOR
HAWAII AND OTHER PACIFIC AREAS
1968

Part 1: Surface Water Records

Prepared in cooperation with

Hawaii Department of Land and Natural Resources,
Division of Water and Land Development
Government of Guam
Government of American Samoa
Trust Territory of the Pacific Islands
City and County of Honolulu
Corps of Engineers, U.S. Army
Federal Water Pollution Control Administration,
U.S. Department of the Interior

Copies of this report may be obtained from
District Chief, Water Resources Division
U.S. Geological Survey
Room 330, First Insurance Bldg.
1100 Ward Avenue
Honolulu, Hawaii 96814

1970

000114

Discharge measurements made at miscellaneous sites during water year 1968--Continued

Stream	Tributary to	Location	Drainage area (sq mi)	Measured previously (water years)	Measurements	
					Date	Discharge (cfs)
Hawaii, Island of Oahu--Continued						
Waihee Stream	Kahaluu Stream	Lat 21°27'02", long 157°51'37", 600 ft below forest-reserve boundary and 1.8 miles southwest of Kahaluu.			7-18-68 8- 8-68 9-17-68	9.67 9.75 9.87
Hawaii, Island of Maui						
Kalepa Gulch	Pacific Ocean	Lat 20°39'06", long 156°05'25", 1,000 ft above Highway 31, 0.3 mile north of Kalepa Point, and 2.4 miles east of Kaupo.			4-16-68	≠3,950
Alelele Stream	Pacific Ocean	Lat 20°39'07", long 156°05'17", 120 ft above Highway 31, 0.3 mile north of Kalepa Point, and 2.5 miles east of Kaupo.			4-16-68	≠2,280
Opelu Gulch	Pacific Ocean	Lat 20°39'23", long 156°04'31", 1,200 ft above Highway 31, 1.1 miles northeast of Kalepa Point and 1.2 miles west of Kipahulu.			4-16-68	≠3,330
Kalena Stream	Pacific Ocean	Lat 20°39'25", long 156°03'46", 700 ft above Highway 31, 0.3 mile west of Kipahulu, and 1.4 miles southwest of Kuloa Point.			4-16-68	≠2,920
Unnamed stream	Pacific Ocean	Lat 20°40'50", long 156°02'16", 500 ft above Highway 31, 1.5 miles west of Muolea Point, and 2.0 miles northeast of Kipahulu.			4-16-68	≠569
Kapia Stream	Pacific Ocean	Lat 20°42'57", long 155°59'35", 700 ft above mouth, 800 ft below Highway 31, and 0.6 mile southwest of Hamoa.			4-16-68	≠16,900
Haneoo Gulch	Pacific Ocean	Lat 20°43'52", long 155°59'38", 1,100 ft below Highway 31, 0.6 mile northwest of Hamoa, and 2.1 miles south of Hana lighthouse.			4-16-68	≠1,170
Holoinawawae Stream tributary	Holoinawawae Stream	Lat 20°45'54", long 156°00'01", 0.2 mile southwest of Hana hospital and 1.1 miles northwest of Hana School.			4-16-68	≠476
Honomaele Gulch tributary	Honomaele Gulch	Lat 20°47'15", long 156°01'54", 400 ft below Highway 36, 1.2 miles southwest of Hana Airport, and 3.6 miles northwest of Hana School.			4-16-68	≠1,590
Honokohau Stream	Pacific Ocean	Lat 20°58'43", long 156°35'41", 3.6 miles above mouth, 4.4 miles southeast of Honokahua Post Office, and at altitude 580 ft.			8-29-68	2.78
Honokohau Stream	Pacific Ocean	Lat 20°59'08", long 156°35'51", 3.1 miles above mouth, 4.1 miles east of Honokahua Post Office, and at altitude 480 ft.			8-29-68	2.82
Honokohau Stream	Pacific Ocean	Lat 20°59'43", long 156°36'10", 2.3 miles above mouth, 3.6 miles east of Honokahua Post Office, and at altitude 300 ft.			8-29-68	2.95
Hawaii, Island of Hawaii						
Waipahoehoe Gulch	Wailuku River	Lat 19°43'34", long 155°16'18", 0.6 mile above mouth, 6.0 miles southeast of Pua Akala, and 8.7 miles west of Piihonua.		1966	10-16-67	.05
Waipahoehoe Gulch tributary	Waipahoehoe Gulch	Lat 19°43'34", long 155°16'17", 50 ft above mouth, 6.0 miles southeast of Pua Akala, and 8.7 miles west of Piihonua.		1966	10-16-67	.04

≠ Peak flow.

000115

1972

Water Resources Data for Hawaii and other Pacific Areas

Part 1. Surface Water Records

Part 2. Water Quality Records

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

Prepared in cooperation with the State of Hawaii, the Government of Guam, the Government of American Samoa, Trust Territory of the Pacific Islands, and with other State, county and Federal agencies

000116

Discharge measurements at miscellaneous sites

Measurements of streamflow at points other than gaging stations are given in the following table.

Discharge measurements made at miscellaneous sites during water year 1972

Stream	Tributary to	Location	Drainage area (sq mi)	Measured previously (water years)	Measurements	
					Date	Discharge (cfs)
Hawaii, Island of Molokai						
Left-bank tributary	Pilipililau Stream	Lat 21°08'11", long 156°53'07", 200 ft upstream from mouth, 1.9 miles south of former village of Pelekunu, and 5.8 miles north of Kamalo.		1969-71	10- 6-71 12- 3-71 1-20-72 3- 8-72 5- 3-72 6-21-72 8-22-72 9-27-72	0.09 .09 .08 .51 .16 .08 .08 .08
Kapuhi Stream	Pelekunu Stream	Lat 21°08'03", long 156°52'47", 800 ft upstream from new Pelekunu gaging station (4040), 1.8 miles west of Olokui trig station (4602), and 2.1 miles upstream from mouth.			10- 7-71 1-21-72 6-22-72	1.5 2.0 2.1
Pelekunu Stream	Pacific Ocean	Lat 21°08'05", long 156°52'45", 600 ft upstream from new Pelekunu gaging station (4040), 1.7 miles west of Olokui trig station (4602), and 2.0 miles upstream from mouth.			10- 7-71 1-21-72 6-22-72	2.8 4.2 4.1
Waikolu Stream	Pacific Ocean	Lat 21°08'54", long 156°55'25", at altitude 780 ft, 0.4 mile northwest of Molokai tunnel east portal, and 5.4 miles southeast of lighthouse near Kalaupapa.		1960-61, 1969-71	12- 1-71 1-22-72 5- 5-72 6-23-72 9-29-72	1.9 .52 1.6 1.3 1.4
Waikolu Stream	Pacific Ocean	Lat 21°09'10", long 156°55'33", at altitude 600 ft, 0.7 mile northwest of Molokai tunnel east portal, and 5.1 miles southeast of lighthouse near Kalaupapa.		1969-71	12- 1-71 1-22-72 5- 5-72 6-23-72 9-29-72	2.9 1.6 2.6 2.4 2.4
Hawaii, Island of Maui						
Iao Stream at State Park	Pacific Ocean	Lat 20°53'01", long 156°32'53", at Iao State Park 200 ft downstream from Kinihapai Stream tributary, 2,500 ft downstream from The Needle and 0.7 mile upstream from Kepaniwai Park.			1-18-72	11
Hawaii, Island of Hawaii						
West Branch Honokane Iki Stream	Honokane Iki Stream	Lat 20°09'47", long 155°43'25", 30 ft downstream from trail crossing, 1.8 miles upstream from confluence with East Branch, and 4.5 miles south of Niulii.		1961-71	12- 2-71 2-16-72	5.2 .33
East Branch Honokane Nui Stream	Honokane Nui Stream	Lat 20°08'58", long 155°43'59", at trail crossing, 0.2 mile upstream from confluence with West Branch, and 5.3 miles south of Niulii.		1964-71	12- 2-71 2-16-72	20 2.6
Samoa Islands, Island of Tutuila						
Right Fork Vaisa Stream at Onenoa	Vaisa Stream	Lat 14°15'27" S., long 170°34'42" W., 100 ft upstream from mouth and 0.1 mile southeast of Onenoa.		1959-61/, 1963	11-16-71	.38
Lausaa Stream at Vatia	Faatafe Stream	Lat 14°15'30" S., long 170°40'25" W., 1,000 ft upstream from Faatafe Stream and 0.15 mile south of Vatia.			10- 1-71	.05
Gaoa Stream at Vatia	Leafu Stream	Lat 14°15'33" S., long 170°40'36" W., 0.5 mile southwest of Vatia and 0.4 mile upstream from mouth.		1959-60/, 1962-64/	10- 1-71	.02
Leafu Stream at Vatia	Pacific Ocean	Lat 14°15'24" S., long 170°40'36" W., 0.3 mile west of Vatia and 0.3 mile upstream from mouth.		1959-60/, 1962-64/	10- 1-71	.06
Vaipuna Stream at Amaluia	Pacific Ocean	Lat 14°19'48" S., long 170°47'20" W., 300 ft upstream from unnamed tributary, 0.6 mile north of Amaluia, and 0.7 mile upstream from mouth.		1959-61/, 1963-65/	10- 1-71	.56

/ Formerly published as a low-flow station.

000117

FEB 28 1979

1974

Water Resources Data for Hawaii and other Pacific Areas

Part 1. Surface Water Records

Part 2. Water Quality Records

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

Prepared in cooperation with the State of Hawaii, Trust Territory of the Pacific Islands, the Government of American Samoa, the Government of Guam, and with other State, county, and Federal agencies

000118

Discharge measurements at miscellaneous sites

Measurements of streamflow at points other than gaging stations are given in the following table.

Discharge measurements made at miscellaneous sites during water year 1974

Stream	Tributary to	Location	Drainage area mi^2 (km^2)	Measured previously (water years)	Measurements	
					Date	Discharge (ft^3/s)
Hawaii, Island of Oahu						
Left-bank tributary	Moanalua Stream	Lat 21°21'16", long 157°53'42", 0.1 mi (0.2 km) east of Board of Water Supply pumping station and 0.2 mi (0.3 km) north of Moanalua School.	0.46 (1.19)		4-19-74	∮ 1,510
Manaiki Stream	Moanalua Stream	Lat 21°21'13", long 157°53'32", 0.2 mi (0.3 km) northeast of Moanalua School and 0.6 mi (1.0 km) northwest of Shafter School.	2.03 (5.26)		4-19-74	∮ 2,120
Kahauiki Stream at Fort Shafter	Moanalua Stream	Lat 21°21'03", long 157°53'13", 0.4 mi (0.6 km) north of Shafter School and 1.0 mi (1.6 km) west of Kaewai School.	1.20 (3.11)		4-19-74	∮ 3,420
Left-bank tributary	Kahauiki Stream	Lat 21°20'45", long 157°53'14", 0.1 mi (0.2 km) northeast of Shafter School and 0.9 mi (1.4 km) west of Dole School.	.39 (1.01)		4-19-74	∮ 1,120
Hawaii, Island of Maui						
Iao Stream	Pacific Ocean	Lat 20°53'01", long 156°32'54", at Iao Needle Park, 0.7 mi (1.1 km) upstream from Kepaniwai Park, and 2.7 mi (4.3 km) southwest of Wailuku Federal Building.	-		10-30-73	20
Waihee ditch	-	Lat 20°52'58", long 156°30'48", 500 ft (152 m) downstream from pump outlet, 0.3 mi (0.5 km) southeast of Wailuku steel water tank and 0.6 mi (1.0 km) southwest of Wailuku Federal Building.	-		9-19-74	19
Samoa Islands, Island of Tutuila						
Laufuti Stream	Pacific Ocean	Lat 14°15'16"S., long 169°26'40"W., 50 ft (15 m) downstream from spring and 200 ft (61 m) upstream from mouth.		1972	2-13-74	.88

∮ Flood measurement.

000119

Water Resources Data for Hawaii and other Pacific Areas

Water Year 1975

U.S. GEOLOGICAL SURVEY WATER-DATA REPORT HI-75-1

Prepared in cooperation with the State of Hawaii, Trust Territory of the Pacific Islands, the Government of American Samoa, the Government of Guam, and with other State, county, and Federal agencies

000120

Annual maximum discharge at crest-stage partial-record stations during water year 1975 --Continued

Station No.	Station name	Location	Drainage area mi² (km²)	Period of record	Annual maximum		
					Date	Gage height (feet)	Discharge (ft³/s)
		Hawaii, Island of Maui					
16500100	Kepuni Gulch near Kahikinui House	Lat 20°37'21", long 156°15'16", on right bank 120 ft (37 m) upstream from bridge on Highway 31, 400 ft (122 m) upstream from Kamole Gulch, 1.1 mi (1.8 km) east of Kahikinui House, and 8.5 mi (1.4 km) west of Kaupo.	1.91 (4.95)	1963-72≠ 1973-75	-	-	No flow
16500300	Hawelewele Gulch near Kaupo	Lat 20°38'01", long 156°11'08", 700 ft (213 m) upstream from Piilani Highway 31 and 3.9 mi (6.3 km) west of Kaupo.	11.3 (29.3)	1967-75	11-17-74	9.34	7,110
16500800	Kukuiula Gulch near Kipahulu	Lat 20°39'18", long 156°04'44", at Highway 31, 1.3 mi (2.1 km) west of Kipahulu and 3.2 mi (5.2 km) east of Kaupo.	.76 (1.97)	1963-68≠ 1969-75	11-17-74	<2.56	e340
*16502000	Hahalawe Gulch near Kipahulu	Lat 20°40'54", long 156°02'50", on left bank at old ditch intake, 0.7 mi (1.1 km) upstream from mouth, and 1.8 mi (2.9 km) northeast of Kipahulu Church.	.43 (1.11)	1927-69≠ 1970-75	11-17-74	4.69	1,380
16502400	Pukuilua Gulch near Hana	Lat 20°42'00", long 156°00'14", at Highway 31, 0.4 mi (0.6 km) southwest of Puuiki, and 4.0 mi (6.4 km) south of Hana.	.48 (1.24)	1963-75	11-17-74	3.72	180
16502800	Moomoonui Gulch at Hana	Lat 20°44'37", long 155°59'18", at Highway 31 just downstream from Moomooiki Gulch and 1.0 mi (1.6 km) south of Hana.	.90 (2.33)	1963-75	2-12-75	11.34	686
16502900	Kawaipapa Gulch at Hana	Lat 20°46'08", long 156°00'04", 1,000 ft (305 m) upstream from Highway 36 and 0.3 mi (0.5 km) northwest of Hana Hospital.	5.83 (15.10)	1965-75	2-12-75	7.84	4,970
16603300	Unnamed gulch at Maliko Bay	Lat 20°56'26", long 156°21'04", at Hana Highway, 0.5 mi (0.8 km) west of Maliko Bay, and 1.3 mi (2.1 km) north of Hamakuapoko.	.43 (1.11)	1963-75	11-21-74	2.66	31
16603700	Kalialinui Gulch tributary near Pukalani	Lat 20°49'02", long 156°19'44", at Lower Kula Road and 1.4 mi (2.3 km) south of Pukalani.	1.17 (3.03)	1967-75	-	-	No flow
16603800	Kaluapulani Gulch tributary near Pukalani	Lat 20°48'52", long 156°18'32", at Haleakala Highway, 1.5 mi (2.4 km) west of Olinda Prison Camp, and 2.3 mi (3.7 km) southeast of Pukalani.	.45 (1.17)	1963-75	-	-	No flow
16603850	Kalialinui Gulch near Kahului	Lat 20°52'47", long 156°26'06", 600 ft (183 m) upstream from Hansen Road, 0.5 mi (0.8 km) northeast of Puunene Hospital, and 2.5 mi (4.0 km) southeast of Kahului Post Office.	17.9 (46.4)	1967-75	11-21-74	3.97	31
**16607000	Iao Stream at Wailuku	Lat 20°53'38", long 156°30'27", 560 ft (171 m) upstream from Market Street bridge at Wailuku and 1.9 mi (3.1 km) upstream from mouth.	8.24 (21.4)	1951≠, 1952-75	11-21-74	5.52	3,720
*16616500	Unnamed gulch at Maluhia Camp	Lat 20°57'26", long 156°31'41", at Kahekili Highway, 0.6 mi (1.0 km) east of Maluhia Camp and 1.8 mi (2.9 km) northwest of Waihee.	.12 (.31)	1964-75	1-12-75	<7.29	e97
16619700	Poelua Gulch near Kahakuloa	Lat 21°00'58", long 156°34'58", at Highway 30 (bypass), 1.3 mi (2.1 km) southeast of Nakalele Point lighthouse, and 2.2 mi (3.5 km) northwest of Kahakuloa.	1.18 (3.06)	1965-75	11-21-74	9.31	342

* Also a low-flow partial-record station.
** Also a water-quality partial-record station.
≠ Operated as a continuous-record gaging station.
< Less than.
e Estimated.

000121

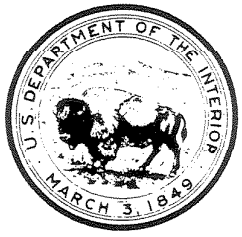
Annual maximum discharge at crest-stage partial-record stations during water year 1975--Continued

Station No.	Station name	Location	Drainage area, mi^2 (km^2)	Period of record	Annual maximum: Date	Annual maximum: Gage height (feet)	Annual maximum: Discharge (ft^3/s)
		Hawaii, Island of Maui--Continued					
16623400	Honokeana Gulch near Honokahua	Lat 20°59'39", long 156°40'13", at Honoapiilani Highway, 1.1 mi (1.8 km) southwest of Honokahua and 1.1 mi (1.8 km) south of Hawea Point.	0.59 (1.53)	1964-75	1-12-75	6.81	273
16630200	Honokowai Stream at Honokowai	Lat 20°56'58", long 156°41'07", 0.5 mi (0.8 km) southeast of Honokowai and 1.1 mi (1.8 km) northwest of Puukolii.	5.59 (14.48)	1962-63, 1965-75	11-21-74	7.24	1,520
16643300	Kauaula Stream near mouth, near Lahaina	Lat 20°52'09", long 156°39'43", 0.7 mi (1.1 km) upstream from Honoapiilani Highway (bypass) and 1.3 mi (2.1 km) southeast of Lahaina lighthouse.	4.12 (10.67)	1960, 1962, 1964-75	11-21-74	<3.68	e25
**16646200	Olowalu Stream at Olowalu	Lat 20°49'23", long 156°37'15", on downstream side of center pier of plantation road bridge, 0.6 mi (1.0 km) northeast of Olowalu, and 5.5 mi (8.8 km) southeast of Lahaina.	4.08 (10.57)	1962-72≠ 1973-75	11-21-74	3.65	444
16647500	Malalowaiaole Gulch near Maalaea	Lat 20°46'56", long 156°31'32", at Honoapiilani Highway, 200 ft (61 m) upstream from mouth, 0.2 mi (0.3 km) north of McGregor Point, and 1.2 mi (1.9 km) southwest of Maalaea.	.64 (1.66)	1964-75	-	-	No flow
16650500	Waikapu Stream near Kihei	Lat 20°49'02", long 156°29'00", at railroad bridge beside Lower Maalaea Road, 2.5 mi (4.0 km) northeast of Maalaea, and 2.5 mi (4.0 km) northwest of Kihei.	6.97 (18.05)	1963-75	8-17-75	2.83	288
16658500	Waiakoa Gulch tributary near Waiakoa	Lat 20°44'56", long 156°19'22", at Upper Kula Road, 1.0 mi (1.6 km) southeast of Waiakoa and 1.0 mi (1.6 km) northeast of junction of Lower and Upper Kula Roads.	.98 (2.54)	1964-75	-	-	No flow
16659000	Waiakoa Gulch at Kihei	Lat 20°47'14", long 156°27'41", 0.3 mi (0.5 km) northeast of Kihei and 0.4 mi (0.6 km) upstream from mouth.	10.1 (26.2)	1963-75	-	-	No flow
16660000	Kulanihakoi Gulch near Kihei	Lat 20°46'06", long 156°27'03", on right bank 0.5 mi (0.8 km) northeast of Lihue Cemetery, 0.8 mi (1.3 km) upstream from mouth and 1.3 mi (2.1 km) southeast of Kihei.	14.4 (37.3)	1963-70≠ 1971-75	11-22-74	<0	e25
16663500	Kamaole Gulch at Kamaole	Lat 20°43'36", long 156°27'02", at Kihei Road, 350 ft (107 m) upstream from mouth, and 0.2 mi (0.3 km) south of Kamaole.	4.28 (11.09)	1972-75	-	-	No flow
16664000	Liilioholo Gulch at Kamaole	Lat 20°43'04", long 156°26'55", on upstream side of Kihei Road, 300 ft (91 m) upstream from mouth, and 0.8 mi (1.3 km) south of Kamaole.	4.12 (10.67)	1972-75	-	-	No flow
		Hawaii, Island of Hawaii					
16701300	Waiakea Stream at Hilo	Lat 19°42'38", long 155°05'02", 0.3 mi (0.5 km) upstream from Kinoole Street bridge and 1.3 mi (2.1 km) southeast of Hilo Post Office.	35.8 (92.7)	1968-75	1- 8-75	4.90	510
16701400	Palai Stream at Hilo	Lat 19°40'56", long 155°04'04", at Highway 11, 300 ft (91 m) south of Palai Street intersection and 3.5 mi (5.6 km) southeast of Hilo Post Office.	5.08 (13.16)	1965-75	1- 8-75	4.38	364
16717400	Kalaoa Mauka Stream near Hilo	Lat 19°48'07", long 155°06'03", at culvert on Highway 19, 1.0 mi (1.6 km) north of Papaikou and 5.1 mi (8.2 km) north of Hilo Post Office.	.24 (.62)	1963-75	1- 8-75	6.04	124

** Also a water-quality partial-record station.
≠ Operated as a continuous-record gaging station.
< Less than.
e Estimated.

000122

Water Resources Data for Hawaii and other Pacific Areas Water Year 1976



U.S. GEOLOGICAL SURVEY WATER-DATA REPORT HI-76-1

Prepared in cooperation with the State of Hawaii, Trust Territory of the Pacific Islands, the Government of American Samoa, the Government of Guam, and with other State, county, and Federal agencies

000123

Annual maximum discharge at crest-stage partial-record stations during water year 1976--Continued

Station No.	Station name	Location	Drainage area mi^2 (km^2)	Period of record	Annual maximum: Date	Annual maximum: Gage height (feet)	Annual maximum: Discharge (ft^3/s)
		Hawaii, Island of Maui--Continued					
16603850	Kalialinui Gulch near Kahului	Lat 20°52'47", long 156°26'06", 600 ft (183 m) upstream from Hansen Road, 0.5 mi (0.8 km) northeast of Puunene Hospital, and 2.5 mi (4.0 km) southeast of Kahului Post Office.	17.9 (46.4)	1967-76	1-16-76	-	757
**16607000	Iao Stream at Wailuku	Lat 20°53'38", long 156°30'27", 560 ft (171 m) upstream from Market Street bridge at Wailuku and 1.9 mi (3.1 km) upstream from mouth.	8.24 (21.4)	1951≠, 1952-76	3- 4-76	4.00	2,390
16616500	Unnamed gulch at Maluhia Camp	Lat 20°57'26", long 156°31'41", at Kahekili Highway, 0.6 mi (1.0 km) east of Maluhia Camp and 1.8 mi (2.9 km) northwest of Waihee.	.12 (.31)	1964-76	-	-	No flow
16619700	Poelua Gulch near Kahakuloa	Lat 21°00'58", long 156°34'58", at Highway 30 (bypass), 1.3 mi (2.1 km) southeast of Nakalele Point lighthouse, and 2.2 mi (3.5 km) northwest of Kahakuloa.	1.18 (3.06)	1965-76	3- 4-76	7.87	255
16623400	Honokeana Gulch near Honokahua	Lat 20°59'39", long 156°40'13", at Honoapiilani Highway, 1.1 mi (1.8 km) southwest of Honokahua and 1.1 mi (1.8 km) south of Hawea Point.	.59 (1.53)	1964-76	3- 4-76	4.19	95
16630200	Honokowai Stream at Honokowai	Lat 20°56'58", long 156°41'07", 0.5 mi (0.8 km) southeast of Honokowai and 1.1 mi (1.8 km) northwest of Puukolii.	5.59 (14.48)	1962-63, 1965-76	3- 4-76	3.66	382
16643300	Kauaula Stream near mouth, near Lahaina	Lat 20°52'09", long 156°39'43", 0.7 mi (1.1 km) upstream from Honoapiilani Highway (bypass) and 1.3 mi (2.1 km) southeast of Lahaina lighthouse.	4.12 (10.67)	1960, 1962, 1964-76	3- 4-76	-	e10
16646200	Olowalu Stream at Olowalu	Lat 20°49'23", long 156°37'15", on downstream side of center pier of plantation road bridge, 0.6 mi (1.0 km) northeast of Olowalu, and 5.5 mi (8.8 km) southeast of Lahaina.	4.08 (10.57)	1962-72≠, 1973-76	3- 4-76	2.26	113
16647500	Malalowaiaole Gulch near Maalaea	Lat 20°46'56", long 156°31'32", at Honoapiilani Highway, 200 ft (61 m) upstream from mouth. 0.2 mi (0.3 km) north of McGregor Point, and 1.2 mi (1.9 km) southwest of Maalaea.	.64 (1.66)	1964-76	3- 4-76	-	e2
16650500	Waikapu Stream near Kihei	Lat 20°49'02", long 156°29'00", at railroad bridge beside Lower Maalaea Road, 2.5 mi (4.0 km) northeast of Maalaea, and 2.5 mi (4.0 km) northwest of Kihei.	6.97 (18.05)	1963-76	3- 4-76	2.91	303
16658500	Waiakoa Gulch tributary near Waiakoa	Lat 20°44'56", long 156°19'22", at Upper Kula Road, 1.0 mi (1.6 km) southeast of Waiakoa and 1.0 mi (1.6 km) northeast of junction of Lower and Upper Kula Roads.	.98 (2.54)	1964-76	11-24-75	1.58	23
16659000	Waiakoa Gulch at Kihei	Lat 20°47'14", long 156°27'41", 0.3 mi (0.5 km) northeast of Kihei and 0.4 mi (0.6 km) upstream from mouth.	10.1 (26.2)	1963-76	11-24-75	5.97	109
16660000	Kulanihakoi Gulch near Kihei	Lat 20°46'06", long 156°27'03", on right bank 0.5 mi (0.8 km) northeast of Lihue Cemetery, 0.8 mi (1.3 km) upstream from mouth and 1.3 mi (2.1 km) southeast of Kihei.	14.4 (37.3)	1963-70≠, 1971-76	11-24-75	-	e27

** Also a water-quality partial-record station.
≠ Operated as a continuous-record gaging station.
e Estimated.

000124

Annual maximum discharge at crest-stage partial-record stations during water year 1976--Continued

Station No.	Station name	Location	Drainage area mi² (km²)	Period of record	Annual maximum		
					Date	Gage height (feet)	Discharge (ft³/s)
		Hawaii, Island of Maui--Continued					
16663500	Kamaole Gulch at Kamaole	Lat 20°43'36", long 156°27'02", at Kihei Road, 350 ft (107 m) upstream from mouth, and 0.2 mi (0.3 km) south of Kamaole.	4.28 (11.09)	1972-76	11-24-75	-	e3
16664000	Liilioholo Gulch at Kamaole	Lat 20°43'04", long 156°26'55", on upstream side of Kihei Road, 300 ft (91 m) upstream from mouth, and 0.8 mi (1.3 km) south of Kamaole.	4.12 (10.67)	1972-76	11-24-75	-	e2
		Hawaii, Island of Hawaii					
16701300	Waiakea Stream at Hilo	Lat 19°42'38", long 155°05'02", 0.3 mi (0.5 km) upstream from Kinoole Street bridge and 1.3 mi (2.1 km) southeast of Hilo Post Office.	35.8 (92.7)	1968-76	1- 7-76	3.72	254
16701400	Palai Stream at Hilo	Lat 19°40'56", long 155°04'04", at Highway 11, 300 ft (91 m) south of Palai Street intersection and 3.5 mi (5.6 km) southeast of Hilo Post Office.	5.08 (13.16)	1965-76	1- 7-76	4.77	428
16717400	Kalaoa Mauka Stream near Hilo	Lat 19°48'07", long 155°06'03", at culvert on Highway 19, 1.0 mi (1.6 km) north of Papaikou and 5.1 mi (8.2 km) north of Hilo Post Office.	.24 (.62)	1963-76	1- 7-76	3.46	38
16717600	Alia Stream near Hilo	Lat 19°50'38", long 155°06'21", on left bank 10 ft (3.0 m) downstream from culvert on Highway 19 at Pepeekeo, 2.0 mi (3.2 km) south of Honomu, and 8.0 mi (12.9 km) north of Hilo.	.58 (1.50)	1962-72≠, 1973-76	1- 7-76	3.93	329
16717650	Kapehu Stream near Pepeekeo	Lat 19°51'52", long 155°06'11", at culvert on Highway 19, 1.0 mi (1.6 km) southeast of Honomu, 2.2 mi (3.5 km) north of Pepeekeo, and 9.4 mi (15.1 km) north of Hilo.	1.09 (2.82)	1963-76	1- 7-76	7.90	727
16717850	Keehia Gulch near Ookala	Lat 20°01'08", long 155°18'45", at culvert on Highway 19, 1.7 mi (2.7 km) west of Ookala, and 4.1 mi (6.6 km) southeast of Paauilo.	.62 (1.61)	1963-76	7- 1-76	2.05	36
16717920	Ahualoa Gulch at Honokaa	Lat 20°05'12", long 155°29'17", at Highway 24, 1.1 mi (1.8 km) northwest of Honokaa Hospital, and 1.5 mi (2.4 km) upstream from mouth.	2.27 (5.88)	1963-76	8- 3-76	5.95	14
16717950	Honokaia Gulch tributary near Honokaa	Lat 20°02'58", long 155°32'19", at culvert, 4.8 mi (7.7 km) southwest of Honokaa Hospital, and 5.5 mi (8.8 km) southeast of Kukuihaele.	2.42 (6.27)	1963-76	-	-	No flow
16752600	Hapahapai Gulch at Kapaau	Lat 20°14'00", long 155°48'00", at Highway 27, 300 ft (91 m) east of Kapaau Post Office.	1.52 (3.94)	1963-76	-	-	No flow
16755800	Luahine Gulch near Waimea	Lat 20°03'11", long 155°44'35", at culvert 5.1 mi (8.2 km) northwest of Waimea and 5.7 mi (9.2 km) east of Kawaihae.	.32 (.83)	1963-76	1-16-76	2.21	47
16756500	Keanuiomano Stream near Kamuela	Lat 20°01'48", long 155°42'05", on left bank 150 ft (46 m) upstream from Highway 25 at Waiaka and 2.0 mi (3.2 km) west of Kamuela.	4.30 (11.14)	1964-72≠, 1973-76	1-16-76	5.57	745

≠ Operated as a continuous-record gaging station.
e Estimated.

000125

CHARGE MEASUREMENTS MADE AT MISCELLANEOUS SITES DURING WATER YEAR 1976

Stream	Tributary to	Location	Drainage area mi² (km²)	Measured previously (water years)	Measurements	
					Date	Discharge (ft³/s)
		Hawaii, Island of Maui				
Diversion ditch from Wailuanui Stream at Wailua	Pacific Ocean	Lat 20°50'27", long 156°08'17", 0.3 mi (0.5 km) southeast from Keanae Valley Lookout Park, 0.5 mi (0.8 km) south of Wailua Homesteads, 0.9 mi (1.4 km) south of Keanae School.			3-30-76 8-10-76 10-14-76	1.6 .46 .57
Banana Spring	Waiokamilo Stream	Lat 20°49'55", long 156°09'22", 1.0 mi (1.6 km) southwest of Keanae Valley Lookout Park and 2.0 mi (3.2 km) south of Keanae.		1969	8-13-76	2.5
Waiokamilo Stream	Pacific Ocean	Lat 20°50'39", long 156°08'44", 0.2 mi (0.3 km) west of Keanae Valley Lookout Park and 0.8 mi (1.3 km) south of Keanae School.			8-13-76	2.8
Diversion ditch from Waiokamilo Stream at intake	Pacific Ocean	Lat 20°50'41", long 156°08'43", 0.2 mi (0.3 km) west of Keanae Valley Lookout Park and 0.7 mi (1.1 km) south of Keanae School.			8-13-76	2.8
Diversion ditch from Waiokamilo Stream at outlet	Pacific Ocean	Lat 20°50'53", long 156°08'32", 100 ft (30 m) upstream from Hana Highway and 0.5 mi (0.8 km) south of Keanae School.			3-30-76 8-10-76 8-13-76	3.5 1.3 2.2
Diversion ditch from Piinaau Stream at Keanae	Pacific Ocean	Lat 20°51'28", long 156°09'11", 0.3 mi (0.5 km) south of Hana Highway, 0.4 mi (0.6 km) southwest of Waialohe Pond and 0.8 mi (1.3 km) west of Keanae School.			3-30-76	1.4
Iao Stream	Pacific Ocean	Lat 20°53'01", long 156°32'54", at Iao Needle Park, 0.7 mi (1.1 km) upstream from Kepaniwai Park and 2.7 mi (4.3 km) southwest of Wailuku Federal Building.		1974, 1975	12- 3-75	46
Honokohau Stream	Pacific Ocean	Lat 20°58'43", long 156°35'41", 3.6 mi (5.8 km) above mouth, 4.4 mi (7.1 km) southeast of Honokohua Post Office, and at altitude 580 ft (177 m).		1968, 1975	1-22-76	.76
Honokohau Stream	Pacific Ocean	Lat 20°59'13", long 156°35'56", 2.8 mi (4.5 km) above mouth, 4.0 mi (6.4 km) southeast of Honokahua Post Office and at altitude 440 ft (134 m).			1-22-76	.69
		Mariana Islands, Island of Guam				
Agana River at Agana	Philippine Sea	Lat 13°28'23" N., long 144°45'13" E., 0.2 mi (0.3 km) southeast of Leary Junction, and 0.5 mi (0.8 km) northeast of Government House, Agana.		1959	10-14-59 5-28-76 6- 8-76	b5.2 47 8.2
Agana Springs at Agana	Agana River	Lat 13°27'42" N., long 144°45'30" E., 1 mi (1.6 km) southeast of Leary Junction in Agana.		1961	7-24-61 5-28-76 6- 8-76	b.60 2.5 1.4
*16817000 Toguan River near Umatac	Pacific Ocean	Lat 13°17'03" N., long 144°39'36" E., at Highway 4 bridge, 100 ft (30 m) upstream from mouth, and 0.9 mi (1.4 km) south of Umatac.	0.48 (1.24)	1952, 1960-75	5-21-76	a2,180
		Caroline Islands, Island of Ponape				
*16897800 Tawenjokola River at mouth	Pacific Ocean	Lat 06°56'42" N., long 158°13'50" E., 0.1 mi (0.2 km) upstream from mouth and 1.4 mi (2.2 km) southwest of Tolenot Peak.	10.9 (28.2)	1970-71, 1973	8- 4-76	a26,710 a2,730

* Also a low-flow partial-record station.
a Result of indirect measurement of peak flow.
b Not previously published.

000126

Water Resources Data for Hawaii and other Pacific Areas

Water Year 1977

Volume 1. Hawaii

U.S. GEOLOGICAL SURVEY WATER-DATA REPORT HI-77-1

Prepared in cooperation with the State of Hawaii
and with other agencies

000127

Annual maximum discharge at crest-stage partial-record stations during water year 1977--Continued

Station No.	Station name	Location	Drainage area mi² (km²)	Period of record	Annual maximum Date	Gage height (feet)	Discharge (ft³/s)
		Hawaii, Island of Maui--Continued					
16602900	Kawaipapa Gulch at Hana	Lat 20°46'08", long 156°00'04", 1,000 ft (305 m) upstream from Highway 36 and 0.3 mi (0.5 km) northwest of Hana Hospital.	5.83 (15.10)	1965-77	4-18-77	7.18	3,600
16603300	Unnamed gulch at Maliko Bay	Lat 20°56'26", long 156°21'04", at Hana Highway, 0.5 mi (0.8 km) west of Maliko Bay, and 1.3 mi (2.1 km) north of Hamakuapoko.	.43 (1.11)	1963-77			No flow
16603700	Kalialinui Gulch tributary near Pukalani	Lat 20°49'02", long 156°19'44", at Lower Kula Road and 1.4 mi (2.3 km) south of Pukalani.	1.17 (3.03)	1967-77	1-16-76 8-12-77	7.34 5.26	c412 75
16603800	Kaluapulani Gulch tributary near Pukalani	Lat 20°48'52", long 156°18'32", at Haleakala Highway, 1.5 mi (2.4 km) west of Olinda Prison Camp, and 2.3 mi (3.7 km) southeast of Pukalani.	.45 (1.17)	1963-77	8-12-77	4.11	134
16603850	Kalialinui Gulch near Kahului	Lat 20°52'47", long 156°26'06", 600 ft (183 m) upstream from Hansen Road, 0.5 mi (0.8 km) northeast of Puunene Hospital, and 2.5 mi (4.0 km) southeast of Kahului Post Office.	17.9 (46.4)	1967-77	-	-	No flow
**16607000	Iao Stream at Wailuku	Lat 20°53'38", long 156°30'27", 560 ft (171 m) upstream from Market Street nridge at Wailuku and 1.9 mi (3.1 km) upstream from mouth.	8.24 (21.4)	1951≠, 1952-77	11-25-76	3.43	1,930
16616500	Unnamed gulch at Maluhia Camp	Lat 20°57'26", long 156°31'41", at Kahekili Highway, 0.6 mi (1.0 km) east of Maluhia Camp and 1.8 mi (2.9 km) northwest of Waihee.	.12 (.31)	1964-77	-	-	No flow
16619700	Poelua Gulch near Kahakuloa	Lat 21°00'58", long 156°34'58", at Highway 30 (bypass), 1.3 mi (2.1 km) southeast of Nakaleie Point lighthouse, and 2.2 mi (3.5 km) northwest of Kahakuloa.	1.18 (3.06)	1965-77	4- 4-77	5.75	117
16623400	Honokeana Gulch near Honokahua	Lat 20°59'39", long 156°40'13", at Honoapiilani Highway, 1.1 mi (1.8 km) southwest of Honokahua and 1.1 mi (1.8 km) south of Hawea Point.	.59 (1.53)	1964-77	4- 4-77	3.75	72
16630200	Honokowai Stream at Honokowai	Lat 20°56'58", long 156°41'07", 0.5 mi (0.8 km) southeast of Honokowai and 1.1 mi (1.8 km) northwest of Puukolii.	5.59 (14.48)	1962-63, 1965-77	7-10-77	3.35	320
16643300	Kauaula Stream near mouth, near Lahaina	Lat 20°52'09", long 156°39 43", 0.7 mi (1.1 km) upstream from Honoapiilani Highway (bypass) and 1.3 mi (2.1 km) southeast of Lahaina lighthouse.	4.12 (10.67)	1960, 1962, 1964-77	3-22-77	-	e30
16646200	Olowalu Stream at Olowalu	Lat 20°49'23", long 156°37'15", on downstream side of center pier of plantation road bridge, 0.6 mi (1.0 km) northeast of Olowalu, and 5.5 mi (8.8 km) southeast of Lahaina.	4.08 (10.57)	1962-72≠, 1973-77	7-17-77	2.60	171
16647500	Malalowaiaole Gulch near Maalaea	Lat 20°46'56", long 156°31'32", at Honoapiilani Highway, 200 ft (61 m) upstream from mouth, 0.2 mi (0.3 km) north of McGregor Point, and 1.2 mi (1.9 km) southwest of Maalaea.	.64 (1.66)	1964-77	-	-	No flow

** Also a water-quality partial-record station.
≠ Operated as a continuous-record gaging station.
c Correction.
e Estimated.

000128

Annual maximum discharge at crest-stage partial-record stations during water year 1977--Continued

Station No.	Station name	Location	Drainage area mi² (km²)	Period of record	Annual maximum		
					Date	Gage height (feet)	Discharge (ft³/s)
		Hawaii, Island of Maui--Continued					
16650500	Waikapu Stream near Kihei	Lat 20°49'02", long 156°29'00", at railroad bridge beside Lower Maalaea Road, 2.5 mi (4.0 km) northeast of Maalaea, and 2.5 mi (4.0 km) northwest of Kihei.	6.97 (18.05)	1963-77	4- 4-77	2.83	288
16658500	Waiakoa Gulch tributary near Waiakoa	Lat 20°44'56", long 156°19'22", at Upper Kula Road, 1.0 mi (1.6 km) southeast of Waiakoa and 1.0 mi (1.6 km) northeast of junction of Lower and Upper Kula Roads.	.98 (2.54)	1964-77	8-12-77	-	e2
16659000	Waiakoa Gulch at Kihei	Lat 20°47'14", long 156°27'41", 0.3 mi (0.5 km) northeast of Kihei and 0.4 mi (0.6 km) upstream from mouth.	10.1 (26.2)	1963-77	-	-	No flow
16660000	Kulanihakoi Gulch near Kihei	Lat 20°46'06", long 156°27'03", on right bank 0.5 mi (0.8 km) northeast of Lihue Cemetery, 0.8 mi (1.3 km) upstream from mouth and 1.3 mi (2.1 km) southeast of Kihei.	14.4 (37.3)	1963-70≠, 1971-77	-	-	No flow
16663500	Kamaole Gulch at Kamaole	Lat 20°43'36", long 156°27'02", at Kihei Road, 350 ft (107 m) upstream from mouth, and 0.2 mi (0.3 km) south of Kamaole.	4.28 (11.09)	1972-77	-	-	No flow
16664000	Liilioholo Gulch at Kamaole	Lat 20°43'04", long 156°26'55", on upstream side of Kihei Road, 300 ft (91 m) upstream from mouth, and 0.8 mi (1.3 km) south of Kamaole.	4.12 (10.67)	1972-77	-	-	No flow
		Hawaii, Island of Hawaii					
16701300	Waiakea Stream at Hilo	Lat 19°42'38", long 155°05'02", 0.3 mi (0.5 km) upstream from Kinoole Street bridge and 1.3 mi (2.1 km) southeast of Hilo Post Office.	35.8 (92.7)	1968-77	8-12-77	3.90	505
16701400	Palai Stream at Hilo	Lat 19°40'56", long 155°04'04", at Highway 11, 300 ft (91 m) south of Palai Street intersection and 3.5 mi (5.6 km) southeast of Hilo Post Office.	5.08 (13.16)	1965-77	8-12-77	4.27	345
16717400	Kalaoa Mauka Stream near Hilo	Lat 19°48'07", long 155°06'03", at culvert on Highway 19, 1.0 mi (1.6 km) north of Papikou and 5.1 mi (8.2 km) north of Hilo Post Office.	.24 (.62)	1963-77	8-12-77	3.91	54
16717600	Alia Stream near Hilo	Lat 19°50'38", long 155°06'21", on left bank 10 ft (3.0 m) downstream from culvert on Highway 19 at Pepeekeo, 2.0 mi (3.2 km) south of Honomu, and 8.0 mi (12.9 km) north of Hilo.	.58 (1.50)	1962-72≠, 1973-77	2-27-77	4.41	504
16717650	Kapehu Stream near Pepeekeo	Lat 19°51'32", long 155°06'11", at culvert on Highway 19, 1.0 mi (1.6 km) southeast of Honomu, 2.2 mi (3.5 km) north of Pepeekeo, and 9.4 mi (15.1 km) north of Hilo.	1.09 (2.82)	1963-77	2-27-77	5.55	393
16717850	Keehia Gulch near Ookala	Lat 20°01'08", long 155°18'45", at culvert on Highway 19, 1.7 mi (2.7 km) west of Ookala, and 4.1 mi (6.6 km) southeast of Paauilo.	.62 (1.61)	1963-77	4-12-77	2.28	45

≠ Operated as a continuous-record gaging station.
e Estimated.

000129

Water Resources Data for Hawaii and other Pacific Areas

Volume 1. Hawaii

U.S.GEOLOGICAL SURVEY WATER-DATA REPORT HI-78-

WATER YEAR 1978

Prepared in cooperation with the State of Hawaii and with agencies

000130

Annual maximum discharge at crest-stage partial-record stations during water year 1978--Continued

Station No.	Station name	Location	Drainage area mi² (km²)	Period of record	Annual maximum Date	Gage height (feet)	Discharge (ft³/s)
		Hawaii, Island of Maui--Continued					
16603700	Kaliialinui Gulch tributary near Pukalani	Lat 20°49'02", long 156°19'44", at Lower Kula Road and 1.4 mi (2.3 km) south of Pukalani.	1.17 (3.03)	1967-78	7- 6-78	3.40	86
16603800	Kaluapulani Gulch tributary near Pukalani	Lat 20°48'52", long 156°18'32", at Haleakala Highway, 1.5 mi (2.4 km) west of Olinda Prison Camp, and 2.3 mi (3.7 km) southeast of Pukalani.	.45 (1.17)	1963-78	4-19-78	2.03	45
16603850	Kaliialinui Gulch near Kahului	Lat 20°52'47", long 156°26'06", 600 ft (183 m) upstream from Hansen Road, 0.5 mi (0.8 km) northeast of Puunene Hospital, and 2.5 mi (4.0 km) southeast of Kahului Post Office.	17.9 (46.4)	1967-78	7- 6-78	-	e10
**16607000	Iao Stream at Wailuku	Lat 20°53'38", long 156°30'27", 560 ft (171 m) upstream from Market Street bridge at Wailuku and 1.9 mi (3.1 km) upstream from mouth.	8.24 (21.4)	1951≠, 1952-78	10-24-77	3.57	e2,000
16616500	Unnamed gulch at Maluhia Camp	Lat 20°57'26", long 156°31'41", at Kahekili Highway, 0.6 mi (1.0 km) east of Maluhia Camp and 1.8 mi (2.9 km) northwest of Waihee.	.12 (.31)	1964-78	-	-	No flow
16619700	Poelua Gulch near Kahakuloa	Lat 21°00'58", long 156°34'58", at Highway 30 (bypass), 1.3 mi (2.1 km) southeast of Nakalele Point lighthouse, and 2.2 mi (3.5 km) northwest of Kahakuloa	1.18 (3.06)	1965-78	5- 5-78	5.46	102
16623400	Honokeana Gulch near Honokahua	Lat 20°59'39", long 156°40'13", at Honoapiilani Highway, 1.1 mi (1.8 km) southwest of Honokahua and 1.1 mi (1.8 km) south of Hawea Point.	.59 (1.53)	1964-78	-	-	No flow
16630200	Honokowai Stream at Honokowai	Lat 20°56'58", long 156°41'07", 0.5 mi (0.8 km) southeast of Honokowai and 1.1 mi (1.8 km) northwest of Puukolii.	5.59 (14.48)	1962-63, 1965-78	7- 6-78	3.39	328
16643300	Kauaula Stream near mouth, near Lahaina	Lat 20°52'09", long 156°39'43", 0.7 mi (1.1 km) upstream from Honoapiilani Highway (bypass) and 1.3 mi (2.1 km) southeast of Lahaina lighthouse.	4.12 (10.67)	1960, 1962, 1964-78	7- 6-78	-	e20
16646200	Olowalu Stream at Olowalu	Lat 20°49'23", long 156°37'15", on downstream side of center pier of plantation road bridge, 0.6 mi (1.0 km) northeast of Olowalu, and 5.5 mi (8.8 km) southeast of Lahaina.	4.08 (10.57)	1962-72≠, 1973-78	10-24-77	2.70	191
16647500	Malalowaiaole Gulch near Maalaea	Lat 20°46'56", long 156°31'32", at Honoapiilani Highway, 200 ft (61 m) upstream from mouth, 0.2 mi (0.3 km) north of McGregor Point, and 1.2 mi (1.9 km) southwest of Maalaea.	.64 (1.66)	1964-78	-	-	No flow
16650500	Waikapu Stream near Kihei	Lat 20°49'02", long 156°29'00", at railroad bridge beside Lower Maalaea Road, 2.5 mi (4.0 km) northeast of Maalaea, and 2.5 mi (4.0 km) northwest of Kihei.	6.97 (18.05)	1963-78	10-24-77	3.48	416
16658500	Waiakoa Gulch tributary near Waiakoa	Lat 20°44'56", long 156°19'22", at Upper Kula Road, 1.0 mi (1.6 km) southeast of Waiakoa and 1.0 mi (1.6 km) northeast of junction of Lower and Upper Kula Roads.	.98 (2.54)	1964-78	5-23-78	-	e1

** Also a water-quality partial-record station.
≠ Operated as a continuous-record gaging station.
e Estimated.

000131

Water Resources Data for Hawaii and other Pacific Areas

Volume 1. Hawaii

U.S. GEOLOGICAL SURVEY WATER-DATA REPORT HI-79-1

WATER YEAR 1979

Prepared in cooperation with the State of Hawaii and with other agencies

000132

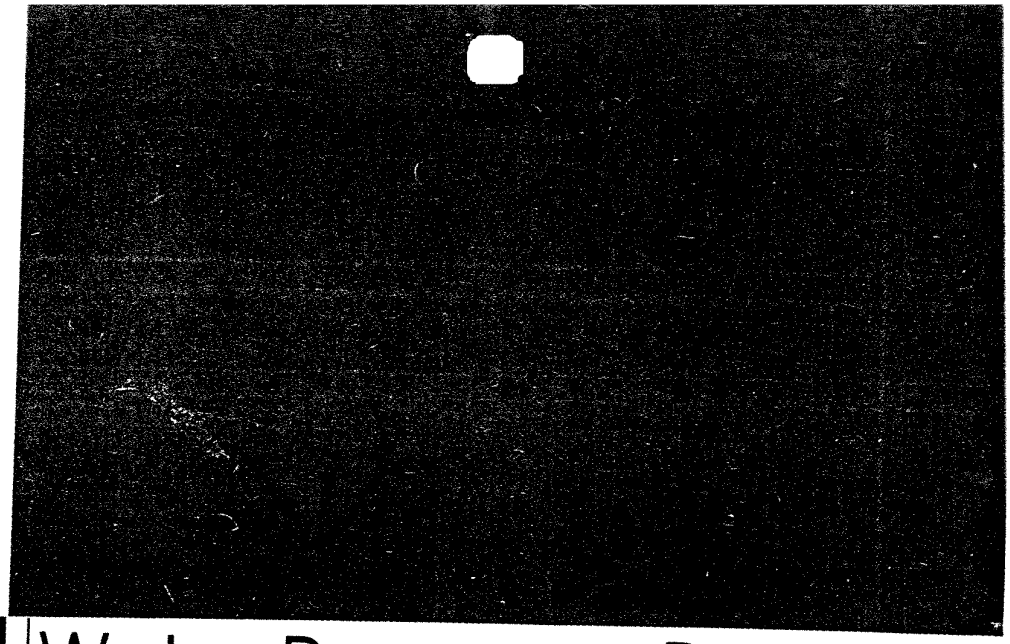
DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

DISCHARGE MEASUREMENTS MADE AT MISCELLANEOUS SITES DURING WATER YEAR 1979

Stream	Tributary to	Location	Drainage area mi² (km²)	Measured previously (water years)	Measurements	
					Date	Discharge (ft³/s)
		Hawaii, Island of Maui				
Waiehu	Pacific Ocean	Lat 20°55'17", long 156°29'53", 500 ft upstream from Waiehu Beach road bridge and 1,000 ft upstream from the mouth.	4.52	1965	11-12-78	3,330
Waihee	Pacific Ocean	Lat 20°56'52", long 156°31'03", 100 ft downstream from new Waihee River bridge, 600 ft downstream from old bridge and 0.45 mile upstream from the mouth.	6.18	-	11-12-78	4,320
		Hawaii, Island of Hawaii				
Alenaoi	Wailoa River	Lat 19°42'49", long 155°05'57", 0.8 mi south of Hilo High School and 1.2 mi southeast of Hilo Hospital.	8.07	1966	2-20-79	1,280
Kaalaala	Pacific Ocean	Lat 19°13'25", long 155°27'55", 1.8 mi northeast of Pahala, 1.8 mi east of Meyer Camp and 200 ft upstream of State Highway 11 bridge crossing.	2.22	-	2-20-79	6,460
Keaiwa	Pacific Ocean	Lat 19°12'58", long 155°28'05", 1.3 mi northeast of Pahala, 1.7 mi east of Meyer Camp and 200 ft downstream of State Highway 11 bridge crossing.	3.39	-	2-20-79	7,360
Piikea	Pacific Ocean	Lat 19°13'34", long 155°27'42", 2.0 mi northeast of Pahala, 2.1 mi east of Meyer Camp and 1,000 ft downstream of State Highway 11 bridge crossing.	7.83	-	2-20-79	6,920

000133

IWAO MATSUOKA



Water Resources Data for Hawaii and other Pacific Areas

Volume 1. Hawaii

U.S. GEOLOGICAL SURVEY WATER-DATA REPORT HI-80-1

WATER YEAR 1980

Prepared in cooperation with the State of Hawaii and with other agencies

000134

Annual maximum discharge at crest-stage partial-record stations during water year 1980--Continued

Station No.	Station name	Location	Drainage area mi² (km²)	Period of record	Annual maximum: Date	Annual maximum: Gage height (feet)	Annual maximum: Discharge (ft³/s)
		Hawaii, Island of Maui--Continued					
16603700	Kalialinui Gulch tributary near Pukalani	Lat 20°49'02", long 156°19'44", at Lower Kula Road and 1.4 mi (2.3 km) south of Pukalani.	1.17 (3.03)	1967-80	1- 9-80	7.35	414
16603800	Kaluapulani Gulch tributary near Pukalani	Lat 20°48'52", long 156°18'32", at Haleakala Highway, 1.5 mi (2.4 km) west of Olinda Prison Camp, and 2.3 mi (3.7 km) southeast of Pukalani.	.45 (1.17)	1963-80	1- 9-80	3.80	118
16603850	Kalialinui Gulch near Kahului	Lat 20°52'47", long 156°26'06", 600 ft (183 m) upstream from Hansen Road, 0.5 mi (0.8 km) northeast of Puunene Hospital, and 2.5 mi (4.0 km) southeast of Kahului Post Office.	17.9 (46.4)	1967-80	1- 9-80	-	1,020
**16607000	Iao Stream at Wailuku	Lat 20°53'38", long 156°30'27", 560 ft (171 m) upstream from Market Street bridge at Wailuku and 1.9 mi (3.1 km) upstream from mouth	8.24 (21.4)	1951≠, 1952-80	1- 8-80	5.38	a4,300
16616500	Unnamed gulch at Maluhia Camp	Lat 20°57'26", long 156°31'41", at Kahekili Highway, 0.6 mi (1.0 km) east of Maluhia Camp and 1.8 mi (2.9 km) northwest of Waihee.	.12 (.31)	1964-80	1- 8-80	6.21	86
16619700	Poelua Gulch near Kahakuloa	Lat 21°00'58", long 156°34'58", at Highway 30 (bypass), 1.3 mi (2.1 km) southeast of Nakalele Point lighthouse, and 2.2 mi (3.5 km) northwest of Kahakuloa.	1.18 (3.06)	1965-80	1- 8-80	8.07	267
16623400	Honokeana Gulch near Honokahua	Lat 20°59'39", long 156°40'13", at Honoapiilani Highway, 1.1 mi (1.8 km) southwest of Honokahua and 1.1 mi (1.8 km) south of Hawea Point.	.59 (1.53)	1964-80	1- 8-80	3.51	31
16630200	Honokowai Stream at Honokowai	Lat 20°56'58", long 156°41'07", 0.5 mi (0.8 km) southeast of Honokowai and 1.1 mi (1.8 km) northwest of Puukolii.	5.59 (14.48)	1962-63, 1965-80	1-10-80	4.54	592
16643300	Kauaula Stream near mouth, near Lahaina	Lat 20°52'09", long 156°39'43", 0.7 mi (1.1 km) upstream from Honoapiilani Highway (bypass) and 1.3 mi (2.1 km) southeast of Lahaina lighthouse.	4.12 (10.67)	1960, 1962, 1964-80	1-10-80	4.97	741
16646200	Olowalu Stream at Olowalu	Lat 20°49'23", long 156°37'15", on downstream side of center pier of plantation road bridge, 0.6 mi (1.0 km) northeast of Olowalu, and 5.5 mi (8.8 km) southeast of Lahaina.	4.08 (10.57)	1962-72≠, 1973-80	1-10-80	4.94	1,020
16647500	Malalowaiaole Gulch near Maalaea	Lat 20°46'56", long 156°31'32", at Honoapiilani Highway, 200 ft (61 m) upstream from mouth, 0.2 mi (0.3 km) north of McGregor Point, and 1.2 mi (1.9 km) southwest of Maalaea.	.64 (1.66)	1964-80	1-10-80	12.95	350
16650500	Waikapu Stream near Kihei	Lat 20°49'02", long 156°29'00", at railroad bridge beside Lower Maalaea Road, 2.5 mi (4.0 km) northeast of Maalaea, and 2.5 mi (4.0 km) northwest of Kihei.	6.97 (18.05)	1963-80	1- 8-80	7.29	1,030

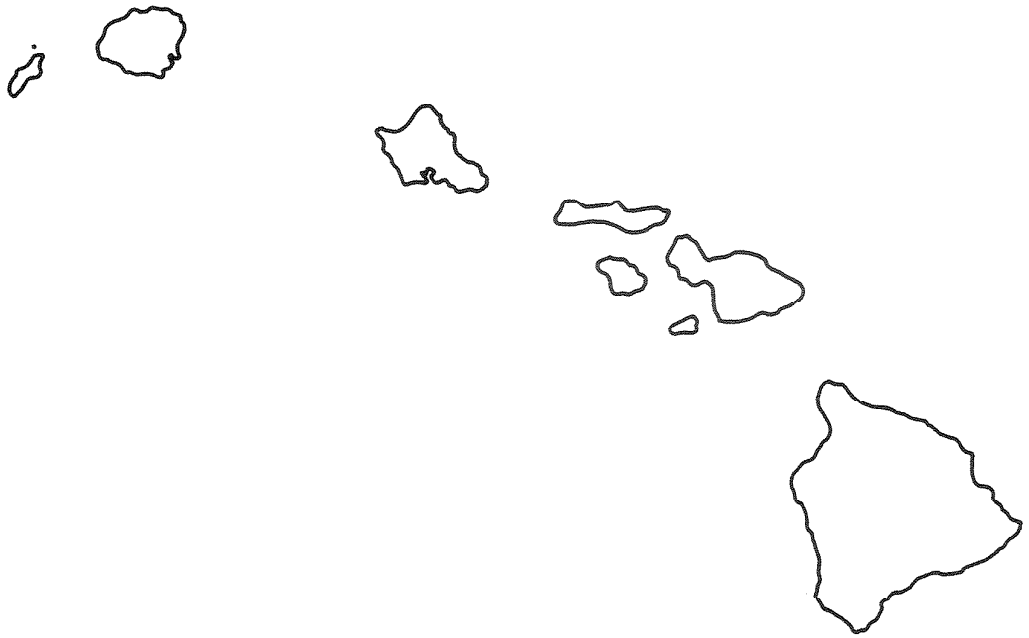
** Also a water-quality partial-record station.
≠ Operated as a continuous-record gaging station.
a Estimated.

000135

Water Resources Data Hawaii

Water Year 1981

Volume 1. Hawaii



U.S. GEOLOGICAL SURVEY WATER-DATA REPORT HI-81-1

Prepared in cooperation with the State of Hawaii
and with other agencies

000136

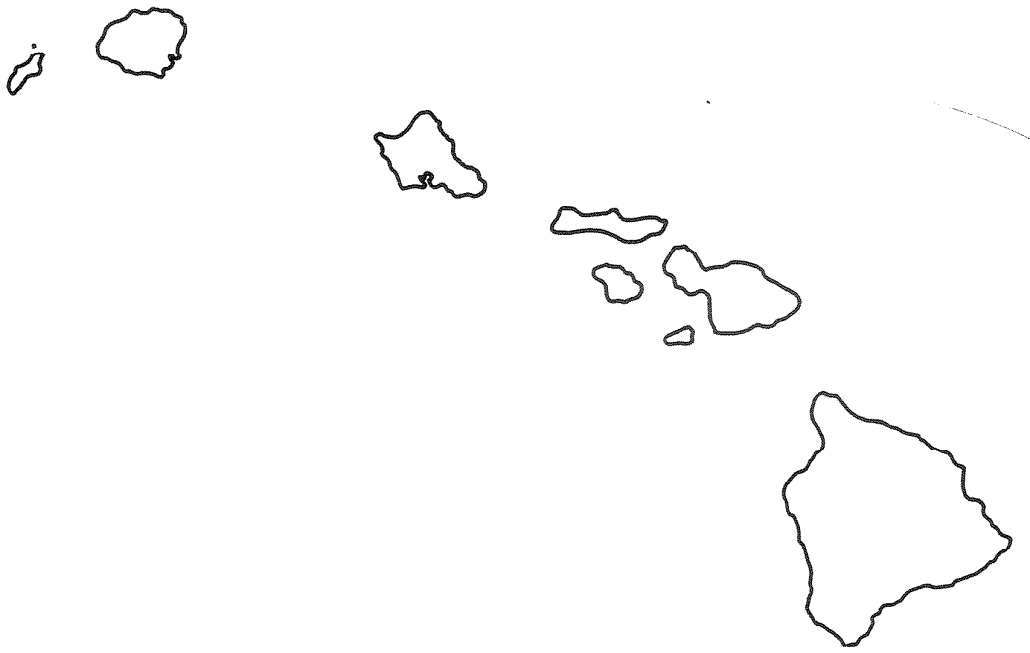
Annual maximum discharge at crest-stage partial-record stations during water year 1981--Continued

Station No.	Station name	Location	Drainage area mi² (km²)	Period of record	Annual maximum: Date	Annual maximum: Gage height (feet)	Annual maximum: Discharge (ft³/s)
		Hawaii, Island of Maui--Continued					
16603700	Kalialinui Gulch tributary near Pukalani	Lat 20°49'02", long 156°19'44", at Lower Kula Road and 1.4 mi (2.3 km) south of Pukalani.	1.17 (3.03)	1967-81	9-20-81	2.74	53
16603800	Kaluapulani Gulch tributary near Pukalani	Lat 20°48'52", long 156°18'32", at Haleakala Highway, 1.5 mi (2.4 km) west of Olinda Prison Camp, and 2.3 mi (3.7 km) southeast of Pukalani.	.45 (1.17)	1963-81	2-11-81	1.68	32
16603850	Kalialinui Gulch near Kahului	Lat 20°52'47", long 156°26'06", 600 ft (183 m) upstream from Hansen Road, 0.5 mi (0.8 km) northeast of Puunene Hospital, and 2.5 mi (4.0 km) southeast of Kahului Post Office.	17.9 (46.4)	1967-81	-	-	No flow
**16607000	Iao Stream at Wailuku	Lat 20°53'38", long 156°30'27", 560 ft (171 m) upstream from Market Street bridge at Wailuku and 1.9 mi (3.1 km) upstream from mouth.	8.24 (21.4)	1951≠, 1952-81	8- 4-81	3.72	1,670
16616500	Unnamed gulch at Maluhia Camp	Lat 20°57'26", long 156°31'41", at Kahekili Highway, 0.6 mi (1.0 km) east of Maluhia Camp and 1.8 mi (2.9 km) northwest of Waihee.	.12 (.31)	1964-81	-	-	No flow
16619700	Poelua Gulch near Kahakuloa	Lat 21°00'58", long 156°34'58", at Highway 30 (bypass), 1.3 mi (2.1 km) southeast of Nakalele Point lighthouse, and 2.2 mi (3.5 km) northwest of Kahakuloa.	1.18 (3.06)	1965-81	4-30-81	6.32	151
16623400	Honokeana Gulch near Honokahua	Lat 20°59'39", long 156°40'13", at Honoapiilani Highway, 1.1 mi (1.8 km) southwest of Honokahua and 1.1 mi (1.8 km) south of Hawea Point.	.59 (1.53)	1964-81	-	-	No flow
16630200	Honokowai Stream at Honokowai	Lat 20°56'58", long 156°41'07", 0.5 mi (0.8 km) southeast of Honokowai and 1.1 mi (1.8 km) northwest of Puukolii.	5.59 (14.48)	1962-63, 1965-81	8- 4-81	3.28	306
16643300	Kauaula Stream near mouth, near Lahaina	Lat 20°52'09", long 156°39'43", 0.7 mi (1.1 km) upstream from Honoapiilani Highway (bypass) and 1.3 mi (2.1 km) southeast of Lahaina lighthouse.	4.12 (10.67)	1960, 1962, 1964-81	12-25-80	3.20	191
16646200	Olowalu Stream at Olowalu	Lat 20°49'23", long 156°37'15", on downstream side of center pier of plantation road bridge, 0.6 mi (1.0 km) northeast of Olowalu, and 5.5 mi (8.8 km) southeast of Lahaina.	4.08 (10.57)	1962-72≠, 1973-81	12-25-80	3.38	364
16647500	Malalowaiaole Gulch near Maalaea	Lat 20°46'56", long 156°31'32", at Honoapiilani Highway, 200 ft (61 m) upstream from mouth, 0.2 mi (0.3 km) north of McGregor Point, and 1.2 mi (1.9 km) southwest of Maalaea.	.64 (1.66)	1964-81	-	-	No flow
16650500	Waikapu Stream near Kihei	Lat 20°49'02", long 156°29'00", at railroad bridge beside Lower Maalaea Road, 2.5 mi (4.0 km) northeast of Maalaea, and 2.5 mi (4.0 km) northwest of Kihei.	6.97 (18.05)	1963-81	8- 4-81	2.49	227

** Also a water-quality partial-record station.
≠ Operated as a continuous-record gaging station.
a Estimated.

Water Resources Data
Hawaii and other Pacific Areas
Water Year 1982

Volume 1. Hawaii



U.S. GEOLOGICAL SURVEY WATER-DATA REPORT HI-82-1
Prepared in cooperation with the State of Hawaii Department of Land and Natural Resources, Division of Water and Land Development and with other agencies

000138

Annual maximum discharge at crest-stage partial-record stations during water year 1982--Continued

Station No.	Station name	Location	Drainage area mi² (km²)	Period of record	Annual maximum: Date	Annual maximum: Gage height (feet)	Annual maximum: Discharge (ft³/s)
		Hawaii, Island of Maui--Continued					
16603700	Kalialinui Gulch tributary near Pukalani	Lat 20°49'02", long 156°19'44", at Lower Kula Road and 1.4 mi (2.3 km) south of Pukalani.	1.17 (3.03)	1967-82	2-11-82	6.65	340
16603800	Kaluapulani Gulch tributary near Pukalani	Lat 20°48'52", long 156°18'32", at Haleakala Highway, 1.5 mi (2.4 km) west of Olinda Prison Camp, and 2.3 mi (3.7 km) southeast of Pukalani.	.45 (1.17)	1963-82	11- 1-81	4.30	143
16603850	Kalialinui Gulch near Kahului	Lat 20°52'47", long 156°26'06", 600 ft (183 m) upstream from Hansen Road, 0.5 mi (0.8 km) northeast of Puunene Hospital, and 2.5 mi (4.0 km) southeast of Kahului Post Office.	17.9 (46.4)	1967-82	2-11-82	6.48	732
**16607000	Iao Stream at Wailuku	Lat 20°53'38", long 156°30'27", 560 ft (171 m) upstream from Market Street bridge at Wailuku and 1.9 mi (3.1 km) upstream from mouth.	8.24 (21.4)	1951≠, 1952-82	1-21-82	5.04	3,380
16616500	Unnamed gulch at Maluhia Camp	Lat 20°57'26", long 156°31'41", at Kahekili Highway, 0.6 mi (1.0 km) east of Maluhia Camp and 1.8 mi (2.9 km) northwest of Waihee.	.12 (.31)	1964-82	3-31-82	7.68	101
16619700	Poelua Gulch near Kahakuloa	Lat 21°00'58", long 156°34'58", at Highway 30 (bypass), 1.3 mi (2.1 km) southeast of Nakalele Point lighthouse, and 2.2 mi (3.5 km) northwest of Kahakuloa.	1.18 (3.06)	1965-82	4- 1-82	12.01	487
16623400	Honokeana Gulch near Honokahua	Lat 20°59'39", long 156°40'13", at Honoapiilani Highway, 1.1 mi (1.8 km) southwest of Honokahua and 1.1 mi (1.8 km) south of Hawea Point.	.59 (1.53)	1964-82	3-21-82	4.06	88
16630200	Honokowai Stream at Honokowai	Lat 20°56'58", long 156°41'07", 0.5 mi (0.8 km) southeast of Honokowai and 1.1 mi (1.8 km) northwest of Puukolii.	5.59 (14.48)	1962-63, 1965-82	8- 1-82	11.0	4,520
16643300	Kauaula Stream near mouth, near Lahaina	Lat 20°52'09", long 156°39'43", 0.7 mi (1.1 km) upstream from Honoapiilani Highway (bypass) and 1.3 mi (2.1 km) southeast of Lahaina lighthouse.	4.12 (10.67)	1960, 1962, 1964-82	8-10-82	4.43	526
16646200	Olowalu Stream at Olowalu	Lat 20°49'23", long 156°37'15", on downstream side of center pier of plantation road bridge, 0.6 mi (1.0 km) northeast of Olowalu, and 5.5 mi (8.8 km) southeast of Lahaina.	4.08 (10.57)	1962-72≠, 1973-82	8- 1-82	4.20	600
16647500	Malalowaiaole Gulch near Maalaea	Lat 20°46'56", long 156°31'32", at Honoapiilani Highway, 200 ft (61 m) upstream from mouth, 0.2 mi (0.3 km) north of McGregor Point, and 1.2 mi (1.9 km) southwest of Maalaea.	.64 (1.66)	1964-82	1- 7-82	4.06	24
16650500	Waikapu Stream near Kihei	Lat 20°49'02", long 156°29'00", at railroad bridge beside Lower Maalaea Road, 2.5 mi (4.0 km) northeast of Maalaea, and 2.5 mi (4.0 km) northwest of Kihei.	6.97 (18.05)	1963-82	1- 7-82	6.56	949

** Also a water quality partial-record station.
≠ Operated as a continuous-record gaging station.

WATER QUALITY DATA, WATER YEAR OCTOBER 1981 TO SEPTEMBER 1982

HAWAII, ISLAND OF MAUI--Continued

DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS)	SPE-CIFIC CON-DUCT-ANCE (UMHOS)	PH (UNITS)	TEMPER-ATURE (DEG C)
16538000 - SPRECKELS DITCH AT HAIPUAENA WEIR NR HUELO, MA (LAT 20 51 15 LONG 156 11 25)					
OCT , 1981					
07...	1010	18	33	5.9	19.0
NOV					
20...	1010	16	32	6.3	18.5
JAN , 1982					
14...	1310	8.7	49	6.9	19.0
MAR					
05...	1425	31	30	6.8	17.0
APR , 1982					
19...	1100	32	28	7.4	18.5
JUN					
09...	1000	9.7	38	7.1	20.0
AUG					
09...	1210	56	29	6.6	21.5
16541000 - KOOLAU DITCH AT HAIPUAENA NR HUELO, MAUI, HI (LAT 20 51 17 LONG 156 11 19)					
OCT , 1981					
07...	1400	74	40	6.1	20.0
NOV					
20...	1315	83	43	6.6	18.5
JAN , 1982					
14...	1500	55	47	6.9	18.5
MAR					
05...	1220	163	34	6.7	17.0
APR , 1982					
19...	1430	119	34	7.0	18.0
JUN					
09...	1240	99	46	7.0	19.5
AUG					
09...	1555	181	39	6.8	20.5
16541500 - MANUEL LUIS DITCH AT PUOHOKAMOA GL NR HUELO, MA (LAT 20 51 48 LONG 156 10 59)					
OCT , 1981					
07...	1245	1.0	53	5.8	21.5
NOV					
20...	1000	1.5	57	6.4	20.5
JAN , 1982					
14...	1255	1.0	60	6.6	20.0
MAR					
04...	1500	20	27	6.7	17.5
APR , 1982					
22...	1250	29	33	6.5	17.5
JUN					
09...	1445	.70	59	7.0	22.0
AUG					
13...	1235	2.2	53	6.6	22.0
16587000 - HONOPOU STREAM NR HUELO, MAUI, HI (LAT 20 53 20 LONG 156 15 20)					
OCT , 1981					
01...	1220	.96	54	6.2	20.5
NOV					
23...	1200	11	40	5.6	19.5
JAN , 1982					
05...	1155	1.3	55	7.1	17.5
MAR					
09...	1525	3.7	51	6.9	18.0
APR , 1982					
22...	1340	19	45	6.7	17.5
JUN					
25...	1110	.94	55	6.9	21.5
AUG					
17...	1105	7.1	42	6.7	22.0
SEP					
27...	1240	2.3	49	6.9	22.0
16588000 - WAILOA DITCH AT HONOPOU NR HUELO, MAUI, HI (LAT 20 53 20 LONG 156 15 19)					
OCT , 1981					
01...	1120	113	42	6.3	20.0
NOV					
23...	1200	298	20	5.3	18.5
JAN , 1982					
05...	1115	83	49	7.2	17.0
MAR					
09...	1310	266	32	6.8	16.5
APR , 1982					
22...	1240	241	22	6.5	16.5
JUN					
25...	1010	66	47	6.8	20.0
AUG					
17...	1000	295	35	6.8	20.0
16589000 - NEW HAMAKUA DITCH AT HONOPOU NR HUELO, MAUI, H (LAT 20 53 28 LONG 156 15 22)					
OCT , 1981					
01	1455	86	39	6.2	20.0
NOV					
23...	1515	157	21	5.5	18.5
JAN , 1982					
05...	1315	.92	63	7.2	19.0
MAR					
09...	1130	118	35	6.9	17.0
APR , 1982					
22...	1500	58	28	6.1	16.5
JUN					
25...	1215	.55	64	7.0	24.0
AUG					
17...	1315	76	49	6.7	22.0

OBSERVATIONS OF PHYSICAL PARAMETERS

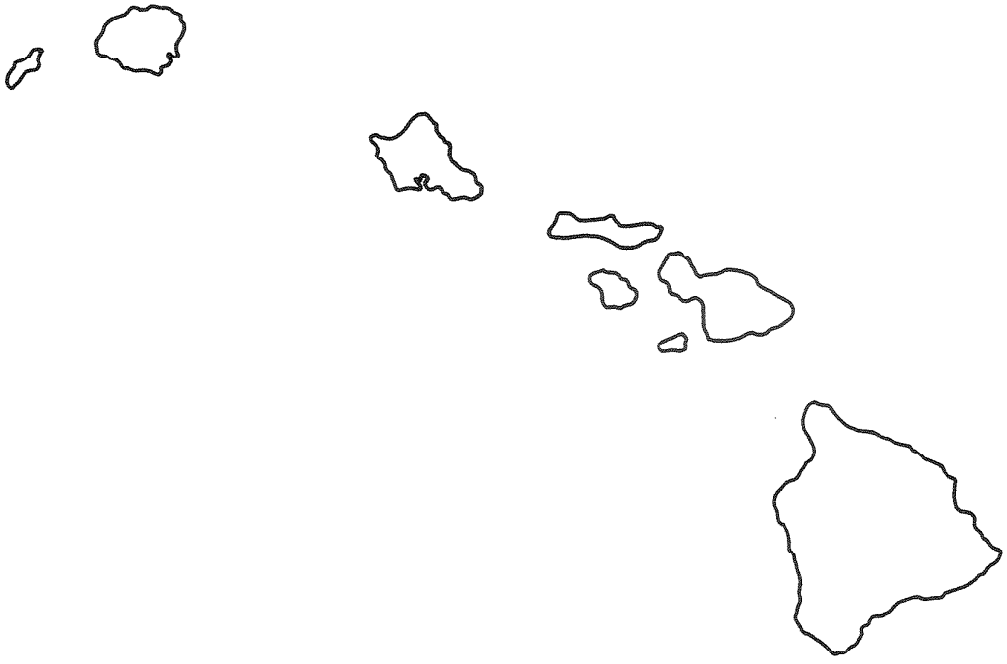
WATER QUALITY DATA, WATER YEAR OCTOBER 1981 TO SEPTEMBER 1982

HAWAII, ISLAND OF MAUI--Continued

DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS)	SPE-CIFIC CON-DUCT-ANCE (UMHOS)	PH (UNITS)	TEMPER-ATURE (DEG C)
16592000 - LOWRIE DITCH AT HONOPOU GULCH NR HUELO, MAUI, (LAT 20 54 57 LONG 156 15 08)					
OCT , 1981					
08...	1450	14	52	6.2	22.5
NOV					
20...	1530	33	60	6.5	21.5
JAN , 1982					
11...	1245	1.9	65	6.7	22.0
MAR					
19...	1245	1.6	67	6.4	23.5
APR , 1982					
19...	1215	1.1	80	6.4	24.0
JUN					
08...	1410	25	52	6.7	23.5
AUG					
10...	1425	79	32	6.7	22.5
16594000 - HAIKU DITCH AT HONOPOU GULCH NR KAILUA, MAUI, HI (LAT 20 55 07 LONG 156 14 58)					
OCT , 1981					
08...	1330	1.7	66	6.1	22.0
NOV					
20...	1600	4.4	84	6.1	22.0
JAN , 1982					
11...	1030	.28	96	5.6	21.0
MAR					
19...	1100	.19	90	5.9	22.5
APR , 1982					
19...	1015	31	59	6.5	19.5
JUN					
08...	1020	1.9	100	6.6	23.0
AUG					
10...	1510	96	31	6.8	23.0
16599500 - OPANA TUNNEL NR KAILIILI, MAUI, HI (LAT 20 51 04 LONG 156 16 17)					
OCT , 1981					
01...	1410	.58	55	5.8	20.0
DEC					
01...	1310	12	26	5.8	16.5
JAN , 1982					
06...	1430	1.9	50	6.5	16.0
MAR					
10...	1515	12	25	6.7	15.0
APR , 1982					
23...	1145	7.0	32	6.4	16.0
JUN					
15...	1455	1.5	53	6.7	21.0
AUG					
18...	1420	5.0	39	6.5	19.5
16607000 - IAO STREAM AT WAILUKU, MAUI, HI (LAT 20 53 38 LONG 156 30 27)					
NOV , 1981					
30...	1010	35	86	7.0	19.0
16620000 - HONOKOHAU STREAM NR HONOKUHAU, MAUI, HI (LAT 20 57 48 LONG 156 35 22)					
OCT , 1981					
09...	1125	13	66	7.1	18.5
NOV					
30...	1410	51	48	7.1	18.0
JAN , 1982					
15...	1125	16	68	7.7	18.0
MAR					
22...	1115	155	19	7.3	19.0
APR , 1982					
05...	1400	33	55	6.8	19.5
MAY					
10...	1300	55	58	7.3	18.0
JUN					
23...	1300	24	73	7.1	21.0
AUG					
18...	1245	33	61	7.1	20.0
16638500 - KAHOMA STREAM AT LAHAINA, MAUI, HI (LAT 20 53 10 LONG 156 40 36)					
NOV , 1981					
24...	1030	58	51	6.5	18.0
25...	1045	.46	90	6.7	21.0
JAN , 1982					
22...	1225	20	73	6.9	19.5
MAR , 1982					
23...	1500	69	26	7.1	19.0
AUG					
02...	1325	4.7	48	6.8	24.0
10...	1035	320	25	6.9	20.5

Water Resources Data Hawaii and other Pacific Areas Water Year 1983

Volume 1. Hawaii



U.S. GEOLOGICAL SURVEY WATER-DATA REPORT HI-83-1
Prepared in cooperation with the State of Hawaii Department of Land and Natural Resources, Division of Water and Land Development and with other agencies

000142

1983

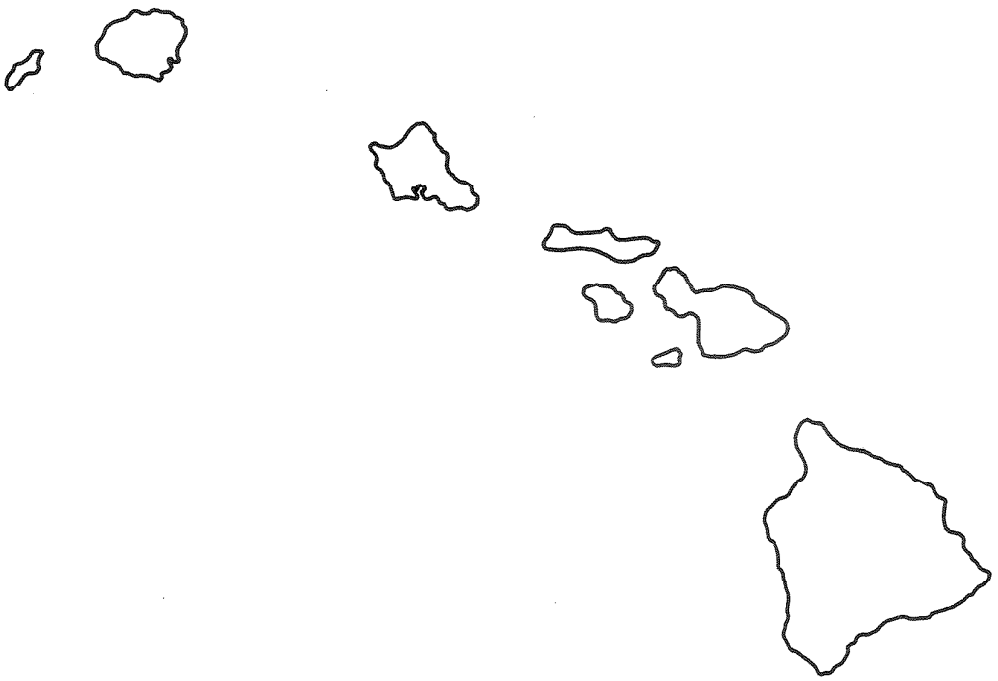
Annual maximum discharge at crest-stage partial-record stations during water year 1983--Continued

Station No.	Station name	Location	Drainage area mi²	Period of record	Annual Maximum Date	Gage height (feet)	Annual Maximum Discharge (ft³/s)
		Hawaii, Island of Maui--Continued					
16502900	Kawaipapa Gulch at Hana	Lat 20°46'08", long 156°00'04, 1,000 ft upstream from Highway 36 and 0.3 mi northwest of Hana Hospital.	5.83	1965-83	12-18-82	6.22	2,160
16603300	Unnamed gulch at Maliko Bay	Lat 20°56'26", long 156°21'04", at Hana Highway, 0.5 mi west of Maliko Bay, and 1.3 mi north of Hamakuapoko.	.43	1963-83	-	-	No flow
16603700	Kalialinui Gulch tributary near Pukalani	Lat 20°49'02", long 156°19'44", at Lower Kula Road and 1.4 mi south of Pukalani.	1.17	1967-83	11-24-82	1.14	6.6
16603800	Kaluapulani Gulch tributary near Pukalani	Lat 20°48'52", long 156°18'32", at Haleakala Highway, 1.5 mi west of Olinda Prison Camp, and 2.3 mi southeast of Pukalani.	.45	1963-83	11-24-82	1.59	29
16603850	Kalialinui Gulch near Kahului	Lat 20°52'47", long 156°26'06", 600 ft upstream from Hansen Road, 0.5 mi northeast of Puunene Hospital, and 2.5 mi southeast of Kahului Post Office.	17.9	1967-83	-	-	No flow
16607000	Iao Stream at Wailuku	Lat 20°53'38", long 156°30'27", 560 ft upstream from Market Street bridge at Wailuku and 1.9 mi upstream from mouth.	8.24	1951≠, 1952-83	12-23-82	4.54	2,600
16616500	Unnamed gulch at Maluhia Camp	Lat 20°57'26", long 156°31'41", at Kahekili Highway, 0.6 mi east of Maluhia Camp, and 1.8 mi northwest of Waihee.	.12	1964-83	-	-	No flow
16619700	Poelua Gulch near Kahakuloa	Lat 21°00'58", long 156°34'58", at Highway 30 (bypass), 1.3 mi southeast of Nakalele Point lighthouse, and 2.2 mi northwest of Kahakuloa.	1.18	1965-83	11-23-82	5.47	102
16623400	Honokeana Gulch near Honokahua	Lat 20°59'39", long 156°40'13", at Honoapiilani Highway, 1.1 mi southwest of Honokahua, and 1.1 mi south of Hawea Point.	.59	1964-83	11-23-82	-	a2
16630200	Honokowai Stream at Honokowai	Lat 20°56'58", long 156°41'07", 0.5 mi southeast of Honokowai, and 1.1 mi northwest of Puukolii.	5.59	1962-63, 1965-83	9-17-83	2.65	120
16643300	Kauaula Stream near mouth, near Lahaina	Lat 20°52'09", long 156°39'43", 0.7 mi upstream from Honoapiilani Highway (bypass) and 1.3 mi southeast of Lahaina Lighthouse.	4.12	1960, 1962, 1964-83	12-18-82	3.48	246
16646200	Olowalu Stream at Olowalu	Lat 20°49'23", long 156°37'15", on downstream side of center pier of plantation road bridge, 0.6 mi northeast of Olowalu, and 5.5 mi southeast of Lahaina.	4.08	1962-72≠, 1973-83	12-23-82	3.95	488
16647500	Malalowaiaole Gulch near Maalaea	Lat 20°46'56", long 156°31'32", at Honoapiilani Highway, 200 ft upstream from mouth, 0.2 mi north of McGregor Point, and 1.2 mi southwest of Maalaea.	.64	1964-83	12-23-82	4.44	35
16650500	Waikapu Stream near Kihei	Lat 20°49'02", long 156°29'00", at railroad bridge beside Lower Maalaea Road, 2.5 mi northeast of Maalaea, and 2.5 mi northwest of Kihei.	6.97	1963-83	12-23-82	5.52	793

≠ Operated as a continuous-record gaging station.

Water Resources Data Hawaii and other Pacific Areas Water Year 1984

Volume 1. Hawaii



U.S. GEOLOGICAL SURVEY WATER-DATA REPORT HI-84-1
Prepared in cooperation with the State of Hawaii Department of Land and Natural Resources, Division of Water and Land Development and with other agencies

000144

16604500 IAO STREAM AT KEPANIWAI PARK, NEAR WAILUKU

LOCATION.--Lat 20°53'08", long 156°32'32", Hydrologic Unit 20020000, on left bank of Maniania and Waikapu ditch intake, 0.3 mi upstream from Kepaniwai Park, 0.5 mi downstream from Iao Valley State Park, and 2.3 mi west of Wailuku Post Office.

DRAINAGE AREA.--5.98 mi².

PERIOD OF RECORD.--May 1983 to September 1984.

GAGE.--Water-stage recorder. Altitude of gage is 780 ft, from topographic map.

REMARKS.--Records fair. No appreciable diversion above station. Observations of specific conductance, pH, and water temperature made during the year are published elsewhere in this report.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge 3,180 ft³/s Dec. 25, 1983, gage height, 6.48 ft, from rating curve extended above 120 ft³/s on basis of slope-area measurement at peak flow; no other peak above base of 1,000 ft³/s; minimum, 13 ft³/s Sept. 25-30, 1984.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum discharge known, 7,540 ft³/s Dec. 3, 1950, from rating curve based on model study of site 2.3 mi downstream.

DISCHARGE, IN CUBIC FEET PER SECOND, MAY TO SEPTEMBER 1983
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1												
2								70	58	18	47	19
3								86	58	34	71	22
4								68	33	37	55	29
5								109	58	31	78	20
6								95	90	61	61	30
7												
8								86	58	56	43	25
9								239	39	39	40	43
10								120	62	46	32	62
11								65	46	34	28	24
12								52	86	39	24	23
13								76	50	61	28	35
14								49	40	54	62	50
15								97	51	40	29	74
16								49	58	43	24	36
17								38	36	29	23	35
18								38	40	26	50	45
19								62	40	31	33	152
20								36	30	52	30	122
21								30	28	57	23	50
22								28	32	31	22	46
23								60	30	26	22	80
24								32	40	26	22	60
25								27	27	29	20	39
26								44	30	27	48	31
27								48	30	42	24	54
28								52	40	36	36	62
29								45	24	48	26	67
30								31	21	43	28	67
31								32	20	31	22	102
								27	21	30	24	101
TOTAL								28	---	24	21	---
MEAN								1999	1276	1181	1096	1605
MAX								64.5	42.5	38.1	35.4	53.5
MIN								239	90	61	78	152
AC-FT								27	20	18	20	19
								3970	2530	2340	2170	3180

HAWAII, ISLAND OF MAUI

16604500 IAO STREAM AT KEPANIWAI PARK, NEAR WAILUKU--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	70	53	22	41	39	26	24	24	23	19	30	32
2	48	48	21	38	79	184	21	33	22	23	22	22
3	56	48	20	35	41	78	21	34	23	20	20	20
4	172	86	20	34	34	68	24	28	22	19	36	18
5	127	204	20	188	30	45	20	24	27	19	28	18
6	132	73	21	117	28	36	119	24	23	19	21	17
7	124	53	24	60	52	32	44	24	21	18	18	17
8	156	45	22	49	113	30	31	24	26	68	17	16
9	75	41	24	42	84	28	36	23	31	61	17	16
10	95	38	19	40	45	26	65	22	40	29	49	16
11	53	85	19	38	36	24	78	22	26	23	19	15
12	88	322	18	78	36	24	44	24	23	21	47	15
13	51	135	18	281	38	24	48	22	24	20	24	15
14	55	76	18	116	71	24	290	21	21	19	18	14
15	49	64	27	205	162	22	115	35	28	19	18	14
16	155	53	28	87	68	22	106	31	54	20	17	14
17	145	44	20	66	46	22	71	50	32	19	17	15
18	103	40	18	53	54	21	52	29	26	19	16	16
19	251	38	17	44	145	21	45	24	24	20	16	14
20	100	35	16	39	98	20	40	30	23	74	16	14
21	64	33	16	34	56	19	40	34	24	26	19	14
22	49	31	16	32	39	19	51	29	23	20	73	14
23	42	45	16	56	44	19	51	24	23	18	44	14
24	80	77	16	34	46	19	39	24	22	20	25	14
25	91	44	454	32	38	19	33	43	21	18	25	14
26	165	32	259	35	32	23	35	23	20	30	26	13
27	293	29	123	44	30	44	30	22	20	22	43	13
28	112	26	80	47	30	82	28	21	20	22	24	13
29	73	24	62	57	24	36	30	41	19	18	21	13
30	73	22	50	60	---	28	27	49	19	17	19	13
31	56	---	44	82	---	22	---	26	---	21	22	---
TOTAL	3203	1944	1548	2164	1638	1107	1658	864	750	781	807	473
MEAN	103	64.8	49.9	69.8	56.5	35.7	55.3	27.9	25.0	25.2	26.0	15.8
MAX	293	322	454	281	162	184	290	50	54	74	73	32
MIN	42	22	16	32	24	19	20	21	19	17	16	13
AC-FT	6350	3860	3070	4290	3250	2200	3290	1710	1490	1550	1600	938

WTR YR 1984 TOTAL 16937 MEAN 46.3 MAX 454 MIN 13 AC-FT 33590

16614000 WAIHEE RIVER AT DAM, NEAR WAIHEE

LOCATION.--Lat 20°56'21", long 156°32'59", Hydrologic Unit 20020000, on right bank at dam 8 ft upstream from the abandoned Waihee canal intake, 2.6 mi southwest from Waihee Point, and 4.4 mi northwest from Wailiku Post Office.

DRAINAGE AREA.--4.20 mi².

PERIOD OF RECORD.--November 1910 to December 1913, November 1983 to September 1984. Low-flow records not equivalent prior to Dec. 31, 1913, due to Waihee canal diverted water above station.

GAGE.--Water-stage recorder. Altitude of gage is 605 ft, from topographic map.

REMARKS.--Records fair. No diversion above station. Observations of specific conductance, pH, and water temperature made during the year are published elsewhere in this report.

EXTREMES FOR CURRENT YEAR.--Peak discharges during period November to September above base of 2,000 ft³/s and maximum (*), from rating curve extended above 280 ft³/s on basis of slope-area measurement at gage height 3.99 ft:

Date	Time	Discharge (ft³/s)	Gage height (ft)
July 20	1630	*2730	4.44
Aug. 22	2000	2530	4.34

Minimum discharge, 28 ft³/s, Sept. 30.

DISCHARGE, IN CUBIC FEET PER SECOND, NOVEMBER 1983 TO SEPTEMBER 1984
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1		67	50	43	57	44	46	42	40	37	48	80
2		61	50	43	97	156	43	48	40	40	37	42
3		63	54	43	57	49	44	74	42	39	36	35
4		138	50	44	47	49	44	55	40	37	54	34
5		237	50	226	43	46	42	47	43	37	45	34
6		68	68	68	43	44	160	42	40	36	35	32
7		59	70	47	127	44	47	50	40	39	34	31
8		57	67	44	146	43	44	44	49	168	34	30
9		55	59	43	68	43	58	42	54	136	35	31
10		55	49	43	50	43	97	42	71	43	43	32
11		191	50	44	47	43	85	48	43	39	35	31
12		418	47	147	57	43	49	55	40	37	131	30
13		81	50	471	100	43	52	43	43	37	39	31
14		68	55	68	146	46	382	43	39	36	34	31
15		73	64	92	257	44	60	64	50	35	32	30
16		64	57	50	59	43	86	49	98	34	31	30
17		59	47	50	50	43	66	76	43	34	31	34
18		57	46	50	76	43	54	47	40	34	31	30
19		55	46	47	202	42	67	46	39	36	32	30
20		57	46	47	77	42	67	54	37	265	31	30
21		54	46	46	57	40	55	52	39	40	35	30
22		52	46	46	63	40	47	46	37	36	172	29
23		61	46	112	52	42	80	43	37	35	44	30
24		111	46	54	50	40	50	44	39	43	36	33
25		71	264	52	50	40	43	43	36	40	49	31
26		57	102	54	47	52	44	44	36	43	41	30
27		54	54	57	46	67	43	42	37	111	71	30
28		52	46	57	104	88	43	42	37	42	37	30
29		52	44	69	49	50	44	47	36	36	36	29
30		54	43	66	---	47	42	68	36	36	35	28
31		---	43	67	---	43	---	42	---	39	44	---
TOTAL		2601	1855	2390	2324	1542	2084	1524	1301	1700	1428	988
MEAN		86.7	59.8	77.1	80.1	49.7	69.5	49.2	43.4	54.8	46.1	32.9
MAX		418	264	471	257	156	382	76	98	265	172	80
MIN		52	43	43	43	40	42	42	36	34	31	28
AC-FT		5160	3680	4740	4610	3060	4130	3020	2580	3370	2830	1960

000147

1984

Annual maximum discharge at crest-stage partial-record stations during water year 1984--Continued

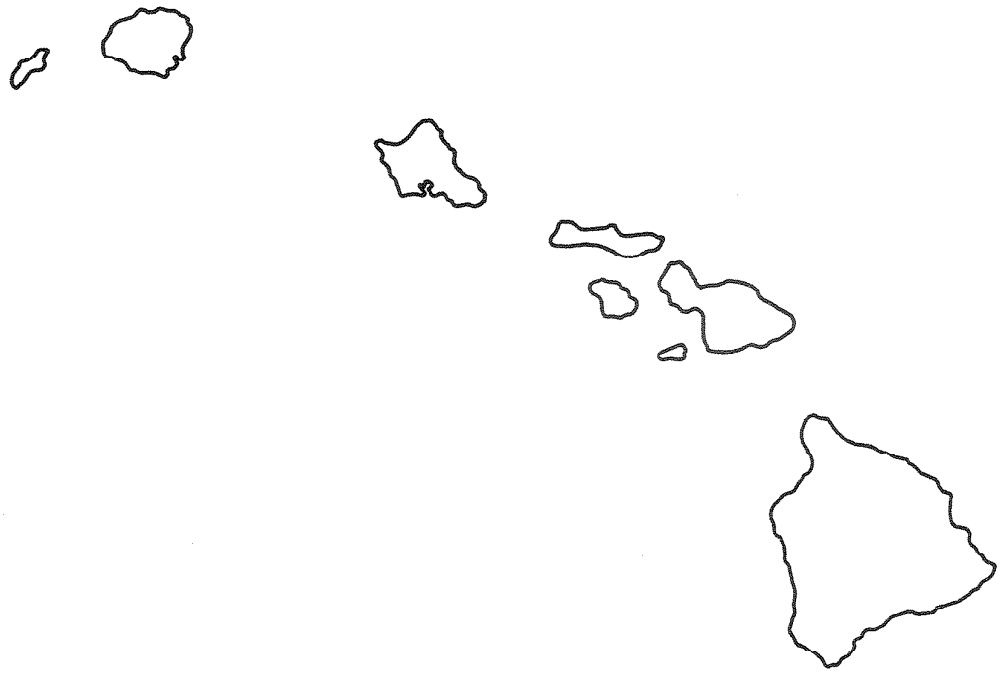
Station No.	Station name	Location	Drainage area mi²	Period of record	Annual Maximum Date	Gage height (feet)	Discharge (ft³/s)
		Hawaii, Island of Maui--Continued					
16602900	Kawaipapa Gulch at Hana	Lat 20°46'08", long 156°00'04", 1,000 ft upstream from Highway 36 and 0.3 mi northwest of Hana Hospital.	5.83	1965-84	2- 8-84	6.29	2,250
16603300	Unnamed gulch at Maliko Bay	Lat 20°56'26", long 156°21'04", at Hana Highway, 0.5 mi west of Maliko Bay, and 1.3 mi north of Hamakuapoko.	.43	1963-84	-	-	No flow
16603700	Kalialinui Gulch tributary near Pukalani	Lat 20°49'02", long 156°19'44", at Lower Kula Road and 1.4 mi south of Pukalani.	1.17	1967-84	-	-	No flow
16603800	Kaluapulani Gulch tributary near Pukalani	Lat 20°48'52", long 156°18'32", at Haleakala Highway, 1.5 mi west of Olinda Prison Camp, and 2.3 mi southeast of Pukalani.	.45	1963-84	12-25-83	1.25	16
16603850	Kalialinui Gulch near Kahului	Lat 20°52'47", long 156°26'06", 600 ft upstream from Hansen Road, 0.5 mi northeast of Puunene Hospital, and 2.5 mi southeast of Kahului Post Office.	17.9	1967-84		-	No flow
16607000	Iao Stream at Wailuku	Lat 20°53'38", long 156°30'27", 560 ft upstream from Market Street bridge at Wailuku and 1.9 mi upstream from mouth.	9.24	1951≠, 1952-84	12-25-83	5.05	3,400
16616500	Unnamed gulch at Maluhia Camp	Lat 20°57'26", long 156°31'41", at Kahekili Highway, 0.6 mi east of Maluhia Camp, and 1.8 mi northwest of Waihee.	.12	1964-84	-	-	No flow
16619700	Poelua Gulch near Kahakuloa	Lat 21°00'58", long 156°34'58", at Highway 30 (bypass), 1.3 mi southeast of Nakalele Point lighthouse, and 2.2 mi northwest of Kahakuloa.	1.18	1965-84	3- 2-84	5.41	100
16623400	Honokeana Gulch near Honokahua	Lat 20°59'39", long 156°40'13", at Honoapiilani Highway, 1.1 mi southwest of Honokahua, and 1.1 mi south of Hawea Point.	.59	1964-84	12-25-83	3.73	72
16630200	Honokowai Stream at Honokowai	Lat 20°56'58", long 156°41'07", 0.5 mi southeast of Honokowai, and 1.1 mi northwest of Puukolii.	5.59	1962-63, 1965-84	8-22-84	3.65	297
16643300	Kauaula Stream near mouth, near Lahaina	Lat 20°52'09", long 156°39'43", 0.7 mi upstream from Honoapiilani Highway (bypass) and 1.3 mi southeast of Lahaina Lighthouse.	4.12	1960, 1962, 1964-84	12-25-83	3.64	285
16646200	Olowalu Stream at Olowalu	Lat 20°49'23", long 156°37'15", on downstream side of center pier of plantation road bridge, 0.6 mi northeast of Olowalu, and 5.5 mi southeast of Lahaina.	4.08	1962-72≠, 1973-84	12-25-83	4.44	720
16647500	Malalowaiaole Gulch near Maalaea	Lat 20°46'56", long 156°31'32", at Honoapiilani Highway, 200 ft upstream from mouth, 0.2 mi north of McGregor Point, and 1.2 mi southwest of Maalaea.	.64	1964-84	12-25-83	6.06	95
16650500	Waikapu Stream near Kihei	Lat 20°49'02", long 156°29'00", at railroad bridge beside Lower Maalaea Road, 2.5 mi northeast of Maalaea, and 2.5 mi northwest of Kihei.	6.97	1963-84	12-25-83	7.85	1,080

≠ Operated as a continuous-record gaging station.

DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS)	SPE-CIFIC CON-DUCT-ANCE (UMHOS)	PH (STAND-ARD UNITS)	TEMPER-ATURE (DEG C)
16594000 - HAIKU DITCH AT HONOPOU GULCH NR KAILUA, MAUI, HI (LAT 20 55 07 LONG 156 14 58)					
OCT , 1983					
13...	1020	3.4	79	5.9	22.0
NOV					
28...	1015	2.4	94	5.2	21.5
JAN , 1984					
09...	1025	1.8	93	6.0	20.5
FEB					
17...	0920	7.0	77	5.9	20.0
APR , 1984					
02...	1235	1.5	94	5.7	23.0
MAY					
07...	1640	1.5	102	5.9	24.0
JUN					
28...	1030	1.4	100	6.9	23.0
AUG					
23...	1030	6.2	40	6.4	21.5
16599500 - OPANA TUNNEL NR KAILIILI, MAUI, HI (LAT 20 51 04 LONG 156 16 17)					
OCT , 1983					
11...	1530	4.2	33	6.6	18.0
NOV					
28...	1440	1.6	42	4.9	17.0
JAN , 1984					
16...	1520	3.3	31	6.5	17.0
FEB					
24...	0945	3.5	40	6.1	15.5
APR , 1984					
03...	1430	2.2	37	6.4	18.0
MAY					
25...	1300	2.4	40	6.3	20.0
JUN					
29...	1350	.37	72	5.8	20.0
AUG					
24...	1500	.65	50	6.5	21.0
16604500 - IAO STREAM AT KEPANIWAI PARK NR WAILUKU, MAUI, HI (LAT 20 53 08 LONG 156 32 32)					
NOV , 1983					
30...	1440	34	96	6.9	20.0
DEC					
26...	1400	245	84	7.3	20.0
JAN , 1984					
17...	1140	61	99	6.2	19.0
FEB					
27...	1220	33	95	5.9	20.5
MAR					
23...	1330	18	105	6.5	20.5
APR , 1984					
10...	1055	67	59	6.0	18.5
MAY					
22...	1040	32	81	7.3	21.0
JUN					
19...	1335	23	87	6.2	22.0
AUG					
14...	1225	18	88	7.0	23.5
16614000 - WAIHEE RIVER AT DAM NR WAIHEE, MAUI, HI (LAT 20 56 20 LONG 156 32 58)					
NOV , 1983					
15...	1425	61	62	5.5	19.5
DEC					
08...	1415	49	65	7.5	19.5
28...	1340	40	66	7.5	19.5
JAN , 1984					
13...	1200	705	29	6.1	18.0
31...	0930	106	54	6.3	18.5
FEB					
28...	1045	44	70	5.8	19.0
MAR , 1984					
23...	0940	43	70	6.7	19.0
APR					
30...	1000	40	68	6.2	19.0
JUN					
19...	1000	40	66	6.1	20.0
AUG					
14...	1200	36	65	7.1	21.0
16620000 - HONOKOHAU STREAM NR HONOKOHAU, MAUI, HI (LAT 20 57 48 LONG 156 35 22)					
OCT , 1983					
12...	1510	530	26	6.9	19.0
NOV					
29...	1300	19	68	7.7	19.5
JAN , 1984					
10...	1240	16	61	6.4	19.0
FEB					
23...	1150	20	56	7.3	18.0
APR , 1984					
04...	1245	20	62	7.7	19.5
MAY					
11...	1045	15	69	6.4	21.0
JUL					
03...	1300	14	68	7.9	21.5
AUG					
22...	1145	12	70	7.7	21.0
16638500 - KAHOMA STREAM AT LAHAINA, MAUI, HI (LAT 20 53 10 LONG 156 40 36)					
MAR , 1984					
02...	1105	58	30	6.8	18.5
APR , 1984					
11...	1000	7.3	66	6.3	20.0

Water Resources Data Hawaii and other Pacific Areas Water Year 1985

Volume 1. Hawaii



U.S. GEOLOGICAL SURVEY WATER-DATA REPORT HI-85-1
Prepared in cooperation with the State of Hawaii Department of Land and Natural Resources, Division of Water and Land Development and with other agencies

000150

16604500 IAO STREAM AT KEPANIWAI PARK, NEAR WAILUKU

LOCATION.--Lat 20°53'08", long 156°32'32", Hydrologic Unit 20020000, on left bank of Maniania and Waikapu ditch intake, 0.3 mi upstream from Kepaniwai Park, 0.5 mi downstream from Iao Valley State Park, and 2.3 mi west of Wailuku Post Office.

DRAINAGE AREA.--5.98 mi^2.

PERIOD OF RECORD.--May 1983 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 780 ft, from topographic map.

REMARKS.--Records fair. No appreciable diversion upstream. Observation of specific conductance, pH, and water temperature made during the year are published elsewhere in this report.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge 3,180 ft^3/s Dec. 25, 1983, gage height, 6.48 ft, from rating curve extended above 153 ft^3/s on basis of slope-area measurement at peak flow; minimum, 11 ft^3/s for several days in October and November 1984.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum discharge known, 7,540 ft^3/s Dec. 3, 1950, from rating curve based on model study of site 2.3 mi downstream.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 705 ft^3/s Feb. 26, gage height, 3.15 ft, no peak greater than base discharge of 1,000 ft^3/s; minimum, 11 ft^3/s for several days.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1984 TO SEPTEMBER 1985
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	13	11	17	13	19	42	126	93	41	44	69	26
2	13	11	14	12	17	34	142	132	40	22	51	24
3	13	13	14	18	16	35	70	84	32	22	73	23
4	12	42	14	35	17	102	52	59	33	60	93	22
5	12	23	14	15	16	62	57	61	30	71	51	21
6	12	13	13	14	16	228	46	52	29	32	56	19
7	11	12	33	13	15	130	42	165	26	55	66	19
8	20	23	54	13	14	131	46	175	25	38	172	19
9	14	15	58	12	14	79	46	104	25	30	131	18
10	13	15	24	12	14	88	41	65	24	28	67	17
11	12	26	18	94	14	252	36	78	23	25	49	24
12	12	43	17	31	14	269	33	65	22	23	43	20
13	12	22	16	22	18	301	32	56	22	22	37	19
14	12	22	15	99	54	178	32	45	22	21	55	18
15	12	17	15	36	31	119	82	46	22	47	48	17
16	11	14	14	25	22	85	222	43	21	76	38	17
17	11	14	17	20	17	64	186	64	20	89	40	19
18	11	13	16	18	17	56	98	49	20	54	32	19
19	11	37	17	17	15	60	64	41	20	33	29	137
20	11	19	15	17	22	45	51	37	19	32	26	70
21	11	16	14	16	16	42	48	36	18	29	24	47
22	11	15	14	18	15	205	49	60	17	48	32	49
23	11	16	13	17	17	156	60	73	17	33	24	82
24	11	15	13	16	21	77	52	71	17	33	23	71
25	11	14	13	15	64	56	42	49	19	29	22	41
26	11	55	17	14	160	45	38	45	20	42	35	32
27	11	30	15	14	174	45	34	56	22	35	44	28
28	11	18	14	14	67	40	33	53	19	51	43	26
29	11	16	13	33	---	36	31	43	20	47	45	30
30	11	16	13	69	---	52	30	38	47	79	37	39
31	11	---	13	26	---	40	---	36	---	142	30	---
TOTAL	369	616	567	788	916	3154	1921	2074	732	1392	1585	1013
MEAN	11.9	20.5	18.3	25.4	32.7	102	64.0	66.9	24.4	44.9	51.1	33.8
MAX	20	55	58	99	174	301	222	175	47	142	172	137
MIN	11	11	13	12	14	34	30	36	17	21	22	17
AC-FT	732	1220	1120	1560	1820	6260	3810	4110	1450	2760	3140	2010

CAL YR 1984	TOTAL	11794	MEAN	32.2	MAX	290	MIN	11	AC-FT	23300
WTR YR 1985	TOTAL	15127	MEAN	41.4	MAX	301	MIN	11	AC-FT	30000

16614000 WAIHEE RIVER AT DAM NEAR WAIHEE

LOCATION.--LAT 20°56'21", long 156°32'59", Hydrologic Unit 20020000, on right bank at dam 8 ft upstream from the abandoned Waihee canal intake, 2.6 mi southwest from Waihee Point, and 4.4 mi northwest from Wailuku Post Office.

DRAINAGE AREA.--4.20 mi^2.

PERIOD OF RECORD.--November 1910 to December 1913, November 1983 to current year. Low-flow records not equivalent prior to Dec. 31, 1913, due to Waihee canal diverted water upstream.

GAGE.--Water-stage recorder. Elevation of gage is 605 ft. from topographic map.

REMARKS.--Records fair except for estimated daily discharges, which are poor. No diversion upstream. Observations of specific conductance, pH, and water temperature made during the year are published elsewhere in this report.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge 3,650 ft^3/s Feb. 26, 1985, gage height, 4.84 ft, from rating curve extended above 280 ft^3/s on basis of slope-area measurement at gage height 3.99 ft; minimum, 22 ft^3/s Jan. 18-22, 24, 25, 1985.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,000 ft^3/s and maximum (*), from rating curve extended above 280 ft^3/s on basis as explained above:

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Feb. 26	1900	*3650	*4.84	Sept. 23	2000	2000	4.07

Minimum discharge, 22 ft^3/s, Jan. 18-22, 24, 25.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1984 TO SEPTEMBER 1985
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	28	27	33	24	27	36	157	149	59	59	83	42
2	28	28	27	24	27	32	93	240	52	40	49	39
3	27	48	26	64	26	31	46	81	47	51	77	40
4	27	74	28	60	24	e93	43	49	50	111	107	39
5	27	36	26	28	24	e70	65	124	47	107	44	37
6	27	28	27	26	24	e280	44	73	46	47	69	37
7	27	27	50	24	24	e170	43	252	44	92	96	37
8	40	41	81	24	24	e180	57	153	44	49	159	39
9	30	28	69	24	24	e100	39	70	46	43	128	37
10	27	30	31	24	24	e76	47	50	44	49	50	39
11	27	44	29	31	24	e305	42	66	43	40	47	44
12	28	94	30	26	24	e400	40	59	43	39	49	39
13	28	34	28	24	97	e260	39	65	43	37	43	39
14	28	31	27	85	130	e105	42	50	43	36	78	37
15	27	31	27	28	43	e91	115	52	42	98	68	37
16	27	28	27	24	31	e73	323	55	40	109	49	36
17	27	27	29	24	28	e70	247	154	40	144	72	46
18	27	30	29	22	30	e52	62	66	39	54	46	42
19	27	60	29	22	27	e60	47	57	39	40	43	273
20	27	31	26	22	48	e47	43	52	39	44	42	86
21	27	30	26	22	28	e54	74	74	37	40	42	187
22	27	28	26	26	53	e500	54	193	37	67	47	91
23	26	29	24	24	32	e113	64	91	37	50	42	229
24	26	29	24	22	40	e75	54	107	37	59	40	62
25	26	27	27	22	105	46	44	55	43	46	39	43
26	26	58	39	24	289	40	40	54	55	60	49	42
27	26	34	26	24	130	50	40	62	45	52	52	40
28	26	29	26	24	46	42	39	63	39	54	53	39
29	26	27	24	31	---	42	39	55	40	52	46	42
30	26	37	24	35	---	84	40	49	62	82	48	51
31	26	---	24	28	---	50	---	49	---	184	44	---
TOTAL	849	1105	971	912	1453	3627	2142	2769	1322	2035	1901	1891
MEAN	27.4	36.8	31.3	29.4	51.9	117	71.4	89.3	44.1	65.6	61.3	63.0
MAX	40	94	81	85	289	500	323	252	62	184	159	273
MIN	26	27	24	22	24	31	39	49	37	36	39	36
AC-FT	1680	2190	1930	1810	2880	7100	4250	5490	2620	4040	3770	3750

CAL YR 1984	TOTAL	18206	MEAN	49.7	MAX	471	MIN	24	AC-FT	36110
WTR YR 1985	TOTAL	20977	MEAN	57.5	MAX	500	MIN	22	AC-FT	41610

e Estimated

000152

1985

Annual maximum discharge at crest-stage partial-record stations during water year 1985--Continued

Station no.	Station name	Location	Drainage area mi^2	Period of record	Annual maximum		
					Date	Gage height (ft)	Discharge (ft^3/s)
		Hawaii, Island of Maui--Continued					
16502900	Kawaipapa Gulch at Hana	Lat 20°46'08", long 156°00'04", 1,000 ft upstream from Highway 36 and 0.3 mi northwest of Hana Hospital.	5.83	1965-85	5- 7-85	7.33	3,870
16603300	Unnamed gulch at Maliko Bay	Lat 20°56'26", long 156°21'04", at Hana Highway, 0.5 mi west of Maliko Bay, and 1.3 mi north of Hamakuapoko.	.43	1963-85	-	-	No flow
16603700	Kalialinui Gulch tributary near Pukalani	Lat 20°49'02", long 156°19'44", at Lower Kula Road and 1.4 mi south of Pukalani.	1.17	1967-85	-	-	No flow
16603800	Kaluapulani Gulch tributary near Pukalani	Lat 20°48'52", long 156°18'32", at Haleakala Highway, 1.5 mi west of Olinda Prison Camp, and 3.3 mi southeast of Pukalani.	.45	1963-85	1-14-85	1.55	27
16603850	Kalialinui Gulch near Kahului	Lat 20°52'47", long 156°26'06", 600 ft upstream from Hansen Road, 0.5 mi northeast of Puunene Hospital, and 2.5 mi southeast of Kahului Post Office.	17.9	1967-85	-	-	No flow
16607000	Iao Stream at Wailuku	Lat 20°53'38", long 156°30'27", 560 ft upstream from Market Street bridge at Wailuku and 1.9 mi upstream from mouth.	0.24	1951≠, 1952-85	2-26-85	3.12	928
16616500	Unnamed gulch at Maluhia Camp	Lat 20°57'26", long 156°31'41", at Kahekili Highway, 0.6 mi east of Maluhia Camp, and 1.8 mi northwest of Waihee.	.12	1964-85	2-26-85	4.58	53
16619700	Poelua Gulch near Kahakuloa	Lat 21°00'58", long 156°34'58", at Highway 30 (bypass), 1.3 mi southeast of Nakalele Point lighthouse, and 2.2 mi northwest of Kahakuloa.	1.18	1965-85	5-22-85	4.25	52
16623400	Honokeana Gulch near Honokahua	Lat 20°59'39", long 156°40'13", at Honoapiilani Highway, 1.1 mi southwest of Honokahua, and 1.1 mi south of Hawea Point.	.59	1964-85	-	-	No flow
16630200	Honokowai Stream at Honokowai	Lat 20°56'58", long 156°41'07", 0.5 mi southeast of Honokowai, and 1.1 mi northwest of Puukolii.	5.59	1962-63, 1965-85	2-26-85	3.39	242
16643300	Kauaula Stream near mouth, near Lahaina	Lat 20°52'09", long 156°39'43", 0.7 mi upstream from Honoapiilani Highway (bypass) and 1.3 mi southeast of Lahaina Lighthouse.	4.12	1960, 1962, 1964-85	3- 6-85	3.23	197
16646200	Olowalu Stream at Olowalu	Lat 20°49'23", long 156°37'15", on downstream side of center pier of plantation road bridge, 0.6 mi northeast of Olowalu, and 5.5 mi southeast of Lahaina.	4.08	1962-72≠, 1973-85	3- 6-85	3.09	198

≠ Operated as a continuous-record gaging station.

Annual maximum discharge at crest-stage partial-record stations during water year 1985--Continued

Station no.	Station name	Location	Drainage area mi^2	Period of record	Annual maximum Date	Gage height (ft)	Discharge (ft^3/s)
		Hawaii, Island of Maui--Continued					
16647500	Malalowaiaole Gulch near Maalaea	Lat 20°46'56", long 156°31'32", at Honoapiilani Highway, 200 ft upstream from mouth, 0.2 mi north of McGregor Point, and 1.2 mi southwest of Maalaea.	.64	1964-85	2-26-85	3.21	4
16650500	Waikapu Stream near Kihei	Lat 20°49'02", long 156°29'00", at railroad bridge beside Lower Maalaea Road, 2.5 mi northeast of Maalaea, and 2.5 mi northwest of Kihei.	6.97	1963-85	3-13-85	2.94	309
16658500	Waiakoa Gulch tributary near Waiakoa	Lat 20°44'56", long 156°19'22", at Upper Kula Road, 1.0 mi southeast of Waiakoa, and 1.0 mi northeast of junction of Lower and Upper Kula Roads.	.98	1964-85	-	-	No flow
16659000	Waiakoa Gulch at Kihei	Lat 20°47'14", long 156°27'41", 0.3 mi northeast of Kihei and 0.4 mi upstream from mouth.	10.1	1963-85	-	-	No flow
16660000	Kulanihakoi Gulch near Kihei	Lat 20°46'06", long 156°27'03", on right bank 0.5 mi northeast of Lihue Cemetery, 0.8 mi upstream from mouth, and 1.3 mi southeast of Kihei.	14.4	1963-70≠, 1971-85	-	-	No flow
16663500	Kamaole Gulch at Kamaole	Lat 20°43'36", long 156°27'02", at Kihei Road, 350 ft upstream from mouth, and 0.2 mi south of Kamaole.	4.28	1972-85	-	-	No flow
16664000	Liilioholo Gulch at Kamaole	Lat 20°43'04", long 156°26'55", on upstream side of Kihei Road, 300 ft upstream from mouth, and 0.8 mi south of Kamaole.	4.12	1972-85	-	-	No flow
		Hawaii, Island of Hawaii					
16701300	Waiakea Stream at Hilo	Lat 19°42'38", long 155°05'02", 0.3 mi upstream from Kinoole Street bridge and 1.3 mi southeast of Hilo Post Office.	35.8	1968-85	3- 1-85	3.90	290
16701400	Palai Stream at Hilo	Lat 19°40'56", long 155°04'04", at Highway 11, 300 ft south of Palai Street intersection, and 3.5 mi southeast of Hilo Post Office.	5.08	1965-85	3- 6-85	3.50	209
16717400	Kalaoa Mauka Stream near Hilo	Lat 19°48'07", long 155°06'03", at culvert on Highway 19, 1.0 mi north of Papaikou, and 5.1 mi north of Hilo Post Office.	.24	1963-85	11-18-84	4.75	80
16717600	Alia Stream near Hilo	Lat 19°50'38", long 155°06'21", on left bank 10 ft downstream from culvert on Highway 19 at Pepeekeo, 2.0 mi south of Honomu, and 8.0 mi north of Hilo.	.58	1962-72≠, 1973-85	11-18-84	4.57	585
16717650	Kapehu Stream near Pepeekeo	Lat 19°51'52", long 155°06'11", at culvert on Highway 19, 1.0 mi southeast of Honomu, 2.2 mi north of Pepeekeo, and 9.4 mi north of Hilo.	1.09	1963-85	3- 6-85	6.20	480
16717000	Ponakupuka Stream near Papaaloa	Lat 19°57'20", long 155°11'20", on right bank 200 ft downstream from Highway 19, 2.8 mi northwest of Honohina, and 3.0 mi southwest of Papaaloa.	2.76	1963-80≠, 1983-85	3- 6-85	5.87	681
16717850	Keehia Gulch near Ookala	Lat 20°01'08", long 155°18'45", at culvert on Highway 19, 1.7 mi west of Ookala, and 4.1 mi southeast of Paauilo.	.62	1963-85	3- 6-85	3.43	96
16717920	Ahualoa Gulch at Honokaa	Lat 20°05'12", long 155°29'17", at Highway 24, 1.1 mi northwest of Honokaa Hospital, and 1.5 mi upstream from mouth.	2.27	1963-85	-	-	No flow

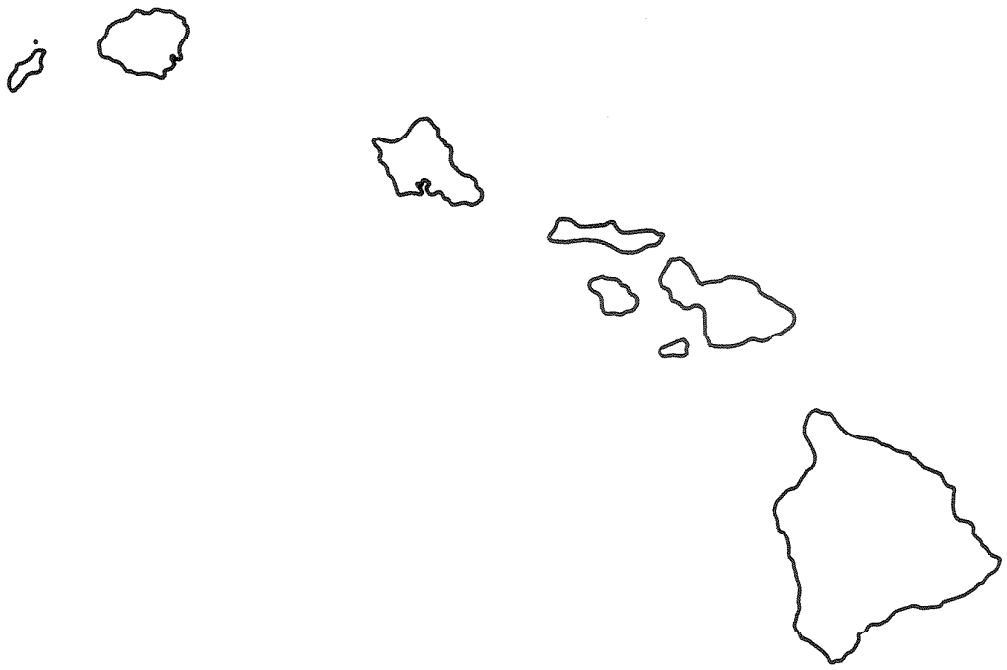
≠ Operated as a continuous-record gaging station.

000154

DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS)	SPE-CIFIC CON-DUCT-ANCE (UMHOS)	PH (STAND-ARD UNITS)	TEMPER-ATURE (DEG C)
16594000 - HAIKU DITCH AT HONOPOU GULCH NR KAILUA, MAUI, HI (LAT 20 55 07 LONG 156 14 58)					
OCT , 1984					
02...	1045	.35	118	7.0	23.5
NOV					
19...	1300	.16	112	7.8	22.0
JAN , 1985					
10...	1035	.31	106	6.2	21.0
MAR					
04...	1145	69	45	7.3	18.0
26...	1020	10	69	7.7	19.0
MAY , 1985					
08...	1010	61	31	7.5	20.0
JUN					
28...	1015	1.4	106	6.8	23.0
AUG					
15...	1200	2.3	95	6.9	23.5
16599500 - OPANA TUNNEL NR KAILIILI, MAUI, HI (LAT 20 51 04 LONG 156 16 17)					
OCT , 1984					
02...	1425	.13	102	5.4	19.0
NOV					
26...	0900	.17	80	7.0	19.0
JAN , 1985					
10...	1335	.27	60	6.9	16.0
MAR					
13...	1150	1.8	40	6.7	15.5
APR , 1985					
04...	1435	6.5	35	6.5	17.0
MAY					
13...	1100	11	15	7.0	16.0
JUL					
01...	0930	1.0	58	6.9	19.5
AUG					
16...	1335	2.2	41	6.7	21.0
16604500 - IAO STREAM AT KEPANIWAI PARK NR WAILUKU, MAUI, HI (LAT 20 53 08 LONG 156 32 32)					
OCT , 1984					
16...	1250	11	104	7.7	22.0
NOV					
07...	1230	11	108	7.6	21.5
26...	1300	160	90	7.3	20.0
JAN , 1985					
04...	1030	26	82	7.8	18.5
MAR					
05...	0930	52	92	7.9	18.0
MAR , 1985					
25...	1445	56	63	7.9	18.0
MAY					
06...	1440	43	93	7.8	21.0
JUN					
24...	1245	17	102	7.9	23.5
AUG					
13...	1045	36	87	7.8	22.0
16614000 - WAIHEE RIVER AT DAM NR WAIHEE, MAUI, HI (LAT 20 56 20 LONG 156 32 58)					
OCT , 1984					
17...	1205	28	68	7.8	21.0
NOV					
06...	1210	29	68	7.4	20.5
JAN , 1985					
03...	1135	26	70	7.9	19.0
FEB					
11...	1130	24	72	7.9	20.0
MAR , 1985					
25...	1055	50	91	7.9	18.0
MAY					
06...	1105	50	59	7.9	19.0
JUN					
24...	0900	36	68	7.7	19.5
AUG					
13...	0730	43	64	7.6	20.5
16620000 - HONOKOHAU STREAM NR HONOKOHAU, MAUI, HI (LAT 20 57 48 LONG 156 35 22)					
OCT , 1984					
12...	1225	10	70	7.9	21.5
NOV					
09...	0950	12	62	7.5	20.0
JAN , 1985					
07...	1250	9.3	70	7.7	19.0
MAR					
12...	1200	182	29	7.9	16.0
APR , 1985					
09...	1020	15	64	7.9	19.0
MAY					
17...	1115	31	43	7.6	19.0
JUL					
08...	1255	18	55	7.7	20.5
AUG					
22...	1025	31	52	7.5	20.5
16638500 - KAHOMA STREAM AT LAHAINA, MAUI, HI (LAT 20 53 10 LONG 156 40 36)					
MAR , 1985					
01...	1100	.74	76	7.9	22.0
MAR , 1985					
11...	1035	107	33	7.9	16.5

Water Resources Data Hawaii and other Pacific Areas Water Year 1986

Volume 1. Hawaii



U.S. GEOLOGICAL SURVEY WATER-DATA REPORT HI-86-1
Prepared in cooperation with the State of Hawaii Department of Land and Natural Resources, Division of Water and Land Development and with other agencies

000156

16604500 IAO STREAM AT KEPANIWAI PARK, NEAR WAILUKU

LOCATION.--Lat 20°53'08", long 156°32'32", Hydrologic Unit 20020000, on left bank of Maniania and Waikapu ditch intake, 0.3 mi upstream from Kepaniwai Park, 0.5 mi downstream from Iao Valley State Park, and 2.3 mi west of Wailuku Post Office.

DRAINAGE AREA.--5.98 mi^2.

PERIOD OF RECORD.--May 1983 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 780 ft, from topographic map.

REMARKS.--Records fair. No appreciable diversion upstream. Periodic determinations of water temperature for the current year are published elsewhere in this report.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge 3,320 ft^3/s Oct. 18, 1985, gage height, 6.62 ft, from rating curve extended above 153 ft^3/s on basis of slope-area measurement at gage height 6.48 ft; minimum, 11 ft^3/s for several days in October and November 1984.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum discharge known, 7,540 ft^3/s Dec. 3, 1950, from rating curve based on model study of site 2.3 mi downstream.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,000 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Oct. 18	0900	*3,320	*6.62	Apr. 10	1130	1,130	3.92
Nov. 30	1830	2,400	5.64				

Minimum discharge, 17 ft^3/s Feb. 14, 15, Mar. 11, 12.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1985 TO SEPTEMBER 1986
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	64	37	832	38	39	22	86	242	59	56	38	37
2	37	33	235	40	24	22	70	130	54	56	46	36
3	31	35	175	34	22	22	72	458	104	91	92	34
4	29	40	108	28	24	21	104	406	76	73	82	33
5	30	36	79	26	23	21	212	322	72	79	49	32
6	31	30	64	34	24	20	273	189	72	62	40	32
7	30	28	54	171	21	20	249	123	57	63	40	32
8	33	26	48	121	20	20	372	90	56	78	51	31
9	40	25	42	87	20	20	382	74	59	62	116	31
10	32	74	38	57	19	19	913	65	143	48	116	30
11	98	90	54	43	20	18	385	62	77	48	54	29
12	40	55	59	40	25	30	265	56	64	76	49	29
13	32	40	40	33	20	165	244	62	60	134	72	53
14	29	33	34	31	18	261	145	49	62	169	184	36
15	29	31	41	29	240	262	119	45	75	87	148	32
16	26	20	41	28	141	176	92	43	48	167	96	31
17	140	28	33	26	54	79	76	46	59	123	70	30
18	618	41	30	25	40	67	139	64	96	103	52	29
19	184	121	29	25	33	213	94	42	153	84	45	28
20	128	51	28	24	30	452	74	38	226	62	40	34
21	88	40	26	25	26	756	74	36	92	52	37	29
22	70	37	25	31	30	476	70	33	76	49	37	26
23	90	36	24	24	46	566	59	32	60	43	65	24
24	182	36	43	22	30	395	70	31	113	40	46	34
25	98	56	30	23	36	168	56	32	306	38	37	31
26	79	48	25	22	29	149	51	60	134	36	33	25
27	91	93	29	21	25	306	48	38	115	38	31	30
28	67	208	31	20	23	150	48	36	102	34	30	26
29	51	92	60	19	---	128	65	122	81	32	60	22
30	45	784	29	19	---	123	267	156	67	31	42	20
31	43	---	34	19	---	85	---	88	---	30	38	---
TOTAL	2585	2313	2420	1185	1102	5234	5174	3270	2818	2144	1936	926
MEAN	83.4	77.1	78.1	38.2	39.4	169	172	105	93.9	69.2	62.5	30.9
MAX	618	784	832	171	240	756	913	458	306	169	184	53
MIN	26	25	24	19	18	18	48	31	48	30	30	20
AC-FT	5130	4590	4800	2350	2190	10380	10260	6490	5590	4250	3840	1840

CAL YR 1985	TOTAL	20893	MEAN	57.2	MAX	832	MIN	12	AC-FT 41440
WTR YR 1986	TOTAL	31107	MEAN	85.2	MAX	913	MIN	18	AC-FT 61700

HAWAII, ISLAND OF MAUI

16614000 WAIHEE RIVER AT DAM NEAR WAIHEE

LOCATION.--LAT 20°58'21", long 156°02'59", Hydrologic Unit 20020000, on right bank at dam 8 ft upstream from the abandoned Waihee canal intake, 2.6 mi southwest from Waihee Point, and 4.4 mi northwest from Wailuku Post Office.

DRAINAGE AREA.--4.20 mi^2.

PERIOD OF RECORD.--November 1910 to December 1913, November 1983 to current year. Low-flow records not equivalent prior to Dec. 31, 1913, due to Waihee canal diverted water upstream.

GAGE.--Water-stage recorder. Elevation of gage is 605 ft, from topographic map.

REMARKS.--Records fair. No diversion upstream. Periodic determinations of water temperature for the current year are published elsewhere in this report.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge 7,550 ft^3/s Oct. 18, 1985, gage height, 6.70 ft, from rating curve extended above 280 ft^3/s on basis of slope-area measurement of peak flow; minimum, 22 ft^3/s Jan. 18-22, 24, 25, 1985.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,000 ft^3/s and maximum (*), from rating curve extended above 280 ft^3/s on basis as explained above:

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Oct. 18	0800	*7,550	*6.70	June 19	2400	2,690	4.77
Apr. 5	1630	2,550	4.70				

Minimum discharge, 36 ft^3/s, Mar. 7-12.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1985 TO SEPTEMBER 1986
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	139	42	517	55	89	38	81	232	76	73	69	59
2	46	39	84	61	74	42	68	147	86	73	98	58
3	40	42	94	54	44	39	82	600	165	106	171	58
4	37	48	53	46	47	38	103	258	85	86	130	56
5	41	64	52	44	46	37	226	253	85	122	73	56
6	40	40	48	78	47	37	143	187	91	83	64	56
7	43	38	47	228	40	36	144	113	83	78	66	58
8	39	38	46	157	39	36	193	89	82	92	74	54
9	56	39	46	86	40	37	240	80	115	93	157	53
10	42	151	46	54	39	36	880	97	294	71	104	52
11	112	167	114	48	39	36	209	89	80	73	66	52
12	43	52	84	48	42	50	134	87	90	95	66	52
13	43	43	52	46	38	177	164	139	83	156	82	93
14	37	40	48	44	38	179	89	83	85	197	294	56
15	42	39	50	44	173	186	115	89	116	74	175	53
16	39	38	47	44	58	146	80	101	71	213	100	53
17	194	38	46	44	42	56	76	90	94	107	76	53
18	990	44	44	47	40	65	146	109	113	96	68	52
19	59	61	44	44	39	286	76	80	172	89	64	52
20	61	38	44	43	38	561	73	74	321	71	62	80
21	43	38	44	44	38	722	76	71	80	69	61	54
22	42	47	44	89	40	372	82	69	78	73	68	53
23	71	58	44	47	48	553	71	69	66	74	120	52
24	200	53	55	43	38	241	83	68	136	68	82	75
25	48	134	44	44	42	84	71	72	208	66	62	69
26	50	85	44	43	38	157	69	148	117	64	59	54
27	64	81	46	42	38	298	69	98	135	66	59	66
28	52	104	53	42	38	87	69	78	103	64	59	53
29	44	43	74	40	---	87	80	214	91	62	89	52
30	42	657	46	40	---	100	298	173	80	61	62	52
31	44	---	54	40	---	69	---	96	---	64	59	---
TOTAL	2843	2401	2156	1829	1372	4888	4290	4153	3481	2779	2839	1736
MEAN	91.7	80.0	69.5	59.0	49.0	158	143	134	116	89.6	91.6	57.9
MAX	990	657	517	228	173	722	880	600	321	213	294	93
MIN	37	38	44	40	38	36	68	68	66	61	59	52
AC-FT	5640	4760	4280	3630	2720	9700	8510	8240	6900	5510	5630	3440

CAL YR 1985	TOTAL	25452	MEAN	69.7	MAX	990	MIN	22	AC-FT	50480
WTR YR 1986	TOTAL	34767	MEAN	95.3	MAX	990	MIN	36	AC-FT	68960

1986

Annual maximum discharge at crest-stage partial-record stations during water year 1986--Continued

Station no.	Station name	Location	Drainage area mi^2	Period of record	Annual maximum		
					Date	Gage height (ft)	Discharge (ft^3/s)
		Hawaii, Island of Maui--Continued					
16603300	Unnamed gulch at Maliko Bay	Lat 20°56'26", long 156°21'04", at Hana Highway, 0.5 mi west of Maliko Bay, and 1.3 mi north of Hamakuapoko.	.43	1963-86	10-18-85	1.65	10
16603700	Kalialinui Gulch tributary near Pukalani	Lat 20°49'02", long 156°19'44", at Lower Kula Road and 1.4 mi south of Pukalani.	1.17	1967-86	10-18-85	1.14	7
16603800	Kaluapulani Gulch tributary near Pukalani	Lat 20°48'52", long 156°18'32", at Haleakala Highway, 1.5 mi west of Olinda Prison Camp, and 2.3 mi southeast of Pukalani.	.45	1963-86	10-18-85	2.04	46
16603850	Kalialinui Gulch near Kahului	Lat 20°52'47", long 156°26'06", 600 ft upstream from Hansen Road, 0.5 mi northeast of Puunene Hospital, and 2.5 mi southeast of Kahului Post Office.	17.9	1967-86	11-30-85	4.22	55
16607000	Iao Stream at Wailuku	Lat 20°53'38", long 156°30'27", 560 ft upstream from Market Street bridge at Wailuku and 1.9 mi upstream from mouth.	8.24	1951≠, 1952-86	10-18-85	5.26	3,750
16616500	Unnamed gulch at Maluhia Camp	Lat 20°57'26", long 156°31'41", at Kahekili Highway, 0.6 mi east of Maluhia Camp, and 1.8 mi northwest of Waihee.	.12	1964-86	10-18-85	-	e1
16619700	Poelua Gulch near Kahakuloa	Lat 21°00'58", long 156°34'58", at Highway 30 (bypass), 1.3 mi southeast of Nakalele Point lighthouse, and 2.2 mi northwest of Kahakuloa.	1.18	1965-86	10-18-85	10.95	437
16630200	Honokowai Stream at Honokowai	Lat 20°56'58", long 156°41'07", 0.5 mi southeast of Honokowai, and 1.1 mi northwest of Puukolii.	5.59	1962-63, 1965-86	10-18-85	4.96	666
16643300	Kauaula Stream near mouth, near Lahaina	Lat 20°52'09", long 156°39'43", 0.7 mi upstream from Honoapiilani Highway (bypass) and 1.3 mi southeast of Lahaina Lighthouse.	4.12	1960, 1962, 1964-86	10-18-85	4.45	532
16646200	Olowalu Stream at Olowalu	Lat 20°49'23", long 156°37'15", on downstream side of center pier of plantation road bridge, 0.6 mi northeast of Olowalu, and 5.5 mi southeast of Lahaina.	4.08	1962-72≠, 1973-86	10-18-85	3.92	474
16647500	Malalowaiaole Gulch near Maalaea	Lat 20°46'56", long 156°31'32", at Honoapiilani Highway, 200 ft upstream from mouth, 0.2 mi north of McGregor Point, and 1.2 mi southwest of Maalaea.	.64	1964-86	10-18-85	5.18	61
16650500	Waikapu Stream near Kihei	Lat 20°49'02", long 156°29'00", at railroad bridge beside Lower Maalaea Road, 2.5 mi northeast of Maalaea, and 2.5 mi northwest of Kihei.	6.97	1963-86	10-18-85	6.30	910

≠ Operated as a continuous-record gaging station.
e Estimated.

000159

PERIODIC DETERMINATIONS OF TEMPERATURES

WATER QUALITY DATA, WATER YEAR OCTOBER 1985 TO SEPTEMBER 1986

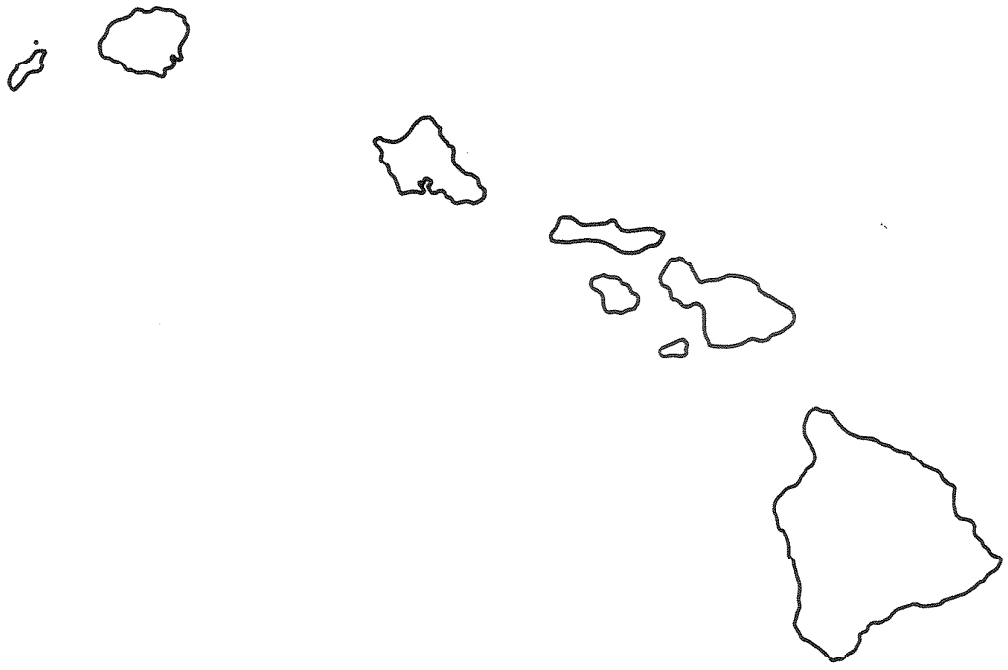
HAWAII, ISLAND OF HAWAII--Continued

DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS)	TEMPER-ATURE (DEG C)	DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS)	TEMPER-ATURE (DEG C)
16720500 - UPPER HAMAKUA DITCH BL KAWAIKI STR NR KAMUELA, HAWAII, HI (LAT 20 05 15 LONG 155 40 42)							
OCT , 1985				MAR , 1986			
15...	1015	3.4	16.0	26...	1135	3.6	14.0
NOV				MAY			
07...	0950	.90	15.0	09...	1135	3.7	15.0
DEC				JUN			
10...	1045	.85	12.0	26...	1000	16	15.0
JAN , 1986				AUG			
15...	1040	1.3	12.0	19...	0955	2.6	15.0
FEB							
17...	1030	6.3	11.0				
16724800 - UP HAMAKUA DITCH AB ALAKAHI STR NR KAMUELA, HAWAII, HI (LAT 20 04 31 LONG 155 40 26)							
OCT , 1985				MAY , 1986			
09...	1100	8.7	14.0	20...	1130	10	14.0
NOV				JUN			
19...	1115	12	16.0	26...	0940	12	15.0
JAN , 1986				AUG			
17...	0930	.15	12.0	19...	0925	1.5	15.0
MAR							
15...	1220	4.0	15.0				
16725000 - ALAKAHI STREAM NEAR KAMUELA, HAWAII, HI (LAT 20 04 27 LONG 155 40 25)							
OCT , 1985				APR , 1986			
15...	1425	2.7	15.0	25...	1120	4.6	14.0
DEC				MAY			
19...	1045	.65	12.0	20...	1035	5.7	15.0
JAN , 1986				JUN			
17...	0950	.91	13.5	26...	1030	8.3	14.0
MAR				AUG			
15...	1325	3.0	15.0	19...	1000	2.2	15.0
16726000 - UP HAMAKUA DITCH AB WAIMEA RES DIV NR KAMUELA, HAWAII, HI (LAT 20 03 31 LONG 155 37 40)							
OCT , 1985				APR , 1986			
08...	1525	37	16.0	16...	1305	16	16.0
NOV				MAY			
21...	1430	4.2	16.0	21...	1020	9.2	15.0
DEC				JUL			
19...	1450	.90	17.0	21...	1145	13	16.0
JAN , 1986				SEP			
29...	1050	.51	16.0	17...	0955	1.5	15.0
FEB							
21...	1435	1.0	15.0				
16727000 - UPPER HAMAKUA D AB PUUKAPU RES NR KAMUELA, HAWAII, HI (LAT 20 02 53 LONG 155 37 17)							
OCT , 1985				JUN , 1986			
08...	1340	15	16.0	20...	1145	7.1	17.0
NOV				JUL			
21...	0930	2.6	16.0	21...	1210	2.1	16.0
MAR , 1986				SEP			
21...	1405	23	15.0	10...	1035	1.7	16.0
MAY							
21...	0935	3.6	16.0				
16756000 - KOHAKOHAU STREAM NEAR KAMUELA, HAWAII, HI (LAT 20 02 38 LONG 155 41 10)							
NOV , 1985				JUN , 1986			
19...	1320	39	15.0	20...	1000	20	16.0
APR , 1986				SEP			
25...	1225	.45	15.0	10...	0855	1.4	15.0

000160

Water Resources Data Hawaii and other Pacific Areas Water Year 1987

Volume 1. Hawaii



U.S. GEOLOGICAL SURVEY WATER-DATA REPORT HI-87-1
Prepared in cooperation with the State of Hawaii Department of Land and Natural Resources, Division of Water and Land Development and with other agencies

000161

16604500 IAO STREAM AT KEPANIWAI PARK, NEAR WAILUKU

LOCATION.--Lat 20°53'08", long 156°32'32", Hydrologic Unit 20020000, on left bank of Maniania and Waikapu ditch intake, 0.3 mi upstream from Kepaniwai Park, 0.5 mi downstream from Iao Valley State Park, and 2.3 mi west of Wailuku Post Office.

DRAINAGE AREA.--5.98 mi^2.

PERIOD OF RECORD.--May 1983 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 780 ft, from topographic map.

REMARKS.--Records fair. No appreciable diversion upstream. Periodic determinations of water temperature for the current year are published elsewhere in this report.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge 3,320 ft^3/s Oct. 18, 1985, gage height, 6.62 ft, from rating curve extended above 181 ft^3/s on basis of slope-area measurement at gage height 6.48 ft; minimum, 11 ft^3/s for several days in October and November 1984.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum discharge known, 7,540 ft^3/s Dec. 3, 1950, from rating curve based on model study of site 2.3 mi downstream.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,000 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Jan. 14	0300	1,020	3.73	May 5	1800	*3,130	*6.43
Feb. 16	0430	1,560	4.57	May 23	2100	1,270	4.15

Minimum discharge, 20 ft^3/s Oct. 1, Sept. 28-30.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	20	139	224	38	38	36	280	132	60	109	68	23
2	28	149	187	109	36	36	78	85	46	84	51	22
3	24	67	204	88	33	32	54	87	43	65	47	21
4	31	51	88	45	32	31	41	97	46	58	40	24
5	41	42	65	38	31	30	36	854	63	80	39	24
6	50	50	126	34	30	29	34	445	58	95	34	21
7	33	48	67	32	29	29	33	404	74	62	32	21
8	28	64	52	30	28	26	30	156	53	70	48	69
9	24	113	46	43	28	25	28	102	57	76	34	40
10	23	69	41	150	26	25	26	77	55	64	68	30
11	22	90	145	76	26	25	25	65	74	81	50	82
12	27	70	122	80	25	26	25	56	138	75	52	86
13	88	156	65	98	45	24	28	70	172	84	40	261
14	48	100	56	227	32	24	29	52	131	198	33	59
15	45	151	71	244	138	24	96	45	118	79	32	37
16	49	86	76	155	491	23	121	40	165	58	91	31
17	97	70	59	96	318	24	120	37	148	51	42	41
18	42	51	45	110	165	25	54	34	176	168	38	30
19	80	78	41	92	146	36	89	32	178	88	44	27
20	312	162	37	65	145	26	62	31	194	123	34	25
21	62	69	54	52	83	24	128	30	134	128	31	24
22	51	60	40	52	62	23	152	29	141	76	30	23
23	37	49	43	46	54	43	79	140	e112	61	28	23
24	31	42	37	81	69	30	55	209	e76	51	26	23
25	177	37	34	218	66	28	49	88	e74	46	26	21
26	285	34	33	113	46	32	179	294	86	42	33	22
27	217	32	32	69	41	31	300	210	72	44	26	21
28	101	208	31	54	38	24	268	92	62	54	25	21
29	62	112	30	51	---	24	168	70	77	62	24	20
30	48	192	81	43	---	25	92	59	108	45	23	26
31	60	---	43	42	---	100	---	84	---	41	22	---
TOTAL	2243	2641	2275	2671	2301	942	2759	4206	2991	2418	1211	1198
MEAN	72.4	88.0	73.4	86.2	82.2	30.4	92.0	136	99.7	78.0	39.1	39.9
MAX	312	208	224	244	491	100	300	854	194	198	91	261
MIN	20	32	30	30	25	23	25	29	43	41	22	20
AC-FT	4450	5240	4510	5300	4560	1870	5470	8340	5930	4800	2400	2380

CAL YR 1986	TOTAL	30948	MEAN	84.8	MAX	913	MIN	18	AC-FT	61390
WTR YR 1987	TOTAL	27856	MEAN	76.3	MAX	854	MIN	20	AC-FT	55250

e Partial daily estimate

000162

HAWAII. ISLAND OF MAUI

16614000 WAIHEE RIVER AT DAM NEAR WAIHEE

LOCATION.--LAT 20°56'21", long 156°32'59". Hydrologic Unit 20020000, on right bank at dam 8 ft upstream from the abandoned Waihee canal intake, 2.6 mi southwest from Waihee Point, and 4.4 mi northwest from Wailuku Post Office.

DRAINAGE AREA.--4.20 mi^2.

PERIOD OF RECORD.--November 1910 to December 1913, November 1983 to current year. Low-flow records not equivalent prior to Dec. 31, 1913, due to Waihee canal diverted water upstream.

GAGE.--Water-stage recorder. Elevation of gage is 605 ft, from topographic map.

REMARKS.--Records fair, except for estimated daily discharges, Apr. 13 to May. 10, which are poor. No diversion upstream. Periodic determinations of water temperature for the current year are published elsewhere in this report.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge 7,550 ft^3/s Oct. 18, 1985, May 5, 1987 gage height, 6.70 ft, from rating curve extended above 280 ft^3/s on basis of slope-area measurement of peak flow; minimum, 22 ft^3/s Jan. 18-22, 24, 25, 1985.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,000 ft^3/s and maximum (*), from rating curve extended above 280 ft^3/s on basis as explained above:

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Oct. 20	0600	2,070	4.38	May 5	1700	*7,550	*6.70
Jan. 14	0230	3,310	5.00	May 23	2000	2,490	4.66
Feb. 16	0400	7,200	6.60				

Minimum discharge, 39 ft^3/s, Apr. 12.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	63	201	91	55	47	46	184	180	78	112	96	54
2	106	143	107	137	46	47	52	79	64	80	88	54
3	57	59	77	87	46	46	52	150	67	82	76	54
4	55	54	61	53	46	44	44	120	102	73	71	60
5	60	52	60	50	46	44	42	900	114	111	78	56
6	81	70	151	50	46	46	46	450	101	126	64	53
7	58	77	56	48	46	46	44	350	92	74	62	53
8	54	126	53	48	46	46	43	130	85	121	96	105
9	50	138	53	95	46	44	44	86	80	95	68	70
10	50	83	53	136	46	44	42	70	71	89	104	69
11	52	83	250	60	46	47	40	64	146	102	88	66
12	64	66	122	58	46	48	39	69	138	76	78	71
13	121	146	58	167	88	44	45	118	143	121	66	194
14	65	66	58	263	52	47	65	78	122	279	62	68
15	67	118	66	176	294	44	120	71	122	103	62	58
16	77	75	76	87	506	52	170	66	184	73	174	56
17	147	58	74	69	148	46	110	64	204	69	72	61
18	58	53	53	163	69	47	74	62	144	187	66	56
19	101	113	53	65	83	53	120	66	148	76	94	56
20	240	104	53	53	78	47	74	66	304	169	66	53
21	61	58	70	52	53	47	130	62	94	175	61	52
22	54	94	54	53	50	44	150	61	178	73	61	52
23	52	58	73	53	48	65	52	186	109	71	59	62
24	52	53	53	87	58	48	50	150	74	68	59	53
25	224	52	53	198	52	51	46	71	102	73	58	52
26	301	50	50	60	46	142	220	152	113	66	64	53
27	160	48	48	53	46	75	250	108	86	76	59	50
28	62	241	47	52	46	48	230	82	69	116	58	50
29	52	87	64	53	---	47	120	126	94	88	56	50
30	48	133	142	47	---	46	59	71	118	69	54	93
31	87	---	56	50	---	209	---	111	---	69	54	---
TOTAL	2779	2839	2335	2678	2270	1750	2757	4419	3546	3162	2274	1934
MEAN	89.6	94.6	75.3	86.4	81.1	56.5	91.9	143	118	102	73.4	64.5
MAX	301	241	250	263	506	209	250	900	304	279	174	194
MIN	48	48	47	47	46	44	39	61	64	66	54	50
AC-FT	5510	5630	4630	5310	4500	3470	5470	8770	7030	6270	4510	3840

CAL YR 1986	TOTAL	35320	MEAN	96.8	MAX	880	MIN	36	AC-FT	70060
WTR YR 1987	TOTAL	32743	MEAN	89.7	MAX	900	MIN	39	AC-FT	64950

000163

1987

Annual maximum discharge at crest-stage partial-record stations during water year 1987--Continued

Station no.	Station name	Location	Drainage area mi^2	Period of record	Annual maximum		
					Date	Gage height (ft)	Discharge (ft^3/s)
		Hawaii, Island of Maui--Continued					
16603300	Unnamed gulch at Maliko Bay	Lat 20°56'26", long 156°21'04", at Hana Highway, 0.5 mi west of Maliko Bay, and 1.3 mi north of Hamakuapoko.	.43	1963-87	5-06-87	1.75	12
16603700	Kalialinui Gulch tributary near Pukalani	Lat 20°49'02", long 156°19'44", at Lower Kula Road and 1.4 mi south of Pukalani.	1.17	1967-87	12-06-86	6.25	300
16603800	Kaluapulani Gulch tributary near Pukalani	Lat 20°48'52", long 156°18'32", at Haleakala Highway, 1.5 mi west of Olinda Prison Camp, and 2.3 mi southeast of Pukalani.	.45	1963-87	12-06-86	3.16	89
16603850	Kalialinui Gulch near Kahului	Lat 20°52'47", long 156°26'06", 600 ft upstream from Hansen Road, 0.5 mi northeast of Puunene Hospital, and 2.5 mi southeast of Kahului Post Office.	17.0	1967-87	12-06-86	5.68	414
16607000	Iao Stream at Wailuku	Lat 20°53'36", long 156°30'27", 560 ft upstream from Market Street bridge at Wailuku and 1.9 mi upstream from mouth.	8.24	1951≠, 1952-87	5-05-87	5.77	4,720
16616500	Unnamed gulch at Maiunia Camp	Lat 20°57'26", long 156°31'41", at Kahekili Highway, 0.6 mi east of Maluhia Camp, and 1.8 mi northwest of Waihee.	.12	1964-87	5-05-87	-	e28
16619700	Poelua Gulch near Kahakuloa	Lat 21°00'58", long 156°34'58", at Highway 30 (bypass), 1.3 mi southeast of Nakalele Point lighthouse, and 2.2 mi northwest of Kahakuloa.	1.18	1965-87	5-05-87	13.20	624
16630200	Honokowai Stream at Honokowai	Lat 20°56'58", long 156°41'07", 0.5 mi southeast of Honokowai, and 1.1 mi northwest of Puukolii.	5.59	1962-63, 1965-87	5-05-87	5.95	1,050
16643300	Kauaula Stream near mouth, near Lahaina	Lat 20°52'09", long 156°39'43", 0.7 mi upstream from Honoapiilani Highway (bypass) and 1.3 mi southeast of Lahaina Lighthouse.	4.12	1960, 1962, 1964-87	5-05-87	4.88	702
16646200	Olowalu Stream at Olowalu	Lat 20°49'23", long 156°37'15", on downstream side of center pier of plantation road bridge, 0.6 mi northeast of Olowalu, and 5.5 mi southeast of Lahaina.	4.08	1962-72≠, 1973-87	5-05-87	4.77	902
16647500	Malalowaiaole Gulch near Maalaea	Lat 20°46'56", long 156°31'32", at Honoapiilani Highway, 200 ft upstream from mouth, 0.2 mi north of McGregor Point, and 1.2 mi southwest of Maalaea.	.64	1964-87	5-05-87	4.66	42
16650500	Waikapu Stream near Kihai	Lat 20°49'02", long 156°29'00", at railroad bridge beside Lower Maalaea Road, 2.5 mi northeast of Maalaea, and 2.5 mi northwest of Kihei.	6.97	1963-87	5-05-87	8.28	1,130

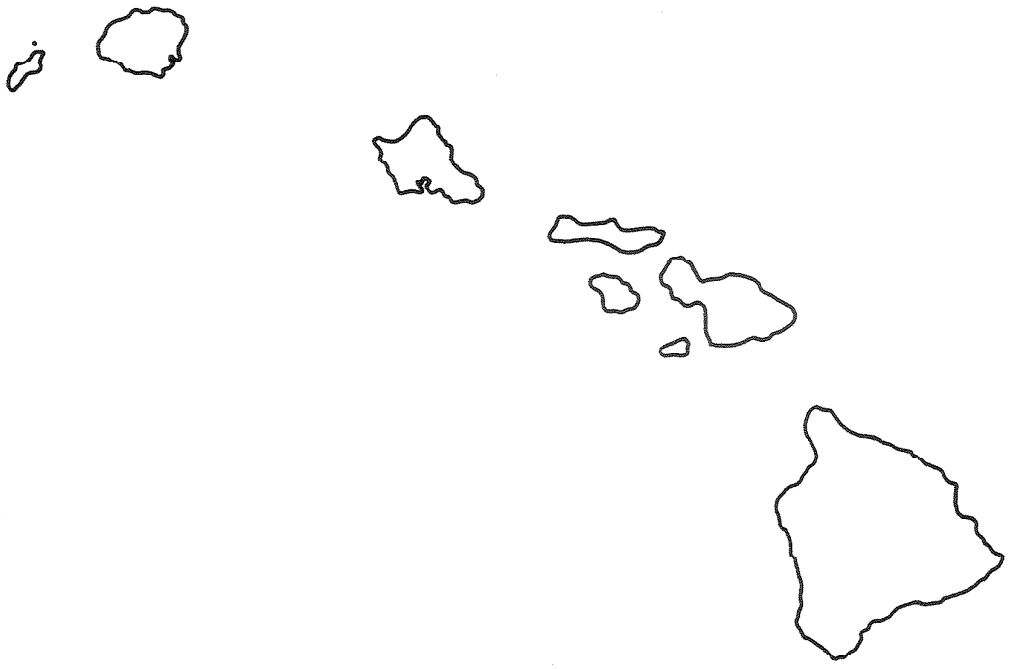
≠ Operated as a continuous-record gaging station.
e Estimated.

000164

DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS)	TEMPER-ATURE (DEG C)	DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS)	TEMPER-ATURE (DEG C)
16604500 - IAO STREAM AT KEPANIWAI PARK NR WAILUKU, MAUI, HI (LAT 20 53 08 LONG 156 32 32)							
OCT , 1986				JUN , 1987			
01...	1130	20	21.0	01...	0940	63	22.0
NOV				17...	1115	105	19.5
18...	1055	48	19.0	25...	1330	57	21.0
JAN , 1987				JUL			
06...	1250	34	19.0	24...	1015	53	21.0
FEB				AUG			
20...	1430	131	19.0	19...	1115	33	21.0
APR				SEP			
02...	1040	76	18.0	02...	1025	22	23.0
MAY				29...	0940	19	21.5
08...	1050	154	18.0				
16614000 - WAIHEE RIVER AT DAM NR WAIHEE, MAUI, HI (LAT 20 56 20 LONG 156 32 58)							
OCT , 1986				MAR , 1987			
01...	1030	48	22.0	30...	1110	46	19.0
NOV				MAY			
17...	1040	57	19.0	11...	1105	65	17.5
DEC				JUN			
04...	1130	64	19.0	29...	0920	73	19.0
JAN , 1987				AUG			
05...	1015	53	19.5	10...	1140	63	20.5
FEB							
20...	0950	78	17.5				
16620000 - HONOKOHAU STREAM NR HONOKOHAU, MAUI, HI (LAT 20 57 48 LONG 156 55 22)							
OCT , 1986				APR , 1987			
03...	1150	25	21.0	08...	1140	19	19.0
NOV				MAY			
21...	1225	26	19.5	19...	1040	24	18.5
JAN , 1987				JUL			
09...	1030	20	18.0	13...	1130	37	21.0
FEB				AUG			
24...	1145	20	18.0	21...	1220	24	21.0
16630500 - KAHOMA STREAM AT LAHAINA, MAUI, HI (LAT 20 53 10 LONG 156 40 36)							
MAY , 1987				MAY			
06...	1215	32	20.5	07...	0915	60	20.0

Water Resources Data Hawaii and other Pacific Areas Water Year 1988

Volume 1. Hawaii



U.S. GEOLOGICAL SURVEY WATER-DATA REPORT HI-88-1
Prepared in cooperation with the State of Hawaii Department of Land and Natural Resources, Division of Water and Land Development and with other agencies

000166

16604500 IAO STREAM AT KEPANIWAI PARK, NEAR WAILUKU

LOCATION.--Lat 20°53'08", long 156°32'32", Hydrologic Unit 20020000, on left bank of Maniania and Waikapu ditch intake, 0.3 mi upstream from Kepaniwai Park, 0.5 mi downstream from Iao Valley State Park, and 2.3 mi west of Wailuku Post Office.

DRAINAGE AREA.--5.98 mi^2.

PERIOD OF RECORD.--May 1983 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 780 ft, from topographic map.

REMARKS.--Records fair except for estimated daily discharges, which are poor. No appreciable diversion upstream. Periodic determinations of water temperature for the current year are published elsewhere in this report.

AVERAGE DISCHARGE.--5 years (1984-88), 65.3 ft^3/s (47,310 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge 6,250 ft^3/s Jan. 28, 1988, gage height, 9.0 ft, from rating curve extended above 181 ft^3/s on basis of slope-area measurements at gage heights 6.48 ft and 9.0 ft; minimum, 11 ft^3/s, for several days in October and November 1984.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum discharge known, 7,540 ft^3/s Dec. 3, 1950, from rating curve based on model study of site 2.3 mi downstream.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,000 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Nov. 21	0730	1,600	4.73	Feb. 25	0900	1,020	3.85
Jan. 28	2230	*6,250	*9.00				

Minimum discharge, 17 ft^3/s, Sept. 17-23.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	68	58	86	183	82	64	72	104	e51	e40	26	21
2	255	79	65	376	67	60	75	81	e66	e39	84	21
3	100	51	55	245	57	46	193	57	e47	e38	47	21
4	48	40	50	152	117	39	166	46	e49	e37	42	20
5	37	41	120	109	55	41	171	42	e54	e35	39	58
6	31	61	189	116	49	59	132	38	e52	e100	69	25
7	28	36	84	74	57	36	86	65	e78	e140	66	21
8	26	31	299	61	39	34	62	39	e49	e189	46	20
9	26	29	113	204	33	31	62	37	e48	89	36	19
10	25	89	102	157	35	29	202	32	e42	53	36	21
11	26	168	68	102	33	27	89	220	e41	72	40	20
12	24	78	238	81	41	26	60	368	e45	150	89	19
13	23	50	268	64	31	26	50	378	e41	90	51	19
14	22	124	136	60	26	159	45	160	e40	72	47	24
15	22	111	93	84	25	116	41	187	e39	49	40	19
16	22	58	73	115	38	87	38	89	e38	39	48	19
17	21	89	74	86	31	145	36	79	e36	41	86	18
18	29	218	90	61	30	224	34	61	e42	62	42	22
19	25	177	105	54	45	134	30	51	e41	41	34	17
20	28	299	91	48	34	180	27	48	e52	42	37	17
21	44	778	65	45	30	62	33	57	e64	47	65	17
22	148	357	58	41	48	70	29	85	e49	33	37	17
23	84	170	64	42	52	73	32	70	e71	31	34	35
24	136	120	50	41	61	50	38	53	e49	31	26	22
25	65	93	83	38	374	45	104	45	e69	29	26	22
26	55	84	84	270	166	41	208	45	e66	27	25	33
27	55	68	57	333	116	37	202	e44	e52	30	24	37
28	54	80	45	740	84	33	156	e46	e41	55	24	25
29	63	153	41	348	71	35	98	e56	e39	31	23	21
30	69	171	39	175	---	89	122	e46	e44	31	25	19
31	49	---	37	109	---	165	---	e48	---	26	22	---
TOTAL	1708	3961	3022	4614	1949	2263	2693	2777	1495	1789	1336	689
MEAN	55.1	132	97.5	149	67.2	73.0	89.8	89.6	49.8	57.7	43.1	23.0
MAX	255	778	299	740	374	224	208	378	78	189	89	58
MIN	21	29	37	38	25	26	27	32	36	26	22	17
AC-FT	3390	7860	5990	9150	3870	4490	5340	5510	2970	3550	2650	1370

CAL YR 1987	TOTAL	29388	MEAN	80.5	MAX	854	MIN	20	AC-FT 58290
WTR YR 1988	TOTAL	28296	MEAN	77.3	MAX	778	MIN	17	AC-FT 56130

e Estimated

16614000 WAIHEE RIVER AT DAM NEAR WAIHEE

LOCATION.--LAT 20°56'21", long 156°32'59", Hydrologic Unit 20020000, on right bank at dam 8 ft upstream from the abandoned Waihee canal intake, 2.6 mi southwest from Waihee Point, and 4.4 mi northwest from Wailuku Post Office.

DRAINAGE AREA.--4.20 mi^2.

PERIOD OF RECORD.--November 1910 to December 1913, November 1983 to current year. Low-flow records not equivalent prior to Dec. 31, 1913, due to Waihee canal diverted water upstream.

GAGE.--Water-stage recorder. Elevation of gage is 605 ft, from topographic map.

REMARKS.--Records fair. No diversion upstream. Periodic determinations of water temperature for the current year are published elsewhere in this report.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge 9,660 ft^3/s Jan. 28, 1988, gage height, 8.95 ft, from rating curve extended above 280 ft^3/s on basis of slope-area measurements at gage heights 6.70 ft and 8.95 ft; minimum, 22 ft^3/s, Jan. 18-22, 24, 25, 1985.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,000 ft^3/s and maximum (*), from rating curve extended above 280 ft^3/s on basis as explained above:

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Oct. 22	1000	2,440	4.69	Jan. 28	2100	*9,660	*8.95
Nov. 21	0400	3,670	5.26	Apr. 3	0400	4,620	5.67
Jan. 1	0800	5,220	5.91				

Minimum discharge, 47 ft^3/s, Oct. 17, 18.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	150	78	83	464	78	68	74	133	74	59	56	52
2	314	143	73	420	76	66	73	98	97	58	129	52
3	73	62	69	230	76	71	341	69	68	58	88	52
4	54	54	71	109	156	66	175	66	71	56	61	52
5	53	65	146	110	76	69	152	71	79	56	62	59
6	52	86	156	107	78	90	126	64	79	114	135	56
7	52	54	100	76	109	68	78	114	115	145	143	52
8	52	52	383	73	83	76	69	64	71	191	77	52
9	50	52	87	341	76	64	69	62	70	95	62	50
10	50	135	100	136	88	62	173	66	62	65	72	60
11	55	196	76	96	78	62	73	536	61	80	164	57
12	50	67	278	87	87	61	66	524	65	156	143	52
13	48	54	195	76	73	61	64	396	61	84	66	50
14	48	157	83	78	71	342	64	99	59	84	68	80
15	48	106	76	149	69	230	66	235	59	69	66	53
16	50	78	73	167	83	138	62	76	58	62	77	52
17	47	146	76	91	73	148	61	89	58	68	137	53
18	58	186	118	74	74	275	61	74	59	96	61	66
19	52	173	113	71	107	105	59	69	60	64	59	53
20	59	351	107	69	71	73	59	71	77	68	66	50
21	80	815	76	68	68	72	61	83	95	91	76	50
22	270	223	71	68	112	83	61	107	72	61	61	50
23	96	108	123	73	146	89	62	95	105	59	58	61
24	121	106	76	71	96	68	68	73	73	63	54	54
25	62	85	105	68	581	66	121	68	101	65	53	53
26	78	95	102	414	148	62	305	66	98	59	52	63
27	98	80	79	519	96	61	205	64	77	61	53	72
28	66	83	71	1160	74	61	141	68	61	80	53	59
29	78	142	68	126	69	66	78	82	61	61	53	53
30	79	155	68	89	---	119	113	69	65	59	58	50
31	61	---	69	83	---	91	---	69	---	56	52	---
TOTAL	2504	4107	3371	5763	3072	3033	3180	3820	2211	2443	2415	1668
MEAN	80.8	140	109	186	106	97.8	106	123	73.7	78.8	77.9	55.6
MAX	314	815	383	1160	581	342	341	536	115	191	164	80
MIN	47	52	68	68	68	61	59	62	58	56	52	50
AC-FT	4970	8300	6690	11430	6090	6020	6310	7580	4390	4850	4790	3310

CAL YR 1987 TOTAL 34852 MEAN 95.5 MAX 900 MIN 39 AC-FT 69130
WTR YR 1988 TOTAL 37667 MEAN 103 MAX 1160 MIN 47 AC-FT 74710

Annual maximum discharge at crest-stage partial-record stations during water year 1988--Continued

Station no.	Station name	Location	Drainage area mi^2	Period of record	Annual maximum Date	Gage height (ft)	Discharge (ft^3/s)
		Hawaii. Island of Maui--Continued					
16603300	Unnamed gulch at Maliko Bay	Lat 20°56'26", long 156°21'04", at Hana Highway, 0.5 mi west of Maliko Bay, and 1.3 mi north of Hamakuapoko.	0.43	1963-88	4-03-88	3.79	62
16603700	Kalialinui Gulch tributary near Pukalani	Lat 20°49'02", long 156°19'44", at Lower Kula Road and 1.4 mi south of Pukalani.	1.17	1967-88	12-18-87	-	<1
16603800	Kaluapulani Gulch tributary near Pukalani	Lat 20°48'52", long 156°18'32", at Haleakala Highway, 1.5 mi west of Olinda Prison Camp, and 2.3 mi southeast of Pukalani.	.45	1963-88	12-18-87	1.26	16
16603850	Kalialinui Gulch near Kahului	Lat 20°52'47", long 156°26'06", 600 ft upstream from Hansen Road, 0.5 mi northeast of Puunene Hospital, and 2.5 mi southeast of Kahului Post Office.	17.9	1967-88	12-18-87	3.75	18
16607000	Iao Stream at Wailuku	Lat 20°53'38", long 156°30'27", 560 ft upstream from Market Street bridge at Wailuku and 1.9 mi upstream from mouth.	8.24	1951≠, 1952-88	1-28-88	6.16	5,570
16616500	Unnamed gulch at Maluhia Camp	Lat 20°57'26", long 156°31'41", at Kahekili Highway, 0.6 mi east of Maluhia Camp, and 1.8 mi northwest of Waihee.	.12	1964-88	1-01-88	-	e2
16619700	Poelua Gulch near Kahakuloa	Lat 21°00'38", long 156°34'38", at Highway 30 (bypass), 1.3 mi southeast of Nakalele Point lighthouse, and 2.2 mi northwest of Kahakuloa.	1.18	1965-88	1-28-88	10.17	392
16630200	Honokowai Stream at Honokowai	Lat 20°56'58", long 156°41'07", 0.5 mi southeast of Honokowai, and 1.1 mi northwest of Puukolii.	5.59	1962-63, 1965-88	11-21-87	4.18	430
16643300	Kauaula Stream near mouth, near Lahaina	Lat 20°52'09", long 156°39'43", 0.7 mi upstream from Honoapiilani Highway (bypass) and 1.3 mi southeast of Lahaina Lighthouse.	4.12	1960, 1962, 1964-88	11-21-87	3.36	222
16646200	Olowalu Stream at Olowalu	Lat 20°49'23", long 156°37'15", on downstream side of center pier of plantation road bridge, 0.6 mi northeast of Olowalu, and 5.5 mi southeast of Lahaina.	4.08	1962-72≠, 1973-88	11-21-87	4.18	591
16647500	Malalowaiaole Gulch near Maalaea	Lat 20°46'56", long 156°31'32", at Honoapiilani Highway, 200 ft upstream from mouth, 0.2 mi north of McGregor Point, and 1.2 mi southwest of Maalaea.	.64	1964-88	11-21-87	-	<1
16650500	Waikapu Stream near Kihei	Lat 20°49'02", long 156°29'00", at railroad bridge beside Lower Maalaea Road, 2.5 mi northeast of Maalaea, and 2.5 mi northwest of Kihei.	6.97	1963-88	1-28-88	7.11	1,010

≠ Operated as a continuous-record gaging station.
< Actual value is known to be less than the value shown.

000169

PERIODIC DETERMINATIONS OF TEMPERATURES

WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

HAWAII, ISLAND OF MAUI

DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS)	TEMPER-ATURE (DEG C)	DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS)	TEMPER-ATURE (DEG C)
16508000 - HANAWI STREAM NEAR NAHIKU, MAUI, HI (LAT 20 48 37 LONG 156 07 00)							
OCT, 1987				MAR, 1988			
07...	1440	3.1	21.0	29...	1300	7.9	18.0
NOV				MAY			
17...	1315	5.3	18.5	10...	1220	5.1	19.0
JAN, 1988				JUN			
05...	1305	15	17.0	28...	1315	5.0	21.0
FEB				AUG			
17...	1255	16	18.0	16...	1340	8.5	20.0
16518000 - WEST WAILUAIKI STREAM NEAR KEANAE, MAUI, HI (LAT 20 49 16 LONG 156 08 37)							
OCT, 1987				MAR, 1988			
07...	1050	5.1	21.0	29...	0910	19	18.5
NOV				MAY			
17...	0905	8.3	17.0	10...	0935	5.7	19.5
JAN, 1988				JUN			
05...	1105	28	15.5	28...	0900	5.1	20.5
FEB				AUG			
17...	1005	22	17.0	16...	1025	9.4	19.5
16587000 - HONOPOU STREAM NR HUELO, MAUI, HI (LAT 20 53 20 LONG 156 15 20)							
OCT, 1987				JUN, 1988			
29...	1025	1.4	20.0	29...	1045	0.78	21.5
DEC				JUL			
30...	1000	2.3	18.0	28...	1105	0.80	22.0
JAN, 1988				SEP			
28...	1245	82	18.0	29...	1210	0.83	23.0
MAR							
30...	1035	4.1	19.0				
16599500 - OPANA TUNNEL NR KAILIILI, MAUI, HI (LAT 20 51 04 LONG 156 16 17)							
OCT, 1987				APR, 1988			
09...	1100	0.72	19.0	01...	1040	8.5	16.0
NOV				MAY			
23...	1055	5.1	18.0	13...	1000	11	18.0
JAN, 1988				AUG			
07...	1040	5.3	15.5	23...	1105	0.76	19.5
FEB							
22...	1105	2.5	17.0				
16604500 - IAO STREAM AT KEPANIWAI PARK NR WAILUKU, MAUI, HI (LAT 20 53 08 LONG 156 32 32)							
NOV, 1987				APR, 1988			
03...	1040	52	20.0	23...	1310	29	19.5
16...	0905	64	18.5	MAY			
19...	0915	181	18.5	23...	1425	63	19.5
JAN, 1988				AUG			
04...	1435	135	18.0	24...	1355	26	22.5
FEB				SEP			
16...	1105	50	19.0	28...	1120	22	21.5
MAR							
07...	1220	37	19.5				
10...	1510	29	21.0				

000170

PERIODIC DETERMINATIONS OF TEMPERATURES

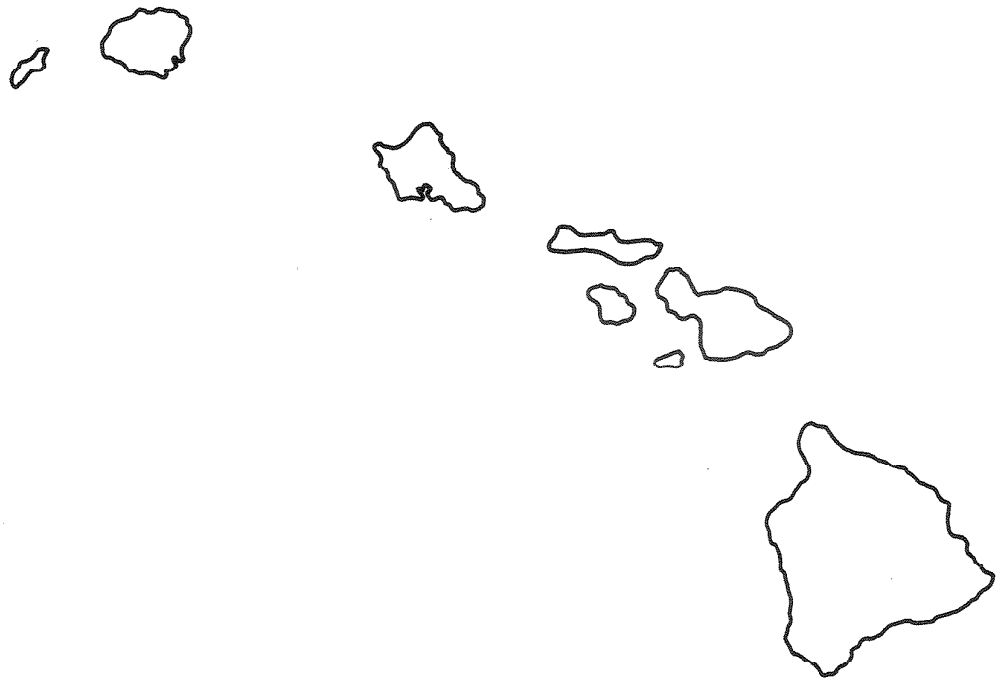
WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

HAWAII, ISLAND OF MAUI--Continued

DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS)	TEMPER-ATURE (DEG C)	DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS)	TEMPER-ATURE (DEG C)
16614000 - WAIHEE RIVER AT DAM NR WAIHEE, MAUI, HI (LAT 20 56 20 LONG 156 32 58)							
OCT, 1987 02...	1120	221	20.5	APR, 1988 21...	1130	57	19.0
NOV 16...	1325	68	19.0	MAY 23...	1150	126	19.0
JAN, 1988 04...	0945	89	17.0	JUL 06...	1100	53	20.5
FEB 12...	1220	72	20.0	AUG 25...	1245	50	19.5
16620000 - HONOKOHAU STREAM NR HONOKOHAU, MAUI, HI (LAT 20 57 48 LONG 156 35 22)							
OCT, 1987 15...	1040	18	20.0	APR, 1988 14...	1020	26	18.0
NOV 25...	1300	33	19.0	MAY 17...	1005	39	18.5
JAN, 1988 08...	1200	30	18.0	JUL 07...	1025	118	20.0
FEB 23...	1210	33	20.0	SEP 02...	1050	18	20.0
16638500 - KAHOMA STREAM AT LAHAINA, MAUI, HI (LAT 20 53 10 LONG 156 40 36)							
NOV, 1987 24...	1040	7.7	22.0	MAR, 1988 31...	0910	9.0	21.0

Water Resources Data Hawaii and other Pacific Areas Water Year 1989

Volume 1. Hawaii



U.S. GEOLOGICAL SURVEY WATER-DATA REPORT HI-89-1
Prepared in cooperation with the State of Hawaii Department of Land and Natural Resources, Division of Water and Land Development and with other agencies

000172

16604500 IAO STREAM AT KEPANIWAI PARK, NEAR WAILUKU

LOCATION.--Lat 20°53'08", long 156°32'32", Hydrologic Unit 20020000, on left bank of Maniania and Waikapu ditch intake, 0.3 mi upstream from Kepaniwai Park, 0.5 mi downstream from Iao Valley State Park, and 2.3 mi west of Wailuku Post Office.

DRAINAGE AREA.--5.98 mi^2.

PERIOD OF RECORD.--May 1983 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 780 ft, from topographic map.

REMARKS.--Records fair. No appreciable diversion upstream. Periodic determinations of water temperature for the current year are published elsewhere in this report.

AVERAGE DISCHARGE.--6 years (1984-89), 68.0 ft^3/s (49,270 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge 6,260 ft^3/s, Jan. 28, 1988, gage height, 9.0 ft, from rating curve extended above 181 ft^3/s on basis of slope-area measurements at gage heights 6.48 ft and 9.0 ft; minimum, 11 ft^3/s for several days in October and November 1984.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum discharge known, 7,540 ft^3/s, Dec. 3, 1950, from rating curve based on model study of site 2.3 mi downstream.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,000 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)
Nov. 4	1330	*4,590	*7.73
Dec. 7	0300	1,550	4.66
Mar. 4	0330	1,090	3.97
Apr. 8	2300	4,280	7.49
Apr. 13	2400	1,680	4.83
May 31	1600	1,620	4.75

Minimum discharge, 17 ft^3/s, Oct. 1-11, 22-23.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	18	20	30	41	23	36	61	148	185	48	85	103
2	18	19	28	36	68	59	113	104	93	42	144	140
3	17	19	27	30	122	149	34	82	67	42	67	63
4	17	313	26	53	266	315	28	71	61	87	63	54
5	17	115	26	61	116	195	161	73	62	203	53	87
6	17	72	342	54	74	430	92	61	74	335	67	77
7	19	45	363	48	62	411	301	60	76	104	46	78
8	18	39	101	57	46	206	555	62	68	72	40	50
9	17	52	60	50	49	104	763	78	46	54	38	48
10	17	39	45	120	198	76	192	79	42	82	34	66
11	18	36	49	89	133	61	40	82	40	62	46	42
12	67	30	36	51	84	53	91	54	60	57	36	41
13	22	86	29	71	61	45	398	55	41	243	31	36
14	22	78	26	136	48	40	711	60	55	166	34	33
15	21	49	26	150	39	49	220	111	41	89	34	31
16	20	48	153	83	34	38	130	111	145	70	31	48
17	21	46	70	50	30	31	93	75	246	55	61	39
18	20	41	45	44	28	29	76	54	189	51	44	33
19	19	41	36	80	27	28	73	71	82	251	70	44
20	18	57	30	46	26	27	304	95	79	125	345	31
21	19	65	27	61	25	26	171	66	55	74	144	33
22	18	99	26	51	24	25	199	104	46	192	74	45
23	48	83	26	36	35	24	398	124	41	150	65	36
24	72	49	47	31	39	24	188	78	40	92	50	37
25	30	36	105	31	42	24	122	122	39	68	42	30
26	26	31	179	28	25	24	95	79	57	61	39	29
27	23	34	58	26	23	23	148	65	38	49	36	26
28	26	33	41	25	44	23	252	60	38	85	33	29
29	34	34	131	40	---	22	633	60	36	133	31	28
30	23	47	104	27	---	26	256	171	48	59	33	26
31	22	---	60	24	---	58	---	411	---	48	42	---
TOTAL	764	1756	2352	1750	1791	2681	6898	2946	2190	3249	1961	1463
MEAN	24.6	58.5	75.9	56.5	64.0	86.5	230	95.0	73.0	105	63.3	48.8
MAX	72	313	363	150	266	430	763	411	246	335	345	140
MIN	17	19	26	24	23	22	28	54	36	42	31	26
AC-FT	1520	3480	4670	3470	3550	5320	13680	5840	4340	6440	3890	2900

CAL YR 1988	TOTAL	24477	MEAN	66.9	MAX	740	MIN	17	AC-FT	48550
WTR YR 1989	TOTAL	29801	MEAN	81.6	MAX	763	MIN	17	AC-FT	59110

HAWAII, ISLAND OF MAUI

16614000 WAIHEE RIVER AT DAM NEAR WAIHEE

LOCATION.--LAT 20°56'21", long 156°32'59", Hydrologic Unit 20020000, on right bank at dam 8 ft upstream from the abandoned Waihee canal intake, 2.6 mi southwest from Waihee Point, and 4.4 mi northwest from Wailuku Post Office.

DRAINAGE AREA.--4.20 mi^2.

PERIOD OF RECORD.--November 1910 to December 1913. November 1983 to current year. Low-flow records not equivalent prior to Dec. 31, 1913, due to Waihee canal diverted water upstream.

GAGE.--Water-stage recorder. Elevation of gage is 605 ft, from topographic map.

REMARKS.--Records fair. No diversion upstream. Periodic determinations of water temperature for the current year are published elsewhere in this report.

AVERAGE DISCHARGE.--5 years, 89.5 ft^3/s (64,840 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge 9,660 ft^3/s, Jan. 28, 1988, gage height, 8.95 ft, from rating curve extended above 280 ft^3/s on basis of slope-area measurements at gage heights 6.70 ft and 8.95 ft; minimum, 22 ft^3/s, Jan. 18-22, 24, 25, 1985.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,000 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Nov. 4	1400	*9,130	*8.54	Apr. 5	0300	3,430	5.14
Dec. 6	0530	4,500	5.62	Apr. 9	0200	5,100	5.86
Jan. 4	1130	2,730	4.79	Apr. 29	0300	2,440	4.63
Mar. 7	0100	2,070	4.38	July 22	0900	2,670	4.76
Apr. 2	0700	3,590	5.22				

Minimum discharge, 38 ft^3/s, Dec. 4, 5, 6.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	48	44	42	44	43	45	69	94	128	75	85	e170
2	48	46	40	74	70	129	238	80	71	68	171	e230
3	47	48	39	51	91	183	58	76	70	69	83	e110
4	47	508	38	59	368	278	61	74	69	117	76	e94
5	46	68	38	52	61	135	505	92	77	299	e70	e150
6	46	57	542	54	56	506	326	76	81	579	e84	e130
7	50	44	144	53	50	514	560	80	83	71	e70	e135
8	46	46	46	61	47	70	1060	91	73	77	e64	e86
9	44	58	43	65	48	54	643	106	62	62	e60	e82
10	44	44	43	195	91	52	83	91	61	95	e56	e110
11	55	44	51	115	85	59	71	96	62	74	e78	e74
12	130	40	44	57	50	56	75	71	102	68	e62	e68
13	50	121	42	84	46	48	579	71	64	301	e53	e64
14	78	72	42	124	44	48	674	71	74	110	e56	e56
15	47	46	43	119	46	67	87	96	65	71	e56	e54
16	47	125	192	58	43	52	73	93	259	69	e52	e82
17	48	46	52	48	42	48	69	71	330	66	e105	e70
18	47	42	46	47	42	48	68	73	165	62	e76	e56
19	47	61	44	56	43	47	91	86	73	377	e120	e76
20	46	52	43	48	42	47	388	133	80	126	e540	e54
21	49	59	43	54	42	46	89	100	77	84	e240	e56
22	48	93	42	47	43	46	96	156	66	293	e130	e78
23	110	72	44	44	46	44	265	118	62	113	e110	e62
24	91	58	77	44	58	44	97	76	64	73	e94	e64
25	52	61	167	46	57	47	83	74	66	71	e76	e52
26	53	47	340	44	43	44	87	76	82	71	e66	e49
27	49	47	47	44	42	44	230	77	61	64	e62	e46
28	64	113	44	43	49	44	429	70	65	96	e56	e50
29	57	60	198	46	---	46	982	79	61	154	e53	e48
30	47	58	87	44	---	46	156	244	70	68	e57	e45
31	46	---	56	43	---	62	---	318	---	64	e72	---
TOTAL	1727	2280	2759	1963	1788	3008	8292	3109	2723	3987	3033	2501
MEAN	55.7	76.0	89.0	63.3	63.9	97.0	276	100	90.8	129	97.8	83.4
MAX	130	508	542	195	368	514	1060	318	330	579	540	230
MIN	44	40	38	43	42	44	58	70	61	62	52	45
AC-FT	3430	4520	5470	3890	3550	5970	16450	6170	5400	7910	6020	4960

CAL YR 1988 TOTAL 34371 MEAN 93.9 MAX 1160 MIN 38 AC-FT 68170
WTR YR 1989 TOTAL 37170 MEAN 102 MAX 1060 MIN 38 AC-FT 73730

e Estimated

Annual maximum discharge at crest-stage partial-record stations during water year 1989-Continued

Station no.	Station name	Location	Drainage area mi^2	Period of record	Annual maximum		
					Date	Gage height (ft)	Discharge (ft^3/s)
		Hawaii, Island of Maui--Continued					
16502400	Pukuilua Gulch near Hana	Lat 20°42'00", long 156°00'14", at Highway 31, 0.4 mi southwest of Puuiki, and 4.0 mi south of Hana.	0.48	1963-89	04-07-89	2.86	113
16502800	Moomoonui Gulch at Hana	Lat 20°44'37", long 155°59'18", at Highway 31 just downstream from Moomooiki Gulch and 1.0 mi south of Hana.	.90	1963-89	04-07-89	13.62	1,190
16502900	Kawaipapa Gulch at Hana	Lat 20°46'08", long 156°00'04", 1,000 ft upstream from Highway 36 and 0.3 mi northwest of Hana Hospital.	5.83	1965-89	04-07-89	7.70	4,940
16603300	Unnamed gulch at Maliko Bay	Lat 20°56'26", long 156°21'04", at Hana Highway, 0.5 mi west of Maliko Bay, and 1.3 mi north of Hamakuapoko.	.43	1963-89	04-09-89	5.13	103
16603700	Kalialinui Gulch tributary near Pukalani	Lat 20°49'02", long 156°19'44", at Lower Kula Road and 1.4 mi south of Pukalani.	1.17	1967-89	03-04-89	5.04	194
16603800	Kaluapulani Gulch tributary near Pukalani	Lat 20°48'52", long 156°18'32", at Haleakala Highway, 1.5 mi west of Olinda Prison Camp, and 2.3 mi southeast of Pukalani.	.45	1963-89	04-09-89	2.60	67
16603850	Kalialinui Gulch near Kahului	Lat 20°52'47", long 156°26'06", 600 ft upstream from Hansen Road, 0.5 mi northeast of Puunene Hospital, and 2.5 mi southeast of Kahului Post Office.	17.9	1967-89	04-09-89	6.25	640
16607000	Iao Stream at Wailuku	Lat 20°53'38", long 156°30'27", 560 ft upstream from Market Street bridge at Wailuku and 1.9 mi upstream from mouth.	8.24	1951≠, 1952-89	11-04-88	5.62	4,420
16616500	Unnamed gulch at Maluhia Camp	Lat 20°57'26", long 156°31'41", at Kahekili Highway, 0.6 mi east of Maluhia Camp, and 1.8 mi northwest of Waihee.	.12	1964-89	04-09-89	-	e10
16619700	Poelua Gulch near Kahakuloa	Lat 21°00'58", long 156°34'58", at Highway 30 (bypass), 1.3 mi southeast of Nakalele Point lighthouse, and 2.2 mi northwest of Kahakuloa.	1.18	1965-89	04-09-89	12.59	523
16630200	Honokowai Stream at Honokowai	Lat 20°56'58", long 156°41'07", 0.5 mi southeast of Honokowai, and 1.1 mi northwest of Puukolii.	5.59	1962-63, 1965-89	11-04-88	4.51	523
16643300	Kauaula Stream near mouth, near Lahaina	Lat 20°52'09", long 156°39'43", 0.7 mi upstream from Honoapiilani Highway (bypass) and 1.3 mi southeast of Lahaina Lighthouse.	4.12	1960, 1962, 1964-89	11-04-88	4.46	506
16646200	Olowalu Stream at Olowalu	Lat 20°49'23", long 156°37'15", on downstream side of center pier of plantation road bridge, 0.6 mi northeast of Olowalu, and 5.5 mi southeast of Lahaina.	4.08	1962-72≠, 1973-89	11-04-88	4.68	840
16647500	Malalowaiaole Gulch near Maalaea	Lat 20°46'56", long 156°31'32", at Honoapiilani Highway, 200 ft upstream from mouth, 0.2 mi north of McGregor Point, and 1.2 mi southwest of Maalaea.	.64	1964-89	04-08-89	5.70	81
16650500	Waikapu Stream near Kihei	Lat 20°49'02", long 156°29'00", at railroad bridge beside Lower Maalaea Road, 2.5 mi northeast of Maalaea, and 2.5 mi northwest of Kihei.	6.97	1963-89	11-04-89	8.69	1,170

≠ Operated as a continuous-record gaging station.
e Estimated.

000175

1989

DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Annual maximum discharge at crest-stage partial-record stations during water year 1989-Continued

Station no.	Station name	Location	Drainage area (mi^2)	Period of record	Annual maximum		
					Date	Gage height (ft)	Discharge (ft^3/s)
		Hawaii, Island of Maui--Continued					
16502400	Pukuilua Gulch near Hana	Lat 20°42'00", long 156°00'14", at Highway 31, 0.4 mi southwest of Puuiki, and 4.0 mi south of Hana.	0.48	1963-89	04-07-89	2.86	113
16502800	Moomoonui Gulch at Hana	Lat 20°44'37", long 155°59'18", at Highway 31 just downstream from Moomooiki Gulch and 1.0 mi south of Hana.	.90	1963-89	04-07-89	13.62	1,190
16502900	Kawaipapa Gulch at Hana	Lat 20°46'08", long 156°00'04", 1,000 ft upstream from Highway 36 and 0.3 mi northwest of Hana Hospital.	5.83	1965-89	04-07-89	7.70	4,940
16603300	Unnamed gulch at Maliko Bay	Lat 20°56'26", long 156°21'04", at Hana Highway, 0.5 mi west of Maliko Bay, and 1.3 mi north of Hamakuapoko.	.43	1963-89	04-09-89	5.13	103
16603700	Kalialinui Gulch tributary near Pukalani	Lat 20°49'02", long 156°19'44", at Lower Kula Road and 1.4 mi south of Pukalani.	1.17	1967-89	03-04-89	5.04	194
16603800	Kaluapulani Gulch tributary near Pukalani	Lat 20°48'52", long 156°18'32", at Haleakala Highway, 1.5 mi west of Olinda Prison Camp, and 2.3 mi southeast of Pukalani.	.45	1963-89	04-09-89	2.60	67
16603850	Kalialinui Gulch near Kahului	Lat 20°52'47", long 156°26'06", 600 ft upstream from Hansen Road, 0.5 mi northeast of Puunene Hospital, and 2.5 mi southeast of Kahului Post Office.	17.9	1967-89	04-09-89	6.25	640
16607000	Iao Stream at Wailuku	Lat 20°53'38", long 156°30'27", 560 ft upstream from Market Street bridge at Wailuku and 1.9 mi upstream from mouth.	8.24	1951≠, 1952-89	11-04-88	5.62	4,420
16616500	Unnamed gulch at Maluhia Camp	Lat 20°57'26", long 156°31'41", at Kahekili Highway, 0.6 mi east of Maluhia Camp, and 1.8 mi northwest of Waihee.	.12	1964-89	04-09-89	-	e10
16619700	Poelua Gulch near Kahakuloa	Lat 21°00'58", long 156°34'58", at Highway 30 (bypass), 1.3 mi southeast of Nakalele Point lighthouse, and 2.2 mi northwest of Kahakuloa.	1.18	1965-89	04-09-89	12.59	523
16630200	Honokowai Stream at Honokowai	Lat 20°56'58", long 156°41'07", 0.5 mi southeast of Honokowai, and 1.1 mi northwest of Puukolii.	5.59	1962-63, 1965-89	11-04-88	4.51	523
16643300	Kauaula Stream near mouth, near Lahaina	Lat 20°52'09", long 156°39'43", 0.7 mi upstream from Honoapiilani Highway (bypass) and 1.3 mi southeast of Lahaina Lighthouse.	4.12	1960, 1962, 1964-89	11-04-88	4.46	536
16646200	Olowalu Stream at Olowalu	Lat 20°40'20", long 156°37'15", on downstream side of center pier of plantation road bridge, 0.6 mi northeast of Olowalu, and 5.5 mi southeast of Lahaina.	4.08	1962-72≠, 1973-89	11-04-88	4.68	848
16647500	Malalowaiaole Gulch near Maalaea	Lat 20°46'56", long 156°31'32", at Honoapiilani Highway, 200 ft upstream from mouth, 0.2 mi north of McGregor Point, and 1.2 mi southwest of Maalaea.	.64	1964-89	04-08-89	5.70	81
16647600	Waikapu Stream near Kihei	Lat 20°49'02", long 156°29'00", at railroad bridge beside Lower Maalaea Road, 2.5 mi northeast of Maalaea, and 2.5 mi northwest of Kihei.	6.97	1963-89	11-04-89	8.69	1,170

perated as a continuous-record gaging station.
stimated.

PERIODIC DETERMINATION OF TEMPERATURES

WATER QUALITY DATA, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

HAWAII, ISLAND OF MAUI

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND	TEMPER-ATURE WATER (DEG C)	DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND	TEMPER-ATURE WATER (DEG C)
16508000 - HANAWI STREAM NEAR NAHIKU, MAUI, HI (LAT 20°48'37" LONG 156°07'00")							
OCT 1988				MAR 1989			
04...	1605	3.1	20.5	28...	1725	4.3	20.0
NOV				MAY			
22...	1540	170	19.0	09...	1320	29	19.0
JAN 1989				JUN			
04...	1445	9.8	18.0	27...	1335	5.5	20.0
FEB				AUG			
14...	1435	5.4	17.5	16...	0900	5.8	20.0
16518000 - WEST WAILUAIKI STREAM NEAR KEANAE, MAUI, HI (LAT 20°49'16" LONG 156°08'37")							
OCT 1988				MAR 1989			
04...	1220	5.3	20.5	28...	1045	4.2	19.5
NOV				MAY			
22...	0950	32	19.0	09...	1110	25	19.0
JAN 1989				JUN			
04...	1150	17	18.5	27...	1015	6.2	21.5
FEB				AUG			
14...	0950	9.1	18.0	16...	1350	5.7	23.0
16587000 - HONOPOU STREAM NR HUELO, MAUI, HI (LAT 20°53'20" LONG 156°15'20")							
NOV 1988				JUN 1989			
29...	1045	2.4	20.5	29...	1030	2.5	20.0
JAN 1989				JUL			
19...	1140	9.2	18.0	28...	1050	6.1	21.0
FEB				AUG			
27...	1120	1.6	18.5	25...	1100	2.8	19.5
MAR				SEP			
30...	1030	1.2	20.0	28...	1030	1.1	21.0
APR							
27...	1110	10	20.0				
16599500 - OPANA TUNNEL NR KAILIILI, MAUI, HI (LAT 20°51'04" LONG 156°16'17")							
OCT 1988				APR 1989			
11...	1145	0.14	19.0	24...	1110	7.7	16.0
NOV				MAY			
21...	1040	6.8	18.0	17...	1105	3.5	18.0
JAN 1989				JUL			
12...	1240	9.2	17.0	07...	1130	6.3	18.5
FEB				AUG			
28...	1110	3.4	16.5	14...	1220	2.9	19.0
16604500 - IAO STREAM AT KEPANIWAI PARK NR WAILUKU, MAUI (LAT 20°53'08" LONG 156°32'32")							
NOV 1988				MAY 1989			
02...	1215	18	21.0	11...	1105	120	19.0
JAN 1989				JUN			
13...	1205	45	19.0	15...	1000	37	19.0
FEB				AUG			
17...	1110	33	20.0	01...	1100	62	20.0
APR							
04...	1145	28	20.0				

PERIODIC DETERMINATION OF TEMPERATURES

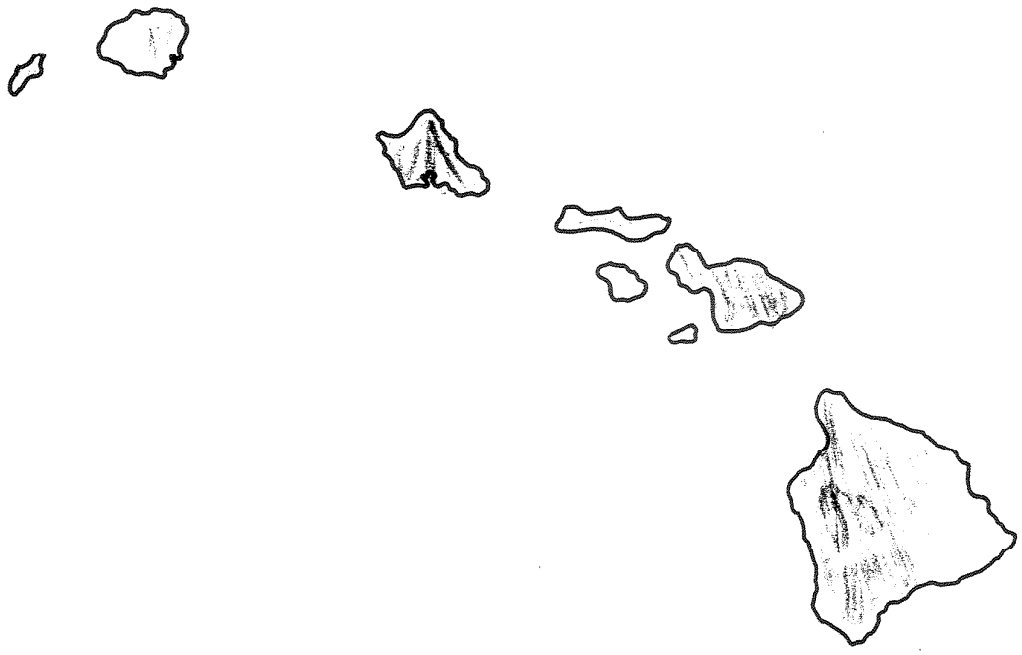
WATER QUALITY DATA, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

HAWAII, ISLAND OF MAUI--Continued

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND	TEMPER-ATURE WATER (DEG C)	DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND	TEMPER-ATURE WATER (DEG C)
16614000 - WAIHEE RIVER AT DAM NR WAIHEE,MAUI,HI (LAT 20°56'21" LONG 156°32'59")							
OCT 1988				APR 1989			
06...	1125	44	20.5	03...	1350	89	19.0
NOV				MAY			
17...	1240	44	20.0	12...	1130	74	19.5
JAN 1989				JUN			
11...	1210	59	19.5	26...	1150	62	19.5
FEB				AUG			
16...	1215	41	19.0	07...	1320	64	21.0
16620000 - HONOKOHAU STREAM NR HONOKOHAU, MAUI, HI (LAT 20°57'48" LONG 156°35'22")							
OCT 1988				JUN 1989			
07...	1235	18	20.5	13...	1100	20	19.0
MAR 1989				AUG			
22...	1220	13	19.0	10...	1100	25	19.5
MAY							
18...	1200	28	19.0				
16638500 - KAHOMA STREAM AT LAHAINA, MAUI, HI (LAT 20°53'10" LONG 156°40'36")							
NOV 1988				APR 1989			
07...	1140	2.1	23.0	05...	1145	35	21.0
JAN 1989				MAY			
09...	1100	1.3	19.5	15...	1000	13	23.5

Water Resources Data Hawaii and other Pacific Areas Water Year 1990

Volume 1. Hawaii



U.S. GEOLOGICAL SURVEY WATER-DATA REPORT HI-90-1
Prepared in cooperation with the State of Hawaii Department of Land and Natural Resources, Division of Water Resource Management and with other agencies

000179

16604500 IAO STREAM AT KEPANIWAI PARK, NEAR WAILUKU

LOCATION.--Lat 20°53'08", long 156°32'32", Hydrologic Unit 20020000, on left bank of Maniania and Waikapu ditch intake, 0.3 mi upstream from Kepaniwai Park, 0.5 mi downstream from Iao Valley State Park, and 2.3 mi west of Wailuku Post Office.

DRAINAGE AREA.--5.98 mi^2.

PERIOD OF RECORD.--May 1983 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 780 ft, from topographic map.

REMARKS.--Records fair. No appreciable diversion upstream.

AVERAGE DISCHARGE.--7 years (1984-90), 67.3 ft^3/s (48,760 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge 6,260 ft^3/s, Jan. 28, 1988, gage height, 9.0 ft, from rating curve extended above 181 ft^3/s on basis of slope-area measurements at gage heights 6.48 ft and 9.0 ft; minimum, 11 ft^3/s for several days in October and November 1984.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum discharge known, 7,540 ft^3/s, Dec. 3, 1950, from rating curve based on model study of site 2.3 mi downstream.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,000 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Oct. 8	2400	2,460	5.75	Jan. 17	0200	*3,370	*6.67
Dec. 9	1230	2,740	6.04	Mar. 1	0630	2,310	5.58

Minimum discharge, 20 ft^3/s, Nov. 26, Dec. 6, 8-9.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	24	29	26	89	139	680	37	28	100	46	71	34
2	23	26	22	78	96	276	65	23	54	89	53	31
3	25	26	23	49	124	138	84	152	45	48	92	36
4	21	26	23	46	71	102	63	54	40	39	74	43
5	37	e25	21	31	77	124	42	95	46	45	64	59
6	62	e25	25	26	84	202	34	90	54	34	99	34
7	29	e24	22	25	62	195	31	65	44	31	91	58
8	187	e23	21	25	44	195	27	173	69	88	57	54
9	280	e26	192	101	39	107	26	66	42	47	49	101
10	73	e24	60	49	48	76	26	65	40	43	44	106
11	49	e23	37	70	47	81	25	50	34	33	50	48
12	40	e22	30	49	34	64	24	39	32	53	74	e52
13	34	e21	38	33	30	54	26	34	31	33	63	e49
14	31	22	26	29	32	48	44	56	32	46	46	e100
15	30	69	25	61	29	98	28	102	47	53	62	e49
16	27	44	24	164	27	54	26	48	152	41	54	e76
17	26	29	23	515	69	46	24	69	73	44	47	142
18	26	26	22	224	40	42	25	63	76	48	73	85
19	86	32	21	132	32	39	50	97	114	64	82	55
20	73	26	35	129	36	40	36	191	103	45	59	44
21	51	26	57	93	29	37	34	183	58	59	45	37
22	33	23	30	109	28	33	52	76	76	39	36	35
23	146	22	26	116	27	31	56	69	86	33	38	50
24	212	21	25	76	34	30	39	139	124	77	104	37
25	114	22	24	61	221	29	29	109	120	68	45	33
26	74	21	30	53	219	28	36	74	55	50	196	31
27	54	21	29	69	110	30	25	108	45	217	192	29
28	50	21	24	54	188	34	24	65	42	112	99	27
29	40	24	23	44	---	51	23	59	86	81	60	59
30	33	34	35	44	---	52	23	80	58	82	46	111
31	30	---	30	61	---	57	---	46	---	64	39	---
TOTAL	2020	823	1049	2705	2016	3073	1074	2570	1978	1852	2204	1705
MEAN	65.2	27.4	33.8	87.3	72.0	99.1	35.8	82.9	65.9	59.7	71.1	56.8
MAX	280	89	192	515	221	680	84	191	152	217	196	142
MIN	21	21	21	25	27	28	23	23	31	31	36	27
AC-FT	4010	1630	2080	5370	4000	6100	2130	5100	3920	3670	4370	3380

CAL YR 1989 TOTAL 28821 MEAN 79.0 MAX 763 MIN 21 AC-FT 57170
WTR YR 1990 TOTAL 23069 MEAN 63.2 MAX 680 MIN 21 AC-FT 45760

e Estimated

HAWAII, ISLAND OF MAUI

16614000 WAIHEE RIVER AT DAM NEAR WAIHEE

LOCATION.--LAT 20°56'21", long 156°32'59", Hydrologic Unit 20020000, on right bank at dam 8 ft upstream from the abandoned Waihee canal intake, 2.6 mi southwest from Waihee Point, and 4.4 mi northwest from Wailuku Post Office.

DRAINAGE AREA.--4.20 mi^2.

PERIOD OF RECORD.--November 1910 to December 1913, November 1983 to current year. Low-flow records not equivalent prior to Dec. 31, 1913, due to Waihee canal diverted water upstream.

GAGE.--Water-stage recorder. Elevation of gage is 605 ft, from topographic map.

REMARKS.--Records fair. No diversion upstream.

AVERAGE DISCHARGE.--6 years, 86.9 ft^3/s (62,960 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge 9,660 ft^3/s, Jan. 28, 1988, gage height, 8.95 ft, from rating curve extended above 280 ft^3/s on basis of slope-area measurements at gage heights 6.70 ft and 8.95 ft; minimum, 22 ft^3/s, Jan. 18-22, 24, 25, 1985.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,000 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Jan. 17	0130	*5,400	*6.00	Mar. 1	1130	3,150	5.00

Minimum discharge, 36 ft^3/s, Dec. 26.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	e48	e49	42	84	118	765	50	55	85	54	80	51
2	e50	e47	39	73	80	93	94	45	52	109	55	49
3	e52	e45	51	49	83	65	124	245	48	56	123	55
4	e60	e44	42	50	50	63	70	48	48	49	66	60
5	e90	e43	39	43	55	93	55	88	55	57	61	74
6	e80	e43	55	39	81	180	49	79	67	47	111	54
7	e52	e42	46	38	53	172	48	61	49	46	70	72
8	e180	e42	40	37	45	140	47	256	88	180	53	97
9	e200	e46	186	95	47	62	49	49	53	64	53	165
10	e56	43	43	48	53	59	47	67	52	54	50	128
11	e54	43	39	67	54	78	46	51	48	47	61	53
12	e50	43	39	47	43	59	45	45	49	67	93	57
13	e48	42	90	39	41	53	49	45	48	51	73	56
14	e48	43	42	38	54	51	77	84	50	96	61	119
15	e80	93	39	102	42	120	48	111	57	85	e56	54
16	e68	49	38	395	41	56	45	48	155	65	e52	79
17	e52	45	38	616	181	53	45	68	69	64	e68	168
18	e82	42	38	80	56	52	46	70	68	62	82	88
19	e140	47	38	118	46	50	57	73	106	101	122	68
20	e90	43	42	64	45	67	52	119	162	71	71	58
21	e72	44	46	46	42	55	51	151	54	123	55	51
22	e56	42	38	70	41	50	69	53	59	54	51	55
23	e150	41	37	67	40	49	84	65	74	49	68	68
24	e160	41	37	43	48	50	63	166	102	74	85	55
25	e80	42	37	45	271	50	47	81	81	71	53	53
26	e60	41	62	46	128	48	45	61	51	59	225	55
27	e50	40	43	51	146	50	44	112	54	320	210	52
28	e100	40	38	45	317	49	44	56	50	130	79	49
29	e90	40	42	43	---	56	43	53	84	84	54	94
30	e56	45	52	46	---	65	51	71	64	90	52	124
31	e50	---	62	53	---	60	---	49	---	65	50	---
TOTAL	2504	1350	1520	2677	2301	2913	1684	2625	2082	2544	2443	2261
MEAN	80.8	45.0	49.0	86.4	82.2	94.0	56.1	84.7	69.4	82.1	78.8	75.4
MAX	200	93	186	616	317	765	124	256	162	320	225	168
MIN	48	40	37	37	40	48	43	45	48	46	50	49
AC-FT	4970	2680	3010	5310	4560	5780	3340	5210	4130	5050	4850	4480

CAL YR 1989 TOTAL 35778 MEAN 98.0 MAX 1060 MIN 37 AC-FT 70970
WTR YR 1990 TOTAL 26904 MEAN 73.7 MAX 765 MIN 37 AC-FT 53360

e Estimated

1990

Annual maximum discharge at crest-stage partial-record stations during water year 1990--Continued

Station no.	Station name	Location	Drainage area (mi^2)	Period of record	Annual maximum		
					Date	Gage height (ft)	Discharge (ft^3/s)
		Hawaii, Island of Maui--Continued					
16502400	Pukuilua Gulch near Hana	Lat 20°42'00", long 156°00'14", at Highway 31, 0.4 mi southwest of Puuiki, and 4.0 mi south of Hana.	0.48	1963-90	10-24-89	2.42	83
16502800	Moomoonui Gulch at Hana	Lat 20°44'37", long 155°59'18", at Highway 31 just downstream from Moomooiki Gulch and 1.0 mi south of Hana.	.90	1963-90	01-19-90	10.17	565
16502900	Kawaipapa Gulch at Hana	Lat 20°46'08", long 156°00'04", 1,000 ft upstream from Highway 36 and 0.3 mi northwest of Hana Hospital.	5.83	1965-90	10-24-89	7.49	4,480
16603300	Unnamed gulch at Maliko Bay	Lat 20°56'26", long 156°21'04", at Hana Highway, 0.5 mi west of Maliko Bay, and 1.3 mi north of Hamakuapoko.	.43	1963-90	01-15-90	1.94	15
16603700	Kalialinui Gulch tributary near Pukalani	Lat 20°49'02", long 156°19'44", at Lower Kula Road and 1.4 mi south of Pukalani.	1.17	1967-90	12-09-89	-	e1
16603800	Kaluapulani Gulch tributary near Pukalani	Lat 20°48'52", long 156°18'32", at Haleakala Highway, 1.5 mi west of Olinda Prison Camp, and 2.3 mi southeast of Pukalani.	.45	1963-90	12-09-89	1.35	10
16603850	Kalialinui Gulch near Kahului	Lat 20°52'47", long 156°26'06", 600 ft upstream from Hansen Road, 0.5 mi northeast of Puunene Hospital, and 2.5 mi southeast of Kahului Post Office.	17.9	1967-90	12-09-89	3.84	22
16607000	Iao Stream at Wailuku	Lat 20°53'38", long 156°30'27", 560 ft upstream from Market Street bridge at Wailuku and 1.9 mi upstream from mouth.	8.24	1951≠, 1952-90	10-08-89	5.31	3,840
16616500	Unnamed gulch at Maluhia Camp	Lat 20°57'26", long 156°31'41", at Kahekili Highway, 0.6 mi east of Maluhia Camp, and 1.8 mi northwest of Waihee.	.12	1964-90	01-16-90	-	e50
16619700	Poelua Gulch near Kahakuloa	Lat 21°00'58", long 156°34'58", at Highway 30 (bypass), 1.3 mi southeast of Nakalele Point lighthouse, and 2.2 mi northwest of Kahakuloa.	1.18	1965-90	01-16-90	13.05	592
16630200	Honokowai Stream at Honokowai	Lat 20°56'58", long 156°41'07", 0.5 mi southeast of Honokowai, and 1.1 mi northwest of Puukolii.	5.59	1962-63, 1965-90	01-16-90	5.42	838
16643300	Kauaula Stream near mouth, near Lahaina	Lat 20°52'09", long 156°39'43", 0.7 mi upstream from Honoapiilani Highway (bypass) and 1.3 mi southeast of Lahaina Lighthouse.	4.12	1960, 1962, 1964-90	10-09-89	3.56	265
16646200	Olowalu Stream at Olowalu	Lat 20°49'23", long 156°37'15", on downstream side of center pier of plantation road bridge, 0.6 mi northeast of Olowalu, and 5.5 mi southeast of Lahaina.	4.08	1962-72≠, 1973-90	10-08-89	3.65	368
16647500	Malalowaiaole Gulch near Maalaea	Lat 20°46'56", long 156°31'32", at Honoapiilani Highway, 200 ft upstream from mouth, 0.2 mi north of McGregor Point, and 1.2 mi southwest of Maalaea.	.64	1964-90	10-08-89	3.90	22
16650500	Waikapu Stream near Kihei	Lat 20°49'02", long 156°29'00", at railroad bridge beside Lower Maalaea Road, 2.5 mi northeast of Maalaea, and 2.5 mi northwest of Kihei.	6.97	1963-90	10-08-89	6.82	982

≠ Operated as a continuous-record gaging station.
e Estimated.

Annual maximum discharge at crest-stage partial-record stations during water year 1990--Continued

Station no.	Station name	Location	Drainage area (mi^2)	Period of record	Annual maximum		
					Date	Gage height (ft)	Discharge (ft^3/s)
		Hawaii, Island of Maui--Continued					
16502400	Pukuilua Gulch near Hana	Lat 20°42'00", long 156°00'14", at Highway 31, 0.4 mi southwest of Puuiki, and 4.0 mi south of Hana.	0.48	1963-90	10-24-89	2.42	83
16502800	Moomoonui Gulch at Hana	Lat 20°44'37", long 155°59'18", at Highway 31 just downstream from Moomooiki Gulch and 1.0 mi south of Hana.	.90	1963-90	01-19-90	10.17	565
16502900	Kawaipapa Gulch at Hana	Lat 20°46'08", long 156°00'04", 1,000 ft upstream from Highway 36 and 0.3 mi northwest of Hana Hospital.	5.83	1963-90	10-24-89	7.49	4,480
16603300	Unnamed gulch at Maliko Bay	Lat 20°56'26", long 156°21'04", at Hana Highway, 0.5 mi west of Maliko Bay, and 1.3 mi north of Hamakuapoko.	.43	1963-90	01-15-90	1.94	15
16603700	Kalialinui Gulch tributary near Pukalani	Lat 20°49'02", long 156°19'44", at Lower Kula Road and 1.4 mi south of Pukalani.	1.17	1967-90	12-09-89	-	e1
16603800	Kaluapulani Gulch tributary near Pukalani	Lat 20°48'52", long 156°18'32", at Haleakala Highway, 1.5 mi west of Olinda Prison Camp, and 2.3 mi southeast of Pukalani.	.45	1963-90	12-09-89	1.25	16
16603850	Kalialinui Gulch near Kahului	Lat 20°52'47", long 156°26'06", 600 ft upstream from Hansen Road, 0.5 mi northeast of Puunene Hospital, and 2.5 mi southeast of Kahului Post Office.	17.9	1967-90	12-09-89	3.84	22
16607000	Iao Stream at Wailuku	Lat 20°53'38", long 156°30'27", 560 ft upstream from Market Street bridge at Wailuku and 1.9 mi upstream from mouth.	8.24	1951≠, 1952-90	10-08-89	5.31	3,840
16616500	Unnamed gulch at Maluhia Camp	Lat 20°57'26", long 156°31'41", at Kahekili Highway, 0.6 mi east of Maluhia Camp, and 1.8 mi northwest of Waihee.	.12	1964-90	01-16-90	-	e50
16619700	Poelua Gulch near Kahakuloa	Lat 21°00'58", long 156°34'58", at Highway 30 (bypass), 1.3 mi southeast of Nakalele Point lighthouse, and 2.2 mi northwest of Kahakuloa.	1.18	1965-90	01-16-90	13.05	592
16630200	Honokowai Stream at Honokowai	Lat 20°56'58", long 156°41'07", 0.5 mi southeast of Honokowai, and 1.1 mi northwest of Puukolii.	5.39	1962-63, 1965-90	01-16-90	5.42	838
16643300	Kauaula Stream near mouth, near Lahaina	Lat 20°52'09", long 156°39'43", 0.7 mi upstream from Honoapiilani Highway (bypass) and 1.3 mi southeast of Lahaina Lighthouse.	4.12	1960, 1962, 1964-90	10-09-89	3.56	265
16646200	Olowalu Stream at Olowalu	Lat 20°49'23", long 156°37'15", on downstream side of center pier of plantation road bridge, 0.6 mi northeast of Olowalu, and 5.5 mi southeast of Lahaina.	4.08	1962-72≠, 1973-90	10-08-89	3.65	368
16647500	Malalowaiaole Gulch near Maalaea	Lat 20°46'56", long 156°31'32", at Honoapiilani Highway, 200 ft upstream from mouth, 0.2 mi north of McGregor Point, and 1.2 mi southwest of Maalaea.	.64	1964-90	10-08-89	3.96	22
16650500	Waikapu Stream near Kihei	Lat 20°49'02", long 156°29'00", at railroad bridge beside Lower Maalaea Road, 2.5 mi northeast of Maalaea, and 2.5 mi northwest of Kihei.	6.97	1963-90	10-08-89	6.82	982

≠ Operated as a continuous-record gaging station.
e Estimated.

000133

Water Resources Data Hawaii and other Pacific Areas Water Year 1991

Volume 1. Hawaii

U.S. GEOLOGICAL SURVEY WATER-DATA REPORT HI-91-1
Prepared in cooperation with the State of Hawaii
Department of Land and Natural Resources,
Division of Water Resource Management
and with other agencies

000134

16604500 IAO STREAM AT KEPANIWAI PARK, NEAR WAILUKU

LOCATION.--Lat 20°53'08", long 156°32'32", Hydrologic Unit 20020000, on left bank of Maniania and Waikapu ditch intake, 0.3 mi upstream from Kepaniwai Park, 0.5 mi downstream from Iao Valley State Park, and 2.3 mi west of Wailuku Post Office.

DRAINAGE AREA.--5.98 mi^2.

PERIOD OF RECORD.--May 1983 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 780 ft, from topographic map.

REMARKS.--Records fair. No appreciable diversion upstream.

AVERAGE DISCHARGE.--8 years (1984-91), 67.9 ft^3/s (49,190 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge 6,260 ft^3/s, Jan. 28, 1988, gage height, 9.0 ft, from rating curve extended above 181 ft^3/s on basis of slope-area measurements at gage heights 6.48 ft and 9.0 ft; minimum, 11 ft^3/s for several days in October and November 1984.

EXTREMES OUTSIDE PERIOD OF RECORD. Maximum discharge known, 7,540 ft^3/s, Dec. 3, 1950, from rating curve based on model study of site 2.3 mi downstream.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,000 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Nov. 14	2200	1,060	3.92	Mar. 9	0730	3,450	6.75
Nov. 19		3,800	7.08	Aug. 7	1600	1,400	4.44
Jan. 27	1130	*4,740	*7.85	Sep. 19	1430	3,920	7.19

Minimum discharge, 21 ft^3/s, Nov. 8-11.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	80	28	e29	e28	46	34	e40	e52	57	40	139	46
2	52	27	e31	e27	42	33	e39	e37	138	47	85	38
3	108	26	e36	e27	65	32	e38	e35	137	112	120	72
4	132	26	e46	e33	45	31	e39	e58	92	66	110	134
5	141	27	e31	e74	40	58	e44	e44	69	41	58	57
6	55	25	e41	e60	38	49	e41	e35	76	34	64	46
7	41	23	e46	e42	37	66	e70	e42	149	34	474	42
8	36	22	e120	e38	36	322	e180	e72	64	31	220	41
9	31	21	e520	e36	34	678	e70	e76	49	33	128	39
10	41	21	e80	e40	34	259	e40	e44	42	124	86	38
11	65	64	e32	e38	33	124	e42	e49	34	229	103	103
12	44	84	e84	34	32	206	40	e37	49	89	82	67
13	34	72	e105	32	188	147	42	e40	34	60	75	59
14	36	368	e36	31	154	147	57	e38	42	48	53	42
15	34	281	e31	33	68	138	63	e37	28	46	46	39
16	120	135	e30	29	54	200	80	e48	26	101	42	34
17	258	e100	e29	28	49	269	40	40	27	66	47	33
18	162	e300	e30	27	45	155	34	37	24	44	75	34
19	97	e550	e50	26	88	237	32	33	24	37	52	244
20	61	e82	e56	26	230	e280	31	32	24	33	39	118
21	48	e35	e52	26	98	e100	29	30	24	32	36	74
22	40	e32	e98	26	64	e39	29	28	24	34	37	58
23	40	e72	e90	86	54	e42	46	28	26	29	39	59
24	36	e34	e450	31	97	e39	64	27	25	39	36	85
25	36	e30	e70	27	60	e37	126	27	92	30	36	49
26	53	e29	e32	26	44	e41	92	27	117	45	40	38
27	33	e31	e30	430	40	e39	71	39	75	29	94	36
28	29	e30	e35	106	37	e37	95	48	93	28	115	33
29	30	e31	e29	64	---	e36	76	59	45	148	200	31
30	59	e30	e28	53	---	e40	e86	85	47	210	76	30
31	30	---	e29	49	---	e37	---	97	---	94	53	---
TOTAL	2062	2636	2406	1633	1852	3952	1776	1381	1753	2033	2860	1819
MEAN	66.5	87.9	77.6	52.7	66.1	127	59.2	44.5	58.4	65.6	92.3	60.6
MAX	258	550	520	430	230	678	180	97	149	229	474	244
MIN	29	21	28	26	32	31	29	27	24	28	36	30
AC-FT	4090	5230	4770	3240	3670	7840	3520	2740	3480	4030	5670	3610

CAL YR 1990 TOTAL 26281 MEAN 72.0 MAX 680 MIN 21 AC-FT 52130
WTR YR 1991 TOTAL 26163 MEAN 71.7 MAX 678 MIN 21 AC-FT 51890

e Estimated

000185

16614000 WAIHEE RIVER AT DAM NEAR WAIHEE

LOCATION.--LAT 20°56'21", long 156°32'59", Hydrologic Unit 20020000, on right bank at dam 8 ft upstream from the abandoned Waihee canal intake, 2.6 mi southwest from Waihee Point, and 4.4 mi northwest from Wailuku Post Office.

DRAINAGE AREA.--4.20 mi^2.

PERIOD OF RECORD.--November 1910 to December 1913, November 1983 to current year. Low-flow records not equivalent prior to Dec. 31, 1913, due to Waihee canal diverted water upstream.

GAGE.--Water-stage recorder. Elevation of gage is 605 ft, from topographic map.

REMARKS.--Records fair. No diversion upstream.

AVERAGE DISCHARGE.--7 years, 87.3 ft^3/s (63,250 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge 9,660 ft^3/s, Jan. 28, 1988, gage height, 8.95 ft, from rating curve extended above 280 ft^3/s on basis of slope-area measurements at gage heights 6.70 ft and 8.95 ft; minimum, 22 ft^3/s, Jan. 18-22, 24, 25, 1985.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,000 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Nov. 11	2000	7,160	6.97	Mar. 9	0730	6,690	6.66
Nov. 14	2230	2,000	4.33	Aug. 7	1830	2,490	4.66
Nov. 19	0300	6,000	6.30	Sep. 19	1330	7,820	7.51
Jan. 27	1200	*8,220	*7.83				

Minimum discharge, 40 ft3/s, Mar. 3-5

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	81	50	52	50	46	42	55	53	57	51	134	52
2	71	55	56	49	46	42	54	49	180	64	84	51
3	161	49	61	49	67	42	53	48	118	185	185	120
4	142	50	83	60	46	41	54	94	77	62	74	181
5	114	53	55	135	45	63	62	50	56	47	53	56
6	54	48	75	126	45	54	56	47	61	46	64	52
7	51	47	78	102	44	61	52	57	119	46	559	53
8	52	46	203	64	44	571	251	100	56	44	101	52
9	57	45	553	52	44	729	97	103	52	53	98	51
10	83	45	71	68	44	88	52	60	57	203	58	52
11	70	439	58	53	43	54	58	68	51	415	72	102
12	58	208	148	51	43	175	57	49	51	72	70	69
13	56	81	192	53	233	70	56	54	49	66	59	59
14	57	570	65	59	90	78	76	53	50	52	54	52
15	59	191	56	58	48	64	65	50	44	53	52	51
16	215	172	54	50	45	107	95	65	44	112	52	48
17	444	113	52	50	44	180	51	52	46	68	64	47
18	187	751	55	48	45	86	49	65	44	50	68	48
19	70	656	92	48	118	435	48	51	43	47	65	493
20	55	168	94	47	205	236	49	46	43	49	53	75
21	52	64	94	47	63	60	48	46	42	47	50	56
22	51	57	184	48	47	54	48	45	42	47	55	53
23	58	133	161	66	45	58	56	45	45	47	56	62
24	53	62	339	49	66	54	73	45	43	68	51	136
25	52	55	60	47	47	53	145	44	118	53	51	55
26	77	53	60	46	43	57	67	45	121	60	57	51
27	52	56	54	509	43	56	57	52	69	46	101	51
28	50	55	65	57	42	52	93	56	99	46	163	50
29	51	58	52	49	---	51	60	55	47	360	364	49
30	116	56	51	47	---	56	89	59	69	274	67	49
31	53	---	52	47	---	50	---	82	---	97	54	---
TOTAL	2802	4486	3325	2284	1781	3819	2126	1788	1993	2930	3088	2376
MEAN	90.4	150	107	73.7	63.6	123	70.9	57.7	66.4	94.5	99.6	79.2
MAX	444	751	553	509	233	729	251	103	180	415	559	493
MIN	50	45	51	46	42	41	48	44	42	44	50	47
AC-FT	5560	8900	6600	4530	3530	7570	4220	3550	3950	5810	6130	4710

CAL YR 1990 TOTAL 32143 MEAN 88.1 MAX 765 MIN 37 AC-FT 63760
WTR YR 1991 TOTAL 32798 MEAN 89.9 MAX 751 MIN 41 AC-FT 65050

Annual maximum discharge at crest-stage partial-record stations during water year 1991--Continued

Station no.	Station name	Location	Drainage area mi^2	Period of record	Annual maximum		
					Date	Gage height (ft)	Discharge (ft^3/s)
		Hawaii, Island of Oahu--Continued					
16331000	Waimea Gulch near Kawailoa Camp	Lat 21°37'29", long 158°04'58", at culvert on Ashley Road, 0.1 mi upstream from Highway 83, and 1.1 mi north of Kawailoa Camp.	2.23	1968-91	11-20-90	3.07	129
16340000	Anahulu River near Haleiwa	Lat 21°35'28", long 158°04'45", 1.7 mi southeast of junction of Emerson Road and Kamehameha Highway and 2.5 mi east of Waialua School at Haleiwa.	13.5	1958-91	11-20-90	13.53	10,100
16350000	Opaeula Stream near Haleiwa	Lat 21°35'09", long 158°06'01", 0.6 mi upstream from Kamehameha Highway and 2.1 mi northeast of Waialua.	5.96	1956-91	11-20-90	18.58	6,100
		Hawaii, Island of Molokai					
16411320	Kakaako Gulch above Kamakahi Gulch, near Mauna Loa	Lat 21°10'11", long 157°11'56", 0.1 mi upstream from Kamakahi Gulch, 1.7 mi downstream from Highway 46, and 2.5 mi northeast of Mauna Loa.	1.40	1964-91	12-24-90	1.90	143
16411400	Kakaako Gulch near Mauna Loa	Lat 21°10'39", long 157°12'31", on left bank 1.0 mi downstream from Kamakahi Gulch, and 3.0 mi north of Mauna Loa School.	5.34	1963-72≠, 1973-91	-	-	e600
16411600	Kaunala Gulch near Mauna Loa	Lat 21°07'01", long 157°15'43", at Sand Haul Road, 3.2 mi east of Laau Point lighthouse, and 3.3 mi southwest of Mauna Loa.	0.28	1964-91	12-24-90	0.92	10
16411640	Halena Gulch near Mauna Loa	Lat 21°05'53", long 157°13'47", 2.7 mi southwest of Mauna Loa and 5.5 mi east of Laau Point.	2.07	1965-91	12-24-90	4.59	1,020
16411800	Kaluapeelua Gulch at Hoolehua	Lat 21°09'55", long 157°04'22", 0.4 mi south of Hoolehua and 2.1 mi west of Kualapuu.	1.46	1964-91	-	-	N.F.
16413500	Manawainui Gulch near Kualapuu	Lat 21°07'42", long 157°03'25", at bridge on Highway 46, 0.5 mi south of Holomua School, and 2.3 mi southwest of Kualapuu.	10.4	1965-91	12-24-90	-	e250
16415400	Wawaia Gulch at Kamalo	Lat 21°03'25", long 156°52'20", at Highway 45, 0.3 mi upstream from mouth, and 0.5 mi northeast of Kamalo.	2.12	1964-91	12-24-90	1.54	545
16419000	Pohakupili Gulch near Halawa	Lat 21°07'59", long 156°44'15", at Highway 45, 0.5 mi upstream from mouth, and 1.9 mi south of Halawa.	0.48	1964-91	03-23-91	7.14	304
		Hawaii, Island of Maui					
16500100	Kepuni Gulch near Kahikinui House	Lat 20°37'21", long 156°15'16", on right bank 120 ft upstream from bridge on Highway 31, 400 ft upstream from Kamole Gulch, 1.1 mi east of Kahikinui House, and 8.5 mi west of Kaupo.	1.91	1963-72≠, 1973-91	01-27-91	7.49	768
16500300	Hawelewele Gulch near Kaupo	Lat 20°38'01", long 156°11'08", 700 ft upstream from Piilani Highway 31 and 3.9 mi west of Kaupo.	11.3	1967-91	11-20-90	12.21	7,360
16500800	Kukuiula Gulch near Kipahulu	Lat 20°39'18", long 156°04'44", at Highway 31, 1.3 mi west of Kipahulu, and 3.2 mi east of Kaupo.	0.76	1963-68≠, 1969-91	11-23-90	5.55	412

≠ Operated as a continuous-record gaging station.
e Estimated.

000137

Annual maximum discharge at crest-stage partial-record stations during water year 1991--Continued

Station no.	Station name	Location	Drainage area mi^2	Period of record	Annual maximum		
					Date	Gage height (ft)	Discharge (ft^3/s)
		Hawaii, Island of Maui--Continued					
16502400	Pukuilua Gulch near Hana	Lat 20°42'00", long 156°00'14", at Highway 31, 0.4 mi southwest of Puuiki, and 4.0 mi south of Hana.	0.48	1963-91	11-23-90	5.25	314
16502800	Moomoonui Gulch at Hana	Lat 20°44'37", long 155°59'18", at Highway 31 just downstream from Moomooiki Gulch and 1.0 mi south of Hana.	0.90	1963-91	03-19-91	13.64	1,200
16502900	Kawaipapa Gulch at Hana	Lat 20°46'08", long 156°00'04", 1,000 ft upstream from Highway 36 and 0.3 mi northwest of Hana Hospital.	5.83	1965-91	03-19-91	9.93	10,790
16603300	Unnamed gulch at Maliko Bay	Lat 20°56'26", long 156°21'04", at Hana Highway, 0.5 mi west of Maliko Bay, and 1.3 mi north of Hamakuapoko.	0.43	1963-91	11-19-90	-	e1
16603700	Kalialinui Gulch tributary near Pukalani	Lat 20°49'02", long 156°19'44", at Lower Kula Road and 1.4 mi south of Pukalani.	1.17	1967-91	01-27-91	-	e1
16603800	Kaluapulani Gulch tributary near Pukalani	Lat 20°48'52", long 156°18'32", at Haleakala Highway, 1.5 mi west of Olinda Prison Camp, and 2.3 mi southeast of Pukalani.	0.45	1963-91	01-27-91	1.25	16
16603850	Kalialinui Gulch near Kahului	Lat 20°52'47", long 156°26'06", 600 ft upstream from Hansen Road, 0.5 mi northeast of Puunene Hospital, and 2.5 mi southeast of Kahului Post Office.	17.9	1967-91	01-27-91	4.28	63
16607000	Iao Stream at Wailuku	Lat 20°53'38", long 156°30'27", 560 ft upstream from Market Street bridge at Wailuku and 1.9 mi upstream from mouth.	8.24	1951≠, 1952-91	01-27-91	5.67	4,520
16616500	Unnamed gulch at Maluhia Camp	Lat 20°57'26", long 156°31'41", at Kahekili Highway, 0.6 mi east of Maluhia Camp, and 1.8 mi northwest of Waihee.	0.12	1964-91	03-09-91	-	e3
16619700	Poelua Gulch near Kahakuloa	Lat 21°00'58", long 156°34'58", at Highway 30 (bypass), 1.3 mi southeast of Nakalele Point lighthouse, and 2.2 mi northwest of Kahakuloa.	1.18	1965-91	03-09-91	7.70	244
16630200	Honokowai Stream at Honokowai	Lat 20°56'58", long 156°41'07", 0.5 mi southeast of Honokowai, and 1.1 mi northwest of Puukolii.	5.59	1962-63, 1965-91	11-19-90	5.39	826
16638500	Kahoma Stream at Lahaina	Lat 20°53'12", long 156°40'36", 0.2 mi west of Kelawea, 0.6 mi northeast of Lahaina, 0.6 mi downstream from Kanaha Stream, and0.9 mi upstream from mouth.	5.22	1963-89≠ 1990-91	11-19-90	-	e1,400
16643300	Kauaula Stream near mouth, near Lahaina	Lat 20°52'09", long 156°39'43", 0.7 mi upstream from Honoapiilani Highway (bypass) and 1.3 mi southeast of Lahaina Lighthouse.	4.12	1960, 1962, 1964-91	03-09-91	4.23	456
16646200	Olowalu Stream at Olowalu	Lat 20°49'23", long 156°37'15", on downstream side of center pier of plantation road bridge, 0.6 mi northeast of Olowalu, and 5.5 mi southeast of Lahaina.	4.08	1962-72≠, 1973-91	03-09-91	4.71	866
16647500	Malalowaiaole Gulch near Maalaea	Lat 20°46'56", long 156°31'32", at Honoapiilani Highway, 200 ft upstream from mouth, 0.2 mi north of McGregor Point, and 1.2 mi southwest of Maalaea.	0.64	1964-91	11-19-90	4.55	38

≠ Operated as a continuous-record gaging station.
e Estimated.

000138

Annual maximum discharge at crest-stage partial-record stations during water year 1991--Continued

Station no.	Station name	Location	Drainage area mi²	Period of record	Annual maximum		
					Date	Gage height (ft)	Discharge (ft³/s)
		Hawaii, Island of Maui--Continued					
16650500	Waikapu Stream near Kihei	Lat 20°49'02", long 156°29'00", at railroad bridge beside Lower Maalaea Road, 2.5 mi northeast of Maalaea, and 2.5 mi northwest of Kihei.	6.97	1963-91	01-27-91	-	e85
16658500	Waiakoa Gulch tributary near Waiakoa	Lat 20°44'56", long 156°19'22", at Upper Kula Road, 1.0 mi southeast of Waiakoa, and 1.0 mi northeast of junction of Lower and Upper Kula Roads.	0.98	1964-91	01-27-91	4.31	14
16659000	Waiakoa Gulch at Kihei	Lat 20°47'14", long 156°27'41", 0.3 mi northeast of Kihei and 0.4 mi upstream from mouth.	10.1	1963-91	01-27-91	6.95	33(
16660000	Kulanihakoi Gulch near Kihei	Lat 20°46'06", long 156°27'03", on right bank 0.5 mi northeast of Lihue Cemetery, 0.8 mi upstream from mouth, and 1.3 mi southeast of Kihei.	14.4	1963-70≠, 1971-91	12-24-90	-	e4
16665500	Kamaole Gulch at Kamaole	Lat 20°43'36", long 156°27'02", at Kihei Road, 350 ft upstream from mouth, and 0.2 mi south of Kamaole.	4.28	1972-91	12-24-90	-	e8
16664000	Liilioholo Gulch at Kamaole	Lat 20°43'04", long 156°26'55", on upstream side of Kihei Road, 300 ft upstream from mouth, and 0.8 mi south of Kamaole.	4.12	1972-91	12-24-90	-	e20
		Hawaii, Island of Hawaii					
16701300	Waiakea Stream at Hilo	Lat 19°42'38", long 155°05'02", 0.3 mi upstream from Kinoole Street bridge and 1.3 mi southeast of Hilo Post Office.	35.8	1968-91	Records being reviewed.		
16701400	Palai Stream at Hilo	Lat 19°40'56", long 155°04'04", at Highway 11, 300 ft south of Palai Street intersection, and 3.5 mi southeast of Hilo Post Office.	5.08	1965-91	Records being reviewed.		
16717400	Kalaoa Mauka Stream near Hilo	Lat 19°48'07", long 155°06'03", at culvert on Highway 19, 1.0 mi north of Papaikou, and 5.1 mi north of Hilo Post Office.	0.24	1963-91	Records being reviewed.		
16717600	Alia Stream near Hilo	Lat 19°50'38", long 155°06'21", on left bank 10 ft downstream from culvert on Highway 19 at Pepeekeo, 2.0 mi south of Honomu, and 8.0 mi north of Hilo.	0.58	1962-72≠, 1973-91	Records being reviewed.		
16717650	Kapehu Stream near Pepeekeo	Lat 19°51'52", long 155°06'11", at culvert on Highway 19, 1.0 mi southeast of Honomu, 2.2 mi north of Pepeekeo, and 9.4 mi north of Hilo.	1.09	1963-91	Records being reviewed.		
16717800	Pohakupuka Stream near Papaaloa	Lat 19°57'20", long 155°11'20", on right bank 200 ft downstream from Highway 19, 2.8 mi northwest of Honohina, and 3.0 mi southwest of Papaaloa.	2.76	1963-80≠, 1983-91	Records being reviewed.		
16717850	Keehia Gulch near Ookala	Lat 20°01'08", long 155°18'45", at culvert on Highway 19, 1.7 mi west of Ookala, and 4.1 mi southeast of Paauilo.	0.62	1963-91	Records being reviewed.		
16717920	Ahualoa Gulch at Honokaa	Lat 20°05'12", long 155°29'17", at Highway 24, 1.1 mi northwest of Honokaa Hospital, and 1.5 mi upstream from mouth.	2.27	1963-91	Records being reviewed.		

≠ Operated as a continuous-record gaging station.
e Estimated.

000139

Water Resources Data Hawaii and other Pacific Areas Water Year 1990

Volume 1. Hawaii

U.S. GEOLOGICAL SURVEY WATER-DATA REPORT HI-90-1
Prepared in cooperation with the State of Hawaii Department of Land and Natural Resources, Division of Water Resource Management and with other agencies

000130

16604500 IAO STREAM AT KEPANIWAI PARK, NEAR WAILUKU

LOCATION.--Lat 20°53'08", long 156°32'32", Hydrologic Unit 20020000, on left bank of Maniania and Waikapu ditch intake, 0.3 mi upstream from Kepaniwai Park, 0.5 mi downstream from Iao Valley State Park, and 2.3 mi west of Wailuku Post Office.

DRAINAGE AREA.--5.98 mi^2.

PERIOD OF RECORD.--May 1983 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 780 ft, from topographic map.

REMARKS.--Records fair. No appreciable diversion upstream.

AVERAGE DISCHARGE.--7 years (1984-90), 67.3 ft^3/s (48,760 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge 6,260 ft^3/s, Jan. 28, 1988, gage height, 9.0 ft, from rating curve extended above 181 ft^3/s on basis of slope-area measurements at gage heights 6.48 ft and 9.0 ft; minimum, 11 ft^3/s for several days in October and November 1984.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum discharge known, 7,540 ft^3/s, Dec. 3, 1950, from rating curve based on model study of site 2.3 mi downstream.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,000 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Oct. 8	2400	2,460	5.75	Jan. 17	0200	*3,370	*6.67
Dec. 9	1230	2,740	6.04	Mar. 1	0630	2,910	5.58

Minimum discharge, 20 ft^3/s, Nov. 26, Dec. 6, 8-9.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	24	29	26	89	139	680	37	28	100	46	71	34
2	23	26	22	78	96	276	65	23	54	89	53	31
3	25	26	23	49	124	138	84	152	45	48	92	36
4	21	26	23	46	71	102	63	54	40	39	74	43
5	37	e25	21	31	77	124	42	95	46	45	64	59
6	62	e25	25	26	84	202	34	90	54	34	99	34
7	29	e24	22	25	62	195	31	65	44	31	91	58
8	187	e23	21	25	44	195	27	173	69	88	57	54
9	280	e26	192	101	39	107	26	66	42	47	49	101
10	73	e24	60	49	48	76	26	65	40	43	44	106
11	49	e23	37	70	47	81	25	50	34	33	50	48
12	40	e22	30	49	34	64	24	39	32	53	74	e52
13	34	e21	38	33	30	54	26	34	31	33	63	e49
14	31	22	26	29	32	48	44	56	32	46	46	e100
15	30	89	25	61	29	98	28	102	47	53	62	e49
16	27	44	24	164	27	54	26	48	152	41	54	e76
17	26	29	23	515	69	46	24	69	73	44	47	142
18	26	26	22	224	40	42	25	63	76	48	73	85
19	86	32	21	132	32	39	50	97	114	64	82	55
20	73	26	35	129	36	40	36	191	103	45	59	44
21	51	26	57	93	29	37	34	183	58	59	45	37
22	33	23	30	109	28	33	52	76	76	39	36	35
23	146	22	26	116	27	31	56	69	86	33	38	50
24	212	21	25	76	34	30	39	139	124	77	104	37
25	114	22	24	61	221	29	29	109	120	68	45	33
26	74	21	30	53	219	28	26	74	55	50	196	31
27	54	21	29	69	110	30	25	108	45	217	192	29
28	50	21	24	54	188	34	24	65	42	112	99	27
29	40	24	23	44	---	51	23	59	86	81	60	59
30	33	34	35	44	---	52	23	80	58	82	46	111
31	30	---	30	61	---	57	---	48	---	64	39	---
TOTAL	2020	823	1049	2705	2016	3073	1074	2570	1978	1852	2204	1705
MEAN	65.2	27.4	33.8	87.3	72.0	99.1	35.8	82.9	65.9	59.7	71.1	56.8
MAX	280	89	192	515	221	680	84	191	152	217	196	142
MIN	21	21	21	25	27	28	23	23	31	31	36	27
AC-FT	4010	1630	2080	5370	4000	6100	2130	5100	3920	3670	4370	3380

CAL YR 1989 TOTAL 28821 MEAN 79.0 MAX 763 MIN 21 AC-FT 57170
WTR YR 1990 TOTAL 23069 MEAN 63.2 MAX 680 MIN 21 AC-FT 45760

e Estimated

HAWAII, ISLAND OF MAUI

16614000 WAIHEE RIVER AT DAM NEAR WAIHEE

LOCATION.--LAT 20°56'21", long 156°32'59", Hydrologic Unit 20020000, on right bank at dam 8 ft upstream from the abandoned Waihee canal intake, 2.6 mi southwest from Waihee Point, and 4.4 mi northwest from Wailuku Post Office.

DRAINAGE AREA.--4.20 mi^2.

PERIOD OF RECORD.--November 1910 to December 1913, November 1983 to current year. Low-flow records not equivalent prior to Dec. 31, 1913, due to Waihee canal diverted water upstream.

GAGE.--Water-stage recorder. Elevation of gage is 605 ft, from topographic map.

REMARKS.--Records fair. No diversion upstream.

AVERAGE DISCHARGE.--6 years, 86.9 ft^3/s (62,960 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge 9,660 ft^3/s, Jan. 28, 1988, gage height, 8.95 ft, from rating curve extended above 280 ft^3/s on basis of slope-area measurements at gage heights 6.70 ft and 8.95 ft; minimum, 22 ft^3/s, Jan. 18-22, 24, 25, 1985.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,000 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Jan. 17	0130	*5,400	*6.00	Mar. 1	1130	3,150	5.00

Minimum discharge, 36 ft^3/s, Dec. 26.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	e48	e49	42	84	118	765	50	55	85	54	80	51
2	e50	e47	39	73	80	93	94	45	52	109	55	49
3	e52	e45	51	49	83	65	124	245	48	56	123	55
4	e60	e44	42	50	50	63	70	48	48	49	66	60
5	e90	e43	39	43	55	93	55	88	55	57	61	74
6	e80	e43	55	39	81	180	49	79	67	47	111	54
7	e52	e42	46	38	53	172	48	61	49	46	70	72
8	e180	e42	40	37	45	140	47	256	88	180	53	97
9	e200	e46	186	95	47	62	49	49	53	64	53	165
10	e56	43	43	48	53	59	47	67	52	54	50	128
11	e54	43	39	67	54	78	46	51	48	47	61	53
12	e50	43	39	47	43	59	45	45	49	67	93	57
13	e48	42	90	39	41	53	49	45	48	51	73	56
14	e48	43	42	38	54	51	77	84	50	96	61	119
15	e80	93	39	102	42	120	48	111	57	85	e56	54
16	e68	49	38	395	41	56	45	48	155	65	e52	79
17	e52	45	38	616	181	53	45	68	69	64	e68	168
18	e62	42	38	80	56	52	46	70	68	62	82	88
19	e140	47	38	118	46	50	57	73	106	101	122	68
20	e90	43	42	64	45	67	52	119	162	71	71	58
21	e72	44	46	46	42	55	51	151	54	123	55	51
22	e56	42	38	70	41	50	69	53	59	54	51	55
23	e150	41	37	67	40	49	84	65	74	49	68	68
24	e160	41	37	43	48	50	63	166	102	74	85	55
25	e80	42	37	45	271	50	47	81	81	71	53	53
26	e60	41	62	46	128	48	45	61	51	59	225	55
27	e50	40	43	51	146	50	44	112	54	320	210	52
28	e100	40	38	45	317	49	44	56	50	130	79	49
29	e90	40	42	43	---	56	43	53	84	84	54	94
30	e56	45	52	46	---	65	51	71	64	90	52	124
31	e50	---	62	53	---	60	---	49	---	65	50	---
TOTAL	2504	1350	1520	2677	2301	2913	1684	2625	2082	2544	2443	2261
MEAN	80.8	45.0	49.0	86.4	82.2	94.0	56.1	84.7	69.4	82.1	78.8	75.4
MAX	200	93	186	616	317	765	124	256	162	320	225	168
MIN	48	40	37	37	40	48	43	45	48	46	50	49
AC-FT	4970	2680	3010	5310	4560	5780	3340	5210	4130	5050	4850	4480

CAL YR 1989 TOTAL 35778 MEAN 98.0 MAX 1060 MIN 37 AC-FT 70970
WTR YR 1990 TOTAL 26904 MEAN 73.7 MAX 765 MIN 37 AC-FT 53360

e Estimated

Annual maximum discharge at crest-stage partial-record stations during water year 1990--Continued

Station no.	Station name	Location	Drainage area mi^2	Period of record	Annual maximum		
					Date	Gage height (ft)	Discharge (ft^3/s)
		Hawaii, Island of Maui--Continued					
16502400	Pukuilua Gulch near Hana	Lat 20°42'00", long 156°00'14", at Highway 31, 0.4 mi southwest of Puuiki, and 4.0 mi south of Hana.	0.48	1963-90	10-24-89	2.42	83
16502800	Moomoonui Gulch at Hana	Lat 20°44'37", long 155°59'18", at Highway 31 just downstream from Moomooiki Gulch and 1.0 mi south of Hana.	.90	1963-90	01-19-90	10.17	565
16502900	Kawaipapa Gulch at Hana	Lat 20°46'08", long 156°00'04", 1,000 ft upstream from Highway 36 and 0.3 mi northwest of Hana Hospital.	5.83	1965-90	10-24-89	7.49	4,480
16603300	Unnamed gulch at Maliko Bay	Lat 20°56'26", long 156°21'04", at Hana Highway, 0.5 mi west of Maliko Bay, and 1.3 mi north of Hamakuapoko.	.43	1963-90	01-15-90	1.94	15
16603700	Kalialinui Gulch tributary near Pukalani	Lat 20°49'02", long 156°19'44", at Lower Kula Road and 1.4 mi south of Pukalani.	1.17	1967-90	12-09-89		e1
16603800	Kaluapulani Gulch tributary near Pukalani	Lat 20°48'52", long 156°18'32", at Haleakala Highway, 1.5 mi west of Olinda Prison Camp, and 2.3 mi southeast of Pukalani.	.45	1963-90	12-09-89	1.25	16
16603850	Kalialinui Gulch near Kahului	Lat 20°52'47", long 156°26'06", 600 ft upstream from Hansen Road, 0.5 mi northeast of Puunene Hospital, and 2.5 mi southeast of Kahului Post Office.	17.9	1967-90	12-09-89	3.84	22
16607000	Iao Stream at Wailuku	Lat 20°53'38", long 156°30'27", 560 ft upstream from Market Street bridge at Wailuku and 1.9 mi upstream from mouth.	8.24	1951≠, 1952-90	10-08-89	5.31	3,840
16616500	Unnamed gulch at Maluhia Camp	Lat 20°57'26", long 156°31'41", at Kahekili Highway, 0.6 mi east of Maluhia Camp, and 1.8 mi northwest of Waihee.	.12	1964-90	01-16-90	-	e50
16619700	Poelua Gulch near Kahakuloa	Lat 21°00'58", long 156°34'58", at Highway 30 (bypass), 1.3 mi southeast of Nakalele Point lighthouse, and 2.2 mi northwest of Kahakuloa.	1.18	1965-90	01-16-90	13.05	592
16630200	Honokowai Stream at Honokowai	Lat 20°56'58", long 156°41'07", 0.5 mi southeast of Honokowai, and 1.1 mi northwest of Puukolii.	5.59	1962-63, 1965-90	01-16-90	5.42	838
16643300	Kauaula Stream near mouth, near Lahaina	Lat 20°52'09", long 156°39'43", 0.7 mi upstream from Honoapiilani Highway (bypass) and 1.3 mi southeast of Lahaina Lighthouse.	4.12	1960, 1962, 1964-90	10-09-89	3.56	265
16646200	Olowalu Stream at Olowalu	Lat 20°49'23", long 156°37'15", on downstream side of center pier of plantation road bridge, 0.6 mi northeast of Olowalu, and 5.5 mi southeast of Lahaina.	4.08	1962-72≠, 1973-90	10-08-89	3.65	368
16647500	Malalowaiaole Gulch near Maalaea	Lat 20°46'56", long 156°31'32", at Honoapiilani Highway, 200 ft upstream from mouth, 0.2 mi north of McGregor Point, and 1.2 mi southwest of Maalaea.	.64	1964-90	10-08-89	3.06	22
16650500	Waikapu Stream near Kihei	Lat 20°49'02", long 156°29'00", at railroad bridge beside Lower Maalaea Road, 2.5 mi northeast of Maalaea, and 2.5 mi northwest of Kihei.	6.97	1963-90	10-08-89	6.82	982

≠ Operated as a continuous-record gaging station.
e Estimated.

Annual maximum discharge at crest-stage partial-record stations during water year 1990--Continued

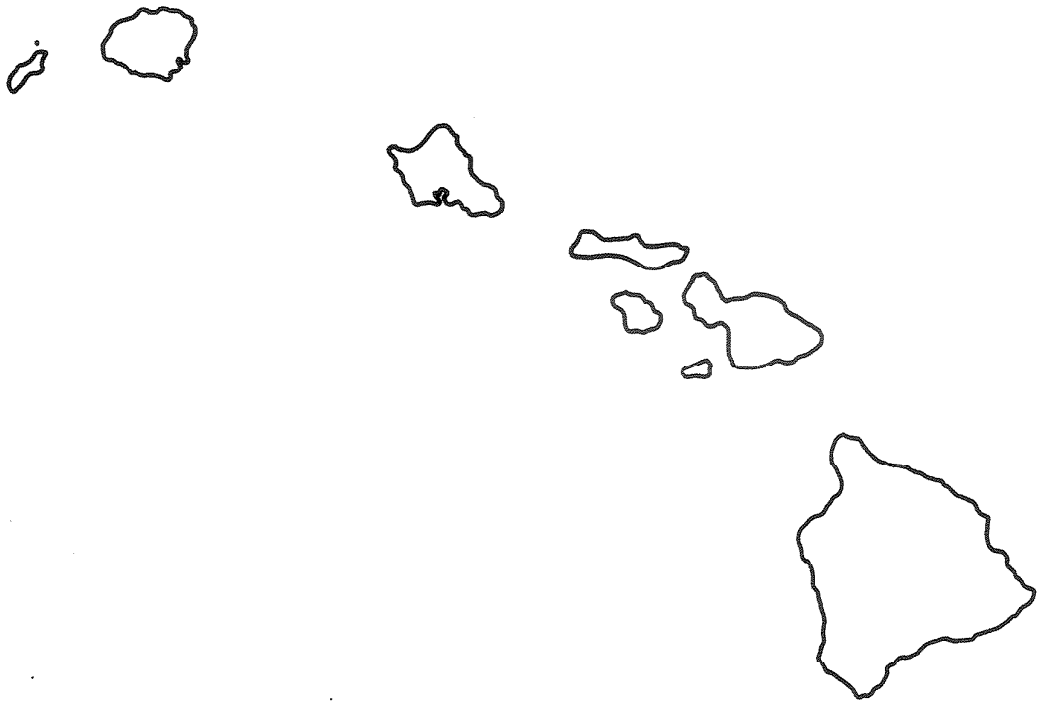
Station no.	Station name	Location	Drainage area mi^2	Period of record	Annual maximum		
					Date	Gage height (ft)	Discharge (ft^3/s)
		Hawaii, Island of Maui--Continued					
16502400	Pukuilua Gulch near Hana	Lat 20°42'00", long 156°00'14", at Highway 31, 0.4 mi southwest of Puuiki, and 4.0 mi south of Hana.	0.48	1963-90	10-24-89	2.42	83
16502800	Moomoonui Gulch at Hana	Lat 20°44'37", long 155°59'18", at Highway 31 just downstream from Moomooiki Gulch and 1.0 mi south of Hana.	.90	1963-90	01-19-90	10.17	565
16502900	Kawaipapa Gulch at Hana	Lat 20°46'08", long 156°00'04", 1,000 ft upstream from Highway 36 and 0.3 mi northwest of Hana Hospital.	5.83	1965-90	10-24-89	7.49	4,480
16603300	Unnamed gulch at Maliko Bay	Lat 20°56'26", long 156°21'04", at Hana Highway, 0.5 mi west of Maliko Bay, and 1.3 mi north of Hamakuapoko.	.43	1963-90	01-15-90	1.94	15
16603700	Kalialinui Gulch tributary near Pukalani	Lat 20°49'02", long 156°19'44", at Lower Kula Road and 1.4 mi south of Pukalani.	1.17	1967-90	12-09-89	-	e1
16603800	Kaluapulani Gulch tributary near Pukalani	Lat 20°48'52", long 156°18'32", at Haleakala Highway, 1.5 mi west of Olinda Prison Camp, and 2.3 mi southeast of Pukalani.	.45	1963-90	12-09-89	1.23	16
16603850	Kalialinui Gulch near Kahului	Lat 20°52'47", long 156°26'06", 600 ft upstream from Hansen Road, 0.5 mi northeast of Puunene Hospital, and 2.5 mi southeast of Kahului Post Office.	17.9	1967-90	12-09-89	3.84	22
16607000	Iao Stream at Wailuku	Lat 20°53'38", long 156°30'27", 560 ft upstream from Market Street bridge at Wailuku and 1.9 mi upstream from mouth.	8.24	1951≠, 1952-90	10-08-89	5.31	3,840
16616500	Unnamed gulch at Maluhia Camp	Lat 20°57'26", long 156°31'41", at Kahekili Highway, 0.6 mi east of Maluhia Camp, and 1.8 mi northwest of Waihee.	.12	1964-90	01-16-90	-	e50
16619700	Poelua Gulch near Kahakuloa	Lat 21°00'58", long 156°34'58", at Highway 30 (bypass), 1.3 mi southeast of Nakalele Point lighthouse, and 2.2 mi northwest of Kahakuloa.	1.18	1965-90	01-16-90	13.05	592
16630200	Honokowai Stream at Honokowai	Lat 20°56'58", long 156°41'07", 0.5 mi southeast of Honokowai, and 1.1 mi northwest of Puukolii.	5.59	1962-63, 1965-90	01-16-90	5.42	838
16643300	Kauaula Stream near mouth, near Lahaina	Lat 20°52'09", long 156°39'43", 0.7 mi upstream from Honoapiilani Highway (bypass) and 1.3 mi southeast of Lahaina Lighthouse.	4.12	1960, 1962, 1964-90	10-09-89	3.56	265
16646200	Olowalu Stream at Olowalu	Lat 20°49'23", long 156°37'15", on downstream side of center pier of plantation road bridge, 0.6 mi northeast of Olowalu, and 5.5 mi southeast of Lahaina.	4.08	1962-72≠, 1979-90	10-08-89	3.65	368
16647500	Malalowaiaole Gulch near Maalaea	Lat 20°46'56", long 156°31'32", at Honoapiilani Highway, 200 ft upstream from mouth, 0.2 mi north of McGregor Point, and 1.2 mi southwest of Maalaea.	.64	1964-90	10-08-89	3.96	22
16650500	Waikapu Stream near Kihei	Lat 20°49'02", long 156°29'00", at railroad bridge beside Lower Maalaea Road, 2.5 mi northeast of Maalaea, and 2.5 mi northwest of Kihei.	6.97	1963-90	10-08-89	6.82	982

≠ Operated as a continuous-record gaging station.
e Estimated.

000194

Water Resources Data Hawaii and other Pacific Areas Water Year 1992

Volume 1. Hawaii



U.S. GEOLOGICAL SURVEY WATER-DATA REPORT HI-92-1
Prepared in cooperation with the State of Hawaii
Department of Land and Natural Resources,
Division of Water Resource Management
and with other agencies

000195

HAWAII, ISLAND OF MAUI

16604500 IAO STREAM AT KEPANIWAI PARK, NEAR WAILUKU

LOCATION.--Lat 20°53'08", long 156°32'32", Hydrologic Unit 20020000, on left bank of Maniania and Waikapu ditch intake, 0.3 mi upstream from Kepaniwai Park, 0.5 mi downstream from Iao Valley State Park, and 2.3 mi west of Wailuku Post Office.

DRAINAGE AREA.--5.98 mi^2.

PERIOD OF RECORD.--May 1983 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 780 ft, from topographic map.

REMARKS.--Records fair. No appreciable diversion upstream.

AVERAGE DISCHARGE.--9 years (1984-92), 66.4 ft^3/s (48,130 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge 6,260 ft^3/s, Jan. 28, 1988, gage height, 9.0 ft, from rating curve extended above 181 ft^3/s on basis of slope-area measurements at gage heights 6.48 ft and 9.0 ft; minimum, 11 ft^3/s for several days in October and November 1984.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum discharge known, 7,540 ft^3/s, Dec. 3, 1950, from rating curve based on model study of site 2.3 mi downstream.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,000 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)
Sept. 15	1400	*2,100	*5.34

Date	Time	Discharge (ft^3/s)	Gage height (ft)
No other peak greater than base discharge			

Minimum discharge, 12 ft^3/s, several days.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1991 TO SEPTEMBER 1992
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	26	30	65	80	19	26	21	15	15	e40	e78	66
2	26	29	48	72	23	21	19	13	14	e24	e67	244
3	26	28	37	37	84	22	19	12	14	e28	e109	318
4	26	26	34	31	116	26	26	39	14	e27	e145	485
5	25	29	34	27	250	21	26	160	17	e25	e44	337
6	25	65	69	26	230	21	25	96	56	e24	e82	306
7	26	38	32	24	88	20	24	31	19	e25	e61	164
8	26	36	28	22	50	20	24	61	21	e42	e62	95
9	23	30	26	24	38	19	23	26	43	e86	e51	64
10	21	26	25	21	33	19	24	21	30	e32	e41	55
11	21	26	25	22	32	19	25	19	19	e37	e190	51
12	21	25	24	25	42	45	23	18	26	e47	e152	39
13	21	24	24	19	33	45	22	19	18	e31	e73	72
14	21	23	23	55	133	35	22	16	20	e31	e73	217
15	153	22	29	121	70	23	22	16	30	e24	e76	290
16	88	22	42	50	46	22	22	16	31	e24	e251	158
17	46	20	69	37	40	41	22	42	55	e42	e129	162
18	39	20	29	35	73	85	22	28	e24	e34	e68	89
19	36	25	29	29	46	26	23	53	e26	e27	e51	60
20	48	22	26	26	39	167	24	37	e22	e80	e54	60
21	59	19	40	24	34	62	16	23	e20	111	e111	42
22	60	99	132	23	31	33	12	21	e22	52	e79	36
23	39	67	251	22	30	26	12	19	e25	e102	e78	68
24	69	37	98	21	28	42	12	20	e26	e54	e54	33
25	136	27	340	20	34	46	12	24	e22	e62	e68	63
26	64	24	262	19	26	35	12	18	e20	e418	e111	85
27	45	20	93	19	25	26	12	16	e22	e312	e57	167
28	39	19	73	19	25	23	21	15	e37	e340	44	53
29	36	19	45	19	26	23	35	16	e24	e160	113	45
30	32	19	47	30	---	23	21	15	e54	e270	87	72
31	31	---	74	25	---	22	---	15	---	e120	66	---
TOTAL	1354	916	2173	1024	1744	1084	623	940	786	2731	2725	3996
MEAN	43.7	30.5	70.1	33.0	60.1	35.0	20.8	30.3	26.2	88.1	87.9	133
MAX	153	99	340	121	250	167	55	160	56	418	251	485
MIN	21	19	23	19	19	19	12	12	14	24	41	33
AC-FT	2690	1820	4310	2030	3460	2150	1240	1860	1560	5420	5410	7930

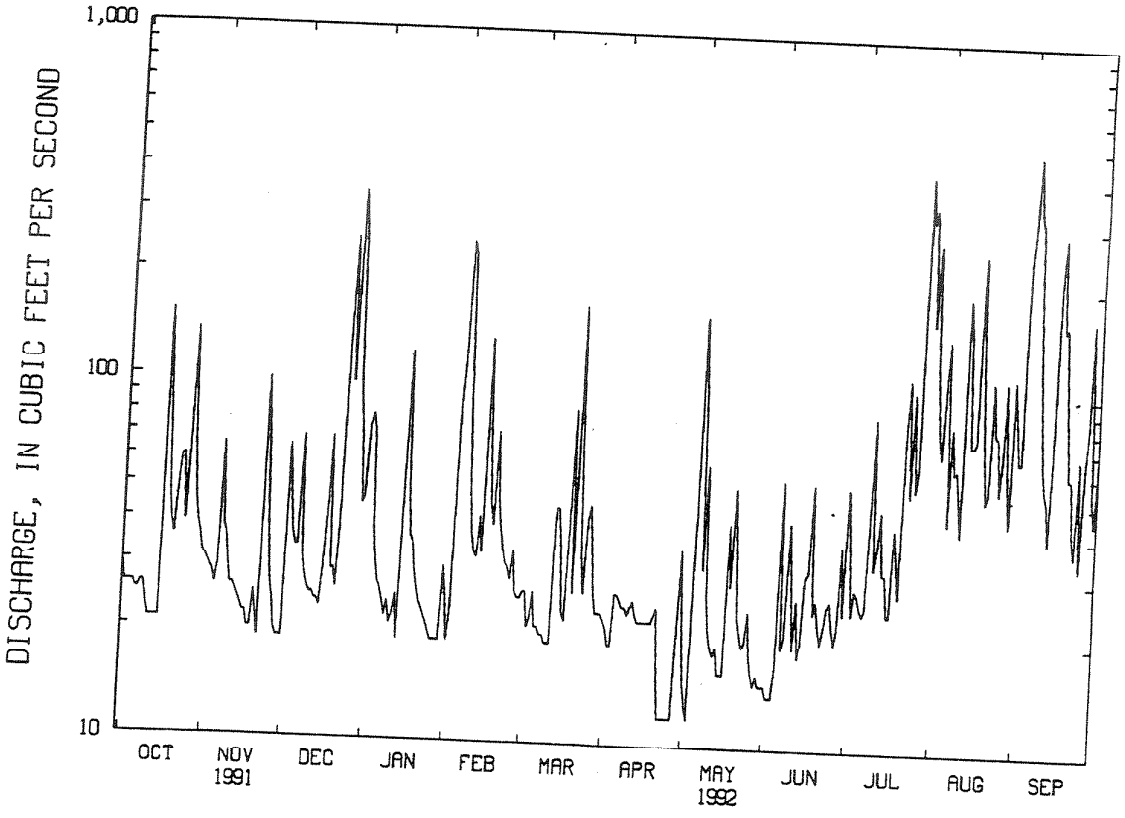
e Estimated

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1983 - 1992, BY WATER YEAR (WY)

MEAN	58.5	65.2	63.8	66.4	60.0	84.2	91.0	74.3	55.9	63.1	57.2	49.6
MAX	103	132	97.5	149	82.2	169	230	136	99.7	105	92.3	133
(WY)	1984	1988	1988	1988	1987	1986	1989	1987	1987	1989	1991	1992
MIN	11.9	20.5	18.3	25.4	32.7	30.4	20.8	27.9	24.4	25.2	26.0	15.8
(WY)	1985	1985	1985	1985	1985	1987	1992	1984	1985	1984	1984	1984

SUMMARY STATISTICS FOR 1991 CALENDAR YEAR

			FOR 1992 WATER YEAR		WATER YEARS 1983 - 1992	
ANNUAL TOTAL	23502		20096			
ANNUAL MEAN	64.4		54.9		66.4	
HIGHEST ANNUAL MEAN					85.2	1986
LOWEST ANNUAL MEAN					41.4	1985
HIGHEST DAILY MEAN	678	Mar 9	485	Sep 4	913	Apr 10 1986
LOWEST DAILY MEAN	19	Nov 21	12	Apr 22	11	Oct 7 1984
ANNUAL SEVEN-DAY MINIMUM	21	Nov 15	13	Apr 21	11	Oct 16 1984
ANNUAL RUNOFF (AC-FT)	46620		39860		48130	
10 PERCENT EXCEEDS	127		112		133	
50 PERCENT EXCEEDS	40		30		41	
90 PERCENT EXCEEDS	26		19		20	



HAWAII, ISLAND OF MAUI

16614000 WAIHEE RIVER AT DAM NEAR WAIHEE

LOCATION.--LAT 20°56'21", long 156°32'59", Hydrologic Unit 20020000, on right bank at dam 8 ft upstream from the abandoned Waihee canal intake, 2.6 mi southwest from Waihee Point, and 4.4 mi northwest from Wailuku Post Office.

DRAINAGE AREA.--4.20 mi^2.

PERIOD OF RECORD.--November 1910 to December 1913, November 1983 to current year. Low-flow records not equivalent prior to Dec. 31, 1913, due to Waihee canal diverted water upstream.

GAGE.--Water-stage recorder. Elevation of gage is 605 ft, from topographic map.

REMARKS.--Records good, except for those estimated which are fair. No diversion upstream.

AVERAGE DISCHARGE.--8 years, 84.6 ft^3/s (61,370 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 9,660 ft^3/s, Jan. 28, 1988, gage height, 8.95 ft, from rating curve extended above 280 ft^3/s on basis of slope-area measurements at gage heights 6.70 ft and 8.95 ft; minimum, 22 ft^3/s, Jan. 18-22, 24, 25, 1985.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,000 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Feb. 14	1230	2,120	4.41	Sept. 3	--	e*6,000	--

Minimum discharge, 31 ft^3/s, Apr. 23-27.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1991 TO SEPTEMBER 1992
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	48	45	135	73	38	36	34	38	32	63	49	e80
2	49	44	61	68	41	36	36	34	32	39	46	e520
3	49	43	46	47	68	36	37	33	33	47	82	e650
4	48	43	47	44	83	39	35	75	33	44	47	e800
5	48	49	46	44	131	36	33	180	35	40	45	e250
6	49	84	65	43	87	35	33	70	97	39	54	e330
7	59	52	43	43	46	34	33	40	36	40	55	e150
8	62	49	41	41	41	34	33	56	37	39	55	e80
9	47	47	40	43	39	34	33	43	51	145	44	e70
10	46	43	40	40	39	34	47	38	42	52	45	e90
11	45	43	40	43	42	35	47	37	35	59	292	e60
12	45	42	39	41	48	45	36	37	46	77	82	e56
13	44	42	40	40	42	51	34	37	35	51	51	e56
14	44	42	40	212	118	45	33	34	35	51	48	e170
15	219	41	52	91	42	35	32	33	37	39	49	e70
16	54	40	48	43	39	35	32	33	42	39	273	e64
17	46	43	75	41	38	44	32	50	57	70	60	e130
18	45	41	43	42	39	84	34	38	39	56	49	e80
19	44	57	50	41	38	38	33	43	43	44	46	e64
20	69	43	41	40	37	150	37	37	36	134	e45	e120
21	83	41	54	39	37	44	32	34	33	66	e210	e64
22	75	171	179	39	37	37	32	33	36	45	e90	e54
23	50	63	272	39	37	35	32	33	40	70	e70	e90
24	81	52	57	39	36	49	31	50	111	41	e60	e76
25	99	43	451	39	37	53	31	50	62	69	e64	e110
26	54	41	127	38	36	44	31	37	41	515	e96	e130
27	49	40	52	38	36	38	36	36	100	244	e70	e200
28	47	40	56	38	36	35	66	35	92	340	e50	e60
29	46	39	47	38	39	35	61	35	38	84	e120	e52
30	45	39	50	45	---	35	41	33	89	217	e66	e66
31	44	---	69	40	---	34	---	32	---	56	e54	---
TOTAL	1833	1502	2446	1552	1427	1355	1097	1394	1475	2915	2467	4792
MEAN	59.1	50.1	78.9	50.1	49.2	43.7	36.6	45.0	49.2	94.0	79.6	160
MAX	219	171	451	212	131	150	66	180	111	515	292	800
MIN	44	39	39	38	36	34	31	32	32	39	44	52
AC-FT	3640	2980	4850	3080	2830	2690	2180	2760	2930	5780	4890	9500

e Estimated

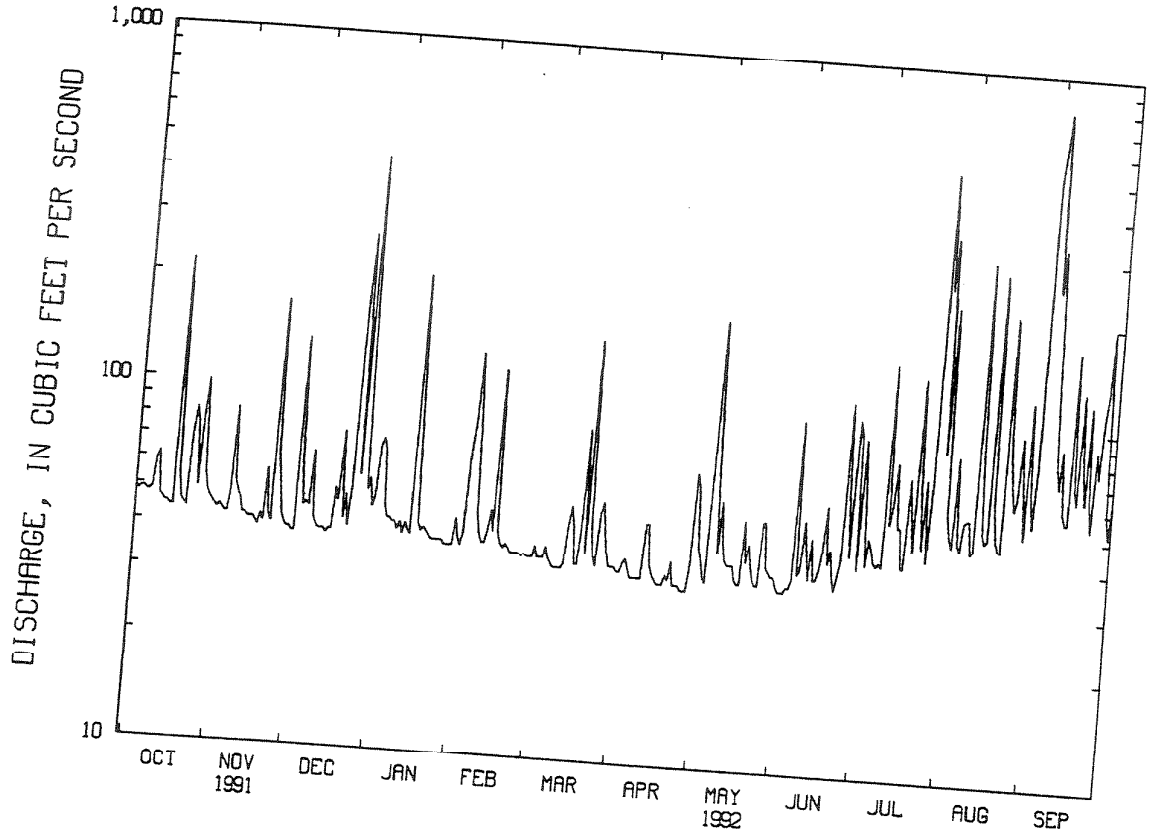
16614000 WAIHEE RIVER AT DAM NEAR WAIHEE--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1984 - 1992, BY WATER YEAR (WY)

MEAN	71.9	84.3	74.3	79.0	69.8	93.0	102	91.8	74.6	87.8	78.5	74.6
MAX	91.7	150	109	186	106	158	276	143	118	129	99.6	160
(WY)	1986	1991	1988	1988	1988	1986	1989	1987	1987	1989	1991	1992
MIN	27.4	36.8	31.3	29.4	49.0	43.7	36.6	45.0	43.4	54.8	46.1	32.9
(WY)	1985	1985	1985	1985	1986	1992	1992	1992	1984	1984	1984	1984

SUMMARY STATISTICS FOR 1991 CALENDAR YEAR FOR 1992 WATER YEAR WATER YEARS 1984 - 1992

ANNUAL TOTAL	27966		24255			
ANNUAL MEAN	76.6		66.3		84.6	
HIGHEST ANNUAL MEAN					103	1988
LOWEST ANNUAL MEAN					57.5	1985
HIGHEST DAILY MEAN	729	Mar 9	800	Sep 4	1160	Jan 28 1988
LOWEST DAILY MEAN	39	Nov 29	31	Apr 24	22	Jan 18 1985
ANNUAL SEVEN-DAY MINIMUM	40	Dec 8	32	Apr 21	23	Jan 18 1985
ANNUAL RUNOFF (AC-FT)	55470		48110		61310	
10 PERCENT EXCEEDS	119		99		143	
50 PERCENT EXCEEDS	52		44		56	
90 PERCENT EXCEEDS	43		34		38	



1992

Annual maximum discharge at crest-stage partial-record stations during water year 1992--Continued

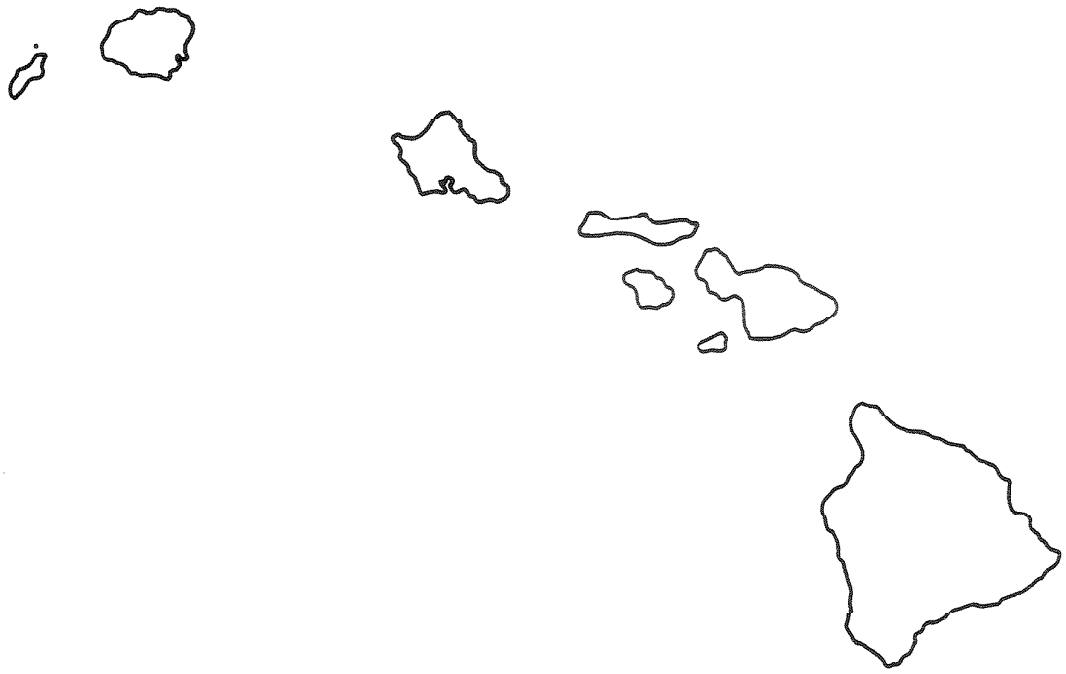
Station name and number	Location	Drainage area mi^2	Period of record	Water year 1992 maximum: Date	Gage height (ft)	Discharge (ft^3/s)	Period of record max: Date	Gage height (ft)	Discharge (ft^3/s)
	Hawaii, Island of Maui--Continued								
16607000 Iao Str at Wailuku	Lat 20°53'38", long 156°30'27", 560 ft upstream from Market Street bridge at Wailuku and 1.9 mi upstream from mouth.	8.24	1951≠, 1952-92	09-15-92	4.70	2,840	12-03-50	6.21	7,540
16616500 Unnamed gulch at Maluhia Camp	Lat 20°57'26", long 156°31'41", at Kahekili Highway, 0.6 mi east of Maluhia Camp, and 1.8 mi norhtwest of Waihee.	0.12	1964-92	-	-	-	01-12-75	7.29	e97
16619700 Poelua Gulch nr Kaha-kuloa	Lat 21°00'58", long 156°34'58", at Highway 30 (bypass), 1.3 mi southeast of Nakalele Point lighthouse and 2.2 mi northwest of Kahakuloa.	1.18	1965-92	09-03-92	8.93	319	03-16-68	15.22	1,760
16630200 Honokowai Str at Honokowai	Lat 20°56'58", long 156°41'07", 0.5 mi southeast of Honokowai, and 1.1 mi northwest of Puukolii.	5.59	1962-63, 1965-92	09-19-92	3.81	332	08-01-82	11.0	4,520
16638300 Kahoma Str at Lahaina	Lat 20°53'12", long 156°40'36", 0.2 mi west of Kelawea, 0.6 mi northeast of Lahaina, 0.6 mi downstream from Kanaha Str, and 0.9 mi upstream from mouth.	5.22	1963-89≠ 1990-92a	09-15-92	-	e200	07-11-65	11.03	2,490
16643300 Kauaula Str nr mouth, nr Lahaina	Lat 20°52'09", long 156°39'43", 0.7 mi upstream from Honoapiilani Highway (bypass) and 1.3 mi southeast of Lanhaina Lighthouse.	4.12	1960, 1962, 1964-92	09-15-92	3.38	226	05-13-60	7.9	2,660
16646200 Olowalu Str at Olowalu	Lat 20°49'23", long 156°37'15", on downstream side of center pier of plantation road bridge, 0.6 mi northeast of Olowalu, and 5.5 mi southeast of Lahaina.	4.08	1962-72≠, 1973-92	09-15-92	4.03	524	03-24-67	5.40	1,300
16647500 Malalowaiaole Gulch nr Maalaea	Lat 20°46'56", long 156°31'32", at Honoapiilani Highway, 200 ft upstream from mouth, 0.2 mi north of McGregor Point, and 1.2 mi southwest of Maalaea.	0.64	1964-92	-	-	-	01-10-80	12.95	350
16650500 Waikapu Str nr Kihei	Lat 20°49'02", long 156°29'00", at railroad bridge beside Lower Maalaea Road, 2.5 mi northeast of Maalaea, and 2.5 mi northwest of Kihei.	6.97	1963-92	02-14-92	-	e200	11-04-88	8.69	1,170
16658500 Waiakoa Gulch tributary nr Waiakoa	Lat 20°44'56", long 156°19'22", at Upper Kula Road, 1.0 mi southeast of Waiakoa, and 1.0 mi norhteast of junction of Lower and Upper Kula Roads.	0.98	1964-92	-	-	-	01-28-71	8.23	409
16659000 Waiakoa Gulch at Kihei	Lat 20°47'14", long 156°27'41", 0.3 mi northeast of Kihei and 0.4 mi upstream from mouth.	10.1	1963-92	-	-	-	01-28-71	9.66	1,560
16660000 Kulanihakoi Gulch nr Kihei	Lat 20°46'06", long 156°27'03", on right bank 0.5 mi northeast of Lihue Cemetery, 0.8 mi upstream from mouth, and 1.3 mi southeast of Kihei.	14.4	1963-70≠, 1971-92	-	-	-	01-28-71	9.40	4,460
16663500 Kamaole Gulch at Kamaole	Lat 20°43'36", long 156°27'02", at Kihei Road, 350 ft upstream from mouth, and 0.2 mi south of Kamaole.	4.28	1972-92	-	-	-	03-17-82	9.01	291

≠ Operated as a continuous-record gaging station.
a At a different datum.
e Estimated.

000200

Water Resources Data Hawaii and other Pacific Areas Water Year 1993

Volume 1. Hawaii



U.S. GEOLOGICAL SURVEY WATER-DATA REPORT HI-93-1

Prepared in cooperation with the State of Hawaii
Department of Land and Natural Resources,
Division of Water Resource Management
and with other agencies

000201

16604500 IAO STREAM AT KEPANIWAI PARK, NEAR WAILUKU

LOCATION.--Lat 20°53'08", long 156°32'32", Hydrologic Unit 20020000, on left bank of Maniania and Waikapu ditch intake, 0.3 mi upstream from Kepaniwai Park, 0.5 mi downstream from Iao Valley State Park, and 2.3 mi west of Wailuku Post Office.

DRAINAGE AREA.--5.98 mi^2.

PERIOD OF RECORD.--May 1983 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 780 ft, from topographic map.

REMARKS.--Records fair. No appreciable diversion upstream.

AVERAGE DISCHARGE.- 10 years (1984-93), 66.8 ft^3/s (48,400 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge 6,260 ft^3/s, Jan. 28, 1988, gage height, 9.0 ft, from rating curve extended above 181 ft^3/s on basis of slope-area measurements at gage heights 6.48 ft and 9.0 ft; minimum, 11 ft^3/s for several days in October and November 1984.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum discharge known, 7,540 ft^3/s, Dec. 3, 1950, from rating curve based on model study of site 2.3 mi downstream.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,000 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)
Dec. 31	0300	*2,810	*6.11

No other peak greater than base discharge.

Minimum discharge, 15 ft^3/s, Nov. 13.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	e26	e26	66	452	48	e21	24	83	66	35	66	90
2	e23	e31	55	160	e23	37	21	55	30	124	72	44
3	e21	26	44	98	e22	23	21	121	35	74	49	33
4	e20	e29	49	110	e22	e22	19	57	31	159	98	31
5	e20	e23	84	93	e22	e50	39	45	72	54	64	26
6	e24	e29	76	140	e22	84	79	38	72	59	46	24
7	e190	e27	53	204	e22	132	222	59	110	62	57	21
8	e64	e23	47	115	119	359	127	131	126	40	77	19
9	e26	100	425	81	90	179	55	169	61	32	92	20
10	e28	32	203	e28	51	e40	62	118	51	26	126	38
11	e42	28	110	e25	e27	e33	42	61	88	26	270	19
12	e84	21	73	e23	e25	e28	61	83	70	22	133	110
13	e30	115	e32	e25	e56	e40	41	51	45	21	206	39
14	e45	175	e27	63	e27	e33	31	79	36	19	104	28
15	e37	98	36	101	e23	e30	28	96	31	19	146	28
16	e30	42	42	71	e22	e28	23	67	40	24	398	27
17	e33	44	e28	65	e22	28	22	66	63	26	113	24
18	e38	28	e25	49	e22	26	22	97	45	30	73	78
19	e130	25	e24	58	e21	32	420	135	50	51	53	64
20	e40	60	e33	49	e21	68	368	145	44	57	45	69
21	e30	105	213	e62	e21	29	160	91	29	140	48	36
22	e26	115	126	e30	e22	24	200	62	29	360	61	34
23	e56	145	76	e25	e22	26	109	50	24	145	78	46
24	e30	70	e36	e23	e23	26	107	78	25	321	161	38
25	96	256	e32	e22	e35	22	81	57	63	180	62	33
26	89	205	38	e21	e25	20	76	40	38	262	45	33
27	181	104	128	21	e22	22	55	36	30	267	38	29
28	92	67	55	28	e21	23	46	31	26	291	34	27
29	53	72	48	161	---	19	52	29	20	223	31	31
30	e29	51	80	47	---	57	74	26	46	132	29	48
31	e39	---	372	32	---	50	---	39	---	84	133	---
TOTAL	1672	2172	2736	2482	898	1611	2687	2295	1496	3365	3008	1187
MEAN	53.9	72.4	88.3	80.1	32.1	52.0	89.6	74.0	49.9	109	97.0	39.6
MAX	190	256	425	452	119	359	420	169	126	360	398	110
MIN	20	21	24	21	21	19	19	26	20	19	29	19
AC-FT	3320	4310	5430	4920	1780	3200	5330	4550	2970	6670	5970	2350

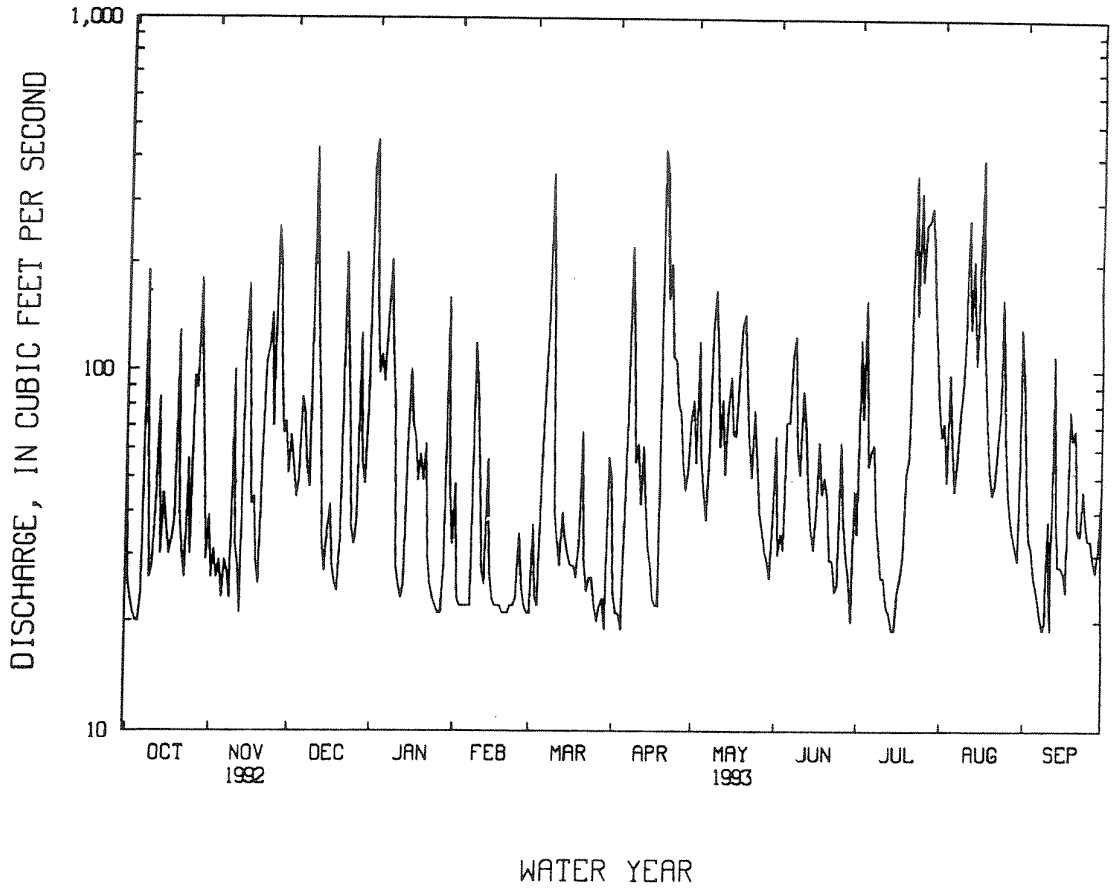
e Estimated

16604500 IAO STREAM AT KEPANIWAI PARK, NEAR WAILUKU--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1983 - 1993, BY WATER YEAR (WY)

MEAN	58.0	65.9	66.3	67.8	57.3	81.0	90.9	74.3	55.3	67.3	60.8	48.7
MAX	103	132	97.5	149	82.2	169	230	136	99.7	109	97.0	133
(WY)	1984	1988	1988	1988	1987	1986	1989	1987	1987	1993	1993	1992
MIN	11.9	20.5	18.3	25.4	32.1	30.4	20.8	27.9	24.4	25.2	26.0	15.8
(WY)	1985	1985	1985	1985	1993	1987	1992	1984	1985	1984	1984	1984

SUMMARY STATISTICS	FOR 1992 CALENDAR YEAR		FOR 1993 WATER YEAR		WATER YEARS 1983 - 1993	
ANNUAL TOTAL	22233		25609			
ANNUAL MEAN	60.7		70.2		66.8	
HIGHEST ANNUAL MEAN					85.2	1986
LOWEST ANNUAL MEAN					41.4	1985
HIGHEST DAILY MEAN	485	Sep 4	452	Jan 1	913	Apr 10 1986
LOWEST DAILY MEAN	12	Apr 22	19	Mar 29	11	Oct 7 1984
ANNUAL SEVEN-DAY MINIMUM	13	Apr 21	22	Feb 16	11	Oct 16 1984
ANNUAL RUNOFF (AC-FT)	44100		50800		48400	
10 PERCENT EXCEEDS	129		145		134	
50 PERCENT EXCEEDS	34		45		42	
90 PERCENT EXCEEDS	19		22		21	



16614000 WAIHEE RIVER AT DAM NEAR WAIHEE

LOCATION.--LAT 20°56'21", long 156°32'59", Hydrologic Unit 20020000, on right bank at dam 8 ft upstream from the abandoned Waihee canal intake, 2.6 mi southwest from Waihee Point, and 4.4 mi northwest from Wailuku Post Office.

DRAINAGE AREA.--4.20 mi^2.

PERIOD OF RECORD.--November 1910 to December 1913, November 1983 to current year. Low-flow records not equivalent prior to Dec. 31, 1913, due to Waihee canal diverted water upstream.

GAGE.--Water-stage recorder. Elevation of gage is 605 ft, from topographic map.

REMARKS.--Records good, except for those estimated which are fair. No diversion upstream.

AVERAGE DISCHARGE.--9 years, 83.7 ft^3/s (60,670 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 9,660 ft^3/s, Jan. 28, 1988, gage height, 8.95 ft, from rating curve extended above 280 ft^3/s on basis of slope-area measurements at gage heights 6.70 ft and 8.95 ft; minimum, 22 ft^3/s, Jan. 18-22, 24, 25, 1985.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,000 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Dec. 31	0130	2,260	4.51	Sep. 23	1800	*7,200	*7.00
Mar. 10	0900	6,560	6.58				

Minimum discharge, 37 ft^3/s, Mar. 1.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	e56	47	90	117	40	36	40	64	85	56	75	89
2	e48	55	68	48	39	48	40	50	45	115	100	57
3	e46	46	58	45	38	42	42	90	50	87	59	55
4	e44	46	65	52	38	37	39	53	46	166	94	55
5	e44	46	86	46	38	69	56	46	65	50	82	53
6	e46	48	69	87	38	75	112	43	50	57	60	52
7	e350	45	56	61	38	193	194	50	168	60	82	51
8	e110	46	80	45	109	467	72	80	102	47	93	50
9	e58	117	233	44	64	83	43	88	52	65	68	52
10	e52	52	84	43	44	384	52	64	55	45	102	50
11	e60	58	67	42	40	58	44	72	99	46	287	54
12	e80	48	58	42	38	46	51	64	67	43	76	121
13	e60	152	51	50	52	43	42	44	49	45	139	55
14	e70	174	50	57	38	64	40	83	45	42	69	50
15	e58	72	49	80	37	47	40	70	44	45	103	59
16	e52	52	76	55	37	43	39	47	70	64	177	55
17	e65	62	51	51	37	45	39	46	61	43	63	51
18	e70	46	49	43	37	41	39	93	52	50	58	134
19	e250	46	49	53	37	44	464	137	51	63	57	104
20	e58	204	54	45	37	81	294	189	50	71	56	85
21	e50	132	273	55	36	47	60	68	44	138	63	54
22	e47	222	81	43	41	42	112	49	45	597	70	52
23	e78	162	66	41	37	45	68	46	43	121	80	419
24	50	70	51	40	44	54	83	101	44	244	184	61
25	114	270	49	40	40	44	56	55	74	122	61	52
26	120	138	49	39	37	42	85	46	47	188	55	49
27	118	105	94	39	36	40	50	44	50	417	58	48
28	65	56	59	41	36	40	45	43	46	176	59	48
29	57	68	51	110	---	40	44	43	43	130	55	64
30	55	54	63	41	---	55	65	42	81	77	55	75
31	51	---	224	39	---	57	---	59	---	62	234	---
TOTAL	2482	2759	2503	1654	1183	2452	2450	2069	1823	3532	2874	2254
MEAN	80.1	91.3	80.7	52.7	42.2	79.1	81.7	66.7	60.8	114	92.7	75.1
MAX	350	270	273	117	109	467	464	189	168	597	287	419
MIN	44	45	49	39	36	36	39	42	43	42	55	48
AC-FT	4920	5430	4960	3240	2350	4860	4860	4100	3620	7010	5700	4470

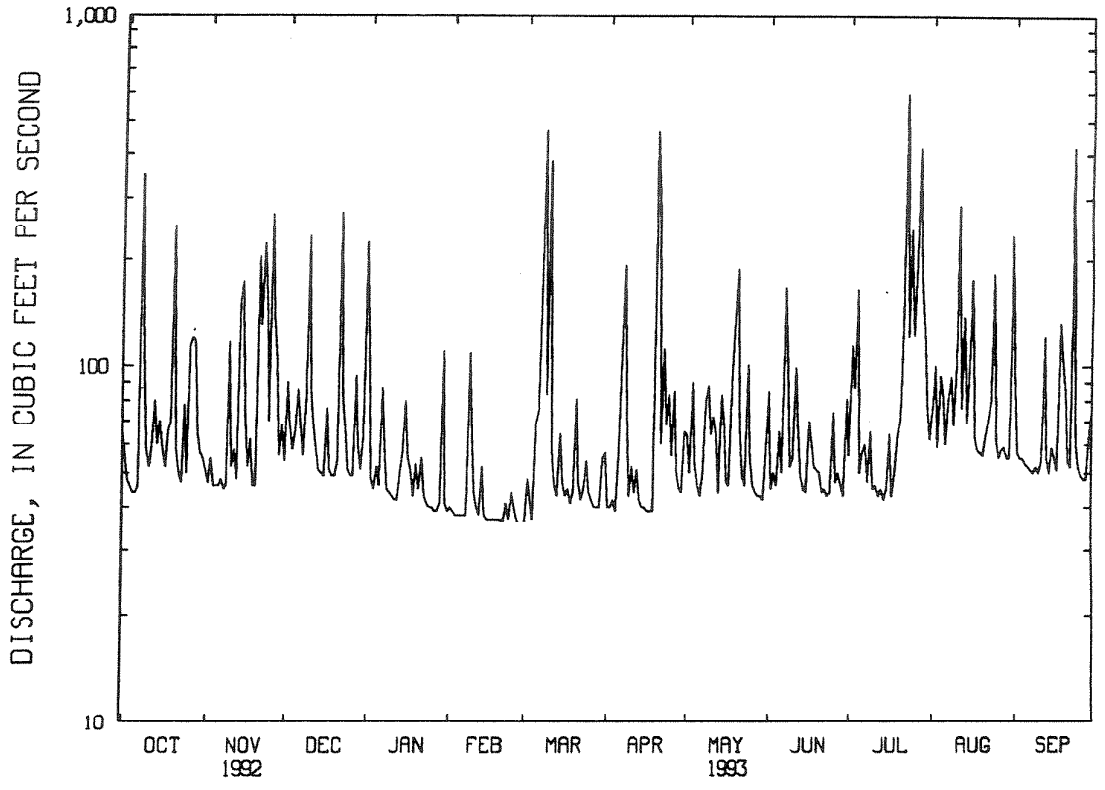
e Estimated

16614000 WAIHEE RIVER AT DAM NEAR WAIHEE--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1984 - 1993, BY WATER YEAR (WY)

MEAN	72.8	85.0	75.0	76.4	67.0	91.6	100	89.3	73.2	90.4	79.9	74.7
MAX	91.7	150	109	186	106	158	276	143	118	129	99.6	160
(WY)	1986	1991	1988	1988	1988	1986	1989	1987	1987	1989	1991	1992
MIN	27.4	36.8	31.3	29.4	42.2	43.7	36.6	45.0	43.4	54.8	46.1	32.9
(WY)	1985	1985	1985	1985	1993	1992	1992	1992	1984	1984	1984	1984

SUMMARY STATISTICS	FOR 1992 CALENDAR YEAR		FOR 1993 WATER YEAR		WATER YEARS 1984 - 1993	
ANNUAL TOTAL	26198		27995			
ANNUAL MEAN	71.6		76.7		83.7	
HIGHEST ANNUAL MEAN					103	1988
LOWEST ANNUAL MEAN					57.5	1985
HIGHEST DAILY MEAN	800	Sep 4	597	Jul 22	1160	Jan 28 1988
LOWEST DAILY MEAN	31	Apr 24	36	Feb 21	22	Jan 18 1985
ANNUAL SEVEN-DAY MINIMUM	32	Apr 21	37	Feb 15	23	Jan 18 1985
ANNUAL RUNOFF (AC-FT)	51960		55530		60670	
10 PERCENT EXCEEDS	123		131		142	
50 PERCENT EXCEEDS	48		55		56	
90 PERCENT EXCEEDS	34		40		38	



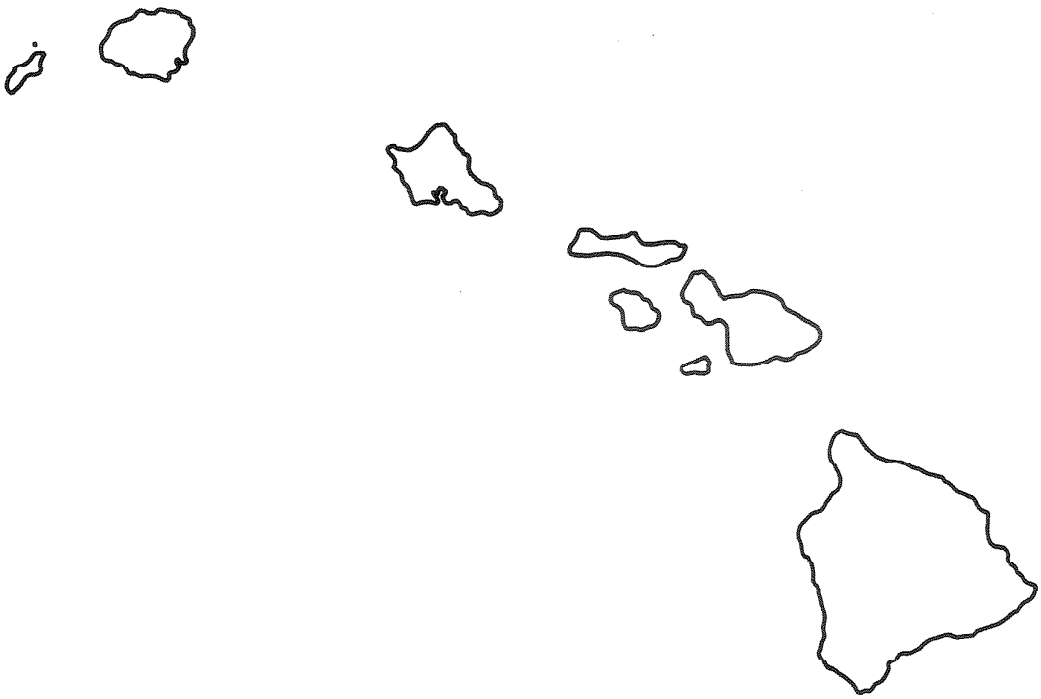
Annual maximum discharge at crest-stage partial-record stations during water year 1993--Continued

Station name and number	Location	Drainage area mi^2	Period of record	Water year 1993 maximum			Period of record max		
				Date	Gage height (ft)	Discharge (ft^3/s)	Date	Gage height (ft)	Discharge (ft^3/s)
	Hawaii, Island of Maui--Continued								
16603300 Unnamed gulch at Maliko Bay	Lat 20°56'26", long 156°21'04", at Hana Highway, 0.5 mi west of Maliko Bay, and 1.3 mi north of Hamakuapoko.	0.43	1963-93	No flow.			03-27-79	17.28	171
16603700 Kalialinui Gulch tributary nr Pukalani	Lat 20°49'02", long 156°19'44", at Lower Kula Road and 1.4 mi south of Pukalani.	1.17	1967-93	11-21-92	2.92	60	01-09-80	7.35	414
16603800 Kaluapulani Gulch tributary nr Pukalani	Lat 20°48'52", long 156°18'32", at Haleakala Highway, 1.5 mi west of Olinda Prison Camp, and 2.3 mi southeast of Pukalani.	0.45	1963-93	11-21-92	1.24	16	07-23-64	9.90	306
16603850 Kalialinui Gulch nr Kahului	Lat 20°52'47", long 156°26'06", 600 ft upstream from Hansen Road, 0.5 mi northeast of Puunene Hospital, and 2.5 mi southeast of Kahului Post Office.	17.9	1967-93	11-21-92	4.77	149	01-28-71	8.33	1,330
16607000 Iao Str at Wailuku	Lat 20°53'38", long 156°30'27", 560 ft upstream from Market Street bridge at Wailuku and 1.9 mi upstream from mouth.	8.24	1951≠, 1952-93	12-31-92	5.45	4,090	12-03-50	6.21	7,540
16616500 Unnamed gulch at Maluhia Camp	Lat 20°57'26", long 156°31'41", at Kahekili Highway, 0.6 mi east of Maluhia Camp, and 1.8 mi northwest of Waihee.	0.12	1964-93	No flow.		-	01-12-75	7.29	e97
16619700 Poelua Gulch nr Kahakuloa	Lat 21°00'58", long 156°34'58", at Highway 30 (bypass), 1.3 mi southeast of Nakalele Point lighthouse and 2.2 mi northwest of Kahakuloa.	1.18	1965-93	11-22-92	6.32	151	03-16-68	15.22	1,760
16630200 Honokowai Str at Honokowai	Lat 20°56'58", long 156°41'07", 0.5 mi southeast of Honokowai, and 1.1 mi northwest of Puukolii.	5.59	1962-63, 1965-93	07-22-93	4.10	408	08-01-82	11.0	4,520
16638500 Kahoma Str at Lahaina	Lat 20°53'12", long 156°40'36", 0.2 mi west of Kelawea, 0.6 mi northeast of Lahaina, 0.6 mi downstream from Kanaha Str, and 0.9 mi upstream from mouth.	5.22	1963-89≠ 1990-93a	11-25-92 04-19-93	- -	e200 e200	07-11-65	11.03	2,490
16643300 Kauaula Str nr mouth, nr Lahaina	Lat 20°52'09", long 156°39'43", 0.7 mi upstream from Honoapiilani Highway (bypass) and 1.3 mi southeast of Lanhaina Lighthouse.	4.12	1960, 1962, 1964-93	12-31-92	4.02	386	05-13-60	7.9	2,660
16646200 Olowalu Str at Olowalu	Lat 20°49'23", long 156°37'15", on downstream side of center pier of plantation road bridge, 0.6 mi northeast of Olowalu, and 5.5 mi southeast of Lahaina.	4.08	1962-72≠, 1973-93	12-31-92	3.95	488	03-24-67	5.40	1,300
16647500 Malalowaiaole Gulch nr Maalaea	Lat 20°46'56", long 156°31'32", at Honoapiilani Highway, 200 ft upstream from mouth, 0.2 mi north of McGregor Point, and 1.2 mi southwest of Maalaea.	0.64	1964-93	12-31-92	3.40	9	01-10-80	12.95	350
16650500 Waikapu Str nr Kihei	Lat 20°49'02", long 156°29'00", at railroad bridge beside Lower Maalaea Road, 2.5 mi northeast of Maalaea, and 2.5 mi northwest of Kihei.	6.97	1963-93	12-31-92	-	e150	11-04-88	8.69	1,170

≠ Operated as a continuous-record gaging station
a At a different datum
e Estimated

Water Resources Data Hawaii and other Pacific Areas Water Year 1994

Volume 1. Hawaii



U.S. GEOLOGICAL SURVEY WATER-DATA REPORT HI-94-1
Prepared in cooperation with the State of Hawaii
Department of Land and Natural Resources,
Division of Water Resource Management
and with other agencies

000207

HAWAII, ISLAND OF MAUI

16604500 IAO STREAM AT KEPANIWAI PARK, NEAR WAILUKU

LOCATION.--Lat 20°53'08", long 156°32'32", Hydrologic Unit 20020000, on left bank of Maniania and Waikapu ditch intake, 0.3 mi upstream from Kepaniwai Park, 0.5 mi downstream from Iao Valley State Park, and 2.3 mi west of Wailuku Post Office.

DRAINAGE AREA.--5.98 mi^2.

PERIOD OF RECORD.--May 1983 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 780 ft, from topographic map.

REMARKS.--Records fair. No appreciable diversion upstream.

AVERAGE DISCHARGE.- 11 years (1984-94), 69.2 ft^3/s (50,150 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge 6,260 ft^3/s, Jan. 28, 1988, gage height, 9.0 ft, from rating curve extended above 181 ft^3/s on basis of slope-area measurements at gage heights 6.48 ft and 9.0 ft; minimum, 11 ft^3/s for several days in October and November 1984.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum discharge known, 7,540 ft^3/s, Dec. 3, 1950, from rating curve based on model study of site 2.3 mi downstream.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,000 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)
Oct. 17	0630	1,010	3.83
Feb. 17	2230	1,560	4.38
Mar. 24	2330	*3,940	*7.21
Jul. 15	1430	1,010	3.84

Minimum discharge, 12 ft^3/s, Oct. 9, 10.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1993 TO SEPTEMBER 1994
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	21	28	74	23	39	39	100	63	24	107	89	91
2	19	27	69	22	36	34	79	68	25	93	51	54
3	17	200	71	30	94	32	65	42	23	64	102	45
4	18	70	112	24	182	30	64	58	49	51	64	40
5	16	36	67	20	131	28	51	39	63	155	67	38
6	15	26	58	69	154	28	45	33	142	142	130	42
7	15	21	96	50	79	27	61	30	172	344	68	37
8	14	73	51	25	102	27	55	28	79	126	51	74
9	14	124	36	21	65	26	65	26	52	105	47	112
10	13	49	34	19	91	24	114	24	40	71	65	68
11	31	30	39	19	250	30	92	23	31	84	63	60
12	16	24	57	19	260	136	138	22	33	54	273	143
13	69	20	99	18	102	93	217	37	26	46	95	73
14	73	49	52	17	231	204	104	45	50	50	68	51
15	30	44	121	17	118	138	79	41	67	408	81	42
16	300	78	142	16	91	91	58	75	36	140	70	37
17	319	71	160	20	148	127	99	41	94	307	57	125
18	153	41	68	100	e230	79	105	44	235	329	86	450
19	62	26	185	373	e92	123	185	51	234	120	70	159
20	40	20	95	527	84	228	240	36	116	86	58	89
21	32	18	62	257	68	182	143	34	126	71	48	82
22	26	52	50	194	60	284	145	39	90	95	51	68
23	e250	311	45	181	53	693	212	53	54	175	184	71
24	e100	109	39	109	49	805	132	38	66	254	85	53
25	e54	76	38	331	86	568	88	32	423	140	64	53
26	e110	129	31	198	55	278	70	30	171	192	70	44
27	e58	165	29	116	45	290	61	28	109	160	48	46
28	49	121	27	86	41	330	80	25	70	86	41	44
29	48	90	26	68	---	170	49	37	64	76	38	34
30	44	125	24	55	---	125	41	27	73	62	52	33
31	46	---	24	46	---	195	---	24	---	58	97	---
TOTAL	2072	2253	2081	3070	3036	5464	3037	1193	2837	4251	2433	2358
MEAN	66.8	75.1	67.1	99.0	108	176	101	38.5	94.6	137	78.5	78.6
MAX	319	311	185	527	260	805	240	75	423	408	273	450
MIN	13	18	24	16	36	24	41	22	23	46	38	33
AC-FT	4110	4470	4130	6090	6020	10840	6020	2370	5630	8430	4830	4680

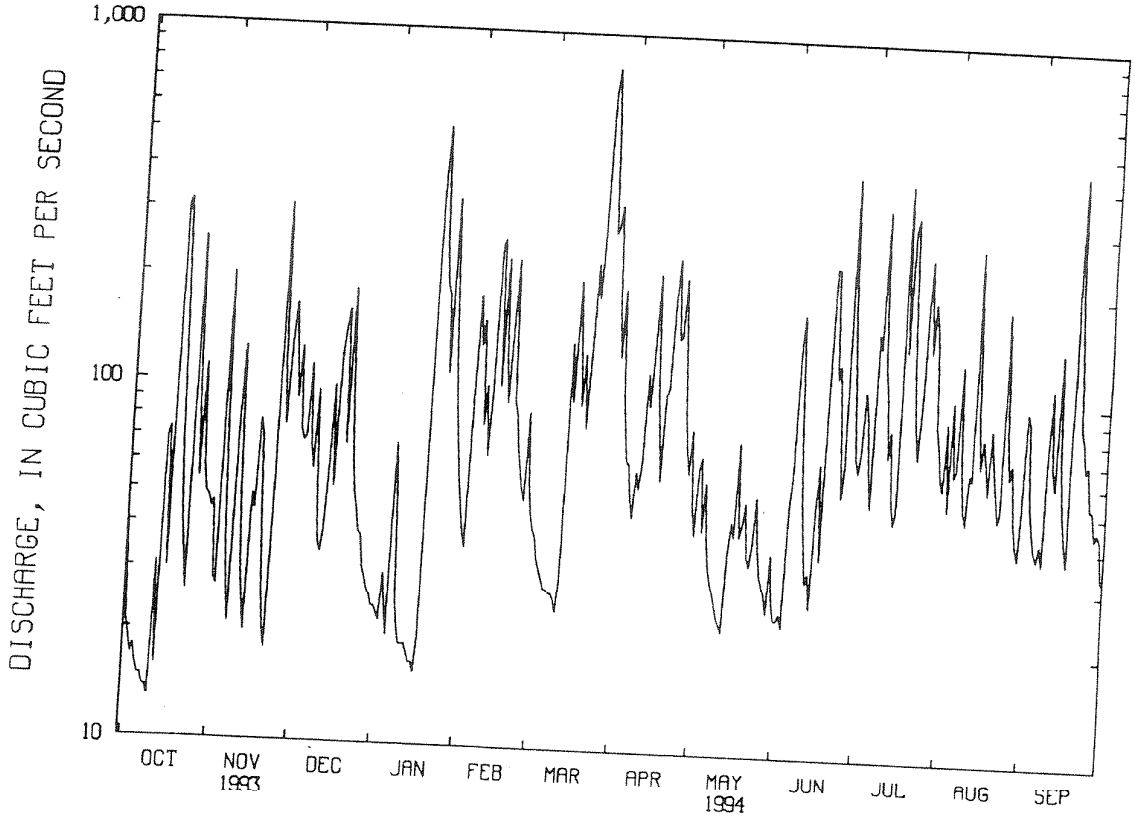
e Estimated

16604500 IAO STREAM AT KEPANIWAI PARK, NEAR WAILUKU--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1983 - 1994, BY WATER YEAR (WY)

MEAN	58.8	66.8	66.4	70.6	61.9	89.6	91.8	71.3	58.6	73.1	62.3	51.2
MAX	103	132	97.5	149	108	176	230	136	99.7	137	97.0	133
(WY)	1984	1988	1988	1988	1994	1994	1989	1987	1987	1994	1993	1992
MIN	11.9	20.5	18.3	25.4	32.1	30.4	20.8	27.9	24.4	25.2	26.0	15.8
(WY)	1985	1985	1985	1985	1993	1987	1992	1984	1985	1984	1984	1984

SUMMARY STATISTICS	FOR 1993 CALENDAR YEAR		FOR 1994 WATER YEAR		WATER YEARS 1983 - 1994	
ANNUAL TOTAL	25435		34085			
ANNUAL MEAN	69.7		93.4		69.2	
HIGHEST ANNUAL MEAN					93.4	1994
LOWEST ANNUAL MEAN					41.4	1985
HIGHEST DAILY MEAN	452	Jan 1	805	Mar 24	913	Apr 10 1986
LOWEST DAILY MEAN	13	Oct 10	13	Oct 10	11	Oct 7 1984
ANNUAL SEVEN-DAY MINIMUM	15	Oct 4	15	Oct 4	11	Oct 16 1984
ANNUAL RUNOFF (AC-FT)	50450		67610		50150	
10 PERCENT EXCEEDS	143		196		140	
50 PERCENT EXCEEDS	46		64		44	
90 PERCENT EXCEEDS	22		24		21	



HAWAII, ISLAND OF MAUI

16614000 WAIHEE RIVER AT DAM NEAR WAIHEE

LOCATION.--LAT 20°56'21", long 156°32'59", Hydrologic Unit 20020000, on right bank at dam 8 ft upstream from the abandoned Waihee canal intake, 2.6 mi southwest from Waihee Point, and 4.4 mi northwest from Wailuku Post Office.

DRAINAGE AREA.--4.20 mi^2.

PERIOD OF RECORD.--November 1910 to December 1913, November 1983 to current year. Low-flow records not equivalent prior to Dec. 31, 1913, due to Waihee canal diverted water upstream.

GAGE.--Water-stage recorder. Elevation of gage is 605 ft, from topographic map.

REMARKS.--Records good. No diversion upstream.

AVERAGE DISCHARGE.--10 years, 85.9 ft^3/s (62,270 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 9,660 ft^3/s, Jan. 28, 1988, gage height, 8.95 ft, from rating curve extended above 280 ft^3/s on basis of slope-area measurements at gage heights 6.70 ft and 8.95 ft; minimum, 22 ft^3/s, Jan. 18-22, 24, 25, 1985.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,000 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)
Nov. 16	2030	2,550	4.70
Dec. 17	0500	2,250	4.50
Feb. 17	2230	2,400	4.60
Mar. 23	1130	*5,700	*6.15
July 15	0830	2,260	4.51
Sep. 18	0100	2,220	4.48

Minimum discharge, 43 ft^3/s, Oct. 7-10, 12.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1993 TO SEPTEMBER 1994
DAILY MEAN VALUES

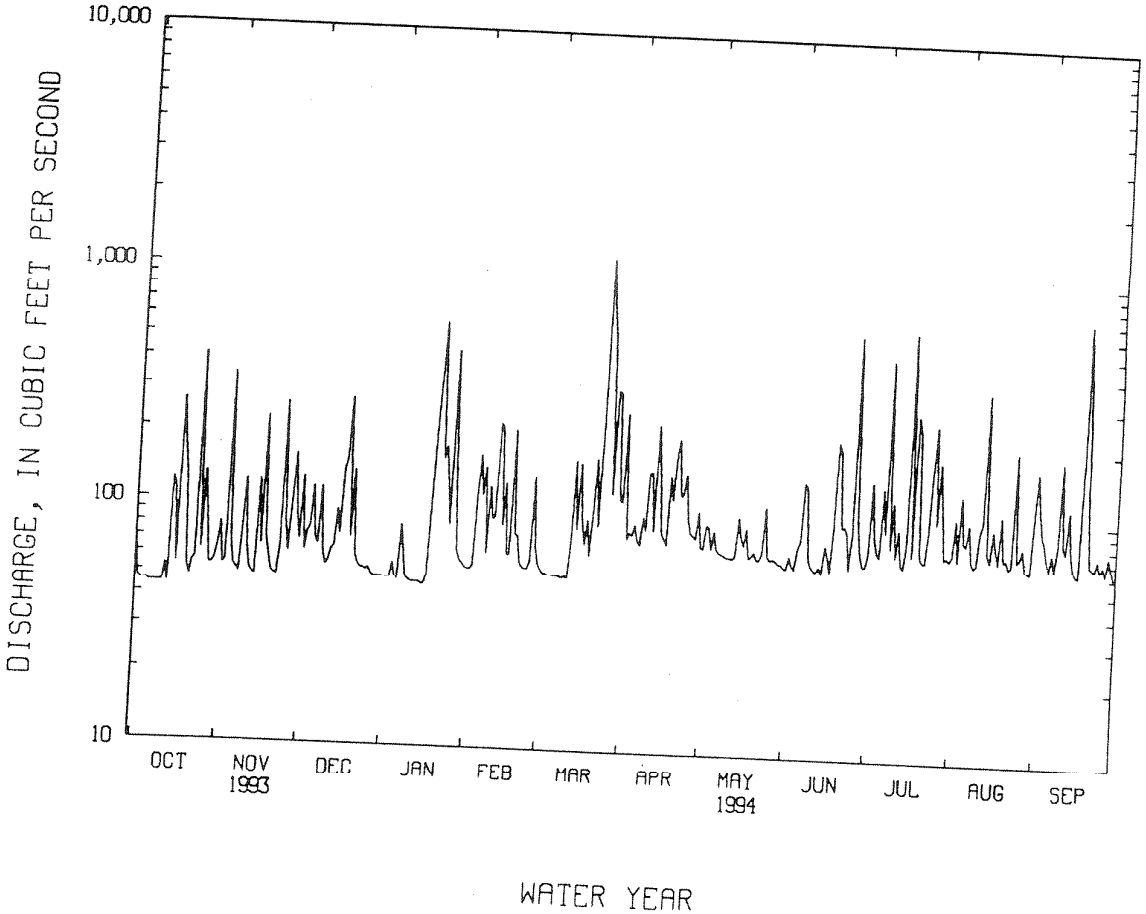
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	47	54	63	49	55	54	77	90	69	143	103	116
2	46	56	75	49	57	54	82	88	63	85	70	91
3	45	342	79	57	110	53	80	72	61	73	129	84
4	46	68	115	50	165	53	88	85	75	71	83	72
5	44	54	71	48	111	52	76	72	80	135	81	66
6	44	52	67	82	147	52	73	70	139	89	99	77
7	44	50	115	64	64	52	95	69	133	471	70	65
8	44	79	62	49	120	51	84	68	68	77	66	82
9	44	123	55	48	89	52	147	67	63	119	68	187
10	44	64	57	47	91	51	148	67	61	71	92	83
11	53	52	64	47	223	72	84	66	60	92	101	78
12	44	50	66	47	214	161	232	68	63	66	350	116
13	122	49	93	47	84	83	149	98	58	64	75	77
14	110	123	74	46	125	157	82	81	77	79	70	65
15	54	66	138	46	64	89	78	75	70	616	94	62
16	262	224	154	50	64	72	74	88	60	72	78	61
17	171	70	272	98	210	91	141	67	91	277	69	255
18	124	59	72	201	78	65	113	68	209	235	108	717
19	52	51	138	328	76	98	179	71	193	72	71	132
20	48	50	61	584	59	166	204	66	92	68	72	70
21	55	49	56	157	57	86	117	66	93	68	66	68
22	57	65	54	176	56	239	120	71	87	91	68	67
23	409	259	54	127	56	1150	147	109	62	165	201	74
24	62	81	53	83	60	727	95	69	85	253	71	65
25	131	62	54	446	135	534	83	66	591	98	73	70
26	87	98	51	130	69	117	81	67	95	178	80	63
27	54	158	50	65	59	318	79	66	72	112	65	76
28	54	88	50	60	56	311	102	64	64	71	63	68
29	56	70	50	58	---	111	73	64	64	72	62	61
30	64	128	50	56	---	109	72	62	72	70	108	60
31	80	---	49	55	---	257	---	61	---	73	166	---
TOTAL	2597	2704	2462	3450	2754	5537	3255	2261	3070	4226	2972	3228
MEAN	83.8	93.1	79.4	111	98.4	179	108	72.9	102	136	95.9	108
MAX	409	342	272	584	223	1150	232	109	591	616	350	717
MIN	44	49	49	46	55	51	72	61	58	64	62	60
AC-FT	5150	5540	4880	6840	5460	10980	6460	4480	6090	8380	5890	6400

16614000 WAIHEE RIVER AT DAM NEAR WAIHEE--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1984 - 1994, BY WATER YEAR (WY)

MEAN	73.9	85.7	75.4	79.6	69.9	99.5	101	87.8	75.8	94.6	81.3	77.7
MAX	91.7	150	109	186	106	179	276	143	118	136	99.6	160
(WY)	1986	1991	1988	1988	1988	1994	1989	1987	1987	1994	1991	1992
MIN	27.4	36.8	31.3	29.4	42.2	43.7	36.6	45.0	43.4	54.8	46.1	32.9
(WY)	1985	1985	1985	1985	1993	1992	1992	1992	1984	1984	1984	1984

	SUMMARY STATISTICS FOR 1993 CALENDAR YEAR		FOR 1994 WATER YEAR		WATER YEARS 1984 - 1994	
ANNUAL TOTAL	28124		38606			
ANNUAL MEAN	77.1		106		85.9	
HIGHEST ANNUAL MEAN					106	1994
LOWEST ANNUAL MEAN					57.5	1985
HIGHEST DAILY MEAN	597	Jul 22	1150	Mar 23	1160	Jan 28 1988
LOWEST DAILY MEAN	36	Feb 21	44	Oct 5	22	Jan 18 1985
ANNUAL SEVEN-DAY MINIMUM	37	Feb 15	44	Oct 4	23	Jan 18 1985
ANNUAL RUNOFF (AC-FT)	55780		76570		62270	
10 PERCENT EXCEEDS	129		178		146	
50 PERCENT EXCEEDS	55		72		58	
90 PERCENT EXCEEDS	40		51		39	



Annual maximum discharge at crest-stage partial-record stations during water year 1994--Continued

Station name and number	Location	Drainage area mi^2	Period of record	Water year 1994 maximum Date	Gage height (ft)	Discharge (ft^3/s)	Period of record max Date	Gage height (ft)	Discharge (ft^3/s)
	Hawaii, Island of Maui--Continued								
16607000 Iao Str at Wailuku	Lat 20°53'38", long 156°30'27", 560 ft upstream from Market Street bridge at Wailuku and 1.9 mi upstream from mouth.	8.24	1951≠, 1952-94	03-24-94	5.22	3,680	12-03-50	6.21	7,540
16616500 Unnamed gulch at Maluhia Camp	Lat 20°57'26", long 156°31'41", at Kahekili Highway, 0.6 mi east of Maluhia Camp, and 1.8 mi norhtwest of Waihee.	0.12	1964-94	03-24-94	-	e80	01-12-75	7.29	e97
16619700 Poelua Gulch nr Kahakuloa	Lat 21°00'58", long 156°34'58", at Highway 30 (bypass), 1.3 mi southeast of Nakalele Point lighthouse and 2.2 mi northwest of Kahakuloa.	1.18	1965-94	03-24-94	11.53	464	03-16-68	15.22	1,760
16630200 Honokowai Str at Honokowai	Lat 20°56'58", long 156°41'07", 0.5 mi southeast of Honokowai, and 1.1 mi northwest of Puukolii.	5.59	1962-63, 1965-94	07-15-94	5.11	718	08-01-82	11.0	4,520
16638500 Kahoma Str at Lahaina	Lat 20°53'12", long 156°40'36", 0.2 mi west of Kelawea, 0.6 mi northeast of Lahaina, 0.6 mi downstream from Kanaha Str, and 0.9 mi upstream from mouth.	5.22	1963-89≠ 1990-94a	03-25-94	-	e650	07-11-65	11.03	2,490
16643300 Kauaula Str nr mouth, nr Lahaina	Lat 20°52'09", long 156°39'43", 0.7 mi upstream from Honoapiilani Highway (bypass) and 1.3 mi southeast of Lanhaina Lighthouse.	4.12	1960, 1962, 1964-94	03-23-94	4.32	487	05-13-60	7.9	2,660
16646200 Olowalu Str at Olowalu	Lat 20°49'23", long 156°37'15", on downstream side of center pier of plantation road bridge, 0.6 mi northeast of Olowalu, and 5.5 mi southeast of Lahaina.	4.08	1962-72≠, 1973-94	03-25-94	4.20	600	03-24-67	5.40	1,300
16647500 Malalowaiaole Gulch nr Maalaea	Lat 20°46'56", long 156°31'32", at Honoapiilani Highway, 200 ft upstream from mouth, 0.2 mi north of McGregor Point, and 1.2 mi southwest of Maalaea.	0.64	1964-94	12-19-93	-	e<1	01-10-80	12.95	350
16650500 Waikapu Str nr Kihei	Lat 20°49'02", long 156°29'00", at railroad bridge beside Lower Maalaea Road, 2.5 mi northeast of Maalaea, and 2.5 mi northwest of Kihei.	6.97	1963-94	03-10-94	-	e255	11-04-88	8.69	1,170
16658500 Waiakoa Gulch tributary nr Waiakoa	Lat 20°44'56", long 156°19'22", at Upper Kula Road, 1.0 mi southeast of Waiakoa, and 1.0 mi northeast of junction of Lower and Upper Kula Roads.	0.98	1964-94	10-25-93	2.18	46	01-28-71	8.23	409
16659000 Waiakoa Gulch at Kihei	Lat 20°47'14", long 156°27'41", 0.3 mi northeast of Kihei and 0.4 mi upstream from mouth.	10.1	1963-94	No flow.			01-28-71	9.66	1,560
16660000 Kulanihakoi Gulch nr Kihei	Lat 20°46'06", long 156°27'03", on right bank 0.5 mi northeast of Lihue Cemetery, 0.8 mi upstream from mouth, and 1.3 mi southeast of Kihei.	14.4	1963-70≠, 1971-94	No flow.			01-28-71	9.40	4,460
16663500 Kamaole Gulch at Kamaole	Lat 20°43'36", long 156°27'02", at Kihei Road, 350 ft upstream from mouth, and 0.2 mi south of Kamaole.	4.28	1972-94	No flow.			03-17-82	9.01	291

≠ Operated as a continuous-record gaging station
< Actual value is known to be less than the value shown
a At a different datum
e Estimated

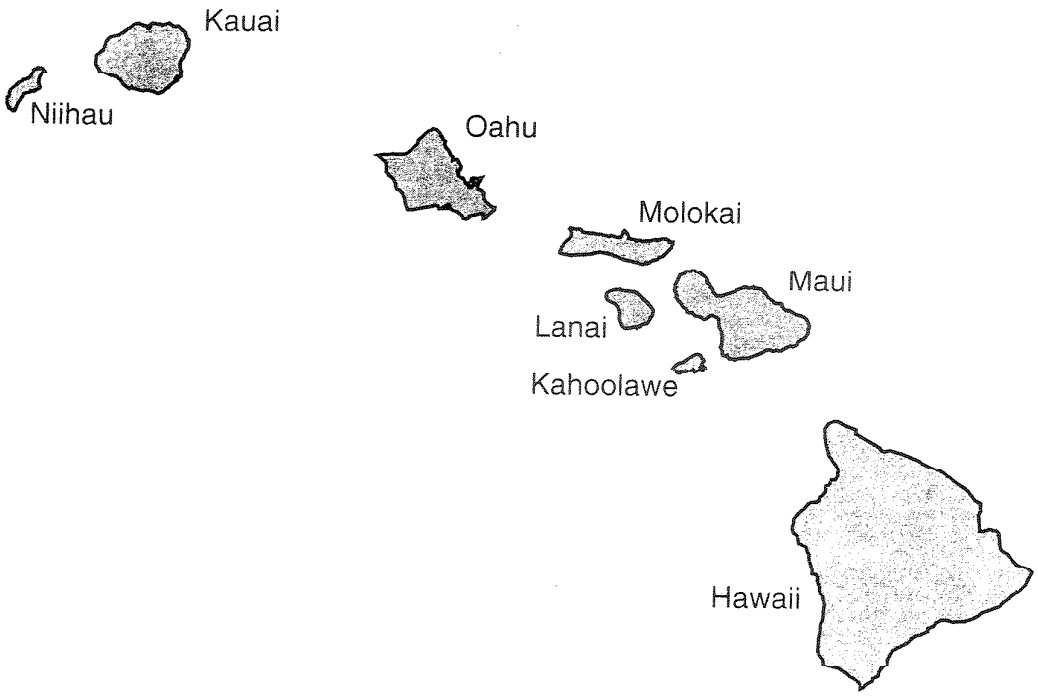
1994

Annual maximum discharge at crest-stage partial-record stations during water year 1994--Continued

Station name and number	Location	Drainage area mi^2	Period of record	Water year 1994 maximum: Date	Gage height (ft)	Discharge (ft^3/s)	Period of record max: Date	Gage height (ft)	Discharge (ft^3/s)
	Hawaii, Island of Maui--Continued								
16607000 Iao Str at Wailuku	Lat 20°53'38", long 156°30'27", 560 ft upstream from Market Street bridge at Wailuku and 1.9 mi upstream from mouth.	8.24	1951≠, 1952-94	03-24-94	5.22	3,680	12-03-50	6.21	7,540
16616500 Unnamed gulch at Maluhia Camp	Lat 20°57'26", long 156°31'41", at Kahekili Highway, 0.6 mi east of Maluhia Camp, and 1.8 mi norhtwest of Waihee.	0.12	1964-94	03-24-94	-	e80	01-12-75	7.29	e97
16619700 Poelua Gulch nr Kaha-kuloa	Lat 21°00'58", long 156°34'58", at Highway 30 (bypass), 1.3 mi southeast of Nakalele Point lighthouse and 2.2 mi northwest of Kahakuloa.	1.18	1965-94	03-24-94	11.53	464	03-16-68	15.22	1,760
16630200 Honokowai Str at Honokowai	Lat 20°56'58", long 156°41'07", 0.5 mi southeast of Honokowai, and 1.1 mi northwest of Puukolii.	5.59	1962-63, 1965-94	07-15-94	5.11	718	08-01-82	11.0	4,520
16638500 Kahoma Str at Lahaina	Lat 20°53'12", long 156°40'36", 0.2 mi west of Kelawea, 0.6 mi northeast of Lahaina, 0.6 mi downstream from Kanaha Str, and 0.9 mi upstream from mouth.	5.22	1963-89≠ 1990-94a	03-25-94	-	e650	07-11-65	11.03	2,490
16643300 Kauaula Str nr mouth, nr Lahaina	Lat 20°52'09", long 156°39'43", 0.7 mi upstream from Honoapiilani Highway (bypass) and 1.3 mi southeast of Lanhaina Lighthouse.	4.12	1960, 1962, 1964-94	03-23-94	4.32	487	05-13-60	7.9	2,660
16646200 Olowalu Str at Olowalu	Lat 20°49'23", long 156°37'15", on downstream side of center pier of plantation road bridge, 0.6 mi northeast of Olowalu, and 5.5 mi southeast of Lahaina.	4.08	1962-72≠, 1973-94	03-25-94	4.20	600	03-24-67	5.40	1,300
16647500 Malalowaiaole Gulch nr Maalaea	Lat 20°46'56", long 156°31'32", at Honoapiilani Highway, 200 ft upstream from mouth, 0.2 mi north of McGregor Point, and 1.2 mi southwest of Maalaea.	0.64	1964-94	12-19-93	-	e<1	01-10-80	12.95	350
16650500 Waikapu Str nr Kihei	Lat 20°49'02", long 156°29'00", at railroad bridge beside Lower Maalaea Road, 2.5 mi northeast of Maalaea, and 2.5 mi northwest of Kihei.	6.97	1963-94	03-10-94	-	e255	11-04-88	8.69	1,170
16658500 Waiakoa Gulch trib-utary nr Waiakoa	Lat 20°44'56", long 156°19'22", at Upper Kula Road, 1.0 mi southeast of Waiakoa, and 1.0 mi northeast of junction of Lower and Upper Kula Roads.	0.98	1964-94	10-25-93	2.18	46	01-28-71	8.23	409
16659000 Waiakoa Gulch at Kihei	Lat 20°47'14", long 156°27'41", 0.3 mi northeast of Kihei and 0.4 mi upstream from mouth.	10.1	1963-94	No flow.			01-28-71	9.66	1,560
16660000 Kulanihakoi Gulch nr Kihei	Lat 20°46'06", long 156°27'03", on right bank 0.5 mi northeast of Lihue Cemetery, 0.8 mi upstream from mouth, and 1.3 mi southeast of Kihei.	14.4	1963-70≠, 1971-94	No flow.			01-28-71	9.40	4,460
16663500 Kamaole Gulch at Kamaole	Lat 20°43'36", long 156°27'02", at Kihei Road, 350 ft upstream from mouth, and 0.2 mi south of Kamaole.	4.28	1972-94	No flow.			03-17-82	9.01	291

≠ Operated as a continuous-record gaging station
< Actual value is known to be less than the value shown
a At a different datum
e Estimated

Water Resources Data Hawaii Water Year 1995



U.S. GEOLOGICAL SURVEY WATER-DATA REPORT HI-95-1
Prepared in cooperation with the State of Hawaii
Department of Land and Natural Resources,
Commission on Water Resource Management
and with other agencies

000214

16604500 IAO STREAM AT KEPANIWAI PARK, NEAR WAILUKU

LOCATION.--Lat 20°53'08", long 156°32'32", Hydrologic Unit 20020000, on left bank of Maniania and Waikapu ditch intake, 0.3 mi upstream from Kepaniwai Park, 0.5 mi downstream from Iao Valley State Park, and 2.3 mi west of Wailuku Post Office.

DRAINAGE AREA.--5.98 mi^2.

PERIOD OF RECORD.--May 1983 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 780 ft above mean sea level, from topographic map.

REMARKS.--Records fair. No appreciable diversion upstream of station.

AVERAGE DISCHARGE.--12 years (water years 1984-95), 68.2 ft^3/s (49,380 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge 6,260 ft^3/s, Jan. 28, 1988, gage height, 9.0 ft, from rating curve extended above 181 ft^3/s on basis of slope-area measurements at gage heights 6.48 ft and 9.0 ft; minimum, 11 ft^3/s for several days in October and November 1984.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum discharge known, 7,540 ft^3/s, Dec. 3, 1950, from rating curve based on model study of site 2.3 mi downstream.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,000 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Nov. 13	2030	*3.820	*7.10	July 14	1900	2,560	5.06
Jan. 29	1010	1,100	3.99				

Minimum discharge, 13 ft^3/s, Sep. 26, 27.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	29	19	62	24	72	112	41	28	22	18	172	51
2	e57	36	72	23	54	51	33	28	22	19	94	40
3	50	22	91	22	41	46	48	27	19	86	61	36
4	39	129	60	21	37	31	106	25	38	96	67	37
5	34	53	49	24	34	30	48	24	89	36	47	37
6	32	43	47	21	52	40	36	31	82	71	41	29
7	e32	43	100	20	29	26	32	28	123	59	99	27
8	27	31	103	20	27	23	26	24	39	28	47	25
9	26	54	82	19	25	21	25	23	40	26	215	26
10	26	88	113	19	48	21	23	23	29	30	110	26
11	37	81	66	18	28	21	22	69	147	47	154	25
12	29	107	38	23	25	23	110	60	51	74	131	23
13	25	276	33	88	23	23	30	92	32	42	119	23
14	24	146	30	345	208	22	26	49	27	264	e70	22
15	24	126	65	206	84	21	66	64	26	133	e75	22
16	25	119	76	217	46	20	30	122	22	114	e90	21
17	26	76	53	92	37	19	23	43	25	96	e80	21
18	40	57	32	53	32	19	24	29	59	73	e60	20
19	24	48	30	39	28	26	24	25	28	162	e57	20
20	19	35	27	31	26	24	35	22	24	184	e57	20
21	32	32	26	28	23	81	36	25	26	198	e60	20
22	36	38	24	26	23	260	248	22	48	79	78	20
23	24	30	24	25	21	80	259	20	28	66	132	20
24	25	37	23	24	20	36	139	19	21	97	76	19
25	30	36	22	23	31	28	130	25	20	116	55	19
26	35	35	34	25	27	27	86	20	21	186	64	19
27	73	27	31	30	19	63	55	19	20	255	151	78
28	26	31	25	92	20	93	42	24	17	160	74	86
29	22	58	126	404	---	38	36	43	17	86	51	172
30	19	60	42	263	---	116	31	34	73	80	52	70
31	19	---	26	116	---	75	---	22	---	62	41	---
TOTAL	966	1973	1632	2381	1140	1516	1870	1109	1235	3043	2680	1074
MEAN	31.2	65.8	52.6	76.8	40.7	48.9	62.3	35.8	41.2	98.2	86.5	35.8
MAX	73	276	126	404	208	260	259	122	147	264	215	172
MIN	19	19	22	18	19	19	22	19	17	18	41	19
AC-FT	1920	3910	3240	4720	2260	3010	3710	2200	2450	6040	5320	2130

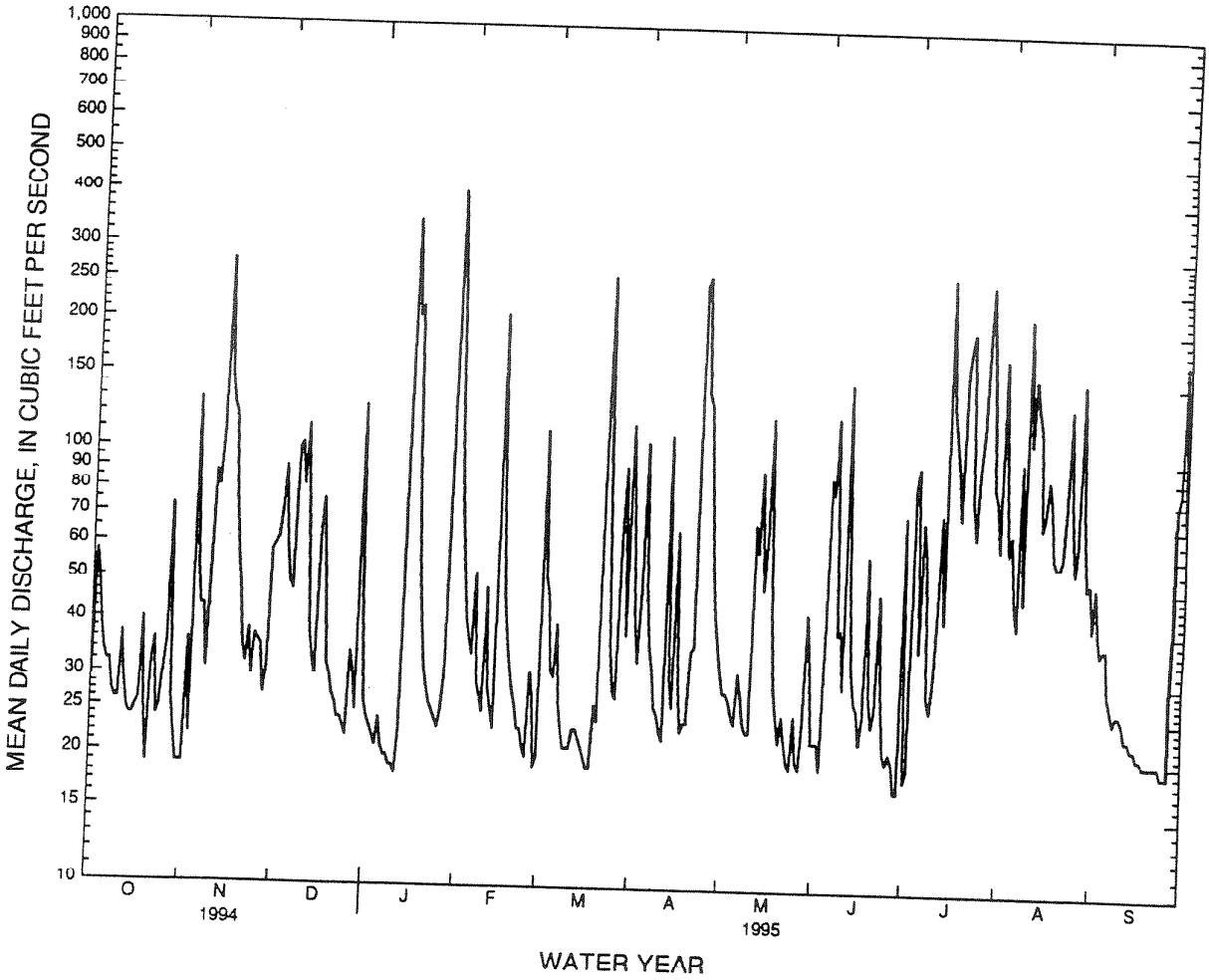
e Estimated

16604500 IAO STREAM AT KEPANIWAI PARK, NEAR WAILUKU--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1983 - 1995, BY WATER YEAR (WY)

MEAN	56.5	66.7	65.2	71.1	60.1	86.2	89.4	68.5	57.3	75.0	64.1	50.0
MAX	103	132	97.5	149	108	176	230	136	99.7	137	97.0	133
(WY)	1984	1988	1988	1988	1994	1994	1989	1987	1987	1994	1993	1992
MIN	11.9	20.5	18.3	25.4	32.1	30.4	20.8	27.9	24.4	25.2	26.0	15.8
(WY)	1985	1985	1985	1985	1993	1987	1992	1984	1985	1984	1984	1984

SUMMARY STATISTICS	FOR 1994 CALENDAR YEAR		FOR 1995 WATER YEAR		WATER YEARS 1983 - 1995	
ANNUAL TOTAL	32250		20619			
ANNUAL MEAN	88.4		56.5		68.2	
HIGHEST ANNUAL MEAN					93.4	1994
LOWEST ANNUAL MEAN					41.4	1985
HIGHEST DAILY MEAN	805	Mar 24	404	Jan 29	913	Apr 10 1986
LOWEST DAILY MEAN	16	Jan 16	17	Jun 28	11	Oct 7 1984
ANNUAL SEVEN-DAY MINIMUM	18	Jan 10	20	Sep 20	11	Oct 16 1984
ANNUAL RUNOFF (AC-FT)	63970		40900		49380	
10 PERCENT EXCEEDS	184		117		138	
50 PERCENT EXCEEDS	58		35		42	
90 PERCENT EXCEEDS	25		21		21	



HAWAII, ISLAND OF MAUI

16614000 WAIHEE RIVER AT DAM NEAR WAIHEE

LOCATION.--LAT 20°56'21", long 156°32'59", Hydrologic Unit 20020000, on right bank at dam 8 ft upstream from the abandoned Waihee canal intake, 2.6 mi southwest from Waihee Point, and 4.4 mi northwest from Wailuku Post Office.

DRAINAGE AREA.--4.20 mi^2.

PERIOD OF RECORD.--November 1910 to December 1913, November 1983 to current year. Low-flow records not equivalent prior to Dec. 31, 1913, due to Waihee canal diverted water upstream.

GAGE.--Water-stage recorder. Elevation of gage is 605 ft above mean sea level, from topographic map.

REMARKS.--Records good, except for the period of no gage height record, which are poor. No diversion upstream of station.

AVERAGE DISCHARGE.--11 years (water years 1985-95), 83.9 ft^3/s (60,790 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 9,660 ft^3/s, Jan. 28, 1988, gage height, 8.95 ft, from rating curve extended above 280 ft^3/s on basis of slope-area measurements at gage heights 6.70 ft and 8.95 ft; minimum, 14 ft^3/s, July 13, 1995.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,000 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)
Nov. 13	2030	*7,090	*6.93

Minimum discharge, 14 ft^3/s, July 13.

No other peak greater than base discharge.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	60	50	64	41	45	74	43	41	e42	38	157	55
2	73	88	76	40	44	44	40	44	e42	48	55	47
3	72	54	70	40	44	44	69	50	e37	140	43	44
4	63	111	61	40	49	41	88	44	e52	107	65	52
5	62	60	52	43	47	41	49	45	e90	46	43	54
6	61	57	49	41	47	45	42	68	e82	85	40	44
7	66	55	69	39	44	40	43	61	e120	62	80	43
8	58	51	76	39	43	40	40	45	e60	43	42	43
9	58	59	75	39	43	41	39	44	e50	41	251	46
10	58	70	89	39	45	41	39	44	e45	47	79	43
11	63	83	55	39	43	39	40	e62	e150	68	102	42
12	60	116	46	47	43	39	101	e56	e90	55	124	41
13	59	558	44	126	42	41	42	e97	e56	35	82	41
14	58	64	43	519	93	39	43	e50	e48	290	49	41
15	59	65	64	128	48	39	62	e68	e45	47	52	40
16	103	62	81	90	43	39	43	e125	e43	51	63	40
17	60	61	54	55	42	39	40	e80	49	48	56	40
18	57	55	44	50	42	39	43	e52	70	40	42	39
19	56	49	44	47	42	49	42	e45	42	163	40	39
20	54	46	42	46	42	42	70	e42	32	148	40	39
21	62	45	42	46	44	73	52	e47	59	144	41	39
22	61	52	41	45	42	177	314	e40	114	44	90	39
23	56	45	42	44	41	54	238	e38	48	56	98	39
24	56	47	41	44	41	44	96	e37	40	83	55	38
25	59	46	40	44	89	40	96	e47	39	102	51	38
26	68	52	50	44	52	41	47	e38	38	128	71	39
27	88	45	51	44	42	66	41	e37	37	285	161	103
28	54	49	43	61	41	59	40	e47	37	92	72	95
29	52	48	95	252	---	43	39	e82	37	45	52	174
30	51	54	47	54	---	99	38	e56	95	60	55	66
31	51	---	42	47	---	55	---	e42	---	48	47	---
TOTAL	1918	2297	1732	2273	1323	1607	2019	1674	1789	2689	2298	1543
MEAN	61.9	76.6	55.9	73.3	47.2	51.8	67.3	54.0	59.6	86.7	74.1	51.4
MAX	103	558	95	519	93	177	314	125	150	290	251	174
MIN	51	45	40	39	41	39	38	37	32	35	40	38
AC-FT	3800	4560	3440	4510	2620	3190	4000	3320	3550	5330	4560	3060

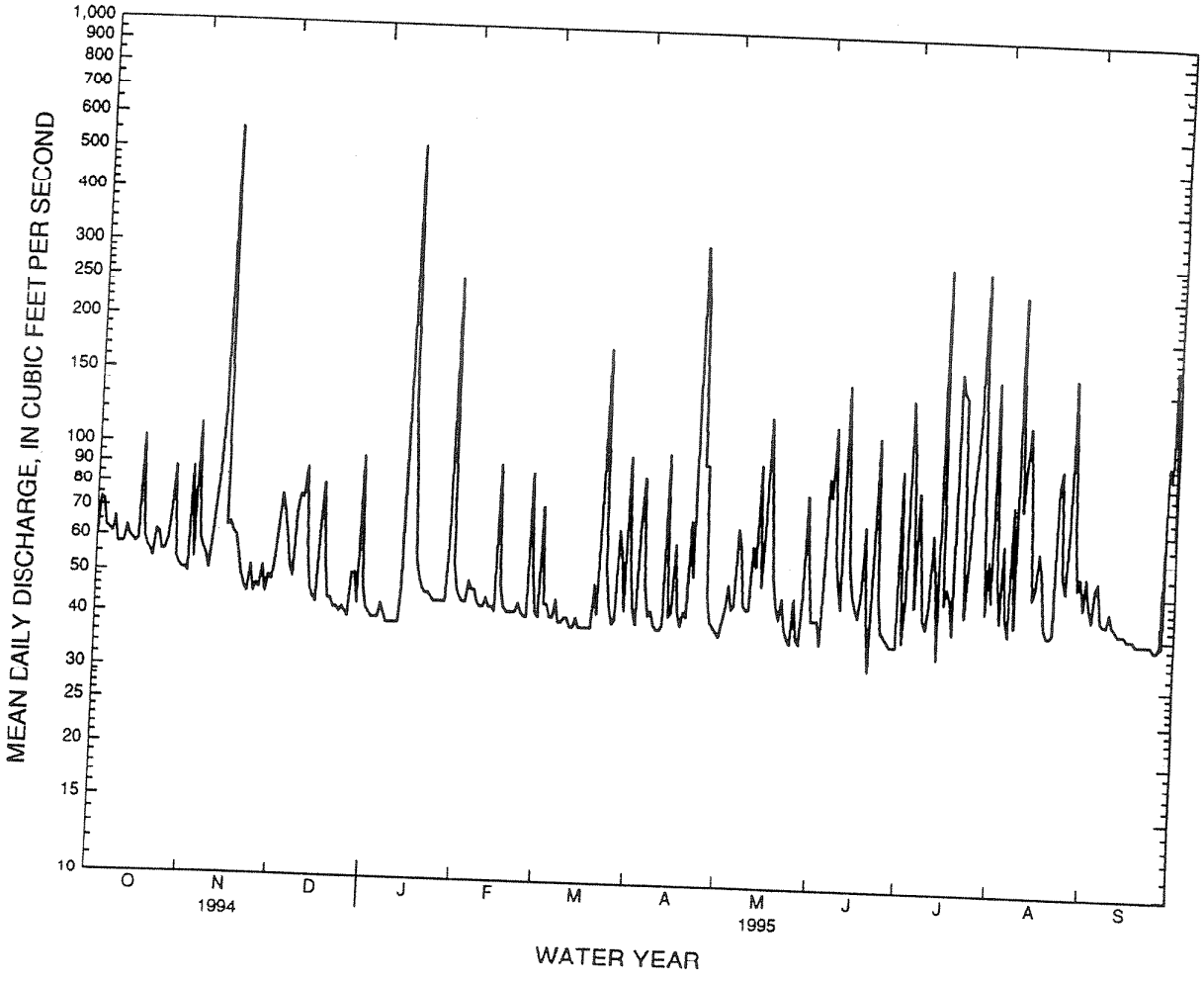
e Estimated

16614000 WAIHEE RIVER AT DAM NEAR WAIHEE--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1984 - 1995, BY WATER YEAR (WY)

MEAN	72.8	84.9	73.7	79.0	68.0	95.5	98.3	85.0	74.5	93.9	80.7	75.5
MAX	91.7	150	109	186	106	179	276	143	118	136	99.6	160
(WY)	1986	1991	1988	1988	1988	1994	1989	1987	1987	1994	1991	1992
MIN	27.4	36.8	31.3	29.4	42.2	43.7	36.6	45.0	43.4	54.8	46.1	32.9
(WY)	1985	1985	1985	1985	1993	1992	1992	1992	1984	1984	1984	1984

SUMMARY STATISTICS	FOR 1994 CALENDAR YEAR		FOR 1995 WATER YEAR		WATER YEARS 1984 - 1995	
ANNUAL TOTAL	36700		23162			
ANNUAL MEAN	101		63.5		83.9	
HIGHEST ANNUAL MEAN					106	1994
LOWEST ANNUAL MEAN					57.5	1985
HIGHEST DAILY MEAN	1150	Mar 23	558	Nov 13	1160	Jan 28 1988
LOWEST DAILY MEAN	40	Dec 25	32	Jun 20	22	Jan 18 1985
ANNUAL SEVEN-DAY MINIMUM	42	Dec 19	39	Sep 19	23	Jan 18 1985
ANNUAL RUNOFF (AC-FT)	72790		45940		60790	
10 PERCENT EXCEEDS	165		96		141	
50 PERCENT EXCEEDS	70		48		56	
90 PERCENT EXCEEDS	50		39		39	



Annual maximum discharge at crest-stage partial-record stations during water year 1995--Continued

Station name and number	Location	Drainage area mi^2	Period of record	Water year 1995 maximum			Period of record max		
				Date	Gage height (ft)	Discharge (ft^3/s)	Date	Gage height (ft)	Discharge (ft^3/s)
Island of Maui--Continued									
16502800 Moomoonui Gulch at Hana	Lat 20°44'37", long 155°59'18", at Highway 31 just downstream from Moomooiki Gulch and 1.0 mi south of Hana.	0.90	1963-95	11-16-94	13.62	1,190	11-26-92	14.71	2,480
16502900 Kawaipapa Gulch at Hana	Lat 20°46'08", long 156°00'04", 1,000 ft upstream from Highway 36 and 0.3 mi northwest of Hana Hospital.	5.83	1965-95	11-16-94	10.26	11,500	08-01-82	11.03	16,880
16603300 Unnamed gulch at Maliko Bay	Lat 20°56'26", long 156°21'04", at Hana Highway, 0.5 mi west of Maliko Bay, and 1.3 mi north of Hamakuapoko.	0.43	1963-95	No flow.			03-27-79	17.28	171
16603700 Kalialinui Gulch tributary nr Pukalani	Lat 20°49'02", long 156°19'44", at Lower Kula Road and 1.4 mi south of Pukalani.	1.17	1967-95	11-13-94	-	e<0.5	01-09-80	7.35	414
16603800 Kaluapulani Gulch tributary nr Pukalani	Lat 20°48'52", long 156°18'32", at Haleakala Highway, 1.5 mi west of Olinda Prison Camp, and 2.3 mi southeast of Pukalani.	0.45	1963-95	11-13-94	-	e<1	07-23-64	9.90	306
16603850 Kalialinui Gulch nr Kahului	Lat 20°52'47", long 156°26'06", 600 ft upstream from Hansen Road, 0.5 mi northeast of Puunene Hospital, and 2.5 mi southeast of Kahului Post Office.	17.9	1967-95	No flow.			01-28-71	8.33	1,330
16607000 Iao Str at Wailuku	Lat 20°53'38", long 156°30'27", 560 ft upstream from Market Street bridge at Wailuku and 1.9 mi upstream from mouth.	8.24	1951≠, 1952-95	11-13-94	5.88	4,960	12-03-50	6.21	7,540
16616500 Unnamed gulch at Maluhia Camp	Lat 20°57'26", long 156°31'41", at Kahekili Highway, 0.6 mi east of Maluhia Camp, and 1.8 mi norhtwest of Waihee.	0.12	1964-95	No flow.			01-12-75	7.29	e97
16619700 Poelua Gulch nr Kahakuloa	Lat 21°00'58", long 156°34'58", at Highway 30 (bypass), 1.3 mi southeast of Nakalele Point lighthouse and 2.2 mi northwest of Kahakuloa.	1.18	1965-95	01-14-95	6.33	152	03-16-68	15.22	1,760
16630200 Honokowai Str at Honokowai	Lat 20°56'58", long 156°41'07", 0.5 mi southeast of Honokowai, and 1.1 mi northwest of Puukolii.	5.59	1962-63, 1965-95	11-13-94	-	e170	08-01-82	11.0	4,520
16638500 Kahoma Str at Lahaina	Lat 20°53'12", long 156°40'36", 0.2 mi west of Kelawea, 0.6 mi northeast of Lahaina, 0.6 mi downstream from Kanaha Str, and 0.9 mi upstream from mouth.	5.22	1963-89≠ 1990-95a	11-13-94	-	e110	07-11-65	11.03	2,490
16643300 Kauaula Str nr mouth, nr Lahaina	Lat 20°52'09", long 156°39'43", 0.7 mi upstream from Honoapiilani Highway (bypass) and 1.3 mi southeast of Lanhaina Lighthouse.	4.12	1960, 1962, 1964-95	11-13-94	3.73	308	05-13-60	7.9	2,660
16646200 Olowalu Str at Olowalu	Lat 20°49'23", long 156°37'15", on downstream side of center pier of plantation road bridge, 0.6 mi northeast of Olowalu, and 5.5 mi southeast of Lahaina.	4.08	1962-72≠, 1973-95	11-13-94	3.88	457	03-24-67	5.40	1,300

≠ Operated as a continuous-record gaging station
< Actual value is known to be less than the value shown
a At a different datum
e Estimated

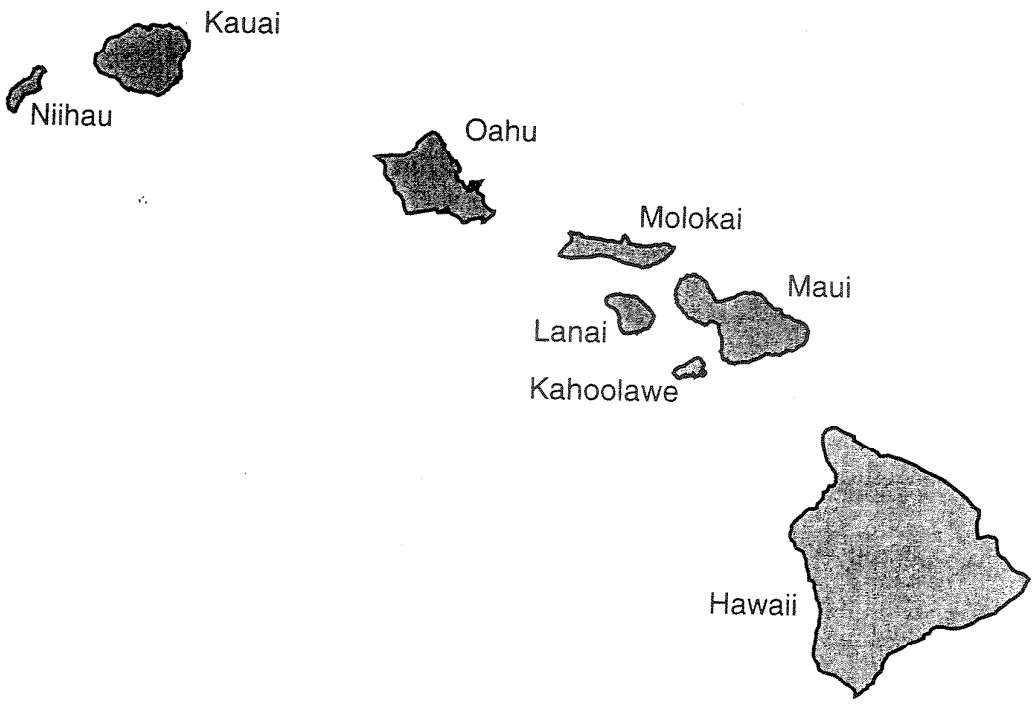
Annual maximum discharge at crest-stage partial-record stations during water year 1995--Continued

Station name and number	Location	Drainage area mi^2	Period of record	Water year 1995 maximum Date	Gage height (ft)	Discharge (ft^3/s)	Period of record max Date	Gage height (ft)	Discharge (ft^3/s)
			Island of Maui--Continued						
16647500 Malalowaiaole Gulch nr Maalaea	Lat 20°46'56", long 156°31'32", at Honoapiilani Highway, 200 ft upstream from mouth, 0.2 mi north of McGregor Point, and 1.2 mi southwest of Maalaea.	0.64	1964-95		No flow.		01-10-80	12.95	350
16650500 Waikapu Str nr Kihei	Lat 20°49'02", long 156°29'00", at railroad bridge beside Lower Maalaea Road, 2.5 mi northeast of Maalaea, and 2.5 mi northwest of Kihei.	6.97	1963-95	01-29-95	-	e260	11-04-88	8.69	1,170
16658500 Waiakoa Gulch tributary nr Waiakoa	Lat 20°44'56", long 156°19'22", at Upper Kula Road, 1.0 mi southeast of Waiakoa, and 1.0 mi northeast of junction of Lower and Upper Kula Roads.	0.98	1964-95		No flow.		01-28-71	8.23	409
16659000 Waiakoa Gulch at Kihei	Lat 20°47'14", long 156°27'41", 0.3 mi northeast of Kihei and 0.4 mi upstream from mouth.	10.1	1963-95		No flow.		01-28-71	9.66	1,560
16660000 Kulanihakoi Gulch nr Kihei	Lat 20°46'06", long 156°27'03", on right bank 0.5 mi northeast of Lihue Cemetery, 0.8 mi upstream from mouth, and 1.3 mi southeast of Kihei.	14.4	1963-70≠, 1971-95		No flow.		01-28-71	9.40	4,460
16663500 Kamaole Gulch at Kamaole	Lat 20°43'36", long 156°27'02", at Kihei Road, 350 ft upstream from mouth, and 0.2 mi south of Kamaole.	4.28	1972-95		No flow.		03-17-82	9.01	291
16664000 Liilioholo Gulch at Kamaole	Lat 20°43'04", long 156°26'55", on upstream side of Kihei Road, 300 ft upstream from mouth, and 0.8 mi south of Kamaole.	4.12	1972-95		No flow.		02-11-82	13.73	526
			Island of Hawaii						
16701300 Waiakea Str at Hilo	Lat 19°42'38", long 155°05'02", 0.3 mi upstream from Kinoole Street bridge and 1.3 mi southeast of Hilo Post Office.	35.8	1968-91, 1993-95	11-16-94	5.72	812	08-12-94	10.90	3,670
16701400 Palai Str at Hilo	Lat 19°40'56", long 155°04'04", at Highway 11, 300 ft south of Palai Street intersection, and 3.5 mi southeast of Hilo Post Office.	5.08	1965-90, 1994-95		Records being reviewed.				
16717400 Kalaoa Mauka Str nr Hilo	Lat 19°48'07", long 155°06'03", at culvert on Highway 19, 1.0 mi north of Papaikou, and 5.1 mi north of Hilo Post Office.	0.24	1963-95		Records being reviewed.				
16717600 Alia Str nr Hilo	Lat 19°50'38", long 155°06'21", on left bank 10 ft downstream from culvert on Highway 19 at Pepeekeo 2.0 mi south of Honomu, and 8.0 mi north of Hilo.	0.58	1962-72≠, 1973-90, 1994-95	11-16-94	unknown	390	02-20-79	17.1	2,850

≠ Operated as a continuous-record gaging station
e Estimated

000220

Water Resources Data
Hawaii
Water Year 1996



U.S. GEOLOGICAL SURVEY WATER-DATA REPORT HI-96-1
Prepared in cooperation with the State of Hawaii
Department of Land and Natural Resources,
Commission on Water Resource Management
and with other agencies

000221

HAWAII, ISLAND OF MAUI

16604500 IAO STREAM AT KEPANIWAI PARK, NEAR WAILUKU

LOCATION.--Lat 20°53'08", long 156°32'32", Hydrologic Unit 20020000, on left bank of Maniania and Waikapu Ditch intake, 0.3 mi upstream from Kepaniwai Park, 0.5 mi downstream from Iao Valley State Park, and 2.3 mi west of Wailuku Post Office.

DRAINAGE AREA.--5.98 mi^2.

PERIOD OF RECORD.--May 1983 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 780 ft above mean sea level, from topographic map.

REMARKS.--Records fair. No appreciable diversion upstream of station.

AVERAGE DISCHARGE.--13 years (water years 1984-96), 66.9 ft^3/s (48,440 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge 6,260 ft^3/s, January 28, 1988, gage height, 9.0 ft, from rating curve extended above 181 ft^3/s on basis of slope-area measurements at gage heights 6.48 ft and 9.0 ft; minimum, 11 ft^3/s for several days in October and November 1984, May 1996.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum discharge known, 7,540 ft^3/s, December 3, 1950, from rating curve based on model study of site 2.3 mi downstream.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,000 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Mar. 31	0300	*2,730	*6.03	No other peak greater than base discharge			

Minimum discharge, 12 ft^3/s, many days.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	36	52	28	62	36	38	354	53	40	76	43	20
2	41	39	23	36	34	44	242	51	41	126	56	20
3	36	37	22	28	30	248	107	47	e30	48	49	21
4	29	68	21	24	25	294	74	45	e45	109	46	23
5	25	32	20	41	22	130	62	45	e48	108	42	22
6	23	29	19	32	19	71	55	45	e66	54	62	26
7	27	50	47	84	20	45	45	45	81	40	46	71
8	32	36	34	207	84	36	40	50	43	34	36	27
9	66	29	26	64	26	30	37	44	42	31	32	17
10	66	29	23	43	26	28	109	42	39	30	31	24
11	33	46	23	35	19	26	53	41	39	28	35	46
12	32	43	22	29	17	26	39	42	37	28	40	109
13	28	103	22	26	16	20	39	44	36	26	150	45
14	28	234	55	25	129	17	126	62	55	25	47	24
15	34	95	25	21	285	16	54	61	40	25	43	19
16	25	56	23	20	195	17	81	60	39	33	35	18
17	23	46	22	32	68	22	68	54	48	27	30	18
18	22	38	26	54	41	54	103	85	66	36	31	20
19	56	35	22	96	29	17	129	67	63	60	27	19
20	107	33	20	30	25	15	160	65	39	109	25	17
21	40	30	19	25	24	15	260	48	35	72	24	13
22	30	28	18	22	21	13	124	45	31	42	24	14
23	27	27	18	19	e26	29	82	42	55	34	23	24
24	27	26	17	36	82	58	67	43	120	29	23	15
25	46	25	18	32	68	17	66	42	89	29	22	13
26	30	24	27	26	97	14	64	42	59	62	21	13
27	26	26	27	22	70	13	89	42	70	29	21	12
28	24	25	18	54	166	13	74	120	66	27	22	14
29	260	23	17	26	96	62	63	69	132	27	22	13
30	188	65	112	42	---	187	57	55	46	29	20	12
31	72	---	211	92	---	393	---	46	---	40	20	---
TOTAL	1539	1429	1025	1385	1796	2008	2923	1642	1640	1473	1148	749
MEAN	49.6	47.6	33.1	44.7	61.9	64.8	97.4	53.0	54.7	47.5	37.0	25.0
MAX	260	234	211	207	285	393	354	120	132	126	150	109
MIN	22	23	17	19	16	13	37	41	30	25	20	12
AC-FT	3050	2830	2030	2750	3560	3980	5800	3260	3250	2920	2280	1490

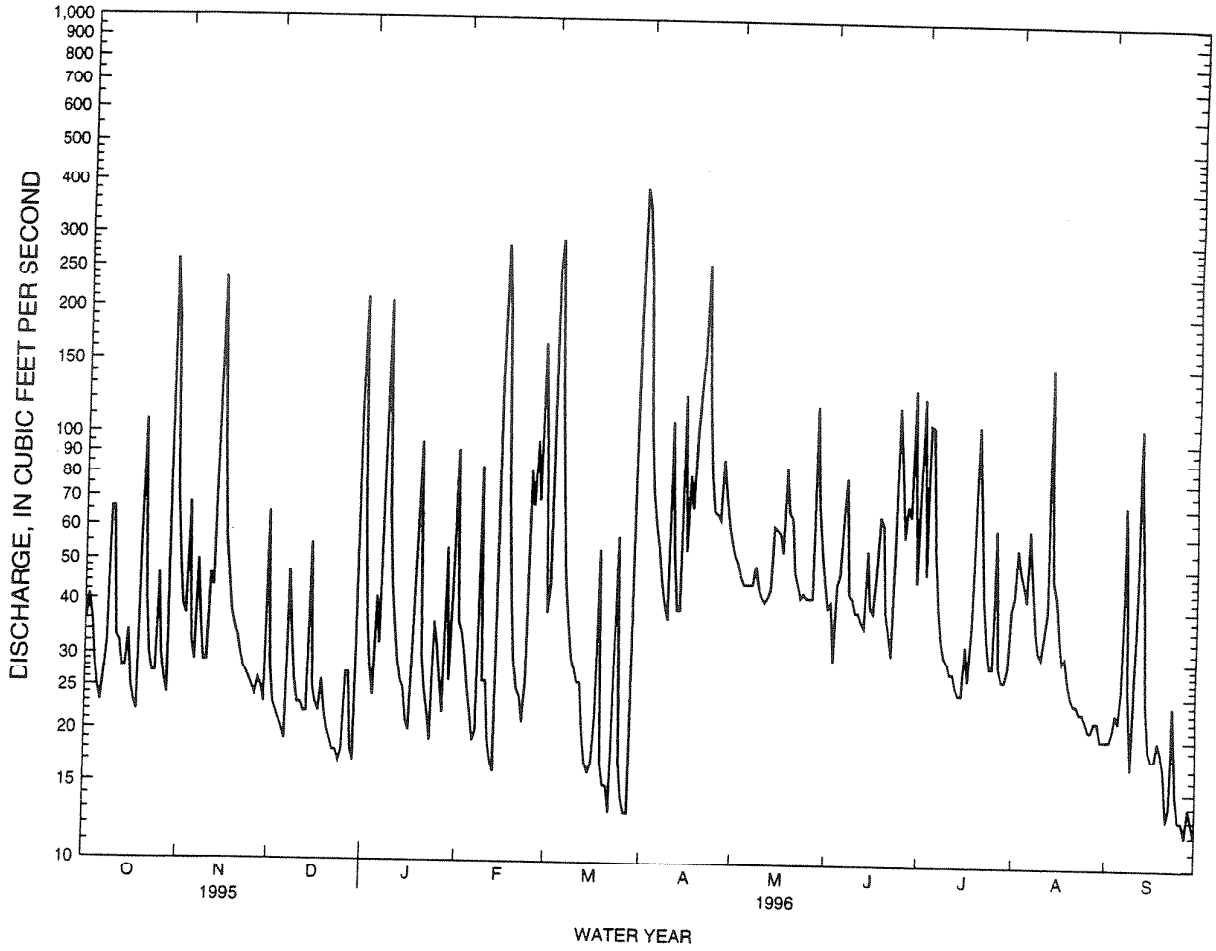
e Estimated

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1983 - 1996, BY WATER YEAR (WY)

MEAN	56.0	65.2	62.7	69.1	60.3	84.6	90.0	67.4	57.1	73.0	62.2	48.2
MAX	103	132	97.5	149	108	176	230	136	99.7	137	97.0	133
(WY)	1984	1988	1988	1988	1994	1994	1989	1987	1987	1994	1993	1992
MIN	11.9	20.5	18.3	25.4	32.1	30.4	20.8	27.9	24.4	25.2	26.0	15.8
(WY)	1985	1985	1985	1985	1993	1987	1992	1984	1985	1984	1984	1984

16604500 IAO STREAM AT KEPANIWAI PARK, NEAR WAILUKU--Continued

SUMMARY STATISTICS	FOR 1995 CALENDAR YEAR		FOR 1996 WATER YEAR		WATER YEARS 1983 - 1996	
ANNUAL TOTAL	20041		18757			
ANNUAL MEAN	54.9		51.2		66.9	
HIGHEST ANNUAL MEAN					93.4	1994
LOWEST ANNUAL MEAN					41.4	1985
HIGHEST DAILY MEAN	404	Jan 29	393	Mar 31	913	Apr 10 1986
LOWEST DAILY MEAN	17	Jun 28	12	Sep 27	11	Oct 7 1984
ANNUAL SEVEN-DAY MINIMUM	19	Dec 19	13	Sep 24	11	Oct 16 1984
ANNUAL RUNOFF (AC-FT)	39750		37200		48440	
10 PERCENT EXCEEDS	116		99		134	
50 PERCENT EXCEEDS	31		36		42	
90 PERCENT EXCEEDS	20		19		21	



HAWAII, ISLAND OF MAUI

16614000 WAIHEE RIVER AT DAM NEAR WAIHEE

LOCATION.--Lat 20°56'21", long 156°32'59", Hydrologic Unit 20020000, on right bank at dam 8 ft upstream from the abandoned Waihee canal intake, 2.6 mi southwest from Waihee Point, and 4.4 mi northwest from Wailuku Post Office.

DRAINAGE AREA.--4.20 mi^2.

PERIOD OF RECORD.--November 1910 to December 1913, November 1983 to current year. Low-flow records not equivalent prior to December 31, 1913, due to Waihee canal diverted water upstream.

GAGE.--Water-stage recorder. Elevation of gage is 605 ft above mean sea level, from topographic map.

REMARKS.--Records good, except for the period of no gage height record, which are poor. No diversion upstream of station.

AVERAGE DISCHARGE.--12 years (water years 1985-96), 82.1 ft^3/s (59,460 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 9,660 ft^3/s, January 28, 1988, gage height, 8.95 ft, from rating curve extended above 280 ft^3/s on basis of slope-area measurements at gage heights 6.70 ft and 8.95 ft; minimum, 14 ft^3/s, July 13, 1995.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,000 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Mar. 03	0735	2,060	4.37	Mar. 31	----	*e3,950	

Minimum discharge, 29 ft^3/s, May 26.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	44	69	51	41	38	115	e410	36	e34	89	49	34
2	48	49	44	38	39	68	e240	35	e35	87	100	34
3	45	47	42	37	37	402	e130	34	e33	47	60	34
4	41	73	42	36	36	125	e80	34	e44	139	66	37
5	40	45	41	36	36	40	e56	34	42	86	48	36
6	39	43	40	35	35	e100	56	33	54	49	76	44
7	49	81	42	128	64	e80	54	33	70	42	55	133
8	55	57	40	226	120	e66	53	34	47	40	41	47
9	111	45	40	46	39	e56	52	33	50	39	40	39
10	64	49	39	40	41	e54	114	32	42	38	44	47
11	44	61	39	38	36	e49	57	31	41	40	54	64
12	57	62	39	37	36	e49	51	31	40	40	45	129
13	44	203	39	40	35	e40	52	31	40	38	193	53
14	47	281	88	37	170	e35	134	52	43	37	43	40
15	55	78	48	36	285	e34	49	43	42	38	42	40
16	43	54	43	37	133	e37	97	52	42	49	41	38
17	46	59	42	57	53	e45	62	40	51	39	39	37
18	42	54	43	126	46	e90	90	68	61	47	41	49
19	92	52	40	117	41	e35	77	56	57	66	38	38
20	96	49	38	45	42	e35	122	42	41	139	37	42
21	52	46	38	40	44	e31	125	32	40	121	37	37
22	44	44	38	38	46	e32	48	31	39	44	36	47
23	42	50	37	38	49	e66	40	30	59	39	36	90
24	41	57	37	52	79	e100	39	35	71	38	36	43
25	60	56	44	48	84	e35	40	35	62	43	35	38
26	42	56	65	41	80	e30	43	42	45	93	35	37
27	39	59	69	52	96	e30	69	e50	49	41	35	36
28	38	61	39	82	227	e30	49	e90	42	38	34	36
29	301	56	38	42	107	e130	39	e62	113	37	34	36
30	213	121	140	56	---	e370	37	e50	43	39	34	35
31	62	---	142	60	---	e510	---	e44	---	45	35	---
TOTAL	2036	2117	1567	1782	2174	2917	2565	1285	1472	1767	1539	1450
MEAN	65.7	70.6	50.5	57.5	75.0	94.1	85.5	41.5	49.1	57.0	49.6	48.3
MAX	301	281	142	226	285	510	410	90	113	139	193	133
MIN	38	43	37	35	35	30	37	30	33	37	34	34
AC-FT	4040	4200	3110	3530	4310	5790	5090	2550	2920	3500	3050	2880

e Estimated

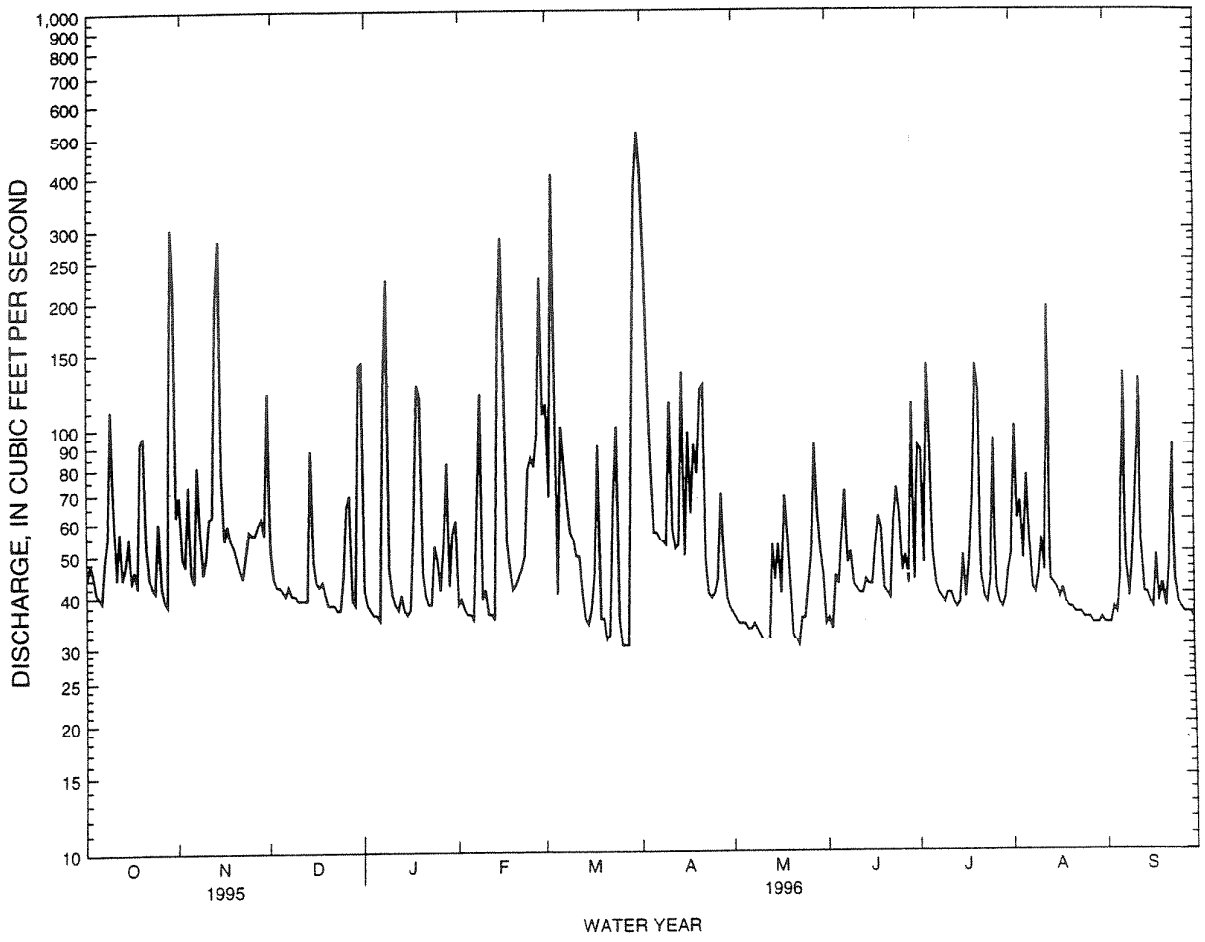
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1984 - 1996, BY WATER YEAR (WY)

MEAN	72.2	83.8	72.0	77.4	68.5	95.4	97.3	81.6	72.5	91.1	78.3	73.4
MAX	91.7	150	109	186	106	179	276	143	118	136	99.6	150
(WY)	1986	1991	1988	1988	1988	1994	1989	1987	1987	1994	1991	1992
MIN	37.4	36.8	31.3	29.4	42.2	43.7	36.6	41.5	43.4	54.8	46.1	32.9
(WY)	1985	1985	1985	1985	1993	1992	1992	1996	1984	1984	1984	1984

HAWAII, ISLAND OF MAUI

16614000 WAIHEE RIVER AT DAM NEAR WAIHEE--Continued

SUMMARY STATISTICS	FOR 1995 CALENDAR YEAR		FOR 1996 WATER YEAR		WATER YEARS 1984 - 1996	
ANNUAL TOTAL	22935		22671			
ANNUAL MEAN	62.8		61.9		82.1	
HIGHEST ANNUAL MEAN					106	1994
LOWEST ANNUAL MEAN					57.5	1985
HIGHEST DAILY MEAN	519	Jan 14	510	Mar 31	1160	Jan 28 1988
LOWEST DAILY MEAN	32	Jun 20	30	Mar 26	22	Jan 18 1985
ANNUAL SEVEN-DAY MINIMUM	39	Sep 19	32	May 7	23	Jan 18 1985
ANNUAL RUNOFF (AC-FT)	45490		44970		59460	
10 PERCENT EXCEEDS	100		112		137	
50 PERCENT EXCEEDS	45		44		56	
90 PERCENT EXCEEDS	39		35		38	



000225

1996

Annual maximum discharge at crest-stage partial-record stations during water year 1996

Station name and number	Location	Drainage area (mi^2)	Period of record	Water year 1996 maximum			Period of record max		
				Date	Gage height (ft)	Discharge (ft^3/s)	Date	Gage height (ft)	Discharge (ft^3/s)
	Island of Maui--Continued								
16502400 Pukuilua Gulch nr Hana	Lat 20°42′00″, long 156°00′14″, at Highway 31, 0.4 mi southwest of Puuiki, and 4.0 mi south of Hana.	0.48	1963-96	09-07-96	2.38	81	01-23-65	9.30	788
16502800 Moomoonui Gulch at Hana	Lat 20°44′37″, long 155°59′18″, at Highway 31 just downstream from Moomooiki Gulch and 1.0 mi south of Hana.	0.90	1963-96	09-07-96	12.35	820	11-26-92	14.71	2,480
16502900 Kawaipapa Gulch at Hana	Lat 20°46′08″, long 156°00′04″, 1,000 ft upstream from Highway 36 and 0.3 mi northwest of Hana Hospital.	5.83	1965-96	09-07-96	7.93	5,470	08-01-82	11.03	16,880
16603300 Unnamed gulch at Maliko Bay	Lat 20°56′26″, long 156°21′04″, at Hana Highway, 0.5 mi west of Maliko Bay, and 1.3 mi north of Hamakuapoko.	0.43	1963-96	01-18-96	1.58	8.7	03-27-79	17.28	171
16603700 Kalialinui Gulch tributary nr Pukalani	Lat 20°49′02″, long 156°19′44″, at Lower Kula Road and 1.4 mi south of Pukalani.	1.17	1967-96	03-03-96	3.61	94	01-09-80	7.35	414
16603800 Kaluapulani Gulch tributary nr Pukalani	Lat 20°48′52″, long 156°18′32″, at Haleakala Highway, 1.5 mi west of Olinda Prison Camp, and 2.3 mi southeast of Pukalani.	0.45	1963-96	03-31-96	1.69	33	07-23-64	9.90	306
16603850 Kalialinui Gulch nr Kahului	Lat 20°52′47″, long 156°26′06″, 600 ft upstream from Hansen Road, 0.5 mi northeast of Puunene Hospital, and 2.5 mi southeast of Kahului Post Office.	17.9	1967-96	03-31-96	5.52	366	01-28-71	8.33	1,330
16607000 Iao Str at Wailuku	Lat 20°53′38″, long 156°30′27″, 560 ft upstream from Market Street bridge at Wailuku and 1.9 mi upstream from mouth.	8.24	1951≠, 1952-96	03-31-96	5.38	3,960	12-03-50	6.21	7,540
16616500 Unnamed gulch at Maluhia Camp	Lat 20°57′26″, long 156°31′41″, at Kahekili Highway, 0.6 mi east of Maluhia Camp, and 1.8 mi norhtwest of Waihee.	0.12	1964-96	03-31-96	-	e1	01-12-75	7.29	e97
16619700 Poelua Gulch nr Kahakuloa	Lat 21°00′58″, long 156°34′58″, at Highway 30 (bypass), 1.3 mi southeast of Nakalele Point lighthouse and 2.2 mi northwest of Kahakuloa.	1.18	1965-96	12-31-95	5.40	99	03-16-68	15.22	1,760
16630200 Honokowai Str at Honokowai	Lat 20°56′58″, long 156°41′07″, 0.5 mi southeast of Honokowai, and 1.1 mi northwest of Puukolii.	5.59	1962-63, 1965-96	03-31-96	-	e370	08-01-82	11.0	4,520
16638500 Kahoma Str at Lahaina	Lat 20°53′12″, long 156°40′36″, 0.2 mi west of Kelawea, 0.6 mi northeast of Lahaina, 0.6 mi downstream from Kanaha Str, and 0.9 mi upstream from mouth.	5.22	1963-89≠ 1990-96a	03-31-96	-	e714	07-11-65	11.03	2,490

≠ Operated as a continuous-record gaging station
e Estimated

000226

Annual maximum discharge at crest-stage partial-record stations during water year 1996

Station name and number	Location	Drainage area (mi^2)	Period of record	Water year 1996 maximum			Period of record max		
				Date	Gage height (ft)	Discharge (ft^3/s)	Date	Gage height (ft)	Discharge (ft^3/s)
Island of Maui--Continued									
16643300 Kauaula Str nr mouth, nr Lahaina	Lat 20°52′09″, long 156°39′43″, 0.7 mi upstream from Honoapiilani Highway (bypass) and 1.3 mi southeast of Lahaina Lighthouse.	4.12	1960,1962, 1964-96	03-31-96	3.37	224	05-13-60	7.9	2,660
16646200 Olowalu Str at Olowalu	Lat 20°49′23″, long 156°37′15″, on downstream side of center pier of plantation road bridge, 0.6 mi northeast of Olowalu, and 5.5 mi southeast of Lahaina.	4.08	1962-72≠, 1973-96	12-30-95	3.18	220	03-24-67	5.40	1,300
16647500 Malalowaiaole Gulch nr Maalaea	Lat 20°46′56″, long 156°31′32″, at Honoapiilani Highway, 200 ft upstream from mouth, 0.2 mi north of McGregor Point, and 1.2 mi southwest of Maalaea.	0.64	1964-96	12-30-95	4.04	24	01-10-80	12.95	350
16650500 Waikapu Str nr Kihei	Lat 20°49′02″, long 156°29′00″, at railroad bridge beside Lower Maalaea Road, 2.5 mi northeast of Maalaea, and 2.5 mi northwest of Kihei.	6.97	1963-96	03-31-96	-	e200	11-04-88	8.69	1,170
16658500 Waiakoa Gulch tributary nr Waiakoa	Lat 20°44′56″, long 156°19′22″, at Upper Kula Road, 1.0 mi southeast of Waiakoa, and 1.0 mi northeast of junction of Lower and Upper Kula	0.98	1964-96	03-31-96	2.39	55	01-28-71	8.23	409
16659000 Waiakoa Gulch at Kihei	Lat 20°47′14″, long 156°27′41″, 0.3 mi northeast of Kihei and 0.4 mi upstream from mouth.	10.1	1963-96	03-03-96	6.05	152	01-28-71	9.66	1,560
16660000 Kulanihakoi Gulch nr Kihei	Lat 20°46′06″, long 156°27′03″, on right bank 0.5 mi northeast of Lihue Cemetery, 0.8 mi upstream from mouth, and 1.3 mi southeast of Kihei.	14.4	1963-70≠, 1971-96	03-03-96	-	e18	01-28-71	9.40	4,460
16663500 Kamaole Gulch at Kamaole	Lat 20°43′36″, long 156°27′02″, at Kihei Road, 350 ft upstream from mouth, and 0.2 mi south of Kamaole.	4.28	1972-96	No flow.	-		03-17-82	9.01	291
16664000 Liilioholo Gulch at Kamaole	Lat 20°43′04″, long 156°26′55″, on upstream side of Kihei Road, 300 ft upstream from mouth, and 0.8 mi south of Kamaole.	4.12	1972-96	No flow.	-		02-11-82	13.73	526
Island of Hawaii									
16701300 Waiakea Str at Hilo	Lat 19°42′38″, long 155°05′02″, 0.3 mi upstream from Kinoole Street bridge and 1.3 mi southeast of Hilo Post Office.	35.8	1968-91, 1993-96	02-25-96	4.32	374	08-12-94	10.90	3,670
16701400 Palai Str at Hilo	Lat 19°40′56″, long 155°04′04″, at Highway 11, 300 ft south of Palai Street intersection, and 3.5 mi southeast of Hilo Post Office.	5.08	1965-90, 1994-96	Records being reviewed.					
16717400 Kalaoa Mauka Str nr Hilo	Lat 19°48′07″, long 155°06′03″, at culvert on Highway 19, 1.0 mi north of Papaikou, and 5.1 mi north of Hilo Post Office.	0.24	1963-96	Records being reviewed.					

≠ Operated as a continuous-record gaging station
a At a different datum
e Estimated

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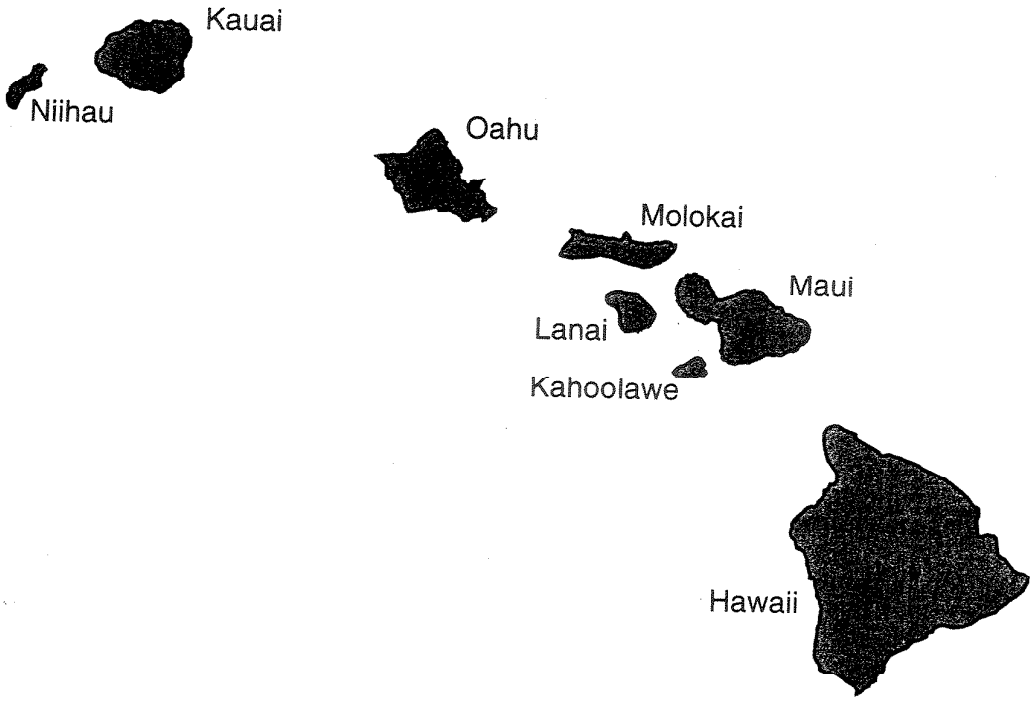
Water Resources Data Hawaii Water Year 1997



U.S. GEOLOGICAL SURVEY WATER-DATA REPORT HI-97-1
Prepared in cooperation with the State of Hawaii
Department of Land and Natural Resources,
Commission on Water Resource Management
and with other agencies

000228

HAWAII, ISLAND OF MAUI

16604500 IAO STREAM AT KEPANIWAI PARK, NEAR WAILUKU

LOCATION.--Lat 20°53'08", long 156°32'32", Hydrologic Unit 20020000, on left bank of Maniania and Waikapu Ditch intake, 0.3 mi upstream from Kepaniwai Park, 0.5 mi downstream from Iao Valley State Park, and 2.3 mi west of Wailuku Post Office.

DRAINAGE AREA.--5.98 mi^2.

PERIOD OF RECORD.--May 1983 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 780 ft above mean sea level (from topographic map).

REMARKS.--Records computed by Matt Wong. Records fair. No appreciable diversion upstream of station.

AVERAGE DISCHARGE.--14 years (water years 1984-97), 66.9 ft^3/s (48,450 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge 6,260 ft^3/s, January 28, 1988, gage height, 9.0 ft, from rating curve extended above 181 ft^3/s on basis of slope-area measurements at gage heights 6.48 ft and 9.0 ft; minimum, 11 ft^3/s for several days in October and November 1984, May 1996, several days in October and November 1996.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum discharge known, 7,540 ft^3/s, December 3, 1950, from rating curve based on model study of site 2.3 mi downstream.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,000 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)
Jan. 4	1800	*606	*3.07

Minimum discharge, 11 ft^3/s, many days in October and November.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	14	12	36	249	30	30	35	42	180	43	49	50
2	15	12	34	113	31	29	35	40	146	72	42	45
3	14	12	32	212	28	36	32	57	76	81	45	38
4	14	11	24	348	25	146	30	44	50	45	38	36
5	14	12	26	274	24	92	30	49	55	67	35	50
6	14	11	98	134	25	71	32	36	142	45	46	36
7	13	12	260	91	24	42	29	32	87	74	39	32
8	12	47	194	68	23	44	27	30	114	99	43	37
9	12	22	87	53	23	70	26	28	82	284	39	33
10	12	17	57	94	24	90	27	28	66	265	35	30
11	13	18	73	56	24	73	26	37	56	200	33	29
12	13	79	44	46	23	53	24	114	62	123	33	29
13	12	315	66	42	e24	36	26	50	39	79	31	30
14	12	134	329	36	e22	30	24	257	48	62	58	73
15	11	68	151	32	20	77	24	182	42	80	104	34
16	13	43	79	51	20	95	24	137	38	95	48	81
17	12	56	53	40	19	259	23	116	51	81	76	118
18	14	38	40	30	39	138	23	65	60	107	44	98
19	19	145	33	41	22	87	e24	67	65	170	38	45
20	14	165	28	182	20	65	e24	60	44	86	36	55
21	13	56	31	89	19	46	24	40	87	76	48	44
22	12	44	38	72	107	38	23	34	75	188	52	36
23	12	174	250	46	77	68	23	76	40	98	36	36
24	14	244	262	38	30	192	24	39	62	68	40	36
25	11	128	113	34	149	252	303	33	150	117	111	32
26	11	76	77	34	94	120	322	31	239	76	103	95
27	12	105	277	35	43	100	152	30	155	60	86	58
28	11	86	154	40	36	77	87	28	128	56	56	65
29	11	44	89	29	---	81	65	28	104	66	44	48
30	11	36	70	54	---	49	45	27	57	77	42	47
31	11	---	95	46	---	39	---	62	---	52	52	---
TOTAL	396	2222	3200	2709	1045	2625	1613	1899	2600	3092	1582	1476
MEAN	12.8	74.1	103	87.4	37.3	84.7	53.8	61.3	86.7	99.7	51.0	49.2
MAX	19	315	329	348	149	259	322	257	239	284	111	118
MIN	11	11	24	29	19	29	23	27	38	43	31	29
AC-FT	785	4410	6350	5370	2070	5210	3200	3770	5160	6130	3140	2930

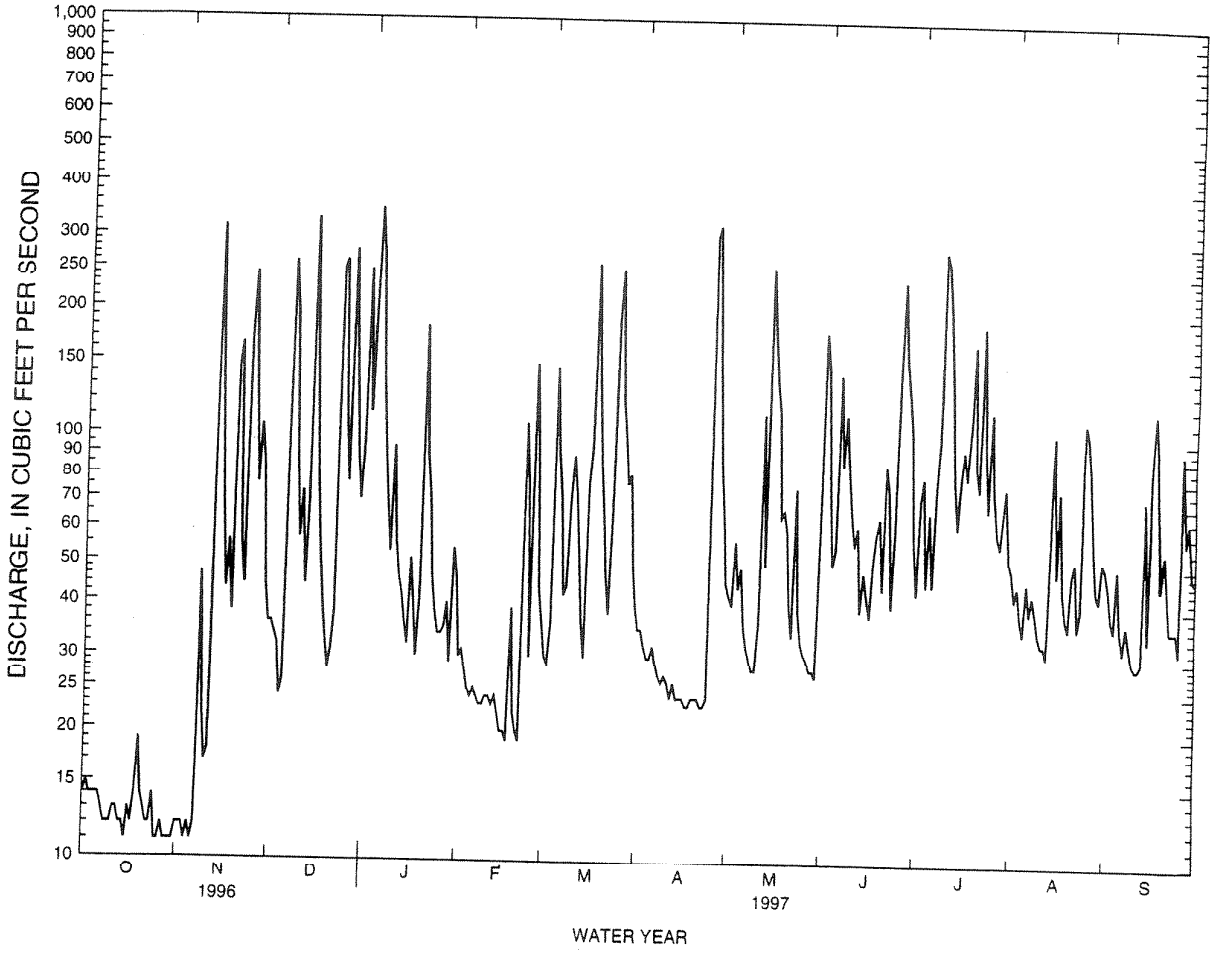
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1983 - 1997, BY WATER YEAR (WY)

MEAN	52.9	65.8	65.6	70.4	58.6	84.6	87.4	67.0	59.1	74.8	61.4	48.3
MAX	103	132	103	149	108	176	230	136	99.7	137	97.0	133
(WY)	1984	1988	1997	1988	1994	1994	1989	1987	1987	1994	1993	1992
MIN	11.9	20.5	18.3	25.4	32.1	30.4	20.8	27.9	24.4	25.2	26.0	15.8
(WY)	1985	1985	1985	1985	1993	1987	1992	1984	1985	1984	1984	1984

e Estimated

16604500 IAO STREAM AT KEPANIWAI PARK, NEAR WAILUKU--Continued

SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR		FOR 1997 WATER YEAR		WATER YEARS 1983 - 1997	
ANNUAL TOTAL	20582		24459			
ANNUAL MEAN	56.2		67.0		66.9	
HIGHEST ANNUAL MEAN					93.4	1994
LOWEST ANNUAL MEAN					41.4	1985
HIGHEST DAILY MEAN	393	Mar 31	348	Jan 4	913	Apr 10 1986
LOWEST DAILY MEAN	11	Oct 15	11	Oct 15	11	Oct 7 1984
ANNUAL SEVEN-DAY MINIMUM	11	Oct 25	11	Oct 25	11	Oct 16 1984
ANNUAL RUNOFF (AC-FT)	40820		48510		40450	
10 PERCENT EXCEEDS	120		146		135	
50 PERCENT EXCEEDS	39		44		42	
90 PERCENT EXCEEDS	13		15		21	



000230

HAWAII, ISLAND OF MAUI

16614000 WAIHEE RIVER AT DAM NEAR WAIHEE

LOCATION.--Lat 20°56'21", long 156°32'59", Hydrologic Unit 20020000, on right bank at dam 8 ft upstream from the abandoned Waihee canal intake, 2.6 mi southwest from Waihee Point, and 4.4 mi northwest from Wailuku Post Office.

DRAINAGE AREA.--4.20 mi^2.

PERIOD OF RECORD.--November 1910 to December 1913, November 1983 to current year. Low-flow records not equivalent prior to December 31, 1913, due to Waihee canal diverted water upstream.

GAGE.--Water-stage recorder. Elevation of gage is 605 ft above mean sea level (from topographic map).

REMARKS.--Records computed by Matt Wong. Records good, except for periods of no gage height record, which are poor. No diversion upstream of station.

AVERAGE DISCHARGE.--13 years (water years 1985-97), 80.9 ft^3/s (58,640 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 9,660 ft^3/s, January 28, 1988, gage height, 8.95 ft, from rating curve extended above 280 ft^3/s on basis of slope-area measurements at gage heights 6.70 ft and 8.95 ft; minimum, 14 ft^3/s, July 13, 1995.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,000 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Dec. 14	0500	2,430	5.21	Mar. 15	2200	*3,990	*6.31

Minimum discharge, 30 ft^3/s, November 5.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	34	32	47	72	38	36	43	43	331	e58	e58	e58
2	34	32	41	43	42	41	61	43	132	e100	e54	e52
3	34	32	41	95	37	45	45	62	62	e70	e58	e49
4	34	31	40	216	35	125	42	49	48	e58	e50	e46
5	34	31	47	52	35	72	41	73	67	e70	e46	e60
6	36	31	63	40	40	57	48	46	115	e56	e54	e45
7	34	32	171	38	36	39	41	42	150	e90	e50	e42
8	34	66	79	37	34	38	66	40	67	e130	e67	e48
9	34	60	45	36	34	111	45	39	57	e300	e58	e40
10	33	46	40	146	34	109	73	39	55	e160	e52	e39
11	33	42	59	44	35	55	46	58	52	e120	e48	e39
12	34	108	42	38	35	41	43	199	53	e100	e47	e40
13	34	288	64	37	38	36	59	75	47	e86	e46	e40
14	34	58	304	36	35	34	44	362	52	e80	e80	e80
15	33	42	44	35	34	344	42	169	54	e100	e120	e45
16	38	38	36	85	34	101	40	150	e54	e110	e60	e100
17	33	75	35	57	33	112	40	103	e66	e100	e86	e140
18	42	47	34	38	58	52	40	52	e74	e130	e54	e70
19	63	92	33	58	35	56	40	79	e58	e170	e47	e54
20	36	74	33	180	33	55	39	70	e52	e110	e45	e66
21	34	39	34	59	33	44	39	49	e100	e96	e60	e50
22	33	41	37	43	163	42	39	46	e70	e200	e50	e47
23	33	220	183	37	48	53	39	75	e54	e90	e46	e46
24	35	191	99	36	34	104	38	47	e80	e82	e52	e45
25	38	83	39	35	77	145	335	47	e150	e110	e120	e44
26	34	50	38	35	66	53	293	46	e260	e76	e100	e100
27	33	63	231	36	36	79	59	45	e170	e72	e74	e70
28	33	52	45	40	34	52	48	44	e140	e74	e62	e80
29	33	42	38	36	---	55	48	44	e70	e86	e56	e62
30	33	40	36	118	---	44	44	45	e58	e70	e54	e60
31	33	---	45	57	---	43	---	110	---	e64	e64	---
TOTAL	1093	2078	2123	1915	1226	2273	1920	2391	2698	3212	1918	1757
MEAN	35.3	69.3	68.5	61.8	43.8	73.3	64.0	77.1	89.9	104	61.9	58.6
MAX	63	288	304	216	163	344	335	362	260	300	120	140
MIN	33	31	33	35	33	34	38	39	47	52	45	39
AC-FT	2170	4120	4210	3800	2430	4510	3810	4740	5350	6370	3800	3490

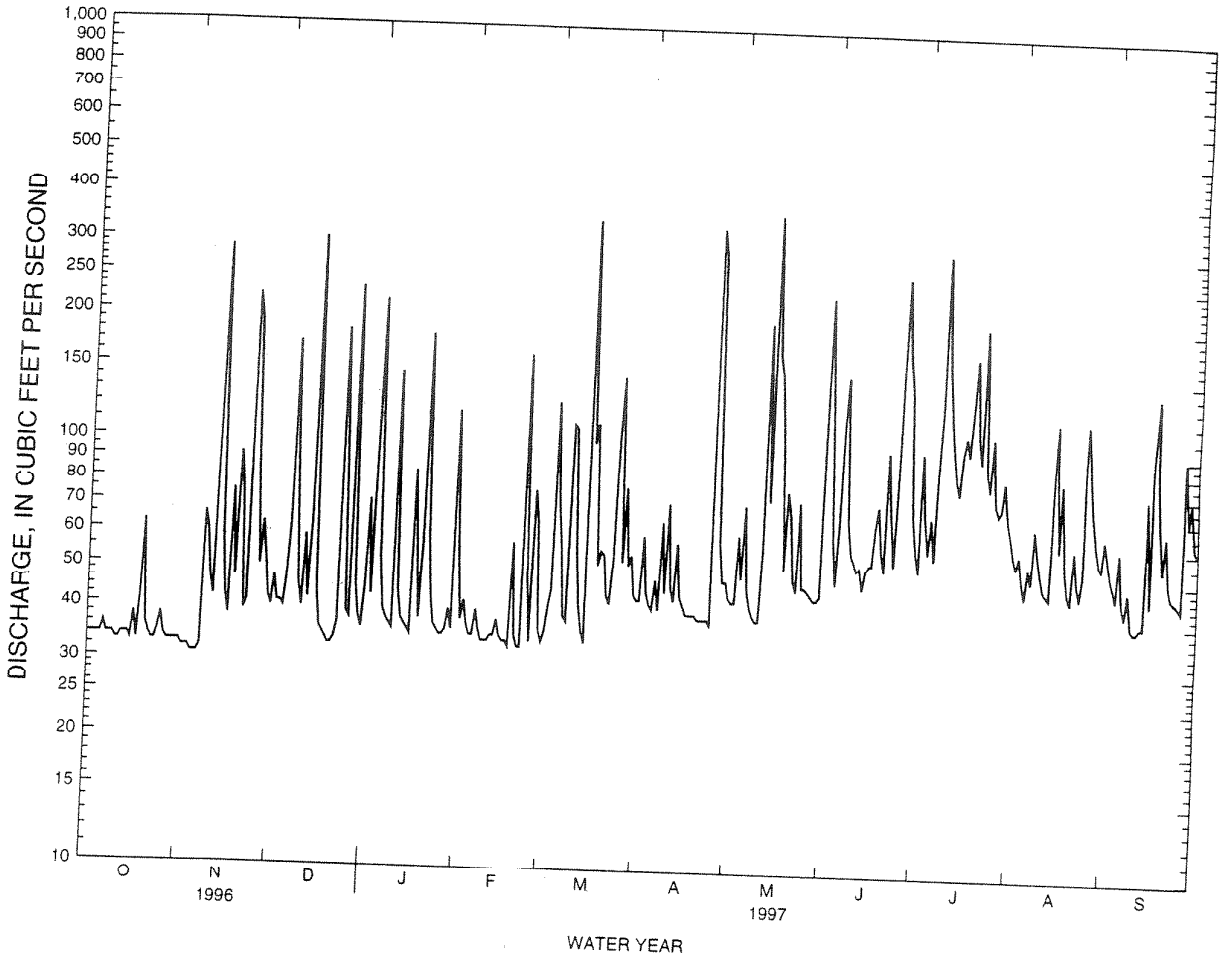
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1984 - 1997, BY WATER YEAR (WY)

MEAN	69.4	82.8	71.7	76.3	66.8	93.8	94.9	81.3	73.8	92.0	77.2	72.3
MAX	91.7	150	109	186	106	179	276	143	118	136	99.6	160
(WY)	1986	1991	1988	1988	1988	1994	1989	1987	1987	1994	1991	1992
MIN	27.4	36.8	31.3	29.4	42.3	43.7	36.6	41.5	43.4	54.8	46.1	32.9
(WY)	1985	1985	1985	1985	1993	1992	1992	1996	1984	1984	1984	1984

e Estimated

16614000 WAIHEE RIVER AT DAM NEAR WAIHEE--Continued

SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR		FOR 1997 WATER YEAR		WATER YEARS 1984 - 1997	
ANNUAL TOTAL	22245		24604			
ANNUAL MEAN	60.8		67.4		80.9	
HIGHEST ANNUAL MEAN					106	1994
LOWEST ANNUAL MEAN					57.5	1985
HIGHEST DAILY MEAN	510	Mar 31	362	May 14	1160	Jan 28 1988
LOWEST DAILY MEAN	30	Mar 26	31	Nov 4	22	Jan 18 1985
ANNUAL SEVEN-DAY MINIMUM	32	Nov 1	32	Nov 1	23	Jan 18 1985
ANNUAL RUNOFF (AC-FT)	44120		48800		58640	
10 PERCENT EXCEEDS	110		120		135	
50 PERCENT EXCEEDS	42		48		55	
90 PERCENT EXCEEDS	34		34		38	



000232

1997

Annual maximum discharge at crest-stage partial-record stations during water year 1997

Station name and number	Location	Drainage area (mi^2)	Period of record	Water year 1997 maximum			Period of record max		
				Date	Gage height (ft)	Discharge (ft^3/s)	Date	Gage height (ft)	Discharge (ft^3/s)
Island of Maui--Continued									
16502800 Moomoonui Gulch at Hana	Lat 20°44′37″, long 155°59′18″, at Highway 31 just downstream from Moomooiki Gulch and 1.0 mi south of Hana.	0.90	1963-97	12-07-96	10.10	559	11-26-92	14.71	2,480
16502900 Kawaipapa Gulch at Hana	Lat 20°46′08″, long 156°00′04″, 1,000 ft upstream from Highway 36 and 0.3 mi northwest of Hana Hospital.	5.83	1965-97	03-10-97	7.84	5,260	08-01-82	11.03	16,880
16603300 Unnamed gulch at Maliko Bay	Lat 20°56′26″, long 156°21′04″, at Hana Highway, 0.5 mi west of Maliko Bay and 1.3 mi north of Hamakuapoko.	0.43	1963-97	01-20-97	1.79	12	03-27-79	17.28	171
16603700 Kalialinui Gulch tributary nr Pukalani	Lat 20°49′02″, long 156°19′44″, at Lower Kula Road and 1.4 mi south of Pukalani.	1.17	1967-97	09-14-97	2.30	35	01-09-80	7.35	414
16603800 Kaluapulani Gulch tributary nr Pukalani	Lat 20°48′52″, long 156°18′32″, at Haleakala Highway, 1.5 mi west of Olinda Prison Camp and 2.3 mi southeast of Pukalani.	0.45	1963-97	03-10-97	1.34	20	07-23-64	9.90	306
16603850 Kalialinui Gulch nr Kahului	Lat 20°52′47″, long 156°26′06″, 600 ft upstream from Hansen Road, 0.5 mi northeast of Puunene Hospital and 2.5 mi southeast of Kahului Post Office.	17.9	1967-97	01-20-97	4.91	183	01-28-71	8.33	1,330
16607000 Iao Str at Wailuku	Lat 20°53′38″, long 156°30′27″, 560 ft upstream from Market Street bridge at Wailuku and 1.9 mi upstream from mouth.	8.24	1951≠, 1952-97	01-04-97	4.55	2,610	12-03-50	6.21	7,540
16616500 Unnamed gulch at Maluhia Camp	Lat 20°57′26″, long 156°31′41″, at Kahekili Highway, 0.6 mi east of Maluhia Camp and 1.8 mi northwest of Waihee.	0.12	1964-97	No flow.			01-12-75	7.29	e97
16619700 Poelua Gulch nr Kahakuloa	Lat 21°00′58″, long 156°34′58″, at Highway 30 (bypass), 1.3 mi southeast of Nakalele Point lighthouse and 2.2 mi northwest of Kahakuloa.	1.18	1965-97	01-20-97	5.64	111	03-16-68	15.22	1,760
16630200 Honokowai Str at Honokowai	Lat 20°56′58″, long 156°41′07″, 0.5 mi southeast of Honokowai and 1.1 mi northwest of Puukolii.	5.59	1962-63, 1965-97	01-20-97	-	e280	08-01-82	11.0	4,520
16638500 Kahoma Str at Lahaina	Lat 20°53′12″, long 156°40′36″, 0.2 mi west of Kelawea, 0.6 mi northeast of Lahaina, 0.6 mi downstream from Kanaha Str and 0.9 mi upstream from mouth.	5.22	1963-89≠ 1990-97	01-04-97	-	e110	07-11-65	11.03	2,490
16643300 Kauaula Str nr mouth, nr Lahaina	Lat 20°52′09″, long 156°39′43″, 0.7 mi upstream from Honoapiilani Highway (bypass) and 1.3 mi southeast of Lahaina Lighthouse.	4.12	1960,1962, 1964-97	01-04-97	3.96	368	05-13-60	7.9	2,660
16646200 Olowalu Str at Olowalu	Lat 20°49′23″, long 156°37′15″, on downstream side of center pier of plantation road bridge, 0.6 mi northeast of Olowalu, and 5.5 mi southeast of Lahaina.	4.08	1962-72≠, 1973-97	01-04-97	3.87	453	03-24-67	5.40	1,300

≠ Operated as a continuous-record gaging station
e Estimated

000233

Annual maximum discharge at crest-stage partial-record stations during water year 1997

Station name and number	Location	Drainage area (mi^2)	Period of record	Water year 1997 maximum			Period of record max		
				Date	Gage height (ft)	Discharge (ft^3/s)	Date	Gage height (ft)	Discharge (ft^3/s)
		Island of Maui--Continued							
16647500 Malalowaiaole Gulch nr Maalaea	Lat 20°46′56″, long 156°31′32″, at Honoapiilani Highway, 200 ft upstream from mouth, 0.2 mi north of McGregor Point, and 1.2 mi southwest of Maalaea.	0.64	1964-97	01-04-97	4.78	46	01-10-80	12.95	350
16650500 Waikapu Str nr Kihei	Lat 20°49′02″, long 156°29′00″, at railroad bridge beside Lower Maalaea Road, 2.5 mi northeast of Maalaea, and 2.5 mi northwest of Kihei.	6.97	1963-97 (discontinued)	01-04-97	-	e600	11-04-88	8.69	1,170
16658500 Waiakoa Gulch tributary nr Waiakoa	Lat 20°44′56″, long 156°19′22″, at Upper Kula Road, 1.0 mi southeast of Waiakoa, and 1.0 mi northeast of junction of Lower and Upper Kula Roads.	0.98	1964-97	11-13-96	2.39	55	01-28-71	8.23	409
16659000 Waiakoa Gulch at Kihei	Lat 20°47′14″, long 156°27′41″, 0.3 mi northeast of Kihei and 0.4 mi upstream from mouth.	10.1	1963-97	01-20-97	7.11	378	01-28-71	9.66	1,560
16660000 Kulanihakoi Gulch nr Kihei	Lat 20°46′06″, long 156°27′03″, on right bank 0.5 mi northeast of Lihue Cemetery, 0.8 mi upstream from mouth, and 1.3 mi southeast of Kihei.	14.4	1963-70≠, 1971-97	01-20-97	1.01	398	01-28-71	9.40	4,460
16663500 Kamaole Gulch at Kamaole	Lat 20°43′36″, long 156°27′02″, at Kihei Road, 350 ft upstream from mouth, and 0.2 mi south of Kamaole.	4.28	1972-97 (discontinued)	01-20-97		e70	03-17-82	9.01	291
16664000 Liilioholo Gulch at Kamaole	Lat 20°43′04″, long 156°26′55″, on upstream side of Kihei Road, 300 ft upstream from mouth, and 0.8 mi south of Kamaole.	4.12	1972-97 (discontinued)	01-20-97	-	e68	02-11-82	13.73	526
		Island of Hawaii							
16701300 Waiakea Str at Hilo	Lat 19°42′38″, long 155°05′02″, 0.3 mi upstream from Kinoole Street bridge and 1.3 mi southeast of Hilo Post Office.	35.8	1968-91, 1993-97	07-30-97	5.00	560	08-12-94	10.90	3,670
16701400 Palai Str at Hilo	Lat 19°40′56″, long 155°04′04″, at Highway 11, 300 ft south of Palai Street intersection, and 3.5 mi southeast of Hilo Post Office.	5.08	1965-90, 1994-97	Records being reviewed.					
16701600 Alenaio Str at Hilo	Lat 19°43′10″, long 155°05′27″, 0.65 mi south of Hilo Post Office, 0.65 mi west of Kapiolani School, and 0.1 mi upstream of Kapiolani Street bridge.	8.62	1997	07-30-97	6.36	1,010	07-30-97	6.36	1,010
16717400 Kalaoa Mauka Str nr Hilo	Lat 19°48′07″, long 155°06′03″, at culvert on Highway 19, 1.0 mi north of Papaikou, and 5.1 mi north of Hilo Post Office.	0.24	1963-97	Records being reviewed.					
16717600 Alia Str nr Hilo	Lat 19°50′38″, long 155°06′21″, on left bank 10 ft downstream from culvert on Highway 19 at Pepeekeo 2.0 mi south of Honomu, and 8.0 mi north of Hilo.	0.58	1962-72≠, 1973-90, 1994-97	07-30-97	unknown	a-	02-20-79	17.1	2,850

≠ Operated as a continuous-record gaging station
a- Discharge not determined
e Estimated

000234

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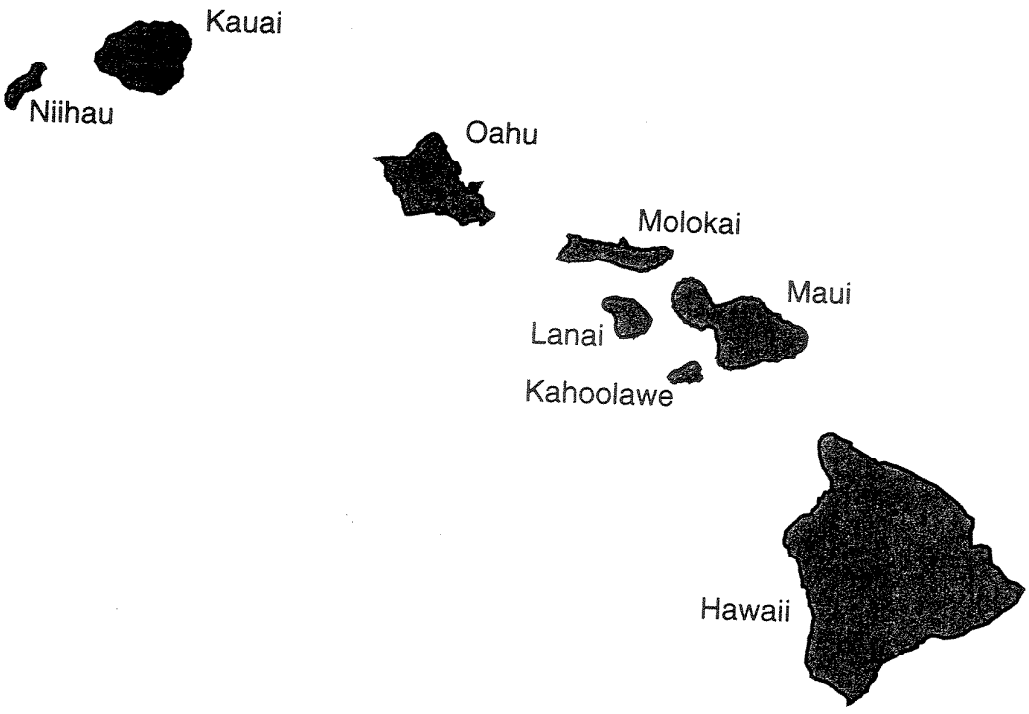
Water Resources Data Hawaii Water Year 1998

Water-Data Report HI-98-1



U.S. Department of the Interior
U.S. Geological Survey

Prepared in cooperation with the State of Hawaii Department of Land and Natural Resources, Commission on Water Resource Management and with other agencies

000235

HAWAII, ISLAND OF MAUI

16604500 IAO STREAM AT KEPANIWAI PARK, NEAR WAILUKU

LOCATION.--Lat 20°53'08", long 156°32'32", Hydrologic Unit 20020000, on left bank of Maniania and Waikapu Ditch intake, 0.3 mi upstream from Kepaniwai Park, 0.5 mi downstream from Iao Valley State Park, and 2.3 mi west of Wailuku Post Office.

DRAINAGE AREA.--5.98 mi^2.

PERIOD OF RECORD.--May 1983 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 780 ft above mean sea level (from topographic map).

REMARKS.--Records computed by Roy Taogoshi. Records fair. No appreciable diversion upstream of station.

AVERAGE DISCHARGE.--15 years (water years 1984-98), 66.9 ft^3/s (48,460 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge 6,260 ft^3/s, January 28, 1988, gage height, 9.0 ft, from rating curve extended above 181 ft^3/s on basis of slope-area measurements at gage heights 6.48 ft and 9.0 ft; minimum, 11 ft^3/s for several days in October and November 1984, May 1996, several days in October and November 1996.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum discharge known, 7,540 ft^3/s, December 3, 1950, from rating curve based on model study of site 2.3 mi downstream.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,000 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Nov. 9	0300	*602	*3.06				

Minimum discharge, 13 ft^3/s, February 20, 21.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1997 TO SEPTEMBER 1998
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	e40	77	173	212	24	25	89	150	44			
2	e35	307	287	101	20	21	112	70	105	e46	e30	e85
3	e85	75	216	68	20	19	78	51	146	e45	e31	e450
4	e50	127	111	51	23	18	39	49	e130	e80	e35	194
5	e30	116	83	79	19	17	28	40	e100	e110	e38	96
6	e50	50	166	61	19	17	73	134	e80	e65	e40	63
7	e32	55	114	40	18	17	77	81	e100	e80	e41	46
8	e42	89	90	34	18	17	127	69	e90	e110	e32	42
9	e30	255	66	30	17	17	194	100	e100	e85	e30	39
10	e33	66	55	28	17	17	138	134	e70	e78	e32	65
11	e36	116	42	29	16	16	124	66	e100	e77	e36	46
12	e30	361	37	29	17	15	91	157	e150	73	e33	37
13	e28	296	33	27	18	16	65	200	e100	57	e30	43
14	e26	102	31	24	17	16	53	140	e150	42	e28	45
15	e25	59	30	21	17	15	45	95	e220	36	e31	34
16	25	46	32	21	18	16	40	70	e250	98	e28	59
17	24	38	56	21	18	15	103	57	e150	39	e27	56
18	27	36	32	21	16	15	182	54	e75	34	e27	47
19	26	34	27	21	15	15	203	98	e100	33	e26	34
20	23	29	25	21	14	15	270	199	e160	32	e28	36
21	25	28	26	20	14	15	183	73	e150	32	e30	40
22	24	28	26	20	98	15	124	42	e100	31	e180	135
23	23	120	51	19	61	16	202	35	e80	30	e75	46
24	22	133	58	19	39	16	209	32	e150	30	e55	38
25	25	254	70	19	32	19	148	51	e75	33	e60	49
26	29	166	30	19	22	32	92	45	e100	29	e56	74
27	36	141	32	19	36	54	64	32	e80	29	e58	45
28	34	268	26	21	25	26	64	28	e60	33	e100	36
29	25	293	24	19	---	94	45	38	e48	104	e97	39
30	28	206	223	18	---	69	45	89	e52	36	e90	36
31	70	---	244	18	---	36	---	72	---	37	e50	38
										e32	e40	---
TOTAL	1038	3971	3516	1130	688	731	3307	2551	3305	1676	1494	2093
MEAN	33.5	132	81.2	37.1	24.6	23.6	110	82.3	110	54.1	48.2	69.8
MAX	85	361	287	212	98	94	270	200	250	110	180	450
MIN	22	28	24	18	14	15	28	28	44	29	26	34
AC-FT	2060	7880	4990	2280	1360	1450	6560	5060	6560	3320	2960	4150

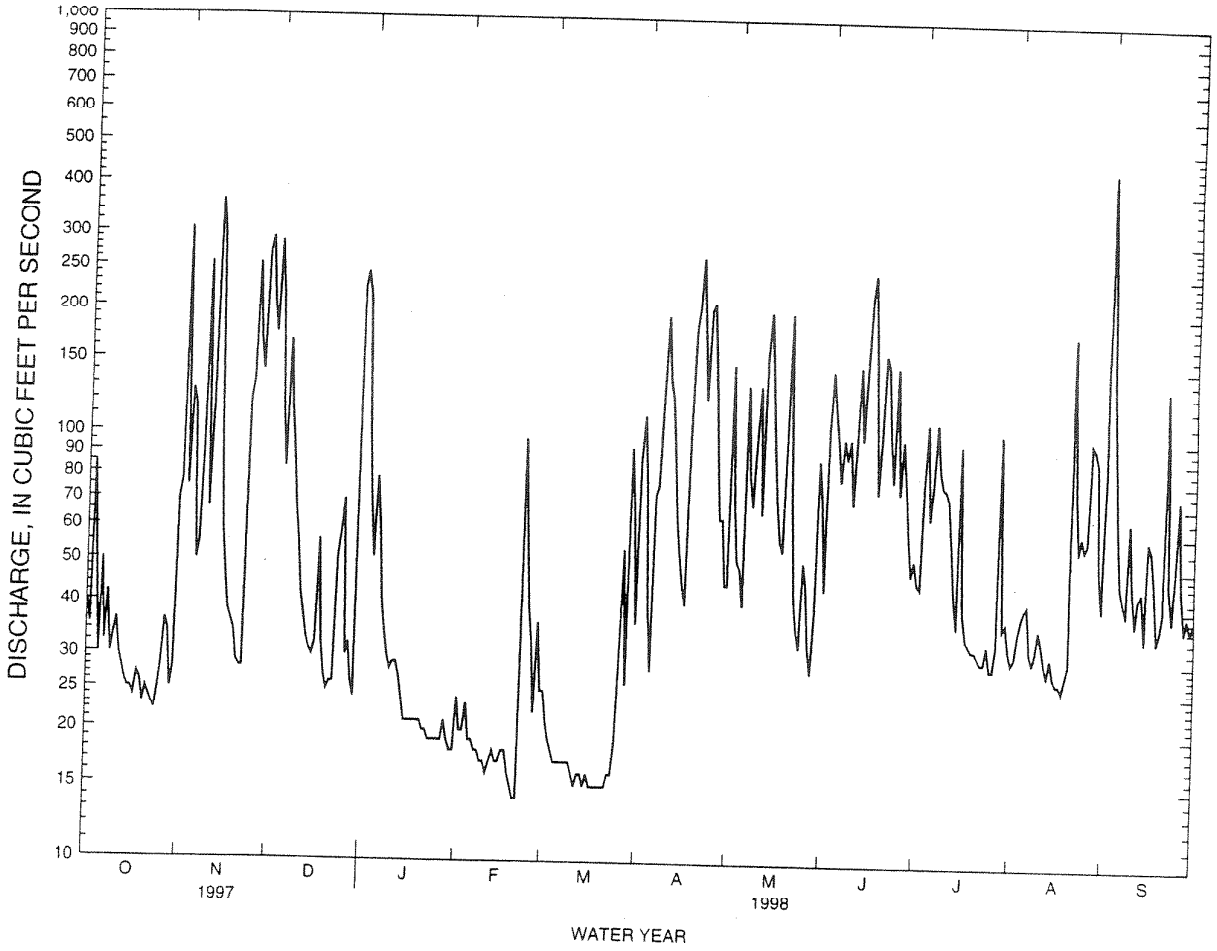
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1983 - 1998, BY WATER YEAR (WY)

MEAN	51.6	70.3	66.7	68.2	56.4	80.5	88.9	68.0	62.3	73.5	60.6	49.6
MAX	103	132	103	149	108	176	230	136	110	137	97.0	133
(WY)	1984	1998	1997	1988	1994	1994	1989	1987	1998	1994	1993	1992
MIN	11.9	20.5	18.3	25.4	24.6	23.6	20.8	27.9	24.4	25.2	26.0	15.8
(WY)	1985	1985	1985	1985	1998	1998	1992	1984	1985	1984	1984	1984

e Estimated

1660 IAO STREAM AT KEPANIWAI PARK, NEAR WAILU Continued

SUMMARY STATISTICS	FOR 1997 CALENDAR YEAR		FOR 1998 WATER YEAR		WATER YEARS 1903 - 1998	
ANNUAL TOTAL	26166		24520			
ANNUAL MEAN	71.7		67.2		66.9	
HIGHEST ANNUAL MEAN					93.4	1994
LOWEST ANNUAL MEAN					41.4	1985
HIGHEST DAILY MEAN	361	Nov 12	450	Sep 2	913	Apr 10 1986
LOWEST DAILY MEAN	19	Feb 17	14	Feb 20	11	Oct 7 1984
ANNUAL SEVEN-DAY MINIMUM	22	Feb 11	15	Mar 15	11	Oct 16 1984
ANNUAL RUNOFF (AC-FT)	51900		48640		48460	
10 PERCENT EXCEEDS	151		150		137	
50 PERCENT EXCEEDS	46		42		42	
90 PERCENT EXCEEDS	25		18		21	



000237

HAWAII, ISLAND OF MAUI

16614000 WAIHEE RIVER AT DAM NEAR WAIHEE

LOCATION.--Lat 20°56'21", long 156°32'59", Hydrologic Unit 20020000, on right bank at dam 8 ft upstream from the abandoned Waihee canal intake, 2.6 mi southwest from Waihee Point, and 4.4 mi northwest from Wailuku Post Office.

DRAINAGE AREA.--4.20 mi^2.

PERIOD OF RECORD.--November 1910 to December 1913, November 1983 to current year. Low-flow records not equivalent prior to December 31, 1913, due to Waihee canal diverted water upstream.

GAGE.--Water stage recorder. Elevation of gage is 605 ft above mean sea level (from topographic map).

REMARKS.--Records computed by Matt Wong. Records good, except for periods of no gage height record, which are poor. No diversion upstream of station.

AVERAGE DISCHARGE.--14 years (water years 1985-98), 80.6 ft^3/s (58,380 acre-ft/yr)

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 9,660 ft^3/s, January 28, 1988, gage height, 8.95 ft, from rating curve extended above 280 ft^3/s on basis of slope-area measurements at gage heights 6.70 ft and 8.95 ft; minimum, 14 ft^3/s, July 13, 1995.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,000 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Nov. 25	0600	*1,200	*4.00				

Minimum discharge, 35 ft^3/s, March 19-22.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1997 TO SEPTEMBER 1998
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	e41	112	132	203	57	57	89	152	72	61	54	75
2	e40	127	257	71	46	49	74	83	158	61	55	416
3	e80	49	97	63	45	43	69	59	123	78	56	122
4	e75	114	70	61	51	42	45	59	163	161	62	60
5	e42	87	68	90	46	41	43	54	106	78	71	51
6	e52	50	147	63	44	39	84	120	67	80	72	48
7	e45	45	89	58	43	39	67	68	88	128	56	47
8	e52	66	97	57	43	38	76	85	75	102	53	48
9	e46	131	73	56	43	38	102	97	81	73	59	92
10	e47	45	70	53	43	38	89	102	62	72	64	64
11	e49	101	63	53	42	38	79	69	92	73	50	48
12	e43	242	62	53	41	37	65	108	124	68	49	65
13	e42	113	61	52	41	37	54	96	88	61	50	79
14	e41	52	60	51	41	37	52	71	162	61	57	49
15	e41	46	59	51	41	40	50	64	178	117	50	71
16	41	44	63	51	41	37	59	58	138	62	48	72
17	41	44	85	51	40	37	92	55	89	60	47	56
18	43	45	76	54	39	37	166	56	67	59	47	47
19	42	44	61	51	40	36	182	84	78	59	46	47
20	42	44	59	49	39	35	295	161	145	61	50	53
21	44	43	59	48	39	36	96	62	122	59	213	179
22	43	45	57	48	202	45	83	54	87	58	88	50
23	41	115	111	48	69	60	177	52	70	58	70	48
24	40	97	82	48	69	41	171	51	163	59	78	75
25	42	522	85	47	58	51	102	65	74	68	73	93
26	49	76	61	47	62	53	69	74	115	69	74	51
27	48	189	65	47	83	72	61	53	73	67	120	47
28	45	197	75	47	59	51	89	50	65	132	114	53
29	41	245	60	47	---	91	57	52	64	64	108	47
30	48	151	366	45	---	80	59	109	67	64	64	48
31	142	---	330	45	---	59	---	96	---	58	53	---
TOTAL	1528	3281	3100	1808	1507	1434	2796	2399	3056	2331	2151	2301
MEAN	49.3	109	100	58.3	53.8	46.3	93.2	77.4	102	75.2	69.4	76.7
MAX	142	522	366	203	202	91	295	161	178	161	213	416
MIN	40	43	57	45	39	35	43	50	62	58	46	47
AC-FT	3030	6510	6150	3590	2990	2840	5550	4760	6060	4620	4270	4560

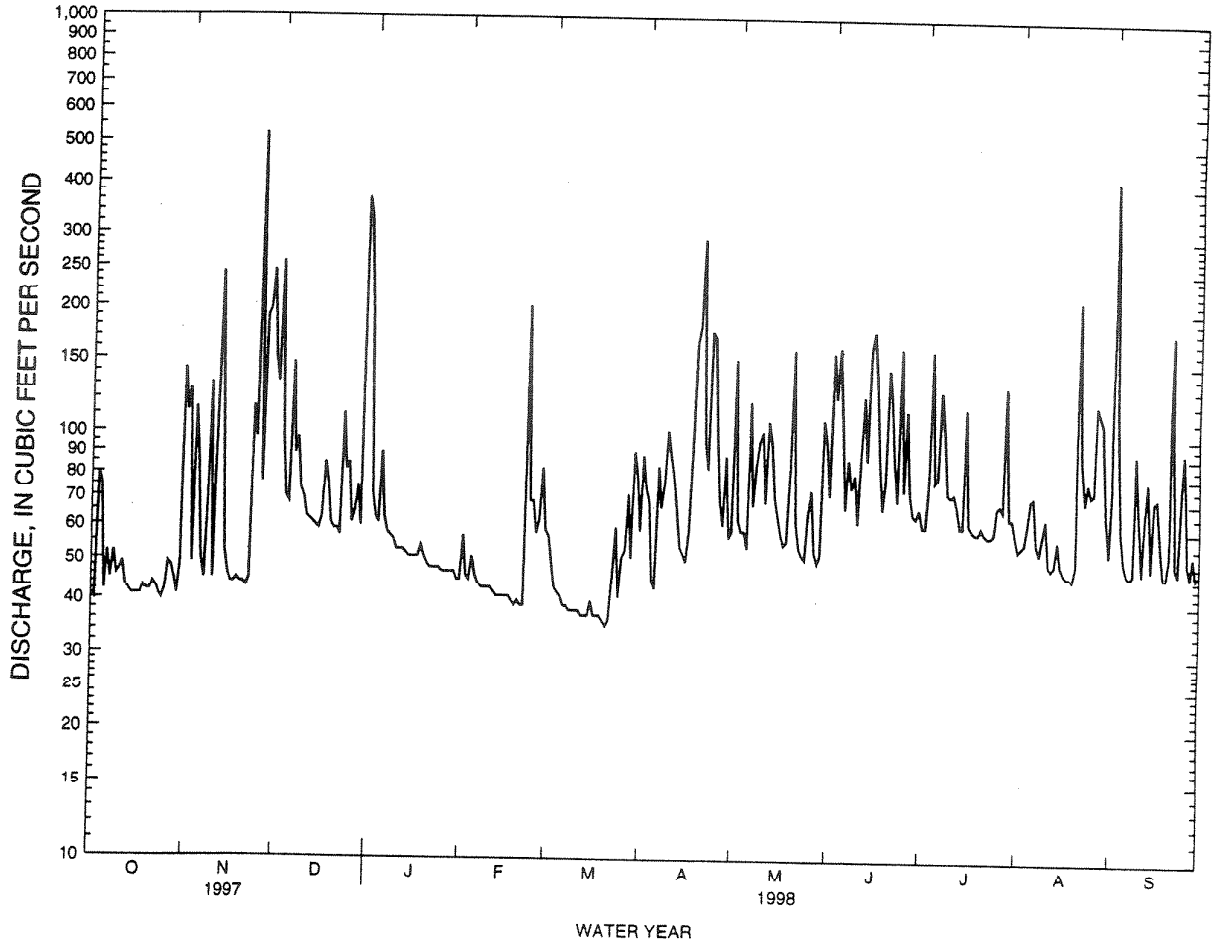
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1984 - 1998, BY WATER YEAR (WY)

MEAN	68.0	84.6	73.6	75.1	65.9	90.7	94.8	81.0	75.6	90.9	76.6	72.6
MAX	91.7	150	109	186	106	179	276	143	118	136	99.6	160
(WY)	1986	1991	1988	1988	1988	1994	1989	1987	1987	1994	1991	1992
MIN	27.4	36.8	31.3	29.4	42.3	43.7	36.6	41.5	43.4	54.8	46.1	32.9
(WY)	1985	1985	1985	1985	1993	1992	1992	1996	1984	1984	1984	1984

e Estimated

16614000 WAIHEE RIVER AT DAM NEAR WAIHEE--Continued

SUMMARY STATISTICS	FOR 1997 CALENDAR YEAR		FOR 1998 WATER YEAR		WATER YEARS 1984 - 1998	
ANNUAL TOTAL	27219		27692			
ANNUAL MEAN	74.6		75.9		80.6	
HIGHEST ANNUAL MEAN					106	1994
LOWEST ANNUAL MEAN					57.5	1985
HIGHEST DAILY MEAN	522	Nov 25	522	Nov 25	1160	Jan 28 1988
LOWEST DAILY MEAN	33	Feb 17	35	Mar 20	22	Jan 18 1985
ANNUAL SEVEN-DAY MINIMUM	35	Feb 11	37	Mar 15	23	Jan 18 1985
ANNUAL RUNOFF (AC-FT)	53990		54930		58380	
10 PERCENT EXCEEDS	131		125		135	
50 PERCENT EXCEEDS	54		60		56	
90 PERCENT EXCEEDS	38		41		38	



Annual maximum discharge at crest-stage partial-record stations during water year 1998

Station name and number	Location	Drainage area (mi^2)	Period of record	Water year 1998 maximum			Period of record max		
				Date	Gage height (ft)	Discharge (ft^3/s)	Date	Gage height (ft)	Discharge (ft^3/s)
Island of Maui--Continued									
16500800 Kukuiula Gulch nr Kipahulu	Lat 20°39′18″, long 156°04′44″, at Highway 31, 1.3 mi west of Kipahulu, and 3.2 mi east of Kaupo.	0.76	1963-68≠, 1969-98	05-20-98	<4.50	<270	03-31-82	13.76	5,950
16502400 Pukuilua Gulch nr Hana	Lat 20°42′00″, long 156°00′14″, at Highway 31, 0.4 mi southwest of Puuiki and 4.0 mi south of Hana.	0.48	1963-98	12-02-97	<1.96	<55	01-23-65	9.30	788
16502800 Moomoonui Gulch at Hana	Lat 20°44′37″, long 155°59′18″, at Highway 31 just downstream from Moomooiki Gulch and 1.0 mi south of Hana.	0.90	1963-98	12-30-97	6.33	233	11-26-92	14.71	2,480
16502900 Kawaipapa Gulch at Hana	Lat 20°46′08″, long 156°00′04″, 1,000 ft upstream from Highway 36 and 0.3 mi northwest of Hana Hospital.	5.83	1965-98	12-30-97	<5.84	<1,730	08-01-82	11.03	16,880
16603300 Unnamed gulch at Maliko Bay	Lat 20°56′26″, long 156°21′04″, at Hana Highway, 0.5 mi west of Maliko Bay and 1.3 mi north of Hamakuapoko.	0.43	1963-98	No flow.			03-27-79	17.28	171
16603700 Kalialinui Gulch tributary nr Pukalani	Lat 20°49′02″, long 156°19′44″, at Lower Kula Road and 1.4 mi south of Pukalani.	1.17	1967-98	11-02-97	<2.12	<30	01-09-80	7.35	414
16603800 Kaluapulani Gulch tributary nr Pukalani	Lat 20°48′52″, long 156°18′32″, at Haleakala Highway, 1.5 mi west of Olinda Prison Camp and 2.3 mi southeast of Pukalani.	0.45	1963-98	11-02-97	<1.21	<14	07-23-64	9.90	306
16603850 Kalialinui Gulch nr Kahului	Lat 20°52′47″, long 156°26′06″, 600 ft upstream from Hansen Road, 0.5 mi northeast of Puunene Hospital and 2.5 mi southeast of Kahului Post Office.	17.9	1967-98	10-08-97	4.77	149	01-28-71	8.33	1,330
16607000 Iao Str at Wailuku	Lat 20°53′38″, long 156°30′27″, 560 ft upstream from Market Street bridge at Wailuku and 1.9 mi upstream from mouth.	8.24	1951≠, 1952-98	11-25-97	2.88	734	12-03-50	6.21	7,540
16616500 Unnamed gulch at Maluhia Camp	Lat 20°57′26″, long 156°31′41″, at Kahekili Highway, 0.6 mi east of Maluhia Camp and 1.8 mi northwest of Waihee.	0.12	1964-98	No flow.			01-12-75	7.29	e97
16619700 Poelua Gulch nr Kahakuloa	Lat 21°00′58″, long 156°34′58″, at Highway 30 (bypass), 1.3 mi southeast of Nakalele Point lighthouse and 2.2 mi northwest of Kahakuloa.	1.18	1965-98	11-25-97	4.66	67	03-16-68	15.22	1,760
16630200 Honokowai Str at Honokowai	Lat 20°56′58″, long 156°41′07″, 0.5 mi southeast of Honokowai and 1.1 mi northwest of Puukolii.	5.59	1962-63, 1965-98	11-25-97	3.27	e280	08-01-82	11.0	4,520
16638500 Kahoma Str at Lahaina	Lat 20°53′12″, long 156°40′36″, 0.2 mi west of Kelawea, 0.6 mi northeast of Lahaina, 0.6 mi downstream from Kanaha Str and 0.9 mi upstream from mouth.	5.22	1963-89≠ 1990-98	05-01-98	-	unknown	07-11-65	11.03	2,490

≠ Operated as a continuous-record gaging station
< Actual value is known to be less than the value shown
e Estimated

000240

1999

Annual maximum discharge at crest-stage partial-record stations during water year 1999--Continued

Station name and number	Location	Drainage area (mi^2)	Period of record	Water year 1999 maximum			Period of record max		
				Date	Gage height (ft)	Discharge (ft^3/s)	Date	Gage height (ft)	Discharge (ft^3/s)
			Island of Maui						
16500100 Kepuni Gulch nr Kahikinui House	Lat 20°37'21", long 156°15'16", on right bank 120 ft upstream from bridge on Highway 31, 400 ft upstream from Kamole Gulch, 1.1 mi east of Kahikinui House, and 8.5 mi west of Kaupo.	1.91	1963-72≠, 1973-99	No flow.			09-18-94	13.68	2,320
16500300 Hawelewele Gulch nr Kaupo	Lat 20°38'01", long 156°11'08", 700 ft upstream from Piilani Highway 31 and 3.9 mi west of Kaupo.	11.3	1967-99	11-04-99	<6.43	<600	01-08-80	15.10	13,600
16500800 Kukuiula Gulch nr Kipahulu	Lat 20°39'18", long 156°04'44", at Highway 31, 1.3 mi west of Kipahulu, and 3.2 mi east of Kaupo.	0.76	1963-68≠, 1969-99	01-31-99	<4.50	<270	03-31-82	13.76	5,950
16502400 Pukuilua Gulch nr Hana	Lat 20°42'00", long 156°00'14", at Highway 31, 0.4 mi southwest of Puuiki and 4.0 mi south of Hana.	0.48	1963-99	01-31-99	3.72	180	01-23-65	9.30	788
16502800 Moomoonui Gulch at Hana	Lat 20°44'37", long 155°59'18", at Highway 31 just downstream from Moomooiki Gulch and 1.0 mi south of Hana.	0.90	1963-99	01-31-99	14.34	1,900	11-26-92	14.71	2,480
16502900 Kawaipapa Gulch at Hana	Lat 20°46'08", long 156°00'04", 1,000 ft upstream from Highway 36 and 0.3 mi northwest of Hana Hospital.	5.83	1965-99	01-31-99	10.74	12,400	08-01-82	11.03	16,880
16603300 Unnamed gulch at Maliko Bay	Lat 20°56'26", long 156°21'04", at Hana Highway, 0.5 mi west of Maliko Bay and 1.3 mi north of Hamakuapoko.	0.43	1963-99	No flow.			03-27-79	17.28	171
16603700 Kalialinui Gulch tributary nr Pukalani	Lat 20°49'02", long 156°19'44", at Lower Kula Road and 1.4 mi south of Pukalani.	1.17	1967-99	No flow.			01-09-80	7.35	414
16603800 Kaluapulani Gulch tributary nr Pukalani	Lat 20°48'52", long 156°18'32", at Haleakala Highway, 1.5 mi west of Olinda Prison Camp and 2.3 mi southeast of Pukalani.	0.45	1963-99	No flow.			07-23-64	9.90	306
16603850 Kalialinui Gulch nr Kahului	Lat 20°52'47", long 156°26'06", 600 ft upstream from Hansen Road, 0.5 mi northeast of Puunene Hospital and 2.5 mi southeast of Kahului Post Office.	17.9	1967-99	No flow.			01-28-71	8.33	1,330
16607000 Iao Str at Wailuku	Lat 20°53'38", long 156°30'27", 560 ft upstream from Market Street bridge at Wailuku and 1.9 mi upstream from mouth.	8.24	1951≠, 1952-99	02-19-99	4.30	2,260	12-03-50	6.21	7,540
16616500 Unnamed gulch at Maluhia Camp	Lat 20°57'26", long 156°31'41", at Kahekili Highway, 0.6 mi east of Maluhia Camp and 1.8 mi northwest of Waihee.	0.12	1964-99	No flow.			01-12-75	7.29	e97

≠ Operated as a continuous-record gaging station
< Actual value is known to be less than the value shown
e Estimated

000241

USGS
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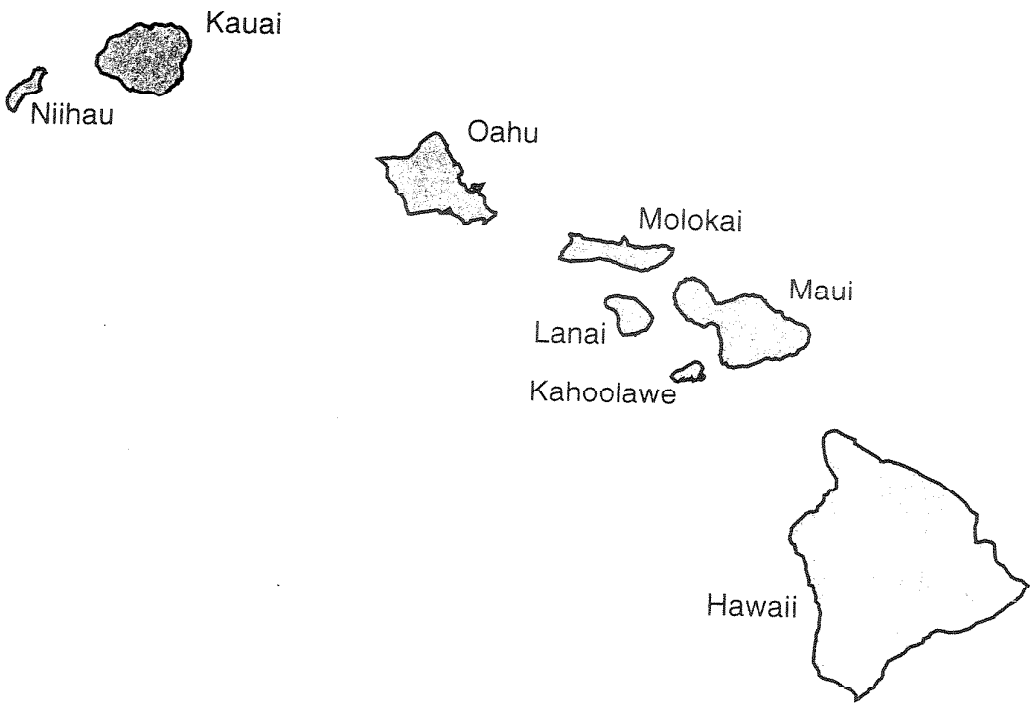
Water Resources Data Hawaii and other Pacific Areas Water Year 2000

Volume 1. Hawaii

Water-Data Report HI-00-1



U.S. Department of the Interior
U.S. Geological Survey

Prepared in cooperation with the State of Hawaii Department of Land and Natural Resources, Commission on Water Resource Management and with other agencies

000242

HAWAII, ISLAND OF MAUI

16604500 IAO STREAM AT KEPANIWAI PARK, NEAR WAILUKU

LOCATION.--Lat 20°53'08", long 156°32'32", Hydrologic Unit 20020000, on left bank of Maniania and Waikapu Ditch intake, 0.3 mi upstream from Kepaniwai Park, 0.5 mi downstream from Iao Valley State Park, and 2.3 mi west of Wailuku Post Office.

DRAINAGE AREA.--5.98 mi^2.

PERIOD OF RECORD.--May 1983 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 780 ft above mean sea level (from topographic map).

REMARKS.--Records computed by Clayton Yoshida. Records fair except for estimated days and discharges above 200 ft^3/s, which are poor. No appreciable diversion upstream of station.

AVERAGE DISCHARGE.--17 years (water years 1984-2000), 65.1 ft^3/s (47,160 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge 6,260 ft^3/s, January 28, 1988, gage height, 9.0 ft, from rating curve extended above 181 ft^3/s on basis of slope-area measurements at gage heights 6.48 ft and 9.0 ft; minimum, 11 ft^3/s for several days in October and November 1984, May 1996, several days in October and November 1996.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum discharge known, 7,540 ft^3/s, December 3, 1950, from rating curve based on model study of site 2.3 mi downstream.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,000 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Jan. 21	2030	*620	*3.10				

Minimum discharge, 15 ft^3/s, October 19, September 26.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1999 TO SEPTEMBER 2000
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	20	24	104	20	57	31	e350	e22	21	21	29	48
2	18	28	49	19	27	25	e100	e25	20	18	28	35
3	18	22	130	18	24	22	e30	35	20	37	27	30
4	23	24	95	17	23	22	e28	22	20	21	80	28
5	39	22	82	17	22	21	e29	22	18	21	47	26
6	36	22	49	22	21	31	e27	21	17	53	30	99
7	38	44	81	21	21	27	e23	21	16	21	27	238
8	22	46	93	30	24	21	e70	20	17	19	23	133
9	21	55	113	40	22	19	e95	20	17	19	30	62
10	20	31	192	24	21	19	e110	20	49	65	33	83
11	20	24	153	33	21	19	e50	23	26	35	20	121
12	20	58	123	83	20	18	e40	30	22	22	16	100
13	37	26	85	110	20	17	e32	98	42	20	16	74
14	23	25	54	129	19	17	e32	31	37	53	17	43
15	20	28	42	e260	18	17	e27	23	23	116	30	29
16	20	26	37	e370	18	19	e24	21	62	48	43	24
17	19	23	34	e215	18	17	e36	20	53	118	127	33
18	19	23	74	e390	29	17	e38	19	53	50	46	42
19	16	80	33	e300	29	17	e30	20	27	42	95	29
20	17	79	27	e400	20	18	e26	20	39	107	105	23
21	19	42	24	e300	21	18	28	24	34	57	47	20
22	17	44	29	204	37	33	29	23	36	33	58	20
23	22	30	26	95	21	31	28	20	33	30	182	18
24	91	25	24	64	20	23	79	18	27	28	147	18
25	105	23	23	49	27	28	36	17	24	63	62	17
26	33	22	41	42	32	62	71	18	30	31	68	16
27	26	22	29	38	23	88	125	21	23	96	205	155
28	24	22	25	32	21	35	e40	21	31	34	97	74
29	26	54	23	29	20	39	e32	20	25	44	58	32
30	25	107	23	28	---	23	e28	22	31	32	93	24
31	38	---	22	27	---	e200		33	---	35	92	---
TOTAL	892	1101	1939	3426	696	994	1693	760	893	1389	1978	1694
MEAN	28.8	36.7	62.5	111	24.0	32.1	56.4	24.5	29.8	44.8	63.8	56.5
MAX	105	107	192	400	57	200	350	98	62	118	205	238
MIN	16	22	22	17	18	17	23	17	16	18	16	16
AC-FT	1770	2180	3850	6800	1380	1970	3360	1510	1770	2760	3920	3360

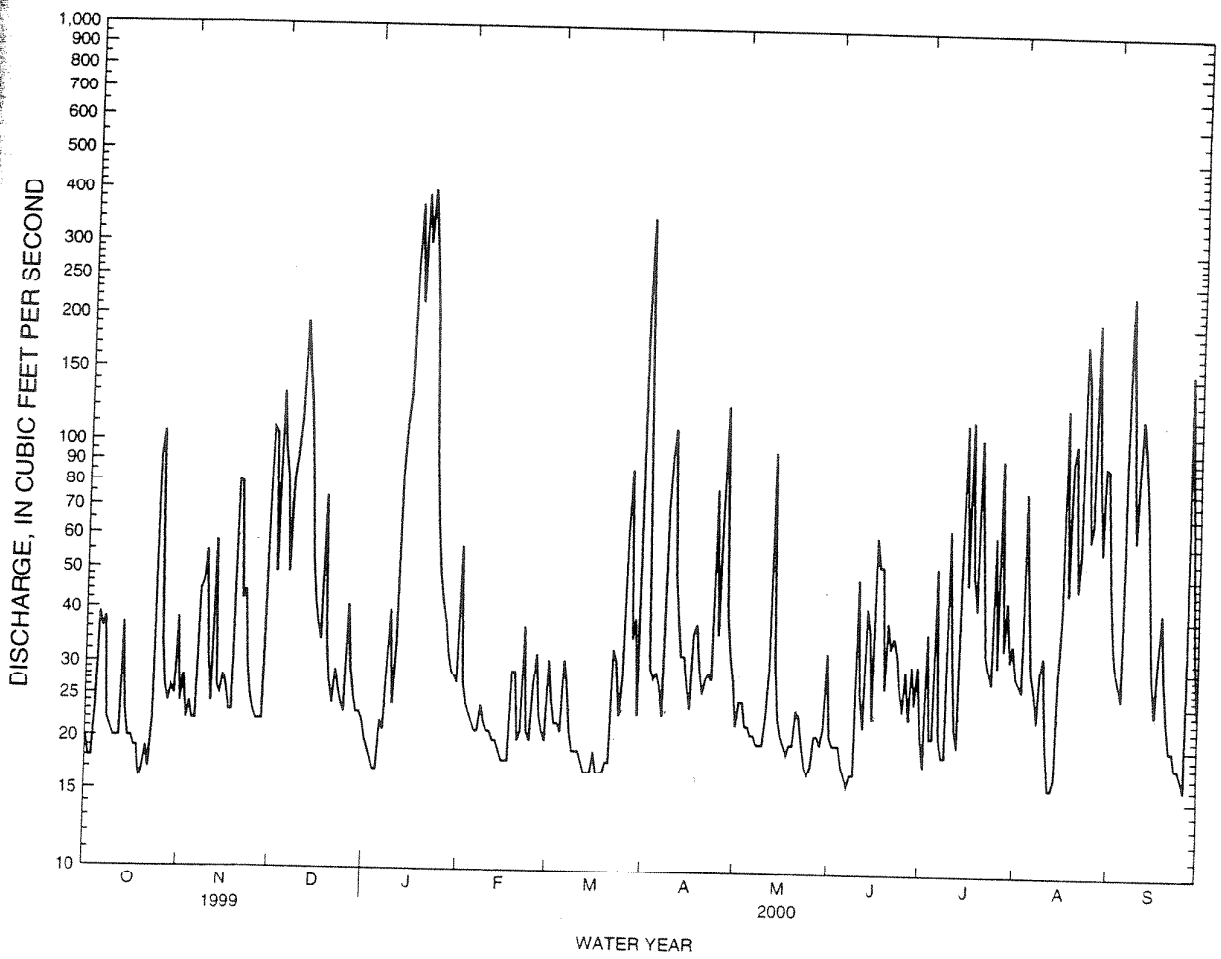
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1983 - 2000, BY WATER YEAR (WY)

MEAN	51.1	68.7	65.3	70.3	56.6	78.7	84.7	63.1	58.5	70.3	60.3	48.9
MAX	103	132	103	149	108	176	230	136	110	137	97.0	133
(WY)	1984	1998	1997	1988	1994	1994	1989	1987	1998	1994	1993	1992
MIN	11.9	20.5	18.3	25.4	24.0	23.6	20.8	23.4	24.4	25.2	26.0	15.8
(WY)	1985	1985	1985	1985	2000	1998	1992	1999	1985	1984	1984	1984

e Estimated

16604500 IAO STREAM AT KEPANIWAI PARK, NEAR WAILUKU--Continued

SUMMARY STATISTICS	FOR 1999 CALENDAR YEAR		FOR 2000 WATER YEAR		WATER YEARS 1983 - 2000	
ANNUAL TOTAL	18353		17455			
ANNUAL MEAN	50.3		47.7		65.1	
HIGHEST ANNUAL MEAN					93.4	1994
LOWEST ANNUAL MEAN					41.4	1985
HIGHEST DAILY MEAN	317	Mar 21	400	Jan 20	913	Apr 10 1986
LOWEST DAILY MEAN	16	Oct 19	16	Oct 19	11	Oct 7 1984
ANNUAL SEVEN-DAY MINIMUM	18	Oct 16	17	Mar 13	11	Oct 16 1984
ANNUAL RUNOFF (AC-FT)	36400		34620		47160	
10 PERCENT EXCEEDS	106		99		133	
50 PERCENT EXCEEDS	29		28		41	
90 PERCENT EXCEEDS	20		19		20	



000244

HAWAII, ISLAND OF MAUI

16614000 WAIHEE RIVER AT DAM NEAR WAIHEE

LOCATION.--Lat 20°56'21", long 156°32'59", Hydrologic Unit 20020000, on right bank at dam 8 ft upstream from the abandoned Waihee canal intake, 2.6 mi southwest from Waihee Point, and 4.4 mi northwest from Wailuku Post Office.

DRAINAGE AREA.--4.20 mi^2.

PERIOD OF RECORD.--November 1910 to December 1913, November 1983 to current year. Low-flow records not equivalent prior to December 31, 1913, due to Waihee canal diverted water upstream.

GAGE.--Water-stage recorder. Elevation of gage is 605 ft above mean sea level (from topographic map).

REMARKS.--Records computed by Matt Wong. Records fair. No diversion upstream of station.

AVERAGE DISCHARGE.--16 years (water years 1985-2000), 79.0 ft^3/s (57,220 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 9,660 ft^3/s, January 28, 1988, gage height, 8.95 ft, from rating curve extended above 280 ft^3/s on basis of slope-area measurements at gage heights 6.70 ft and 8.95 ft; minimum, 14 ft^3/s, July 13, 1995.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,000 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Aug. 27	0630	*3,470	*5.98	No other peak greater than base discharge.			

Minimum discharge, 32 ft^3/s, on many days.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1999 TO SEPTEMBER 2000
DAILY MEAN VALUES

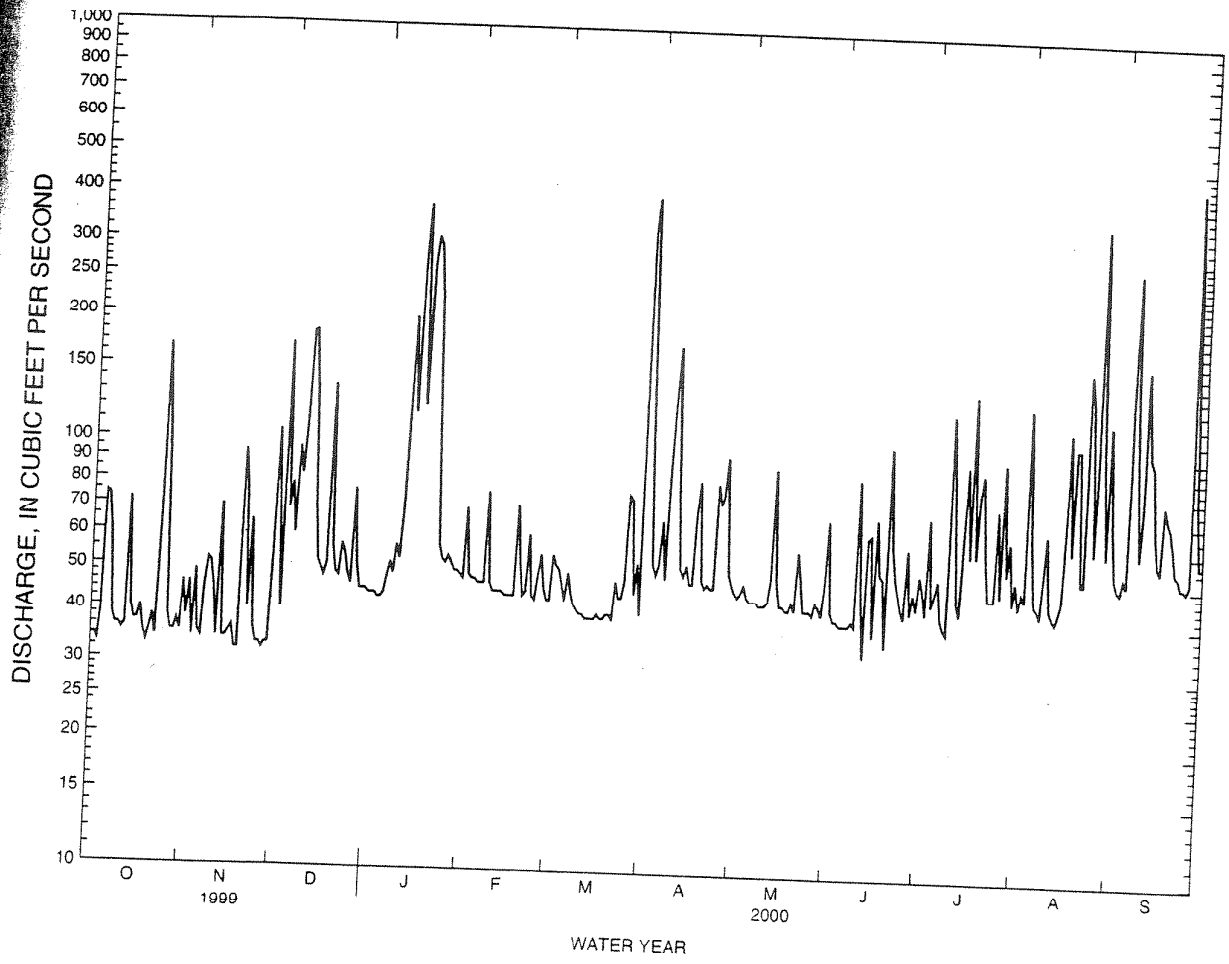
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	34	38	68	44	70	55	399	45	42	48	44	53
2	34	46	40	44	49	52	105	46	40	42	48	50
3	33	34	170	43	48	51	53	48	40	71	46	49
4	38	49	69	43	48	47	50	45	39	44	131	53
5	74	35	79	44	47	43	53	44	39	47	63	51
6	73	34	60	48	47	50	67	44	39	51	45	138
7	60	45	96	52	47	45	49	44	39	41	44	284
8	38	52	83	49	77	42	91	43	40	39	42	93
9	36	51	112	57	47	41	133	43	39	38	52	59
10	36	45	181	53	45	40	175	43	87	125	66	77
11	35	34	182	69	45	40	80	44	48	83	44	167
12	36	70	132	116	45	39	52	50	33	45	42	103
13	72	34	70	198	45	39	50	91	63	42	41	98
14	40	34	52	117	44	39	53	49	64	64	43	67
15	37	35	50	267	44	39	48	43	37	95	46	57
16	37	36	48	372	44	40	48	43	70	58	67	55
17	40	32	51	123	44	39	70	42	52	141	116	79
18	35	32	136	265	72	39	84	42	51	58	60	73
19	33	94	56	310	53	40	49	44	35	81	106	70
20	35	77	49	296	44	40	47	42	104	91	106	63
21	38	40	48	221	45	39	48	58	60	57	51	55
22	34	64	57	106	61	48	47	50	51	46	51	54
23	61	36	54	57	44	44	47	42	47	46	162	51
24	167	33	48	53	43	44	83	42	43	46	136	51
25	106	33	46	52	49	48	74	42	41	75	60	50
26	38	32	77	54	55	77	78	41	60	47	102	52
27	35	33	51	52	46	75	96	44	42	97	360	453
28	35	33	45	50	43	45	51	43	47	53	95	80
29	37	52	45	50	43	53	48	41	43	63	59	57
30	35	105	45	49	---	40	46	49	52	45	121	57
31	46	---	44	48	---	325	---	69	---	51	69	---
TOTAL	1488	1368	2344	3402	1434	1698	2374	1456	1487	1930	2510	2699
MEAN	48.0	45.6	75.6	110	49.4	54.8	79.1	47.0	49.6	62.3	81.2	90.0
MAX	167	105	182	372	77	325	399	91	104	141	360	453
MIN	33	32	40	43	43	39	46	41	33	38	41	49
AC-FT	2950	2710	4650	6750	2840	3370	4710	2890	2950	3830	4990	5350

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1904 - 2000, BY WATER YEAR (WY)

MEAN	67.4	82.3	73.1	77.3	67.1	89.1	92.3	77.1	72.5	87.3	76.1	72.0
MAX	91.7	150	109	186	106	179	276	143	118	136	99.6	160
(WY)	1986	1991	1988	1988	1988	1994	1989	1987	1987	1994	1991	1992
MIN	27.4	36.8	31.3	29.4	42.2	43.7	36.6	41.5	43.4	54.8	46.1	32.9
(WY)	1985	1985	1985	1985	1993	1992	1992	1996	1984	1984	1984	1984

14000 WAIHEE RIVER AT DAM NEAR WAIHEE--Continued

SUMMARY STATISTICS	FOR 1999 CALENDAR YEAR		FOR 2000 WATER YEAR		WATER YEARS 1984 - 2000	
ANNUAL TOTAL	23661		24198			
ANNUAL MEAN	64.8		66.1		79.0	
HIGHEST ANNUAL MEAN					106	1994
LOWEST ANNUAL MEAN					57.5	1985
HIGHEST DAILY MEAN	467	Feb 19	453	Sep 27	1160	Jan 28 1988
LOWEST DAILY MEAN	32	Nov 17	32	Nov 17	22	Jan 18 1985
ANNUAL SEVEN-DAY MINIMUM	34	Sep 27	36	Oct 16	23	Jan 18 1985
ANNUAL RUNOFF (AC-FT)	46930		48000		57220	
10 PERCENT EXCEEDS	110		106		132	
50 PERCENT EXCEEDS	49		49		55	
90 PERCENT EXCEEDS	36		38		38	



000246

2000

As the number of streams on which streamflow information is likely to be desired far exceeds the number of continuous-record ... gaging stations feasible to operate at one time, the Geological Survey collects limited streamflow data at sites other than continuou... stream-gaging stations. When limited streamflow data are collected on a systematic basis over a period of years for use in hydrologic ... analyses, the site at which the data are collected is called a partial-record station. Data collected at these partial-record stations are usable in low-flow or flood-flow analyses, depending on the type of data collected. In addition, discharge measurements are made at other sites not included in the partial-record program. These measurements are generally made in times of drought or flood to give better areal coverage of these events. Those measurements and others collected for some special reason are called measurements at miscellaneous sites.

Records collected at partial-record stations are presented in three tables. The first is a table of annual maximum stage and discharge ... crest-stage stations, the second is a table of discharge measurements at low-flow partial-record stations, and the third is a table of discharge measurements at miscellaneous sites.

Crest-Stage Partial-Record Stations

Prior to 1973, crest-stage partial-record station records for the State of Hawaii were published in an annual progress report entitled "... Investigation of Floods in Hawaii." The following table contains annual maximum discharge for crest-stage stations. A crest-stage gage ... device which will register the peak stage occurring between inspections of the gage. A stage-discharge relation for each gage is developed ... from discharge measurements made by indirect measurements of peak flow or by current meter. The date of the maximum discharge is not always certain, but is usually determined by comparison with nearby continuous-record stations, weather records, or local inquiry. Only the maximum discharge for each water year is given. Information on some lower floods may have been obtained for purposes of establishing the stage-discharge relation, but these are not published herein. The years given in the period of record represent water years for which the annual maximum has been determined.

Revised annual maximum discharge at crest-stage partial-record stations during water years 1998-99

Station name and number	Location	Drainage area (mi^2)	Period of record	Water year maximum			Period of record max...		
				Date	Gage height (ft)	Dis-charge (ft^3/s)	Date	Gage height (ft)	Dis-charge (ft^3/s)
			Island of Maui						
16619700 Poelua Gulch nr Kahakuloa	Lat 21°00′58″, long 156°34′58″, at Highway 30 (bypass), 1.3 mi southeast of Nakalele Point lighthouse and 2.2 mi northwest of Kahakuloa.	1.18	1965-1999	02-20-99	6.33	126	03-16-68	15.22	1,760
16630200 Honokowai Str at Honokowai	Lat 20°56′58″, long 156°41′07″, 0.5 mi southeast of Honokowai and 1.1 mi northwest of Puukolii.	5.59	1962-63, 1965-1998	11-25-97	3.27	154	08-01-82	11.0	4,520

e Estimated
< Actual value is known to be less than the value shown

000247

Annual maximum discharge at crest-stage partial-record stations during water year 2000--Continued

Station name and number	Location	Drainage area (mi^2)	Period of record	Water year 2000 maximum			Period of record max		
				Date	Gage height (ft)	Discharge (ft^3/s)	Date	Gage height (ft)	Discharge (ft^3/s)
			Island of Maui--Continued						
16603850 Kalialinui Gulch nr Kahului	Lat 20°52′47″, long 156°26′06″, 600 ft upstream from Hansen Road, 0.5 mi northeast of Puunene Hospital and 2.5 mi southeast of Kahului Post Office.	17.9	1967-2000	No flow.			01-28-71	8.33	1,330
16607000 Iao Str at Wailuku	Lat 20°53′38″, long 156°30′27″, 560 ft upstream from Market Street bridge at Wailuku and 1.9 mi upstream from mouth.	8.24	1951≠, 1952-2000	04-01-00	3.86	1,690	12-03-50	6.21	7,540
16616500 Unnamed gulch at Maluhia Camp	Lat 20°57′26″, long 156°31′41″, at Kahekili Highway, 0.6 mi east of Maluhia Camp and 1.8 mi northwest of Waihee.	0.12	1964-2000	No flow.			01-12-75	7.29	e97
16619700 Poelua Gulch nr Kahakuloa	Lat 21°00′58″, long 156°34′58″, at Highway 30 (bypass), 1.3 mi southeast of Nakalele Point lighthouse and 2.2 mi northwest of Kahakuloa.	1.18	1965-2000	01-19-00	5.31	78	03-16-68	15.22	1,760
16630200 Honokowai Str at Honokowai	Lat 20°56′58″, long 156°41′07″, 0.5 mi southeast of Honokowai and 1.1 mi northwest of Puukolii.	5.59	1962-63, 1965-2000	12-03-99	3.80	216	08-01-82	11.0	4,520
16638500 Kahoma Str at Lahaina	Lat 20°53′12″, long 156°40′36″, 0.2 mi west of Kelawea, 0.6 mi northeast of Lahaina, 0.6 mi downstream from Kanaha Str and 0.9 mi upstream from mouth.	5.22	1963-89≠ 1990-2000	08-20-00	-	unknown	07-11-65	11.03	2,490
16643300 Kauaula Str nr mouth, nr Lahaina	Lat 20°52′09″, long 156°39′43″, 0.7 mi upstream from Honoapiilani Highway (bypass) and 1.3 mi southeast of Lahaina Lighthouse.	4.12	1960,1962, 1964-2000	08-27-00	<2.88	<137	05-13-60	7.9	2,660
16646200 Olowalu Str at Olowalu	Lat 20°49′23″, long 156°37′15″, on downstream side of center pier of plantation road bridge, 0.6 mi northeast of Olowalu, and 5.5 mi southeast of Lahaina.	4.08	1962-72≠, 1973-2000	12-03-99	3.29	252	03-24-67	5.40	1,300
16647500 Malalowaiaole Gulch nr Maalaea	Lat 20°46′56″, long 156°31′32″, at Honoapiilani Highway, 200 ft upstream from mouth, 0.2 mi north of McGregor Point, and 1.2 mi southwest of Maalaea.	0.64	1964-2000	12-26-99	<3.14	<3	01-10-80	12.95	350
16658500 Waiakoa Gulch tributary nr Waiakoa	Lat 20°44′56″, long 156°19′22″, at Upper Kula Road, 1.0 mi southeast of Waiakoa, and 1.0 mi northeast of junction of Lower and Upper Kula Roads.	0.98	1964-2000	No flow.			01-28-71	8.23	409
16659000 Waiakoa Gulch at Kihei	Lat 20°47′14″, long 156°27′41″, 0.3 mi northeast of Kihei and 0.4 mi upstream from mouth.	10.1	1963-2000	No flow.		<34	01-28-71	9.66	1,560
16660000 Kulanihakoi Gulch nr Kihei	Lat 20°46′06″, long 156°27′03″, on right bank 0.5 mi northeast of Lihue Cemetery, 0.8 mi upstream from mouth, and 1.3 mi southeast of Kihei.	14.4	1963-70≠, 1971-2000	No flow.			01-28-71	9.40	4,460

≠ Operated as a continuous-record gaging station
< Actual value is known to be less than the value shown

2001

Annual maximum discharge at crest-stage partial-record stations during water year 2001--Continued

Station name and number	Location	Drainage area (mi^2)	Period of record	Water year 2001 maximum			Period of record max.		
				Date	Gage height (ft)	Discharge (ft^3/s)	Date	Gage height (ft)	Discharge (ft^3/s)
Island of Maui--Continued									
16500800 Kukuiula Gulch nr Kipahulu	Lat 20°39′18″, long 156°04′44″, at Highway 31, 1.3 mi west of Kipahulu, and 3.2 mi east of Kaupo.	0.76	1963-68≠, 1969-2001	10-29-00	7.76	920	03-31-82	13.76	5,950
16502400 Pukuilua Gulch nr Hana	Lat 20°42′00″, long 156°00′14″, at Highway 31, 0.4 mi southwest of Puuiki and 4.0 mi south of Hana.	0.48	1963-2001	10-29-00	9.02	756	01-23-65	9.30	788
16502800 Moomoonui Gulch at Hana	Lat 20°44′37″, long 155°59′18″, at Highway 31 just downstream from Moomooiki Gulch and 1.0 mi south of Hana.	0.90	1963-2001	10-29-00	15.64	2,950	10-29-00	15.64	2,950
16502900 Kawaipapa Gulch at Hana	Lat 20°46′08″, long 156°00′04″, 1,000 ft upstream from Highway 36 and 0.3 mi northwest of Hana Hospital.	5.83	1965-2001	10-29-00	14.53	e22,200	10-29-00	14.53	e22,200
16603300 Unnamed gulch at Maliko Bay	Lat 20°56′26″, long 156°21′04″, at Hana Highway, 0.5 mi west of Maliko Bay and 1.3 mi north of Hamakuapoko.	0.43	1963-2001	No flow.			03-27-79	17.28	171
16603700 Kalialinui Gulch tributary nr Pukalani	Lat 20°49′02″, long 156°19′44″, at Lower Kula Road and 1.4 mi south of Pukalani.	1.17	1967-2001	11-03-00	e2.91	e59.0	01-09-80	7.35	414
16603800 Kaluapulani Gulch tributary nr Pukalani	Lat 20°48′52″, long 156°18′32″, at Haleakala Highway, 1.5 mi west of Olinda Prison Camp and 2.3 mi southeast of Pukalani.	0.45	1963-2001	11-03-00	2.78	74.2	07-23-64	9.90	306
16603850 Kalialinui Gulch nr Kahului	Lat 20°52′47″, long 156°26′06″, 600 ft upstream from Hansen Road, 0.5 mi northeast of Puunene Hospital and 2.5 mi southeast of Kahului Post Office.	17.9	1967-2001	No flow.			01-28-71	8.33	1,330
16607000 Iao Str at Wailuku	Lat 20°53′38″, long 156°30′27″, 560 ft upstream from Market Street bridge at Wailuku and 1.9 mi upstream from mouth.	8.24	1951≠, 1952-2001	10-28-00	4.06	1,930	12-03-50	6.21	7,540
16616500 Unnamed gulch at Maluhia Camp	Lat 20°57′26″, long 156°31′41″, at Kahekili Highway, 0.6 mi east of Maluhia Camp and 1.8 mi northwest of Waihee.	0.12	1964-2001	No flow.			01-12-75	7.29	e97
16619700 Poelua Gulch nr Kahakuloa	Lat 21°00′58″, long 156°34′58″, at Highway 30 (bypass), 1.3 mi southeast of Nakalele Point lighthouse and 2.2 mi northwest of Kahakuloa.	1.18	1965-2001	02-08-01	4.56	55.0	03-16-68	15.22	1,760
16630200 Honokowai Str at Honokowai	Lat 20°56′58″, long 156°41′07″, 0.5 mi southeast of Honokowai and 1.1 mi northwest of Puukolii.	5.59	1962-63, 1965-2001	10-28-00	3.79	215	08-01-82	11.0	4,520

≠ Operated as a continuous-record gaging station
e Estimated
r 16619700 peak gage height and discharge published for water year 1999 were revised in water-resources data report for Hawaii, water year 2000
r 16630200 peak gage height and discharge published for water years 1997 were revised in water-resources data report for Hawaii, water year 2000