OTHER USGS STREAM FLOW DATA FOR WAIKAPŪ

EXHIBIT 12

DEPARTMENT OF THE INTERIOR
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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

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1913

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Daily discharge, in second-feet, of Maniania ditch near Wailuku, for 1910–11—Continued.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1911.												
1	10	13	16	19	22	14	21	22	26	10	21	28
2	11	13	16	16	21	21	19	25	26	10	20	26
3	16	16	16	19	23	20	21	23	26	16	20	22
4	16	16	16	19	23	15	17	26	26	16	20	24
5	17	14	14	18	23	19	21	25	24	12	19	24
6	16	17	21	18	22	19	22	21	26	19	21	24
7	16	16	19	18	20	20	22	22	26	19	20	23
8	10	16	19	17	22	20	23	23	26	16	22	27
9	10	16	20	16	22	20	17	26	26	22	21	24
10	12	11	21	16	16	19	23	25	24	23	20	22
11	15	10	21	17	16	16	22	25	24	24	20	22
12	15	10	19	20	16	19	22	26	25	24	19	22
13	16	13	19	17	16	19	23	17	24	24	23	24
14	16	19	19	17	16	20	23	26	26	25	26	29
15	16	19	19	16	16	19	23	25	26	23	26	29
16	16	21	19	17	20	20	16	26	26	26	26	29
17	14	21	21	23	22	19	22	26	23	26	27	29
18	14	21	21	23	22	17	24	26	24	26	26	32
19	13	19	15	23	22	21	24	22	27	26	23	32
20	13	20	16	22	22	21	23	23	24	23	25	22
21	13	20	16	22	18	21	24	26	24	23	26	25
22	10	20	16	22	22	21	24	26	26	22	26	25
23	13	20	19	19	22	21	19	26	24	22	26	25
24	13	19	20	21	22	19	23	26	24	22	27	16
25	13	12	23	20	22	17	22	25	25	22	26	24
26	13	12	19	21	22	21	22	25	25	22	23	24
27	13	12	20	21	22	20	22	23	25	22	26	25
28	13	12	19	21	19	20	21	26	24	22	27	28
29	10	.....	23	21	20	20	21	26	24	20	29	32
30	13	.....	23	19	12	21	20	26	17	21	29	27
31	13	.....	19	.....	12	.....	21	26	.....	21	.....	14

NOTE.—Daily discharge Nov. 14 to Nov. 25, 1910, computed by indirect method for shifting channels. From Nov. 26, 1910, to Dec. 31, 1911, daily discharge computed from a rating curve well defined between 15 and 35 second-feet.

Monthly discharge of Maniania ditch near Wailuku, Maui, for 1910–11.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
1910.					
November 14–30	32	15	22.1	745	B.
December	24	7	18.2	1,120	A.
1911.					
January	17	10	13.5	830	A.
February	21	10	16.0	889	A.
March	23	14	18.8	1,160	A.
April	23	16	19.3	1,150	A.
May	23	12	19.8	1,220	A.
June	21	14	19.3	1,150	A.
July	24	16	21.5	1,320	A.
August	26	17	24.5	1,510	A.
September	27	17	24.8	1,480	A.
October	26	10	20.9	1,290	A.
November	29	19	23.7	1,410	A.
December	32	14	25.1	1,540	A.
The year	32	10	20.6	14,900	

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WAIKAPU STREAM BASIN.

GENERAL FEATURES.

The Waikapu basin is on the southeast slope of West Maui, south of Iao basin. It is a narrow, deep basin extending well back into the heart of the mountains and there receives a heavy rainfall. The stream is tributary to Maalaea Bay on the south side of the isthmus, but only storm water ever reaches the sea.

Several development tunnels have been driven into the mountain side to increase the water supply. Water is diverted through several ditches at various elevations, the largest of which is the Upper or South Side ditch. Gaging stations have been placed on the main stream and on the upper ditches on each side.

WAIKAPU STREAM NEAR WAIKAPU, MAUI.

A gaging station was established November 25, 1910, on Waikapu Stream at a point about 2 miles above Waikapu and about 5 miles south of Wailuku. The station is below the intakes of South Side and Palolo ditches.

A staff gage, graduated in tenths of feet, is fastened on the right bank about 200 feet below the trail crossing and is used to obtain gage heights.

The discharge at this station gives the flow of the stream below the South Side and Palolo ditches.

Discharge measurements of Waikapu Stream near Waikapu, Maui, in 1910–11.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
1910.		*Feet.*	*Sq. ft.*	*Feet.*	*Sec.-ft*
Nov. 25	C. H. Pierce	4.0	3.8	0.33	0.
Dec. 31	Pierce and Scultz	12.0	15.4	1.45	29.
1911.					
Jan. 5	.....do	12.0	11.8	1.20	15.6
28	Martin and Pierce	13.6	28.5	2.30	126
Mar. 31	C. H. Pierce	12.5	8.2	0.85	7.2
Oct. 10	F. B. Stewart	7.2	4.1	0.65	3.62
Dec. 1	.....do	2.5	.76	.37	.40

NOTE.—Measurements made by wading at various sections.

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Daily gage height, in feet, of Waikapu Stream near Waikapu, Maui, for 1910–11.

[Tanitsu, observer.]

Day.	Dec.	Day.	Dec.	Day.	Dec.
1910.		1910.		1910.	
1	1.49	11	1.15	21	0.52
2	2.52	12	1.18	22	.52
3	1.49	13	1.08	23	.52
4	1.49	14	1.02	24	.60
5	2.05	15	.62	25	.60
6	2.63	16	.58	26	.60
7	1.62	17	.52	27	.60
8	1.42	18	.52	28	.60
9	1.34	19	.52	29	1.05
10	1.32	20	.52	30	1.08
				31	1.75

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1911.												
1	0.95	1.02	1.30	0.78	0.65	0.80	1.35	0.34	0.61	1.35	0.32	0.35
2	.72	1.08	.88	.68	.65	1.31	.92	.40	.69	1.00	.32	.35
3	.72	1.08	.72	.60	.72	1.51	.70	.38	.59	.71	.30	.35
4	1.16	1.08	.72	.60	.65	1.20	.65	.45	.46	.70	.30	.35
5	1.75	1.08	.70	.60	.65	1.28	.62	.45	.44	.52	.30	.35
6	1.06	1.15	.70	.60	.65	1.05	.70	.39	.40	.52	.30	.38
7	.97	1.08	.62	.60	.65	1.19	.68	.38	.64	1.32	.30	.35
8	.85	1.08	.60	.60	.65	1.00	.76	.35	.59	.84	.30	.69
9	.72	1.21	.60	.58	1.38	1.14	.76	.35	.41	.72	.30	.44
10	.88	2.05	.55	.52	1.42	1.49	1.00	.35	.45	.65	.30	.40
11	.82	1.40	.52	.52	1.10	1.05	1.62	.38	1.66	.62	.34	.40
12	.72	1.18	.50	.52	.94	.95	1.31	.41	1.18	.54	.35	.40
13	.72	1.00	.50	.50	.87	1.08	1.14	1.21	.62	.52	.55	.41
14	.72	.95	.50	.50	1.41	1.14	1.14	.60	.48	.51	1.11	.64
15	.65	.85	.50	.50	1.38	.91	.90	.41	.60	.48	.44	.51
16	.62	.85	.50	.50	1.29	1.12	1.38	.45	.45	.48	.48	.55
17	.95	.70	.92	.8	.90	1.09	.79	1.02	.46	.49	.30	.46
18	1.21	.70	.79	.90	.80	.96	.75	.91	.99	.45	.30	.55
19	1.28	.70	.72	.88	.80	1.10	.70	1.32	.58	.41	.32	.44
20	1.22	.62	.62	.88	.75	1.08	.68	.86	1.28	.38	.31	.42
21	1.28	.60	.55	1.1	1.32	1.28	.68	.45	.98	.38	.50	.40
22	1.15	.60	.52	1.1	1.08	1.04	.64	.41	1.32	.44	.51	.40
23	.96	.60	.50	1.3	.90	.91	.62	.39	1.95	.35	.68	.38
24	1.21	1.09	.50	1.2	.79	.78	.58	.92	1.25	.34	.34	.41
25	1.36	1.28	.50	1.2	.74	.94	.55	1.25	1.20	.34	.30	.42
26	1.18	1.19	.50	1.3	.80	.78	.42	1.05	2.20	.38	.30	.40
27	1.25	1.40	.50	1.0	.63	.70	.40	.59	1.21	.34	.36	.40
28	1.48	1.21	.50	.9	.61	.91	.40	.50	1.55	.34	1.05	.40
29	1.26	.....	.50	.8	1.00	.75	.40	1.46	1.16	.32	.41	.38
30	1.08	.....	1.22	.7	1.15	.68	.31	1.22	2.29	.32	.32	.40
31	1.02	.....	1.02	.....	1.01	.....	.30	.74	.....	.31	.....	.38

Daily discharge, in second-feet, of Waikapu Stream near Waikapu, Maui, for 1910–11.

Day.	Dec.	Day.	Dec.	Day.	Dec.
1910.		1910.		1910.	
1	27	11	16	21	1.7
2	158	12	17	22	1.7
3	32	13	13	23	1.7
4	32	14	11	24	2.5
5	90	15	2.8	25	2.5
6	175	16	2.3	26	2.5
7	42	17	1.7	27	2.5
8	28	18	1.7	28	2.5
9	24	19	1.7	29	12
10	23	20	1.7	30	13
				31	53

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Daily discharge, in second-feet, of Waikapu Stream, near Waikapu, Maui, for 1910–11. Continued.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug	Sept.	Oct.	Nov.	Dec
1911.												
1	9.6	12	22	5.6	3.2	6.0	24	0.6	2.6	24	0.5	0.6
2	4.4	13	7.7	3.2	3.2	22	8.7	.9	3.8	11	.5	.6
3	4.4	13	4.4	2.5	4.4	33	4.0	.8	2.4	4.2	.4	.6
4	16	13	4.4	2.5	3.2	18	3.2	1.2	1.3	4.0	.4	.6
5	53	13	4.0	2.5	3.2	21	2.8	1.2	1.1	1.7	.4	.6
6	13	16	4.0	2.5	3.2	13	4.0	.8	.9	1.7	.4	.8
7	10	13	2.8	2.5	3.2	18	3.7	.8	3.1	23	.4	.6
8	7.0	13	2.5	2.5	3.2	11	5.2	.6	2.4	6.9	.4	3.8
9	4.4	18	2.5	2.0	26	15	5.2	.6	1.0	4.4	.4	1.1
10	7.7	89	2.0	1.7	28	33	11	.6	1.2	3.2	.4	.9
11	6.4	27	1.7	1.7	14	13	42	.8	45	2.8	.6	
12	4.4	17	1.5	1.7	9.3	9.6	22	1.0	17	1.9	.6	
13	4.4	11	1.5	1.5	7.4	13	16	18	2.8	1.7	2.0	
14	4.4	9.6	1.5	1.5	28	16	16	2.5	1.4	1.6	14	3.1
15	3.2	7.0	1.5	1.5	26	8.5	8.3	1.0	2.5	1.4	1.1	1.6
16	2.8	7.0	1.5	1.5	22	15	26	1.2	1.2	1.4	1.4	2.0
17	9.6	4.0	8.8	6.2	8.3	14	5.8	12	1.3	1.4	.4	1.3
18	18	4.0	5.8	8.3	6.0	9.9	5.0	8.5	11	1.2	.4	2.0
19	21	4.0	4.4	7.2	6.0	14	4.0	23	2.3	1.0	.5	1.1
20	18	2.8	2.8	6.0	5.0	13	3.7	7.2	21	.8	.4	1.0
21	21	2.5	2.0	14	23	21	3.7	1.2	11	.8	1.5	.9
22	16	2.5	1.7	16	13	12	3.1	1.0	23	1.1	1.6	.9
23	9.9	2.5	1.5	24	8.3	8.5	2.8	.8	76	.6	3.7	.8
24	18	14	1.5	20	5.8	5.6	2.3	8.8	20	.6	.6	1.0
25	25	21	1.5	19	4.8	9.3	2.0	20	18	.6	.4	1.0
26	17	18	1.5	23	6.0	5.6	1.2	12	110	.8	.4	.9
27	20	27	1.5	13	2.8	4.0	.9	2.4	18	.6	.7	.9
28	32	18	1.5	8.5	2.6	8.5	.9	1.5	36	.6	12	.9
29	20	.....	1.5	6.4	11	5.0	.9	30	16	.5	1.0	.8
30	13	.....	19	5.0	13	3.7	.4	19	124	.5	.5	.9
31	12	.....	12	.....	11	.....	.4	4.8	.....	.4	.....	.8

NOTE.—Daily discharge determined from a rating curve well defined below 40 second-feet.

Monthly discharge of Waikapu Stream near Waikapu, Maui, for 1910–11.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Ac... ra...
	Maximum.	Minimum.	Mean.		
December	175	1.7	25.7	1,580	B.
January	53	2.8	13.7	842	A.
February	89	2.5	14.7	816	A.
March	22	1.5	4.27	263	A.
April	24	1.5	7.12	424	A.
May	28	2.6	10.1	621	A.
June	33	3.7	13.3	791	A.
July	42	.4	7.72	475	A.
August	30	.6	5.96	366	A.
September	124	.9	19.2	1,140	B.
October	24	.4	3.43	211	A.
November	14	.4	1.60	95.2	A.
December	3.8	.6	1.09	67.0	A.
The year	124	.4	8.46	6,110	

NOTE.—These estimates do not include water diverted by the South Side and Palolo ditches.

SOUTH SIDE WAIKAPU DITCH NEAR WAIKAPU, MAUI.

The South Side ditch diverts water from Waikapu Stream above the gaging station on the stream. The station was established November 11, 1910, at a point a short distance above the upper Waikapu reservoir and 5 miles south of Wailuku.

A staff gage, graduated in tenths of feet, is fastened to the right bank and is used to obtain gage heights.

Records show the amount of water diverted from the south side of the stream. A part of this water is dropped back into the stream below the gaging station on Waikapu Stream.

Discharge measurements of South Side Waikapu ditch near Waikapu, Maui, in 1910–11.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
1910.		*Feet.*	*Sq. ft.*	*Feet.*	*Sec.-ft.*
Nov. 11	C. H. Pierce	3.5	2.4	0.65	4.81
12	do	3.6	2.4	0.60	4.64
17[a]	do	3.6	2.6	0.65	5.8
Dec. 31	Pierce and Schulz	3.8	3.7	1.02	10.4
1911.					
Mar. 31	C. H. Pierce	3.5	3.0	0.90	8.6
Oct. 10	J. B. Stewart	4.6	3.6	0.85	7.2
Dec. 1	do	4.5	3.0	0.72	5.6

[a] Gage height probably affected by gate.

NOTE.—Measurements made at various sections.

Daily gage height, in feet, of South Side Waikapu ditch near Waikapu, Maui, for 1910–11.

[Tanitsu, observer.]

Day.	Nov.	Dec.	Day.	Nov.	Dec.	Day.	Nov.	Dec.
1910.			1910.			1910.		
1		0.95	11			21	0.6	0.7
2		.9	12			22	.6	.75
3		.85	13			23	.7	.7
4		.9	14			24	.8	.75
5		.9	15		0.8	25	.7	.75
6		1.0	16		.8	26	.65	.7
7		.8	17		.8	27	.65	.7
8			18		.75	28	.65	.7
9			19		.75	29	1.0	.85
10			20		.75	30	.85	.9
						31		.9

Daily gage height, in feet, of South Side Waikapu ditch near Waikapu, Maui, for 1910–11—Continued.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1911.												
1	0.[illegible]	0.6	0.85	0.8	0.8	0.8	0.9	0.85	0.8	0.9	0.8	0.7
2	.[illegible]	.8	.8	.8	.85	.9	.9	.85	.8	.9	.8	.7
3	.[illegible]	.8	.8	.8	.8	.9	.85	.85	.8	.9	.8	.65
4	.[illegible]	.9	.8	.8	.8	.85	.85	.85	.8	.85	.7	.65
5	.9	.9	.8	.8	.8	.9	.85	.8	.8	.8	.7	.65
6	.85	.9	.8	.8	.8	.8	.85	.8	.8	.8	.7	.7
7	.85	.85	.8	.75	.8	.9	.85	.8	.85	.9	.7	.6
8	.85	.85	.8	.75	.8	.85	.9	.8	.9	.85	.7	.85
9	.85	.9	.8	.75	.95	.9	.9	.8	.8	.85	.7	.7
10	.9	.9	.8	.75	1.0	.9	.9	.8	.8	.85	.7	.65
11	.8	.85	.8	.75	.8	.85	.9	.8	.9	.8	.7	
12	.8	.85	.8	.75	.8	.85	.9	.8	.9	.8	.7	
13	.8	.8	.8	.75	.8	.85	.9	.8	.9	.8	.7	
14	.8	.8	.8	.75	.8	.85	.9	.9	.85	.8	.85	.[illegible]
15	.8	.8	.8	.75	.85	.85	.9	.85	.8	.8	.9	.85
16	.8	.8	.8	.75	.8	.85	.85	.8	.8	.8	.75	.8
17	.9	.8	.9	.8	.8	.9	.9	.85	.8	.8	.7	.75
18	.8	.8	.85	.85	.8	.9	.9	.9	.8	.8	.7	.75
19	.7	.8	.85	.9	.8	.85	.85	.85	.9	.8	.7	.9
20	.7	.8	.8	.9	.8	.9	.85	.9	.8	.8	.7	.8
21	.7	.8	.8	.9	.9	.9	.85	.8	.85	.8	.9	.7
22	.7	.8	.8	.8	.95	.9	.85	.8	.9	.8	.9	.7
23	.65	.8	.8	.9	.8	.9	.8	.8	.9	.8	.9	.65
24	.85	.8	.8	.85	.8	.85	.85	.9	.9	.8	.8	.6
25	.7	.8	.8	.65	.8	.9	.8	.9	.9	.8	.8	.65
26	.65	.8	.8	.85	.8	.9	.85	.9	.9	.8	.7	.6
27	.65	.85	.8	.85	.8	.85	.85	.8	.9	.8	.7	.6
28	.8	.85	.8	.8	.8	.9	.85	.8	.9	.8	1.05	.6
29	.65	.....	.8	.8	.9	.9	.85	.9	.9	.8	.95	.6
30	.6	.....	.9	.8	.85	.9	.85	.9	.9	.8	.8	.6
31	.6	.....	.8	.....	.8	.....	.85	.85	.....	.8	.....	.6

Daily discharge, in second-feet, of South Side Waikapu ditch near Waikapu, Maui, for 1910–11.

Day.	Nov.	Dec.	Day.	Nov.	Dec.	Day.	Nov.	Dec.
1910.			1910.			1910.		
1		9.1	11			21	4.5	5.4
2		8.2	12			22	4.5	6.0
3		7.4	13			23	5.4	5.4
4		8.2	14			24	6.7	6.0
5		8.2	15		6.7	25	5.4	6.0
6		10	16		6.7	26	5.0	5.4
7		6.7	17		6.7	27	6.0	5.4
8			18		6.0	28	5.0	5.4
9			19		6.0	29	10	7.4
10			20		6.0	30	7.4	8.2
						31		8.2

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Daily discharge, in second-feet, of South Side Waikapu ditch, near Waikapu, Maui, for 1910–11—Continued.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1911.												
1	5.4	4.5	7.4	6.7	6.7	6.7	8.2	7.4	6.7	8.2	6.7	5.4
2	5.4	6.7	6.7	6.7	7.4	8.2	8.2	7.4	6.7	8.2	6.7	5.4
3	5.4	6.7	6.7	6.7	6.7	8.2	7.4	7.4	6.7	8.2	6.7	5.0
4	5.4	8.2	6.7	6.7	6.7	7.4	7.4	7.4	6.7	7.4	5.4	5.0
5	8.2	8.2	6.7	6.7	6.7	8.2	7.4	6.7	6.7	6.7	5.4	5.0
6	7.4	8.2	6.7	6.7	6.7	6.7	7.4	6.7	6.7	6.7	5.4	5.4
7	9.1	7.4	6.7	6.0	6.7	8.2	7.4	6.7	7.4	8.2	5.4	4.5
8	7.4	7.4	6.7	6.0	6.7	7.4	8.2	6.7	8.2	7.4	5.4	7.4
9	7.4	8.2	6.7	6.0	9.1	8.2	8.2	6.7	6.7	7.4	5.4	5.4
10	8.2	8.2	6.7	6.0	10	8.2	8.2	6.7	6.7	7.4	5.4	5.0
11	6.7	7.4	6.7	6.0	6.7	7.4	8.2	6.7	8.2	6.7	5.4	5.0
12	6.7	7.4	6.7	6.0	6.7	7.4	8.2	6.7	8.2	6.7	5.4	5.0
13	6.7	6.7	6.7	6.0	6.7	7.4	8.2	8.2	7.4	6.7	7.4	5.0
14	6.7	6.7	6.7	6.0	7.4	7.4	8.2	7.4	6.7	6.7	8.2	7.4
15	6.7	6.7	6.7	6.0	7.4	7.4	7.4	6.7	6.7	6.7	6.0	6.7
16	6.7	6.7	6.7	6.0	6.7	7.4	8.2	7.4	6.7	6.7	5.4	6.0
17	8.2	6.7	5.2	6.7	6.7	8.2	8.2	8.2	6.7	6.7	5.4	6.0
18	6.7	6.7	7.4	7.4	6.7	7.4	7.4	7.4	8.2	6.7	5.4	8.2
19	5.4	6.7	7.4	8.2	6.7	8.2	7.4	8.2	6.7	6.7	5.4	6.7
20	5.4	6.7	6.7	8.2	6.7	8.2	7.4	6.7	5.2	6.7	5.4	5.4
21	5.4	6.7	6.7	8.2	8.2	8.2	7.4	6.7	7.4	6.7	8.2	5.4
22	5.4	6.7	6.7	6.7	9.1	8.2	7.4	6.7	8.2	6.7	8.2	5.4
23	5.0	6.7	6.7	8.2	6.7	8.2	6.7	6.7	8.2	6.7	8.2	5.0
24	7.4	6.7	6.7	7.4	6.7	7.4	7.4	8.2	8.2	6.7	6.7	4.5
25	5.4	6.7	6.7	5.0	6.7	8.2	6.7	8.2	8.2	6.7	6.7	5.0
26	5.0	6.7	6.7	7.4	6.7	8.2	7.4	8.2	8.2	6.7	5.4	4.5
27	5.0	7.4	6.7	7.4	6.7	7.4	7.4	6.7	8.2	6.7	5.4	4.5
28	6.7	7.4	6.7	6.7	6.7	8.2	7.4	6.7	8.2	6.7	11	4.5
29	5.0	.....	6.7	6.7	8.2	8.2	7.4	8.2	8.2	6.7	7.4	4.5
30	4.5	.....	8.2	6.7	7.4	8.2	7.4	8.2	8.2	6.7	6.7	4.5
31	4.5	.....	6.7	.....	6.7	.....	7.4	7.4	.....	6.7	.....	4.5

NOTE.—Daily discharge computed from a rating curve well defined between 4 and 10 second-feet. The ditch was not carrying water during the period Dec. 8–14, 1910.

Monthly discharge of South Side Waikapu ditch near Waikapu, Maui, for 1910–11.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
1910.					
November 21–30	10	4.5	5.89	117	A.
December 1–7 and 15–31	10	5.4	6.86	326	A.
1911.					
January	9.1	4.5	6.28	386	A.
February	8.2	4.5	7.04	391	A.
March	8.2	6.7	6.87	422	A.
April	8.2	6.0	6.70	399	A.
May	10	6.7	7.15	440	A.
June	8.2	6.7	7.81	465	A.
July	8.2	6.7	7.63	469	A.
August	8.2	6.7	7.27	447	A.
September	8.2	6.7	7.47	444	A.
October	8.2	6.7	6.98	429	A.
November	11	5.4	6.37	379	A.
December	8.2	4.5	5.39	331	A.
The year	11	4.5	6.91	5,000	

C70073

PALOLO (EVERETT) DITCH NEAR WAIKAPU, MAUI.

Palolo ditch takes water from the north side of Waikapu Stream at a point about 1 mile below the upper South Side ditch.

A gaging station was established on this ditch November 21, 1910, about 200 feet below the intake.

A staff gage, graduated in tenths of feet, is fastened to the left bank and is used to obtain gage heights.

The records at this station show the amount of water diverted on the north side above the gaging station on Waikapu Stream.

Discharge measurements of Palolo ditch near Waikapu, Maui, in 1910–11.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
1910.		*Feet.*	*Sq. ft.*	*Feet.*	*Sec.-ft.*
Nov. 11	C. H. Pierce	3.4	2.3	0.94	3.51
17	....do	3.3	2.2	0.93	4.14
Dec. 31	Pierce and Schulz	3.3	2.5	1.03	5.2
1911.					
Jan. 5	....do	3.3	2.3	0.98	4.37
28	Martin and Pierce	3.4	2.7	1.00	4.86
Mar. 31	C. H. Pierce	2.8	0.9	0.55	1.07
Oct. 10	J. B. Stewart	5.3	4.0	1.05	3.58
Dec. 1	....do	5.1	3.9	.98	3.50

NOTE.—Measurements made at various sections.

Daily gage height, in feet, of Palolo ditch near Waikapu, Maui, for 1910–11.

[Tanitsu, observer.]

Day.	Nov.	Dec.	Day.	Nov.	Dec.	Day.	Nov.	Dec.
1910.			1910.			1910.		
1	.....	0.95	1	.....	1.08	21	0.90	0.88
2	.....	.95	2	.....	1.05	22	.90	.90
3	.....	.84	3	.....	.98	23	.96	.90
4	.....	.85	4	.....	.95	24	.91	
5	.....	.91	5	.....	.88	25	.90	
6	.....	.85	6	.....	.88	26	.90	.92
7	.....	.80	7	.....	.88	27	.91	.90
8	.....	.66	8	.....	.88	28	.90	.90
9	.....	.58	9	.....	.88	29	.95	.91
10	.....	.60	20	.....	.88	30	.92	.92
						31	.....	.99

020076

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

WAIKAPU STREAM NEAR WAIKAPU, MAUI.

LOCATION.—500 feet below intake of Palolo ditch, 1½ miles west of Waikapu, and 5 miles by road southwest of Wailuku.

RECORDS AVAILABLE.—December 1, 1910, to June 30, 1915.

GAGE.—Vertical staff on right bank installed May 10, 1914, at new datum to replace original inclined staff; read twice daily.

DISCHARGE MEASUREMENTS.—Made by wading.

CHANNEL AND CONTROL.—One channel at all stages; straight for 20 feet above and for 100 feet below gage; right bank high and nearly vertical; left bank slopes gently. Control composed of large boulders; fairly permanent between extreme floods.

EXTREMES OF DISCHARGE.—Maximum stage recorded during period of record, 3.76 feet (old datum) at 9 a. m. May 8, 1914 (discharge, computed from extension of rating curve, approximately 230 million gallons per day, or 360 second-feet); minimum stage recorded, 0.25 foot (old datum) February 26 to March 4, 1914 (discharge, 0.1 million gallons per day, or 0.15 second-foot).

DIVERSIONS.—Nearly all low-water flow is diverted above station by South Side Waikapu ditch and Palolo ditch.

REGULATION.—Natural flow has been increased by development tunnels near the headwaters.

UTILIZATION.—Flow at low and medium stages is diverted for irrigation of sugar cane.

ACCURACY.—Estimates July 1, 1913, to May 10, 1914, fair for low stages but approximate only for medium and high stages owing to lack of discharge measurements; estimates May 11, 1914, to June 30, 1915, fair for all stages.

Discharge measurements of Waikapu Stream near Waikapu, Maui, during the years ending June 30, 1914 and 1915.

Date.	Made by—	Gage height (feet).	Discharge.	
			Second-feet.	Million gallons per day.
1914—Feb. 27	G. R. White	[a] 0.38	0.3	0.2
Apr. 21	C. T. Bailey	[b] 1.80	8.8	5.7
21	....do	[b] 2.05	26	17
Apr. 27	....do	[b] 1.30	.55	.35
May 11	....do	1.33	1.8	1.2
28	....do	2.14	28	18
June 13	....do	1.68	7.9	5.1
13	....do	2.58	64	41
July 2	....do	2.25	31	20
2	....do	2.07	24	15
Sept. 3	....do	1.90	16	10
Oct. 8	....do	1.78	9.2	6.0
1915—Feb. 11	....do	1.56	5.2	3.3

[a] Old gage datum. [b] Referred to gage installed May 11, 1914.

270000

Discharge, in million gallons per day, of Waikapu Stream near Waikapu, Maui, for the years ending June 30, 1914 and 1915.

[To convert discharge in million gallons per day to second-feet multiply by 1.55.]

Date.	July.	Aug	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.
1913–14.												
1	3.9	0.2	0.1	0.2	0.1	0.1	0.2	0.6	0.1	0.5	0.2	26
2	1.9	.2	.1	.2	.1	.1	.2	.5	.1	.6	.3	13
3	.2	.2	.1	.2	1.0	.1	.3	.5	.1	.5	.3	7.1
4	.1	.2	.1	.2	.1	115	.3	.5	.1	.2	5.8	4.4
5	.1	.2	.1	.2	.1	44	.3	.3	.2	.2	.5	3.6
6	.2	.2	.1	.2	.1	34	.2	.2	.2	40	.3	3.6
7	.2	.2	.2	2	.1	26	.2	.1	.2	13	2.6	4.4
8	.1	.2	.1	.2	95	16	16	.1	.2	1.3	220	2.9
9	.1	.2	.1	.1	55	5.8	11	.3	.2	1.0	18	2.3
10	.1	.6	.1	.1	5.8	3.2	1.3	.2	.2	2.6	4.8	7.1
11	.1	.1	.1	.1	.5	1.3	1.0	.2	2	.6	.3	2.9
12	.3	16	.1	.1	.2	9.7	28	.1	.2	.3	1.0	24
13	.2	.6	.2	.1	.2	3.9	13	.1	.2	.6	1.8	21
14	.2	.1	.1	.1	.1	3.9	1.3	.1	.2	1.3	.6	7.1
15	.1	.2	.1	.1	.1	2.6	.6	.1	.2	.5	.5	2.9
16	.2	34	.1	.1	.1	1.3	.6	.2	.2	.3	.3	2.9
17	.2	1.0	.1	.1	.2	1.3	47	.2	.3	.3	.6	7.1
18	.2	.2	.5	.1	3.2	1.9	1.9	.1	.2	.2	52	2.9
19	.2	.1	.2	.1	11	1.0	1.0	.1	.2	1.0	31	21
20	2	.1	.1	.1	.1	.6	11	.1	.2	13	94	9.7
21	.2	.1	.1	.1	.1	.5	1.3	.1	.2	13	37	5.2
22	.2	2	.1	.1	.1	.3	40	.1	.2	3.9	11	3.6
23	.2	.1	.1	.1	.2	.3	3.2	.1	.2	68	4.4	2.3
24	.2	1	.1	.1	.1	.3	.6	.1	.2	9.7	2.9	1.3
25	.2	2	.1	.1	.2	.3	.5	.1	.2	1.3	2.9	49
26	.2	.2	.1	.1	5.8	.2	.5	.1	.2	.6	15	9.7
27	.2	.2	.1	.1	.2	.2	.5	.1	.3	.5	6.2	8.4
28	.2	.2	.1	.3	.1	.2	.6	.1	.2	.3	19	6.2
29	.2	.2	.1	.6	.1	.2	.6	.....	140	.2	8.4	3.6
30	.2	.2	.1	.1	.2	.2	.6	.....	3.9	.2	5.2	3.6
31	.2	3.9	.....	.1	.....	.2	.6	.....	.5	.....	2.3	.....
1914–15.												
1	15	7.1	9.7	6.2	94	6.2	3.6	1.0	1.3	1.0	1.8	1.0
2	21	4.4	28	13	8.4	5.2	5.2	1.0	1.3	1.0	1.3	1.0
3	5.2	4.4	15	9.7	6.2	3.6	3.6	1.0	1.3	1.0	1.3	1.0
4	8.4	94	11	9.7	4.4	2.9	17	1.0	5.2	1.0	1.3	1.0
5	17	13	26	13	3.6	2.9	13	13	2.3	1.0	1.3	1.0
6	19	7.1	26	8.4	3.6	2.3	5.2	1.8	1.8	1.0	1.3	1.0
7	8.4	6.2	13	8.4	2.9	2.9	3.6	8.4	2.3	1.0	1.0	1.0
8	19	3.6	9.7	7.1	2.9	2.9	3.6	2.3	7.1	1.0	1.0	1.0
9	8.4	1.8	6.2	53	2.9	3.6	3.6	1.3	4.4	1.0	1.0	.65
10	4.4	19	7.1	15	2.3	3.6	3.6	21	2.3	2.3	3.6	1.0
11	1.8	70	5.2	7.1	2.3	5.2	9.7	5.2	2.3	9.7	1.3	.65
12	21	9.7	7.1	7.1	1.8	6.2	4.4	34	1.8	2.9	1.0	1.0
13	26	2	6.2	7.1	2.3	5.2	3.6	19	2.9	1.8	1.0	1.0
14	8.4	2	40	6.2	3.6	8.4	2.9	4.4	2.3	1.0	1.0	1.0
15	24	1	43	6.2	8.4	3.6	2.9	2.3	3.6	1.3	1.0	1.0
16	8.4	9.7	26	13	3.6	2.9	2.9	1.8	2.9	66	1.0	1.0
17	3.6	40	11	3.6	3.6	2.3	2.3	2.3	2.3	13	1.0	1.0
18	13	26	37	4.4	2.3	2.3	1.8	1.8	1.8	8.4	1.0	1.0
19	5.2	3.4	56	3.6	3.6	3.6	1.8	2.9	1.8	8.4	1.0	9.7
20	5.2	7.1	11	3.6	7.1	31	1.8	3.6	1.8	3.6	1.0	15
21	1.3	17	9.7	6.2	9.7	8.4	3.6	98	1.8	1.3	1.0	1.8
22	6.2	5.2	9.7	4.4	7.1	6.2	1.8	9.7	1.8	3.6	1.8	2.3
23	7.1	13	21	3.6	8.4	5.2	1.8	15	2.3	2.3	1.0	1.8
24	7.1	17	8.4	3.6	34	3.6	1.3	6.2	4.4	1.8	1.0	1.3
25	9.7	3.4	9.7	3.6	9.7	8.4	1.3	4.4	2.3	1.8	1.0	1.8
26	40	7.1	9.7	3.6	6.2	21	1.3	2.9	1.8	40	1.0	3.6
27	37	7.1	8.4	3.6	13	6.2	1.0	2.3	1.8	24	1.0	2.3
28	34	17	8.4	11	31	17	1.0	1.8	1.8	9.7	.65	1.0
29	26	9.7	13	11	17	6.2	1.0	.....	1.0	5.2	1.0	1.0
30	19	7.1	9.7	9.7	8.4	5.2	1.0	.....	1.0	2.3	1.0	1.3
31	11	10	.....	26	.....	4.4	1.0	.....	1.0	.....	1.0	.....

NOTE.—Discharge determined from rating curves applicable as follows: July 1, 1913, to May 10, 1914, fairly well defined below 1 million gallons per day (1.5 second-feet); May 11, 1914, to June 30, 1915, fairly well defined below 60 million gallons per day (93 second-feet).

Water Resources

Data Category: Surface Water | Geographic Area: United States | go

Peak Streamflow for the Nation

USGS 16650500 WAIKAPU STREAM NEAR KIHEI, MAUI, HI

Available data for this site | Station home page | GO

Maui County, Hawaii
Hydrologic Unit Code 20020000
Latitude 20°49'02", Longitude 156°29'00" NAD27
Drainage area 6.97 square miles
Gage datum 35.00 feet above sea level NGVD29

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Water Year	Date	Gage Height (feet)	Stream-flow (cfs)
1963	Jan. 16, 1963		320
1964	May 25, 1964	1.67	104
1965	Feb. 04, 1965	5.05	836
1966	Nov. 14, 1965	4.39	648
1967	Mar. 24, 1967	5.59	725
1968	Nov. 24, 1967	5.30	651
1969	Nov. 29, 1968	4.44	593
1970	Dec. 28, 1969	3.77	454
1971	Jan. 28, 1971	5.61	956
1972	Feb. 24, 1972	5.78	1,000
1973	Oct. 03, 1972	4.09	553
1974	Nov. 12, 1973	5.41	893
1975	Aug. 17, 1975	2.83	288
1976	Mar. 04, 1976	2.91	303
1977	Apr. 04, 1977	2.83	288
1978	Oct. 24, 1977	3.48	416
1979	Feb. 10, 1979	7.80	1,080
1980	Jan. 08, 1980	7.29	1,030
1981	Aug. 04, 1981	2.49	227
1982	Jan. 07, 1982	6.56	949
1983	Dec. 23, 1982	5.52	793
1984	Dec. 25, 1983	7.85	1,080
1985	Mar. 13, 1985	2.94	309
1986	Oct. 18, 1985	6.30	910
1987	May 05, 1987	8.28	1,130
1988	Jan. 28, 1988	7.11	1,010
1990	Oct. 08, 1989	6.82	982
1991	Jan. 27, 1991		850[2]
1992	Feb. 14, 1992		200[2]
1993	Dec. 31, 1992		150[2]
1994	Mar. 10, 1994		255[2]
1995	Jan. 29, 1995		260[2]
1996	Mar. 31, 1996		200[2]
1997	Jan. 04, 1997		600[2]

Peak Streamflow Qualification Codes.

000078

- 2 -- Discharge is an Estimate

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Water Resources

Data Category: Site Information | Geographic Area: United States | go

USGS 16650500 WAIKAPU STREAM NEAR KIHEI, MAUI, HI

Available data for this site Station home page GO

Station Description

LOCATION
Latitude 20°49'02", Longitude 156°29'00" NAD27,
Maui County, Hawaii , Hydrologic Unit 20020000

DRAINAGE AREA
6.97 square miles

GAGE
Datum of gage is 35.00 feet above sea level NGVD29.

STATION TYPE:
Surface Water

STATION DATA:

Data Type	Begin Date	End Date	Count
Peak streamflow	1963-01-16	1997-01-04	34

SITE OPERATION:
Site is located in Hawaii; record is maintained by Hawaii

CONTACT INFORMATION
Email questions about this station to h2oteam@usgs.gov

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