OTHER USGS STREAM FLOW DATA FOR SOUTH WAIEHU

EXHIBIT 11

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

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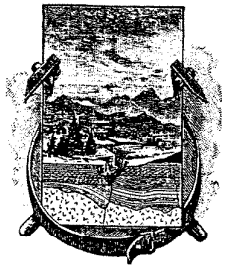

WASHINGTON
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1913

Daily gage height, in feet, of North Waiehu ditch near Wailuku, Maui, for 1910–11—Continued.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1911.												
21	.....	0.5	0.5	0.7	0.7	0.7	0.7	0.8	0.95	0.8	0.85	0.85
22	.....	.5	.5	.7	.65	.65	.7	.8	.9	.8	.35	.85
23	.....	.5	.5	.75	.6	.65	.7	.8	1.0	.8	.35	.85
24	.....	.7	.55	.7	.6	.65	.7	.8	.9	.75	.35	.85
25	.....	.55	.5	.7	.6	.7	.7	.8	.85	.8	.35	.85
26	.....	.5	.5	.7	.6	.65	.7	.85	.9	.8	.85	.85
27	.....	.3	.5	.75	.6	.65	.7	.8	.85	.8	.85	.85
28	.....	.....	.95	.75	.6	.65	.7	.8	.9	.8	.9	.85
29	.....	.....	.95	.7	.7	.7	.7	.9	.9	.8	.85	.85
30	.....	.....	.95	.7	.6	.7	.7	.9	.9	.8	.85	.85
31	.....	.....	.9	.....	.6	.....	.7	.8	.....	.8	.....	.85

Daily discharge, in second-feet, of North Waiehu ditch near Wailuku, Maui, for 1910–11.

Day.	Dec.	Day.	Dec.	Day.	Dec.
1910.		1910.		1910.	
1	3.1	11	.....	21	3.1
2	2.7	12	.....	22	3.1
3	2.7	13	.....	23	3.1
4	3.1	14	.....	24	3.1
5	.8	15	.....	25	3.1
6	.....	16	3.1	26	3.1
7	.....	17	3.1	27	3.1
8	.....	18	3.1	28	3.1
9	.....	19	3.1	29	3.1
10	.....	20	3.1	30	.6
				31	.6

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1911.												
1	0.6	.....	.....	4.1	2.3	1.7	2.3	2.3	3.1	2.3	3.6	3.6
2	.6	.....	.....	4.1	2.7	1.7	2.3	2.3	3.6	2.7	3.6	3.6
3	1.7	.....	.....	4.1	2.3	1.7	2.3	2.3	3.1	2.7	3.6	3.6
4	1.7	1.7	.....	4.1	2.3	1.7	2.3	2.7	3.6	2.7	3.6	3.6
5	1.7	1.7	1.2	4.1	2.3	1.7	2.3	2.3	3.6	2.7	3.6	3.6
6	2.0	1.7	1.2	4.1	2.3	1.7	2.3	2.3	3.6	2.7	3.6	3.6
7	2.0	1.7	1.2	4.1	2.3	1.7	2.3	2.3	3.6	3.6	3.6	3.6
8	2.0	1.7	1.2	4.1	2.3	1.7	2.3	2.3	3.6	3.1	3.6	3.6
9	1.7	1.7	1.2	4.1	2.7	1.7	2.3	2.3	3.6	3.1	3.6	3.6
10	1.7	2.0	1.2	4.1	3.1	1.7	2.3	2.3	3.6	3.1	3.6	3.6
11	2.0	2.0	1.2	4.1	3.1	1.7	3.1	2.3	4.1	3.1	3.6	4.1
12	1.7	2.0	1.2	4.1	3.1	1.7	3.1	2.3	3.6	3.1	3.6	3.6
13	1.7	2.0	1.2	4.1	2.7	1.7	2.3	2.3	3.1	3.1	3.6	3.6
14	1.7	1.7	1.2	1.7	2.7	1.7	2.3	2.3	3.1	3.1	3.6	3.6
15	1.7	1.7	1.2	1.7	2.3	1.7	2.3	2.3	3.1	3.1	3.6	3.6
16	1.7	1.7	1.2	2.3	2.3	2.0	2.3	2.3	3.1	3.1	3.6	3.6
17	2.3	1.7	1.2	2.3	2.3	2.0	2.3	3.1	3.1	3.1	3.6	3.6
18	.....	1.7	1.2	2.3	1.7	2.0	2.3	3.1	3.6	3.1	3.6	3.6
19	.....	1.7	1.4	2.3	1.7	2.0	2.3	3.1	3.1	3.1	3.6	3.6
20	.....	1.7	1.4	2.3	3.1	2.3	2.3	3.1	4.3	3.1	3.6	3.1
21	.....	1.7	1.2	2.3	2.3	2.3	2.3	3.1	4.3	3.1	3.6	3.6
22	.....	1.7	1.2	2.3	2.0	2.0	2.3	3.1	4.1	3.1	3.6	3.6
23	.....	1.7	1.2	2.7	1.7	2.0	2.3	3.1	5.4	3.1	3.6	3.6
24	.....	2.3	1.4	2.3	1.7	2.0	2.3	3.1	4.1	2.7	3.6	3.6
25	.....	2.0	1.2	2.3	1.7	2.3	2.3	3.1	3.6	3.1	3.6	3.6
26	.....	1.7	1.2	2.3	1.7	2.0	2.3	3.6	4.1	3.1	3.6	3.6
27	.....	.5	1.2	2.7	1.7	2.0	2.3	3.1	3.6	3.1	3.6	3.6
28	.....	.....	4.8	2.7	1.7	2.0	2.3	3.1	4.1	3.1	4.1	3.6
29	.....	.....	4.8	2.3	2.3	2.3	2.3	4.1	4.1	3.1	3.6	3.6
30	.....	.....	4.8	2.3	1.7	2.3	2.3	4.1	4.1	3.1	3.6	3.6
31	.....	.....	4.1	.....	1.7	.....	2.3	3.1	.....	3.1	.....	3.6

NOTE.—Daily discharge computed from a rating curve that is poorly defined. On days when no discharge is given the ditch was not carrying water.

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

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum	Mean.		
1910.					
December [a]	3.1	0.6	2.71	113	C.
1911.					
January [b]	2.3	.6	1.68	57	D.
February [c]	2.3	.5	1.74	83	D.
March [d]	4.8	1.2	1.73	93	D.
April	4.1	1.7	3.08	183	C.
May	3.1	1.7	2.25	138	C.
June	2.3	1.7	1.90	113	C.
July	3.1	2.3	2.35	144	C.
August	4.1	2.3	2.78	171	C.
September	5.4	3.1	3.72	221	C.
October	3.6	2.3	3.01	185	
November	4.1	3.5	3.62	215	
December	4.1	3.1	3.60	221	C.
The period [e]	5.4	.5	2.68	1,820	

[a] For 21 days, Dec. 1–5 and 16–31.
[b] For 17 days, Jan. 1–17.
[c] For 24 days, Feb. 4–27.
[d] For 27 days, Mar. 5–31.
[e] For 343 days.

SOUTH WAIEHU STREAM NEAR WAILUKU, MAUI.

A gaging station was established on South Waiehu Stream at the intake of the upper ditch about 3 miles northwest of Wailuku November 17, 1910.

A staff gage, graduated in tenths of feet, is fastened to the upstream face of the concrete head gate at the intake.

The discharge at this station gives the total flow of the stream.

Discharge measurements of South Waiehu Stream near Wailuku, Maui, in 1910–11.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
1910.		*Feet.*	*Sq. ft.*	*Feet.*	
Nov. 15	C. H. Pierce	3	1.4	0.40	3.36
Dec. 28	Pierce and Schulz	3	1.6	0.55	5.5
1911.					
Jan. 3 [a]	do	3	1.5	[b] 1.05	4.35
Apr. 1	C. H. Pierce	3	1.5		6.8
Aug. 30	J. B. Stevart	.....	.....	1.37	7.7
Oct. 11	do	3	1.8	1.03	5.8
Nov. 28 [c]	do	7	6.2	2.27	11.6

[a] New gage installed at different location and datum.
[b] Old gage height was 0.50.
[c] Measurement by wading in stream above ditch intake; all other measurements in wooden flume which carries total low of stream except at high stages.

Daily gage height, in feet, of South Waiehu Stream near Wailuku, Maui, for 1910–11.

[T. Burlem, observer.]

Day.	Nov.	Dec.	Day.	Nov.	Dec.	Day.	Nov.	Dec.
1910.			1910.			1910.		
1		1.0	11		0.9	21	0.4	0.5
2		.8	12		.8	22	.4	.5
3		1.0	13		.7	23	.4	.5
4		1.0	14		.65	24	.75	.55
5		1.0	15		.4	25	.4	.7
6		1.0	16		.4	26	.45	.7
7		1.0	17	0.65	.4	27	.45	.55
8		1.0	18	.45	.4	28	.7	.5
9		1.0	19	.4	.4	29	1.0	.7
10		.95	20	.4	.45	30	1.0	.8
						31		.75

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1911.												
1		1.2	2.35	1.2	1.2	1.4	1.2	1.2	1.2	.6	1.2	1.2
2		1.8	1.35	1.45	1.9	1.3	1.2	1.2	1.2	.5	1.2	1.2
3	1.3	1.6	1.2	1.30	1.2	1.3	1.2	1.2	1.3	.3	1.2	1.2
4	2.0	2.45	1.2	1.4	1.2	1.2	1.3	1.8	1.2	.2	1.2	1.2
5	3.0	1.5	1.2	1.4	1.2	3.0	1.3	1.2	1.2	.2	1.2	1.2
6	2.05	2.3	1.2	1.2	1.2	1.4	1.4	1.2	1.2	.6	1.2	1.2
7	1.45	1.35	1.2	1.2	1.2	1.2	1.4	1.2	1.2	.2	1.2	1.2
8	1.10	1.85	1.2	1.65	1.2	1.2	1.4	1.2	1.2	.2	1.2	1.2
9	1.15	2.45	1.2	1.2	3.8	1.2	1.2	1.2	1.2	.2	1.2	1.2
10	1.25	2.95	1.2	1.2	2.9	1.2	1.4	1.2	1.7	.2	1.2	1.2
11	1.4	1.45	1.2	1.2	1.6	1.2	1.7	1.2	1.9	.2	1.2	1.2
12	1.0	1.3	1.2	1.2	1.8	1.4	2.6	1.2	1.4	.2	1.2	1.2
13	1.0	1.3	1.2	1.2	1.95	1.4	1.3	1.2	1.4	.2	1.75	1.2
14	0.9	1.2	1.2	1.2	3.0	1.2	1.2	1.2	1.4	.2	1.9	1.2
15	1.0	1.2	1.2	1.2	1.3	1.2	1.2	1.2	1.2	.2	1.2	1.2
16	1.05	1.2	1.2	1.2	1.2	1.7	1.2	1.2	1.2	.2	1.2	1.2
17	3.2	1.2	1.2	1.2	1.2	1.4	1.2	1.2	1.2	.2	1.2	1.2
18	1.5	1.2	1.2	1.5	1.3	1.4	1.2	1.5	1.4	.2	1.2	1.3
19	1.5	1.2	1.85	2.0	1.4	1.3	1.2	1.2	1.3	.2	1.2	1.2
20	1.25	1.2	1.45	2.0	1.2	1.2	1.2	1.2	2.05	.2	1.2	1.2
21	1.2	1.2	1.45	2.75	1.2	1.4	1.2	1.2	3.4	.2	1.3	1.2
22	1.1	1.2	1.4	1.7	1.4	1.2	1.2	1.2	1.85	.2	1.4	1.2
23	1.1	1.2	1.7	1.3	1.5	1.2	1.2	1.2	4.0	.2	1.4	1.2
24	1.7	1.2	1.4	1.2	1.3	1.2	1.2	1.2	3.5	.2	1.4	1.2
25	2.0	3.5	1.3	1.3	1.2	1.4	1.2	1.2	2.45	.2	1.4	1.2
26	2.0	1.85	1.2	1.8	2.2	1.4	1.2	1.8	3.0	.2	1.4	1.2
27	2.0	1.2	1.2	2.4	3.0	1.3	1.2	1.2	2.95	.2	1.4	1.2
28	3.2	2.4	1.2	1.3	2.5	1.2	1.2	1.2	1.5	.2	1.6	1.2
29	2.1	.....	2.7	1.2	3.75	1.2	1.2	2.5	1.45	.2	2.0	1.2
30	1.35	.....	1.4	1.2	1.4	1.2	1.2	1.7	3.45	.2	1.8	1.2
31	1.2	.....	1.4	.....	1.25	.....	1.2	1.2	.....	.2	.....	1.2

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

Day.	Nov.	Dec.	Day.	Nov.	Dec.	Day.	Nov.	Dec.
1910.			1910.			1910.		
1		13	11		11	21	3.4	4.7
2		9.5	12		9.5	22	3.4	4.7
3		13	13		7.8	23	3.4	4.7
4		13	14		7.0	24	8.6	5.2
5		13	15		3.4	25	3.4	7.8
6		13	16		3.4	26	4.0	7.8
7		13	17	7.0	3.4	27	4.0	5.2
8		13	18	4.0	3.4	28	7.8	4.7
9		13	19	3.4	3.4	29	13	7.8
10		12	20	3.4	4.0	30	13	9.5
						31		8.6

Daily discharge, in second-feet, of South Waiehu Stream near Wailuku, Maui, for 1910–11—Continued.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1911.												
1	a 8.1	6.7	27	6.7	6.7	8.0	6.7	6.7	6.7	10	6.7	6.7
2	a 7.7	12	7.6	8.5	14	7.3	6.7	6.7	6.7	9.0	6.7	6.7
3	7.3	10	6.7	7.3	6.7	7.3	6.7	6.7	6.7	7.3	6.7	6.7
4	16	32	6.7	8.0	6.7	6.7	7.3	12	6.7	6.7	6.7	6.7
5	60	9.0	6.7	8.0	6.7	60	7.3	6.7	6.7	6.7	6.7	6.7
6	18	25	6.7	6.7	6.7	8.0	8.0	6.7	6.7	10	6.7	6.7
7	8.5	7.6	6.7	6.7	6.7	6.7	8.0	6.7	6.7	6.7	6.7	6.7
8	6.2	13	6.7	10	6.7	6.7	8.0	6.7	6.7	6.7	6.7	6.7
9	6.4	32	6.7	6.7	120	6.7	6.7	6.7	6.7	6.7	6.7	6.7
10	7.0	57	6.7	6.7	54	6.7	8.0	6.7	11	6.7	6.7	6.7
11	8.0	8.5	6.7	6.7	10	6.7	11	6.7	14	6.7	6.7	6.7
12	5.7	7.3	6.7	6.7	12	8.0	39	6.7	8.0	6.7	6.7	6
13	5.7	7.3	6.7	6.7	15	8.0	7.3	6.7	8.0	6.7	12	6
14	5.3	6.7	6.7	6.7	60	6.7	6.7	6.7	8.0	6.7	14	6
15	5.7	6.7	6.7	6.7	7.3	6.7	6.7	6.7	6.7	6.7	6.7	6.7
16	6.0	6.7	6.7	6.7	6.7	11	6.7	6.7	6.7	6.7	6.7	6.7
17	74	6.7	6.7	6.7	6.7	8.0	6.7	6.7	6.7	6.7	6.7	6.7
18	9.0	6.7	6.7	9.0	7.3	8.0	6.7	9.0	8.0	6.7	6.7	6.3
19	9.0	6.7	13	16	8.0	7.3	6.7	6.7	7.3	6.7	6.7	6.7
20	7.0	6.7	8.5	16	6.7	6.7	6.7	6.7	18	6.7	6.7	6.7
21	6.7	6.7	8.5	46	6.7	8.0	6.7	6.7	89	6.7	7.3	6.7
22	6.2	6.7	8.0	11	8.0	6.7	6.7	6.7	13	6.7	8.0	6.7
23	6.2	6.7	11	7.3	9.0	6.7	6.7	6.7	135	6.7	8.0	6.7
24	11	6.7	8.0	6.7	7.3	6.7	6.7	6.7	97	6.7	8.0	6.7
25	16	97	7.3	7.3	6.7	8.0	6.7	6.7	32	6.7	8.0	6.7
26	16	13	6.7	12	22	8.0	6.7	12	60	6.7	8.0	6.7
27	16	6.7	6.7	29	60	7.3	6.7	6.7	57	6.7	8.0	6.7
28	74	29	6.7	7.3	34	6.7	6.7	6.7	9.0	6.7	10	6.7
29	19	.....	44	6.7	116	6.7	6.7	34	8.5	6.7	16	6.7
30	7.6	.....	8.0	6.7	8.0	6.7	6.7	11	93	6.7	12	6.7
31	6.7	.....	8.0	.....	7.0	.....	6.7	6.7	.....	6.7	.....	6.7

a Discharge interpolated.

NOTE.—Daily discharge computed from rating curves fairly well defined between 4 and 8 second-feet. Above 10 second-feet the discharge is obtained by taking sum of flow in ditch and flow over broad crested weir and is only approximate.

Monthly discharge of South Waiehu Stream near Wailuku, Maui, for 1910–11.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
1910.					
November 17–30	13	3.4	5.84	162	B.
December	13	3.4	8.15	501	B.
1911.					
January	74	5.3	15.0	922	C.
February	97	6.7	16.0	889	C.
March	44	6.7	9.23	568	C.
April	46	6.7	10.1	601	C.
May	120	6.7	21.3	1,310	D.
June	60	6.7	9.10	541	C.
July	39	6.7	8.11	499	C.
August	34	6.7	8.14	501	C.
September	135	6.7	25.2	1,500	D
October	10	6.7	7.01	431	B.
November	14	6.7	8.00	476	B.
December	7.3	6.7	6.72	413	B.
The year	135	5.3	11.9	8,650	