

**State of Hawaii
COMMISSION ON WATER RESOURCE MANAGEMENT
Department of Land and Natural Resources**

MAY 24 09:43
MAY 24 09:10
PETITION TO AMEND INTERIM INSTREAM FLOW STANDARDS

WAIHOUE STREAM, EAST MAUI

Instructions: Please print in ink or type and send completed petition with attachments to the Commission on Water Resource Management, P.O. Box 621, Honolulu, Hawaii 96809. Petition must be accompanied by a non-refundable filing fee of \$25.00 payable to the Dept. of Land and Natural Resources. The Commission may not accept incomplete applications. For assistance, call the Regulation Branch at 587-0225.

1. PETITIONER

Firm/Name Na Moku 'Aupuni o Ko'olau Hui c/o Native Hawaiian Legal Corporation
 Contact Person Alan Murakami, Attorney Ph. 521-2302
 Address 1164 Bishop Street, Honolulu, Hawai'i 96813

2. STREAMFLOW DATA

Data to follow.

USGS stream gaging station 16515000 Period of Record Gage Inactive
 Location/Reach SEE ATTACHED
 (Attach a USGS map, scale 1"=2000', and a property tax map showing diversion location referenced to established property boundaries.)

TABLE 1. PERIOD OF RECORD AVERAGE MONTHLY STREAMFLOW WITHIN THE AFFECTED STREAM REACH, IN CFS

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
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STREAMFLOW DATA TABLES TO FOLLOW.

Annual Median flow in cfs =

TABLE 2. PROPOSED AVERAGE MONTHLY STREAMFLOW DIVERSION FROM AFFECTED STREAM REACH, IN CFS

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
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NONE. UNDETERMINED; SUFFICIENT FOR TARO FARMING AND/OR GATHERING.

Annual Median flow in cfs =

RESTORATION

TABLE 3. AVERAGE MONTHLY STREAMFLOW IN AFFECTED STREAM REACH AFTER RESTORATION (min release flow), IN CFS

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
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NATURAL STREAMFLOW EXCEPT FOR EXERCISE OF APPURTENANT WATER RIGHTS.

Annual Median flow in cfs =

3. EXISTING INSTREAM AND OFFSTREAM WATER USES FOR ENTIRE STREAM REACH

TMK	OWNER	USE
		RESEARCH IN PROGRESS.

(If more space is necessary, attach an extended list following above format)

4. ANTICIPATED IMPACTS ON STREAM AND BASIS FOR SUCH IMPACTS:

RESTORATION OF INSTREAM NATURAL HABITAT AND BIOTA, AND BENEFICIAL APPURTENANT AND GATHERING USES.

(Attach supporting documentation, plans, letters, etc.)

NATIVE HAWAIIAN LEGAL CORPORATION

Signature Alan Murakami Personer
 Attorney for Na Moku 'Aupuni o Ko'olau Hui

May 24, 2001

Date

For Official Use
 Date Received _____
 Date Accepted _____

Waiohue Stream

Waiohue Stream is a relatively short stream headed 2.5 mi inland at 2,400 ft altitude (plate 1). The stream rises steeply from sea level to 600 ft altitude 0.5 mi from the coast (a gradient of 1,320 ft/mi) and at this altitude the stream valley is incised 260 ft below the upland surface. The stream lies on Honomanu Basalt at the coast and Kula Volcanics farther upstream, but it appears that lava flows of the Hana Volcanics came down the valley and reached the ocean (Stearns and Macdonald, 1942). The Waiohue Stream valley is near the western boundary of the extensive area of Hana Volcanics that cover most of the volcano surface for many miles to the east (fig. 6). Streamflow is diverted by the Koolau Ditch at 1,300 ft altitude (table 4).

The lowest daily streamflow measured during 1921–63 at gaging station 5150, at 1,316 ft altitude, was 1.36 Mgal/d (table 2, plate 1). The estimated average annual base flow for the 40-year period of record is about 3.57 Mgal/d (table 2, fig. 150). EMI records indicate that the flow at about 500 ft altitude was 0.4 Mgal/d in March 1928 (table 10). This value represents the gain in flow downstream of the diversion system which is at 1,300 ft altitude.

The drainage subbasin of Waiohue Stream upstream of the gaging station is the smallest used in the water-budget estimates, 0.52 mi² (Shade, 1999). In this area, 7.25 Mgal/d of rainfall and 1.49 Mgal/d of fog drip is apportioned into 3.91 Mgal/d of runoff, 0.87 Mgal/d of evapotranspiration, and 3.96 Mgal/d of recharge (table 1, fig. 6). The estimated base flow at the gaging station is about 90 percent of the recharge to the subbasin. This subbasin is another example where the surface-drainage divides probably do not coincide with the ground-water divides. If the base flow and recharge for Waiohue Stream subbasin are combined with the base flow and recharge for Kopiliula Stream subbasin which lies directly upstream (fig. 3), the ratio of base flow to recharge becomes 31 percent. This value is much more consistent with values for the adjacent Wailuaiki and Wailuanui Stream subbasins.

WAIOHUE

DURATION CURVE STATISTICAL CHARACTERISTICS FOR ...
 STATION ID: 16515000 WAIOHUE GULCH NEAR NAHIKU, MAUI, HI
 PARAMETER CODE = 00060
 STATISTIC CODE - 00003 MEAN

DURATION DATA VALUES ARE INTERPOLATED FROM DURATION TABLE:
 DATA ARE NOT ANALYTICALLY FITTED TO A PARTICULAR STATISTICAL DISTRIBUTION,
 AND THE USER IS RESPONSIBLE FOR ASSESSMENT AND INTERPRETATION.

ADDITIONAL CONDITIONS FOR THIS RUN ARE:
 STATISTICS ARE BASED ON LOGARITHMS (BASE 10).
 NUMBER OF VALUES IS REDUCED FOR EACH NEAR-ZERO OR ZERO VALUE.

NUMBER OF VALUES = 19 (NUMBER OF NEAR-ZERO VALUES = 0)
 LISTING OF DATA FOLLOWS:

PERCENT OF TIME VALUE EQUALED OR EXCEEDED	DATA VALUE	(LOG =
95.0	3.15	0.49798)
90.0	3.57	(LOG = 0.55258)
85.0	3.91	(LOG = 0.59256)
80.0	4.23	(LOG = 0.62676)
75.0	4.56	(LOG = 0.65890)
70.0	4.91	(LOG = 0.69083)
65.0	5.27	(LOG = 0.72145)
60.0	5.68	(LOG = 0.75437)
55.0	6.13	(LOG = 0.78716)
50.0	6.67	(LOG = 0.82440)
45.0	7.26	(LOG = 0.86113)
40.0	7.91	(LOG = 0.89826)
35.0	8.69	(LOG = 0.93899)
30.0	9.67	(LOG = 0.98557)
25.0	11.7	(LOG = 1.06705)
20.0	13.7	(LOG = 1.13796)
15.0	17.3	(LOG = 1.23798)
10.0	23.5	(LOG = 1.37141)
5.0	37.3	(LOG = 1.57120)

MEAN OF LOGS = 0.88298

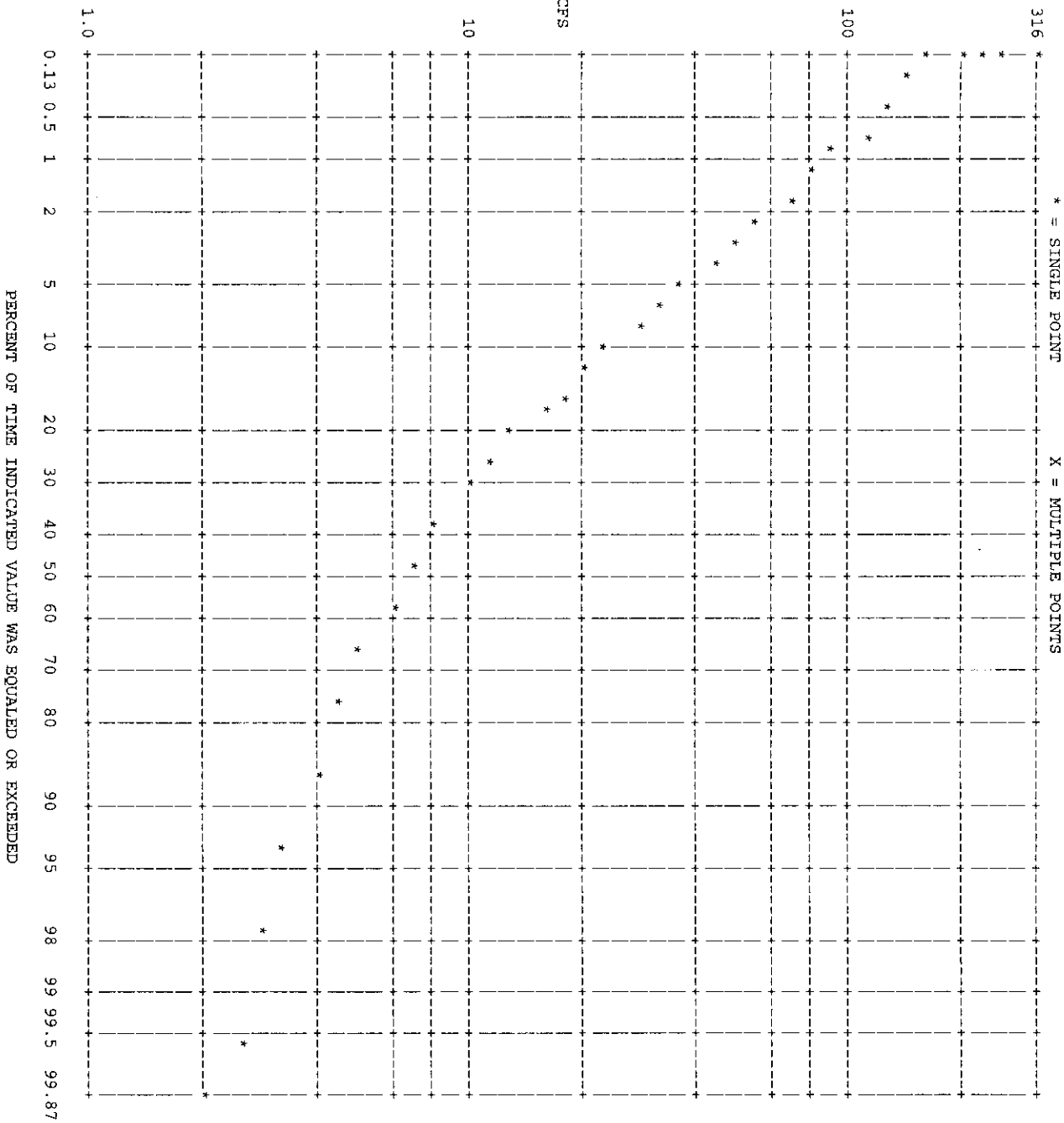
STANDARD DEVIATION OF LOGS = 0.28880 (VARIABILITY INDEX - SEE USGS WSP 1542-A)

COEFFICIENT OF VARIATION = 0.32707

COEFFICIENT OF SKEW = 0.90508

LOG-NORMAL DURATION PLOT FOR PERIOD OCT TO SEP
 STATION ID: 16515000 WAIOHUE GULCH NEAR NAHIKU, MAUI, HI
 PARAMETER CODE - 00060 DISCHARGE
 STATISTIC CODE - 00003 MEAN

(YEARS 1922 - 1963)



DVSTAT - DAILY VALUES STATISTICAL PROGRAM

STATION ID - 16515000
 WAIOHUE GULCH NEAR NAHIKU, MAUI, HI
 PARAMETER CODE - 00060 DISCHARGE
 STATISTIC CODE - 00003 MEAN

LOWEST MEAN VALUE AND RANKING FOR THE FOLLOWING NUMBER OF CONSECUTIVE DAYS
 FOR PERIOD OCT TO SEP

WATER YEAR	1	3	7	14	30	60	90	120	183
1923 1923	4.00 35	4.00 34	4.09 33	4.24 33	4.82 31	8.08 37	8.48 34	8.48 32	10.2 29
1924 1924	3.70 29	3.70 29	3.79 29	3.94 28	4.33 26	5.43 21	7.35 26	7.15 19	9.44 25
1925 1925	4.00 36	4.13 37	4.60 38	4.75 36	5.04 34	6.30 27	6.94 21	8.83 33	13.3 37
1926 1926	2.80 15	2.80 14	2.83 12	3.01 11	3.22 9	3.48 3	3.68 2	4.28 1	4.78 2
1927 1927	3.70 30	3.70 30	3.86 30	4.00 30	4.20 24	6.61 30	7.15 23	10.4 37	10.4 30
1928 1928	3.90 32	3.90 32	3.96 32	4.19 32	4.80 30	7.57 34	9.55 36	10.8 38	11.6 33
1929 1929	3.70 31	3.77 31	3.89 31	4.10 31	4.85 32	5.63 23	6.32 17	6.79 16	8.01 15
1930 1930	3.30 26	3.33 26	3.46 26	3.66 25	4.24 25	8.76 38	12.7 39	13.0 39	16.9 40
1931 1931	3.90 33	4.03 36	4.19 35	4.31 34	4.75 29	6.37 29	6.56 19	7.05 18	9.07 22
1932 1932	4.80 40	4.93 40	5.37 39	5.56 39	6.92 38	7.30 33	10.1 38	9.47 35	13.2 36
1933 1933	2.90 18	2.90 17	3.06 19	3.21 17	3.32 12	4.09 10	4.91 8	5.02 9	5.85 7
1934 1934	2.20 1	2.27 4	2.31 5	2.49 6	2.75 5	3.86 8	5.07 10	4.99 8	5.77 5
1935 1935	4.00 37	4.00 35	4.11 34	4.41 35	4.88 33	6.75 31	7.21 25	7.40 21	9.49 26
1936 1936	2.50 7	2.50 7	2.53 7	2.63 7	2.76 6	3.72 6	3.84 3	4.88 5	6.10 9
1937 1937	4.20 39	4.23 39	4.41 36	4.89 37	7.48 39	8.88 39	14.4 40	14.6 40	16.0 39
1938 1938	4.00 38	4.13 38	4.53 37	5.21 38	6.76 37	7.77 35	7.64 29	9.14 34	15.0 38
1939 1939	3.90 34	3.90 33	5.70 40	6.44 40	8.28 40	9.46 40	9.82 37	10.0 36	12.1 35
1940 1940	2.70 12	2.70 11	2.77 10	2.93 9	3.26 10	4.44 13	4.78 7	4.89 6	5.66 4
1941 1941	3.10 23	3.13 23	3.26 23	3.46 24	3.85 19	4.78 17	7.95 31	8.11 28	9.71 27
1942 1942	3.20 24	3.27 25	3.37 25	3.67 26	3.95 20	5.64 24	7.88 30	8.19 30	10.9 31
1943 1943	2.90 19	2.93 18	3.03 17	3.20 16	4.19 23	5.58 22	8.03 32	7.51 22	8.47 18
1944 1944	2.20 2	2.20 1	2.26 2	2.30 2	2.55 2	3.18 2	5.04 9	4.84 4	5.22 3
1945 1945	2.20 3	2.20 2	2.20 1	2.23 1	2.52 1	3.01 1	3.61 1	4.58 3	6.55 11
1946 1946	2.60 9	2.70 12	2.80 11	2.94 10	3.28 11	4.05 9	6.64 20	6.50 15	8.36 17
1947 1947	2.50 8	2.63 9	2.73 8	2.90 8	3.49 15	6.34 28	7.07 22	7.84 25	8.80 21
1948 1948	3.40 28	3.47 28	3.70 28	3.98 29	5.09 35	8.02 36	8.76 35	8.39 31	11.7 34
1949 1949	2.80 16	2.93 19	3.10 20	3.26 20	3.49 16	4.70 15	5.09 12	5.54 13	6.30 10
1950 1950	2.60 10	2.60 8	2.90 13	3.31 21	3.65 17	6.17 26	7.43 28	7.55 23	9.29 23
1951 1951	3.00 21	3.10 22	3.16 22	3.24 19	3.71 18	4.11 11	4.46 5	4.89 7	6.00 8
1952 1952	2.70 13	2.70 13	3.00 16	3.03 12	4.40 27	5.73 25	7.20 24	8.13 29	8.55 19
1953 1953	2.30 5	2.33 6	2.39 6	2.48 5	2.72 3	3.49 4	5.08 11	5.15 11	5.83 6
1954 1954	2.20 4	2.23 3	2.29 3	2.42 4	2.94 7	4.46 14	5.25 13	5.48 12	6.57 12
1955 1955	2.90 20	2.97 20	3.04 18	3.21 18	4.04 22	4.81 18	8.20 33	7.69 24	9.37 24
1956 1956	3.00 22	3.03 21	3.11 21	3.44 22	3.95 21	4.89 19	6.12 16	7.96 27	11.5 32
1957 1957	2.70 14	2.83 15	2.99 15	3.12 14	3.20 8	3.85 7	5.29 14	7.35 20	7.28 14
1958 1958	3.20 25	3.20 24	3.26 24	3.44 23	5.47 36	7.17 32	7.42 27	7.84 26	8.35 16
1959 1959	3.30 27	3.43 27	3.54 27	3.81 27	4.62 28	5.42 20	6.48 18	6.90 17	8.77 20

DVSTAT - DAILY VALUES STATISTICAL PROGRAM

STATION ID - 16515000
 WAIOHUE GULCH NEAR NAHIKU, MAUI, HI
 PARAMETER CODE - 00060 DISCHARGE
 STATISTIC CODE - 00003 MEAN

LOWEST MEAN VALUE AND RANKING FOR THE FOLLOWING NUMBER OF CONSECUTIVE DAYS
 FOR PERIOD OCT TO SEP

WATER YEAR	1	3	7	14	30	60	90	120	183
RANGE									
1960 1960	2.80 17	2.83 16	2.97 14	3.14 15	3.38 14	4.30 12	6.09 15	6.28 14	9.99 28
1961 1961	2.60 11	2.67 10	2.76 9	3.06 13	3.37 13	4.71 16	4.63 6	5.14 10	7.07 13
1962 1962	2.30 6	2.30 5	2.30 4	2.37 3	2.72 4	3.49 5	4.34 4	4.28 2	4.73 1

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HIGHEST MEAN VALUE AND RANKING FOR THE FOLLOWING NUMBER OF CONSECUTIVE DAYS
 FOR PERIOD OCT TO SEP

WATER YEAR	1	3	7	15	30	60	90	120	183
RANGE									
1923 1923	196 10	139 6	123 3	76.3 2	44.2 5	27.0 7	22.5 9	20.6 9	17.2 11
1924 1924	192 11	119 13	76.1 11	47.7 14	31.3 16	24.5 14	19.8 16	19.1 13	16.2 13
1925 1925	111 33	86.0 24	59.9 19	42.8 18	37.9 8	25.3 12	20.7 13	18.1 16	16.6 12
1926 1926	67.0 37	32.3 40	20.6 39	18.5 39	13.8 39	10.7 39	9.18 39	8.47 39	7.22 40
1927 1927	305 2	123 11	63.6 16	38.5 20	25.0 23	18.2 27	16.4 27	16.3 21	14.2 22
1928 1928	122 27	92.3 20	46.7 27	28.2 31	24.8 24	20.8 21	19.5 18	16.1 22	15.7 15
1929 1929	161 18	105 17	74.0 13	50.2 10	42.5 6	28.5 6	25.6 6	22.8 6	19.4 6
1930 1930	141 20	114 14	85.0 9	56.3 8	37.2 9	35.3 3	29.1 3	26.7 3	23.7 3
1931 1931	170 16	100 19	56.0 22	34.2 24	21.1 31	17.8 29	16.9 25	14.3 30	14.1 23
1932 1932	166 17	122 12	83.4 10	67.3 5	47.3 3	32.0 4	27.3 5	25.7 4	22.3 5
1933 1933	136 21	90.3 21	53.6 25	30.1 29	22.1 30	17.7 30	16.9 26	15.0 26	12.4 32
1934 1934	265 6	108 15	60.3 18	47.3 15	36.4 12	25.3 13	22.2 10	19.6 12	15.7 16
1935 1935	258 7	205 3	109 4	58.2 6	37.1 10	26.9 8	21.5 11	19.9 11	17.9 9
1936 1936	127 25	58.3 32	33.2 35	24.8 35	20.2 32	18.3 26	16.2 28	14.9 27	14.4 21
1937 1937	172 15	134 7	87.9 7	68.7 4	50.2 2	38.3 2	35.3 2	31.0 1	26.3 1
1938 1938	289 4	195 4	131 2	70.2 3	47.3 4	31.4 5	28.3 4	24.8 5	22.4 4
1939 1939	297 3	128 8	87.4 8	50.1 11	29.9 18	24.5 15	20.7 14	20.0 10	17.3 10
1940 1940	136 22	89.7 22	56.1 21	39.0 19	28.6 20	19.0 25	15.0 30	12.4 33	10.6 35
1941 1941	125 26	70.7 29	41.0 30	28.1 32	19.3 34	16.1 32	14.6 31	14.6 28	13.7 26
1942 1942	266 5	220 1	169 1	106 1	69.3 1	45.9 1	36.1 1	29.0 2	24.7 2
1943 1943	108 34	49.2 36	27.6 38	23.9 36	17.0 38	14.5 36	12.4 36	11.6 34	11.0 33
1944 1944	62.0 39	32.7 39	18.9 40	13.1 40	10.4 40	9.51 40	8.69 40	8.41 40	7.76 39
1945 1945	67.0 38	44.3 37	32.7 36	26.5 34	18.4 36	13.6 38	10.2 38	9.27 38	9.96 38
1946 1946	145 19	58.3 33	37.8 33	31.9 27	23.0 27	19.5 23	18.4 21	17.2 17	14.0 24
1947 1947	217 9	144 5	101 5	57.1 7	40.1 7	25.5 11	20.2 15	17.2 18	15.1 18
1948 1948	325 1	215 2	97.9 6	48.6 12	36.5 11	25.6 10	25.5 7	22.1 7	19.3 7
1949 1949	130 24	77.3 27	48.4 26	37.0 22	30.0 17	21.9 19	19.1 19	16.1 23	13.8 25
1950 1950	119 30	74.7 28	60.6 17	47.9 13	33.8 13	26.1 9	21.1 12	18.3 14	15.1 19
1951 1951	121 28	81.3 26	42.4 29	32.4 26	25.3 22	18.1 28	17.1 24	17.1 19	13.4 27
1952 1952	133 23	63.4 30	40.0 31	30.7 28	22.3 29	15.1 34	14.0 32	14.4 29	12.8 29
1953 1953	105 35	51.9 34	36.3 34	21.7 38	20.2 33	17.4 31	13.5 34	11.0 36	10.1 37
1954 1954	61.0 40	42.3 38	28.1 37	22.8 37	17.8 37	15.0 35	13.9 33	13.8 32	12.6 31
1955 1955	119 31	88.0 23	75.6 12	46.8 16	33.3 14	22.6 17	23.0 8	21.4 8	18.4 8
1956 1956	181 13	127 9	73.3 14	50.7 9	29.6 19	22.3 18	19.6 17	18.2 15	16.0 14
1957 1957	113 32	63.3 31	45.0 28	28.5 30	22.7 28	15.6 33	12.8 35	11.6 35	10.8 34
1958 1958	183 12	102 18	54.0 24	35.2 23	32.3 15	22.8 16	18.2 22	15.6 24	13.3 28
1959 1959	121 29	81.7 25	55.7 23	34.2 25	23.6 26	20.5 22	17.2 23	15.3 25	14.5 20

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HIGHEST MEAN VALUE AND RANKING FOR THE FOLLOWING NUMBER OF CONSECUTIVE DAYS
 FOR PERIOD OCT TO SEP

WATER YEAR	1	3	7	15	30	60	90	120	183
RANGE	181 14	106 16	72.3 15	38.1 21	24.3 25	19.3 24	19.1 20	16.7 20	15.7 17
1960 1960									
1961 1961	237 8	127 10	58.9 20	43.8 17	25.7 21	21.4 20	15.4 29	14.0 31	12.8 30
1962 1962	100 36	50.3 35	39.8 32	26.7 33	19.1 35	13.9 37	11.2 37	10.0 37	10.2 36

DVSTAT - DAILY VALUES STATISTICAL PROGRAM

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 WAIHOHE GULCH NEAR NAHIKU, MAUI, HI
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ANNUAL AND/OR SEMI-ANNUAL VALUES

MEAN VALUE AND RANKING FOR PERIOD INCLUDED IN LOW-VALUE ANALYSIS (OCT-SEP)		MEAN VALUE AND RANKING FOR PERIOD INCLUDED IN HIGH-VALUE ANALYSIS (OCT-SEP)	
WATER YEAR RANGE		WATER YEAR RANGE	
1923 1923	13.2 31	1923 1923	13.2 10
1924 1924	12.8 29	1924 1924	12.8 12
1925 1925	13.7 34	1925 1925	13.7 7
1926 1926	6.89 2	1926 1926	6.89 39
1927 1927	12.3 26	1927 1927	12.3 15
1928 1928	13.2 32	1928 1928	13.2 9
1929 1929	13.1 30	1929 1929	13.1 11
1930 1930	17.4 38	1930 1930	17.4 3
1931 1931	11.9 25	1931 1931	11.9 16
1932 1932	16.7 37	1932 1932	16.7 4
1933 1933	8.51 6	1933 1933	8.51 35
1934 1934	10.7 17	1934 1934	10.7 24
1935 1935	12.8 28	1935 1935	12.8 13
1936 1936	10.3 16	1936 1936	10.3 25
1937 1937	19.7 40	1937 1937	19.7 1
1938 1938	15.8 36	1938 1938	15.8 5
1939 1939	13.5 33	1939 1939	13.5 8
1940 1940	8.94 8	1940 1940	8.94 33
1941 1941	11.1 21	1941 1941	11.1 20
1942 1942	17.8 39	1942 1942	17.8 2
1943 1943	9.10 9	1943 1943	9.10 32
1944 1944	6.31 1	1944 1944	6.31 40
1945 1945	7.89 4	1945 1945	7.89 37
1946 1946	10.0 15	1946 1946	10.0 26
1947 1947	11.6 23	1947 1947	11.6 18
1948 1948	14.2 35	1948 1948	14.2 6
1949 1949	9.86 13	1949 1949	9.86 28
1950 1950	11.0 20	1950 1950	11.0 21
1951 1951	9.59 12	1951 1951	9.59 29
1952 1952	9.99 14	1952 1952	9.99 27
1953 1953	7.96 5	1953 1953	7.96 36
1954 1954	9.28 10	1954 1954	9.28 31
1955 1955	12.5 27	1955 1955	12.5 14
1956 1956	11.5 22	1956 1956	11.5 19
1957 1957	9.37 11	1957 1957	9.37 30
1958 1958	11.8 24	1958 1958	11.8 17
1959 1959	10.8 19	1959 1959	10.8 22
1960 1960	10.7 18	1960 1960	10.7 23
1961 1961	8.89 7	1961 1961	8.89 34
1962 1962	7.42 3	1962 1962	7.42 38

DVSTAT - DAILY VALUES STATISTICAL PROGRAM

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ANNUAL AND/OR SEMI-ANNUAL VALUES

MEAN VALUE AND RANKING FOR PERIOD INCLUDED IN LOW-VALUE ANALYSIS (OCT-SEP)	WATER YEAR RANGE	MEAN VALUE AND RANKING FOR PERIOD INCLUDED IN HIGH-VALUE ANALYSIS (OCT-SEP)	WATER YEAR RANGE
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