

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

PETITION TO AMEND INTERIM INSTREAM FLOW STANDARDS

EAST AND WEST WAILUANUI STREAMS, 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

16519000 (W), 16520000 (E),

Data to follow.

USGS stream gaging station 16521000

Period of Record Gages 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
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	--------

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
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THE 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

Alan Murakami

May 24, 2001

Signature

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

Date

For Official Use
 Date Received _____
 Date Approved _____

Streamflow

Estimates of streamflow and base flow are based on streamflow records of varying length and from different times. The error associated with comparing these records is not considered significant because the average annual values used in the comparisons are expected to be within about 10 percent of the true value in most cases. A statistical analysis of five streamflow records, each with more than 60 years of record, shows that the average annual discharge for any 10-year period within that record has a standard error of 12 percent when compared with the whole record (Fontaine, 1996). When the length of the subset is increased to a 50-year period, the standard error only improves to 5 percent. Thirty nine of the streamflow records for the study area are equal to or greater than 10 years long.

For this study, the length of the period of record at each gaging station was determined to be unimportant by comparing each record to three reference records from the study area. The three longest streamflow records, 5080 (73 years), 5180 (76 years), and 5870 (85 years) were chosen as reference records. For each other individual record, a time period equal to the length of that record was chosen. A subset of a reference record was then selected from this same time period and the average flow during that time period was compared with the total reference record to estimate the ratio of flow during the subset period to the reference period. This analysis was made for all three reference records and the result was averaged to obtain a period-of-record scale factor for each of the other records. The scale factor ranged from 0.88 to 1.13 (table 2). This variability is consistent with the statistical analysis reported by Fontaine (1996). This range of accuracy is considered sufficient for the type of comparisons made in this study, and therefore, no corrections were made to any of the records to account for differences in length or period of record.

Table 16. Streamflow in Wailuanui Stream, northeast Maui, Hawaii

[ft, feet; Mgal/d, million gallons per day; all data from Paulsen (1950); gaging-station number is preceded by 16 and ends in 00]

Gaging-station number	Stream name	Altitude (ft)	Date	Stream-flow (Mgal/d)	Cumulative streamflow without diversion (Mgal/d)	Comments
5210	Wailuanui	620	7/4/46	0.30	2.50	Daily mean
			2/23/47	0.17	1.15	
5190	West Wailuanui	1,268	7/4/46	1.11	1.11	Daily mean; upstream from Koolau Ditch diversion
			2/23/47	0.56	0.56	
5200	East Wailuanui	1,287	7/4/46	1.09	1.09	Daily mean; upstream from Koolau Ditch diversion
			2/23/47	0.42	0.42	

WAILUANUI

DVSTAT - DAILY VALUES STATISTICAL PROGRAM

STATION ID - 16521000
 WAIJUANUI STREAM NR KEANAE, MAUI, HI
 PARAMETER CODE - 0060 DISCHARGE
 STATISTIC CODE - 00003 MEAN

DURATION TABLE OF DAILY VALUES
 FOR PERIOD OCT TO SEP

CLASS	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35																													
WATER YEAR																																																																
RANGE																																																																
1933 1933	10	46	68	32	31	39	14	17	21	11	4	5	6	7	4	16	1	4	5	5	5	6	9	4	4	4	2	2	3	1	1	1	1	1	1	1																												
1934 1934	9	19	15	6	24	34	49	19	22	32	21	14	10	10	10	3	6	5	5	5	5	6	9	4	4	4	9	8	6	4	4	2	2	2	2	3	1																											
1935 1935	5	26	28	57	35	43	28	20	14	10	6	11	7	11	5	5	12	4	11	4	6	4	2	2	2	2	4	2	2	2	2	2	2	2	2	3	1																											
1940 1940	2	11	14	40	59	46	38	16	23	13	10	7	12	8	2	10	4	9	6	4	5	3	7	3	6	2	4	1	1	1	1	1	1	1	1	1																												
1941 1941	6	9	5	21	44	24	27	53	35	20	3	14	6	9	8	5	5	7	4	10	10	10	7	13	8	5	5	3	5	3	5	3	1	1	1	1																												
1942 1942	1	9	33	29	25	36	30	31	21	8	9	16	4	11	3	3	4	10	9	4	4	9	9	5	5	10	10	12	7	4	4	4	4	4	4	2																												
1943 1943	12	18	18	30	52	22	49	30	25	13	4	5	3	4	5	6	4	4	9	10	8	12	6	5	3	3	7	3	3	1	1	1	1	1	1	2																												
1944 1944	2	14	37	16	18	36	50	34	37	30	18	9	5	2	6	4	4	3	4	3	10	7	5	5	3	3	3	3	1	1	1	1	1	1	1	1																												
1945 1945	32	45	32	24	30	20	26	24	23	18	6	10	4	2	7	2	7	7	10	9	9	9	6	1	9	4	2	2	1	2	1	1	1	1	1	1																												
1946 1946	2	3	5	42	26	30	43	20	21	15	12	4	9	6	3	12	4	7	8	10	5	11	9	7	4	7	4	3	1	1	1	1	1	1	1	1																												
CLASS	VALUE	TOTAL	ACCUM	PERCT	CLASS	VALUE	TOTAL	ACCUM	PERCT	CLASS	VALUE	TOTAL	ACCUM	PERCT	CLASS	VALUE	TOTAL	ACCUM	PERCT	CLASS	VALUE	TOTAL	ACCUM	PERCT	CLASS	VALUE	TOTAL	ACCUM	PERCT	CLASS	VALUE	TOTAL	ACCUM	PERCT	CLASS	VALUE	TOTAL	ACCUM	PERCT																									
1	0.00	0	3652	100.00	13	2.50	165	1224	33.52	25	46.00	54	299	8.19	26	59.00	63	245	6.71	27	75.00	50	182	4.98	28	95.00	42	132	3.61	29	121.00	34	90	2.46	30	155.00	19	56	1.53	31	198.00	19	37	1.01	32	252.00	9	18	0.49	33	321.00	2	9	0.25	34	410.00	6	7	0.19	35	523.00	1	1	0.03
2	0.17	4	3652	100.00	14	3.20	80	1059	29.00	26	59.00	63	245	6.71	27	75.00	50	182	4.98	28	95.00	42	132	3.61	29	121.00	34	90	2.46	30	155.00	19	56	1.53	31	198.00	19	37	1.01	32	252.00	9	18	0.49	33	321.00	2	9	0.25	34	410.00	6	7	0.19	35	523.00	1	1	0.03					
3	0.22	26	3648	99.89	15	4.00	76	979	26.81	27	75.00	50	182	4.98	28	95.00	42	132	3.61	29	121.00	34	90	2.46	30	155.00	19	56	1.53	31	198.00	19	37	1.01	32	252.00	9	18	0.49	33	321.00	2	9	0.25	34	410.00	6	7	0.19	35	523.00	1	1	0.03										
4	0.28	123	3622	99.18	16	5.10	78	903	24.73	28	95.00	42	132	3.61	29	121.00	34	90	2.46	30	155.00	19	56	1.53	31	198.00	19	37	1.01	32	252.00	9	18	0.49	33	321.00	2	9	0.25	34	410.00	6	7	0.19	35	523.00	1	1	0.03															
5	0.35	203	3499	95.81	17	6.60	58	825	22.59	29	121.00	34	90	2.46	30	155.00	19	56	1.53	31	198.00	19	37	1.01	32	252.00	9	18	0.49	33	321.00	2	9	0.25	34	410.00	6	7	0.19	35	523.00	1	1	0.03																				
6	0.45	201	3296	90.25	18	8.40	56	767	21.00	30	155.00	19	56	1.53	31	198.00	19	37	1.01	32	252.00	9	18	0.49	33	321.00	2	9	0.25	34	410.00	6	7	0.19	35	523.00	1	1	0.03																									
7	0.57	296	3095	84.75	19	11.00	56	711	19.47	31	198.00	19	37	1.01	32	252.00	9	18	0.49	33	321.00	2	9	0.25	34	410.00	6	7	0.19	35	523.00	1	1	0.03																														
8	0.73	400	2799	76.64	20	14.00	44	637	17.44	32	252.00	9	18	0.49	33	321.00	2	9	0.25	34	410.00	6	7	0.19	35	523.00	1	1	0.03																																			
9	0.93	336	2399	65.69	21	17.00	73	593	16.24	33	321.00	2	9	0.25	34	410.00	6	7	0.19	35	523.00	1	1	0.03																																								
10	1.20	302	2063	56.49	22	22.00	82	520	14.24	34	410.00	6	7	0.19	35	523.00	1	1	0.03																																													
11	1.20	280	1761	48.22	23	28.00	70	438	11.99	35	523.00	1	1	0.03																																																		
12	1.90	257	1481	40.55	24	36.00	69	368	10.08																																																							

DURATION CURVE STATISTICAL CHARACTERISTICS FOR ...
 STATION ID: 16521000 WAILUANI STREAM NR KEANAE, 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	0.36	(LOG = -0.43821)
90.0	0.46	(LOG = -0.34152)
85.0	0.56	(LOG = -0.24833)
80.0	0.66	(LOG = -0.17801)
75.0	0.76	(LOG = -0.11919)
70.0	0.85	(LOG = -0.06992)
65.0	0.95	(LOG = -0.02216)
60.0	1.10	(LOG = 0.04020)
55.0	1.25	(LOG = 0.09831)
50.0	1.44	(LOG = 0.15698)
45.0	1.67	(LOG = 0.22220)
40.0	1.95	(LOG = 0.28940)
35.0	2.37	(LOG = 0.37538)
30.0	3.04	(LOG = 0.48355)
25.0	4.96	(LOG = 0.69507)
20.0	10.1	(LOG = 1.00429)
15.0	20.1	(LOG = 1.30311)
10.0	36.4	(LOG = 1.56117)
5.0	74.8	(LOG = 1.87418)

MEAN OF LOGS = 0.35192

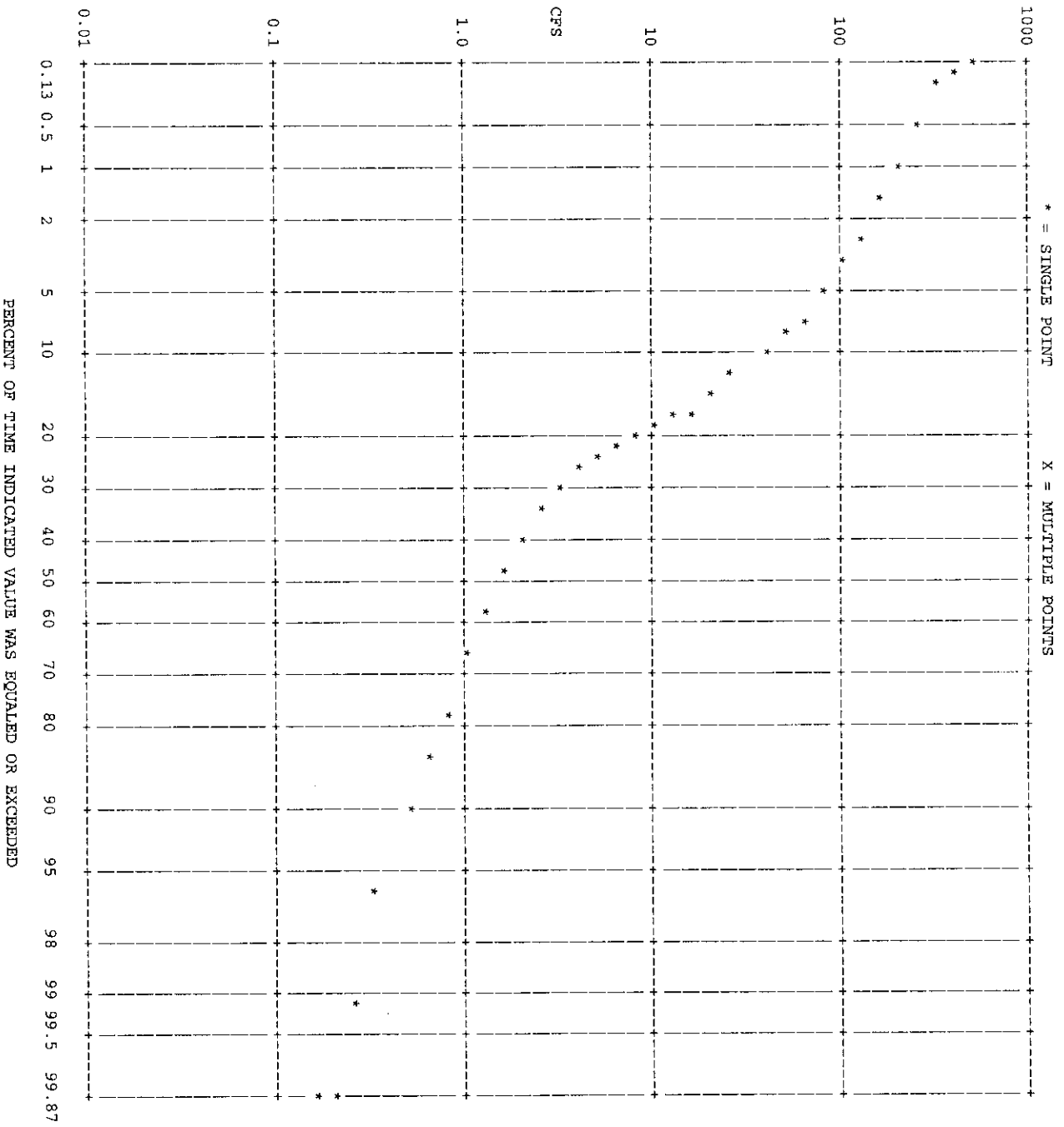
STANDARD DEVIATION OF LOGS = 0.65625 (VARIABILITY INDEX - SEE USGS WSP 1542-A)

COEFFICIENT OF VARIATION = 1.86475

COEFFICIENT OF SKEW = 1.09772

LOG-NORMAL DURATION PLOT FOR PERIOD OCT TO SEP
 STATION ID: 16521000 WAILUANUI STREAM NR KEANAE, MAUI, HI
 PARAMETER CODE - 00060 DISCHARGE
 STATISTIC CODE - 00003 MEAN

(YEARS 1932 - 1947)



DVSTXT - DAILY VALUES STATISTICAL PROGRAM

STATION ID - 16521000
 WAILUANUI STREAM NR KEANAE, 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 RANGE	1	3	7	14	30	60	90	120	183
1933 1933	.29 5	.30 5	.32 5	.37 5	.41 4	.66 2	.81 1	1.00 1	1.95 1
1934 1934	.22 3	.25 3	.27 3	.27 1	.29 1	2.32 8	5.95 8	5.27 6	6.98 5
1935 1935	.50 10	.50 10	.55 10	.64 10	1.01 10	2.57 9	2.75 3	3.34 3	7.19 6
1940 1940	.31 7	.34 7	.36 8	.38 7	.54 6	1.45 5	3.22 4	5.06 5	6.97 4
1941 1941	.34 8	.34 8	.35 6	.43 8	.62 8	1.52 6	6.92 9	8.52 10	12.0 10
1942 1942	.43 9	.46 9	.53 9	.62 9	.78 9	1.58 7	4.79 6	6.07 7	11.2 9
1943 1943	.28 4	.31 6	.35 7	.37 6	.58 7	4.19 10	9.02 10	8.12 9	10.7 8
1944 1944	.20 2	.21 2	.23 1	.28 2	.31 2	1.23 4	4.03 5	4.07 4	5.25 2
1945 1945	.29 6	.29 4	.30 4	.32 4	.37 3	.57 1	1.14 2	2.92 2	5.78 3
1946 1946	.17 1	.20 1	.25 2	.31 3	.49 5	.80 3	5.47 7	6.78 8	9.77 7

DVSTAT - DAILY VALUES STATISTICAL PROGRAM

STATION ID - 16521000
 WAILUANUI STREAM NR KEANAE, MAUI, HI
 PARAMETER CODE - 00060 DISCHARGE
 STATISTIC CODE - 00003 MEAN

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

WATER YEAR	1	3	4	7	15	30	60	90	120	183
1933 1933	453	283	283	148	75.4	49.8	30.1	26.8	22.5	16.2
1934 1934	693	291	291	151	119	86.2	54.0	42.9	35.8	26.4
1935 1935	436	425	425	235	122	69.1	45.4	37.5	33.4	27.9
1940 1940	364	231	231	136	84.4	58.2	32.3	23.4	19.6	16.2
1941 1941	292	180	180	101	55.6	36.3	25.4	21.2	22.4	20.2
1942 1942	480	391	391	328	210	144	91.0	67.6	51.4	44.3
1943 1943	200	92.7	92.7	56.5	48.8	30.2	23.4	18.5	16.7	14.6
1944 1944	161	85.5	85.5	45.4	28.5	17.5	14.2	12.1	9.97	8.89
1945 1945	161	104	104	73.3	55.2	32.6	22.2	15.2	12.7	13.2
1946 1946	322	132	132	82.7	62.5	44.7	33.3	32.3	28.9	22.8

DVSTAT - DAILY VALUES STATISTICAL PROGRAM

STATION ID - 16521000
 WALLUANUI STREAM NR KEANAE, MAUI, HI
 PARAMETER CODE - 00060 DISCHARGE
 STATISTIC CODE - 00003 MEAN

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	
1933 1933	8.55 2	1933 1933	8.55 9
1934 1934	16.2 9	1934 1934	16.2 2
1935 1935	15.8 8	1935 1935	15.8 3
1940 1940	12.6 5	1940 1940	12.6 6
1941 1941	14.2 7	1941 1941	14.2 4
1942 1942	27.8 10	1942 1942	27.8 4
1943 1943	10.9 4	1943 1943	10.9 7
1944 1944	6.00 1	1944 1944	6.00 10
1945 1945	8.63 3	1945 1945	8.63 8
1946 1946	13.9 6	1946 1946	13.9 5