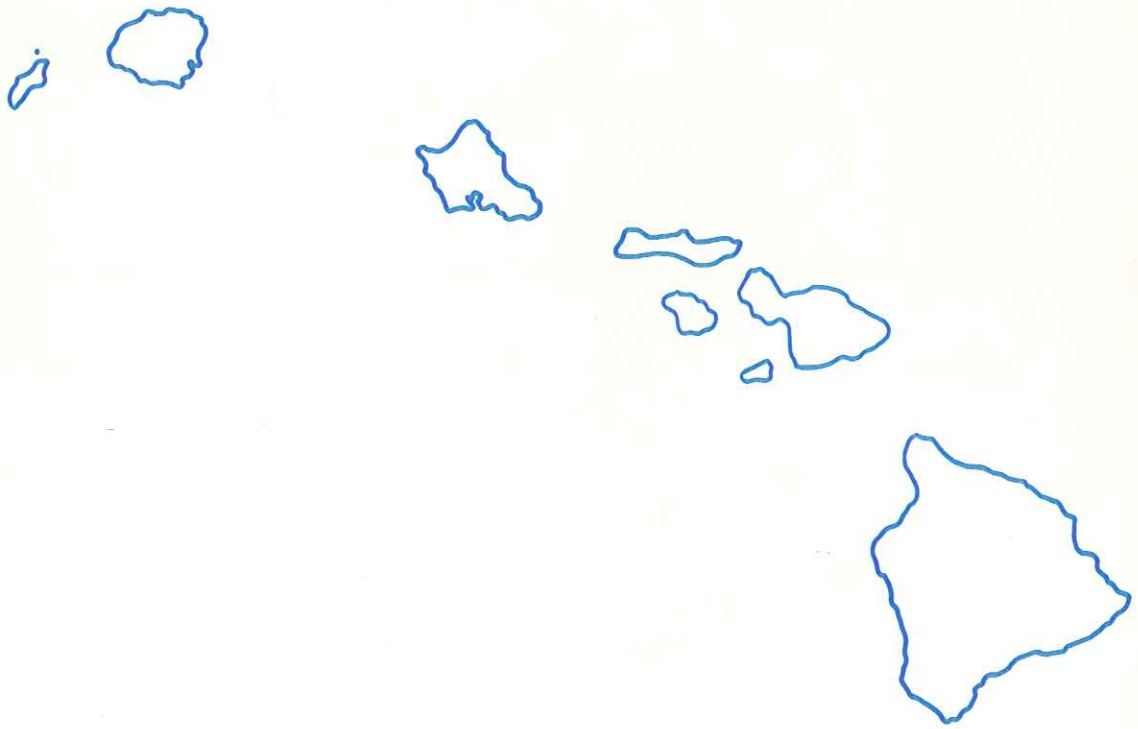
Water Resources Data Hawaii and other Pacific Areas Water Year 1993

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

CALENDAR FOR WATER YEAR 1993

1992

OCTOBER

S	M	T	W	T	F	S
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NOVEMBER

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1993

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JULY

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AUGUST

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15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

SEPTEMBER

S	M	T	W	T	F	S
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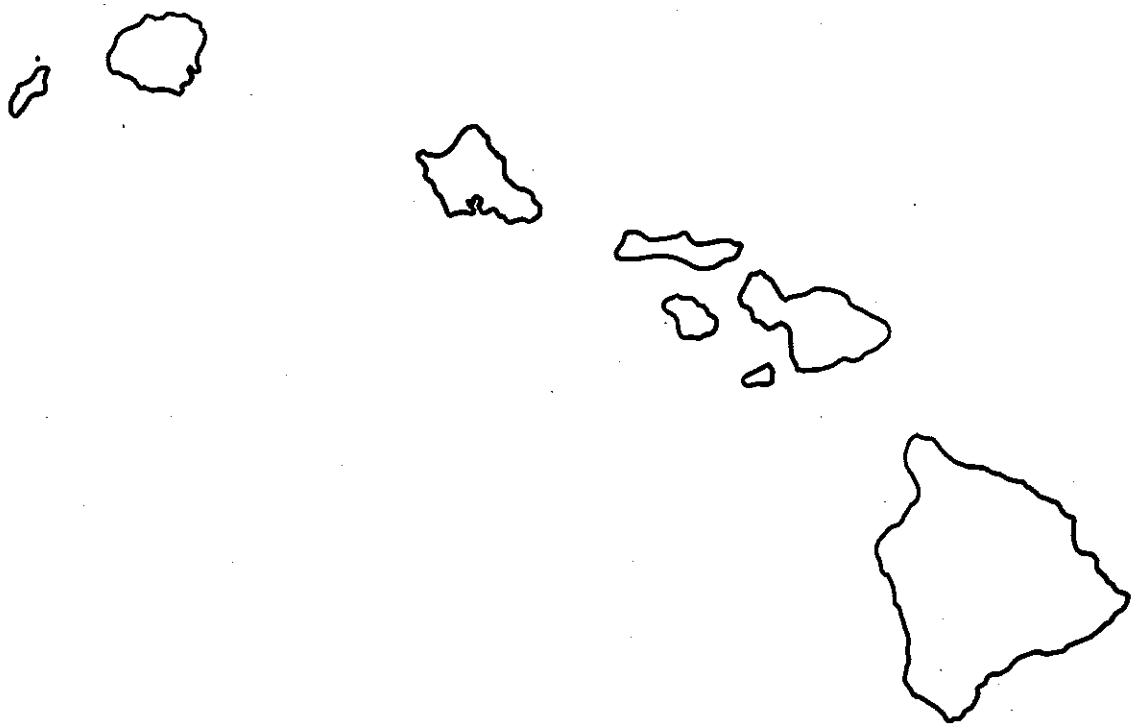
Water Resources Data Hawaii and other Pacific Areas Water Year 1993

Volume 1. Hawaii

by Iwao Matsuoka, Vaughn E. Kunishige, and Marty G. Lum



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

U.S DEPARTMENT OF THE INTERIOR

BRUCE BABBITT, Secretary

U.S. GEOLOGICAL SURVEY

GORDON P. EATON, Director

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and other Pacific Areas write to
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677 Ala Moana Boulevard, Suite 415
Honolulu, Hawaii 96813

1994

PREFACE

This volume of the annual hydrologic data report for Hawaii and other Pacific Areas is one of a series of annual reports that document hydrologic data gathered from the U.S. Geological Survey's surface and ground-water data collection networks in each State, Puerto Rico, and the Trust Territories. These records of streamflow, ground-water levels, and quality of water provide the hydrologic information needed by State, local, and Federal agencies, and the private sector for developing and managing our Nation's land and water resources. Hydrologic data for Hawaii and other Pacific Areas are contained in two volumes:

Volume 1. Hawaii
Volume 2. Guam, Northern Mariana Islands, Federated States of Micronesia, Palau, and American Samoa.

This report is the culmination of a concerted effort by dedicated personnel of the U.S. Geological Survey who collected, compiled, analyzed, verified, and organized the data, and who typed, edited, and assembled the report. In addition to the authors, who had primary responsibility for assuring that the information contained herein is accurate, complete, and adheres to Geological Survey policy and established guidelines, the following individuals contributed significantly to the collection, processing, and tabulation of the data:

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16. Abstract (Limit: 200 words)

Water resources data for the 1993 water year for Hawaii and other Pacific Areas consist of records of stage, discharge, and water quality of streams and springs; and water levels and quality of water in wells. This report, volume 1, contains discharge records for 88 gaging stations; water quality for 16 gaging stations, 19 partial-record flow stations, and 142 wells; and water levels for 63 observation wells. Also included are - 107 crest-stage partial record stations, 4 miscellaneous partial-record stations, 6 low-flow partial-record stations, and 45 rainfall stations. These data represent that part of the National Water Data System operated by the U.S. Geological Survey and cooperating State, Federal, and other agencies in Hawaii.

17. Document Analysis a. Descriptors

*Hawaii, *Hydrologic data, *Surface water, *Ground water, *Water quality, Flow rate, Gaging stations, Chemical analyses, Sediments, Water temperatures, Sampling sites, Water levels, Water analyses, Rainfall accumulation.

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NOTE.--Data for partial-record and miscellaneous sites are published in separate sections of the data report. See references at the end of this list of page numbers for these sections.

Letters after station name designate type of data: (d) discharge, (c) chemical, (m) microbiological,(t) water temperature, and (s) sediment

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HAWAII		
ISLAND OF KAUAI		
Kawaikoi Stream (head of Waimea River) near Waimea (d)	16010000	40
Waimea River:		
Waialae Stream at altitude 3,820 ft, near Waimea (dct)	16019000	42
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ISLAND OF OAHU		
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SURFACE-WATER STATIONS IN DOWNSTREAM ORDER, FOR WHICH RECORDS ARE PUBLISHED IN THIS VOLUME

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Letters after well number designate type of data:
(c) chemical, (t) water temperature, (w) water level

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ISLAND OF KAUAI			
(2-0021-01)	220057159210301	(w)	284
(2-0044-13)	220018159444702	(ctw)	285, 324
(2-0044-14)	220019159444801	(w)	286
(2-0044-15)	220016159442701	(ctw)	287, 324
(2-0120-01)	220136159205501	(ct)	324
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(2-0545-01)	220530159450401	(ct)	324
(2-0818-01)	220827159185401	(ct)	324
(2-0818-02)	220826159185401	(ct)	324
(2-0818-03)	220825159185301	(w)	290
(2-1020-03)	221038159203801	(w)	290
(2-1125-01)	221141159252501	(ct)	324
(2-1125-02)	221141159252502	(ct)	324
(2-1126-01)	221150159264501	(ctw)	291, 324
(2-1126-02)	221151159265001	(ct)	324
(2-1229-03)	221201159293401	(ct)	325
(2-1232-01)	221247159324801	(ctw)	291, 325
(2-1333-01)	221318159335901	(ctw)	292, 325
(2-5426-03)	215434159263301	(w)	292
(2-5427-01)	215454159274201	(ctw)	293, 325
(2-5427-02)	215455159274201	(ct)	325
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(3-1646-01)	211646157465201	(ct)	327
(3-1851-19A)	211832157515501	(ct)	327
(3-1851-19B)	211832157515502	(ct)	327
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(3-2448-01)	212422157485601	(ct)	328
(3-2550-01)	212556157500301	(ct)	328
(3-2558-10)	212506157582301	(ct)	328
(3-2600-04)	212659158004102	(w)	306
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(3-2809-06)	212828158092001	(ct)	328
(3-2812-01)	212859158124301	(ct)	328
(3-2901-07)	212927158014801	(ctw)	307, 329
(3-2901-09)	212945158014301	(ct)	329
(3-2911-02)	212939158112301	(ct)	329

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(3-3213-06)	213224158135901	(ct)	329
(3-3251-01)	213243157510001	(ct)	329
(3-3352-01)	213327157524401	(ctW)	308, 329
(3-3404-01)	213445158044301	(ct)	339
(3-3405-01)	213429158055501	(ct)	329
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(6-4928-02)	204909156281401	(W)	315
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(6-5128-02)	205102156282501	(ct)	332
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DISCONTINUED GAGING STATIONS

The following continuous record streamflow stations in Hawaii have been discontinued or converted to partial-record stations. Daily records were collected and are stored in WATSTORE for the period of record shown for each station.

Station Number	Station name	Drainage area (mi^2)	Period of Record
	ISLAND OF KAUAI		
16011000	Waikoali Str nr Waimea	1.58	1909-13, 1919-25
16012000	Kauaikinana Str nr Waimea	0.84	1919-25
16013000	Mohihi Str at alt 3,420 ft nr Waimea	1.68	1920-26, 1936-71
16014000	Kokee Ditch nr Waimea	--	1926-82
16015000	Mohihi Str nr Waimea	2.20	1909-17
16016000	Waimea River at alt 840 ft nr Waimea	20.0	1916-18, 1925-68
16017000	Koaie Str at alt 3,770 ft nr Waimea	1.68	1919-32, 1954-68
16018000	Koaie Str nr Waimea	9.97	1916-18
16020000	Waialae Str nr Waimea	2.81	1910-16
16021000	Waialae Str at alt 800 ft nr Waimea	7.87	1917-21
16022000	Kekaha Ditch at Camp 1 nr Waimea	--	1908-68
16024000	Kekaha Ditch at siphon nr Waimea	--	1910-12
16025000	Kekaha Ditch at flume 2 nr Waimea	--	1910-12
16027000	Kekaha Ditch below tunnel 12 nr Waimea	--	1908-34
16028000	Waimea R below Kekaha Ditch intk nr Waimea	44.2	1921-55
16029000	Waimea Ditch nr Waimea	--	1912-14 1916-21
16029100	Waimea Ditch below wasteway nr Waimea	--	1960-72
16031000	Waimea River nr Waimea	57.8	1910-18, 1919, 1943-68, 1969-72
16033000	Olokele Ditch at weir nr Makaweli	--	1912-17
16034000	Olokele River nr Waimea	4.85	1915-16
16035000	Halekua Str nr Waimea	0.56	1912-14
16037000	Poowaiomahaihai Ditch nr Waimea	--	1911-13
16037100	Makaweli R bl Poowaiomahaihai Dit nr Waimea	25.0	1911-17
16039000	Hiloa Ditch nr Eleele	--	1911-15
16042000	Hanapepe Ditch at Hanapepe Falls nr Eleele	--	1911-15
16043000	Hanapepe Ditch below intake	--	1930-38
16044000	Hanapepe Ditch at Koula nr Eleele	--	1910-21, 1927-49
16045000	Hanapepe Ditch below makai siphon nr Eleele	--	1929-32
16046000	Hanapepe Ditch at weir nr Hanapepe	--	1912-13, 1915-17
16047000	Koula River at Koula nr Eleele	12.6	1910-16
16048000	Manuahi Str at Koula nr Eleele	5.44	1917-20
16050000	G Ditch at makai siphon nr Eleele	--	1929-32
16051000	Hanapepe River at makai siphon nr Eleele	20.5	1929-32
16053000	Kamoolao Str nr Koloa	1.30	1939-41
16053400	Upper Haiku Ditch nr Puhi	--	1963-71
16053600	Lower Haiku Ditch nr Puhi	--	1963-71
16053800	Kamooloa Str nr Puhi	5.79	1963-70
16054000	Kuia Str nr Puhi	0.40	1939-41
16054200	Koloa Ditch nr Koloa	--	1964-71
16054400	Koloa tunnel nr Koloa	--	1966-71
16054500	Kuia Str nr Puhi	5.09	1963-66
16056000	Hanamaulu Str at Kapaia nr Lihue	6.41	1911-13
16056800	Waiahi-Kuia aqueduct nr Puhi	--	1964-71
16057000	Lihue Ditch nr Lihue	--	1910-19
16058000	Hanamaulu Ditch nr Lihue	--	1910-20
16058500	S F Wailua River nr rock quarry nr Lihue	20.2	1974-83
16061000	North Wailua Ditch nr Lihue	--	1932-85
16063000	N F Wailua River at alt. 650 ft nr Lihue	5.29	1914-85
16064000	Kanaha Ditch nr Lihue	--	1910-55
16068700	North Fork Wailua River nr Lihue	14.6	1910-14
16070000	Aahoaka Ditch nr Kapaa	--	1966-72
16072000	Konohiki Str at Makakualele mka weir nr Kapaa	0.65	1911-13
16073000	Konohiki Str at Makakualele mki weir nr Kapaa	0.89	1912
16074000	N F Kaehulua Str at Kainahola weir nr Kapaa	1.39	1911-13
16075000	S F Kaehulua Str at Wainamuamu weir nr Kapaa	0.04	1911-13
16076000	Kaehulua Str at Kuhinoa weir nr Kapaa	1.90	1911-13
16078000	Kapaa Str nr Kealia	3.05	1910-20
16079200	Tunnel Ditch at Kapahi nr Kapaa	--	1909-11
16079400	Pipe Ditch at Kapahi nr Kapaa	--	1909-11
16079600	Kapaa Ditch at Kapahi nr Kapaa	--	1909-11
16082000	Kaneha Ditch nr Kealia	--	1909-13
16086000	Anahola Ditch above wasteway nr Kealia	--	1915-21
16087000	Anahola Ditch wasteway nr Kealia	--	1936-85
16089000	Anahola Str nr Kealia	4.27	1910, 1913-85
16090000	Lower Anahola Ditch at Kiokala nr Kealia	--	1909-14
16092000	Lower Anahola Ditch at makai weir nr Kealia	--	1909-10

DISCONTINUED GAGING STATIONS--Continued

Station Number	Station name	Drainage area (mi^2)	Period of Record
	ISLAND OF KAUAI--Continued		
16093000	Anahola Str at Kiokala Dam nr Kealia	4.27	1910-12
16093200	Anahola Str at Anahola	9.24	1962-65
16094200	Ka Loko Ditch nr Kilauea	--	1932-68
16095000	Puu Ka Ele Ditch nr Kilauea	--	1932-67
16095200	Ross Ditch nr Kilauea	--	1955-67
16095900	Kalihiwai Ditch above wasteway nr Kilauea	--	1960-68
16096000	Kalihiwai Ditch nr Kilauea	--	1934-67
16097000	Pohakuhonu Str nr Kilauea	1.73	1957-72
16097300	Halaulani Str nr Kilauea	0.12	1922-25
16098000	Kalihiwai River nr Hanalei	3.64	1914-23
16099000	Kalihiwai River nr Kilauea	4.12	1912-13
16099500	Hanalei Ditch nr Kilauea	--	1956-62
16100000	Hanalei tunnel outlet nr Lihue	--	1932-85
16101000	Hanalei River at alt. 625 ft. nr Hanalei	7.17	1914-55
16102000	China Ditch nr Hanalei	--	1911-19
16104000	Kuna Ditch nr Hanalei	--	1912-14, 1917-20
16105000	Waioli Str nr Hanalei	1.81	1914-32
16106000	Lumahai River nr Hanalei	6.95	1914-33
16109000	Wainiha River above intake nr Hanalei	11.6	1914-16
16110000	Wainiha Canal at intake nr Wainiha	--	1910-16
16111000	Wainiha Canal at tunnel 18 nr Wainiha	--	1911
16113000	Wainiha River nr Wainiha	20.6	1912-16
16115000	Hanakapiai Str nr Hanalei	2.73	1931-52
16116000	Hanakoa Str nr Hanalei	0.50	1931-52
16117000	Kalalau Str nr Hanalei	1.55	1931-55
	ISLAND OF OAHU		
16201000	RB of NF Kaukonahua Str nr Wahiawa	1.17	1913-53
16203000	Mauka Ditch nr Wahiawa	--	1947-68
16204000	North Fork Kaukonahua Str nr Wahiawa	4.86	1946-68
16206000	South Fork Kaukonahua Str nr Wahiawa	1.93	1913-14, 1915-16, 1944-50
16206500	Koolau Ditch at reservoir nr Wahiawa	4.00	1914-15
16207000	SF Kaukonahua Str bl U.S. Army res nr Wahiawa	0.86	1914-17
16208500	RB of South Fork Kaukonahua Str nr Wahiawa	5.26	1957-72
16209000	SF Kaukonahua Str ab Wahiawa res nr Wahiawa	--	1946-58
16210900	Poamoho Tunnel nr Wahiawa	1.79	1958-79
16211000	Poamoho Str nr Wahiawa	--	1947-73
16211850	Puea Mauka Ditch nr Waianae	4.39	1960-67
16211900	Kaupuni Str nr Waianae	0.60	1957-60
16212000	Puhawai Str at Lualualei nr Waianae	1.16	1930-44
16212400	Awanui Gulch nr Barbers Point NAS	13.80	1957-58
16212900	Kipapa Str nr Waipahu	--	1966-68
16217000	Pearl Harbor Spr at Puukapu nr Pearl City	--	1931-35
16218000	Pearl Harbor Springs at Loko Kukona	--	1931-35, 1936-45
16218500	Pearl Harbor Spr at Kaluaoopu nr Pearl City	--	1931-37
16219000	Hawn Elec. Co. tunnel at Waiau nr Pearl City	--	1939-42
16220000	Hawn Elec. Co. wasteway at Waiau nr Pearl City	--	1953-59
16222000	Pearl Harbor Sprngs at Waiau	--	1913-39, 1942-47
16224000	Pearl Harbor Springs at Kalauoa	--	1931-62, 1964-65, 1966-68, 1970-88
16224500	Kalauao Str at Moanalua Road at Aiea	2.59	1957-82
16225000	Kalauao Str at Aiea	2.61	1953-57
16227500	Moanalua Str nr Kaneohe	0.94	1968-78
16227700	Moanalua Str tributary nr Kaneohe	0.62	1968-78
16227900	Moanalua Str tributary nr Aiea	0.03	1972-78
16228900	Kalihi Str nr Kaneohe	0.60	1966-71
16230000	Lulumahu Dit at upper Nuuanu Res nr Honolulu	--	1911-13
16231000	Luakaha weir in upper Nuuanu Valley nr Hon	--	1910-13
16231500	Moole Ditch mauka station nr Honolulu	--	1917-20
16231700	Moole Ditch makai station nr Honolulu	--	1918-23
16235000	Nuuanu Str at Kuakini Street nr Honolulu	4.39	1911-12
16236000	Kahuawai Spring nr Honolulu	--	1912-14
16237000	Pauoa Str at upper Pauoa Valley nr Honolulu	0.79	1911-13
16238500	Waihi Str at Honolulu	1.14	1913-21, 1925-83
16239500	East Manoa Ditch nr Honolulu	--	1915-16, 1918-20, 1926-39
16241000	Manoa Str at upper Manoa Valley nr Honolulu	2.62	1910-13
16242000	Manoa Str at College of Hawaii nr Honolulu	4.99	1909-10, 1912-18
16243000	Manoa Str at Waialae Road nr Honolulu	5.38	1910-12

DISCONTINUED GAGING STATIONS--Continued

Station Number	Station name	Drainage area (mi^2)	Period of Record
	ISLAND OF OAHU--Continued		
16244000	Pukele Str nr Honolulu	1.18	1926-82
16245000	Waiomao Str at upper Palolo Valley nr Hon	0.35	1911-13
16246000	Waiomao Str nr Honolulu	1.04	1911, 1912, 1926-71
16247000	Palolo Str nr Honolulu	3.63	1952-79
16248900	Waimanalo Ditch below main res nr Waimanalo	--	1912-13
16249000	Waimanalo Str at Waimanalo	2.16	1967-70
16249200	Maunawili Str nr Waimanalo	1.28	1912-16
16249400	Main Spring nr Kailua	--	1914-16
16249600	Makawao Spring nr Kailua	--	1914-16
16249800	Makawao Ditch nr Kailua	--	1912-15
16250000	Maunawili Ditch nr Waimanalo	--	1954-68
16256000	Kamakalepo Str nr Kailua	0.82	1912, 1913-16
16257000	Pohakea Str nr Kailua	0.21	1912-14
16258000	Maunawili Str ab Wong Leongs Ditch nr Kailua	4.60	1922-23
16260000	Maunawili Str nr Kailua	4.60	1912, 1913-16
16260500	Maunawili Str at highway 61 nr Kailua	5.34	1967-71
16261000	North Branch Kahanaiki Str nr Kailua	0.34	1913-14
16262000	South Branch Kahanaiki Str nr Kailua	0.21	1913-14
16263000	Kahanaiki Str nr Kailua	0.58	1912, 1914-16
16264400	Kawainui Swamp drain canl at Kailua Rd at Kailua	--	1961-65
16264500	Kawainui Swamp canal at Wanaao Rd at Kailua	--	1961-64
16266000	Kamooalii Str nr Kaneohe	1.48	1914-16
16267000	Hooleinaiwa Str nr Kaneohe	0.61	1914-16
16268000	Piho Str nr Kaneohe	0.43	1914-16
16269000	Kuou Ditch nr Kaneohe	--	1914-16
16270000	Kuou Str nr Kaneohe	0.37	1914-16
16270500	Kamooalii Str below Kuou Str nr Kaneohe	3.21	1967-70, 1971, 1972-76
16271000	North Luluku Ditch nr Kaneohe	--	1914-16
16272000	Luluku Str nr Kaneohe	0.46	1914-16
16273000	Young Mau Ditch nr Kaneohe	--	1914-16
16273900	Kamooalii Str at Kaneohe	4.38	1959-63, 1965-80
16274000	Ahlo Ditch nr Kaneohe	--	1914-16
16276000	Reservoir Ditch nr Heeia	--	1914-16
16277000	Waipio Ditch nr Heeia	--	1914-16
16278000	Iolekaa Str mauka nr Heeia	0.29	1940-70
16279000	Iolekaa Str nr Heeia	0.52	1914-16
16280000	Wing Wo Tai Ditch nr Heeia	--	1914-16
16281000	Hop Tuck Ditch nr Heeia	--	1914-16
16282000	Lee Ditch nr Heeia	--	1914-16
16283000	Kahaluu Str nr Heeia	0.28	1935-71
16283800	Waihee Str at alt. 260 ft nr Heeia	0.31	1961-66
16284000	Waihee Str nr Heeia	0.93	1935-82
16284500	Waihee Str at Kahaluu	2.26	1966-71
16285000	Waiahole tunnel at Waianu nr Waiahole	--	1950-69
16286000	Waiahole tunl wasteway at intk 31 nr Waiahole	--	1951-69
16287000	Waiahole tunnel at north portal nr Waiahole	--	1951-69
16287200	Waiahole tunnel at adit 8 nr Waipahu	--	1956-69
16288000	Halona Str nr Waikane	0.08	1911
16289000	Waihi Str nr Waikane	0.11	1911
16290000	Waiahole Str below powerhouse nr Waiahole	0.46	1915
16291000	Waiahole Str at alt. 250 ft. nr Waiahole	0.99	1955-68
16292000	Waiahole Str nr Waiahole	1.22	1911-16
16293000	Waianu Str nr Waikane	1.28	1911
16294000	Waiahole Str at Waiahole nr Waikane	3.60	1911-12
16295000	Waikane Str nr Waikane	2.35	1912
16296000	Kahana Str nr Kahana	3.20	1914-17
16297000	Kawa Str nr Kahana	2.09	1914-17
16299000	Punaluu Str at alt. 539 ft. nr Punaluu	0.98	1915-18
16300000	Waihoi Str nr Punaluu	0.50	1915-17
16301000	Punaluu Str at alt. 250 ft. nr Punaluu	2.78	1914-18
16304000	Kaluanui Str nr Hauula	0.50	1915-17
16305000	Kaipapau Str nr Hauula	0.21	1906-07
16306000	Koloa Gulch nr Laie	0.90	1914-18
16307000	Wailele Gulch nr Laie	0.50	1914-15, 1916-18
16308000	East Branch Kahawainui Str nr Laie	0.53	1914-18
16308990	Malaekahana Str nr Laie	0.64	1963-71
16309000	Malaekahana Str nr Kahuku	1.66	1914-18
16310000	Middle Branch Malaekahana Str nr Kahuku	0.69	1914-18
16329000	Kaiwikoele Str tributary nr Maunawai	0.97	1967-71
16340500	Anahulu River tributary nr Haleiwa	0.83	1967-71
16343000	Helemano Str at Haleiwa	14.20	1967-82

DISCONTINUED GAGING STATIONS--Continued

Station Number	Station name	Drainage area (mi^2)	Period of Record
	ISLAND OF MOLOKAI		
16401000	Papalaua Str nr Pukoo	2.00	1919-29
16402000	Pulena Str nr Wailau	4.38	1919-28, 1937-57
16403000	Waiakeakua Str nr Wailau	1.41	1919-29, 1937-57
16404000	Pelekunu Str nr Pelekunu	2.59	1919-29, 1937-47, 1948-57, 1971-82
16405000	Lanipuni Str nr Pelekunu	1.09	1919-29, 1937-57
16406000	Waikolu Str at alt. 650 ft nr Kalaupapa	2.99	1920-23
16409000	Waihanau Str nr Kalaupapa	1.18	1930-32
16410000	Keolewa Str nr Kalae	0.18	1940-44
16411000	Waialala Spring nr Kalae	--	1940-60
16412000	Mokomoko Gulch nr kalae	0.23	1940-45
16411300	Kakaako Gulch at Hwy 46 nr Mauna Loa	0.18	1964-85
16415000	EF Kawela Gulch	0.45	1946-71
16416000	Punaula Gulch nr Pukoo	0.24	1947-72
	ISLAND OF MAUI		
16501000	Palikea Str bl diversion dam nr Kipahulu	6.29	1927-29, 1931-35, 1935-38, 1939-83
16502000	Hahalawe Gulch nr Kipahulu	0.43	1927-37, 1938-69
16503000	Kaeluku flume nr Kaeleku	--	1940-45
16504000	Hana flume nr Hana	--	1940-45
16506000	Makapipi Ditch nr Nahiku	--	1948-66
16506500	West Makapipi Spring nr Nahiku	--	1932-45
16507000	Makapipi Str nr Nahiku	1.93	1932-45
16510000	Kapaula Gulch nr Nahiku	0.69	1921-63
16511000	Kapaula Gulch below government road nr Nahiku	0.93	1932-47
16512000	Koolau Ditch at Nahiku weir nr Nahiku	--	1919-85
16513000	Waiaaka Str nr Nahiku	0.10	1932-47
16514000	Paakea Gulch nr Nahiku	0.34	1932-47
16515000	Waiohue Gulch nr Nahiku	0.32	1921-63
16516000	Kopiliula Str nr Keanae	4.31	1914-17, 1921-58
16517000	East Wailuaiki Str nr Keanae	3.11	1913-17, 1922-58
16519000	West Wailuanui Str nr Keanae	1.93	1913-17, 1922-58
16520000	East Wailuanui Str nr Keanae	0.51	1914-17, 1921-58
16521000	Wailuanui Str nr Keanae	2.51	1932-36, 1938-47
16522000	Taro patch feeder Ditch at Keanae	--	1934-68
16523000	Koolau Ditch nr Keanae	--	1910-12, 1917-85
16524000	Honomanu Str at Haiku-uka boundry nr Kaili	2.54	1919-27, 1932-34, 1962-68
16525000	Sevth Br Honomanu Str at Haiku-uka nr Kailiili	0.30	1932-33
16526000	Fourth Br Honomanu Str at Haiku-uka nr Kailiili	0.10	1932-33
16527000	Honomanu Str nr Keanae	3.17	1913-64
16528000	Spreckels Ditch at station 1 nr Huelo	--	1910-13
16529000	Spreckels Ditch at station 2 nr Kuelo	--	1911-13
16530000	Spreckels Ditch at station 3 nr Kuelo	--	1910-13
16531000	Kula diversion from Haipuaena Str nr Olinda	--	1945-85
16531100	Haipuaena Str at Kula pipeline intake nr Olinda	0.27	1946-68
16532000	Haipuaena Str at Haiku-uka bdy nr Kailiili	0.63	1919-26, 1932-34
16533000	Third Br Haipuaena Str at Haiku-uka nr Kailiili	0.06	1932-33
16534000	First Br Haipuaena Str at Haiku-uka nr Kailiili	0.05	1932-33
16535000	Haipuaena div ditch at Kolea Gulch nr Keanae	--	1938-60
16536000	Haipuaena Str above Spreckels Ditch nr Huelo	1.16	1913-67
16537000	Haipuaena Str nr Huelo	1.10	1910-13
16538000	Spreckels Ditch at Haipuaena weir nr Huelo	--	1922-85
16539000	Spreckels Ditch at station 4 nr Huelo	--	1910-13
16541000	Koolau Ditch at Haipuaena nr Huelo	--	1932-87
16541500	Manuel Luis Ditch at Puohokamoa Gulch nr Huelo	--	1917-24
16542000	E Br Puohokamoa Str at Haiku-uka bdry nr Kailiili	0.14	1919-27, 1932-33
16543000	M Br Puohokamoa Str at Haiku-uka bdry nr Kailiili	0.48	1919-27, 1932-34, 1962-69
16544000	W Br Puohokamoa Str at Haiku-uka bdry nr Kailiili	0.45	1919-28, 1932-34
16545000	Puohokamoa Str above Spreckels Ditch nr Huelo	2.35	1913-71
16546000	Puohokamoa Str nr Huelo	2.60	1910-13
16547000	Puohokamoa intake of Koolau Ditch nr Huelo	--	1922-30
16551000	Koolau Ditch at Wahinepee nr Huelo	--	1922-29
16552000	Spreckels Ditch at Wahinepee nr Huelo	--	1929-30, 1931-38
16552200	Spreckels Ditch at station 5 nr Huelo	--	1911-13
16552500	Manuel Luis Ditch W of Puohokamoa Str nr Huelo	--	1930-35
16552600	Waikamoi Str at Puuluau nr Olinda	2.10	1949-66
16552800	Waikamoi Str ab res at Kula pl intake nr Olinda	2.50	1953-68

DISCONTINUED GAGING STATIONS--Continued

Station Number	Station name	Drainage area (mi^2)	Period of Record
	ISLAND OF MAUI--Continued		
16553000	Waikamoi Str bl res at Kula pl intake nr Olinda	2.52	1945-49
16554000	Waikamoi Str at Haiku-uka boundary nr Kailiili	3.46	1918,19-28, 1932-34
16554500	E Br Waikamoi Str at Haiku-uka bdry nr Kailiili	0.07	1918-28, 1932-33
16555000	Waikamoi Str above Wailoa Ditch nr Huelo	3.93	1922-57
16556000	Waikamoi Str nr Huelo	3.98	1910-22
16557000	Alo Str nr Huelo	0.47	1910-57
16558000	Koolau Ditch at Alo diversion weir nr Huelo	--	1908-11
16560000	Spreckels Ditch at station 6 nr Huelo	--	1911-13
16561000	Center Ditch below Kolea reservoir nr Huelo	--	1918, 1919, 1920-24, 1925-30
16562000	Center Ditch nr Huelo	--	1910-12
16565000	Kaaiea Gulch nr Huelo	0.58	1921-62
16565500	Spreckels Ditch below Kaaiea Gulch nr Huelo	--	1917-30
16566000	Oopuola Str nr Huelo	0.20	1930-57
16567000	Oopuola Str ab Spreckels Dt crossing nr Huelo	0.58	1910-15
16567500	Spreckels Ditch at station 7 nr Huelo	--	1911-12
16568000	Spreckels Ditch at station 8 nr Huelo	--	1911-13
16569000	Second Branch Nailiilihaele Str at Haiku-uka	0.20	1932-33
16570000	Nailiihaele Str nr Huelo	3.49	1910-11, 1913-18, 1919-24, 1925-75
16571000	Nailiilihaele Str bl new Hamakua Dt nr Huelo	3.60	1912
16572000	New Hamakua Ditch at Nailiilihaele weir nr Huelo	--	1910-12
16573000	New Hamakua Ditch at station 1 nr Kailiili	--	1912-13
16574000	Kailua Str at Haiku-uka boundary nr Kailiili	0.80	1918-28, 1932-34
16574500	Kailua Str nr Kailiili	1.10	1963-71
16575000	Tenth Br Kailua Str at Haiku-uka nr Kailiili	0.10	1932-33
16576000	Ninth Br Kailua Str at Haiku-uka nr Kailiili	0.20	1932-33
16577000	Kailua Str nr Huelo	2.41	1910-11, 1912-18, 1919-58
16578000	New Hamakua Ditch at station 2 nr Huelo	--	1912-13
16579000	New Hamakua Ditch at station 3 nr Huelo	--	1912-13
16579500	New Hamakua Ditch at station 4 nr Huelo	--	1912-13
16580000	Oanui Str nr Huelo	0.90	1910-11, 1913-16
16582000	New Hamakua Ditch at station 5 nr Huelo	--	1912-13
16583000	Old Hamakua Ditch at Kailua nr Huelo	--	1919-22
16584000	Kailua Str nr Huelo	3.69	1912-13
16585000	Hoolawanui Str nr Huelo	1.34	1910-71
16586000	Hoolawaliilii Str nr Huelo	0.55	1911-57
16588000	Wailoa Ditch at Honopou nr Huelo	--	1922-87
16589000	New Hamakua Ditch at Honopou nr Huelo	--	1918-85
16590000	Old Hamakua Ditch at Honopou nr Huelo	--	1918-22, 1936-65
16591000	Honopou Str at Lowrie Ditch siphon nr Huelo	2.00	1932-47
16592000	Lowrie Ditch at Honopou Gulch nr Huelo	--	1910-27
16593000	Honopou Str above Haiku Ditch nr Huelo	2.20	1930-85
16594000	Haiku Ditch at Honopou Gulch nr Kailua	--	1910-28, 1930-85
16595000	Honopou Str below Haiku Ditch nr Huelo	2.30	1932-47
16596000	New Hamakua Ditch at Halehaku weir nr Huelo	--	1910-14, 1915-23
16596200	Halehaku Gulch nr Kailiili	0.13	1965-71
16597000	Halehaku Gulch weir at New Hamakua Dt nr Huelo	--	1910-12
16598000	Halehaku Gulch nr Huelo	1.40	1910-12
16599000	E Br Opana Gulch at Haiku-uka bdry nr Kailiili	0.60	1932-33
16600000	Opana Ditch nr Huelo	--	1910-12
16601000	Opana Str nr Huelo	3.30	1910-12
16602000	Kauhikoa Ditch at Opana weir nr Huelo	--	1910-13, 1913-15, 1916-28
16602400	Awalau Gulch nr Kailiili	0.23	1965-71
16603000	Kaluanui Ditch at Puuomalei nr Hamakuapoko	--	1910-12
16604000	Iao Str nr Wailuku	--	1910-15
16605000	Maniania Ditch nr Wailuku	--	1910-13
16608000	North Waiehu Str nr Wailuku	0.90	1912-15
16609000	North Waiehu Ditch nr Wailuku	--	1910-11, 1916-17
16609500	North Waiehu Str bl N Waiehu Ditch nr Wailuku	0.90	1910-11
16610000	South Waiehu Str nr Wailuku	0.70	1910-17
16611000	South Waiehu Ditch nr Wailuku	--	1913
16612000	Waihee River nr Waihee	3.90	1913-17
16613000	Waihee Canal nr Waihee	--	1910-12
16613500	Waihee Canal at Waiale weir nr Wailulu	--	1911-12
16615000	Spreckels Ditch nr Waihee	--	1910-13
16616000	Spreckels Ditch at Waiale weir nr Wailuku	--	1910-11
16617000	Left Branch Makamakaole Str nr Waihee	0.40	1939-52
16617700	Kahakuloa Str at alt. 1,380 ft. nr Honokohau	1.50	1913-14

DISCONTINUED GAGING STATIONS--Continued

Station Number	Station name	Drainage area (mi^2)	Period of Record
	ISLAND OF MAUI--Continued		
16619000	Kahakuloa Str at Kahaluloa nr Waihee	4.00	1912-13
16620000	Honokohau Str nr Honokohau	4.11	1911, 1913-20, 1922-88
16621000	Honokohau Ditch intake nr Honokohau	--	1907-13
16622000	Honokohau Ditch above Honolua Str nr Honolohau	--	1910-11
16623000	Honolua Str nr Honokohau	2.90	1913-17
16624000	Honokohau Ditch at Honokowai weir nr Lahaina	--	1910-12
16625000	Honolua Ditch nr Honokohau	--	1911-12
16626000	Honolua Str at Honolua Ranch nr Honokahau	3.96	1911
16627000	Kapaloa Str at weir 1 nr Lahaina	1.00	1901
16628000	Kapaloa Str nr Lahaina	1.00	1911-12
16629000	Honokowai Ditch nr Lahaina	--	1912-17, 1918-67
16630000	Honokowai Str nr Lahaina	1.10	1913-17
16633000	Kahoma development tunnel nr Lahaina	--	1911-17
16634000	Kahoma Str nr Lahaina	1.19	1911-12, 1913-17
16635000	Lahainaluna Str at weir 1 nr Lahaina	0.54	1901
16635500	Lahainaluna Str at weir 2 nr Lahaina	0.19	1901
16636000	Kahana Str above pipeline intake nr Lahaina	1.51	1916-25, 1926-32
16637000	Lahainaluna Ditch nr Lahaina	--	1913-14
16638000	Kahana Str nr Lahaina	1.83	1911-16
16638500	Kahoma Str at Lahaina	5.22	1962-89
16639000	North Fork Kauaula Str nr Lahaina	0.52	1901
16640000	South Fork Kauaula Str nr Lahaina	0.18	1901
16641000	Kauaula Str nr Lahaina	1.84	1912, 1914-17
16643000	Kauaula Ditch nr Lahaina	--	1911-17
16644000	Launiupoko Str nr Lahaina	1.13	1911-18
16645000	Olowalu Ditch nr Olowalu	--	1911-16, 1916-20, 1920-58, 1958-67
16646000	Olowalu Str nr Olowalu	4.00	1913-16
16647000	Ukumehame Gulch nr Olowalu	3.75	1911-12, 1913-19
16647100	Ukumehame Gulch at mouth nr Olowalu	4.03	1964-71
16648000	South side Waikapu Ditch nr Waikapu	--	1910-17
16649000	Palolo Ditch nr Waikapu	--	1910-17
16650000	Waikapu Str nr Waikapu	2.76	1910-17
	ISLAND OF HAWAII		
16701000	Olaa Flume at Kaumana nr Hilo	--	1917-20
16701200	Waiakea Str nr Hilo	33.60	1957-67
16701700	Wailuku River nr Pua Akala	10.20	1964-65
16701750	Wailuku River nr Humuula	34.80	1965-82
16701800	Wailuku River nr Kaumana	43.40	1966-82
16703000	Wailuku River at Pukamaui nr Hilo	97.20	1923-28, 1929-40
16705000	Hilo Boarding School Ditch at intake nr Hilo	--	1931-40
16706000	Hilo Boarding School Ditch nr Hilo	--	1918-19
16707000	Kapehu Ditch diversion nr Hilo	--	1954-62
16708000	Kapehu Ditch nr Hilo	--	1938-41, 1942-48, 1948-51, 1951-62
16709000	Kapehu Str at Piihonua nr Hilo	4.84	1928-37
16710000	Wailuku River nr Hilo	150.00	1911-13, 1918-19
16716000	Honolii Str nr Hilo	8.00	1924-32
16717500	Kawainui Str nr Pepeekeo	9.20	1912
16717820	Manowaiopae Str nr Laupahoehoe	1.04	1965-71
16718000	Upper Hamakua Ditch at Puualala nr Kukuihaele	--	1913-20
16721000	Kawainui Str at alt. 2,120 ft nr Waipio	3.48	1901-02
16721500	Br 3 Kawainui Str at alt. 1,700 ft nr Waipio	3.90	1901-02
16722000	Kawainui Str at alt. 1,435 ft nr Waipio	4.43	1901-02
16722300	Br 3 Kawainui Str at alt. 1,405 ft nr Waipio	0.47	1901-02
16722600	Br 1 Kawainui Str at alt. 1,380 ft nr Waipio	5.19	1901-02
16723000	Kawainui Str nr Waipio	5.55	1901-02
16724000	Kawainui Str at alt. 775 ft nr Waipio	6.00	1901-02
16728000	Alakahi Str at alt. 1,200 ft nr Waipio	1.49	1901-02
16729000	Alakahi Str at alt. 730 ft. nr Waipio	3.14	1901-02
16730000	Koiawe Str at alt. 1,120 ft. nr Waipio	1.65	1901-02
16731000	Koiawe Str at alt. 610 ft. nr Waipio	2.23	1901-02
16732000	Waipio Str below Koiawe Str nr Waipio	11.70	1901-02
16732100	Waima Str at alt. 790 ft. nr Waipio	0.51	1901-02
16732150	Waima Str at alt. 385 ft nr Waipio	0.77	1901-02
16732200	Wailoa Str nr Waipio	14.30	1901-02, 1911-12, 1964-69
16732300	Upper Hamakua Ditch at Puualala and Res No. 3	--	1913-20

DISCONTINUED GAGING STATIONS--Continued

Station Number	Station name	Drainage area (mi^2)	Period of Record
	ISLAND OF HAWAII--Continued		
16732600	Lower Hamakua Ditch at Waima flume nr Kukuihaele	--	1910-13
16732900	Lower Hamakua Ditch at main weir nr Kukuihaele	--	1910-20
16733000	Lower Hamakua Ditch wasteway nr Kukuihaele	--	1964-73
16733100	Lower Hamakua Ditch bl main weir nr Kukuihaele	--	1964-73
16733200	Honokaa diversion at Honokaa	--	1964-73
16733300	Lower Hamakua Ditch bl Honokaa div at Honokaa	--	1964-73
16737000	Waiilikahi Str nr Waimanu	0.76	1939-60
16738000	Kaimu Str nr Waimanu	0.90	1939-47, 1950-52
16739000	Punalulu Str nr Waimanu	0.66	1939-52
16740000	Waiaalala Str nr Waimanu	0.12	1939-52
16741000	Paopao Str nr Waimanu	0.32	1939-52
16742000	Kukui Str nr Waimanu	0.22	1939-52, 1959-66
16743000	Awini Ditch at E Honokane iki Gulch nr Niulii	--	1927-38, 1938-49, 1950-72
16744000	E Honokane iki intake to Awini Ditch nr Niulii	--	1927-36, 1937-38, 1939-40, 1940-49, 1951-72
16745000	Awini Ditch above Honokane Gulch nr Kohala	--	1918
16745500	Awini Ditch at Awini Weir nr Kohala	--	1907-17
16747000	E Br Honokane nui Str at alt 1,300ft nr Honokane	4.53	1901
16747500	East Branch Honokane nui Str nr Niulii	4.96	1963-69
16748000	E Br Honokane nui Str at alt 770ft nr Honokane	5.41	1901
16749000	W Br Honokane nui Str at alt 1,370ft nr Honokane	1.81	1901
16749500	W Br Honokane nui Str at alt 775ft nr Honokane	2.40	1901
16750000	Kohala Ditch at Honokane weir nr Kohala	--	1907-12
16750900	Kohala Ditch at Honokane nr Niulii	--	1963-72
16751000	Kohala Ditch at Pololu nr Niulii	--	1927-38, 1938-72
16752000	Kohala Ditch at Niulii weir nr Kohala	--	1907-17
16755000	Kehena Ditch nr Kohala	--	1917-19, 1928-66
16757000	Waikoloa Str nr Kamuela	0.78	1947-71
16759200	Right Branch Waiaha Str nr Holualoa	1.89	1960-82
16759500	Waiaha Str nr Holualoa	9.35	1957-68
16759800	Kiilae Str nr Honaunau	0.67	1958-82
16761200	Kahilipali nui Gulch at Waiohinu	0.47	1962-65
16765000	Hilea Gulch tributary 2 nr Honuapo	1.86	1966-82
16767000	Ninole Gulch nr Punaluu	15.5	1966-82
16770500	Paauau Gulch at Pahala	1.74	1962-79

DISCONTINUED WATER-QUALITY STATIONS

The following continuous water-quality stations in Hawaii have been discontinued. Daily records were collected and are stored in WATSTORE for the period of record shown for each station.

[Type of record: C (specific conductance), S (sediment), T (temperature).]

Station Number	Station name	Drainage area (mi^2)	Type of Record	Period of Record
	ISLAND OF OAHU			
16212800	Kipapa Str nr Wahiwa	4.29	S	1973-82
16213000	Waikele Str nr Waipahu	45.70	C,T	1973-81
16227500	Moanalua Str nr Kaneohe,	0.94	S	1971-78
16270500	Kamooalii Str blw Kuou Str nr Kaneohe	3.21	S	1972-76
	ISLAND OF HAWAII			
16704000	Wailuku River at Piihonua, Hawaii, HI	125.00	C	1975-78
			T	1975-79
16713000	Wailuku River at Hilo, Hawaii, HI	256.00	S	1977-79, 1980-83
			C,T	1982-84, 1984-85

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WATER RESOURCES DATA FOR HAWAII AND OTHER PACIFIC AREAS, 1993

Volume 1--HAWAII

INTRODUCTION

The Water Resources Division of the U.S. Geological Survey, in cooperation with State, local, and other Federal agencies, obtains a large amount of data pertaining to the water resources of Hawaii and other Pacific Areas each water year. These data, accumulated during many water years, constitute a valuable data base for developing an improved understanding of the water resources of the State and the Pacific Areas. To make these data readily available to interested parties outside the U.S. Geological Survey, the data are published annually in this report series entitled "Water Resources Data - Hawaii and other Pacific Areas."

This report includes records on both surface and ground water in the State. Specifically, it contains: (1) Discharge records for 88 stream-gaging stations, 4 miscellaneous streamflow stations, 107 crest-stage, partial-record streamflow stations, and 6 low-flow partial-record streamflow stations; (2) water-quality records for 16 streamflow-gaging stations, and 19 partial-record streamflow stations; (3) water-level records for 63 observation wells; (4) water-quality records for 142 wells; (5) accumulated rainfall records for 45 rainfall stations. Records included for stream stages and for ground-water levels are only a small fraction of those obtained during the water year.

This series of annual reports for Hawaii and other Pacific Areas began with the 1961 water year (fiscal year for Hawaii) with a report that contained only data relating to the quantities of surface water. For the 1964 water year, a similar report was introduced that contained only data relating to water quality. Beginning with the 1975 water year, the report format was changed to present, in one volume, data on quantities of surface water, quality of surface and ground water, and ground-water levels.

Prior to introduction of this series (Through June 30, 1960, for Hawaii and other Pacific Areas) and for several water years concurrent with it, water-resources data for Hawaii and other Pacific Areas were published in U.S. Geological Survey Water-Supply Papers. Data on stream discharge and stage and on lake or reservoir contents and stage, through September 1960, were published annually under the title "Surface-Water Supply of the United States." The records in Hawaii were contained in the series as "Surface Water Supply of Hawaii." Records for other Pacific areas were contained in one volume entitled, "Surface Water Supply of Mariana, Caroline, and Samoa Islands." For the 1961 through 1970 water years, the data were published in two 5-year reports. Data on chemical quality, temperature, and suspended sediment for the 1941 through 1970 water years were published annually under the title "Quality of Surface Waters of the United States," and water levels for the 1935 through 1974 water years were published under the title "Ground-Water Levels in the United States." These Water-Supply Papers may be consulted in the libraries of the principal cities in the United States, or if out of print, may be purchased from the U.S. Geological Survey, Books and Open-File Reports, Federal Center, Building 41, Box 25425, Denver, CO 80225. For further ordering information, telephone (303) 236-7476.

Publications similar to this report are published annually by the Geological Survey for all states. These official Survey reports have an identification number consisting of the two-letter State abbreviation, the last two digits of the water year, and the volume number. For example, this report is identified as "U.S. Geological Survey Water-Data Report HI-93-1." For archiving and general distribution, the reports for 1971-74 water years also are indentified as water-data reports. These water-data reports are for sale, in paper copy or in microfiche by the National Technical Information Service, U.S. Department of Commerce, Springfield, VA 22161. For further ordering information, the Customer Inquires telephone number is (703) 487-4650. Beginning with the 1990 water year, all water-data reports are available on Compact Disc - Read Only Memory (CD-ROM). All data reports published for the current water year for the entire Nation, including Puerto Rico and the Trust Territories, will be reproduced on a single CD-ROM disc.

Additional information, including current prices, for ordering specific reports may be obtained from the District Chief at the address given on the back of the title page or by telephone (808) 541-2655. A limited number of CD-ROM discs will be available for sale by the Books and Open-File Reports Section, U.S. Geological Survey, Federal Center, Box 25425, Denver, Colorado 80225.

COOPERATION

The U.S. Geological Survey and organizations of the State of Hawaii have had cooperative agreements for the systematic collection of streamflow and ground water-level records since 1909, and for water-quality records since 1967. Organizations that supplied data are acknowledged in station descriptions. Organizations that assisted in collecting data through cooperative agreement with the Survey are:

Hawaii Department of Land and Natural Resources, Division of Water Resource Management, Rae Loui, Deputy for Water Resources Management.
Hawaii Department of Transportation, Rex Johnson, Director.
City and County of Honolulu, Board of Water Supply, Kazu Hayashida, Manager and Chief Engineer.
City and County of Honolulu, Department of Public Works, Kenneth E. Sprague, Director and Chief Engineer.

Assistance in the form of funds or services was given by the Corps of Engineers, U.S. Army and the Public Works, U.S. Navy.

The following organizations aided in collecting records:

Maui County Board of Water Supply; East Kauai Water Co., Ltd.; McBryde Sugar Co., Ltd.; East Maui Irrigation Co., Ltd.; and B. P. Bishop Estate.

SUMMARY OF HYDROLOGIC CONDITIONS

Surface Water

Runoff during the 1993 water year was normal at the index stations on the islands of Oahu and Maui, and deficient (lower 25 percent of record) at the index station on the island of Kauai. The monthly mean flow for all index stations was deficient for the month of February, and excessive for the month of December. The data for the index station (Waiakea Stream near Mountain View, Hawaii) on the island of Hawaii is being reviewed and was not included in the summary.

The annual mean discharge at East Branch of North Fork Wailua River near Lihue, Kauai was 81 percent of the 1961-90 median, 98 percent at Kalihi Stream near Honolulu, Oahu, and 121 percent at Honopou Stream near Huelo, Maui.

Monthly and yearly mean discharges of the three index stations are compared with their 1961-90 medians in figure 1. A comparison of 1993 peak discharge to peaks for period of record at the index stations are shown in Table 1.

Table 1. Comparison of peak discharge for 1993 water year with the peak discharge for the period of record at three representative stations

Station Number	Station name	Water year 1993		Period of record	
		Date	Peak discharge (ft^3/s)	Date	Peak discharge (ft^3/s)
16068000	East Branch of North Fork Wailua River near Lihue, Kauai	Dec. 3	4,720	Nov. 12, 1955	18,400
16229000	Kalihi Stream near Honolulu, Oahu	Dec. 30	1,270	Nov. 18, 1930	12,400
16587000	Honopou Stream near Huelo, Maui	Mar. 8	317	Nov. 18, 1930	5,710

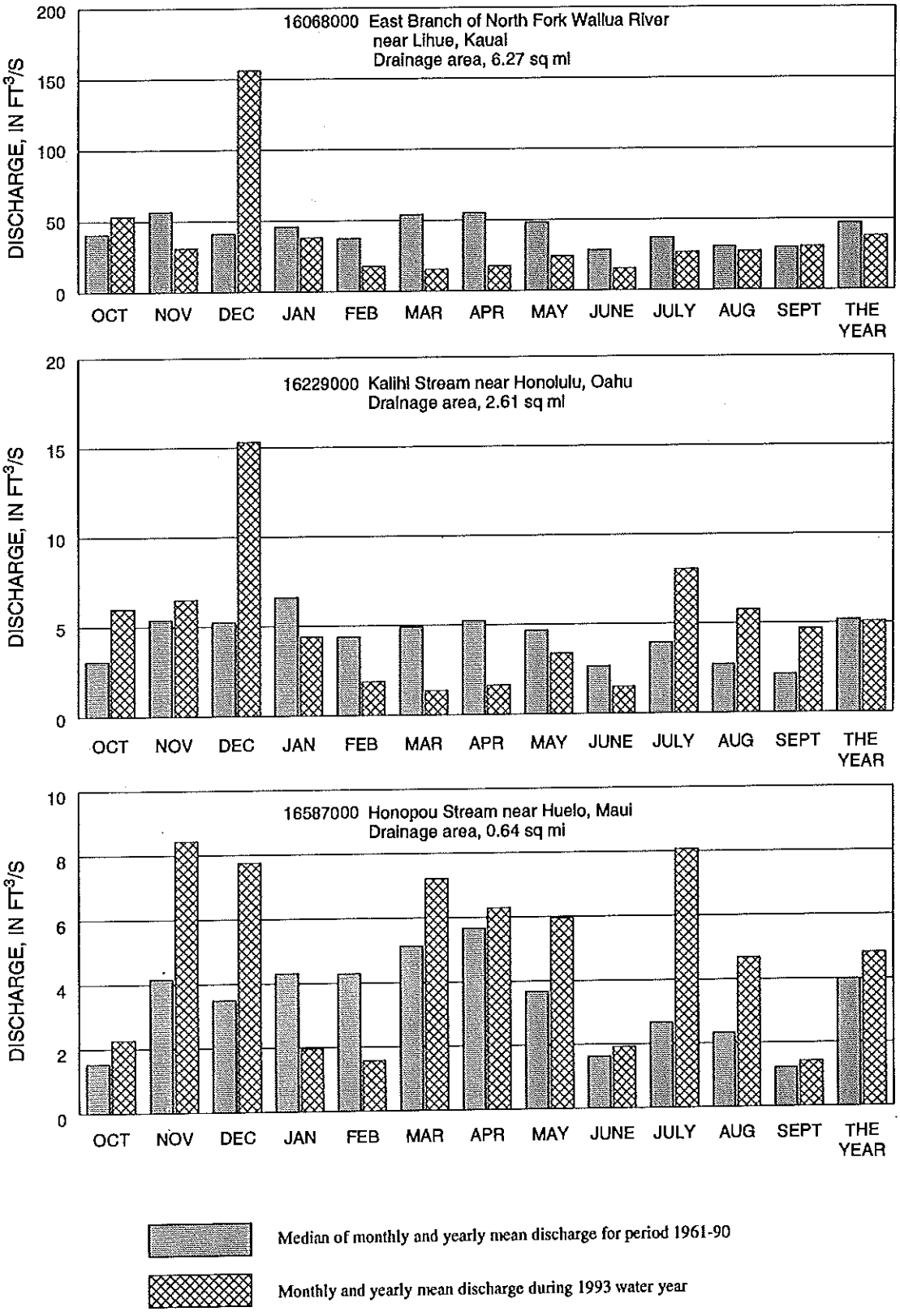


Figure 1. Discharge during 1993 water year compared with median discharge for period 1961-90 for three representative gaging stations.

Water Quality

Dissolved-solids concentrations at the five NASQAN (National Stream Quality Accounting Network) stations showed no significant change during the 1993 water year. Samples collected bi-monthy showed dissolved-solids concentrations ranged from 25 to 314 mg/L (milligrams per liter) during 1993. Waikele Stream at Waipahu, Oahu, had the highest concentration values and Halawa Stream at Halawa, Molokai, had the lowest concentration values. Records for stations on the island of Hawaii are being reviewed for later publication.

Average dissolved-oxygen for all samples at each station ranged from 87 to 99 percent saturation. Waikele Stream at Waipahu, Oahu, was lowest at 87 percent, and Waimea River at Waimea, Kauai, was highest at 99 percent.

Fecal coliform densities decreased at two of the NASQAN stations in Hawaii and increased at the other three. The geometric-mean values were:

NASQAN Station	Fecal Coliform (colonies per 100 milliliters) 1992	1993
Waimea River at Waimea, Kauai	160	210
Waikele Stream at Waipahu, Oahu	3,900	630
Kalihi Stream at Kalihi, Oahu	2,700	5,300
Halawa Stream at Halawa, Molokai	650	500
Kahakuloa Stream at Kahakuloa, Maui	37	72

Analyses of water samples taken at more than 135 basal water-table wells generally did not show significant changes in chloride concentration.

SPECIAL NETWORKS AND PROGRAMS

Hydrologic Bench-Mark Network is a network of more than 57 sites in small drainage basins around the country whose purpose is to provide consistent data on the hydrology, including water quality, and related factors in representative undeveloped watersheds nationwide, and to provide analyses on a continuing basis to compare and contrast conditions observed in basins more obviously affected by the activities of man.

National Stream-Quality Accounting Network (NASQAN) is a nationwide data-collection network designed by the U.S. Geological Survey to meet many of the information needs of government agencies and other groups involved in national or regional water-quality planning and management. The five hundred or so sites in NASQAN are generally located at the downstream ends of hydrologic accounting units designated by the U.S. Geological Survey Office of Water Data Coordination in consultation with the Water Resources Council. The objectives of NASQAN are (1) to obtain information on the quality and quantity of water moving within and from the United States through a systematic and unifrom process of data collection, summarization, analysis, and reporting, such that the data may be used for, (2) description of the areal variability of water quality in the Nation's rivers through analysis of data from this and other programs, (3) detection of changes or trends with time in the pattern of occurrence of water-quality characteristics, and (4) providing a nationally consistent data base useful for water-quality assessment and hydrologic research.

EXPLANATION OF THE RECORDS

The surface-water and ground-water records published in this report are for the 1993 water year that began October 1, 1992, and ended September 30, 1993. A calendar of the water year is provided on the inside of the front cover. The records contain streamflow data, water-quality data for surface water, ground-water, and reservoirs, and ground-water level data. The locations of the stations and wells where the data were collected are shown in figures 2-11. The following sections of the intrductory text are presented to provide users with a more detailed explanation of how the hydrologic data published in this report were collected, analyzed, computed, and arranged for presentation.

Station Identification Numbers

Each data station, whether streamsite or well, in this report is assigned a unique identification number. This number is unique in that it applies specifically to a given station and to no other. The number usually is assigned when a station is first established and is retained for that station indefinitely. The systems used by the U.S. Geological Survey to assign identification numbers for surface-water stations and for ground-water well sites differ, but both are based on geographic location. The "downstream order" system is used for regular surface-water stations and the "latitude-longitude" system is used for wells and, in Hawaii and Other Pacific Areas, for surface-water stations where only miscellaneous measurements are made.

Downstream Order System

Since October 1, 1950, the order of listing hydrologic-station records in Survey reports is in a downstream direction along the main stream. All stations on a tributary entering upstream from a mainstream station are listed before that station. A station on a tributary that enters between two mainstream stations is listed between them. A similar order is followed in listing stations on first rank, second rank, and other ranks of tributaries. The rank of any tributary with respect to the stream to which it is immediately tributary is indicated by an indention in the "List of Stations" in the front of this report. Each indention represents one rank. This downstream order and system of indention show which stations are on tributaries between any two stations and the rank of the tributary on which each station is situated.

The station-identification number is assigned according to downstream order. In assigning station numbers, no distinction is made between partial-record stations and other stations; therefore, the station number for a partial-record station inidcates downstream-order position in a list made up of both types of stations. Gaps are left in the series of numbers to allow for new stations that may be established; hence, the numbers are not consecutive. The complete 8-digit number for each station, such as 16200000, which appears just to the left of the station name includes the two-digit number "16" plus the six-digit downstream order number "200000."

Latitude-Longitude System

The identification numbers for wells and miscellaneous surface-water sites are assigned according to the grid system of latitude and longitude. The number consists of 15 digits. The first six digits denote the degrees, minutes, and seconds of latitude, the next seven digits denote degrees, minutes, and seconds of longitude, and the last two digits (assigned sequentially) identify the wells or other sites within a one-second grid. This site-identification number, once assigned, is a pure number, and has no localational significance. In the rare instance where the initial determination of latitude and longitude are found to be in error, the station will retain its initial identification number; however, its true latitude and longitude will be listed in the LOCATION paragraph of the station description. See figure 12.

Local Identifier Well-Numbering System

In addition to the latitude-longitude based site identification number, wells in the State of Hawaii and the other Pacific Areas are assigned local well numbers. Beginning in 1971, the local well-numbering system was restructured to contain seven digits based on a non-arbitrary, unique one-minute grid system. One-minute parallel lines for both latitude and longitude are drawn on the map resulting in one-minute grids. Each grid is designated by a four-digit number. The first two digits represent minutes of latitude for the grid and the second two digits represent minutes of longitude for that grid. This establishes unique minute-grid numbers within each of the islands in the state except for the island of Hawaii where it encompasses an area more than one degree (60 minutes) of latitude and longitude. To establish unique minute-grid numbers for this island, 30 was added to the minutes of latitude in areas less than 19°00" of latitude, and 60 was added to the minutes of latitude in areas more than 20°00" of latitude. For the same reason, 30 was added to the minutes of longitude in areas less than 155°00" of longitude, and 60 was added to the minutes of longitudes more than 156°00" longitude. See figures 13 and 14.

To distinguish wells within a minute grid, two digits are added following the 4-digit minute-grid numbers with a dash separator. These two-digit numbers are assigned with the oldest well dug within the grid as 01 and increase chronologically, with few exceptions, to the latest dug.

Since it is possible to have a same 6-digit number for wells on different islands, another digit distinguishing each of the islands, is added in front of the 6-digit number with a dash separator.

Records of Stage and Water Discharge

Records of stage and water discharge may be complete or partial. Complete records of discharge are those obtained using a continuous stage-recording device through which either instantaneous or mean daily discharges may be computed for any time, or any period of time, during the period of record. Complete records of lake or reservoir content, similarly, are those for which stage or content may be computed or estimated with reasonable accuracy for any time, or peiod of time. They may be obtained using a continuous stage-recording device, but need not be. Because daily mean discharges and end-of-day contents commonly are published for such stations, they are referred to as "daily stations".

By contrast, partial records are obtained through discrete measurements without using a continuous stage-recording device and pertain only to a few flow characteristics, or perhaps only one. The nature of the partial record is indicated by table titles such as "Crest-stage partial records," or "Low-flow partial records." Records of miscellaneous discharge measurements or of measurements from special studies, such as low-flow seepage studies, may be considered as partial records, but they are presented separately in this report. Location of all complete-record and crest-stage partial-record stations for which data are given in this report are shown in figures 2, 4, 6, 8, 10.

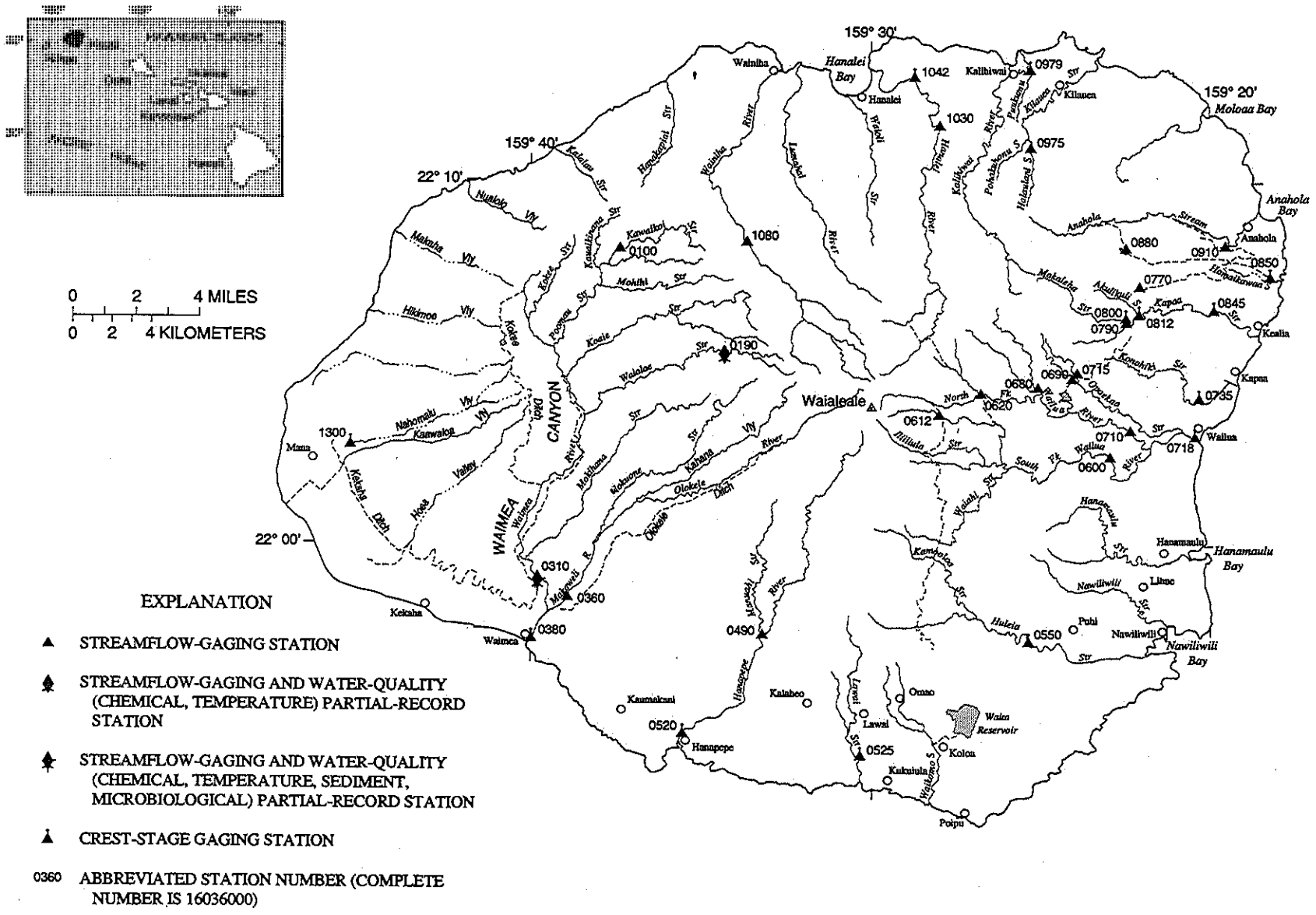


Figure 2. Locations of gaging, water-quality, and partial-record stations on Kauai.

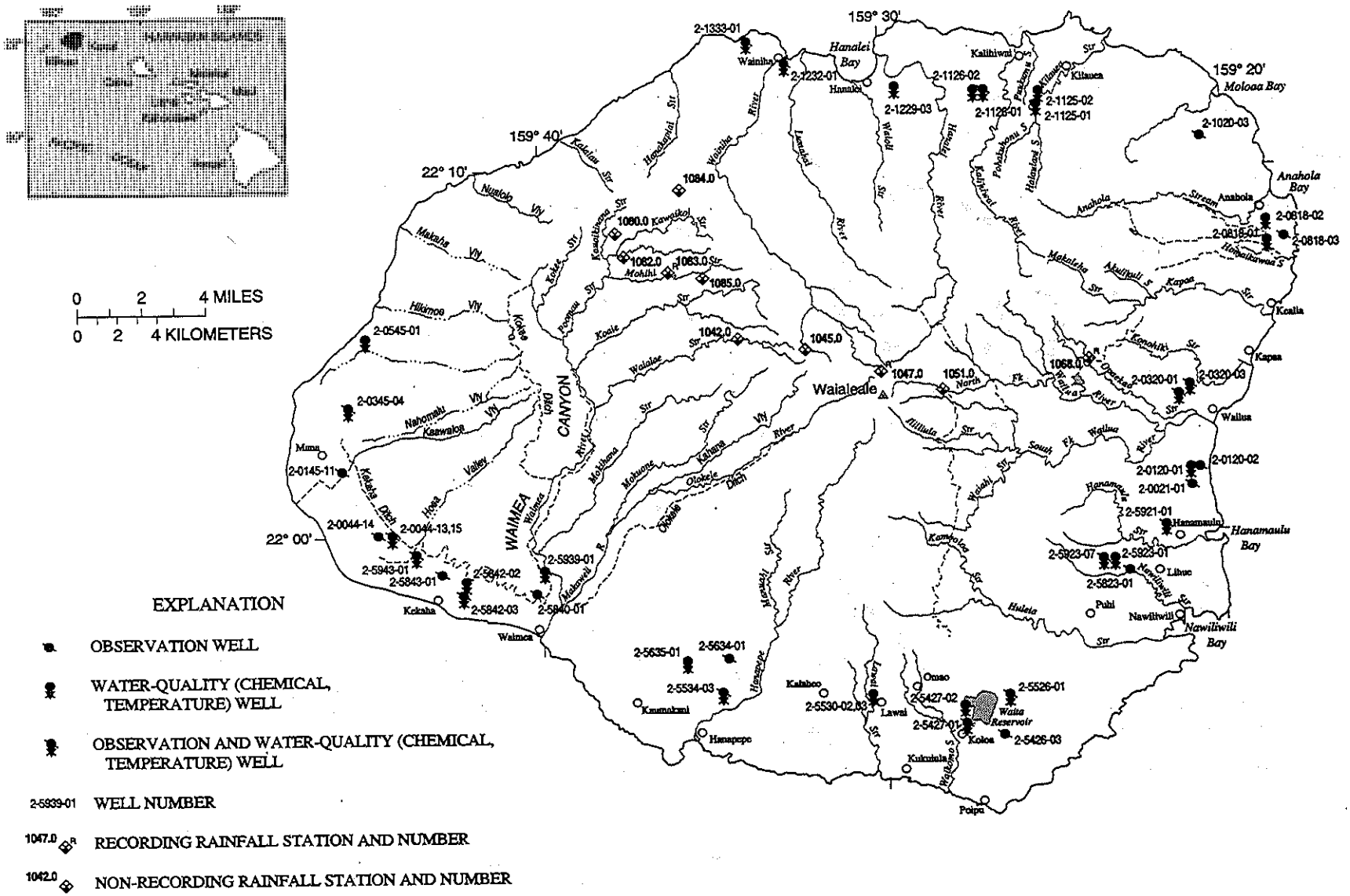


Figure 3. Locations of observation wells, ground-water quality sampling wells, and rainfall stations on Kauai.

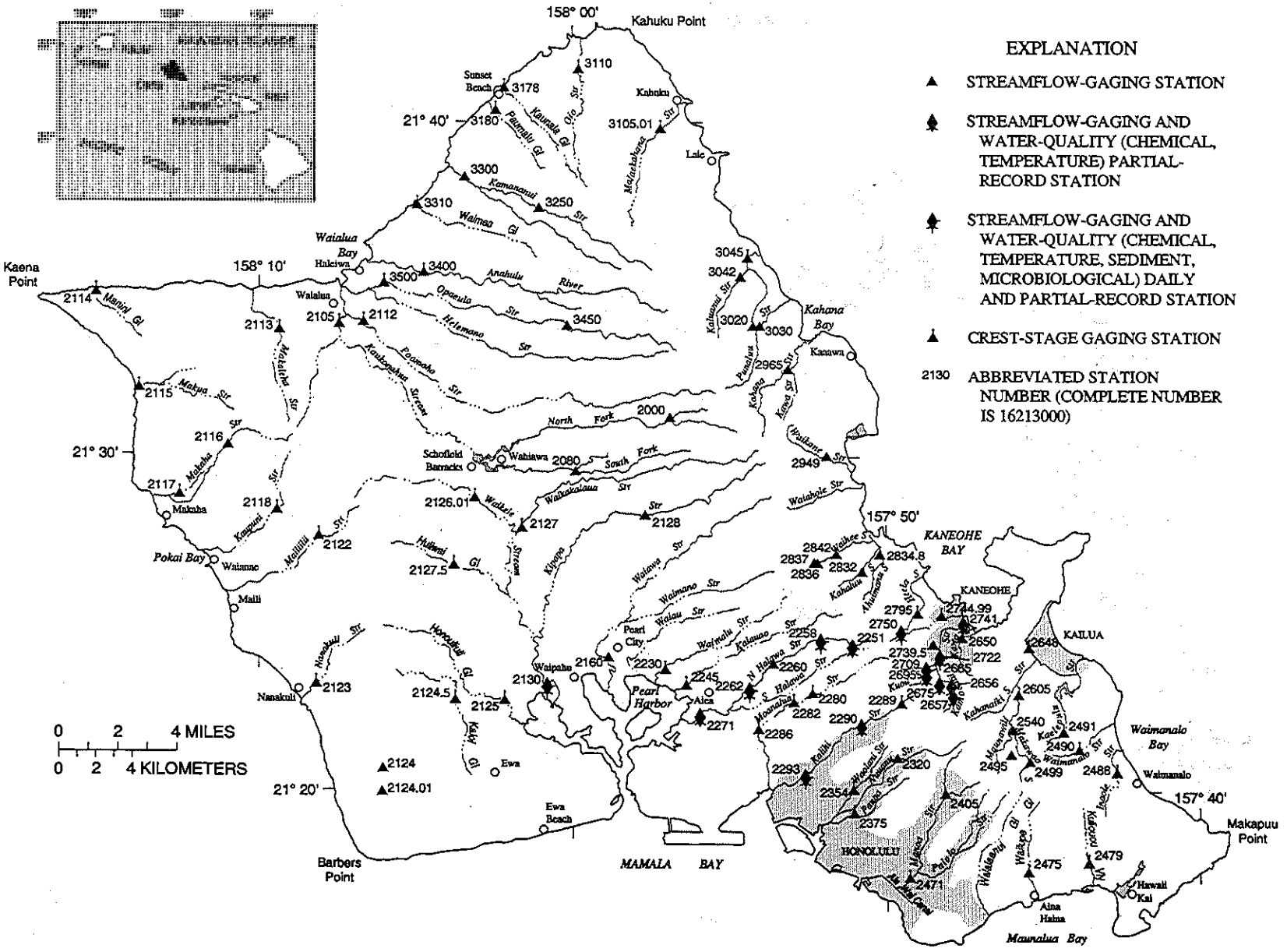


Figure 4. Locations of gaging, water-quality, and partial-record stations on Oahu.

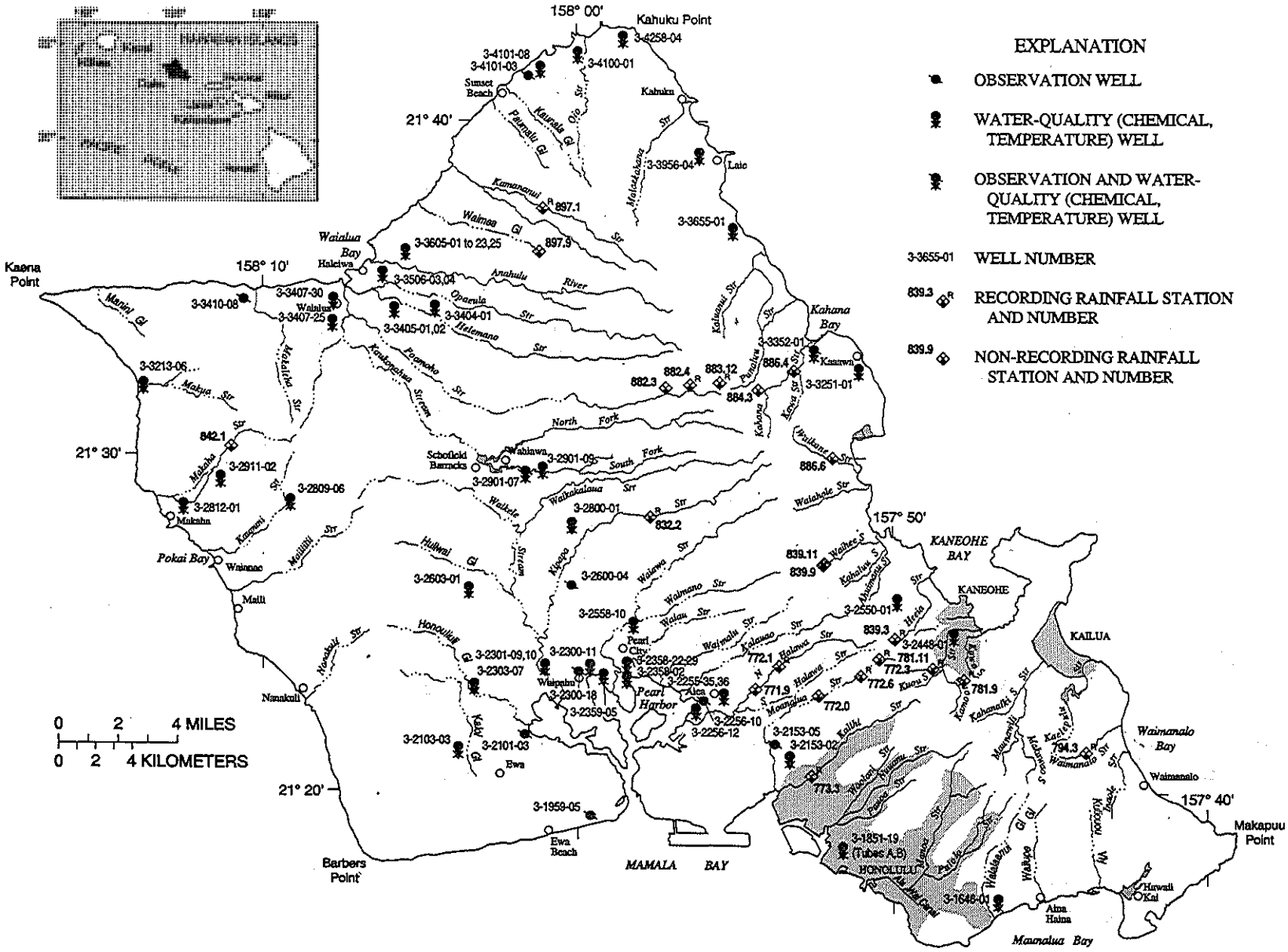


Figure 5. Locations of observation wells, ground-water quality sampling wells, and rainfall stations on Oahu.

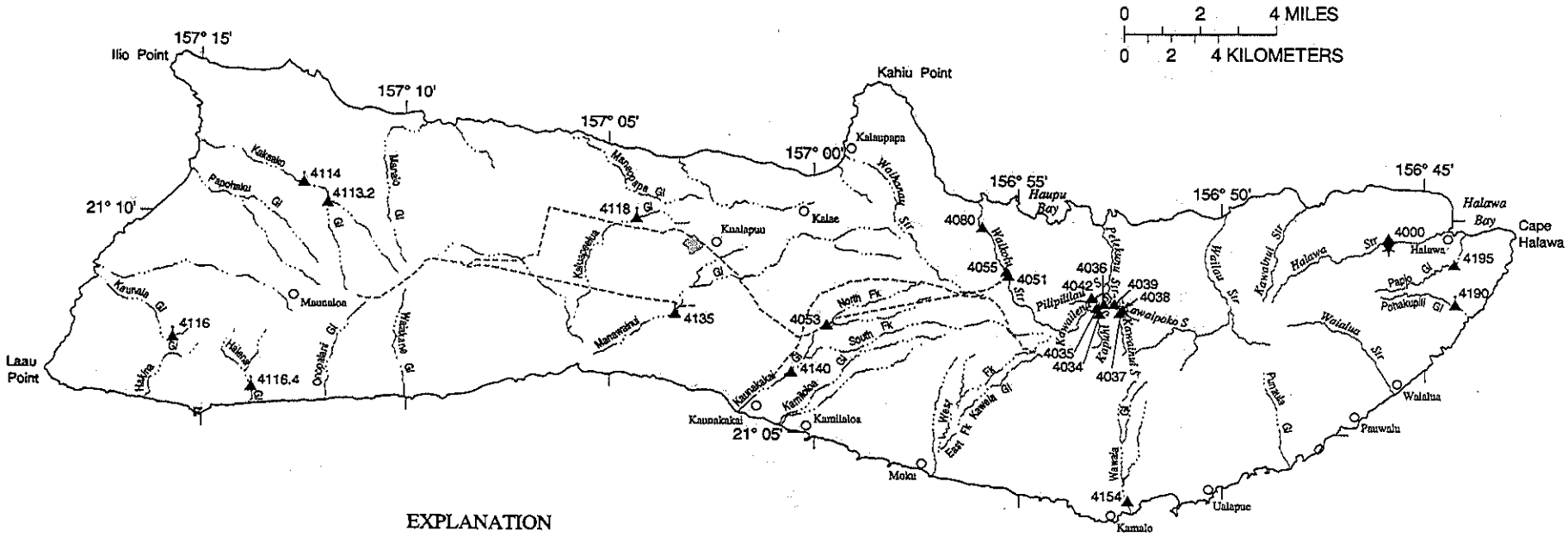


Figure 6. Locations of gaging, water-quality, and partial-record stations on Molokai.

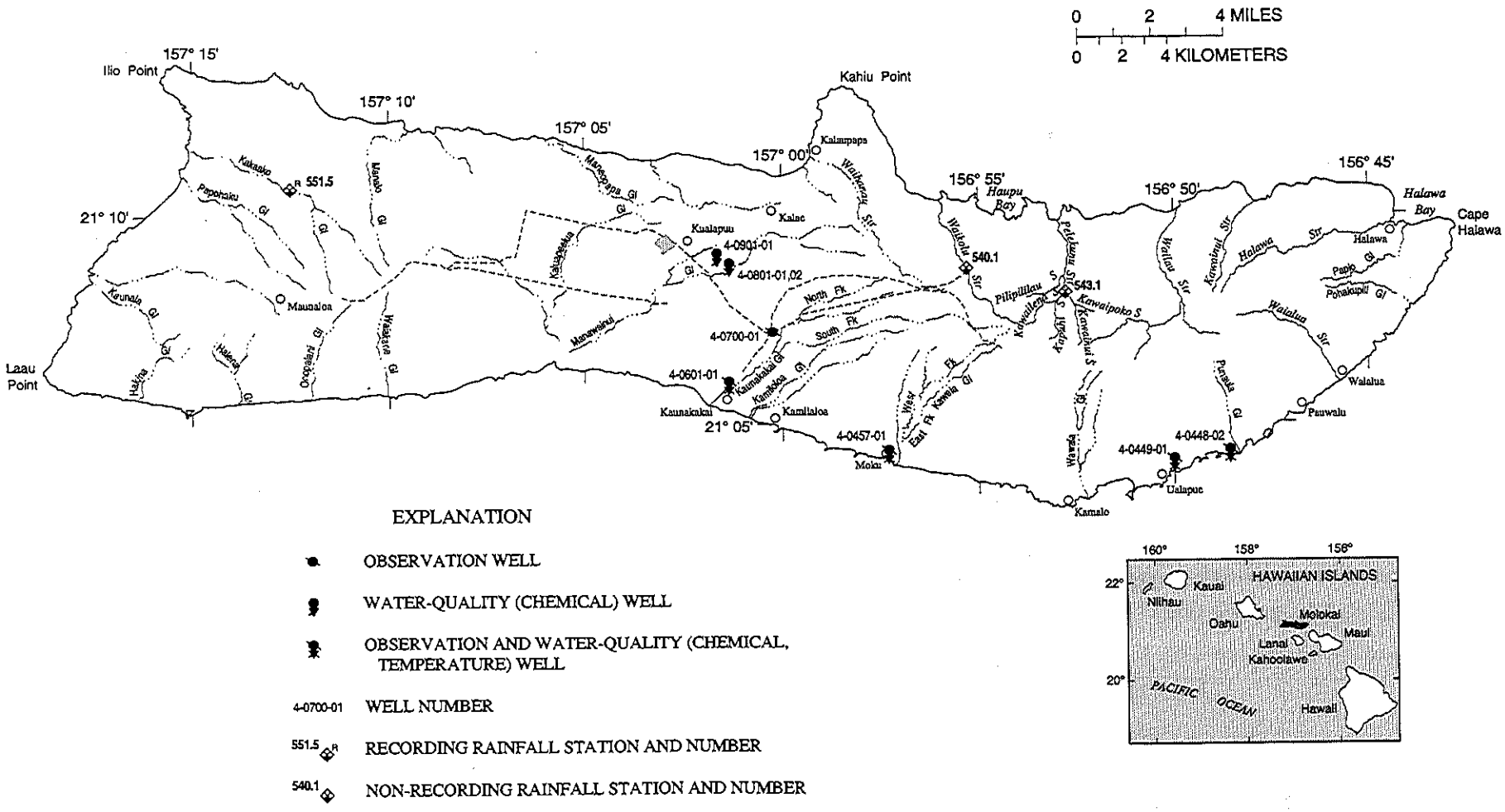


Figure 7. Locations of observation wells, ground-water quality sampling wells, and rainfall stations on Molokai.

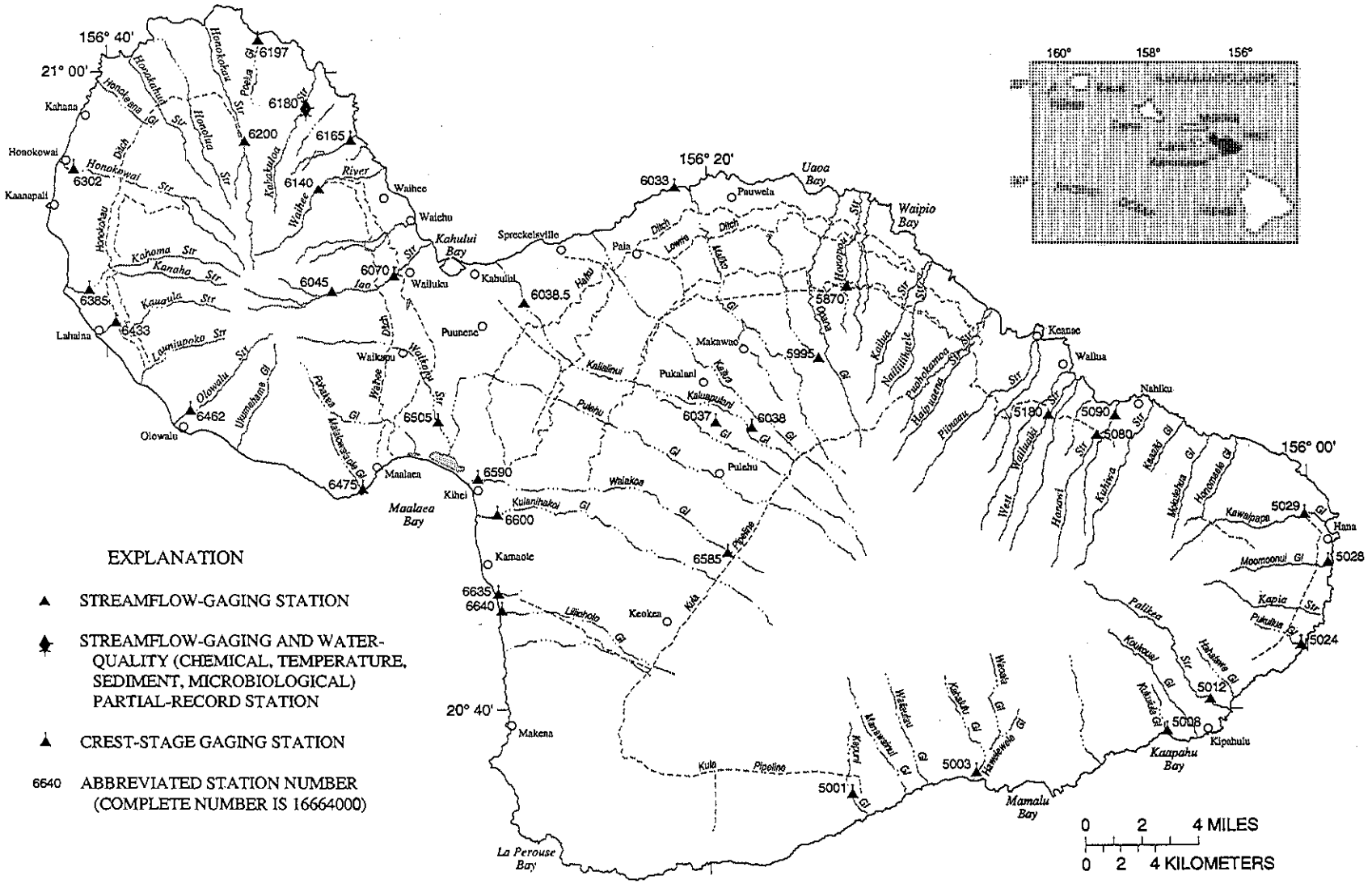


Figure 8. Locations of gaging, water-quality, and partial-record stations on Maui.

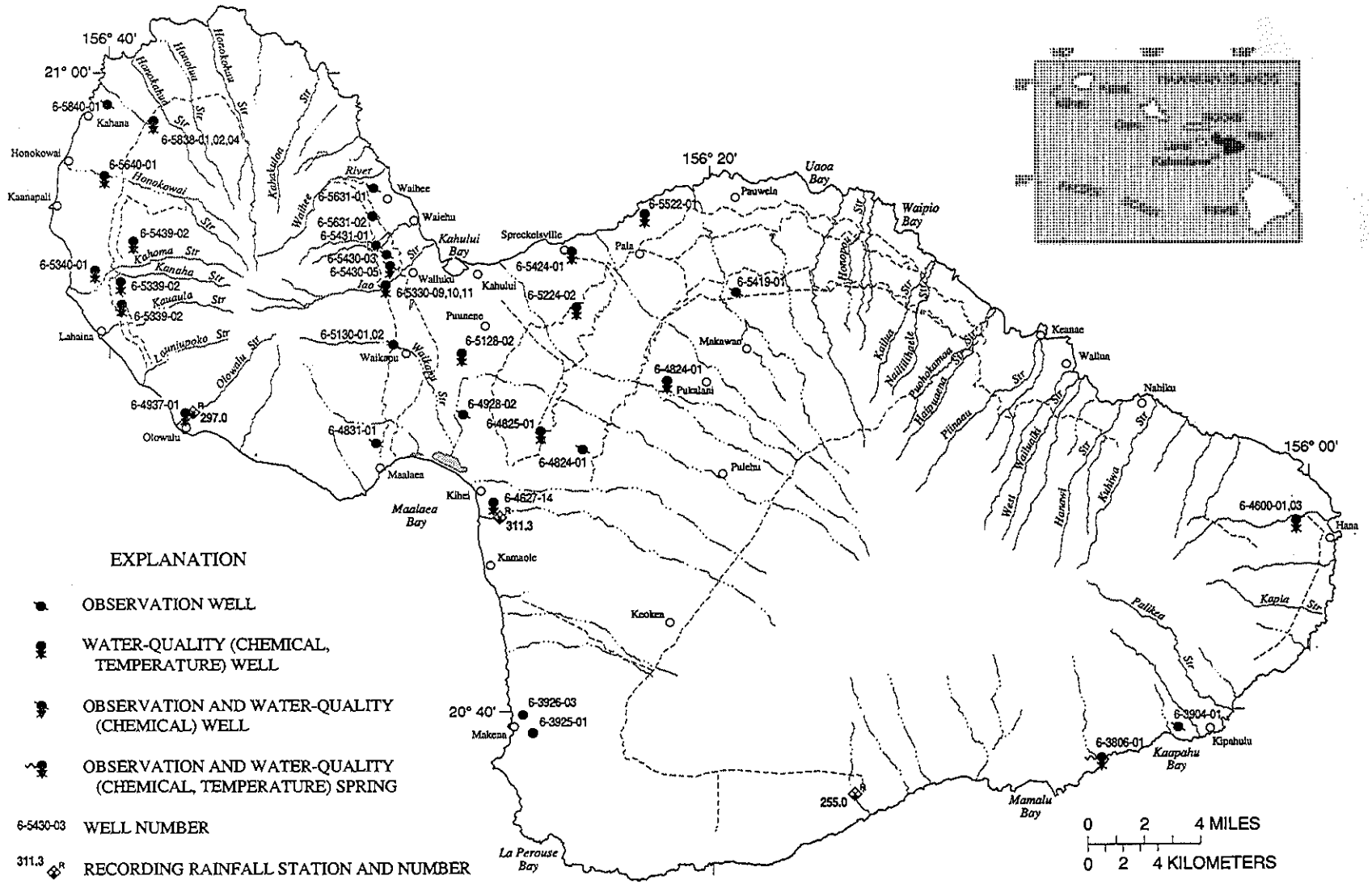


Figure 9. Locations of observation wells, ground-water quality sampling wells, and rainfall stations on Maui.

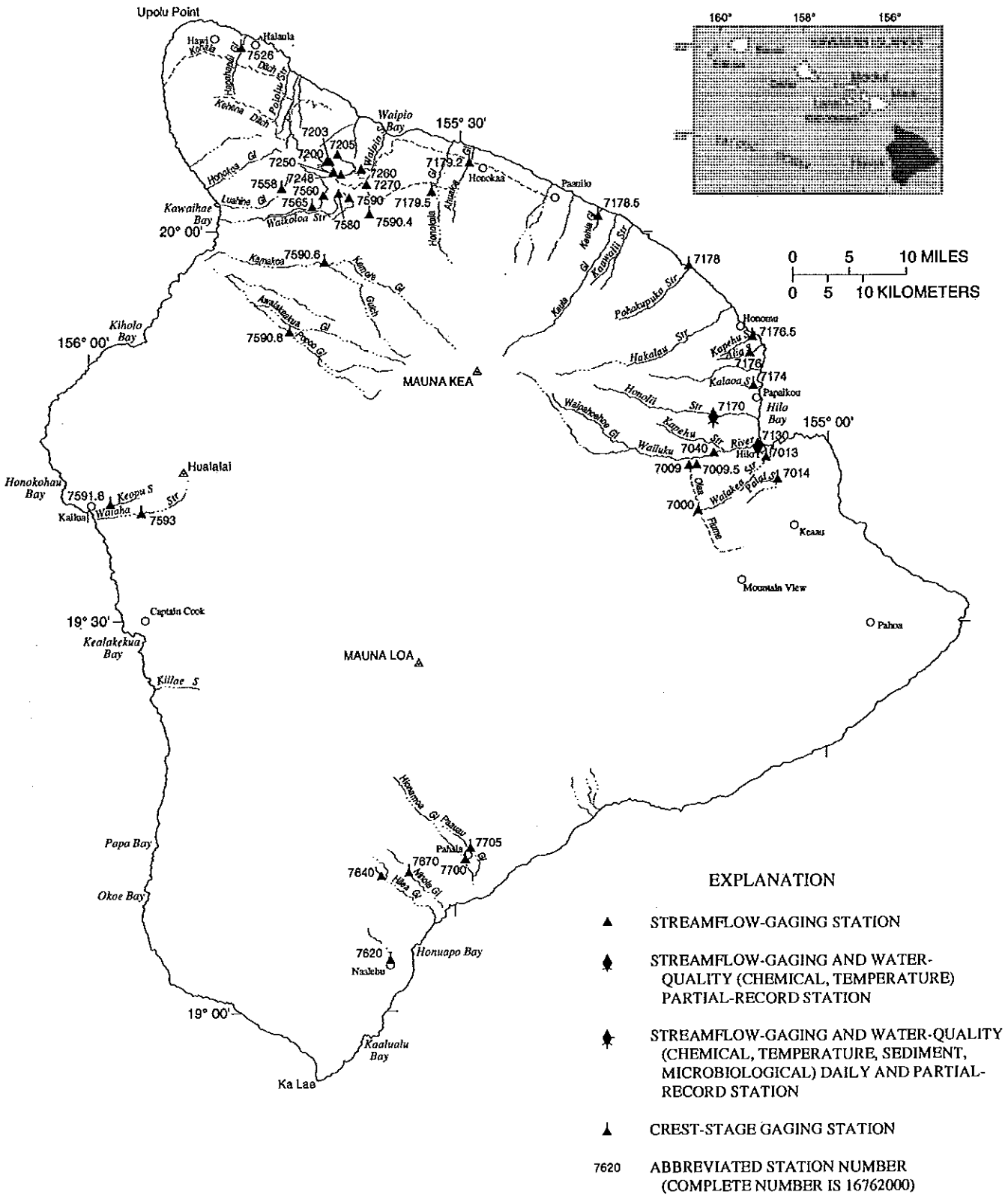


Figure 10. Locations of gaging, water-quality, and partial-record stations on Hawaii.

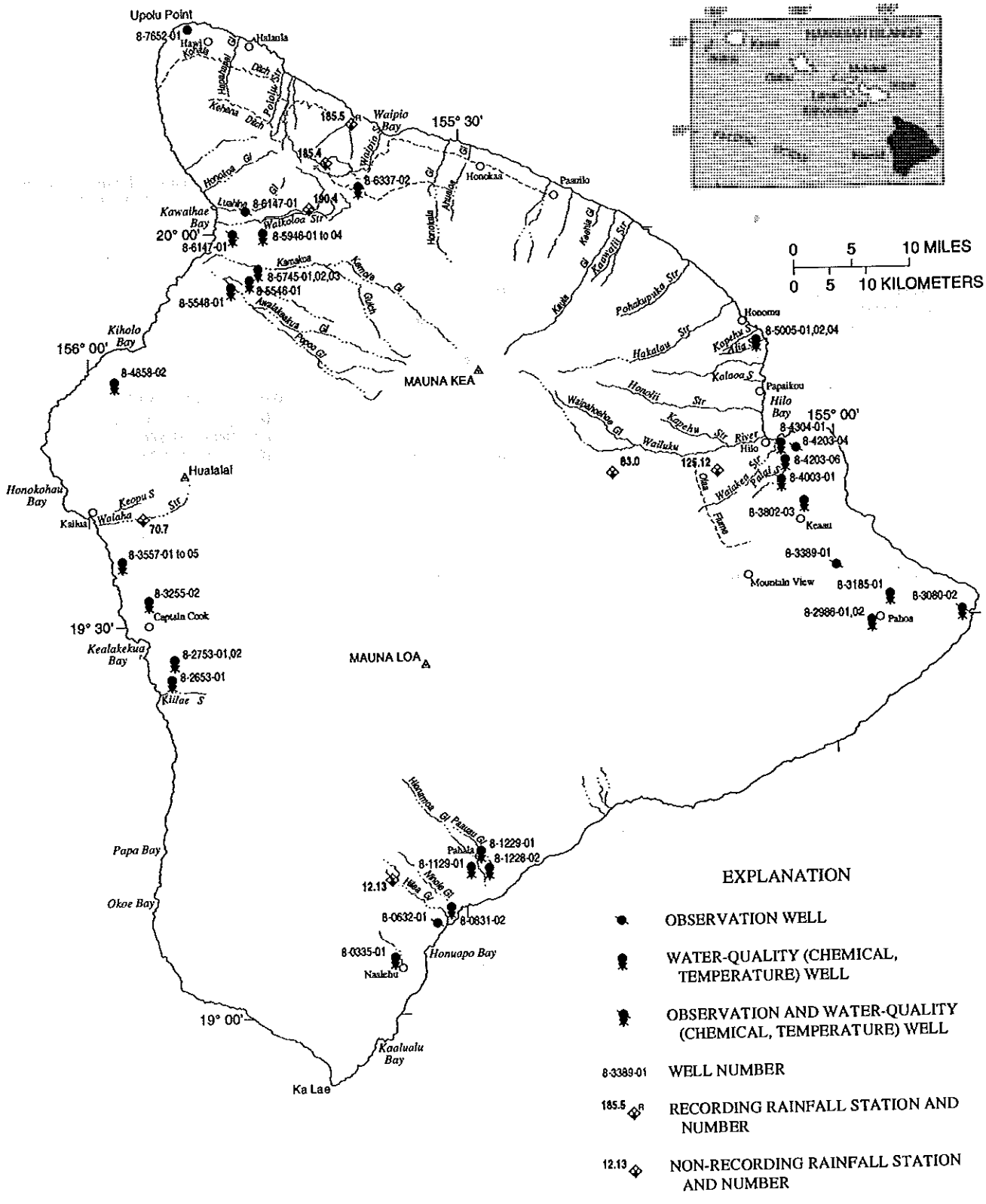


Figure 11. Locations of observation wells, ground-water quality sampling wells, and rainfall stations on Hawaii.

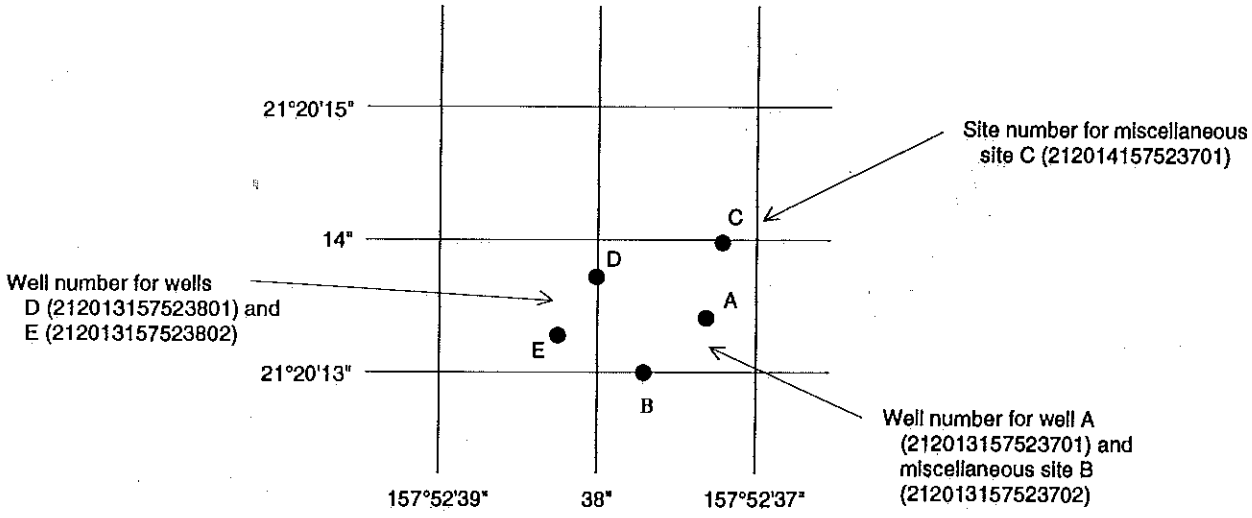


Figure 12. Sketch showing system for numbering wells and miscellaneous sites.

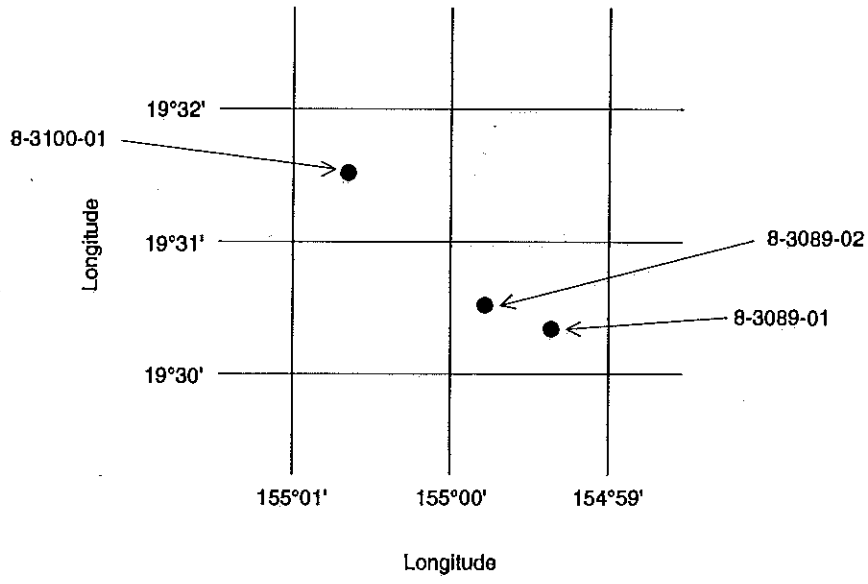


Figure 13. Sketch showing local well-numbering system.

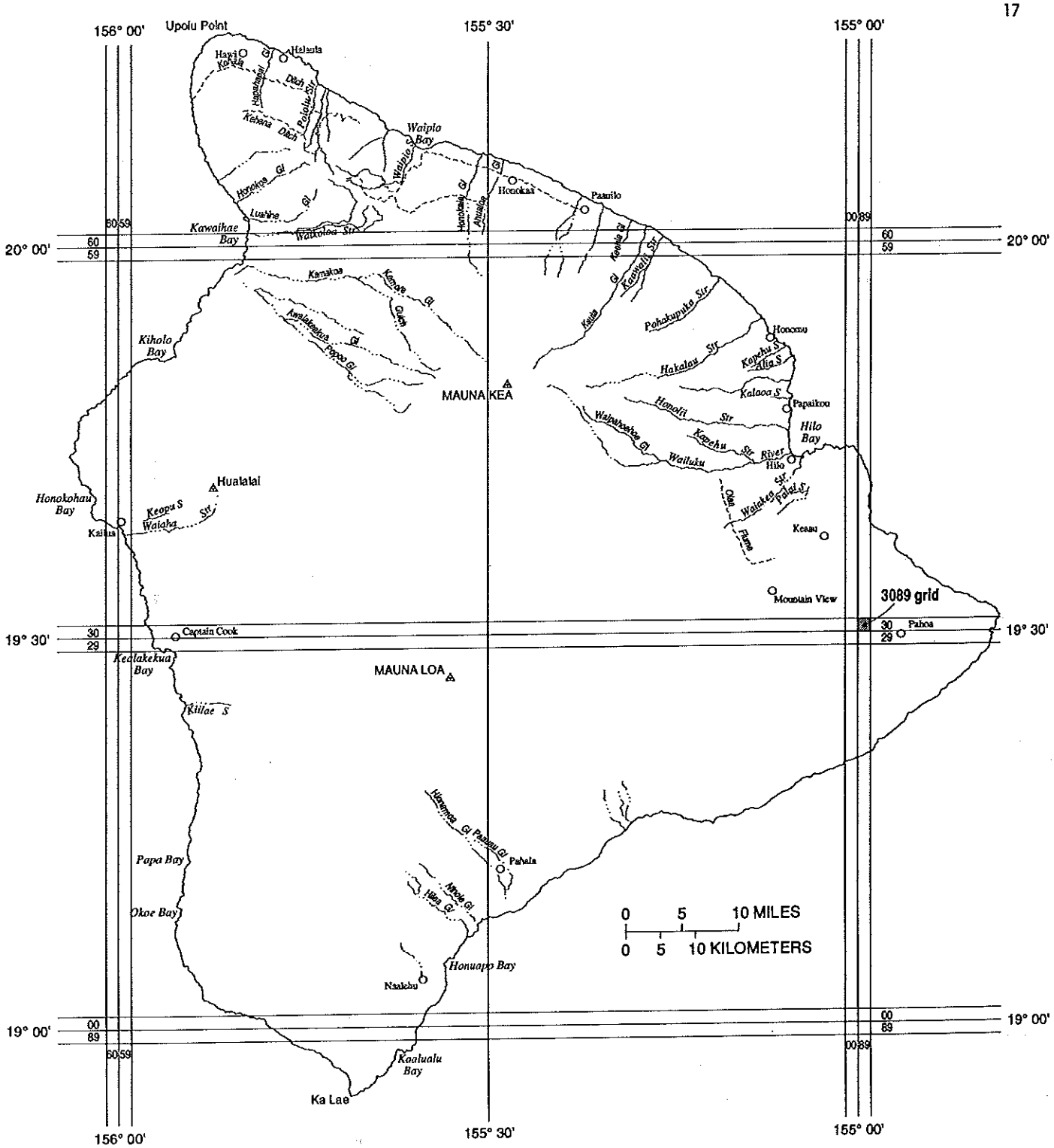


Figure 14. Map of island of Hawaii showing system for numbering local well numbers.

Data Collection and Computation

The data obtained at a complete-record gaging station on a stream or canal consist of a continuous record of stage, individual measurements of discharge throughout a range of stages, and notations regarding factors that may affect the relations between stage and discharge. These data, togethor with supplemental information, such as weather records, are used to compute daily discharges. The data obtained at a complete-record gaging station on a lake or reservoir consist of a record of stage and of notations regarding factors that may affect the relations between stage and lake content. These data are used with stage-area and stage-capacity curves or tables to compute water-surface areas and lake storage.

Continuous records of stage are obtained with digital recorders that punch stage values on paper tapes at selected time intervals, or with analog recorders that trace continuous graphs of stage. Measurements of discharge are made with current meters, using methods adapted by the Geological Survey as a result of experience accumulated since 1880. These methods are described in standard textbooks, in U.S. Geological Survey Water-Supply Paper 2175, and in U.S. Geological Survey Techniques of Water Resources Investigations (TWRI), Book 3, Chapter A6.

In computing discharge records, results of individual measurements are plotted against corresponding stages, and stage-discharge relation curves are then constructed. From these curves, rating tables indicating the approximate discharge for any stage within the range of the measurements are prepared. If it is necessary to define extremes of discharge outside the range of the current-meter measurements, the curves are extended using: (1) logarithmic plotting; (2) velocity- area studies; (3) results of indirect measurements of peak discharge, such as slope-area or contracted-opening measurements, and computations of flow-over-dams or weirs; or (4) step-backwater techniques.

Daily mean discharges are computed by applying the daily mean stages (gage heights) to the stage-discharge curves or tables. If the stage-discharge relation is subject to change because of frequent or continual change in the physical features that form the control, the daily mean discharge is determined by the shifting-control method, in which correction factors based on individual discharge measurements and notes of the personnel making the measurements are applied to the gage heights before the discharges are determined from the curves or tables. This shifting-control method also is used if the stage-discharge relation is changed temporarily because of aquatic growth or debris on the control.

At some stream-gaging stations, the stage-discharge relation is affected by the backwater from reservoirs, tributary streams, or other sources. This necessitates the use of the slope method in which the slope or fall in a reach of the stream is a factor in computing discharge. The slope or fall is obtained by means of an auxiliary gage set at some distance from the base gage. At some stations the stage-discharge relation is affected by changing stage; at these stations the rate of change in stage is used as a factor in computing discharge.

In computing records of lake or reservoir contents, it is necessary to have information available from surveys, curves, or tables that define the relation of stage and content. The application of stage to the stage-content curves or tables gives the contents from which daily, monthly, or yearly changes then are determined. If the stage-content relation changes because of deposition of sediment in a lake or reservoir, periodic resurveys may be necessary to redefine the relation. Discharges over lake or reservoir spillways are computed from stage-discharge relations much as other stream discharges are computed.

For some gaging stations there are periods when no gage-height record is obtained, or the validity of the recorded gage height is so questionable that it cannot be used to compute daily discharge or contents. This happens when the recorder stops or otherwise fails to operate properly, intakes are plugged, or for various other reasons. For such periods, the daily discharges are estimated from the recorded range in stage, previous and following record, discharge measurements, weather records, and comparison with other stations records from the same or nearby basins. Likewise, daily contents may be estimated from operator's logs, previous and following record, inflow-outflow studies, and other information. Information explaining how estimated daily-discharge values are identified in station records is included in the next two sections, "Data Presentation" (REMARKS paragraph) and "Identifying Estimated Daily Discharge."

Data Presentation

Streamflow data in this report are presented in a new format that is considerably different from the format in data reports prior to the 1992 water year. The major changes are that statistical characteristics of discharge now appear in tabular summaries following the water-year data table and less information is provided in the text or station manuscript above the table. These changes represent the results of a pilot program to reformat the annual water-data report to meet current user needs and data preferences.

The records published for each continuous-record surface-water discharge station (gaging station) now consist of four parts, the manuscript or station description; the data table of daily mean values of discharge for the current water year with summary data; a tabular statistical summary of monthly mean flow data for a designated period, by water year; and a summary statistics table that includes statistical data of annual and daily flows as well as data pertaining to annual runoff, 7-day low-flow minimums, and flow duration. Summary statistics were not included for certain sites where these data would be misleading. Contact the District Office for information concerning summary statistics for these sites.

Station manuscript

The manuscript provides, under various headings, descriptive information, such as station location; period of record; historical extremes outside the period of record; record accuracy; and other remarks pertinent to station operation and regulation. The following information, as appropriate, is provided with each continuous record of discharge or lake content. Comments to follow clarify information presented under the various headings of the station description.

LOCATION.--Information on locations is obtained from the most accurate maps available. The location of the gage with respect to the cultural and physical features in the vincinity and with respect to the reference place mentioned in the station name is given.

DRAINAGE AREA.--Drainage areas are measured using the most accurate maps available. Because the type of maps available varies from one drainage basin to another, the accuracy of drainage areas likewise varies. Drainage areas are updated as better maps become available.

PERIOD OF RECORD.--This indicates the period for which there are published records for the station or for an equivalent station. An equivalent station is one that was in operation at a time that the present station was not, and whose location was such that records from it can reasonably be considered equivalent with records from the present station.

REVISED RECORDS.--Published records, because of new information, occasionally are found to be incorrect, and revisions are printed in later reports. Listed under this heading are all the reports in which revisions have been published for the station and the water years to which the revisions apply. If a revision did not include daily, monthly, or annual figures of discharge, that fact is noted after the year dates as follows: "(M)" means the instantaneous maximum discharge was revised; "(m)" the instantaneous minimum was revised; and "(P)" the peak discharges were revised. If the drainage area has been revised, the report in which the most recently revised figure was first published is given.

GAGE.--The type of gage in current use, the datum of the current gage referred to mean sea level, and a condensed history of the types, locations, and datums of previous gages are given under this heading. In references to datum of gage, the phrase "mean sea level" denotes "Sea Level Datum of 1929" as used by the Topographic Division of the Geological Survey unless otherwise qualified.

REMARKS.--All periods of estimated daily-discharge record will either be identified by date in this paragraph of the station description for water-discharge stations or flagged in the daily-discharge table. (See next section, "Identifying Estimated Daily Discharge.") If a remark statement is used to identify estimated record, the paragraph will begin with this information presented as the first entry. The paragraph is also used to present information relative to the accuracy of the records, special methods of computation, conditions that affect natural flow at the station, and possibly, other pertinent items. For reservoir stations, information is given on the dam forming the reservoir, the capacity, outlet works and spillway, and purpose and use of the reservoir.

COOPERATION.--Records provided by a cooperating organization or obtained for the Geological Survey by a cooperating organization are identified here.

AVERAGE DISCHARGE.--The discharge value given is the arithmetic average of the water-year mean discharges. Average discharge is computed only for stations having at least 5 water years of complete record; water years with incomplete record are not included in the computation. The mean-discharge value that uses all published data may differ from that given in the summary statistics data, which is based only on computer-stored data. The summary data does not include values of monthly or yearly data that were determined by various methods for the series of Water-Supply Papers entitled "Compilation of Records of Surface Water of the United States". The average-discharge value is not computed for stations where diversions, storage or other water-use practices cause the value to be meaningless. If water projects that significantly alter flow at a station are put into use after the station has been in operation for a period of years, the new average is computed as soon as 5 water years of record have accumulated after the project began.

EXTREMES FOR PERIOD OF RECORD.--Extremes may include maximum and minimum stages and maximum and minimum discharges or contents. Unless otherwise qualified, the maximum discharge or contents is the instantaneous maximum corresponding to the highest stage that occurred. The highest stage may have been obtained from a graphic or digital recorder, a crest-stage gage, or by direct observation of a nonrecording gage. If the maximum stage did not occur on the same day as the maximum discharge or contents, it is given separately. Similarly, the minimum is the instantaneous minimum discharge, unless otherwise qualified, and was determined and is reported in the same manner as the maximum.

EXTREMES OUTSIDE PERIOD OF RECORD.--Included here is information concerning major floods or unusually low flows that occurred outside the stated period of record. The information may or may not have been obtained by the U.S. Geological Survey

EXTREMES FOR CURRENT YEAR.--Extremes given here are similar to those for the period of record, except peak discharges listing may include secondary peaks. For stations meeting certain criteria, all peak discharges and stages occurring during the water year and greater than a selected base discharge are presented under this heading. The peaks greater than the base discharge, excluding the highest one, are referred to as secondary peaks. Peak discharges are not published for any canals, ditches, drains, or streams for which the peaks are subject to substantial control by man. The time of occurrence for peaks is expressed in 24-hour local standard time. For example, 12:30 a.m. is 0030, 1:30 p.m. is 1330. The minimum for the current water year appears below the table of peak data.

REVISIONS.--If a critical error in published records is discovered, a revision is included in the first report published following discovery of the error.

Although rare, occasionally the records of a discontinued gaging station may need revision. Because, for these stations, there would be no current or, possibly, future station manuscript published to document the revision in a "Revised Records" entry, users of data for these stations who obtained the record from previously published data reports may wish to contact the Hawaii office (address given on the back of the title page of this report) to determine if the published records were ever revised after the station was discontinued. Of course, if the data were obtained by computer retrieval, the data would be current and there would be no need to check because any published revision of data is always accompanied by revision of the corresponding data in computer storage.

Manuscript information for lake or reservoir stations differs from that for stream stations in the nature of the "Remarks" and in the inclusion of a skeleton stage-capacity table when daily contents are given.

Data table of daily mean values

The daily table of discharge records for stream-gaging stations gives mean discharge for each day of the water year. In the monthly summary for the table, the line headed "TOTAL" gives the sum of the daily figures for each month. The line headed "MEAN" gives the average flow in cubic feet per second during the month, and the lines headed "MAX" and "MIN" give the maximum and minimum daily mean discharges, respectively, for the month. Discharge for the month also is usually expressed in cubic feet per second per square mile (line headed "CFSM"); or in inches (line headed "IN"), or in acre-feet (line headed "AC-FT"). Figures for cubic feet per second per square mile and runoff in inches are omitted if there is extensive regulation or diversion or if the drainage area includes large noncontributing areas.

Statistics of monthly mean data

A tabular summary of the mean (line headed "MEAN"), maximum (line headed "MAX"), and minimum (line headed "MIN") of monthly mean flows for each month for a designated period is provided below the mean values table. The water years of the first occurrence of the maximum and minimum monthly flows are provided immediately below those figures. The designated period will be expressed as "FOR WATER YEAR ____-____, BY WATER YEAR (WY)", and will list the first and last water years of the range of years selected from the PERIOD OF RECORD paragraph in the station manuscript. It will consist of all of the station record within the specified water years, inclusive, including complete months of record for partial water years, if any, and may coincide with the period of record for the station. The water years for which the statistics are computed will be consecutive, unless a break in the station record is indicated in the manuscript.

Summary statistics

A table titled "SUMMARY STATISTICS" follows the statistics of monthly mean data tabulation. This table consists of four columns, with the first column containing the line headings of the statistics being reported. The table provides a statistical summary of yearly, daily, and instataneous flows, not only for the current water year but also for the previous calendar year and for a designated period, as appropriate. The designated period selected, "WATER YEARS ____-____", will consist of all of the station record within the specified water years, inclusive, including months of record for partial water years, if any, and may coincide with the period of record for the station. The water years for which the statistics are computed will be consecutive, unless a break in the station record is indicated in the manuscript. All of the calculations for the statistical characteristics designated ANNUAL (See line headings below), except for the "ANNUAL 7-DAY MINIMUM" statistic, are calculated for the designated period using complete water years. The other statistical characteristics may be calculated using partial water years.

The date or water year, as appropriate, of the first occurrence of each statistic reporting extreme values of discharge is provided adjacent to the statistic. Repeated occurrences may be noted in the REMARKS paragraph of the manuscript or in footnotes. Because the designated period may not be the same as the station period of record published in the manuscript, occasionally the dates of occurrence listed for the daily and instantaneous extremes in the designated-period column may not be within the selected water years listed in the headings. When this occurs, it will be noted in the REMARKS paragraph or in footnotes. Selected streamflow duration curve statistics and runoff are also given. Runoff data may be omitted if there is extentive regulation or diversion of flow in the drainage basin.

The following summary statistics data, as appropriate, are provided with each continuous record of discharge. Comments to follow clarify information presented under the various line headings of the summary statistics table.

ANNUAL TOTAL.--The sum of the daily mean values of discharge for the year.

ANNUAL MEAN.--The arithmetic mean of the individual daily mean discharges for the year noted or for the designated period.

HIGHEST ANNUAL MEAN.--The maximum annual mean discharge occurring for the designated period.

LOWEST ANNUAL MEAN.--The minimum annual mean discharge occurring for the designated period.

HIGHEST DAILY MEAN.--The maximum daily mean discharge for the year or for the designated period.

LOWEST DAILY MEAN.--The minimum daily mean discharge for the year or for the designated period.

ANNUAL 7-DAY MINIMUM.--The lowest mean discharge for 7 consecutive days for a calendar year or a water year. Note that most low-flow frequency analyses of annual 7-day minimum flows use a climatic year (April 1 - March 31). The date shown in the summary statistics table is the initial date of the 7-day period. (This value should not be confused with the 7-day 10-year low-flow statistic.)

INSTANTANEOUS PEAK FLOW.--The maximum instantaneous discharge occuring for the water year or for the designated period. Note that secondary instantaneous peak discharges above a selected base discharge are stored in District computer files for stations meeting certain criteria. Those discharge values may be obtained by writing to the District Office. (see address on back title page of this report.)

INSTANTANEOUS PEAK STAGE.--The maxmimum instantaneous stage occuring for the water year or for the designated period. If the dates of occurrence for the instantaneous peak flow and instantaneous peak stage differ, the REMARKS paragraph in the manuscript or a footnote may be used to provide further information.

INSTANTANEOUS LOW FLOW.--The minimum instantaneous discharge occurring for the water year or for the designated period.

ANNUAL RUNOFF.--Indicates the total quantity of water in runoff for a drainage area for the year. Data reports may use any of the following units of measurement in presenting annual runoff data:

Acre-foot (AC-FT) is the quantity of water required to cover 1 acre to a depth of 1 foot and is equivalent to 43,560 cubic feet or about 326,000 gallons or 1,233 cubic meters.

Cubic feet per second per square mile (CFSM) is the average number of cubic feet of water flowing per second from each square mile area drained, assuming the runoff is distributed uniformly in time and area.

Inches (INCHES) indicates the depth to which the drainage area would be covered if all of the runoff for a given time period were uniformly distributed on it.

10 PERCENT EXCEEDS.--The discharge that has been exceeded 10 percent of the time for the designated period.

50 PERCENT EXCEEDS.--The discharge that has been exceeded 50 percent of the time for the designated period.

90 PERCENT EXCEEDS.--The discharge that has been exceeded 90 percent of the time for the designated period.

Data collected at miscellaneous sites are presented in a table following the information for continuous sites. This table summarizes discharge measurements made at sites other than continuous-record sites.

Identifying Estimated Daily Discharge

Estimated daily-discharge values published in the water-discharge tables of annual State data reports are identified either by flagging individual daily values with the letter symbol "e" and printing a table footnote, "e Estimated," or by listing the dates of the estimated record in the REMARKS paragraph of the station description.

Accuracy of the Records

The accuracy of streamflow records depends primarily on: (1) The stability of the stage-discharge relation or, if the control is unstable, the frequency of discharge measurements, and (2) the accuracy of measurements of stage, measurements of discharge, and interpretations of records.

The accuracy attributed to the records is indicated under "REMARKS". "Excellent" means that about 95 percent of the daily discharges are within 5 percent of their true values; "good", within 10 percent; and "fair" within 15 percent. Records that do not meet the criteria mentioned, are rated "poor." Different accuracies may be attributed to different parts of a given record.

Daily mean discharges in this report are given to the nearest hundredth of a cubic foot per second for values less than 1 ft^3/s; the nearest tenths between 1.0 and 10 ft^3/s; to whole numbers between 10 and 1,000 ft^3/s; and to 3 significant figures for more than 1,000 ft^3/s. The number of significant figures used is based solely on the magnitude of the discharge figure. The same rounding rules apply to discharges listed for partial-record stations and miscellaneous sites.

Discharge at many stations, as indicated by the monthly mean, may not reflect natural runoff due to the effects of diversion, consumption, regulation by storage, increase or decrease in evaporation due to artificial causes, or to other factors. For such stations, figures of cubic feet per second per square mile and of runoff, in inches, are not published unless satisfactory adjustments can be made for diversions, for changes in contents to reservoirs, or for other changes incident to use and control. Evaporation from a reservoir is not included in the adjustments for changes in reservoir contents, unless it is so stated. Even at those stations where adjustments are made, large errors in computed runoff may occur if adjustments or losses are large in comparison with the observed discharge.

Other Records available

Information used in the preparation of the records in this publication, such as discharge-measurement notes, gage-height records, temperature measurements, and rating tables are on file in the Hawaii District Office. Also, most of the daily mean discharges are in computer readable form and have been analyzed statistically. Information on the availability of the unpublished information or on the results of statistical analyses of the unpublished records may be obtained from the Hawaii District Office.

Records of Surface-Water Quality

Records of surface-water quality ordinarily are obtained at or near stream-gaging stations because interpretation of records of surface-water quality nearly always requires corresponding discharge data. Records of surface-water quality in this report may involve a variety of types of data and measurement frequencies.

Classification of Records

Water-quality data for surface-water sites are grouped into one of three classifications. A continuing-record station is a site where data are collected on a regularly scheduled basis. Frequency may be one or more times daily, weekly, monthly, or quarterly. A partial-record station is a site where limited water-quality data are collected systematically over a period of years. Frequency of sampling is usually less than quarterly. A miscellaneous sampling site is a location other than a continuing or partial-record station, where random samples are collected to give better areal coverage to define water-quality conditions in the river basin.

A careful distinction needs to be made between "continuing records" as used in this report and "continuous recordings," which refers to a continuous graph or a series of discrete values punched at short intervals on a paper tape or obtained via data collection platform. Some records of water quality, such as temperature and specific conductance, may be obtained through continuous recordings; however, because of costs, most data are obtained only monthly or less frequently. Locations of stations for which records on the quality of surface water appear in this report are shown in figures 2, 4, 6, 8, and 10.

Arrangement of Records

Water-quality records collected at a surface-water daily record station are published immediately following that record, regardless of the frequency of sample collection. Station number and name are the same for both records. Where a surface-water daily record station is not available or where the water quality differs significantly from that at the nearby surface-water station, the continuing water-quality record is published with its own station number and name in the regular downstream-order sequence. Water-quality data for partial-record stations and for miscellaneous sampling sites appear in separate tables following the table of discharge measurements at miscellaneous sites.

On-site Measurement and Sample Collection

In obtaining water-quality data, it is important that the data obtained represent the in situ quality of the water. To assure this, certain measurements, such as water temperature, pH, and dissolved oxygen, need to be made onsite when the samples are taken. To assure that measurements made in the laboratory also represent the in situ water, carefully prescribed procedures need to be followed in collecting the samples, treating the samples to prevent changes in quality pending analysis, and shipping the samples to the laboratory. Procedures for onsite measurements and for collecting, treating, and shipping samples are given in publications on "Techniques of Water-Resources Investigations," (TWRI), Book 1, Chapter D2; Book 3, Chapter C2; Book 5, Chapter A1, A3, and A4. All of these references are listed under " PUBLICATIONS ON TECHNIQUES OF WATER-RESOURCES INVESTIGATIONS" in this report. Also, detailed information on collecting, treating, and shipping samples may be obtained from the Geological Survey, Water Resources Division office in Honolulu, Hawaii.

One sample can define adequately the water quality at a given time if the mixture of solutes throughout the stream cross section is homogeneous. However, the concentration of solutes at different locations in the cross section may vary widely with different rates of water discharge, depending on the source of material and the turbulence and mixing of the stream. Some streams must be sampled through several vertical sections to obtain a representative sample needed for an accurate mean concentration and for use in calculating load. All samples obtained for the National Stream Quality Accounting Network (see "DEFINITION OF TERMS") are obtained from at least five verticals. Whether samples are obtained from the centroid of flow or from several verticals, depends on flow conditions and other factors which must be evaluated by the collector.

Chemical-quality data published in this report are considered to be the most representative values available for the stations listed. The values reported represent water-quality conditions at the time of sampling as much as possible, consistent with available sampling techniques and methods of analysis. In the rare case where an apparant inconsistency exists between a reported pH value and the relative abundance of carbon dioxide species (carbonate and bicarbonate), the inconsistency is the result of a slight uptake of carbon dioxide from the air by the sample between measurements of pH in the field and determination of carbonate and bicarbonate in the laboratory.

For chemical-quality stations equipped with digital monitors, the records consist of daily maximum, minimum, and mean values for each constituent measured and are based upon hourly punches beginning at 0100 hours and ending at 2400 hours for the day of record. More detailed records (hourly values) may be obtained from the U.S. Geological Survey office whose address is given on the back of the title page in this report.

Water Temperature

Water temperatures are measured at most of the water-quality stations. In addition, water temperatures are sometimes taken at time of discharge measurements for water-discharge stations. For stations where water temperatures are taken manually once or twice daily, the water temperatures are taken at about the same time each day. Large streams have a small diurnal temperature change; shallow streams may have a daily range of several degrees and may follow closely the changes in air temperature. Some streams may be affected by waste-heat discharges.

At stations where recording instruments are used, maximum, minimum, and mean temperatures for each day are published. Water temperatures measured at the time of water-discharge measurements are on file in the Hawaii office.

Sediment

Suspended-sediment concentrations are determined from samples collected by one of the standard techniques discussed in TWRI, Book 3, Chapter C2, "Field methods for measurement of fluvial sediment," 1985 revision. Samples are obtained using standard depth- or point-integrating samplers, or by means of an approved pumping sampler. Mean concentrations for the sampled cross section are in turn determined from these samples.

During periods of rapidly changing flow or rapidly changing suspended-sediment concentration, samples may have been collected more frequently (twice daily or, in some instances, hourly). The published sediment discharges for days of rapidly changing flow or concentration were computed by the subdivided-day method (time-discharge weighted average). Therefore, for those days when the published sediment discharge value differs from the value computed as the product of discharge times mean concentration times 0.0027, the reader can assume that the sediment discharge for that day was computed by the subdivided-day method. For periods when no samples were collected, daily discharges of suspended sediment were estimated on the basis of water discharge, sediment concentrations observed immediately before and after the periods, and suspended-sediment loads for other periods of similar discharge.

At other stations, suspended-sediment samples were collected periodically. Although data collected periodically may represent conditions only at the time of observations, such data are useful in establishing seasonal relations between quality and streamflow in predicting long-term sediment-discharge characteristics of the stream.

In addition to the records of suspended-sediment discharge, periodic measurements of the particle-size distributions for the suspended-sediment, bed-load, and bed-material samples are included for stations where samples were obtained to measure this parameter.

Laboratory Measurements

Sediment samples, samples for indicator bacteria, and daily samples for specific conductance are analyzed locally. All other samples are analyzed in the Geological Survey laboratory in Arvada, Colorado. Methods used in analyzing sediment samples and computing sediment records are given in TWRI, Book 5, Chapter C1. Methods used by the Geological Survey laboratory are given in TWRI, Book 1, Chapter D2; Book 3, Chapter C2; Book 5, Chapter A1, A3, and A4.

In March 1989, the National Water-Quality Laboratory discovered a bias in the turbidimetric method for sulfate analysis, indicating that values below 75 mg/L have a median positive bias of 2 mg/L above the true value for the period between 1982 and 1989. Sulfate values for years 1982 to 1989 have not been corrected for this bias.

Data Presentation

For continuing-record stations, information pertinent to the history of station operation is provided in descriptive headings preceding the tabular data. These descriptive headings give details regarding location, drainage area, period of record, type of data available, instrumentation, general remarks, cooperation, and extremes for parameters currently measured daily. Tables of chemical, physical, biological, radiochemical data, and so forth, obtained at a frequency less than daily are presented first. Tables of "daily values" of specific conductance, pH, water temperature, dissolved oxygen, and suspended sediment then follow in sequence.

In the descriptive headings, if the location is identical to that of the discharge gaging station, neither the LOCATION nor the DRAINAGE AREA statements are repeated. The following information, as appropriate, is provided with each continuous-record station. Comments that follow clarify information presented under the various headings of the station description.

LOCATION.--See Data Presentation under "Records of Stage and Water Discharge;" same comments apply.

DRAINAGE AREA.--See Data Presentation under "Records of Stage and Water Discharge;" same comments apply.

PERIOD OF RECORD.--This indicates the periods for which there are published water-quality records for the station. The periods are shown separately for records of parameters measured daily or continuously and those measured less than daily. For those measured daily or continuously, periods of record are given for the parameters individually.

INSTRUMENTATION.--Information on instrumentation is given only if a water-quality monitor, sediment pumping sampler, or other sampling device is in operation at a station.

REMARKS.--Remarks provide added information pertinent to the collection, analysis, or computation of the records.

COOPERATION.--Records provided by a cooperating organization or obtained for the Geological Survey by a cooperating organization are identified here.

EXTREMES FOR PERIOD OF RECORD.--Maximums and minimums are given only for parameters measured daily or more frequently. None are given for parameters measured weekly or less frequently, because the true maximums and minimums may not have been sampled. Extremes, when given, are provided for both the period of record and for the current water year.

REVISIONS.--If errors in published water-quality records are discovered after publication, appropriate updates are made to the Water-Quality File in the U.S. Geological Survey's computerized data system, WATSTORE, and subsequently by monthly transfer of update transactions to the U.S. Environmental Protection Agency's STORET system. Because the usual volume of updates makes it impractical to document individual changes in the State data-report series or elsewhere, potential users of U.S. Geological Survey water-quality data are encouraged to obtain all required data from the appropriate computer file.

The surface-water-quality records for partial-record stations and miscellaneous sampling sites are published in separate tables following the table of discharge measurements at miscellaneous sites. No descriptive statements are given to these records. Each station is published with its own station number and name in the regular downstream-order sequence.

Remark Codes

The following remark codes may appear with the water-quality data in this report:

PRINTED OUPUT	REMARK
E	Estimated value.
>	Actual value is known to be greater than the value shown.
<	Actual value is known to be less than the value shown.
A	Laboratory conductance.
J	Collected by non - USGS agency.
K	Results based on colony count outside the acceptance range (non-ideal colony count).

Dissolved Trace-Element Concentrations

NOTE.--Traditionally, dissolved trace-element concentrations have been reported at the microgram per liter (µg/L) level. Recent evidence, mostly from large rivers, indicates that actual dissolved-phase concentrations for a number of trace elements are within the range of 10's and 100's of nanograms per liter (ng/L). Present data above the µg/L level should be viewed with caution. Such data may actually represent elevated environmental concentrations from natural or human causes; however, these data could reflect contamination introduced during sampling, processing, or analysis. To confidently produce dissolved trace-element data with insignificant contamination, the U.S. Geological Survey will begin using new trace-element protocols in water year 1994.

Records of Ground-Water Levels

Only water-level data from a basic network of observation wells are given in this report. This basic network contains observation wells so located that the most significant data are obtained from the fewest wells in the most important aquifers. Locations of the observation wells in Hawaii listed in this report are shown in figures 3, 5, 7, 9, and 11.

Although, in this report, records of water levels are presented for fewer than 100 wells, records are obtained through cooperative efforts of many Federal, State,and local agencies for several thousand observation wells throughout Hawaii and are placed in computer storage, published in reports, or kept in files. Information about the availability of ground-water data may be obtained from the District Chief, Hawaii District, U.S. Geological Survey, 677 Ala Moana Blvd., Suite 415, Honolulu, Hawaii, 96813.

Data Collection and Computation

Measurements of water levels are made in many types of wells, under varying conditions, but the method of measurement are standardized to the extent possible. The equipment and measuring techniques used at each observation well ensure that measurements at each well are of consistent accuracy and reliability.

Tables of water-level data are presented by counties arranged in alphabetical order. The prime identification number for a given well is the 15-digit number that appears in the upper left corner of the table. The secondary identification number is the local well number, an alphanumeric number, derived from the township-range location of the well.

Water-level records are obtained from direct measurements with a steel or electrical tape or from the graph or punched tape of a water-stage recorder. The water-level measurements in this report are given in feet with reference to either mean sea level (msl) or land-surface datum (lsd). Mean sea level is the datum plane on which the national network of precise levels is based; land-surface datum is a datum plane that is approximately at land surface at each well. If known, the altitude of the land-surface datum above mean sea level is given in the well description. The height of the measuring point (MP) above or below land-surface datum is given in each well description. Water levels in wells equipped with recording gages are reported for every fifth day and the end of each month (eom). To show the intraday variation in the ground-water levels caused by local pumping and tidal fluctuations, instantaneous maximum and minimum water levels are given with the mean water levels for the day.

Water levels are reportd to as many significant figures as can be justified by the local conditions. For example, in a measurement of a depth to water of several hundred feet, the error in determining the absolute value of the total depth to water may be a few tenths of a foot, whereas the error in determining the net change of water level between successive measurements may be only a hundredth or a few hundredths of a foot. For lesser depths to water, the accuracy is greater. Accordingly, most measurements are reported to a hundredth of a foot, but some are given only to a tenth of a foot or a larger unit.

Data Presentation

Each well record consists of two parts, the station description and the data table of water levels observed during the water year. The description of the well is presented first through use of descriptive headings preceding the tabular data. The comments to follow clarify information presented under the various headings.

LOCATION.--This paragraph follows the well-identification number and reports the latitude and longitude (given in degrees, minutes, and seconds); a land line location designation; the hydrologic unit number; the distance and direction from a geographic point of reference; and the owner's name.

AQUIFER.--This entry designates by name (if a name exists) and geologic age the aquifer(s) open to the well.

WELL CHARACTERISTICS.--This entry describes the well in terms of depth, diameter, casing depth and (or) screened interval, method of construction, use, and additional information such as casing breaks, collapsed screen, and other changes since construction.

INSTRUMENTATION.--This paragraph provides information on both the frequency of measurement and the collection method used, allowing the user to better evaluate the reported water-level extremes by knowing whether they are based on weekly, monthly, or some other frequency of measurement.

DATUM.--This entry describes the land-surface elevation at the well. The elevation of the land-surface datum is described is described in feet above (or below) mean sea level; it is reported with a precision depending on the method of determination.

REMARKS.--This entry describes factors that may influence the water level in a well or the measurement of the water level. It should identify wells that also are water-quality observation wells, and may be used to acknowledge the assistance of local (non-Survey) observers.

PERIOD OF RECORD.--This entry indicates the period for which there are published records for the well. It reports the month and year of the start of publication of water-level records by the U.S. Geological Survey and the words "to current year" if the records are to be continued into the following year. Periods for which water-level records are available, but are not published by the Geological Survey, may be noted.

EXTREMES FOR PERIOD OF RECORD.--This entry contains the highest and lowest water levels of the period of published record, with respect to land-surface datum, and the dates of their occurence.

A table of water levels follows the station description for each well. Water levels are reported in feet above mean sea level and all taped measurements ofwater levels are listed. For wells equipped with a recorder, only abbreviated tables are published; generally, only water-level lows are listed for every fifthday and at the end of the month (eom). The highest and lowest water levels of the water year and their dates of occurrence are shown on a line below the abbreviated table. Because all values are not published for wells with recorders, the extremes may be values that are not listed in the table. Missing records are indicated by dashes in place of the water level.

ACCESS TO WATSTORE DATA

The U.S. Geological Survey is the principal Federal water-data agency and, as such, collects and disseminates about 70 percent of the water data currently being used by numerous State, local, private, and other federal agencies to develop and manage our water resources. As part of the Geological Survey's program of releasing water data to the public, a large-scale computerized system has been developed for the storage and retrieval of water data collected through its activities. The National WATer Data STOrage and REtrieval System (WATSTORE) was established in 1972 to provide an effective and efficient means for the processing and maintenance of water data collected through the activities of the U.S. Geological Survey and to facilitate release of the data to the public. A variety of useful products, ranging from data tables to complex statistical analyses such as frequency analyses using the Log Pearson Type III distribution, can be produced using WATSTORE. The system resides on the central computer facilities of the U.S. Geological Survey at its National Center in Reston, Virginia, and consists of related files and data bases.

* Station Header File - Contains descriptive information on more than 440,000 sites throughout the United States and its territories where the U.S. Geological Survey collects or has collected data.

* Daily Values File - Contains more than 220 million daily values of stream flows, stages, reservoir contents, water temperatures, specific conductances, sediment concentrations, sediment discharges, and ground-water levels.

* Peak Flow File - Contains approximately 500,000 maximum (peak) streamflow and gage-height values at surface-water sites.

* Water Quality File - Contains approximately 2 million analyses of water samples that describe the chemical, physical, biological, and radio-chemical characteristics of both surface and ground water.

* Ground-Water Site Inventory Data Base - Contains inventory data for more than 900,000 wells, springs, and other sources of ground water. The data includes site location, geohydrologic characteristics, well-construction history, and one-time field measurements such as water temperature.

In 1976, the U.S. Geological Survey opened WATSTORE to the public for direct access. The signing of a Memorandum of Agreement with the Survey is required to obtain direct access to WATSTORE. The system can be accessed either synchronously or asynchronously. The requestor will be expected to pay all computer costs he/she incurs. Direct access may be obtained by contacting:

U.S. Geological Survey
National Water Data Exchange
421 USGS National Center
Reston, Virginia 22092

In addition to providing direct access to WATSTORE, data can be provided in various machine-readable formats on magnetic tape or 5-1/4 inch floppy disk and, as noted in the introduction, on CD-ROM discs. Beginning with the 1990 water year, all water-data reports will also be available on Compact Disc - Read Only Memory (CD-ROM). All data reports published for the current water year for the entire Nation, including Puerto Rico and the Trust Territories, will be reproduced on a single CD-ROM disc. Information about the availability of specific types of data or products, and user charges, can be obtained locally from each of the Water Resources Division's District offices. (See address on the back of the title page). A limited number of CD-ROM discs will be available for sale by the Books and Open-file Reports Section, U.S. Geological Survey, Federal Center, Box 25425, Denver, Colorado 80225.

DEFINITION OF TERMS

Terms related to streamflow, water-quality, and other hydrologic data, as used in this report, are defined below. See the table for converting English units to International System (SI) Units on the inside of the back cover.

Acre-foot (AC-FT, acre-ft) is the quantity of water required to cover 1 acre to a depth of 1 foot and is equivalent to 43,560 cubic feet or 325,851 gallons or 1,233 cubic meters.

Adenosine triphosphate (ATP) is an organic, phosphate-rich, compound important in the transfer of energy in organisms. Its central role in living cells makes it an excellent indicator of the presence of living material in water. A measure of ATP therefore provides a sensitive and rapid estimate of biomass. ATP is reported in micrograms per liter of the original water sample.

Algae are mostly aquatic single-celled, colonial, or multi-celled plants, containing chlorophyll and lacking roots, stems, and leaves.

Algal growth potential (AGP) is the maximum algal dry weight biomass that can be produced in a natural water sample under standardized laboratory conditions. The growth potential is the algal biomass present at stationary phase and is expressed as milligrams dry weight of algae produced per liter of sample.

Aquifer is a geologic formation, group of formations, or part of a formation that contains sufficient saturated permeable material to yield significant quantities of water to wells and springs.

Artesian means confined and is used to describe a well in which the water level stands above the top of the aquifer tapped by the well. A flowing artesian well is one in which the water level is above the land surface.

Bacteria are microscopic unicellular organisms, typically spherical, rodlike, or spiral and threadlike in shape, often clumped into colonies. Some bacteria cause disease, others perform an essential role in nature in the recycling of materials; for example, by decomposing organic matter into a form available for reuse by plants.

Total coliform bacteria are a particular group of bacteria that are used as indicators of possible sewage pollution. They are characterized as aerobic or facultative anaerobic, gram-negative, nonspore-forming, rod-shaped bacteria which ferment lactose with gas formation within 48 hours at 35°C. In the laboratory these bacteria are defined as all the organisms which produce colonies withing 24 hours when incubated at 35°C ± 0.5°C on M-Endoagar (nutrient medium for bacterial growth). Their concentrations are expressed as number of colonies per 100 mL of sample.

Fecal coliform bacteria are bacteria that are present in the intestine or feces of warm-blooded animals. They are often used as indicators of the sanitary quality of the water. In the laboratory they are defined as all organisms which produce blue colonies within 24 hours when incubated at 44.5°C ± 0.2°C on M-FC agar (nutrient medium for bacterial growth). Their concentrations are expressed as number of colonies per 100 milliliter of sample.

Fecal streptococcal bacteria are bacteria found also in the intestine of warm-blooded animals. Their presence in water is considered to verify fecal pollution. They are characterized as gram-positive, cocci bacterial which are capable of growth in brain-heart infusion broth. In the laboratory they are defined as all the organisms which produce red or pink colonies within 48 hours at 35°C ± 0.5°C on KF Streptococcus agar (nutrient medium for bacterial growth). Their concentrations are expressed as number of colonies per 100 mL of sample.

Benthic organisms (invertebrates) are the group of animals living in or on the bottom of an aquatic environment. They include a number of types of organisms, such as bacteria, fungi, insect larvae and nymphs, snails, clams, and crayfish.

Biochemical oxygen demand (BOD) is a measure of the quantity of dissolved oxygen, in milligrams per liter, necessary for the decomposition of organic matter by microorganisms, such as bacteria.

Biomass is the amount of living matter present at any time, expressed as the weight per unit area or volume of habitat.

Ash mass is the mass or amount of residue present after the residue from the dry mass determination has been ashed in a muffle furnace at a temperature of 500°C for 1 hour. The ash mass values of zooplankton and phytoplankton are expressed in g/m^3 (grams per cubic meter), and periphyton and benthic organisms in g/m^2 (grams per square meter).

Dry mass refers to the mass of residue present after drying in an oven at 60°C for zooplankton and 105°C for periphyton, until the mass remains unchanged. This mass represents the total organic matter, ash, and sediment, in the sample. Dry mass values are expressed in the same units as ash mass.

Organic mass or volatile mass of the living substance is the difference between the dry mass and the ash mass, and represents the actual mass of the living matter. The organic mass is expressed in the same units as for ash and dry mass.

Wet mass is the mass of living matter plus contained water.

Bottom material is the unconsolidated material of which a streambed, lake, pond, reservoir, or estuary bottom is composed.

Recoverable from bottom material is the amount of a given constituent that is in solution after a representative sample of bottom material has been digested by a method (usually using an acid or mixture of acids) that results in dissolution of only readily soluble substances. Complete dissolution of all bottom material is not achieved by the digestion treatment and thus the determination represents less than the total amount (that is, less than 95 percent) of the constituent in the sample. To achieve comparability of analytical data, equivalent digestion procedures would be required of all laboratories performing such analyses because different digestion procedures are likely to produce different analytical results.

Total in bottom material is the total amount of a given constituent in a representative sample of bottom material. This term is used only when the analytical procedure assures measurement of at least 95 percent of the constituent determined. A knowledge of the expected form of the constituent in the sample, as well as the analytical methodology used, is required to judge when the results should be reported as "total in bottom material."

Cells/volume refers to the number of cells of any organism which is counted by using a microscope and grid or counting cell. Many planktonic organisms are multicelled and are counted according to the number of contained cells per sample, usually milliliters of liters (L).

Chlorophyll refers to the green pigments of plants. Chlorophyll a and b are the two most common pigments in plants.

Coliform organisms are a group of bacteria used as an indicator of the sanitary quality of the water. The number of coliform colonies per 100 milliliters is determined by the immediate or delayed incubation membrane filter method.

Color unit is produced by one milligram per liter of platinum in the form of the chloroplatinate ion. Color is expressed in units of the platinum-cobalt scale.

Contents is the volume of water in a reservoir or lake. Unless otherwise indicated, volume is computed on the basis of a level pool and does not include bank storage.

Continuing record station is a specified site which meets one or all conditions listed:

1. When chemical samples are collected daily or monthly for 10 or more months during the water year.

2. When water temperature records include observations taken one or more times daily.

3. When sediment discharge records include those periods for which sediment loads are computed and are considered to be representative of the runoff for the water year.

Control designates a feature downstream from the gage that determines the stage-discharge relation at the gage. This feature may be a natural constriction of the channel, an artificial structure, or a uniform cross section over a long reach of the channel.

Control structure as used in this report is a structure on a stream or canal that is used to regulate the flow or stage of the stream or to prevent the intrusion of salt water.

Cubic foot per second (FT^3/s, ft^3/s) is the rate of discharge representing a volume of 1 cubic foot passing a given point during 1 second and is equivalent to 7.48 gallons per second or 448.8 gallons per minute or 0.02832 cubic meters per second.

Cubic foot per second-day [$(FT^3/s)/d$, $(ft^3/s)/d$] is the volume of water represented by a flow of 1 cubic foot per second for 24 hours. It is equivalent to 86,400 cubic feet, 1.9835 acre-feet, or 646,317 gallons or 2,447 cubic meters.

Discharge is the volume of water (or more broadly, volume of fluid plus suspended sediment), that passes a given point within a given period of time.

Mean discharge (MEAN) is the arithmetic average of individual daily mean discharges during a specified period.

Instantaneous discharge is the discharge at a particular instant of time. If this discharge is reported instead of the daily mean, the heading of the discharge column in the table is "STREAMFLOW INSTANTANEOUS (CFS)."

Annual 7-day minimum is the lowest mean discharge for 7 consecutive days for a calendar year or water year. Note that most low-flow frequency analyses of annual 7-day minimum flows use a climatic year (April 1 - March 31). The date shown in the summary statistics table is the initial date of the 7-day period. (This value should not be confused with the 7-day 10-year low-flow statistic.)

Dissolved is that material in a representative water sample which passes through a 0.45 micrometer membrane filter. This is a convenient operational definition used by Federal agencies that collect water data. Determinations of "dissolved" constituents are made on subsamples of the filtrate.

Drainage area of a stream at a specific location is that area, measured in a horizontal plane, enclosed by a topographic divide from which direct surface runoff from precipitation normally drains by gravity into the river above the specified point. Figures of drainage area given herein include all closed basins, or noncontributing areas, within the area unless otherwise noted.

Drainage basin is a part of the surface of the earth that is occupied by a drainage system, which consists of a surface stream or a body of impounded surface water together with all tributary surface streams and bodies of impounded water.

Gage height (G.H.) is the water-surface elevation referred to some arbitrary gage datum. Gage height is often used interchangeably with the more general term "stage," although gage height is more appropriate when used with a reading on a gage.

Gaging station is a particular site on a stream, canal, lake, or reservoir where systematic observations of hydrologic data are obtained.

Hardness of water is a physical-chemical characteristic that is commonly recognized by the increased quantity of soap required to produce lather. It is attributable to the presence of alkaline earths (principally calcium and magnesium) and is expressed as equivalent calcium carbonate ($CaCO_3$).

Hydrologic Bench-Mark Network is a network of more than 57 sites in small drainage basins around the country whose purpose is to provide consistent data on the hydrology, including water quality, and related factors in representative undeveloped watersheds nationwide, and to provide analyses on a continuing basis to compare and contrast conditions observed in basins more obviously affected by the activities of man.

Hydrologic unit is a geographic area representing part or all of a surface drainage basin or distinct hydrologic feature as delineated by the Office of Water Data Coordination on the State Hydrologic Unit Maps; each hydrologic unit is identified by an 8-digit number.

Microgram per gram ($\mu g/g$) is a unit expressing the concentration of a chemical element as the mass (micrograms) of the element sorbed per unit mass (gram) of sediment.

Microgram per liter ($\mu G/L$, $\mu g/L$) is a unit expressing the concentration of chemical constituents in solution as mass (micrograms) of solute per unit volume (liter) of water. One thousand micrograms per liter is equivalent to one milligram per liter.

Milligram per liter (MG/L, mg/L) is a unit for expressing the concentration of chemical constituents in solution. Milligrams per liter represent the mass of solute per unit volume (liter) of water. Concentration of suspended sediment also is expressed in mg/L, and is based on the mass of sediment per liter of water-sediment mixture.

National Geodetic Vertical Datum of 1929 (NGVD of 1929) is a geodetic datum derived from a general adjustment of the first order level nets of both the United States and Canada. It was formerly called "Sea Level DAtum of 1929" or " mean sea level" in this series of reports. Although the datum was derived from the average sea level over a period of many years at 26 tide stations along the Atlantic, Gulf of Mexico, and Pacific Coasts, it does not necessarily represent local mean sea levelat any particular place.

National Stream-Quality Accounting Network (NASQAN) is a nationwide data-collection network designed by the U.S. Geological Survey to meet many of the information needs of government agencies and other groups involved in national or regional water-quality planning and management. The several hundred sites in NASQAN are generally located at the downstream ends of hydrologic accounting units designated by the U.S. Geological Survey Office of Water Data Coordination in consultation with the Water Resources Council. The objective of NASQAN is to obtain information on the quality and quantity of water moving within and from the United States through a systematic and unifrom process of data collection, summarization, analysis, and reporting. The design of the network is intended to provide data for (1) description of the areal variability of water quality in the Nation's rivers through analysis of data from this and other programs, (2) detection of changes or trends with time in the pattern of occurrence of water-quality characteristics, and (3) a nationally consistent data base useful for water-quality assessment and hydrologic research.

Parameter code is a 5-digit number used in the U.S. Geological Survey computerized data system, WATSTORE, to uniquely identify a specific constituent. The codes used in WATSTORE are the same as those used in the U.S. Environmental Protection Agency data system, STORET. The Environmental Protection Agency assigns and approves all requests for new codes.

Partial-record station is a particular site where limited streamflow and/or water-quality data are collected systematically over a period of years for use in hydrologic analyses.

Particle size is the diameter, in millimeters (mm), of suspended sediment or bed material determined by either sieve or sedimentation methods. Sedimentation methods (pipet, bottom-withdrawal tube, visual-accumulation tube) determine fall diameter of particles in either distilled water (chemically dispersed) or in native water (the river water at the time and point of sampling).

Particle-size classification used in this report agrees with recommendations made by the American Geophysical Union Subcommittee on Sediment Terminology. The classification is as follows:

Classification	Size (mm)	Method of analysis
Clay.....	0.00024 - 0.004	Sedimentation.
Silt.....	.004 - .062	Sedimentation.
Sand.....	.062 - 2.0	Sedimentation or sieve.
Gravel.....	2.0 - 64.0	Sieve.

The particle-size distributions given in this report are not necessarily representative of all particles in transport in the stream. Most of the organic material is removed and the sample is subjected to mechanical and chemical dispersion before analysis in distilled water. Chemical dispersion is not used for native-water analysis.

Percent composition is a unit for expressing the ratio of a particular part of a sample or population to the total sample or population, in terms of types, numbers, mass, or volume.

Periphyton is the assemblage of micro-organisms attached to and living upon submerged solid surfaces. While primarily consisting of algae, the periphyton also include bacteria, fungi, protozoa, rotifers, and other small organisms. Periphyton are useful indicators of water quality.

Pesticides are chemical compounds used to control the growth of undesirable plants and animals. Major categories of pesticides include insecticides, miticides, fungicides, herbicides, and rodenticides.

Picocurie (Pc,pCi) is one trillionth (1×10^{-12}) of the amount of radioactivity represented by a curie (Ci). A curie is the amount of radioactivity that yields 3.7×10^{10} radio-active disintegrations per second. A picocurie yields 2.22 dpm (disintegrations per minute).

Plankton are suspended, floating, or weakly swimming organisms that live in the open water of lakes and rivers.

Phytoplankton compose the plant part of the plankton. They are usually microscopic, and their movement is subject to water currents. Phytoplankton growth is dependent upon solar radiation and nutrient substances. Because they are able to incorporate as well as release materials into the surrounding water, the phytoplankton have a profound effect on the quality of the water. They are the primary food producers in the aquatic environment and are commonly known as algae.

Blue-green algae are phytoplankton organisms having a blue pigment in addition to the green pigment called chlorophyll. Blue-green algae often cause nuisance conditions in water.

Diatoms are the unicellular or colonial algae having a siliceous shell. Their concentrations are expressed as number of cells per milliliter (cells/mL) of sample.

Green algae have chlorophyll pigments similar in color to those of higher green plants. Some forms produce algal mats or floating "moss" in lakes. Their concentrations are expressed as number of cells per milliliter (cells/mL) of sample.

Polychlorinated biphenyls (PCBs) are industrial chemicals that are mixtures of chlorinated biphenyl compounds having various percentages of chlorine. They are similar in structure to organochlorine insecticides.

Recoverable from bottom material is the amount of a given constituent that is in solution after a representative sample of bottom material has been digested by a method (usually using an acid or mixture of acids) that results in dissolution of readily soluble substances. Complete dissolution of all bottom material is not achieved by the digestion treatment and thus the determination represents less than the total amount (that is, less than 95 percent) of the constituent in the sample. To achieve comparability of analytical data, equivalent digestion procedures would be required of all laboratories performing such analyses because different digestion procedures are likely to produce different analytical results.

Sea level refers to the National Geodetic Vertical Datum of 1929 (NGVD of 1929)-- a geodetic datum derived from a general adjustment of the first-order level nets of both the United Stated and Canada, formerly called Sea Level Datum of 1929.

Sediment is solid material that originates mostly from disintegrated rocks and is transported by, suspended in, or deposited from water; it includes chemical and biochemical precipitates and decomposed organic material, such as humus. The quantity, characteristics, and cause of the occurrence of sediment in streams are influenced by environmental factors. Some major factors are degree of slope, length of slope, soil characteristics, land usage, and quantity and intensity of precipitation.

Suspended sediment is the sediment that at any given time is maintained in suspension by the upward components of turbulent currents or that exists in suspension as a colloid.

Suspended-sediment concentration is the velocity-weighted concentration of suspended sediment in the sampled zone (from the water surface to a point approximately 0.3 ft above the bed) expressed as milligrams of dry sediment per liter of water-sediment mixture (mg/L).

Suspended-sediment discharge (tons/day) is the rate at which dry weight of sediment passes a section of a stream or is the quantity of sediment, as measured by dry weight or volume, that passes a section in a given time. It is computed by multiplying discharge times milligrams per liter times 0.0027.

Suspended-sediment load is quantity of suspended sediment passing a section in a specified period.

Total-sediment discharge (tons/day) is the sum of the suspended-sediment discharge and the bedload discharge. It is the total quantity of sediment, as measured by dry weight or volume, that passes a section during a given time.

Mean concentration is the time-weight concentration of suspended sediment passing a stream section during a 24-hour day.

Solute is any substance derived from the atmosphere, vegetation, soil, or rocks that is dissolved in water.

Specific conductance is a measure of the ability of a water to conduct an electrical current. It is expressed in microsiemens per centimeter at 25°C. Specific conductance is related to the type and concentration of ions in solution and can be used for approximating the dissolved-solids content of the water. Commonly, the concentration of dissolved solids (in milligrams per liter) is about 65 percent of the specific conductance (in microsiemens). This relation is not constant from stream to stream, and it may vary in the same source with changes in the composition of the water.

Stage-discharge relation is the relation between gage height (stage) and volume of water per unit of time, flowing in a channel.

16019000 WAIALAE STREAM AT ALTITUDE 3,820 FT, NEAR WAIMEA

LOCATION.--Lat 22°05'20", long 159°34'18", Hydrologic Unit 20070000, on left bank 5.0 mi northeast of mouth, 6.4 mi southeast of Kokee Lodge, and 11 mi northeast of Waimea.

DRAINAGE AREA.--1.79 mi^2.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--January 1920 to July 1932, June 1952 to current year. Prior to July 1954, published as Waialae River at altitude 3,700 ft near Waimea.

REVISED RECORDS.--WSP 1937: 1921, 1922-32(M), 1953(M), 1954. WSP 2137: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 3,820 ft, from topographic map.

REMARKS.--Records good. No diversion upstream.

AVERAGE DISCHARGE.--52 years (water years 1921-31, 1953-93), 21.6 ft^3/s (15,630 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 4,530 ft^3/s, Jan. 16, 1921, gage height, 8.44 ft, from rating curve extended above 1,100 ft^3/s on basis of slope-area measurement at gage height 4.60 ft; minimum, 0.99 ft^3/s, May 17, 18, May 30 to June 2, 1966.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,300 ft3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Dec. 3	2300	*1,490	*4.82	No other peak greater than base discharge.			

Minimum discharge, 1.5 ft^3/s, June 16.

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	2.9	11	8.1	19	13	3.2	2.1	8.1	1.7	2.3	4.9	2.9
2	2.9	11	6.1	13	5.9	3.1	2.1	3.5	1.7	2.1	4.0	2.8
3	2.8	6.8	95	11	4.4	2.9	2.0	2.6	1.7	2.0	3.4	2.8
4	2.8	6.5	202	13	3.8	2.7	2.0	2.6	1.6	1.9	3.2	2.8
5	2.8	5.2	87	150	4.0	2.8	2.0	2.5	1.7	1.9	3.1	2.8
6	2.8	4.5	22	117	3.5	3.1	2.1	2.3	1.7	1.8	3.0	2.6
7	4.8	4.1	13	62	3.3	11	2.1	29	2.2	1.8	3.0	2.6
8	4.5	8.2	9.0	25	4.0	5.4	2.3	20	10	1.7	3.0	2.6
9	3.4	40	7.3	63	4.9	11	2.3	5.3	3.6	1.6	3.3	2.6
10	3.0	14	13	29	11	8.5	2.4	3.9	2.2	1.8	5.5	2.4
11	2.9	25	122	22	5.5	4.1	2.2	3.8	1.9	1.7	16	2.4
12	284	8.8	57	14	4.0	3.2	2.2	4.5	1.8	1.9	6.1	2.3
13	e33	14	11	14	4.6	2.8	2.4	3.6	1.7	4.4	5.2	2.4
14	e11	13	7.9	14	4.2	3.3	2.4	4.1	1.6	3.2	5.8	2.4
15	61	7.2	6.4	12	3.6	3.6	2.1	6.9	1.6	2.7	4.1	2.3
16	47	5.3	6.8	11	3.3	3.2	1.9	4.1	1.6	2.5	6.3	2.3
17	14	4.7	156	8.9	3.2	2.9	1.9	4.9	1.8	6.0	44	2.3
18	9.3	69	22	7.4	3.0	2.7	1.9	7.2	7.5	6.5	8.8	2.3
19	6.4	74	13	6.3	3.0	2.6	7.3	4.2	26	30	61	2.2
20	5.3	11	17	5.7	2.9	2.6	3.8	3.1	16	6.8	18	2.2
21	4.7	7.5	11	5.6	2.7	2.4	2.6	2.8	5.4	20	6.8	2.2
22	4.3	6.1	39	5.1	2.6	2.4	2.2	2.4	2.9	53	4.5	2.2
23	4.0	6.0	80	4.8	3.0	2.4	2.1	2.2	2.2	10	3.8	2.3
24	6.4	5.8	23	4.6	3.6	2.4	2.1	2.0	2.0	177	3.2	13
25	24	12	187	4.3	5.7	2.3	2.1	2.0	2.0	54	3.5	5.5
26	13	17	286	4.1	7.0	2.1	e2.1	1.9	4.9	52	4.2	2.9
27	23	14	46	4.0	3.7	2.1	e26	1.8	5.0	24	3.4	12
28	12	11	111	4.1	3.1	2.1	5.2	1.8	15	23	3.2	24
29	9.3	7.0	350	30	---	2.1	4.8	1.8	5.7	17	3.0	6.6
30	11	7.2	380	8.7	---	2.1	27	1.7	2.9	14	3.0	3.5
31	11	---	40	6.3	---	2.1	---	1.7	---	6.9	3.0	---
TOTAL	629.3	436.9	2434.6	698.9	126.5	109.2	125.7	148.3	137.6	535.5	253.3	124.2
MEAN	20.3	14.6	78.5	22.5	4.52	3.52	4.19	4.78	4.59	17.3	8.17	4.14
MAX	284	74	380	150	13	11	27	29	26	177	61	24
MIN	2.8	4.1	6.1	4.0	2.6	2.1	1.9	1.7	1.6	1.6	3.0	2.2
AC-FT	1250	867	4830	1390	251	217	249	294	273	1060	502	246

e Estimated

PUBLICATIONS ON TECHNIQUES OF WATER-RESOURCES INVESTIGATIONS

The U.S. Geological Survey publishes a series of manuals describing procedures for planning and conducting specialized work in water-resources investigations. The material is grouped under major subject headings called books and is further divided into sections and chapters. For example, Section A of Book 3 (Applications of Hydraulics) pertains to surface water. The chapter, the unit of publication, is limited to a narrow field of subject matter. This format permits flexibility in revision and publication as the need arises.

The reports listed below are for sale by the U.S. Geological Survey, Books and Open-File Reports Section, Federal Center, Box 25425, Denver, Colorado 80225 (authorized agent of the Superintendent of Documents, Government Printing Office). Prepayment is required. Remittance should be sent by check or money order payable to the U.S. Geological Survey. Prices are not included because they are subject to change. Current prices can be obtained by writing to the above address. When ordering or inquiring about prices for any of these publications, please give the title, book number, chapter number, and "U.S. Geological Survey Techniques of Water-Resources Investigations."

1-D1. *Water temperature--influential factors, field measurement, and data presentation*, by H. H. Stevens, Jr., J. F. Ficken, and G. F. Smoot: USGS--TWRI Book 1, Chapter D1. 1975. 65 pages.

1-D2. *Guidelines for collection and field analysis of ground-water samples for selected unstable constituents*, by W. W. Wood: USGS--TWRI Book 1, Chapter D2. 1976. 24 pages.

2-D1. *Application of surface geophysics to ground-water investigations*, by A. A. R. Zohdy, G. P. Eaton, and D. R. Mabey: USGS--TWRI Book 2, Chapter D1. 1974. 116 pages.

2-D2. *Application of seismic-refraction techniques to hydrologic studies*, by F. P. Haeni: USGS--TWRI Book 2, Chapter D2. 1988. 86 pages.

2-E1. *Application of borehole geophysics to water-resources investigations*, by W. S. Keys and L.M. McCary: USGS--TWRI Book 2, Chapter E1. 1971. 126 pages.

2-E2. *Borehole geophysics applied to ground-water investigations*, by W. S. Keys: USGS--TWRI Book 2, Chapter E2. 1990. 150 pages.

2-F1. *Application of drilling, coring, and sampling techniques to test holes and wells*, by Eugene Shuter and W. E. Teasdale: USGS--TWRI Book 2, Chapter F1. 1989. 97 pages.

3-A1. *General field and office procedures for indirect discharge measurements*, by M. A. Benson and Tate Dalrymple: USGS--TWRI Book 3, Chapter A1. 1967. 30 pages.

3-A2. *Measurement of peak discharge by the slope-area method*, by Tate Dalrymple and M. A. Benson: USGS--TWRI Book 3, Chapter A2. 1967. 12 pages.

3-A3. *Measurement of peak discharge at culverts by indirect methods*, by G. L. Bodhaine: USGS--TWRI Book 3, Chapter A3. 1968. 60 pages.

3-A4. *Measurement of peak discharge at width contractions by indirect methods*, by H. F. Matthai: USGS-TWRI Book 3, Chapter A4. 1967. 44 pages.

3-A5. *Measurement of peak discharge at dams by indirect methods*, by Harry Hulsing: USGS--TWRI Book 3, Chapter A5. 1967. 29 pages.

3-A6. *General procedure for gaging streams*, by R. W. Carter and Jacob Davidian: USGS--TWRI Book 3, Chapter A6. 1968. 13 pages.

3-A7. *Stage measurements at gaging stations*, by T. J. Buchanan and W. P. Somers: USGS--TWRI Book 3, Chapter A7. 1968. 28 pages.

3-A8. *Discharge measurements at gaging stations*, by T. J. Buchanan and W. P. Somers: USGS--TWRI Book 3, Chapter A8. 1969. 65 pages.

Total load (tons) is the total quantity of any individual constituent, as measured by dry mass or volume, that is dissolved in a specific amount of water (discharge) during a given time. It is computed by multiplying the total discharge, times the mg/L of the constituent, times the factor 0.0027, times the number of days.

Total, recoverable is the amount of a given constituent that is in solution after a representative water-suspended sediment sample has been digested by a method (usually using a dilute acid solution) that results in dissolution of only readily soluble substances. Complete dissolution of all particulate matter is not achieved by the digestion treatment, and thus the determination represents something less than the "total" amount (that is, less than 95 percent) of the constituent present in the dissolved and suspended phases of the sample. To achieve comparability of analytical data, equivalent digestion procedures would be required of all laboratories performing such analyses because diggerent digestion procedures are likely to produce different analytical results.

Turbidity of a sample is the reduction of transparency due to the presence of particulate matter. In this report it is expressed Nephelometric turbidity units (NTU).

WDR is used as an abbreviation for "Water-Data Reports" in the summary REVISIONS paragraph to refer to previously published State annual basic-data reports.

Weighted average is used in this report to indicate discharge-weighted average. It is computed by multiplying the discharge for a sampling period by the concentrations of individual constituents for the corresponding period and dividing the sum of the products by the sum of discharges. A discharge-weighted average approximates the composition of water that would be found in a reservoir containing all the water passing a given location during the water year after thorough mixing in the reservoir.

WRD is used as an abbreviation for "Water-Resources Data" in the REVISED RECORDS paragraph to refer to State annual basic-data reports published before 1975.

WSP is used as an abbreviation for "Water-Supply Paper" in references to previously published reports.

Streamflow is the discharge that occurs in a natural channel. Although the term "discharge" can be applied to the flow of a canal, the word "streamflow" uniquely describes the discharge in a surface stream course. The term "streamflow" is more general than "runoff" as streamflow may be applied to discharge whether or not it is affected by diversion or regulation.

Suspended (as used in tables of chemical analyses) refers to the amount (concentration) of the total concentration in a water-sediment mixture. The water-sediment mixture is associated with (or sorbed on) that material retained on a 0.45 micrometer filter.

Suspended recoverable is the amount of a given constituent that is insolution after the part of a respresentative water-suspended sediment sample that is retained on a 0.45 micrometer membrane filter has been digested by a method (usually using a dilute acid solution) that results in dissolution of only readily soluble substances. Complete dissolution of all the particulate matter is not achieved by the digestion treatment and thus the determination represents something less than the "total" amount (that is, less than 95 percent) of the constituent present in the sample. To achieve comparibility of analytical data, equivalent digestion procedures would be required of all laboratories performing such analyses because different digestion procedures are likely to produce different analytical results.

Determinations of "suspended, recoverable" constituents are made either by analyzing portions of the material collected on the filter or, more commonly, by difference, based on determinations of (1) dissolved and (2) total recoverable concentrations of the constituent.

Suspended, total is the total amount of a given constituent in the part of a representative water-suspended sediment sample that is retained on a 0.45 micrometer membrane filter. This term is used only when the analytical procedure assures measurement of at least 95 percent of the constituent determined. A knowledge of the expected form of the constituent in the sample, as well as the analytical methodology used, is required to determine when the results should be reported as "suspended, total."

Determinations of "suspended, total" constituents are made either by analyzing portions of the material collected on the filter or, more commonly, by difference, based on determinations of (1) dissolved and (2) total concentrations of the constituents.

Taxonomy is the division of biology concerned with the classification and naming of organisms. The classification of organisms is based upon a hierarchical scheme beginning with Kingdom and ending with Species at the base. The higher the classification level, the fewer features the organisms have in common. For example, the taxonomy of a particular mayfly, Hexagenia limbata is the following:

Kingdom	Animal
Phylum	Arthropoda
Class	Insecta
Order	Ephemeroptera
Family	Ephemeridae
Genus	Hexagenia
Species	Hexagenia limbata

Time-weighted average is computed by multiplying the number of days in the sampling period by the concentrations of individual constituents for the corresponding period and dividing the sum of the products by the total number of days. A time-weighted average represents the composition of water that would be contained in a vessel or reservoir that had received equal quantities of water from the stream each day for the year.

Tons per acre-foot indicates the dry mass of dissolved solids in 1 acre-foot of water. It is computed by multiplying the concentration in milligrams per liter by 0.00136.

Tons per day is the quantity of substance in solution or suspension that passes a stream section during a 24-hour day.

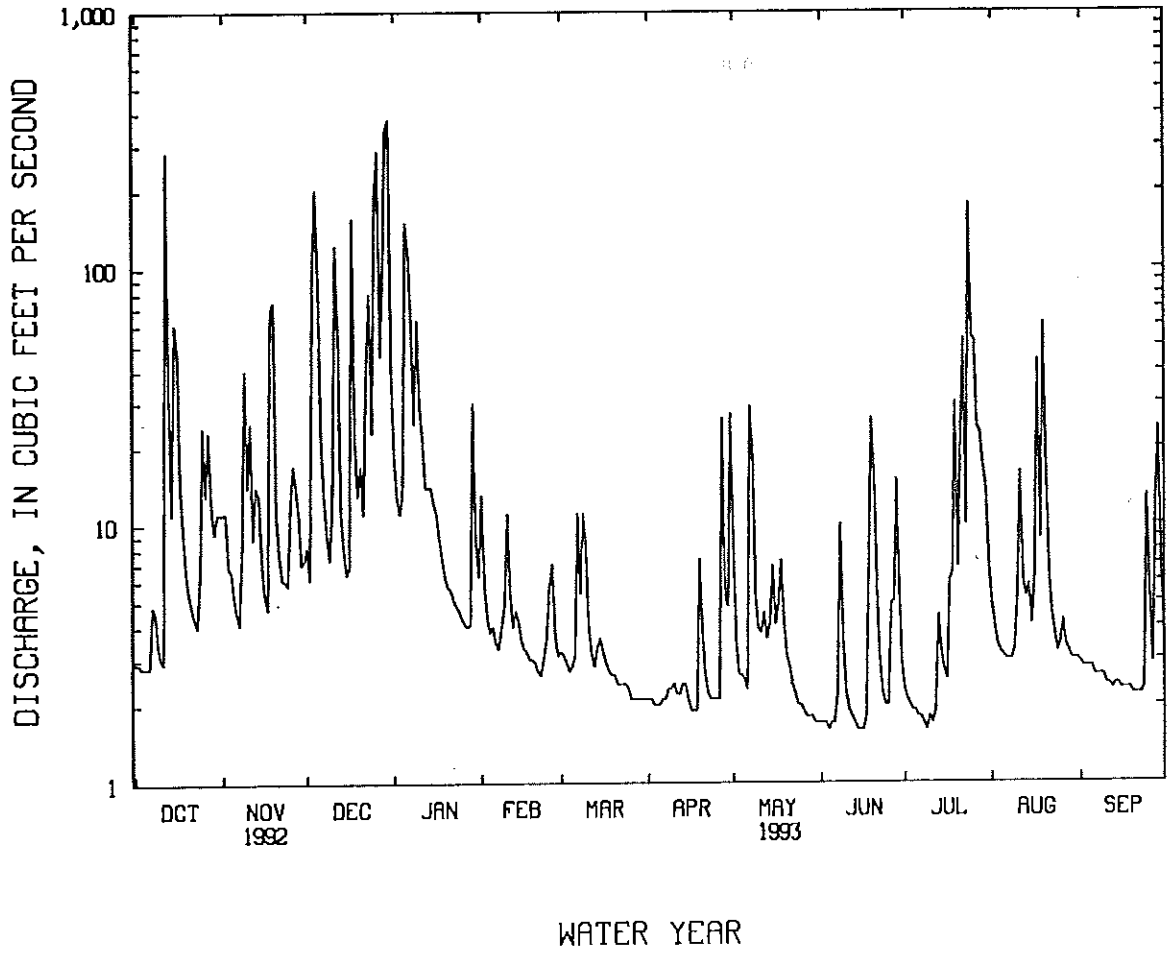
Total is the total amount of a given constituent in a representative water-suspended sediment sample, regardless of the constituent's physical or chemical form. This term is used only when the analytical procedure assures measurement of at least 95 percent of the constituent present in both the dissolved and suspended phases of the sample. A knowledge of the expected form of the constituent in the sample, as well as the analytical methodology used, is required to judge when the results should be reported as "total." (Note that the word "total" does double duty here, indicating both that the sample consists of a water-suspended sediment mixture and that the analytical method determines all of the constituent in the sample.)

16019000 WAIALAE STREAM AT ALTITUDE 3,820 FT, NEAR WAIMEA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1920 - 1993, BY WATER YEAR (WY)

MEAN	15.1	32.0	34.5	34.4	27.6	29.0	24.7	13.6	9.47	15.3	12.7	10.7
MAX	47.0	99.2	106	166	155	106	92.4	44.1	39.4	58.0	44.9	56.0
(WY)	1983	1968	1968	1921	1956	1982	1974	1927	1978	1989	1959	1922
MIN	2.49	5.58	4.16	4.48	2.44	2.15	1.87	1.81	1.89	2.56	2.86	1.67
(WY)	1927	1927	1923	1966	1983	1926	1966	1966	1975	1984	1952	1975

SUMMARY STATISTICS	FOR 1992 CALENDAR YEAR		FOR 1993 WATER YEAR		WATER YEARS 1920 - 1993	
ANNUAL TOTAL	7111.0		5760.0			
ANNUAL MEAN	19.4		15.8		21.6	
HIGHEST ANNUAL MEAN					40.9	1982
LOWEST ANNUAL MEAN					8.94	1926
HIGHEST DAILY MEAN	642	Sep 11	380	Dec 30	1440	Dec 1 1957
LOWEST DAILY MEAN	2.0	Apr 24	1.6	Jun 4	.99	May 17 1966
ANNUAL SEVEN-DAY MINIMUM	2.1	Apr 27	1.7	May 30	1.1	May 26 1966
ANNUAL RUNOFF (AC-FT)	14100		11420		15630	
10 PERCENT EXCEEDS	38		28		45	
50 PERCENT EXCEEDS	5.5		4.1		6.5	
90 PERCENT EXCEEDS	2.8		2.0		2.5	



16019000 WAIALAE STREAM AT ALTITUDE 3,820 FT NEAR WAIMEA--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1972 to current year.

REMARKS.--Quality of water samples obtained at the gage.

WATER QUALITY DATA, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND	SPE-CIFIC CON-DUCT-ANCE (US/CM)	PH WATER WHOLE FIELD (STAND-ARD UNITS)	TEMPER-ATURE WATER (DEG C)	TEMPER-ATURE AIR (DEG C)	HARD-NESS TOTAL (MG/L AS CACO3)	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)	SODIUM, DIS-SOLVED (MG/L AS NA)	SODIUM PERCENT
OCT 1992 14...	1030	10	29	7.1	17.5	21.5	5	0.76	0.73	3.3	57
DEC 16...	1000	6.1	31	6.7	15.0	16.0	5	0.75	0.79	3.6	58
MAR 1993 15...	1000	3.7	38	6.9	12.0	13.0	7	1.1	1.1	4.0	53
JUL 07...	0950	1.6	37	6.9	18.0	15.0	6	0.79	0.86	3.5	56

DATE	SODIUM AD-SORP-TION RATIO	POTAS-SIUM, DIS-SOLVED (MG/L AS K)	ALKA-LINITY LAB (MG/L AS CACO3)	SULFATE DIS-SOLVED (MG/L AS SO4)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)	FLUO-RIDE, DIS-SOLVED (MG/L AS F)	SILICA, DIS-SOLVED (MG/L AS SIO2)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L)	SOLIDS, DIS-SOLVED (TONS PER DAY)	IRON, DIS-SOLVED (UG/L AS FE)	MANGA-NESE, DIS-SOLVED (UG/L AS MN)
OCT 1992 14...	0.6	0.40	4.1	0.70	6.3	<0.10	4.3	19	0.53	330	10
DEC 16...	0.7	0.40	4.6	0.70	6.7	<0.10	6.0	22	0.36	160	3
MAR 1993 15...	0.6	0.30	5.6	0.70	8.0	<0.10	5.8	25	0.25	210	2
JUL 07...	0.6	0.30	4.4	0.80	5.8	<0.10	7.0	22	0.09	170	1

< Actual value is known to be less than the value shown

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16031000 WAIMEA RIVER NEAR WAIMEA
(National stream-quality accounting network station)

LOCATION.--Lat 21°59'02", long 159°39'47", Hydrologic Unit 20070000, on right bank 1.3 mi upstream from Makaweli River and 1.9 mi north of Waimea Post Office.

DRAINAGE AREA.--57.8 mi^2.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--July 1910 to June 1918, July to October 1919, November 1943 to September 1968, October 1969 to September 1972 (discontinued as a continuous-record station, converted to a crest-stage partial-record station October 1972 to April 1975), May 1975 to current year.

GAGE.--Water-stage recorder. Datum of gage is 20.0 ft above mean sea level (Department of Water, County of Kauai bench mark). Prior to Oct. 5, 1911, nonrecording gage at site 1.0 mi downstream at different datum. Oct. 5, 1911, to Oct. 31, 1919, nonrecording gage at present site at different datum.

REMARKS.--Records good except for estimated discharges which are fair. Several upstream diversions for power and irrigation.

AVERAGE DISCHARGE.--52 years (water years 1911-17, 1945-68, 1970-72, 1976-93), 126 ft^3/s (91,470 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 37,100 ft^3/s, Feb. 7, 1949, gage height, 19.3 ft, from rating curve extended above 5,200 ft^3/s on basis of slope-area measurements at gage heights 10.28 ft and 18.7 ft; practically no flow occasionally owing to upstream diversions.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Apr. 19, 1974, which destroyed the station reached a stage of 19.05 ft, from floodmarks, discharge, 29,100 ft^3/s, from rating curve extended above 2,200 ft^3/s on basis of slope-area measurement at gage height 19.05 ft.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 8,700 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Oct. 12	1900	*6,900	*11.45				

Minimum discharge, 6.9 ft^3/s, Apr. 22-27.

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	e15	81	30	619	210	19	9.7	42	9.4	16	24	14
2	e15	96	30	444	132	24	8.5	15	8.9	14	18	14
3	e15	117	33	350	102	23	8.3	9.5	8.4	14	17	13
4	e14	135	e1690	524	86	19	8.3	8.6	8.4	14	16	13
5	e14	86	e640	1310	65	17	8.3	8.9	8.8	15	16	13
6	e13	67	e300	1670	71	31	8.6	8.7	9.2	14	16	13
7	e106	58	e120	1290	51	58	9.0	8.3	9.6	14	15	13
8	e50	58	e75	760	43	55	9.6	89	11	14	16	13
9	e18	153	e54	971	56	100	12	31	23	14	16	13
10	e16	167	e58	696	56	102	11	14	14	14	16	13
11	e15	143	e295	534	51	30	9.8	11	12	15	21	14
12	e1660	108	e246	390	e45	18	9.3	11	11	17	57	14
13	e950	137	e95	310	e40	12	9.2	15	11	17	23	14
14	e240	179	e54	290	e36	15	9.5	16	12	17	19	15
15	e360	111	e34	236	e33	27	9.7	52	12	17	22	14
16	e536	83	e27	216	e30	20	9.5	30	12	17	21	15
17	e206	51	e50	196	e28	15	9.8	20	13	16	313	15
18	e150	39	e300	165	e26	14	9.8	24	13	20	155	15
19	e100	893	e200	144	24	13	58	40	47	77	97	15
20	e76	117	e135	135	23	13	31	31	51	50	149	15
21	e66	71	e93	129	21	13	14	18	44	26	37	15
22	e60	56	e120	123	20	13	8.2	14	21	110	18	15
23	e56	37	e260	111	18	13	6.9	11	15	115	14	15
24	e53	31	e265	105	18	12	7.4	10	14	140	13	16
25	e51	53	e480	102	20	12	7.5	9.9	14	347	12	30
26	e100	108	e2470	100	29	11	7.5	9.7	14	150	13	20
27	e114	47	e950	97	29	9.8	7.3	9.5	24	e200	14	24
28	100	65	e520	94	22	9.5	21	9.1	22	e83	13	53
29	97	37	e1500	288	---	9.5	11	8.9	37	102	12	50
30	86	30	3670	172	---	8.7	23	8.9	21	69	13	30
31	78	---	1320	129	---	8.4	---	9.2	---	51	13	---
TOTAL	5430	3414	16114	12700	1385	744.9	372.7	603.2	530.7	1799	1219	546
MEAN	175	114	520	410	49.5	24.0	12.4	19.5	17.7	58.0	39.3	18.2
MAX	1660	893	3670	1670	210	102	58	89	51	347	313	53
MIN	13	30	27	94	18	8.4	6.9	8.3	8.4	14	12	13
AC-FT	10770	6770	31960	25190	2750	1480	739	1200	1050	3570	2420	1080

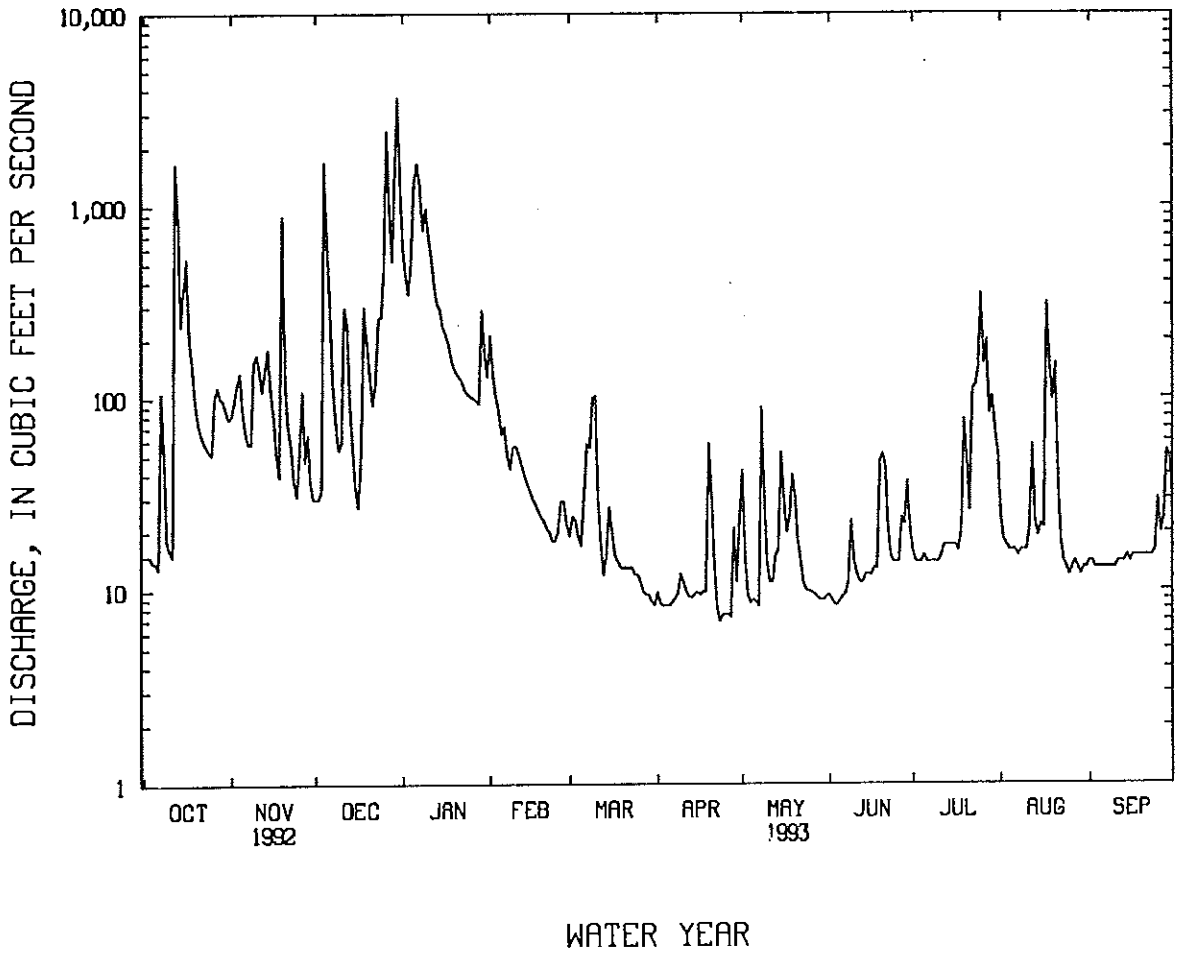
e Estimated

16031000 WAIMEA RIVER NEAR WAIMEA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1910 - 1993, BY WATER YEAR (WY)

MEAN	61.6	183	223	267	195	218	142	64.9	25.4	43.3	59.9	32.8
MAX	352	1632	1285	1639	996	1113	589	244	125	423	1453	294
(WY)	1983	1914	1968	1916	1956	1951	1918	1965	1978	1989	1950	1914
MIN	2.79	8.94	8.39	2.28	2.97	4.91	1.60	.95	1.02	2.54	.000	1.13
(WY)	1950	1945	1977	1945	1978	1959	1966	1966	1912	1953	1911	1949

SUMMARY STATISTICS	FOR 1992 CALENDAR YEAR		FOR 1993 WATER YEAR		WATER YEARS 1910 - 1993	
ANNUAL TOTAL	44008.3		44858.5			
ANNUAL MEAN	120		123		126	
HIGHEST ANNUAL MEAN					297	1982
LOWEST ANNUAL MEAN					24.1	1984
HIGHEST DAILY MEAN	4400	Sep 11	3670	Dec 30	17300	Aug 16 1950
LOWEST DAILY MEAN	5.1	Apr 24	6.9	Apr 23	.00	Jun 12 1911
ANNUAL SEVEN-DAY MINIMUM	5.6	Apr 23	8.4	Apr 21	.00	Jun 16 1911
ANNUAL RUNOFF (AC-FT)	87290		88980		91470	
10 PERCENT EXCEEDS	232		252		252	
50 PERCENT EXCEEDS	26		24		15	
90 PERCENT EXCEEDS	7.4		9.6		2.2	



16031000 WAIMEA RIVER NEAR WAIMEA--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1971-74, November 1974 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND	SPE-CIFIC CON-DUCT-ANCE (US/CM)	PH WATER WHOLE FIELD (STAND-ARD UNITS)	TEMPER-ATURE WATER (DEG C)	TEMPER-ATURE AIR (DEG C)	TUR-BID-ITY (NTU)	BARO-METRIC PRES-SURE (MM OF HG)	OXYGEN, DIS-SOLVED (MG/L)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML)
NOV 1992											
02...	1030	151	67	7.8	20.5	25.0	3.3	760	8.7	97	640
DEC											
08...	1000	88	70	7.8	19.0	19.0	2.1	764	9.0	97	230
FEB 1993											
23...	1030	18	138	8.1	21.0	22.0	2.3	766	9.3	104	160
APR											
13...	1030	9.3	172	8.3	22.0	27.0	1.4	766	8.6	98	130
JUN											
02...	1130	8.6	179	8.4	26.0	30.0	1.9	764	8.2	101	--
AUG											
10...	1030	15	156	8.2	23.5	29.0	0.50	761	8.4	99	150

DATE	STREP-TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML)	HARD-NESS TOTAL (MG/L AS CACO3)	HARD-NESS NONCARB DISSOLV FLD. AS CACO3 (MG/L)	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)	SODIUM, DIS-SOLVED (MG/L AS NA)	SODIUM PERCENT	SODIUM AD-SORP-TION RATIO	POTAS-SIUM, DIS-SOLVED (MG/L AS K)	BICAR-BONATE WATER DIS IT FIELD MG/L AS HCO3	CAR-BONATE WATER DIS IT FIELD MG/L AS CO3
NOV 1992											
02...	1100	20	2	2.9	3.2	5.7	37	0.5	0.50	22	0
DEC											
08...	610	28	1	3.6	4.5	5.8	31	0.5	0.60	32	0
FEB 1993											
23...	330	48	0	6.1	8.0	8.5	27	0.5	0.60	61	0
APR											
13...	180	66	0	8.4	11	10	24	0.5	0.80	84	0
JUN											
02...	50	66	0	8.3	11	10	25	0.5	0.80	79	2
AUG											
10...	85	54	0	7.0	8.9	8.4	25	0.5	0.70	70	0

DATE	ALKA-LINITY WAT DIS TOT IT FIELD MG/L AS CACO3	SULFATE DIS-SOLVED (MG/L AS SO4)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)	FLUO-RIDE, DIS-SOLVED (MG/L AS F)	SILICA, DIS-SOLVED (MG/L AS SIO2)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L)	SOLIDS, DIS-SOLVED (TONS PER DAY)	NITRO-GEN, NITRITE TOTAL (MG/L AS N)	NITRO-GEN, NITRITE DIS-SOLVED (MG/L AS N)	NITRO-GEN, NO2+NO3 TOTAL (MG/L AS N)
NOV 1992											
02...	18	1.2	7.9	<0.10	12	51	45	20.8	0.010	0.020	0.091
DEC											
08...	26	1.3	8.3	<0.10	8.5	56	49	13.4	0.040	0.040	0.200
FEB 1993											
23...	50	3.2	12	0.10	22	83	91	4.06	--	0.020	--
APR											
13...	69	1.9	13	<0.10	27	116	114	2.91	--	<0.010	--
JUN											
02...	69	1.8	13	<0.10	27	110	113	2.54	--	<0.010	--
AUG											
10...	58	1.4	10	0.10	24	97	95	3.95	--	<0.010	--

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16031000 WAIMEA RIVER NEAR WAIMEA--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	NITROGEN, NO2+NO3 DISSOLVED (MG/L AS N)	NITROGEN, AMMONIA TOTAL (MG/L AS N)	NITROGEN, AMMONIA DISSOLVED (MG/L AS N)	NITROGEN, AMMONIA + ORGANIC TOTAL (MG/L AS N)	PHOSPHORUS TOTAL (MG/L AS P)	PHOSPHORUS DISSOLVED (MG/L AS P)	PHOSPHORUS ORTHO TOTAL (MG/L AS P)	PHOSPHORUS ORTHO, DISSOLVED (MG/L AS P)	ALUMINUM, DISSOLVED (UG/L AS AL)	BARIUM, DISSOLVED (UG/L AS BA)
NOV 1992 02...	0.110	0.050	0.040	0.30	0.020	<0.010	0.020	<0.010	150	2
DEC 08...	0.200	0.020	<0.010	<0.20	0.140	0.010	<0.010	<0.010	--	--
FEB 1993 23...	0.075	--	0.030	<0.20	0.010	<0.010	--	<0.010	20	2
APR 13...	<0.050	--	0.020	<0.20	<0.010	<0.010	--	<0.010	20	2
JUN 02...	<0.050	--	0.030	<0.20	0.010	<0.010	--	0.010	--	--
AUG 10...	<0.050	--	0.020	<0.20	0.020	<0.010	--	<0.010	20	2

DATE	TIME	COBALT, DISSOLVED (UG/L AS CO)	IRON, DISSOLVED (UG/L AS FE)	LITHIUM DISSOLVED (UG/L AS LI)	MANGANESE, DISSOLVED (UG/L AS MN)	MOLYBDENUM, DISSOLVED (UG/L AS MO)	NICKEL, DISSOLVED (UG/L AS NI)	SELENIUM, DISSOLVED (UG/L AS SE)	SILVER, DISSOLVED (UG/L AS AG)	STRONTIUM, DISSOLVED (UG/L AS SR)	VANADIUM, DISSOLVED (UG/L AS V)
NOV 1992 02...	1030	<3	220	<4	6	<10	5	<1	<1.0	20	<6
FEB 1993 23...	1030	<3	71	<4	19	<10	5	<1	<1.0	43	<6
APR 13...	1030	<3	110	<4	30	<10	3	<1	<1.0	57	<6
AUG 10...	1030	<3	120	<4	12	<10	5	<1	<1.0	45	<6

CROSS SECTION ANALYSES, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	TIME	SAMPLE LOCATION, CROSS SECTION (FT FM R BK)	SPECIFIC CONDUCTANCE (US/CM)	PH WATER WHOLE FIELD (STANDARD UNITS)	TEMPERATURE WATER (DEG C)	BAROMETRIC PRESSURE (MM OF HG)	OXYGEN, DISSOLVED (MG/L)	OXYGEN, DISSOLVED (PERCENT SATURATION)
NOV 1992 02...*	0945	14.0	67	7.8	20.5	760	8.7	97
02...*	0947	23.0	67	7.8	20.5	760	8.6	96
02...*	0949	29.0	67	7.8	20.5	760	8.6	96
02...*	0951	36.0	67	7.8	20.5	760	8.7	97
02...*	0953	41.0	67	7.8	20.5	760	8.6	96
02...*	0955	45.0	67	7.8	20.5	760	8.7	97
02...*	0957	47.0	67	7.8	20.5	760	8.7	97
02...*	0959	54.0	67	7.8	20.5	760	8.7	97
02...*	1001	60.0	67	7.8	20.5	760	8.7	97
02...*	1003	68.0	67	7.8	20.5	760	8.7	97
02...*	1005	83.0	67	7.8	20.5	760	8.7	97

* Instantaneous streamflow at the time of cross-sectional measurement: Nov. 2, 151 ft3/s.

PARTICLE-SIZE DISTRIBUTION OF SUSPENDED SEDIMENT, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	TIME	SEDIMENT, SUSPENDED (MG/L)	SEDIMENT, DISCHARGE, SUSPENDED (T/DAY)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM
NOV 1992 02...	1030	5	2.0	100
DEC 08...	1000	1	0.24	100
FEB 1993 23...	1030	1	0.05	100
APR 1993 13...	1030	1	0.02	100
JUN 02...	1130	4	0.09	100
AUG 10...	1030	3	0.12	100

< Actual value is known to be less than the value shown

16036000 MAKAWELI RIVER NEAR WAIMEA

LOCATION.--Lat 21°58'31", long 159°38'55", Hydrologic Unit 20070000, on left bank 0.7 mi upstream from mouth, and 1.9 mi northeast of Waimea.

DRAINAGE AREA.--26.0 mi^2.

PERIOD OF RECORD.--July 1943 to current year. Records for October 1911 to June 1917 at site 0.2 mi downstream not equivalent owing to intervening diversion.

REVISED RECORDS.--WSP 2137: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 18.2 ft above mean sea level (by stadia survey). Prior to June 16, 1959, at datum 1.00 ft higher.

REMARKS.--Records good, except for periods of estimated discharges which are poor. Olokele ditch diverts all low flow from the headwaters of the Olokele River 9 mi upstream for irrigation in vicinity of Makaweie. A 5 ft^3/s capacity ditch diverts water from upstream of station for irrigation of taro in the vicinity of the station.

AVERAGE DISCHARGE.--50 years, 87.3 ft^3/s (63,220 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 26,000 ft^3/s, Jan. 31, 1975, gage height, 15.51 ft, from rating curve extended above 3,200 ft^3/s on basis of slope-area measurement at gage height 10.65 ft; minimum, 3.15 ft^3/s, July 19, 1951.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 4,700 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Dec. 3	2230	*10,280	*11.20	Dec. 29	2200	7,390	9.83
Dec. 26	0030	5,000	8.40				

Minimum discharge, 7.5 ft^3/s, Jul. 6, 7.

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	17	35	21	324	e38	19	12	22	9.6	9.2	e38	e9.4
2	17	34	38	230	e30	17	12	15	9.2	8.8	e35	e9.2
3	16	27	775	195	e26	17	11	14	8.8	8.3	e28	e9.0
4	15	24	1340	171	e24	17	11	13	8.8	8.3	e15	e30
5	16	19	566	354	e23	17	11	12	8.3	7.9	e11	e10
6	18	17	216	574	22	22	11	12	8.3	7.5	e11	e10
7	21	15	174	360	21	55	11	103	10	7.5	e11	e9.6
8	18	32	110	254	21	25	18	66	65	7.9	e15	e10
9	16	190	88	379	43	30	16	19	14	7.9	e27	e9.8
10	15	56	105	e212	96	28	11	16	10	8.3	e16	e9.6
11	15	78	414	e150	27	20	10	18	9.2	8.3	e26	e9.4
12	1220	37	277	e125	e21	16	10	52	9.2	8.8	e18	e12
13	457	35	90	e106	e19	e14	11	34	9.6	9.2	e16	e13
14	158	32	66	e92	e18	e14	11	28	9.6	10	e20	e11
15	271	24	54	e78	e17	e13	10	27	9.6	9.2	e16	e10
16	233	21	65	e66	e16	e13	9.2	18	9.6	8.3	e12	e9.8
17	64	18	796	e60	e16	e13	9.2	15	18	17	e30	e9.6
18	46	222	220	e54	e15	e16	9.2	17	46	10	e19	e9.4
19	37	299	188	e49	e15	e15	12	15	70	78	e46	e9.6
20	33	39	226	e45	e15	e16	10	15	25	19	e16	e10
21	32	26	147	e41	e14	e13	9.7	14	15	22	e11	e9.6
22	32	20	260	e37	e14	e12	9.2	17	10	146	e11	e9.4
23	30	18	483	e35	24	e12	9.5	15	9.2	36	e10	e9.2
24	28	14	230	e30	29	20	9.8	14	8.8	494	e11	e10
25	108	16	909	e27	64	29	9.6	14	8.8	382	e15	e9.8
26	43	38	2190	e26	35	19	9.7	12	10	160	e12	e9.6
27	66	18	480	e25	23	15	65	11	10	138	e11	e11
28	37	22	783	e22	21	13	17	11	28	103	e10	e28
29	35	15	2430	e68	---	12	12	10	14	92	e9.6	e16
30	35	16	3380	e63	---	12	36	10	10	80	e9.4	e55
31	46	---	765	e41	---	12	---	9.6	---	e52	e9.2	---
TOTAL	3195	1457	17886	4293	747	566	413.1	668.6	491.6	1964.4	545.2	388.0
MEAN	103	48.6	577	138	26.7	18.3	13.8	21.6	16.4	63.4	17.6	12.9
MAX	1220	299	3380	574	96	55	65	103	70	494	46	55
MIN	15	14	21	22	14	12	9.2	9.6	8.3	7.5	9.2	9.0
AC-FT	6340	2890	35480	8520	1480	1120	819	1330	975	3900	1080	770

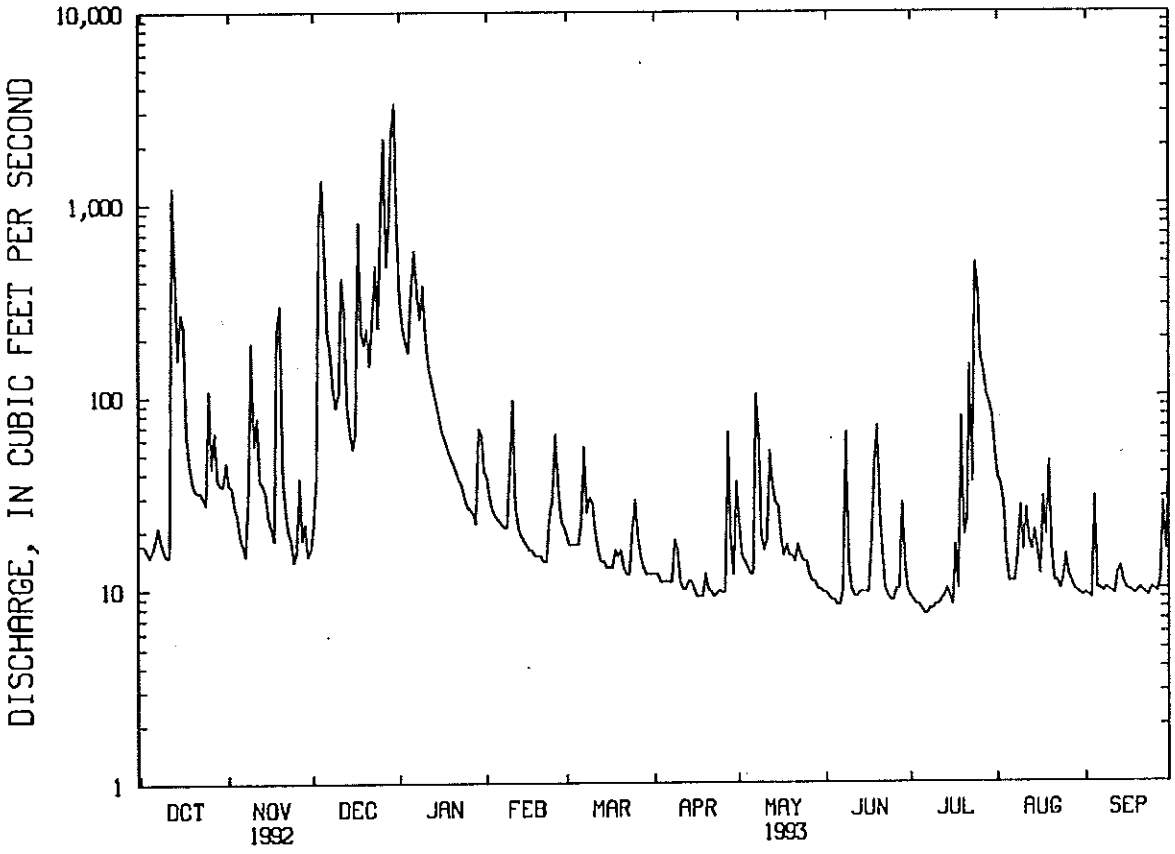
e Estimated

16036000 MAKAWELI RIVER NEAR WAIMEA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1943 - 1993, BY WATER YEAR (WY)

MEAN	55.2	122	147	136	117	135	99.1	59.5	37.1	53.2	53.8	33.5
MAX	265	491	577	441	774	609	419	283	101	222	328	147
(WY)	1983	1991	1993	1989	1956	1982	1963	1965	1980	1989	1950	1992
MIN	11.7	15.2	18.0	9.49	12.0	10.6	11.6	15.5	9.56	10.0	14.2	9.54
(WY)	1960	1951	1977	1945	1978	1959	1992	1966	1951	1984	1944	1962

SUMMARY STATISTICS	FOR 1992 CALENDAR YEAR		FOR 1993 WATER YEAR		WATER YEARS 1943 - 1993	
ANNUAL TOTAL	37554.3		32614.9			
ANNUAL MEAN	103		89.4		87.3	
HIGHEST ANNUAL MEAN					204	1982
LOWEST ANNUAL MEAN					31.1	1984
HIGHEST DAILY MEAN	3380	Dec 30	3380	Dec 30	5170	Dec 1 1957
LOWEST DAILY MEAN	9.8	Aug 27	7.5	Jul 6	4.3	Jul 19 1951
ANNUAL SEVEN-DAY MINIMUM	9.9	Aug 26	7.9	Jul 3	5.7	Oct 21 1944
ANNUAL RUNOFF (AC-FT)	74490		64690		63220	
10 PERCENT EXCEEDS	222		192		173	
50 PERCENT EXCEEDS	18		18		27	
90 PERCENT EXCEEDS	11		9.4		12	



16049000 HANAPEPE RIVER BELOW MANUAHI STREAM, NEAR ELEELE

LOCATION.--Lat 21°57'29", long 159°33'13", Hydrologic Unit 20070000, on left bank 200 ft downstream from Manuahi Stream and 4.0 mi northeast of Eleele.

DRAINAGE AREA.--18.5 mi^2.

PERIOD OF RECORD.--July 1917 to January 1921, December 1926 to current year. Prior to July 1952, published as "at Koula, near Eleele." Records for August 1910 to December 1916 at site 0.5 mi upstream not equivalent owing to intervening inflow.

REVISED RECORDS.--WSP 740: 1931. WSP 1719: 1929-31(M). WSP 1937: 1918, 1919(M), 1920, 1921(M), 1927-28(M), 1930, 1936-37(M), 1941(P), 1943-46(P), 1947(M), 1948-52(P), 1955(M), 1956-57(P), 1958(M), 1960(M). WSP 2137: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 222 ft above mean sea level (by stadia survey). July 1, 1917, to Jan. 22, 1921, nonrecording gage and Dec. 16, 1926, to June 30, 1951, water-stage recorder, at same site at datum 1.00 ft higher.

REMARKS.--Records good. Koula ditch diverts 3.0 mi upstream for irrigation in vicinity of Makaweli.

AVERAGE DISCHARGE.--69 years (water years 1918-20, 1928-93), 84.9 ft^3/s (61,480 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 39,000 ft^3/s, Apr. 15, 1963, gage height, 14.87 ft, from rating curve extended above 7,600 ft^3/s on basis of slope-area measurement of peak flow; minimum, 5.1 ft^3/s, May 21, 1954.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 3,600 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Dec. 3	2200	*8,280	8.56	Dec. 29	2130	4,560	6.80
Dec. 26	0300	3,880	6.38				

Minimum discharge, 10 ft^3/s, Mar. 1, 2, Apr. 10, 11.

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

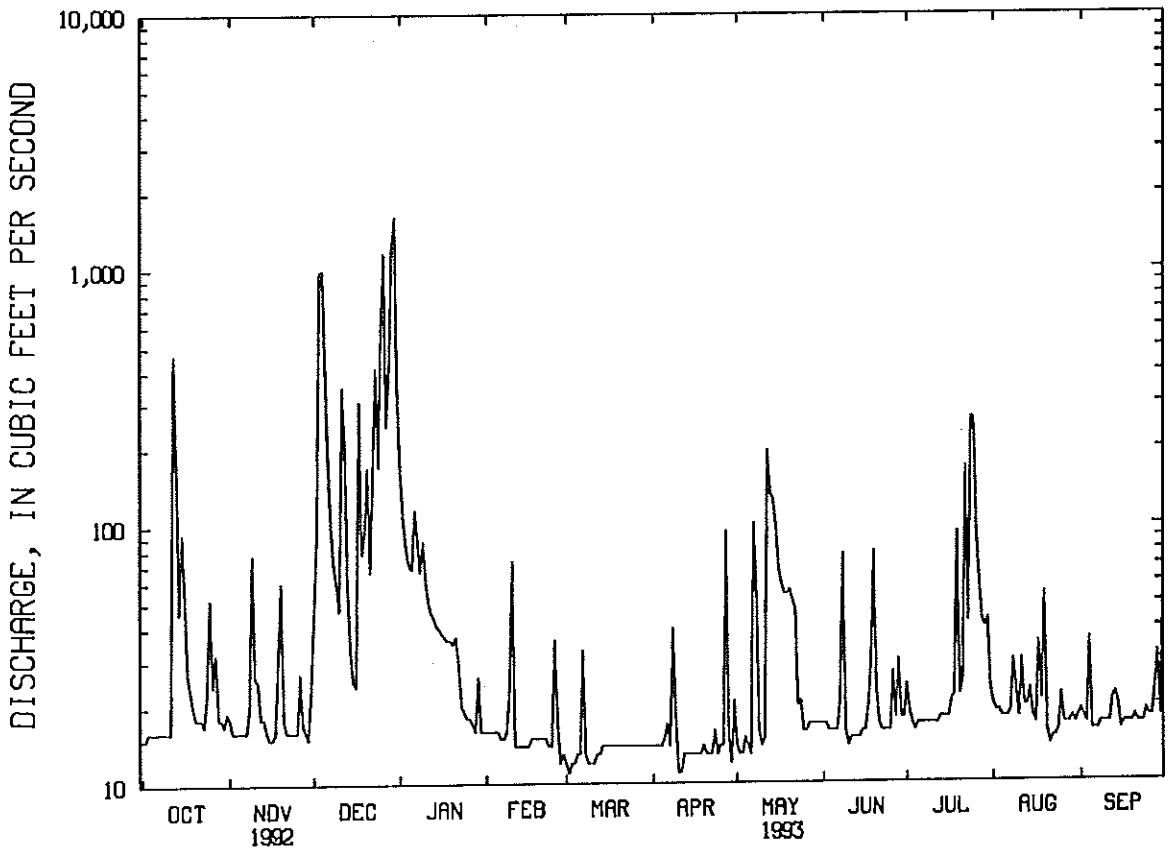
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	15	18	44	164	16	12	14	14	17	24	20	19
2	15	16	91	108	16	11	14	13	17	19	19	18
3	16	16	980	83	16	12	14	13	16	17	19	17
4	16	16	988	71	16	12	14	15	16	16	18	36
5	16	16	432	68	16	13	15	14	16	17	18	16
6	16	16	180	116	15	13	17	13	16	17	18	16
7	16	16	100	88	15	33	14	102	21	17	19	16
8	16	20	71	66	16	13	40	58	77	17	30	17
9	16	77	60	87	24	12	18	16	16	17	23	17
10	16	26	47	61	73	12	11	14	14	17	18	17
11	16	25	350	51	14	12	11	15	15	17	30	17
12	469	18	203	46	14	13	13	196	15	17	20	21
13	171	18	58	44	14	13	13	132	15	18	20	22
14	46	16	33	41	14	14	13	126	15	18	23	20
15	94	15	25	40	14	14	13	99	16	18	18	16
16	55	15	24	38	14	14	13	68	16	18	17	17
17	27	16	306	37	15	14	13	59	20	21	35	17
18	23	30	78	36	15	14	13	54	29	22	21	17
19	20	60	94	36	15	14	14	54	79	94	54	17
20	18	18	170	35	15	14	13	56	23	22	16	18
21	18	16	66	37	15	14	13	51	17	25	14	17
22	18	16	175	29	15	14	13	47	16	169	15	17
23	17	16	415	20	14	14	16	20	16	42	15	17
24	23	16	172	19	14	14	13	21	16	262	16	19
25	52	16	572	18	36	14	14	16	16	260	22	18
26	24	27	1160	18	17	14	14	16	27	93	17	18
27	32	17	247	17	12	14	95	17	18	61	17	23
28	18	16	387	16	13	14	15	17	30	43	17	32
29	18	15	1210	26	---	14	12	17	18	40	18	18
30	17	24	1610	16	---	14	21	17	18	43	17	67
31	19	---	334	16	---	14	---	17	---	23	18	---
TOTAL	1353	647	10682	1548	503	433	526	1387	661	1504	642	617
MEAN	43.6	21.6	345	49.9	18.0	14.0	17.5	44.7	22.0	48.5	20.7	20.6
MAX	469	77	1610	164	73	33	95	196	79	262	54	67
MIN	15	15	24	16	12	11	11	13	14	16	14	16
AC-FT	2680	1280	21190	3070	998	859	1040	2750	1310	2980	1270	1220

16049000 HANAPEPE RIVER BELOW MANUAHI STREAM, NEAR ELEELE--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1917 - 1993, BY WATER YEAR (WY)

MEAN	58.9	104	117	112	99.3	119	92.9	68.2	51.6	72.7	74.3	51.7
MAX	192	430	720	578	657	803	470	201	175	202	222	174
(WY)	1983	1991	1920	1920	1932	1918	1963	1965	1978	1989	1931	1935
MIN	11.5	15.3	13.0	11.7	15.0	8.84	13.2	12.9	12.1	13.6	18.4	11.7
(WY)	1954	1977	1986	1986	1986	1959	1941	1958	1959	1953	1953	1953

SUMMARY STATISTICS	FOR 1992 CALENDAR YEAR		FOR 1993 WATER YEAR		WATER YEARS 1917 - 1993	
ANNUAL TOTAL	23078		20503			
ANNUAL MEAN	63.1		56.2		84.9	
HIGHEST ANNUAL MEAN					182	1918
LOWEST ANNUAL MEAN					30.6	1953
HIGHEST DAILY MEAN	1610	Dec 30	1610	Dec 30	10900	Dec 3 1919
LOWEST DAILY MEAN	12	Jun 7	11	Mar 2	5.3	May 21 1954
ANNUAL SEVEN-DAY MINIMUM	13	May 25	12	Feb 27	6.4	May 10 1954
ANNUAL RUNOFF (AC-FT)	45780		40670		61480	
10 PERCENT EXCEEDS	95		93		175	
50 PERCENT EXCEEDS	18		17		30	
90 PERCENT EXCEEDS	14		14		15	



16060000 SOUTH FORK WAILUA RIVER NEAR LIHUE

LOCATION.--Lat 22°02'24", long 159°22'58", Hydrologic Unit 20070000, on right bank 0.2 mi upstream from Wailua Falls and 4.3 mi north of Lihue.

DRAINAGE AREA.--22.4 mi^2.

PERIOD OF RECORD.--December 1911 to April 1919, June 1919 to March 1921, May 1921 to June 1957, August, September 1957, November 1957 to February 1958, June 1958 to current year. Monthly discharge only for some periods, published in WSP 1319. Published as "above Waiehu Falls, near Lihue" 1912-13.

REVISED RECORDS.--WSP 1249: 1941-47(M), 1948-51(P). WSP 1719: 1943-49. WSP 1937: 1958-60.

GAGE.--Water-stage recorder. Elevation of gage is 240 ft, from topographic map. Prior to Nov. 18, 1918, at site 0.3 mi upstream at different datum. Nov. 18, 1918, to June 30, 1957, at site 10 ft downstream from present site at datum 2.50 ft higher and July 1, 1957, to June 23, 1958, at present datum.

REMARKS.--Records good. Lihue and Hanamaulu ditches divert upstream for irrigation of sugarcane in vicinity of Lihue.

AVERAGE DISCHARGE.--76 years (water years 1913-18, 1920, 1922-24, 1926-56, 1959-93), 116 ft^3/s (84,180 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 87,300 ft^3/s, Apr. 15, 1963, gage height, 22.90 ft, from rating curve extended above 13,000 ft^3/s on basis of slope-area measurement of peak flow; minimum, 1.5 ft^3/s, Aug. 21, 1984.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 5,800 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Dec. 3	2330	*18,880	*17.98	Dec. 29	2230	7,880	15.26

Minimum discharge, 3.3 ft^3/s, Mar. 30, Apr. 4, 5.

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

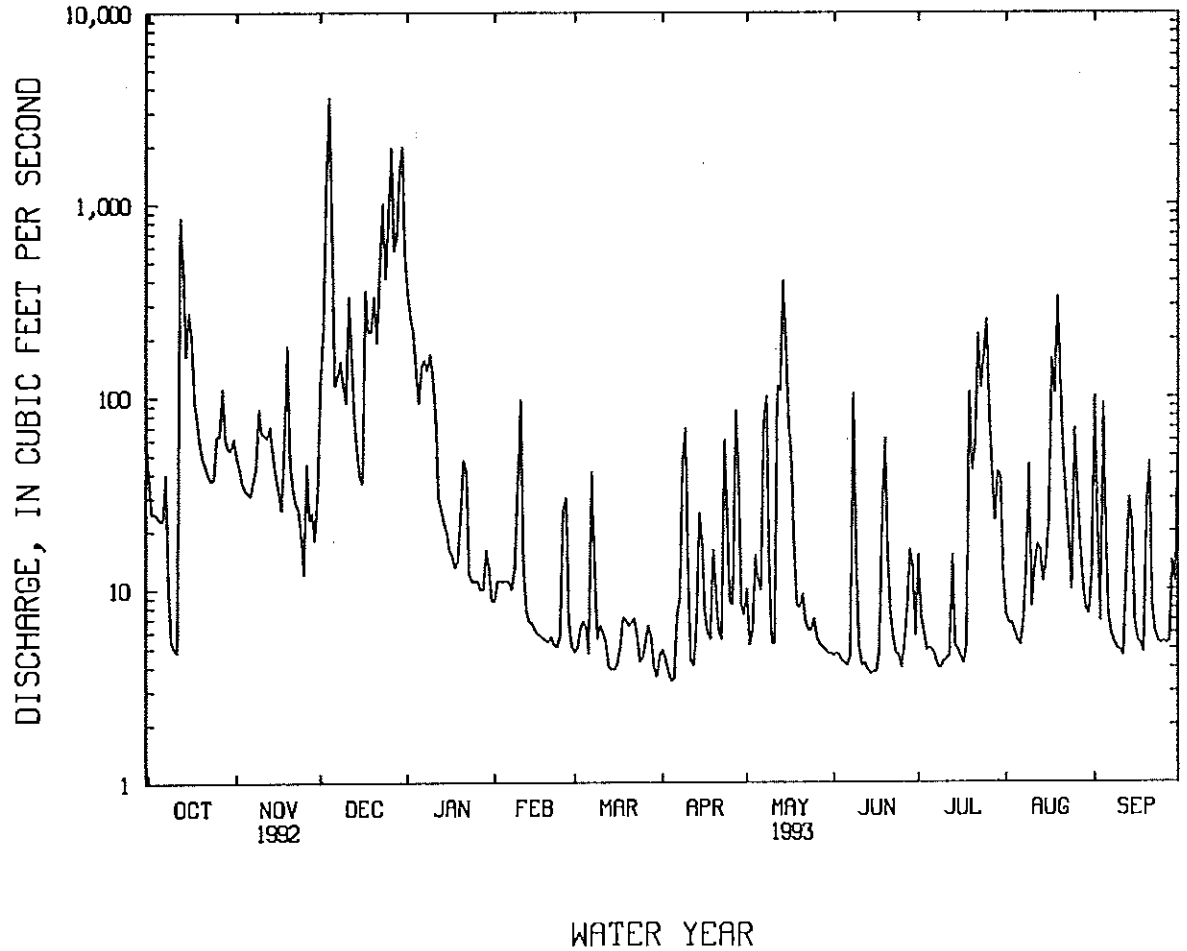
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	39	49	121	353	8.7	4.8	4.9	10	4.6	15	7.5	101
2	25	43	223	266	11	5.0	4.4	5.2	4.7	7.2	6.7	21
3	25	36	1260	217	11	6.2	3.8	6.1	4.6	6.0	6.7	6.9
4	24	33	3600	144	11	6.8	3.4	15	4.3	4.9	6.1	93
5	23	32	771	94	11	6.4	3.5	11	4.2	5.0	5.5	18
6	23	31	115	143	11	4.7	7.3	10	4.1	4.9	5.2	7.1
7	40	37	127	155	10	41	9.0	80	4.6	4.5	6.9	5.9
8	10	44	152	138	13	14	48	101	104	4.0	13	5.3
9	5.4	87	116	166	34	5.6	69	13	15	4.0	45	5.0
10	5.0	65	94	124	97	6.5	11	5.3	5.1	4.3	8.2	4.9
11	4.8	64	332	79	13	6.0	4.3	5.3	4.1	4.4	13	4.6
12	856	62	161	30	7.8	5.4	4.1	114	4.2	4.6	17	12
13	469	70	78	26	6.8	4.0	6.6	108	3.9	15	16	30
14	164	51	52	22	6.7	3.9	25	403	3.7	5.2	11	22
15	275	40	39	20	6.2	3.9	18	188	3.8	4.9	14	6.8
16	200	33	36	16	5.9	4.2	7.7	75	3.8	4.5	23	5.5
17	95	26	355	15	5.8	5.1	6.0	50	4.9	4.2	158	5.3
18	75	56	218	13	5.6	7.1	5.6	17	25	5.2	105	4.8
19	57	183	218	14	5.5	6.9	16	8.3	61	106	330	28
20	48	47	333	24	5.4	6.5	9.6	8.1	15	42	120	46
21	44	34	192	47	5.7	6.7	6.0	9.4	7.6	56	51	8.3
22	39	28	459	41	5.2	7.0	5.6	6.9	5.6	212	30	6.1
23	37	26	1010	12	5.1	5.8	60	6.2	4.7	112	18	5.5
24	38	19	415	11	5.8	4.3	23	6.2	4.6	165	10	5.3
25	63	12	825	11	26	4.5	8.6	7.0	4.0	252	69	5.4
26	63	45	1970	11	30	5.4	8.4	5.7	5.2	86	34	5.3
27	111	23	578	10	6.7	6.5	85	5.2	8.0	43	18	5.4
28	61	25	669	10	5.1	5.7	41	5.1	16	23	11	14
29	54	18	1500	16	---	4.0	8.3	4.9	13	41	7.9	11
30	54	32	2000	13	---	3.6	7.4	4.7	5.8	39	7.5	64
31	61	---	551	8.8	---	4.6	---	4.7	---	12	12	---
TOTAL	3088.2	1351	18570	2249.8	376.0	212.1	520.5	1299.3	359.1	1296.8	1186.2	563.4
MEAN	99.6	45.0	599	72.6	13.4	6.84	17.3	41.9	12.0	41.8	38.3	18.8
MAX	856	183	3600	353	97	41	85	403	104	252	330	101
MIN	4.8	12	36	8.8	5.1	3.6	3.4	4.7	3.7	4.0	5.2	4.6
AC-FT	6130	2680	36830	4460	746	421	1030	2580	712	2570	2350	1120

16060000 SOUTH FORK WAILUA RIVER NEAR LIHUE--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1912 - 1993, BY WATER YEAR (WY)

MEAN	88.5	170	174	179	127	152	134	101	54.1	72.6	85.1	71.2
MAX	339	866	696	1485	716	830	673	467	271	281	321	650
(WY)	1983	1991	1917	1921	1932	1982	1963	1927	1914	1989	1948	1914
MIN	2.58	3.13	6.61	4.66	3.15	3.46	3.84	3.29	2.82	3.27	4.76	2.59
(WY)	1954	1934	1977	1986	1947	1934	1931	1926	1957	1953	1973	1953

SUMMARY STATISTICS	FOR 1992 CALENDAR YEAR		FOR 1993 WATER YEAR		WATER YEARS 1912 - 1993	
ANNUAL TOTAL	38223.7		31072.4			
ANNUAL MEAN	104		85.1		116	
HIGHEST ANNUAL MEAN					284	1982
LOWEST ANNUAL MEAN					17.3	1984
HIGHEST DAILY MEAN	3600	Dec 4	3600	Dec 4	13800	Jan 16 1921
LOWEST DAILY MEAN	2.7	Jul 7	3.4	Apr 4	1.8	Sep 17 1953
ANNUAL SEVEN-DAY MINIMUM	3.0	Jul 1	4.0	Mar 30	1.8	Sep 16 1953
ANNUAL RUNOFF (AC-FT)	75820		61630		84180	
10 PERCENT EXCEEDS	218		162		266	
50 PERCENT EXCEEDS	28		13		37	
90 PERCENT EXCEEDS	3.7		4.6		4.6	



16061200 NORTH WAILUA DITCH BELOW WAIKOKO STREAM, NEAR LIHUE

LOCATION.--Lat 22°03'34", long 159°28'00", Hydrologic Unit 20070000, on left bank 380 ft downstream from Waikoko Stream, 8.1 mi west of Wailua, and 8.4 mi northwest of Lihue.

PERIOD OF RECORD.--January 1965 to current year.

GAGE.--Water-stage recorder and concrete control. Elevation of gage is 1,070 ft, from topographic map.

REMARKS.--Records good. Ditch diverts from North Fork Wailua River and Waikoko Stream for power and irrigation in vicinity of Lihue.

AVERAGE DISCHARGE.--28 years, 22.2 ft^3/s (16,050 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 58 ft^3/s, Oct. 11, 1966; no flow for many days.

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge, 29 ft^3/s, Aug. 17, 19; minimum daily, 0.22 ft^3/s, Jan. 31.

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

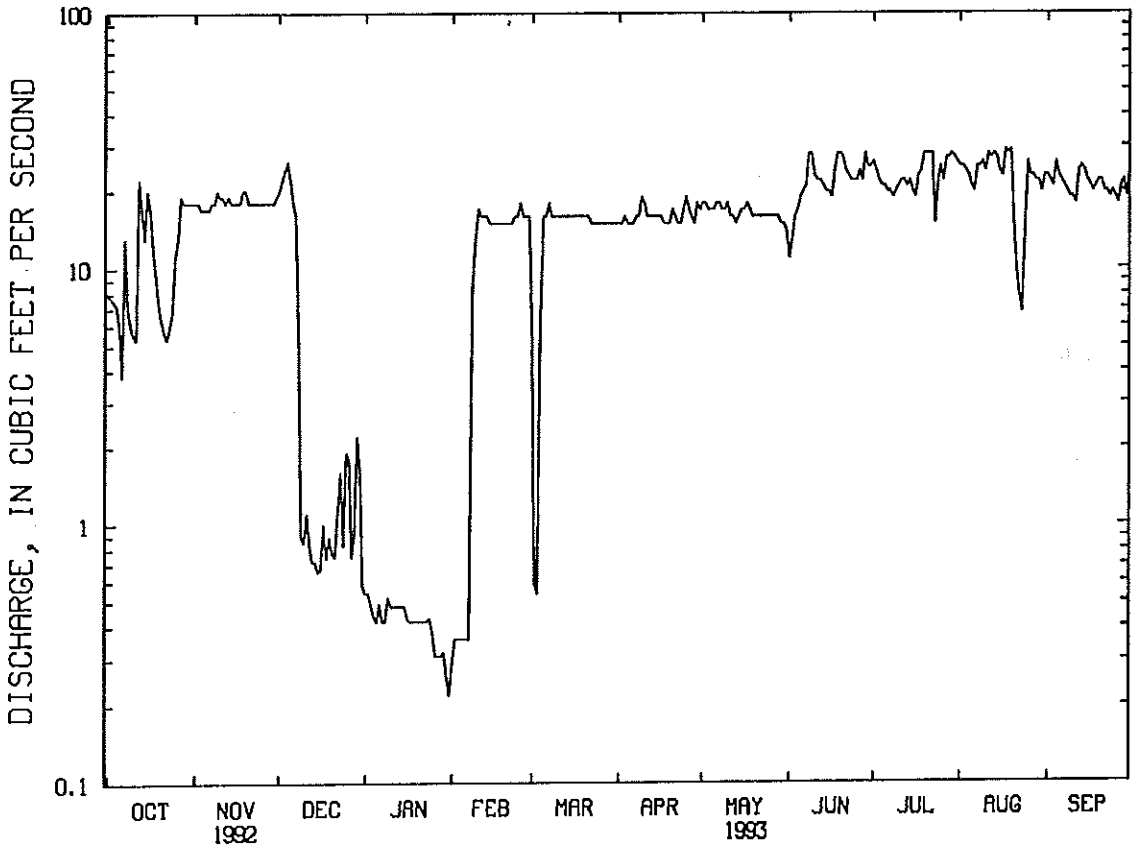
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	7.9	18	20	.54	.29	5.5	15	18	11	26	25	23
2	7.7	18	22	.54	.36	.59	15	18	13	24	25	22
3	7.5	17	24	.49	.36	.54	16	17	16	22	24	21
4	7.2	17	26	.44	.36	6.3	15	17	17	21	23	26
5	6.1	17	22	.42	.36	16	15	17	19	21	21	23
6	3.8	17	18	.49	.36	16	15	18	20	20	20	22
7	13	18	16	.42	.36	18	16	18	21	20	25	21
8	7.0	18	5.1	.42	8.4	16	16	17	28	19	25	20
9	6.0	20	.90	.52	13	16	19	17	28	20	26	19
10	5.5	19	.85	.48	17	16	18	18	23	21	24	19
11	5.3	19	1.1	.48	16	16	16	16	22	22	28	18
12	22	18	.84	.48	16	16	16	16	22	22	27	24
13	17	19	.72	.48	16	16	16	15	21	21	28	25
14	13	18	.72	.48	15	16	16	16	20	22	27	24
15	20	18	.66	.48	15	16	16	17	20	20	24	22
16	17	18	.67	.43	15	16	16	17	19	19	23	21
17	12	18	1.0	.42	15	16	15	18	24	23	29	20
18	9.5	20	.74	.42	15	16	15	17	28	24	28	21
19	7.4	20	.89	.42	15	16	15	16	28	28	29	22
20	6.3	18	.78	.42	15	16	17	16	27	28	15	22
21	5.7	18	.75	.42	15	16	16	16	24	28	9.9	20
22	5.3	18	1.1	.42	15	15	15	16	23	28	7.8	20
23	5.9	18	1.6	.42	16	15	15	16	22	15	6.8	19
24	6.7	18	.83	.43	16	15	17	16	22	22	14	20
25	11	18	1.9	.38	18	15	19	16	22	25	26	19
26	13	18	1.8	.31	16	15	17	16	24	22	23	18
27	19	18	.75	.31	16	15	16	16	22	27	23	21
28	18	18	.93	.31	16	15	15	16	28	27	22	22
29	18	18	2.2	.32	---	15	18	15	25	28	22	19
30	18	19	1.6	.26	---	15	17	15	25	27	20	24
31	18	---	.58	.22	---	15	---	14	---	26	23	---
TOTAL	339.8	546	177.01	13.07	321.85	436.93	483	511	664	718	693.5	637
MEAN	11.0	18.2	5.71	.42	11.5	14.1	16.1	16.5	22.1	23.2	22.4	21.2
MAX	22	20	26	.54	18	18	19	18	28	28	29	26
MIN	3.8	17	.58	.22	.29	.54	15	14	11	15	6.8	18
AC-FT	674	1080	351	26	638	867	958	1010	1320	1420	1380	1260

16061200 NORTH WAILUA DITCH BELOW WAIKOKO STREAM, NEAR LIHUE--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1965 - 1993, BY WATER YEAR (WY)

MEAN	23.0	23.5	21.4	20.3	21.0	22.0	22.9	22.7	22.2	22.9	22.7	22.0
MAX	29.7	34.0	33.4	30.1	34.4	32.0	31.8	31.3	28.5	34.0	31.7	30.5
(WY)	1969	1966	1969	1968	1969	1969	1986	1969	1986	1969	1966	1966
MIN	11.0	12.3	2.94	.42	.065	.21	.14	.097	.16	3.89	19.4	13.7
(WY)	1993	1983	1991	1993	1991	1991	1991	1991	1991	1991	1980	1991

SUMMARY STATISTICS	FOR 1992 CALENDAR YEAR		FOR 1993 WATER YEAR		WATER YEARS 1965 - 1993		
ANNUAL TOTAL	6627.21		5541.16				
ANNUAL MEAN	18.1		15.2		22.2		
HIGHEST ANNUAL MEAN					30.3		1969
LOWEST ANNUAL MEAN					6.64		1991
HIGHEST DAILY MEAN	36	Feb 13	29	Aug 17	58	Oct 11	1966
LOWEST DAILY MEAN	.58	Dec 31	.22	Jan 31	.00	Jan 1	1965
ANNUAL SEVEN-DAY MINIMUM	.76	Dec 12	.29	Jan 26	.00	Jan 1	1965
ANNUAL RUNOFF (AC-FT)	13150		10990		16050		
10 PERCENT EXCEEDS	24		24		30		
50 PERCENT EXCEEDS	20		17		22		
90 PERCENT EXCEEDS	5.5		.53		17		



16062000 STABLE STORM DITCH NEAR LIHUE

LOCATION.--Lat 22°04'09", long 159°26'46", Hydrologic Unit 20070000, on left bank 100 ft downstream from intake, 7.8 mi northwest of Lihue, and 7.9 mi west of Kapaa.

PERIOD OF RECORD.--December 1936 to current year.

GAGE.--Water-stage recorder and sharp-crested weir. Elevation of gage is 710 ft, by barometer.

REMARKS.--Records good except for periods of estimated discharge which are fair. Ditch diverts from North Fork Wailua River for irrigation of sugarcane in vicinity of Lihue.

AVERAGE DISCHARGE.--56 years (water years 1938-93), 10.2 ft^3/s (7,390 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 71 ft^3/s, Apr. 3, 1948; no flow on many days.

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge, 44 ft^3/s, Apr. 27, no flow on many days.

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	.00	.00	.06	.07	.00	e.30	21	29	8.4	25	1.1	6.4
2	.00	.00	.26	.00	.00	e.08	21	24	8.4	24	1.1	9.8
3	.00	.00	3.1	.00	.00	.00	21	27	8.4	22	1.1	17
4	.00	.00	2.1	.00	.00	.37	22	26	8.4	22	1.1	26
5	.00	.00	.08	.00	.00	.74	22	23	18	22	.99	17
6	.00	.00	.08	.00	.00	.90	28	22	22	21	.99	17
7	.00	.00	.03	.00	.00	.90	26	36	32	7.4	1.0	18
8	.00	.00	.00	.00	.00	.90	33	34	38	11	18	18
9	.00	.01	.00	.00	.11	.90	28	26	27	21	26	12
10	.00	.00	.00	.00	1.3	.74	28	24	23	22	25	7.4
11	.00	.00	.00	.00	.00	.62	26	28	17	23	30	7.1
12	.34	.00	.00	.00	.91	.50	29	38	11	26	28	12
13	.26	.00	.00	.00	5.4	.50	29	28	9.5	27	19	7.1
14	.20	.00	.00	.00	2.7	.50	28	42	9.4	26	2.2	.27
15	.24	.00	.00	.00	2.2	.50	26	37	17	21	2.0	1.4
16	.30	.00	.00	.00	1.1	.62	25	30	21	14	1.9	2.9
17	.30	.00	.00	.00	.62	16	24	16	29	20	2.0	.40
18	.10	.21	.00	.00	.62	24	27	3.7	32	26	1.8	.41
19	.00	.17	.00	.00	.50	24	42	3.7	33	33	24	.57
20	.00	.00	.00	.00	.50	24	30	3.8	32	35	25	.79
21	.00	.00	.00	.00	e.50	25	28	3.5	26	35	20	.98
22	.00	.00	.01	.00	e.15	26	27	3.3	24	9.7	16	.89
23	.00	.00	.05	.00	e.30	14	43	3.1	13	2.2	15	.90
24	.00	.00	.04	.00	e.30	14	33	3.0	.97	2.2	12	1.1
25	.02	.04	.02	.00	e.62	18	33	2.6	18	2.0	16	1.7
26	.00	.02	.48	.00	.62	20	29	2.5	30	1.7	7.7	5.8
27	.00	.00	.03	.00	e.39	18	44	6.7	25	1.5	6.8	12
28	.00	.00	.02	.00	e.30	11	33	9.0	31	1.4	6.4	14
29	.00	.00	.03	.00	---	13	30	8.9	26	1.3	6.4	13
30	.00	.00	.68	.00	---	20	34	8.8	26	1.2	5.7	17
31	.00	---	.14	.00	---	20	---	8.4	---	1.1	12	---
TOTAL	1.76	0.45	7.21	0.07	19.14	296.07	870	561.0	624.47	507.7	336.28	248.91
MEAN	.057	.015	.23	.002	.68	9.55	29.0	18.1	20.8	16.4	10.8	8.30
MAX	.34	.21	3.1	.07	5.4	26	44	42	38	35	30	26
MIN	.00	.00	.00	.00	.00	.00	21	2.5	.97	1.1	.99	.27
AC-FT	3.5	.9	14	.1	38	587	1730	1110	1240	1010	667	494

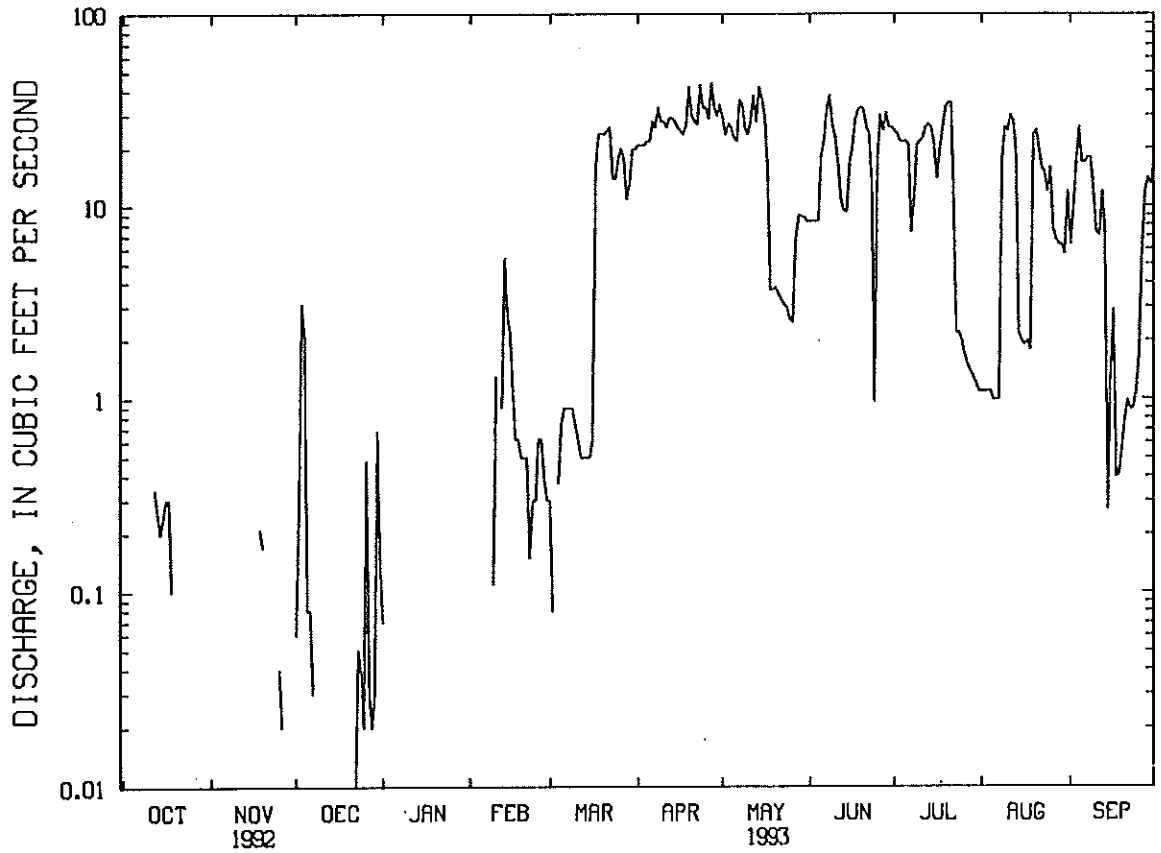
e Estimated

16062000 STABLE STORM DITCH NEAR LIHUE--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1938 - 1993, BY WATER YEAR (WY)

MEAN	13.3	6.39	4.70	6.56	9.05	7.99	9.10	9.97	15.9	12.0	12.1	15.3
MAX	37.3	35.7	24.8	31.4	32.3	36.0	34.7	34.4	38.7	36.8	37.0	36.1
(WY)	1951	1951	1984	1946	1991	1947	1954	1954	1953	1953	1970	1950
MIN	.020	.000	.000	.000	.000	.000	.000	.000	.000	.014	.000	.000
(WY)	1990	1938	1991	1939	1938	1939	1939	1963	1938	1980	1964	1989

SUMMARY STATISTICS	FOR 1992 CALENDAR YEAR		FOR 1993 WATER YEAR		WATER YEARS 1938 - 1993	
ANNUAL TOTAL	1438.72		3473.06			
ANNUAL MEAN	3.93		9.52		10.2	
HIGHEST ANNUAL MEAN					22.1	1984
LOWEST ANNUAL MEAN					.59	1990
HIGHEST DAILY MEAN	37	Jul 9	44	Apr 27	71	Apr 3 1948
LOWEST DAILY MEAN	.00	Jan 1	.00	Oct 1	.00	Oct 1 1937
ANNUAL SEVEN-DAY MINIMUM	.00	Jan 1	.00	Oct 1	.00	Oct 1 1937
ANNUAL RUNOFF (AC-FT)	2850		6890		7390	
10 PERCENT EXCEEDS	10		28		34	
50 PERCENT EXCEEDS	.39		1.4		.33	
90 PERCENT EXCEEDS	.00		.00		.00	



16068000 EAST BRANCH OF NORTH FORK WAILUA RIVER NEAR LIHUE

LOCATION.--Lat 22°04'19", long 159°25'05", Hydrologic Unit 20070000, on right bank 1,200 ft upstream from mouth and 7.2 mi northwest of Lihue.

DRAINAGE AREA.--6.27 mi^2.

PERIOD OF RECORD.--July 1912 to September 1914, December 1914 to March 1915, May 1915 to March 1919, June 1919 to current year. Monthly discharge only for some periods, published in WSP 1319.

REVISED RECORDS.--WSP 770: 1932-33. WSP 1719: 1916. WSP 1937: 1918. WSP 2137: Drainage area.

GAGE.--Water-stage recorder and concrete control. Elevation of gage is 500 ft, from topographic map. Prior to Dec. 31, 1914, nonrecording gage at site 725 ft downstream at different datum. Dec. 31, 1914 to May 10, 1934, water-stage recorder at site 75 ft upstream at present datum.

REMARKS.--Records good. No diversion upstream.

AVERAGE DISCHARGE.--78 years (water years 1913-14, 1916-17, 1920-93), 48.3 ft^3/s (35,000 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 18,400 ft^3/s, Nov. 12, 1955, gage height, 14.7 ft, from floodmarks, from rating curve extended above 2,700 ft^3/s; minimum, 6.8 ft^3/s, July 3, 13, 1926.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,900 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Dec. 3	2230	*4,720	*8.29	Dec. 30	0130	2,250	6.22

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

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	21	24	34	102	18	15	13	17	13	16	25	26
2	20	24	61	84	18	14	13	15	13	16	23	20
3	19	23	555	73	17	14	12	15	13	14	22	18
4	19	21	614	64	17	14	12	16	13	13	20	21
5	18	20	134	71	17	14	12	14	13	13	19	17
6	18	20	84	70	17	19	13	14	13	13	18	17
7	44	20	67	51	16	36	13	19	15	13	22	16
8	20	23	56	45	21	18	45	34	33	13	21	16
9	18	29	49	44	31	22	32	17	15	13	21	15
10	18	23	50	38	26	18	15	16	13	15	20	16
11	18	29	71	36	18	15	14	16	13	14	31	15
12	336	22	70	34	17	15	13	53	13	13	26	25
13	138	40	45	34	22	15	13	25	13	30	23	20
14	74	27	38	32	17	15	14	100	13	18	27	32
15	148	21	34	31	16	14	13	45	12	14	21	17
16	120	20	44	29	16	14	13	29	12	13	20	18
17	83	20	124	28	15	14	12	25	14	15	75	16
18	68	98	84	26	15	14	13	23	18	17	45	16
19	53	71	86	25	15	14	22	22	28	33	56	189
20	45	34	82	25	15	14	e13	34	21	28	37	75
21	40	28	65	25	15	14	e12	26	16	35	33	35
22	36	25	105	24	15	14	e12	21	14	47	28	33
23	33	24	209	23	15	13	46	19	13	45	25	28
24	32	22	107	23	15	13	18	20	13	52	23	40
25	39	40	287	22	22	13	15	18	13	67	34	32
26	34	45	457	22	18	13	14	18	17	48	23	29
27	37	42	141	21	15	13	30	17	14	38	21	25
28	29	33	190	21	15	13	18	17	21	45	20	25
29	27	25	293	20	---	13	16	16	16	47	19	22
30	26	30	456	19	---	13	17	16	14	37	18	41
31	26	---	143	19	---	13	---	14	---	29	30	---
TOTAL	1657	923	4835	1181	494	473	518	751	462	824	846	915
MEAN	53.5	30.8	156	38.1	17.6	15.3	17.3	24.2	15.4	26.6	27.3	30.5
MAX	336	98	614	102	31	36	46	100	33	67	75	189
MIN	18	20	34	19	15	13	12	14	12	13	18	15
AC-FT	3290	1830	9590	2340	980	938	1030	1490	916	1630	1680	1810

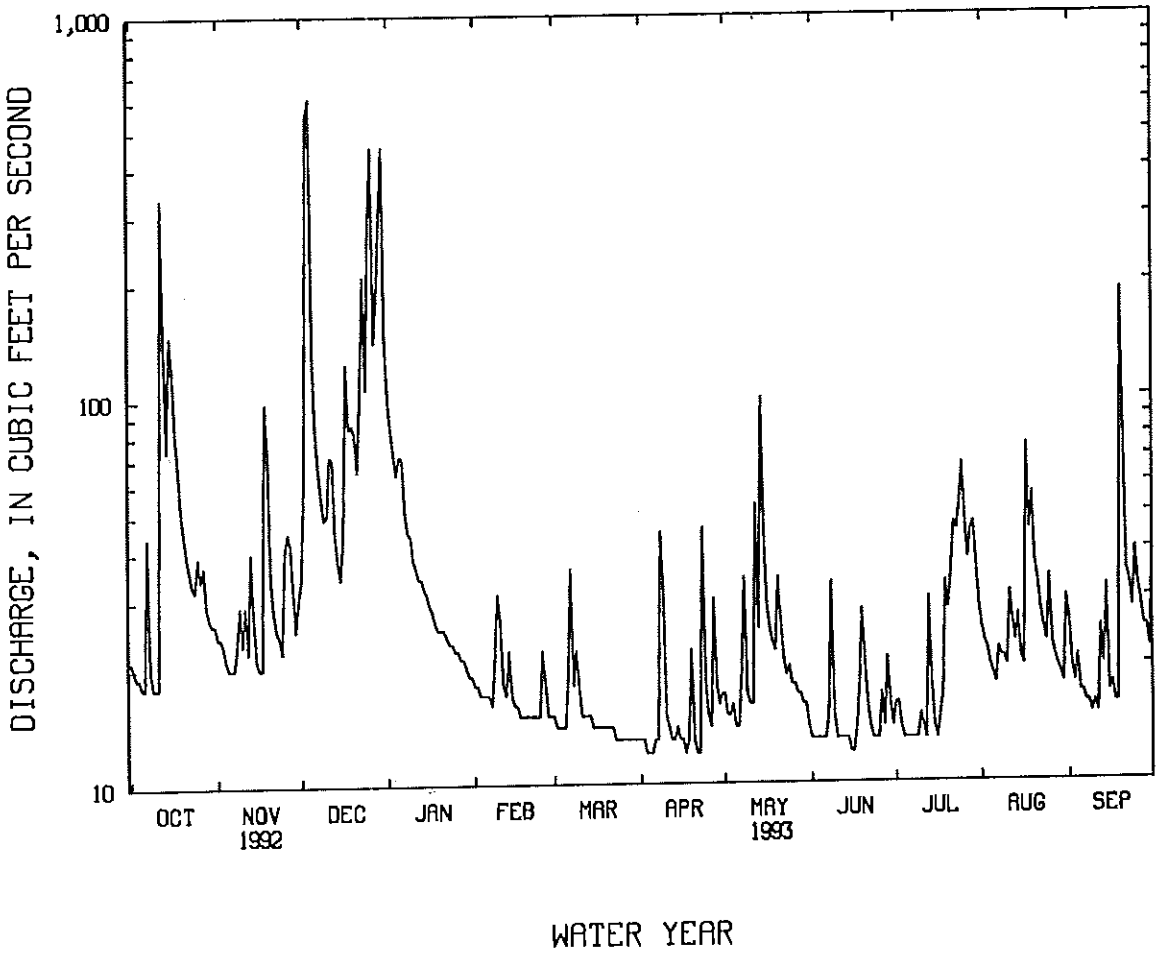
e Estimated

16068000 EAST BRANCH OF NORTH FORK WAILUA RIVER NEAR LIHUE--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1912 - 1993, BY WATER YEAR (WY)

MEAN	40.8	59.9	60.9	60.1	47.2	57.2	57.1	47.7	32.9	38.3	40.5	35.8
MAX	94.6	226	157	392	163	270	173	144	84.9	78.4	111	106
(WY)	1983	1991	1988	1921	1979	1982	1927	1967	1978	1980	1948	1922
MIN	12.4	16.8	12.3	11.0	8.87	11.0	10.6	9.81	13.0	12.3	11.5	11.8
(WY)	1954	1934	1964	1986	1986	1970	1926	1926	1969	1926	1984	1953

SUMMARY STATISTICS	FOR 1992 CALENDAR YEAR		FOR 1993 WATER YEAR		WATER YEARS 1912 - 1993	
ANNUAL TOTAL	14503		13879			
ANNUAL MEAN	39.6		38.0		48.3	
HIGHEST ANNUAL MEAN					95.5	1982
LOWEST ANNUAL MEAN					21.3	1984
HIGHEST DAILY MEAN	614	Dec 4	614	Dec 4	2210	Jan 16 1921
LOWEST DAILY MEAN	12	May 25	12	Apr 3	7.0	Jul 8 1926
ANNUAL SEVEN-DAY MINIMUM	12	May 25	13	Mar 30	8.2	Mar 5 1986
ANNUAL RUNOFF (AC-FT)	28770		27530		35000	
10 PERCENT EXCEEDS	69		70		84	
50 PERCENT EXCEEDS	21		21		31	
90 PERCENT EXCEEDS	14		13		16	



16069000 WAILUA DITCH NEAR KAPAA

LOCATION.--Lat 22°04'34", long 159°24'04", Hydrologic Unit 20070000, on right bank 2,000 ft downstream from Wailua Reservoir, 5.2 mi west of Kapaa, and 7.0 mi north of Lihue.

PERIOD OF RECORD.--November 1936 to current year.

GAGE.--Water-stage recorder. Sharp-crested weir since Feb. 4, 1965. Datum of gage is 462.3 ft above mean sea level (by stadia survey).

REMARKS.--Records good. Ditch diverts water from North Fork Wailua River to reservoir, 2,000 ft upstream and thence to fields for irrigation of sugarcane in vicinity of Kapaa.

AVERAGE DISCHARGE.--56 years (water years 1938-93), 16.0 ft^3/s (11,580 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 63 ft^3/s, June 4, 1937; no flow on many days.

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge, 27 ft^3/s, Sep. 23-27; minimum daily, 7.3 ft^3/s, Mar. 26.

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	e13	12	e11	e11	11	10	7.9	17	e22	21	21	21
2	e13	12	e11	e11	11	10	7.9	17	e22	21	e20	21
3	e12	12	e11	e11	11	9.8	8.3	17	e22	21	e20	21
4	e12	12	e11	e11	10	9.5	8.4	17	22	21	e19	21
5	e12	12	e11	e11	11	9.3	8.4	17	22	21	20	22
6	12	11	e11	e11	11	9.2	8.4	16	21	21	19	22
7	12	11	e11	e11	11	9.1	8.4	16	21	20	20	22
8	12	11	11	e11	11	8.9	8.4	17	21	20	21	22
9	12	e11	11	e11	11	8.9	8.5	17	19	20	22	21
10	12	e11	11	e11	11	8.6	8.7	17	13	19	23	21
11	12	e11	11	e10	10	8.2	8.7	17	21	19	23	22
12	12	e11	11	e10	10	8.1	13	17	21	20	24	22
13	14	e11	11	e10	10	8.1	20	17	21	20	25	23
14	14	e10	11	e10	10	8.4	20	e17	20	19	25	24
15	14	e10	11	e10	10	8.4	20	e18	20	19	25	24
16	14	e10	11	e10	10	8.4	20	e18	20	22	24	24
17	14	e10	11	e10	10	8.4	20	e18	20	21	23	24
18	14	e10	12	e10	10	8.2	19	e18	20	20	22	25
19	14	e10	12	e10	10	8.2	19	e19	21	21	21	25
20	13	e10	12	e10	10	8.2	19	e19	21	20	21	25
21	13	e10	12	e11	10	8.1	19	e19	21	21	21	25
22	13	e10	12	e10	10	7.9	18	e19	21	21	21	26
23	13	e10	e12	e10	10	7.8	15	e19	21	21	21	27
24	12	e10	e12	e10	10	7.8	12	e20	21	22	21	27
25	12	e11	e12	e10	10	7.6	12	e20	21	23	21	27
26	12	e11	e11	10	10	7.3	12	e20	21	22	21	27
27	12	e11	e11	11	10	7.8	15	e20	21	24	21	27
28	12	e11	e11	11	10	8.0	17	e21	21	24	21	26
29	12	e11	e11	11	---	8.2	17	e21	21	24	21	26
30	12	e11	e11	11	---	8.1	17	e21	21	23	21	25
31	12	---	e11	11	---	7.8	---	e21	---	22	21	---
TOTAL	392	324	349	326	289	262.3	416.0	567	620	653	669	715
MEAN	12.6	10.8	11.3	10.5	10.3	8.46	13.9	18.3	20.7	21.1	21.6	23.8
MAX	14	12	12	11	11	10	20	21	22	24	25	27
MIN	12	10	11	10	10	7.3	7.9	16	13	19	19	21
AC-FT	778	643	692	647	573	520	825	1120	1230	1300	1330	1420

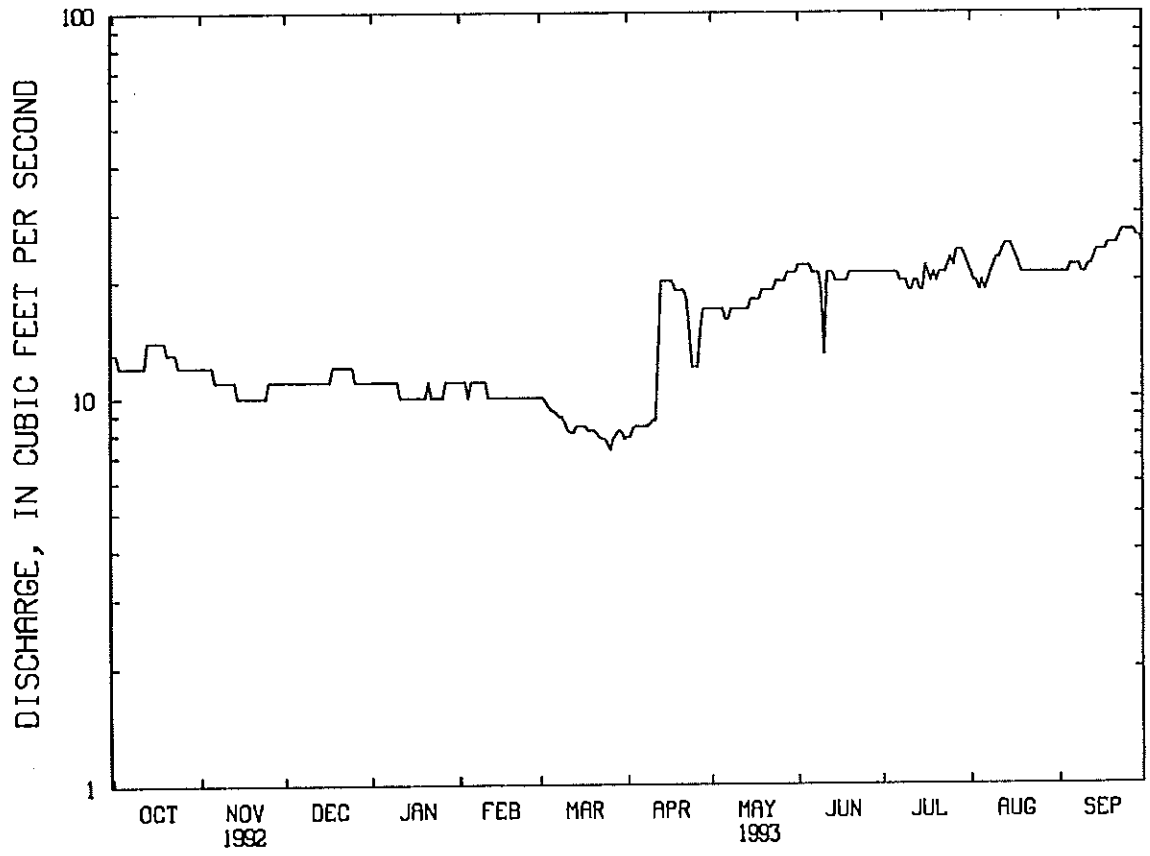
e Estimated

16069000 WAILUA DITCH NEAR KAPAA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1937 - 1993, BY WATER YEAR (WY)

MEAN	18.9	12.0	8.99	10.4	11.7	12.3	13.3	16.5	21.5	22.3	22.1	22.7
MAX	35.2	28.5	33.3	35.3	37.8	27.3	28.8	40.5	40.0	46.5	48.6	53.5
(WY)	1958	1984	1938	1938	1940	1980	1938	1938	1937	1938	1939	1938
MIN	2.80	.19	.009	.20	.071	.41	.90	1.08	7.87	9.72	5.72	3.89
(WY)	1969	1965	1955	1968	1969	1956	1963	1965	1962	1954	1954	1946

SUMMARY STATISTICS	FOR 1992 CALENDAR YEAR		FOR 1993 WATER YEAR		WATER YEARS 1937 - 1993	
ANNUAL TOTAL	5627.00		5582.3			
ANNUAL MEAN	15.4		15.3		16.0	
HIGHEST ANNUAL MEAN					32.9	1938
LOWEST ANNUAL MEAN					6.52	1962
HIGHEST DAILY MEAN	32	Feb 7	27	Sep 23	63	Jun 4 1937
LOWEST DAILY MEAN	.00	Aug 12	7.3	Mar 26	.00	May 15 1940
ANNUAL SEVEN-DAY MINIMUM	.50	Aug 11	7.7	Mar 22	.00	May 15 1940
ANNUAL RUNOFF (AC-FT)	11160		11070		11580	
10 PERCENT EXCEEDS	23		22		31	
50 PERCENT EXCEEDS	14		12		16	
90 PERCENT EXCEEDS	7.4		9.2		.80	



16071000 NORTH FORK WAILUA RIVER NEAR KAPAA

LOCATION.--Lat 22°03'08", long 159°22'22", Hydrologic Unit 20070000, on right bank 1.1 mi upstream from confluence with South Fork, 3.7 mi southwest of Kapaa, and 5.0 mi north of Lihue.

DRAINAGE AREA.--17.9 mi^2.

PERIOD OF RECORD.--July 1952 to current year.

REVISED RECORDS.--WSP 2137: Drainage area. WDR HI-75-1: 1974.

GAGE.--Water-stage recorder. Elevation of gage is 18 ft, from topographic map.

REMARKS.--Records good except for periods of no gage height record which is poor. Wailua ditch (station 16069000) diverts upstream for irrigation of sugarcane in vicinities of Kapaa and Wailua.

AVERAGE DISCHARGE.--41 years, 122 ft^3/s (88,660 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 53,200 ft^3/s, Nov. 12, 1955, gage height, 19.88 ft in gage well, 20.8 ft, from floodmarks, from rating curve extended above 3,700 ft^3/s on basis of slope-area measurement of peak flow; minimum, 2.1 ft^3/s, Oct. 28, 1953.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 4,100 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Dec. 3	2300	*11,550	*10.90	No other peak greater than base discharge.			

Minimum discharge, 6.8 ft^3/s, June 25, July 10.

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	55	74	110	392	e75	35	15	11	18	15	74	52
2	53	74	208	327	e32	37	14	8.6	17	9.4	70	29
3	54	68	1030	287	30	34	e12	8.1	17	7.7	71	16
4	66	64	2100	202	30	35	e12	15	14	7.1	44	27
5	50	62	599	180	31	35	e10	9.5	13	7.1	34	9.0
6	82	61	e268	212	30	47	e9.5	8.5	8.1	7.1	51	7.3
7	123	68	e159	168	29	89	8.9	23	13	7.0	44	7.3
8	60	75	e121	152	39	39	58	55	83	12	26	7.2
9	51	89	e107	187	83	46	59	13	15	7.9	29	7.3
10	49	56	e121	123	92	40	15	9.8	8.7	7.1	13	7.4
11	48	66	227	114	48	27	9.8	12	7.4	7.0	38	7.5
12	885	53	209	110	42	25	9.9	66	11	7.1	31	33
13	373	81	129	127	45	24	10	40	11	37	39	25
14	196	63	107	132	39	24	9.1	166	11	24	65	59
15	349	47	96	130	36	25	10	85	8.8	17	52	16
16	280	40	102	124	36	39	9.7	36	7.2	8.9	50	13
17	179	40	351	121	36	35	9.3	31	9.8	28	194	13
18	149	240	194	117	35	17	8.7	41	23	24	146	14
19	119	237	215	115	35	15	37	37	39	64	316	221
20	105	77	223	114	35	15	11	55	16	46	104	116
21	97	61	160	121	34	17	8.6	52	9.7	64	74	51
22	90	53	302	111	34	18	8.2	36	7.3	140	59	33
23	86	50	567	109	34	24	56	31	7.0	123	51	45
24	88	45	294	110	44	24	17	39	6.9	156	45	51
25	112	81	756	112	64	24	9.9	32	9.5	185	64	49
26	93	111	1460	101	60	20	8.8	28	9.1	125	35	42
27	95	85	480	78	37	15	36	25	11	96	29	34
28	68	71	559	77	34	16	20	20	31	98	26	48
29	73	58	1030	93	---	24	9.9	19	14	121	25	35
30	80	77	1410	83	---	17	9.1	18	8.0	111	23	88
31	87	---	542	85	---	15	---	18	---	82	39	---
TOTAL	4295	2327	14236	4514	1199	897	521.4	1048.5	464.5	1651.4	1961	1163.0
MEAN	139	77.6	459	146	42.8	28.9	17.4	33.8	15.5	53.3	63.3	38.8
MAX	885	240	2100	392	92	89	59	166	83	185	316	221
MIN	48	40	96	77	29	15	8.2	8.1	6.9	7.0	13	7.2
AC-FT	8520	4620	28240	8950	2380	1780	1030	2080	921	3280	3890	2310

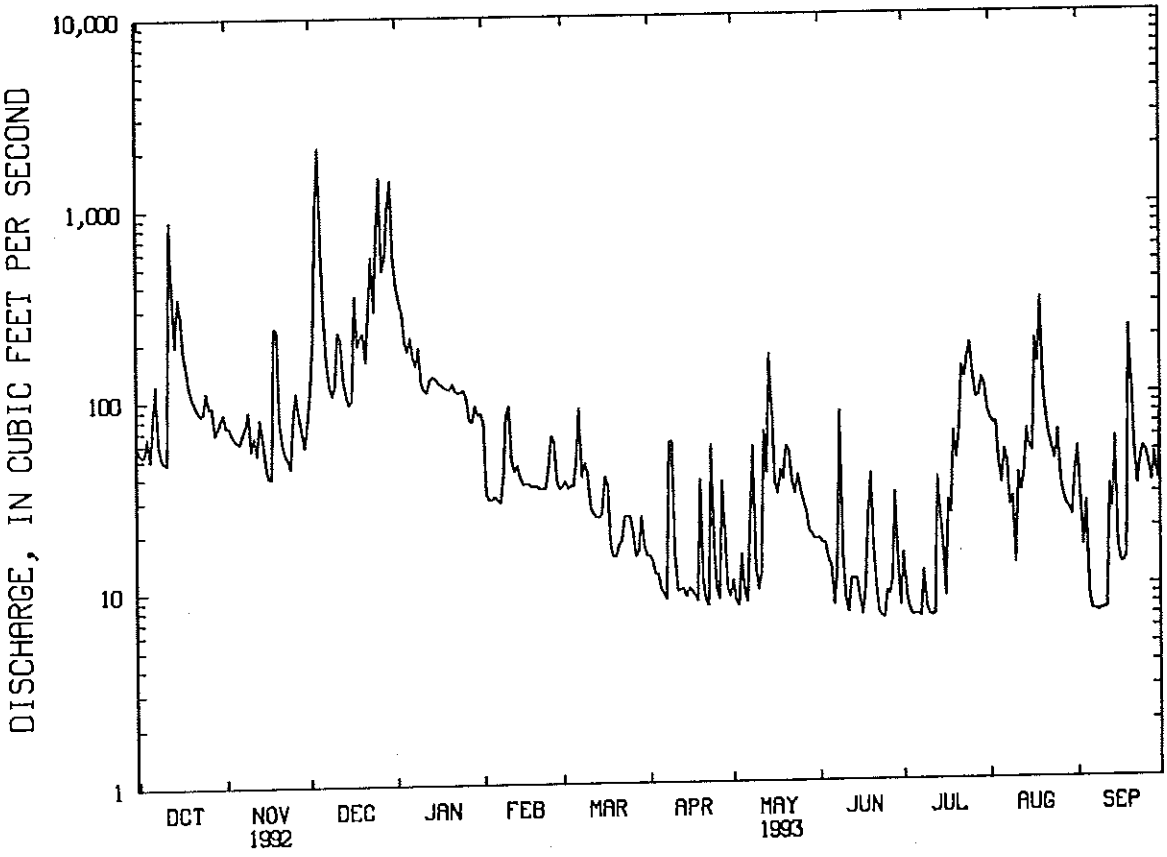
e Estimated

16071000 NORTH FORK WAILUA RIVER NEAR KAPAA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1952 - 1993, BY WATER YEAR (WY)

MEAN	95.8	185	174	153	132	150	155	123	61.6	89.1	90.5	57.5
MAX	255	591	459	529	522	730	474	418	247	230	223	161
(WY)	1983	1991	1993	1956	1979	1982	1971	1967	1980	1980	1958	1982
MIN	2.54	19.1	7.74	6.90	4.43	4.76	15.0	11.8	5.78	5.22	5.80	3.17
(WY)	1954	1977	1984	1986	1978	1978	1966	1992	1957	1953	1984	1953

SUMMARY STATISTICS	FOR 1992 CALENDAR YEAR		FOR 1993 WATER YEAR		WATER YEARS 1952 - 1993	
ANNUAL TOTAL	34975.5		34277.8			
ANNUAL MEAN	95.6		93.9		122	
HIGHEST ANNUAL MEAN					262	1982
LOWEST ANNUAL MEAN					25.7	1984
HIGHEST DAILY MEAN	2100	Dec 4	2100	Dec 4	7350	Jan 25 1956
LOWEST DAILY MEAN	7.5	Jun 26	6.9	Jun 24	2.2	Oct 21 1953
ANNUAL SEVEN-DAY MINIMUM	8.1	Jun 23	7.6	Sep 5	2.4	Oct 20 1953
ANNUAL RUNOFF (AC-FT)	69370		67990		88660	
10 PERCENT EXCEEDS	190		190		259	
50 PERCENT EXCEEDS	40		44		67	
90 PERCENT EXCEEDS	9.0		9.1		8.0	



16071500 LEFT BRANCH OPAEKAA STREAM NEAR KAPAA

LOCATION.--Lat 22°04'44", long 159°23'55", Hydrologic Unit 20070000, on left bank 0.4 mi upstream from mouth, 0.6 mi northeast of Wailua Reservoir, and 4.9 mi west of Kapaa.

DRAINAGE AREA.--0.65 mi^2.

PERIOD OF RECORD.--May 1960 to current year. Prior to July 1960, published as Left Branch Opaikaa Stream near Kapaa.

REVISED RECORDS.--WSP 2137: Drainage area.

GAGE.--Water-stage recorder and concrete control. Datum of gage is 458.4 ft above mean sea level (by stadia survey).

REMARKS.--Records good. No diversion upstream. Recording rain gage located at station.

AVERAGE DISCHARGE.--33 years, 2.66 ft^3/s (1,930 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,060 ft^3/s, Dec. 14, 1991, gage height, 6.60 ft, from rating curve extended above 415 ft^3/s on basis of slope-area measurement at gage height 5.01 ft; minimum, 0.09 ft^3/s, Sept. 27-30, 1968.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 70 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Oct. 12	1930	86	2.46	Dec. 25	2100	82	2.42
Dec. 3	2300	*324	*3.97	Dec. 29	2230	86	2.46

Minimum discharge, 0.52 ft^3/s, Jul. 3, 4, 6-9, 12.

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

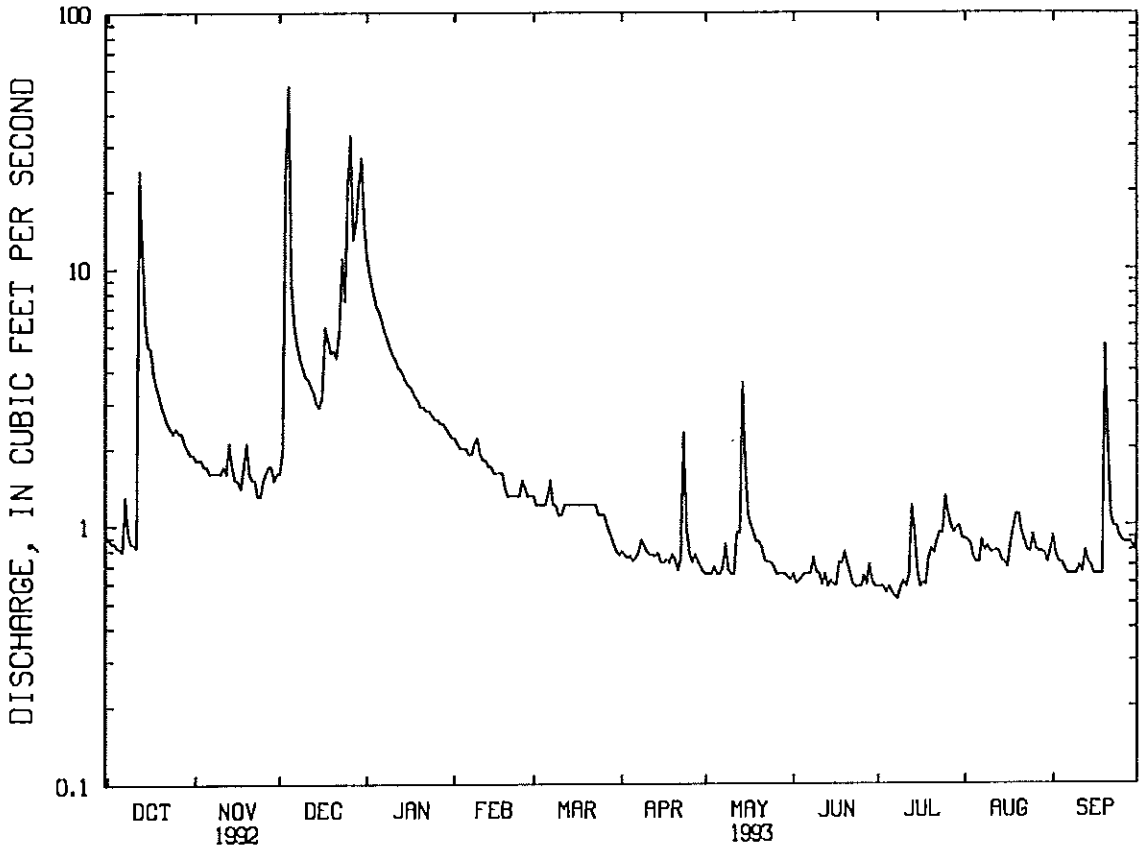
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.89	1.8	1.6	11	2.2	1.3	.79	.65	.65	.58	.89	.91
2	.86	1.8	2.0	9.4	2.1	1.2	.77	.65	.60	.58	.87	.77
3	.86	1.8	24	8.2	2.0	1.2	.75	.65	.61	.58	.85	.72
4	.83	1.7	52	7.2	2.0	1.2	.76	.69	.63	.55	.75	.72
5	.82	1.7	8.7	6.8	2.0	1.2	.73	.65	.65	.58	.72	.68
6	.80	1.6	6.1	6.3	1.9	1.3	.75	.65	.65	.55	.72	.65
7	1.3	1.6	5.1	5.7	1.9	1.5	.79	.69	.65	.53	.88	.65
8	.95	1.6	4.5	5.3	2.1	1.2	.88	.85	.75	.52	.80	.65
9	.86	1.6	4.1	4.9	2.2	1.2	.84	.67	.66	.57	.83	.65
10	.85	1.6	3.8	4.6	1.9	1.1	.79	.65	.65	.61	.79	.70
11	.83	1.7	3.7	4.4	1.8	1.1	.77	.65	.59	.58	.79	.66
12	24	1.6	3.5	4.1	1.8	1.2	.77	.94	.65	.64	.80	.80
13	12	2.1	3.3	4.0	1.7	1.2	.76	.93	.58	1.2	.79	.72
14	6.4	1.7	3.0	3.8	1.7	1.2	.78	3.6	.61	.96	.73	.70
15	5.0	1.5	2.9	3.6	1.6	1.2	.72	1.7	.59	.67	.72	.65
16	4.9	1.5	3.2	3.5	1.6	1.2	.72	1.1	.59	.58	.69	.65
17	3.9	1.4	5.9	3.4	1.6	1.2	.74	1.0	.72	.60	.84	.65
18	3.5	1.7	5.3	3.2	1.6	1.2	.72	.93	.71	.59	.97	.65
19	3.2	2.1	4.7	3.1	1.4	1.2	.77	.86	.79	.74	1.1	5.0
20	2.9	1.6	4.8	2.9	1.3	1.2	.74	.87	.71	.81	1.1	2.1
21	2.7	1.5	4.5	2.9	1.3	1.2	.67	.81	.65	.78	.94	1.1
22	2.5	1.5	5.8	2.8	1.3	1.2	.75	.73	.59	.87	.87	.99
23	2.4	1.3	11	2.8	1.3	1.2	2.3	.72	.58	.94	.80	.99
24	2.3	1.3	7.5	2.7	1.3	1.1	.98	.72	.58	.93	.79	.90
25	2.4	1.5	21	2.6	1.5	1.1	.79	.69	.58	1.3	.92	.87
26	2.3	1.6	33	2.6	1.4	1.1	.72	.65	.64	1.1	.81	.86
27	2.3	1.7	13	2.5	1.3	1.0	.77	.65	.59	1.0	.79	.86
28	2.1	1.7	15	2.5	1.3	.93	.73	.65	.71	.94	.79	.86
29	2.0	1.5	21	2.4	---	.86	.69	.65	.61	.98	.78	.80
30	1.9	1.6	27	2.3	---	.80	.66	.63	.58	.99	.72	.93
31	1.9	---	15	2.2	---	.77	---	.62	---	.89	.80	---
TOTAL	100.45	48.9	326.0	133.7	47.1	35.56	24.40	26.90	19.15	23.74	25.64	28.84
MEAN	3.24	1.63	10.5	4.31	1.68	1.15	.81	.87	.64	.77	.83	.96
MAX	24	2.1	52	11	2.2	1.5	2.3	3.6	.79	1.3	1.1	5.0
MIN	.80	1.3	1.6	2.2	1.3	.77	.66	.62	.58	.52	.69	.65
AC-FT	199	97	647	265	93	71	48	53	38	47	51	57

16071500 LEFT BRANCH OPAEKAA STREAM NEAR KAPAA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1960 - 1993, BY WATER YEAR (WY)

MEAN	2.24	3.85	4.06	3.28	2.44	2.92	3.34	2.92	1.88	1.70	1.69	1.53
MAX	8.29	14.3	11.0	12.4	7.93	14.7	11.8	9.66	5.68	3.80	4.24	4.67
(WY)	1961	1966	1992	1989	1979	1982	1982	1965	1980	1989	1982	1980
MIN	.42	.59	.56	.58	.50	.50	.81	.62	.29	.59	.36	.38
(WY)	1985	1964	1963	1977	1986	1978	1993	1966	1968	1968	1984	1975

SUMMARY STATISTICS	FOR 1992 CALENDAR YEAR		FOR 1993 WATER YEAR		WATER YEARS 1960 - 1993		
ANNUAL TOTAL	803.90		840.38				
ANNUAL MEAN	2.20		2.30		2.66		
HIGHEST ANNUAL MEAN					5.72		1982
LOWEST ANNUAL MEAN					.92		1984
HIGHEST DAILY MEAN	52	Dec 4	52	Dec 4	218	Dec 14	1991
LOWEST DAILY MEAN	.46	Aug 3	.52	Jul 8	.09	Sep 28	1968
ANNUAL SEVEN-DAY MINIMUM	.49	Jul 31	.55	Jul 3	.10	Jun 6	1968
ANNUAL RUNOFF (AC-FT)	1590		1670		1930		
10 PERCENT EXCEEDS	3.2		4.5		4.6		
50 PERCENT EXCEEDS	1.3		.99		1.7		
90 PERCENT EXCEEDS	.58		.65		.67		



16077000 MAKALEHA DITCH NEAR KEALIA

LOCATION.--Lat 22°07'06", long 159°22'04", Hydrologic Unit 20070000, on left bank at end of last tunnel from which flow enters Mimino Reservoir, 3.9 mi northwest of Kealia, and 4.0 mi northwest of Kapaa.

PERIOD OF RECORD.--December 1936 to current year.

GAGE.--Water-stage recorder and Parshall flume. Datum of gage is 518 ft above mean sea level (by stadia survey).

REMARKS.--Ditch diverts from Makaleha Stream for irrigation of sugarcane in vicinity of Kealia.

AVERAGE DISCHARGE.--56 years (water years 1938-93), 6.43 ft^3/s (4,660 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 31 ft^3/s, Aug. 1, 1961, June 30, 1982; no flow at times.

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge, 5.0 ft^3/s, Dec. 4; minimum daily, no flow on many days.

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	.02	.02	.02	.19	.00	.05	.05	.05	.00	.02	.02	.02
2	.02	.02	.03	.17	.00	.05	.04	.05	.00	.02	.01	.02
3	.02	.02	1.8	.14	.02	.05	.05	.05	.00	.02	.00	.02
4	.00	.02	5.0	.14	.02	.07	.04	.05	.00	.02	.00	.00
5	.00	.02	.27	.14	.02	.06	.04	.05	.00	.01	.00	.00
6	.00	.02	.10	.12	.02	.06	.02	.05	.00	.00	.00	.00
7	.02	.02	.07	.11	.02	.07	.03	.05	.00	.00	.00	.00
8	.01	.01	.05	.08	.02	.07	.02	.05	.00	.00	.02	.00
9	.01	.01	.05	.08	.02	.05	.04	.05	e.00	.00	.00	.00
10	.02	.00	.05	.08	.02	.07	.03	.05	e.00	.00	.00	.00
11	.00	.01	.05	.07	.02	.05	.02	.05	e.00	.01	.00	.00
12	2.2	.00	.05	.05	.01	.06	.02	.06	e.00	.02	.00	.00
13	.62	.01	.05	.05	.00	.06	.04	.06	.00	.02	.00	.00
14	.25	.00	.04	.05	.00	.03	.04	.28	.00	.02	.00	.00
15	.09	.00	.02	.05	.00	.02	.04	.08	.00	.02	.01	.00
16	.14	.00	.03	.05	.00	.02	.05	.03	.01	.02	.02	.00
17	.11	.00	.13	.05	.00	.02	.05	.02	.02	.02	.04	.00
18	.08	.00	.08	.05	.01	.02	.04	.02	.01	.02	.04	.00
19	.05	.00	.08	.05	.01	.02	.05	.01	.01	.02	.03	.01
20	.05	.00	.08	.05	.02	.02	.05	.00	.02	.02	.03	.00
21	.05	.00	.06	.05	.02	.02	.05	.04	.02	.02	.01	.00
22	.03	.00	.07	.05	.00	.02	.05	.05	.02	.02	.00	.08
23	.02	.00	.08	.04	.00	.01	.06	.04	.02	.04	.00	.04
24	.02	.00	.11	.02	.01	.00	.08	.02	.02	.02	.00	.01
25	.02	.00	.64	.01	.02	.02	.05	.02	.02	.02	.02	.00
26	.02	.02	1.4	.00	.02	.02	.05	.02	.02	.02	.02	.00
27	.02	.02	.41	.00	.02	.02	.05	.02	.02	.00	.02	.00
28	.02	.02	.23	.00	.04	.02	.05	.02	.02	.00	.02	.00
29	.02	.02	.46	.00	---	.02	.05	.02	.02	.01	.02	.00
30	.02	.02	1.1	.00	---	.02	.05	.02	.02	.00	.00	.00
31	.02	---	.36	.01	---	.04	---	.00	---	.01	.00	---
TOTAL	3.97	0.28	12.97	1.95	0.36	1.13	1.30	1.38	0.27	0.44	0.33	0.20
MEAN	.13	.009	.42	.063	.013	.036	.043	.045	.009	.014	.011	.007
MAX	2.2	.02	5.0	.19	.04	.07	.08	.28	.02	.04	.04	.08
MIN	.00	.00	.02	.00	.00	.00	.02	.00	.00	.00	.00	.00
AC-FT	7.9	.6	26	3.9	.7	2.2	2.6	2.7	.5	.9	.7	.4

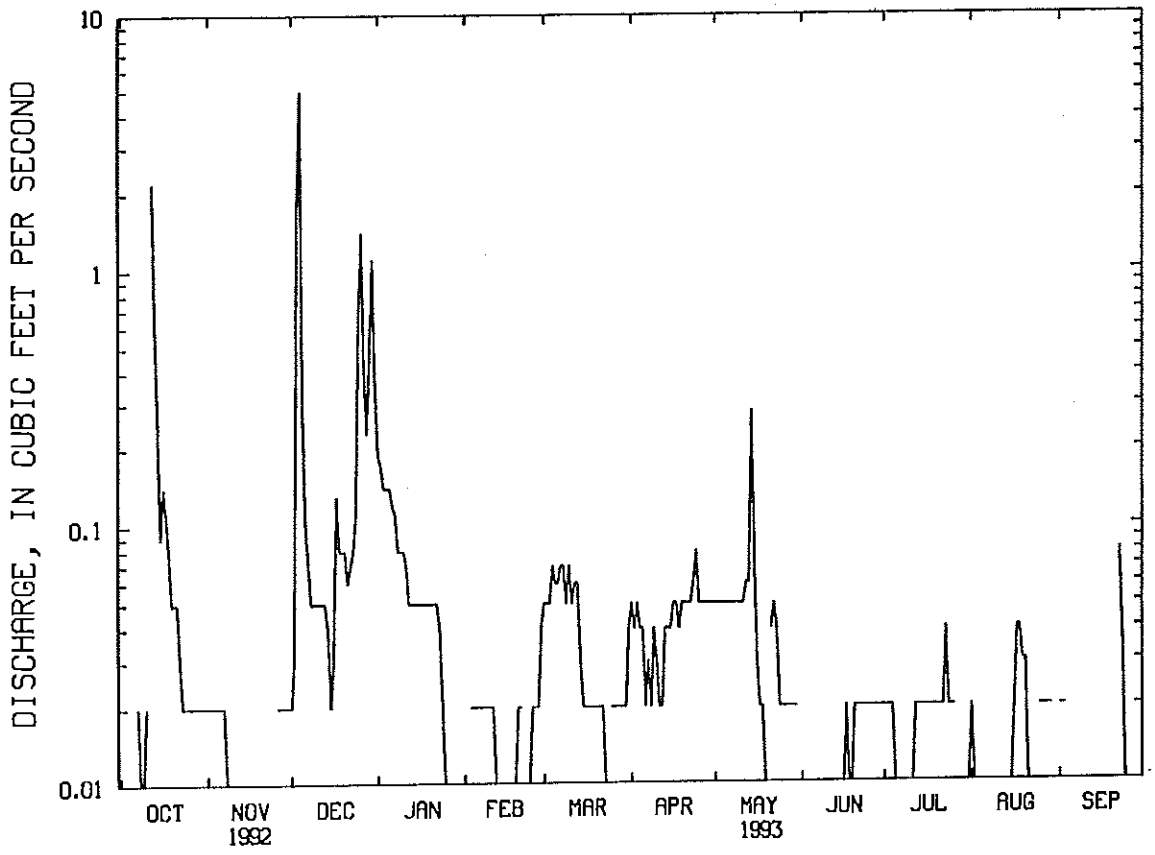
e Estimated

16077000 MAKALEHA DITCH NEAR KEALIA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1937 - 1993, BY WATER YEAR (WY)

MEAN	8.18	5.15	3.52	3.52	4.46	4.69	5.46	6.55	8.54	9.15	8.95	8.51
MAX	13.7	11.8	10.1	9.48	12.7	13.0	15.7	17.1	16.8	17.1	16.4	14.0
(WY)	1984	1954	1939	1983	1961	1961	1960	1956	1956	1958	1955	1969
MIN	.12	.009	.052	.044	.013	.028	.027	.030	.009	.006	.011	.007
(WY)	1947	1993	1966	1992	1993	1992	1992	1992	1993	1992	1993	1993

SUMMARY STATISTICS	FOR 1992 CALENDAR YEAR		FOR 1993 WATER YEAR		WATER YEARS 1937 - 1993		
ANNUAL TOTAL	28.46		24.58				
ANNUAL MEAN	.078		.067		6.43		
HIGHEST ANNUAL MEAN					10.0		1961
LOWEST ANNUAL MEAN					.067		1993
HIGHEST DAILY MEAN	5.0	Dec 4	5.0	Dec 4	31	Aug 1	1961
LOWEST DAILY MEAN	.00	Jan 26	.00	Oct 4	.00	Jan 11	1958
ANNUAL SEVEN-DAY MINIMUM	.00	Jan 26	.00	Nov 14	.00	Dec 6	1959
ANNUAL RUNOFF (AC-FT)	56		49		4660		
10 PERCENT EXCEEDS	.10		.08		13		
50 PERCENT EXCEEDS	.02		.02		6.8		
90 PERCENT EXCEEDS	.00		.00		.12		



16079000 KAPAHI DITCH NEAR KEALIA

LOCATION.--Lat 22°06'09", long 159°22'28", Hydrologic Unit 20070000, on right bank 500 ft downstream from intake and 4.0 mi west of Kealia.

PERIOD OF RECORD.--April 1909 to February 1911, May 1911, July 1911 to May 1914, July 1915 to April 1917, June 1917 to current year. Published as "at Kapahi, near Kapaa" prior to January 1914 and as "at Kapahi, near Kealia" January to December 1913.

GAGE.--Water-stage recorder and Parshall flume. Datum of gage is 377.1 ft above mean sea level (by stadia survey). Prior to Nov. 26, 1936, at site 61 ft upstream at datum 2.52 ft higher.

REMARKS.--Records good. Ditch diverts from Kapaa Stream for irrigation of sugarcane in vicinity of Kapaa.

AVERAGE DISCHARGE.--75 years (water years 1918-20, 1922-93), 6.20 ft^3/s (4,490 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 138 ft^3/s, Feb. 6, 1913; no flow at times.

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge, 21 ft^3/s, May 20, Jul. 21; minimum daily, no flow on Jan. 3, Jan. 22-28.

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

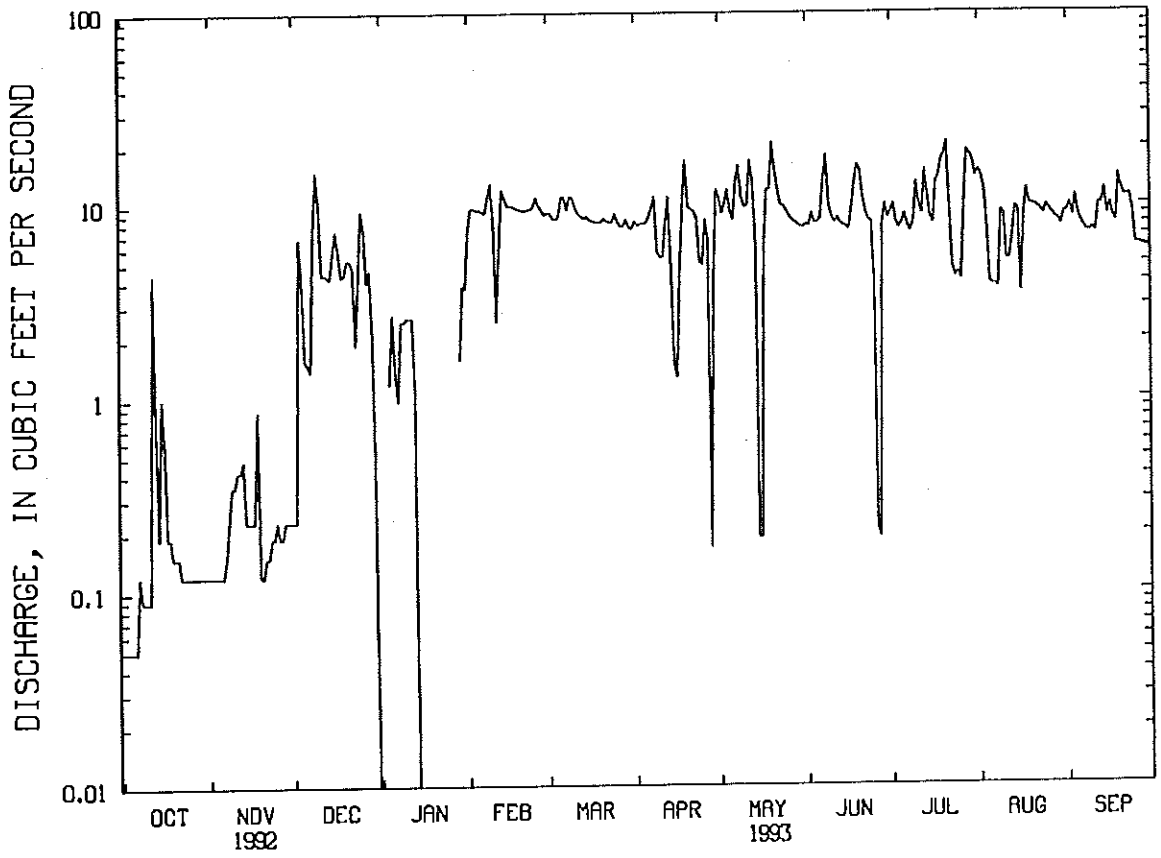
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.05	.12	.23	.01	7.5	9.1	8.2	11	7.9	9.1	15	9.1
2	.05	.12	.23	.01	9.6	9.1	7.9	9.1	7.8	10	14	10
3	.05	.12	6.7	.00	9.6	8.6	8.0	10	9.0	8.1	12	8.7
4	.05	.12	4.4	1.2	9.5	8.5	8.0	12	8.1	7.6	7.6	11
5	.05	.12	1.6	2.7	9.5	8.8	8.1	9.3	8.1	8.0	3.9	8.8
6	.05	.12	1.5	1.4	9.3	11	8.7	8.4	8.5	8.9	3.8	8.1
7	.12	.15	1.4	.98	9.2	11	9.6	13	13	7.8	3.8	7.6
8	.09	.23	6.9	2.5	11	9.5	11	16	18	7.3	3.7	7.2
9	.09	.35	15	2.5	13	11	5.7	11	10	8.1	9.2	7.2
10	.09	.35	10	2.6	7.9	11	5.4	9.8	8.6	13	8.9	7.4
11	.09	.42	4.4	2.6	2.5	9.8	5.4	10	8.1	10	5.2	7.2
12	4.4	.42	4.4	2.6	6.0	9.1	8.1	17	8.5	9.0	5.2	10
13	.69	.48	4.3	1.1	12	8.8	11	13	8.0	15	6.8	10
14	.19	.23	4.2	.01	11	8.6	4.7	6.2	7.8	11	9.6	12
15	1.0	.23	5.6	.01	10	8.7	1.5	.19	7.7	8.6	9.4	8.8
16	.59	.23	7.4	.01	10	8.4	1.3	.19	7.5	8.0	3.5	10
17	.19	.23	5.8	.01	9.9	8.3	4.4	6.3	9.6	13	8.9	8.6
18	.19	.87	4.3	.01	9.7	8.2	9.9	12	13	14	12	8.1
19	.15	.12	4.4	.01	9.6	8.2	17	12	16	17	10	14
20	.15	.12	5.2	.01	9.5	8.2	9.8	21	15	18	9.9	12
21	.15	.15	5.2	.01	9.4	8.5	9.5	15	11	21	9.8	11
22	.12	.15	4.8	.00	9.5	8.3	9.2	12	9.1	9.6	9.6	11
23	.12	.19	1.9	.00	9.6	8.2	8.5	10	8.3	4.7	9.2	11
24	.12	.19	4.1	.00	9.8	8.2	5.1	9.8	8.1	4.2	8.9	9.2
25	.12	.23	9.4	.00	11	9.0	4.9	9.3	4.0	4.4	9.8	6.2
26	.12	.19	7.7	.00	10	8.2	8.4	8.7	.21	4.1	9.3	6.2
27	.12	.19	4.0	.00	9.5	7.8	6.7	8.3	.19	9.8	8.9	6.1
28	.12	.23	4.6	.00	9.0	7.8	.17	8.1	8.0	19	8.5	6.1
29	.12	.23	2.2	1.6	---	8.4	4.2	7.9	10	18	8.3	5.9
30	.12	.23	.48	3.8	---	7.7	12	7.7	8.6	17	7.8	6.3
31	.12	---	.01	3.7	---	7.6	---	7.7	---	14	9.0	---
TOTAL	9.68	7.13	142.35	29.38	264.1	273.6	222.37	311.98	267.70	337.3	261.5	264.8
MEAN	.31	.24	4.59	.95	9.43	8.83	7.41	10.1	8.92	10.9	8.44	8.83
MAX	4.4	.87	15	3.8	13	11	17	21	18	21	15	14
MIN	.05	.12	.01	.00	2.5	7.6	.17	.19	.19	4.1	3.5	5.9
AC-FT	19	14	282	58	524	543	441	619	531	669	519	525

16079000 KAPAHI DITCH NEAR KEALIA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1918 - 1993, BY WATER YEAR (WY)

MEAN	5.98	5.03	4.53	4.33	4.85	5.60	6.45	7.69	7.57	8.32	8.58	7.10
MAX	26.0	21.8	27.5	22.9	19.4	22.6	21.2	28.0	26.1	33.6	30.0	25.8
(WY)	1919	1919	1922	1918	1919	1919	1922	1918	1918	1918	1918	1920
MIN	.27	.044	.073	.012	.042	.22	.27	.32	1.57	1.66	2.11	.72
(WY)	1961	1952	1949	1943	1956	1968	1945	1965	1962	1987	1987	1946

SUMMARY STATISTICS	FOR 1992 CALENDAR YEAR		FOR 1993 WATER YEAR		WATER YEARS 1918 - 1993	
ANNUAL TOTAL	2460.25		2391.89			
ANNUAL MEAN	6.72		6.55		6.20	
HIGHEST ANNUAL MEAN					21.0	1918
LOWEST ANNUAL MEAN					2.23	1965
HIGHEST DAILY MEAN	20	May 12	21	May 20	94	Oct 25 1926
LOWEST DAILY MEAN	.01	Dec 31	.00	Jan 3	.00	Jun 4 1922
ANNUAL SEVEN-DAY MINIMUM	.04	Sep 15	.00	Jan 22	.00	Nov 13 1925
ANNUAL RUNOFF (AC-FT)	4880		4740		4490	
10 PERCENT EXCEEDS	13		12		15	
50 PERCENT EXCEEDS	8.4		7.9		4.5	
90 PERCENT EXCEEDS	.12		.12		.25	



16088000 ANAHOLA DITCH ABOVE KANEHA RESERVOIR, NEAR KEALIA

LOCATION.--Lat 22°08'10", long 159°22'28", Hydrologic Unit 20070000, on left bank at point of discharge into Kaneha Reservoir, 500 ft below wasteway gates, and 4.8 mi northwest of Kealia.

PERIOD OF RECORD.--December 1921 to current year. Records for May 1915 to December 1921 at site 520 ft upstream not equivalent owing to intervening diversion.

GAGE.--Water-stage recorder and Parshall flume. Datum of gage is 821.8 ft above mean sea level (Lihue Plantation bench mark). Dec. 9, 1921, to June 2, 1934, at site 480 ft upstream at different datum.

REMARKS.--Records good. Ditch diverts water from Anahola Stream to Kaneha Reservoir, where it is stored for irrigation. Floods sometimes diverted upstream by Anahola ditch wasteway.

AVERAGE DISCHARGE.--69 years (water years, 1923-25, 1928-93), 4.23 ft^3/s (3,070 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 62 ft^3/s, Nov. 12, 1947; no flow at times.

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge, 8.7 ft^3/s, Dec. 4; minimum daily, no flow for many days.

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

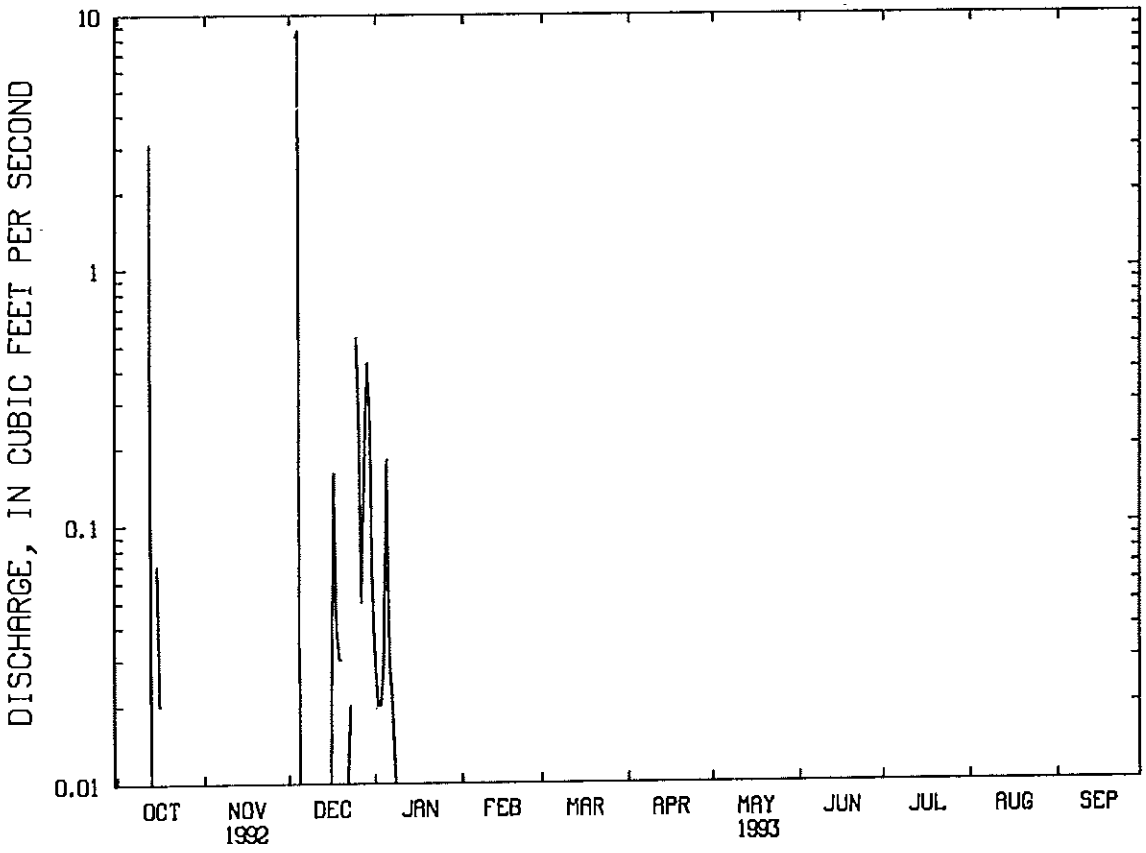
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.01	.00	.03	.00	.00	.00	.00	.00	.00	.00	.00
2	.00	.00	.00	.02	.00	.00	.00	.00	.00	.00	.00	.00
3	.00	.00	8.2	.02	.00	.00	.00	.00	.00	.00	.00	.00
4	.00	.00	8.7	.03	.00	.00	.00	.00	.00	.00	.00	.00
5	.00	.00	.01	.18	.00	.00	.00	.00	.00	.00	.00	.00
6	.00	.00	.00	.03	.00	.00	.00	.00	.00	.00	.00	.00
7	.01	.00	.00	.02	.00	.00	.00	.00	.00	.00	.00	.00
8	.00	.00	.00	.01	.09	.00	.00	.00	.00	.00	.00	.00
9	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
10	.00	.00	.01	.00	.00	.00	.00	.00	.00	.00	.00	.00
11	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
12	3.1	.00	.00	.00	.00	.00	.00	.00	.00	.01	.01	.00
13	.01	.03	.00	.00	.07	.00	.00	.00	.00	.00	.00	.00
14	.00	.00	.00	.00	.00	.00	.00	.27	.00	.00	.00	.00
15	.07	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
16	.02	.00	.01	.00	.00	.00	.00	.00	.00	.00	.00	.00
17	.00	.00	.16	.00	.00	.00	.00	.00	.00	.00	.10	.00
18	.00	.03	.04	.00	.00	.00	.00	.00	.00	.00	.00	.00
19	.00	.00	.03	.00	.00	.00	.00	.00	.00	.00	.04	.02
20	.00	.00	.03	.00	.00	.00	.00	.00	.00	.02	.00	.00
21	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	---
22	.00	.00	.01	.00	.00	.00	.00	.00	.00	.00	.00	.04
23	.00	.00	.02	.00	.00	.00	.02	.00	.00	.07	.00	.00
24	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
25	.00	.00	.54	.00	.00	.00	.00	.00	.00	.00	.01	.00
26	.00	.00	.26	.00	.00	.00	.00	.00	.00	.00	.00	.00
27	.00	.10	.05	.00	.00	.00	.00	.00	.00	.00	.00	.00
28	.00	.00	.17	.00	.00	.00	.00	.00	.00	.00	.00	.00
29	.00	.00	.43	.00	---	.00	.00	.00	.00	.00	.00	.00
30	.00	.00	.28	.00	---	.00	.00	.00	.00	.00	.00	.00
31	.00	---	.06	.00	---	.00	---	.00	---	.00	.00	---
TOTAL	3.21	0.17	19.01	0.34	0.16	0.00	0.02	0.27	0.00	0.10	0.16	---
MEAN	.10	.006	.61	.011	.006	.000	.001	.009	.000	.003	.005	---
MAX	3.1	.10	8.7	.18	.09	.00	.02	.27	.00	.07	.10	---
MIN	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	---
AC-FT	6.4	.3	38	.7	.3	.00	.04	.5	.00	.2	.3	---

16088000 ANAHOLA DITCH ABOVE KANEHA RESERVOIR, NEAR KEALIA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1937 - 1993, BY WATER YEAR (WY)

MEAN	4.70	3.64	2.38	2.18	3.17	3.64	4.57	5.07	4.86	6.37	5.44	4.80
MAX	12.1	9.93	7.96	10.8	16.1	11.1	12.5	11.1	11.5	11.4	11.8	10.0
(WY)	1987	1950	1987	1975	1989	1986	1986	1986	1952	1969	1951	1941
MIN	.011	.004	.002	.004	.004	.000	.001	.009	.000	.003	.005	.002
(WY)	1992	1992	1961	1992	1969	1993	1993	1993	1993	1993	1993	1991

SUMMARY STATISTICS	FOR 1992 CALENDAR YEAR		WATER YEARS 1937 - 1993	
ANNUAL TOTAL	27.68			
ANNUAL MEAN	.076		4.31	
HIGHEST ANNUAL MEAN			8.00	1987
LOWEST ANNUAL MEAN			.13	1992
HIGHEST DAILY MEAN	8.7	Dec 4	62	Nov 12 1947
LOWEST DAILY MEAN	.00	Jan 1	.00	Mar 29 1937
ANNUAL SEVEN-DAY MINIMUM	.00	Jan 1	.00	Mar 29 1937
ANNUAL RUNOFF (AC-FT)	55		3120	
10 PERCENT EXCEEDS	.07		10	
50 PERCENT EXCEEDS	.00		2.8	
90 PERCENT EXCEEDS	.00		.03	



16091000 LOWER ANAHOLA DITCH NEAR KEALIA

LOCATION.--Lat 22°08'14", long 159°19'31", Hydrologic Unit 20070000, on left bank 100 ft downstream from last wasteway, 1.5 mi southwest of mouth of Anahola Stream, and 2.8 mi northwest of Kealia.

PERIOD OF RECORD.--December 1936 to September 1983, October 1984 to current year.

GAGE.--Water-stage recorder and Parshall flume. Datum of gage is 276.11 ft above mean sea level (Highway Department bench mark).

REMARKS.--Records good. Ditch diverts from Anahola Stream for irrigation of sugarcane in vicinity of Anahola.

AVERAGE DISCHARGE.--55 years (water years 1938-83, 1986-93), 2.43 ft^3/s (1,760 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 18.6 ft^3/s, June 1, 1938; no flow at times.

EXTREMES FOR CURRENT YEAR.--No flow for the entire year.

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	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
2	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
3	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
4	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
5	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
6	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
7	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
8	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
9	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
10	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
11	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
12	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
13	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
14	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
15	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
16	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
17	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
18	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
19	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
20	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
21	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
22	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
23	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
24	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
25	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
26	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
27	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
28	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
29	.00	.00	.00	.00	---	.00	.00	.00	.00	.00	.00	.00
30	.00	.00	.00	.00	---	.00	.00	.00	.00	.00	.00	.00
31	.00	---	.00	.00	---	.00	---	.00	---	.00	.00	---
TOTAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MEAN	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
MAX	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
MIN	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
AC-FT	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00

16091000 LOWER ANAHOLA DITCH NEAR KEALIA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1937 - 1993, BY WATER YEAR (WY)

MEAN	2.83	1.85	1.25	1.33	2.05	1.76	2.20	2.75	3.27	3.40	3.29	3.39
MAX	7.48	7.72	7.46	5.39	8.12	7.38	8.51	10.9	10.0	9.58	7.55	9.16
(WY)	1955	1955	1975	1973	1975	1947	1954	1938	1937	1947	1943	1940
MIN	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
(WY)	1983	1952	1940	1937	1937	1937	1956	1983	1983	1983	1982	1982

SUMMARY STATISTICS	FOR 1992 CALENDAR YEAR		FOR 1993 WATER YEAR		WATER YEARS 1937 - 1993	
ANNUAL MEAN	.00		.00		2.43	
HIGHEST ANNUAL MEAN					6.06	1947
LOWEST ANNUAL MEAN					.000	1983
HIGHEST DAILY MEAN					19 Jun 1	1938
LOWEST DAILY MEAN	.00 Jan 1		.00 Oct 1		.00 Jan 1	1937
ANNUAL SEVEN-DAY MINIMUM	.00 Jan 1		.00 Oct 1		.00 Jan 1	1937
ANNUAL RUNOFF (AC-FT)	.00		.00		1760	
10 PERCENT EXCEEDS	.00		.00		7.0	
50 PERCENT EXCEEDS	.00		.00		.17	
90 PERCENT EXCEEDS	.00		.00		.00	

16097500 HALAULANI STREAM AT ALTITUDE 400 FT, NEAR KILAUEA

LOCATION.--Lat 22°10'54", long 159°25'17", Hydrologic Unit 20070000, on left bank 0.5 mi upstream from confluence with Pohakuhono Stream and 2.3 mi south of Kilauea.

DRAINAGE AREA.-- 1.9 mi^2

PERIOD OF RECORD.--November 1957 to current year.

REVISED RECORDSD.--WSP 2137: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 391.8 ft above mean sea level (by stadia survey).

REMARKS.--Records good, except for periods of no gage height record which is poor. No diversion upstream.

AVERAGE DISCHARGE.-- 35 years (water years 1959-93), 12.0 ft^3/s (8,710 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 4,030 ft^3/s, Dec. 14 1991, gage height, 9.64 ft; minimum, 1.8 ft^3/s, Sept. 6-8,1968.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 580 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Dec. 3	2230	*2,300	*7.54	Dec. 26	0030	642	4.59

Minimum discharge, 3.7 ft^3/s, Jul. 7, 8.

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	5.7	12	7.5	13	5.6	4.9	4.1	4.7	4.5	4.6	e6.4	6.2
2	5.6	9.5	12	11	5.3	4.7	3.9	4.5	4.4	4.2	e6.3	6.3
3	5.5	13	270	9.4	5.1	4.6	3.8	4.5	4.4	4.0	e6.5	7.1
4	5.3	9.4	120	9.5	5.0	4.6	3.8	4.6	4.2	3.9	e5.8	8.8
5	5.2	7.4	32	21	5.4	4.8	3.8	4.4	4.2	4.0	e5.6	5.5
6	5.2	6.9	16	16	5.1	5.2	3.9	4.3	4.2	3.9	5.5	7.1
7	17	6.9	11	12	5.0	14	4.0	4.7	4.4	3.8	5.6	5.4
8	6.5	6.7	9.4	9.8	38	5.8	20	5.7	e8.9	3.8	5.6	6.9
9	5.7	7.2	8.7	8.8	22	5.8	8.7	4.7	e4.7	4.9	5.5	7.6
10	5.4	7.3	9.5	8.2	9.1	5.3	5.2	4.6	e4.3	5.5	5.8	6.3
11	5.3	14	14	7.8	7.0	4.8	4.7	4.9	e4.1	4.1	6.5	5.1
12	70	9.4	11	7.5	6.3	4.7	4.6	26	e4.1	4.2	9.2	5.2
13	21	20	9.1	7.3	13	4.6	4.7	6.8	e4.0	9.9	6.9	12
14	9.1	11	8.1	7.0	6.8	4.6	4.5	104	e4.0	6.2	10	8.2
15	46	8.2	7.5	6.9	6.1	4.5	4.3	15	e4.0	4.7	7.0	6.4
16	32	7.3	11	6.7	5.9	4.4	4.2	9.0	e4.0	4.5	7.4	7.1
17	26	7.2	45	6.5	5.7	4.4	4.2	7.5	e5.2	4.9	34	7.7
18	17	9.7	24	6.4	5.6	4.3	4.5	6.7	e6.0	5.6	9.8	5.9
19	10	8.3	19	6.3	5.4	4.2	4.6	6.2	e6.9	7.0	9.6	5.2
20	8.5	6.7	17	6.2	5.2	4.3	4.5	12	e5.8	11	8.2	5.1
21	7.7	6.2	11	6.3	5.1	4.2	4.4	7.2	e4.8	14	10	5.3
22	7.1	6.0	14	6.0	5.1	4.2	4.2	6.1	e4.3	20	8.2	6.5
23	7.0	5.8	37	5.8	5.1	4.1	8.7	5.7	e4.2	25	8.2	5.1
24	6.6	5.6	15	5.8	5.1	4.0	5.1	5.5	e4.9	16	7.7	6.6
25	8.5	7.8	75	5.7	6.9	4.0	4.6	5.2	e4.0	23	10	5.5
26	7.6	10	83	5.7	5.4	3.9	4.4	5.0	e4.7	16	8.5	5.3
27	7.8	16	19	5.6	5.0	3.9	6.6	4.9	e4.4	15	8.2	5.5
28	6.7	8.8	39	5.5	4.9	3.9	5.0	4.8	e6.6	19	7.3	4.8
29	6.4	7.2	55	5.5	---	3.8	4.5	4.7	e4.8	16	9.2	5.6
30	6.9	7.4	41	5.4	---	3.8	5.4	4.6	4.2	e14	5.4	7.3
31	6.7	---	18	5.7	---	3.8	---	4.6	---	e8.3	7.7	---
TOTAL	391.0	268.9	1068.8	250.3	215.2	148.1	158.9	303.1	143.2	291.0	257.6	192.6
MEAN	12.6	8.96	34.5	8.07	7.69	4.78	5.30	9.78	4.77	9.39	8.31	6.42
MAX	70	20	270	21	38	14	20	104	8.9	25	34	12
MIN	5.2	5.6	7.5	5.4	4.9	3.8	3.8	4.3	4.0	3.8	5.4	4.8
AC-FT	776	533	2120	496	427	294	315	601	284	577	511	382

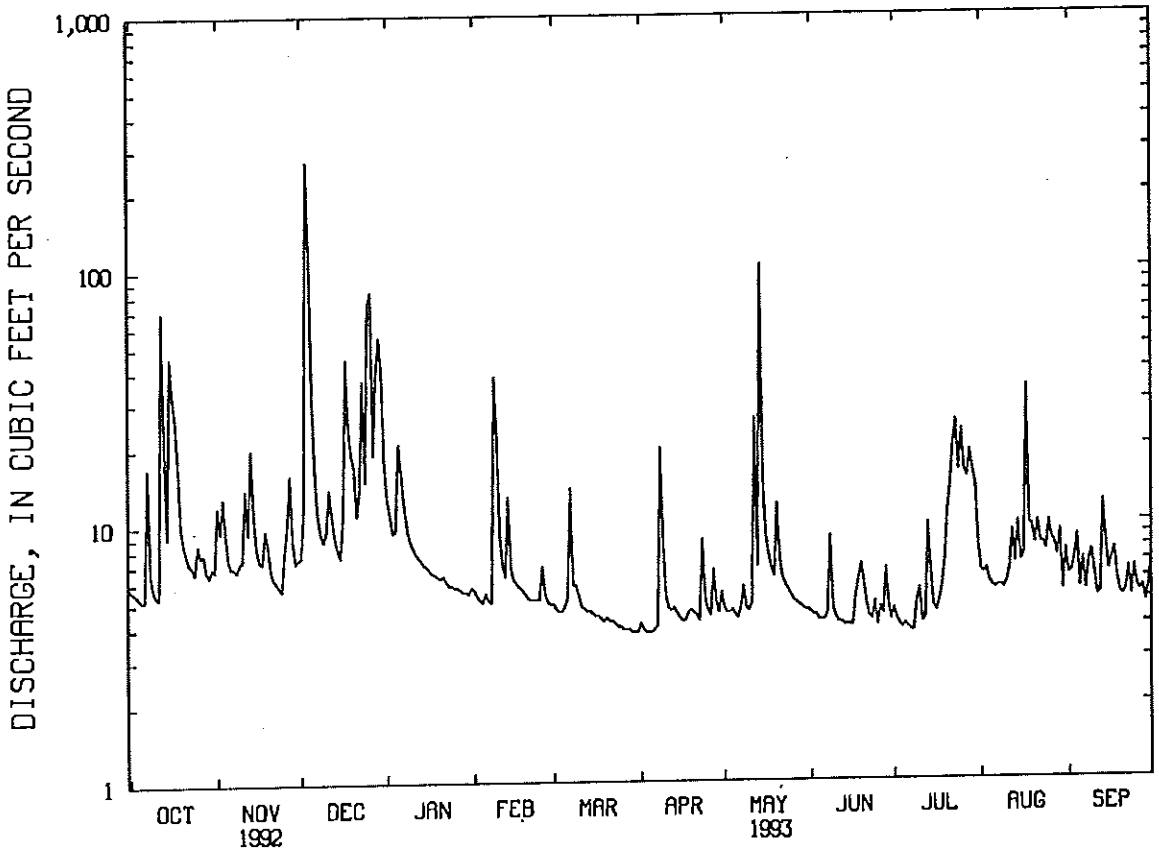
e Estimated

16097500 HALAULANI STREAM AT ALTITUDE 400 FT, NEAR KILAUEA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1958 - 1993, BY WATER YEAR (WY)

MEAN	10.3	16.3	14.4	11.6	10.7	14.3	15.4	12.3	8.48	11.6	10.7	8.07
MAX	24.6	42.4	43.1	28.4	29.4	42.7	35.1	22.5	29.1	27.1	23.7	15.0
(WY)	1983	1991	1988	1989	1979	1982	1971	1965	1978	1989	1991	1980
MIN	4.40	5.73	3.79	3.45	3.20	4.59	5.06	6.11	4.27	5.05	3.95	3.93
(WY)	1985	1977	1986	1986	1986	1970	1992	1992	1959	1975	1973	1975

SUMMARY STATISTICS	FOR 1992 CALENDAR YEAR		FOR 1993 WATER YEAR		WATER YEARS 1958 - 1993	
ANNUAL TOTAL	3920.3		3688.7			
ANNUAL MEAN	10.7		10.1		12.0	
HIGHEST ANNUAL MEAN					19.6	1982
LOWEST ANNUAL MEAN					7.01	1984
HIGHEST DAILY MEAN	270	Dec 3	270	Dec 3	521	Dec 14 1991
LOWEST DAILY MEAN	4.1	Jun 1	3.8	Mar 29	1.9	Sep 5 1968
ANNUAL SEVEN-DAY MINIMUM	4.2	May 29	3.9	Mar 29	2.4	Sep 2 1968
ANNUAL RUNOFF (AC-FT)	7780		7320		8710	
10 PERCENT EXCEEDS	17		16		21	
50 PERCENT EXCEEDS	6.5		6.1		7.6	
90 PERCENT EXCEEDS	4.6		4.2		4.6	



16103000 HANALEI RIVER NEAR HANALEI

LOCATION.--Lat 22°11'31", long 159°27'57", Hydrologic Unit 20070000, on right bank 2.6 mi southeast of Hanalei School and 4.9 mi upstream from mouth.

DRAINAGE AREA.--19.1 mi^2.

PERIOD OF RECORD.--January 1912 to November 1919, annual maximum, water years 1962-63, December 1962 to current year.

REVISED RECORDS.--WSP 1937: Drainage area. WSP 2137: 1962(M), 1963-65(P). WDR HI-77-1: 1970-76(M), 1975-76.

GAGE.--Water-stage recorder and crest-stage gage. Datum of gage is 35.8 ft above mean sea level (by stadia survey). Jan. 1, 1912, to Nov. 20, 1919, nonrecording gage at site 0.2 mi upstream at different datum. Jan. 26 to Dec. 26, 1962, crest-stage gage at present site and datum.

REMARKS.--Records good except for estimated daily discharges, which are poor. Since 1925, Hanalei tunnel has diverted from Hanalei River and its tributary Kaapoko Stream upstream to North Branch of North Fork Wailua River for irrigation. China ditch upstream diverts for irrigation of taro in vicinity of Hanalei.

AVERAGE DISCHARGE (since diversion to Hanalei tunnel).--30 years (water years 1964-93), 214 ft^3/s (154,800) acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 25,750 ft^3/s, Dec. 14, 1991, gage height, 14.45 ft, from rating curve extended above 9,600 ft^3/s; minimum, 31 ft^3/s, Sept. 30, Oct. 1, 2, 5, 12, 13, Nov. 3, 1975.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 9,200 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Dec. 3	2200	*23,400	*13.98	No other peak greater than base discharge.			

Minimum discharge, 54 ft^3/s, July 7-9.

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	e105	145	148	e165	e100	84	60	98	e60	68	e84	e91
2	e101	150	e170	e121	e85	81	57	71	63	65	e84	e73
3	e97	155	e787	e102	e80	75	57	71	62	59	e90	e69
4	e94	123	e1190	e124	79	75	56	78	61	57	e80	e109
5	e92	106	e625	e448	80	98	58	66	61	58	e79	e73
6	e90	100	e265	e459	78	153	63	62	62	57	77	e65
7	556	100	e220	e303	78	272	62	117	80	55	86	e64
8	131	114	e170	e183	149	116	130	169	146	54	81	e63
9	105	166	160	e256	244	190	92	80	70	56	86	e63
10	96	119	188	e183	191	121	65	73	62	70	81	e63
11	91	160	e500	e154	99	100	60	79	60	59	185	e63
12	1570	126	389	e119	89	93	61	192	60	68	153	e92
13	393	254	191	e155	232	89	60	93	58	118	113	e118
14	220	163	158	e130	100	90	61	561	58	93	143	e129
15	1320	123	145	e149	88	88	58	203	57	68	99	e71
16	710	110	159	e122	84	e70	57	121	57	59	118	e67
17	395	107	e685	e108	80	e69	56	102	79	83	716	e64
18	242	215	250	e97	79	e66	76	96	93	77	210	e68
19	174	210	293	e93	78	65	196	92	109	e200	e414	e68
20	146	114	281	e90	76	64	73	e120	89	e170	e179	e68
21	130	103	191	e107	75	66	65	e85	72	e180	e130	e62
22	119	100	e361	e92	74	64	60	e75	63	e350	e103	e60
23	115	104	e640	e88	81	62	98	e70	61	e180	e87	e69
24	113	94	e252	e86	86	61	68	e85	73	e450	e84	e85
25	156	208	e915	e84	147	61	62	e70	57	e370	e177	e76
26	146	192	e1010	e82	97	61	61	e65	69	e300	e91	e66
27	157	232	e278	e81	79	60	158	e64	65	e260	e76	e81
28	124	148	e825	e80	77	59	82	e63	104	e250	e70	e110
29	118	116	e1320	e160	---	59	73	e61	71	e140	e79	e73
30	123	133	e1160	e95	---	58	113	e61	63	e110	e71	e101
31	125	---	e314	e85	---	58	---	e60	---	e96	e87	---
TOTAL	8154	4290	14240	4601	2885	2728	2298	3303	2145	4280	4213	2324
MEAN	263	143	459	148	103	88.0	76.6	107	71.5	138	136	77.5
MAX	1570	254	1320	459	244	272	196	561	146	450	716	129
MIN	90	94	145	80	74	58	56	60	57	54	70	60
AC-FT	16170	8510	28250	9130	5720	5410	4560	6550	4250	8490	8360	4610

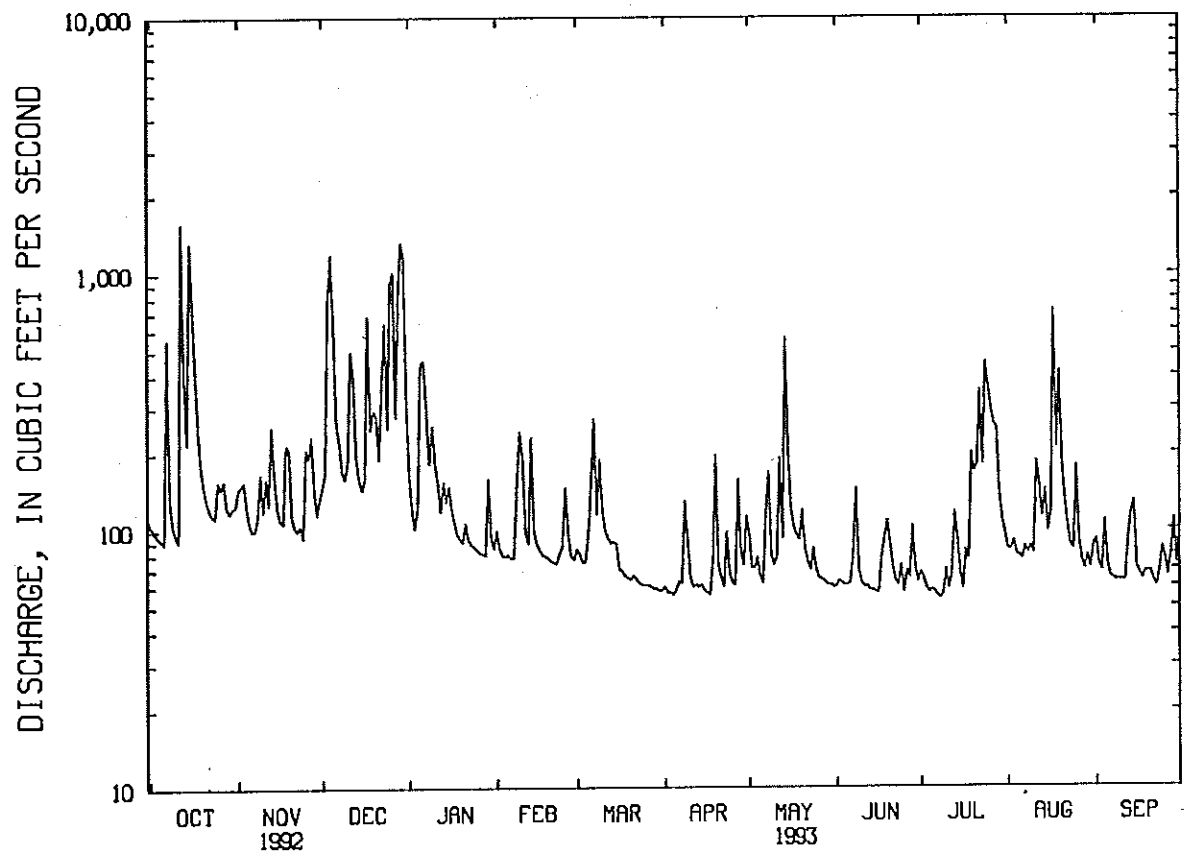
e Estimated

16103000 HANALEI RIVER NEAR HANALEI--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1962 - 1993, BY WATER YEAR (WY)

MEAN	176	305	249	219	224	285	297	221	139	185	158	124
MAX	466	793	596	614	616	1096	781	626	567	418	413	280
(WY)	1983	1991	1968	1989	1989	1982	1974	1967	1978	1989	1982	1982
MIN	44.0	72.8	59.6	49.5	42.8	56.4	76.3	73.5	57.5	62.6	42.1	35.7
(WY)	1985	1964	1984	1986	1978	1970	1966	1984	1975	1984	1973	1975

SUMMARY STATISTICS	FOR 1992 CALENDAR YEAR		FOR 1993 WATER YEAR		WATER YEARS 1962 - 1993	
ANNUAL TOTAL	67089		55461			
ANNUAL MEAN	183		152		214	
HIGHEST ANNUAL MEAN					408	1982
LOWEST ANNUAL MEAN					92.7	1984
HIGHEST DAILY MEAN	1570	Oct 12	1570	Oct 12	8340	May 22 1967
LOWEST DAILY MEAN	72	Jun 2	54	Jul 8	31	Nov 3 1975
ANNUAL SEVEN-DAY MINIMUM	73	May 27	57	Jul 3	33	Sep 19 1975
ANNUAL RUNOFF (AC-FT)	133100		110000		154800	
10 PERCENT EXCEEDS	325		258		421	
50 PERCENT EXCEEDS	113		92		117	
90 PERCENT EXCEEDS	81		61		57	



16108000 WAINIHA RIVER NEAR HANALEI

LOCATION.--Lat 22°08'20", long 159°33'38", Hydrologic Unit 20070000, on left bank at Puwainui Falls, 1.5 mi upstream from Wainiha powerplant intake, and 6.0 mi southwest of Hanalei.

DRAINAGE AREA.--10.2 mi^2.

PERIOD OF RECORD.--August 1952 to February 1956, October 1957 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 960 ft, from topographic map.

REMARKS.--Records good, except for period of no gage height record and those above 120 cfs which are fair. No diversion upstream.

AVERAGE DISCHARGE.--38 years (water years 1953-55, 1959-93), 139 ft^3/s (100,300 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 28,100 ft^3/s, Apr. 19, 1974, gage height, 9.47 ft, from rating curve extended above 1,100 ft^3/s on basis of slope-area measurement at gage height 7.72 ft; minimum, 32 ft^3/s, Oct. 21-23, 1984.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Feb. 17, 1956, which destroyed the station, reached a stage of 14.1 ft, from floodmarks, discharge, about 40,000 ft^3/s, from unit-discharge study.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 3,600 ft^3/s: and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Dec. 3	2200	*5,560	5.86	Dec. 25	1430	3,650	5.24

Minimum, 33 ft^3/s, Sept. 22

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	65	63	114	94	63	64	42	93	42	e43	60	52
2	61	64	126	69	50	57	41	56	47	e42	61	40
3	59	71	639	58	48	51	40	81	49	e42	62	38
4	57	74	893	75	47	50	39	70	41	e41	49	67
5	56	63	397	342	48	64	41	55	47	e42	47	39
6	55	61	154	302	47	128	62	48	58	e42	44	36
7	139	62	135	185	47	190	59	266	118	e42	54	36
8	86	100	81	106	75	70	125	147	180	41	78	35
9	91	243	78	168	171	206	71	76	e50	40	68	35
10	76	110	144	107	155	107	47	64	e45	57	83	35
11	69	111	411	91	56	69	42	96	e40	49	181	35
12	801	71	303	68	52	60	71	115	e39	48	103	55
13	e212	190	90	96	82	55	58	63	e39	70	88	71
14	e128	116	77	75	56	59	58	137	e38	53	104	77
15	e650	71	73	91	52	58	45	104	e38	40	64	37
16	e384	62	88	70	51	49	38	76	e37	38	75	37
17	e221	61	561	62	50	48	34	73	e51	130	426	35
18	e140	293	122	55	49	46	58	81	e59	88	123	38
19	e104	203	171	53	49	46	178	71	e69	196	296	38
20	e61	77	164	51	48	46	57	95	e56	135	99	38
21	60	63	95	63	48	48	51	64	e46	152	75	34
22	58	63	257	52	48	46	46	54	e40	358	58	33
23	57	72	463	50	92	45	76	49	e39	129	49	39
24	84	58	142	49	73	44	54	59	e47	519	48	49
25	151	171	757	48	155	44	60	47	e40	356	117	42
26	112	136	721	48	70	44	51	45	e45	302	48	36
27	118	105	153	47	53	43	195	45	e42	200	42	47
28	86	93	663	47	50	43	61	44	e67	202	39	66
29	79	64	1010	106	---	42	86	43	e45	171	45	39
30	87	99	827	54	---	42	139	43	e40	152	39	61
31	74	---	175	51	---	42	---	42	---	75	51	---
TOTAL	4481	3090	10084	2833	1885	2006	2025	2402	1594	3895	2776	1320
MEAN	145	103	325	91.4	67.3	64.7	67.5	77.5	53.1	126	89.5	44.0
MAX	801	293	1010	342	171	206	195	266	180	519	426	77
MIN	55	58	73	47	47	42	34	42	37	38	39	33
AC-FT	8890	6130	20000	5620	3740	3980	4020	4760	3160	7730	5510	2620

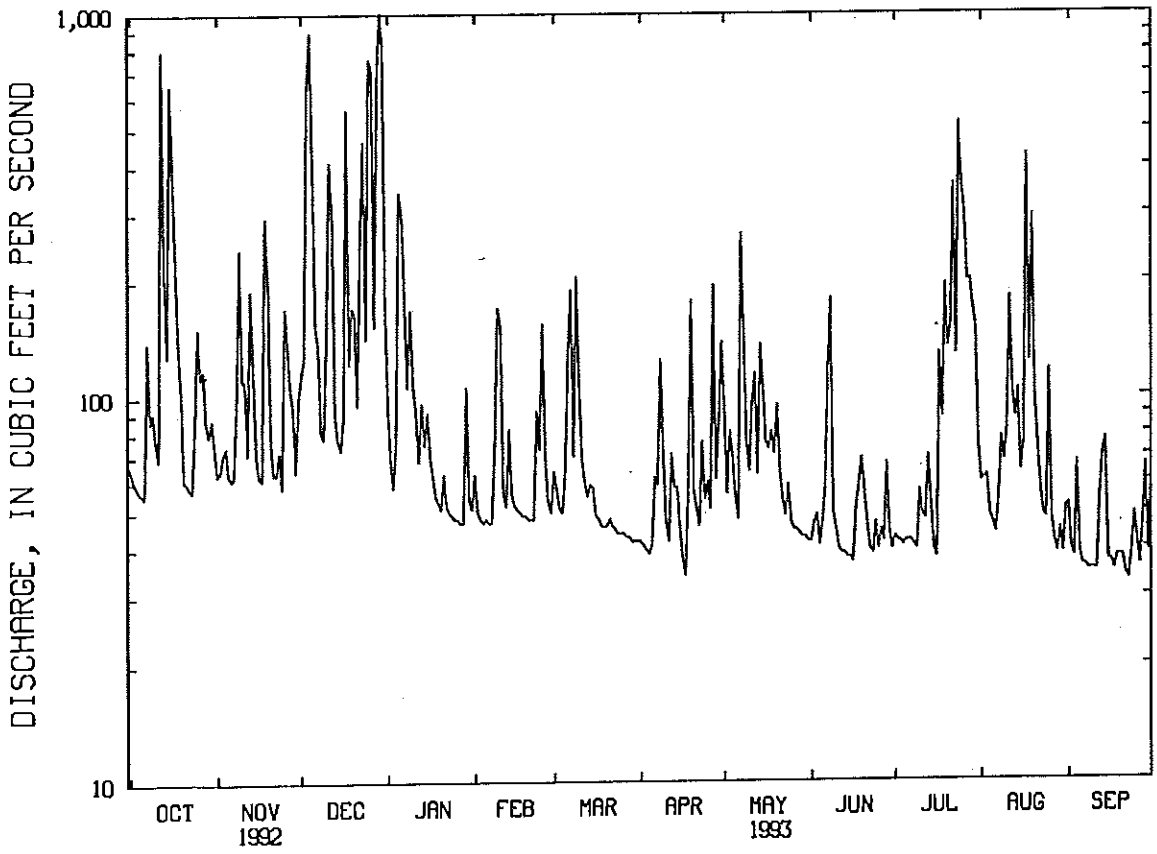
e Estimated

16108000 WAINIHA RIVER NEAR HANALEI--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1952 - 1993, BY WATER YEAR (WY)

MEAN	111	184	170	145	144	176	177	125	98.1	132	115	90.6
MAX	228	414	384	371	492	611	504	238	187	315	272	175
(WY)	1983	1991	1968	1989	1969	1982	1971	1967	1978	1989	1982	1992
MIN	42.8	72.7	54.1	44.6	36.5	52.2	52.8	51.9	53.1	50.4	54.6	42.3
(WY)	1985	1964	1984	1986	1978	1970	1992	1966	1993	1984	1965	1965

SUMMARY STATISTICS	FOR 1992 CALENDAR YEAR		FOR 1993 WATER YEAR		WATER YEARS 1952 - 1993	
ANNUAL TOTAL	45084		38391			
ANNUAL MEAN	123		105		139	
HIGHEST ANNUAL MEAN					243	1982
LOWEST ANNUAL MEAN					84.7	1984
HIGHEST DAILY MEAN	1380	Sep 11	1010	Dec 29	3650	Nov 21 1974
LOWEST DAILY MEAN	42	May 31	33	Sep 22	31	Sep 29 1965
ANNUAL SEVEN-DAY MINIMUM	43	May 27	36	Sep 5	33	Sep 24 1965
ANNUAL RUNOFF (AC-FT)	89420		76150		100300	
10 PERCENT EXCEEDS	239		190		264	
50 PERCENT EXCEEDS	71		61		78	
90 PERCENT EXCEEDS	49		40		48	



16200000 NORTH FORK KAUKONAHUA STREAM ABOVE RIGHT BRANCH, NEAR WAHIAWA

LOCATION.--Lat 21°31'09", long 157°56'53", Hydrologic Unit 20060000, on left bank 140 ft upstream from Mauka ditch intake and Right Branch, and 4.5 mi northeast of Wahiawa.

DRAINAGE AREA.--1.38 mi^2.

PERIOD OF RECORD.--May 1913 to July 1953, April 1960 to current year. Monthly discharge only for some periods, published in WSP 1319. Prior to August 1953, published as Left Branch of North Fork Kaukonahua Stream near Wahiawa.

REVISED RECORDS.--WSP 1219: 1931-33(M), 1935(M), 1937-38(M). WSP 1319: 1914, 1917-18(M), 1920-23(M), 1925(M), 1927-30(M). WSP 1719: Drainage area.

GAGE.--Water-stage recorder and concrete control. Elevation of gage is 1,150 ft, from topographic map.

REMARKS.--Records good.

AVERAGE DISCHARGE.--70 years (water years 1914-24, 1927-52, 1961-93), 16.4 ft^3/s (11,850 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 5,640 ft^3/s, Oct. 28, 1981, gage height, 13.2 ft, from rating curve extended above 68 ft^3/s on basis of slope-area measurement at gage height, 12.46 ft; minimum, 0.12 ft^3/s, Mar. 2, 13, 1941.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,300 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Dec. 23	1630	1,560	6.77	July 22	0300	*3,120	*9.37
Dec. 26	0100	1,980	7.46	Sep. 23	0350	1,950	7.42
Feb. 9	0930	1,310	6.26				

Minimum discharge, 0.26 ft^3/s, Apr. 2-5.

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

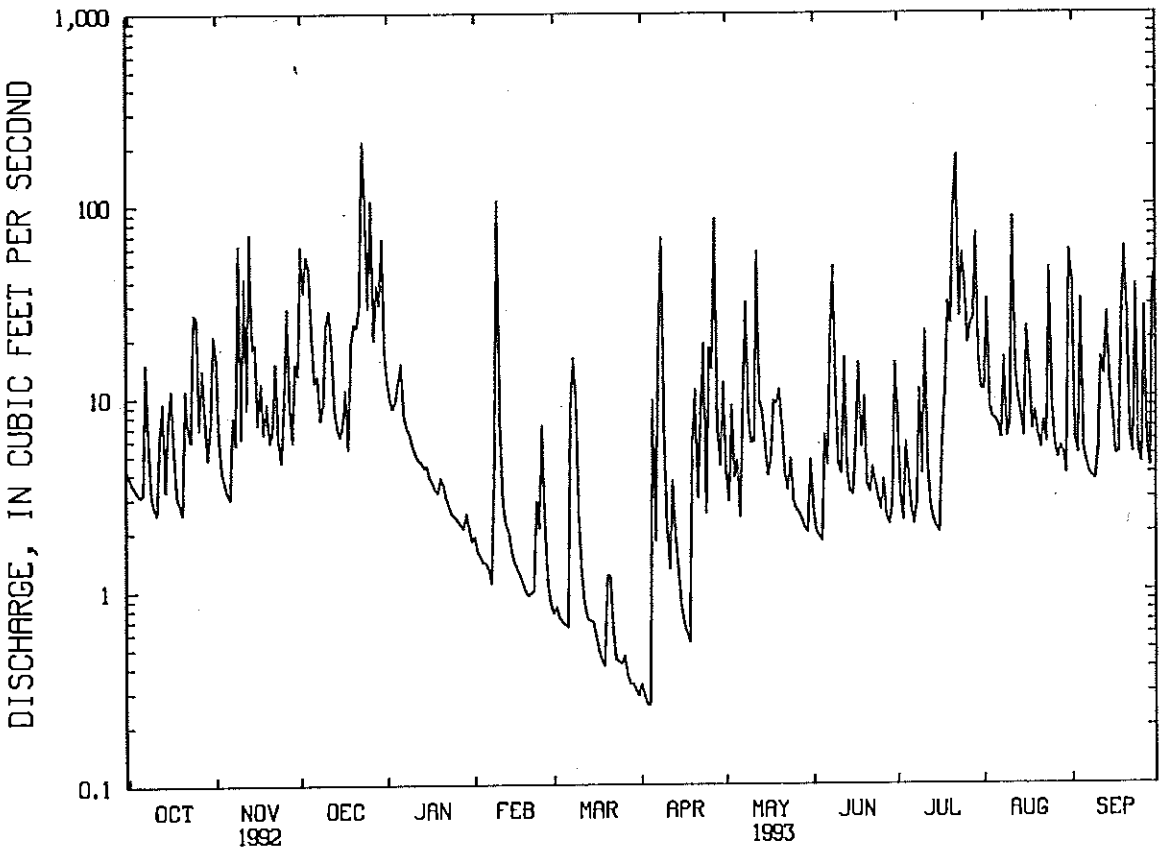
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3.9	16	61	12	1.9	.77	.33	4.1	2.6	7.9	11	41
2	3.6	6.2	35	9.8	1.6	.83	.29	2.9	2.0	3.1	32	6.2
3	3.4	4.1	54	8.8	1.5	.73	.26	9.1	1.9	2.3	8.9	5.1
4	3.2	3.6	47	9.6	1.4	.69	.26	3.8	1.8	5.8	7.8	32
5	3.1	3.2	21	12	1.4	.67	9.7	4.7	6.4	3.9	7.6	5.4
6	3.2	3.0	12	15	1.3	.65	1.8	2.4	4.4	2.7	7.1	4.5
7	15	8.0	13	8.2	1.1	8.8	19	9.0	20	2.2	6.1	4.0
8	6.1	5.7	7.7	7.0	4.3	16	68	31	48	2.8	16	3.8
9	3.1	62	9.3	6.5	106	9.5	6.6	8.1	11	11	6.2	3.7
10	2.7	6.2	24	5.6	7.4	2.3	2.1	5.8	4.4	4.0	7.4	5.2
11	2.5	42	28	5.1	2.9	1.2	1.3	5.9	4.0	22	86	16
12	6.2	8.8	19	4.7	2.2	.86	3.7	57	16	4.5	14	13
13	9.5	71	8.8	4.6	2.0	.72	1.9	9.5	4.1	2.7	9.9	27
14	3.3	18	7.0	4.3	1.6	.70	1.3	8.3	3.2	2.3	8.2	12
15	7.6	19	6.3	4.4	1.4	.69	.85	5.9	3.1	2.1	6.2	8.3
16	11	7.3	7.2	3.8	1.3	.59	.68	3.9	5.7	2.0	23	5.0
17	5.2	12	11	3.6	1.2	.49	.61	4.7	15	6.1	14	5.1
18	3.1	6.5	5.4	3.3	1.1	.44	.54	9.6	5.5	11	6.8	25
19	2.8	9.4	19	3.2	1.0	.41	5.6	9.2	10	31	8.5	60
20	2.5	5.9	24	3.8	.95	1.2	11	11	3.5	24	6.5	27
21	11	6.7	23	3.5	.98	1.2	3.0	7.1	3.2	100	5.4	6.3
22	6.8	15	30	3.0	1.0	.62	8.3	4.0	4.3	182	7.5	5.1
23	6.0	6.1	215	2.7	2.9	.44	19	3.3	3.5	26	5.8	38
24	27	4.6	97	2.5	2.1	.43	2.5	4.8	3.0	56	47	5.2
25	26	9.4	29	2.4	7.2	.42	18	2.9	2.6	38	9.2	4.5
26	6.9	29	106	2.3	2.2	.46	14	2.6	3.7	19	5.7	29
27	14	9.2	20	2.2	1.1	.37	85	2.5	2.4	24	4.8	5.8
28	8.1	5.9	38	2.1	.86	.33	7.1	2.3	2.2	25	5.5	4.3
29	4.8	15	30	2.5	---	.33	4.4	2.1	2.7	71	5.1	38
30	7.1	13	67	2.1	---	.31	12	2.0	15	16	4.0	51
31	21	---	17	1.8	---	.29	---	4.7	---	11	58	---
TOTAL	239.7	431.8	1091.7	162.4	161.89	53.44	309.12	244.2	215.2	721.4	451.2	496.5
MEAN	7.73	14.4	35.2	5.24	5.78	1.72	10.3	7.88	7.17	23.3	14.6	16.5
MAX	27	71	215	15	106	16	85	57	48	182	86	60
MIN	2.5	3.0	5.4	1.8	.86	.29	.26	2.0	1.8	2.0	4.0	3.7
AC-FT	475	856	2170	322	321	106	613	484	427	1430	895	985

16200000 NORTH FORK KAUKONAHUA STREAM ABOVE RIGHT BRANCH, NEAR WAHIAWA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1913 - 1993, BY WATER YEAR (WY)

MEAN	12.5	17.1	15.0	14.9	12.5	19.7	20.1	16.5	13.3	18.2	18.3	15.4
MAX	32.7	76.5	48.9	126	117	74.4	58.6	53.3	31.3	48.0	50.1	79.1
(WY)	1942	1966	1988	1921	1932	1982	1963	1927	1963	1930	1931	1914
MIN	2.21	1.31	1.57	.36	.40	.28	1.38	.67	2.63	4.22	1.81	1.95
(WY)	1985	1934	1990	1986	1986	1983	1966	1992	1951	1951	1971	1975

SUMMARY STATISTICS	FOR 1992 CALENDAR YEAR		FOR 1993 WATER YEAR		WATER YEARS 1913 - 1993	
ANNUAL TOTAL	4740.19		4578.55			
ANNUAL MEAN	13.0		12.5		16.4	
HIGHEST ANNUAL MEAN					29.5	1932
LOWEST ANNUAL MEAN					9.11	1984
HIGHEST DAILY MEAN	330	Sep 3	215	Dec 23	975	Feb 27 1935
LOWEST DAILY MEAN	.16	Jun 2	.26	Apr 3	.12	Mar 13 1941
ANNUAL SEVEN-DAY MINIMUM	.17	May 28	.30	Mar 29	.13	Mar 5 1986
ANNUAL RUNOFF (AC-FT)	9400		9080		11850	
10 PERCENT EXCEEDS	27		29		36	
50 PERCENT EXCEEDS	5.3		5.7		7.1	
90 PERCENT EXCEEDS	.41		1.0		1.6	



16208000 SOUTH FORK KAUKONAHUA STREAM AT EAST PUMP RESERVOIR, NEAR WAHIAWA

LOCATION.--Lat 21°29'32", long 157°59'54", Hydrologic Unit 20060000, on right bank on upstream side of dam at East Pump Reservoir, 2.3 mi east of Wahiawa Post Office, and 7.1 mi north of Waipahu.

DRAINAGE AREA.--4.04 mi^2.

PERIOD OF RECORD.--July 1957 to June 1963, water years 1963-64 (annual maximum), July 1964 to current year.

GAGE.--Water-stage recorder and Ogee-type dam control. Datum of gage is 860.35 ft above mean sea level.

REMARKS.--Records good. Prior to 1960, diversions from reservoirs upstream for use at Schofield Barracks.

AVERAGE DISCHARGE.--31 years (water years, 1961-62, 1965-93), 21.5 ft^3/s (15,590 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 5,460 ft^3/s, Apr. 15, 1963, gage height, 11.33 ft, from rating curve extended above 1,100 ft^3/s on basis of computation of peak flow over dam; no flow at times.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,100 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Dec. 26	0300	1,190	5.26	Sept. 1	0030	*1,300	*5.45

Minimum discharge, 0.21 ft^3/s, Apr. 2-4.

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	4.7	22	8.0	24	e3.1	e.88	.31	8.0	2.7	31	25	206
2	4.5	16	52	18	e2.6	e.94	.23	3.7	2.0	5.5	27	15
3	4.2	6.8	24	16	e2.3	e.82	.24	6.6	2.1	4.5	19	9.3
4	4.0	5.5	57	16	e2.0	e.76	.24	8.8	2.1	17	16	39
5	3.8	4.9	55	24	e2.1	e.70	1.8	5.8	2.0	12	18	11
6	4.3	4.5	18	28	e1.8	e.68	5.3	3.4	2.1	9.8	15	7.3
7	11	5.3	14	19	e1.5	e13	31	2.2	2.4	3.9	13	6.3
8	8.8	5.7	11	15	e20	e18	61	68	14	7.4	12	5.7
9	4.4	117	15	13	e115	e14	10	19	36	3.4	12	5.8
10	3.3	14	14	11	e25	e5.0	3.2	20	4.7	6.8	14	6.1
11	3.0	43	50	9.8	e4.0	e1.7	1.6	9.4	2.6	18	182	5.7
12	7.5	14	22	8.8	e2.5	e.92	.99	56	12	10	36	17
13	18	72	14	8.1	e1.8	e.86	.77	30	5.2	3.9	26	42
14	8.7	31	11	7.7	e1.7	e.76	.94	14	2.5	3.0	19	24
15	11	23	9.4	7.7	e1.6	e.66	.90	17	2.0	2.4	14	15
16	17	11	8.5	7.1	e1.4	e.60	.54	6.6	1.6	2.2	49	12
17	7.8	15	20	6.8	e1.2	e.57	.37	5.9	3.7	2.8	35	6.7
18	5.5	12	8.7	6.0	e1.1	e.53	.28	9.6	4.2	19	16	8.8
19	3.7	14	7.5	5.7	e1.1	e.49	4.1	13	10	63	20	94
20	3.3	9.9	22	6.0	e1.2	.52	18	19	4.4	39	16	77
21	8.1	8.0	13	5.7	e1.2	.51	11	14	2.9	40	11	11
22	8.1	21	49	5.3	e2.3	.49	2.7	6.4	2.3	336	15	7.2
23	15	11	130	4.9	e3.1	.46	46	4.3	1.9	65	17	84
24	24	6.9	73	4.7	e2.2	.43	7.6	3.7	1.6	128	51	9.1
25	52	8.0	28	e4.4	e7.5	.42	27	3.3	2.0	73	23	6.6
26	14	38	173	e4.2	e2.4	.38	5.2	2.8	9.9	61	11	7.9
27	30	15	38	e3.7	e1.2	.34	40	2.5	4.2	130	8.6	11
28	23	8.1	25	e3.5	e1.0	.30	9.4	2.3	2.4	116	7.7	5.8
29	10	7.4	51	e4.3	---	.31	5.3	2.1	4.0	99	7.3	4.5
30	7.7	18	123	e3.4	---	.34	13	1.9	4.4	43	6.6	27
31	17	---	59	e2.9	---	.35	---	1.9	---	30	34	---
TOTAL	347.4	588.0	1203.1	304.7	213.9	66.72	309.01	371.2	153.9	1385.6	776.2	787.8
MEAN	11.2	19.6	38.8	9.83	7.64	2.15	10.3	12.0	5.13	44.7	25.0	26.3
MAX	52	117	173	28	115	18	61	68	36	336	182	206
MIN	3.0	4.5	7.5	2.9	1.0	.30	.23	1.9	1.6	2.2	6.6	4.5
AC-FT	689	1170	2390	604	424	132	613	736	305	2750	1540	1560

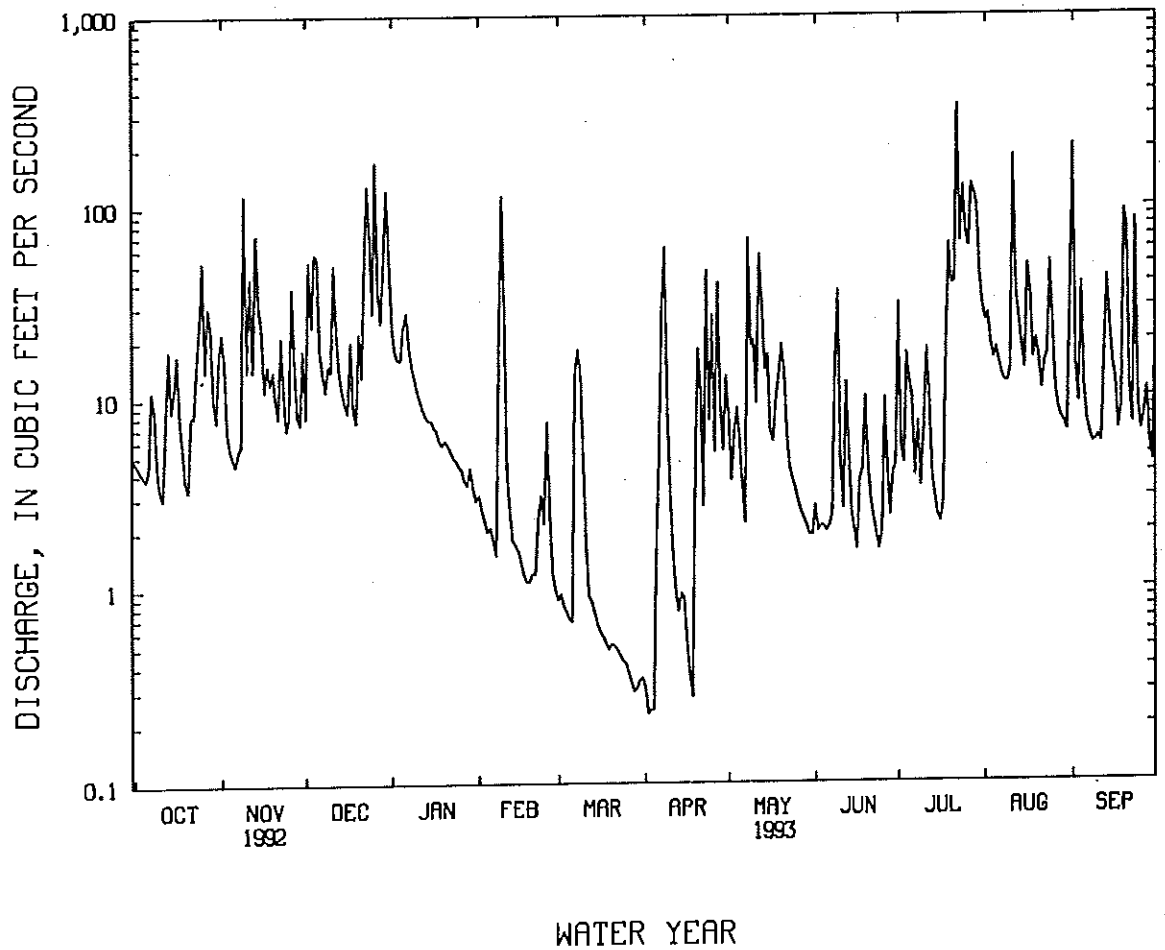
e Estimated

16208000 SOUTH FORK KAUKONAHUA STREAM AT EAST PUMP RESERVOIR, NEAR WAHIAWA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1961 - 1993, BY WATER YEAR (WY)

MEAN	17.2	28.3	22.0	20.3	16.6	27.9	31.7	21.3	16.5	25.3	18.6	14.5
MAX	38.0	107	61.7	55.2	99.7	104	90.1	64.9	46.1	60.9	53.7	35.7
(WY)	1967	1966	1988	1989	1969	1980	1963	1963	1987	1989	1967	1990
MIN	.32	3.54	2.07	.38	.11	.66	2.45	.51	3.40	4.25	3.04	1.43
(WY)	1985	1963	1990	1986	1986	1983	1992	1992	1968	1968	1971	1975

SUMMARY STATISTICS	FOR 1992 CALENDAR YEAR		FOR 1993 WATER YEAR		WATER YEARS 1961 - 1993	
ANNUAL TOTAL	5250.10		6507.53			
ANNUAL MEAN	14.3		17.8		21.5	
HIGHEST ANNUAL MEAN					37.2	1982
LOWEST ANNUAL MEAN					11.1	1984
HIGHEST DAILY MEAN	312	Sep 3	336	Jul 22	1050	Feb 1 1969
LOWEST DAILY MEAN	.00	May 25	.23	Apr 2	.00	Dec 24 1960
ANNUAL SEVEN-DAY MINIMUM	.00	May 25	.29	Mar 29	.00	Jan 19 1977
ANNUAL RUNOFF (AC-FT)	10410		12910		15590	
10 PERCENT EXCEEDS	38		43		50	
50 PERCENT EXCEEDS	6.4		7.9		8.9	
90 PERCENT EXCEEDS	.45		.97		1.7	



16211600 MAKAHA STREAM NEAR MAKAHA

LOCATION.--Lat 21°30'16", long 158°10'59", Hydrologic Unit 20060000, on right bank, 1.5 mi northeast of Kaneaki Heiau, and 3.4 mi northeast of Makaha.

DRAINAGE AREA.--2.31 mi^2.

PERIOD OF RECORD.--July 1959 to current year.

REVISED RECORDS.--WSP 1937: Drainage area.

GAGE.--Water-stage recorder and concrete-masonry control. Datum of gage is 938.64 ft above mean sea level (Waianae Plantation bench mark).

REMARKS.--Records good. Honolulu Board of Water Supply wells upstream of gage were put into production this year. Recording rain gage located at station.

AVERAGE DISCHARGE.--34 years, 1.91 ft^3/s (1,390 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,450 ft^3/s, Jan. 6, 1982, gage height, 7.40 ft, from floodmarks, from rating curve extended above 51 ft^3/s on basis of slope-area measurements at gage heights 6.50 ft and 7.40 ft; no flow at times.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum stage known since at least 1953, about 7.8 ft, Nov. 24, 1954, from information by local resident. Discharge, about 1,700 ft^3/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 200 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Dec. 30	1300	*325	*3.90	No other peak greater than base discharge.			

Minimum discharge, No flow on many days.

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	.00	3.7	.78	7.4	1.5	.36	.12	.09	.09	.00	.15	.12
2	.00	4.0	.89	4.8	.74	.53	.12	.09	.08	.00	.11	.13
3	.00	1.8	.70	3.6	.59	.42	.11	.12	.08	.00	.07	.09
4	.00	1.2	.84	4.9	.53	.37	.11	.17	.07	.00	.05	.08
5	.00	.86	1.5	3.6	.80	.33	.15	.16	.06	.00	.03	.05
6	.00	.65	1.6	7.1	.71	.32	.15	.16	.06	.00	.03	.02
7	1.9	.52	1.3	2.9	.53	.33	.17	.15	.05	.00	.02	.01
8	.07	.42	1.0	2.1	.66	.44	.16	1.2	.06	.00	.03	.00
9	.00	.58	.99	2.6	2.9	.80	.13	.42	.07	.00	.02	.00
10	.00	.51	.93	e1.9	1.3	.92	.12	.28	.07	.00	.02	.00
11	.00	.74	.84	e1.8	.82	.46	.11	.20	.05	.00	.01	.00
12	.00	.49	3.6	e1.6	.70	.38	.12	.17	.05	.00	.08	.01
13	.92	3.3	2.3	e1.5	3.9	.33	.11	.15	.06	.00	.10	.29
14	.34	2.5	1.2	e1.3	1.4	.35	.11	5.5	.07	.00	.06	.31
15	.60	1.4	.95	e1.3	.98	.35	.10	1.5	.08	.00	.04	.19
16	.70	.89	.87	e1.2	.80	.46	.09	.61	.07	.00	4.9	.15
17	.49	.61	.78	e1.1	.70	.37	.08	.53	.06	.00	1.2	.11
18	.43	.49	.69	e1.0	.62	.32	.08	1.4	.05	.00	.29	.07
19	.45	1.4	.62	e1.0	.55	.26	.16	1.4	.05	.00	.15	.05
20	.37	.85	.55	e1.0	.49	.23	.23	.79	.04	.00	.12	.08
21	.34	2.4	.56	.97	.47	.21	.21	.59	.03	.00	.11	.09
22	.30	8.0	.59	.85	.45	.20	.19	.40	.03	1.9	.09	.09
23	.27	3.9	1.9	.78	.46	.19	.17	.32	.02	.44	.07	.08
24	.69	2.1	1.0	.71	.42	.18	.15	.27	.01	.74	.15	.60
25	.56	2.3	1.1	.66	.38	.18	.13	.22	.00	.41	.18	.52
26	.57	1.8	26	.63	.36	.17	.12	.19	.00	.32	.11	.23
27	.57	4.4	11	.60	.34	.16	.11	.17	.00	.36	.09	.17
28	.48	1.4	5.2	.58	.32	.15	.10	.15	.00	.23	.07	.14
29	.37	1.1	3.6	3.6	---	.14	.08	.13	.00	.27	.05	.09
30	.30	.99	60	1.2	---	.13	.08	.11	.00	.32	.03	.06
31	.26	---	16	.76	---	.12	---	.10	---	.19	.02	---
TOTAL	10.98	55.30	149.88	65.04	24.42	10.16	3.87	17.74	1.36	5.18	8.45	3.83
MEAN	.35	1.84	4.83	2.10	.87	.33	.13	.57	.045	.17	.27	.13
MAX	1.9	8.0	60	7.4	3.9	.92	.23	5.5	.09	1.9	4.9	.60
MIN	.00	.42	.55	.58	.32	.12	.08	.09	.00	.00	.01	.00
AC-FT	22	110	297	129	48	20	7.7	35	2.7	10	17	7.6

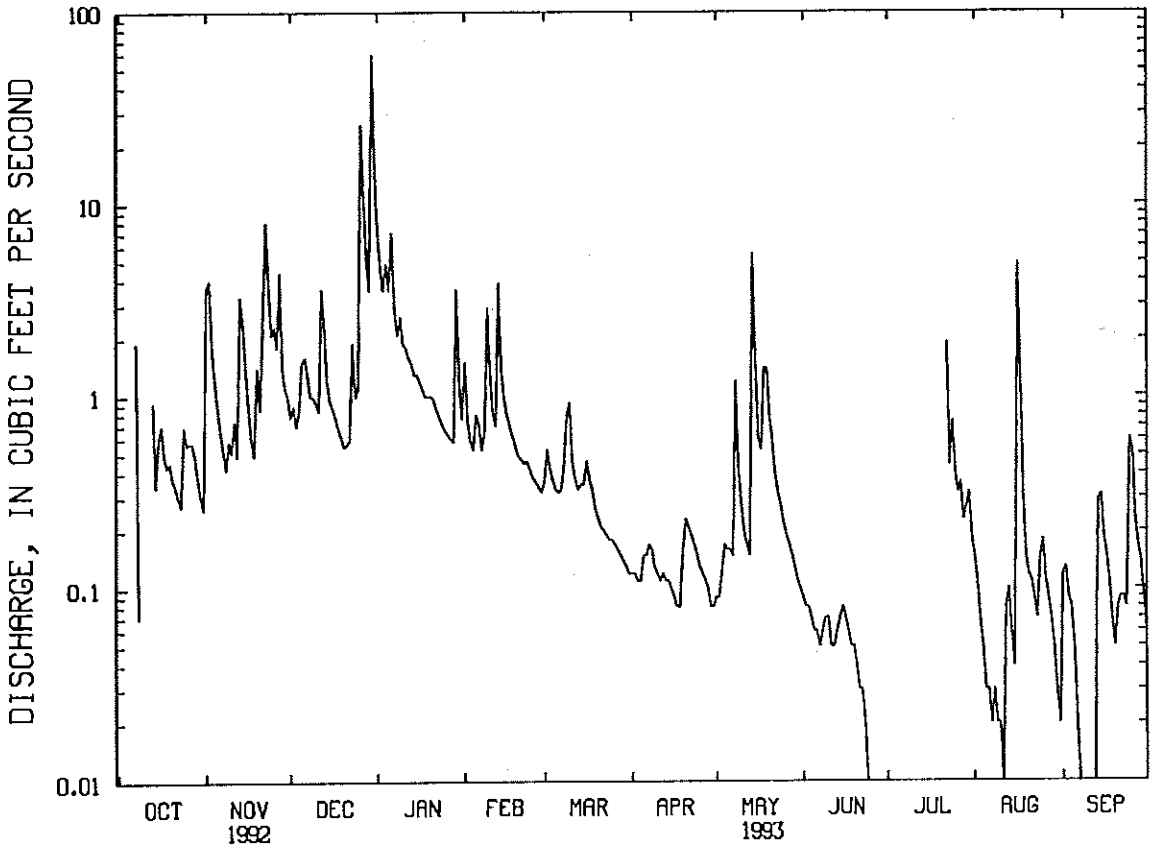
e Estimated

16211600 MAKAHA STREAM NEAR MAKAHA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1959 - 1993, BY WATER YEAR (WY)

MEAN	.79	1.65	3.19	4.47	3.60	3.09	2.74	1.54	.66	.52	.40	.40
MAX	3.66	8.67	15.0	22.7	16.3	11.5	15.7	5.33	1.72	1.31	1.44	2.19
(WY)	1983	1966	1965	1982	1976	1962	1963	1965	1978	1986	1983	1974
MIN	.000	.074	.21	.26	.27	.33	.13	.20	.045	.059	.002	.000
(WY)	1976	1978	1960	1977	1978	1993	1993	1984	1993	1975	1975	1961

SUMMARY STATISTICS	FOR 1992 CALENDAR YEAR		FOR 1993 WATER YEAR		WATER YEARS 1959 - 1993		
ANNUAL TOTAL	456.41		356.21				
ANNUAL MEAN	1.25		.98		1.91		
HIGHEST ANNUAL MEAN					3.80		1963
LOWEST ANNUAL MEAN					.77		1964
HIGHEST DAILY MEAN	60	Dec 30	60	Dec 30	283	Feb 7	1976
LOWEST DAILY MEAN	.00	Aug 15	.00	Oct 1	.00	Sep 25	1960
ANNUAL SEVEN-DAY MINIMUM	.00	Aug 25	.00	Jun 25	.00	Aug 28	1961
ANNUAL RUNOFF (AC-FT)	905		707		1390		
10 PERCENT EXCEEDS	2.1		1.8		3.7		
50 PERCENT EXCEEDS	.61		.28		.62		
90 PERCENT EXCEEDS	.00		.00		.08		



16212800 KIPAPA STREAM NEAR WAHIAWA

LOCATION.--Lat 21°28'13", long 157°57'40", Hydrologic Unit 20060000, on left bank 1,700 ft downstream from forest-reserve boundary, 4.9 mi southeast of Wahiawa Post Office, and 6.3 mi northeast of Waipahu.

DRAINAGE AREA.--4.29 mi^2.

PERIOD OF RECORD.--January 1957 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 690 ft, from topographic map.

REMARKS.--Records fair. At times, a small amount of water is diverted from the gage pool for domestic use. Recording rain gage located at station.

AVERAGE DISCHARGE.--36 years, 11.0 ft^3/s (8,000 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 6,370 ft^3/s, Mar. 21, 1991, revised, gage height, 12.67 ft, from rating curve extended above 5,680 ft^3/s on basis of the shape of the rating; no flow at times.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 930 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Dec. 23	1830	1,020	7.09	Jul. 21	2300	1,180	7.45
Dec. 26	0230	2,240	9.25	Sep. 23	0530	*4,250	*11.35

Minimum discharge, No flow on several days.

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	1.5	13	17	e30	.95	.63	.00	3.6	1.C	7.4	21	64
2	1.4	10	45	e20	.79	.98	.00	1.9	.79	1.7	18	7.2
3	1.3	3.5	21	e11	.73	1.0	.00	1.7	.61	.86	7.4	4.1
4	1.2	2.4	18	e5.0	.63	.73	.00	3.2	.51	3.2	5.1	13
5	1.1	1.9	23	e6.0	.61	.65	.00	2.1	.55	3.3	5.9	4.0
6	4.7	1.6	8.6	e12	.60	.62	.00	1.4	.67	3.2	4.1	2.5
7	20	3.5	6.6	e9.0	.51	.54	3.1	1.0	1.4	2.5	4.7	2.0
8	6.2	2.8	4.8	e5.0	.58	12	12	16	11	3.9	4.5	1.7
9	1.9	40	5.7	e4.0	18	26	2.4	11	9.3	1.1	4.2	2.4
10	1.2	7.1	4.9	e4.0	4.5	3.9	.94	4.3	2.3	.66	6.0	3.4
11	.99	22	19	e3.5	1.7	1.3	.39	2.8	1.2	.48	28	4.2
12	8.4	15	15	e3.0	1.1	.62	.20	29	.95	.69	8.9	40
13	13	46	9.4	e3.0	.81	.36	.15	9.2	1.5	.57	6.1	18
14	3.2	17	5.2	e2.6	.64	.27	.17	15	.81	.51	4.6	9.5
15	3.9	12	3.8	e2.5	.49	.25	.04	9.4	.50	.26	3.3	5.0
16	6.3	5.6	3.2	e2.2	.41	.21	.00	3.4	.36	.11	22	3.8
17	4.8	9.0	17	e2.0	.35	.13	.00	3.2	.35	.13	23	5.9
18	2.7	6.5	5.4	e1.8	.31	.14	.00	6.1	1.7	.83	7.7	3.0
19	1.5	5.8	4.4	e1.7	.29	.15	6.7	13	3.1	17	6.1	51
20	1.4	4.3	19	e1.6	.33	.25	24	11	1.8	23	7.0	100
21	17	3.2	8.7	e1.5	.34	.30	8.2	49	.84	49	3.5	10
22	4.4	12	17	e1.4	.44	.23	1.8	7.1	.65	203	3.7	5.8
23	11	6.0	98	1.4	.66	.13	44	3.9	.44	44	6.4	181
24	17	2.8	41	1.3	.78	.08	7.7	3.0	.32	50	29	16
25	21	3.5	18	1.2	.87	.07	8.0	2.2	.26	35	12	12
26	8.2	32	190	1.2	1.1	.02	3.7	1.6	.33	30	3.9	7.1
27	17	12	e40	1.0	.75	.02	28	1.3	.34	21	2.8	8.9
28	8.7	4.5	e35	1.0	.61	.00	5.4	1.1	.23	32	2.3	5.0
29	4.7	7.1	e55	1.4	---	.00	2.8	.96	.18	32	2.1	4.3
30	3.8	14	e199	1.4	---	.00	3.9	.81	.11	13	1.8	28
31	10	---	e100	.97	---	.00	---	.86	---	7.2	24	---
TOTAL	209.49	326.1	1057.7	143.67	39.88	51.58	163.59	220.13	44.10	587.60	289.1	622.8
MEAN	6.76	10.9	34.1	4.63	1.42	1.66	5.45	7.10	1.47	19.0	9.33	20.8
MAX	21	46	199	30	18	26	44	49	11	203	29	181
MIN	.99	1.6	3.2	.97	.29	.00	.00	.81	.11	.11	1.8	1.7
AC-FT	416	647	2100	285	79	102	324	437	87	1170	573	1240

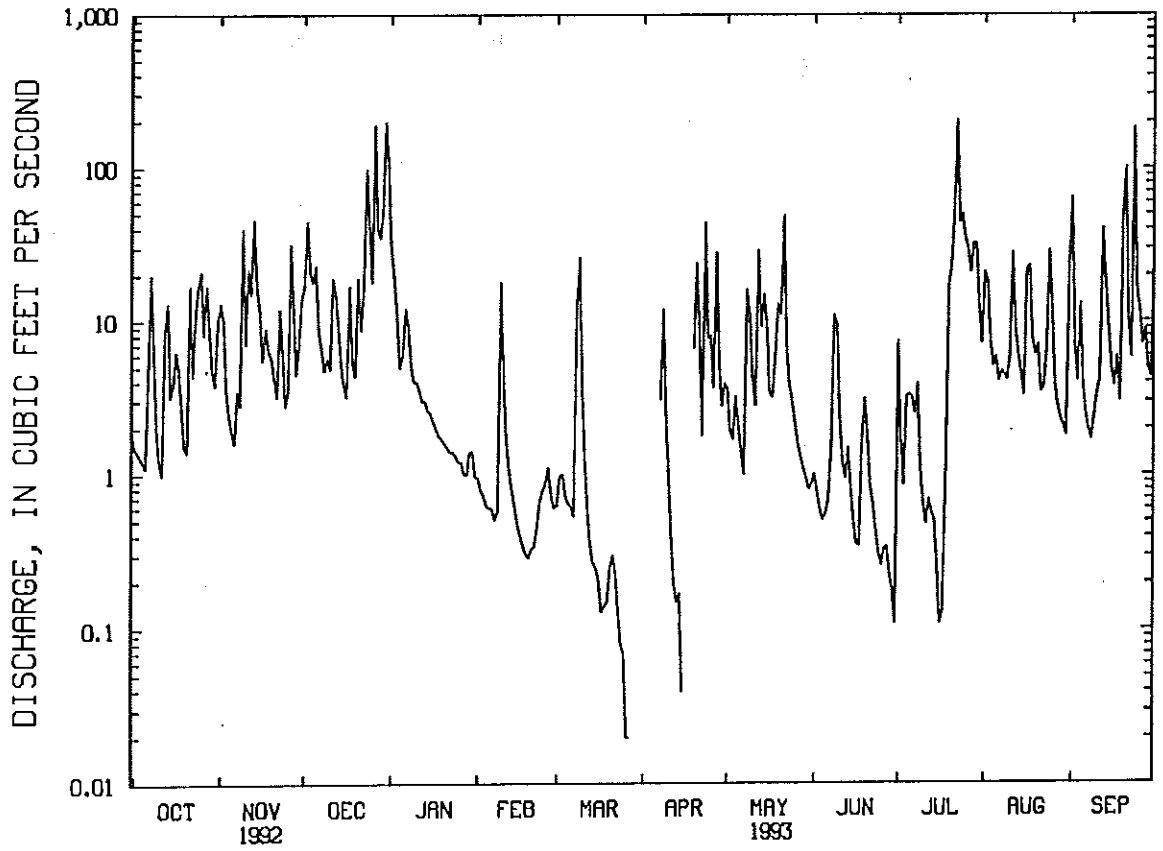
e Estimated

16212800 KIPAPA STREAM NEAR WAHIAWA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1957 - 1993, BY WATER YEAR (WY)

MEAN	10.3	15.0	13.0	11.2	10.1	16.8	15.7	9.79	5.39	9.94	8.51	5.91
MAX	49.6	61.8	42.2	32.1	54.4	98.4	60.9	34.0	21.9	28.1	37.5	20.8
(WY)	1982	1966	1988	1989	1969	1991	1963	1965	1978	1989	1958	1993
MIN	.84	.23	.83	.17	.19	.021	.33	.39	.16	.47	.30	.54
(WY)	1958	1963	1990	1977	1978	1983	1966	1992	1959	1968	1971	1984

SUMMARY STATISTICS	FOR 1992 CALENDAR YEAR		FOR 1993 WATER YEAR		WATER YEARS 1957 - 1993	
ANNUAL TOTAL	2868.00		3755.74			
ANNUAL MEAN	7.84		10.3		11.0	
HIGHEST ANNUAL MEAN					25.2	1982
LOWEST ANNUAL MEAN					4.50	1984
HIGHEST DAILY MEAN	258	Sep 3	203	Jul 22	852	Apr 15 1963
LOWEST DAILY MEAN	.00	Apr 18	.00	Mar 28	.00	Jun 18 1959
ANNUAL SEVEN-DAY MINIMUM	.00	May 24	.00	Mar 28	.00	Jun 18 1959
ANNUAL RUNOFF (AC-FT)	5690		7450		8000	
10 PERCENT EXCEEDS	17		23		25	
50 PERCENT EXCEEDS	1.9		3.4		2.8	
90 PERCENT EXCEEDS	.10		.27		.32	



16213000 WAIKELE STREAM AT WAIPAHU
(National stream-quality accounting network station)

LOCATION.--Lat 21°23'11", long 158°00'49", Hydrologic Unit 20060000, on left bank 300 ft upstream from bridge on Highway 90, and 0.3 mi southwest of sugar refinery at Waipahu.

DRAINAGE AREA.--45.7 mi^2.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--June to October 1951, December 1951 to October 1959, July 1960 to current year.

REVISED RECORDS.--WSP 1639: 1955(M). WSP 1937: Drainage area. WSP 2137: 1965.

GAGE.--Water-stage recorder and concrete control. Datum of gage is 1.37 ft above mean sea level. Prior to July 1, 1960, at site 300 ft downstream at datum 1.30 ft higher.

REMARKS.--Records good. Diversions upstream for irrigation of sugarcane in vicinity of Waipahu.

AVERAGE DISCHARGE.--40 years (water years 1953-59, 1961-93), 40.9 ft^3/s (29,650 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 13,600 ft^3/s, Nov. 28, 1954, gage height, 14.82 ft, site and datum then in use, from rating curve extended above 730 ft^3/s on basis of slope-area measurement of peak flow; no flow for part of Feb. 25, 1978.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,300 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Dec. 26	0300	2,400	5.90	Sep. 23	0800	1,890	5.39
Dec. 30	1500	*2,640	*6.14				

Minimum discharge, 11 ft^3/s, June 23-26.

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

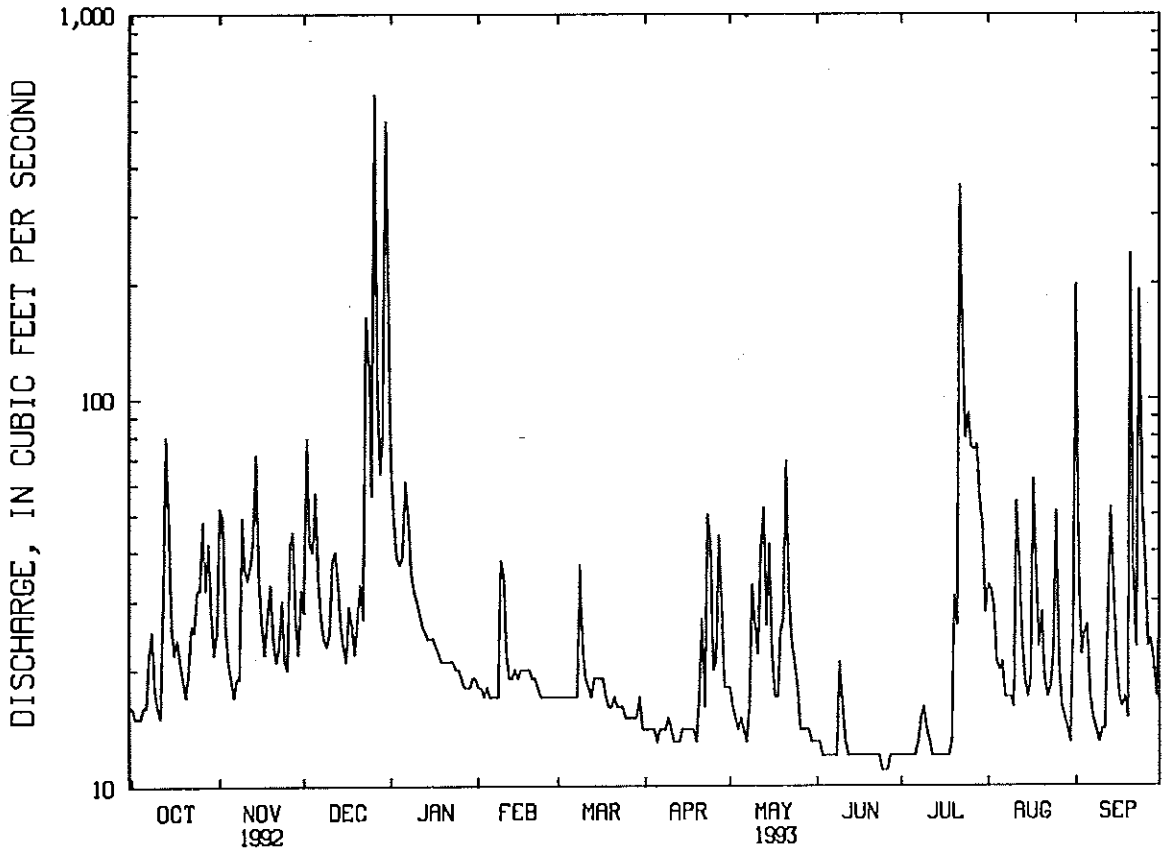
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	16	52	28	68	18	17	14	18	13	12	33	199
2	15	49	79	49	18	17	14	16	13	12	32	36
3	15	26	42	39	17	17	14	15	12	12	29	22
4	15	21	40	37	18	17	14	14	12	12	21	25
5	16	19	57	39	17	17	13	15	12	12	20	26
6	16	17	34	61	17	17	14	14	12	12	21	17
7	22	19	27	50	17	17	14	13	12	13	17	15
8	25	19	24	36	17	17	14	16	12	15	17	14
9	18	49	23	32	38	37	15	33	21	16	17	13
10	16	36	25	30	35	23	14	26	16	14	16	14
11	15	34	38	28	22	19	13	22	13	13	54	14
12	29	37	40	26	19	18	13	40	12	12	38	28
13	80	43	34	25	19	17	13	52	12	12	24	52
14	47	72	26	24	20	19	14	26	12	12	19	33
15	26	35	23	24	19	19	14	42	12	12	17	22
16	22	27	21	24	20	19	14	22	12	12	19	17
17	24	22	29	23	20	19	14	17	12	12	62	16
18	21	27	26	22	20	17	14	17	12	12	36	17
19	19	33	22	21	20	16	13	25	12	13	23	15
20	17	24	27	21	19	16	17	27	12	31	28	238
21	20	21	33	21	19	17	27	69	12	26	19	36
22	26	23	27	21	18	16	16	32	12	358	17	23
23	25	30	164	21	17	16	50	24	12	143	18	192
24	32	21	127	20	17	16	42	21	11	79	22	55
25	32	20	56	20	17	15	20	18	11	92	51	39
26	48	42	619	19	17	15	21	14	11	75	21	23
27	32	45	123	18	17	15	44	14	12	74	16	24
28	42	27	64	18	17	15	30	14	12	76	15	21
29	28	22	80	18	---	15	18	14	12	54	14	17
30	22	32	529	19	---	17	18	13	12	47	13	29
31	25	---	194	19	---	14	---	13	---	28	26	---
TOTAL	806	944	2681	893	549	546	565	716	373	1323	775	1292
MEAN	26.0	31.5	86.5	28.8	19.6	17.6	18.8	23.1	12.4	42.7	25.0	43.1
MAX	80	72	619	68	38	37	50	69	21	358	62	238
MIN	15	17	21	18	17	14	13	13	11	12	13	13
AC-FT	1600	1870	5320	1770	1090	1080	1120	1420	740	2620	1540	2560

16213000 WAIKELE STREAM AT WAIPAHU--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1953 - 1993, BY WATER YEAR (WY)

MEAN	32.8	48.3	51.8	62.5	56.5	55.0	51.1	33.8	23.1	29.0	25.9	21.5
MAX	97.8	198	146	222	179	195	235	99.3	51.5	76.8	90.0	49.9
(WY)	1992	1966	1966	1969	1955	1991	1963	1965	1980	1989	1958	1974
MIN	7.22	12.2	13.3	14.7	7.72	6.13	18.4	14.9	10.6	9.08	7.50	6.28
(WY)	1978	1954	1954	1986	1978	1978	1961	1954	1981	1985	1984	1975

SUMMARY STATISTICS	FOR 1992 CALENDAR YEAR		FOR 1993 WATER YEAR		WATER YEARS 1953 - 1993	
ANNUAL TOTAL	11357		11463			
ANNUAL MEAN	31.0		31.4		40.9	
HIGHEST ANNUAL MEAN					77.3	1969
LOWEST ANNUAL MEAN					18.5	1954
HIGHEST DAILY MEAN	619	Dec 26	619	Dec 26	2590	Mar 21 1991
LOWEST DAILY MEAN	14	Jul 1	11	Jun 24	.61	Feb 25 1978
ANNUAL SEVEN-DAY MINIMUM	14	Jul 1	12	Jun 20	2.5	Feb 24 1978
ANNUAL RUNOFF (AC-FT)	22530		22740		29650	
10 PERCENT EXCEEDS	41		49		65	
50 PERCENT EXCEEDS	22		19		24	
90 PERCENT EXCEEDS	15		12		12	



16213000 WAIKELE STREAM AT WAIPAHU--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1967-72. April 1973 to current year.

PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: April 1973 to September 1981.
WATER TEMPERATURE: April 1973 to September 1981.
SUSPENDED SEDIMENT DISCHARGE: July 1972 to August 1993 (discontinued).

INSTRUMENTATION.--Water-quality monitor April 1973 to September 1981. Automatic pumping sediment sampler since July 1972.

REMARKS.--In addition to the sediment record, water-quality samples are collected.

EXTREMES FOR PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: Maximum, 796 micromhos/cm, Dec. 1, 1980; minimum, 30 micromhos/cm, Apr. 19, 1974.
WATER TEMPERATURES: Maximum, 30.0°C, May 6, 1973; minimum, 16.0°C, Mar. 16, 1976.
SEDIMENT CONCENTRATIONS: Maximum daily mean, 3,420 mg/L, Feb. 7, 1976; minimum daily mean, 1 mg/L, Mar. 16, 20-22, 1989, July 10, 1990.
SEDIMENT DISCHARGE: Maximum daily, 32,900 tons, Apr. 19, 1974; minimum daily, less than 0.01 ton, Aug. 29, 30, 1992.

EXTREMES FOR CURRENT YEAR.--
SEDIMENT CONCENTRATIONS: Maximum daily mean, 751 mg/L (estimated), Dec. 26; minimum daily mean, 5 mg/L, Feb. 17.
SEDIMENT DISCHARGE: Maximum daily, 2,130 tons, Dec. 30; minimum daily, 0.19 ton, Jun. 23.

WATER QUALITY DATA, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	TIME	DISCHARGE, INST. CUBIC FEET PER SECOND	SPECIFIC CONDUCTANCE (US/CM)	PH WATER WHOLE FIELD (STANDARD UNITS)	TEMPERATURE WATER (DEG C)	TEMPERATURE AIR (DEG C)	TURBIDITY (NTU)	BAROMETRIC PRESSURE (MM OF HG)	OXYGEN, DISSOLVED (MG/L)	OXYGEN, DISSOLVED (PERCENT SATURATION)	COLIFORM, FECAL, 0.7 UM-MF (COLS./100 ML)
OCT 1992											
26...	1310	39	193	6.8	23.5	--	33	763	7.8	92	1600
DEC											
23...	1105	99	149	6.7	22.0	28.0	19	762	8.2	94	7200
FEB 1993											
22...	1205	16	482	6.8	22.0	29.0	1.0	766	7.9	90	110
APR											
28...	1008	32	268	7.1	22.0	29.0	11	766	7.1	81	940
JUN											
28...	1015	12	457	6.9	22.0	--	1.3	763	6.6	76	K62
AUG											
18...	1045	35	203	6.8	24.0	29.0	6.3	764	7.3	87	820

DATE	STREPTOCOCCI FECAL, KF AGAR (COLS. PER 100 ML)	HARDNESS TOTAL (MG/L AS CACO3)	HARDNESS NONCARB DISSOLV FLD. AS CACO3 (MG/L)	CALCIUM DISSOLVED (MG/L AS CA)	MAGNESIUM, DISSOLVED (MG/L AS MG)	SODIUM, DISSOLVED (MG/L AS NA)	SODIUM PERCENT	SODIUM ADSORPTION RATIO	POTASSIUM, DISSOLVED (MG/L AS K)	BICARBONATE WATER DIS IT FIELD MG/L AS HCO3	CARBONATE WATER DIS IT FIELD MG/L AS CO3
OCT 1992											
26...	5500	34	5	6.5	4.4	22	57	2	1.4	36	0
DEC											
23...	18000	26	4	5.0	3.4	14	52	1	1.7	28	0
FEB 1993											
22...	K63	78	16	13	11	61	62	3	2.5	76	0
APR											
28...	5800	50	12	9.0	6.7	34	59	2	1.9	46	0
JUN											
28...	K91	73	10	11	11	60	63	3	2.5	77	0
AUG											
18...	780	35	7	6.2	4.7	24	59	2	1.3	34	0

K Results based on colony count outside acceptance range

16213000 WAIKELE STREAM AT WAIPAHU--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	ALKALINITY WAT DIS TOT IT FIELD MG/L AS CACO3	SULFATE DIS-SOLVED (MG/L AS SO4)	CHLORIDE, DIS-SOLVED (MG/L AS CL)	FLUORIDE, DIS-SOLVED (MG/L AS F)	SILICA, DIS-SOLVED (MG/L AS SIO2)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L)	SOLIDS, SUM OF CONSTITUENTS, DIS-SOLVED (MG/L)	SOLIDS, DIS-SOLVED (TONS PER DAY)	NITROGEN, NITRITE TOTAL (MG/L AS N)	NITROGEN, NITRITE DIS-SOLVED (MG/L AS N)	NITROGEN, NO2+NO3 TOTAL (MG/L AS N)
OCT 1992											
26...	30	7.4	32	<0.10	24	126	118	13.3	0.020	0.010	0.480
DEC											
23...	22	5.1	22	<0.10	14	88	81	23.5	0.020	0.020	0.290
FEB 1993											
22...	62	21	95	0.20	64	303	314	13.1	--	0.020	--
APR											
28...	38	10	51	0.10	32	151	171	13.0	--	<0.010	--
JUN											
28...	63	20	84	0.20	64	299	298	9.53	--	<0.010	--
AUG											
18...	28	7.8	35	0.10	24	124	123	11.7	--	<0.010	--

DATE	NITROGEN, NO2+NO3 DIS-SOLVED (MG/L AS N)	NITROGEN, AMMONIA TOTAL (MG/L AS N)	NITROGEN, AMMONIA DIS-SOLVED (MG/L AS N)	NITROGEN, AMMONIA + ORGANIC TOTAL (MG/L AS N)	PHOSPHORUS TOTAL (MG/L AS P)	PHOSPHORUS DIS-SOLVED (MG/L AS P)	PHOSPHORUS ORTHO TOTAL (MG/L AS P)	PHOSPHORUS ORTHO, DIS-SOLVED (MG/L AS P)	ALUMINUM, DIS-SOLVED (UG/L AS AL)	BARIUM, DIS-SOLVED (UG/L AS BA)
OCT 1992										
26...	0.490	0.030	0.010	0.20	0.130	0.070	0.090	0.070	50	3
DEC										
23...	0.300	0.030	0.020	0.30	0.130	0.070	0.050	0.060	--	--
FEB 1993										
22...	1.70	--	0.040	<0.20	0.220	0.210	--	0.220	10	7
APR										
28...	0.730	--	0.030	0.20	0.120	0.110	--	0.110	70	5
JUN										
28...	1.50	--	0.040	<0.20	0.240	0.210	--	0.230	--	--
AUG										
18...	0.530	--	0.030	<0.20	0.100	0.080	--	0.070	180	4

DATE	TIME	COBALT, DIS-SOLVED (UG/L AS CO)	IRON, DIS-SOLVED (UG/L AS FE)	LITHIUM DIS-SOLVED (UG/L AS LI)	MANGANESE, DIS-SOLVED (UG/L AS MN)	MOLYBDENUM, DIS-SOLVED (UG/L AS MO)	NICKEL, DIS-SOLVED (UG/L AS NI)	SELENIUM, DIS-SOLVED (UG/L AS SE)	SILVER, DIS-SOLVED (UG/L AS AG)	STRONTIUM, DIS-SOLVED (UG/L AS SR)	VANADIUM, DIS-SOLVED (UG/L AS V)
OCT 1992											
26...	1310	<3	130	<4	22	<10	<1	<1	<1.0	43	10
FEB 1993											
22...	1205	<3	36	<4	58	<10	1	1	<1.0	93	41
APR											
28...	1008	<3	89	<4	26	<10	1	<1	<1.0	65	19
AUG											
18...	1045	<3	100	<4	26	<10	3	<1	<1.0	44	14

< Actual value is known to be less than the value shown

16213000 WAIKELE STREAM AT WAIPAHU--Continued

CROSS SECTION ANALYSES, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	TIME	SAMPLE LOCATION, CROSS SECTION (FT FM R BK)	SPECIFIC CONDUCTANCE (US/CM)	PH WATER WHOLE FIELD (STANDARD UNITS)	TEMPERATURE WATER (DEG C)	BAROMETRIC PRESSURE (MM OF HG)	OXYGEN, DISSOLVED (MG/L)	OXYGEN, DISSOLVED (PERCENT SATURATION)
OCT 1992								
26...*	1235	2.0	192	6.6	23.5	763	7.7	91
26...*	1240	12.0	192	6.8	23.5	763	7.8	92
26...*	1245	22.0	192	6.9	23.5	763	7.8	92
26...*	1250	33.0	194	6.9	23.0	763	7.8	91
26...*	1300	42.0	193	6.9	23.0	763	7.7	90
JUN 1993								
28...*	0945	12.0	458	6.9	22.0	763	6.5	75
28...*	0950	22.0	458	6.8	22.0	763	6.6	76
28...*	0953	33.0	456	6.9	22.0	763	6.6	75
28...*	0956	12.0	457	6.9	22.0	763	6.6	75
28...*	0958	22.0	457	6.9	22.0	763	6.6	75

* Instantaneous streamflow at the time of cross-sectional measurements: Oct. 26, 39 ft^3/s; June 28, 12 ft^3/s.

PARTICLE-SIZE DISTRIBUTION OF SUSPENDED SEDIMENT, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	TIME	SEDIMENT, SUSPENDED (MG/L)	SEDIMENT, DISCHARGE, SUSPENDED (T/DAY)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM
OCT 1992				
26...	1310	41	4.3	100
DEC				
23...	1105	11	2.9	100
FEB 1993				
22...	1205	4	0.17	100
APR 1993				
28...	1008	9	0.78	100
JUN				
28...	1015	5	0.16	100
AUG				
18...	1045	8	0.76	100

16213000 WAIKELE STREAM AT WAIPAHU--Continued

SEDIMENT DISCHARGE, SUSPENDED (TONS/DAY), WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DAY	MEAN DISCHARGE (CFS)	MEAN CONCEN-TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN-TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN-TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)
		OCTOBER			NOVEMBER			DECEMBER	
1	16	e14	.60	52	e60	14	28	e31	2.4
2	15	e12	.51	49	e59	8.5	79	e93	25
3	15	e11	.44	26	e29	2.0	42	e50	5.9
4	15	e9	.38	21	e23	1.3	40	e48	5.2
5	16	e8	.36	19	e19	.99	57	e61	9.6
6	16	10	.46	17	e20	.94	34	e40	3.7
7	22	25	1.8	19	e22	1.1	27	e33	2.4
8	25	24	1.8	19	e20	1.0	24	e27	1.8
9	18	17	.84	49	e63	11	23	e25	1.6
10	16	19	.82	36	e42	4.3	25	e26	1.8
11	15	17	.71	34	e37	3.6	38	e32	3.4
12	29	e42	8.8	37	e40	4.2	40	e37	3.9
13	80	e80	29	43	e63	12	34	e32	3.0
14	47	e50	9.2	72	e83	20	26	e29	2.0
15	26	49	3.5	35	e37	3.5	23	e32	2.0
16	22	31	1.9	27	e30	2.2	21	32	1.8
17	24	21	1.4	22	e24	1.5	29	e22	1.8
18	21	13	.76	27	e31	2.3	26	9	.66
19	19	11	.57	33	e39	3.8	22	12	.71
20	17	18	.83	24	e34	2.2	27	15	1.1
21	20	e22	1.5	21	e28	1.6	33	17	1.6
22	26	27	2.0	23	e26	1.8	27	12	.85
23	25	21	1.4	30	e32	2.6	164	e167	169
24	32	24	2.1	21	e26	1.5	127	230	97
25	32	e23	3.0	20	e23	1.2	56	182	60
26	48	67	9.0	42	e52	8.2	619	e751	1960
27	32	43	4.0	45	e51	6.5	123	137	49
28	42	60	6.9	27	e30	2.2	64	43	7.6
29	28	54	4.0	22	e25	1.5	80	74	17
30	22	50	3.0	32	e38	3.5	529	662	2130
31	25	41	2.8	---	---	---	194	191	133
TOTAL	806	---	104.38	944	---	131.03	2681	---	4704.82
		JANUARY			FEBRUARY			MARCH	
1	68	38	7.4	18	18	.91	17	24	1.1
2	49	15	2.1	18	11	.53	17	13	.57
3	39	12	1.3	17	15	.71	17	10	.43
4	37	14	1.4	18	12	.55	17	22	1.0
5	39	13	1.3	17	11	.53	17	e27	1.2
6	61	58	12	17	11	.50	17	e24	1.1
7	50	28	4.2	17	16	.73	17	e21	.97
8	36	11	1.1	17	21	.99	17	e19	.86
9	32	12	1.0	38	e50	6.1	37	e46	5.4
10	30	12	.97	35	75	7.0	23	56	3.5
11	28	9	.67	22	57	3.4	19	14	.74
12	26	8	.57	19	18	.91	18	16	.77
13	25	7	.50	19	12	.59	17	7	.32
14	24	8	.52	20	11	.57	19	12	.63
15	24	11	.71	19	12	.65	19	13	.64
16	24	15	.97	20	7	.40	19	12	.58
17	23	9	.59	20	5	.25	19	10	.50
18	22	15	.91	20	12	.67	17	8	.39
19	21	18	1.0	20	9	.50	16	12	.54
20	21	21	1.2	19	9	.48	16	13	.58
21	21	21	1.2	19	10	.52	17	10	.46
22	21	18	1.0	18	9	.43	16	8	.37
23	21	20	1.1	17	8	.37	16	e9	.37
24	20	37	2.1	17	11	.50	16	e10	.43
25	20	30	1.6	17	12	.57	15	e11	.44
26	19	39	1.9	17	14	.62	15	e12	.47
27	18	55	2.7	17	13	.59	15	e13	.53
28	18	57	2.8	17	59	2.7	15	e15	.57
29	18	42	2.1	---	---	---	15	e18	.74
30	19	35	1.8	---	---	---	17	e17	.77
31	19	52	2.7	---	---	---	14	e15	.58
TOTAL	893	---	61.41	549	---	33.27	546	---	27.55

e Estimated

1621300J WAIKELE STREAM AT WAIPAHU--Continued

SEDIMENT DISCHARGE, SUSPENDED (TONS/DAY), WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DAY	MEAN DISCHARGE (CFS)	MEAN CONCEN-TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN-TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN-TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)
		APRIL			MAY			JUNE	
1	14	e15	.58	18	10	.51	13	e15	.52
2	14	e15	.58	16	10	.42	13	e15	.51
3	14	e15	.56	15	7	.30	12	e15	.50
4	14	e15	.55	14	10	.38	12	e15	.50
5	13	e15	.55	15	14	.56	12	e15	.50
6	14	e15	.56	14	12	.45	12	e15	.49
7	14	e15	.55	13	11	.38	12	e15	.49
8	14	e15	.55	16	12	.55	12	65	2.2
9	15	e15	.60	33	23	2.0	21	61	3.2
10	14	e15	.56	26	31	2.1	16	22	.93
11	13	e15	.53	22	34	2.0	13	23	.81
12	13	e15	.54	40	e51	6.6	12	12	.40
13	13	e15	.54	52	e75	12	12	9	.30
14	14	e15	.55	26	21	1.5	12	9	.30
15	14	e15	.55	42	e48	5.8	12	12	.38
16	14	e15	.55	22	e26	1.6	12	12	.41
17	14	e15	.56	17	e19	.89	12	9	.31
18	14	e15	.55	17	e16	.74	12	8	.26
19	13	e15	.54	25	e26	1.9	12	8	.26
20	17	e20	1.3	27	e26	1.9	12	9	.28
21	27	e30	2.3	69	e73	20	12	9	.29
22	16	e17	.74	32	e41	3.6	12	10	.31
23	50	e52	12	24	e28	1.8	12	6	.19
24	42	e50	6.5	21	e24	1.4	11	8	.24
25	20	e22	1.2	18	e21	1.0	11	9	.27
26	21	e21	1.2	14	e15	.57	11	9	.27
27	44	e46	7.0	14	e15	.56	12	e7	.23
28	30	12	1.0	14	e15	.57	12	20	.62
29	18	e13	.62	14	e15	.56	12	20	.66
30	18	15	.73	13	e15	.52	12	19	.61
31	---	---	---	13	e15	.52	---	---	---
TOTAL	565	---	45.14	716	---	73.68	373	---	17.24
		JULY			AUGUST			SEPTEMBER	
1	12	14	.44	33	e32	3.1	199	---	---
2	12	11	.35	32	e32	3.0	36	---	---
3	12	14	.44	29	21	1.7	22	---	---
4	12	12	.37	21	19	1.1	25	---	---
5	12	13	.40	20	20	1.1	26	---	---
6	12	14	.45	21	29	1.7	17	---	---
7	13	17	.61	17	17	.82	15	---	---
8	15	13	.50	17	14	.66	14	---	---
9	16	11	.47	17	16	.71	13	---	---
10	14	10	.37	16	15	.64	14	---	---
11	13	9	.30	54	e45	9.6	14	---	---
12	12	11	.38	38	28	3.1	28	---	---
13	12	12	.37	24	19	1.3	52	---	---
14	12	10	.31	19	21	1.1	33	---	---
15	12	11	.37	17	18	.83	22	---	---
16	12	11	.36	19	18	1.1	17	---	---
17	12	11	.36	62	e51	9.5	16	---	---
18	12	10	.32	36	22	2.3	17	---	---
19	13	17	.61	23	e18	1.1	15	---	---
20	31	e34	3.0	28	19	1.5	238	---	---
21	26	e19	1.4	19	15	.79	36	---	---
22	358	525	537	17	13	.60	23	---	---
23	143	120	62	18	12	.57	192	---	---
24	79	e72	21	22	e17	1.5	55	---	---
25	92	58	17	51	---	---	39	---	---
26	75	e51	11	21	---	---	23	---	---
27	74	e57	14	16	---	---	24	---	---
28	76	e52	11	15	---	---	21	---	---
29	54	e41	7.3	14	---	---	17	---	---
30	47	22	3.3	13	---	---	29	---	---
31	28	13	.98	26	---	---	---	---	---
TOTAL	1323	---	696.76	775	---	---	1292	---	---

e Estimated

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16216000 WAIAWA STREAM NEAR PEARL CITY

LOCATION.--Lat 21°23'57", long 157°58'51", Hydrologic Unit 20060000, on left bank 100 ft upstream from lower bridge on Highway 90, 0.6 mi northwest of Pearl City, and 2.0 mi northeast of Waipahu.

DRAINAGE AREA.--26.4 mi^2.

PERIOD OF RECORD.--June 1952 to current year.

REVISED RECORDS.--WSP 1569: Drainage area, WDR HI-90-1: 1982-89 (M).

GAGE.--Water-stage recorder and concrete control. Datum of gage is 1.81 ft above mean sea level.

REMARKS.--Records fair. Low flow affected by effluent from sewage treatment plant and occasional small irrigation diversion and return flow upstream.

AVERAGE DISCHARGE.--41 years, 34.3 ft^3/s (24,820 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 27,900 ft^3/s, Oct. 28, 1981, gage height, 22.46 ft, from rating curve extended above 1,100 ft^3/s on basis of slope-area measurements at gage heights 17.1 ft and 20.56 ft: minimum, 1.1 ft^3/s on several days in 1984 and 1985.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,300 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Dec. 23	1800	2,890	9.55	Jul. 21	2400	4,070	10.82
Dec. 26	0200	*9,180	*14.80	Sep. 01	0230	2,790	9.42
Dec. 30	1630	3,950	10.70				

Minimum discharge, 1.1 ft^3/s on several days.

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	e1.8	94	7.9	43	e1.7	e1.7	1.5	4.8	1.2	2.0	17	486
2	e1.7	39	117	22	e1.7	e1.7	1.4	2.2	1.2	1.6	30	25
3	e1.6	11	23	14	e1.6	e1.7	1.4	1.9	1.2	1.7	13	10
4	e1.6	5.1	25	12	e1.6	e1.6	1.4	1.8	1.2	2.2	6.6	7.2
5	e1.7	2.7	38	10	e1.6	e1.6	1.4	1.7	1.2	2.3	6.0	5.8
6	e1.8	1.7	17	12	e1.5	e1.6	1.5	1.7	1.2	2.4	6.2	5.0
7	e5.0	9.4	9.0	16	e1.5	e1.6	1.5	1.6	1.2	2.4	6.1	5.4
8	7.7	5.5	5.0	e10	e1.5	e1.6	1.4	1.8	1.3	2.4	6.0	5.4
9	2.7	138	4.9	e8.0	38	e1.6	1.4	1.6	1.2	2.3	6.1	6.0
10	1.6	26	4.6	e6.4	11	e1.6	1.4	1.6	1.3	2.4	6.2	6.5
11	1.3	64	8.7	e5.0	e4.0	e1.6	1.4	1.6	1.3	2.4	24	6.5
12	8.3	32	16	e4.5	e3.0	1.6	1.4	47	1.4	2.3	14	6.4
13	44	98	11	e4.2	e2.5	1.6	1.4	13	1.4	2.3	6.9	9.4
14	15	49	5.4	e4.0	e2.2	1.6	1.4	22	1.5	2.3	6.2	12
15	4.6	32	3.1	e3.4	e2.1	1.6	1.4	13	1.5	2.3	6.2	6.2
16	2.5	13	2.1	e3.2	e2.0	1.6	1.5	2.5	2.2	2.2	6.2	6.1
17	3.2	8.0	16	e3.0	e1.9	1.6	1.5	1.5	2.2	2.0	17	6.1
18	2.3	11	5.0	e2.8	e1.9	1.6	1.5	1.1	2.3	2.1	19	6.0
19	1.8	6.0	2.3	e2.6	e1.8	1.6	1.5	5.3	2.3	2.2	17	29
20	1.4	5.3	16	e2.5	e1.8	1.6	1.5	5.7	2.4	36	12	346
21	3.6	2.9	13	e2.4	e1.8	1.6	13	47	2.4	58	4.4	26
22	9.5	11	6.0	e2.3	e1.8	1.6	2.3	11	2.3	1200	3.9	10
23	26	9.1	375	e2.2	e1.7	1.5	8.5	3.3	2.3	188	3.9	125
24	19	3.3	99	e2.1	e1.7	1.4	6.8	1.5	2.3	146	65	63
25	54	1.7	48	e2.0	e1.7	1.4	2.2	1.2	2.3	114	39	47
26	26	22	1350	e1.9	e1.7	1.4	1.6	1.2	2.3	101	7.3	12
27	19	26	161	e1.8	e1.7	1.4	19	1.1	2.3	72	4.3	8.1
28	33	8.0	47	e1.8	e1.7	1.4	7.0	1.1	2.3	147	4.1	6.1
29	17	9.2	58	e2.0	---	1.5	2.4	1.1	2.2	97	4.0	5.5
30	7.8	31	969	e1.8	---	1.5	2.6	1.1	2.3	32	4.0	17
31	13	---	247	e1.7	---	1.4	---	1.1	---	14	144	---
TOTAL	339.5	774.9	3710.0	210.6	98.7	48.4	94.2	204.1	53.7	2246.8	515.6	1315.7
MEAN	11.0	25.8	120	6.79	3.52	1.56	3.14	6.58	1.79	72.5	16.6	43.9
MAX	54	138	1350	43	38	1.7	19	47	2.4	1200	144	486
MIN	1.3	1.7	2.1	1.7	1.5	1.4	1.4	1.1	1.2	1.6	3.9	5.0
AC-FT	673	1540	7360	418	196	96	187	405	107	4460	1020	2610

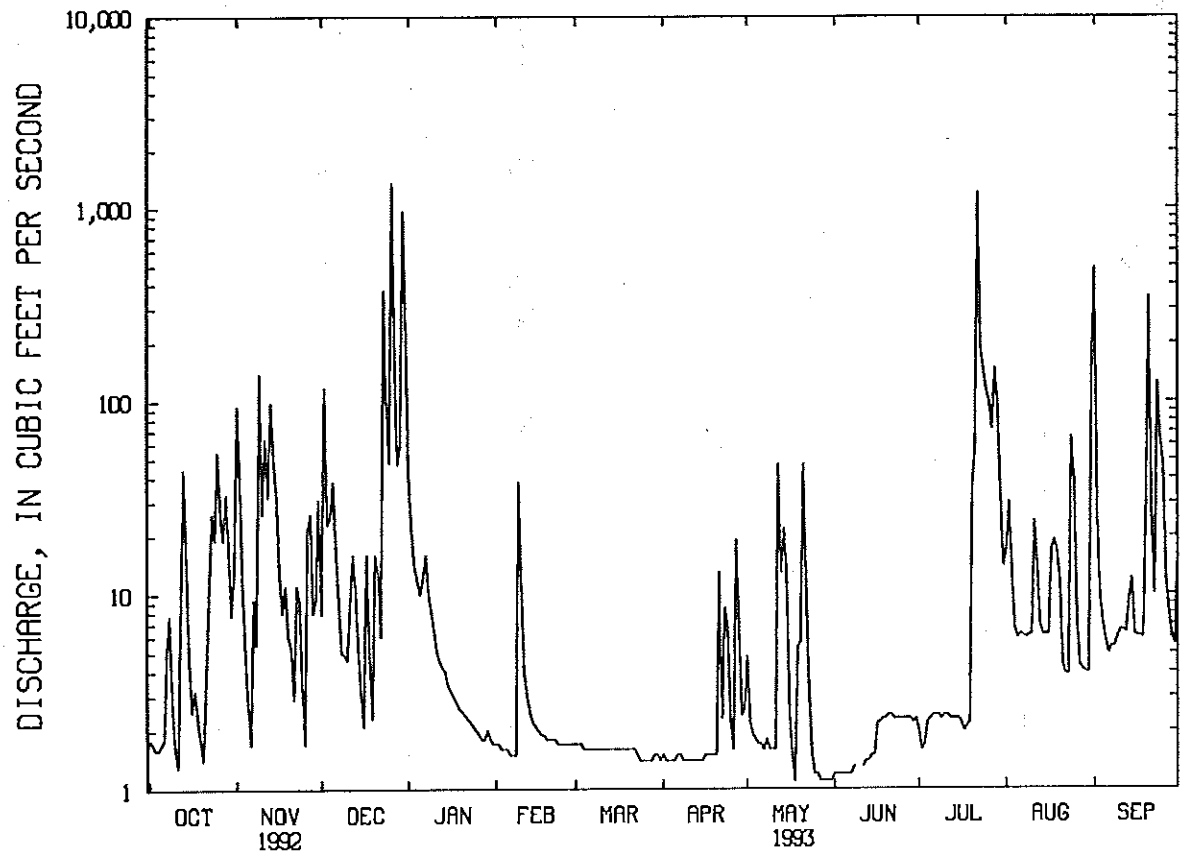
e Estimated

16216000 WAIAWA STREAM NEAR PEARL CITY--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1952 - 1993, BY WATER YEAR (WY)

MEAN	30.8	51.7	47.9	44.7	38.8	52.0	42.5	25.6	14.0	27.4	21.7	13.0
MAX	131	209	351	199	208	336	241	131	72.9	149	128	104
(WY)	1967	1991	1988	1969	1955	1980	1974	1965	1987	1970	1982	1992
MIN	1.55	2.54	1.92	1.65	1.66	1.56	1.75	1.62	1.43	1.40	1.28	1.28
(WY)	1985	1990	1984	1986	1986	1993	1992	1992	1984	1984	1984	1984

SUMMARY STATISTICS	FOR 1992 CALENDAR YEAR		FOR 1993 WATER YEAR		WATER YEARS 1952 - 1993	
ANNUAL TOTAL	9688.0		9612.2			
ANNUAL MEAN	26.5		26.3		34.3	
HIGHEST ANNUAL MEAN					80.8	1982
LOWEST ANNUAL MEAN					7.56	1984
HIGHEST DAILY MEAN	1970	Sep 3	1350	Dec 26	4870	Mar 19 1980
LOWEST DAILY MEAN	1.3	Oct 11	1.1	May 18	1.1	May 18 1993
ANNUAL SEVEN-DAY MINIMUM	1.4	Jun 29	1.1	May 25	1.1	May 25 1993
ANNUAL RUNOFF (AC-FT)	19220		19070		24820	
10 PERCENT EXCEEDS	32		41		47	
50 PERCENT EXCEEDS	2.1		2.9		6.6	
90 PERCENT EXCEEDS	1.5		1.4		2.4	



16225800 NORTH HALAWA STREAM NEAR KANEOHE

LOCATION.--Lat 21°24'33", long 157°52'06", (Kaneohe quadrangle, 1968, 1:24,000), on right bank, 4.1 miles west of Kaneohe Post Office, and 4.4 miles east of Aiea High School.

DRAINAGE AREA.--1.64 mi^2.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--April 1991 to current year.

GAGE.--Water-stage recorder. Gage datum is 646.52 ft above mean sea level.

REMARKS.--Records fair. suspended sediment data are collected at this site.

AVERAGE DISCHARGE- 3 years (Water Years 1991-93), 2.51 ft^3/s (1,820 acre ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 468 ft^3/s, Oct. 16, 1991, gage height, 6.92 ft; no flow at times each year.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 250 ft^3/s and maximum (*)

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Oct. 12	2300	284	5.30	July 21	2145	*307	*5.48

Minimum discharge, No flow for many days.

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

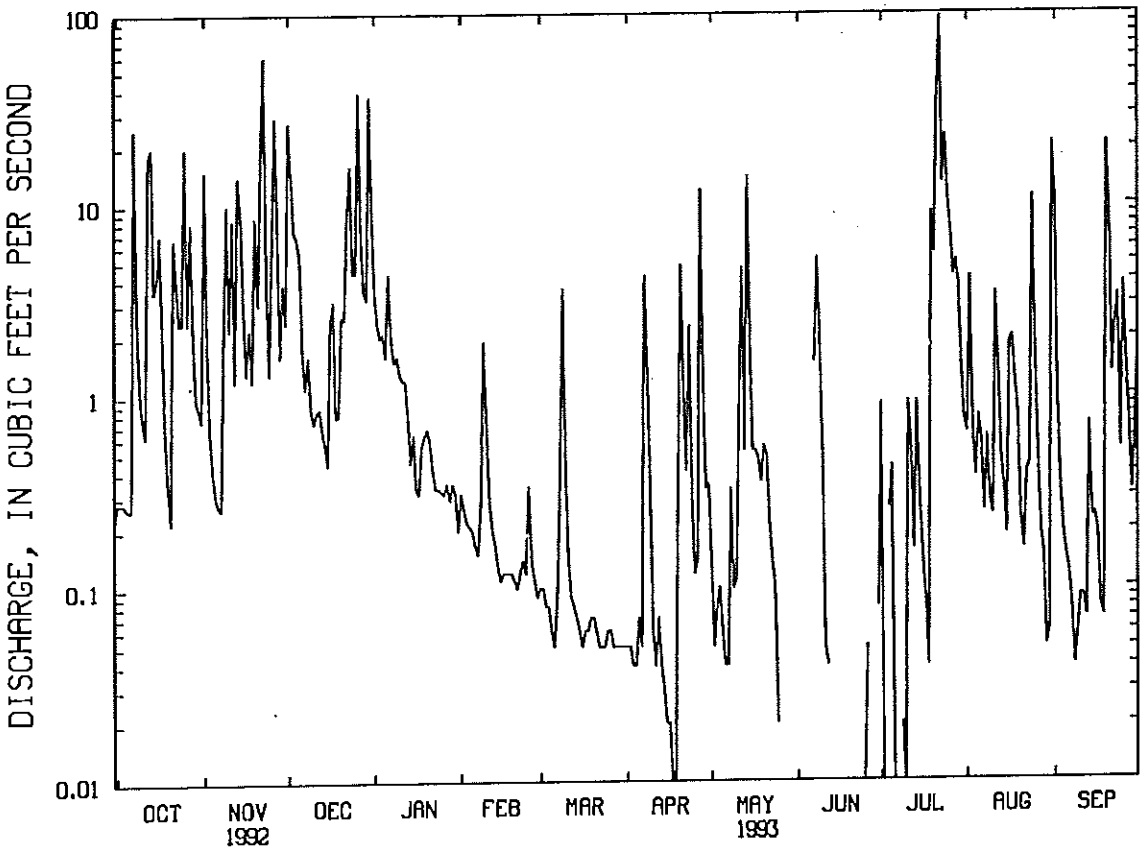
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.28	15	27	3.5	.31	.10	.05	.14	.00	.91	.64	11
2	.28	1.9	14	2.4	.26	.10	.05	.05	.00	.01	4.1	.95
3	.28	.64	7.3	2.0	.22	.08	.04	.08	.00	.00	.69	.35
4	.27	.40	6.6	2.1	.21	.08	.04	.10	.00	.26	.38	.20
5	.26	.30	5.3	1.6	.20	.06	.07	.06	.00	.43	.78	.15
6	.26	.27	1.7	4.3	.17	.05	.05	.04	.00	.01	.57	.12
7	25	.26	1.1	2.0	.15	.09	4.2	.04	1.5	.00	.25	.08
8	2.7	2.0	1.6	1.5	.27	.35	1.5	.33	5.2	.00	.61	.04
9	1.1	10	.87	1.6	1.9	3.6	.36	.10	2.1	.02	.29	.06
10	.76	2.2	.73	1.3	.73	.44	.06	.11	.52	.01	.24	.09
11	.62	8.4	.83	1.2	.29	.14	.04	.85	.05	.93	3.4	.09
12	18	1.2	.86	1.2	.20	.09	.07	4.6	.04	.58	1.4	.07
13	20	14	.67	.78	.17	.08	.04	.52	.00	.16	.48	.71
14	3.5	9.4	.56	.45	.13	.07	.03	14	.00	.93	.34	.23
15	4.0	3.1	.44	.63	.11	.06	.02	1.9	.00	.29	.19	.24
16	6.9	1.3	2.5	.33	.12	.05	.02	.52	.00	.15	1.9	.19
17	2.2	2.2	3.1	.31	.12	.06	.01	.52	.00	.09	2.0	.08
18	.66	1.2	.78	.55	.12	.06	.01	.47	.00	.04	1.2	.07
19	.35	8.6	.79	.62	.12	.07	.33	.36	.08	9.1	.79	21
20	.22	3.0	2.6	.67	.11	.07	4.8	.55	.00	5.5	.23	9.3
21	6.6	17	2.5	.58	.10	.06	1.1	.49	.00	34	.16	1.3
22	3.9	60	8.6	.42	.12	.05	.41	.22	.01	96	.40	2.4
23	2.4	3.9	16	.33	.14	.05	2.3	.14	.00	13	.44	3.3
24	2.4	1.3	4.4	.33	.12	.05	.30	.10	.00	23	11	.53
25	20	6.6	4.4	.32	.34	.06	.12	.02	.01	11	1.7	3.8
26	2.4	29	39	.31	.14	.06	.14	.00	.05	7.5	.51	1.5
27	8.1	7.0	6.9	.35	.11	.05	12	.00	.00	4.2	.20	.75
28	2.1	1.6	3.5	.29	.09	.05	1.3	.00	.00	5.0	.15	.32
29	.98	3.8	3.2	.35	---	.05	.33	.00	.00	3.8	.05	.63
30	.86	2.4	37	.31	---	.05	.35	.00	.08	1.5	.06	1.7
31	.75	---	8.9	.20	---	.05	---	.00	---	.75	21	---
TOTAL	138.13	217.97	213.73	32.83	7.07	6.28	30.14	26.31	9.64	219.17	56.15	61.25
MEAN	4.46	7.27	6.89	1.06	.25	.20	1.00	.85	.32	7.07	1.81	2.04
MAX	25	60	39	4.3	1.9	3.6	12	14	5.2	96	21	21
MIN	.22	.26	.44	.20	.09	.05	.01	.00	.00	.00	.05	.04
AC-FT	274	432	424	65	14	12	60	52	19	435	111	121

16225800 NORTH HALAWA STREAM NEAR KANEOHE--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1991 - 1993, BY WATER YEAR (WY)

MEAN	4.47	3.91	4.90	.93	.38	.75	.51	.46	.72	4.15	2.97	5.29
MAX	4.48	7.27	6.89	1.06	.51	1.31	1.00	.85	1.72	7.07	5.97	12.3
(WY)	1992	1993	1993	1993	1992	1992	1993	1993	1991	1993	1991	1992
MIN	4.46	.56	2.90	.81	.25	.20	.018	.033	.11	2.69	1.13	1.53
(WY)	1993	1992	1992	1992	1993	1993	1992	1992	1992	1991	1992	1991

SUMMARY STATISTICS	FOR 1992 CALENDAR YEAR		FOR 1993 WATER YEAR		WATER YEARS 1991 - 1993	
ANNUAL TOTAL	1142.21		1018.67			
ANNUAL MEAN	3.12		2.79		2.51	
HIGHEST ANNUAL MEAN					2.79	1993
LOWEST ANNUAL MEAN					2.23	1992
HIGHEST DAILY MEAN	124	Sep 3	96	Jul 22	124	Sep 3 1992
LOWEST DAILY MEAN	.00	Jan 24	.00	May 26	.00	Nov 28 1991
ANNUAL SEVEN-DAY MINIMUM	.00	Jan 24	.00	May 26	.00	Jan 24 1992
ANNUAL RUNOFF (AC-FT)	2270		2020		1820	
10 PERCENT EXCEEDS	8.3		7.1		5.3	
50 PERCENT EXCEEDS	.20		.35		.31	
90 PERCENT EXCEEDS	.00		.02		.00	



16225800 NORTH HALAWA STREAM NEAR KANEOHE--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--April 1991 to current year.

PERIOD OF DAILY RECORD.--
SUSPENDED SEDIMENT DISCHARGE: April 1991 to current year.

INSTRUMENTATION.--Automatic pumping sediment sampler since September 1991.

REMARKS.--Water-quality samples were also collected at this site.

EXTREMES FOR PERIOD OF DAILY RECORD.--
SEDIMENT CONCENTRATIONS: Maximum daily mean, 5,620 mg/L (estimated), Sep. 3, 1992; no flow on many days in 1992.
SEDIMENT DISCHARGE: Maximum daily, 979 tons (estimated), Sep. 3, 1992; no flow on many days in 1992.

EXTREMES FOR CURRENT YEAR.--
SEDIMENT CONCENTRATIONS: Maximum daily mean, 2,850 mg/L (estimated), July 22; minimum daily mean, 1 mg/L (estimated) on many days.
SEDIMENT DISCHARGE: Maximum daily, 758 tons (estimated), July 22; minimum daily, less than 0.01 tons on many days.

PARTICLE-SIZE DISTRIBUTION OF SUSPENDED SEDIMENT, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	TIME	SEDIMENT, SUSPENDED (MG/L)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM
OCT 1992			
12...	0755	299	94

16225800 NORTH HALAWA STREAM NR KANEOHE--Continued

SEDIMENT DISCHARGE, SUSPENDED (TONS/DAY), WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DAY	MEAN DISCHARGE (CFS)	MEAN CONCEN-TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN-TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN-TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)
		OCTOBER			NOVEMBER			DECEMBER	
1	.28	e150	.11	15	e1000	75	27	e773	137
2	.28	e150	.11	1.9	86	.66	14	304	20
3	.28	e150	.11	.64	86	.14	7.3	e554	14
4	.27	e150	.11	.40	171	.19	6.6	e363	12
5	.26	e150	.11	.30	67	.05	5.3	221	5.7
6	.26	e150	.11	.27	48	.03	1.7	65	.32
7	25	902	94	.26	e43	.03	1.1	30	.25
8	2.7	e478	4.0	2.0	e172	1.3	1.6	e197	1.3
9	1.1	e262	.76	10	e235	12	.87	e229	.54
10	.76	e180	.37	2.2	e244	.57	.73	e247	.50
11	.62	e170	.29	8.4	98	3.8	.83	1660	3.6
12	18	e633	139	1.2	21	.07	.86	e260	.62
13	20	e1050	107	14	e366	26	.67	e193	.35
14	3.5	e446	5.6	9.4	e468	15	.56	e157	.24
15	4.0	e571	8.9	3.1	e200	1.9	.44	e150	.18
16	6.9	e610	16	1.3	e84	.31	2.5	e315	5.1
17	2.2	72	.38	2.2	e55	.34	3.1	e410	4.3
18	.66	71	.11	1.2	28	.09	.78	e203	.43
19	.35	132	.13	8.6	e326	9.7	.79	e214	.47
20	.22	e91	.05	3.0	e96	.80	2.6	e446	3.9
21	6.6	e808	24	17	e516	93	2.5	e356	3.5
22	3.9	e517	15	60	e1860	336	8.6	e611	15
23	2.4	e463	2.5	3.9	78	1.4	16	e1060	49
24	2.4	e274	1.6	1.3	27	.09	4.4	e506	6.3
25	20	e181	13	6.6	e382	19	4.4	e579	15
26	2.4	396	2.5	29	e397	32	39	e1370	192
27	8.1	e370	9.2	7.0	e168	6.7	6.9	e387	8.3
28	2.1	100	.69	1.6	19	.08	3.5	e183	1.9
29	.98	e158	.36	3.8	e255	7.8	3.2	1520	9.5
30	.86	e139	.26	2.4	e190	1.5	37	3990	428
31	.75	e86	.20	---	---	---	8.9	453	16
TOTAL	138.13	---	446.56	217.97	---	645.55	213.73	---	955.30
		JANUARY			FEBRUARY			MARCH	
1	3.5	e384	3.6	.31	e142	.13	.10	e69	.02
2	2.4	e354	2.3	.26	e112	.08	.10	e66	.02
3	2.0	e326	1.7	.22	e100	.06	.08	e64	.01
4	2.1	e336	1.9	.21	e100	.06	.08	e61	.01
5	1.6	e303	1.3	.20	e100	.05	.06	e59	.01
6	4.3	e470	6.6	.17	e100	.05	.05	e57	.01
7	2.0	e368	2.0	.15	e100	.04	.09	e83	.02
8	1.5	e325	1.4	.27	e185	.15	.35	e186	.36
9	1.6	e319	1.3	1.9	e384	2.0	3.6	e476	7.9
10	1.3	e314	1.1	.73	e250	.51	.44	e120	.16
11	1.2	e309	1.0	.29	e154	.12	.14	e83	.03
12	1.2	e304	.94	.20	e112	.06	.09	e73	.02
13	.78	e275	.60	.17	e96	.04	.08	e72	.02
14	.45	e186	.23	.13	e83	.03	.07	e71	.01
15	.63	e197	.34	.11	e74	.02	.06	e70	.01
16	.33	e136	.12	.12	e91	.03	.05	e70	.01
17	.31	e146	.13	.12	e113	.04	.06	261	.05
18	.55	e193	.32	.12	e99	.03	.06	e70	.01
19	.62	e260	.44	.12	e83	.03	.07	e74	.01
20	.67	3230	5.9	.11	e122	.04	.07	e70	.01
21	.58	e307	.48	.10	e91	.02	.06	e70	.01
22	.42	e109	.12	.12	e94	.03	.05	e70	.01
23	.33	e100	.09	.14	e104	.04	.05	e70	.01
24	.33	e100	.09	.12	e87	.03	.05	e70	.01
25	.32	e100	.09	.34	e173	.19	.06	e70	.01
26	.31	e100	.08	.14	e108	.04	.06	e70	.01
27	.35	e126	.12	.11	e96	.03	.05	e70	.01
28	.29	e104	.08	.09	e78	.02	.05	e70	.01
29	.35	e131	.13	---	---	---	.05	e70	.01
30	.31	e130	.11	---	---	---	.05	e70	.01
31	.20	e107	.06	---	---	---	.05	e70	.01
TOTAL	32.83	---	34.67	7.07	---	3.97	6.28	---	8.81

e Estimated

16225800 NORTH HALAWA STREAM NR KANEOHE--Continued

SEDIMENT DISCHARGE, SUSPENDED (TONS/DAY), WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DAY	MEAN DISCHARGE (CFS)	MEAN CONCEN-TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN-TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN-TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)
		APRIL			MAY			JUNE	
1	.05	e70	.01	.14	e114	.05	.00	e1	<.01
2	.05	e70	.01	.05	e68	.01	.00	e1	<.01
3	.04	e70	.01	.08	e78	.02	.00	e1	<.01
4	.04	e70	.01	.10	e91	.03	.00	e1	<.01
5	.07	e70	.01	.06	e80	.01	.00	e1	<.01
6	.05	e70	.01	.04	e4	<.01	.00	e1	<.01
7	4.2	e473	13	.04	e1	<.01	1.5	e130	1.5
8	1.5	e355	2.1	.33	e102	.13	5.2	e503	3.3
9	.36	e142	.16	.10	e77	.02	2.1	e305	.52
10	.06	e63	.01	.11	e93	.03	.52	e66	.03
11	.04	e52	<.01	.85	e111	2.3	.05	e2	<.01
12	.07	e106	.03	4.6	e166	4.3	.04	e11	<.01
13	.04	e50	.01	.52	e34	.05	.00	e1	<.01
14	.03	e37	<.01	14	e503	64	.00	e1	<.01
15	.02	e26	<.01	1.9	e149	.77	.00	e1	<.01
16	.02	e29	<.01	.52	e128	.18	.00	e1	<.01
17	.01	e26	<.01	.52	e120	.17	.00	e1	<.01
18	.01	e27	<.01	.47	e120	.15	.00	e1	<.01
19	.33	353	.46	.36	e120	.12	.08	e17	<.01
20	4.8	e472	9.2	.55	e166	.28	.00	e1	<.01
21	1.1	e321	1.2	.49	e153	.21	.00	e1	<.01
22	.41	e180	.33	.22	e103	.06	.01	e5	<.01
23	2.3	e376	2.8	.14	e80	.03	.00	e1	<.01
24	.30	e118	.11	.10	e62	.02	.00	e1	<.01
25	.12	e66	.02	.02	e17	<.01	.01	e2	<.01
26	.14	e107	.11	.00	1	<.01	.05	e18	<.01
27	12	e1020	40	.00	e1	<.01	.00	e1	<.01
28	1.3	e388	1.6	.00	e1	<.01	.00	e1	<.01
29	.33	e138	.13	.00	e1	<.01	.00	e1	<.01
30	.35	e170	.17	.00	e1	<.01	.08	e31	.01
31	---	---	---	.00	e1	<.01	---	---	---
TOTAL	30.14	---	71.56	26.31	---	73.03	9.64	---	5.61
		JULY			AUGUST			SEPTEMBER	
1	.91	e92	.09	.64	e189	.33	11	e1170	61
2	.01	e2	<.01	4.1	e501	8.3	.95	e264	1.0
3	.00	e1	<.01	.69	e183	.36	.35	e203	.33
4	.26	e81	.04	.38	e135	.14	.20	e156	.13
5	.43	e88	.05	.78	e212	.56	.15	e119	.06
6	.01	e2	<.01	.57	e233	.39	.12	e92	.04
7	.00	e1	<.01	.25	e106	.07	.08	e76	.03
8	.00	e1	<.01	.61	e207	.36	.04	210	.06
9	.02	e11	<.01	.29	e177	.14	.06	e82	.02
10	.01	e3	<.01	.24	e135	.10	.09	e101	.04
11	.93	e133	1.1	3.4	e339	3.4	.09	e108	.04
12	.58	147	.30	1.4	e319	1.2	.07	e76	.02
13	.16	e81	.03	.48	e170	.23	.71	e205	.82
14	.93	e194	.88	.34	e122	.11	.23	e116	.13
15	.29	e150	.14	.19	e104	.05	.24	e126	.18
16	.15	e118	.06	1.9	922	4.9	.19	e166	.13
17	.09	e58	.02	2.0	e445	2.5	.08	e110	.04
18	.04	e17	<.01	1.2	e245	1.1	.07	e73	.02
19	9.1	e747	26	.79	e253	.57	21	e809	68
20	5.5	e555	9.1	.23	e157	.10	9.3	e809	25
21	34	e1030	256	.16	e101	.04	1.3	e229	.86
22	96	e2850	758	.40	e138	.18	2.4	e312	8.3
23	13	330	20	.44	e165	.21	3.3	e889	10
24	23	e661	75	11	e597	47	.53	e297	.40
25	11	e775	26	1.7	e312	1.7	3.8	e400	10
26	7.5	e549	13	.51	e131	.23	1.5	e444	2.2
27	4.2	e424	5.3	.20	e83	.05	.75	e400	.86
28	5.0	e591	8.7	.15	e80	.03	.32	e202	.17
29	3.8	e518	5.9	.05	e44	.01	.63	e183	.54
30	1.5	e459	1.9	.06	e88	.02	1.7	e400	1.9
31	.75	e294	.60	21	e991	90	---	---	---
TOTAL	219.17	---	1208.29	56.15	---	164.38	61.25	---	192.32
YEAR	1018.67		3810.05						

< Actual value is known to be less than the value shown
e Estimated

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16226000 NORTH HALAWA STREAM NEAR AIEA

LOCATION.--Lat 21°23'46", long 157°53'37", Hydrologic Unit 20060000, on left bank 2.7 mi upstream from confluence with South Halawa Stream and 2.7 mi northeast of Aiea Post Office.

DRAINAGE AREA.--3.45 mi^2.

PERIOD OF RECORD.--August 1929 to June 1933, July 1953 to current year. Monthly discharge only May, June 1931, published in WSP 1319.

REVISED RECORDS.--WSP 1319: Drainage area. WSP 1719: 1954-55(P), 1956, 1957(P), 1958-59.

GAGE.--Water-stage recorder. Elevation of gage is 320 ft, from topographic map.

REMARKS.--Records good. Recording rain gage located at station.

AVERAGE DISCHARGE.--43 years (water years 1930-32, 1954-93), 5.51 ft^3/s (4,000 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 6,650 ft^3/s, Feb. 28, 1932, gage height, 13.36 ft, from rating curve extended above 420 ft^3/s; maximum gage height, 13.46 ft, May 14, 1963; no flow at times each year.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 570 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Dec. 30	1600	*217	*7.18	July 21	2200	214	7.16

Minimum discharge, no flow on many days.

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

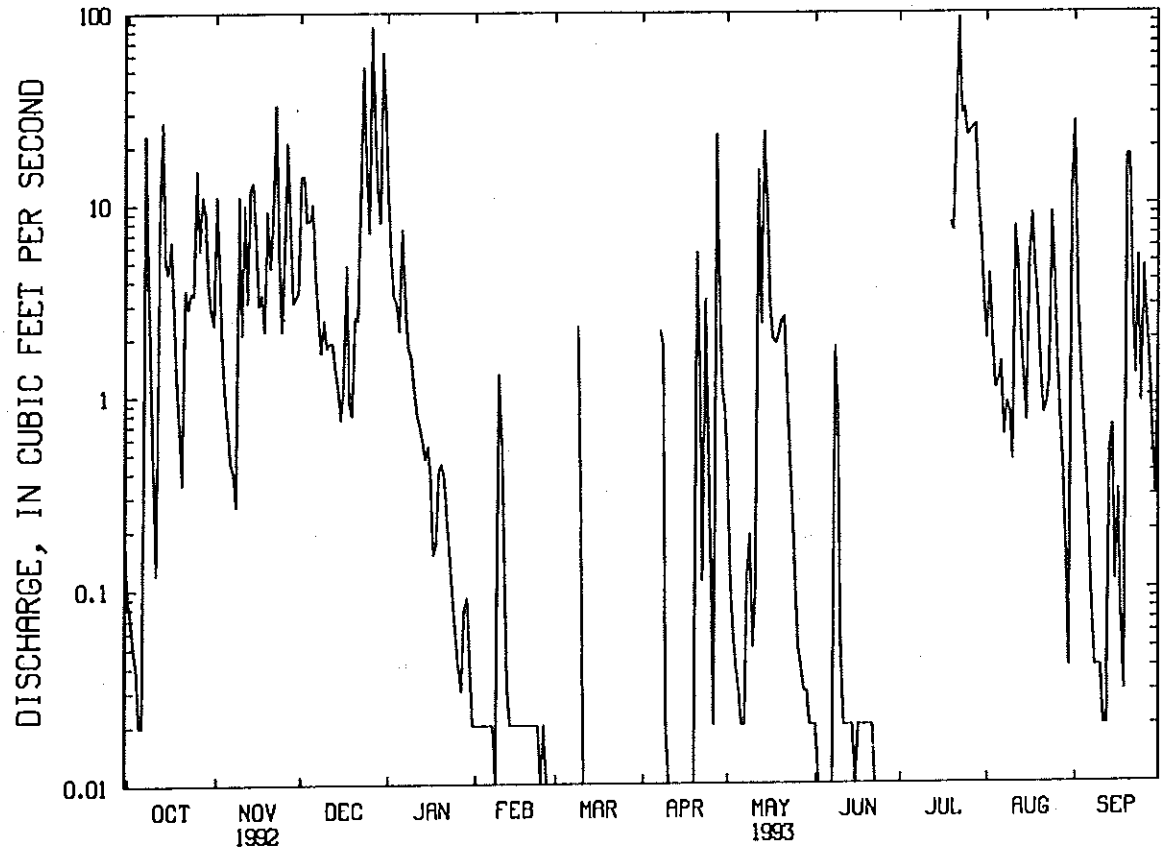
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.09	11	14	11	.02	.00	.00	.41	.02	.01	2.0	27
2	.07	4.5	14	5.3	.02	.01	.00	.11	.01	.01	4.3	3.7
3	.05	1.7	8.2	3.3	.02	.00	.00	.06	.01	.00	1.9	1.5
4	.04	1.0	8.2	3.1	.02	.00	.00	.04	.00	.01	1.1	.78
5	.02	.68	10	2.2	.02	.00	.00	.03	.00	.01	1.2	.41
6	.02	.45	4.3	7.4	.02	.00	.00	.02	.00	.01	1.5	.20
7	23	.40	2.7	3.2	.02	.00	2.2	.02	.01	.00	.62	.08
8	4.5	.27	1.7	1.8	.01	.00	1.8	.12	1.8	.00	.92	.04
9	1.1	11	2.5	1.6	1.3	2.3	.02	.19	.84	.00	.83	.04
10	.35	2.1	1.8	1.1	.61	.27	.01	.05	.05	.00	.46	.04
11	.12	10	1.9	.81	.13	.01	.01	.10	.02	.00	7.6	.02
12	9.3	3.1	1.9	.70	.03	.01	.01	15	.02	.00	5.1	.02
13	27	12	1.4	.58	.02	.01	.01	2.4	.02	.00	2.2	.52
14	5.0	13	1.1	.47	.02	.01	.01	24	.02	.00	1.3	.69
15	4.4	6.9	.76	.55	.02	.01	.01	10	.01	.00	.74	.11
16	6.4	3.0	1.2	.37	.02	.01	.01	3.0	.02	.00	5.1	.32
17	2.8	3.4	4.8	.15	.02	.01	.01	2.0	.02	.00	8.9	.07
18	1.2	2.2	.93	.17	.02	.01	.01	1.9	.02	.00	4.7	.03
19	.70	9.2	.79	.41	.02	.01	.01	2.1	.02	8.0	3.1	18
20	.35	4.7	2.6	.44	.02	.01	5.6	2.5	.02	7.3	1.4	18
21	3.6	8.8	2.5	.37	.02	.01	1.5	2.6	.02	27	.81	3.5
22	2.9	33	12	.23	.02	.01	.11	1.1	.01	94	.89	1.3
23	3.5	5.8	52	.15	.02	.00	3.2	.48	.01	30	1.2	5.3
24	3.4	2.2	15	.09	.01	.00	.58	.25	.01	32	9.0	.92
25	15	5.6	7.2	.06	.02	.00	.14	.11	.00	23	4.3	4.7
26	5.8	21	85	.04	.01	.00	.02	.05	.01	24	1.6	2.5
27	11	8.1	28	.03	.01	.00	23	.04	.01	25	.77	1.5
28	9.1	3.1	12	.08	.00	.00	3.5	.03	.00	26	.40	.60
29	3.9	3.3	8.1	.09	---	.00	1.1	.03	.00	11	.17	.30
30	2.8	3.5	62	.04	---	.00	.82	.02	.00	7.1	.04	2.4
31	2.4	---	32	.02	---	.00	---	.02	---	3.3	12	---
TOTAL	149.91	195.00	400.58	45.85	2.49	2.70	43.69	68.78	3.00	317.75	86.15	94.59
MEAN	4.84	6.50	12.9	1.48	.089	.087	1.46	2.22	.10	10.2	2.78	3.15
MAX	27	33	85	11	1.3	2.3	23	24	1.8	94	12	27
MIN	.02	.27	.76	.02	.00	.00	.00	.02	.00	.00	.04	.02
AC-FT	297	387	795	91	4.9	5.4	87	136	6.0	630	171	188

16226000 NORTH HALAWA STREAM NEAR AIEA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1929 - 1993, BY WATER YEAR (WY)

MEAN	3.59	8.02	8.20	6.59	8.29	8.27	7.24	5.09	1.74	3.78	3.80	2.15
MAX	16.3	50.6	35.0	26.0	76.3	37.8	33.2	30.1	7.86	23.0	21.6	17.1
(WY)	1959	1966	1930	1988	1932	1968	1932	1965	1932	1954	1982	1931
MIN	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
(WY)	1933	1954	1990	1977	1931	1931	1931	1931	1931	1953	1962	1953

SUMMARY STATISTICS	FOR 1992 CALENDAR YEAR		FOR 1993 WATER YEAR		WATER YEARS 1929 - 1993	
ANNUAL TOTAL	1402.36		1410.49			
ANNUAL MEAN	3.83		3.86		5.51	
HIGHEST ANNUAL MEAN					15.7	1932
LOWEST ANNUAL MEAN					1.41	1984
HIGHEST DAILY MEAN	105	Sep 3	94	Jul 22	956	Nov 18 1930
LOWEST DAILY MEAN	.00	Feb 4	.00	Feb 28	.00	Sep 14 1929
ANNUAL SEVEN-DAY MINIMUM	.00	Feb 4	.00	Mar 23	.00	Sep 14 1929
ANNUAL RUNOFF (AC-FT)	2780		2800		4000	
10 PERCENT EXCEEDS	10		11		11	
50 PERCENT EXCEEDS	.10		.41		.37	
90 PERCENT EXCEEDS	.00		.00		.00	



16226200 NORTH HALAWA STREAM NEAR HONOLULU

LOCATION.--Lat 21°23'04", long 157°54'22", Hydrologic Unit 20060000, on right bank, 0.5 mi north of Halawa quarry, 1.7 mi east of Aiea High School, and 1.9 mi east of Aiea.

DRAINAGE AREA.--4.01 mi^2.

WATER-DISCHARGE RECORDS

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

GAGE.--Water-stage recorder. Elevation of gage is 160 ft, from topographic map.

REMARKS.--Records fair.

AVERAGE DISCHARGE.--10 Years, 5.44 ft^3/s (3,940 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,780 ft^3/s, Dec. 18, 1990, gage height, 12.02 ft; no flow at times each year.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 750 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
July 21	2238	*294	*9.04				

Minimum discharge, no flow for many days.

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	.29	11	14	11	.07	.02	.00	.67	.05	.00	2.0	e35
2	.19	4.1	13	5.1	.06	.02	.00	.27	.05	.00	5.2	e7.0
3	.15	1.9	6.3	3.1	.06	.01	.00	.13	.04	.00	2.0	e3.8
4	.14	1.3	6.1	2.7	.06	.01	.00	.10	.04	.00	1.0	e2.0
5	.13	.94	8.4	2.1	.06	.01	.00	.09	.03	.00	1.1	e.98
6	.13	.73	3.5	5.2	.05	.01	.00	.06	.03	.00	1.4	e.47
7	24	.68	2.3	2.2	.05	.01	.34	.05	.04	.00	.70	e.22
8	4.4	.53	1.6	1.1	.06	.01	1.7	.20	.73	.00	.69	.10
9	1.4	8.6	2.1	.91	.66	.78	.03	.22	.75	.00	.77	.07
10	.65	2.3	1.6	.67	.44	.10	.00	.12	.14	.00	.42	.06
11	.34	7.6	1.8	.60	.10	.01	.00	.17	.04	.00	6.2	.05
12	5.3	3.0	1.8	.60	.07	.01	.00	14	.04	.00	4.6	.05
13	32	9.4	1.5	.60	.03	.01	.00	2.1	.04	.00	1.8	.12
14	4.5	10	1.2	.60	.03	.01	.00	24	.03	.00	1.1	.97
15	4.1	5.9	.80	.68	.02	.01	.00	9.4	.02	.00	.65	.20
16	5.5	3.1	.69	.65	.02	.01	.00	2.5	.01	.00	4.0	.25
17	3.0	3.1	3.7	.37	.02	.01	.00	1.6	.01	.00	7.8	.14
18	1.6	2.5	1.1	.22	.02	.00	.00	1.4	.00	.00	3.9	.06
19	1.0	7.4	.69	.38	.01	.00	.00	1.6	.00	4.4	3.0	17
20	.68	4.4	1.9	.48	.02	.00	3.3	1.7	.00	5.2	1.4	20
21	3.1	7.2	1.5	.41	.02	.00	1.4	1.9	.00	26	.84	4.7
22	2.1	33	8.6	.33	.01	.00	.24	1.1	.00	113	.72	2.0
23	3.7	5.3	63	.22	.02	.00	2.1	.67	.00	32	.21	5.8
24	3.1	2.6	14	.15	.02	.00	.70	.40	.00	33	e4.2	1.3
25	13	4.5	6.2	.10	.02	.00	.19	.21	.00	23	e30	4.6
26	4.9	20	130	.09	.02	.00	.04	.08	.00	22	e5.4	3.4
27	8.5	7.0	37	.08	.02	.00	24	.06	.00	16	e1.5	2.3
28	7.4	3.3	12	.08	.02	.00	3.0	.06	.00	17	e1.0	.89
29	3.6	3.0	7.7	.09	---	.00	1.1	.03	.00	11	e.53	.44
30	2.7	3.6	89	.08	---	.00	.90	.04	.00	6.0	e.30	2.7
31	2.4	---	39	.08	---	.00	---	.05	---	2.9	e3.1	---
TOTAL	144.00	177.98	482.08	40.97	2.06	1.05	39.04	64.98	2.09	311.50	97.53	116.67
MEAN	4.65	5.93	15.6	1.32	.074	.034	1.30	2.10	.070	10.0	3.15	3.89
MAX	32	33	130	11	.66	.78	24	24	.75	113	30	35
MIN	.13	.53	.69	.08	.01	.00	.00	.03	.00	.00	.21	.05
AC-FT	286	353	956	81	4.1	2.1	77	129	4.1	618	193	231

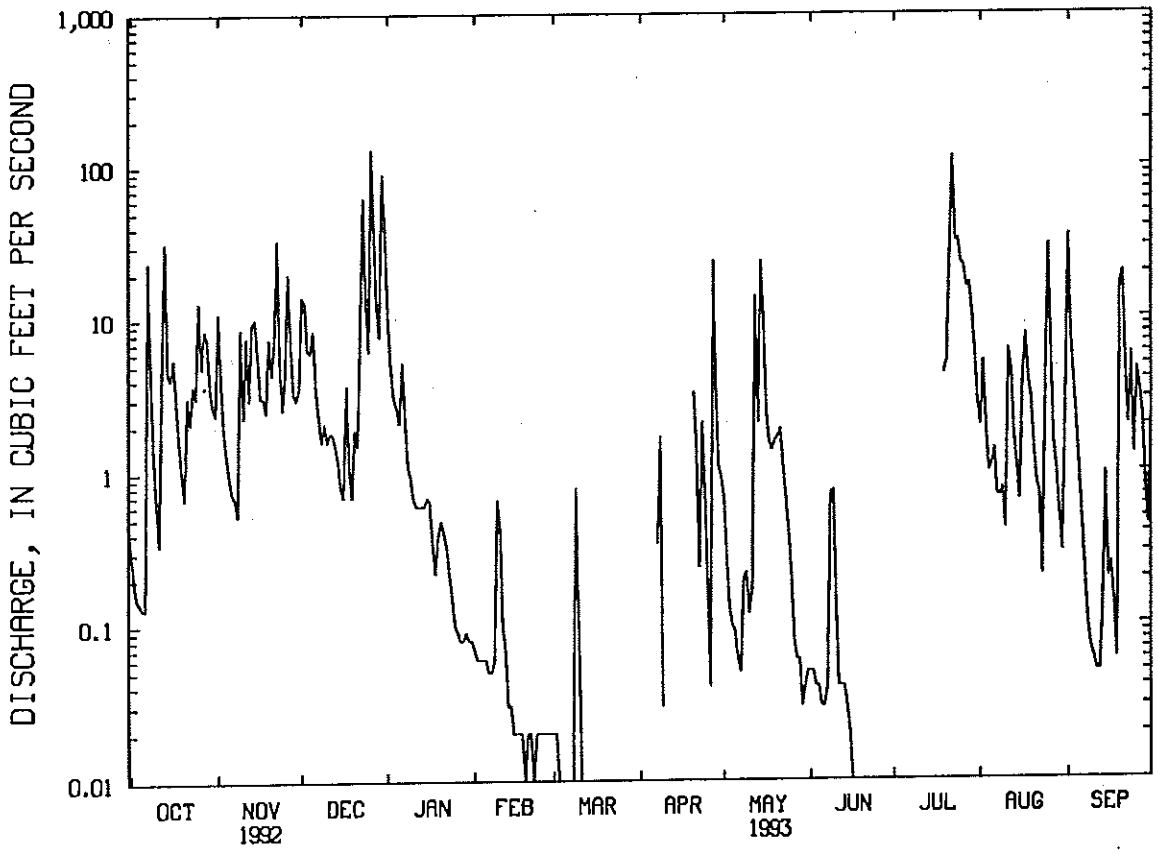
e Estimated

16226200 NORTH HALAWA STREAM NEAR HONOLULU--Continued

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

MEAN	4.12	7.06	10.7	6.61	4.26	7.93	6.21	3.35	1.46	4.64	2.90	3.15
MAX	9.71	25.9	40.6	29.6	17.4	31.0	35.3	15.5	7.84	15.0	10.0	12.6
(WY)	1992	1991	1988	1988	1989	1991	1989	1988	1987	1989	1991	1992
MIN	.000	.059	.008	.001	.000	.000	.000	.000	.000	.000	.000	.000
(WY)	1985	1990	1990	1986	1983	1983	1983	1992	1984	1984	1984	1984

SUMMARY STATISTICS	FOR 1992 CALENDAR YEAR		FOR 1993 WATER YEAR		WATER YEARS 1983 - 1993	
ANNUAL TOTAL	1490.05		1479.95			
ANNUAL MEAN	4.07		4.05		5.44	
HIGHEST ANNUAL MEAN					10.1	1988
LOWEST ANNUAL MEAN					1.43	1984
HIGHEST DAILY MEAN	133	Sep 3	130	Dec 26	399	Dec 31 1987
LOWEST DAILY MEAN	.00	Apr 17	.00	Mar 18	.00	Feb 1 1983
ANNUAL SEVEN-DAY MINIMUM	.00	Apr 17	.00	Mar 18	.00	Feb 1 1983
ANNUAL RUNOFF (AC-FT)	2960		2940		3940	
10 PERCENT EXCEEDS	8.8		8.6		11	
50 PERCENT EXCEEDS	.20		.60		.52	
90 PERCENT EXCEEDS	.00		.00		.00	



16226200 NORTH HALAWA STREAM NR HONOLULU--Continued

WATER-QUALITY RECORDS

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

PERIOD OF DAILY RECORD.--
SUSPENDED SEDIMENT DISCHARGE: February 1983 to current year.

INSTRUMENTATION.--Automatic pumping sediment sampler since February 1983.

REMARKS.--Water-quality samples were also collected at this site.

EXTREMES FOR PERIOD OF DAILY RECORD.--
SEDIMENT CONCENTRATIONS: Maximum daily mean, 4,230 mg/L (estimated), Apr. 8, 1989; no flow on many days in 1983-1988, 1990, 1992, 1993.
SEDIMENT DISCHARGE: Maximum daily, 4,730 tons (estimated), Apr. 8, 1989; no flow on many days in 1983-1988, 1990, 1992, 1993.

EXTREMES FOR CURRENT YEAR.--
SEDIMENT CONCENTRATIONS: Maximum daily mean, 2,070 mg/L, July 22; no flow on many days.
SEDIMENT DISCHARGE: Maximum daily, 723 tons, July 22; no flow on many days.

WATER QUALITY DATA, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND	SPE-CIFIC CON-DUCT-ANCE (US/CM)	PH WATER WHOLE FIELD (STAND-ARD UNITS)	TEMPER-ATURE AIR (DEG C)	TEMPER-ATURE WATER (DEG C)	TUR-BID-ITY (NTU)	BARO-METRIC PRES-SURE (MM OF HG)	OXYGEN, DIS-SOLVED (MG/L)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML)
NOV 1992											
03...	1300	2.2	196	7.2	22.0	21.5	27	755	8.4	96	--
DEC											
08...	1345	1.6	214	7.3	24.0	22.0	33	760	8.6	99	290
JAN 1993											
15...	1340	0.62	246	7.0	21.5	19.5	1.9	760	9.3	102	--
FEB											
24...	1030	0.01	290	6.8	20.5	19.5	2.7	762	7.2	78	93
APR											
21...	1400	0.77	176	7.9	26.0	23.5	21	762	7.9	93	--
MAY											
25...	1255	0.14	245	7.9	26.0	24.0	1.0	762	8.2	98	120
JUN											
22...	1130	0.00	--	--	--	--	--	--	--	--	--
JUL											
22...	0930	125	130	7.7	26.5	22.0	78	758	9.2	106	--
SEP											
07...	1430	0.14	255	8.0	29.0	26.5	0.50	758	7.2	90	--
23...	1436	2.9	118	8.0	25.5	23.0	32	758	8.1	95	10000

DATE	TIME	HARD-NESS TOTAL (MG/L AS CACO3)	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)	SODIUM, DIS-SOLVED (MG/L AS NA)	SODIUM PERCENT	SODIUM AD-SORP-TION RATIO	POTAS-SIUM, DIS-SOLVED (MG/L AS K)	ALKA-LINITY LAB (MG/L AS CACO3)	SULFATE DIS-SOLVED (MG/L AS SO4)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)
FEB 1993											
24...	1030	95	15	14	20	31	0.9	1.1	87	8.8	34
SEP											
23...	1436	34	7.7	3.5	9.0	36	0.7	0.90	38	4.5	9.8

16226200 NORTH HALAWA STREAM NR HONOLULU--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	TIME	FLUORIDE, DISSOLVED (MG/L AS F)	SILICA, DISSOLVED (MG/L AS SIO2)	SOLIDS, RESIDUE AT 180 DEG. C DISSOLVED (MG/L)	SOLIDS, SUM OF CONSTITUENTS, DISSOLVED (MG/L)	SOLIDS, DISSOLVED (TONS PER AC-FT)	RESIDUE TOTAL AT 105 DEG. C, SUSPENDED (MG/L)	NITROGEN, NO2+NO3 TOTAL (MG/L AS N)	NITROGEN, AMMONIA TOTAL (MG/L AS N)	NITROGEN,AMMONIA + ORGANIC TOTAL (MG/L AS N)	PHOSPHORUS TOTAL (MG/L AS P)	PHOSPHATE, TOTAL (MG/L AS PO4)
DEC 1992												
08...	1345	--	--	--	--	--	26	0.130	0.030	<0.20	0.030	0.09
FEB 1993												
24...	1030	<0.10	24	159	169	0.22	2	--	--	<0.20	0.010	--
MAY												
25...	1255	--	--	--	--	--	<1	--	--	<0.20	<0.010	--
SEP												
23...	1436	0.10	11	68	69	0.09	11	--	--	0.20	0.040	--

DATE	TIME	ALUMINUM, TOTAL RECOVERABLE (UG/L AS AL)	ALUMINUM, DISSOLVED (UG/L AS AL)	ARSENIC TOTAL (UG/L AS AS)	BARIUM, TOTAL RECOVERABLE (UG/L AS BA)	BARIUM, DISSOLVED (UG/L AS BA)	BERYLLIUM, TOTAL RECOVERABLE (UG/L AS BE)	CADMIUM TOTAL RECOVERABLE (UG/L AS CD)	CHROMIUM, TOTAL RECOVERABLE (UG/L AS CR)	COBALT, TOTAL RECOVERABLE (UG/L AS CO)	COBALT, DISSOLVED (UG/L AS CO)	COPPER, TOTAL RECOVERABLE (UG/L AS CU)
FEB 1993												
24...	1030	160	<10	<1	<100	2	<10	<1	4	1	<3	1
SEP												
23...	1436	1600	40	<1	<100	<2	<10	<1	4	2	<3	4

DATE	IRON, TOTAL RECOVERABLE (UG/L AS FE)	IRON, DISSOLVED (UG/L AS FE)	LEAD, TOTAL RECOVERABLE (UG/L AS PB)	LITHIUM TOTAL RECOVERABLE (UG/L AS LI)	LITHIUM DISSOLVED (UG/L AS LI)	MANGANESE, TOTAL RECOVERABLE (UG/L AS MN)	MANGANESE, DISSOLVED (UG/L AS MN)	MERCURY TOTAL RECOVERABLE (UG/L AS HG)	MOLYBDENUM, TOTAL RECOVERABLE (UG/L AS MO)	MOLYBDENUM, DISSOLVED (UG/L AS MO)	NICKEL, TOTAL RECOVERABLE (UG/L AS NI)
FEB 1993											
24...	450	66	<1	<10	<4	120	77	<0.10	<1	<10	2
SEP											
23...	1300	27	<1	<10	<4	60	5	0.20	<1	<10	4

DATE	NICKEL, DISSOLVED (UG/L AS NI)	SELENIUM, TOTAL (UG/L AS SE)	SELENIUM, DISSOLVED (UG/L AS SE)	SILVER, TOTAL RECOVERABLE (UG/L AS AG)	SILVER, DISSOLVED (UG/L AS AG)	STRONTIUM, DISSOLVED (UG/L AS SR)	VANADIUM, DISSOLVED (UG/L AS V)	ZINC, TOTAL RECOVERABLE (UG/L AS ZN)	CARBON, ORGANIC TOTAL (MG/L AS C)	OIL AND GREASE, TOTAL RECOV. GRAVIMETRIC (MG/L)	ALDRIN, TOTAL (UG/L)
FEB 1993											
24...	1	<1	<1	<1	<1.0	98	<6	20	1.2	<1	<0.010
SEP											
23...	<1	<1	<1	<1	<1.0	35	<6	20	6.2	<1	<0.010

DATE	CHLORDANE, TOTAL (UG/L)	CHLORDYRIFOS TOTAL RECOVER (UG/L)	DDD, TOTAL (UG/L)	DDE, TOTAL (UG/L)	DDT, TOTAL (UG/L)	DEF TOTAL (UG/L)	DIAZINON, TOTAL (UG/L)	DIELDRIN TOTAL (UG/L)	DISYSTON TOTAL (UG/L)	2, 4-DP TOTAL (UG/L)	2,4-D, TOTAL (UG/L)
FEB 1993											
24...	<0.1	<0.01	<0.010	<0.010	<0.010	<0.01	<0.01	<0.010	<0.01	<0.01	<0.01
SEP											
23...	<0.1	<0.01	<0.010	<0.010	<0.010	<0.01	<0.01	<0.010	<0.01	<0.01	<0.01

< Actual value is known to be less than the value shown

16226200 NORTH HALAWA STREAM NR HONOLULU--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	ENDO-SULFAN, TOTAL (UG/L)	ENDRIN WATER UNFLTRD REC (UG/L)	ETHION, TOTAL (UG/L)	FONOFOS (DY-FONATE) WATER WHOLE TOT.REC (UG/L	HEPTA-CHLOR, TOTAL (UG/L)	HEPTA-CHLOR EPOXIDE TOTAL (UG/L)	LINDANE TOTAL (UG/L)	MALA-THION, TOTAL (UG/L)	METH-OXY-CHLOR, TOTAL (UG/L)	METHYL PARA-THION, TOTAL (UG/L)
FEB 1993										
24...	<0.010	<0.010	<0.01	<0.01	<0.010	<0.010	<0.010	0.02	<0.01	<0.01
SEP										
23...	<0.010	<0.010	<0.01	<0.01	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01

DATE	MIREX, TOTAL (UG/L)	NAPH-THA-LENES, POLY-CHLOR. TOTAL (UG/L)	PARA-THION, TOTAL (UG/L)	PCB, TOTAL (UG/L)	PER-THANE TOTAL (UG/L)	PHORATE TOTAL (UG/L)	SILVEX, TOTAL (UG/L)	TOX-APHENE, TOTAL (UG/L)	TOTAL TRI-THION (UG/L)	2,4,5-T TOTAL (UG/L)
FEB 1993										
24...	<0.01	<0.10	<0.01	<0.1	<0.1	<0.01	<0.01	<1	<0.01	<0.01
SEP										
23...	<0.01	<0.10	<0.01	<0.1	<0.1	<0.01	<0.01	<1	<0.01	<0.01

PARTICLE-SIZE DISTRIBUTION OF SUSPENDED SEDIMENT, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	TIME	SEDI-MENT, SUS-PENDED (MG/L) (80154)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
OCT 1992			
13...	0300	1140	90
NOV			
22...	0030	2440	100
DEC			
01...	2400	1020	92
23...	1545	670	90
30...	1300	501	97
30...	1925	1960	84

< Actual value is known to be less than the value shown

16226200 NORTH HALAWA STREAM NR HONOLULU--Continued

SEDIMENT DISCHARGE, SUSPENDED (TONS/DAY), WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DAY	MEAN DISCHARGE (CFS)	MEAN CONCEN-TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN-TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN-TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)
		OCTOBER			NOVEMBER			DECEMBER	
1	.29	e15	.01	11	1200	104	14	476	67
2	.19	e13	.01	4.1	124	1.9	13	254	18
3	.15	e11	<.01	1.9	20	.10	6.3	e169	3.3
4	.14	e9	<.01	1.3	e15	.05	6.1	121	2.8
5	.13	e8	<.01	.94	e11	.03	8.4	e124	3.7
6	.13	e7	<.01	.73	e8	.02	3.5	29	.28
7	24	788	116	.68	e6	.01	2.3	e30	.19
8	4.4	44	.75	.53	e5	.01	1.6	42	.18
9	1.4	e14	.05	8.6	183	7.3	2.1	126	.76
10	.65	e6	.01	2.3	63	.37	1.6	157	.70
11	.34	e3	<.01	7.6	179	4.3	1.8	154	.73
12	5.3	194	50	3.0	27	.23	1.8	143	.70
13	32	411	119	9.4	e137	8.1	1.5	e53	.21
14	4.5	e51	.69	10	e119	3.6	1.2	17	.05
15	4.1	e115	1.6	5.9	57	1.0	.80	e19	.04
16	5.5	e187	3.1	3.1	13	.11	.69	e28	.05
17	3.0	71	.59	3.1	45	.41	3.7	e139	2.0
18	1.6	e42	.19	2.5	108	.74	1.1	e45	.13
19	1.0	e30	.08	7.4	302	7.8	.69	e27	.05
20	.68	e21	.04	4.4	e100	1.3	1.9	102	.74
21	3.1	e154	2.5	7.2	236	27	1.5	e82	.41
22	2.1	e77	.82	33	721	94	8.6	154	4.1
23	3.7	e91	1.3	5.3	29	.49	63	1010	257
24	3.1	e59	.49	2.6	20	.14	14	238	9.7
25	13	558	40	4.5	e93	3.0	6.2	79	5.9
26	4.9	39	.60	20	e372	24	130	989	478
27	8.5	e130	3.4	7.0	e75	1.8	37	39	4.6
28	7.4	58	1.4	3.3	10	.09	12	17	.57
29	3.6	25	.24	3.0	e61	1.0	7.7	14	.29
30	2.7	52	.37	3.6	109	1.2	89	636	296
31	2.4	58	.38	---	---	---	39	142	30
TOTAL	144.00	---	343.67	177.98	---	294.10	482.08	---	1188.18
		JANUARY			FEBRUARY			MARCH	
1	11	15	.44	.07	e4	<.01	.02	e2	<.01
2	5.1	6	.08	.06	e4	<.01	.02	e2	<.01
3	3.1	3	.02	.06	e4	<.01	.01	e2	<.01
4	2.7	10	.08	.06	e4	<.01	.01	e2	<.01
5	2.1	12	.07	.06	e4	<.01	.01	e2	<.01
6	5.2	e176	3.9	.05	e4	<.01	.01	e2	<.01
7	2.2	76	.47	.05	e4	<.01	.01	e2	<.01
8	1.1	23	.08	.06	e4	<.01	.01	e2	<.01
9	.91	7	.02	.66	e5	.01	.78	e33	.14
10	.67	e6	.01	.44	e5	.01	.10	e7	<.01
11	.60	e6	.01	.10	e4	<.01	.01	e2	<.01
12	.60	e5	.01	.07	e4	<.01	.01	e2	<.01
13	.60	e5	.01	.03	e3	<.01	.01	e2	<.01
14	.60	e4	.01	.03	e2	<.01	.01	e2	<.01
15	.68	4	.01	.02	e2	<.01	.01	e2	<.01
16	.65	e4	.01	.02	e2	<.01	.01	e2	<.01
17	.37	e4	<.01	.02	e2	<.01	.01	e2	<.01
18	.22	e4	<.01	.02	e2	<.01	.00	0	.00
19	.38	e4	<.01	.01	e2	<.01	.00	0	.00
20	.48	e4	<.01	.02	e2	<.01	.00	0	.00
21	.41	e4	<.01	.02	e2	<.01	.00	0	.00
22	.33	e4	<.01	.01	e2	<.01	.00	0	.00
23	.22	e4	<.01	.02	e2	<.01	.00	0	.00
24	.15	e4	<.01	.02	e2	<.01	.00	0	.00
25	.10	e4	<.01	.02	e2	<.01	.00	0	.00
26	.09	e4	<.01	.02	e2	<.01	.00	0	.00
27	.08	e4	<.01	.02	e2	<.01	.00	0	.00
28	.08	e4	<.01	.02	e2	<.01	.00	0	.00
29	.09	e4	<.01	---	---	---	.00	0	.00
30	.08	e4	<.01	---	---	---	.00	0	.00
31	.08	e4	<.01	---	---	---	.00	0	.00
TOTAL	40.97	---	5.38	2.06	---	0.28	1.05	---	0.30

< Actual value is known to be less than the value shown
e Estimated

16226200 NORTH HALAWA STREAM NR HONOLULU--Continued

SEDIMENT DISCHARGE, SUSPENDED (TONS/DAY), WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DAY	MEAN DISCHARGE (CFS)	MEAN CONCEN-TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN-TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN-TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)
		APRIL			MAY			JUNE	
1	.00	0	.00	.67	27	.05	.05	e10	<.01
2	.00	0	.00	.27	e18	.01	.05	e10	<.01
3	.00	0	.00	.13	e12	<.01	.04	e10	<.01
4	.00	0	.00	.10	e8	<.01	.04	e10	<.01
5	.00	0	.00	.09	e5	<.01	.03	e10	<.01
6	.00	0	.00	.06	e4	<.01	.03	e10	<.01
7	.34	e4	.10	.05	e2	<.01	.04	e10	<.01
8	1.7	e49	.53	.20	e10	.01	.73	e40	.09
9	.03	e3	<.01	.22	e15	.01	.75	e29	.06
10	.00	0	.00	.12	e7	<.01	.14	17	.01
11	.00	0	.00	.17	43	.07	.04	e12	<.01
12	.00	0	.00	14	211	15	.04	e8	<.01
13	.00	0	.00	2.1	18	.11	.04	e6	<.01
14	.00	0	.00	24	910	119	.03	e4	<.01
15	.00	0	.00	9.4	39	1.2	.02	e3	<.01
16	.00	0	.00	2.5	16	.11	.01	e2	<.01
17	.00	0	.00	1.6	16	.07	.01	e1	<.01
18	.00	0	.00	1.4	20	.08	.00	0	.00
19	.00	0	.00	1.6	15	.07	.00	0	.00
20	3.3	e118	2.3	1.7	13	.06	.00	0	.00
21	1.4	e43	.21	1.9	13	.07	.00	0	.00
22	.24	e27	.02	1.1	11	.03	.00	0	.00
23	2.1	e81	.63	.67	6	.01	.00	0	.00
24	.70	27	.06	.40	e7	.01	.00	0	.00
25	.19	e9	<.01	.21	e9	<.01	.00	0	.00
26	.04	e3	<.01	.08	10	<.01	.00	0	.00
27	24	362	50	.06	e10	<.01	.00	0	.00
28	3.0	47	.35	.06	e10	<.01	.00	0	.00
29	1.1	49	.15	.03	e10	<.01	.00	0	.00
30	.90	30	.07	.04	e10	<.01	.00	0	.00
31	---	---	---	.05	e10	<.01	---	---	---
TOTAL	39.04	---	54.45	64.98	---	136.10	2.09	---	0.30
		JULY			AUGUST			SEPTEMBER	
1	.00	0	.00	2.0	162	.90	e35	e670	63
2	.00	0	.00	5.2	e182	3.5	e7.0	e180	3.4
3	.00	0	.00	2.0	44	.24	e3.8	e120	1.2
4	.00	0	.00	1.0	30	.08	e2.0	e70	.37
5	.00	0	.00	1.1	52	.15	e.98	e40	.10
6	.00	0	.00	1.4	130	.48	e.47	e18	.02
7	.00	0	.00	.70	70	.15	e.22	e12	<.01
8	.00	0	.00	.69	17	.03	.10	e12	<.01
9	.00	0	.00	.77	11	.02	.07	e12	<.01
10	.00	0	.00	.42	18	.02	.06	e12	<.01
11	.00	0	.00	6.2	e116	2.4	.05	e12	<.01
12	.00	0	.00	4.6	126	1.3	.05	e12	<.01
13	.00	0	.00	1.8	231	1.2	.12	e15	.01
14	.00	0	.00	1.1	e124	.38	.97	33	.10
15	.00	0	.00	.65	e64	.12	.20	e12	.01
16	.00	0	.00	4.0	e146	1.9	.25	17	.01
17	.00	0	.00	7.8	36	.74	.14	e10	<.01
18	.00	0	.00	3.9	88	.94	.06	e4	<.01
19	4.4	e115	3.1	3.0	183	1.5	17	e344	27
20	5.2	e153	2.3	1.4	e169	.66	20	130	8.1
21	26	e510	225	.84	e155	.35	4.7	42	.54
22	113	2070	723	.72	e142	.28	2.0	e42	.22
23	32	1240	183	.21	e131	.08	5.8	125	2.4
24	33	277	31	e4.2	e120	1.4	1.3	49	.17
25	23	e354	23	e30	e590	48	4.6	e117	4.4
26	22	e326	22	e5.4	e140	2.0	3.4	73	.73
27	16	e257	12	e1.5	e50	.20	2.3	e64	.46
28	17	e235	13	e1.0	e40	.10	.89	32	.08
29	11	e242	7.5	e.53	e23	.03	.44	25	.03
30	6.0	197	3.4	e.30	e15	.01	2.7	e63	.50
31	2.9	220	1.7	e3.1	e95	.79	---	---	---
TOTAL	311.50	---	1250.00	97.53	---	69.95	116.67	---	112.93
YEAR	1479.95		3455.64						

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e Estimated

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16229000 KALIHI STREAM NEAR HONOLULU

LOCATION.--Lat 21°22'00", long 157°50'49", Hydrologic Unit 20060000, on right bank 1.9 mi upstream from Kamanaiki Stream and 4.1 mi north of Honolulu Post Office.

DRAINAGE AREA.--2.61 mi^2.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--September 1913 to April 1914, July 1914 to current year. Monthly discharge only for some periods, published in WSP 1319.

REVISED RECORDS.--WSP 1569: Drainage area. WSP 1719: 1921-22(M), 1923-24, 1925-26(M), 1927-28, 1929-32(M), 1935, 1937, 1938-39(M), 1943(M), 1948-52(P), 1955-56, 1957-58(M), 1959.

GAGE.--Water-stage recorder and concrete control. Datum of gage is 464.40 ft above mean sea level. Prior to Oct. 12, 1923, at datum 2.00 ft lower.

REMARKS.--Records good. No diversion upstream.

AVERAGE DISCHARGE.--79 years (water years 1915-93), 6.57 ft^3/s (4,760 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, about 12,400 ft^3/s, Nov. 18, 1930, gage height, 13.81 ft, from rating curve extended above 280 ft^3/s on basis of indirect measurements at gage heights 8.9 ft, 10.96 ft, and 11.27 ft; minimum, 0.09 ft^3/s, Oct. 22, 1933, July 29, 1966.

EXTREMES FOR CURRENT YEAR.--Peak discharge greater than base discharge of 700 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Dec. 30	2000	*1,270	*8.55	No other peak greater than base discharge.			

Minimum discharge, 0.75 ft^3/s on several days

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	2.8	7.4	19	12	2.2	1.4	.94	1.6	1.3	1.2	4.6	17
2	2.8	4.8	12	9.0	2.0	1.3	.89	1.3	1.2	1.1	6.7	5.5
3	2.6	3.7	6.6	7.5	2.0	1.2	.82	1.3	1.3	.97	4.9	4.2
4	2.5	3.5	9.9	7.4	1.9	1.3	.79	1.2	1.2	1.2	4.1	3.8
5	2.4	3.2	6.8	6.5	1.9	1.2	1.2	1.2	1.3	1.0	4.0	3.5
6	2.4	3.0	5.3	8.2	1.9	1.2	1.0	1.1	1.4	.99	3.5	3.3
7	15	3.1	4.9	6.1	1.8	1.4	2.6	1.2	2.6	1.1	3.4	3.1
8	4.8	2.7	4.6	5.5	2.7	2.0	2.0	1.2	3.8	1.2	4.5	3.1
9	3.3	13	4.4	5.2	4.2	2.4	1.2	1.1	2.8	1.1	3.4	3.0
10	2.8	4.3	4.2	4.8	2.3	1.6	1.0	1.8	1.8	1.0	4.1	3.5
11	2.7	11	4.1	4.4	2.0	1.5	1.0	11	1.6	1.6	28	3.0
12	12	4.3	4.9	4.2	1.9	1.6	1.0	13	1.6	1.3	6.8	7.7
13	25	6.7	3.9	4.0	1.8	1.6	.96	3.3	1.4	1.0	5.1	5.9
14	7.2	6.8	3.4	3.7	1.8	1.7	.89	24	1.3	1.3	4.2	e4.4
15	4.9	5.5	3.3	3.8	1.7	1.9	.85	7.6	1.3	1.1	3.6	e4.0
16	8.3	4.1	4.2	3.4	1.7	1.8	.86	3.7	1.3	1.0	7.4	e3.9
17	5.3	6.0	3.9	3.3	1.6	1.6	.86	3.6	e1.5	.98	7.8	e4.5
18	4.2	4.0	3.1	3.2	1.6	1.6	.83	3.3	e1.6	1.1	5.2	e4.2
19	3.7	4.2	3.5	3.1	1.6	1.3	1.6	2.8	e1.3	7.4	4.2	e5.8
20	4.5	4.0	8.7	3.1	1.5	1.3	2.8	2.6	e1.2	3.1	3.6	e7.4
21	5.5	6.4	4.1	3.0	1.5	1.0	1.5	2.4	e1.2	23	3.2	e4.8
22	7.0	27	5.7	2.8	1.5	1.0	1.4	1.9	e1.1	79	3.5	e4.7
23	5.8	7.9	68	2.7	1.7	1.1	3.5	1.7	e1.1	21	3.0	e5.0
24	4.8	5.4	9.6	2.6	1.5	1.1	1.7	1.6	e1.1	28	9.6	e4.3
25	12	6.5	11	2.6	1.7	1.1	3.1	1.4	e1.2	16	5.0	e4.5
26	6.0	12	77	2.5	1.5	1.0	1.7	1.3	e1.5	10	3.5	e3.5
27	5.9	6.8	21	2.4	1.4	.96	6.2	1.3	e1.1	8.3	3.0	e3.2
28	5.3	5.2	10	2.4	1.4	1.0	2.1	1.2	e1.2	12	2.7	e3.1
29	4.4	7.1	8.9	2.6	---	1.3	1.5	1.3	e1.1	8.9	2.5	e3.4
30	4.1	5.1	114	2.3	---	1.0	1.9	1.2	e1.5	6.9	2.4	e3.1
31	5.3	---	24	2.2	---	.83	---	1.2	---	5.4	21	---
TOTAL	185.3	194.7	474.0	136.5	52.3	42.29	48.69	104.4	44.9	249.24	178.5	140.4
MEAN	5.98	6.49	15.3	4.40	1.87	1.36	1.62	3.37	1.50	8.04	5.76	4.68
MAX	25	27	114	12	4.2	2.4	6.2	24	3.8	79	28	17
MIN	2.4	2.7	3.1	2.2	1.4	.83	.79	1.1	1.1	.97	2.4	3.0
AC-FT	368	386	940	271	104	84	97	207	89	494	354	278

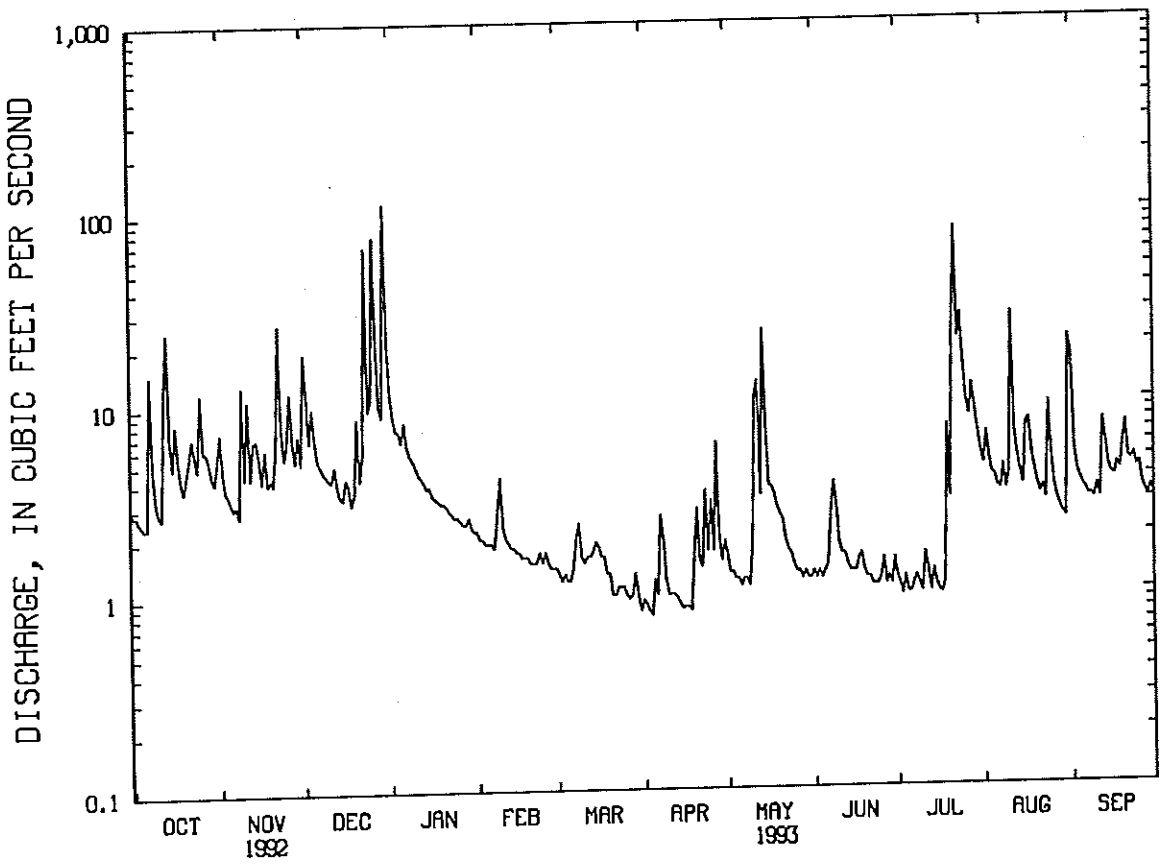
e Estimated

16229000 KALIHI STREAM NEAR HONOLULU--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1914 - 1993, BY WATER YEAR (WY)

MEAN	4.69	7.35	8.73	9.21	7.30	8.59	8.47	6.65	3.71	4.57	5.21	4.60
MAX	18.9	35.0	35.0	65.7	48.6	40.6	36.0	37.5	12.9	16.6	26.7	31.3
(WY)	1937	1928	1930	1923	1932	1951	1989	1927	1934	1954	1958	1914
MIN	.29	.46	.74	.50	.34	.74	.63	.27	.32	.60	.43	.30
(WY)	1985	1954	1977	1977	1978	1926	1926	1926	1966	1984	1984	1984

SUMMARY STATISTICS	FOR 1992 CALENDAR YEAR		FOR 1993 WATER YEAR		WATER YEARS 1914 - 1993	
ANNUAL TOTAL	1811.78		1851.22			
ANNUAL MEAN	4.95		5.07		6.57	
HIGHEST ANNUAL MEAN					13.5	1923
LOWEST ANNUAL MEAN					2.04	1984
HIGHEST DAILY MEAN	114	Dec 30	114	Dec 30	951	Jan 19 1923
LOWEST DAILY MEAN	.61	Jun 11	.79	Apr 4	.11	Jul 29 1966
ANNUAL SEVEN-DAY MINIMUM	.75	Jun 30	.89	Apr 12	.15	May 15 1926
ANNUAL RUNOFF (AC-FT)	3590		3670		4760	
10 PERCENT EXCEEDS	9.7		8.9		12	
50 PERCENT EXCEEDS	2.3		3.0		2.9	
90 PERCENT EXCEEDS	.89		1.1		.99	



16229000 KALIHI STREAM NEAR HONOLULU--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1972, 1974 to current year.

REMARKS.--Miscellaneous chemical analyses published for this station for 1969, 1973 water years. Quality of water samples obtained at the gage.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	TIME	DISCHARGE, INST. CUBIC FEET PER SECOND	SPECIFIC CONDUCTANCE (US/CM)	PH WATER WHOLE FIELD (STANDARD UNITS)	TEMPERATURE WATER (DEG C)	TEMPERATURE AIR (DEG C)	HARDNESS TOTAL (MG/L AS CACO3)	CALCIUM DISSOLVED (MG/L AS CA)	MAGNESIUM, DISSOLVED (MG/L AS MG)	SODIUM, DISSOLVED (MG/L AS NA)	SODIUM PERCENT
DEC 1992											
31...	1145	19	140	6.5	21.0	21.5	32	5.8	4.3	14	48
MAR 1993											
31...	1125	0.67	182	6.4	20.0	22.0	46	8.3	6.2	16	42
JUN											
30...	1110	1.3	175	7.4	21.5	23.0	42	7.5	5.7	16	44
SEP											
01...	1140	9.5	120	7.9	21.5	23.5	31	5.5	4.1	13	47

DATE	SODIUM ADSORPTION RATIO	POTASSIUM, DISSOLVED (MG/L AS K)	ALKALINITY LAB (MG/L AS CACO3)	SULFATE DISSOLVED (MG/L AS SO4)	CHLORIDE, DISSOLVED (MG/L AS CL)	FLUORIDE, DISSOLVED (MG/L AS F)	SILICA, DISSOLVED (MG/L AS SIO2)	SOLIDS, SUM OF CONSTITUENTS, DISSOLVED (MG/L)	SOLIDS, DISSOLVED (TONS PER DAY)	IRON, DISSOLVED (UG/L AS FE)	MANGANESE, DISSOLVED (UG/L AS MN)
DEC 1992											
31...	1	1.1	28	4.9	21	<0.10	13	81	4.15	65	16
MAR 1993											
31...	1	0.90	40	5.2	28	<0.10	15	104	0.19	300	11
JUN											
30...	1	1.0	34	5.1	29	<0.10	15	100	0.35	200	19
SEP											
01...	1	0.90	26	4.5	18	0.10	14	76	1.94	130	16

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16229300 KALIHI STREAM AT KALIHI
(National stream-quality accounting network station)

LOCATION.--Lat 21°20'29", long 157°52'36", Hydrologic Unit 20060000, on right bank at Kalihi, 0.4 mi northwest of Bishop Museum, and 2.4 mi northwest of Honolulu Post Office.

DRAINAGE AREA.--5.18 mi^2.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--Water year 1962 (annual maximum), July 1962 to current year.

GAGE.--Water-stage recorder and concrete control. Elevation of gage is 70 ft, from topographic map. Aug. 28, 1961, to June 30, 1962, crest-stage gage at site 600 ft downstream at different datum.

REMARKS.--Records good.

AVERAGE DISCHARGE.--31 years, 10.5 ft^3/s (7,610 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 7,110 ft^3/s, Apr. 19, 1974, gage height, 9.98 ft from rating curve extended above 180 ft^3/s on basis of slope-area measurement at gage height 9.98 ft; minimum, 0.16 ft^3/s, June 24, 1966.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of May 14, 1960, reached a stage of 8.0 ft from floodmarks, present site and datum, discharge, 6,350 ft^3/s, from slope-area measurement of peak flow.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 980 ft^3/s (revised) and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Dec. 23	1100	2,100	5.60	Dec. 30	2030	*2,160	*5.68

Minimum discharge, 0.84 ft^3/s, June 28, July 9, 10, 16.

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

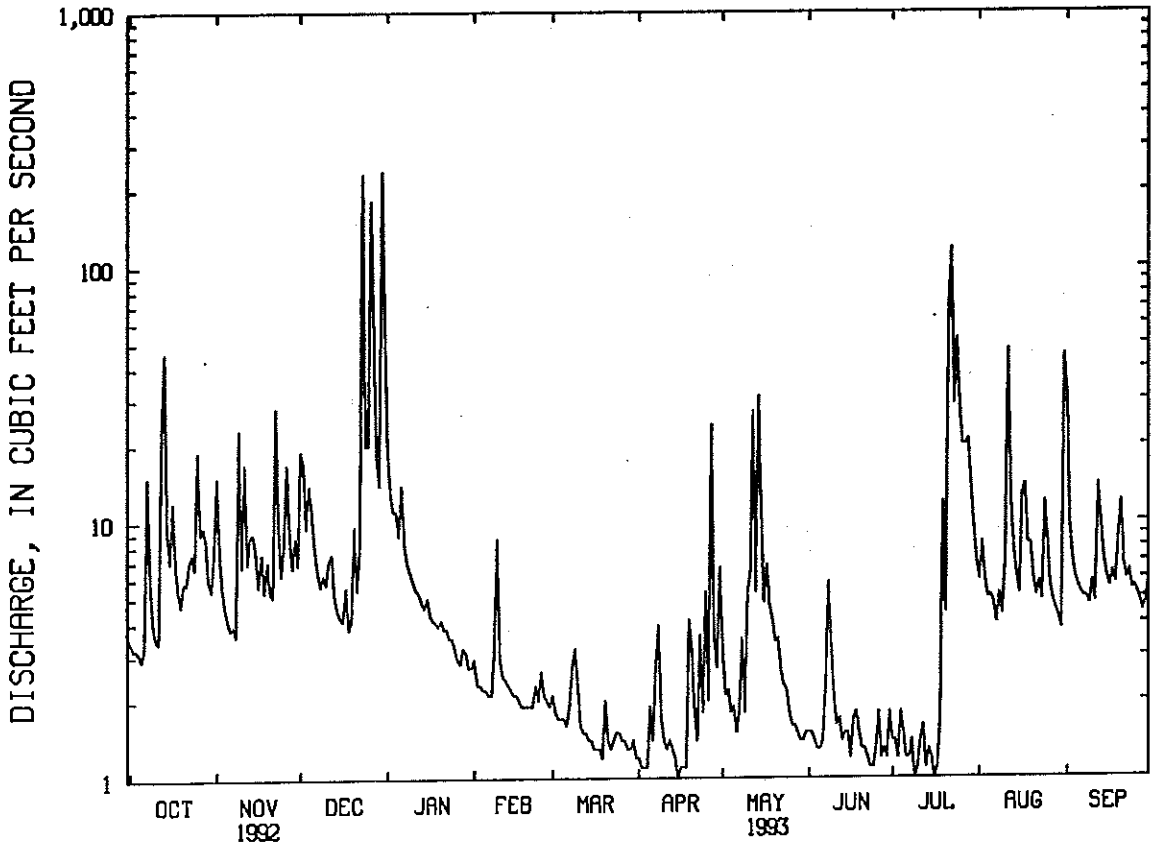
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3.4	15	19	19	2.9	2.1	1.2	3.2	1.5	1.4	5.9	32
2	3.2	7.8	17	13	2.3	1.8	1.1	2.1	1.5	1.4	8.3	9.8
3	3.2	5.5	9.5	11	2.3	1.7	1.1	2.2	1.4	1.2	5.9	7.1
4	3.1	4.6	14	11	2.2	1.7	1.1	1.8	1.3	1.8	5.0	6.0
5	2.9	4.1	11	8.8	2.2	1.7	1.9	1.9	1.3	1.5	5.1	5.5
6	3.3	3.8	7.9	14	2.1	1.6	1.4	1.5	1.4	1.2	4.8	5.2
7	15	3.9	6.5	8.1	2.1	1.9	2.7	1.8	2.3	1.2	4.0	5.0
8	6.0	3.6	5.6	6.9	3.2	2.7	3.9	3.5	5.8	1.4	5.2	5.0
9	4.0	23	6.2	6.3	8.6	3.2	1.7	1.8	3.4	1.0	4.3	4.7
10	3.5	6.7	5.7	5.8	2.9	2.3	1.4	5.3	2.1	1.1	6.9	5.8
11	3.4	17	7.1	5.4	2.5	1.6	1.3	6.2	1.6	1.4	47	4.8
12	21	6.9	7.5	5.2	2.4	1.5	1.4	27	1.7	1.6	12	14
13	46	8.8	5.1	4.8	2.3	1.5	1.3	5.3	1.4	1.1	7.9	9.8
14	9.5	9.0	4.5	4.6	2.2	1.4	1.2	31	1.5	1.3	6.2	7.1
15	7.0	7.6	4.2	5.0	2.1	1.4	1.0	11	1.5	1.2	5.2	6.1
16	12	5.6	4.1	4.3	2.1	1.3	1.1	4.8	1.2	1.0	13	5.5
17	6.9	7.5	5.5	4.1	2.0	1.3	1.1	6.8	1.7	1.1	14	6.3
18	5.4	5.3	3.8	4.0	1.9	1.3	1.1	4.7	1.8	1.7	8.2	5.7
19	4.7	7.0	4.1	3.9	1.9	1.2	4.1	4.1	1.5	12	8.2	8.7
20	5.8	5.3	9.6	4.1	1.9	2.0	3.2	3.4	1.3	4.4	5.9	12
21	5.7	5.1	5.4	3.8	1.9	1.4	1.8	3.5	1.3	62	5.1	6.8
22	7.0	28	8.2	3.8	1.9	1.3	1.4	2.6	1.2	118	5.8	5.9
23	7.5	9.7	232	3.5	2.3	1.4	3.6	2.3	1.1	29	4.9	6.4
24	6.6	6.2	20	3.5	2.0	1.5	1.8	2.2	1.1	52	12	5.4
25	19	8.3	20	3.2	2.6	1.5	5.3	1.8	1.3	28	8.4	5.5
26	9.0	17	182	2.9	2.1	1.4	2.0	1.6	1.8	20	5.6	5.2
27	9.6	9.1	54	2.8	2.0	1.4	24	1.6	1.2	20	4.9	4.8
28	8.5	6.6	18	3.2	1.9	1.3	3.5	1.5	1.3	21	4.5	4.4
29	5.9	8.7	14	3.1	---	1.3	2.7	1.4	1.2	14	4.2	4.8
30	5.4	6.8	238	2.7	---	1.4	6.6	1.4	1.8	9.6	3.8	5.9
31	7.6	---	55	2.7	---	1.2	---	1.5	---	7.1	45	---
TOTAL	261.1	263.5	1004.5	184.5	68.8	50.3	87.0	150.8	50.5	420.7	287.2	221.2
MEAN	8.42	8.78	32.4	5.95	2.46	1.62	2.90	4.86	1.68	13.6	9.26	7.37
MAX	46	28	238	19	8.6	3.2	24	31	5.8	118	47	32
MIN	2.9	3.6	3.8	2.7	1.9	1.2	1.0	1.4	1.1	1.0	3.8	4.4
AC-FT	518	523	1990	366	136	100	173	299	100	834	570	439

16229300 KALIHI STREAM AT KALIHI--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1962 - 1993, BY WATER YEAR (WY)

MEAN	7.07	14.0	16.1	13.8	11.1	15.8	13.9	10.2	5.18	8.12	6.26	4.63
MAX	22.2	49.2	56.6	45.8	60.3	73.2	57.6	40.9	19.5	29.3	35.7	20.4
(WY)	1964	1966	1988	1982	1969	1968	1989	1965	1980	1970	1982	1992
MIN	.95	2.15	1.15	.82	.78	1.15	1.65	1.49	.87	1.17	.83	.64
(WY)	1985	1981	1977	1977	1978	1983	1992	1966	1966	1984	1984	1984

SUMMARY STATISTICS	FOR 1992 CALENDAR YEAR		FOR 1993 WATER YEAR		WATER YEARS 1962 - 1993	
ANNUAL TOTAL	3071.70		3050.1			
ANNUAL MEAN	8.39		8.36		10.5	
HIGHEST ANNUAL MEAN					21.3	1982
LOWEST ANNUAL MEAN					3.13	1984
HIGHEST DAILY MEAN	238	Dec 30	238	Dec 30	781	Feb 1 1969
LOWEST DAILY MEAN	.81	May 31	1.0	Apr 15	.23	Jun 28 1966
ANNUAL SEVEN-DAY MINIMUM	.92	May 27	1.2	Apr 12	.36	Oct 14 1984
ANNUAL RUNOFF (AC-FT)	6090		6050		7610	
10 PERCENT EXCEEDS	15		14		18	
50 PERCENT EXCEEDS	3.2		4.1		3.8	
90 PERCENT EXCEEDS	1.3		1.3		1.3	



16229300 KALIHI STREAM AT KALIHI--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1970-74, 1975 to current year.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND	SPE-CIFIC CON-DUCT-ANCE (US/CM)	PH WATER WHOLE FIELD (STAND-ARD UNITS)	TEMPER-ATURE WATER (DEG C)	TEMPER-ATURE AIR (DEG C)	TUR-BID-ITY (NTU)	BARO-METRIC PRES-SURE (MM OF HG)	OXYGEN, DIS-SOLVED (MG/L)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML)
OCT 1992											
26...	0930	8.5	192	7.1	22.5	--	7.9	761	8.2	95	3500
JAN 1993											
26...	1125	3.2	256	6.7	20.0	25.5	1.2	760	8.9	98	2000
APR											
27...	1015	18	234	7.6	22.5	25.0	31	763	7.9	91	38000
AUG											
19...	0830	5.2	215	7.5	23.5	--	2.8	762	7.5	88	2900

DATE	STREP-TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML)	HARD-NESS TOTAL (MG/L AS CACO3)	HARD-NESS NONCARB DISSOLV FLD. AS CACO3 (MG/L)	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)	SODIUM, DIS-SOLVED (MG/L AS NA)	SODIUM PERCENT	SODIUM AD-SORP-TION RATIO	POTAS-SIUM, DIS-SOLVED (MG/L AS K)	BICAR-BONATE WATER DIS IT FIELD MG/L AS HCO3	CAR-BONATE WATER DIS IT FIELD MG/L AS CO3
OCT 1992											
26...	7200	51	4	10	6.2	18	43	1	1.2	57	0
JAN 1993											
26...	1100	68	8	14	7.9	23	42	1	1.1	73	0
APR											
27...	68000	59	15	14	5.9	19	40	1	1.8	54	0
AUG											
19...	2800	56	5	11	6.9	20	43	1	1.0	62	0

DATE	ALKA-LINITY WAT DIS TOT IT FIELD MG/L AS CACO3	SULFATE DIS-SOLVED (MG/L AS SO4)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)	FLUO-RIDE, DIS-SOLVED (MG/L AS F)	SILICA, DIS-SOLVED (MG/L AS SIO2)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L)	SOLIDS, DIS-SOLVED (TONS PER DAY)	NITRO-GEN, NITRITE TOTAL (MG/L AS N)	NITRO-GEN, NITRITE DIS-SOLVED (MG/L AS N)	NITRO-GEN, NO2+NO3 TOTAL (MG/L AS N)
OCT 1992											
26...	47	6.6	24	<0.10	17	117	113	2.69	<0.010	0.010	0.180
JAN 1993											
26...	60	9.4	33	<0.10	16	145	142	1.24	--	0.020	--
APR											
27...	44	12	28	<0.10	12	138	125	6.71	--	0.020	--
AUG											
19...	50	7.7	29	<0.10	17	124	124	1.74	--	<0.010	--

DATE	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N)	NITRO-GEN, AMMONIA TOTAL (MG/L AS N)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N)	NITRO-GEN, AMMONIA + ORGANIC TOTAL (MG/L AS N)	PHOS-PHORUS TOTAL (MG/L AS P)	PHOS-PHORUS DIS-SOLVED (MG/L AS P)	PHOS-PHORUS ORTHO TOTAL (MG/L AS P)	PHOS-PHORUS ORTHO, DIS-SOLVED (MG/L AS P)	ALUM-INUM, DIS-SOLVED (UG/L AS AL)	BARIUM, DIS-SOLVED (UG/L AS BA)
OCT 1992										
26...	0.190	0.030	0.020	<0.20	0.060	0.040	0.030	0.030	320	4
JAN 1993										
26...	0.240	--	0.020	<0.20	0.050	0.030	--	0.030	20	5
APR										
27...	1.20	--	0.050	0.80	0.280	0.080	--	0.070	140	7
AUG										
19...	0.210	--	0.030	<0.20	0.040	0.030	--	0.020	30	4

< Actual value is known to be less than the value shown

16229300 KALIHI STREAM AT KALIHI--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	COBALT, DIS-SOLVED (UG/L AS CO)	IRON, DIS-SOLVED (UG/L AS FE)	LITHIUM DIS-SOLVED (UG/L AS LI)	MANGA-NESE, DIS-SOLVED (UG/L AS MN)	MOLYB-DENUM, DIS-SOLVED (UG/L AS MO)	NICKEL, DIS-SOLVED (UG/L AS NI)	SELE-NIUM, DIS-SOLVED (UG/L AS SE)	SILVER, DIS-SOLVED (UG/L AS AG)	STRON-TIUM, DIS-SOLVED (UG/L AS SR)	VANA-DIUM, DIS-SOLVED (UG/L AS V)
OCT 1992 26...	<3	130	<4	9	<10	<1	<1	<1.0	77	<6
JAN 1993 26...	<3	110	<4	8	<10	<1	<1	<1.0	110	<6
APR 27...	<3	140	<4	13	<10	1	1	<1.0	110	<6
AUG 19...	<3	130	<4	11	<10	1	<1	<1.0	86	<6

CROSS SECTION ANALYSES, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	TIME	SAMPLE LOC-ATION, CROSS SECTION (FT FM R BK)	SPE-CIFIC CON-DUCT-ANCE (US/CM)	PH WATER WHOLE FIELD (STAND-ARD UNITS)	TEMPER-ATURE WATER (DEG C)	BARO-METRIC PRES-SURE (MM OF HG)	OXYGEN, DIS-SOLVED (MG/L)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION)
OCT 1992								
26...*	0900	2.0	192	6.7	22.5	761	8.2	95
26...*	0902	8.0	192	7.0	22.5	761	8.2	95
26...*	0904	15.0	192	7.3	22.5	761	8.2	95
26...*	0906	22.0	192	7.3	22.5	761	8.2	95
26...*	0908	30.0	193	7.4	22.5	761	8.2	95

* Instantaneous streamflow at the time of cross-sectional measurement: Oct. 26, 8.5 ft3/s.

PARTICLE-SIZE DISTRIBUTION OF SUSPENDED SEDIMENT, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	TIME	SEDI-MENT, SUS-PENDED (MG/L)	SEDI-MENT, DIS-CHARGE, SUS-PENDED (T/DAY)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM
OCT 1992 26...	0930	5	0.11	100
JAN 1993 26...	1125	3	0.03	100
APR 1993 27...	1015	24	1.2	100
AUG 19...	0830	6	--	100

< Actual value is known to be less than the value shown

16232000 NUUANU STREAM BELOW RESERVOIR 2 WASTEWAY, NEAR HONOLULU

LOCATION.--Lat 21°20'57", long 157°49'40", Hydrologic Unit 20060000, on right bank beside Old Pali Road in upper Nuuanu Valley, 0.2 mi downstream from reservoir 2 wasteway, and 3.5 mi northeast of Honolulu Post Office.

DRAINAGE AREA.--3.35 mi^2.

PERIOD OF RECORD.--October 1913 to January 1921. September 1921 to current year.

REVISED RECORDS.--WSP 985: 1921-35(M). WSP 1319: 1931. WSP 1569: Drainage area. WSP 1639: 1931, 1935.

GAGE.--Water-stage recorder and sharp-crested weirs. Datum of gage is 631.71 ft above mean sea level. Prior to Sep. 7, 1915, nonrecording gage at same site at datum 0.03 ft lower and Sep. 7, 1915, to Mar. 31, 1918, at same datum. Datum of gage lowered 1.00 ft on Feb. 4, 1992. Datum of gage is 630.71 ft above sea level.

REMARKS.--Records good. Low-flow regulation by reservoirs 2, 3, and 4, capacities, 21 acre-ft, 34 acre-ft, and 1,630 acre-ft, respectively. Honolulu Board of Water Supply diverts ground water from tunnels in drainage area.

AVERAGE DISCHARGE.--77 years (water years 1915-16, 1918-20, 1922-93), 6.99 ft^3/s (5,060 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 6,990 ft^3/s, Jan. 16, 1921, gage height, 8.74 ft, from floodmarks, from rating curve extended above 420 ft^3/s by test of model of station site; minimum, 0.09 ft^3/s, Sep. 10, 11, 1925.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 240 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Dec. 23	1030	*1,040	*6.35	Jul. 21	2130	322	4.93
Dec. 30	2030	976	6.27				

Minimum discharge, 0.74 ft^3/s, June 29, July 10.

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

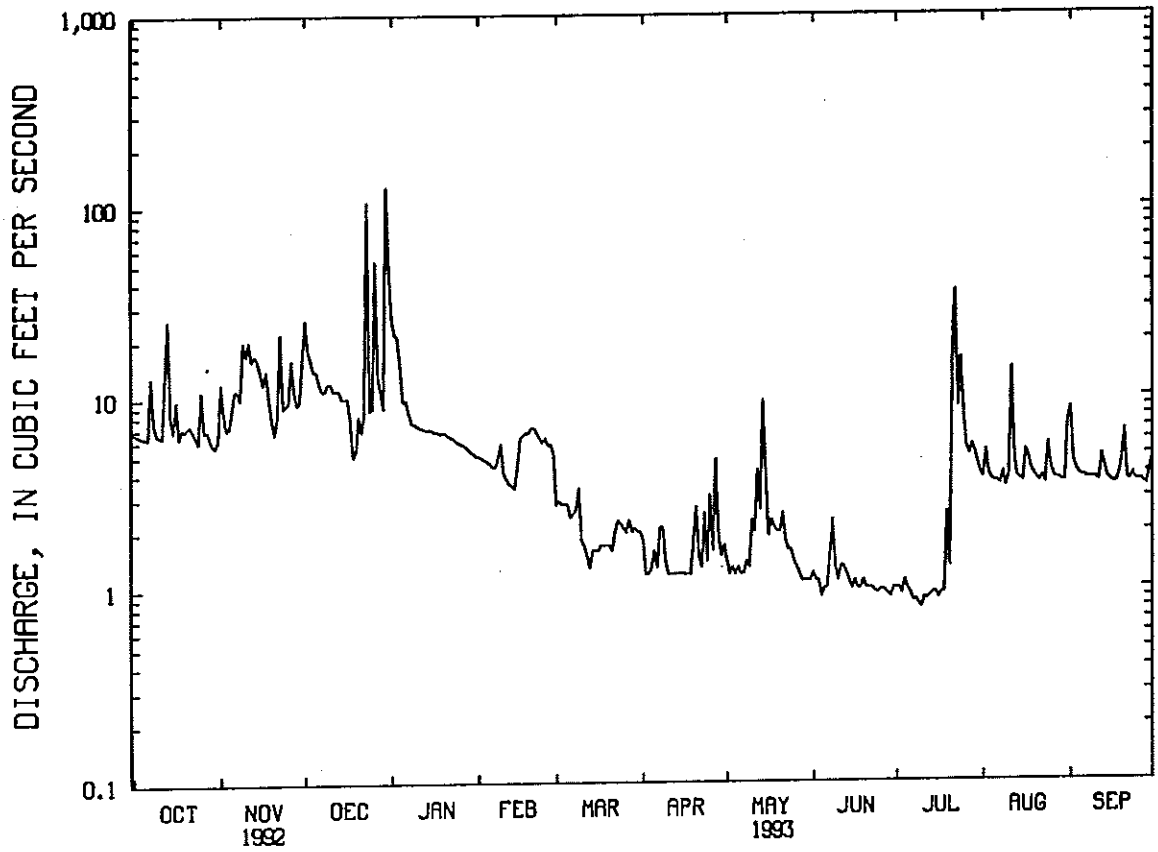
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	6.7	12	26	26	5.0	2.8	1.8	1.4	1.2	1.0	3.8	8.6
2	6.6	8.4	18	22	4.9	2.9	1.2	1.2	1.1	1.0	5.2	4.6
3	6.5	7.0	16	21	4.8	2.8	1.2	1.3	1.1	.94	3.9	4.1
4	6.4	7.2	14	15	4.7	2.8	1.3	1.2	.91	1.1	3.7	3.9
5	6.4	8.8	14	9.6	4.6	2.8	1.6	1.3	1.0	.99	3.6	3.8
6	6.3	11	12	9.8	4.4	2.4	1.3	1.2	1.0	.94	3.6	3.8
7	13	11	11	8.5	4.4	2.5	2.1	1.2	1.5	.86	3.5	3.7
8	7.6	10	11	7.5	4.9	2.6	2.1	1.4	2.3	.87	4.0	3.7
9	6.6	20	12	7.4	5.8	3.4	1.4	1.3	1.3	.83	3.4	3.7
10	6.5	17	12	7.2	4.1	1.8	1.2	2.3	1.1	.80	3.9	3.7
11	6.4	20	11	7.1	3.8	1.7	1.2	2.0	1.3	.89	14	3.6
12	13	16	11	7.0	3.6	1.5	1.2	4.2	1.3	.88	4.7	4.9
13	26	17	11	6.9	3.5	1.3	1.2	2.6	1.2	.91	3.8	4.2
14	8.2	16	10	6.9	3.4	1.6	1.2	9.6	1.1	.94	3.7	3.7
15	6.8	14	10	6.9	4.5	1.6	1.2	3.9	1.0	.95	3.6	3.6
16	9.8	12	10	6.7	6.2	1.6	1.2	1.9	1.1	.89	5.2	3.5
17	6.3	14	7.7	6.7	6.4	1.7	1.2	2.3	1.0	.94	4.8	3.5
18	7.1	10	5.0	6.6	6.6	1.7	1.2	2.1	1.0	.95	4.1	3.8
19	6.9	7.8	5.4	6.6	6.6	1.7	1.8	2.0	1.1	2.5	3.9	4.6
20	7.2	6.6	8.1	6.6	7.0	1.7	2.7	2.0	1.0	1.3	3.7	6.6
21	7.3	8.4	6.7	6.4	7.0	1.6	1.5	2.5	1.0	16	3.6	3.7
22	6.8	22	8.5	6.3	6.6	2.0	1.3	1.8	1.0	36	3.8	3.6
23	6.4	9.0	107	6.2	6.2	2.3	2.5	1.6	.96	8.9	3.5	3.9
24	6.0	9.3	8.7	6.0	5.9	2.2	1.4	1.6	.95	16	5.7	3.6
25	11	9.6	8.9	5.9	6.2	2.1	3.1	1.4	.97	8.0	4.3	3.6
26	6.8	16	53	5.8	5.7	2.0	1.6	1.3	.98	5.5	3.8	3.6
27	6.9	11	13	5.7	5.8	2.3	4.8	1.2	.96	5.0	3.7	3.5
28	6.3	9.4	11	5.5	5.1	2.0	1.9	1.1	.93	5.6	3.7	3.4
29	5.8	9.7	8.9	5.3	---	2.1	1.5	1.1	.90	5.1	3.6	4.1
30	5.7	16	128	5.2	---	2.0	1.7	1.1	1.0	4.5	3.6	4.8
31	6.2	---	49	5.0	---	2.0	---	1.1	---	4.0	7.4	---
TOTAL	245.5	366.2	637.9	265.3	147.7	65.5	50.6	62.2	33.26	135.08	136.8	123.4
MEAN	7.92	12.2	20.6	8.56	5.27	2.11	1.69	2.01	1.11	4.36	4.41	4.11
MAX	26	22	128	26	7.0	3.4	4.8	9.6	2.3	36	14	8.6
MIN	5.7	6.6	5.0	5.0	3.4	1.3	1.2	1.1	.90	.80	3.4	3.4
AC-FT	487	726	1270	526	293	130	100	123	66	268	271	245

16232000 NUUANU STREAM BELOW RESERVOIR 2 WASTEWAY, NEAR HONOLULU--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1914 - 1993, BY WATER YEAR (WY)

MEAN	4.31	6.90	8.96	9.56	9.08	9.50	9.35	8.04	4.98	4.29	5.04	4.45
MAX	21.5	43.7	46.8	56.0	81.3	52.5	41.7	46.2	19.0	10.7	32.4	27.7
(WY)	1931	1966	1928	1988	1932	1968	1989	1927	1938	1954	1982	1931
MIN	.23	.38	.38	.51	.39	.39	.32	.28	.35	.22	.43	.38
(WY)	1918	1946	1920	1920	1920	1926	1926	1926	1920	1922	1920	1917

SUMMARY STATISTICS	FOR 1992 CALENDAR YEAR		FOR 1993 WATER YEAR		WATER YEARS 1914 - 1993	
ANNUAL TOTAL	2033.55		2269.44			
ANNUAL MEAN	5.56		6.22		6.99	
HIGHEST ANNUAL MEAN					20.0	1932
LOWEST ANNUAL MEAN					.88	1920
HIGHEST DAILY MEAN	128	Dec 30	128	Dec 30	514	May 16 1927
LOWEST DAILY MEAN	.56	Jul 6	.80	Jul 10	.14	Jul 7 1922
ANNUAL SEVEN-DAY MINIMUM	.71	May 30	.86	Jul 7	.14	Jul 18 1922
ANNUAL RUNOFF (AC-FT)	4030		4500		5060	
10 PERCENT EXCEEDS	12		12		14	
50 PERCENT EXCEEDS	2.0		3.9		3.6	
90 PERCENT EXCEEDS	.80		1.1		.93	



16240500 WAIAKEAKUA STREAM AT HONOLULU

LOCATION.--Lat 21°19'53", long 157°48'12", Hydrologic Unit 20060000, on right bank 5 ft downstream from bridge on Waaloa Way, 500 ft upstream from confluence with Waihi Stream, and 4.2 mi northeast of Honolulu Post Office.

DRAINAGE AREA.--1.06 mi^2.

PERIOD OF RECORD.--May 1913 to January 1921, August 1925 to current year. Prior to July 1960, published as East Branch Manoa Stream near Honolulu.

REVISED RECORDS.--WSP 1319: 1919(M), 1930-33(M). WSP 1569: Drainage area. WSP 1937: 1949(M), 1960(M).

GAGE.--Water-stage recorder and combination Parshall flume and concrete weir. Datum of gage is 294.50 ft above mean sea level (Honolulu Board of Water Supply bench mark). Prior to May 20, 1914, nonrecording gage at site 200 ft upstream at different datum. May 20, 1914, to Jan. 16, 1921, water-stage recorder at site 30 ft upstream at different datum. Aug. 18, 1925, to Mar. 15, 1928, water-stage recorder at present site at datum 2.99 ft lower, and Mar. 16, 1928, to Oct. 18, 1933, at datum 0.41 ft higher than present datum.

REMARKS.--Records fair. Honolulu Board of Water Supply at times diverts a small amount of ground water from tunnel upstream. Occasional small diversions for irrigation upstream.

AVERAGE DISCHARGE.--75 years (water years 1914-20, 1926-93), 4.93 ft^3/s (3,570 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 3,090 ft^3/s, Jan. 16, 1921, gage height, 10.4 ft, from floodmarks, site and datum then in use, from rating curve extended above 58 ft^3/s. Current peak discharges are derived from rating curve extended above 1,760 ft^3/s on the basis of slope-area measurement at gage height 5.28 ft; minimum, 0.6 ft^3/s, June 7, 8, 1926.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 310 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Dec. 25	2400	312	3.24	Dec. 30	2000	*678	*4.08

Minimum discharge, 2.0 ft^3/s, July 14-18.

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

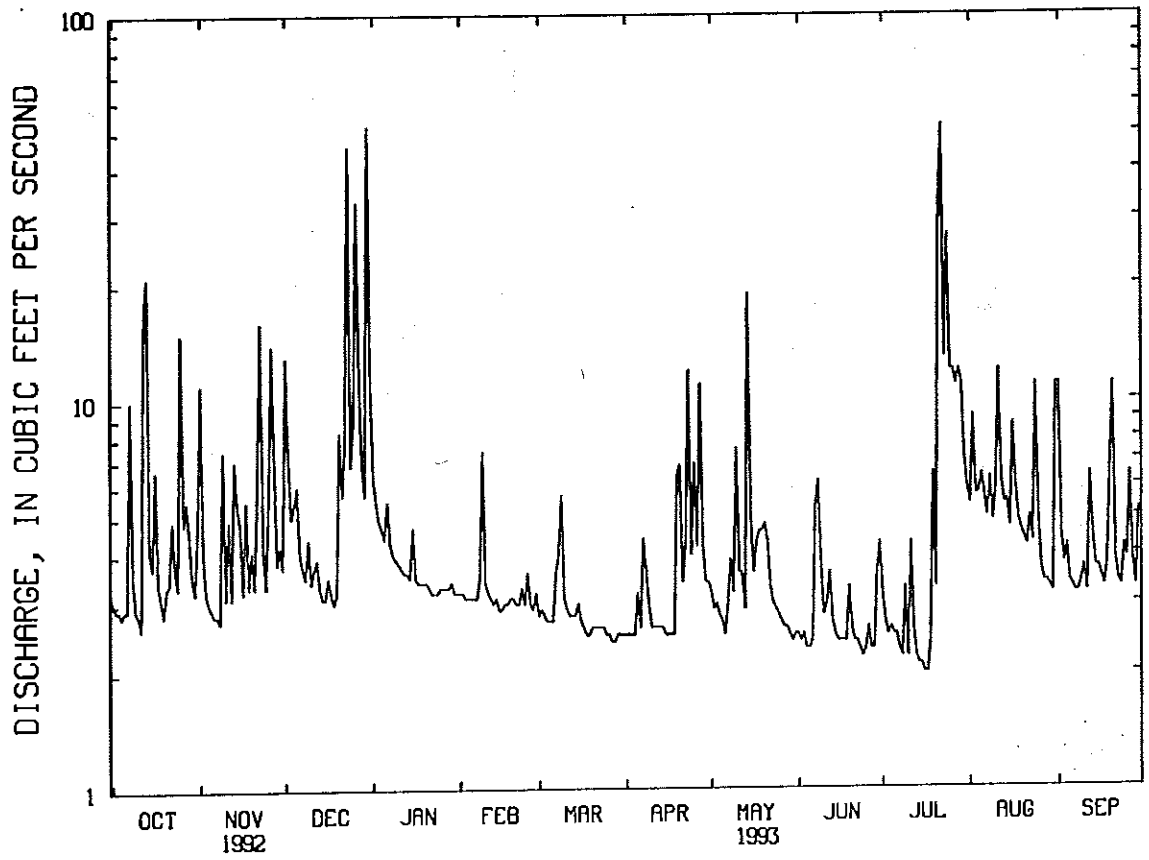
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3.0	11	13	6.4	3.2	2.8	2.5	3.2	2.5	3.2	5.4	11
2	2.9	4.1	7.2	5.5	3.2	2.9	2.5	2.9	2.4	2.7	9.1	4.5
3	2.9	3.2	5.0	4.9	3.1	2.8	2.5	3.0	2.5	2.5	5.7	3.8
4	2.8	3.0	5.4	4.7	3.1	2.7	2.5	2.8	2.3	2.6	5.8	4.2
5	2.9	2.9	6.0	4.4	3.1	2.7	3.2	2.7	2.3	2.5	6.4	3.4
6	2.9	2.8	4.1	5.5	3.1	2.7	2.6	2.5	2.4	2.5	5.7	3.3
7	10	2.8	3.7	4.3	3.1	3.6	4.4	3.0	5.3	2.3	5.0	3.2
8	3.5	2.7	3.5	4.0	3.5	4.0	3.6	3.9	6.2	2.2	6.3	3.2
9	2.9	7.4	4.4	3.9	7.4	5.7	3.0	3.2	3.8	3.3	4.9	3.4
10	2.8	3.1	3.4	3.8	3.4	3.1	2.6	7.5	2.8	2.2	6.0	3.7
11	2.6	4.9	3.7	3.7	3.2	2.9	2.6	3.6	3.0	4.3	12	3.2
12	17	3.1	3.9	3.6	3.1	2.8	2.6	3.6	3.6	2.6	6.2	6.4
13	21	7.0	3.3	3.6	3.0	2.8	2.6	2.9	2.7	2.2	5.4	4.5
14	4.1	5.3	3.1	3.5	3.1	2.8	2.6	19	2.5	2.1	5.5	3.7
15	3.7	4.8	3.1	4.7	2.9	3.0	2.5	5.1	2.4	2.1	4.7	3.7
16	6.6	3.2	3.5	3.5	2.9	2.7	2.5	3.6	2.4	2.0	8.7	3.5
17	3.4	5.5	3.2	3.4	3.0	2.6	2.5	4.3	2.4	2.0	6.0	3.3
18	3.1	3.3	3.0	3.4	3.0	2.5	2.5	4.6	2.4	2.4	4.9	3.8
19	2.8	4.1	3.2	3.4	3.1	2.5	6.4	4.6	3.3	6.5	4.6	6.7
20	3.3	3.3	8.3	3.4	3.1	2.6	6.8	4.8	2.6	3.3	4.4	11
21	3.4	6.1	5.7	3.3	3.0	2.6	3.4	4.3	2.4	29	4.2	3.9
22	4.9	16	8.0	3.2	3.0	2.6	4.3	3.3	2.4	52	5.0	3.4
23	3.7	4.2	46	3.2	3.3	2.6	12	3.0	2.3	13	4.3	3.3
24	3.3	3.3	6.8	3.2	3.0	2.6	4.0	2.9	2.2	27	11	4.2
25	15	5.7	8.9	3.3	3.6	2.5	6.9	2.8	2.3	12	5.1	3.9
26	4.8	14	33	3.3	3.0	2.5	4.2	2.7	2.6	12	3.7	6.4
27	5.5	6.7	12	3.3	2.9	2.4	11	2.6	2.3	11	3.4	3.9
28	4.5	3.8	6.8	3.3	3.2	2.4	4.2	2.6	2.3	12	3.4	3.3
29	3.5	4.2	5.7	3.4	---	2.5	3.4	2.5	3.6	11	3.3	5.2
30	3.2	3.7	52	3.2	---	2.5	3.4	2.4	4.3	7.1	3.2	5.0
31	4.8	---	12	3.2	---	2.5	---	2.5	---	5.9	11	---
TOTAL	160.8	155.2	290.9	119.5	91.6	87.9	119.8	122.4	86.5	247.5	180.3	136.0
MEAN	5.19	5.17	9.38	3.85	3.27	2.84	3.99	3.95	2.88	7.98	5.82	4.53
MAX	21	16	52	6.4	7.4	5.7	12	19	6.2	52	12	11
MIN	2.6	2.7	3.0	3.2	2.9	2.4	2.5	2.4	2.2	2.0	3.2	3.2
AC-FT	319	308	577	237	182	174	238	243	172	491	358	270

16240500 WAIAKEAKUA STREAM AT HONOLULU--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1913 - 1993, BY WATER YEAR (WY)

MEAN	4.21	5.25	5.43	4.90	4.52	5.44	5.70	5.26	4.17	4.96	4.91	4.20
MAX	10.7	18.1	15.5	14.8	15.6	19.5	17.5	13.3	10.3	12.3	13.6	13.3
(WY)	1915	1928	1988	1988	1955	1942	1989	1988	1938	1958	1958	1914
MIN	1.18	1.17	1.42	1.28	1.03	1.14	1.16	.87	1.27	.87	1.31	1.27
(WY)	1946	1934	1920	1977	1920	1926	1926	1926	1920	1926	1984	1984

SUMMARY STATISTICS	FOR 1992 CALENDAR YEAR		FOR 1993 WATER YEAR		WATER YEARS 1913 - 1993	
ANNUAL TOTAL	1638.9		1798.4			
ANNUAL MEAN	4.48		4.93		4.93	
HIGHEST ANNUAL MEAN					8.23	1988
LOWEST ANNUAL MEAN					1.94	1920
HIGHEST DAILY MEAN	52	Dec 30	52	Dec 30	164	Dec 31 1987
LOWEST DAILY MEAN	1.5	May 27	2.0	Jul 16	.62	Feb 26 1920
ANNUAL SEVEN-DAY MINIMUM	1.6	May 27	2.2	Jul 12	.75	May 23 1926
ANNUAL RUNOFF (AC-FT)	3250		3570		3570	
10 PERCENT EXCEEDS	7.3		7.4		8.1	
50 PERCENT EXCEEDS	2.9		3.4		3.6	
90 PERCENT EXCEEDS	1.8		2.5		1.7	



16249500 MAUNAWILI DITCH AT AINONI SPRING

LOCATION.--Lat 21°21'08", long 157°46'03" on left bank approximately 1,000 ft below Siphon 8, 3.2 miles east of Waimanalo Elementary School, and 3.8 miles northeast of Manoa Elementary School. Altitude of gage is 440 ft. from topographic map.

PERIOD OF RECORD.--June 1991 to current year.

GAGE.--Water-stage recorder and concrete control. Elevation of gage is 440 ft. from topographic map.

REMARKS.--Records good. At times flow is diverted above gage by Waimanalo Irrigation System, State Department of Agriculture.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 2.7 ft^3/s, Oct. 29, 1991; minimum daily, no flow on Jan. 1, 2, 1993.

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge, 2.4 ft^3/s, Oct. 10, Nov. 22, Sept. 2; minimum daily, no flow on Jan. 1, 2.

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	2.1	1.1	.61	.00	.48	1.0	1.7	1.1	1.5	1.8	.84	2.1
2	2.2	.78	.51	.00	.42	1.5	1.8	.77	1.9	1.5	1.5	2.4
3	2.3	.90	.50	.01	.37	1.7	1.7	1.5	1.8	1.3	1.2	2.3
4	2.3	1.4	.50	.09	.37	1.6	1.4	1.3	1.9	1.0	.84	1.9
5	2.3	2.0	.54	.12	.43	1.9	1.8	1.5	1.9	1.1	1.6	1.3
6	2.3	2.1	.63	.13	.46	1.6	1.8	1.6	1.6	1.5	2.1	1.0
7	2.3	1.7	.61	.12	.49	1.5	1.8	1.6	1.7	1.8	1.7	1.6
8	1.9	1.3	.56	.12	.44	1.3	2.0	1.2	1.7	1.8	1.4	2.1
9	2.1	.89	.52	.16	.42	1.1	2.0	.92	2.0	1.8	1.7	2.1
10	2.4	1.7	.46	.18	.35	1.4	1.6	1.5	1.8	1.1	1.7	1.5
11	2.3	2.2	.41	.19	.34	1.7	1.2	1.8	1.5	1.5	1.8	1.2
12	2.2	2.0	.43	.17	.57	1.9	1.6	2.0	1.0	1.6	1.6	.93
13	.81	2.3	.38	.17	.66	2.0	1.7	2.0	.98	2.0	.99	1.6
14	.39	2.2	.39	.18	.50	1.6	1.1	1.5	1.6	1.9	1.2	2.0
15	.31	2.0	1.0	.18	.33	1.7	.92	.72	1.9	1.9	1.6	1.9
16	.37	1.7	1.5	.20	.28	1.6	1.5	.70	1.9	1.8	1.3	1.5
17	.27	1.5	1.5	.20	.26	1.8	1.6	1.5	1.7	1.3	1.1	1.6
18	.25	1.2	1.1	.20	.26	2.1	1.1	1.5	1.5	.83	1.6	1.6
19	1.0	.97	.90	.50	.88	2.1	1.5	1.7	1.1	1.3	2.1	1.4
20	1.3	.92	.86	.77	1.4	2.0	1.4	1.4	.80	1.4	1.8	1.2
21	1.1	1.4	.82	.80	1.3	1.4	1.4	1.6	1.5	1.7	1.1	.89
22	1.1	2.4	.83	.75	1.6	1.2	1.3	1.9	1.9	2.2	1.4	.87
23	.85	1.6	1.2	.82	1.6	2.0	1.6	1.9	1.8	2.2	1.4	.73
24	.62	1.3	.83	.87	1.4	2.0	1.3	1.9	1.8	1.7	1.6	.76
25	.67	1.9	.88	.73	1.2	2.1	.93	1.9	1.9	1.1	1.8	.72
26	.96	1.9	1.5	1.1	1.6	2.0	1.6	1.8	1.9	e1.9	1.8	1.1
27	1.6	.80	.75	1.2	1.5	1.7	2.1	1.7	1.4	e1.7	1.4	1.8
28	1.6	.65	.52	1.0	.99	1.3	1.9	1.7	1.5	e1.7	1.1	2.1
29	1.7	.62	.59	.64	---	1.6	1.3	1.8	1.9	e1.6	.85	2.0
30	2.0	.56	1.0	.56	---	2.0	1.5	1.3	1.8	1.6	1.5	1.5
31	1.3	---	.01	.52	---	1.9	---	.97	---	1.1	1.7	---
TOTAL	44.90	43.99	22.84	12.68	20.90	52.3	46.15	46.28	49.18	48.73	45.32	45.70
MEAN	1.45	1.47	.74	.41	.75	1.69	1.54	1.49	1.64	1.57	1.46	1.52
MAX	2.4	2.4	1.5	1.2	1.6	2.1	2.1	2.0	2.0	2.2	2.1	2.4
MIN	.25	.56	.01	.00	.26	1.0	.92	.70	.80	.83	.84	.72
AC-FT	89	87	45	25	41	104	92	92	98	97	90	91

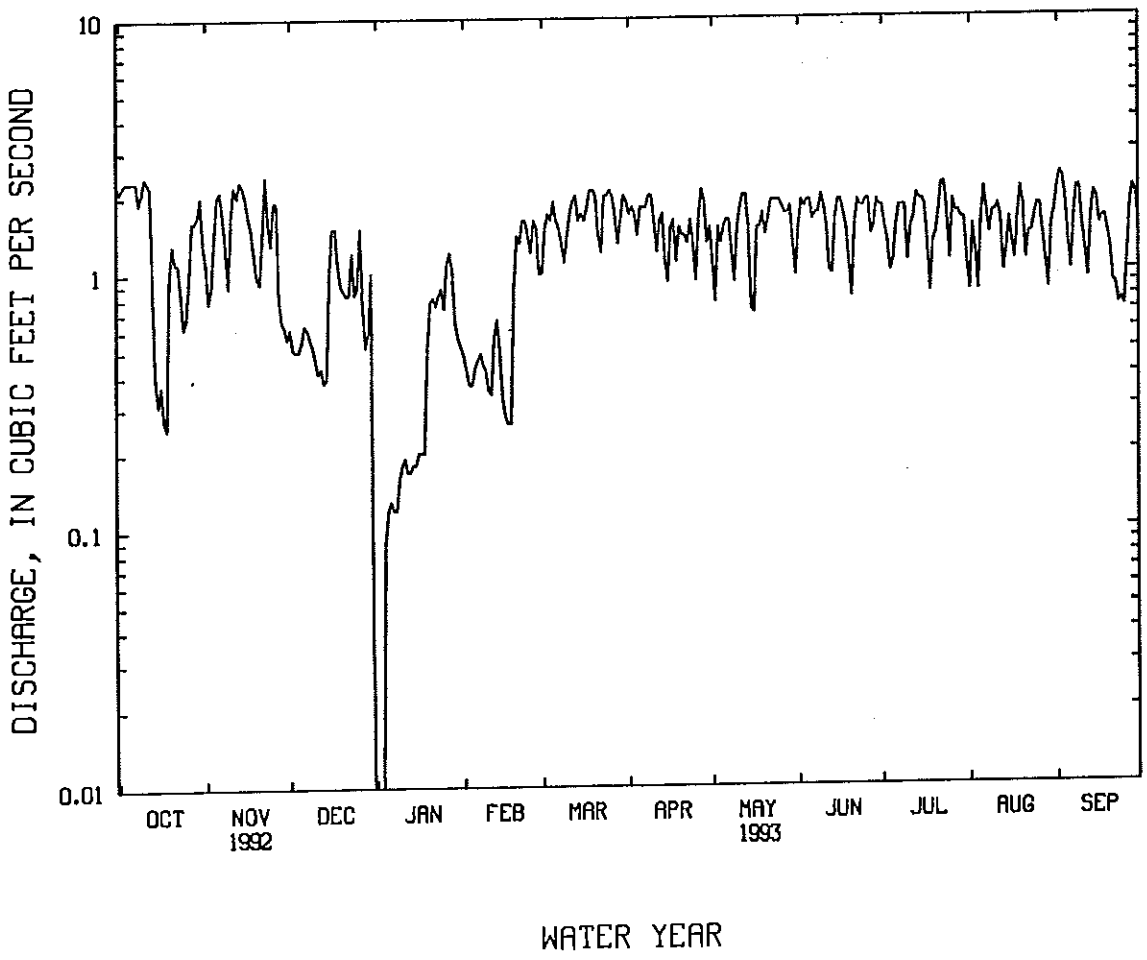
e Estimated

16249500 MAUNAWILI DITCH AT AINONI SPRING--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1991 - 1993, BY WATER YEAR (WY)

MEAN	1.73	1.65	1.30	1.15	1.15	1.72	1.59	1.53	1.60	1.69	1.65	1.75
MAX	2.01	1.84	1.86	1.89	1.53	1.76	1.63	1.57	1.64	1.76	1.76	1.90
(WY)	1992	1992	1992	1992	1992	1992	1992	1992	1993	1991	1991	1992
MIN	1.45	1.47	.74	.41	.75	1.69	1.54	1.49	1.56	1.57	1.46	1.52
(WY)	1993	1993	1993	1993	1993	1993	1993	1993	1992	1993	1993	1993

SUMMARY STATISTICS	FOR 1992 CALENDAR YEAR		FOR 1993 WATER YEAR		WATER YEARS 1991 - 1993	
ANNUAL TOTAL	577.70		478.97			
ANNUAL MEAN	1.58		1.31		1.53	
HIGHEST ANNUAL MEAN					1.75	1992
LOWEST ANNUAL MEAN					1.31	1993
HIGHEST DAILY MEAN	2.5	Jan 8	2.4	Oct 10	2.7	Oct 29 1991
LOWEST DAILY MEAN	.01	Dec 31	.00	Jan 1	.00	Jan 1 1993
ANNUAL SEVEN-DAY MINIMUM	.45	Dec 8	.05	Dec 31	.05	Dec 31 1992
ANNUAL RUNOFF (AC-FT)	1150		950		1110	
10 PERCENT EXCEEDS	2.1		2.0		2.1	
50 PERCENT EXCEEDS	1.7		1.5		1.7	
90 PERCENT EXCEEDS	.85		.42		.81	



16249900 MAUNAWILI DITCH ABOVE AINANINUI TUNNEL NR KAILUA

LOCATION.--Lat 21°20'50", long 157°46'26" on left bank approximately 1,000 ft above Aniani Nui Tunnel, 2.5 miles east of Waimanalo Elementary School, and 3.6 miles north of Wailupe Valley Elementary School.

PERIOD OF RECORD.--December 3, 1990 to current year.

GAGE.--Water-stage recorder and 3 ft semi-circular corregated metal pipe with concrete on upstream end. Elevation of gage is 400 ft from topographic map.

REMARKS.--Records good, except for periods of estimated discharge which are poor.

AVERAGE DISCHARGE.--2 years (water years 1992-93), 2.21 ft^3/s (1600 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 4.6 ft^3/s, Nov. 26, 1991; no flow on Mar. 22, 24, 1991.

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge, 3.9 ft^3/s, Jul. 22, 23; minimum daily, 0.60 ft^3/s, Jan. 2-4.

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	e2.7	e2.0	e1.1	e1.0	1.3	1.6	2.4	1.8	1.4	2.5	1.6	e2.7
2	e2.8	e1.8	e1.0	e.60	1.3	1.9	2.6	1.5	2.2	2.2	2.3	e2.9
3	e2.9	e1.9	e.96	e.60	1.4	2.4	2.4	2.2	2.4	1.9	2.2	e2.8
4	e3.0	e2.0	e.96	e.60	1.2	2.3	1.8	2.0	2.3	1.7	1.9	e2.4
5	e3.0	e2.6	e1.0	e.90	1.4	2.7	2.3	2.2	2.0	1.8	2.5	e2.0
6	e3.0	e2.7	e1.1	e.97	1.4	2.2	2.5	2.3	1.6	2.1	2.9	e1.8
7	e3.0	e2.5	e1.1	e.95	1.4	2.0	2.5	2.3	2.2	2.4	2.3	e2.2
8	e2.5	e2.4	e1.0	e.95	1.5	1.8	2.5	1.9	2.1	2.5	2.3	e2.7
9	e2.7	e1.8	e.97	e1.1	1.7	1.5	2.4	1.6	2.4	2.4	2.3	e2.7
10	e2.9	2.8	e.90	e1.1	1.4	1.9	1.6	2.1	2.4	1.7	2.2	e2.1
11	e2.8	2.9	e.83	e1.2	1.3	2.2	1.5	2.5	2.0	2.2	2.6	e2.0
12	e2.8	2.5	e.86	e1.0	1.3	2.4	2.2	2.7	1.7	2.2	2.5	e1.9
13	e2.6	e3.5	e.79	e1.0	1.2	2.6	2.3	2.7	1.6	2.6	1.8	e2.2
14	e1.4	e2.8	e.80	e1.1	1.1	2.1	1.7	2.2	2.1	2.7	1.6	e2.6
15	e1.5	e2.6	e1.6	e1.1	1.0	1.5	1.5	1.4	2.5	2.5	1.5	e2.5
16	e1.2	e2.3	e2.1	e1.2	1.0	1.1	2.2	1.3	2.6	2.5	1.2	e2.1
17	e1.2	e2.1	e2.1	e1.2	.98	1.9	2.2	2.1	2.3	2.0	.96	e2.2
18	e1.2	e1.8	e1.7	e1.2	.96	2.3	1.8	2.1	2.1	1.5	1.6	e2.2
19	e2.0	e1.5	e1.5	e1.3	.95	2.3	2.3	2.3	1.8	1.7	2.7	e2.0
20	e2.3	e1.5	e1.4	e1.3	.95	2.1	2.1	2.1	1.5	1.8	2.6	e1.9
21	e2.2	e2.0	e1.4	e1.3	.82	1.8	2.1	2.2	2.1	2.6	1.8	e1.8
22	e2.1	e2.9	e1.4	e1.3	.78	1.8	1.9	2.5	2.5	3.9	1.9	e1.8
23	e1.9	e2.2	e1.8	e1.4	.81	2.5	2.4	2.6	2.5	3.9	1.9	e1.7
24	e1.5	e1.9	e1.4	e1.5	.75	2.7	2.0	2.6	2.5	3.0	2.4	e1.8
25	e1.6	e2.5	e1.4	e1.4	.73	2.9	1.6	2.4	2.5	2.4	2.7	e1.7
26	e2.0	e2.0	e2.1	e1.8	1.7	2.6	2.6	2.4	2.5	2.8	2.8	e1.0
27	e2.2	e1.3	e1.3	e2.0	2.2	2.0	3.2	1.5	2.0	2.3	2.2	e2.4
28	e2.2	e1.2	e1.0	e1.8	1.7	1.7	2.8	.83	2.1	2.3	1.9	e2.7
29	e2.4	e1.1	e1.1	1.6	---	2.3	2.1	.78	2.6	2.2	1.7	e2.6
30	e2.6	e1.0	e1.6	1.4	---	2.5	2.2	.68	2.4	2.0	e2.3	e2.1
31	e2.2	---	e2.0	1.4	---	2.5	---	1.4	---	1.7	e2.5	---
TOTAL	70.4	64.1	40.27	37.27	34.23	66.1	65.7	61.19	64.9	72.0	65.66	65.5
MEAN	2.27	2.14	1.30	1.20	1.22	2.13	2.19	1.97	2.16	2.32	2.12	2.18
MAX	3.0	3.5	2.1	2.0	2.2	2.9	3.2	2.7	2.6	3.9	2.9	2.9
MIN	1.2	1.0	.79	.60	.73	1.1	1.5	.68	1.4	1.5	.96	1.0
AC-FT	140	127	80	74	68	131	130	121	129	143	130	130

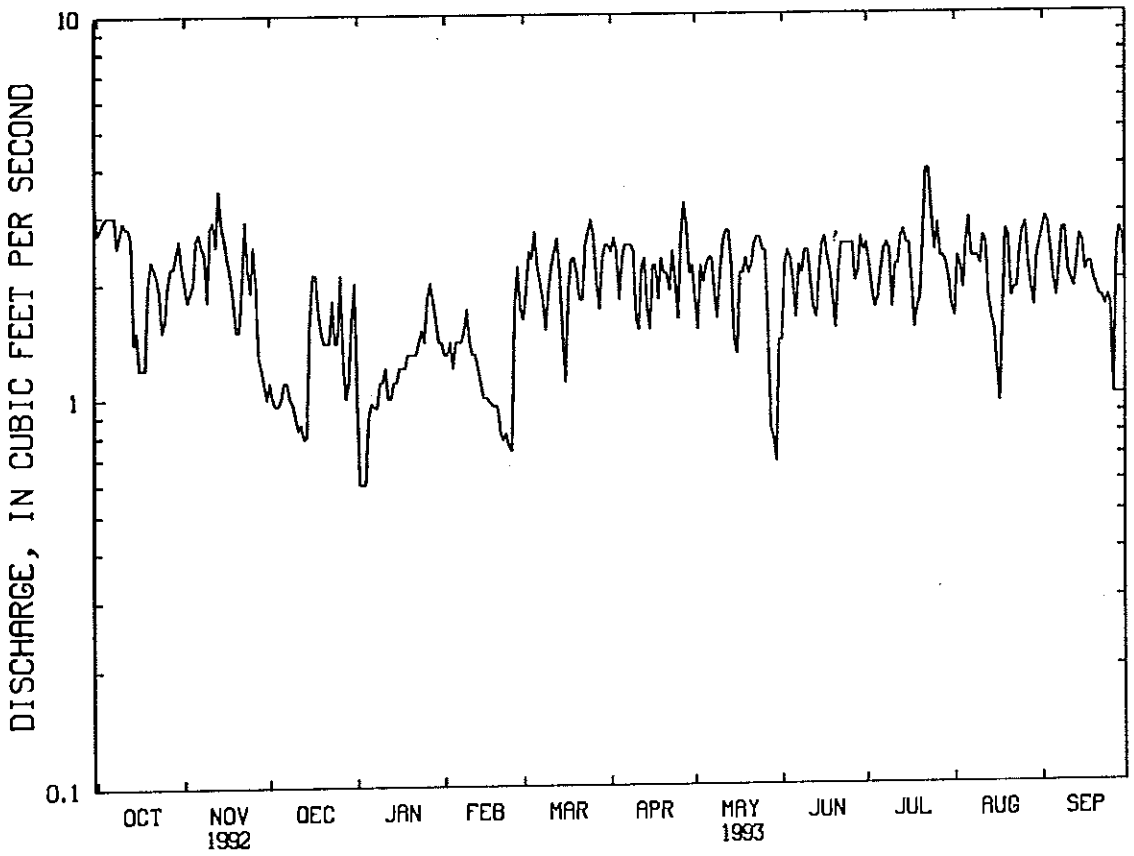
e Estimated

16249900 MAUNAWILI DITCH ABOVE AINANINUI TUNNEL NR KAILUA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1991 - 1993, BY WATER YEAR (WY)

MEAN	2.48	2.56	1.93	1.71	1.92	2.01	2.17	2.12	2.18	2.51	2.41	2.68
MAX	2.69	2.99	2.57	2.22	2.46	2.23	2.26	2.29	2.39	2.80	2.75	3.22
(WY)	1992	1992	1992	1992	1991	1992	1991	1991	1991	1992	1992	1992
MIN	2.27	2.14	1.30	1.20	1.22.	1.69	2.07	1.97	1.99	2.32	2.12	2.18
(WY)	1993	1993	1993	1993	1993	1991	1992	1993	1992	1993	1993	1993

SUMMARY STATISTICS	FOR 1992 CALENDAR YEAR		FOR 1993 WATER YEAR		WATER YEARS 1991 - 1993		
ANNUAL TOTAL	828.31		707.32				
ANNUAL MEAN	2.26		1.94		2.21		
HIGHEST ANNUAL MEAN					2.48		1992
LOWEST ANNUAL MEAN					1.94		1993
HIGHEST DAILY MEAN	4.1	Sep 25	3.9	Jul 22	4.6	Nov 26	1991
LOWEST DAILY MEAN	.79	Dec 13	.60	Jan 2	.00	Mar 22	1991
ANNUAL SEVEN-DAY MINIMUM	.88	Dec 8	.80	Jan 2	.66	Mar 20	1991
ANNUAL RUNOFF (AC-FT)	1640		1400		1600		
10 PERCENT EXCEEDS	3.2		2.7		3.0		
50 PERCENT EXCEEDS	2.2		2.0		2.3		
90 PERCENT EXCEEDS	1.4		1.0		1.4		



16254000 MAKAWAO STREAM NEAR KAILUA

LOCATION.--Lat 21°21'49", long 157°46'02", Hydrologic Unit 20060000, on left bank 650 ft upstream from mouth, 2.7 mi southwest of Kailua, and 4.3 mi southeast of Kaneohe Courthouse.

DRAINAGE AREA.--2.04 mi^2.

PERIOD OF RECORD.--November 1912 to June 1916, January 1958 to current year.

REVISED RECORDS.--WSP 1937: Drainage area.

GAGE.--Water-stage recorder and concrete control. Elevation of gage is 80 ft, from topographic map. Prior to Jan. 1, 1958, nonrecording gage at sites about 200 ft upstream at different datums.

REMARKS.--Records good. Maunawili ditch diverts 1.5 mi upstream for irrigation in vicinity of Waimanalo.

AVERAGE DISCHARGE.--37 years (water years 1914-15, 1959-93), 5.15 ft^3/s (3,730 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 6,000 ft^3/s, Feb. 4, 1965, gage height, 12.41 ft, from rating curve extended above 470 ft^3/s on basis of slope-area measurement of peak flow; minimum, 0.43 ft^3/s, Sept. 8-12, 14, 16-20, 22, 23, 1964.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 390 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Nov. 1	1700	536	5.47	Nov. 26	1330	515	5.40
Nov. 27	0430	432	5.09	Dec. 30	2000	*3,050	*10.00

Minimum discharge, 1.1 ft^3/s, July 15, 16.

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	2.6	25	13	13	4.4	2.6	2.6	2.4	2.1	1.6	2.5	3.7
2	2.6	6.4	9.2	12	4.3	2.9	2.4	2.5	1.5	1.5	2.7	1.9
3	2.2	5.5	7.9	11	4.2	2.8	2.1	2.3	1.7	1.4	2.1	1.8
4	2.3	4.7	7.4	8.0	4.2	2.8	2.1	2.2	1.5	1.5	2.2	1.6
5	2.4	4.1	7.0	8.0	4.3	2.8	2.3	2.1	1.8	1.5	2.0	1.9
6	2.1	3.9	6.7	11	4.3	2.8	2.2	2.1	2.4	1.5	2.1	2.3
7	5.8	3.7	6.2	8.9	4.7	3.2	2.3	2.2	2.9	1.5	2.0	2.1
8	e3.0	4.0	6.0	7.9	5.6	3.4	2.3	2.5	2.5	1.4	1.9	1.6
9	e2.7	4.7	6.0	6.7	7.6	3.8	2.1	2.6	2.1	1.4	1.8	1.6
10	e2.5	3.8	5.6	5.9	4.2	3.0	2.4	2.6	1.7	2.1	2.4	2.2
11	e11	4.2	5.5	5.9	4.0	2.7	2.5	2.0	1.9	3.0	3.4	2.3
12	e70	4.0	7.3	5.6	3.7	2.6	2.6	1.7	2.1	2.1	2.3	2.5
13	e26	4.8	5.6	5.5	3.4	2.6	2.2	1.7	2.1	1.8	2.4	2.2
14	e11	3.8	5.3	5.7	3.4	2.8	2.5	2.1	1.7	1.4	2.4	1.9
15	e8.0	3.4	5.2	7.0	3.3	3.2	2.7	2.2	1.7	1.2	2.3	2.1
16	e6.2	3.3	5.4	6.2	3.2	3.9	2.5	2.2	1.7	1.3	3.5	2.4
17	e6.1	3.7	5.9	6.0	3.3	3.3	2.2	2.2	1.6	1.5	3.3	2.4
18	e6.1	3.4	5.6	5.8	3.3	2.8	2.3	2.0	1.6	1.8	2.9	1.7
19	e5.4	4.2	5.3	5.8	3.2	2.8	2.7	2.1	2.3	2.8	2.0	2.1
20	e5.4	4.2	6.3	5.8	3.5	2.7	2.6	2.2	2.5	2.2	1.7	2.6
21	e7.4	27	5.5	5.3	3.7	2.7	2.4	2.1	2.2	5.6	2.1	2.3
22	5.2	65	6.0	4.8	4.1	2.3	2.4	1.6	1.6	16	2.2	3.1
23	4.8	13	12	4.8	4.1	2.5	2.4	1.6	1.6	4.7	1.8	3.0
24	4.5	8.9	5.9	5.0	3.9	2.3	2.3	1.6	1.5	3.3	2.5	3.0
25	6.2	7.8	7.3	5.3	4.0	2.3	3.4	1.6	1.5	2.8	2.2	2.8
26	5.5	89	67	5.1	3.5	2.3	2.7	1.7	1.6	2.4	1.7	6.6
27	5.5	44	16	4.5	3.0	2.4	3.4	1.6	1.9	2.5	1.9	4.1
28	4.7	13	9.0	4.7	2.7	2.5	2.2	1.8	1.9	2.6	2.0	2.2
29	4.5	11	8.6	5.3	---	2.2	2.4	1.5	1.7	2.5	1.8	2.0
30	5.0	9.6	190	4.7	---	2.2	2.2	1.8	2.0	2.1	1.6	2.2
31	5.7	---	21	4.5	---	2.3	---	2.3	---	2.5	3.1	---
TOTAL	242.4	393.1	480.7	205.7	111.1	85.5	73.4	63.1	56.9	81.5	70.8	74.2
MEAN	7.82	13.1	15.5	6.64	3.97	2.76	2.45	2.04	1.90	2.63	2.28	2.47
MAX	70	89	190	13	7.6	3.9	3.4	2.6	2.9	16	3.5	6.6
MIN	2.1	3.3	5.2	4.5	2.7	2.2	2.1	1.5	1.5	1.2	1.6	1.6
AC-FT	481	780	953	408	220	170	146	125	113	162	140	147

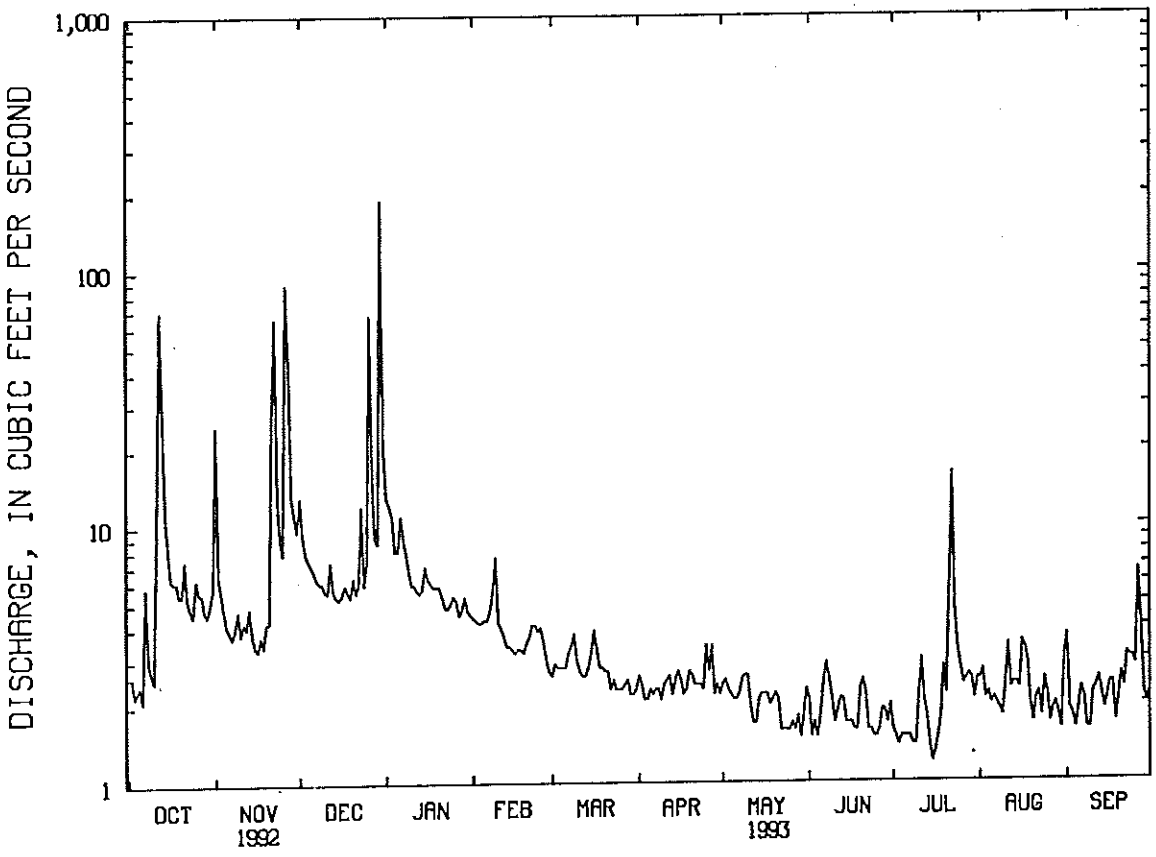
e Estimated

16254000 MAKAWAO STREAM NEAR KAILUA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1913 - 1993, BY WATER YEAR (WY)

MEAN	3.05	5.59	7.40	8.52	7.10	7.72	6.75	5.44	3.34	2.67	2.57	2.50
MAX	8.43	38.2	34.8	39.2	27.2	24.3	31.4	17.2	11.3	6.66	8.52	15.1
(WY)	1966	1966	1988	1916	1979	1958	1963	1981	1982	1982	1982	1914
MIN	1.06	.99	1.22	1.24	1.11	1.25	1.55	1.40	1.15	1.25	1.18	1.00
(WY)	1976	1963	1978	1973	1978	1978	1973	1973	1973	1959	1984	1975

SUMMARY STATISTICS	FOR 1992 CALENDAR YEAR		FOR 1993 WATER YEAR		WATER YEARS 1913 - 1993	
ANNUAL TOTAL	1963.4		1938.4			
ANNUAL MEAN	5.36		5.31		5.15	
HIGHEST ANNUAL MEAN					11.1	1982
LOWEST ANNUAL MEAN					1.31	1973
HIGHEST DAILY MEAN	190	Dec 30	190	Dec 30	518	Dec 31 1987
LOWEST DAILY MEAN	1.4	Jul 7	1.2	Jul 15	.50	Sep 8 1964
ANNUAL SEVEN-DAY MINIMUM	1.8	Apr 11	1.5	Jul 3	.67	Sep 8 1964
ANNUAL RUNOFF (AC-FT)	3890		3840		3730	
10 PERCENT EXCEEDS	7.3		7.5		9.0	
50 PERCENT EXCEEDS	3.0		2.7		2.8	
90 PERCENT EXCEEDS	2.0		1.7		1.4	



16260500 MAUNAWILI STREAM AT HIGHWAY 61, NEAR KAILUA

LOCATION.--Lat 21°22'51", long 157°45'48", Hydrologic Unit 20060000, on right bank at downstream side of bridge on Highway 61, 0.6 mile west of Maunawili School, and 1.6 miles southwest of Kailua Post Office.

DRAINAGE AREA.--5.34 mi^2.

PERIOD OF RECORD.--Water years 1922, 1956-62, 1965-67 (low-flow measurements); water years 1958-67, 1971-91 (annual maximum); daily record January 1967 to October 1971, April 1991 to current year.

GAGE.--Water-stage recorder. Datum of gage is 9.79 ft above mean sea level (levels by Sunn, Low, Tom, and Hara, Inc.), Oct. 16, 1957 to Dec. 31, 1966, crest-stage gage at site 400 ft upstream at datum 3.46 ft higher.

REMARKS.--Records fair. Maunawili ditch diverts from headwaters of Maunawili and Makawao Streams for irrigation in vicinity of Waimanalo. Records of chemical analyses and suspended sediment loads were published during the water years 1969-71, and 1967-71 respectively.

AVERAGE DISCHARGE.--6 years (1967-1993), 16.0 ft^3/s (11,590 acre-ft/yr)

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 9,690 ft^3/s, Feb. 4, 1965, gage height, 15.62 ft (site and datum then in use), from rating curve extended above 700 ft^3/s on basis of contracted-opening measurement of peak flow; minimum, 2.1 ft^3/s, Oct. 12, 13, 1991.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 700 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Oct. 13	0030	2,180	10.05	Nov. 26	1300	1,920	9.62
Dec. 26	0100	968	7.72	Dec. 30	2100	*3,370	*11.52

Minimum discharge, 2.04 ft^3/s on several days.

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

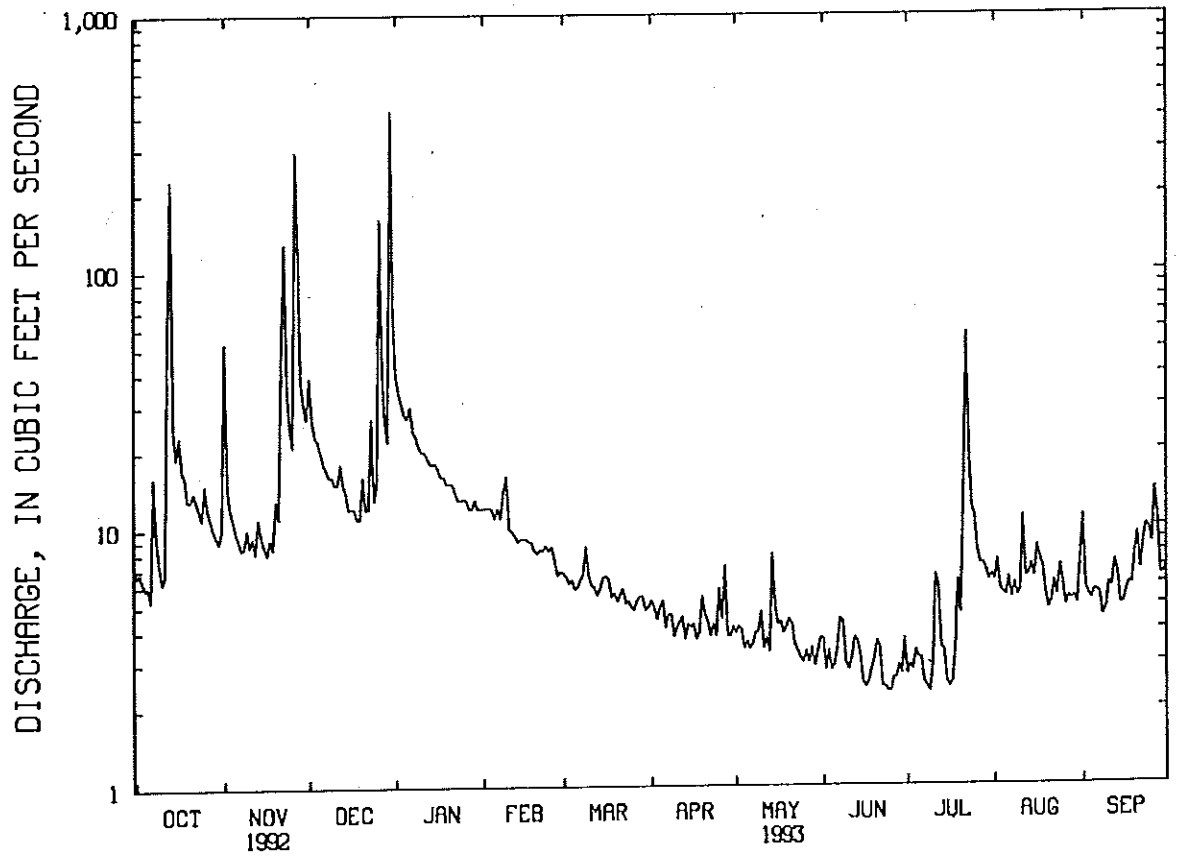
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	6.6	53	39	40	12	6.7	5.2	3.9	3.7	2.7	6.2	11
2	6.8	15	27	34	12	6.5	4.9	4.1	2.8	2.9	7.4	5.8
3	6.3	12	23	31	12	6.1	4.4	4.0	3.3	2.8	5.7	5.4
4	5.9	11	22	28	12	6.3	4.9	3.4	2.8	3.3	5.5	5.2
5	6.0	9.8	20	27	11	5.8	5.2	3.6	2.9	3.1	5.4	5.6
6	5.3	9.1	18	30	12	5.9	4.1	3.4	3.4	3.1	6.3	5.6
7	16	8.4	17	24	11	6.3	4.6	3.5	4.4	2.5	5.3	5.4
8	9.3	8.5	16	23	14	6.6	4.6	3.9	4.3	2.4	6.0	4.5
9	7.4	10	16	21	16	8.5	3.8	3.9	3.0	2.3	5.4	4.7
10	6.2	8.6	15	20	10	6.6	4.1	4.7	2.8	2.9	5.6	6.0
11	6.7	9.3	15	20	9.7	6.0	4.3	3.4	3.1	6.5	11	5.8
12	52	8.1	18	19	9.4	5.9	4.5	3.7	3.7	5.9	6.4	7.3
13	227	11	15	18	8.9	5.5	3.7	3.3	3.6	3.4	6.5	6.6
14	25	9.4	14	18	9.1	5.8	4.2	7.9	3.2	3.3	7.1	5.0
15	19	8.6	12	18	9.1	6.4	4.1	4.9	2.5	2.5	6.4	5.0
16	23	8.0	12	17	9.1	6.5	4.2	4.2	2.4	2.4	8.4	5.6
17	17	9.1	12	16	8.9	6.3	3.7	4.3	2.5	2.5	7.5	6.0
18	16	8.4	11	16	8.8	5.4	3.9	3.9	2.8	3.4	6.9	5.9
19	13	13	11	15	8.2	5.6	5.4	4.1	3.1	6.2	5.5	7.9
20	13	11	16	15	8.0	5.2	4.6	4.4	3.6	4.6	4.8	9.3
21	14	46	12	15	8.3	5.5	4.3	4.2	3.4	14	5.1	6.8
22	13	128	12	14	8.2	5.8	3.8	3.5	2.4	57	6.1	8.7
23	12	36	27	13	8.6	5.1	4.2	3.3	2.4	20	5.4	10
24	11	25	13	13	8.2	5.2	3.8	3.1	2.3	12	7.1	9.7
25	15	21	15	13	8.5	4.9	5.8	3.0	2.3	11	6.1	8.6
26	12	295	160	13	7.6	4.8	4.4	3.3	2.6	8.1	4.9	14
27	11	117	42	12	6.6	5.2	7.1	3.0	2.6	7.2	5.3	11
28	10	38	26	12	6.8	5.4	3.8	3.4	2.9	7.2	5.2	6.5
29	9.4	31	22	13	---	5.4	3.8	2.9	2.7	6.8	5.3	6.5
30	8.9	27	426	12	---	4.8	4.1	3.3	3.7	6.2	5.0	6.9
31	10	---	69	12	---	4.9	---	3.7	---	6.5	7.4	---
TOTAL	613.8	1005.3	1173	592	274.0	180.9	133.5	119.2	91.2	224.7	192.2	212.3
MEAN	19.8	33.5	37.8	19.1	9.79	5.84	4.45	3.85	3.04	7.25	6.20	7.08
MAX	227	295	426	40	16	8.5	7.1	7.9	4.4	57	11	14
MIN	5.3	8.0	11	12	6.6	4.8	3.7	2.9	2.3	2.3	4.8	4.5
AC-FT	1220	1990	2330	1170	543	359	265	236	181	446	381	421

16260500 MAUNAWILI STREAM AT HIGHWAY 61, NEAR KAILUA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1967 - 1993, BY WATER YEAR (WY)

MEAN	11.8	20.4	33.0	25.6	21.4	25.1	16.6	9.45	7.64	6.95	7.67	8.41
MAX	19.8	47.6	78.2	41.1	60.6	72.9	40.3	15.1	12.5	9.90	21.0	16.9
(WY)	1993	1971	1968	1969	1969	1968	1968	1968	1971	1967	1967	1967
MIN	5.91	7.14	10.1	7.91	9.79	5.84	4.45	3.85	3.04	5.55	4.75	4.73
(WY)	1971	1970	1970	1992	1993	1993	1993	1993	1993	1970	1971	1970

SUMMARY STATISTICS	FOR 1992 CALENDAR YEAR		FOR 1993 WATER YEAR		WATER YEARS 1967 - 1993	
ANNUAL TOTAL	5009.9		4812.1			
ANNUAL MEAN	13.7		13.2		16.0	
HIGHEST ANNUAL MEAN					26.0	1968
LOWEST ANNUAL MEAN					8.62	1970
HIGHEST DAILY MEAN	426	Dec 30	426	Dec 30	875	Dec 18 1967
LOWEST DAILY MEAN	2.6	May 9	2.3	Jun 24	2.3	Jun 24 1993
ANNUAL SEVEN-DAY MINIMUM	3.0	May 9	2.5	Jun 22	2.5	Jun 22 1993
ANNUAL RUNOFF (AC-FT)	9940		9540		11590	
10 PERCENT EXCEEDS	20		20		28	
50 PERCENT EXCEEDS	7.7		6.5		8.5	
90 PERCENT EXCEEDS	4.3		3.3		4.2	



16265600 RIGHT BRANCH KAMOOALII STREAM NEAR KANEOHE

LOCATION.--Lat 21°23'22", long 157°47'44", Hydrologic Unit 20060000, on left bank, 0.3 mi south of Hawaiian Memorial Park cemetery, 1.0 mi northwest of Pali Golf Course, and 1.3 mi south of Castle High School.

DRAINAGE AREA.--1.11 mi^2.

WATER-DISCHARGE RECORDS

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

GAGE.--Water-stage recorder. Elevation of gage is 210 ft, from topographic map.

REMARKS.--Records poor.

AVERAGE DISCHARGE.--10 years (water years 1984-93), 1.55 ft^3/s (1,120 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,160 ft^3/s, Nov. 10, 1986, gage height, 11.65 ft from rating curve extended above 100 ft^3/s on basis of slope-conveyance computation; minimum, 0.03 ft^3/s for several days in November, December 1984 and January 1985.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 600 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Nov. 26	1115	779	8.94	Dec. 30	1530	*856	*9.33

Minimum discharge, 0.16 ft^3/s, June 20, 23, 24, 26.

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

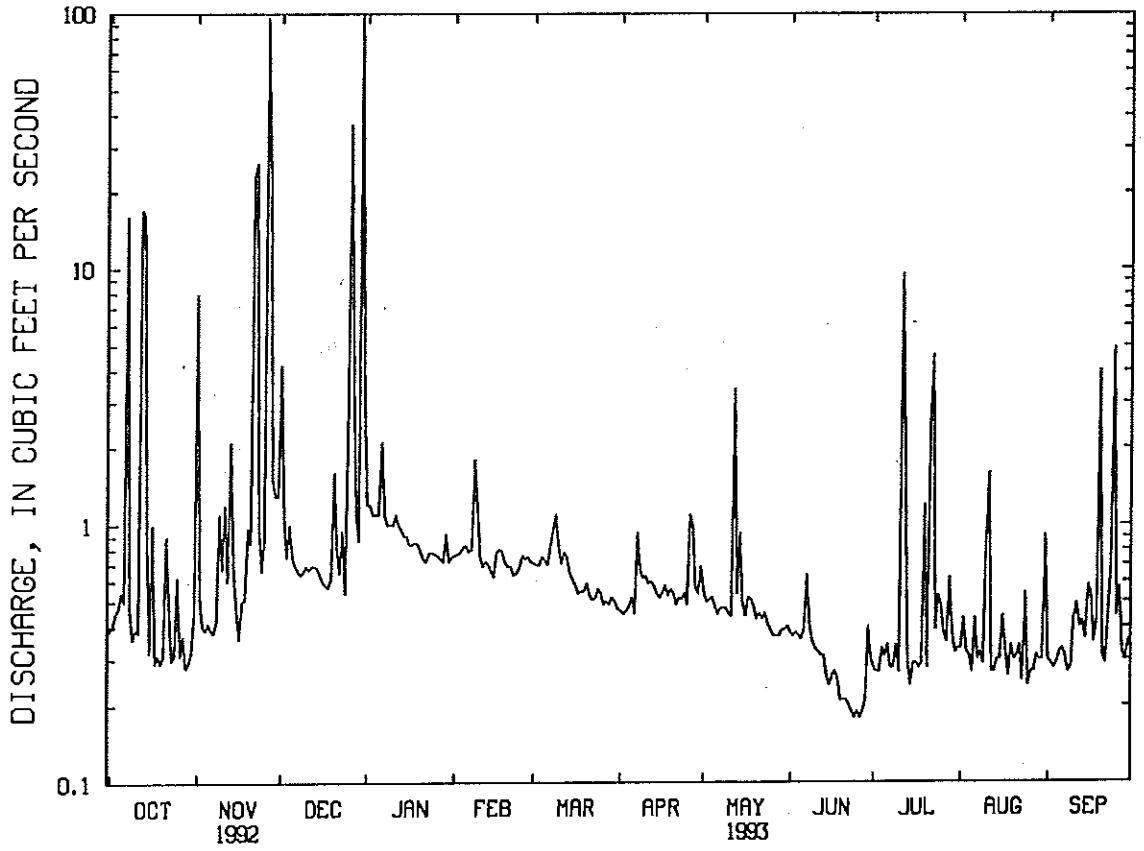
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.39	7.9	4.2	1.2	.76	.71	.46	.55	.38	.28	.33	.30
2	.41	.53	1.1	1.2	.77	.70	.45	.50	.37	.27	.43	.29
3	.45	.40	.75	1.1	.78	.70	.46	.51	.38	.27	.32	.28
4	.47	.39	1.0	1.1	.82	.75	.48	.52	.37	.33	.31	.29
5	.54	.41	.75	1.1	.83	.73	.52	.48	.36	.31	.27	.32
6	.50	.39	.69	2.1	.79	.70	.45	.45	.39	.34	.43	.33
7	16	.38	.66	1.1	.80	.83	.93	.47	.64	.28	.30	.31
8	.47	.42	.64	1.0	1.8	.96	.67	.47	.41	.28	.32	.27
9	.36	1.1	.66	1.0	1.2	1.1	.62	.47	.35	.34	.29	.28
10	.39	.67	.69	1.0	.75	.83	.63	.45	.33	.27	.87	.43
11	.38	1.2	.67	1.1	.69	.71	.59	.44	.32	9.5	1.6	.49
12	17	.60	.69	1.0	.72	.78	.60	3.4	.31	1.8	.27	.40
13	16	2.1	.69	.96	.70	.75	.58	.54	.31	.30	.27	.42
14	.94	.69	.68	.91	.66	.65	.54	.93	.26	.24	.30	.36
15	.32	.48	.64	.91	.63	.61	.52	.50	.24	.29	.30	.58
16	1.0	.36	.60	.84	.78	.58	.54	.44	.26	.29	.44	.53
17	.29	.50	.58	.84	.80	.54	.58	.52	.27	.28	.33	.35
18	.31	.51	.57	.85	.79	.55	.53	.51	.25	.29	.26	.43
19	.29	.97	.62	.85	.72	.55	.56	.48	.21	1.2	.34	4.0
20	.31	.85	1.6	.79	.69	.59	.54	.43	.21	.28	.30	.31
21	.90	23	.82	.74	.69	.53	.49	.45	.21	2.5	.31	.29
22	.50	26	.65	.72	.64	.51	.52	.43	.20	4.6	.34	.44
23	.30	1.0	.95	.78	.65	.52	.51	.45	.19	.39	.25	.72
24	.31	.66	.54	.78	.68	.56	.54	.41	.18	.53	.54	4.9
25	.62	.89	2.9	.77	.76	.54	.49	.39	.19	.48	.24	.44
26	.31	96	37	.76	.74	.49	1.1	.37	.18	.38	.27	.57
27	.37	24	3.9	.74	.75	.50	1.0	.37	.19	.35	.27	.32
28	.28	1.5	1.1	.72	.72	.49	.57	.37	.21	.62	.31	.30
29	.29	1.3	.87	.92	---	.52	.54	.39	.40	.38	.30	.35
30	.32	1.3	101	.72	---	.50	.69	.39	.30	.32	.30	.36
31	.45	---	3.5	.75	---	.47	---	.40	---	.33	.91	---
TOTAL	61.47	196.50	171.71	29.35	22.11	19.95	17.70	17.48	8.87	28.32	12.32	19.66
MEAN	1.98	6.55	5.54	.95	.79	.64	.59	.56	.30	.91	.40	.66
MAX	17	96	101	2.1	1.8	1.1	1.1	3.4	.64	9.5	1.6	4.9
MIN	.28	.36	.54	.72	.63	.47	.45	.37	.18	.24	.24	.27
AC-FT	122	390	341	58	44	40	35	35	18	56	24	39

16265600 RIGHT BRANCH KAMOOALII STREAM NEAR KANEOHE--Continued

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

MEAN	1.15	2.75	3.00	1.30	2.06	2.08	1.89	.96	.83	.79	.58	1.10
MAX	2.21	9.43	15.0	4.05	5.46	8.83	11.9	1.95	2.17	1.92	1.10	4.36
(WY)	1990	1987	1988	1988	1985	1991	1989	1988	1989	1989	1989	1986
MIN	.34	.12	.35	.18	.44	.37	.34	.33	.28	.18	.14	.11
(WY)	1985	1985	1985	1985	1984	1984	1992	1984	1984	1984	1984	1984

SUMMARY STATISTICS	FOR 1992 CALENDAR YEAR		FOR 1993 WATER YEAR		WATER YEARS 1983 - 1993	
ANNUAL TOTAL	614.20		605.44			
ANNUAL MEAN	1.68		1.66		1.55	
HIGHEST ANNUAL MEAN					2.84	1989
LOWEST ANNUAL MEAN					.33	1984
HIGHEST DAILY MEAN	101	Dec 30	101	Dec 30	177	Dec 31 1987
LOWEST DAILY MEAN	.16	Aug 20	.18	Jun 24	.03	Nov 16 1984
ANNUAL SEVEN-DAY MINIMUM	.18	Aug 25	.19	Jun 21	.04	Nov 15 1984
ANNUAL RUNOFF (AC-FT)	1220		1200		1120	
10 PERCENT EXCEEDS	1.2		1.1		1.7	
50 PERCENT EXCEEDS	.38		.52		.59	
90 PERCENT EXCEEDS	.25		.29		.29	



16265600 RIGHT BRANCH OF KAMOOALII STREAM NEAR KANEOHE--Continued

WATER-QUALITY RECORDS

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

PERIOD OF DAILY RECORD.--
SUSPENDED SEDIMENT DISCHARGE: February 1983 to current year.

INSTRUMENTATION.--Automatic pumping sediment sampler since February 1983.

Remarks.--Water quality samples were also collected at this site.

EXTREMES FOR PERIOD OF RECORD.--
SEDIMENT CONCENTRATIONS: Maximum daily mean, 1,230 mg/L, Apr. 19, 1984; minimum daily mean, less than 1 mg/L, Jan. 24, 1992.
SEDIMENT DISCHARGE: Maximum daily mean, 966 tons, Dec. 31, 1987; minimum daily, less than 0.01 ton on many days.

EXTREMES FOR CURRENT YEAR.--
SEDIMENT CONCENTRATIONS: Maximum daily mean, 202 mg/L, Dec. 30; minimum daily mean, less than 1 mg/L on many days.
SEDIMENT DISCHARGE: Maximum daily mean, 207 tons, Dec. 30; minimum daily, less than 0.01 ton on many days.

WATER QUALITY DATA, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	TIME	DISCHARGE, INST. CUBIC FEET PER SECOND	SPECIFIC CONDUCTANCE (US/CM)	PH WATER WHOLE FIELD (STANDARD UNITS)	TEMPERATURE AIR (DEG C)	TEMPERATURE WATER (DEG C)	TURBIDITY (NTU)	BAROMETRIC PRESSURE (MM OF HG)	OXYGEN, DISSOLVED (MG/L)	OXYGEN, DISSOLVED (PERCENT SATURATION)	COLIFORM, FECAL, 0.7 UM-MF (COLS./100 ML)
NOV 1992											
05...	1115	0.43	250	7.0	22.5	22.5	1.1	758	5.1	59	--
DEC											
09...	1230	0.62	270	6.6	--	23.5	1.7	760	5.3	63	2400
JAN 1993											
15...	0920	0.83	240	7.0	19.0	22.0	1.1	762	5.5	63	--
MAR											
01...	1000	0.66	235	6.4	21.0	22.0	3.3	765	6.2	71	840
APR											
20...	1435	0.54	230	6.6	21.0	23.0	3.5	762	4.5	53	--
MAY											
25...	1055	0.41	210	6.6	25.5	24.0	1.9	763	5.9	70	1000
JUN											
23...	0935	0.20	215	6.6	25.0	24.0	0.40	758	4.8	57	--
JUL											
22...	0920	8.0	80	6.9	--	23.5	13	762	7.5	88	--
SEP											
01...	1430	0.31	220	6.2	25.5	24.5	0.70	756	4.6	56	--
22...	1230	0.30	225	6.3	27.0	24.0	1.4	757	4.8	57	420

DATE	TIME	HARDNESS TOTAL (MG/L AS CACO3)	CALCIUM DISSOLVED (MG/L AS CA)	MAGNESIUM, DISSOLVED (MG/L AS MG)	SODIUM, DISSOLVED (MG/L AS NA)	SODIUM PERCENT	SODIUM ADSORPTION RATIO	POTASSIUM, DISSOLVED (MG/L AS K)	ALKALINITY LAB (MG/L AS CACO3)	SULFATE DISSOLVED (MG/L AS SO4)	CHLORIDE, DISSOLVED (MG/L AS CL)
MAR 1993											
01...	1000	61	12	7.4	19	40	1	1.0	57	15	24
SEP											
22...	1230	66	13	8.2	18	37	1	1.1	64	14	19

DATE	TIME	FLUORIDE, DISSOLVED (MG/L AS F)	SILICA, DISSOLVED (MG/L AS SIO2)	SOLIDS, RESIDUE AT 180 DEG. C DISSOLVED (MG/L)	SOLIDS, SUM OF CONSTITUENTS, DISSOLVED (MG/L)	SOLIDS, DISSOLVED (TONS PER AC-FT)	RESIDUE TOTAL AT 105 DEG. C, SUSPENDED (MG/L)	NITROGEN, NO2+NO3 TOTAL (MG/L AS N)	NITROGEN, AMMONIA TOTAL (MG/L AS N)	NITROGEN, AMMONIA + ORGANIC TOTAL (MG/L AS N)	PHOSPHORUS TOTAL (MG/L AS P)	ALUMINUM, TOTAL RECOVERABLE (UG/L AS AL)
DEC 1992												
09...	1230	--	--	--	--	--	23	0.550	0.070	<0.20	0.020	--
MAR 1993												
01...	1000	<0.10	19	130	132	0.18	4	--	--	<0.20	0.010	50
MAY												
25...	1055	--	--	--	--	--	<1	--	--	<0.20	<0.010	--
SEP												
22...	1230	<0.10	22	130	134	0.18	2	--	--	<0.20	0.020	<10

< Actual value is known to be less than the value shown

16265600 RIGHT BRANCH OF KAMOOALII STREAM NEAR KANEOHE--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	TIME	ALUMINUM, DISSOLVED (UG/L AS AL)	ARSENIC TOTAL (UG/L AS AS)	BARIUM, TOTAL RECOVERABLE (UG/L AS BA)	BARIUM, DISSOLVED (UG/L AS BA)	BERYLLIUM, TOTAL RECOVERABLE (UG/L AS BE)	CADMIUM TOTAL RECOVERABLE (UG/L AS CD)	CHROMIUM, TOTAL RECOVERABLE (UG/L AS CR)	COBALT, TOTAL RECOVERABLE (UG/L AS CO)	COBALT, DISSOLVED (UG/L AS CO)	COPPER, TOTAL RECOVERABLE (UG/L AS CU)	IRON, TOTAL RECOVERABLE (UG/L AS FE)
MAR 1993												
01...	1000	<10	<1	<100	13	<10	<1	3	<1	<3	1	410
SEP												
22...	1230	<10	<1	<100	13	<10	<1	1	<1	<3	<1	390

DATE	IRON, DISSOLVED (UG/L AS FE)	LEAD, TOTAL RECOVERABLE (UG/L AS PB)	LITHIUM TOTAL RECOVERABLE (UG/L AS LI)	LITHIUM DISSOLVED (UG/L AS LI)	MANGANESE, TOTAL RECOVERABLE (UG/L AS MN)	MANGANESE, DISSOLVED (UG/L AS MN)	MERCURY TOTAL RECOVERABLE (UG/L AS HG)	MOLYBDENUM, TOTAL RECOVERABLE (UG/L AS MO)	MOLYBDENUM, DISSOLVED (UG/L AS MO)	NICKEL, TOTAL RECOVERABLE (UG/L AS NI)	NICKEL, DISSOLVED (UG/L AS NI)
MAR 1993											
01...	120	<1	<10	<4	170	140	<0.10	<1	<10	3	1
SEP											
22...	130	<1	<10	<4	170	150	0.20	<1	<10	1	<1

DATE	SELENIUM, TOTAL (UG/L AS SE)	SELENIUM, DISSOLVED (UG/L AS SE)	SILVER, TOTAL RECOVERABLE (UG/L AS AG)	SILVER, DISSOLVED (UG/L AS AG)	STRONTIUM, DISSOLVED (UG/L AS SR)	VANADIUM, DISSOLVED (UG/L AS V)	ZINC, TOTAL RECOVERABLE (UG/L AS ZN)	CARBON, ORGANIC TOTAL (MG/L AS C)	OIL AND GREASE, TOTAL RECOV. GRAVIMETRIC (MG/L)	ALDRIN, TOTAL (UG/L)	CHLORDANE, TOTAL (UG/L)
MAR 1993											
01...	<1	<1	<1	<1.0	82	<6	10	1.3	<1	<0.010	<0.1
SEP											
22...	<1	<1	<1	<1.0	90	<6	10	0.7	<1	<0.010	<0.1

DATE	CHLORDYRIFOS TOTAL RECOVER (UG/L)	DDD, TOTAL (UG/L)	DDE, TOTAL (UG/L)	DDT, TOTAL (UG/L)	DEF TOTAL (UG/L)	DIAZINON, TOTAL (UG/L)	DIELDRIN TOTAL (UG/L)	DISYSTON TOTAL (UG/L)	2, 4-DP TOTAL (UG/L)	2,4-D, TOTAL (UG/L)
MAR 1993										
01...	<0.01	<0.010	<0.010	<0.010	<0.01	<0.01	<0.010	<0.01	<0.01	<0.01
SEP										
22...	<0.01	<0.010	<0.010	<0.010	<0.01	<0.01	<0.010	<0.01	<0.01	<0.01

DATE	ENDOSULFAN, TOTAL (UG/L)	ENDRIN WATER UNFLTRD REC (UG/L)	ETHION, TOTAL (UG/L)	FONOFOS (DYFONATE) WATER WHOLE TOT.REC (UG/L	HEPTACHLOR, TOTAL (UG/L)	HEPTACHLOR EPOXIDE TOTAL (UG/L)	LINDANE TOTAL (UG/L)	MALATHION, TOTAL (UG/L)	METHOXYCHLOR, TOTAL (UG/L)	METHYL PARATHION, TOTAL (UG/L)
MAR 1993										
01...	<0.010	<0.010	<0.01	<0.01	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01
SEP										
22...	<0.010	<0.010	<0.01	<0.01	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01

DATE	MIREX, TOTAL (UG/L)	NAPHTHALENES, POLYCHLOR. TOTAL (UG/L)	PARATHION, TOTAL (UG/L)	PCB, TOTAL (UG/L)	PERTHANE TOTAL (UG/L)	PHORATE TOTAL (UG/L)	SILVEX, TOTAL (UG/L)	TOXAPHENE, TOTAL (UG/L)	TOTAL TRITHION (UG/L)	2,4,5-T TOTAL (UG/L)
MAR 1993										
01...	<0.01	<0.10	<0.01	<0.1	<0.1	<0.01	<0.01	<1	<0.01	<0.01
SEP										
22...	<0.01	<0.10	<0.01	<0.1	<0.1	<0.01	<0.01	<1	<0.01	<0.01

< Actual value is known to be less than the value shown

16265600 RIGHT BRANCH OF KAMOOALII STREAM NR KANEOHE--Continued

SEDIMENT DISCHARGE, SUSPENDED (TONS/DAY), WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DAY	MEAN DISCHARGE (CFS)	MEAN CONCEN-TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN-TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN-TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)
		OCTOBER			NOVEMBER			DECEMBER	
1	.39	2	<.01	7.9	e24	3.2	4.2	e13	.64
2	.41	2	<.01	.53	3	<.01	1.1	9	.05
3	.45	7	.01	.40	3	<.01	.75	e4	.01
4	.47	4	<.01	.39	2	<.01	1.0	e7	.03
5	.54	2	<.01	.41	2	<.01	.75	4	.01
6	.50	2	<.01	.39	2	<.01	.69	2	<.01
7	16	e21	5.3	.38	1	<.01	.66	3	<.01
8	.47	4	<.01	.42	1	<.01	.64	3	<.01
9	.36	2	<.01	1.1	e7	.05	.66	3	<.01
10	.39	3	<.01	.67	e6	.01	.69	3	.01
11	.38	1	<.01	1.2	e11	.06	.67	3	<.01
12	17	e31	11	.60	2	<.01	.69	4	.01
13	16	e33	8.4	2.1	e13	.15	.69	4	.01
14	.94	e7	.05	.69	4	.01	.68	4	.01
15	.32	2	<.01	.48	2	<.01	.64	3	<.01
16	1.0	e11	.05	.36	2	<.01	.60	3	<.01
17	.29	2	<.01	.50	e3	<.01	.58	2	<.01
18	.31	1	<.01	.51	1	<.01	.57	2	<.01
19	.29	1	<.01	.97	e10	.04	.62	1	<.01
20	.31	2	<.01	.85	e5	.02	1.6	e12	.13
21	.90	e6	.04	23	e54	13	.82	e5	.03
22	.50	e4	.01	26	e91	11	.65	e4	.01
23	.30	2	<.01	1.0	7	.02	.95	e10	.03
24	.31	1	<.01	.66	e3	<.01	.54	2	<.01
25	.62	5	.02	.89	e5	.02	2.9	e12	4.1
26	.31	2	<.01	96	110	92	37	e159	27
27	.37	e5	.01	24	e84	24	3.9	e58	.92
28	.28	2	<.01	1.5	4	.02	1.1	4	.01
29	.29	2	<.01	1.3	2	.01	.87	4	.01
30	.32	2	<.01	1.3	1	<.01	101	202	207
31	.45	e3	.01	---	---	---	3.5	e20	.36
TOTAL	61.47	---	25.10	196.50	---	143.75	171.71	---	240.49
		JANUARY			FEBRUARY			MARCH	
1	1.2	5	.02	.76	2	<.01	.71	2	<.01
2	1.2	1	<.01	.77	2	<.01	.70	2	<.01
3	1.1	2	<.01	.78	2	<.01	.70	2	<.01
4	1.1	e3	.01	.82	2	<.01	.75	3	.01
5	1.1	1	<.01	.83	2	<.01	.73	4	.01
6	2.1	12	.15	.79	2	<.01	.70	3	.01
7	1.1	3	.01	.80	2	<.01	.83	e4	.01
8	1.0	2	.01	1.8	e14	.12	.96	e4	.04
9	1.0	e3	.01	1.2	e7	.04	1.1	e5	.03
10	1.0	1	<.01	.75	1	<.01	.83	e4	.01
11	1.1	2	<.01	.69	3	.01	.71	3	.01
12	1.0	2	<.01	.72	3	.01	.78	3	.01
13	.96	e2	<.01	.70	3	.01	.75	3	.01
14	.91	1	<.01	.66	2	<.01	.65	3	<.01
15	.91	e1	<.01	.63	3	<.01	.61	2	<.01
16	.84	2	<.01	.78	3	.01	.58	2	<.01
17	.84	2	<.01	.80	2	<.01	.54	2	<.01
18	.85	2	<.01	.79	2	<.01	.55	2	<.01
19	.85	2	<.01	.72	3	.01	.55	3	<.01
20	.79	1	<.01	.69	3	.01	.59	4	.01
21	.74	2	<.01	.69	3	<.01	.53	3	<.01
22	.72	1	<.01	.64	2	<.01	.51	4	<.01
23	.78	2	<.01	.65	2	<.01	.52	4	.01
24	.78	2	<.01	.68	e2	<.01	.56	2	<.01
25	.77	1	<.01	.76	e3	.01	.54	2	<.01
26	.76	1	<.01	.74	2	<.01	.49	2	<.01
27	.74	2	<.01	.75	3	.01	.50	3	<.01
28	.72	3	.01	.72	3	<.01	.49	2	<.01
29	.92	e6	.02	---	---	---	.52	3	<.01
30	.72	4	.01	---	---	---	.50	2	<.01
31	.75	1	<.01	---	---	---	.47	2	<.01
TOTAL	29.35	---	0.47	22.11	---	0.42	19.95	---	0.36

< Actual value is known to be less than the value shown
e Estimated

16265600 RIGHT BRANCH OF KAMOOALII STREAM NR KANEOHE--Continued

SEDIMENT DISCHARGE, SUSPENDED (TONS/DAY), WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DAY	MEAN DISCHARGE (CFS)	MEAN CONCEN-TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN-TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN-TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)
		APRIL			MAY			JUNE	
1	.46	2	<.01	.55	2	<.01	.38	3	<.01
2	.45	2	<.01	.50	1	<.01	.37	2	<.01
3	.46	1	<.01	.51	e3	<.01	.38	2	<.01
4	.48	2	<.01	.52	e3	<.01	.37	e2	<.01
5	.52	e4	.01	.48	2	<.01	.36	e3	<.01
6	.45	2	<.01	.45	3	<.01	.39	3	<.01
7	.93	e8	.03	.47	3	<.01	.64	e7	.02
8	.67	e3	.01	.47	2	<.01	.41	2	<.01
9	.62	2	<.01	.47	2	<.01	.35	3	<.01
10	.63	3	<.01	.45	2	<.01	.33	2	<.01
11	.59	3	<.01	.44	e3	<.01	.32	2	<.01
12	.60	3	<.01	3.4	e16	1.2	.31	2	<.01
13	.58	2	<.01	.54	6	.01	.31	3	<.01
14	.54	3	<.01	.93	e7	.04	.26	2	<.01
15	.52	3	<.01	.50	2	<.01	.24	2	<.01
16	.54	3	<.01	.44	2	<.01	.26	3	<.01
17	.58	5	.01	.52	e3	<.01	.27	2	<.01
18	.53	4	.01	.51	e4	.01	.25	2	<.01
19	.56	2	<.01	.48	e4	.01	.21	2	<.01
20	.54	e5	.01	.43	e3	<.01	.21	2	<.01
21	.49	3	<.01	.45	3	<.01	.21	1	<.01
22	.52	3	<.01	.43	2	<.01	.20	3	<.01
23	.51	e3	<.01	.45	2	<.01	.19	2	<.01
24	.54	e3	.01	.41	2	<.01	.18	1	<.01
25	.49	e2	<.01	.39	2	<.01	.19	1	<.01
26	1.1	e8	.07	.37	1	<.01	.18	3	<.01
27	1.0	e6	.04	.37	2	<.01	.19	1	<.01
28	.57	2	<.01	.37	1	<.01	.21	1	<.01
29	.54	2	<.01	.39	1	<.01	.40	e3	.01
30	.69	e4	.01	.39	2	<.01	.30	e2	<.01
31	---	---	---	.40	2	<.01	---	---	---
TOTAL	17.70	---	0.41	17.48	---	1.53	8.87	---	0.31
		JULY			AUGUST			SEPTEMBER	
1	.28	3	<.01	.33	1	<.01	.30	e3	<.01
2	.27	2	<.01	.43	e3	<.01	.29	2	<.01
3	.27	3	<.01	.32	1	<.01	.28	1	<.01
4	.33	e4	<.01	.31	1	<.01	.29	2	<.01
5	.31	2	<.01	.27	2	<.01	.32	1	<.01
6	.34	e2	<.01	.43	3	.01	.33	1	<.01
7	.28	3	<.01	.30	1	<.01	.31	1	<.01
8	.28	2	<.01	.32	e2	<.01	.27	1	<.01
9	.34	e5	.01	.29	1	<.01	.28	2	<.01
10	.27	4	<.01	.87	e6	.06	.43	e3	<.01
11	9.5	e34	3.3	1.6	e10	.16	.49	e4	.01
12	1.8	e17	.16	.27	1	<.01	.40	e4	<.01
13	.30	e3	<.01	.27	1	<.01	.42	e3	<.01
14	.24	2	<.01	.30	1	<.01	.36	1	<.01
15	.29	e4	<.01	.30	1	<.01	.58	e4	.01
16	.29	3	<.01	.44	e3	<.01	.53	e4	.02
17	.28	e3	<.01	.33	e1	<.01	.35	e4	<.01
18	.29	3	<.01	.26	1	<.01	.43	2	<.01
19	1.2	e10	.07	.34	e2	<.01	4.0	e16	.88
20	.28	3	<.01	.30	1	<.01	.31	1	<.01
21	2.5	e13	.44	.31	3	<.01	.29	2	<.01
22	4.6	e24	.85	.34	1	<.01	.44	e4	.01
23	.39	4	<.01	.25	1	<.01	.72	e6	.03
24	.53	e6	.01	.54	e4	.02	4.9	e15	1.5
25	.48	e5	.01	.24	1	<.01	.44	e4	.01
26	.38	e3	<.01	.27	1	<.01	.57	e4	.02
27	.35	3	<.01	.27	1	<.01	.32	2	<.01
28	.62	e6	.02	.31	1	<.01	.30	2	<.01
29	.38	e4	<.01	.30	1	<.01	.35	e2	<.01
30	.32	2	<.01	.30	2	<.01	.36	e2	<.01
31	.33	2	<.01	.91	e8	.06	---	---	---
TOTAL	28.32	---	5.09	12.32	---	0.57	19.66	---	2.70
YEAR	605.44		421.20						

< Actual value is known to be less than the value shown
e Estimated

16270900 LULUKU STREAM AT ALTITUDE 220 FT, NEAR KANEOHE

LOCATION.--Lat 21°23'42", long 157°48'44", Hydrologic Unit 20060000, on right bank 0.5 mi upstream from mouth, 1.4 mi southwest of Castle High School, and 1.9 mi south of Kaneohe Post Office.

DRAINAGE AREA.--0.44 mi^2.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--1960-63 (low-flow measurements), 1965-71, 1971-84 (annual maximum), April 1984 to current year. Prior to April 1984, the station was located 400 ft upstream.

GAGE.--Water-stage recorder and wooden control. Elevation of gage is 200 ft (from Corps of Engineers).

REMARKS.--Records fair. Honolulu Board of Water Supply diverts water from tunnel in drainage area.

AVERAGE DISCHARGE.--13 years (water years 1968-71, 1985-93), 1.37 ft^3/s (993 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 651 ft^3/s, Nov. 26, 1970 (gage height, 6.18 ft for datum and site then in use), from rating curve extended above 10 ft^3/s on basis of slope-area measurement at gage height 6.09 ft; minimum, 0.03 ft^3/s on many days 1984-85.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 180 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Dec. 30	1515	*232	*2.06	No other peaks greater than base discharge.			

Minimum discharge, 0.09 ft^3/s, June 11, 12.

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

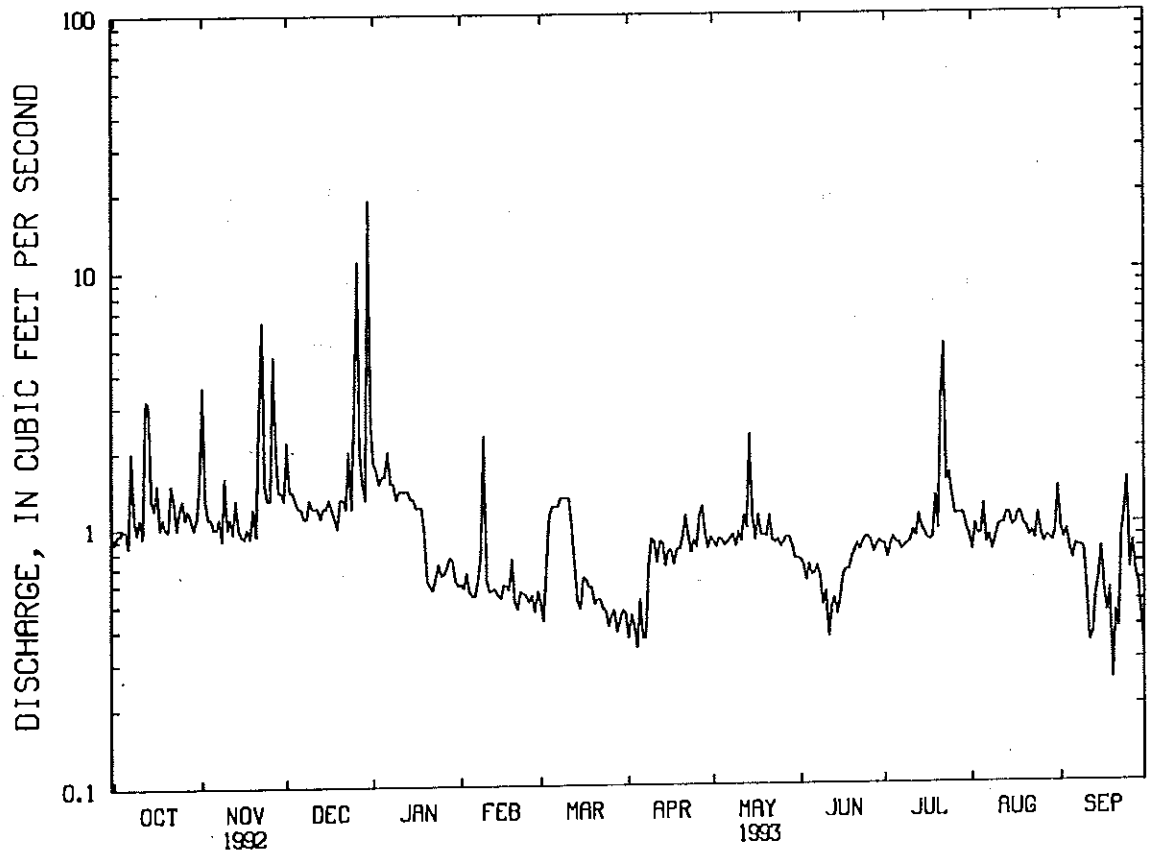
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.88	3.6	2.2	1.8	.60	.51	.37	.87	.73	.84	.79	.96
2	.95	1.3	1.4	1.7	.58	.43	.45	.83	.70	.74	1.0	.87
3	.95	1.1	1.4	1.5	.66	.71	.41	.89	.61	.83	.91	.94
4	.99	1.1	1.3	1.6	.56	1.1	.34	.88	.70	.89	.92	.80
5	.99	1.0	1.2	1.6	.54	1.2	.52	.84	.64	.85	1.2	.72
6	.85	1.0	1.2	2.0	.54	1.2	.37	.86	.65	.85	.84	.82
7	2.0	1.1	1.1	1.5	.62	1.2	.37	.89	.69	.80	.90	.81
8	1.1	.90	1.1	1.5	.79	1.3	.70	.92	.63	.82	.79	.81
9	.96	1.6	1.3	1.3	2.3	1.3	.89	.83	.49	.84	.87	.79
10	1.1	1.0	1.2	1.4	.62	1.3	.87	.94	.55	.86	.97	.55
11	.93	1.1	1.2	1.4	.56	1.3	.72	.87	.37	.95	1.0	.35
12	3.2	.96	1.2	1.4	.57	1.0	.87	1.1	.48	.90	1.0	.37
13	3.1	1.3	1.1	1.4	.57	.71	.86	.98	.52	1.1	1.1	.52
14	1.3	1.0	1.2	1.3	.54	.51	.70	2.3	.45	.97	1.1	.61
15	1.2	.94	1.2	1.3	.53	.48	.80	1.1	.53	.93	.98	.80
16	1.5	.92	1.3	1.2	.59	.63	.80	.88	.64	.88	1.0	.55
17	1.0	1.0	1.2	1.2	.59	.62	.71	1.1	.67	.87	1.1	.45
18	1.1	.92	1.1	1.2	.57	.58	.81	.92	.67	.89	1.1	.55
19	1.0	1.2	1.0	.96	.75	.58	.81	.92	.74	1.3	.99	.25
20	.99	.94	1.3	.62	.51	.50	.90	.91	.79	.96	.97	.45
21	1.5	2.7	1.3	.59	.48	.52	1.1	1.1	.84	3.2	.89	.39
22	1.3	6.4	1.2	.57	.56	.52	.92	.88	.80	5.1	.93	.91
23	1.0	1.5	2.0	.64	.55	.48	.79	.86	.86	1.5	.87	1.1
24	1.2	1.3	1.2	.72	.54	.47	.88	.88	.89	1.6	1.1	1.5
25	1.3	1.3	3.0	.65	.51	.41	.83	.83	.89	1.3	.92	.66
26	1.1	4.7	11	.66	.54	.45	1.1	.86	.86	1.1	.84	.84
27	1.2	2.1	2.0	.70	.47	.47	1.2	.90	.78	1.1	.88	.64
28	1.1	1.4	1.5	.76	.56	.39	.94	.90	.83	1.1	.88	.58
29	1.0	1.4	1.3	.74	---	.43	.82	.83	.86	1.1	.85	.43
30	1.1	1.3	19	.62	---	.47	.90	.74	.84	.97	.92	.31
31	1.5	---	2.6	.59	---	.46	---	.74	---	.91	1.4	---
TOTAL	39.39	48.08	71.3	35.12	17.80	22.23	22.75	29.35	20.70	37.05	30.01	20.33
MEAN	1.27	1.60	2.30	1.13	.64	.72	.76	.95	.69	1.20	.97	.68
MAX	3.2	6.4	19	2.0	2.3	1.3	1.2	2.3	.89	5.1	1.4	1.5
MIN	.85	.90	1.0	.57	.47	.39	.34	.74	.37	.74	.79	.25
AC-FT	78	95	141	70	35	44	45	58	41	73	60	40

16270900 LULUKU STREAM AT ALTITUDE 220 FT, NEAR KANEOHE--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1967 - 1993, BY WATER YEAR (WY)

MEAN	1.03	1.58	1.90	1.57	1.52	1.68	1.57	1.20	.99	1.09	1.01	1.00
MAX	2.30	3.57	4.10	3.02	4.92	3.78	3.67	2.07	1.89	1.91	2.39	1.65
(WY)	1992	1971	1988	1969	1969	1968	1989	1969	1971	1971	1991	1971
MIN	.089	.12	.26	.16	.17	.63	.39	.34	.23	.16	.14	.14
(WY)	1985	1985	1986	1986	1986	1985	1984	1984	1984	1984	1985	1984

SUMMARY STATISTICS	FOR 1992 CALENDAR YEAR		FOR 1993 WATER YEAR		WATER YEARS 1967 - 1993		
ANNUAL TOTAL	459.88		394.11				
ANNUAL MEAN	1.26		1.08		1.37		
HIGHEST ANNUAL MEAN					2.13		1969
LOWEST ANNUAL MEAN					.41		1986
HIGHEST DAILY MEAN	19	Dec 30	19	Dec 30	67	Feb 1	1969
LOWEST DAILY MEAN	.60	Jan 5	.25	Sep 19	.03	Oct 14	1988
ANNUAL SEVEN-DAY MINIMUM	.62	Jan 1	.40	Apr 1	.07	Nov 18	1984
ANNUAL RUNOFF (AC-FT)	912		782		993		
10 PERCENT EXCEEDS	1.5		1.4		2.1		
50 PERCENT EXCEEDS	1.0		.90		1.1		
90 PERCENT EXCEEDS	.77		.52		.30		



16270900 LULUKU STREAM AT ALTITUDE 220 FT, NEAR KANEOHE--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--April 1984 to current year.

PERIOD OF DAILY RECORD.--
SUSPENDED SEDIMENT DISCHARGE: April 1984 to current year.

INSTRUMENTATION.--Automatic pumping sediment sampler since April 1984.

REMARKS.--Water-quality samples were also collected at this site.

EXTREMES FOR PERIOD OF RECORD.--
SEDIMENT CONCENTRATIONS: Maximum daily mean, 679 mg/L, Dec. 30, 1992; minimum daily mean, 1 mg/L, Apr. 2, 4, 5, 1991.
SEDIMENT DISCHARGE: Maximum daily, 342 tons, Dec. 31, 1987; minimum daily, less than 0.01 ton on many days each year.

EXTREMES FOR CURRENT YEAR.--
SEDIMENT CONCENTRATIONS: Maximum daily mean, 679 mg/L, Dec. 30; minimum daily mean, 4 mg/L, Dec. 8, 9.
SEDIMENT DISCHARGE: Maximum daily, 127 tons, Dec. 30; minimum daily, less than 0.01 ton, Apr. 4, 6, Sep. 19.

WATER QUALITY DATA, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	TIME	DISCHARGE, INST. CUBIC FEET PER SECOND	SPECIFIC CONDUCTANCE (US/CM)	PH WATER WHOLE FIELD (STANDARD UNITS)	TEMPERATURE AIR (DEG C)	TEMPERATURE WATER (DEG C)	TURBIDITY (NTU)	BAROMETRIC PRESSURE (MM OF HG)	OXYGEN, DISSOLVED (MG/L)	OXYGEN, DISSOLVED (PERCENT SATURATION)	COLIFORM, FECAL, 0.7 UM-MF (COLS./ 100 ML)
NOV 1992											
03...	1020	1.2	165	7.9	22.0	20.0	0.50	756	8.6	95	--
DEC											
08...	1155	1.2	167	7.7	22.5	20.5	1.1	762	8.6	96	470
JAN 1993											
14...	1315	1.1	172	7.7	22.5	20.0	0.60	760	9.2	102	--
MAR											
02...	1220	0.37	165	7.0	22.0	20.0	0.60	764	8.8	97	880
APR											
20...	1020	1.1	160	7.1	20.0	19.5	1.1	764	8.6	93	--
MAY											
24...	1340	0.77	148	7.7	29.5	22.0	1.5	761	8.4	96	K2400
JUN											
23...	1030	0.89	145	7.3	27.0	21.0	0.50	763	8.2	92	--
JUL											
22...	1340	2.5	145	7.1	--	21.5	15	761	8.3	94	--
SEP											
01...	0900	0.79	160	7.0	--	21.0	2.1	757	8.2	93	--
21...	1100	0.20	173	7.1	29.5	22.0	3.8	757	7.7	89	1400

DATE	TIME	HARDNESS TOTAL (MG/L AS CACO3)	CALCIUM DISSOLVED (MG/L AS CA)	MAGNESIUM, DISSOLVED (MG/L AS MG)	SODIUM, DISSOLVED (MG/L AS NA)	SODIUM PERCENT	SODIUM ADSORPTION RATIO	POTASSIUM, DISSOLVED (MG/L AS K)	ALKALINITY LAB (MG/L AS CACO3)	SULFATE DISSOLVED (MG/L AS SO4)	CHLORIDE, DISSOLVED (MG/L AS CL)
MAR 1993											
02...	1220	49	9.6	6.0	13	36	0.8	1.0	46	4.0	18
SEP											
21...	1100	54	11	6.4	14	36	0.8	0.90	57	3.9	15

DATE	TIME	FLUORIDE, DISSOLVED (MG/L AS F)	SILICA, DISSOLVED (MG/L AS SIO2)	SOLIDS, RESIDUE AT 180 DEG. C DISSOLVED (MG/L)	SOLIDS, SUM OF CONSTITUENTS, DISSOLVED (MG/L)	SOLIDS, DISSOLVED (TONS PER AC-FT)	RESIDUE TOTAL AT 105 DEG. C, SUSPENDED (MG/L)	NITROGEN, NO2+NO3 TOTAL (MG/L AS N)	NITROGEN, AMMONIA TOTAL (MG/L AS N)	NITROGEN,AMMONIA + ORGANIC TOTAL (MG/L AS N)	PHOSPHORUS TOTAL (MG/L AS P)	PHOSPHATE, TOTAL (MG/L AS PO4)
DEC 1992												
08...	1115	--	--	--	--	--	<1	0.240	<0.010	<0.20	0.010	0.03
MAR 1993												
02...	1220	<0.10	26	108	105	0.15	8	--	--	<0.20	0.020	--
MAY												
24...	1340	--	--	--	--	--	<1	--	--	<0.20	0.020	--
SEP												
21...	1100	0.10	29	107	115	0.15	1	--	--	<0.20	0.020	--

< Actual value is known to be less than the value shown
K Results based on colony count outside the acceptance range (non-ideal colony count)

16270900 LULUKU STREAM AT ALTITUDE 220 FT, NEAR KANEOHE--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	TIME	ALUMINUM, TOTAL RECOVERABLE (UG/L AS AL)	ALUMINUM, DISSOLVED (UG/L AS AL)	ARSENIC TOTAL (UG/L AS AS)	BARIUM, TOTAL RECOVERABLE (UG/L AS BA)	BARIUM, DISSOLVED (UG/L AS BA)	BERYLLIUM, TOTAL RECOVERABLE (UG/L AS BE)	CADMIUM TOTAL RECOVERABLE (UG/L AS CD)	CHROMIUM, TOTAL RECOVERABLE (UG/L AS CR)	COBALT, TOTAL RECOVERABLE (UG/L AS CO)	COBALT, DISSOLVED (UG/L AS CO)	COPPER, TOTAL RECOVERABLE (UG/L AS CU)
MAR 1993												
02...	1220	30	<10	1	<100	<2	<10	<1	2	<1	<3	<1
SEP												
21...	1100	300	<10	<1	<100	<2	<10	<1	2	<1	<3	<1

DATE	IRON, TOTAL RECOVERABLE (UG/L AS FE)	IRON, DISSOLVED (UG/L AS FE)	LEAD, TOTAL RECOVERABLE (UG/L AS PB)	LITHIUM TOTAL RECOVERABLE (UG/L AS LI)	LITHIUM DISSOLVED (UG/L AS LI)	MANGANESE, TOTAL RECOVERABLE (UG/L AS MN)	MANGANESE, DISSOLVED (UG/L AS MN)	MERCURY TOTAL RECOVERABLE (UG/L AS HG)	MOLYBDENUM, TOTAL RECOVERABLE (UG/L AS MO)	MOLYBDENUM, DISSOLVED (UG/L AS MO)	NICKEL, TOTAL RECOVERABLE (UG/L AS NI)
MAR 1993											
02...	60	31	<1	<10	<4	20	5	<0.10	<1	<10	2
SEP											
21...	460	18	<1	<10	<4	20	<1	0.20	<1	<10	<1

DATE	NICKEL, DISSOLVED (UG/L AS NI)	SELENIUM, TOTAL (UG/L AS SE)	SELENIUM, DISSOLVED (UG/L AS SE)	SILVER, TOTAL RECOVERABLE (UG/L AS AG)	SILVER, DISSOLVED (UG/L AS AG)	STRONTIUM, DISSOLVED (UG/L AS SR)	VANADIUM, DISSOLVED (UG/L AS V)	ZINC, TOTAL RECOVERABLE (UG/L AS ZN)	CARBON, ORGANIC TOTAL (MG/L AS C)	OIL AND GREASE, TOTAL RECOV. GRAVIMETRIC (MG/L)	ALDRIN, TOTAL (UG/L)
MAR 1993											
02...	<1	<1	<1	<1	<1.0	51	<6	<10	2.1	<1	<0.010
SEP											
21...	<1	<1	<1	<1	<1.0	61	<6	<10	0.8	<1	<0.010

DATE	CHLORDANE, TOTAL (UG/L)	CHLORDYRIFOS TOTAL RECOVER (UG/L)	DDD, TOTAL (UG/L)	DDE, TOTAL (UG/L)	DDT, TOTAL (UG/L)	DEF TOTAL (UG/L)	DIAZINON, TOTAL (UG/L)	DIELDRIN TOTAL (UG/L)	DISYSTON TOTAL (UG/L)	2, 4-DP TOTAL (UG/L)	2,4-D, TOTAL (UG/L)
MAR 1993											
02...	<0.1	<0.01	<0.010	<0.010	<0.010	<0.01	<0.01	<0.010	<0.01	<0.01	<0.01
SEP											
21...	<0.1	<0.01	<0.010	<0.010	<0.010	<0.01	<0.01	<0.010	<0.01	<0.01	<0.01

DATE	ENDOSULFAN, TOTAL (UG/L)	ENDRIN WATER UNFLTRD REC (UG/L)	ETHION, TOTAL (UG/L)	FONOFOS (DYFONATE) WATER WHOLE TOT.REC (UG/L	HEPTACHLOR, TOTAL (UG/L)	HEPTACHLOR EPOXIDE TOTAL (UG/L)	LINDANE TOTAL (UG/L)	MALATHION, TOTAL (UG/L)	METHOXYCHLOR, TOTAL (UG/L)	METHYL PARATHION, TOTAL (UG/L)
MAR 1993										
02...	<0.010	<0.010	<0.01	<0.01	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01
SEP										
21...	<0.010	<0.010	<0.01	<0.01	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01

DATE	MIREX, TOTAL (UG/L)	NAPHTHALENES, POLYCHLOR. TOTAL (UG/L)	PARATHION, TOTAL (UG/L)	PCB, TOTAL (UG/L)	PERTHANE TOTAL (UG/L)	PHORATE TOTAL (UG/L)	SILVEX, TOTAL (UG/L)	TOXAPHENE, TOTAL (UG/L)	TOTAL TRITHION (UG/L)	2,4,5-T TOTAL (UG/L)
MAR 1993										
02...	<0.01	<0.10	<0.01	<0.1	<0.1	<0.01	<0.01	<1	<0.01	<0.01
SEP										
21...	<0.01	<0.10	<0.01	<0.1	<0.1	<0.01	<0.01	<1	<0.01	<0.01

< Actual value is known to be less than the value shown

16270900 LULUKU STREAM AT ALTITUDE 220 FT NR KANEOHE--Continued

SEDIMENT DISCHARGE, SUSPENDED (TONS/DAY), WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DAY	MEAN DISCHARGE (CFS)	MEAN CONCEN-TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN-TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN-TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)
		OCTOBER			NOVEMBER			DECEMBER	
1	.88	e11	.02	3.6	54	2.4	2.2	30	.57
2	.95	e10	.03	1.3	e11	.04	1.4	e12	.05
3	.95	e10	.03	1.1	12	.03	1.4	e8	.03
4	.99	e10	.03	1.1	e12	.03	1.3	e7	.03
5	.99	e10	.03	1.0	e11	.03	1.2	e6	.02
6	.85	e10	.02	1.0	e11	.03	1.2	e5	.02
7	2.0	e18	.13	1.1	e11	.03	1.1	e5	.01
8	1.1	e8	.02	.90	e10	.02	1.1	4	.01
9	.96	e8	.02	1.6	18	.21	1.3	e4	.01
10	1.1	e8	.02	1.0	e9	.02	1.2	e5	.02
11	.93	e9	.02	1.1	e11	.04	1.2	e5	.02
12	3.2	21	.68	.96	e8	.02	1.2	e5	.02
13	3.1	21	.50	1.3	e13	.06	1.1	e6	.02
14	1.3	e10	.03	1.0	e10	.03	1.2	e6	.02
15	1.2	e10	.03	.94	e9	.02	1.2	e6	.02
16	1.5	e12	.05	.92	8	.02	1.3	e10	.04
17	1.0	e10	.03	1.0	e9	.02	1.2	e12	.04
18	1.1	e10	.03	.92	e9	.02	1.1	e11	.03
19	1.0	e10	.03	1.2	e14	.05	1.0	e11	.03
20	.99	e10	.03	.94	e10	.03	1.3	e14	.06
21	1.5	e13	.07	2.7	44	1.0	1.3	e13	.06
22	1.3	e11	.04	6.4	116	3.3	1.2	e10	.03
23	1.0	e9	.02	1.5	e16	.07	2.0	e95	1.7
24	1.2	8	.02	1.3	e12	.04	1.2	e12	.04
25	1.3	e10	.04	1.3	e12	.04	3.0	e83	12
26	1.1	e8	.02	4.7	84	2.3	11	179	15
27	1.2	e8	.03	2.1	23	.17	2.0	35	.19
28	1.1	e8	.02	1.4	e14	.05	1.5	20	.08
29	1.0	e8	.02	1.4	e13	.05	1.3	e13	.05
30	1.1	e8	.02	1.3	e11	.04	19	679	127
31	1.5	e13	.15	---	---	---	2.6	14	.11
TOTAL	39.39	---	2.23	48.08	---	10.21	71.3	---	157.33
		JANUARY			FEBRUARY			MARCH	
1	1.8	21	.10	.60	e6	.01	.51	e7	.01
2	1.7	e15	.07	.58	e6	.01	.43	7	.01
3	1.5	e14	.05	.66	e6	.01	.71	10	.02
4	1.6	e15	.06	.56	e6	.01	1.1	e10	.03
5	1.6	e15	.06	.54	e6	.01	1.2	e10	.03
6	2.0	e19	.19	.54	e6	.01	1.2	e10	.03
7	1.5	e10	.04	.62	e6	.01	1.2	e10	.03
8	1.5	e9	.04	.79	e8	.02	1.3	e13	.06
9	1.3	e9	.03	2.3	e38	2.3	1.3	e12	.05
10	1.4	e9	.03	.62	e7	.01	1.3	e11	.04
11	1.4	e8	.03	.56	e7	.01	1.3	e10	.03
12	1.4	e8	.03	.57	e7	.01	1.0	e10	.03
13	1.4	e8	.03	.57	e7	.01	.71	e10	.02
14	1.3	e7	.02	.54	e7	.01	.51	e10	.01
15	1.3	e7	.02	.53	e7	.01	.48	e9	.01
16	1.2	e7	.02	.59	e7	.01	.63	e9	.02
17	1.2	e7	.02	.59	e7	.01	.62	e9	.02
18	1.2	e6	.02	.57	e7	.01	.58	e9	.01
19	.96	e6	.02	.75	e7	.01	.58	e8	.01
20	.62	6	.01	.51	e7	.01	.50	e8	.01
21	.59	e6	.01	.48	e7	.01	.52	e8	.01
22	.57	e6	.01	.56	e7	.01	.52	e8	.01
23	.64	e6	.01	.55	e7	.01	.48	e8	.01
24	.72	e6	.01	.54	e7	.01	.47	e7	.01
25	.65	e6	.01	.51	e7	.01	.41	e7	.01
26	.66	e6	.01	.54	e7	.01	.45	e7	.01
27	.70	e6	.01	.47	e7	.01	.47	e7	.01
28	.76	e6	.01	.56	e7	.01	.39	e7	.01
29	.74	e6	.01	---	---	---	.43	e6	.01
30	.62	e6	.01	---	---	---	.47	e6	.01
31	.59	e6	.01	---	---	---	.46	e6	.01
TOTAL	35.12	---	1.00	17.80	---	2.58	22.23	---	0.59

e Estimated

16270900 LULUKU STREAM AT ALTITUDE 220 FT NR KANEOHE--Continued

SEDIMENT DISCHARGE, SUSPENDED (TONS/DAY), WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DAY	MEAN DISCHARGE (CFS)	MEAN CONCEN-TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN-TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN-TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)
		APRIL			MAY			JUNE	
1	.37	e6	.01	.87	e8	.02	.73	e10	.02
2	.45	e6	.01	.83	e8	.02	.70	e10	.02
3	.41	e6	.01	.89	e8	.02	.61	e10	.02
4	.34	e5	<.01	.88	e8	.02	.70	e10	.02
5	.52	e5	.01	.84	e7	.02	.64	e10	.02
6	.37	e5	<.01	.86	e7	.02	.65	e10	.02
7	.37	e7	.01	.89	e7	.02	.69	e10	.02
8	.70	e8	.02	.92	e7	.02	.63	e10	.02
9	.89	e8	.02	.83	e7	.02	.49	e10	.01
10	.87	e8	.02	.94	e7	.02	.55	e10	.02
11	.72	e8	.02	.87	e7	.02	.37	e10	.01
12	.87	e8	.02	1.1	29	.28	.48	e10	.01
13	.86	e8	.02	.98	e10	.03	.52	e10	.01
14	.70	e8	.02	2.3	23	.34	.45	e10	.01
15	.80	e8	.02	1.1	e10	.03	.53	e10	.01
16	.80	e8	.02	.88	e10	.02	.64	e10	.02
17	.71	e8	.02	1.1	e10	.03	.67	e10	.02
18	.81	e8	.02	.92	10	.03	.67	e10	.02
19	.81	e8	.02	.92	e10	.02	.74	e10	.02
20	.90	e8	.02	.91	e10	.02	.79	e10	.02
21	1.1	e8	.02	1.1	e10	.03	.84	e10	.02
22	.92	e8	.02	.88	e10	.02	.80	17	.04
23	.79	e8	.02	.86	e10	.02	.86	e10	.02
24	.88	e8	.02	.88	e10	.02	.89	e10	.02
25	.83	e8	.02	.83	e10	.02	.89	e10	.02
26	1.1	e11	.04	.86	e10	.02	.86	e10	.02
27	1.2	e11	.04	.90	e10	.02	.78	e10	.02
28	.94	e8	.02	.90	e10	.02	.83	e10	.02
29	.82	e8	.02	.83	e10	.02	.86	e9	.02
30	.90	e8	.02	.74	e10	.02	.84	e8	.02
31	---	---	---	.74	e10	.02	---	---	---
TOTAL	22.75	---	0.57	29.35	---	1.25	20.70	---	0.56
		JULY			AUGUST			SEPTEMBER	
1	.84	e8	.02	.79	e10	.02	.96	10	.03
2	.74	e8	.02	1.0	e10	.03	.87	11	.02
3	.83	e8	.02	.91	e10	.02	.94	e11	.03
4	.89	e8	.02	.92	e10	.02	.80	e11	.02
5	.85	e8	.02	1.2	e10	.03	.72	e11	.02
6	.85	e8	.02	.84	e10	.02	.82	e11	.02
7	.80	e7	.02	.90	e10	.02	.81	e10	.02
8	.82	e6	.01	.79	e10	.02	.81	e10	.02
9	.84	e7	.02	.87	e10	.02	.79	e10	.02
10	.86	e7	.02	.97	e10	.03	.55	e10	.02
11	.95	e9	.03	1.0	e10	.03	.35	e10	.01
12	.90	e9	.02	1.0	e10	.03	.37	e11	.01
13	1.1	e11	.04	1.1	e10	.03	.52	e10	.01
14	.97	e10	.02	1.1	e10	.03	.61	e10	.02
15	.93	e9	.02	.98	e10	.03	.80	e10	.02
16	.88	e9	.02	1.0	e10	.03	.55	e11	.02
17	.87	e8	.02	1.1	e10	.03	.45	e11	.01
18	.89	e8	.02	1.1	e10	.03	.55	e9	.01
19	1.3	e14	.05	.99	e10	.03	.25	e8	<.01
20	.96	e9	.02	.97	e10	.03	.45	e7	.01
21	3.2	43	2.5	.89	e10	.02	.39	6	.01
22	5.1	60	1.8	.93	e10	.02	.91	e10	.03
23	1.5	e18	.07	.87	e10	.02	1.1	21	.14
24	1.6	e14	.06	1.1	e11	.03	1.5	e33	.83
25	1.3	e10	.03	.92	e8	.02	.66	e16	.04
26	1.1	e10	.03	.84	e8	.02	.84	66	1.7
27	1.1	e10	.03	.88	e8	.02	.64	e15	.03
28	1.1	e10	.03	.88	e8	.02	.58	e10	.02
29	1.1	e10	.03	.85	e8	.02	.43	e10	.01
30	.97	e10	.03	.92	e8	.02	.31	e10	.01
31	.91	e10	.02	1.4	e14	.07	---	---	---
TOTAL	37.05	---	5.08	30.01	---	0.81	20.33	---	3.17
YEAR	394.11		185.38						

< Actual value is known to be less than the value shown
e Estimated

16272200 KAMOOALII STREAM BELOW LULUKU STREAM NEAR KANEOHE

LOCATION.--Lat 21°23'47", long 157°48'23", Hydrologic Unit 20060000, on left bank 300 ft downstream from Luluku Stream, 1.0 mi southwest of Castle High School, and 1.9 mi northwest of the intersection of State Highways 61 and 83.

DRAINAGE AREA.--3.81 mi^2.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--November 1976 to current year.

REVISED RECORDS.-- WDR HI-92-1: 1991(M).

GAGE.--Water-stage recorder and concrete control.

REMARKS.--Records good. Flow regulated by a flood-control dam upstream.

AVERAGE DISCHARGE.--16 years, 11.3 ft^3/s (8,190 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,650 ft^3/s, Dec. 31, 1987, gage height, 5.72 ft, from rating curve extended above 200 ft^3/s; minimum, 0.25 ft^3/s on several days in October 1984.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 700 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)
Dec. 30	2100	*850	*4.50

No other peak greater than base discharge.

Minimum discharge, 1.2 ft^3/s, Aug. 12-13,

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

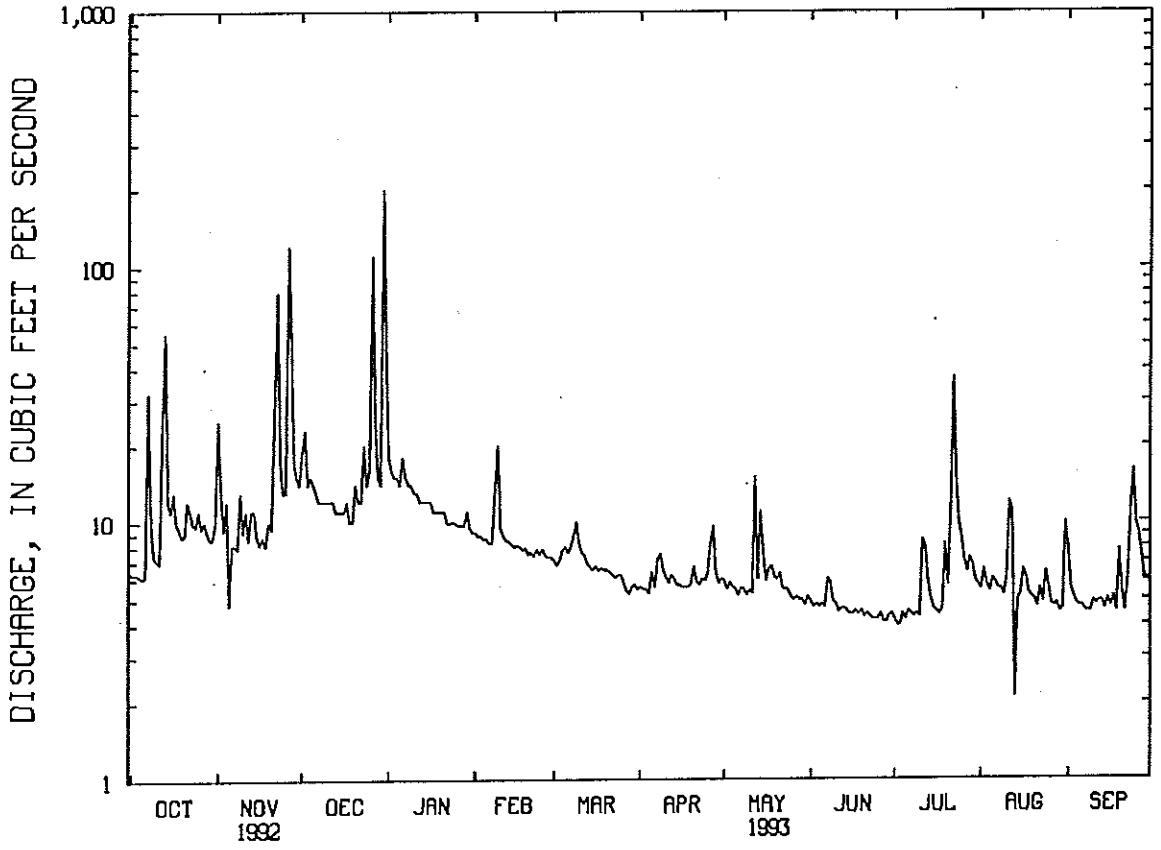
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	6.3	25	19	18	9.1	7.1	5.6	5.9	4.9	4.2	5.5	7.9
2	6.3	13	23	16	8.8	6.8	5.5	5.5	4.7	4.0	6.5	5.5
3	6.3	9.3	14	15	8.8	7.1	5.5	5.8	4.8	4.0	5.7	5.1
4	6.2	12	15	15	8.6	7.7	5.3	5.6	4.7	4.4	5.4	4.8
5	6.1	4.8	14	14	8.6	8.0	6.4	5.5	4.8	4.2	6.0	4.7
6	6.2	8.1	13	18	8.3	7.6	5.6	5.2	4.7	4.5	5.8	4.7
7	32	8.1	12	15	8.3	8.0	7.1	5.5	6.0	4.4	5.5	4.5
8	10	7.9	12	14	13	8.8	7.5	5.5	5.8	4.3	5.5	4.5
9	7.4	13	12	14	20	10	6.5	5.2	4.9	4.4	5.2	4.5
10	7.1	9.1	12	13	9.5	8.3	6.1	5.4	4.8	4.3	6.0	4.9
11	7.0	11	12	13	8.8	7.6	5.8	5.3	4.5	8.5	12	4.8
12	24	8.5	12	12	8.5	7.4	6.2	15	4.6	8.0	11	4.9
13	55	11	11	12	8.4	6.9	6.0	6.0	4.6	5.8	2.1	4.9
14	12	11	11	12	8.2	6.7	5.7	11	4.5	5.0	5.0	4.6
15	11	8.8	11	12	8.0	6.5	5.7	7.6	4.4	4.6	5.2	5.0
16	13	8.2	11	12	8.1	6.7	5.6	5.9	4.4	4.5	6.5	4.7
17	9.9	8.7	12	11	8.0	6.5	5.6	6.6	4.5	4.4	6.1	5.1
18	9.4	8.1	10	11	7.8	6.6	5.6	6.7	4.4	4.6	5.3	4.5
19	8.8	10	10	11	7.9	6.5	5.7	6.1	4.5	8.2	5.1	7.7
20	8.9	9.4	14	11	7.5	6.5	6.7	6.0	4.3	5.7	5.0	5.4
21	12	25	12	11	7.6	6.4	5.9	6.3	4.4	11	4.7	4.5
22	11	79	12	9.9	7.4	6.2	5.7	5.5	4.3	37	5.5	6.0
23	9.9	18	20	9.9	7.8	6.1	6.0	5.5	4.2	15	4.9	11
24	9.7	13	14	10	7.5	6.2	5.9	5.4	4.2	9.9	6.4	16
25	11	13	16	9.9	7.8	6.2	6.3	5.1	4.2	8.8	5.6	9.9
26	9.5	121	110	9.7	7.4	5.8	8.3	5.0	4.4	7.1	4.8	9.0
27	10	52	26	9.7	7.3	5.4	9.6	5.1	4.1	6.4	4.7	7.4
28	9.2	17	15	9.7	7.3	5.3	6.3	5.0	4.1	7.2	4.8	5.9
29	8.6	15	14	11	---	5.6	5.8	5.0	4.3	6.8	4.5	5.9
30	8.6	14	200	9.5	---	5.7	6.0	4.8	4.4	5.9	4.6	5.9
31	10	---	45	9.1	---	5.5	---	5.1	---	5.7	9.9	---
TOTAL	362.4	572.0	744	378.4	244.3	211.7	185.5	189.1	137.4	222.8	180.8	184.2
MEAN	11.7	19.1	24.0	12.2	8.72	6.83	6.18	6.10	4.58	7.19	5.83	6.14
MAX	55	121	200	18	20	10	9.6	15	6.0	37	12	16
MIN	6.1	4.8	10	9.1	7.3	5.3	5.3	4.8	4.1	4.0	2.1	4.5
AC-FT	719	1130	1480	751	485	420	368	375	273	442	359	365

16272200 KAMOOALII STREAM BELOW LULUKU STREAM NEAR KANEOHE--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1977 - 1993, BY WATER YEAR (WY)

MEAN	8.51	11.5	13.8	15.7	12.6	13.6	13.0	11.1	9.26	8.31	7.86	7.65
MAX	16.8	29.6	37.2	53.4	35.9	34.3	49.1	23.0	25.7	19.9	24.0	16.9
(WY)	1983	1987	1988	1988	1979	1982	1989	1981	1982	1982	1982	1982
MIN	2.91	3.90	4.56	4.05	3.83	4.03	5.32	4.53	3.59	3.19	2.91	2.94
(WY)	1985	1985	1978	1977	1978	1978	1985	1984	1984	1984	1984	1984

SUMMARY STATISTICS	FOR 1992 CALENDAR YEAR		FOR 1993 WATER YEAR		WATER YEARS 1977 - 1993	
ANNUAL TOTAL	3597.6		3612.6			
ANNUAL MEAN	9.83		9.90		11.3	
HIGHEST ANNUAL MEAN					22.0	1982
LOWEST ANNUAL MEAN					4.36	1984
HIGHEST DAILY MEAN	200	Dec 30	200	Dec 30	723	Jan 1 1988
LOWEST DAILY MEAN	4.2	Jul 5	2.1	Aug 13	.29	Oct 10 1984
ANNUAL SEVEN-DAY MINIMUM	4.3	Aug 25	4.2	Jun 27	.30	Oct 10 1984
ANNUAL RUNOFF (AC-FT)	7140		7170		8190	
10 PERCENT EXCEEDS	14		14		17	
50 PERCENT EXCEEDS	6.7		6.9		7.6	
90 PERCENT EXCEEDS	4.7		4.5		4.4	



16272200 KAMOOALII STREAM BELOW LULUKU STREAM NEAR KANEOHE--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--November 1976 to current year.

PERIOD OF DAILY RECORD.--
SUSPENDED SEDIMENT DISCHARGE: November 1976 to current year.

INSTRUMENTATION.--Automatic pumping sediment sampler since November 1976.

REMARKS.--Water-quality samples were also collected at this site.

EXTREMES FOR PERIOD OF RECORD.--
SEDIMENT CONCENTRATIONS: Maximum daily mean, 879 mg/L, Mar. 18, 1980; minimum daily mean, 1 mg/L on several days in 1988, 1990, 1991.
SEDIMENT DISCHARGE: Maximum daily, 1,380 tons, Mar. 18, 1980; minimum daily, 0.01 ton, Oct. 9-11, 1981, Aug. 13, 1993.

EXTREMES FOR CURRENT YEAR.--
SEDIMENT CONCENTRATIONS: Maximum daily mean, 444 mg/L (estimated), Dec. 30; minimum daily mean, 2 mg/L, Jan. 20, 22, 25, 30, Aug. 13.
SEDIMENT DISCHARGE: Maximum daily, 505 tons, Dec. 30; minimum daily, 0.01 ton, Aug. 13.

WATER QUALITY DATA, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND	SPE-CIFIC CON-DUCT-ANCE (US/CM)	PH WATER WHOLE FIELD (STAND-ARD UNITS)	TEMPER-ATURE AIR (DEG C)	TEMPER-ATURE WATER (DEG C)	TUR-BID-ITY (NTU)	BARO-METRIC PRES-SURE (MM OF HG)	OXYGEN, DIS-SOLVED (MG/L)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML)
NOV 1992											
05...	1415	5.7	172	8.0	26.0	23.5	2.4	758	9.0	107	--
DEC											
08...	1015	11	172	7.9	--	22.0	9.5	764	9.0	103	90
JAN 1993											
15...	1140	12	190	8.0	21.5	20.5	2.6	764	9.7	108	--
MAR											
01...	1345	6.6	195	7.8	27.0	23.5	2.3	765	9.2	108	K16
APR											
20...	0915	8.2	185	7.1	21.0	23.0	2.2	764	8.1	94	--
MAY											
24...	0915	5.6	180	7.6	27.0	24.0	3.7	767	8.7	103	120
JUN											
22...	1115	4.5	175	8.3	29.0	26.5	0.50	763	10.8	134	--
JUL											
23...	1025	14	177	7.8	26.5	25.0	1.9	762	8.6	104	--
SEP											
02...	1400	5.1	175	8.3	27.5	28.0	1.5	758	8.3	107	--
22...	1046	4.7	180	8.2	26.5	26.0	1.7	761	8.7	108	K130

DATE	TIME	HARD-NESS TOTAL (MG/L AS CACO3)	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)	SODIUM, DIS-SOLVED (MG/L AS NA)	SODIUM PERCENT	SODIUM AD-SORP-TION RATIO	POTAS-SIUM, DIS-SOLVED (MG/L AS K)	ALKA-LINITY LAB (MG/L AS CACO3)	SULFATE DIS-SOLVED (MG/L AS SO4)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)
MAR 1993											
01...	1345	57	8.6	8.7	17	39	1	1.1	55	6.8	21
SEP											
22...	1046	52	7.5	8.0	15	38	0.9	1.0	54	7.5	17

DATE	TIME	FLUO-RIDE, DIS-SOLVED (MG/L AS F)	SILICA, DIS-SOLVED (MG/L AS SIO2)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L)	SOLIDS, DIS-SOLVED (TONS PER AC-FT)	RESIDUE TOTAL AT 105 DEG. C, SUS-PENDED (MG/L)	NITRO-GEN, NO2+NO3 TOTAL (MG/L AS N)	NITRO-GEN, AMMONIA TOTAL (MG/L AS N)	NITRO-GEN,AM-MONIA + ORGANIC TOTAL (MG/L AS N)	PHOS-PHORUS TOTAL (MG/L AS P)	PHOS-PHATE, TOTAL (MG/L AS PO4)
DEC 1992												
08...	1015	--	--	--	--	--	8	0.350	0.060	<0.20	0.030	0.03
MAR 1993												
01...	1345	<0.10	20	113	116	0.15	<1	--	--	<0.20	0.020	--
MAY												
24...	0915	--	--	--	--	--	5	--	--	<0.20	0.010	--
SEP												
22...	1046	0.10	21	106	110	0.14	2	--	--	<0.20	0.020	--

< Actual value is known to be less than the value shown
K Results based on colony count outside the acceptable range (non-ideal colony count)

16272200 KAHOOALII STREAM BELOW LULUKU STREAM NEAR KANEOHE--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	TIME	ALUMINUM, TOTAL RECOVERABLE (UG/L AS AL)	ALUMINUM, DISSOLVED (UG/L AS AL)	ARSENIC TOTAL (UG/L AS AS)	BARIUM, TOTAL RECOVERABLE (UG/L AS BA)	BARIUM, DISSOLVED (UG/L AS BA)	BERYLLIUM, TOTAL RECOVERABLE (UG/L AS BE)	CADMIUM TOTAL RECOVERABLE (UG/L AS CD)	CHROMIUM, TOTAL RECOVERABLE (UG/L AS CR)	COBALT, TOTAL RECOVERABLE (UG/L AS CO)	COBALT, DISSOLVED (UG/L AS CO)	COPPER, TOTAL RECOVERABLE (UG/L AS CU)
MAR 1993 01...	1345	130	20	<1	<100	5	<10	<1	3	<1	<3	1
SEP 22...	1046	160	20	<1	<100	4	<10	<1	1	<1	<3	1

DATE	IRON, TOTAL RECOVERABLE (UG/L AS FE)	IRON, DISSOLVED (UG/L AS FE)	LEAD, TOTAL RECOVERABLE (UG/L AS PB)	LITHIUM TOTAL RECOVERABLE (UG/L AS LI)	LITHIUM DISSOLVED (UG/L AS LI)	MANGANESE, TOTAL RECOVERABLE (UG/L AS MN)	MANGANESE, DISSOLVED (UG/L AS MN)	MERCURY TOTAL RECOVERABLE (UG/L AS HG)	MOLYBDENUM, TOTAL RECOVERABLE (UG/L AS MO)	MOLYBDENUM, DISSOLVED (UG/L AS MO)	NICKEL, TOTAL RECOVERABLE (UG/L AS NI)
MAR 1993 01...	300	29	<1	<10	<4	40	3	<0.10	<1	<10	2
SEP 22...	280	27	<1	<10	<4	20	5	0.20	<1	<10	<1

DATE	NICKEL, DISSOLVED (UG/L AS NI)	SELENIUM, TOTAL (UG/L AS SE)	SELENIUM, DISSOLVED (UG/L AS SE)	SILVER, TOTAL RECOVERABLE (UG/L AS AG)	SILVER, DISSOLVED (UG/L AS AG)	STRONTIUM, DISSOLVED (UG/L AS SR)	VANADIUM, DISSOLVED (UG/L AS V)	ZINC, TOTAL RECOVERABLE (UG/L AS ZN)	CARBON, ORGANIC TOTAL (MG/L AS C)	OIL AND GREASE, TOTAL RECOV. GRAVIMETRIC (MG/L)	ALDRIN, TOTAL (UG/L)
MAR 1993 01...	<1	<1	<1	<1	<1.0	78	<6	<10	1.9	<1	<0.010
SEP 22...	<1	<1	<1	<1	<1.0	73	<6	<10	1.6	<1	<0.010

DATE	CHLORDANE, TOTAL (UG/L)	CHLORDYRIFOS TOTAL RECOVER (UG/L)	DDD, TOTAL (UG/L)	DDE, TOTAL (UG/L)	DDT, TOTAL (UG/L)	DEF TOTAL (UG/L)	DIAZINON, TOTAL (UG/L)	DIELDRIN TOTAL (UG/L)	DISYSTON TOTAL (UG/L)	2, 4-DP TOTAL (UG/L)	2,4-D, TOTAL (UG/L)
MAR 1993 01...	<0.1	<0.01	<0.010	<0.010	<0.010	<0.01	<0.01	<0.010	<0.01	<0.01	<0.01
SEP 22...	<0.1	<0.01	<0.010	<0.010	<0.010	<0.01	<0.01	<0.010	<0.01	<0.01	<0.01

DATE	ENDOSULFAN, TOTAL (UG/L)	ENDRIN WATER UNFLTRD REC (UG/L)	ETHION, TOTAL (UG/L)	FONOFOS (DYFONATE) WATER WHOLE TOT.REC (UG/L	HEPTACHLOR, TOTAL (UG/L)	HEPTACHLOR EPOXIDE TOTAL (UG/L)	LINDANE TOTAL (UG/L)	MALATHION, TOTAL (UG/L)	METHOXYCHLOR, TOTAL (UG/L)	METHYL PARATHION, TOTAL (UG/L)
MAR 1993 01...	<0.010	<0.010	<0.01	<0.01	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01
SEP 22...	<0.010	<0.010	<0.01	<0.01	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01

DATE	MIREX, TOTAL (UG/L)	NAPHTHALENES, POLYCHLOR. TOTAL (UG/L)	PARATHION, TOTAL (UG/L)	PCB, TOTAL (UG/L)	PERTHANE TOTAL (UG/L)	PHORATE TOTAL (UG/L)	SILVEX, TOTAL (UG/L)	TOXAPHENE, TOTAL (UG/L)	TOTAL TRITHION (UG/L)	2,4,5-T TOTAL (UG/L)
MAR 1993 01...	<0.01	<0.10	<0.01	<0.1	<0.1	<0.01	<0.01	<1	<0.01	<0.01
SEP 22...	<0.01	<0.10	<0.01	<0.1	<0.1	<0.01	<0.01	<1	<0.01	<0.01

< Actual value is known to be less than the value shown

16272200 KAMOOALII STREAM BELOW LULUKU STREAM NEAR KANEOHE--Continued

SEDIMENT DISCHARGE, SUSPENDED (TONS/DAY), WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DAY	MEAN DISCHARGE (CFS)	MEAN CONCEN-TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN-TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN-TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)
		OCTOBER			NOVEMBER			DECEMBER	
1	6.3	10	.17	25	e24	2.3	19	e16	1.3
2	6.3	17	.30	13	e17	.66	23	e21	1.6
3	6.3	25	.43	9.3	e10	.25	14	e10	.40
4	6.2	220	3.6	12	e10	.66	15	e13	.51
5	6.1	205	3.4	4.8	5	.07	14	e10	.39
6	6.2	35	.58	8.1	6	.14	13	e9	.31
7	32	e28	3.1	8.1	7	.16	12	e9	.29
8	10	33	.86	7.9	e8	.16	12	103	3.3
9	7.4	32	.63	13	e12	.47	12	e84	2.7
10	7.1	88	1.7	9.1	7	.16	12	e34	1.1
11	7.0	23	.43	11	8	.25	12	14	.45
12	24	e21	1.9	8.5	5	.11	12	19	.62
13	55	36	6.9	11	e9	.29	11	19	.59
14	12	20	.61	11	4	.11	11	13	.37
15	11	15	.44	8.8	e3	.07	11	24	.71
16	13	e11	.41	8.2	e3	.07	11	31	.93
17	9.9	5	.14	8.7	e3	.07	12	20	.62
18	9.4	7	.18	8.1	e3	.07	10	11	.30
19	8.8	6	.15	10	e6	.18	10	13	.37
20	8.9	5	.12	9.4	e4	.10	14	e18	.74
21	12	e9	.34	25	e9	1.5	12	16	.59
22	11	e8	.25	79	e49	11	12	19	.67
23	9.9	10	.26	18	e18	.93	20	e18	1.2
24	9.7	8	.21	13	e8	.28	14	e6	.23
25	11	e8	.24	13	9	.32	16	4	.27
26	9.5	e6	.16	121	19	4.3	110	360	95
27	10	e6	.16	52	167	25	26	e64	5.6
28	9.2	e6	.14	17	142	6.6	15	e18	.76
29	8.6	e5	.13	15	e26	1.1	14	e13	.51
30	8.6	e5	.12	14	e14	.57	200	e444	505
31	10	e9	.32	---	---	---	45	e150	31
TOTAL	362.4	---	28.38	572.0	---	57.95	744	---	658.43
		JANUARY			FEBRUARY			MARCH	
1	18	e40	2.0	9.1	5	.12	7.1	44	.84
2	16	e18	.79	8.8	5	.11	6.8	19	.36
3	15	e13	.55	8.8	3	.08	7.1	16	.31
4	15	e13	.55	8.6	3	.07	7.7	8	.16
5	14	e14	.54	8.6	4	.08	8.0	8	.17
6	18	e16	.84	8.3	3	.07	7.6	14	.29
7	15	e16	.63	8.3	3	.07	8.0	15	.32
8	14	e16	.57	13	e7	.30	8.8	e6	.17
9	14	e15	.56	20	e10	.90	10	8	.25
10	13	e15	.53	9.5	5	.13	8.3	8	.20
11	13	e15	.50	8.8	4	.09	7.6	5	.10
12	12	e15	.49	8.5	3	.08	7.4	5	.09
13	12	e14	.48	8.4	6	.13	6.9	5	.10
14	12	e14	.46	8.2	9	.19	6.7	6	.11
15	12	e14	.45	8.0	9	.20	6.5	11	.19
16	12	e14	.43	8.1	8	.17	6.7	18	.33
17	11	e13	.41	8.0	8	.18	6.5	6	.10
18	11	e13	.40	7.8	11	.23	6.6	5	.08
19	11	13	.39	7.9	12	.25	6.5	8	.13
20	11	2	.05	7.5	19	.39	6.5	6	.11
21	11	7	.23	7.6	22	.45	6.4	8	.14
22	9.9	2	.06	7.4	23	.45	6.2	14	.24
23	9.9	3	.08	7.8	19	.40	6.1	9	.14
24	10	3	.07	7.5	16	.32	6.2	6	.11
25	9.9	2	.06	7.8	18	.37	6.2	7	.11
26	9.7	4	.10	7.4	20	.40	5.8	e6	.09
27	9.7	4	.11	7.3	18	.35	5.4	e5	.08
28	9.7	3	.07	7.3	33	.64	5.3	e5	.07
29	11	e5	.15	---	---	---	5.6	e5	.08
30	9.5	2	.05	---	---	---	5.7	e5	.08
31	9.1	4	.10	---	---	---	5.5	e5	.07
TOTAL	378.4	---	12.70	244.3	---	7.22	211.7	---	5.62

e Estimated

16272200 KAMOOALII STREAM BELOW LULUKU STREAM NEAR KANEOHE--Continued

SEDIMENT DISCHARGE, SUSPENDED (TONS/DAY), WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DAY	MEAN DISCHARGE (CFS)	MEAN CONCEN-TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN-TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN-TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)
		APRIL			MAY			JUNE	
1	5.6	e5	.08	5.9	e6	.09	4.9	e6	.08
2	5.5	e5	.07	5.5	e6	.09	4.7	e6	.08
3	5.5	e5	.07	5.8	6	.09	4.8	e6	.08
4	5.3	e5	.07	5.6	6	.09	4.7	e6	.08
5	6.4	e7	.13	5.5	e6	.09	4.8	e6	.08
6	5.6	4	.06	5.2	e7	.09	4.7	e6	.08
7	7.1	e6	.12	5.5	e7	.11	6.0	e11	.18
8	7.5	e6	.12	5.5	8	.12	5.8	10	.16
9	6.5	4	.08	5.2	e7	.11	4.9	e8	.11
10	6.1	5	.08	5.4	e7	.10	4.8	e8	.10
11	5.8	4	.06	5.3	e6	.09	4.5	e7	.09
12	6.2	4	.07	15	e25	1.3	4.6	e7	.09
13	6.0	6	.09	6.0	9	.14	4.6	e7	.09
14	5.7	4	.06	11	e11	.44	4.5	e7	.08
15	5.7	4	.05	7.6	13	.26	4.4	e6	.08
16	5.6	5	.08	5.9	e9	.15	4.4	e6	.07
17	5.6	4	.06	6.6	e16	.28	4.5	e6	.07
18	5.6	e3	.05	6.7	38	.69	4.4	e6	.07
19	5.7	e3	.05	6.1	30	.49	4.5	e6	.07
20	6.7	e4	.08	6.0	52	.84	4.3	e5	.06
21	5.9	e4	.06	6.3	40	.68	4.4	e5	.06
22	5.7	6	.09	5.5	e25	.37	4.3	5	.06
23	6.0	6	.09	5.5	e16	.23	4.2	e5	.06
24	5.9	5	.07	5.4	10	.15	4.2	e5	.06
25	6.3	19	.33	5.1	e10	.13	4.2	e5	.06
26	8.3	e9	.25	5.0	e9	.13	4.4	e6	.07
27	9.6	e11	.33	5.1	e9	.12	4.1	e5	.05
28	6.3	6	.10	5.0	e9	.12	4.1	e5	.06
29	5.8	9	.15	5.0	e9	.11	4.3	e5	.06
30	6.0	8	.12	4.8	e8	.11	4.4	e5	.07
31	---	---	---	5.1	e8	.11	---	---	---
TOTAL	185.5	---	3.12	189.1	---	7.92	137.4	---	2.41
		JULY			AUGUST			SEPTEMBER	
1	4.2	e5	.06	5.5	e7	.10	7.9	15	.34
2	4.0	e5	.05	6.5	e8	.15	5.5	8	.11
3	4.0	e5	.05	5.7	e6	.09	5.1	e6	.08
4	4.4	e5	.06	5.4	e5	.08	4.8	e5	.07
5	4.2	e5	.06	6.0	e6	.11	4.7	e5	.06
6	4.5	e6	.07	5.8	e5	.09	4.7	e5	.06
7	4.4	e5	.06	5.5	e3	.04	4.5	e4	.05
8	4.3	e5	.05	5.5	e3	.04	4.5	e4	.05
9	4.4	e4	.05	5.2	e3	.04	4.5	e4	.05
10	4.3	e4	.05	6.0	7	.13	4.9	e6	.08
11	8.5	e9	.35	12	e14	.53	4.8	e6	.08
12	8.0	e8	.20	11	e10	.66	4.9	e7	.10
13	5.8	e6	.10	2.1	e2	.01	4.9	e5	.07
14	5.0	e5	.07	5.0	e3	.04	4.6	e6	.07
15	4.6	e5	.06	5.2	e4	.05	5.0	e6	.09
16	4.5	e4	.05	6.5	e9	.16	4.7	e5	.07
17	4.4	e4	.05	6.1	12	.20	5.1	e7	.09
18	4.6	e4	.05	5.3	8	.11	4.5	e4	.05
19	8.2	e8	.18	5.1	e5	.08	7.7	e12	.30
20	5.7	e5	.08	5.0	e5	.06	5.4	e6	.09
21	11	e10	.70	4.7	e4	.05	4.5	e4	.05
22	37	e28	3.0	5.5	12	.18	6.0	e7	.18
23	15	11	.46	4.9	e7	.09	11	16	.56
24	9.9	e8	.23	6.4	9	.19	16	e19	1.4
25	8.8	e7	.18	5.6	e6	.10	9.9	e16	.45
26	7.1	10	.19	4.8	e4	.05	9.0	e13	.41
27	6.4	12	.22	4.7	e4	.05	7.4	13	.26
28	7.2	e10	.19	4.8	e4	.05	5.9	12	.19
29	6.8	e8	.15	4.5	e4	.05	5.9	10	.17
30	5.9	6	.10	4.6	e4	.05	5.9	e12	.20
31	5.7	e7	.11	9.9	e22	.70	---	---	---
TOTAL	222.8	---	7.28	180.8	---	4.33	184.2	---	5.83
YEAR	3612.6		801.19						

e Estimated

16273950 SOUTH FORK KAPUNAHALA STREAM AT KANEOHE

LOCATION.--Lat 21°24'21", long 157°48'31", Hydrologic Unit 20060000, on right bank, 1.8 mi west of Castle High School, 1.2 mi northwest of Hawaiian Memorial Park Cemetary, and 2.4 mi northwest of Pali Golf Courese.

DRAINAGE AREA.--0.40 mi^2.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1987 to current year.

GAGE.--Water-stage recorder.

REMARKS.--Records good except those above 10 cfs which are fair.

AVERAGE DISCHARGE.--6 years, 2.57 ft^3/s (1,860 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 207 ft^3/s, Dec. 31, 1987, gage height, 5.18 ft, from rating curve extended above 8.7 ft^3/s; minimum, 1.5 ft^3/s, July 18, 19, 1989.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 100 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Dec. 30	1515	*116	*4.01	No other peak greater than base discharge.			

Minimum discharge, 1.6 ft^3/s, Mar. 11

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	2.1	4.8	2.8	2.8	2.5	2.0	2.0	2.2	1.9	1.9	2.0	e2.0
2	2.1	2.5	2.5	2.6	2.6	1.9	2.1	2.2	1.9	1.9	2.0	e1.9
3	2.1	2.3	2.5	2.5	2.6	2.0	2.1	2.1	1.9	1.9	2.0	e1.9
4	2.2	2.2	2.4	2.5	2.5	2.0	2.1	2.0	1.9	1.9	2.0	e1.9
5	2.2	2.1	2.3	2.4	2.5	2.0	2.2	2.0	1.9	1.9	2.0	e1.9
6	2.3	2.0	2.2	2.9	2.4	2.0	2.2	2.1	1.9	1.9	2.0	e1.9
7	3.1	2.1	2.2	2.5	2.3	2.0	2.4	2.2	2.0	1.9	2.0	e2.0
8	2.2	2.0	2.2	2.4	3.2	2.5	2.3	2.2	2.0	1.9	2.0	2.0
9	2.0	2.4	2.2	2.4	4.5	2.4	2.2	2.2	2.0	1.9	2.0	2.0
10	2.0	2.2	2.2	2.4	2.3	2.1	2.3	2.3	1.9	1.9	e2.0	2.0
11	1.9	2.4	2.2	2.3	2.3	2.1	2.3	2.2	1.9	2.3	e2.1	2.0
12	4.5	2.1	2.4	2.2	2.2	2.0	2.4	4.0	2.0	2.6	e2.0	2.3
13	4.1	2.5	2.2	2.2	2.2	2.1	2.3	2.1	2.0	3.1	e2.0	2.3
14	2.5	2.3	2.2	2.2	2.2	2.1	2.1	3.8	2.0	2.2	e2.0	2.2
15	2.5	2.2	2.2	2.2	2.2	2.1	2.1	2.3	2.0	2.0	e2.0	2.1
16	3.0	2.1	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.0	e2.1	2.2
17	2.5	2.1	2.2	2.2	2.2	2.1	2.1	2.2	2.0	2.1	e2.0	2.1
18	2.5	2.0	2.2	2.3	2.2	2.1	2.2	2.3	2.0	2.2	e2.0	2.1
19	2.4	2.6	2.1	2.3	2.2	2.2	2.2	2.2	2.0	3.0	e2.0	2.0
20	2.4	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.0	2.7	e2.0	2.1
21	3.0	4.3	2.4	2.4	2.2	2.1	2.1	2.2	1.9	4.2	e1.9	1.9
22	2.7	5.5	2.3	2.3	2.2	2.1	2.2	2.1	2.0	6.5	e1.9	2.1
23	2.5	2.6	3.5	2.3	2.1	2.1	2.2	2.2	1.9	2.3	e1.9	2.9
24	2.4	2.3	2.4	2.4	2.0	2.1	2.2	2.2	1.9	2.4	e2.1	3.1
25	2.8	2.4	3.6	2.4	2.1	2.1	2.0	2.0	1.9	2.2	e2.0	2.5
26	2.4	8.7	9.6	2.3	2.1	2.1	2.4	2.0	2.1	2.1	e1.9	2.9
27	2.6	3.8	3.1	2.4	2.1	2.1	2.7	2.0	2.0	2.0	e1.9	2.3
28	2.4	2.7	2.6	2.4	2.1	2.1	2.2	2.0	2.0	2.1	e1.9	2.3
29	2.3	2.6	2.5	2.8	---	2.1	2.2	2.0	2.0	2.1	e1.9	2.2
30	2.3	2.5	14	2.5	---	2.1	2.2	1.9	2.0	2.1	e1.9	2.2
31	2.6	---	3.4	2.5	---	2.1	---	1.9	---	2.0	e3.0	---
TOTAL	78.6	84.6	95.1	74.5	66.4	65.1	66.3	69.4	59.0	73.2	62.5	65.3
MEAN	2.54	2.82	3.07	2.40	2.37	2.10	2.21	2.24	1.97	2.36	2.02	2.18
MAX	4.5	8.7	14	2.9	4.5	2.5	2.7	4.0	2.1	6.5	3.0	3.1
MIN	1.9	2.0	2.1	2.2	2.0	1.9	2.0	1.9	1.9	1.9	1.9	1.9
AC-FT	156	168	189	148	132	129	132	138	117	145	124	130

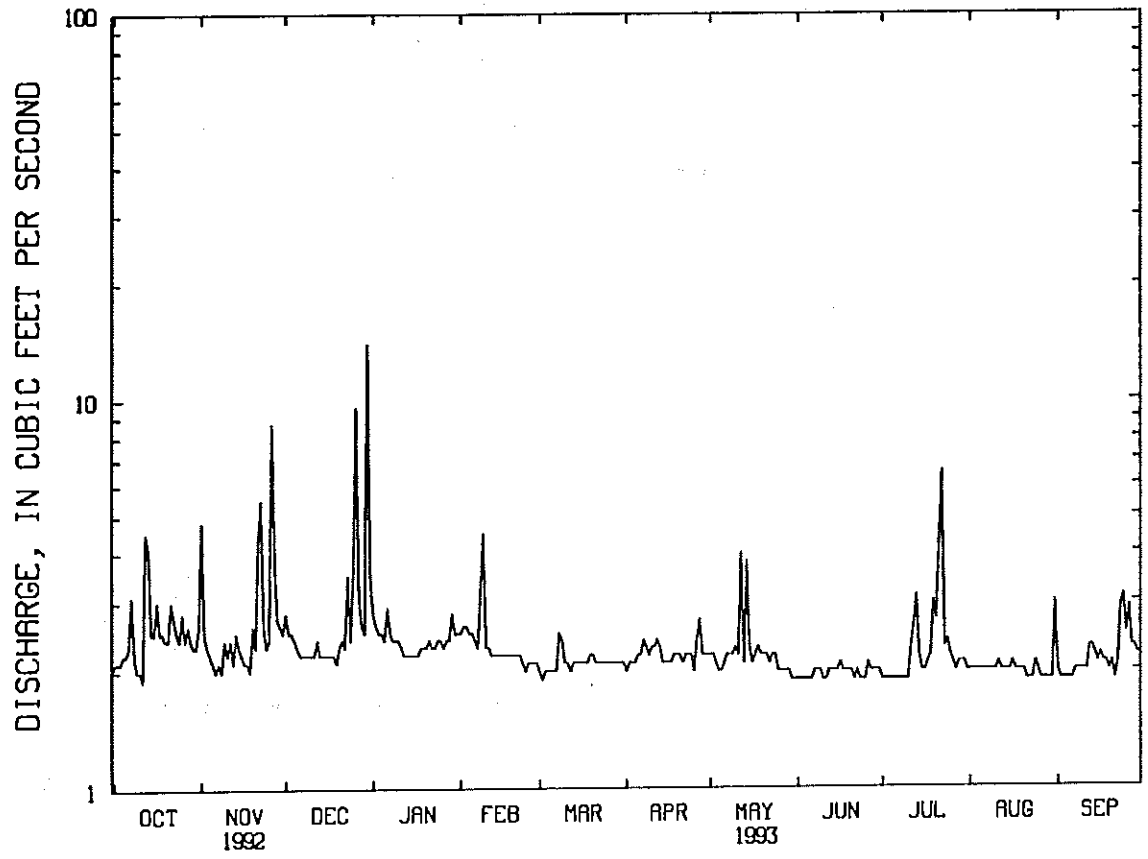
e Estimated

16273950 SOUTH FORK KAPUNAHALA STREAM AT KANEOHE--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1988 - 1993, BY WATER YEAR (WY)

MEAN	2.46	2.66	3.09	2.78	2.72	2.75	2.81	2.21	2.12	2.27	2.23	2.28
MAX	3.07	3.45	4.99	4.31	3.41	3.78	5.44	2.46	2.31	2.64	2.50	2.85
(WY)	1992	1991	1988	1988	1989	1991	1989	1988	1988	1990	1989	1988
MIN	1.90	1.93	2.16	2.07	2.37	2.10	1.92	1.92	1.92	2.05	1.95	1.91
(WY)	1988	1990	1990	1992	1993	1993	1992	1990	1990	1992	1992	1990

SUMMARY STATISTICS	FOR 1992 CALENDAR YEAR		FOR 1993 WATER YEAR		WATER YEARS 1988 - 1993	
ANNUAL TOTAL	845.9		860.0			
ANNUAL MEAN	2.31		2.36		2.53	
HIGHEST ANNUAL MEAN					2.87	1989
LOWEST ANNUAL MEAN					2.26	1992
HIGHEST DAILY MEAN	14	Dec 30	14	Dec 30	30	Apr 8 1989
LOWEST DAILY MEAN	1.8	Apr 7	1.9	Oct 11	1.5	Jul 18 1989
ANNUAL SEVEN-DAY MINIMUM	1.8	Apr 10	1.9	May 30	1.6	May 24 1990
ANNUAL RUNOFF (AC-FT)	1680		1710		1830	
10 PERCENT EXCEEDS	2.7		2.7		3.0	
50 PERCENT EXCEEDS	2.1		2.2		2.2	
90 PERCENT EXCEEDS	1.9		1.9		1.9	



16273950 SOUTH FORK KAPUNAHALA STREAM AT KANEOHE--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--July 1988 to current year.

PERIOD OF DAILY RECORD.--
SUSPENDED SEDIMENT DISCHARGE: October 1990 to current year.

INSTRUMENTATION.--Automatic pumping sediment sampler since August 1984.

REMARKS.--Water-quality samples were also collected at this site.

EXTREMES FOR PERIOD OF RECORD.--
SEDIMENT CONCENTRATIONS: Maximum daily mean, 1,010 mg/L, Mar. 19, 1991; minimum daily mean, 8 mg/L, Oct. 20, 23-26, 1993.
SEDIMENT DISCHARGE: Maximum daily, 117 tons, Mar. 19, 1991; minimum daily, 0.05 tons on several days in 1993.

EXTREMES FOR CURRENT YEAR.--
SEDIMENT CONCENTRATIONS: Maximum daily mean, 175 mg/L, Dec. 30; minimum daily mean, 8 mg/L, Oct. 20, 23-26.
SEDIMENT DISCHARGE: Maximum daily, 13 tons, Dec. 30; minimum daily, 0.05 ton on several days.

WATER QUALITY DATA, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	TIME	DISCHARGE, INST. CUBIC FEET PER SECOND	SPECIFIC CONDUCTANCE (US/CM)	PH WATER WHOLE FIELD (STANDARD UNITS)	TEMPERATURE AIR (DEG C)	TEMPERATURE WATER (DEG C)	TURBIDITY (NTU)	BAROMETRIC PRESSURE (MM OF HG)	OXYGEN, DISSOLVED (MG/L)	OXYGEN, DISSOLVED (PERCENT SATURATION)	COLIFORM, FECAL, 0.7 UM-MF (COLS./ 100 ML)
NOV 1992											
02...	1140	2.4	225	7.8	25.5	22.5	11	758	8.2	95	--
DEC											
09...	1205	2.7	210	7.9	22.5	21.5	3.3	764	8.6	97	1900
JAN 1993											
12...	1410	2.4	210	8.0	21.0	20.5	3.0	760	8.8	98	--
MAR											
01...	1015	2.1	195	8.0	22.5	20.5	6.1	767	8.6	95	640
APR											
20...	1000	2.2	207	7.8	--	20.5	6.5	764	8.2	91	--
MAY											
25...	0935	1.8	205	7.9	24.5	21.5	5.5	765	8.5	96	1800
JUN											
22...	0920	1.9	202	7.8	25.5	22.0	1.2	763	8.4	96	--
JUL											
22...	0954	9.2	262	7.2	24.0	23.5	40	761	8.2	97	--
SEP											
01...	1035	2.0	212	8.0	23.0	22.0	2.2	761	8.4	96	--
21...	0950	1.8	198	7.6	24.0	21.0	4.3	760	8.1	91	2200

DATE	TIME	HARDNESS TOTAL (MG/L AS CACO3)	CALCIUM DISSOLVED (MG/L AS CA)	MAGNESIUM, DISSOLVED (MG/L AS MG)	SODIUM, DISSOLVED (MG/L AS NA)	SODIUM PERCENT	SODIUM ADSORPTION RATIO	POTASSIUM, DISSOLVED (MG/L AS K)	ALKALINITY LAB (MG/L AS CACO3)	SULFATE DISSOLVED (MG/L AS SO4)	CHLORIDE, DISSOLVED (MG/L AS CL)
MAR 1993											
01...	1015	55	11	6.6	16	38	0.9	1.2	63	4.4	21
SEP											
21...	0950	60	13	6.6	16	36	0.9	1.2	66	5.2	19

DATE	TIME	FLUORIDE, DISSOLVED (MG/L AS F)	SILICA, DISSOLVED (MG/L AS SIO2)	SOLIDS, RESIDUE AT 180 DEG. C DISSOLVED (MG/L)	SOLIDS, SUM OF CONSTITUENTS, DISSOLVED (MG/L)	SOLIDS, DISSOLVED (TONS PER AC-FT)	RESIDUE TOTAL AT 105 DEG. C, SUSPENDED (MG/L)	NITROGEN, NO2+NO3 TOTAL (MG/L AS N)	NITROGEN, AMMONIA TOTAL (MG/L AS N)	NITROGEN, AMMONIA + ORGANIC TOTAL (MG/L AS N)	PHOSPHORUS TOTAL (MG/L AS P)	PHOSPHATE, TOTAL (MG/L AS PO4)
DEC 1992												
09...	1205	--	--	--	--	--	14	0.610	0.020	<0.20	0.030	0.03
MAR 1993												
01...	1015	<0.10	30	113	128	0.15	12	--	--	<0.20	0.040	--
MAY												
25...	0935	--	--	--	--	--	5	--	--	<0.20	0.020	--
SEP												
21...	0950	0.10	32	130	133	0.18	3	--	--	<0.20	0.030	--

< Actual value is known to be less than the value shown

16273950 SOUTH FORK KAPUNAHALA STREAM AT KANEOHE--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	TIME	ALUMINUM, TOTAL RECOVERABLE (UG/L AS AL)	ALUMINUM, DISSOLVED (UG/L AS AL)	ARSENIC TOTAL (UG/L AS AS)	BARIUM, TOTAL RECOVERABLE (UG/L AS BA)	BARIUM, DISSOLVED (UG/L AS BA)	BERYLLIUM, TOTAL RECOVERABLE (UG/L AS BE)	CADMIUM TOTAL RECOVERABLE (UG/L AS CD)	CHROMIUM, TOTAL RECOVERABLE (UG/L AS CR)	COBALT, TOTAL RECOVERABLE (UG/L AS CO)	COBALT, DISSOLVED (UG/L AS CO)	COPPER, TOTAL RECOVERABLE (UG/L AS CU)
MAR 1993 01...	1015	300	30	<1	<100	4	<10	<1	4	<1	<3	2
SEP 21...	0950	230	10	<1	<100	3	<10	<1	2	<1	<3	<1

DATE	IRON, TOTAL RECOVERABLE (UG/L AS FE)	IRON, DISSOLVED (UG/L AS FE)	LEAD, TOTAL RECOVERABLE (UG/L AS PB)	LITHIUM TOTAL RECOVERABLE (UG/L AS LI)	LITHIUM DISSOLVED (UG/L AS LI)	MANGANESE, TOTAL RECOVERABLE (UG/L AS MN)	MANGANESE, DISSOLVED (UG/L AS MN)	MERCURY TOTAL RECOVERABLE (UG/L AS HG)	MOLYBDENUM, TOTAL RECOVERABLE (UG/L AS MO)	MOLYBDENUM, DISSOLVED (UG/L AS MO)	NICKEL, TOTAL RECOVERABLE (UG/L AS NI)
MAR 1993 01...	860	110	<1	<10	<4	100	60	<0.10	<1	<10	2
SEP 21...	680	81	<1	<10	<4	50	25	0.20	<1	<10	<1

DATE	NICKEL, DISSOLVED (UG/L AS NI)	SELENIUM, TOTAL (UG/L AS SE)	SELENIUM, DISSOLVED (UG/L AS SE)	SILVER, TOTAL RECOVERABLE (UG/L AS AG)	SILVER, DISSOLVED (UG/L AS AG)	STRONTIUM, DISSOLVED (UG/L AS SR)	VANADIUM, DISSOLVED (UG/L AS V)	ZINC, TOTAL RECOVERABLE (UG/L AS ZN)	CARBON, ORGANIC TOTAL (MG/L AS C)	OIL AND GREASE, TOTAL RECOV. GRAVIMETRIC (MG/L)	ALDRIN, TOTAL (UG/L)
MAR 1993 01...	1	<1	<1	<1	<1.0	64	8	<10	2.0	<1	<0.010
SEP 21...	<1	<1	<1	<1	<1.0	69	6	<10	1.0	<1	<0.010

DATE	CHLORDANE, TOTAL (UG/L)	CHLORDYRIFOS TOTAL RECOVER (UG/L)	DDD, TOTAL (UG/L)	DDE, TOTAL (UG/L)	DDT, TOTAL (UG/L)	DEF TOTAL (UG/L)	DIAZINON, TOTAL (UG/L)	DIELDRIN TOTAL (UG/L)	DISYSTON TOTAL (UG/L)	2, 4-DP TOTAL (UG/L)	2,4-D, TOTAL (UG/L)
MAR 1993 01...	<0.1	<0.01	<0.010	<0.010	<0.010	<0.01	<0.01	<0.010	<0.01	<0.01	<0.01
SEP 21...	<0.1	<0.01	<0.010	<0.010	<0.010	<0.01	<0.01	<0.010	<0.01	<0.01	<0.01

DATE	ENDOSULFAN, TOTAL (UG/L)	ENDRIN WATER UNFLTRD REC (UG/L)	ETHION, TOTAL (UG/L)	FONOFOS (DYFONATE) WATER WHOLE TOT.REC (UG/L	HEPTACHLOR, TOTAL (UG/L)	HEPTACHLOR EPOXIDE TOTAL (UG/L)	LINDANE TOTAL (UG/L)	MALATHION, TOTAL (UG/L)	METHOXYCHLOR, TOTAL (UG/L)	METHYL PARATHION, TOTAL (UG/L)
MAR 1993 01...	<0.010	<0.010	<0.01	<0.01	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01
SEP 21...	<0.010	<0.010	<0.01	<0.01	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01

DATE	MIREX, TOTAL (UG/L)	NAPHTHALENES, POLYCHLOR. TOTAL (UG/L)	PARATHION, TOTAL (UG/L)	PCB, TOTAL (UG/L)	PERTHANE TOTAL (UG/L)	PHORATE TOTAL (UG/L)	SILVEX, TOTAL (UG/L)	TOXAPHENE, TOTAL (UG/L)	TOTAL TRITHION (UG/L)	2,4,5-T TOTAL (UG/L)
MAR 1993 01...	<0.01	<0.10	<0.01	<0.1	<0.1	<0.01	<0.01	<1	<0.01	<0.01
SEP 21...	<0.01	<0.10	<0.01	<0.1	<0.1	<0.01	<0.01	<1	<0.01	<0.01

< Actual value is known to be less than the value shown

16273950 SOUTH FORK KAPUNAHALA STREAM AT KANEOHE--Continued

SEDIMENT DISCHARGE, SUSPENDED (TONS/DAY), WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DAY	MEAN DISCHARGE (CFS)	MEAN CONCEN-TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN-TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN-TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)
		OCTOBER			NOVEMBER			DECEMBER	
1	2.1	e19	.10	4.8	38	.79	2.8	e38	.33
2	2.1	e16	.09	2.5	29	.19	2.5	e53	.36
3	2.1	e14	.08	2.3	e26	.16	2.5	e51	.35
4	2.2	e12	.07	2.2	e26	.16	2.4	e48	.31
5	2.2	e10	.06	2.1	e27	.15	2.3	e46	.29
6	2.3	e9	.05	2.0	e28	.15	2.2	e44	.26
7	3.1	e13	.12	2.1	e29	.16	2.2	e42	.25
8	2.2	13	.08	2.0	e29	.16	2.2	e40	.23
9	2.0	e15	.08	2.4	e33	.22	2.2	38	.23
10	2.0	e14	.08	2.2	e32	.19	2.2	e38	.22
11	1.9	e14	.07	2.4	e33	.22	2.2	e37	.22
12	4.5	43	.76	2.1	e31	.18	2.4	e37	.24
13	4.1	17	.28	2.5	e38	.26	2.2	e37	.22
14	2.5	e9	.06	2.3	e32	.20	2.2	e37	.22
15	2.5	e10	.07	2.2	e32	.19	2.2	e36	.22
16	3.0	e13	.11	2.1	e32	.18	2.2	e36	.22
17	2.5	e10	.07	2.1	e32	.18	2.2	e36	.22
18	2.5	e10	.06	2.0	e32	.17	2.2	e35	.21
19	2.4	e9	.06	2.6	e36	.25	2.1	e35	.20
20	2.4	e8	.05	2.3	e33	.20	2.3	e35	.22
21	3.0	e14	.13	4.3	50	.79	2.4	e35	.22
22	2.7	e12	.09	5.5	e55	.91	2.3	e34	.22
23	2.5	e8	.05	2.6	e32	.22	3.5	72	1.4
24	2.4	e8	.05	2.3	22	.14	2.4	e42	.28
25	2.8	e8	.06	2.4	e21	.14	3.6	e48	1.1
26	2.4	e8	.05	8.7	54	1.9	9.6	e146	5.3
27	2.6	e10	.07	3.8	e40	.51	3.1	e66	.55
28	2.4	e10	.06	2.7	e30	.22	2.6	e63	.43
29	2.3	e9	.06	2.6	e30	.21	2.5	e59	.40
30	2.3	e9	.05	2.5	e30	.20	14	e175	13
31	2.6	e11	.10	---	---	---	3.4	e60	.57
TOTAL	78.6	---	3.17	84.6	---	9.60	95.1	---	28.49
		JANUARY			FEBRUARY			MARCH	
1	2.8	e40	.30	2.5	e33	.23	2.0	e20	.11
2	2.6	e39	.27	2.6	e32	.22	1.9	e21	.11
3	2.5	e38	.26	2.6	e31	.22	2.0	e21	.11
4	2.5	e37	.25	2.5	e30	.20	2.0	e21	.11
5	2.4	e36	.23	2.5	e29	.19	2.0	e22	.12
6	2.9	e44	.38	2.4	e28	.18	2.0	e22	.12
7	2.5	e44	.29	2.3	e27	.17	2.0	e22	.12
8	2.4	e42	.27	3.2	e53	.51	2.5	e35	.52
9	2.4	e41	.27	4.5	78	5.5	2.4	e35	.24
10	2.4	e39	.25	2.3	e15	.10	2.1	e22	.13
11	2.3	e38	.24	2.3	e15	.09	2.1	e21	.11
12	2.2	e36	.22	2.2	e16	.09	2.0	e20	.11
13	2.2	41	.24	2.2	e16	.10	2.1	e20	.11
14	2.2	e38	.22	2.2	e16	.09	2.1	e20	.11
15	2.2	e38	.23	2.2	e16	.10	2.1	e21	.12
16	2.2	e38	.22	2.2	e17	.10	2.1	e21	.12
17	2.2	e38	.22	2.2	e17	.10	2.1	e21	.12
18	2.3	e38	.24	2.2	e17	.10	2.1	e21	.12
19	2.3	e38	.24	2.2	e18	.10	2.2	e21	.12
20	2.3	e38	.24	2.2	e18	.11	2.2	e21	.12
21	2.4	e38	.24	2.2	e18	.11	2.1	e21	.12
22	2.3	e38	.23	2.2	e18	.11	2.1	e22	.12
23	2.3	e38	.24	2.1	e19	.11	2.1	e22	.12
24	2.4	e38	.24	2.0	e19	.11	2.1	e22	.12
25	2.4	e38	.24	2.1	e19	.11	2.1	e22	.12
26	2.3	e38	.24	2.1	e20	.11	2.1	e22	.12
27	2.4	e38	.24	2.1	e20	.11	2.1	e22	.12
28	2.4	e38	.25	2.1	e20	.11	2.1	e23	.13
29	2.8	e40	.30	---	---	---	2.1	e23	.13
30	2.5	e36	.24	---	---	---	2.1	e23	.13
31	2.5	e34	.23	---	---	---	2.1	e25	.14
TOTAL	74.5	---	7.77	66.4	---	9.38	65.1	---	4.22

e Estimated

16273950 SOUTH FORK KAPUNAHALA STREAM AT KANEOHE--Continued

SEDIMENT DISCHARGE, SUSPENDED (TONS/DAY), WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DAY	MEAN DISCHARGE (CFS)	MEAN CONCEN-TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN-TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN-TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)
		APRIL			MAY			JUNE	
1	2.0	e27	.15	2.2	e21	.13	1.9	e24	.12
2	2.1	e26	.15	2.2	e21	.12	1.9	e24	.12
3	2.1	e25	.14	2.1	e21	.12	1.9	e24	.12
4	2.1	e24	.13	2.0	e21	.12	1.9	e24	.12
5	2.2	e23	.14	2.0	e22	.12	1.9	e24	.12
6	2.2	e23	.13	2.1	e22	.12	1.9	e24	.12
7	2.4	e35	.25	2.2	e22	.13	2.0	e24	.13
8	2.3	e32	.20	2.2	e23	.14	2.0	e24	.13
9	2.2	e22	.13	2.2	e23	.14	2.0	e24	.12
10	2.3	e21	.13	2.3	e23	.14	1.9	e23	.12
11	2.3	e20	.13	2.2	e24	.14	1.9	e23	.12
12	2.4	e23	.15	4.0	80	3.3	2.0	e23	.12
13	2.3	e22	.14	2.1	e21	.12	2.0	e23	.12
14	2.1	e21	.12	3.8	e94	2.0	2.0	e23	.12
15	2.1	e21	.12	2.3	e29	.18	2.0	e23	.12
16	2.1	e21	.12	2.1	e23	.13	2.1	e23	.13
17	2.1	e21	.12	2.2	21	.12	2.0	e23	.12
18	2.2	e21	.12	2.3	e23	.14	2.0	e22	.12
19	2.2	e21	.12	2.2	e23	.14	2.0	e22	.12
20	2.2	e20	.12	2.2	e23	.14	2.0	e22	.12
21	2.1	e20	.12	2.2	e23	.14	1.9	e22	.11
22	2.2	e20	.12	2.1	e24	.14	2.0	24	.13
23	2.2	e20	.12	2.2	e24	.14	1.9	e22	.11
24	2.2	e20	.12	2.2	e24	.14	1.9	e22	.11
25	2.0	e20	.11	2.0	24	.13	1.9	e22	.11
26	2.4	e30	.26	2.0	e24	.13	2.1	e23	.13
27	2.7	e53	.44	2.0	e24	.13	2.0	e21	.11
28	2.2	e22	.13	2.0	e24	.13	2.0	e21	.11
29	2.2	e22	.13	2.0	e24	.13	2.0	e20	.11
30	2.2	e22	.13	1.9	e24	.13	2.0	e20	.11
31	---	---	---	1.9	e24	.13	---	---	---
TOTAL	66.3	---	4.49	69.4	---	9.16	59.0	---	3.57
		JULY			AUGUST			SEPTEMBER	
1	1.9	e20	.11	2.0	e22	.11	e2.0	e20	.11
2	1.9	e20	.10	2.0	e22	.12	e1.9	e20	.10
3	1.9	e20	.10	2.0	e21	.12	e1.9	e20	.10
4	1.9	e19	.10	2.0	e21	.11	e1.9	e20	.10
5	1.9	e19	.10	2.0	e21	.11	e1.9	e20	.10
6	1.9	e19	.10	2.0	e21	.12	e1.9	e22	.12
7	1.9	19	.10	2.0	e21	.11	e2.0	25	.13
8	1.9	e19	.10	2.0	e21	.12	2.0	e23	.13
9	1.9	e19	.10	2.0	e21	.11	2.0	e22	.12
10	1.9	e19	.10	e2.0	e21	.12	2.0	e21	.11
11	2.3	e40	.32	e2.1	e21	.11	2.0	e20	.11
12	2.6	e56	.61	e2.0	e21	.12	2.3	e27	.19
13	3.1	e83	1.7	e2.0	e21	.11	2.3	e21	.13
14	2.2	e26	.16	e2.0	e21	.11	2.2	e20	.12
15	2.0	25	.13	e2.0	e21	.11	2.1	e20	.11
16	2.0	e26	.14	e2.1	e21	.11	2.2	e19	.11
17	2.1	e24	.14	e2.0	e21	.12	2.1	e18	.11
18	2.2	e23	.13	e2.0	e21	.11	2.1	e18	.10
19	3.0	e84	.76	e2.0	e21	.11	2.0	e17	.09
20	2.7	e42	.30	e2.0	e21	.11	2.1	e17	.09
21	4.2	e104	3.1	e1.9	e20	.10	1.9	17	.09
22	6.5	150	3.1	e1.9	e20	.10	2.1	68	.56
23	2.3	e25	.16	e1.9	e20	.10	2.9	49	.60
24	2.4	e27	.20	e2.1	e21	.12	3.1	47	1.0
25	2.2	e22	.13	e2.0	e20	.11	2.5	e35	.24
26	2.1	e22	.12	e1.9	e20	.10	2.9	38	.41
27	2.0	e22	.12	e1.9	e20	.10	2.3	e31	.19
28	2.1	e22	.12	e1.9	e20	.10	2.3	e27	.17
29	2.1	e22	.12	e1.9	e20	.10	2.2	e24	.15
30	2.1	e22	.12	e1.9	e20	.10	2.2	e21	.13
31	2.0	e22	.12	e3.0	e38	.32	---	---	---
TOTAL	73.2	---	12.81	62.5	---	3.62	65.3	---	5.82
YEAR	860.0		102.10						

e Estimated

16275000 HAIKU STREAM NEAR HEEIA

LOCATION.--Lat 21°24'46", long 157°49'33", Hydrologic Unit 20060000, on left bank, 1.7 mi west of Kaneohe Post Office, and 1.8 mi southwest of Heeia.

DRAINAGE AREA.--0.97 mi^2.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--January 1914 to October 1919, July 1939 to September 1977, October 1982 to current year.

REVISED RECORDS (FISCAL YEARS).--WSP 935: 1940. WSP 1319: 1916-19(M). WSP 1569: Drainage area. WSP 1719: 1942-43, 1946(M), 1947, 1949, 1951, 1954(M), 1955, 1957-59. WSP 1937: 1940-45(M), 1947(M), 1948-50(P), 1951, 1952(P), 1953(M), 1955-57(P), 1958-59, 1960(M).

GAGE.--Water-stage recorder. Datum of gage is 271.9 ft above mean sea level (levels by city and county of Honolulu). Prior to Apr. 28, 1914, nonrecording gage and Apr. 28, 1914, to Oct. 25, 1919, water-stage recorder, at same site at different datums.

REMARKS.--Records good. Honolulu Board of Water Supply has diverted ground water from tunnel in drainage area since 1943.

AVERAGE DISCHARGE (since diversion from tunnel began).--45 years (water years 1944-77, 1983-93), 2.23 ft^3/s, (1,620 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 5,740 ft^3/s, May 2, 1965, gage height, 7.94 ft, from rating curve extended above 57 ft^3/s on basis of slope-area measurements at gage heights 3.87 ft, 3.88 ft, and 7.94 ft; minimum, 0.20 ft^3/s, July 20, 1957, Sept. 17, 1961.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 340 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Dec. 30	1515	*290	*2.96				

Minimum discharge, 1.2 ft^3/s, June 16-18, 20-22.

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

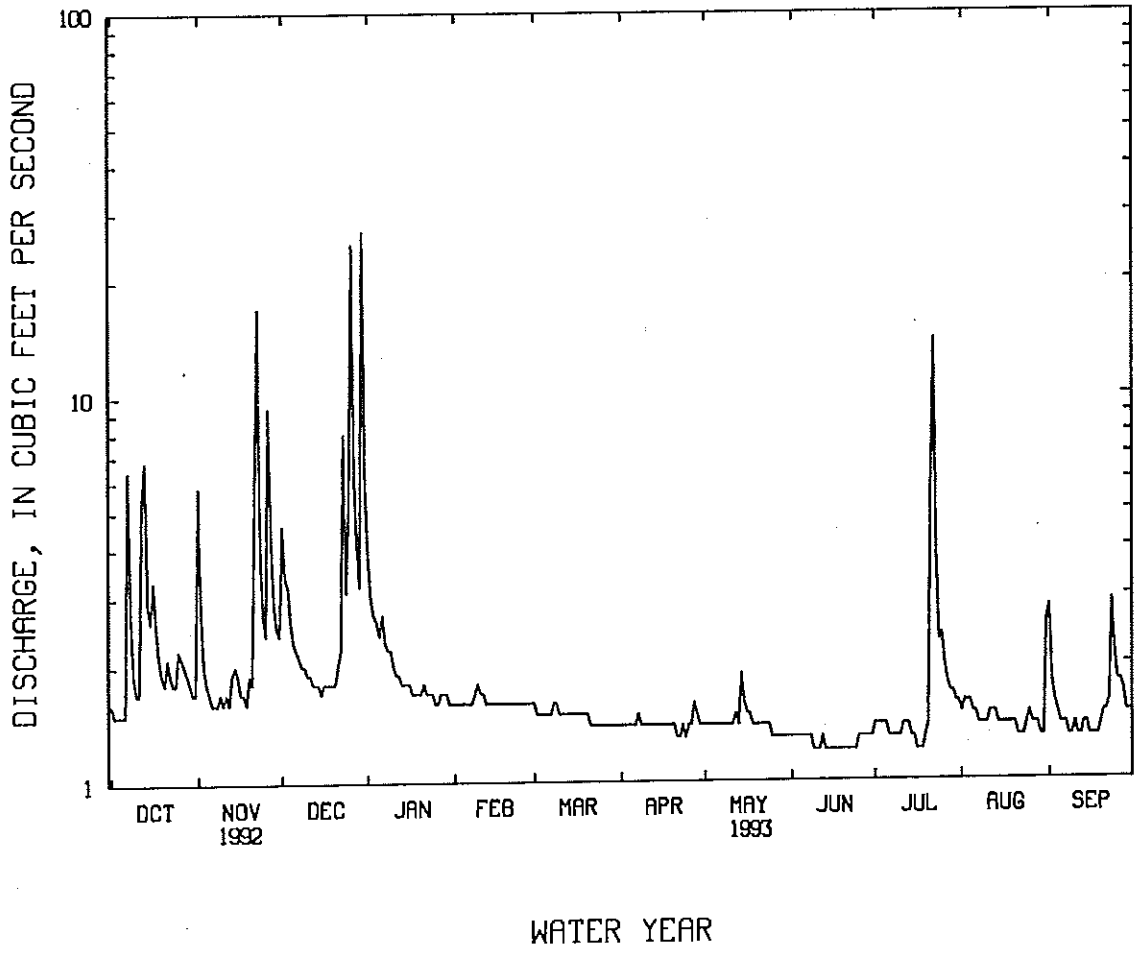
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.6	5.8	4.6	3.9	1.6	1.6	1.4	1.4	1.3	1.4	1.5	2.8
2	1.5	2.7	3.4	3.0	1.6	1.5	1.4	1.4	1.3	1.4	1.6	1.8
3	1.5	2.0	3.2	2.7	1.6	1.5	1.4	1.4	1.3	1.4	1.6	1.6
4	1.5	1.8	2.6	2.6	1.6	1.5	1.4	1.4	1.3	1.4	1.6	1.5
5	1.5	1.7	2.3	2.4	1.6	1.5	1.4	1.4	1.3	1.4	1.5	1.4
6	1.5	1.6	2.2	2.7	1.6	1.5	1.4	1.4	1.3	1.3	1.5	1.4
7	6.4	1.6	2.1	2.3	1.6	1.5	1.5	1.4	1.3	1.3	1.4	1.4
8	2.7	1.6	2.0	2.2	1.7	1.6	1.4	1.4	1.3	1.3	1.4	1.3
9	1.9	1.7	2.0	2.2	1.8	1.6	1.4	1.4	1.2	1.3	1.4	1.3
10	1.7	1.6	1.9	2.0	1.7	1.5	1.4	1.4	1.2	1.3	1.4	1.4
11	1.7	1.7	1.9	1.9	1.7	1.5	1.4	1.4	1.2	1.4	1.5	1.3
12	5.3	1.6	1.8	1.9	1.6	1.5	1.4	1.5	1.3	1.4	1.5	1.3
13	6.8	1.9	1.8	1.8	1.6	1.5	1.4	1.4	1.2	1.4	1.5	1.4
14	2.9	2.0	1.8	1.8	1.6	1.5	1.4	1.9	1.2	1.3	1.4	1.4
15	2.6	1.9	1.7	1.8	1.6	1.5	1.4	1.6	1.2	1.3	1.4	1.3
16	3.3	1.7	1.8	1.8	1.6	1.5	1.4	1.5	1.2	1.2	1.4	1.3
17	2.5	1.7	1.8	1.7	1.6	1.5	1.4	1.5	1.2	1.2	1.4	1.3
18	2.1	1.6	1.8	1.7	1.6	1.5	1.4	1.4	1.2	1.2	1.4	1.3
19	1.9	1.9	1.8	1.7	1.6	1.5	1.4	1.4	1.2	1.3	1.4	1.4
20	1.8	1.8	1.8	1.7	1.6	1.5	1.4	1.4	1.2	1.4	1.4	1.5
21	2.1	5.6	2.0	1.8	1.6	1.4	1.3	1.4	1.2	5.7	1.3	1.5
22	1.9	17	2.2	1.7	1.6	1.4	1.3	1.4	1.2	14	1.3	1.6
23	1.8	4.1	8.0	1.7	1.6	1.4	1.4	1.4	1.2	3.8	1.3	2.9
24	1.8	2.7	3.1	1.7	1.6	1.4	1.3	1.4	1.2	2.3	1.4	2.1
25	2.2	2.4	5.2	1.6	1.6	1.4	1.4	1.3	1.3	2.4	1.5	1.8
26	2.1	9.4	25	1.6	1.6	1.4	1.4	1.3	1.3	2.0	1.4	1.8
27	2.0	4.3	6.3	1.7	1.6	1.4	1.6	1.3	1.3	1.8	1.4	1.7
28	1.9	2.9	4.1	1.7	1.6	1.4	1.5	1.3	1.3	1.7	1.4	1.5
29	1.8	2.5	3.2	1.7	---	1.4	1.4	1.3	1.3	1.7	1.3	1.5
30	1.7	2.4	27	1.6	---	1.4	1.4	1.3	1.3	1.6	1.3	1.5
31	1.7	---	6.2	1.6	---	1.4	---	1.3	---	1.6	2.6	---
TOTAL	73.7	93.2	136.6	62.2	45.3	45.7	42.1	43.7	37.5	65.2	45.4	47.3
MEAN	2.38	3.11	4.41	2.01	1.62	1.47	1.40	1.41	1.25	2.10	1.46	1.58
MAX	6.8	17	27	3.9	1.8	1.6	1.6	1.9	1.3	14	2.6	2.9
MIN	1.5	1.6	1.7	1.6	1.6	1.4	1.3	1.3	1.2	1.2	1.3	1.3
AC-FT	146	185	271	123	90	91	84	87	74	129	90	94

16275000 HAIKU STREAM NEAR HEEIA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1944 - 1993, BY WATER YEAR (WY)

MEAN	1.94	2.80	2.78	2.62	2.48	3.28	2.58	2.39	1.36	1.55	1.59	1.43
MAX	11.6	15.7	9.72	9.68	10.7	16.5	13.0	27.3	2.34	3.25	4.24	3.62
(WY)	1959	1966	1988	1949	1955	1958	1989	1965	1989	1989	1967	1992
MIN	.32	.33	.64	.94	.86	.60	.50	.51	.38	.41	.56	.36
(WY)	1946	1946	1960	1977	1963	1946	1946	1961	1946	1945	1961	1945

SUMMARY STATISTICS	FOR 1992 CALENDAR YEAR		FOR 1993 WATER YEAR		WATER YEARS 1944 - 1993	
ANNUAL TOTAL	807.0		737.9			
ANNUAL MEAN	2.20		2.02		2.23	
HIGHEST ANNUAL MEAN					4.82	1965
LOWEST ANNUAL MEAN					.67	1946
HIGHEST DAILY MEAN	27	Dec 30	27	Dec 30	620	May 2 1965
LOWEST DAILY MEAN	1.3	Jul 14	1.2	Jun 9	.29	Jul 13 1945
ANNUAL SEVEN-DAY MINIMUM	1.3	Aug 24	1.2	Jun 13	.29	Oct 19 1945
ANNUAL RUNOFF (AC-FT)	1600		1460		1620	
10 PERCENT EXCEEDS	2.9		2.6		2.7	
50 PERCENT EXCEEDS	1.6		1.5		1.5	
90 PERCENT EXCEEDS	1.4		1.3		.82	



16275000 HAIKU STREAM NEAR HEEIA--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--October 1982 to September 1985, October 1986 to current year.

PERIOD OF DAILY RECORD.--
SUSPENDED SEDIMENT DISCHARGE: December 1983 to September 1984, July 1987 to current year.

INSTRUMENTATION.--Automatic pumping sediment sampler since December 1983.

REMARKS.--Water-quality samples were also collected at this site.

EXTREMES FOR PERIOD OF RECORD.--
SEDIMENT CONCENTRATIONS: Maximum daily mean, 2,130 mg/L (estimated), Apr. 8, 1989; minimum daily mean, 1 mg/L, on many days in 1984, 1988-93.
SEDIMENT DISCHARGE: Maximum daily, 1,800 tons (estimated), Apr. 8, 1989; minimum daily, less than 0.01 ton on many days in 1984, 1988-93.

EXTREMES FOR CURRENT YEAR.--
SEDIMENT CONCENTRATIONS: Maximum daily mean, 466 mg/L, Dec. 30; minimum daily mean, 1 mg/L on many days.
SEDIMENT DISCHARGE: Maximum daily, 122 tons, Dec. 30; minimum daily, less than 0.01 tons on many days.

WATER QUALITY DATA, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	TIME	DISCHARGE, INST. CUBIC FEET PER SECOND	SPECIFIC CONDUCTANCE (US/CM)	PH WATER WHOLE FIELD (STANDARD UNITS)	TEMPERATURE AIR (DEG C)	TEMPERATURE WATER (DEG C)	TURBIDITY (NTU)	BAROMETRIC PRESSURE (MM OF HG)	OXYGEN, DISSOLVED (MG/L)	OXYGEN, DISSOLVED (PERCENT SATURATION)	COLIFORM, FECAL, 0.7 UM-MF (COLS./ 100 ML)
NOV 1992											
02...	1405	2.5	160	8.0	22.5	21.0	0.60	752	8.7	99	--
DEC											
09...	1020	2.0	155	7.8	21.5	20.0	0.90	760	8.9	98	230
JAN 1993											
12...	1040	1.8	155	8.0	16.0	18.5	0.40	757	9.0	97	--
MAR											
02...	1100	1.5	145	8.0	20.5	19.5	0.70	762	8.9	97	74
APR											
20...	1340	1.4	145	8.0	21.0	19.5	0.70	758	8.8	96	--
MAY											
24...	1125	1.3	142	7.8	22.0	20.0	0.80	760	8.8	97	330
JUN											
22...	1340	1.2	142	7.9	24.0	21.0	0.10	756	8.6	97	--
JUL											
22...	1255	11	159	7.7	22.0	22.0	28	757	8.5	98	--
SEP											
02...	1015	1.8	155	8.0	21.0	20.5	0.30	754	8.6	97	--
22...	0915	1.4	144	7.6	21.5	20.0	0.30	756	8.8	98	110

DATE	TIME	HARDNESS TOTAL (MG/L AS CACO3)	CALCIUM DISSOLVED (MG/L AS CA)	MAGNESIUM, DISSOLVED (MG/L AS MG)	SODIUM, DISSOLVED (MG/L AS NA)	SODIUM PERCENT	SODIUM ADSORPTION RATIO	POTASSIUM, DISSOLVED (MG/L AS K)	ALKALINITY LAB (MG/L AS CACO3)	SULFATE DISSOLVED (MG/L AS SO4)	CHLORIDE, DISSOLVED (MG/L AS CL)
MAR 1993											
02...	1100	42	8.2	5.2	12	38	0.8	0.80	45	3.5	16
SEP											
22...	0915	43	8.3	5.4	12	38	0.8	0.20	48	3.0	14

DATE	TIME	FLUORIDE, DISSOLVED (MG/L AS F)	SILICA, DISSOLVED (MG/L AS SIO2)	SOLIDS, RESIDUE AT 180 DEG. C DISSOLVED (MG/L)	SOLIDS, SUM OF CONSTITUENTS, DISSOLVED (MG/L)	SOLIDS, DISSOLVED (TONS PER AC-FT)	RESIDUE TOTAL AT 105 DEG. C, SUSPENDED (MG/L)	NITROGEN, NO2+NO3 TOTAL (MG/L AS N)	NITROGEN, AMMONIA TOTAL (MG/L AS N)	NITROGEN, AMMONIA + ORGANIC TOTAL (MG/L AS N)	PHOSPHORUS TOTAL (MG/L AS P)	PHOSPHATE, TOTAL (MG/L AS PO4)
DEC 1992												
09...	1020	--	--	--	--	--	10	0.170	<0.010	<0.20	0.030	0.03
MAR 1993												
02...	1100	<0.10	26	93	99	0.13	4	--	--	<0.20	0.030	--
MAY												
24...	1125	--	--	--	--	--	<1	--	--	<0.20	0.020	--
SEP												
22...	0915	<0.10	27	94	99	0.13	<1	--	--	<0.20	0.030	--

< Actual value is known to be less than the value shown

16275000 HAIKU STREAM NEAR HEEIA--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	TIME	ALUMINUM, TOTAL RECOVERABLE (UG/L AS AL)	ALUMINUM, DISSOLVED (UG/L AS AL)	ARSENIC TOTAL (UG/L AS AS)	BARIUM, TOTAL RECOVERABLE (UG/L AS BA)	BARIUM, DISSOLVED (UG/L AS BA)	BERYLLIUM, TOTAL RECOVERABLE (UG/L AS BE)	CADMIUM TOTAL RECOVERABLE (UG/L AS CD)	CHROMIUM, TOTAL RECOVERABLE (UG/L AS CR)	COBALT, TOTAL RECOVERABLE (UG/L AS CO)	COBALT, DISSOLVED (UG/L AS CO)	COPPER, TOTAL RECOVERABLE (UG/L AS CU)
MAR 1993 02...	1100	30	<10	<1	<100	<2	<10	<1	2	<1	<3	<1
SEP 22...	0915	10	10	<1	<100	<2	<10	<1	<1	<1	<3	<1

DATE	IRON, TOTAL RECOVERABLE (UG/L AS FE)	IRON, DISSOLVED (UG/L AS FE)	LEAD, TOTAL RECOVERABLE (UG/L AS PB)	LITHIUM TOTAL RECOVERABLE (UG/L AS LI)	LITHIUM DISSOLVED (UG/L AS LI)	MANGANESE, TOTAL RECOVERABLE (UG/L AS MN)	MANGANESE, DISSOLVED (UG/L AS MN)	MERCURY TOTAL RECOVERABLE (UG/L AS HG)	MOLYBDENUM, TOTAL RECOVERABLE (UG/L AS MO)	MOLYBDENUM, DISSOLVED (UG/L AS MO)	NICKEL, TOTAL RECOVERABLE (UG/L AS NI)
MAR 1993 02...	90	43	<1	<10	<4	10	5	0.10	<1	<10	1
SEP 22...	70	26	<1	<10	<4	<10	3	0.20	<1	<10	<1

DATE	NICKEL, DISSOLVED (UG/L AS NI)	SELENIUM, TOTAL (UG/L AS SE)	SELENIUM, DISSOLVED (UG/L AS SE)	SILVER, TOTAL RECOVERABLE (UG/L AS AG)	SILVER, DISSOLVED (UG/L AS AG)	STRONTIUM, DISSOLVED (UG/L AS SR)	VANADIUM, DISSOLVED (UG/L AS V)	ZINC, TOTAL RECOVERABLE (UG/L AS ZN)	CARBON, ORGANIC TOTAL (MG/L AS C)	OIL AND GREASE, TOTAL RECOV. GRAVIMETRIC (MG/L)	ALDRIN, TOTAL (UG/L)
MAR 1993 02...	<1	<1	<1	<1	<1.0	48	<6	<10	0.5	<1	<0.010
SEP 22...	<1	<1	<1	<1	<1.0	52	<6	<10	0.2	<1	<0.010

DATE	CHLORDANE, TOTAL (UG/L)	CHLORDYRIFOS TOTAL RECOVER (UG/L)	DDD, TOTAL (UG/L)	DDE, TOTAL (UG/L)	DDT, TOTAL (UG/L)	DEF TOTAL (UG/L)	DIAZINON, TOTAL (UG/L)	DIELDRIN TOTAL (UG/L)	DISYSTON TOTAL (UG/L)	2, 4-DP TOTAL (UG/L)	2,4-D, TOTAL (UG/L)
MAR 1993 02...	<0.1	<0.01	<0.010	<0.010	<0.010	<0.01	<0.01	<0.010	<0.01	<0.01	<0.01
SEP 22...	<0.1	<0.01	<0.010	<0.010	<0.010	<0.01	<0.01	<0.010	<0.01	<0.01	<0.01

DATE	ENDOSULFAN, TOTAL (UG/L)	ENDRIN WATER UNFLTRD REC (UG/L)	ETHION, TOTAL (UG/L)	FONOFOS (OYFONATE) WATER WHOLE TOT.REC (UG/L	HEPTACHLOR, TOTAL (UG/L)	HEPTACHLOR EPOXIDE TOTAL (UG/L)	LINDANE TOTAL (UG/L)	MALATHION, TOTAL (UG/L)	METHOXYCHLOR, TOTAL (UG/L)	METHYL PARATHION, TOTAL (UG/L)
MAR 1993 02...	<0.010	<0.010	<0.01	<0.01	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01
SEP 22...	<0.010	<0.010	<0.01	<0.01	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01

DATE	MIREX, TOTAL (UG/L)	NAPHTHALENES, POLYCHLOR. TOTAL (UG/L)	PARATHION, TOTAL (UG/L)	PCB, TOTAL (UG/L)	PERTHANE TOTAL (UG/L)	PHORATE TOTAL (UG/L)	SILVEX, TOTAL (UG/L)	TOXAPHENE, TOTAL (UG/L)	TOTAL TRITHION (UG/L)	2,4,5-T TOTAL (UG/L)
MAR 1993 02...	<0.01	<0.10	<0.01	<0.1	<0.1	<0.01	<0.01	<1	<0.01	<0.01
SEP 22...	<0.01	<0.10	<0.01	<0.1	<0.1	<0.01	<0.01	<1	<0.01	<0.01

< Actual value is known to be less than the value shown

16275000 HAIKU STREAM NEAR HEEIA--Continued

SEDIMENT DISCHARGE, SUSPENDED (TONS/DAY), WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DAY	MEAN DISCHARGE (CFS)	MEAN CONCEN-TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN-TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN-TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)
		OCTOBER			NOVEMBER			DECEMBER	
1	1.6	e4	.02	5.8	e72	5.5	4.6	73	2.7
2	1.5	e5	.02	2.7	20	.15	3.4	18	.21
3	1.5	e3	.01	2.0	7	.04	3.2	13	.11
4	1.5	e2	.01	1.8	8	.04	2.6	5	.03
5	1.5	e2	.01	1.7	10	.05	2.3	4	.02
6	1.5	e1	<.01	1.6	8	.04	2.2	4	.02
7	6.4	61	2.5	1.6	6	.03	2.1	4	.02
8	2.7	8	.06	1.6	4	.02	2.0	7	.04
9	1.9	4	.02	1.7	4	.02	2.0	4	.02
10	1.7	2	.01	1.6	4	.02	1.9	3	.02
11	1.7	2	.01	1.7	6	.03	1.9	2	.01
12	5.3	57	5.4	1.6	2	.01	1.8	3	.02
13	6.8	121	6.0	1.9	8	.05	1.8	4	.02
14	2.9	e24	.29	2.0	14	.08	1.8	3	.02
15	2.6	e22	.16	1.9	11	.05	1.7	3	.02
16	3.3	e27	.28	1.7	13	.06	1.8	5	.03
17	2.5	e20	.14	1.7	7	.03	1.8	4	.02
18	2.1	e18	.10	1.6	6	.02	1.8	3	.02
19	1.9	e16	.08	1.9	7	.03	1.8	4	.02
20	1.8	e14	.07	1.8	5	.02	1.8	3	.02
21	2.1	e16	.12	5.6	93	5.6	2.0	4	.02
22	1.9	e11	.06	17	e436	26	2.2	13	.08
23	1.8	e11	.05	4.1	54	.65	8.0	e367	30
24	1.8	e10	.05	2.7	20	.15	3.1	73	.67
25	2.2	e14	.09	2.4	e3	.02	5.2	70	18
26	2.1	e12	.06	9.4	e167	9.0	25	464	82
27	2.0	e9	.05	4.3	17	.21	6.3	e87	1.6
28	1.9	e6	.03	2.9	12	.10	4.1	e40	.45
29	1.8	e5	.02	2.5	7	.05	3.2	25	.22
30	1.7	e4	.02	2.4	9	.06	27	466	122
31	1.7	e3	.01	---	---	---	6.2	202	3.9
TOTAL	73.7	---	15.76	93.2	---	48.13	136.6	---	262.33
		JANUARY			FEBRUARY			MARCH	
1	3.9	47	.50	1.6	e15	.07	1.6	e4	.02
2	3.0	38	.31	1.6	e15	.06	1.5	e4	.02
3	2.7	36	.26	1.6	e14	.06	1.5	4	.02
4	2.6	40	.28	1.6	e13	.06	1.5	2	.01
5	2.4	26	.17	1.6	e13	.05	1.5	2	.01
6	2.7	33	.24	1.6	e12	.05	1.5	3	.01
7	2.3	22	.14	1.6	e12	.05	1.5	4	.02
8	2.2	22	.13	1.7	e11	.05	1.6	7	.03
9	2.2	21	.12	1.8	e11	.05	1.6	e6	.02
10	2.0	18	.10	1.7	e10	.05	1.5	2	.01
11	1.9	11	.05	1.7	e10	.04	1.5	5	.02
12	1.9	8	.04	1.6	e9	.04	1.5	7	.03
13	1.8	5	.02	1.6	e9	.04	1.5	5	.02
14	1.8	4	.02	1.6	e9	.04	1.5	7	.03
15	1.8	3	.02	1.6	e8	.03	1.5	4	.02
16	1.8	4	.02	1.6	e8	.03	1.5	3	.01
17	1.7	3	.02	1.6	e7	.03	1.5	5	.02
18	1.7	4	.02	1.6	e7	.03	1.5	5	.02
19	1.7	3	.02	1.6	e7	.03	1.5	2	.01
20	1.7	e3	.02	1.6	e7	.03	1.5	3	.01
21	1.8	5	.03	1.6	e6	.03	1.4	3	.01
22	1.7	30	.14	1.6	e6	.02	1.4	3	.01
23	1.7	25	.12	1.6	e6	.02	1.4	7	.03
24	1.7	e22	.10	1.6	e5	.02	1.4	10	.04
25	1.6	e21	.09	1.6	e5	.02	1.4	5	.02
26	1.6	e20	.09	1.6	e5	.02	1.4	3	.01
27	1.7	e19	.09	1.6	e5	.02	1.4	4	.02
28	1.7	e18	.08	1.6	e5	.02	1.4	3	.01
29	1.7	e18	.08	---	---	---	1.4	2	.01
30	1.6	e17	.08	---	---	---	1.4	2	.01
31	1.6	e16	.07	---	---	---	1.4	2	.01
TOTAL	62.2	---	3.47	45.3	---	1.06	45.7	---	0.54

< Actual value is known to be less than the value shown
e Estimated

16275000 HAIKU STREAM NEAR HEEIA--Continued

SEDIMENT DISCHARGE, SUSPENDED (TONS/DAY), WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DAY	MEAN DISCHARGE (CFS)	MEAN CONCEN-TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN-TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN-TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)
		APRIL			MAY			JUNE	
1	1.4	2	.01	1.4	2	.01	1.3	7	.02
2	1.4	1	<.01	1.4	2	.01	1.3	7	.02
3	1.4	1	<.01	1.4	3	.01	1.3	4	.01
4	1.4	4	.02	1.4	4	.02	1.3	3	.01
5	1.4	5	.02	1.4	5	.02	1.3	3	.01
6	1.4	6	.02	1.4	5	.02	1.3	2	.01
7	1.5	6	.02	1.4	5	.02	1.3	2	.01
8	1.4	3	.01	1.4	3	.01	1.3	2	.01
9	1.4	3	.01	1.4	4	.01	1.2	e3	.01
10	1.4	1	<.01	1.4	4	.02	1.2	6	.02
11	1.4	2	.01	1.4	4	.01	1.2	3	.01
12	1.4	2	.01	1.5	5	.02	1.3	e3	.01
13	1.4	1	<.01	1.4	3	.01	1.2	5	.02
14	1.4	2	.01	1.9	3	.02	1.2	e5	.02
15	1.4	3	.01	1.6	4	.02	1.2	e4	.02
16	1.4	2	.01	1.5	4	.02	1.2	e4	.01
17	1.4	1	<.01	1.5	4	.02	1.2	e4	.01
18	1.4	1	<.01	1.4	8	.03	1.2	e4	.01
19	1.4	1	<.01	1.4	3	.01	1.2	e4	.01
20	1.4	2	.01	1.4	3	.01	1.2	e3	.01
21	1.3	3	.01	1.4	2	.01	1.2	e3	.01
22	1.3	2	.01	1.4	1	<.01	1.2	3	.01
23	1.4	3	.01	1.4	2	.01	1.2	e3	.01
24	1.3	2	.01	1.4	2	.01	1.2	e3	.01
25	1.4	2	.01	1.3	3	.01	1.3	e3	.01
26	1.4	1	<.01	1.3	2	.01	1.3	e2	.01
27	1.6	1	<.01	1.3	5	.02	1.3	e2	.01
28	1.5	5	.02	1.3	5	.02	1.3	e2	.01
29	1.4	e5	.02	1.3	2	.01	1.3	e2	.01
30	1.4	1	<.01	1.3	2	.01	1.3	e2	.01
31	---	---	---	1.3	4	.01	---	---	---
TOTAL	42.1	---	0.36	43.7	---	0.45	37.5	---	0.36
		JULY			AUGUST			SEPTEMBER	
1	1.4	e2	.01	1.5	e10	.04	2.8	16	.13
2	1.4	e2	.01	1.6	e10	.04	1.8	e13	.07
3	1.4	e2	.01	1.6	e10	.04	1.6	e17	.07
4	1.4	e2	.01	1.6	e10	.04	1.5	e22	.09
5	1.4	e2	.01	1.5	e10	.04	1.4	e29	.11
6	1.3	e2	<.01	1.5	e10	.04	1.4	e37	.14
7	1.3	e1	<.01	1.4	e10	.04	1.4	24	.09
8	1.3	e1	<.01	1.4	e10	.04	1.3	3	.01
9	1.3	e1	<.01	1.4	e10	.04	1.3	2	.01
10	1.3	e1	<.01	1.4	e10	.04	1.4	4	.01
11	1.4	e1	<.01	1.5	e10	.04	1.3	e5	.02
12	1.4	e1	<.01	1.5	e10	.04	1.3	7	.02
13	1.4	e1	<.01	1.5	e10	.04	1.4	6	.02
14	1.3	e1	<.01	1.4	e10	.04	1.4	2	.01
15	1.3	2	.01	1.4	e10	.04	1.3	1	<.01
16	1.2	4	.01	1.4	e9	.04	1.3	1	<.01
17	1.2	5	.02	1.4	e9	.04	1.3	1	<.01
18	1.2	17	.06	1.4	e9	.04	1.3	1	<.01
19	1.3	25	.09	1.4	e9	.04	1.4	3	.01
20	1.4	70	.26	1.4	e9	.03	1.5	6	.02
21	5.7	92	7.6	1.3	e9	.03	1.5	4	.02
22	14	224	13	1.3	e9	.03	1.6	e6	.04
23	3.8	e37	.38	1.3	e9	.03	2.9	e32	.70
24	2.3	e32	.20	1.4	e9	.03	2.1	e15	.13
25	2.4	e27	.18	1.5	e9	.04	1.8	6	.03
26	2.0	e23	.13	1.4	e9	.04	1.8	6	.03
27	1.8	e20	.10	1.4	e9	.03	1.7	6	.03
28	1.7	e17	.08	1.4	e9	.03	1.5	5	.02
29	1.7	e15	.07	1.3	e9	.03	1.5	7	.03
30	1.6	e13	.05	1.3	e9	.03	1.5	8	.03
31	1.6	e11	.05	2.6	e27	.69	---	---	---
TOTAL	65.2	---	22.43	45.4	---	1.80	47.3	---	1.93
YEAR	737.9		358.62						

< Actual value is known to be less than the value shown
e Estimated

16283200 KAHALUU STREAM NEAR AHUIMANU

LOCATION.--Lat 21°26'32", long 157°50'47", Hydrologic Unit 20060000, on left bank, 1.1 mi west of Valley of the Temples Memorial Park, 1.3 mi south of Kahaluu School, and 2.7 mi northwest of Heeia Elementary School, and 2.7 mi northwest of Heeia Elementary School.

DRAINAGE AREA.--0.99 mi^2.

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

GAGE.--Water-stage recorder and concrete control. Elevation of gage is 150 ft, from topographic map. Honolulu Board of Water Supply).

REMARKS.--Records fair. Honolulu Board of Water Supply has diverted ground water from tunnel in drainage area since 1947. At times, farmers upstream of gage pump and/or divert small amounts of water from the stream.

AVERAGE DISCHARGE.--10 years, 3.52 ft^3/s (2,550 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 608 ft^3/s, Mar. 19, 1991, gage height, 5.76 ft; minimum, 0.58 ft^3/s on several days in September, October, November 1984.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 180 ft^3/s and maximum(*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Dec. 26	0030	*208	*3.82	No other peak greater than base discharge.			

Minimum discharge, 1.7 ft^3/s, Aug. 14, 15, 21, 23, Sep. 12.

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

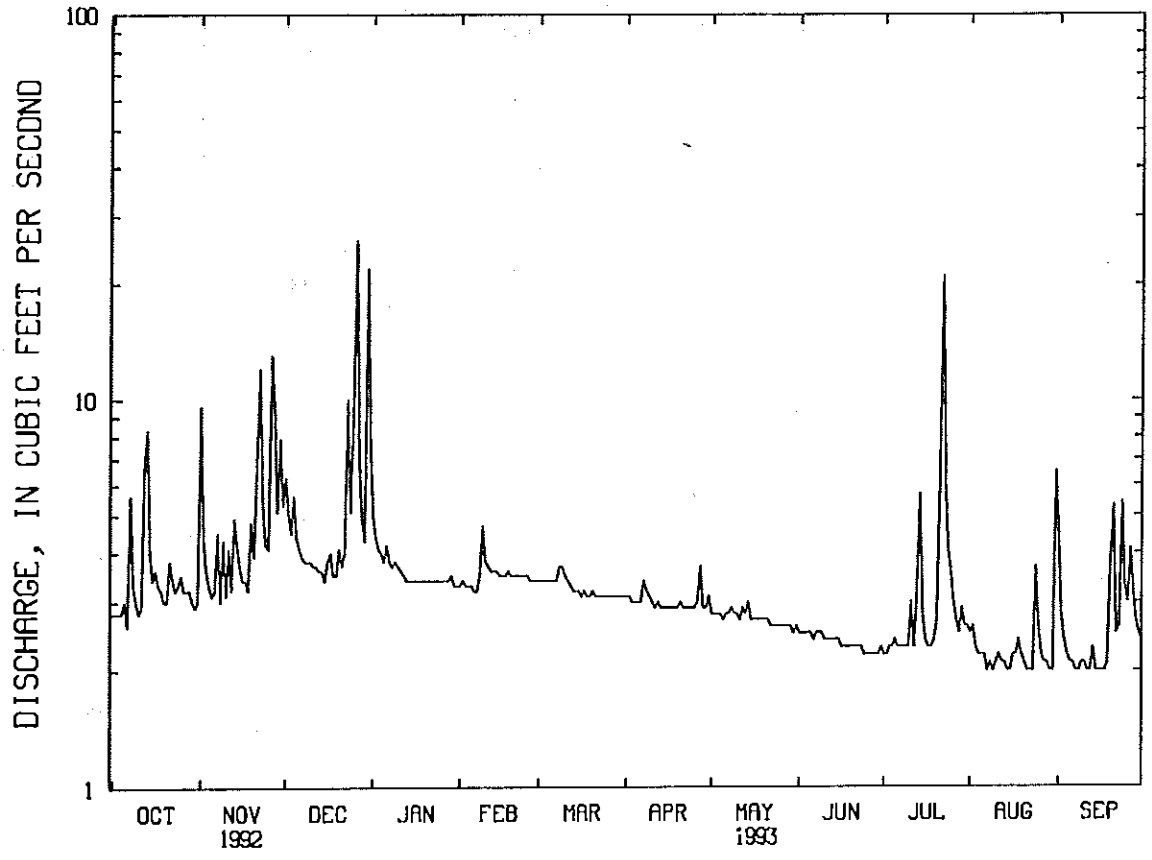
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.8	9.6	6.3	5.0	3.3	3.4	3.1	2.8	2.5	2.2	2.5	4.5
2	2.8	4.4	5.1	4.4	3.4	3.4	3.1	2.8	2.5	2.2	2.6	2.8
3	2.8	3.6	4.5	4.1	3.3	3.4	3.0	2.8	2.5	2.3	2.3	2.4
4	2.8	3.3	5.6	4.0	3.3	3.4	3.0	2.8	2.5	2.3	2.2	2.2
5	3.0	3.1	4.4	3.8	3.3	3.4	3.0	2.7	2.5	2.4	2.2	2.1
6	2.6	3.2	4.1	4.2	3.2	3.4	3.0	2.8	2.4	2.3	2.2	2.1
7	5.6	4.5	3.9	3.8	3.2	3.4	3.4	2.8	2.5	2.3	2.0	2.0
8	3.3	3.0	3.8	3.7	3.5	3.7	3.2	2.9	2.5	2.3	2.1	2.0
9	3.0	4.3	3.8	3.8	4.7	3.7	3.1	2.8	2.5	2.3	2.0	2.1
10	2.8	3.1	3.8	3.7	3.8	3.5	3.0	2.8	2.4	2.3	2.1	2.1
11	2.9	4.1	3.7	3.6	3.7	3.4	2.9	2.7	2.4	3.0	2.2	2.0
12	6.9	3.2	3.7	3.5	3.6	3.3	3.0	2.9	2.4	2.3	2.1	2.0
13	8.3	4.9	3.6	3.4	3.6	3.2	2.9	2.8	2.4	3.2	2.1	2.3
14	4.0	4.2	3.6	3.4	3.6	3.2	2.9	3.0	2.4	5.7	2.0	2.0
15	3.4	3.7	3.4	3.4	3.5	3.2	2.9	2.7	2.4	2.8	2.0	2.0
16	3.6	3.4	3.8	3.4	3.5	3.1	2.9	2.7	2.3	2.4	2.2	2.0
17	3.3	3.4	4.0	3.4	3.5	3.2	2.9	2.7	2.3	2.3	2.2	2.0
18	3.2	3.2	3.5	3.4	3.6	3.1	2.9	2.7	2.3	2.3	2.4	2.1
19	3.0	4.8	3.5	3.4	3.5	3.1	2.9	2.7	2.3	2.4	2.2	3.9
20	3.0	3.9	4.1	3.4	3.5	3.2	3.0	2.7	2.3	2.7	2.1	5.3
21	3.8	6.8	3.7	3.4	3.5	3.1	2.9	2.7	2.3	7.0	2.0	2.5
22	3.4	12	4.0	3.4	3.5	3.1	2.9	2.6	2.3	21	2.0	2.6
23	3.2	5.4	10	3.4	3.5	3.1	2.9	2.6	2.3	6.0	2.0	5.4
24	3.3	4.2	5.1	3.4	3.5	3.1	2.9	2.6	2.2	4.1	3.7	3.3
25	3.5	4.1	9.1	3.4	3.5	3.1	2.9	2.6	2.2	3.6	2.6	3.0
26	3.2	13	26	3.4	3.4	3.1	3.0	2.6	2.2	3.0	2.2	4.1
27	3.2	9.2	7.1	3.4	3.4	3.1	3.7	2.6	2.2	2.7	2.1	3.2
28	3.2	5.1	4.9	3.4	3.4	3.1	2.9	2.6	2.2	2.5	2.1	2.7
29	3.0	7.9	4.3	3.5	---	3.1	2.9	2.6	2.2	2.9	2.0	2.5
30	2.9	5.3	22	3.3	---	3.1	3.1	2.5	2.3	2.6	2.0	2.4
31	3.0	---	7.7	3.3	---	3.1	---	2.6	---	2.6	6.5	---
TOTAL	108.8	153.9	186.1	112.1	98.3	100.8	90.2	84.2	70.7	110.0	72.9	81.6
MEAN	3.51	5.13	6.00	3.62	3.51	3.25	3.01	2.72	2.36	3.55	2.35	2.72
MAX	8.3	13	26	5.0	4.7	3.7	3.7	3.0	2.5	21	6.5	5.4
MIN	2.6	3.0	3.4	3.3	3.2	3.1	2.9	2.5	2.2	2.2	2.0	2.0
AC-FT	216	305	369	222	195	200	179	167	140	218	145	162

16283200 KAHALUU STREAM NEAR AHUIMANU--Continued

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

MEAN	3.34	4.02	4.29	3.70	3.73	4.49	3.65	3.25	2.73	3.11	2.76	3.19
MAX	6.69	10.5	9.56	8.65	7.55	11.8	10.6	5.52	4.78	5.89	5.78	5.81
(WY)	1992	1991	1988	1988	1989	1991	1989	1988	1991	1989	1991	1992
MIN	.66	1.24	1.09	.95	1.03	1.03	.92	.85	.73	.74	.67	.67
(WY)	1985	1986	1986	1986	1986	1984	1985	1984	1984	1984	1984	1984

SUMMARY STATISTICS	FOR 1992 CALENDAR YEAR		FOR 1993 WATER YEAR		WATER YEARS 1984 - 1993	
ANNUAL TOTAL	1369.6		1269.6			
ANNUAL MEAN	3.74		3.48		3.52	
HIGHEST ANNUAL MEAN					5.97	1991
LOWEST ANNUAL MEAN					1.07	1984
HIGHEST DAILY MEAN	52	Sep 3	26	Dec 26	97	Mar 19 1991
LOWEST DAILY MEAN	2.1	Aug 30	2.0	Aug 7	.58	Sep 22 1984
ANNUAL SEVEN-DAY MINIMUM	2.3	Aug 22	2.0	Sep 6	.59	Nov 5 1984
ANNUAL RUNOFF (AC-FT)	2720		2520		2550	
10 PERCENT EXCEEDS	4.7		4.5		5.1	
50 PERCENT EXCEEDS	3.2		3.1		3.1	
90 PERCENT EXCEEDS	2.4		2.2		.91	



16283600 SOUTH FORK WAIHEE STREAM NEAR HEEIA

LOCATION.--Lat 21°26'47", long 157°52'12", Hydrologic Unit 20060000, on left bank 0.2 mi upstream from confluence with North Fork, 3.0 mi southwest of Waiahole School, and 4.0 mi northwest of Heeia.

DRAINAGE AREA.--0.03 mi^2.

PERIOD OF RECORD.--September 1962 to current year.

GAGE.--Water-stage recorder and concrete control. Datum of gage is 615.74 ft above mean sea level (levels by Honolulu Board of Water Supply).

REMARKS.--Records fair. Honolulu Board of Water Supply diverts water from wells in drainage area.

AVERAGE DISCHARGE.--31 years, 1.31 ft^3/s (950 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 430 ft^3/s, Oct. 28, 1981, gage height, 4.68 ft, from rating curve extended above 4.8 ft^3/s; no flow, July 7, 1977.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 47 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Nov. 1	1559	*32	*1.88				

Minimum discharge, 0.33 ft^3/s, Nov. 8, May 11.

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	e.47	1.1	.76	.55	.51	.56	e.56	e.58	.60	.56	e.58	.66
2	e.47	.42	.51	.52	.51	.56	e.56	e.58	.60	.56	e.71	.51
3	e.47	.37	.42	.55	.51	.56	e.56	e.58	.60	.56	e.58	.49
4	e.42	.37	.44	.54	.51	.56	e.56	e.58	.60	.56	e.58	.47
5	e.42	.37	.42	.51	.51	.57	e.60	e.58	.60	.56	e.56	.47
6	e.42	.38	.42	.54	.51	.56	e.56	.63	.60	.56	e.56	.47
7	e.47	.41	.42	.52	.51	e.56	e.58	.65	.60	.56	e.56	.47
8	e.42	.37	.42	.51	.53	e.56	e.58	.56	.60	.56	e.54	.47
9	e.42	.60	.42	.51	.95	e.56	e.58	.55	.60	.56	e.54	.47
10	e.42	.37	.42	.51	.52	e.56	e.58	.56	.60	.56	e.54	.47
11	e.42	.51	.42	.51	.51	e.56	e.58	.52	.60	.56	e.56	.47
12	e1.0	.39	.42	.51	.51	e.56	e.58	.50	.60	.56	e.54	.47
13	e.47	.61	.42	.51	.51	e.56	e.58	.58	.60	.64	e.54	.73
14	e.42	.47	.42	.51	.51	e.56	e.58	.72	.60	.58	e.52	.49
15	e.42	.40	.42	.51	.51	e.56	e.58	.61	.60	.56	e.52	.47
16	e.42	.37	.53	.51	.51	e.56	e.58	.60	.60	.56	e.52	.47
17	e.42	.37	.51	.51	.51	e.56	e.58	.60	.58	.56	e.50	.42
18	e.37	.37	.42	.51	.51	e.56	e.58	.60	.59	e.56	e.60	.42
19	e.37	.50	.42	.52	.51	e.56	e.58	.60	.59	e.56	e.56	.93
20	e.37	.42	.49	.56	.52	e.56	e.58	.60	.59	e.56	e.54	.66
21	e.42	.46	.43	.56	.55	e.56	e.58	.60	.57	e1.2	e.52	.48
22	e.37	.66	e.46	.56	.56	e.56	e.58	.60	.57	e2.0	e.50	.47
23	e.37	.43	e1.9	.56	.56	e.56	e.58	.60	.56	e.70	e.47	1.1
24	e.37	.38	e.55	.56	.56	e.56	e.57	.60	.56	e.64	.70	.63
25	e.41	.39	e1.0	.56	.56	e.56	e.58	.60	.56	e.60	.54	.50
26	e.37	.87	e2.1	.56	.56	e.56	e.57	.60	.56	e.58	.50	.45
27	e.37	.59	e.60	.56	.56	e.56	e.59	.60	.56	e.58	.47	.42
28	e.37	.42	e.53	.56	.56	e.56	e.58	.60	.56	e.62	.47	.42
29	e.37	.74	.52	.56	---	e.56	e.58	.60	.56	e.82	.47	.44
30	e.37	.46	2.1	.56	---	e.56	e.58	.60	.56	e.63	.47	.47
31	.37	---	.62	.56	---	e.56	---	.60	---	e.59	1.5	---
TOTAL	13.24	14.57	19.93	16.58	15.15	17.37	17.31	18.38	17.57	20.26	17.76	15.86
MEAN	.43	.49	.64	.53	.54	.56	.58	.59	.59	.65	.57	.53
MAX	1.0	1.1	2.1	.56	.95	.57	.60	.72	.60	2.0	1.5	1.1
MIN	.37	.37	.42	.51	.51	.56	.56	.50	.56	.56	.47	.42
AC-FT	26	29	40	33	30	34	34	36	35	40	35	31

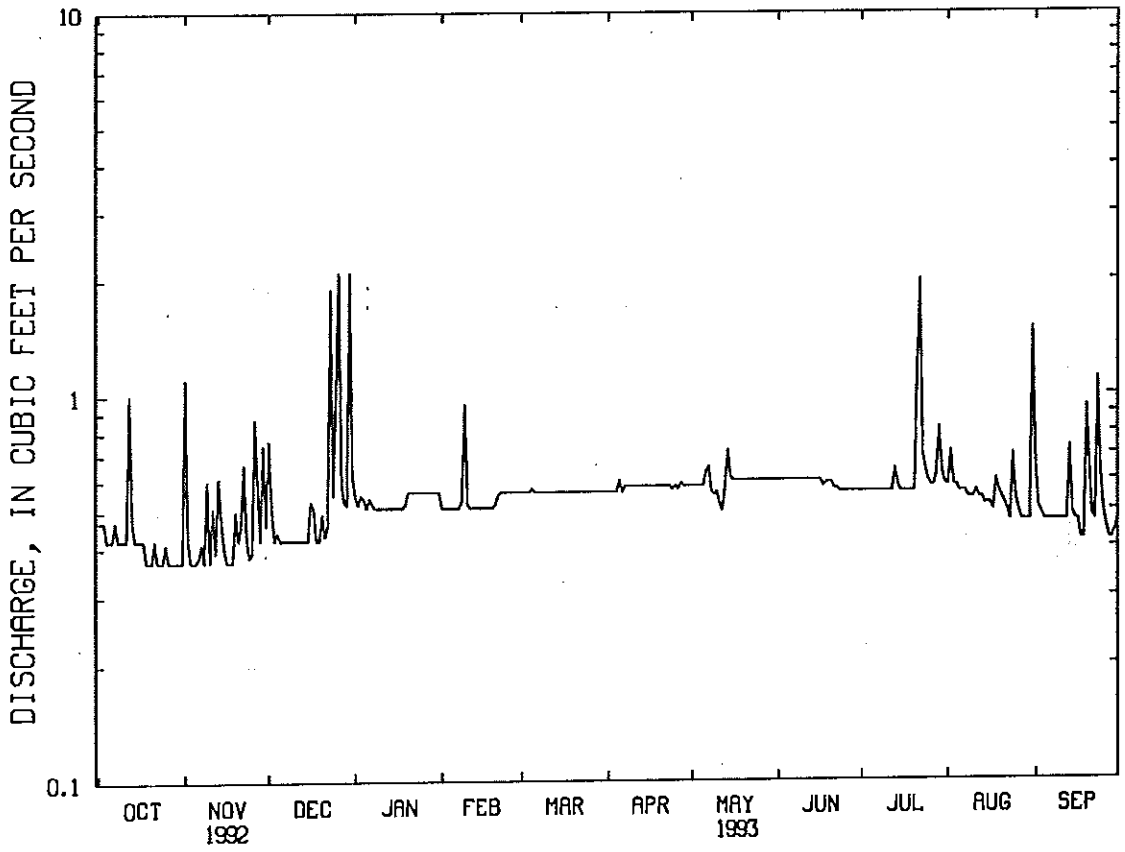
e Estimated

16283600 SOUTH FORK WAIHEE STREAM NEAR HEEIA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1962 - 1993, BY WATER YEAR (WY)

MEAN	1.32	1.36	1.32	1.30	1.30	1.35	1.31	1.32	1.22	1.30	1.33	1.30
MAX	2.47	2.85	2.49	2.39	2.97	2.96	2.79	3.57	2.60	2.62	3.17	2.47
(WY)	1969	1966	1969	1968	1969	1968	1968	1965	1968	1971	1971	1968
MIN	.36	.29	.28	.31	.28	.25	.24	.29	.27	.41	.32	.28
(WY)	1990	1990	1990	1983	1983	1983	1983	1989	1989	1981	1989	1989

SUMMARY STATISTICS	FOR 1992 CALENDAR YEAR		FOR 1993 WATER YEAR		WATER YEARS 1962 - 1993	
ANNUAL TOTAL	229.89		203.98			
ANNUAL MEAN	.63		.56		1.31	
HIGHEST ANNUAL MEAN					2.52	1968
LOWEST ANNUAL MEAN					.37	1990
HIGHEST DAILY MEAN	5.3	Sep 3	2.1	Dec 26	33	May 2 1965
LOWEST DAILY MEAN	.37	Oct 18	.37	Oct 18	.00	Jul 8 1977
ANNUAL SEVEN-DAY MINIMUM	.38	Oct 22	.38	Oct 22	.21	Jan 26 1989
ANNUAL RUNOFF (AC-FT)	456		405		950	
10 PERCENT EXCEEDS	.72		.60		2.2	
50 PERCENT EXCEEDS	.60		.56		1.2	
90 PERCENT EXCEEDS	.42		.42		.42	



16283700 NORTH FORK WAIHEE STREAM NEAR HEEIA

LOCATION.--Lat 21°26'48", long 157°52'18", Hydrologic Unit 20060000, on left bank 0.3 mi upstream from confluence with South Fork, 2.8 mi southwest of Waiahole School, and 4.3 mi northwest of Heeia.

DRAINAGE AREA.--0.03 mi^2.

PERIOD OF RECORD.--September 1962 to current year.

GAGE.--Water-stage recorder. Datum of gage is 639.00 ft above mean sea level (levels by Honolulu Board of Water Supply).

REMARKS.--Records good except for estimated daily discharges, which are fair. Honolulu Board of Water Supply diverts water from wells in South Fork Waihee which affects the low flow at this station.

AVERAGE DISCHARGE.--31 years, 1.51 ft^3/s (1,090 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 376 ft^3/s, Feb. 4, 1965, gage height, 3.38 ft, from rating curve extended above 19 ft^3/s; no flow July 7, 8, 1977.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 45 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Nov. 1	1530	*53	*1.82	No other peak greater than base discharge.			

Minimum discharge, 0.78 ft^3/s on many days.

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	.82	1.6	1.2	.88	.92	.98	1.0	1.1	1.1	.98	.92	1.0
2	.79	.80	.89	.87	.92	.98	1.0	1.1	1.1	.98	.98	.87
3	.78	.78	.82	.87	.92	.98	1.0	1.1	1.1	.98	.92	.84
4	.78	.78	.82	.87	.92	.98	1.0	1.1	1.1	.98	.92	.82
5	.78	.78	.82	.87	.92	.98	1.1	1.1	1.1	.98	.91	.82
6	.78	.80	.82	.88	.92	.98	1.0	1.1	1.1	.98	.89	.82
7	.92	.81	.80	.87	.92	.98	1.1	1.1	1.1	.98	.92	.82
8	.82	.78	.81	.87	.96	1.0	1.1	1.1	1.1	.98	.91	.82
9	.82	1.0	.81	.87	1.2	1.0	1.1	1.1	1.1	.98	.88	.82
10	.78	.78	.81	.87	.98	1.0	1.1	1.1	1.1	.97	.89	.82
11	.80	.87	.82	.87	.98	1.0	1.1	1.1	1.1	.95	.92	.82
12	1.5	.78	.82	.87	.98	1.0	1.1	1.1	1.1	.92	.88	.82
13	.86	1.1	.82	.87	.98	1.0	1.1	1.1	1.1	.95	.87	1.0
14	.82	.86	.82	.87	1.0	1.0	1.1	1.2	1.1	.96	.88	.82
15	.82	.80	.82	.87	1.0	1.0	1.1	1.1	1.0	.92	.87	.82
16	e.86	.78	.90	.87	.98	1.0	1.1	1.1	1.1	.92	.88	.82
17	e.82	.78	.86	.88	.98	1.0	1.1	1.1	1.0	.92	.87	.82
18	e.82	.78	.82	.88	.98	1.0	1.1	1.1	1.0	.92	.94	.82
19	e.82	.85	.82	.91	.98	1.0	1.1	1.1	1.0	.93	.87	1.2
20	e.82	.80	.87	.92	.98	1.0	1.1	1.1	1.0	.95	.87	.96
21	e.91	.84	.82	.92	.98	1.0	1.1	1.1	1.0	1.5	.87	.82
22	e.86	1.0	.85	.92	.98	1.0	1.1	1.1	1.0	2.7	.87	.82
23	e.84	.82	1.8	.92	.98	1.0	1.1	1.1	1.0	1.1	.87	1.1
24	e.83	.79	.92	.92	.98	1.0	1.1	1.1	1.0	1.0	1.0	.99
25	e.90	.78	1.3	.92	.98	1.0	1.1	1.1	1.0	1.0	.88	.83
26	e.84	1.1	1.8	.92	.98	1.0	1.1	1.1	.98	.97	.87	.82
27	e.82	.94	.91	.92	.98	1.0	1.1	1.1	.98	.93	.87	.82
28	e.80	.82	.82	.92	.98	1.0	1.1	1.1	.98	1.0	.86	.82
29	e.78	1.2	.82	.92	---	1.0	1.1	1.1	.98	1.1	.82	.82
30	.82	.84	1.9	.92	---	1.0	1.1	1.1	.98	.94	.82	.82
31	.79	---	.98	.92	---	1.0	---	1.1	---	.92	1.7	---
TOTAL	26.20	26.44	29.89	27.65	27.26	30.86	32.5	34.2	31.40	32.29	28.42	26.01
MEAN	.85	.88	.96	.89	.97	1.00	1.08	1.10	1.05	1.04	.92	.87
MAX	1.5	1.6	1.9	.92	1.2	1.0	1.1	1.2	1.1	2.7	1.7	1.2
MIN	.78	.78	.80	.87	.92	.98	1.0	1.1	.98	.92	.82	.82
AC-FT	52	52	59	55	54	61	64	68	62	64	56	52

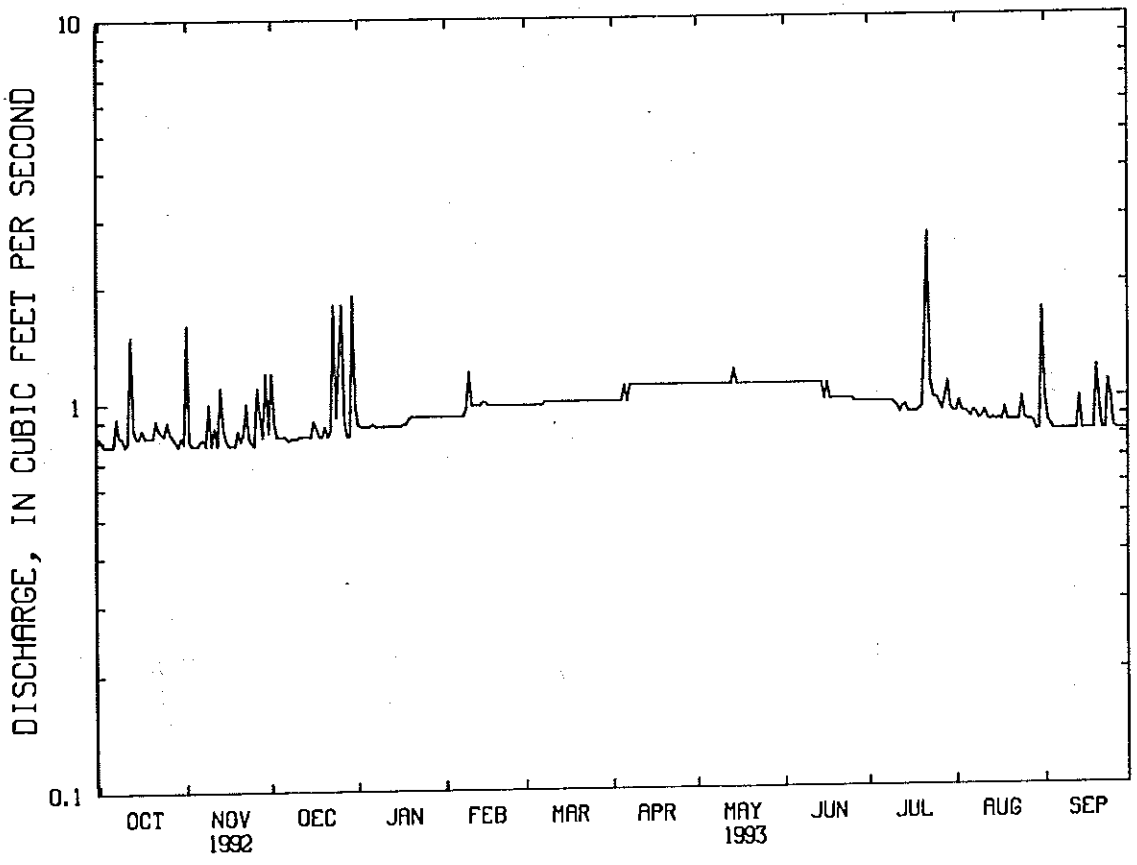
e Estimated

16283700 NORTH FORK WAIHEE STREAM NEAR HEEIA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1962 - 1993, BY WATER YEAR (WY)

MEAN	1.52	1.54	1.50	1.49	1.51	1.51	1.50	1.53	1.47	1.51	1.52	1.52
MAX	2.35	2.82	2.43	2.39	3.42	2.74	2.64	3.40	2.40	2.47	2.55	2.48
(WY)	1970	1966	1966	1970	1965	1968	1968	1965	1969	1965	1965	1969
MIN	.82	.82	.76	.72	.61	.56	.43	.58	.64	.80	.70	.78
(WY)	1990	1990	1990	1983	1983	1983	1983	1990	1990	1990	1990	1989

SUMMARY STATISTICS	FOR 1992 CALENDAR YEAR		FOR 1993 WATER YEAR		WATER YEARS 1962 - 1993	
ANNUAL TOTAL	371.67		353.12			
ANNUAL MEAN	1.02		.97		1.51	
HIGHEST ANNUAL MEAN					2.42	1965
LOWEST ANNUAL MEAN					.76	1990
HIGHEST DAILY MEAN	5.0	Sep 3	2.7	Jul 22	32	May 2 1965
LOWEST DAILY MEAN	.78	Oct 3	.78	Oct 3	.00	Jul 7 1977
ANNUAL SEVEN-DAY MINIMUM	.79	Nov 2	.79	Nov 2	.35	Apr 25 1983
ANNUAL RUNOFF (AC-FT)	737		700		1090	
10 PERCENT EXCEEDS	1.2		1.1		2.2	
50 PERCENT EXCEEDS	.96		.96		1.5	
90 PERCENT EXCEEDS	.82		.82		.83	



16284200 WAIHEE STREAM NEAR KAHALUU

LOCATION.--Lat 21°27'04", long 157°51'36", Hydrologic Unit 20060000, on right bank, 0.2 mi downstream from forest-reserve boundary, 1.0 mi south of Kahaluu School, and 1.6 mi west of Ahuimanu sewage treatment plant.

DRAINAGE AREA.--0.97 mi^2.

PERIOD OF RECORD.--October 1974 to current year.

GAGE.--Water-stage recorder and concrete control. Elevation of gage is 170 ft, from topographic map.

REMARKS.--Records good. Honolulu Board of Water Supply diverts water from tunnel and wells in drainage area.

AVERAGE DISCHARGE.--19 years, 6.28 ft^3/s (4,550 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,530 ft^3/s, Mar. 21, 1991, gage height, 7.93 ft, from rating curve extended above 100 ft^3/s on basis of slope area measurement at gage height 7.93 ft; minimum, 1.1 ft^3/s, Apr. 7, 1977.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 280 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Nov. 1	1600	353	5.26	Dec. 25	2400	*538	*5.88
Dec. 23	1530	395	5.42				

Minimum discharge, 4.2 ft^3/s on several days.

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

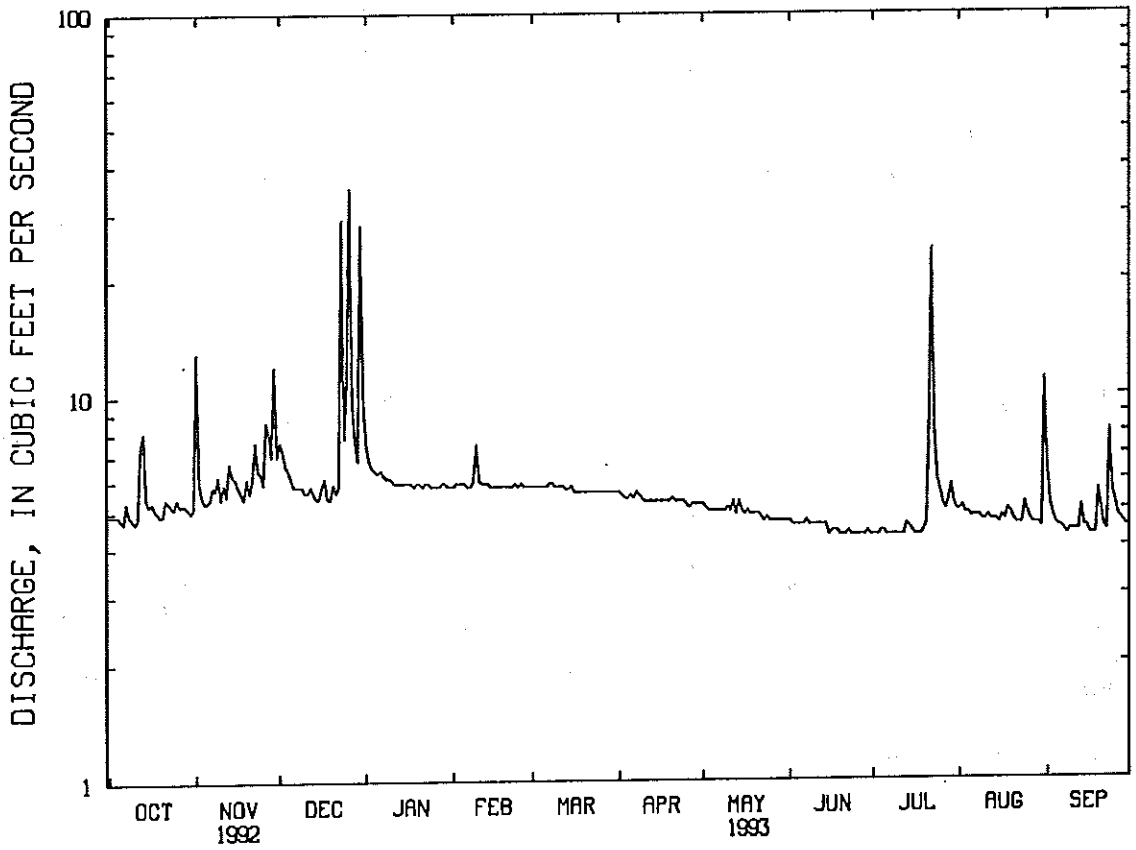
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	4.9	13	7.6	7.5	5.8	5.8	5.6	5.2	4.7	4.3	5.0	6.4
2	4.9	6.0	7.2	6.8	5.9	5.8	5.5	5.1	4.6	4.3	5.1	5.2
3	4.9	5.5	6.6	6.5	5.9	5.8	5.4	5.0	4.6	4.3	4.9	4.8
4	4.9	5.3	6.4	6.4	5.9	5.8	5.4	5.0	4.6	4.4	4.9	4.6
5	4.8	5.3	6.1	6.3	5.9	5.8	5.5	5.0	4.6	4.4	4.8	4.5
6	4.7	5.4	5.8	6.4	5.8	5.8	5.4	5.0	4.6	4.3	4.8	4.5
7	5.3	5.8	5.8	6.2	5.8	5.9	5.6	5.0	4.7	4.3	4.8	4.4
8	4.9	5.7	5.8	6.1	6.0	5.9	5.5	5.0	4.6	4.3	4.8	4.3
9	4.8	6.2	5.8	6.1	7.5	5.8	5.4	5.0	4.6	4.3	4.7	4.4
10	4.7	5.4	5.6	6.0	6.0	5.8	5.3	5.1	4.6	4.3	4.7	4.4
11	4.8	5.9	5.6	5.9	5.9	5.8	5.3	5.0	4.6	4.3	4.8	4.4
12	7.5	5.5	5.8	5.9	5.9	5.8	5.3	5.3	4.6	4.3	4.7	4.4
13	8.1	6.7	5.6	5.9	5.9	5.7	5.3	4.9	4.6	4.6	4.7	5.1
14	5.4	6.2	5.4	5.9	5.8	5.7	5.3	5.3	4.6	4.5	4.7	4.5
15	5.2	6.1	5.4	5.9	5.8	5.8	5.3	5.0	4.3	4.4	4.6	4.5
16	5.3	5.8	5.8	5.9	5.8	5.6	5.3	4.9	4.4	4.3	4.8	4.3
17	5.1	5.6	6.1	5.9	5.8	5.6	5.3	5.0	4.4	4.3	4.7	4.3
18	5.0	5.4	5.4	5.8	5.8	5.6	5.3	4.9	4.4	4.3	5.0	4.3
19	4.9	6.1	5.4	5.9	5.8	5.6	5.3	4.9	4.3	4.4	4.9	5.6
20	4.9	5.6	5.9	5.9	5.8	5.6	5.4	4.9	4.3	4.6	4.7	5.0
21	5.4	6.1	5.6	5.8	5.8	5.6	5.3	4.9	4.3	8.0	4.6	4.5
22	5.3	7.6	5.8	5.9	5.8	5.6	5.3	4.8	4.4	24	4.6	4.4
23	5.2	6.4	29	5.9	5.9	5.6	5.3	4.7	4.3	8.0	4.6	8.1
24	5.1	6.3	7.8	5.8	5.8	5.6	5.3	4.8	4.3	6.0	5.2	5.6
25	5.4	5.9	11	5.8	5.9	5.6	5.2	4.7	4.3	5.6	4.9	5.2
26	5.2	8.6	35	5.8	5.8	5.6	5.1	4.7	4.3	5.2	4.7	4.8
27	5.2	8.1	9.7	5.8	5.8	5.6	5.2	4.7	4.3	5.0	4.6	4.7
28	5.2	7.0	7.6	5.9	5.8	5.6	5.2	4.7	4.3	5.3	4.6	4.6
29	5.1	12	6.8	5.9	---	5.6	5.2	4.7	4.4	5.8	4.6	4.5
30	5.0	7.0	28	5.8	---	5.6	5.2	4.7	4.3	5.2	4.5	4.5
31	5.1	---	10	5.8	---	5.6	---	4.7	---	5.0	11	---
TOTAL	162.2	197.5	275.4	187.4	165.4	176.6	160.0	152.6	133.9	170.3	154.0	144.8
MEAN	5.23	6.58	8.88	6.05	5.91	5.70	5.33	4.92	4.46	5.49	4.97	4.83
MAX	8.1	13	35	7.5	7.5	5.9	5.6	5.3	4.7	24	11	8.1
MIN	4.7	5.3	5.4	5.8	5.8	5.6	5.1	4.7	4.3	4.3	4.5	4.3
AC-FT	322	392	546	372	328	350	317	303	266	338	305	287

16284200 WAIHEE STREAM NEAR KAHALUU--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1975 - 1993, BY WATER YEAR (WY)

MEAN	5.98	6.66	6.80	6.79	6.46	7.53	6.35	5.98	5.69	5.78	5.72	5.65
MAX	9.81	14.3	15.5	12.1	13.2	17.7	15.1	8.46	8.88	9.95	10.6	9.43
(WY)	1983	1991	1988	1988	1979	1991	1989	1981	1982	1989	1982	1982
MIN	2.70	4.08	3.60	3.71	3.05	2.85	2.72	3.18	3.36	2.40	2.61	2.74
(WY)	1976	1978	1976	1977	1977	1977	1977	1977	1976	1977	1976	1976

SUMMARY STATISTICS	FOR 1992 CALENDAR YEAR		FOR 1993 WATER YEAR		WATER YEARS 1975 - 1993	
ANNUAL TOTAL	2198.4		2080.1			
ANNUAL MEAN	6.01		5.70		6.28	
HIGHEST ANNUAL MEAN					9.36	1982
LOWEST ANNUAL MEAN					3.32	1977
HIGHEST DAILY MEAN	77	Sep 3	35	Dec 26	149	Mar 19 1991
LOWEST DAILY MEAN	4.2	Aug 28	4.3	Jun 15	1.3	Apr 15 1977
ANNUAL SEVEN-DAY MINIMUM	4.3	Aug 24	4.3	Jul 6	1.4	Apr 12 1977
ANNUAL RUNOFF (AC-FT)	4360		4130		4550	
10 PERCENT EXCEEDS	6.2		6.3		7.6	
50 PERCENT EXCEEDS	5.4		5.3		5.6	
90 PERCENT EXCEEDS	4.7		4.4		3.8	



16294900 WAIKANE STREAM AT ALTITUDE 75 FT, AT WAIKANE

LOCATION.--Lat 21°30'00", long 157°51'34", Hydrologic Unit 20060000, on right bank, 0.3 mi downstream from Waikeekee Stream, 0.7 mi west of Waikane, and 1.2 mi northwest of Waiahole School.

DRAINAGE AREA.--2.22 mi^2.

PERIOD OF RECORD.--December 1959 to current year.

REVISED RECORDS.--WSP 1937: Drainage area.

GAGE.--Water-stage recorder and concrete control. Elevation of gage is 75 ft, from topographic map.

REMARKS.--Records fair.

AVERAGE DISCHARGE.--33 years (water years 1961-93), 8.84 ft^3/s (6,400 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 8,800 ft^3/s, Feb. 4, 1965, gage height, 10.76 ft, from rating curve extended above 120 ft^3/s on basis of slope-area measurements at gage heights 4.88 ft, 9.46 ft, and 10.76 ft; minimum, 0.76 ft^3/s, Oct. 27, 1975.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 700 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Nov. 26	1400	1,340	6.06	Sep. 23	0430	*5,910	*10.21

Minimum discharge, 1.8 ft^3/s, July 18.

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	7.2	21	16	e12	3.5	2.7	2.5	2.6	2.8	2.2	5.3	31
2	6.8	9.3	14	e9.4	3.4	2.6	2.4	2.6	2.7	2.1	5.1	7.9
3	6.7	6.7	13	e8.7	3.4	2.4	2.4	2.6	2.7	2.1	4.3	5.9
4	6.3	5.9	11	e7.7	3.3	2.5	2.3	2.6	2.7	2.2	4.2	5.3
5	12	5.6	9.4	e8.7	3.3	2.5	2.7	2.6	2.7	2.3	4.4	4.8
6	7.0	5.5	8.0	e9.4	3.2	2.4	2.5	2.4	2.7	2.2	4.1	4.5
7	39	6.2	7.7	e7.0	3.0	2.6	3.6	2.5	3.0	2.1	3.7	4.2
8	12	5.2	7.0	e6.2	4.3	6.1	4.0	2.9	3.4	2.0	4.0	4.2
9	5.7	7.1	6.7	e5.8	6.3	6.9	2.6	2.8	3.0	2.0	3.7	4.0
10	4.6	5.6	6.7	e5.5	4.0	2.9	2.3	2.6	2.6	1.9	3.6	4.2
11	9.1	8.8	6.4	e5.2	3.6	2.5	2.3	2.5	2.5	2.0	8.5	3.9
12	14	6.1	6.4	e5.0	3.2	2.5	2.4	11	2.6	2.0	5.4	7.0
13	16	46	6.1	e5.0	3.1	2.5	2.4	3.7	2.5	2.8	4.4	5.8
14	8.0	12	5.5	e5.0	2.9	2.6	2.3	35	2.5	2.7	4.1	5.1
15	9.7	7.2	5.2	e4.7	2.9	2.6	2.3	8.7	2.4	2.0	3.8	4.5
16	8.5	5.8	5.2	e4.5	2.8	2.5	2.3	4.9	2.4	1.9	6.4	4.4
17	8.3	6.3	6.1	e4.5	2.7	2.5	2.3	4.2	2.5	1.9	8.2	4.2
18	7.0	4.8	5.2	e4.2	2.7	2.5	2.2	4.1	2.3	1.9	5.3	3.7
19	6.3	5.4	5.2	e4.2	2.8	2.5	2.5	4.4	2.4	3.6	4.4	50
20	5.9	5.2	6.9	e4.4	2.7	2.5	5.2	8.5	2.2	3.3	4.0	47
21	12	8.5	5.9	e4.4	2.6	2.5	3.4	24	2.3	12	3.7	8.3
22	6.9	44	e12	e3.9	2.6	2.5	2.6	6.1	2.3	104	4.0	6.5
23	6.2	13	e60	e3.9	2.8	2.5	15	4.6	2.3	14	3.7	e115
24	6.9	8.2	e14	e3.9	2.7	2.5	3.8	4.1	2.2	9.4	12	17
25	11	8.2	e15	e3.9	2.8	2.6	3.8	3.7	2.2	10	6.6	12
26	7.3	104	e110	3.9	2.7	2.5	5.4	3.5	2.3	6.3	4.5	9.1
27	9.2	27	e30	3.9	2.6	2.5	8.7	3.3	2.1	5.1	4.1	7.8
28	6.9	14	e25	3.8	2.6	2.4	4.0	3.3	2.1	5.2	4.1	6.9
29	5.9	27	e20	4.2	---	2.4	3.1	3.0	2.1	11	3.7	7.1
30	6.7	15	e55	3.8	---	2.4	2.9	2.9	2.2	6.0	3.6	7.0
31	10	---	e17	3.6	---	2.4	---	3.0	---	7.2	28	---
TOTAL	289.1	454.6	521.6	170.3	88.5	86.0	106.2	174.7	74.7	235.4	174.9	408.3
MEAN	9.33	15.2	16.8	5.49	3.16	2.77	3.54	5.64	2.49	7.59	5.64	13.6
MAX	39	104	110	12	6.3	6.9	15	35	3.4	104	28	115
MIN	4.6	4.8	5.2	3.6	2.6	2.4	2.2	2.4	2.1	1.9	3.6	3.7
AC-FT	573	902	1030	338	176	171	211	347	148	467	347	810

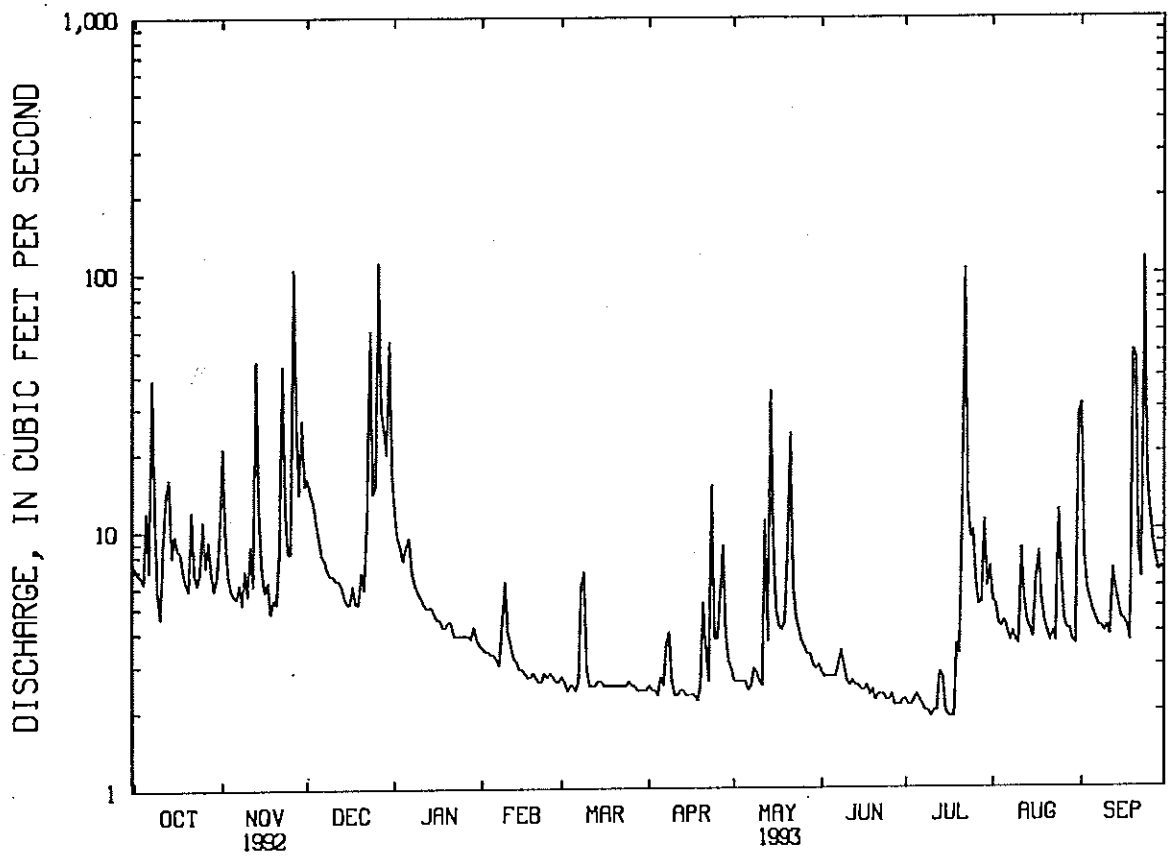
e Estimated

16294900 WAIKANE STREAM AT ALTITUDE 75 FT, AT WAIKANE--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1960 - 1993, BY WATER YEAR (WY)

MEAN	6.98	11.9	10.2	11.1	11.2	12.8	10.5	8.94	5.46	6.44	5.45	5.24
MAX	31.0	55.7	44.1	45.6	60.3	53.1	49.3	29.3	16.2	30.2	25.0	22.1
(WY)	1992	1966	1988	1988	1969	1982	1963	1965	1977	1987	1967	1986
MIN	1.55	2.13	2.23	1.67	1.77	2.03	2.88	2.19	1.83	1.76	1.57	1.38
(WY)	1985	1963	1978	1977	1978	1978	1985	1991	1984	1984	1984	1984

SUMMARY STATISTICS	FOR 1992 CALENDAR YEAR		FOR 1993 WATER YEAR		WATER YEARS 1960 - 1993	
ANNUAL TOTAL	2906.3		2784.3			
ANNUAL MEAN	7.94		7.63		8.84	
HIGHEST ANNUAL MEAN					16.7	1982
LOWEST ANNUAL MEAN					3.33	1984
HIGHEST DAILY MEAN	287	Sep 3	115	Sep 23	868	Feb 4 1965
LOWEST DAILY MEAN	2.0	Apr 24	1.9	Jul 10	1.1	Oct 17 1975
ANNUAL SEVEN-DAY MINIMUM	2.1	Apr 11	2.0	Jul 6	1.3	Sep 19 1984
ANNUAL RUNOFF (AC-FT)	5760		5520		6400	
10 PERCENT EXCEEDS	14		12		14	
50 PERCENT EXCEEDS	3.4		4.2		4.2	
90 PERCENT EXCEEDS	2.3		2.4		2.1	



16296500 KAHANA STREAM AT ALTITUDE 30 FT, NEAR KAHANA

LOCATION.--Lat 21°32'37", long 157°53'07", Hydrologic Unit 20060000, on right bank 600 ft upstream from Kawa Stream, 1.1 mi southwest of Kahana, and 2.2 mi southwest of Swanzy Beach Park in Kaaawa.

DRAINAGE AREA.--3.74 mi^2.

PERIOD OF RECORD.--December 1958 to current year.

REVISED RECORDS.--WSP 1937: 1959-60.

GAGE.--Water-stage recorder and concrete-masonry control. Elevation of gage is 30 ft, from topographic map.

REMARKS.--Records fair. Waiahole tunnel diverts water from tributaries and tunnels at 800-ft elevation upstream. Recording rain gage located at station.

AVERAGE DISCHARGE.--34 years (water years 1960-93), 37.3 ft^3/s (27,020 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 6,250 ft^3/s, Mar. 20, 1991, gage height, 8.60 ft, from rating curve extended above 530 ft^3/s on basis of computation of peak flow over submerged weir; minimum, 10 ft^3/s, Sept. 17, 18, 20, 1961.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,600 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Dec. 26	0100	2,850	6.10	July 22	0330	2,370	5.63
July 21	2230	1,600	4.80	Sep. 23	0430	*5,210	*7.94

Minimum discharge, 13 ft^3/s for several days.

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

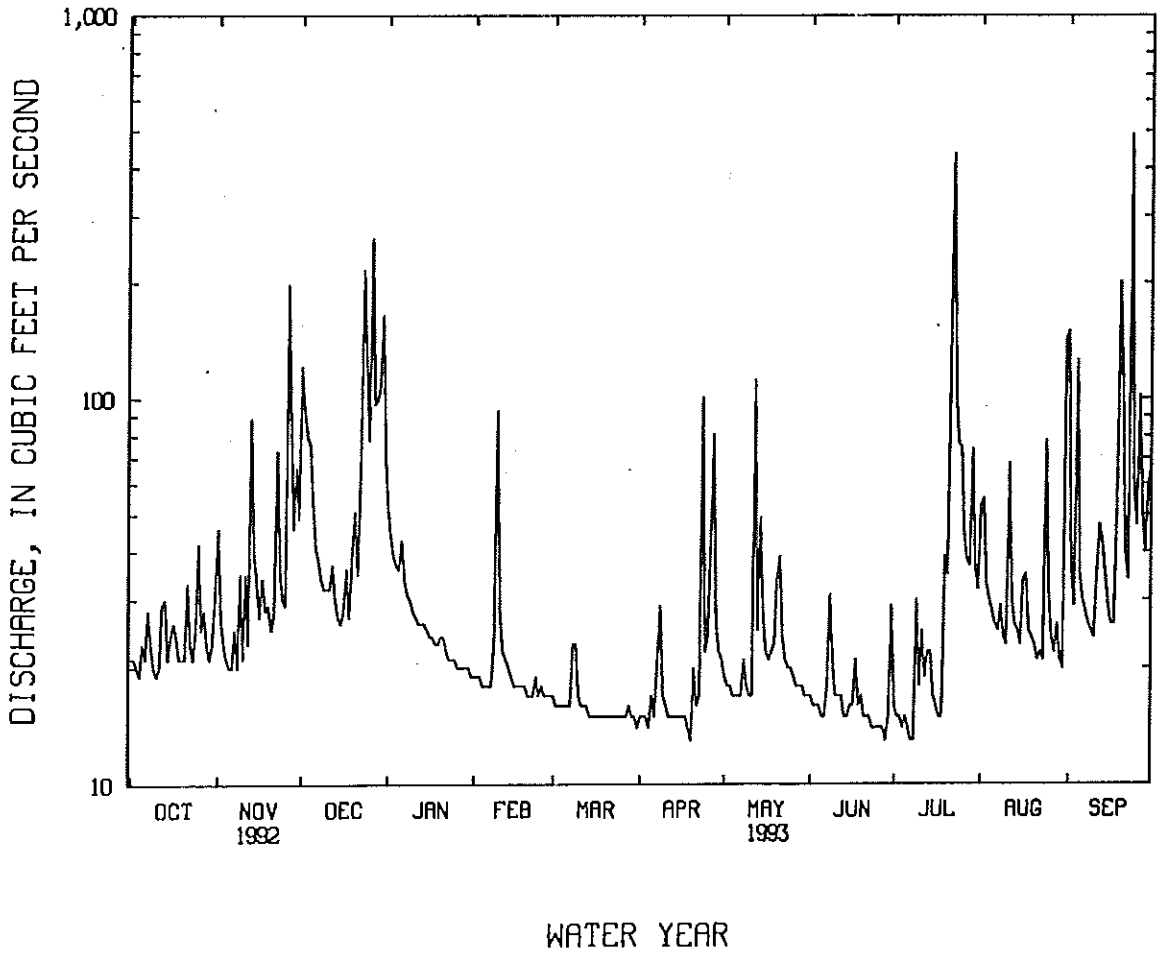
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	21	46	121	52	19	17	15	19	17	16	53	150
2	21	27	93	44	19	16	15	18	16	15	55	36
3	20	23	80	39	19	16	15	18	16	15	33	29
4	19	21	76	37	18	16	14	17	16	14	30	126
5	23	20	54	36	18	16	17	17	15	15	28	35
6	21	20	41	43	18	16	15	17	15	14	26	30
7	28	25	38	34	18	16	21	17	18	13	25	28
8	23	20	34	31	23	23	29	21	31	13	29	26
9	20	35	32	30	93	23	17	18	21	30	24	25
10	19	21	32	28	28	17	16	17	17	18	23	24
11	20	35	32	27	22	16	15	17	17	25	68	35
12	29	23	37	26	21	16	15	112	17	19	30	47
13	30	89	30	26	20	16	15	25	15	22	26	42
14	21	40	27	26	19	15	15	49	15	22	25	35
15	24	34	26	25	18	15	15	28	16	17	23	29
16	26	27	28	24	18	15	15	22	16	16	34	26
17	24	34	36	24	18	15	15	21	21	15	35	26
18	21	28	27	23	18	15	14	22	16	15	25	55
19	21	29	39	23	18	15	13	23	17	39	24	201
20	21	25	51	24	17	15	20	34	15	35	23	110
21	33	28	35	24	17	15	16	39	15	129	21	40
22	23	73	69	22	17	15	17	24	15	437	22	34
23	21	36	216	21	19	15	101	21	14	103	21	490
24	25	30	127	21	17	15	22	20	14	76	78	59
25	42	29	78	21	18	15	24	20	14	75	31	47
26	25	198	262	20	17	15	43	19	14	44	24	102
27	28	86	97	20	17	15	81	18	14	38	22	51
28	23	46	99	20	17	16	26	18	13	37	26	40
29	21	66	108	20	---	15	22	18	15	74	21	60
30	23	49	165	20	---	15	21	17	29	37	20	67
31	31	---	72	19	---	14	---	17	---	32	143	---
TOTAL	747	1263	2262	850	601	494	699	763	504	1470	1068	2105
MEAN	24.1	42.1	73.0	27.4	21.5	15.9	23.3	24.6	16.8	47.4	34.5	70.2
MAX	42	198	262	52	93	23	101	112	31	437	143	490
MIN	19	20	26	19	17	14	13	17	13	13	20	24
AC-FT	1480	2510	4490	1690	1190	980	1390	1510	1000	2920	2120	4180

16296500 KAHANA STREAM AT ALTITUDE 30 FT, NEAR KAHANA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1959 - 1993, BY WATER YEAR (WY)

MEAN	32.5	45.8	39.2	37.0	35.9	46.0	47.1	40.9	27.3	33.0	30.8	29.0
MAX	55.1	170	101	94.9	141	176	137	102	56.5	90.5	73.7	70.2
(WY)	1992	1991	1988	1988	1969	1982	1963	1965	1978	1987	1978	1993
MIN	12.6	14.5	14.5	12.9	13.2	15.4	19.3	18.1	14.3	15.0	13.6	13.3
(WY)	1985	1963	1978	1977	1978	1984	1992	1973	1984	1984	1984	1975

SUMMARY STATISTICS	FOR 1992 CALENDAR YEAR		FOR 1993 WATER YEAR		WATER YEARS 1959 - 1993	
ANNUAL TOTAL	11051		12826			
ANNUAL MEAN	30.2		35.1		37.3	
HIGHEST ANNUAL MEAN					67.2	1982
LOWEST ANNUAL MEAN					20.1	1984
HIGHEST DAILY MEAN	478	Sep 3	490	Sep 23	1750	Apr 15 1963
LOWEST DAILY MEAN	14	Jun 30	13	Apr 19	11	Sep 16 1961
ANNUAL SEVEN-DAY MINIMUM	16	Apr 21	14	Jun 22	11	Oct 16 1984
ANNUAL RUNOFF (AC-FT)	21920		25440		27020	
10 PERCENT EXCEEDS	47		68		59	
50 PERCENT EXCEEDS	20		23		23	
90 PERCENT EXCEEDS	17		15		15	



16302000 PUNALUU DITCH NEAR PUNALUU

LOCATION.--Lat 21°33'41", long 157°54'10", Hydrologic Unit 20060000, on right bank 800 ft downstream from intake, 1.5 mi west of Kahana, and 1.7 mi southwest of Punaluu.

PERIOD OF RECORD.--May 1953 to current year.

REVISED RECORDS.--WSP 1719: 1954-55, WDR HI-91-1: 1990 (Maximum and minimum daily discharges).

GAGE.--Water-stage recorder. Elevation of gage is 200 ft, from topographic map.

REMARKS.--Records good. Ditch diverts from Punaluu Stream for irrigation in Punaluu Valley.

AVERAGE DISCHARGE.--40 years, 7.72 ft^3/s (5,600 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 54 ft^3/s, Oct. 31, 1964; no flow at times.

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge, 22 ft^3/s, Nov. 27; minimum daily, 3.8 ft^3/s, July 22.

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

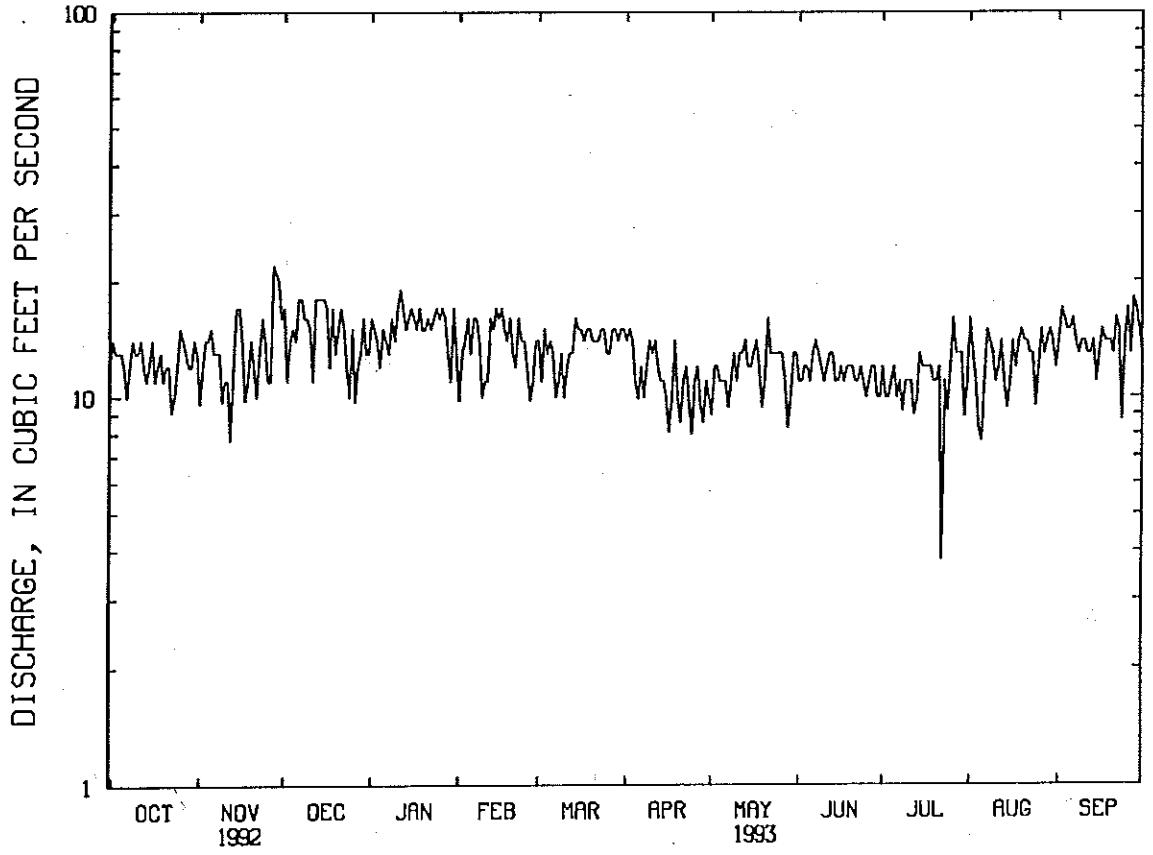
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	14	9.6	17	16	9.8	14	14	9.0	11	12	16	14
2	13	12	11	15	13	11	15	12	11	10	13	17
3	13	14	14	14	14	15	14	12	12	10	11	16
4	13	14	15	12	16	13	11	11	12	11	8.3	15
5	12	15	14	15	13	14	9.9	11	11	12	7.7	15
6	10	13	18	14	16	13	12	11	13	10	11	16
7	12	13	18	13	16	10	10	9.4	14	11	15	14
8	14	13	16	16	14	11	12	11	13	9.2	14	13
9	13	9.7	16	14	10	13	14	13	12	11	13	14
10	13	11	15	17	11	10	13	11	11	11	11	14
11	14	11	11	19	11	12	14	13	12	11	12	13
12	12	7.7	18	17	16	13	12	13	13	9.0	14	13
13	11	12	18	15	15	13	11	14	13	9.8	11	14
14	12	17	18	16	17	16	11	12	11	13	9.4	11
15	14	17	18	17	16	15	9.9	12	11	12	11	13
16	11	14	17	16	17	15	8.1	13	12	12	14	15
17	12	9.8	12	15	15	14	10	14	11	12	12	14
18	13	11	17	17	14	15	14	12	12	12	14	14
19	11	14	13	15	16	15	10	9.4	12	11	15	14
20	12	12	15	15	13	14	8.6	11	12	11	14	13
21	12	10	17	16	12	14	11	16	11	12	14	16
22	9.1	13	15	15	16	14	12	13	11	3.8	13	15
23	10	16	12	16	14	15	9.7	13	12	11	13	8.7
24	12	14	10	17	14	15	8.0	13	11	9.2	9.5	14
25	15	11	15	16	12	13	11	13	10	12	12	17
26	14	11	9.7	17	9.8	13	12	13	11	16	15	13
27	13	22	12	16	11	15	9.5	11	12	13	13	18
28	12	21	13	13	14	15	8.6	8.3	12	13	14	17
29	12	20	16	11	---	14	11	10	10	13	15	15
30	14	16	13	17	---	15	10	13	10	8.9	14	13
31	13	---	13	13	---	15	---	13	---	11	12	---
TOTAL	385.1	403.8	456.7	475	385.6	424	336.3	370.1	349	342.9	390.9	428.7
MEAN	12.4	13.5	14.7	15.3	13.8	13.7	11.2	11.9	11.6	11.1	12.6	14.3
MAX	15	22	18	19	17	16	15	16	14	16	16	18
MIN	9.1	7.7	9.7	11	9.8	10	8.0	8.3	10	3.8	7.7	8.7
AC-FT	764	801	906	942	765	841	667	734	692	680	775	850

16302000 PUNALUU DITCH NEAR PUNALUU--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1953 - 1993, BY WATER YEAR (WY)

MEAN	8.71	6.98	5.40	5.18	5.15	6.20	7.84	8.35	9.43	9.83	10.1	9.83
MAX	26.4	15.3	16.0	17.6	21.7	16.1	19.0	21.2	22.6	22.0	23.9	21.3
(WY)	1965	1988	1988	1960	1964	1964	1961	1964	1963	1963	1958	1958
MIN	.002	.000	.001	.003	.011	.046	.015	.027	.020	.003	.002	.001
(WY)	1981	1981	1981	1981	1981	1979	1979	1981	1979	1980	1974	1980

SUMMARY STATISTICS	FOR 1992 CALENDAR YEAR		FOR 1993 WATER YEAR		WATER YEARS 1953 - 1993	
ANNUAL TOTAL	4521.8		4748.1			
ANNUAL MEAN	12.4		13.0		7.72	
HIGHEST ANNUAL MEAN					15.2	1964
LOWEST ANNUAL MEAN					.23	1981
HIGHEST DAILY MEAN	22	Nov 27	22	Nov 27	54	Oct 31 1964
LOWEST DAILY MEAN	5.5	May 15	3.8	Jul 22	.00	Dec 7 1963
ANNUAL SEVEN-DAY MINIMUM	7.3	May 15	10	Apr 23	.00	Jan 5 1969
ANNUAL RUNOFF (AC-FT)	8970		9420		5600	
10 PERCENT EXCEEDS	15		16		17	
50 PERCENT EXCEEDS	12		13		5.6	
90 PERCENT EXCEEDS	9.7		10		.15	



16303000 PUNALUU STREAM NEAR PUNALUU

LOCATION.--Lat 21°33'33", long 157°54'06", Hydrologic Unit 20060000, on left bank at Punaluu ditch diversion dam, 1.4 mi west of Kahana, and 1.8 mi southwest of Punaluu.

DRAINAGE AREA.--2.78 mi^2.

PERIOD OF RECORD.--May 1953 to current year.

REVISED RECORDS.--WSP 1569: Drainage area. WRD Hawaii 1974: 1971-72(P), 1973(M). WDR HI-78-1: 1954(M), 1955-70(P).

GAGE.--Gage destroyed by flood of Mar. 20-21, 1991 was restored and water-stage recorder installed on Mar. 29, 1993. Masonry control and elevation of gage is 212 ft from topographic map. Prior to Mar. 29, 1993, datum 2.00 ft higher.

REMARKS.--Records poor. Records do not include flow of Punaluu ditch (see station 16302000).

AVERAGE DISCHARGE.--40 years, 17.4 ft^3/s (12,630 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 6,900 ft^3/s, Mar. 20, 1991, gage height, 8.02 ft, from rating curve extended above 170 ft^3/s on basis of slope-area measurements at gage heights 5.77 ft and 7.60 ft; no flow at times.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 930 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Dec. 26	unknown	e1,150	unknown	Sep. 23	0400	*1,630	*6.50
July 22	0400	985	5.49				

Minimum discharge, 0.62 ft^3/s, July 17.

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	e5.1	e21	e40	e17	e8.2	e2.9	2.9	6.0	4.5	1.9	9.8	15
2	e6.1	e10	e36	e15	e5.0	e5.3	2.0	3.0	4.2	3.3	14	5.0
3	e5.6	e6.2	e29	e14	e4.0	e2.3	2.8	3.1	3.1	3.3	8.1	4.3
4	e5.0	e5.1	e26	e15	e2.4	e3.3	5.1	4.3	3.4	2.2	9.8	25
5	e8.2	e3.6	e19	e11	e4.4	e2.3	6.4	4.6	4.1	2.1	10	6.2
6	e9.1	e5.6	e10	e15	e2.4	e3.3	2.5	3.7	2.1	3.1	7.0	4.4
7	e11	e8.2	e9.1	e12	e2.4	e6.3	5.6	5.7	2.4	1.9	2.7	4.8
8	e6.2	e5.6	e9.4	e8.1	e6.2	e9.2	5.8	7.8	3.7	4.0	4.1	5.1
9	e5.6	e16	e8.5	e9.6	e36	e7.2	3.0	3.0	2.9	8.6	3.9	4.3
10	e5.0	e8.1	e9.5	e5.6	e12	e6.9	3.3	4.0	3.5	3.4	5.2	4.1
11	e4.6	e15	e14	e3.2	e8.6	e4.3	2.4	2.3	2.0	3.4	8.8	5.6
12	e11	e12	e8.7	e4.7	e3.1	e3.3	3.5	42	2.0	4.7	4.0	5.5
13	e13	e34	e5.6	e6.7	e3.6	e3.3	3.8	4.6	1.9	3.8	5.9	5.1
14	e7.1	e11	e4.2	e5.7	e2.0	e1.4	3.7	6.9	3.0	1.9	6.9	9.4
15	e6.7	e8.4	e3.7	e4.2	e2.4	e1.7	5.0	4.6	2.9	1.8	4.6	5.2
16	e11	e8.2	e5.6	e4.7	e1.4	e1.7	6.6	3.6	2.5	1.5	5.8	2.5
17	e8.7	e16	e14	e5.7	e2.4	e2.7	4.6	3.5	3.6	1.4	6.2	3.8
18	e6.1	e12	e5.2	e3.2	e3.4	e1.7	1.7	5.9	2.3	1.9	3.4	6.7
19	e8.1	e9.1	e15	e5.2	e2.4	e1.7	4.6	7.3	2.6	7.2	4.4	26
20	e7.1	e9.2	e17	e5.7	e3.9	e2.7	7.4	7.4	2.3	6.6	3.0	16
21	e13	e13	e8.8	e4.7	e4.9	e2.7	3.9	17	3.1	22	2.9	4.2
22	e11	e27	e24	e4.6	e1.9	e2.7	3.8	6.3	2.6	198	3.3	5.3
23	e9.1	e10	e16	e3.1	e4.0	e1.7	8.6	5.3	1.6	42	3.1	173
24	e9.2	e9.6	e77	e2.1	e2.9	e1.7	7.1	4.6	2.8	28	22	43
25	e14	e12	e27	e3.1	e5.4	e2.7	5.1	4.3	3.5	17	9.2	21
26	e7.2	e69	e95	e2.6	e7.1	e2.7	5.2	3.8	2.5	7.6	3.7	78
27	e9.6	e23	e37	e3.6	e5.9	e1.7	25	5.8	1.6	8.8	4.2	18
28	e8.2	e9.4	e36	e5.6	e3.9	e2.3	8.3	7.6	2.0	7.6	5.2	11
29	e7.1	e18	e37	e7.6	---	e2.5	5.3	5.8	3.9	15	2.8	11
30	e6.2	e16	e58	e2.6	---	2.3	5.4	3.0	4.2	11	3.2	11
31	e11	---	e27	e5.0	---	2.3	---	2.9	---	7.8	45	---
TOTAL	255.9	431.3	732.3	215.9	152.2	98.8	160.4	199.7	86.8	432.8	232.2	539.5
MEAN	8.25	14.4	23.6	6.96	5.44	3.19	5.35	6.44	2.89	14.0	7.49	18.0
MAX	14	69	95	17	36	9.2	25	42	4.5	198	45	173
MIN	4.6	3.6	3.7	2.1	1.4	1.4	1.7	2.3	1.6	1.4	2.7	2.5
AC-FT	508	855	1450	428	302	196	318	396	172	858	461	1070

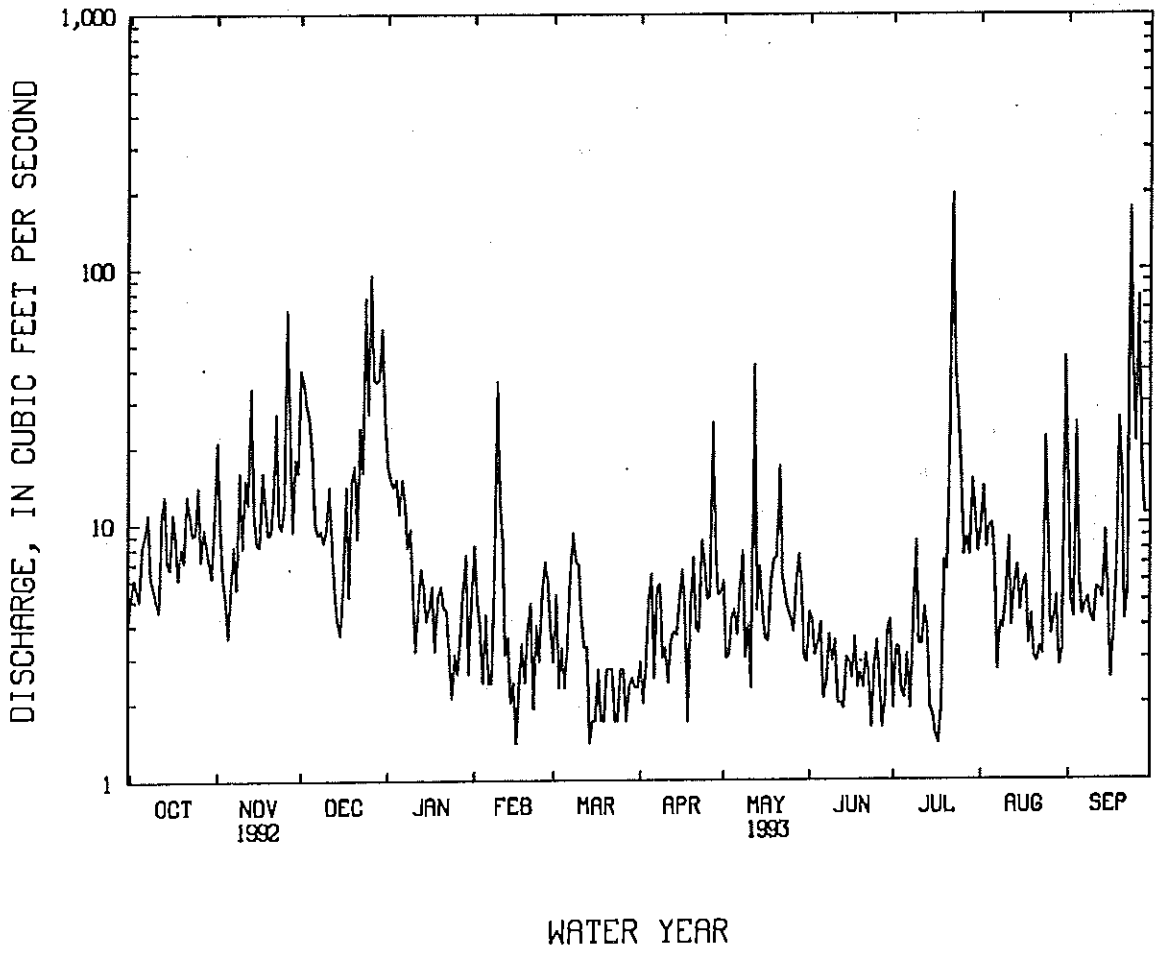
e Estimated

16303000 PUNALUU STREAM NEAR PUNALUU--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1953 - 1993, BY WATER YEAR (WY)

MEAN	14.2	20.9	21.9	21.6	21.5	22.9	22.8	18.1	11.6	12.6	11.7	10.2
MAX	38.7	74.7	64.5	40.9	76.3	73.1	84.6	64.9	35.4	39.0	36.9	29.6
(WY)	1959	1991	1965	1988	1969	1982	1963	1965	1982	1974	1982	1982
MIN	.28	4.58	.23	3.32	.58	3.19	2.37	1.00	.000	.000	.31	.49
(WY)	1958	1960	1960	1960	1964	1993	1954	1961	1953	1953	1961	1961

SUMMARY STATISTICS	FOR 1992 CALENDAR YEAR		FOR 1993 WATER YEAR		WATER YEARS 1953 - 1993	
ANNUAL TOTAL	3376.6		3537.8			
ANNUAL MEAN	9.23		9.69		17.4	
HIGHEST ANNUAL MEAN					35.4	1982
LOWEST ANNUAL MEAN					.29	1953
HIGHEST DAILY MEAN	215	Sep 3	198	Jul 22	1010	Apr 15 1963
LOWEST DAILY MEAN	1.4	Aug 25	1.4	Feb 16	.00	Jun 1 1953
ANNUAL SEVEN-DAY MINIMUM	1.5	Aug 24	1.9	Mar 14	.00	Jun 1 1953
ANNUAL RUNOFF (AC-FT)	6700		7020		12630	
10 PERCENT EXCEEDS	17		17		31	
50 PERCENT EXCEEDS	6.0		5.3		12	
90 PERCENT EXCEEDS	2.0		2.3		2.2	



16304200 KALUANUI STREAM NEAR PUNALUU

LOCATION.--Lat 21°35'22", long 157°54'38", Hydrologic Unit 20060000, on right bank, 0.8 mi downstream from Sacred Falls, 1.6 mi west of Punaluu Beach Park, and 1.7 mi south of cemetery in Hauula.

DRAINAGE AREA.--1.11 mi^2.

PERIOD OF RECORD.--May 1967 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 110 ft, from topographic map.

REMARKS.--Records good. No diversion upstream.

AVERAGE DISCHARGE.--26 years, 4.42 ft^3/s (3,200 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 2,390 ft^3/s, Jan. 6, 1982, gage height, 11.90 ft, from rating curve extended above 14 ft^3/s on basis of slope-area measurements at gage heights 8.85 ft and 10.0 ft; no flow at times.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 500 ft^3/s and maximum(*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Nov. 26	1615	*451	*8.27				

Minimum discharge, no flow on several days.

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	.58	12	13	3.1	.81	.04	.00	.64	.64	.41	5.4	13
2	.51	4.2	9.1	2.2	.30	.01	.09	.37	.43	.42	7.0	1.3
3	.50	1.4	5.9	2.0	.15	.01	.05	.49	.85	1.5	1.9	.98
4	.38	1.0	16	7.5	.11	.00	.02	.64	.49	1.2	3.4	.75
5	.43	.87	5.9	6.1	.14	.01	4.2	.59	1.1	.58	2.6	.89
6	.56	.94	2.5	14	.27	.07	.90	.32	1.4	.56	1.3	.97
7	20	3.0	2.5	3.1	.10	2.3	3.0	2.0	6.4	2.7	1.3	6.0
8	3.0	1.0	1.5	e1.9	14	9.9	5.8	4.7	1.4	1.4	3.6	1.1
9	.77	5.0	1.3	e1.4	33	3.8	1.0	.83	.64	3.4	1.7	3.1
10	.51	1.0	2.1	e1.1	5.6	.51	.51	.48	1.1	2.6	6.7	19
11	1.6	7.4	3.8	e1.0	1.1	.21	.20	.46	.84	1.3	2.6	5.7
12	6.4	4.4	8.8	e.82	.61	.10	.29	15	.61	1.8	2.2	1.3
13	8.6	29	1.9	e.76	3.3	.07	.54	1.2	.47	.51	2.5	1.0
14	3.3	7.5	1.2	.73	.63	.06	.24	6.0	.41	e.58	1.2	41
15	11	3.3	.94	.64	.31	.09	.18	1.9	1.6	e.52	16	17
16	7.7	1.4	7.6	.58	.21	.06	.10	.79	.83	e.31	3.8	2.8
17	5.7	9.3	10	.55	.16	.03	.12	.63	2.0	.35	1.5	8.7
18	1.4	1.8	2.0	.45	.13	.04	.09	8.0	.66	.49	6.2	2.6
19	1.1	5.9	4.9	.43	.10	.03	1.3	3.2	.48	12	1.9	e8.2
20	1.8	4.3	7.5	.41	.07	.81	10	4.3	.71	2.1	1.2	e3.0
21	7.0	21	2.9	2.6	.06	1.2	.97	28	.56	15	4.3	e1.6
22	3.8	42	13	.57	.05	.31	5.2	1.7	.40	87	1.4	e1.0
23	1.5	6.9	46	.36	.24	.10	5.4	1.2	.34	13	28	e25
24	6.4	3.0	21	.29	.34	.06	.70	3.0	1.3	18	3.1	e2.6
25	8.4	5.3	40	.25	.56	.42	1.3	.89	.54	12	1.5	e1.9
26	1.9	60	39	.22	.41	.34	2.4	.71	.55	5.8	1.4	e8.0
27	2.5	25	14	.20	.12	.10	6.6	.57	.38	4.3	1.6	e2.2
28	2.3	4.1	9.8	.18	.06	.04	.83	.48	3.8	2.9	4.1	e1.3
29	2.0	8.6	15	1.6	---	.02	.52	.43	1.9	12	5.0	3.0
30	2.6	4.9	25	.71	---	.00	1.0	.44	.58	3.2	1.2	6.4
31	5.1	---	5.8	.25	---	.00	---	1.4	---	1.8	.96	---
TOTAL	119.34	285.51	339.94	56.00	62.94	20.74	53.55	91.36	33.41	209.73	126.56	191.39
MEAN	3.85	9.52	11.0	1.81	2.25	.67	1.78	2.95	1.11	6.77	4.08	6.38
MAX	20	60	46	14	33	9.9	10	28	6.4	87	28	41
MIN	.38	.87	.94	.18	.05	.00	.00	.32	.34	.31	.96	.75
AC-FT	237	566	674	111	125	41	106	181	66	416	251	380

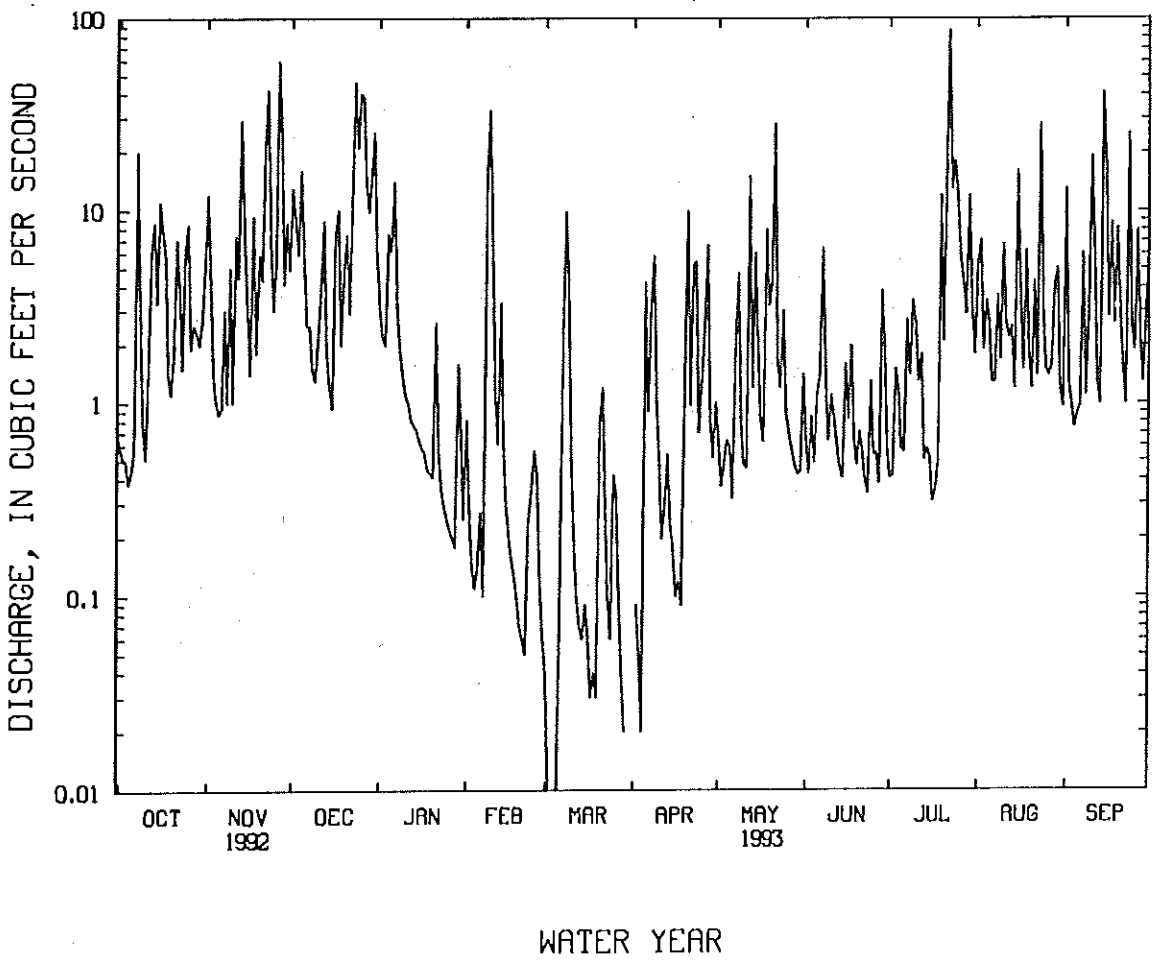
e Estimated

16304200 KALUANUI STREAM NEAR PUNALUU--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1967 - 1993, BY WATER YEAR (WY)

MEAN	3.45	6.05	5.37	5.18	4.52	5.95	5.81	3.89	2.71	4.09	3.32	2.97
MAX	7.68	19.0	17.7	17.9	19.7	32.2	19.3	7.93	7.72	11.7	8.37	8.04
(WY)	1992	1991	1988	1988	1979	1982	1989	1988	1987	1982	1991	1986
MIN	.27	1.66	.48	.26	.41	.14	.87	.85	.61	.21	.53	.22
(WY)	1985	1981	1977	1986	1983	1983	1979	1991	1981	1971	1984	1975

SUMMARY STATISTICS	FOR 1992 CALENDAR YEAR		FOR 1993 WATER YEAR		WATER YEARS 1967 - 1993	
ANNUAL TOTAL	1452.44		1590.47			
ANNUAL MEAN	3.97		4.36		4.42	
HIGHEST ANNUAL MEAN					9.94	1982
LOWEST ANNUAL MEAN					2.04	1984
HIGHEST DAILY MEAN	60	Nov 26	87	Jul 22	230	Feb 1 1969
LOWEST DAILY MEAN	.00	Mar 10	.00	Mar 4	.00	Jul 24 1971
ANNUAL SEVEN-DAY MINIMUM	.01	Apr 12	.03	Mar 29	.00	Sep 14 1975
ANNUAL RUNOFF (AC-FT)	2880		3150		3200	
10 PERCENT EXCEEDS	9.9		11		9.6	
50 PERCENT EXCEEDS	1.2		1.4		1.4	
90 PERCENT EXCEEDS	.11		.13		.25	



16325000 KAMANANUI STREAM AT PUPUKEA MILITARY ROAD, NEAR MAUNAWAI

LOCATION.--Lat 21°37'25", long 158°01'04", Hydrologic Unit 20060000, on left bank 75 ft upstream from Pupukea Military Road, and 3.5 mi southeast of Maunawai.

DRAINAGE AREA.--3.13 mi^2.

PERIOD OF RECORD.--June 1963 to current year. Occasional low-flow measurements, water years 1961 and 1963.

GAGE.--Water-stage recorder and combination pipe culvers and paved road control. Elevation of gage is 590 ft, from topographic map.

REMARKS.--Records fair. No diversion upstream. Recording rain gage located at station.

AVERAGE DISCHARGE.--30 years, 10.4 ft^3/s (7,540 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 16,800 ft^3/s, Nov. 20, 1990, gage height, 15.84 ft, from rating curve extended above 150 ft^3/s on basis of slope-area measurements at gage heights 5.68 ft, 11.46 ft, and 15.84 ft; no flow at times.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,300 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Nov. 26	1730	*1,440	*8.12	No other peak greater than base discharge.			

Minimum discharge, 0.20 ft^3/s, Apr. 5, July 17, 18.

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

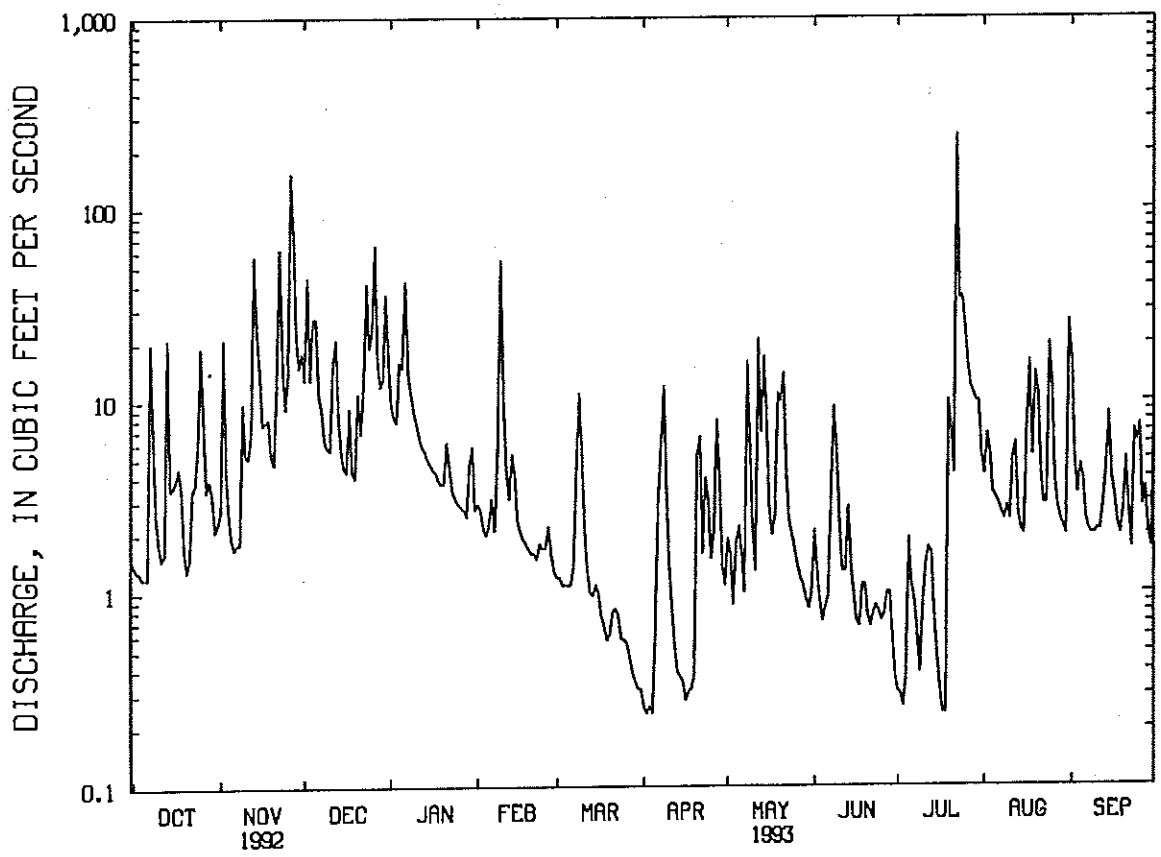
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.4	2.7	13	10	2.9	1.2	.26	1.9	2.4	.31	4.1	17
2	1.3	21	44	8.3	2.7	1.2	.24	1.6	1.3	.30	6.7	5.1
3	1.3	4.3	13	7.8	2.2	1.1	.26	.87	.91	.26	5.3	3.3
4	1.2	2.5	27	16	2.0	1.1	.24	1.8	.71	.37	3.3	4.6
5	1.2	1.9	27	15	2.2	1.1	.58	2.2	.83	1.9	3.1	3.9
6	1.2	1.7	11	42	3.1	1.1	2.9	1.6	.95	1.1	2.9	2.4
7	20	1.8	9.2	14	2.1	1.4	5.7	1.0	3.1	.92	2.6	2.1
8	6.4	1.8	6.3	11	5.3	4.7	12	16	9.4	.64	2.4	2.0
9	2.5	9.8	5.7	8.9	54	11	3.5	5.8	5.4	.39	2.8	2.0
10	1.8	5.2	5.6	7.6	10	5.1	1.4	2.1	2.3	.86	2.4	2.1
11	1.5	5.1	16	6.5	4.6	2.1	.85	1.3	1.3	1.4	5.1	2.1
12	1.6	6.8	21	5.8	3.1	1.3	.53	21	1.3	1.7	6.0	2.9
13	21	57	8.4	5.5	5.3	1.0	.39	6.9	2.8	1.6	2.6	4.4
14	3.5	23	5.5	5.0	4.2	.97	.37	17	1.4	.78	2.1	8.6
15	3.6	15	4.5	4.7	2.4	1.1	.35	8.1	.99	.47	2.0	4.0
16	3.9	7.6	4.3	4.4	2.1	.98	.28	2.7	.71	.32	7.5	3.2
17	4.5	7.8	9.2	4.3	1.9	.75	.31	2.0	.67	.24	16	2.3
18	3.5	8.1	4.3	3.9	1.8	.67	.32	2.5	1.1	.24	5.2	2.0
19	1.7	5.2	4.0	3.7	1.7	.57	.38	11	1.1	10	14	2.7
20	1.3	4.7	11	3.7	1.6	.61	5.3	10	.76	7.6	11	5.0
21	1.5	13	6.8	6.1	1.6	.79	6.5	14	.67	4.2	4.3	2.7
22	3.4	62	12	4.5	1.5	.82	1.6	4.7	.78	241	2.9	1.7
23	3.7	17	41	3.4	1.8	.76	4.0	2.4	.85	34	2.9	7.0
24	5.9	9.2	19	3.1	1.7	.58	3.0	2.0	.79	35	20	6.1
25	19	14	23	2.9	1.7	.57	1.5	1.7	.72	25	12	7.5
26	7.4	154	65	2.8	2.2	.55	2.1	1.4	.77	16	4.0	2.8
27	3.4	74	17	2.7	1.6	.47	8.0	1.2	1.0	12	2.8	3.5
28	3.9	22	12	2.5	1.3	.39	4.0	1.1	1.0	11	2.4	2.1
29	3.2	15	13	4.7	---	.35	1.4	.94	.60	10	2.2	1.7
30	2.1	18	36	5.8	---	.32	1.1	.83	.37	10	2.0	8.2
31	2.3	---	18	2.7	---	.32	---	1.0	---	5.3	26	---
TOTAL	140.2	591.2	512.8	229.3	128.6	44.97	69.36	148.64	46.68	434.90	188.6	125.0
MEAN	4.52	19.7	16.5	7.40	4.59	1.45	2.31	4.79	1.56	14.0	6.08	4.17
MAX	21	154	65	42	54	11	12	21	9.4	241	26	17
MIN	1.2	1.7	4.0	2.5	1.3	.32	.24	.83	.37	.24	2.0	1.7
AC-FT	278	1170	1020	455	255	89	138	295	93	863	374	248

16325000 KAMANANUI STREAM AT PUPUKEA MILITARY ROAD, NEAR MAUNAWAI--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1963 - 1993, BY WATER YEAR (WY)

MEAN	6.97	16.5	13.6	14.9	12.1	16.1	14.2	8.42	4.70	8.07	5.37	3.82
MAX	16.3	68.6	44.8	75.8	64.2	77.3	53.6	30.5	20.1	20.2	19.7	8.87
(WY)	1966	1966	1965	1988	1969	1968	1989	1965	1978	1982	1982	1988
MIN	.000	2.27	.91	.45	.073	1.07	.79	.95	1.00	.76	.57	.000
(WY)	1985	1990	1977	1986	1978	1983	1992	1966	1992	1971	1984	1984

SUMMARY STATISTICS	FOR 1992 CALENDAR YEAR		FOR 1993 WATER YEAR		WATER YEARS 1963 - 1993		
ANNUAL TOTAL	1990.77		2660.25				
ANNUAL MEAN	5.44		7.29		10.4		
HIGHEST ANNUAL MEAN					22.1		1982
LOWEST ANNUAL MEAN					4.09		1984
HIGHEST DAILY MEAN	154	Nov 26	241	Jul 22	620	Nov 20	1990
LOWEST DAILY MEAN	.03	Jun 6	.24	Apr 2	.00	Aug 27	1971
ANNUAL SEVEN-DAY MINIMUM	.09	May 24	.28	Mar 29	.00	Oct 15	1971
ANNUAL RUNOFF (AC-FT)	3950		5280		7540		
10 PERCENT EXCEEDS	13		16		20		
50 PERCENT EXCEEDS	1.5		2.8		3.3		
90 PERCENT EXCEEDS	.30		.67		.60		



16330000 KAMANANUI STREAM AT MAUNAWAI

LOCATION.--Lat 21°38'20", long 158°03'27", Hydrologic Unit 20060000, on right bank, 0.5 mi upstream from Kamehameha Highway, 4.9 mi northeast of Waialua School, and 7.3 mi southwest of Kahuku School.

DRAINAGE AREA.--12.36 mi^2, revised, including that of Elehaha Stream which is mostly diverted into Kamananui Stream since June 14, 1975.

PERIOD OF RECORD.--February 1958 to current year.

REVISED RECORDS.--WSP 1937: 1958-60. WRD Hawaii 1974: 1971(P), 1972-73(M). WDR HI-81-1: Drainage area.

GAGE.--Gage destroyed by flood of Nov. 20, 1990 was restored and water-stage recorder installed on Feb. 25, 1993. Control rebuilt about 75 ft downstream of gage and elevation of gage is 20 ft from topographic map. Prior to May 18, 1966, datum 2.00 ft higher.

REMARKS.--Records good except for period of estimated discharge (Oct. 1 to Feb. 25). Small diversion upstream.

AVERAGE DISCHARGE.--35 years, 18.6 ft^3/s (13,450 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 16,800 ft^3/s, Nov. 20, 1990, gage height, 15.84 ft, from rating curve extended above 150 ft^3/s on basis of slope-area measurements at gage heights 5.68 ft, 11.46 ft, and 15.84 ft; no flow at times.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,300 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Nov. 26	--	e3,000	unknown	No other peak greater than base discharge.			

Minimum discharge, no flow on Apr. 17.

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	e.59	e2.6	e21	e17	e2.9	1.0	.02	1.3	.39	.05	6.1	37
2	e.54	e42	e97	e12	e2.6	.97	.01	1.6	1.5	.12	5.3	12
3	e.50	e4.9	e19	e11	e2.0	.94	.02	1.2	.74	.05	8.4	5.7
4	e.46	e2.4	e52	e30	e1.9	.81	.06	.73	.19	.03	4.7	4.0
5	e.46	e1.8	e52	e26	e2.1	.85	.06	1.7	.09	.06	3.9	6.7
6	e.46	e1.4	e17	e97	e3.2	.85	.68	2.4	.08	.52	4.1	3.7
7	e40	e1.5	e13	e26	e1.9	.83	2.7	1.8	.16	.32	3.6	2.8
8	e9.5	e1.5	e8.1	e17	e6.7	1.8	13	14	13	.16	2.9	2.0
9	e2.0	e15	e7.3	e14	e134	14	5.6	9.3	8.5	.09	2.8	2.3
10	e1.1	e6.5	e7.1	e11	e15	6.3	2.2	3.5	3.5	.05	3.0	1.5
11	e.77	e6.3	e28	e9.0	e5.4	3.6	1.3	1.8	1.6	.18	3.6	1.5
12	e.87	e9.2	e37	e7.6	e3.3	1.9	.41	29	1.0	.87	8.1	1.5
13	e42	e144	e12	e7.1	e6.7	1.3	.12	9.7	2.1	1.6	3.7	3.2
14	e3.6	e44	e9.5	e6.3	e4.8	.99	.07	18	2.2	.84	2.5	7.0
15	e3.7	e28	e5.5	e5.9	e2.3	.84	.03	18	.93	.33	2.0	4.7
16	e4.3	e11	e5.1	e5.4	e1.9	.85	.02	5.1	.53	.11	3.7	3.5
17	e5.5	e11	e14	e5.1	e1.8	.52	.01	2.9	.23	.05	27	2.2
18	e3.7	e12	e5.2	e4.6	e1.6	.17	.01	2.3	.43	.05	11	2.0
19	e1.4	e6.5	e4.8	e4.3	e1.5	.06	.01	9.1	.38	6.4	20	1.7
20	e1.1	e5.7	e19	e4.2	e1.4	.03	.01	9.5	.50	7.4	32	3.0
21	e1.2	e21	e9.5	e8.0	e1.3	.03	6.7	22	.19	3.4	9.8	3.7
22	e3.6	e164	e19	e5.2	e1.2	.05	2.3	8.9	.10	572	5.1	2.0
23	e4.0	e30	e94	e3.6	e1.5	.03	1.3	3.8	.20	107	4.1	6.4
24	e7.8	e14	e35	e3.2	e1.2	.11	3.7	2.5	.24	59	26	6.3
25	e35	e23	e44	e2.9	e1.2	.10	1.8	2.0	.10	50	27	14
26	e10	e520	e174	e2.8	1.5	.12	1.5	1.5	.15	31	8.4	4.9
27	e3.6	e195	e32	e2.6	1.7	.14	4.1	1.1	.11	20	5.3	3.6
28	e4.5	e40	e21	e2.4	1.3	.13	6.0	.81	.20	21	4.1	2.9
29	e3.3	e23	e21	e5.7	---	.12	2.3	.39	.22	15	4.1	1.5
30	e1.9	e30	e79	e7.6	---	.08	1.5	.16	.09	17	3.2	5.7
31	e2.1	---	e32	e2.8	---	.03	---	.12	---	9.1	36	---
TOTAL	199.55	1417.3	994.1	367.3	213.9	39.55	57.54	186.21	39.65	923.78	291.5	159.0
MEAN	6.44	47.2	32.1	11.8	7.64	1.28	1.92	6.01	1.32	29.8	9.40	5.30
MAX	42	520	174	97	134	14	13	29	13	572	36	37
MIN	.46	1.4	4.8	2.4	1.2	.03	.01	.12	.08	.03	2.0	1.5
AC-FT	396	2810	1970	729	424	78	114	369	79	1830	578	315

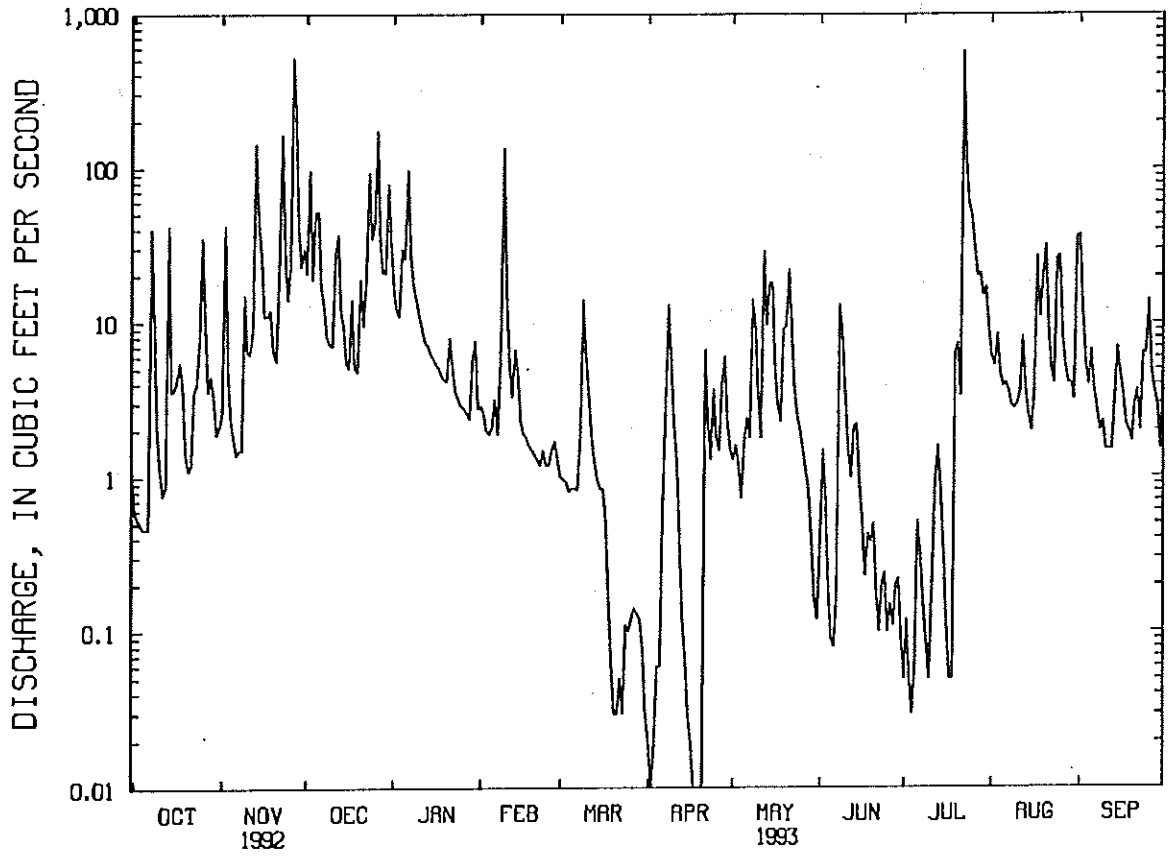
e Estimated

16330000 KAMANANUI STREAM AT MAUNAWAI--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1958 - 1993, BY WATER YEAR (WY)

MEAN	12.6	29.1	22.8	26.7	22.1	32.5	28.9	15.6	6.87	12.9	9.29	5.40
MAX	56.7	168	107	143	106	155	168	62.8	52.9	52.7	68.0	18.4
(WY)	1959	1991	1988	1988	1969	1982	1989	1965	1978	1989	1958	1988
MIN	.006	.51	.67	.094	.022	1.23	.64	.95	.33	.52	.20	.006
(WY)	1985	1963	1977	1986	1978	1983	1992	1984	1959	1971	1971	1984

SUMMARY STATISTICS	FOR 1992 CALENDAR YEAR		FOR 1993 WATER YEAR		WATER YEARS 1958 - 1993	
ANNUAL TOTAL	3805.32		4889.38			
ANNUAL MEAN	10.4		13.4		18.6	
HIGHEST ANNUAL MEAN					50.3	1982
LOWEST ANNUAL MEAN					4.81	1984
HIGHEST DAILY MEAN	520	Nov 26	572	Jul 22	1940	Jan 1 1988
LOWEST DAILY MEAN	.00	May 25	.01	Apr 2	.00	Jun 21 1959
ANNUAL SEVEN-DAY MINIMUM	.01	Jun 1	.02	Apr 14	.00	Jul 23 1959
ANNUAL RUNOFF (AC-FT)	7550		9700		13450	
10 PERCENT EXCEEDS	23		28		31	
50 PERCENT EXCEEDS	1.3		3.2		3.9	
90 PERCENT EXCEEDS	.14		.12		.28	



16345000 OPAEULA STREAM NEAR WAHIAWA

LOCATION.--Lat 21°33'55", long 158°00'10", Hydrologic Unit 200600000, on left bank, 4.3 mi northeast of Leilehua High School in Wahiawa, and 8.1 mi east of Waialua School.

DRAINAGE AREA.--2.98 mi^2.

PERIOD OF RECORD.--August 1959 to current year.

REVISED RECORDS.--WSP 1937: 1960.

GAGE.--Water-stage recorder and concrete control. Elevation of gage is 1,120 ft, from topographic map.

REMARKS.--Records good. No diversion upstream.

AVERAGE DISCHARGE.--34 years, 14.0 ft^3/s (10,110 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 5,540 ft^3/s, July 17, 1974, gage height, 11.94 ft from rating curve extended above 110 ft^3/s on basis of slope-area measurements at gage heights 6.74 ft and 10.12 ft; maximum gage height, 13.20 ft, Nov. 20, 1990; no flow at times.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,200 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Dec. 23	1930	*1,140	*6.80				

Minimum discharge, 0.05 ft^3/s, Apr. 4, 5.

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

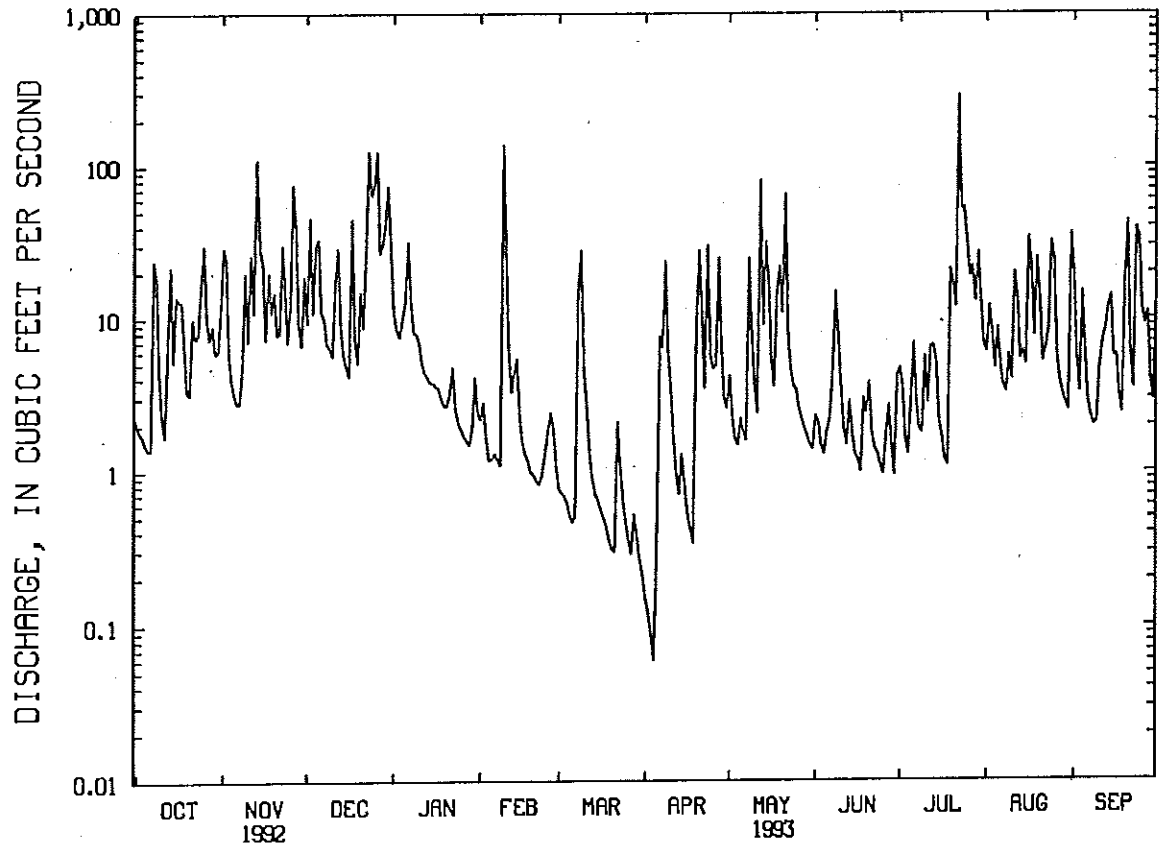
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.0	29	9.4	11	2.2	.77	.15	4.2	2.3	4.7	6.0	21
2	1.8	25	46	8.5	2.8	.72	.12	2.3	2.1	3.5	12	5.6
3	1.7	5.9	11	7.6	1.7	.69	.09	1.6	1.5	1.6	8.2	3.3
4	1.5	3.9	30	10	1.2	.63	.06	1.5	1.3	1.3	4.7	15
5	1.4	3.2	33	13	1.2	.52	.26	2.2	1.8	2.9	8.6	6.1
6	1.4	2.8	11	32	1.3	.47	7.6	1.8	2.2	6.9	4.8	2.9
7	24	2.8	10	13	1.2	.51	6.4	1.6	4.3	2.9	3.6	2.3
8	18	4.7	6.8	8.1	1.1	16	24	25	15	1.9	3.3	2.0
9	4.2	20	6.4	7.9	138	28	5.9	7.9	7.2	1.8	5.8	2.1
10	2.2	7.1	5.7	7.0	27	4.6	3.5	3.8	3.5	5.6	4.0	4.8
11	1.7	26	17	5.1	6.1	2.8	1.7	2.4	1.9	2.8	20	7.1
12	6.4	11	29	4.4	3.3	1.4	.99	80	1.5	6.5	14	8.5
13	22	110	9.2	4.1	4.4	.92	.71	9.1	2.9	6.6	5.4	12
14	5.2	29	5.8	3.8	5.4	.71	1.3	32	1.8	5.1	6.1	14
15	14	23	4.8	3.8	2.3	.65	.82	17	1.3	2.1	5.0	5.6
16	13	7.3	4.2	3.6	1.6	.56	.53	5.5	1.2	1.7	34	5.7
17	13	20	45	3.5	1.3	.50	.43	3.6	1.0	1.2	22	3.1
18	6.5	11	7.5	3.0	1.2	.44	.34	15	3.0	1.1	7.7	2.4
19	3.3	15	5.1	2.7	1.0	.36	8.6	22	2.4	21	25	18
20	3.2	7.9	15	2.7	.96	.31	28	11	3.8	17	14	43
21	10	8.1	8.7	3.2	.88	.30	11	65	1.8	12	5.2	6.4
22	7.4	30	28	4.8	.83	2.1	3.5	8.0	1.4	290	6.4	3.5
23	7.9	15	126	2.6	.95	1.1	30	4.7	1.3	52	8.3	39
24	16	7.0	65	2.1	1.3	.66	5.7	3.6	1.1	53	32	34
25	30	12	73	1.9	1.8	.47	4.7	3.4	.96	33	24	12
26	10	76	125	1.7	2.4	.36	4.9	2.6	1.8	19	5.7	9.2
27	7.3	40	27	1.6	1.9	.29	25	2.2	2.7	22	3.9	11
28	8.9	9.5	31	1.5	1.1	.52	6.6	1.9	1.5	13	3.2	4.0
29	5.9	6.7	41	1.9	---	.38	3.0	1.7	.95	27	2.8	2.9
30	6.1	19	74	4.1	---	.27	2.6	1.5	4.2	13	2.5	16
31	11	---	30	2.4	---	.21	---	1.4	---	6.7	36	---
TOTAL	267.0	587.9	940.6	182.6	216.42	68.22	188.50	345.5	79.71	638.9	344.2	322.5
MEAN	8.61	19.6	30.3	5.89	7.73	2.20	6.28	11.1	2.66	20.6	11.1	10.7
MAX	30	110	126	32	138	28	30	80	15	290	36	43
MIN	1.4	2.8	4.2	1.5	.83	.21	.06	1.4	.95	1.1	2.5	2.0
AC-FT	530	1170	1870	362	429	135	374	685	158	1270	683	640

16345000 OPAEULA STREAM NEAR WAHIAWA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1959 - 1993, BY WATER YEAR (WY)

MEAN	11.2	19.0	16.6	15.7	13.9	21.5	21.5	13.0	7.21	12.1	8.54	7.32
MAX	30.7	71.9	52.6	54.1	66.9	90.0	75.7	43.7	24.9	29.3	31.0	22.8
(WY)	1982	1991	1988	1988	1969	1982	1989	1965	1978	1989	1982	1986
MIN	.057	2.90	1.29	.37	.32	.35	1.57	1.75	2.02	.95	1.51	.52
(WY)	1985	1963	1977	1977	1978	1983	1966	1966	1975	1971	1984	1975

SUMMARY STATISTICS	FOR 1992 CALENDAR YEAR		FOR 1993 WATER YEAR		WATER YEARS 1959 - 1993	
ANNUAL TOTAL	3660.51		4182.05			
ANNUAL MEAN	10.0		11.5		14.0	
HIGHEST ANNUAL MEAN					29.7	1982
LOWEST ANNUAL MEAN					7.24	1984
HIGHEST DAILY MEAN	193	Sep 3	290	Jul 22	825	Feb 1 1969
LOWEST DAILY MEAN	.02	Jun 2	.06	Apr 4	.00	Jan 24 1977
ANNUAL SEVEN-DAY MINIMUM	.04	May 29	.17	Mar 30	.00	Oct 24 1984
ANNUAL RUNOFF (AC-FT)	7260		8300		10110	
10 PERCENT EXCEEDS	25		28		29	
50 PERCENT EXCEEDS	3.9		4.7		4.5	
90 PERCENT EXCEEDS	.51		.94		.88	



16400000 HALAWA STREAM NEAR HALAWA
(National stream-quality accounting network station)

LOCATION.--Lat 21°09'31", long 156°45'53", Hydrologic Unit 20050000, on right bank 600 ft downstream from Hipuapua Stream and 1.5 mi west of Halawa.

DRAINAGE AREA.--4.62 mi^2.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--July 1917 to July 1932, November 1937 to current year.

REVISED RECORDS.--WSP 1319: 1928, 1929(M), 1930-31, 1938-50(M), drainage area. WSP 1719: 1954.

GAGE.--Water-stage recorder. Elevation of gage is 210 ft, from topographic map. Prior to June 25, 1923, at site 350 ft upstream at different datum. June 25, 1923 to July 18, 1932, and Nov. 17, 1937 to Feb. 3, 1965, at present site at datum 2.00 ft higher.

REMARKS.--Records good. No diversion upstream.

AVERAGE DISCHARGE.--69 years (water years 1918-31, 1939-93), 29.9 ft^3/s (21,690 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 26,900 ft^3/s, Feb. 4, 1965, gage height, 19.91 ft, from floodmarks, from rating curve extended above 163 ft^3/s on basis of slope-area measurement of peak flow; minimum, 0.76 ft^3/s, about Nov. 23, 1962.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,900 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Nov. 26	1800	*2,130	*8.61	No other peak greater than base discharge.			

Minimum discharge, 2.8 ft^3/s, Mar. 6, 7.

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

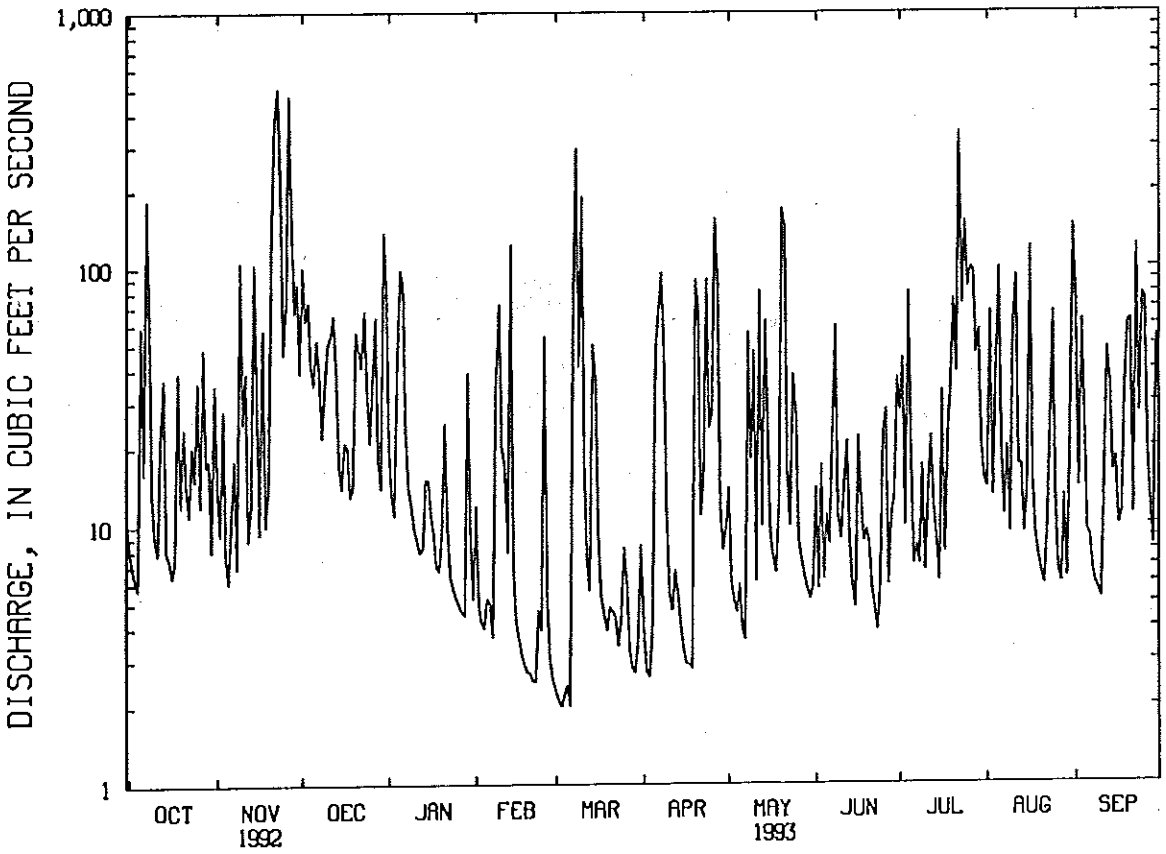
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	8.1	14	100	20	12	2.3	4.0	14	14	28	14	72
2	7.0	9.2	62	13	5.0	2.1	2.7	6.0	5.7	44	67	14
3	6.2	28	73	11	4.2	2.0	2.6	5.1	17	10	13	62
4	5.7	7.5	42	39	4.0	2.2	4.0	4.6	6.2	80	40	26
5	59	6.0	35	98	5.2	2.4	47	5.9	11	20	99	9.5
6	16	11	52	87	5.0	2.0	69	3.9	8.5	7.1	20	9.0
7	184	18	39	23	3.7	57	95	3.6	22	8.3	11	6.7
8	60	6.9	22	14	34	294	45	56	59	7.1	20	5.9
9	13	105	35	12	72	41	11	18	11	17	9.4	5.6
10	8.9	25	50	9.7	20	190	5.5	47	8.9	6.7	62	5.2
11	7.8	39	54	8.7	17	18	4.7	6.1	14	13	92	16
12	23	8.8	65	7.9	7.9	7.4	6.7	81	21	22	17	48
13	37	12	39	8.2	123	5.6	5.4	10	8.6	12	17	35
14	8.0	103	17	15	7.1	50	4.1	62	5.8	8.9	9.4	16
15	7.4	31	14	15	4.3	37	3.3	24	4.8	6.1	14	18
16	6.4	9.3	21	11	3.7	9.3	2.9	9.1	22	33	120	10
17	7.3	57	20	9.3	3.2	5.3	2.9	7.5	13	7.9	15	11
18	39	10	13	6.9	2.9	4.5	2.8	6.6	8.7	22	9.2	34
19	12	14	14	6.7	2.7	3.9	89	12	9.6	34	7.5	61
20	24	141	56	9.5	2.7	4.8	69	170	8.5	75	6.6	62
21	14	380	48	25	2.5	4.6	11	145	5.7	39	5.9	11
22	11	504	41	10	2.5	4.4	15	16	4.8	338	9.4	121
23	20	221	68	6.4	4.7	3.4	90	10	3.9	72	23	27
24	15	46	34	5.7	3.9	4.4	24	38	5.9	151	67	78
25	36	72	21	5.2	54	8.2	27	27	23	84	12	75
26	12	474	36	4.9	5.5	6.0	155	8.8	28	99	6.7	20
27	48	145	64	4.6	3.0	3.3	86	7.4	5.9	97	6.0	12
28	17	67	18	4.5	2.5	2.8	12	6.4	11	46	13	8.3
29	18	86	14	39	---	2.7	8.1	5.7	13	57	6.3	54
30	8.0	39	138	9.3	---	3.5	9.8	5.2	37	21	22	32
31	35	---	78	5.2	---	8.4	---	5.8	---	15	147	---
TOTAL	773.8	2689.7	1383	544.7	418.2	792.5	914.5	827.7	417.5	1481.1	981.4	965.2
MEAN	25.0	89.7	44.6	17.6	14.9	25.6	30.5	26.7	13.9	47.8	31.7	32.2
MAX	184	504	138	98	123	294	155	170	59	338	147	121
MIN	5.7	6.0	13	4.5	2.5	2.0	2.6	3.6	3.9	6.1	5.9	5.2
AC-FT	1530	5340	2740	1080	829	1570	1810	1640	828	2940	1950	1910

16400000 HALAWA STREAM NEAR HALAWA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1917 - 1993, BY WATER YEAR (WY)

MEAN	26.9	36.4	36.9	33.8	29.7	37.6	40.8	27.4	18.5	25.7	25.2	20.6
MAX	100	97.8	84.7	118	114	134	157	85.2	59.2	58.2	69.8	58.2
(WY)	1942	1951	1947	1921	1932	1942	1989	1963	1961	1954	1938	1992
MIN	2.04	5.80	8.56	5.31	2.98	5.48	11.7	4.26	4.93	6.00	1.19	2.85
(WY)	1918	1920	1977	1977	1978	1970	1990	1920	1966	1917	1971	1975

SUMMARY STATISTICS	FOR 1992 CALENDAR YEAR		FOR 1993 WATER YEAR		WATER YEARS 1917 - 1993	
ANNUAL TOTAL	12278.8		12189.3			
ANNUAL MEAN	33.5		33.4		29.9	
HIGHEST ANNUAL MEAN					47.4	1965
LOWEST ANNUAL MEAN					17.4	1975
HIGHEST DAILY MEAN	504	Nov 22	504	Nov 22	1240	Feb 4 1965
LOWEST DAILY MEAN	2.4	Mar 10	2.0	Mar 3	.86	Sep 1 1971
ANNUAL SEVEN-DAY MINIMUM	2.6	Mar 5	2.2	Feb 28	.90	Aug 26 1971
ANNUAL RUNOFF (AC-FT)	24350		24180		21690	
10 PERCENT EXCEEDS	69		79		65	
50 PERCENT EXCEEDS	13		13		14	
90 PERCENT EXCEEDS	3.7		4.2		4.8	



16400000 HALAWA STREAM NEAR HALAWA--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1969-74, 1975 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND	SPE-CIFIC CON-DUCT-ANCE (US/CM)	PH WATER WHOLE FIELD (STAND-ARD UNITS)	TEMPER-ATURE WATER (DEG C)	TEMPER-ATURE AIR (DEG C)	TUR-BID-ITY (NTU)	BARO-METRIC PRES-SURE (MM OF HG)	OXYGEN, DIS-SOLVED (MG/L)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML)
OCT 1992											
06...	1230	18	39	7.1	24.0	27.5	4.6	757	8.6	103	1200
DEC											
01...	1300	25	49	7.7	21.5	24.0	1.7	756	8.2	94	53
FEB 1993											
02...	1245	4.8	60	7.3	16.5	22.0	1.9	750	8.2	85	120
APR											
06...	1140	72	54	7.0	19.0	20.5	3.9	756	6.2	67	2100
JUN											
08...	1115	97	44	6.7	21.5	23.5	9.5	756	8.6	98	1900
AUG											
03...	1245	13	41	6.8	24.0	27.0	3.8	757	8.0	96	60

DATE	STREP-TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML)	HARD-NESS TOTAL (MG/L AS CACO3)	HARD-NESS NONCARB DISSOLV FLD. AS CACO3 (MG/L)	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)	SODIUM, DIS-SOLVED (MG/L AS NA)	SODIUM PERCENT	SODIUM AD-SORP-TION RATIO	POTAS-SIUM, DIS-SOLVED (MG/L AS K)	BICAR-BONATE WATER DIS IT FIELD MG/L AS HCO3	CAR-BONATE WATER DIS IT FIELD MG/L AS CO3
OCT 1992											
06...	1700	6	1	0.84	0.84	5.3	65	1	0.60	5	0
DEC											
01...	1200	6	2	0.88	0.99	6.4	67	1	0.50	5	0
FEB 1993											
02...	330	10	2	1.4	1.5	7.7	62	1	0.60	9	0
APR											
06...	1600	8	4	1.1	1.3	7.3	64	1	0.70	5	0
JUN											
08...	3200	6	4	0.78	0.93	6.0	67	1	0.60	2	0
AUG											
03...	1600	6	1	0.88	0.91	5.9	66	1	0.60	6	0

DATE	ALKA-LINITY WAT DIS TOT IT FIELD MG/L AS CACO3	SULFATE DIS-SOLVED (MG/L AS SO4)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)	FLUO-RIDE, DIS-SOLVED (MG/L AS F)	SILICA, DIS-SOLVED (MG/L AS SIO2)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L)	SOLIDS, DIS-SOLVED (TONS PER DAY)	NITRO-GEN, NITRITE TOTAL (MG/L AS N)	NITRO-GEN, NITRITE DIS-SOLVED (MG/L AS N)	NITRO-GEN, NO2+NO3 TOTAL (MG/L AS N)
OCT 1992											
06...	4	1.8	7.8	<0.10	5.0	31	25	1.51	<0.010	<0.010	<0.050
DEC											
01...	4	2.1	11	<0.10	6.8	26	32	1.76	<0.010	<0.010	0.061
FEB 1993											
02...	8	2.1	13	<0.10	7.4	33	38	0.43	--	<0.010	--
APR											
06...	4	1.7	12	<0.10	4.3	31	31	6.03	--	<0.010	--
JUN											
08...	2	1.9	10	<0.10	3.4	41	25	10.7	--	<0.010	--
AUG											
03...	5	1.7	7.2	<0.10	4.4	33	25	1.17	--	<0.010	--

< Actual value is known to be less than the value shown

16400000 HALAWA STREAM NEAR HALAWA--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	NITROGEN, NO2+NO3 DISSOLVED (MG/L AS N)	NITROGEN, AMMONIA TOTAL (MG/L AS N)	NITROGEN, AMMONIA DISSOLVED (MG/L AS N)	NITROGEN, AMMONIA + ORGANIC TOTAL (MG/L AS N)	PHOSPHORUS TOTAL (MG/L AS P)	PHOSPHORUS DISSOLVED (MG/L AS P)	PHOSPHORUS ORTHO TOTAL (MG/L AS P)	PHOSPHORUS ORTHO, DISSOLVED (MG/L AS P)	ALUMINUM, DISSOLVED (UG/L AS AL)	BARIUM, DISSOLVED (UG/L AS BA)
OCT 1992 06...	<0.050	<0.010	<0.010	0.20	0.030	0.030	0.010	<0.010	230	11
DEC 01...	0.078	0.010	0.020	<0.20	0.030	<0.010	0.010	0.010	--	--
FEB 1993 02...	<0.050	--	0.040	<0.20	0.030	0.010	--	<0.010	80	<2
APR 06...	<0.050	--	0.040	0.20	0.040	0.040	--	<0.010	150	2
JUN 08...	<0.050	--	0.030	0.30	0.040	0.020	--	0.010	--	--
AUG 03...	<0.050	--	0.070	0.20	0.020	<0.010	--	<0.010	180	12

DATE	TIME	COBALT, DISSOLVED (UG/L AS CO)	IRON, DISSOLVED (UG/L AS FE)	LITHIUM DISSOLVED (UG/L AS LI)	MANGANESE, DISSOLVED (UG/L AS MN)	MOLYBDENUM, DISSOLVED (UG/L AS MO)	NICKEL, DISSOLVED (UG/L AS NI)	SELENIUM, DISSOLVED (UG/L AS SE)	SILVER, DISSOLVED (UG/L AS AG)	STRONTIUM, DISSOLVED (UG/L AS SR)	VANADIUM, DISSOLVED (UG/L AS V)
OCT 1992 06...	1230	<3	220	<4	3	<10	1	<1	<1.0	13	6
FEB 1993 02...	1245	<3	70	<4	3	<10	1	<1	<1.0	20	<6
APR 06...	1140	<3	120	<4	2	<10	<1	<1	<1.0	18	<6
AUG 03...	1245	<3	200	<4	2	20	<1	<1	<1.0	13	<6

CROSS SECTION ANALYSES, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	TIME	SAMPLE LOCATION, CROSS SECTION (FT FM R BK)	SPECIFIC CONDUCTANCE (US/CM)	PH WATER WHOLE FIELD (STANDARD UNITS)	TEMPERATURE WATER (DEG C)	BAROMETRIC PRESSURE (MM OF HG)	OXYGEN, DISSOLVED (MG/L)	OXYGEN, DISSOLVED (PERCENT SATURATION)
AUG 1993 03...*	1250	24.0	41	--	24.0	757	8:0	95
03...*	1251	23.0	41	6.8	24.0	757	8.0	95
03...*	1252	22.0	41	--	24.0	757	8.0	95
03...*	1253	21.0	41	6.8	24.0	757	8.0	95
03...*	1257	4.0	41	6.8	24.0	757	8.1	96
03...*	1258	3.0	41	--	24.0	757	8.0	95
03...*	1259	2.0	41	--	24.0	757	8.0	95
03...*	1300	1.0	41	6.8	24.0	757	8.0	95

* Instantaneous streamflow at the time of cross-sectional measurement: Aug. 3, 13.0 ft^3/s.

PARTICLE-SIZE DISTRIBUTION OF SUSPENDED SEDIMENT, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	TIME	SEDIMENT, SUSPENDED (MG/L)	SEDIMENT, DISCHARGE, SUSPENDED (T/DAY)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM
OCT 1992 06...	1230	3	0.15	100
DEC 01...	1300	2	0.13	100
FEB 1993 02...	1245	2	0.03	100
APR 1993 06...	1140	2	0.39	100
JUN 08...	1115	8	2.1	100
AUG 03...	1245	3	0.11	100

< Actual value is known to be less than the value shown

16404200 PILIPILILAU STREAM NEAR PELEKUNU

LOCATION.--Lat 21°08'08", long 156°53'09", Hydrologic Unit 20050000, on right bank 500 ft downstream from left-bank tributary, 1.9 mi south of former village of Pelekunu, and 5.8 mi north of Kamalo.

DRAINAGE AREA.--0.49 mi^2.

PERIOD OF RECORD.--August 1968 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 1,000 ft, from topographic map.

REMARKS.--Records fair. No diversion upstream.

AVERAGE DISCHARGE.--25 years, 1.62 ft^3/s (1,170 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 835 ft^3/s, Jan. 25, 1982, gage height, 4.25 ft, from rating curve extended above 6.2 ft^3/s on basis of slope-area measurement at gage height, 4.25 ft; minimum, 0.50 ft^3/s, Sept. 2-8, 21-29, 1975, Nov. 26 to Dec. 3, 1977.

EXTREMES FOR CURRENT YEAR.--Peak discharge greater than base discharge of 100 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	0100	*320	*3.58	No other peak greater than base discharge.			

Minimum discharge, 0.68 ft^3/s, July 15, 17.

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	e.94	1.0	2.2	4.3	1.8	1.1	e1.0	e2.2	.89	.76	.89	2.6
2	e.89	1.0	2.0	2.2	1.3	1.2	e1.0	e1.3	.84	.84	.89	.94
3	e.89	1.5	1.9	2.0	1.3	1.1	e1.0	e1.3	.84	.80	.84	.89
4	e.89	.94	2.0	2.9	1.3	1.0	e.99	1.2	.84	.99	.94	.84
5	e.89	.89	2.2	2.4	1.4	1.0	e1.2	1.1	.89	.80	.89	.84
6	e.84	.84	2.0	4.1	1.2	1.2	e1.3	.99	.89	.76	.84	.80
7	e2.9	.80	1.9	3.5	1.2	3.2	e4.0	1.1	.99	.80	.84	.80
8	e1.5	.81	1.6	2.3	1.5	5.0	e1.5	2.2	1.3	.76	.84	.80
9	e.94	1.8	3.5	2.3	1.6	2.3	e1.0	1.9	.94	.72	.89	.76
10	e.84	1.1	2.8	2.0	1.3	7.7	e.99	1.5	.89	.72	.94	.76
11	e.76	.94	2.8	2.0	1.2	2.2	e.94	1.2	.84	.72	1.2	.80
12	e.72	.84	2.6	1.9	1.2	1.8	e1.0	1.2	.84	.72	.89	.99
13	e2.0	.95	2.0	2.7	3.3	1.6	e.99	1.1	.84	.72	.84	.84
14	e1.0	1.8	2.0	3.0	1.5	2.1	e.94	1.4	.84	.72	.80	.80
15	.99	1.1	1.7	2.2	1.3	2.2	e.94	1.3	.80	.72	1.2	.84
16	.94	.94	1.6	1.9	1.2	1.6	e.94	1.1	.84	.77	4.7	.84
17	.94	1.0	1.6	1.8	1.2	1.5	e.94	1.2	.84	.72	1.4	.80
18	.94	.89	1.5	1.6	1.2	1.4	e.94	1.0	.84	.76	1.0	.76
19	.94	.90	1.4	1.6	1.2	1.3	e3.5	.99	.84	.80	.94	.76
20	.84	1.7	1.4	1.6	1.2	1.3	e2.0	1.8	.80	.76	.89	.76
21	.84	25	1.4	1.5	1.2	1.2	e1.5	1.5	.76	.76	.89	.76
22	.84	13	1.5	1.4	1.2	1.2	e1.3	1.1	.76	3.0	.89	.76
23	.89	8.2	1.9	1.4	1.2	1.2	e1.5	.99	.76	1.9	.89	.76
24	.84	3.2	1.7	1.4	1.2	e1.2	e1.2	1.1	.76	5.5	.94	.76
25	.88	3.2	1.7	1.3	1.2	e1.2	e1.2	.99	.97	1.9	.84	.76
26	.84	6.0	2.4	1.3	1.1	e1.1	e5.0	.94	.84	2.2	.80	.81
27	1.0	5.6	2.4	1.3	1.0	e1.1	e3.0	.94	.76	3.0	.84	.76
28	.99	3.3	1.6	1.5	1.0	e1.0	e1.3	.89	.72	1.6	.80	.76
29	.89	3.0	1.5	2.6	---	e.99	e1.2	.89	.72	1.2	.80	.80
30	.84	2.3	5.5	1.6	---	e.94	e1.3	.84	.84	1.1	.80	.76
31	.94	---	6.1	1.3	---	e1.2	---	.89	---	.99	1.7	---
TOTAL	31.38	94.54	68.4	64.9	37.5	54.13	45.61	38.15	25.52	38.51	32.85	25.91
MEAN	1.01	3.15	2.21	2.09	1.34	1.75	1.52	1.23	.85	1.24	1.06	.86
MAX	2.9	25	6.1	4.3	3.3	7.7	5.0	2.2	1.3	5.5	4.7	2.6
MIN	.72	.80	1.4	1.3	1.0	.94	.94	.84	.72	.72	.80	.76
AC-FT	62	188	136	129	74	107	90	76	51	76	65	51

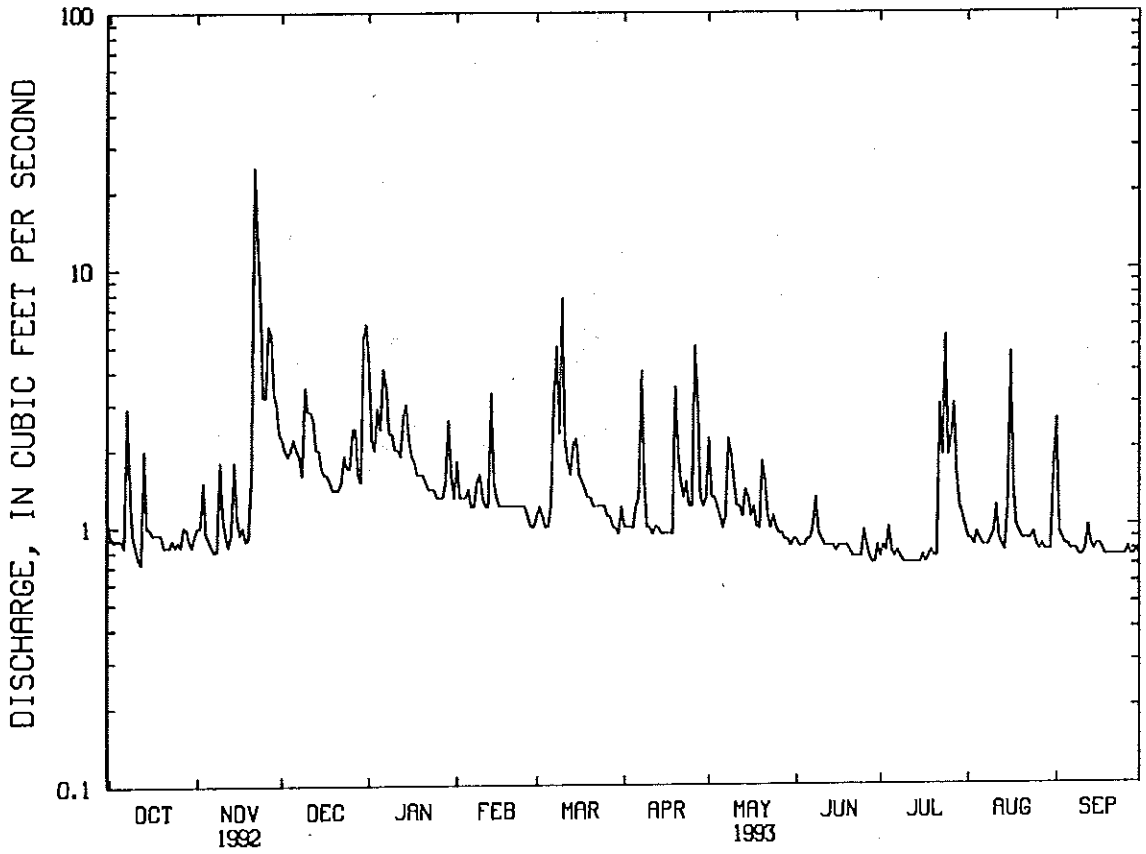
e Estimated

16404200 PILIPILILAU STREAM NEAR PELEKUNU--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1968 - 1993, BY WATER YEAR (WY)

MEAN	.88	1.60	1.84	2.67	2.11	2.26	2.42	1.73	1.15	1.05	.92	.82
MAX	1.32	4.85	3.92	6.55	5.56	4.41	12.1	5.92	2.22	1.90	1.56	1.38
(WY)	1984	1979	1969	1982	1979	1980	1989	1987	1987	1980	1980	1992
MIN	.58	.60	.58	.64	.58	1.02	.75	.77	.69	.60	.58	.53
(WY)	1978	1978	1976	1977	1978	1975	1978	1975	1975	1975	1975	1975

SUMMARY STATISTICS	FOR 1992 CALENDAR YEAR		FOR 1993 WATER YEAR		WATER YEARS 1968 - 1993	
ANNUAL TOTAL	591.78		557.40			
ANNUAL MEAN	1.62		1.53		1.62	
HIGHEST ANNUAL MEAN					2.69	1982
LOWEST ANNUAL MEAN					.77	1978
HIGHEST DAILY MEAN	25	Nov 21	25	Nov 21	152	Apr 8 1989
LOWEST DAILY MEAN	.72	Oct 12	.72	Oct 12	.50	Sep 3 1975
ANNUAL SEVEN-DAY MINIMUM	.84	Aug 26	.72	Jul 9	.50	Sep 21 1975
ANNUAL RUNOFF (AC-FT)	1170		1110		1170	
10 PERCENT EXCEEDS	2.3		2.5		2.8	
50 PERCENT EXCEEDS	1.2		1.1		1.0	
90 PERCENT EXCEEDS	.89		.77		.65	



16405100 MOLOKAI TUNNEL AT EAST PORTAL

LOCATION.--Lat 21°08'38", long 156°55'16", Hydrologic Unit 20050000, on left bank 100 ft downstream from the east portal, 5.3 mi southeast of Kalaupapa, and 7.5 mi northeast of Kaunakakai.

PERIOD OF RECORD.--July 1966 to current year.

GAGE.--Water-stage recorder and concrete control. Elevation of gage is 989 ft, from tunnel plans.

REMARKS.--Records excellent. Tunnel diverts from Waikolu Stream and two tributaries; diversion is augmented by water pumped from two wells and from the stream at elevation 728 ft in Waikolu Valley near the east portal. Water is used for irrigation in west-central Molokai.

AVERAGE DISCHARGE.--27 years, 4.42 ft^3/s (3,200 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 41 ft^3/s, Mar. 19, 1986; no flow at times.

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge, 33 ft^3/s, July 24; minimum daily, 1.1 ft^3/s, Oct. 4.

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

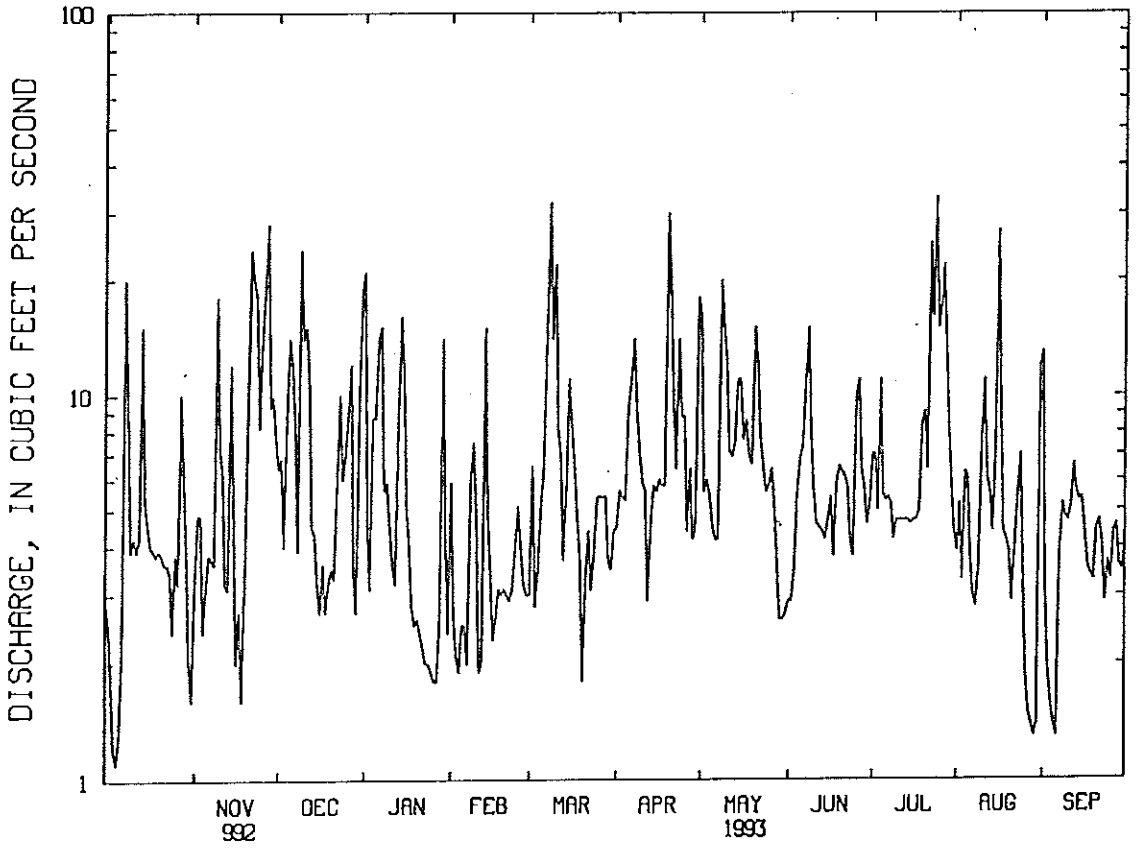
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.6	3.1	6.4	21	5.9	3.0	4.5	16	2.9	7.0	3.9	13
2	1.9	4.8	6.8	4.6	2.7	6.5	5.6	5.6	2.9	7.0	5.2	3.2
3	1.2	4.8	4.0	3.1	2.1	2.8	5.4	6.0	3.5	5.0	3.3	2.0
4	1.1	2.4	8.5	8.7	1.9	3.5	5.3	5.5	5.7	11	6.3	1.6
5	1.3	3.1	14	8.7	2.5	5.1	9.3	4.6	6.8	5.5	6.1	1.4
6	2.1	3.8	12	14	2.5	6.5	11	4.2	7.4	5.3	3.8	1.3
7	20	3.7	8.4	15	2.0	15	14	4.2	11	5.4	3.0	3.8
8	9.4	3.6	3.9	5.6	6.0	32	9.1	20	15	5.2	2.8	5.2
9	3.9	18	24	5.9	7.5	14	7.1	15	7.9	4.2	3.6	4.8
10	4.2	7.3	14	4.5	4.7	22	5.9	12	5.6	4.7	7.6	4.7
11	3.9	6.2	15	3.6	1.9	8.2	5.6	7.1	4.6	4.7	11	5.1
12	4.2	3.2	11	3.2	2.0	6.9	2.9	6.9	4.5	4.7	6.1	6.6
13	15	3.1	4.5	9.2	15	3.7	4.5	7.5	4.4	4.7	5.6	5.6
14	5.2	12	4.3	16	4.9	5.5	5.8	11	4.2	4.7	4.4	5.3
15	4.5	4.9	3.2	11	3.5	11	5.6	11	4.7	4.6	7.2	5.4
16	4.0	2.0	2.7	5.0	2.3	8.3	6.0	7.6	5.4	4.7	27	4.4
17	3.9	2.7	3.6	4.0	2.6	6.5	5.8	8.6	3.8	4.7	8.7	3.6
18	3.8	1.6	2.7	2.8	3.1	4.8	5.8	6.9	5.9	5.0	4.4	3.4
19	3.9	3.3	3.2	2.5	3.0	3.7	30	6.6	6.5	8.4	4.2	3.3
20	3.8	9.0	3.5	2.6	3.1	1.8	19	15	6.3	9.1	3.9	4.5
21	3.6	24	3.3	2.4	3.0	3.3	9.7	12	6.1	6.4	2.9	4.7
22	3.6	20	5.8	2.2	2.9	4.4	6.4	7.7	5.7	25	4.0	4.1
23	3.4	18	10	2.0	3.1	3.1	14	6.5	4.1	16	5.5	2.9
24	2.4	8.2	6.0	2.0	3.9	3.9	8.8	5.6	3.8	33	7.0	3.7
25	3.8	14	7.0	1.9	5.1	5.4	8.8	5.8	10	15	3.4	3.3
26	3.2	19	8.9	1.8	4.0	5.4	4.4	6.4	11	17	1.9	4.4
27	10	28	12	1.8	3.2	5.4	6.4	5.1	6.4	22	1.5	4.6
28	6.0	9.3	3.4	2.6	3.0	5.4	4.2	3.6	5.7	13	1.4	3.6
29	3.9	9.9	2.7	14	---	3.7	4.4	2.6	4.6	8.1	1.3	3.5
30	2.0	7.7	10	4.3	---	3.5	18	2.6	5.2	5.8	1.4	4.1
31	1.6	---	19	2.4	---	4.4	---	2.7	---	4.4	12	---
TOTAL	143.4	260.7	243.8	188.4	107.4	218.7	253.3	241.9	181.6	281.3	170.4	127.1
MEAN	4.63	8.69	7.86	6.08	3.84	7.05	8.44	7.80	6.05	9.07	5.50	4.24
MAX	20	28	24	21	15	32	30	20	15	33	27	13
MIN	1.1	1.6	2.7	1.8	1.9	1.8	2.9	2.6	2.9	4.2	1.3	1.3
AC-FT	284	517	484	374	213	434	502	480	360	558	338	252

16405100 MOLOKAI TUNNEL AT EAST PORTAL--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1966 - 1993, BY WATER YEAR (WY)

MEAN	3.75	5.15	5.05	4.82	4.59	5.24	5.25	4.34	3.73	4.20	3.62	3.09
MAX	7.34	10.2	10.6	12.5	12.5	13.8	12.8	12.3	8.37	9.89	7.22	5.63
(WY)	1986	1988	1991	1987	1990	1986	1986	1987	1986	1986	1985	1984
MIN	1.80	1.86	.41	.086	.010	.009	.001	.037	.016	.055	.004	.24
(WY)	1972	1992	1968	1968	1968	1968	1967	1967	1974	1974	1974	1974

SUMMARY STATISTICS	FOR 1992 CALENDAR YEAR		FOR 1993 WATER YEAR		WATER YEARS 1966 - 1993	
ANNUAL TOTAL	1754.1		2418.0			
ANNUAL MEAN	4.79		6.62		4.42	
HIGHEST ANNUAL MEAN					8.19	1987
LOWEST ANNUAL MEAN					1.31	1974
HIGHEST DAILY MEAN	28	Nov 27	33	Jul 24	41	Mar 19 1986
LOWEST DAILY MEAN	1.0	Aug 29	1.1	Oct 4	.00	Mar 30 1967
ANNUAL SEVEN-DAY MINIMUM	1.1	Aug 26	2.0	Jan 21	.00	Mar 30 1967
ANNUAL RUNOFF (AC-FT)	3480		4800		3200	
10 PERCENT EXCEEDS	11		14		9.3	
50 PERCENT EXCEEDS	3.5		4.8		3.1	
90 PERCENT EXCEEDS	1.2		2.5		.90	



16405300 MOLOKAI TUNNEL AT WEST PORTAL

LOCATION.--Lat 21°07'27", long 156°59'50", Hydrologic Unit 20050000, on left bank 50 ft upstream from the west portal, 2.5 mi northeast of Kaunakakai, and 4.7 mi south of Kalaupapa.

PERIOD OF RECORD.--July 1965 to current year.

GAGE.--Water-stage recorder and concrete control. Elevation of gage is 970 ft, from tunnel plans.

REMARKS.--Records good, except those for estimated days which are fair. Tunnel diverts from Waikolu Stream and two tributaries; diversion is augmented by water pumped from two wells and from the stream at elevation 728 ft in Waikolu Valley near the east portal and one well in the tunnel near east portal. Water is used for irrigation in west-central Molokai.

AVERAGE DISCHARGE.--28 years, 6.95 ft^3/s (5,040 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 39 ft^3/s, Apr. 8, 9, 1986, Jan. 2, 26, 1988, and Mar. 3, 1989; minimum daily, 1.8 ft^3/s, Oct. 15, 1967, Aug. 27, 1992.

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge, 36 ft^3/s, Mar. 8; minimum daily, 2.9 ft^3/s, Oct. 31.

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	6.1	3.6	9.7	24	e8.6	5.8	e6.8	20	5.4	8.4	7.2	16
2	5.5	6.4	9.6	7.4	e5.2	8.7	e7.9	8.0	5.6	10	8.1	5.6
3	4.7	6.1	5.1	5.8	e4.6	3.4	7.4	8.2	6.2	8.9	5.8	4.3
4	4.5	4.0	8.7	9.9	6.1	e4.1	e7.3	7.9	8.5	15	7.6	4.0
5	3.3	5.5	16	12	6.3	e6.0	e11	7.0	9.8	9.6	9.4	3.8
6	3.9	7.4	14	16	6.6	7.4	e14	6.7	10	8.3	6.8	3.6
7	21	7.2	12	18	5.8	e17	e17	6.4	14	8.7	5.5	5.6
8	12	7.2	5.6	8.8	8.9	e36	13	21	19	8.6	5.2	7.7
9	5.6	21	26	8.6	11	e18	10	18	11	6.6	6.4	7.3
10	6.1	11	18	7.2	8.6	e26	8.6	16	10	7.9	9.6	7.2
11	5.6	8.4	17	5.8	5.4	e12	8.3	11	8.9	7.9	14	7.4
12	5.9	5.9	14	5.8	4.7	e9.9	5.6	9.6	8.7	7.9	8.7	8.9
13	17	4.9	7.2	11	e17	e6.4	7.6	11	8.6	7.5	9.1	8.3
14	8.2	15	6.9	20	8.6	e8.3	9.0	13	8.3	7.4	8.2	8.0
15	8.0	8.6	5.6	13	7.2	e14	8.7	14	7.2	7.4	9.0	8.0
16	7.4	4.1	5.2	e8.0	4.5	e11	8.8	10	7.8	7.4	31	7.7
17	7.2	4.6	5.8	e7.4	4.6	e8.9	8.9	11	7.2	7.4	12	7.7
18	6.9	3.7	5.2	e4.6	6.9	e7.2	8.8	10	8.6	7.3	7.1	7.1
19	6.9	5.9	5.4	e4.3	6.5	e6.1	33	9.2	8.8	11	6.9	6.4
20	6.9	9.8	5.8	e4.5	6.6	e4.0	23	17	8.9	12	8.1	6.0
21	6.9	26	5.6	e4.0	6.6	e5.5	14	15	8.5	8.7	6.0	6.5
22	6.9	20	8.3	e3.8	6.4	8.0	8.9	11	8.1	26	8.0	6.2
23	6.0	21	13	e3.6	6.4	7.4	17	9.2	7.8	19	7.8	5.8
24	3.4	11	9.2	e3.6	7.2	e8.2	11	8.2	6.8	37	9.1	7.0
25	4.2	17	9.5	e3.5	8.1	e7.7	12	8.7	12	17	5.4	6.9
26	4.3	24	10	e3.4	7.2	e7.7	6.8	9.3	13	21	3.6	7.6
27	10	34	16	e3.4	6.4	e7.7	8.9	8.0	9.1	26	3.2	8.2
28	8.2	14	5.8	e4.5	6.1	e7.7	6.7	6.6	8.1	17	3.2	6.9
29	4.9	13	4.9	e16	---	e6.0	7.1	4.7	7.6	12	3.2	6.8
30	3.4	12	11	e7.0	---	e5.8	20	4.7	7.4	9.6	3.4	7.2
31	2.9	---	16	e5.2	---	e6.7	---	4.9	---	7.9	12	---
TOTAL	213.8	342.3	312.1	260.1	198.1	298.6	337.1	325.3	270.9	376.4	250.6	209.7
MEAN	6.90	11.4	10.1	8.39	7.07	9.63	11.2	10.5	9.03	12.1	8.08	6.99
MAX	21	34	26	24	17	36	33	21	19	37	31	16
MIN	2.9	3.6	4.9	3.4	4.5	3.4	5.6	4.7	5.4	6.6	3.2	3.6
AC-FT	424	679	619	516	393	592	669	645	537	747	497	416

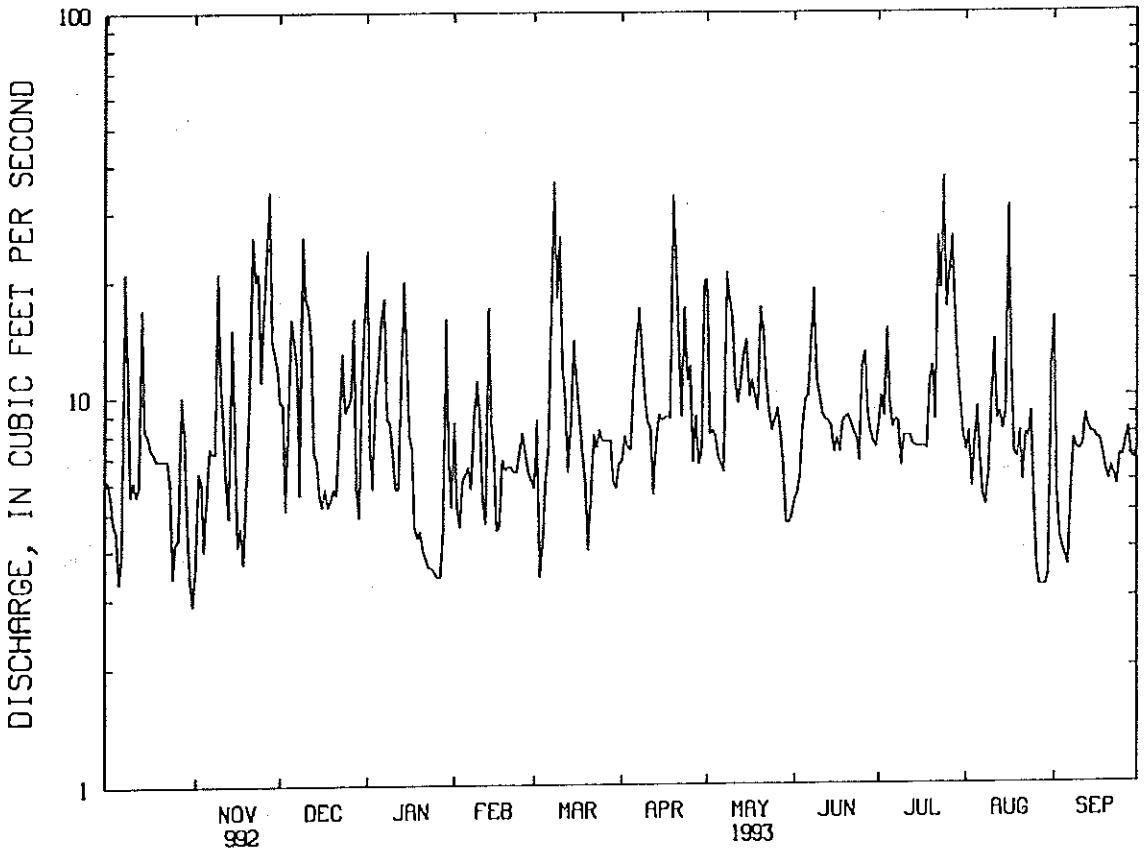
e Estimated

16405300 MOLOKAI TUNNEL AT WEST PORTAL--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1965 - 1993, BY WATER YEAR (WY)

MEAN	6.12	7.44	7.31	7.06	7.09	7.82	7.90	7.07	6.44	6.89	6.28	5.64
MAX	9.10	13.3	13.8	14.4	15.9	15.5	15.6	15.8	11.7	13.2	10.2	9.21
(WY)	1986	1988	1991	1988	1990	1986	1986	1987	1986	1986	1985	1987
MIN	2.60	2.60	2.83	2.61	2.25	2.55	2.61	2.69	2.32	2.30	2.21	2.33
(WY)	1966	1966	1966	1966	1974	1967	1974	1974	1974	1974	1974	1974

SUMMARY STATISTICS	FOR 1992 CALENDAR YEAR		FOR 1993 WATER YEAR		WATER YEARS 1965 - 1993	
ANNUAL TOTAL	2684.4		3395.0			
ANNUAL MEAN	7.33		9.30		6.95	
HIGHEST ANNUAL MEAN					11.4	1987
LOWEST ANNUAL MEAN					3.46	1974
HIGHEST DAILY MEAN	34	Nov 27	37	Jul 24	39	Apr 8 1986
LOWEST DAILY MEAN	1.8	Aug 27	2.9	Oct 31	1.8	Oct 15 1967
ANNUAL SEVEN-DAY MINIMUM	2.1	Aug 26	3.6	Jan 21	1.9	May 3 1976
ANNUAL RUNOFF (AC-FT)	5320		6730		5040	
10 PERCENT EXCEEDS	13		17		12	
50 PERCENT EXCEEDS	6.4		7.9		5.6	
90 PERCENT EXCEEDS	3.6		4.6		3.0	



16405500 WAIKOLU STREAM AT ALTITUDE 900 FT, NEAR KALAUPAPA

LOCATION.--Lat 21°08'43", long 156°55'18", Hydrologic Unit 20050000, on right bank 1.8 mi southwest of Haupu Bay, 2.3 mi upstream from mouth, and 5.2 mi southeast of Kalaupapa.

DRAINAGE AREA.--1.99 mi^2.

PERIOD OF RECORD.--May 1956 to October 1961, July 1962 to current year.

REVISED RECORDS.--WSP 1719: 1959. WSP 2137: 1965(P).

GAGE.--Water-stage recorder. Elevation of gage is 900 ft, from topographic map. Prior to July 1, 1962, at site 200 ft upstream at datum 6.14 ft higher.

REMARKS.--Records good. Since Nov. 16, 1960, water diverted upstream at times, either into or from Molokai tunnel.

AVERAGE DISCHARGE (since Molokai tunnel diversion began).--32 years (water years 1961, 1963-93), 6.56 ft^3/s (4,750 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 3,570 ft^3/s, Jan. 25, 1982, gage height, 6.64 ft, from rating curve extended above 43 ft^3/s on basis of slope-area measurement at gage height 5.25 ft; no flow at times since 1984.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Oct. 31, 1961, reached a stage of 13.62 ft, from floodmarks, former site and datum, discharge, 6,220 ft^3/s, by slope-area measurement.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 590 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	0030	*1,650	*5.14	Nov. 26	2200	696	3.91

Minimum discharge, No flow on many days.

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

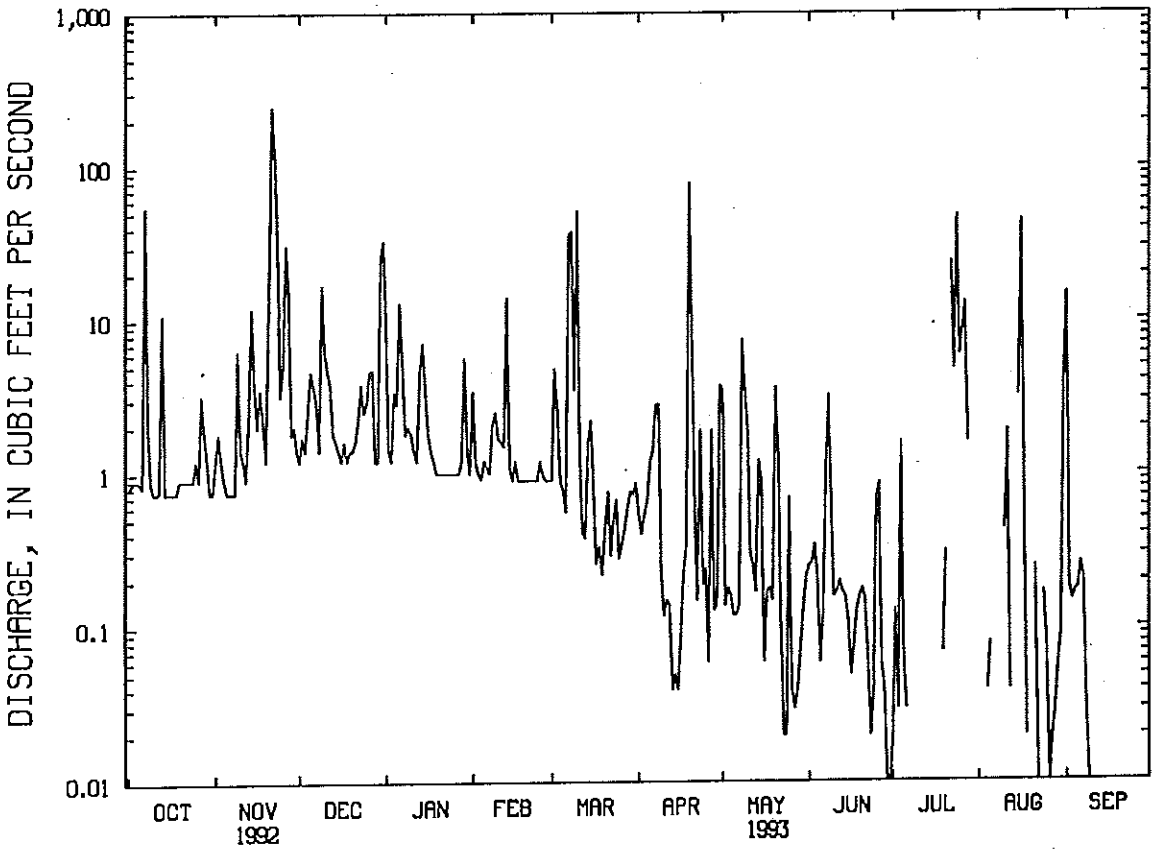
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.80	1.2	1.2	9.9	3.4	.90	.55	3.4	.25	.02	.00	15
2	.85	1.8	1.7	1.4	1.2	4.8	.40	.14	.26	.13	.00	.19
3	.90	1.2	1.4	1.2	1.0	2.6	.53	.18	.34	.03	.00	.15
4	.90	.90	2.4	3.4	.92	.90	.66	.16	.21	1.6	.04	.17
5	.88	.75	4.6	2.8	1.2	.77	1.2	.12	.06	.07	.08	.18
6	.82	.75	3.7	13	1.1	.56	1.4	.12	.12	.03	.00	.26
7	55	.75	3.0	5.1	1.0	36	2.8	.14	1.1	.00	.00	.21
8	2.0	.75	1.4	1.8	2.1	38	2.8	7.4	3.2	.00	.00	.03
9	.87	6.3	17	2.0	2.5	3.5	.23	3.4	.59	.00	.00	.01
10	.75	1.4	6.2	1.8	1.7	52	.12	1.9	.16	.00	.43	.00
11	.75	1.2	4.7	1.4	1.6	1.3	.15	.30	.17	.00	1.9	.00
12	.77	.90	3.8	1.2	1.5	.41	.14	.25	.20	.00	.04	.03
13	11	2.4	1.8	4.5	14	.38	.04	.17	.17	.00	.00	.00
14	.75	12	1.6	7.1	1.1	1.6	.05	1.2	.16	.00	.00	.00
15	.75	3.9	1.4	3.5	.90	2.2	.04	.88	.11	.00	3.2	.00
16	.75	2.0	1.2	1.8	1.2	.75	.09	.06	.05	.00	45	.00
17	.75	3.5	1.6	1.4	.90	.26	.22	.17	.08	.00	.85	.00
18	.75	2.2	1.2	1.2	.90	.33	.34	.18	.13	.00	.02	.00
19	.90	1.2	1.4	1.0	.90	.22	78	.15	.16	.07	.00	.00
20	.90	12	1.4	1.0	.90	.44	7.4	3.6	.18	.31	.00	.00
21	.90	248	1.6	1.0	.90	.76	.62	1.3	.15	.00	.25	.00
22	.90	118	2.2	1.0	.90	.29	.15	.11	.06	24	.01	.00
23	.90	32	3.8	1.0	.90	.50	1.9	.02	.02	4.8	.00	.00
24	.90	3.2	2.5	1.0	.90	.67	.19	.02	.04	48	.17	.00
25	1.2	5.1	2.9	1.0	1.2	.28	.24	.69	.70	5.9	.08	.00
26	.90	31	4.6	1.0	.97	.35	.06	.04	.86	8.7	.01	.03
27	3.2	15	4.7	1.0	.90	.43	1.9	.03	.06	13	.02	.00
28	1.8	1.8	1.2	1.2	.90	.60	.13	.04	.04	1.6	.03	.00
29	1.2	2.0	1.2	5.7	---	.76	.14	.07	.01	.00	.06	.00
30	.75	1.4	26	1.4	---	.73	3.7	.13	.01	.00	.09	.00
31	.75	---	33	1.0	---	.86	---	.21	---	.00	4.0	---
TOTAL	95.24	514.60	146.4	82.8	47.59	154.15	106.19	26.58	9.65	108.26	56.28	16.26
MEAN	3.07	17.2	4.72	2.67	1.70	4.97	3.54	.86	.32	3.49	1.82	.54
MAX	55	248	33	13	14	52	78	7.4	3.2	48	45	15
MIN	.75	.75	1.2	1.0	.90	.22	.04	.02	.01	.00	.00	.00
AC-FT	189	1020	290	164	94	306	211	53	19	215	112	32

16405500 WAIKOLU STREAM AT ALTITUDE 900 FT, NEAR KALAUPAPA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1961 - 1993, BY WATER YEAR (WY)

MEAN	3.48	9.23	9.99	12.2	9.71	9.24	10.3	5.25	2.60	3.14	2.27	1.59
MAX	16.7	30.5	31.0	40.5	30.6	22.6	64.8	23.6	10.5	11.0	7.52	6.81
(WY)	1966	1971	1966	1982	1979	1968	1989	1987	1961	1964	1961	1963
MIN	.000	.77	.37	.96	.81	1.31	.98	.68	.000	.23	.050	.059
(WY)	1985	1985	1976	1986	1978	1983	1992	1984	1985	1984	1985	1984

SUMMARY STATISTICS	FOR 1992 CALENDAR YEAR		FOR 1993 WATER YEAR		WATER YEARS 1961 - 1993	
ANNUAL TOTAL	1815.01		1364.00			
ANNUAL MEAN	4.96		3.74		6.57	
HIGHEST ANNUAL MEAN					11.8	1965
LOWEST ANNUAL MEAN					1.26	1985
HIGHEST DAILY MEAN	248	Nov 21	248	Nov 21	847	Apr 8 1989
LOWEST DAILY MEAN	.65	Jun 23	.00	Jul 7	.00	Sep 12 1984
ANNUAL SEVEN-DAY MINIMUM	.65	Jul 1	.00	Jul 7	.00	Sep 12 1984
ANNUAL RUNOFF (AC-FT)	3600		2710		4760	
10 PERCENT EXCEEDS	7.9		4.7		12	
50 PERCENT EXCEEDS	.90		.80		1.5	
90 PERCENT EXCEEDS	.75		.00		.45	



16408000 WAIKOLU STREAM BELOW PIPELINE CROSSING, NEAR KALAUPAPA

LOCATION.--Lat 21°09'45", long 156°55'54", Hydrologic Unit 20050000, on left bank 0.7 mi upstream from mouth and 4.4 mi southeast of Molokai Lighthouse near Kalaupapa.

DRAINAGE AREA.--3.68 mi^2.

PERIOD OF RECORD.--July 1919 to November 1930, August 1931 to July 1932, September 1937 to January 1948, July 1948 to current year. Prior to August 1931, published as "at pipeline crossing, near Kalaupapa."

REVISED RECORDS.--WSP 1155: 1932(M), 1938-44(M), 1946-48(M). WSP 1319: 1923(M), 1930(M), 1932, 1938-40, 1945(M), 1974-81(M), drainage area.

GAGE.--Water-stage recorder. Datum of gage is 252 ft above mean sea level (hand levels by Bureau of Reclamation). Prior to Nov. 19, 1930, at site 500 ft upstream at different datums. Aug. 14, 1931, to July 20, 1932, and Sept. 20, 1937, to Jan. 26, 1948, at present site at datum 1.49 ft higher, and July 30, 1948, to June 30, 1962, at present site at datum 1.00 ft higher.

REMARKS.--Records fair. Diversion upstream for domestic use in Kalaupapa, and since Nov. 16, 1960, water has been diverted upstream both to and from Molokai tunnel.

AVERAGE DISCHARGE (since Molokai tunnel diversion began).--33 years (water years 1961-93), 16.8 ft^3/s (12,170. acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 13,210 ft^3/s, Apr. 8, 1989, gage height, 8.50 ft, from rating curve extended above 26 ft^3/s on basis of slope-area measurement at gage height 6.68 ft; minimum, 2.0 ft^3/s, Nov. 1, 2, 1926, June 5, 1926.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,200 ft^3/s (revised) and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Nov. 21	0630	*3,770	*6.13	No other peak greater than base discharge.			

Minimum discharge, 5.9 ft^3/s, Oct. 23-25, Nov. 8, 12.

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

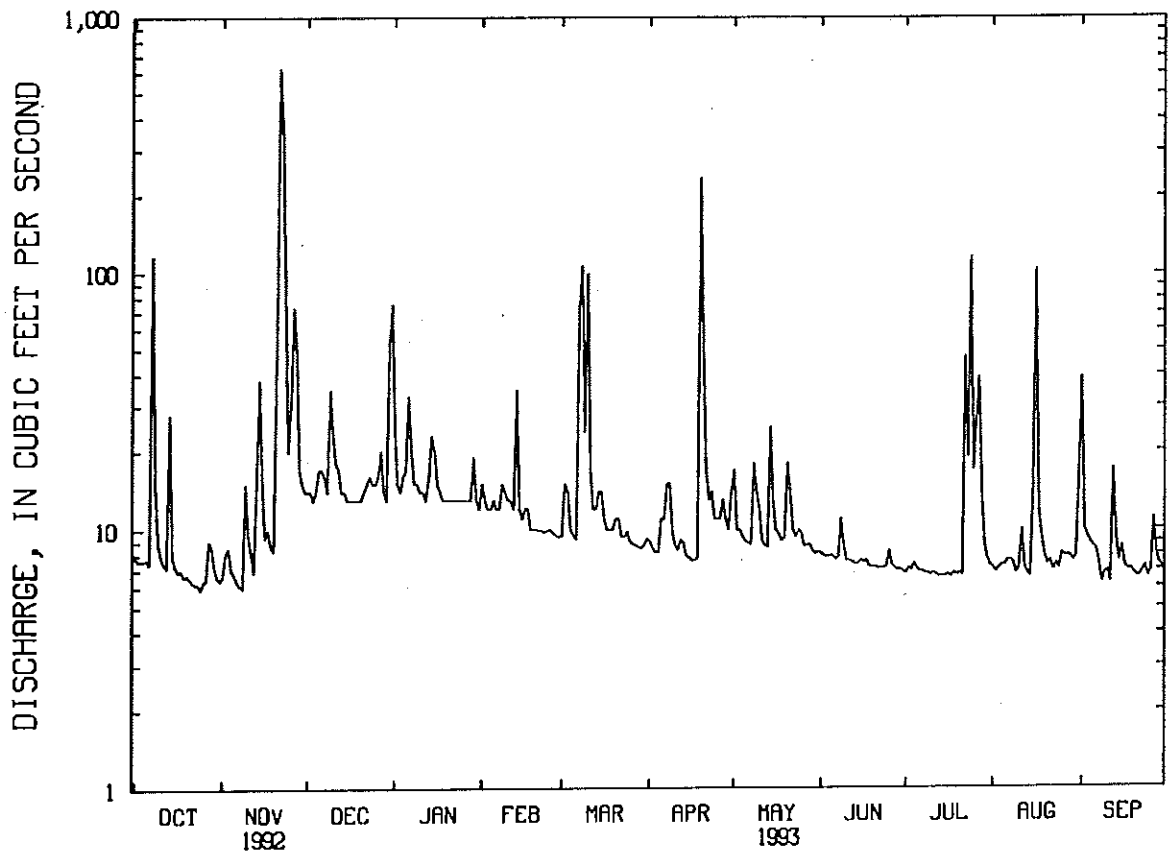
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	7.8	6.6	14	25	15	9.5	9.0	17	8.1	6.8	7.1	39
2	7.6	8.1	14	15	13	15	8.5	9.9	7.9	7.1	6.9	10
3	7.6	8.5	13	14	12	14	8.2	10	7.9	7.0	7.1	9.4
4	7.6	7.0	14	16	12	10	8.2	9.4	7.9	7.4	7.3	8.9
5	7.7	6.7	17	17	13	9.5	11	9.0	7.9	7.1	7.3	8.6
6	7.4	6.3	17	33	12	9.2	11	8.9	7.7	6.9	7.6	8.4
7	116	6.1	16	20	12	74	15	8.8	7.8	6.9	7.6	7.4
8	15	6.0	14	15	15	106	15	18	11	6.8	7.5	6.3
9	8.9	15	35	15	14	24	9.7	14	8.7	6.8	6.8	6.8
10	7.9	9.5	23	14	13	99	8.7	12	7.6	6.7	7.1	6.9
11	7.4	8.2	18	14	13	17	8.4	9.0	7.6	6.8	10	6.3
12	7.2	6.9	17	13	12	12	9.1	8.7	7.5	6.7	7.2	17
13	28	15	14	16	35	12	8.9	8.6	7.4	6.6	6.8	9.2
14	7.9	38	14	23	12	14	7.9	25	7.4	6.6	6.6	7.6
15	7.2	15	13	20	11	14	7.8	13	7.6	6.6	16	8.6
16	6.9	9.3	13	15	12	11	7.6	9.9	7.5	6.7	103	7.2
17	7.0	10	13	14	12	10	7.6	9.6	7.6	6.6	12	7.0
18	6.6	8.7	13	13	10	10	7.8	9.1	7.2	6.8	9.5	7.0
19	6.7	8.3	13	13	10	10	235	9.3	7.2	6.7	8.0	6.8
20	6.5	47	13	13	10	11	49	18	7.2	6.8	7.4	6.6
21	6.3	628	14	13	9.9	11	17	14	7.1	6.7	7.6	6.6
22	6.2	353	15	13	9.9	9.4	13	10	7.1	47	7.0	6.9
23	6.2	85	16	13	9.8	9.4	14	9.4	7.1	19	7.4	7.2
24	5.9	20	15	13	9.9	9.8	11	9.9	7.2	115	7.1	6.6
25	6.3	31	15	13	10	9.0	11	9.7	8.3	17	8.1	6.9
26	6.4	73	16	13	9.7	8.8	11	8.7	7.3	27	7.9	11
27	9.0	49	20	13	9.5	8.7	13	8.7	7.1	39	7.9	8.1
28	8.7	17	14	13	9.4	8.6	11	8.8	7.0	14	7.9	7.4
29	7.2	15	13	19	---	8.5	10	8.3	7.0	8.7	7.6	7.2
30	6.6	14	53	13	---	8.7	14	8.1	6.9	7.7	7.9	7.0
31	6.4	---	75	12	---	9.2	---	8.2	---	7.3	16	---
TOTAL	360.1	1531.2	584	486	346.1	592.3	578.4	341.0	228.8	444.8	351.2	269.9
MEAN	11.6	51.0	18.8	15.7	12.4	19.1	19.3	11.0	7.63	14.3	11.3	9.00
MAX	116	628	75	33	35	106	235	25	11	115	103	39
MIN	5.9	6.0	13	12	9.4	8.5	7.6	8.1	6.9	6.6	6.6	6.3
AC-FT	714	3040	1160	964	686	1170	1150	676	454	882	697	535

16408000 WAIKOLU STREAM BELOW PIPELINE CROSSING, NEAR KALAUPAPA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1919 - 1993, BY WATER YEAR (WY)

MEAN	12.7	20.3	23.8	23.9	21.4	24.6	26.3	17.8	12.4	12.4	12.2	9.81
MAX	35.9	58.5	65.2	92.4	72.8	116	235	105	26.9	34.9	40.4	28.8
(WY)	1962	1962	1955	1988	1955	1942	1989	1987	1938	1958	1958	1931
MIN	3.20	5.07	2.93	5.91	5.59	7.69	7.13	4.77	3.15	3.43	2.91	3.60
(WY)	1985	1976	1976	1977	1985	1983	1978	1984	1985	1984	1985	1984

SUMMARY STATISTICS	FOR 1992 CALENDAR YEAR		FOR 1993 WATER YEAR		WATER YEARS 1919 - 1993	
ANNUAL TOTAL	6143.9		6113.8			
ANNUAL MEAN	16.8		16.8		18.1	
HIGHEST ANNUAL MEAN					37.9	1989
LOWEST ANNUAL MEAN					6.12	1985
HIGHEST DAILY MEAN	628	Nov 21	628	Nov 21	3810	Apr 8 1989
LOWEST DAILY MEAN	5.3	Aug 26	5.9	Oct 24	2.0	Oct 6 1985
ANNUAL SEVEN-DAY MINIMUM	5.4	Aug 24	6.3	Oct 20	2.2	Dec 27 1984
ANNUAL RUNOFF (AC-FT)	12190		12130		13080	
10 PERCENT EXCEEDS	24		19		28	
50 PERCENT EXCEEDS	8.4		9.4		11	
90 PERCENT EXCEEDS	6.4		6.8		6.1	



16414000 KAUNAKAKAI GULCH AT KAUNAKAKAI

LOCATION.--Lat 21°06'21", long 157°00'34", Hydrologic Unit 20050000, on left bank 0.6 mi upstream from Molokai Ranch pipeline crossing, 1.3 mi northeast of Kaunakakai Post Office, and 1.7 mi upstream from mouth.

DRAINAGE AREA.--6.57 mi^2.

PERIOD OF RECORD.--December 1949 to current year. Prior to July 1958, published as Kaunakakai Stream at Kaunakakai.

REVISED RECORDS.--WSP 1289: 1950-51. WSP 1569: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 240 ft, from topographic map.

REMARKS.--Records fair. Flow has been augmented by occasional spillage from Molokai tunnel since May 1965.

AVERAGE DISCHARGE.--43 years (water years 1951-93), 1.88 ft^3/s (1,360 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 3,060 ft^3/s, Oct. 31, 1961, gage height, 9.30 ft, from rating curve extended above 620 ft^3/s on basis of slope-area measurements at gage heights 7.22 ft and 9.30 ft; no flow most of the time each year.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 280 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	*0800	*700	*5.74	No other peak greater than base discharge.			

Minimum discharge, no flow for many days.

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

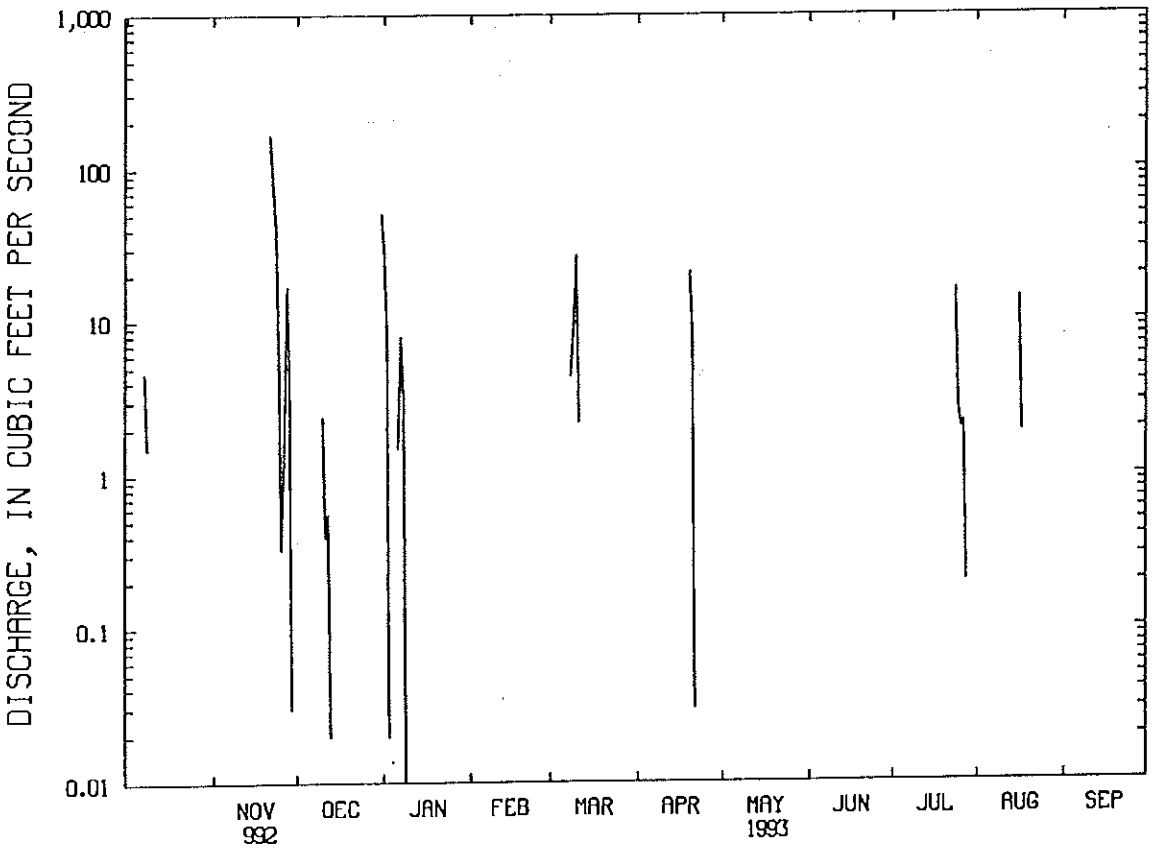
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	.00	27	.00	.00	.00	.00	.00	.00	.00	.00
2	.00	.00	.00	7.1	.00	.00	.00	.00	.00	.00	.00	.00
3	.00	.00	.00	.02	.00	.00	.00	.00	.00	.00	.00	.00
4	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
5	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
6	.00	.00	.00	1.5	.00	.00	.00	.00	.00	.00	.00	.00
7	4.6	.00	.00	7.9	.00	.00	.00	.00	.00	.00	.00	.00
8	1.5	.00	.00	3.2	.00	4.4	.00	.00	.00	.00	.00	.00
9	.00	.00	.00	.01	.00	8.7	.00	.00	.00	.00	.00	.00
10	.00	.00	2.4	.00	.00	27	.00	.00	.00	.00	.00	.00
11	.00	.00	.39	.00	.00	2.2	.00	.00	.00	.00	.00	.00
12	.00	.00	.56	.00	.00	.00	.00	.00	.00	.00	.00	.00
13	.46	.00	.02	.00	.00	.00	.00	.00	.00	.00	.00	.00
14	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
15	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
16	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	14	.00
17	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	1.9	.00
18	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
19	.00	.00	.00	.00	.00	.00	21	.00	.00	.00	.00	.00
20	.00	.00	.00	.00	.00	.00	7.6	.00	.00	.00	.00	.00
21	.00	166	.00	.00	.00	.00	.03	.00	.00	.00	.00	.00
22	.00	79	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
23	.00	41	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
24	.00	5.6	.00	.00	.00	.00	.00	.00	.00	16	.00	.00
25	.00	.33	.00	.00	.00	.00	.00	.00	.00	2.8	.00	.00
26	.00	1.4	.00	.00	.00	.00	.00	.00	.00	2.0	.00	.00
27	.00	17	.00	.00	.00	.00	.00	.00	.00	2.2	.00	.00
28	.00	4.0	.00	.00	.00	.00	.00	.00	.00	.20	.00	.00
29	.00	.03	.00	.00	---	.00	.00	.00	.00	.00	.00	.00
30	.00	.00	.00	.00	---	.00	.00	.00	.00	.00	.00	.00
31	.00	---	51	.00	---	.00	---	.00	---	.00	.00	---
TOTAL	6.56	314.36	54.37	46.73	0.00	42.30	28.63	0.00	0.00	23.20	15.90	0.00
MEAN	.21	10.5	1.75	1.51	.000	1.36	.95	.000	.000	.75	.51	.000
MAX	4.6	166	51	27	.00	27	21	.00	.00	16	14	.00
MIN	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
AC-FT	13	624	108	93	.00	84	57	.00	.00	46	32	.00

16414000 KAUNAKAKAI GULCH AT KAUNAKAKAI--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1950 - 1993, BY WATER YEAR (WY)

MEAN	.52	3.33	4.04	5.41	2.63	2.95	2.53	.70	.032	.075	.31	.060
MAX	7.09	25.4	16.5	29.7	15.5	26.8	46.2	17.5	.74	1.39	6.56	1.02
(WY)	1962	1951	1956	1982	1979	1951	1989	1987	1966	1966	1950	1966
MIN	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
(WY)	1951	1952	1953	1953	1953	1952	1952	1950	1950	1950	1951	1950

SUMMARY STATISTICS	FOR 1992 CALENDAR YEAR		FOR 1993 WATER YEAR		WATER YEARS 1950 - 1993		
ANNUAL TOTAL	708.53		532.05				
ANNUAL MEAN	1.94		1.46		1.88		
HIGHEST ANNUAL MEAN					6.01		1989
LOWEST ANNUAL MEAN					.002		1953
HIGHEST DAILY MEAN	166	Nov 21	166	Nov 21	643	Apr 8	1989
LOWEST DAILY MEAN	.00	Jan 1	.00	Oct 1	.00	Jan 1	1950
ANNUAL SEVEN-DAY MINIMUM	.00	Jan 1	.00	Oct 14	.00	Jan 1	1950
ANNUAL RUNOFF (AC-FT)	1410		1060		1360		
10 PERCENT EXCEEDS	.03		.02		.38		
50 PERCENT EXCEEDS	.00		.00		.00		
90 PERCENT EXCEEDS	.00		.00		.00		



16419500 PAPIO GULCH AT HALAWA

LOCATION.--Lat 21°08'55", long 156°44'16", Hydrologic Unit 20050000, on left bank 200 ft downstream from wooden bridge on Highway 45 and 0.8 mi south of Halawa.

DRAINAGE AREA.--0.94 mi^2.

PERIOD OF RECORD.--July 1963 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 640 ft, from topographic map.

REMARKS.--Records fair except for estimated days which are poor. Diversion upstream for domestic use at Puu O Hoku Ranch.

AVERAGE DISCHARGE.--30 years, 0.90 ft^3/s (650 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 2,720 ft^3/s, Apr. 13, 1965, gage height, 11.25 ft, from rating curve extended above 37 ft^3/s on basis of slope-area measurements at gage heights 4.60 ft, 7.15 ft, and 11.25 ft; no flow at times.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 210 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
July 12	2400	*92	*3.06				

Minimum discharge, 0.16 ft^3/s, July 9-11.

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	e.42	.62	1.2	1.1	.42	.32	.35	.29	.29	.50	.50	2.2
2	e.38	.26	1.5	.80	.42	.32	.35	.26	.29	.53	.72	.55
3	e.35	.35	1.3	.65	.38	.29	.35	.26	.29	.35	.55	.55
4	e.35	.32	1.0	.72	.38	.29	.35	.23	.29	.80	.46	.50
5	.74	.26	.85	2.2	.38	.29	.60	.23	.29	.38	2.7	.38
6	.35	.29	.80	3.9	.35	.29	1.1	.23	.29	.26	.82	.38
7	1.8	.32	.90	1.5	.35	.32	1.2	.23	.29	.23	.55	.35
8	2.0	.26	.75	.90	.55	13	.99	.29	.50	.20	.46	.35
9	.46	.92	.75	.80	1.5	3.6	.50	.35	.35	.18	.42	.35
10	.32	.42	.80	.70	.55	6.8	.38	.62	.26	.18	.74	.32
11	.29	.46	1.0	.65	.53	1.2	.35	.32	.23	.20	1.6	.35
12	.42	.26	.80	.60	.50	.80	.35	2.0	.23	6.9	.65	.66
13	.95	.23	.70	.60	6.7	.65	.32	.60	.23	10	.50	.50
14	.35	.59	.65	.65	.75	1.2	.32	.35	.20	.85	.42	.38
15	.32	.42	.60	.60	.50	1.6	.32	.29	.20	.55	.38	.35
16	.29	.26	.60	.60	.42	.80	.32	.26	.20	1.0	1.1	.35
17	.29	.52	.65	.55	.38	.60	.32	.26	.20	.60	.62	.35
18	.61	.29	.70	.50	.35	.55	.32	.23	.20	.42	.38	.38
19	.35	.23	.75	.50	.35	.55	.42	.23	.23	.50	.35	.92
20	.38	1.7	1.1	.50	.35	.50	.60	2.1	.23	1.3	.35	1.4
21	.29	12	.95	.50	.35	.50	.60	2.5	.23	.60	.32	.50
22	.26	e20	1.2	.50	.32	.50	.55	.55	.26	8.1	.32	1.4
23	.35	e9.4	1.1	.50	.35	.46	.88	.32	.23	3.7	.35	.91
24	.26	e2.3	1.0	.50	.35	.46	.46	.32	.23	2.4	.67	.42
25	.23	e1.7	1.2	.50	.80	.42	.64	.91	.32	1.3	.50	.84
26	.29	e3.1	1.6	.50	.50	.42	.60	.35	.38	1.8	.32	.50
27	.44	e3.7	1.7	.46	.35	.38	3.8	.29	.29	1.6	.29	.38
28	.26	e1.6	.65	.46	.35	.35	.50	.29	.23	.90	.29	.35
29	.26	e1.5	.50	.72	---	.35	.35	.29	.23	.75	.29	.55
30	.20	1.3	4.0	.60	---	.35	.32	.29	.29	.70	.35	.63
31	.60	---	4.5	.46	---	.38	---	.29	---	.55	3.0	---
TOTAL	14.86	65.58	35.80	24.72	19.48	38.54	18.51	16.03	7.98	48.33	20.97	18.05
MEAN	.48	2.19	1.15	.80	.70	1.24	.62	.52	.27	1.56	.68	.60
MAX	2.0	20	4.5	3.9	6.7	13	3.8	2.5	.50	10	3.0	2.2
MIN	.20	.23	.50	.46	.32	.29	.32	.23	.20	.18	.29	.32
AC-FT	29	130	71	49	39	76	37	32	16	96	42	36

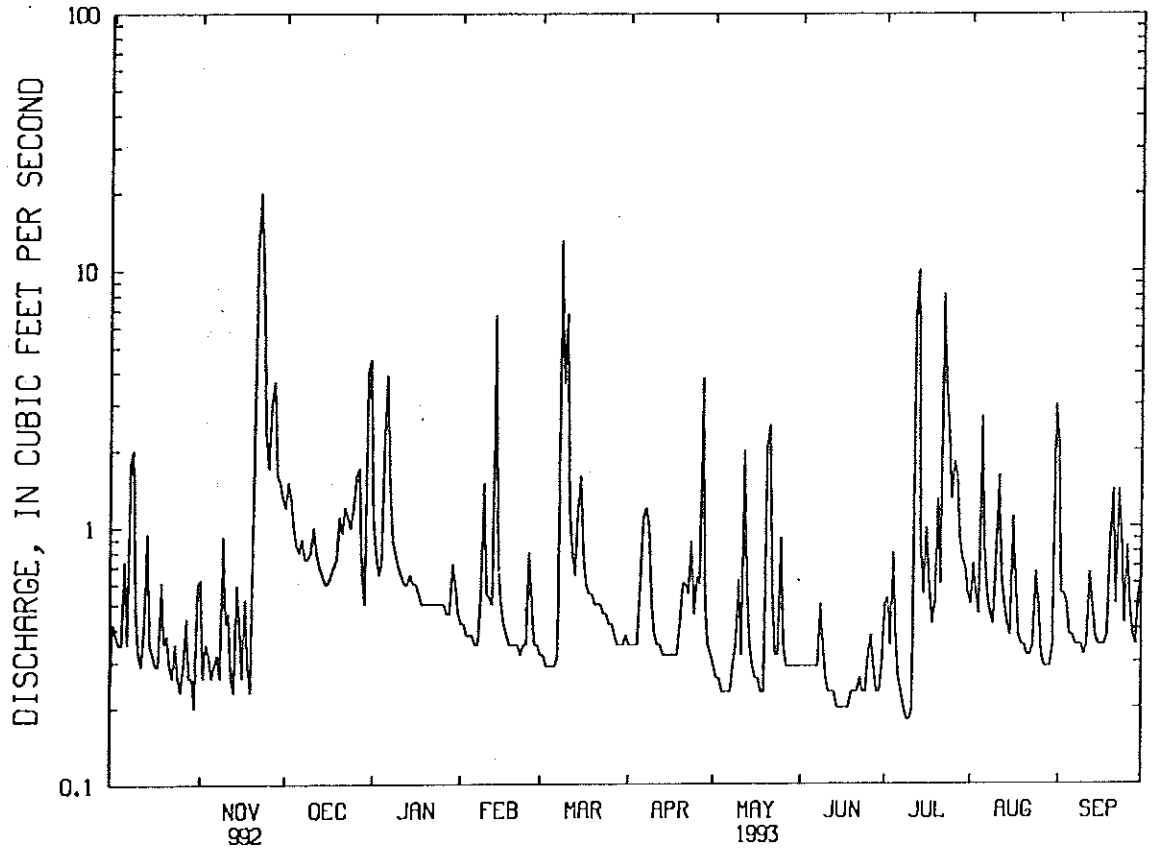
e Estimated

16419500 PAPIO GULCH AT HALAWA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1963 - 1993, BY WATER YEAR (WY)

MEAN	.54	1.22	1.19	1.35	1.30	1.48	1.57	.74	.32	.46	.31	.31
MAX	2.63	7.56	6.12	4.84	5.88	6.42	10.3	3.99	1.43	1.56	1.21	2.24
(WY)	1986	1971	1965	1988	1965	1968	1989	1987	1982	1993	1980	1992
MIN	.000	.000	.000	.000	.000	.007	.003	.000	.000	.000	.000	.000
(WY)	1972	1972	1972	1977	1973	1973	1975	1975	1964	1972	1964	1964

SUMMARY STATISTICS	FOR 1992 CALENDAR YEAR		FOR 1993 WATER YEAR		WATER YEARS 1963 - 1993	
ANNUAL TOTAL	300.84		328.85			
ANNUAL MEAN	.82		.90		.90	
HIGHEST ANNUAL MEAN					2.32	1989
LOWEST ANNUAL MEAN					.063	1973
HIGHEST DAILY MEAN	31	Sep 3	20	Nov 22	164	Apr 13 1965
LOWEST DAILY MEAN	.00	Apr 26	.18	Jul 9	.00	Jul 5 1963
ANNUAL SEVEN-DAY MINIMUM	.07	Mar 2	.21	Jun 12	.00	Aug 3 1963
ANNUAL RUNOFF (AC-FT)	597		652		650	
10 PERCENT EXCEEDS	1.4		1.6		1.6	
50 PERCENT EXCEEDS	.23		.46		.24	
90 PERCENT EXCEEDS	.10		.26		.00	



16501200 OHEO GULCH AT DAM NEAR KIPAHULU

LOCATION.--Lat 20°40'17", long 156°03'17", Hydrologic Unit 20020000, on right bank 31 ft upstream from dam, 1,000 ft downstream from the confluence of Palikea and Pipiwai Streams, 0.8 mi upstream from mouth, and 1.0 mi north from Kipahulu Church.

DRAINAGE AREA.--8.06 mi^2.

PERIOD OF RECORD.--July 1, 1988 to current year. Forty-eight years of records are available for the right branch drainage, 1.3 mi upstream (Palikea Stream, 16501000) for periods prior to Sept. 30, 1983.

GAGE.--Water-stage recorder. Datum of gage is 420 ft above mean sea level (from topographic map).

AVERAGE DISCHARGE.--5 years (water years 1989-93), 62.8 ft^3/s (45,530 acre-ft/yr).

REMARKS.--Records good. No diversion upstream.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 8,770 ft^3/s, revised, Dec. 6, 1988, from rating curve extended above 6,020 ft^3/s, on basis of slope-area measurement at gage height 7.35 ft; minimum, no flow, Feb. 24-29, Mar. 1-12, 29, 30, Apr. 14-17, 26-28, May 11-13, 1992.

EXTREMES FOR CURRENT PERIOD.--Peak discharges greater than base discharge of 3,770 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	0500	*6,800	*7.61	No other peak greater than base discharge.			

Minimum discharge, 0.29 ft^3/s, Apr. 19.

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

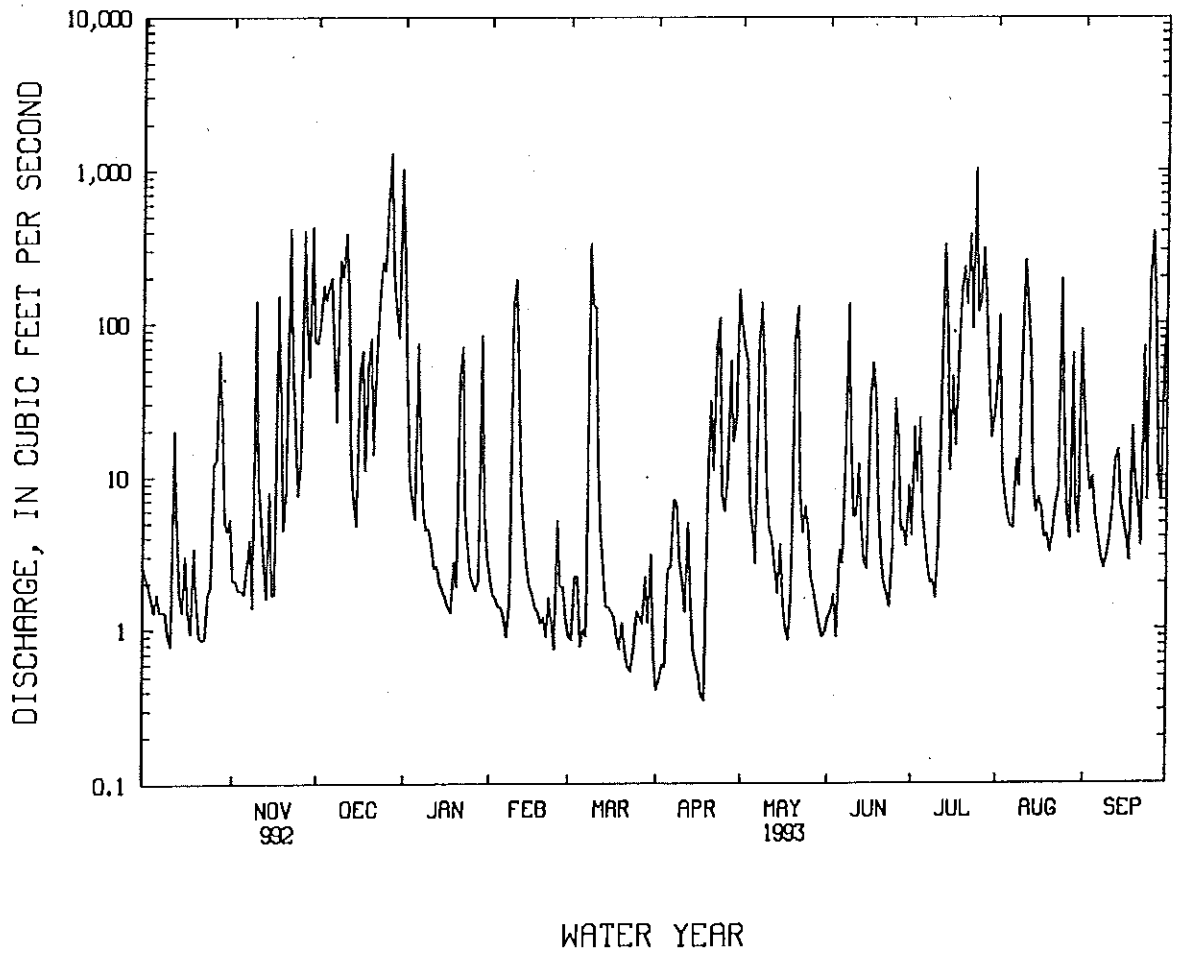
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.2	2.1	75	283	2.2	.90	.41	98	1.2	4.1	37	31
2	1.9	2.1	98	43	1.7	.86	.47	70	1.3	21	113	14
3	1.6	1.8	176	10	1.6	2.2	.60	57	1.7	9.2	11	8.1
4	1.3	1.8	142	7.0	1.4	2.2	.57	6.9	.90	24	7.6	10
5	1.7	1.7	173	5.3	1.4	.78	2.5	4.6	3.3	6.0	5.5	5.6
6	1.3	2.6	198	74	1.2	1.0	2.5	2.7	2.7	3.9	4.7	4.1
7	1.3	3.9	65	18	.90	.90	7.1	72	13	2.6	4.6	3.0
8	1.3	1.4	23	6.4	1.5	333	6.8	137	135	2.0	13	2.5
9	.90	140	262	4.5	137	132	2.9	51	18	2.1	8.7	3.0
10	.79	9.6	202	4.6	195	126	2.1	9.0	5.5	1.6	55	4.0
11	20	5.3	388	3.7	44	13	1.3	4.6	5.6	3.8	259	6.4
12	4.6	2.8	153	2.5	7.9	4.4	5.0	3.9	12	39	140	13
13	1.7	1.6	13	2.6	4.3	2.5	1.6	2.6	4.7	327	68	15
14	1.3	7.9	6.6	2.0	2.6	1.4	.75	1.7	2.7	105	9.3	6.6
15	3.0	1.7	4.8	1.8	1.9	1.4	.60	3.6	2.5	11	5.9	5.2
16	1.3	1.7	50	1.6	1.7	1.3	.51	1.5	31	45	7.3	4.0
17	.95	151	66	1.4	1.4	1.2	.37	1.0	55	16	6.2	2.8
18	3.4	34	11	1.3	1.3	.90	.35	.86	32	59	4.0	21
19	1.5	4.5	54	2.8	1.1	.75	8.6	1.8	7.2	163	4.2	9.1
20	.90	8.0	80	1.9	1.2	1.1	31	82	3.1	235	3.2	6.7
21	.86	419	14	45	.90	.72	11	129	2.0	134	4.2	3.5
22	.88	57	60	71	1.6	.57	74	8.2	1.7	387	6.5	71
23	1.7	22	137	6.2	1.1	.54	109	4.3	1.4	92	8.0	7.0
24	1.9	7.6	254	3.6	.75	.76	7.6	6.4	3.3	1040	195	205
25	12	13	219	2.3	5.2	1.3	6.0	4.5	32	119	21	398
26	13	406	633	2.0	1.9	1.2	10	2.2	19	137	5.7	104
27	66	98	1290	1.8	1.9	1.1	57	1.8	4.4	309	3.9	9.5
28	23	45	215	2.1	1.2	2.2	17	1.4	4.6	142	63	7.2
29	5.0	428	125	84	---	1.1	22	1.1	3.5	47	6.5	64
30	4.4	77	81	6.0	---	3.1	166	.90	8.8	18	4.2	116
31	5.3	---	1020	3.1	---	.68	---	.95	---	24	91	---
TOTAL	186.98	1958.1	6288.4	704.5	425.85	641.06	555.63	772.51	419.10	3529.3	1176.2	1160.3
MEAN	6.03	65.3	203	22.7	15.2	20.7	18.5	24.9	14.0	114	37.9	38.7
MAX	66	428	1290	283	195	333	166	137	135	1040	259	398
MIN	.79	1.4	4.8	1.3	.75	.54	.35	.86	.90	1.6	3.2	2.5
AC-FT	371	3880	12470	1400	845	1270	1100	1530	831	7000	2330	2300

16501200 OHEO GULCH AT DAM NEAR KIPAHULU--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1988 - 1993, BY WATER YEAR (WY)

MEAN	54.4	96.2	114	82.2	44.1	99.5	47.2	35.9	30.0	53.1	36.6	40.1
MAX	145	334	203	218	133	320	116	99.1	66.5	114	82.4	77.4
(WY)	1990	1991	1993	1989	1990	1991	1989	1989	1990	1993	1991	1992
MIN	6.03	11.2	5.28	11.1	2.90	10.2	6.56	3.03	14.0	15.2	10.4	12.5
(WY)	1993	1992	1990	1992	1992	1992	1992	1992	1993	1988	1988	1988

SUMMARY STATISTICS	FOR 1992 CALENDAR YEAR		FOR 1993 WATER YEAR		WATER YEARS 1988 - 1993	
ANNUAL TOTAL	14102.56		17817.93			
ANNUAL MEAN	38.5		48.8		62.8	
HIGHEST ANNUAL MEAN					102	1991
LOWEST ANNUAL MEAN					22.3	1992
HIGHEST DAILY MEAN	1290	Dec 27	1290	Dec 27	2220	Nov 19 1990
LOWEST DAILY MEAN	.00	Feb 25	.35	Apr 18	.00	Feb 25 1992
ANNUAL SEVEN-DAY MINIMUM	.00	Feb 25	.76	Mar 18	.00	Feb 25 1992
ANNUAL RUNOFF (AC-FT)	27970		35340		45530	
10 PERCENT EXCEEDS	101		137		170	
50 PERCENT EXCEEDS	4.6		5.2		6.5	
90 PERCENT EXCEEDS	.28		1.1		1.1	



16508000 HANAWI STREAM NEAR NAHIKU

LOCATION.--Lat 20°48'37", long 156°07'00", Hydrologic Unit 20020000, on left bank 200 ft upstream from Koolau ditch intake and trail, 1.9 mi southwest of Nahiku, and 4.5 mi southeast of Keanae.

DRAINAGE AREA.--3.49 mi^2.

PERIOD OF RECORD.--January 1914 to January 1916, November 1921 to current year. Monthly discharge only April to June 1915, published in WSP 1319.

REVISED RECORDS.--WSP 1045: 1922-43(M). WSP 1569: Drainage area. WSP 1719: 1915(M), 1922, 1924-25, 1927, 1930-35, 1937, 1939-40, 1942-43.

GAGE.--Water-stage recorder. Datum of gage is 1,318 ft above mean sea level (by vertical angles). Prior to Nov. 1, 1921, at site 50 ft downstream at datum 0.12 ft lower.

REMARKS.--Records good. No diversion upstream.

AVERAGE DISCHARGE.--71 years (water years 1923-93), 23.9 ft^3/s (17,350 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, about 5,570 ft^3/s, Jan. 18, 1916, gage height, 11.6 ft, present site and datum, from rating curve extended above 814 ft^3/s by physical model of station site; minimum, 0.90 ft^3/s, Oct. 28 to Nov. 1, 1984.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,700 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	*3,130	*8.90	Mar. 9	2100	2,020	7.03

Minimum discharge, 2.2 ft^3/s, Feb. 28, Mar. 1.

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

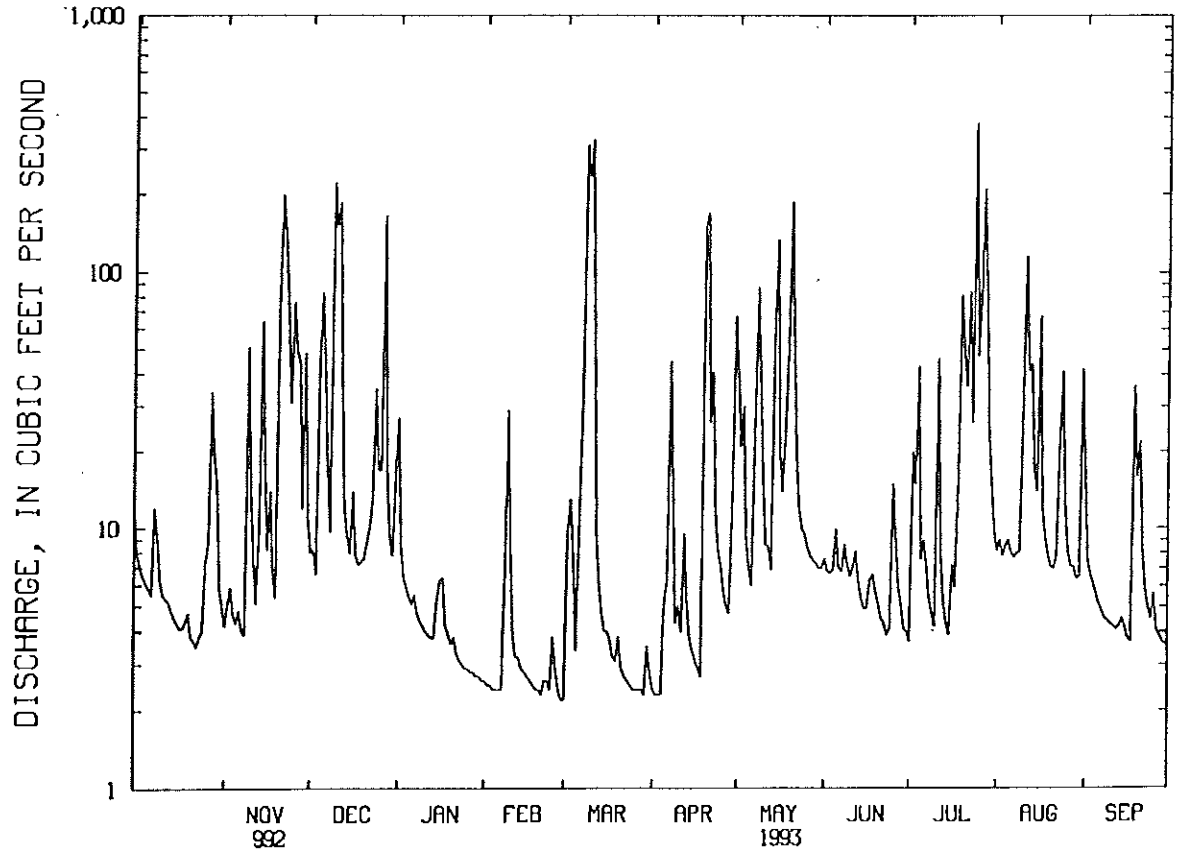
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	7.9	4.2	8.0	27	2.6	2.2	2.4	41	7.6	3.7	8.2	17
2	7.0	5.0	8.2	8.4	2.5	9.4	2.3	21	6.8	20	9.0	7.5
3	6.5	5.9	6.6	6.4	2.5	13	2.3	30	6.7	15	7.8	6.6
4	6.1	4.6	45	5.9	2.4	7.6	2.3	9.2	6.9	43	8.5	6.1
5	5.8	4.3	83	5.4	2.4	3.4	5.0	7.0	9.9	7.6	9.0	5.6
6	5.5	4.8	41	5.1	2.4	11	6.2	6.0	7.0	9.0	8.1	5.1
7	12	4.0	17	5.5	2.4	35	45	28	6.8	7.2	7.7	4.8
8	9.3	3.9	9.7	4.7	6.2	311	14	87	8.6	5.4	8.0	4.5
9	6.3	51	221	4.4	29	233	4.3	37	7.2	4.7	8.1	4.4
10	5.5	14	152	4.2	8.2	325	5.0	16	6.5	4.2	33	4.3
11	5.3	7.6	185	4.0	3.9	55	4.0	8.6	7.0	46	115	4.2
12	5.2	5.1	39	3.9	3.2	9.5	9.5	8.5	8.1	8.2	41	4.1
13	4.8	9.8	12	3.8	3.2	6.0	5.2	6.9	6.3	5.3	44	4.2
14	4.5	64	9.3	3.8	2.9	4.7	3.8	63	5.4	4.3	17	4.5
15	4.3	18	8.0	5.3	2.8	4.0	3.4	133	4.9	3.9	14	4.2
16	4.1	8.2	14	6.3	2.7	4.0	3.1	20	4.9	7.2	67	3.8
17	4.1	14	7.8	6.4	2.6	3.7	2.9	14	6.3	5.9	12	3.7
18	4.3	6.6	7.2	4.2	2.5	3.2	2.7	24	6.6	16	9.2	36
19	4.7	5.4	7.4	3.9	2.4	3.1	152	50	5.7	81	7.9	16
20	3.8	93	7.6	3.6	2.4	3.8	169	187	5.1	49	7.1	22
21	3.7	199	8.8	3.8	2.3	2.9	26	53	4.5	36	7.0	8.3
22	3.5	134	10	3.3	2.6	2.7	41	19	4.3	84	7.8	5.9
23	3.8	70	13	3.1	2.6	2.6	12	12	3.9	26	22	5.0
24	4.0	31	35	3.0	2.4	2.5	8.2	10	4.1	379	41	4.5
25	7.3	76	17	2.9	3.8	2.4	7.1	9.5	15	47	12	5.6
26	8.8	49	17	2.9	2.9	2.4	5.7	8.4	9.0	85	8.1	4.1
27	34	44	165	2.8	2.4	2.4	5.0	7.8	6.0	209	7.1	3.9
28	19	12	17	2.8	2.2	2.4	4.7	7.5	5.1	82	7.1	3.7
29	15	48	9.2	2.7	---	2.3	12	7.3	4.1	23	6.4	3.6
30	5.9	11	7.8	2.7	---	3.5	67	7.0	4.0	15	6.5	3.7
31	5.0	---	17	2.6	---	2.8	---	7.0	---	9.8	42	---
TOTAL	227.0	1007.4	1205.6	154.8	110.4	1076.5	633.1	945.7	194.3	1342.4	608.6	216.9
MEAN	7.32	33.6	38.9	4.99	3.94	34.7	21.1	30.5	6.48	43.3	19.6	7.23
MAX	34	199	221	27	29	325	169	187	15	379	115	36
MIN	3.5	3.9	6.6	2.6	2.2	2.2	2.3	6.0	3.9	3.7	6.4	3.6
AC-FT	450	2000	2390	307	219	2140	1260	1880	385	2660	1210	430

16508000 HANAWI STREAM NEAR NAHIKU--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1914 - 1993, BY WATER YEAR (WY)

MEAN	14.5	29.3	32.4	31.0	31.0	40.9	36.9	20.8	10.6	15.7	17.2	11.6
MAX	101	110	129	123	182	235	161	68.2	33.5	53.1	66.2	52.3
(WY)	1942	1991	1947	1979	1969	1980	1989	1987	1987	1914	1957	1914
MIN	1.15	2.99	2.71	1.87	2.25	2.10	2.75	2.82	2.16	2.42	2.40	1.88
(WY)	1985	1990	1981	1977	1983	1983	1992	1945	1981	1926	1973	1974

SUMMARY STATISTICS	FOR 1992 CALENDAR YEAR		FOR 1993 WATER YEAR		WATER YEARS 1914 - 1993	
ANNUAL TOTAL	7346.5		7722.7			
ANNUAL MEAN	20.1		21.2		23.9	
HIGHEST ANNUAL MEAN					52.6	1969
LOWEST ANNUAL MEAN					7.59	1926
HIGHEST DAILY MEAN	290	Sep 3	379	Jul 24	1610	Jan 25 1948
LOWEST DAILY MEAN	1.8	Apr 22	2.2	Feb 28	.90	Oct 31 1984
ANNUAL SEVEN-DAY MINIMUM	1.9	Apr 19	2.4	Mar 23	.96	Oct 25 1984
ANNUAL RUNOFF (AC-FT)	14570		15320		17350	
10 PERCENT EXCEEDS	44		47		51	
50 PERCENT EXCEEDS	6.2		6.8		7.2	
90 PERCENT EXCEEDS	2.3		2.8		2.8	



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16509000 HANAWI STREAM BELOW GOVERNMENT ROAD, NEAR NAHIKU

LOCATION.--Lat 20°49'15", long 156°06'25", Hydrologic Unit 20020000, on right bank about 0.8 mi downstream from Hanawi stream highway bridge, 0.7 mi southwest of Nahiku and 6.4 mi southeast of Keanae school.

DRAINAGE AREA.--5.03 mi^2.

PERIOD OF RECORD.--July 1932 to July 1947, Feb. 1992 to current year. Records at same site collected by East Maui Irrigation Co. Jan. 1927 to June 1932.

GAGE.--Concrete control. Water-stage recorder. Datum of gage is 500 ft above mean sea level (by barometer).

REMARKS.--Records good except those above 100 ft^3/s which are fair.

Entire flow of stream above station up to 39 ft^3/s is diverted by East Maui Irrigation CO. ditch at altitude 1,300 ft for irrigation in central Maui. Maui Land and Pineapple Co. pumps from the stream at the highway bridge.

EXTREMES FOR PERIOD OF RECORD.--1932-47: Maximum discharge 11,100 ft^3/s, Mar. 21, 1937, gage height 9.54 ft, from rating curve extended above 43 ft^3/s; minimum, 12.7 ft^3/s, Feb. 25, 26, 1936.

Flood that destroyed shelter Apr. 6 or 7, 1938, probably reached a higher stage than 9.54 ft, the maximum given.

EXTREMES FOR CURRENT YEAR.--Maximum discharge during the period Feb. to Sep., 712 ft^3/s, gage height, 4.87 ft; minimum discharge, 17 ft^3/s on 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	---	---	---	---	---	19	17	19	18	19	28	25
2	---	---	---	---	---	19	17	18	17	19	25	103
3	---	---	---	---	---	19	17	18	17	19	24	212
4	---	---	---	---	---	19	17	41	17	19	20	208
5	---	---	---	---	---	19	17	78	17	18	20	128
6	---	---	---	---	---	19	17	54	18	18	38	90
7	---	---	---	---	---	19	17	22	17	18	25	30
8	---	---	---	---	---	19	17	20	18	17	22	24
9	---	---	---	---	---	18	17	19	17	44	21	22
10	---	---	---	---	---	18	18	19	17	19	20	21
11	---	---	---	---	---	18	19	19	17	19	22	20
12	---	---	---	---	---	18	18	18	19	21	23	20
13	---	---	---	---	---	18	18	19	18	20	22	19
14	---	---	---	---	---	19	18	18	18	21	21	80
15	---	---	---	---	---	18	18	18	18	19	21	20
16	---	---	---	---	---	18	18	18	18	20	33	23
17	---	---	---	---	---	18	18	19	19	21	22	48
18	---	---	---	---	---	18	18	18	19	20	22	25
19	---	---	---	---	---	17	18	18	19	31	21	22
20	---	---	---	---	---	18	18	18	19	121	21	43
21	---	---	---	---	20	18	18	18	19	33	37	22
22	---	---	---	---	20	18	17	18	19	21	23	22
23	---	---	---	---	20	18	17	19	18	22	25	32
24	---	---	---	---	20	18	17	21	19	20	22	20
25	---	---	---	---	20	18	17	21	19	20	22	20
26	---	---	---	---	19	18	17	20	18	119	23	22
27	---	---	---	---	19	18	17	19	19	135	22	25
28	---	---	---	---	19	18	18	19	21	143	22	21
29	---	---	---	---	19	18	19	18	19	64	22	20
30	---	---	---	---	---	18	19	18	19	91	23	20
31	---	---	---	---	---	17	---	18	---	32	31	---
TOTAL	---	---	---	---	---	565	528	700	547	1223	743	1407
MEAN	---	---	---	---	---	18.2	17.6	22.6	18.2	39.5	24.0	46.9
MAX	---	---	---	---	---	19	19	78	21	143	38	212
MIN	---	---	---	---	---	17	17	18	17	17	20	19
AC-FT	---	---	---	---	---	1120	1050	1390	1080	2430	1470	2790

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1932 - 1992, BY WATER YEAR (WY)

MEAN	29.0	32.6	60.5	50.4	46.1	66.5	53.2	41.5	25.3	28.8	34.7	27.5
MAX	115	52.8	241	132	138	244	255	150	65.7	56.7	113	48.5
(WY)	1942	1940	1937	1937	1937	1942	1938	1938	1941	1937	1940	1940
MIN	17.9	18.0	15.7	17.1	13.8	17.3	17.6	16.5	16.4	16.5	18.6	17.4
(WY)	1936	1944	1936	1945	1936	1934	1992	1945	1940	1945	1944	1945

16509000 HANAWI STREAM BELOW GOVERNMENT ROAD, NEAR NAHIKU

LOCATION.--Lat 20°49'15", long 156°06'25", Hydrologic Unit 20020000, on right bank about 0.8 mi downstream from Hanawi stream highway bridge, 0.7 mi southwest of Nahiku and 6.4 mi southeast of Keanae school.

DRAINAGE AREA.--5.03 mi^2.

PERIOD OF RECORD.--July 1932 to July 1947, Feb. 1992 to current year. Records at same site collected by East Maui Irrigation Co. Jan. 1927 to June 1932.

GAGE.--Concrete control. Water-stage recorder. Datum of gage is 500 ft above mean sea level (by barometer).

REMARKS.--Records good except those above 100 ft^3/s which are fair.

Entire flow of stream above station up to 39 ft^3/s is diverted by East Maui Irrigation CO. ditch at altitude 1,300 ft for irrigation in central Maui. Maui Land and Pineapple Co. pumps from the stream at the highway bridge.

AVERAGE DISCHARGE.--16 years (1932-47, 1993), 41.0 ft^3/s (29,680 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--1932-47: Maximum discharge 11,100 ft^3/s, Mar. 21, 1937, gage height 9.54 ft, from rating curve extended above 43 ft^3/s; minimum, 12.7 ft^3/s, Feb. 25, 26, 1936.

Flood that destroyed shelter Apr. 6 or 7, 1938, probably reached a higher stage than 9.54 ft, the maximum given.

EXTREMES FOR CURRENT YEAR.--Peak discharge greater than base discharge of 1,300 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	0700	*2,510	*8.48	No other peak greater than base discharge.			

Minimum discharge, 16 ft^3/s on several days.

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	20	17	22	25	18	17	16	e35	18	18	20	23
2	19	17	22	20	18	17	16	21	17	19	19	19
3	19	17	21	20	18	18	16	e25	17	19	19	19
4	18	17	36	20	18	18	16	20	17	31	19	19
5	18	17	58	20	18	18	16	20	17	19	19	19
6	18	18	30	19	18	18	17	20	17	19	18	19
7	20	18	23	19	18	25	32	e22	17	19	18	19
8	21	18	22	19	19	220	18	e56	18	19	19	18
9	20	32	150	19	28	153	18	e30	18	18	19	18
10	19	20	103	19	21	214	18	20	17	18	22	18
11	19	19	136	19	19	55	17	20	17	43	72	18
12	19	19	34	18	19	22	17	20	19	20	30	19
13	19	19	22	18	20	20	17	20	19	19	31	19
14	19	44	22	18	19	19	16	51	18	18	21	18
15	19	20	21	19	19	19	16	87	17	18	20	17
16	19	19	21	19	19	18	16	20	18	19	50	17
17	18	19	20	18	18	17	16	19	18	18	20	18
18	19	19	20	18	18	17	16	22	18	19	20	31
19	19	19	20	18	18	17	e103	34	19	53	19	21
20	18	86	20	18	18	18	e112	148	18	37	19	24
21	17	159	20	20	18	17	24	42	17	27	19	21
22	17	113	21	19	18	17	30	24	17	70	19	19
23	17	81	22	19	18	16	23	21	17	30	20	19
24	17	52	34	19	18	16	22	20	17	232	31	19
25	17	74	23	19	17	16	21	19	18	35	20	19
26	18	45	42	19	17	16	21	19	18	66	19	18
27	22	45	110	18	17	16	21	18	18	157	19	17
28	20	24	24	18	17	16	20	18	18	66	19	17
29	18	44	22	18	---	16	20	18	17	23	19	17
30	18	22	21	18	---	16	e50	18	17	22	19	17
31	18	---	22	18	---	16	---	18	---	20	36	---
TOTAL	579	1133	1184	588	521	1118	781	945	528	1211	734	576
MEAN	18.7	37.8	38.2	19.0	18.6	36.1	26.0	30.5	17.6	39.1	23.7	19.2
MAX	22	159	150	25	28	220	112	148	19	232	72	31
MIN	17	17	20	18	17	16	16	18	17	18	18	17
AC-FT	1150	2250	2350	1170	1030	2220	1550	1870	1050	2400	1460	1140

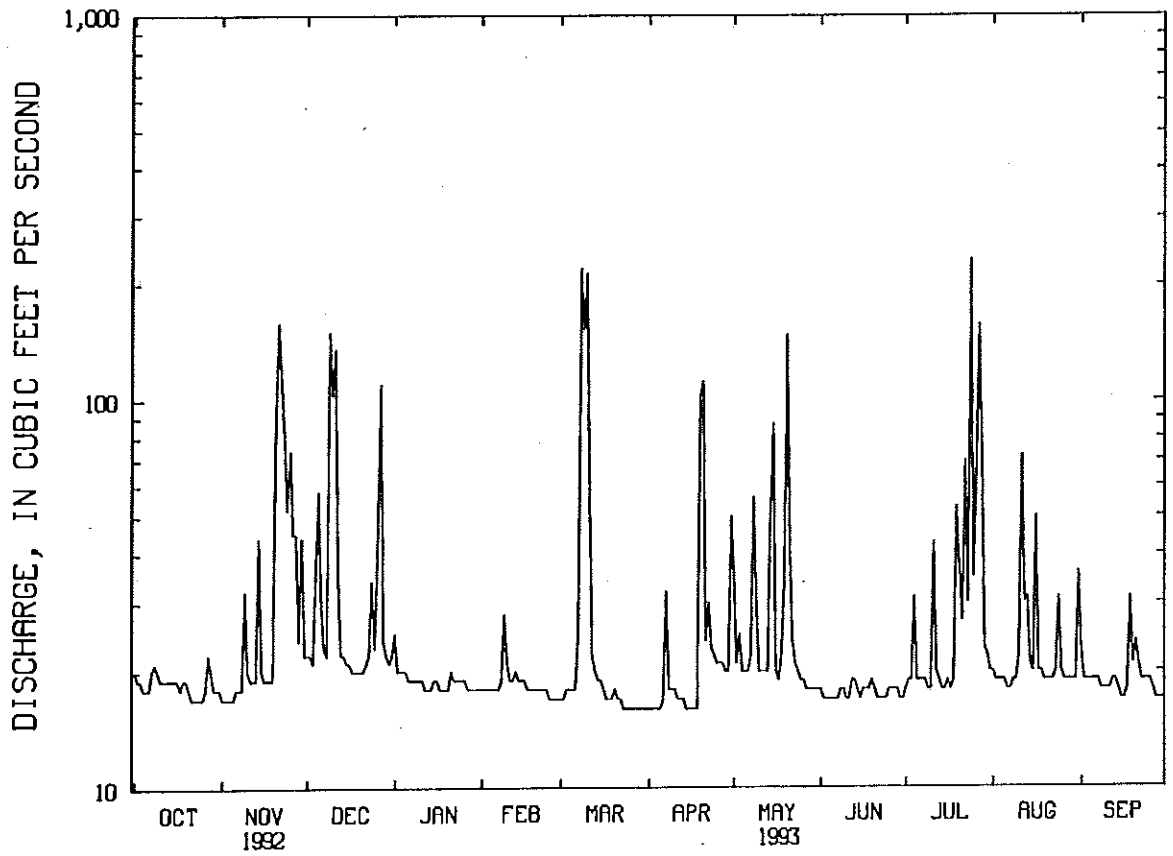
e Estimated

16509000 HANAWI STREAM BELOW GOVERNMENT ROAD, NEAR NAHIKU--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1932 - 1993, BY WATER YEAR (WY)

MEAN	28.3	32.9	59.1	48.4	44.4	64.7	51.6	40.8	24.8	29.4	34.1	27.0
MAX	115	52.8	241	132	138	244	255	150	65.7	56.7	113	48.5
(WY)	1942	1940	1937	1937	1937	1942	1938	1938	1941	1937	1940	1940
MIN	17.9	18.0	15.7	17.1	13.8	17.3	17.6	16.5	16.4	16.5	18.6	17.4
(WY)	1936	1944	1936	1945	1936	1934	1992	1945	1940	1945	1944	1945

SUMMARY STATISTICS	FOR 1993 WATER YEAR		WATER YEARS 1932 - 1993	
ANNUAL TOTAL	9898			
ANNUAL MEAN	27.1		41.0	
HIGHEST ANNUAL MEAN			85.0	1937
LOWEST ANNUAL MEAN			21.3	1944
HIGHEST DAILY MEAN	232	Jul 24	2320	Apr 7 1938
LOWEST DAILY MEAN	16	Mar 23	13	Feb 22 1936
ANNUAL SEVEN-DAY MINIMUM	16	Mar 23	13	Feb 22 1936
ANNUAL RUNOFF (AC-FT)	19630		29680	
10 PERCENT EXCEEDS	42		48	
50 PERCENT EXCEEDS	19		20	
90 PERCENT EXCEEDS	17		17	



16518000 WEST WAILUAIKI STREAM NEAR KEANAE

LOCATION.--Lat 20°49'16", long 156°08'37", Hydrologic Unit 20020000, on left bank 500 ft upstream from Koolau ditch crossing and trail bridge and 2.8 mi south of Keanae Post Office.

DRAINAGE AREA.--3.66 mi^2.

PERIOD OF RECORD.--January 1914 to December 1915, May 1916 to October 1917, November 1921 to current year. Monthly discharge only for some periods, published in WSP 1319.

REVISED RECORDS.--WSP 1569. Drainage area. WSP 2137: 1915-16(M), 1923-25(M), 1929-31(M), 1934-35(M), 1937-39(M), 1941-43(M), 1946-47(M), 1948(P), 1949(M), 1952-53(M), 1955-56(M), 1959-60(M), 1960(P), 1961(M), 1963(M).

GAGE.--Water-stage recorder. Datum of gage is 1,343.1 ft above mean sea level (by vertical angles). Prior to Oct. 3, 1974, at present site at datum 0.50 ft higher.

REMARKS.--Records good. No diversion upstream. Water is diverted by Koolau ditch, 500 ft downstream, for domestic supply and irrigation of sugarcane in central Maui.

AVERAGE DISCHARGE.--73 years (water years 1915, 1917, 1923-93), 35.4 ft^3/s (25,650 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 9,900 ft^3/s, Jan. 14, 1923, gage height, 13.5 ft, from floodmarks, from rating curve extended above 660 ft^3/s by logarithmic plotting; minimum, 0.5 ft^3/s, July 26, 1922.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,900 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Mar. 8	1830	2,580	8.56	July 11	1700	*3,900	*9.93

Minimum discharge, 2.2 ft^3/s, Mar. 1.

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

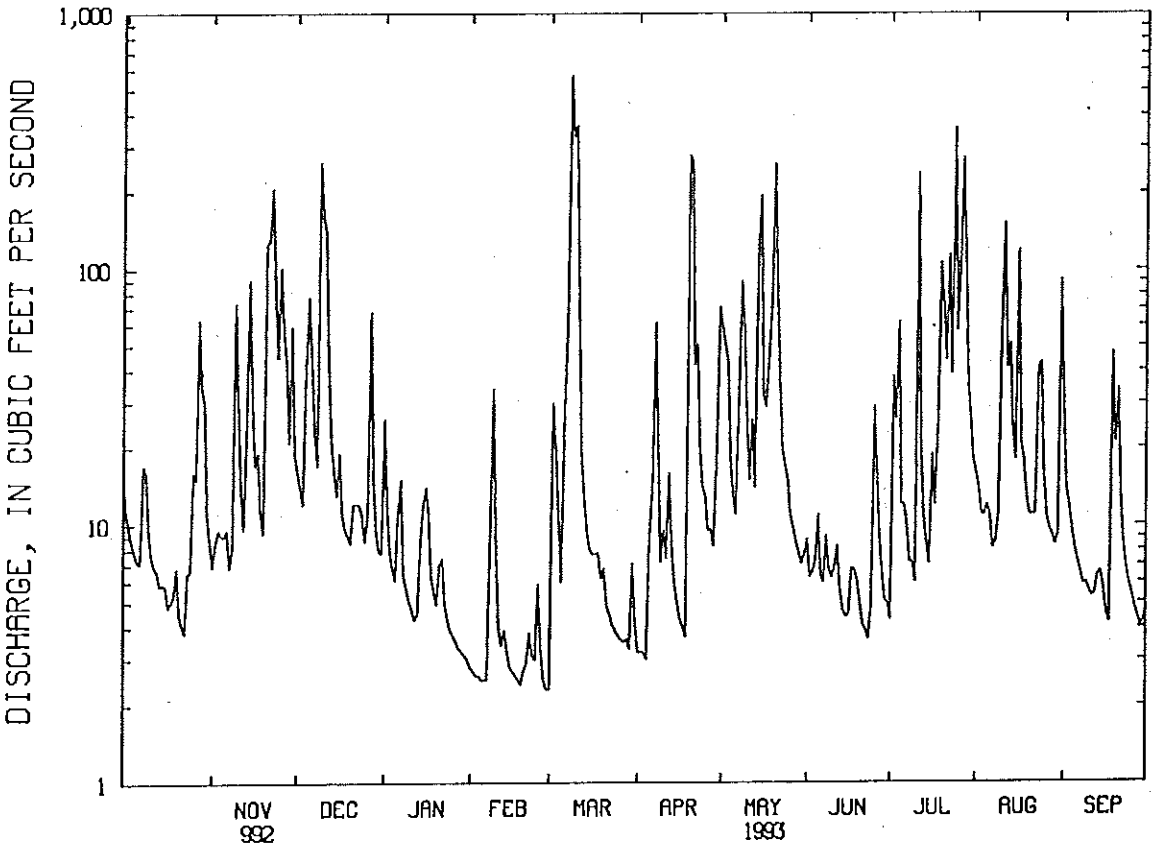
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	11	6.9	16	26	2.8	2.3	3.2	59	8.8	4.3	16	32
2	9.6	8.5	14	12	2.7	30	3.2	50	6.3	38	14	14
3	8.5	9.5	12	7.9	2.6	20	3.2	43	6.6	26	11	12
4	7.7	9.1	39	6.8	2.6	11	3.0	18	7.3	62	11	9.8
5	7.2	9.0	78	6.1	2.5	6.0	8.8	13	11	12	12	8.2
6	7.1	9.5	45	11	2.5	27	14	11	6.4	12	11	7.3
7	17	6.8	23	15	2.5	60	62	31	6.0	10	8.2	6.6
8	16	8.1	17	6.5	8.9	576	20	90	9.1	7.2	8.6	5.9
9	9.6	73	262	5.7	34	329	7.2	59	6.8	7.2	11	6.0
10	7.5	29	159	5.1	8.8	365	9.6	27	6.3	6.0	57	5.6
11	6.9	14	140	4.7	4.1	75	7.4	15	6.8	237	151	5.3
12	6.6	9.6	42	4.3	3.4	19	16	26	8.3	21	41	5.4
13	5.8	24	22	4.5	3.9	13	8.2	14	5.7	11	51	6.4
14	5.9	91	16	8.5	3.3	9.6	5.9	126	4.7	8.7	23	6.6
15	5.8	32	13	12	2.8	8.1	5.0	195	4.4	7.1	18	5.8
16	4.8	17	19	14	2.7	7.7	4.3	32	4.5	19	119	4.6
17	5.0	19	11	11	2.6	7.7	4.0	29	6.8	12	21	4.2
18	5.3	11	9.6	6.3	2.5	7.8	3.7	45	6.7	25	18	47
19	6.8	9.3	9.1	5.5	2.4	6.2	278	75	6.1	106	13	21
20	4.5	125	8.5	4.9	2.7	6.8	263	258	5.0	72	11	34
21	4.1	130	12	7.0	2.9	4.9	42	83	4.1	44	11	13
22	3.8	207	12	7.4	3.8	4.5	51	36	3.9	114	11	8.4
23	6.5	85	12	5.0	3.1	4.1	20	20	3.6	39	41	6.8
24	6.6	45	11	4.3	3.0	3.9	14	17	4.8	357	43	5.9
25	16	101	8.6	3.9	5.9	3.7	13	15	29	57	16	5.4
26	15	57	11	3.7	3.3	3.6	9.5	11	16	109	11	4.8
27	63	43	68	3.5	2.5	3.5	9.7	9.8	9.2	272	9.7	4.4
28	34	21	15	3.3	2.3	3.6	8.3	8.7	6.6	111	9.2	4.1
29	30	59	9.5	3.2	---	3.3	18	7.8	5.1	36	8.4	4.2
30	11	19	7.9	3.1	---	7.1	71	7.1	5.0	26	9.2	4.7
31	8.6	---	7.8	3.0	---	4.2	---	7.7	---	18	91	---
TOTAL	357.2	1288.3	1130.0	225.2	127.1	1633.6	986.2	1439.1	220.9	1886.5	886.3	309.4
MEAN	11.5	42.9	36.5	7.26	4.54	52.7	32.9	46.4	7.36	60.9	28.6	10.3
MAX	63	207	262	26	34	576	278	258	29	357	151	47
MIN	3.8	6.8	7.8	3.0	2.3	2.3	3.0	7.1	3.6	4.3	8.2	4.1
AC-FT	709	2560	2240	447	252	3240	1960	2850	438	3740	1760	614

16518000 WEST WAILUAIKI STREAM NEAR KEANAE--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1914 - 1993, BY WATER YEAR (WY)

MEAN	23.5	46.3	49.7	42.8	47.2	56.2	55.9	30.6	16.4	25.3	26.5	18.4
MAX	133	198	200	192	222	303	221	88.4	58.1	99.4	111	101
(WY)	1942	1922	1937	1979	1932	1942	1989	1914	1941	1914	1914	1914
MIN	.88	4.06	2.82	2.01	2.80	2.04	4.17	3.86	2.37	1.72	2.85	1.68
(WY)	1985	1992	1981	1977	1983	1926	1992	1945	1981	1922	1973	1974

SUMMARY STATISTICS	FOR 1992 CALENDAR YEAR		FOR 1993 WATER YEAR		WATER YEARS 1914 - 1993	
ANNUAL TOTAL	10091.7		10489.8			
ANNUAL MEAN	27.6		28.7		35.4	
HIGHEST ANNUAL MEAN					67.3	1980
LOWEST ANNUAL MEAN					14.5	1981
HIGHEST DAILY MEAN	513	Sep 3	576	Mar 8	2260	Jan 26 1948
LOWEST DAILY MEAN	1.8	Apr 8	2.3	Feb 28	.62	Jul 23 1922
ANNUAL SEVEN-DAY MINIMUM	2.0	Apr 19	2.6	Feb 1	.71	Oct 25 1984
ANNUAL RUNOFF (AC-FT)	20020		20810		25650	
10 PERCENT EXCEEDS	54		65		79	
50 PERCENT EXCEEDS	10		9.5		10	
90 PERCENT EXCEEDS	2.8		3.7		3.3	



16587000 HONOPOU STREAM NEAR HUELO

LOCATION.--Lat 20°53'20", long 156°15'20", Hydrologic Unit 20020000, on left bank 75 ft upstream from Wailoa ditch intake, 2.2 mi southwest of Huelo, and 2.5 mi west of Kailua.

DRAINAGE AREA.--0.64 mi^2.

PERIOD OF RECORD.--December 1910 to current year. Monthly discharge only for some periods, published in WSP 1319.

REVISED RECORDS.--WSP 1219: 1914(M), 1916-50(M). WSP 1249: 1948-50(P). WSP 1569: Drainage area.

GAGE.--Water-stage recorders and concrete control. Datum of gage is 1,208 ft above mean sea level (by vertical angles). Prior to June 19, 1914, nonrecording gage at same site and datum.

REMARKS.--Records good. No diversion upstream.

AVERAGE DISCHARGE.--82 years (water years 1912-93), 4.80 ft^3/s (3,480 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 5,710 ft^3/s, Nov. 18, 1930, gage height, 7.28 ft from rating curve extended above 110 ft^3/s by test of model of station site; minimum, 0.02 ft^3/s, several days in 1933, 1934.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 270 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Nov. 20	1830	306	3.14	Mar. 10	1300	276	3.08
Mar. 8	1900	*317	*3.16				

Minimum discharge, 0.60 ft^3/s, Feb. 27, 28, Mar. 1.

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

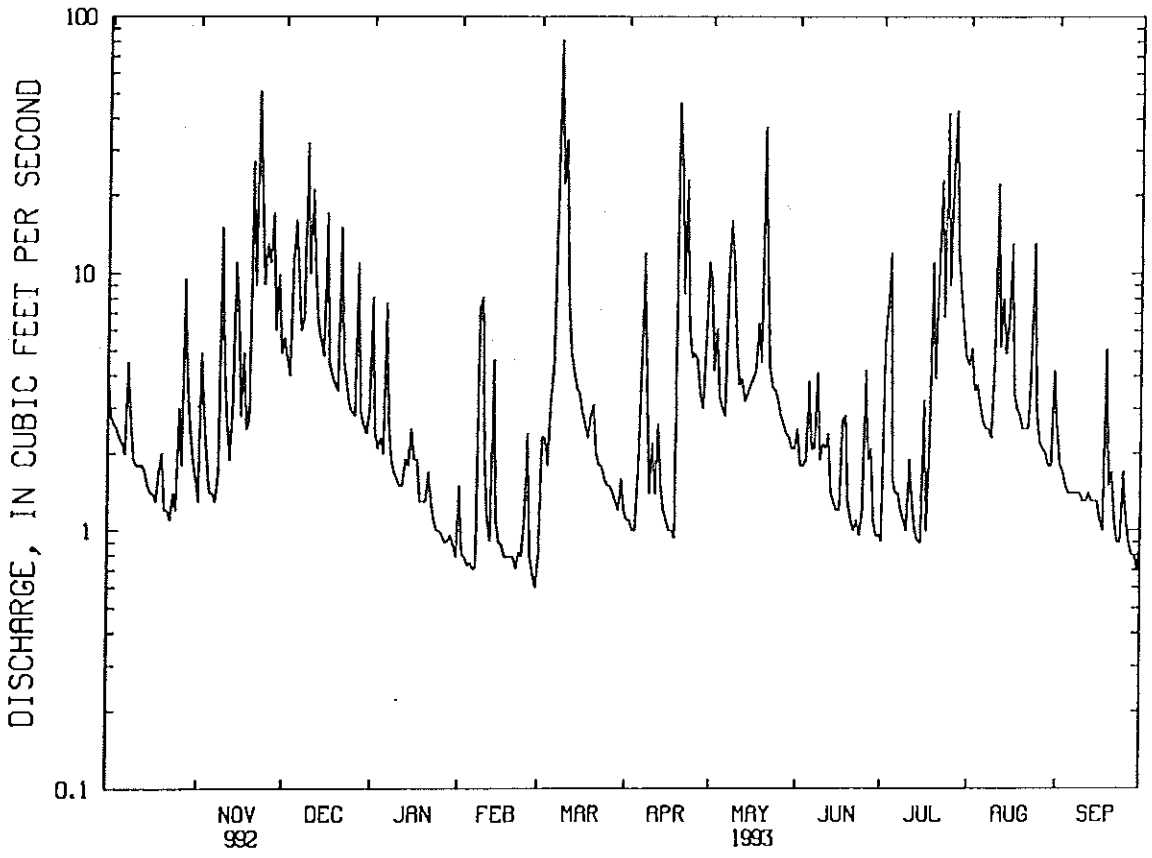
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.8	1.3	5.6	8.1	1.5	.79	1.1	9.5	2.5	.91	4.4	2.5
2	2.6	4.9	4.7	2.4	.81	2.3	1.1	4.2	1.8	5.3	5.1	1.8
3	2.5	2.8	4.0	2.1	.79	2.3	1.0	6.1	1.8	7.4	3.5	1.7
4	2.3	1.9	11	2.3	.73	1.8	1.0	3.3	1.9	12	3.7	1.5
5	2.2	1.4	16	2.0	.75	3.2	1.7	3.0	3.8	1.6	3.1	1.4
6	2.0	1.4	10	7.7	.71	4.5	4.1	2.8	2.1	1.4	2.7	1.4
7	4.5	1.3	6.0	2.6	.72	18	12	9.7	2.1	1.4	2.5	1.4
8	2.7	1.7	6.7	1.9	7.4	81	3.8	16	4.1	1.2	2.5	1.4
9	1.9	15	32	1.7	8.1	22	1.4	11	1.9	1.1	2.3	1.4
10	1.8	4.5	10	1.6	1.9	33	2.2	5.4	2.2	1.0	4.6	1.3
11	1.8	2.7	21	1.5	1.1	7.9	1.4	3.7	2.1	1.9	22	1.3
12	1.8	1.9	10	1.5	.91	4.9	2.6	3.9	2.4	1.3	5.2	1.4
13	1.7	3.1	6.4	1.9	4.6	4.2	1.5	3.2	1.4	1.0	8.0	1.3
14	1.5	11	5.5	1.8	1.1	3.6	1.2	3.4	1.3	.91	4.9	1.3
15	1.4	7.2	4.8	2.5	.90	3.4	1.1	3.7	1.2	.90	6.6	1.3
16	1.4	2.8	17	1.9	.88	2.9	1.0	3.9	1.2	3.2	13	1.1
17	1.3	4.9	4.4	1.9	.79	2.6	1.0	4.2	2.7	1.0	3.4	1.0
18	1.7	2.5	4.0	1.3	.79	2.3	.94	6.4	2.8	2.3	3.0	5.1
19	2.0	2.7	3.7	1.3	.79	2.8	46	4.5	1.3	11	2.8	1.5
20	1.2	27	3.5	1.3	.79	3.1	28	37	1.1	3.9	2.5	1.7
21	1.2	9.0	15	1.7	.71	2.0	8.4	11	1.0	10	2.5	1.1
22	1.1	51	4.6	1.3	.82	1.8	23	4.3	1.1	23	2.5	.90
23	1.4	20	3.8	1.1	.79	1.8	6.3	3.6	.96	6.8	4.3	.90
24	1.2	9.1	3.1	1.0	1.1	1.6	4.7	3.5	1.2	42	13	1.7
25	3.0	13	2.9	1.0	2.4	1.5	4.9	3.2	4.2	9.0	2.9	1.1
26	1.8	11	2.8	.96	.80	1.5	4.6	2.8	1.9	24	2.2	.90
27	9.5	17	11	.90	.68	1.4	3.4	2.6	2.1	43	2.1	.80
28	3.7	6.0	2.9	.91	.60	1.3	3.0	2.4	1.1	12	2.0	.80
29	2.5	9.9	2.6	.96	---	1.2	5.1	2.3	.95	8.3	1.8	.70
30	1.9	4.9	2.4	.88	---	1.6	11	2.1	.97	6.2	1.8	.90
31	1.6	---	2.9	.79	---	1.2	---	2.1	---	4.7	4.2	---
TOTAL	70.0	252.9	240.3	60.80	43.96	223.49	188.54	184.8	57.18	249.72	145.1	42.60
MEAN	2.26	8.43	7.75	1.96	1.57	7.21	6.28	5.96	1.91	8.06	4.68	1.42
MAX	9.5	51	32	8.1	8.1	81	46	37	4.2	43	22	5.1
MIN	1.1	1.3	2.4	.79	.60	.79	.94	2.1	.95	.90	1.8	.70
AC-FT	139	502	477	121	87	443	374	367	113	495	288	84

16587000 HONOPOU STREAM NEAR HUELO--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1911 - 1993, BY WATER YEAR (WY)

MEAN	2.71	5.47	6.11	5.51	5.38	6.97	7.68	5.22	2.78	3.49	4.02	2.68
MAX	15.9	21.4	20.0	20.9	24.5	33.0	43.4	24.3	9.97	12.6	18.1	14.6
(WY)	1942	1991	1947	1921	1969	1942	1989	1916	1914	1914	1982	1992
MIN	.15	.25	1.04	.61	.62	.79	.58	.84	.52	.41	.40	.25
(WY)	1985	1963	1981	1977	1983	1992	1992	1933	1962	1981	1973	1984

SUMMARY STATISTICS	FOR 1992 CALENDAR YEAR		FOR 1993 WATER YEAR		WATER YEARS 1911 - 1993	
ANNUAL TOTAL	1847.80		1759.39			
ANNUAL MEAN	5.05		4.82		4.80	
HIGHEST ANNUAL MEAN					9.88	1914
LOWEST ANNUAL MEAN					1.73	1981
HIGHEST DAILY MEAN	80	Sep 3	81	Mar 8	305	Apr 7 1989
LOWEST DAILY MEAN	.34	May 3	.60	Feb 28	.11	Oct 27 1984
ANNUAL SEVEN-DAY MINIMUM	.37	Apr 21	.78	Feb 17	.11	Oct 26 1984
ANNUAL RUNOFF (AC-FT)	3670		3490		3480	
10 PERCENT EXCEEDS	11		11		10	
50 PERCENT EXCEEDS	2.0		2.3		2.5	
90 PERCENT EXCEEDS	.53		.96		.74	



16599500 OPANA TUNNEL AT KAILIILI

LOCATION.--Lat 20°51'04", long 156°16'17", Hydrologic Unit 20020000, on left bank at tunnel outlet, 0.3 mi north of Kailiili, and 2.7 mi east of Makawao.

PERIOD OF RECORD.--May 1965 to current year.

GAGE.--Water-stage recorder and concrete control. Elevation of gage is 2,340 ft, from topographic map.

REMARKS.--Records good. Tunnel diverts from Opana Gulch for agricultural and domestic use in the Kokomo, Makawao, and Pukalani areas.

AVERAGE DISCHARGE.--28 years, 3.21 ft^3/s (2,330 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 18 ft^3/s, Mar. 31, 1982, Apr. 12, 1986; minimum daily, 0.11 ft^3/s, Nov. 5-10, 1973, Oct. 5, 6, 25, 26, 1974.

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge, 11 ft^3/s, Dec. 9, 10, Mar. 10, July 27; minimum daily, 0.66 ft^3/s, Mar. 1.

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

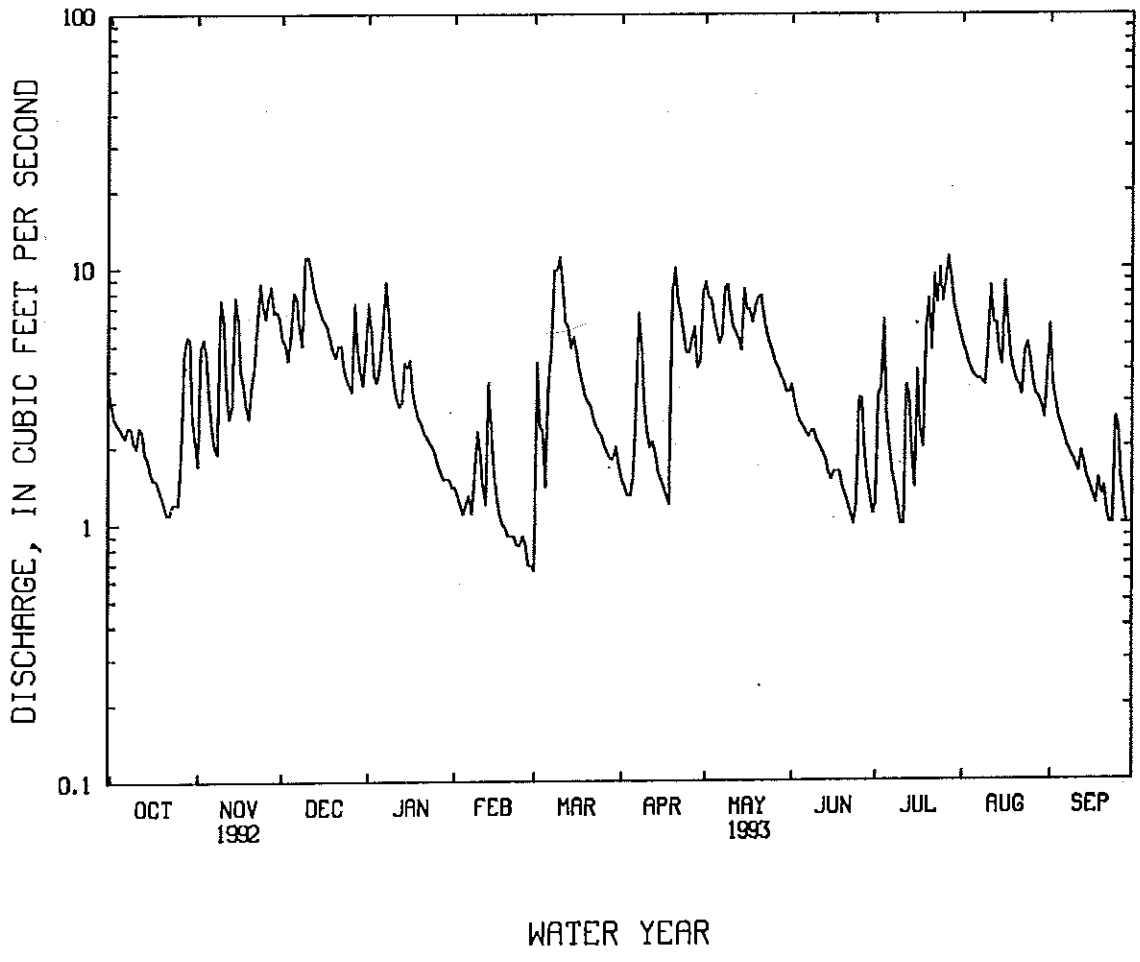
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3.0	1.7	5.3	7.3	1.4	.66	1.5	8.8	3.5	1.2	5.1	6.0
2	2.6	4.9	5.1	5.7	1.3	4.3	1.4	7.7	3.0	3.2	4.7	3.5
3	2.5	5.3	4.4	3.8	1.2	2.4	1.3	7.6	2.7	3.4	4.3	3.0
4	2.4	4.6	5.5	3.6	1.1	2.3	1.3	6.4	2.5	6.3	4.0	2.6
5	2.3	3.2	8.0	4.2	1.2	1.4	1.5	5.7	2.4	2.7	3.8	2.4
6	2.2	2.4	7.6	5.7	1.3	3.6	2.7	5.1	2.3	2.0	3.7	2.2
7	2.4	2.0	5.9	8.8	1.1	4.8	6.7	5.5	2.2	1.6	3.7	2.0
8	2.4	1.9	5.0	6.7	1.6	9.8	5.0	8.4	2.3	1.4	3.6	1.9
9	2.1	7.5	11	4.5	2.3	9.8	3.0	8.6	2.3	1.2	3.5	1.8
10	2.0	6.4	11	3.6	1.9	11	2.3	6.9	2.1	1.0	5.0	1.7
11	2.4	3.6	10	3.1	1.4	8.6	2.0	5.9	2.0	1.0	8.5	1.6
12	2.3	2.6	8.5	2.9	1.2	6.2	2.1	5.6	1.9	3.5	6.1	1.9
13	1.9	2.9	7.6	3.0	3.6	5.9	1.9	5.3	1.8	3.2	6.1	1.7
14	1.8	7.7	7.1	4.3	2.4	4.9	1.6	4.8	1.6	1.9	4.7	1.5
15	1.6	6.4	6.5	4.1	1.6	5.4	1.5	8.3	1.5	1.4	4.2	1.4
16	1.5	4.0	6.2	4.4	1.3	4.7	1.4	6.9	1.6	4.0	8.8	1.3
17	1.5	3.5	5.9	3.3	1.1	4.0	1.3	6.9	1.6	2.3	6.1	1.2
18	1.4	2.9	5.3	2.9	1.0	3.6	1.2	6.2	1.6	2.0	4.5	1.5
19	1.3	2.6	4.8	2.6	.97	3.2	7.9	7.1	1.4	5.8	4.0	1.3
20	1.2	3.5	4.5	2.5	.90	3.0	10	7.7	1.3	7.6	3.6	1.4
21	1.1	4.1	5.0	2.3	.90	2.9	7.5	7.8	1.2	4.8	3.5	1.1
22	1.1	6.2	5.0	2.2	.90	2.6	6.7	6.5	1.1	9.4	3.2	1.0
23	1.2	8.7	4.1	2.1	.83	2.4	5.7	5.6	1.0	7.3	4.7	1.0
24	1.2	7.2	3.7	2.0	.83	2.3	4.7	5.1	1.2	10	5.1	2.6
25	1.2	6.4	3.5	1.9	.90	2.2	4.7	4.7	3.1	7.4	4.4	2.4
26	1.9	7.6	3.3	1.7	.83	2.0	5.3	4.3	3.1	8.9	3.6	1.5
27	4.6	8.5	7.3	1.6	.69	1.9	5.9	4.1	1.9	11	3.2	1.2
28	5.4	6.7	4.8	1.5	.69	1.8	4.1	3.8	1.5	9.1	3.1	1.0
29	5.3	6.8	4.0	1.5	---	1.8	4.3	3.6	1.3	7.2	2.9	1.0
30	2.6	6.4	3.5	1.5	---	2.0	8.0	3.3	1.1	6.4	2.6	1.0
31	2.1	---	4.7	1.4	---	1.7	---	3.3	---	5.7	3.9	---
TOTAL	68.5	148.2	184.1	106.7	36.44	123.16	114.5	187.5	58.1	143.9	138.2	55.7
MEAN	2.21	4.94	5.94	3.44	1.30	3.97	3.82	6.05	1.94	4.64	4.46	1.86
MAX	5.4	8.7	11	8.8	3.6	11	10	8.8	3.5	11	8.8	6.0
MIN	1.1	1.7	3.3	1.4	.69	.66	1.2	3.3	1.0	1.0	2.6	1.0
AC-FT	136	294	365	212	72	244	227	372	115	285	274	110

16599500 OPANA TUNNEL AT KAILIILI--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1965 - 1993, BY WATER YEAR (WY)

MEAN	1.86	3.27	3.85	3.80	3.72	4.83	5.27	3.66	2.07	2.58	2.16	1.55
MAX	5.40	7.97	9.19	7.55	9.04	11.1	9.35	7.42	5.99	6.40	4.98	5.69
(WY)	1984	1968	1971	1989	1969	1982	1968	1987	1986	1982	1969	1992
MIN	.14	.25	.65	.22	.36	.51	.27	1.28	.54	.40	.19	.15
(WY)	1985	1992	1977	1977	1978	1983	1992	1992	1981	1981	1974	1984

SUMMARY STATISTICS	FOR 1992 CALENDAR YEAR		FOR 1993 WATER YEAR		WATER YEARS 1965 - 1993		
ANNUAL TOTAL	1085.31		1365.00				
ANNUAL MEAN	2.97		3.74		3.21		
HIGHEST ANNUAL MEAN					5.34		1969
LOWEST ANNUAL MEAN					1.45		1981
HIGHEST DAILY MEAN	11	Dec 9	11	Dec 9	18	Mar 31	1982
LOWEST DAILY MEAN	.16	May 2	.66	Mar 1	.11	Nov 5	1973
ANNUAL, SEVEN-DAY MINIMUM	.19	Apr 27	.78	Feb 23	.11	Nov 4	1973
ANNUAL RUNOFF (AC-FT)	2150		2710		2330		
10 PERCENT EXCEEDS	6.8		7.5		7.8		
50 PERCENT EXCEEDS	2.3		3.1		2.2		
90 PERCENT EXCEEDS	.26		1.2		.37		



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)	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

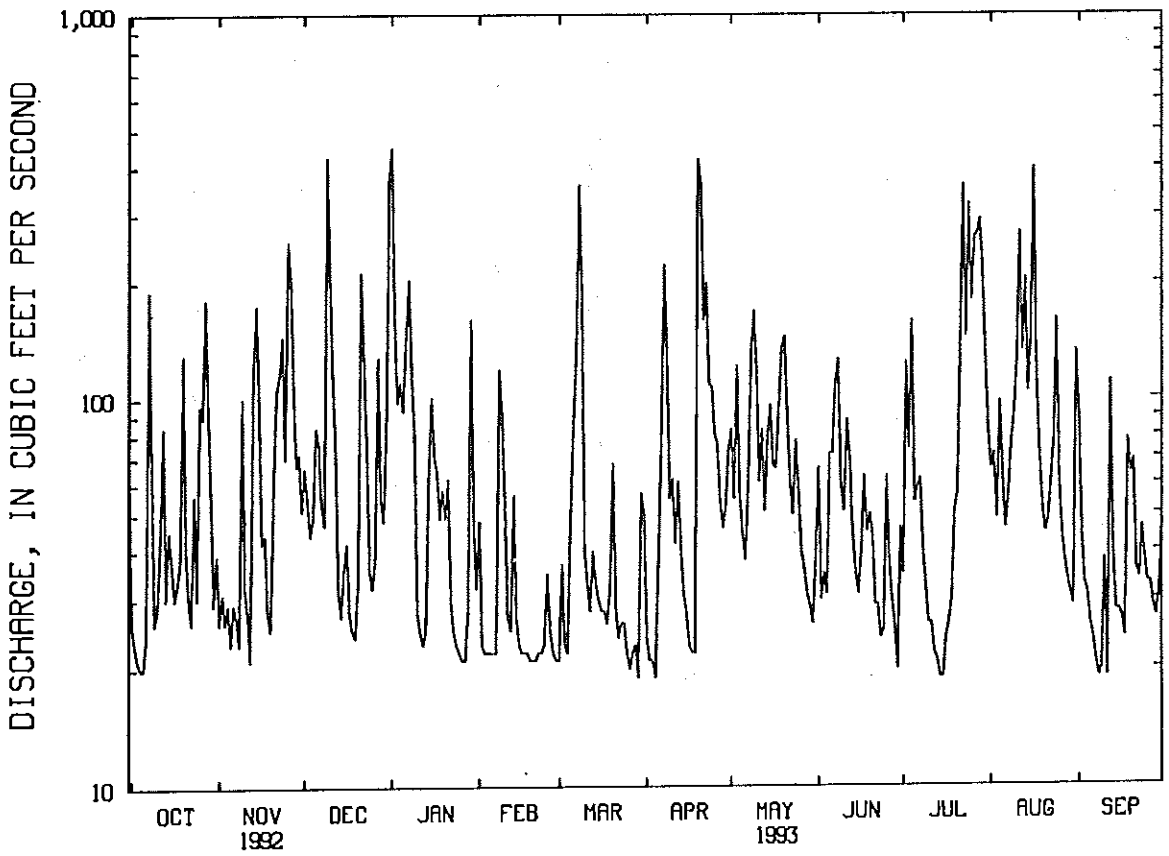
e Estimated

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	2739	2503	1634	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

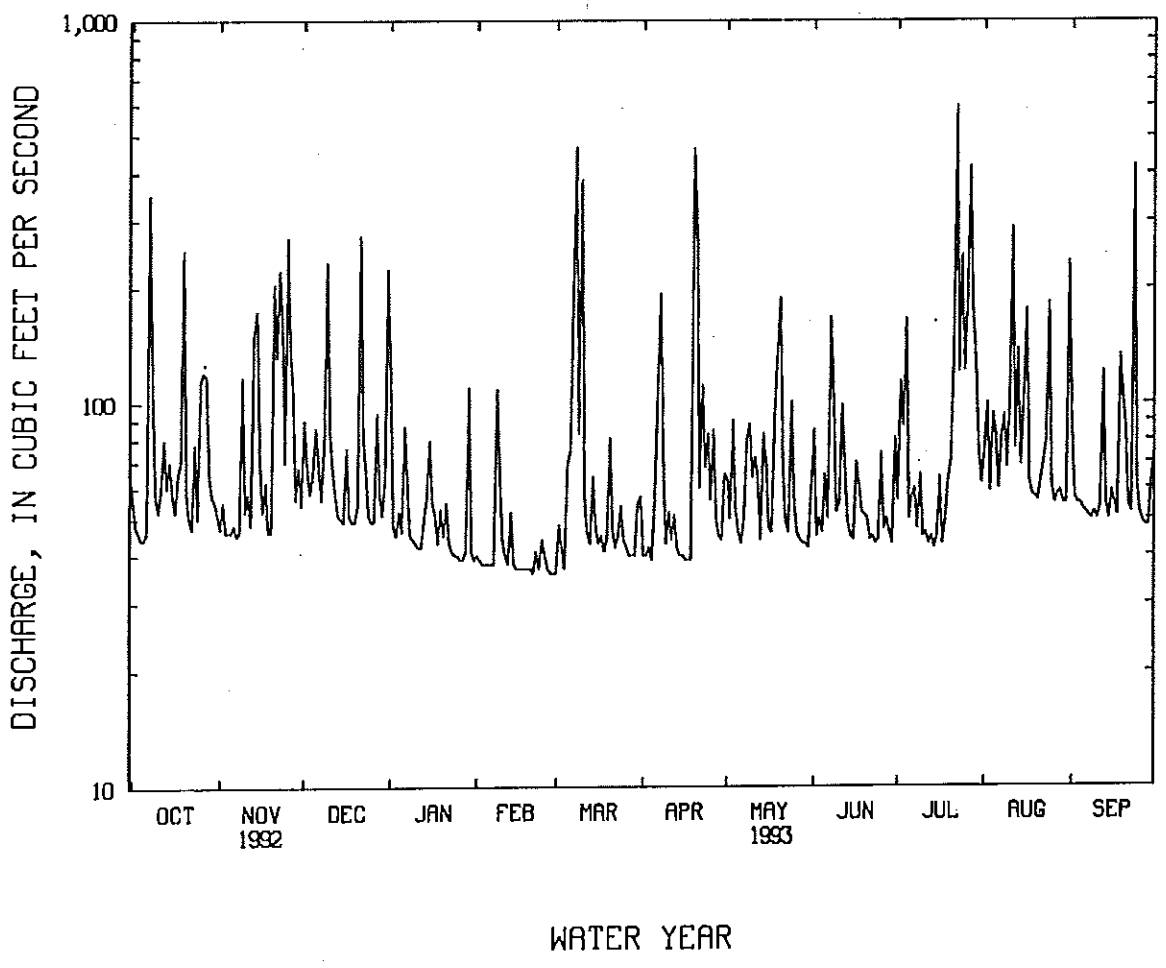
e Estimated

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	



16618000 KAHAKULOA STREAM NEAR HONOKOHAU
(National stream-quality accounting network station)

LOCATION.--Lat 20°58'54", long 156°33'26", Hydrologic Unit 20020000, on right bank 0.5 mi downstream from Kapuna Stream, 1.3 mi south of Kahakuloa, 2.0 mi west of Puu Makawana, and 4.3 mi southeast of Honokohau.

DRAINAGE AREA.--3.47 mi^2.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--July 1939 to August 1943, September 1947 to November 1970, December 1974 to current year. Records for January 1913 to December 1914 (fragmentary) at site 1.0 mi upstream not equivalent owing to difference in drainage areas.

REVISED RECORDS.--WSP 1319: 1948, 1949(M). WSP 1569: Drainage area.

GAGE.--Water-stage recorder and concrete control. Elevation of gage is 330 ft, from topographic map.

REMARKS.--Records fair. No diversion upstream.

AVERAGE DISCHARGE.--44 years (1940-42, 1948-70, 1976-93), 17.9 ft^3/s (12,980 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 4,220 ft^3/s, Jan. 28, 1988, gage height, 9.93 ft from floodmarks, from rating curve extended above 510 ft^3/s, on basis of slope-area measurements at gage heights 6.70 ft, 8.48 ft, and 9.93 ft; minimum, 2.7 ft^3/s, Jan. 22, 28, 29, Feb. 10, 12, 13, 1985.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 700 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Sep. 23	1800	*3,300	*9.05	No other peak greater than base discharge.			

Minimum discharge, 6.0 ft^3/s, Apr. 18, Sept. 28, 29.

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	9.2	8.7	14	43	8.0	6.9	7.7	11	18	12	19	40
2	8.2	11	13	12	7.7	7.1	6.7	8.2	8.1	30	36	10
3	7.9	8.7	13	9.4	7.5	9.3	7.1	13	8.4	15	11	8.2
4	7.5	10	16	11	7.5	7.4	6.9	8.7	8.0	58	18	7.6
5	7.5	8.1	19	12	7.5	16	9.6	10	12	9.6	33	7.0
6	8.0	10	15	34	7.3	30	17	7.9	9.0	11	15	7.0
7	100	9.2	11	18	7.3	81	61	8.0	12	10	11	6.5
8	32	8.1	19	11	29	246	20	18	16	8.6	21	6.3
9	11	27	70	9.3	26	51	8.7	19	10	11	9.2	6.5
10	9.0	9.7	19	8.9	12	e100	8.0	17	9.1	8.2	24	6.3
11	13	9.1	16	8.5	8.5	20	7.7	9.2	16	8.4	82	6.0
12	23	10	11	8.2	8.2	11	8.8	18	18	7.9	14	11
13	9.8	41	9.5	9.0	19	9.2	7.8	10	11	14	28	10
14	15	62	8.7	27	9.1	e14	6.9	18	7.9	9.7	11	6.3
15	12	21	8.3	16	7.8	12	6.7	30	7.2	7.1	18	16
16	8.6	12	15	11	7.5	9.2	6.4	10	11	24	50	7.6
17	12	20	10	13	7.3	10	6.2	9.8	9.3	8.5	12	7.3
18	13	9.4	8.1	9.0	7.3	9.6	6.2	27	7.4	8.3	8.8	49
19	65	11	7.8	12	7.1	7.7	126	60	7.1	12	7.7	32
20	14	148	11	10	7.1	e28	104	86	7.2	20	7.3	27
21	9.4	102	51	25	7.1	9.8	16	34	7.0	29	8.8	9.5
22	8.9	150	20	11	7.4	9.0	21	12	6.7	170	11	7.3
23	19	120	26	8.7	7.3	9.9	17	9.9	6.4	33	16	119
24	10	30	13	8.4	9.4	8.7	23	30	6.2	61	70	17
25	35	70	9.7	8.2	12	8.2	17	20	12	23	14	7.8
26	32	67	9.6	8.0	8.1	7.3	38	9.5	7.9	31	8.3	6.8
27	40	64	32	7.7	7.2	7.1	14	8.5	7.0	122	9.2	6.4
28	19	16	11	7.7	6.9	6.9	9.3	8.1	6.8	49	10	6.1
29	13	13	10	29	---	6.6	8.4	7.7	6.5	37	7.6	6.7
30	10	12	8.8	11	---	8.4	13	7.5	8.6	20	7.7	10
31	13	---	40	8.2	---	14	---	8.5	---	18	67	---
TOTAL	595.0	1098.0	545.5	425.2	274.1	781.3	616.1	554.5	287.8	886.3	665.6	474.2
MEAN	19.2	36.6	17.6	13.7	9.79	25.2	20.5	17.9	9.59	28.6	21.5	15.8
MAX	100	150	70	43	29	246	126	86	18	170	82	119
MIN	7.5	8.1	7.8	7.7	6.9	6.6	6.2	7.5	6.2	7.1	7.3	6.0
AC-FT	1180	2180	1080	843	544	1550	1220	1100	571	1760	1320	941

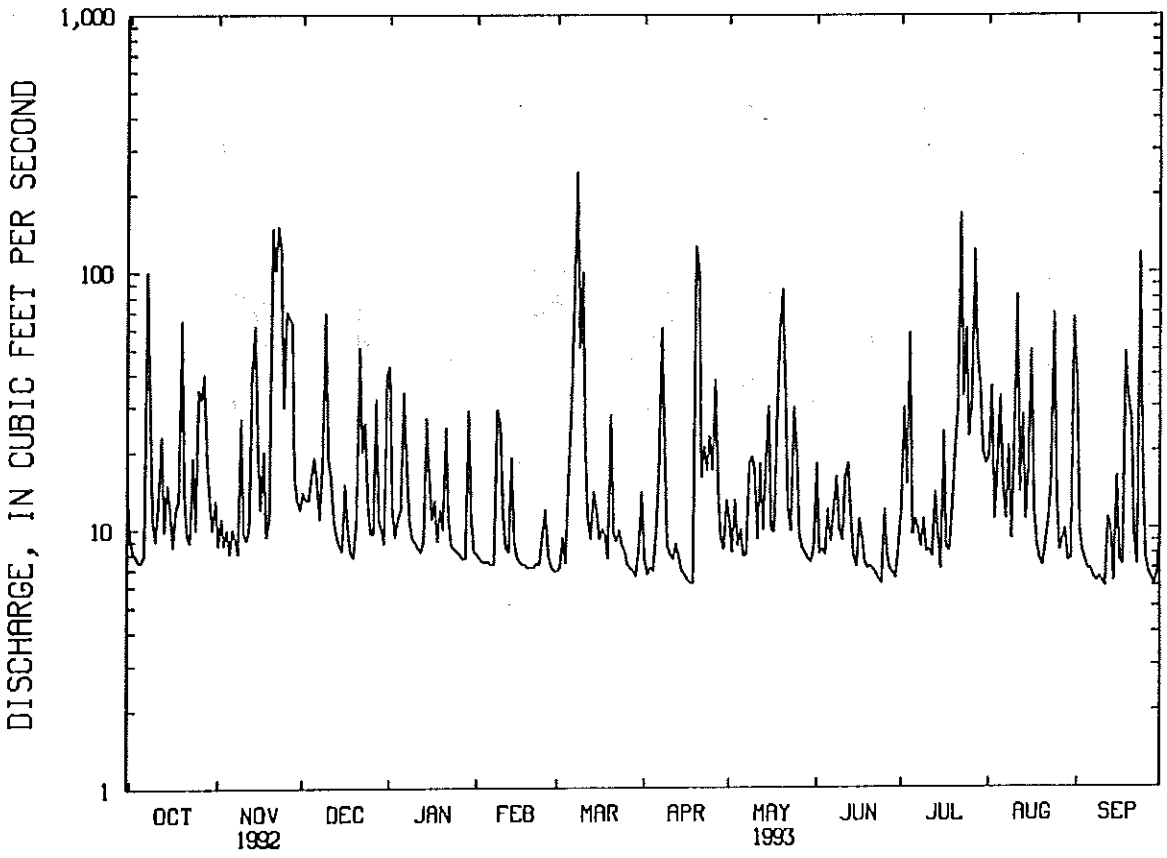
e Estimated

16618000 KAHAKULOA STREAM NEAR HONOKOHAU--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1939 - 1993, BY WATER YEAR (WY)

MEAN	15.4	20.7	19.0	17.6	17.6	25.0	24.4	17.8	11.9	16.1	16.8	11.7
MAX	49.6	51.2	37.5	71.2	50.2	133	121	54.5	28.1	34.4	37.2	40.4
(WY)	1942	1979	1955	1988	1969	1942	1989	1987	1987	1989	1957	1992
MIN	3.20	4.41	4.88	4.82	5.09	5.78	7.02	5.21	4.99	6.32	6.09	4.18
(WY)	1985	1963	1985	1977	1978	1961	1992	1975	1962	1975	1976	1984

SUMMARY STATISTICS	FOR 1992 CALENDAR YEAR		FOR 1993 WATER YEAR		WATER YEARS 1939 - 1993	
ANNUAL TOTAL	6511.2		7203.6			
ANNUAL MEAN	17.8		19.7		17.9	
HIGHEST ANNUAL MEAN					30.8	1942
LOWEST ANNUAL MEAN					11.0	1981
HIGHEST DAILY MEAN	247	Sep 4	246	Mar 8	696	Mar 10 1942
LOWEST DAILY MEAN	3.9	Mar 7	6.0	Sep 11	2.7	Jan 28 1985
ANNUAL SEVEN-DAY MINIMUM	3.9	Mar 5	6.5	Sep 5	2.8	Feb 6 1985
ANNUAL RUNOFF (AC-FT)	12910		14290		12980	
10 PERCENT EXCEEDS	40		40		35	
50 PERCENT EXCEEDS	8.7		10		9.0	
90 PERCENT EXCEEDS	4.5		7.1		5.3	



16618000 KAHAKULOA STREAM NEAR HONOKOHAU--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--December 1974 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND	SPE-CIFIC CON-DUCT-ANCE (US/CM)	PH WATER WHOLE FIELD (STAND-ARD UNITS)	TEMPER-ATURE WATER (DEG C)	TEMPER-ATURE AIR (DEG C)	TUR-BID-ITY (NTU)	BARO-METRIC PRES-SURE (MM OF HG)	OXYGEN, DIS-SOLVED (MG/L)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML)
NOV 1992 09...	1230	22	52	7.8	21.0	23.5	2.4	753	8.6	98	190
DEC 08...	1215	9.7	72	8.0	20.0	24.0	1.2	755	8.6	96	17
FEB 1993 09...	1125	18	58	7.4	17.5	18.5	7.9	753	9.2	97	860
APR 13...	1200	7.4	75	8.1	20.0	24.5	0.60	756	8.2	91	10
JUN 15...	1230	7.0	80	8.2	21.5	25.5	0.50	754	8.4	96	40
AUG 10...	1140	17	46	7.6	21.0	26.0	1.4	752	8.8	100	130

DATE	STREP-TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML)	HARD-NESS TOTAL (MG/L AS CACO3)	HARD-NESS NONCARB DISSOLV FLD. AS CACO3 (MG/L)	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)	SODIUM, DIS-SOLVED (MG/L AS NA)	SODIUM PERCENT	SODIUM AD-SORP-TION RATIO	POTAS-SIUM, DIS-SOLVED (MG/L AS K)	BICAR-BONATE WATER DIS IT FIELD MG/L AS HCO3	CAR-BONATE WATER DIS IT FIELD MG/L AS CO3
NOV 1992 09...	2100	11	1	2.0	1.4	5.4	50	0.7	0.80	12	0
DEC 08...	690	18	0	3.4	2.3	7.3	45	0.7	0.90	24	0
FEB 1993 09...	3300	13	2	2.4	1.8	6.3	49	0.7	0.80	14	0
APR 13...	1000	20	0	3.8	2.5	8.0	46	0.8	0.80	27	0
JUN 15...	600	21	0	4.1	2.6	7.9	44	0.8	0.80	29	0
AUG 10...	900	10	0	1.9	1.2	5.1	52	0.7	0.60	13	0

DATE	ALKA-LINITY WAT DIS TOT IT FIELD MG/L AS CACO3	SULFATE DIS-SOLVED (MG/L AS SO4)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)	FLUO-RIDE, DIS-SOLVED (MG/L AS F)	SILICA, DIS-SOLVED (MG/L AS SIO2)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L)	SOLIDS, DIS-SOLVED (TONS PER DAY)	NITRO-GEN, NITRITE TOTAL (MG/L AS N)	NITRO-GEN, NITRITE DIS-SOLVED (MG/L AS N)	NITRO-GEN, NO2+NO3 TOTAL (MG/L AS N)
NOV 1992 09...	10	1.4	8.4	<0.10	9.4	38	35	2.26	<0.010	0.010	0.057
DEC 08...	20	1.7	9.5	<0.10	17	51	55	1.34	0.030	<0.010	0.160
FEB 1993 09...	12	1.7	9.1	<0.10	11	36	41	1.75	--	0.020	--
APR 13...	22	1.7	10	<0.10	18	60	59	1.20	--	<0.010	--
JUN 15...	24	2.0	9.7	<0.10	19	52	61	0.98	--	<0.010	--
AUG 10...	11	1.8	6.5	<0.10	8.8	38	33	1.74	--	<0.010	--

< Actual value is known to be less than the value shown

16618000 KAHAKULOA STREAM NEAR HONOKOHAU--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	NITROGEN, NO2+NO3 DISSOLVED (MG/L AS N)	NITROGEN, AMMONIA TOTAL (MG/L AS N)	NITROGEN, AMMONIA DISSOLVED (MG/L AS N)	NITROGEN, AMMONIA + ORGANIC TOTAL (MG/L AS N)	PHOSPHORUS TOTAL (MG/L AS P)	PHOSPHORUS DISSOLVED (MG/L AS P)	PHOSPHORUS ORTHO TOTAL (MG/L AS P)	PHOSPHORUS ORTHO, DISSOLVED (MG/L AS P)	ALUMINUM, DISSOLVED (UG/L AS AL)	BARIUM, DISSOLVED (UG/L AS BA)
NOV 1992 09...	0.085	0.020	0.060	0.50	0.030	<0.010	<0.010	0.020	60	10
DEC 08...	0.160	0.010	0.020	<0.20	0.020	0.010	<0.010	0.010	--	--
FEB 1993 09...	0.087	--	0.020	<0.20	0.030	0.020	--	0.020	180	11
APR 13...	0.079	--	0.020	<0.20	0.020	0.030	--	0.020	20	11
JUN 15...	0.058	--	0.020	<0.20	0.090	<0.010	--	0.010	--	--
AUG 10...	<0.050	--	0.040	<0.20	0.020	<0.010	--	<0.010	130	10

DATE	TIME	COBALT, DISSOLVED (UG/L AS CO)	IRON, DISSOLVED (UG/L AS FE)	LITHIUM DISSOLVED (UG/L AS LI)	MANGANESE, DISSOLVED (UG/L AS MN)	MOLYBDENUM, DISSOLVED (UG/L AS MO)	NICKEL, DISSOLVED (UG/L AS NI)	SELENIUM, DISSOLVED (UG/L AS SE)	SILVER, DISSOLVED (UG/L AS AG)	STRONTIUM, DISSOLVED (UG/L AS SR)	VANADIUM, DISSOLVED (UG/L AS V)
NOV 1992 09...	1230	<3	56	<4	<1	<10	<1	<1	<1.0	16	<6
FEB 1993 09...	1125	<3	220	<4	2	<10	<1	<1	<1.0	19	<6
APR 13...	1200	<3	7	<4	<1	<10	<1	<1	<1.0	27	6
AUG 10...	1140	<3	94	<4	<1	<10	<1	<1	<1.0	15	<6

CROSS SECTION ANALYSES, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	TIME	SAMPLE LOCATION, CROSS SECTION (FT FM R BK)	SPECIFIC CONDUCTANCE (US/CM)	PH WATER WHOLE FIELD (STANDARD UNITS)	TEMPERATURE WATER (DEG C)	BAROMETRIC PRESSURE (MM OF HG)	OXYGEN, DISSOLVED (MG/L)	OXYGEN, DISSOLVED (PERCENT SATURATION)
DEC 1992 08...*	1200	2.0	72	8.0	20.0	755	8.6	96
08...*	1202	3.0	72	8.0	20.0	755	8.6	96
08...*	1204	4.0	72	8.0	20.0	755	8.6	96
08...*	1206	5.0	72	8.0	20.0	755	8.6	96
08...*	1208	6.0	72	8.0	20.0	755	8.6	96
08...*	1210	7.0	72	8.0	20.0	755	8.6	96
08...*	1212	8.0	72	8.0	20.0	755	8.6	96
08...*	1214	10.0	72	8.0	20.0	755	8.6	96
08...*	1216	11.0	72	8.0	20.0	755	8.6	96

* Instantaneous streamflow at the time of cross-sectional measurement: Dec. 8, 9.7 ft3/s.

PARTICLE-SIZE DISTRIBUTION OF SUSPENDED SEDIMENT, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	TIME	SEDIMENT, SUSPENDED (MG/L)	SEDIMENT, DISCHARGE, SUSPENDED (T/DAY)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM
NOV 1992 09...	1230	2	0.12	100
DEC 08...	1215	<1	--	100
FEB 1993 09...	1125	5	0.24	100
APR 1993 13...	1200	<1	--	100
JUN 15...	1230	1	0.02	100
AUG 10...	1140	3	0.14	100

< Actual value is known to be less than the value shown

16620000 HONOKOHAU STREAM NEAR HONOKOHAU

LOCATION.--Lat 20°57'45", long 156°35'22", Hydrologic Unit 20020000, on left bank 1,250 ft upstream from intake of Honokohau ditch and 4.1 mi southeast of Honokohau. Previous to Oct. 1990 at site 250 ft downstream.

DRAINAGE AREA.--4.11 mi^2.

PERIOD OF RECORD.--September, November, and December 1911 (combined flow of stream and ditch below point of diversion), March 1913 to September 1920, May 1922 to November 1988, Oct. 1990 to current year. Record since Oct. 1990 equivalent to earlier records.

REVISED RECORDS.--WSP 1937: Drainage area. WDR HI-79-1: 1927-48(M), 1949-78(P).

GAGE.--Water-stage recorders. Elevation of gage is 870 ft, from topographic map. Prior to Mar. 7, 1913, nonrecording gage at site just below Honokohau ditch intake at different datum. Oct. 1, 1990 at site 250 ft downstream at datum 26.67 ft lower.

REMARKS.--Records fair. No diversion upstream. All medium and low flow, together with the inflow from two development tunnels downstream of station, is diverted into Honokohau ditch.

AVERAGE DISCHARGE.--75 years (water years 1914-19, 1923-88, 1991-93), 39.5 ft^3/s (28,590 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Prior to Oct. 1990. Maximum discharge, 7,260 ft^3/s revised, Jan. 28, 1988 (gage-height, 8.38 ft for datum and site then in use), from rating curve extended above 3,200 ft^3/s, on basis of slope-area measurement at gage height 8.38 ft; minimum, 8.4 ft^3/s, May 1, 1945, Jan. 5, 1946.

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)
Sep. 23	1800	*987	*4.17				

Minimum discharge, 13 ft^3/s, Apr. 18, 19, July 15.

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

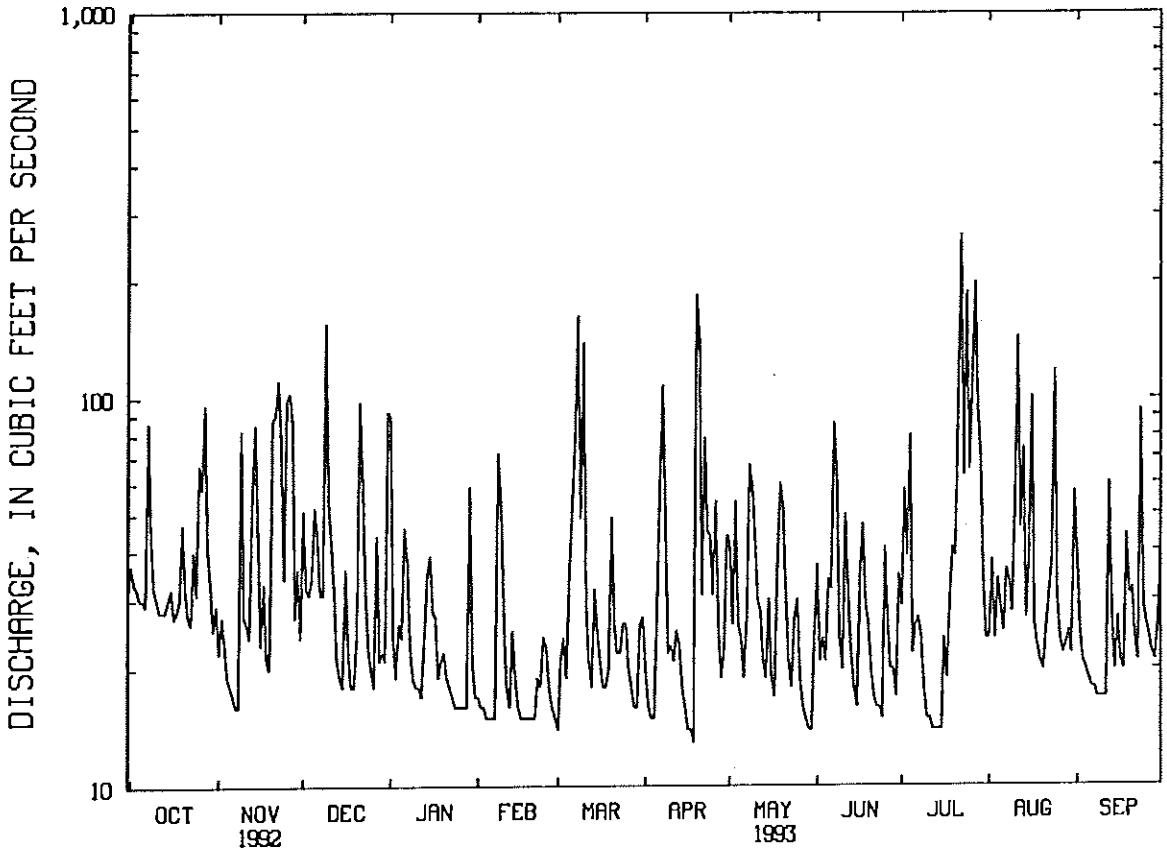
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	37	22	51	90	17	14	20	42	37	29	24	38
2	33	27	32	24	16	21	16	26	21	58	38	25
3	32	23	31	19	16	24	15	54	24	39	24	21
4	30	19	34	26	15	19	15	26	21	80	34	20
5	30	18	52	24	15	34	28	24	34	22	29	19
6	29	17	44	46	15	53	59	19	32	26	25	18
7	86	16	31	38	15	76	108	27	86	27	36	18
8	43	16	31	23	72	163	46	67	62	24	34	17
9	32	82	156	19	53	49	22	59	24	18	28	17
10	30	27	53	18	28	139	23	44	20	15	53	17
11	28	26	42	18	18	29	21	30	50	15	144	17
12	28	24	31	17	16	21	25	28	30	14	46	60
13	28	56	21	24	25	18	23	21	22	14	74	28
14	30	85	19	35	19	32	18	19	18	14	27	20
15	32	45	18	39	16	25	16	30	16	14	38	27
16	27	23	36	28	15	21	14	19	34	24	101	21
17	28	33	22	27	15	18	14	17	47	19	26	20
18	30	21	18	19	15	18	13	37	29	30	23	44
19	47	20	18	21	15	20	185	60	26	41	21	31
20	32	88	24	22	15	49	145	52	20	39	20	32
21	27	90	98	19	15	26	31	31	17	100	25	24
22	26	111	61	18	19	22	79	21	16	264	31	21
23	40	77	32	17	18	22	45	18	16	63	38	93
24	31	34	23	16	24	26	44	27	15	187	118	29
25	67	99	20	16	23	26	31	30	41	65	30	26
26	58	103	18	16	18	20	54	19	26	111	24	24
27	96	87	44	16	16	18	26	16	20	198	22	22
28	41	27	21	16	15	16	19	15	20	93	23	21
29	33	36	22	59	---	16	22	14	17	69	25	26
30	25	24	21	21	---	26	44	14	35	34	22	43
31	29	---	92	17	---	27	---	24	---	24	57	---
TOTAL	1165	1376	1216	808	579	1088	1221	930	876	1770	1260	839
MEAN	37.6	45.9	39.2	26.1	20.7	35.1	40.7	30.0	29.2	57.1	40.6	28.0
MAX	96	111	156	90	72	163	185	67	86	264	144	93
MIN	25	16	18	16	15	14	13	14	15	14	20	17
AC-FT	2310	2730	2410	1600	1150	2160	2420	1840	1740	3510	2500	1660

16620000 HONOKOHAU STREAM NEAR HONOKOHAU--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1913 - 1993, BY WATER YEAR (WY)

MEAN	31.7	41.3	41.4	35.8	37.3	44.0	49.4	42.1	34.4	40.1	41.5	30.5
MAX	94.8	110	97.5	98.6	132	144	120	130	81.1	116	103	122
(WY)	1915	1915	1955	1916	1932	1942	1980	1916	1916	1914	1914	1914
MIN	10.8	11.8	13.0	12.3	13.5	13.4	12.9	12.2	14.2	16.2	14.5	12.1
(WY)	1985	1963	1936	1944	1963	1926	1992	1945	1962	1926	1971	1984

SUMMARY STATISTICS	FOR 1992 CALENDAR YEAR		FOR 1993 WATER YEAR		WATER YEARS 1913 - 1993	
ANNUAL TOTAL	12070.3		13128			
ANNUAL MEAN	33.0		36.0		39.5	
HIGHEST ANNUAL MEAN					68.3	1914
LOWEST ANNUAL MEAN					24.1	1926
HIGHEST DAILY MEAN	327	Sep 4	264	Jul 22	781	Apr 7 1938
LOWEST DAILY MEAN	9.7	Jun 3	13	Apr 18	8.0	Aug 10 1920
ANNUAL SEVEN-DAY MINIMUM	10	May 30	15	Jul 9	8.5	Feb 6 1985
ANNUAL RUNOFF (AC-FT)	23940		26040		28590	
10 PERCENT EXCEEDS	72		70		79	
50 PERCENT EXCEEDS	21		26		24	
90 PERCENT EXCEEDS	12		16		13	



HAWAII, ISLAND OF HAWAII

16700000 WAIAKEA STREAM NEAR MOUNTAIN VIEW

RECORDS BEING REVIEWED

16700900 OLAA FLUME SPRING NEAR KAUMANA

RECORDS BEING REVIEWED

HAWAII, ISLAND OF HAWAII

16700950 LYMAN SPRINGS NO. 2 NEAR PIIHONUA

RECORDS BEING REVIEWED

16704000 WAILUKU RIVER AT PIIHONUA

RECORDS BEING REVIEWED

HAWAII, ISLAND OF HAWAII

16713000 WAILUKU RIVER AT HILO
(National stream-quality accounting network station)

RECORDS BEING REVIEWED

16717000 HONOLII STREAM NEAR PAPAIKOU
(Hydrologic bench-mark station)

RECORDS BEING REVIEWED

HAWAII, ISLAND OF HAWAII

16720000 KAWAINUI STREAM NEAR KAMUELA

RECORDS BEING REVIEWED

16720300 KAWAIKI STREAM NEAR KAMUELA

RECORDS BEING REVIEWED

16720500 UPPER HAMAKUA DITCH BELOW KAWAIKI STREAM, NEAR KAMUELA

RECORDS BEING REVIEWED

16724800 UPPER HAMAKUA DITCH ABOVE ALAKAHI STREAM, NEAR KAMUELA

RECORDS BEING REVIEWED

16725000 ALAKAHI STREAM NEAR KAMUELA

RECORDS BEING REVIEWED

16726000 UPPER HAMAKUA DITCH ABOVE WAIMEA RESERVOIR DIVERSIOH, NEAR KAMUELA

RECORDS BEING REVIEWED

HAWAII, ISLAND OF HAWAII

16727000 UPPER HAMAKUA DITCH ABOVE PUUKAPU RESERVOIR, NEAR KAMUELA

RECORDS BEING REVIEWED

16756000 KOHAKOHAU STREAM NEAR KAMUELA

RECORDS BEING REVIEWED

HAWAII, ISLAND OF HAWAII

16758000 WAIKOLOA STREAM AT MARINE DAM, NEAR KAMUELA

RECORDS BEING REVIEWED

16759000 HAUANI GULCH NEAR KAMUELA

RECORDS BEING REVIEWED

HAWAII, ISLAND OF HAWAII

16764000 HILEA GULCH TRIBUTARY NEAR HONUAPO

RECORDS BEING REVIEWED

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 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 discharge measurements at low-flow partial-record stations, the second is a table of annual maximum stage and discharge at crest-stage stations, and the third is a table of discharge measurements at miscellaneous sites.

Low-flow partial-record stations

Measurements of streamflow in the area covered by this report made at low-flow partial-record stations are given in the following table. Most of these measurements were made during periods of base flow when streamflow is primarily from ground-water storage. These measurements, when correlated with the simultaneous discharge of a nearby stream where continuous records are available, will give a picture of the low-flow potentiality of the stream. The column headed "Period of record" shows the water years in which measurements were made at the same, or practically the same, site.

Discharge measurements made at low-flow partial-record stations during water year 1993

Station No.	Station name	Location	Drainage area mi^2	Period of record	Measurements	
					Date	Discharge (ft^3/s)
		Hawaii, Island of Molokai				
16403400	Kapuhi Stream at altitude 1,000 ft, near Pelekunu	Lat 21°07'50", long 156°53'02", 500 ft upstream from Kawailena Stream, 2.2 mi south of former village of Pelekunu, and 5.4 mi north of Kamalo.	0.51	1968-93	10-15-92 01-19-93 05-04-93	2.16 2.62 2.15
16403500	Kawailena Stream near Pelekunu	Lat 20°07'52", long 156°53'05", 800 ft upstream from mouth, 2.2 mi south of former village of Pelekunu, and 5.5 mi north of Kamalo.	0.65	1968-93	10-15-92 01-19-93 05-04-93 07-30-93	1.70 2.68 2.09 2.36
16403600	Kapuhi Stream near Pelekunu	Lat 21°07'57", long 156°52'56", on left bank 400 ft downstream from Kawailena Stream, 2.1 mi south of former village of Pelekunu, and 5.6 mi north of Kamalo.	1.20	1968-70≠, 1974-93	10-15-92 01-19-93 05-04-93 07-30-93	3.98 6.00 5.40 6.01
16403700	Kawainui Stream at altitude 1,000 ft, near Pelekunu	Lat 20°07'46", long 156°52'31", 400 ft upstream from Kawaipoko Stream, 2.4 mi south of former village of Pelekunu, and 5.4 mi north of Kamalo.	0.79	1968-93	10-15-92 01-19-93 05-04-93 07-30-93	3.67 3.59 4.62 8.53
16403800	Kawaipoko Stream near Pelekunu	Lat 21°07'48", long 156°52'30", 300 ft upstream from mouth, 2.4 mi south of former village of Pelekunu, and 5.4 mi north of Kamalo.	0.26	1968-93	10-15-92 01-19-93 05-04-93 07-30-93	0.92 1.03 1.43 2.41
16403900	Kawainui Stream near Pelekunu	Lat 21°07'59", long 156°52'38", on right bank 900 ft upstream from confluence with Kapuhi Stream, 2.1 mi south of former village of Pelekunu, and 5.7 mi north of Kamalo.	1.17	1968-79≠, 1980-93	10-15-92 01-19-93 05-04-93 07-30-93	5.80 5.14 7.43 13.5

≠ Operated as a continuous-record gaging station

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 "An Investigation of Floods in Hawaii." The following table contains annual maximum discharge 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 or 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 made 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.

Annual maximum discharge at crest-stage partial-record stations during water years 1963-92

Station name and number	Location	Drainage area mi^2	Period of record	Water year maximum			Period of record max		
				Date	Gage height (ft)	Discharge (ft^3/s)	Date	Gage height (ft)	Discharge (ft^3/s)
			Hawaii, Island of Kauai						
16052000 Hanapepe River at Hanapepe	Lat 21°54'47", long 159°35'33", 400 ft upstream from bridge on Highway 50 and 0.5 mi upstream from mouth.	26.6	1950-63b	04-15-63	a11.30	-	04-15-63	a11.30	-
			1950-64b	03-08-64	a4.79	-	04-15-63	a11.30	-
			1950-65b	01-05-65	a4.67	-	04-15-63	a11.30	-
			1950-66b		a<3.92	-	04-15-63	a11.30	-
			1950-67b	11-05-66	a4.04	-	04-15-63	a11.30	-
			1950-68b	11-26-67	a4.03	-	04-15-63	a11.30	-
			1950-69b	12-01-68	a4.55	-	04-15-63	a11.30	-
			1950-70b		a<3.90	-	04-15-63	a11.30	-
			1950-71b	11-26 70	a5.48	-	04-15-63	a11.30	-
			1950-72b	12-28-71	a5.02	-	04-15-63	a11.30	-
			1950-73b	03-12-73	a<3.91	-	04-15-63	a11.30	-
			1950-74b	04-19-74	a5.76	-	04-15-63	a11.30	-
			1950-75b	01-31-75	a8.39	-	04-15-63	a11.30	-
			1950-76b	02-06-76	a4.72	-	04-15-63	a11.30	-
			1950-77b	06-28-77	a3.29	-	04-15-63	a11.30	-
			1950-78b	12-06-77	a3.40	-	04-15-63	a11.30	-
			1950-79b	08-16-79	a4.39	-	04-15-63	a11.30	-
			1950-80b	05-28-80	a4.35	-	04-15-63	a11.30	-
			1950-81b	08-05-81	a4.58	-	04-15-63	a11.30	-
			1950-82b	11-01-81	a3.47	-	04-15-63	a11.30	-
			1950-83b	10-30-82	a5.96	-	04-15-63	a11.30	-
			1950-84b		a<2.88	-	04-15-63	a11.30	-
			1950-85b	03-01-85	a4.71	-	04-15-63	a11.30	-
			1950-86b	08-11-86	a4.76	-	04-15-63	a11.30	-
			1950-87b	09-14-87	a2.57	-	04-15-63	a11.30	-
			1950-88b	12-13-87	a4.65	-	04-15-63	a11.30	-
			1950-89b	07-23-89	a5.87	-	04-15-63	a11.30	-
			1950-90b	01-21-90	a5.30	-	04-15-63	a11.30	-
			1950-91b	11-18-90	a5.89	-	04-15-63	a11.30	-
			1950-92b	09-11-92	a7.78	-	04-15-63	a11.30	-

< Actual value is known to be less than the value shown
a Revised
b Gage height only

Annual maximum discharge at crest-stage partial-record stations during water years 1983-92

Station name and number	Location	Drainage area mi^2	Period of record	Water year maximum Date	Gage height (ft)	Discharge (ft^3/s)	Period of record max Date	Gage height (ft)	Discharge (ft^3/s)
			Hawaii, Island of Kauai						
16104200 Hanalei Riv at Highway 56 bridge nr Hanalei	Lat 22°12'50", long 159°28'43", at highway bridge, 1.6 mi northeast of Hanalei, and 2.4 mi upstream from mouth.	21.0	1963-83b	10-30-82	a11.94	-	10-30-82	a11.94	-
			1963-84b		a<6.89	-	10-30-82	a11.94	-
			1963-85b	11-26-84	a11.26	-	10-30-82	a11.94	-
			1963-86b	10-20-85	a10.74	-	10-30-82	a11.94	-
			1963-87b	11-10-86	a11.61	-	10-30-82	a11.94	-
			1963-88b	12-13-87	a11.69	-	10-30-82	a11.94	-
			1963-89b	02-23-89	a11.13	-	10-30-82	a11.94	-
			1963-90b	11-04-89	a10.95	-	10-30-82	a11.94	-
			1963-91b	11-18-90	a12.54	-	11-18-90	a12.54	-
			1963-92b	12-14-91	a13.31	-	12-14-91	a13.31	-

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

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 Oahu						
16211500 Makua Str at Makua	Lat 21°31'59", long 158°13'49", on left bank 20 ft upstream from old concrete highway ford, 140 ft downstream from Farrington Highway box culvert, 0.1 mi north of Makua cemetery, and 4.5 mi southeast of Kaena Point lighthouse.	4.24	1958-92	10-16-91	a8.16	e500	02-07-76	8.00	3,220

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

Station name and number	Location	Drainage area mi^2	Period of record	Water year 1993 maximum Date	Gage height (ft)	Discharge (ft^3/s)	Period of record max Date	Gage height (ft)	Discharge (ft^3/s)
			Hawaii, Island of Kauai						
16038000 Waimea Riv at Waimea	Lat 21°57'23", long 159°39'59", 150 ft upstream from highway bridge at Waimea and 0.2 mi upstream from mouth.	86.5	1944-93b	10-12-92	5.68	-	02-07-49	11.40	-
16052000 Hanapepe Riv at Hanapepe	Lat 21°54'47", long 159°35'33", 400 ft upstream from bridge on Highway 50 and 0.5 mi upstream from mouth.	26.6	1950-93b	07-24-93	4.34	-	04-15-63	a11.30	-
16052500 Lawai Str nr Koloa	Lat 21°54'11", long 159°30'21", on right bank at private road bridge, 0.9 mi upstream from mouth, and 2.4 mi southwest of Koloa.	6.62	1962-63, 1964-72≠ 1973-93	12-03-92	4.63	1,330	01-31-75	11.37	5,810
16055000 Huleia Str nr Lihue	Lat 21°57'20", long 159°25'23", at highway bridge, 3.7 mi southwest of Lihue, and 4.5 mi upstream from mouth.	17.6	1912-15≠, 1962-67, 1968-70≠, 1971-93	12-03-92	12.52	5,680	11-28-70	22.40	26,800

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b Gage height only
e Estimated

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 Kauai--Continued						
16071800 Wailua Riv nr Kapaa	Lat 22°03'00", long 159°20'26", at State Park 600 ft upstream from highway bridge, 850 ft upstream from mouth, and 2.5 mi southwest of Kapaa.	52.6	1962-93b	12-03-92	7.64	-	11-26-70	8.57	-
16073500 Konohiki Str nr Kapaa	Lat 22°04'01", long 159°20'21", at culvert on private road, 1.8 mi upstream from mouth, and 2.4 mi southwest of Kapaa High School.	3.38	1964-67, 1970-93	12-03-92	9.20	340	12-14-91	16.92	2,530
16080000 Kapaa Str at Kapahi ditch intake nr Kapaa	Lat 22°06'15", long 159°22'29", on right bank at Kapahi ditch intake, 3.8 mi northwest of Kapaa, and 4.3 mi northwest of Wailua.	3.86	1936-85≠, 1986-93	12-03-92	4.02	3,940	12-14-91	5.66	9,660
16081200 Akulikuli Str nr Kapaa	Lat 22°06'25", long 159°22'07", at Kahuna road crossing, 800 ft upstream from mouth, and 3.5 mi northwest of Kapaa armory.	0.40	1964-93	12-03-92	5.72	345	12-14-91	11.40	1,550
16084500 Kapaa Str at old highway crossing nr Kealia	Lat 22°06'28", long 159°19'52", at abutment of old highway bridge, 100 ft upstream from road crossing, 1.4 mi northwest of Kealia, and 2.1 mi upstream from mouth.	14.0	1962-93	12-03-92	13.75	9,520	12-14-91	23.11	30,330
16085000 Homaikawaa Str nr Kealia	Lat 22°07'23", long 159°18'12", at culvert on Highway 56, 1.6 mi southeast of Anahola School, and 1.6 mi north of Kealia.	0.85	1964-93	Destroyed by flood of 12-14-91.			12-14-91	-	e3,800
16097900 Puukumu Str nr Kilauea	Lat 22°13'01", long 159°25'18", at culvert on Highway 56, 0.8 mi northwest of Kilauea School, and 0.9 mi upstream from mouth.	0.91	1964-68, 1971-93	12-03-92	5.87	223	04-07-71	17.27	1,430
16104200 Hanalei Riv at Highway 56 bridge nr Hanalei	Lat 22°12'50", long 159°28'43", at highway bridge, 1.6 mi northeast of Hanalei, and 2.4 mi upstream from mouth.	21.0	1963-93b	12-03-92	13.04	-	12-14-91	a13.31	-
16130000 Nahomalu Valley nr Mana	Lat 22°02'41", long 159°45'17", on left bank 1.1 mi northeast of Mana, and 5.3 mi northwest of Kekaha School.	3.81	1962-63, 1964-71≠, 1972-93	12-03-92	4.96	360	04-15-72	7.15	2,120
			Hawaii, Island of Oahu						
16210500 Kaukonahua Str at Waialua	Lat 21°33'56", long 158°07'26", 0.2 mi upstream from Highway 99, 0.4 mi southeast of Waialua High School, and 1.3 mi southwest of Weed Circle.	38.7	1963, 1968-93	12-26-92	-	e1,800	04-05-63	26.4	15,600
16211200 Poamoho Str at Waialua	Lat 21°34'00", long 158°06'40", at culvert crossing of Kaheaka Road, 0.2 mi upstream from Highway 83, and 1.1 mi east of Waialua High School.	12.7	1967-93	12-26-92	12.08	e1,500	04-19-74	24.0	7,340
16211300 Makaleha Str nr Waialua	Lat 21°33'49", long 158°09'21", 1.0 mi southwest of Dillingham Ranch and 1.9 mi southwest of sugar mill at Waialua.	4.15	1958-63, 1964-65≠ 1966-93	12-26-92	4.41	e375	11-13-65	7.41	3,640

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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 Date	Gage height (ft)	Discharge (ft^3/s)	Period of record max Date	Gage height (ft)	Discharge (ft^3/s)
			Hawaii, Island of Oahu--Continued						
16211400 Manini Gulch at Kaena	Lat 21°34'50", long 158°15'12", 180 ft upstream from Highway 99, 1.7 mi west of Camp Erdman, and 2.0 mi east of Kaena Point.	1.08	1974-93	12-26-92	12.75	165	01-01-88	19.61	1,000
16211500 Makua Str at Makua	Lat 21°31'59", long 158°13'49", on left bank 20 ft upstream from old concrete highway ford, 140 ft downstream from Farrington Highway box culvert, 0.1 mi north of Makua cemetery, and 4.5 mi southeast of Kaena Point lighthouse.	4.24	1958-93	12-30-92	6.94	e330	02-07-76	8.00	3,220
16211700 Makaha Str at Makaha	Lat 21°28'47", long 158°12'31", 0.9 mi upstream from Farrington Highway and 1.1 mi north of junction of Farrington Highway and Makhaha Valley Road.	5.25	1966-93	12-30-92	9.06	448	02-07-76	16.40	4,310
16211800 Kaupuni Str at altitude 372 ft, nr Waianae	Lat 21°28'20", long 158°09'26", at abandoned diversion dam, 2.6 mi northeast of Waianae cemetery, and 2.8 mi northeast of junction of Waianae Valley Road and Farrington Highway.	3.58	1961-72≠, 1973-93	12-30-92	5.38	e250	01-06-82	7.82	3,640
16212200 Mailiili Str nr Waianae	Lat 21°27'34", long 158°08'05", at bridge at Lualualei Naval Reservation and 3.4 mi east of cemetery nr Waianae.	1.51	1958-93	12-30-92	1.85	e200	01-06-82	7.20	2,460
16212300 Nanakuli Str at Nanakuli	Lat 21°23'08", long 158°08'11", 0.7 mi upstream from Highway 90 and 0.6 mi northeast of Nanakuli Post Office.	3.98	1968-93	12-30-92	24.33	e400	02-07-76	26.20	3,320
16212450 Kaloi Gulch tributary nr Honouliuli	Lat 21°22'41", long 158°03'45", at culvert on private road, 1.8 mi west of Honouliuli, and 2.8 mi northwest of Ewa Post Office.	1.70	1968-93	12-30-92	3.14	72	01-08-80	7.45	724
16212500 Honouliuli Str nr Waipahu	Lat 21°22'40", long 158°02'10", at bridge on Farrington Highway and 1.8 mi west of Waipahu Post Office.	11.0	1956-93	12-30-92	2.38	344	01-06-82	10.28	3,500
16212601 Waikele Str at Wheeler Field	Lat 21°28'44", long 158°03'07", at culvert 0.3 mi west of east-west runway at Wheeler Field and 1.9 mi southwest of Wahiawa Post Office.	6.35	1958, 1960-93	11-13-92	5.56	251	01-06-82	22.50	1,850
16212700 Waikakalaua Str nr Wahiawa	Lat 21°27'50", long 158°01'38", 0.2 mi downstream from Kamehameha Highway and 2.4 mi south of Wahiawa Post Office.	7.49	1958-93	09-23-93	9.23	1,430	04-15-63	16.50	4,830
16212750 Huliwai Gulch nr Kunia Camp	Lat 21°26'43", long 158°03'47", 200 ft upstream from Highway 75 and 1.2 mi south of Kunia Camp.	0.84	1974-93	12-26-92	8.72	e50	02-10-79	8.36	600
16223000 Waimalu Str nr Aiea	Lat 21°23'48", long 157°56'56", 1,300 ft upstream from bridge on Moanalua Road and 1.2 mi northwest of Aiea High School.	5.97	1952-70≠, 1973-93	07-21-93	2.46	824	01-05-68	6.82	8,020
16224500 Kalauao Str at Moanalua Road, at Aiea	Lat 21°23'07", long 157°56'22", on left bank at downstream side of Moanalua Road bridge, 0.4 mi northwest of Aiea Post Office, and 2.3 mi southeast of Pearl City Post Office.	2.59	1957-82≠, 1984-93	07-21-93	-	e700	05-14-63	6.63	2,580

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e Estimated

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 Date	Gage height (ft)	Discharge (ft^3/s)	Period of record max Date	Gage height (ft)	Discharge (ft^3/s)
			Hawaii, Island of Oahu--Continued						
16228000 Moanalua Str nr Honolulu	Lat 21°22'53", long 157°52'22", on left bank 1.8 mi northeast of Tripler Hospital and 5.0 mi norht of Honolulu Post Office.	2.73	1927-78≠, 1979-93	12-30-92	5.74	e600	11-18-30	11.58	4,580
16228200 Moanalua Str nr Aiea	Lat 21°22'37", long 157°53'03", on right bank 1.1 mi northeast of Tripler Hospital and 2.9 mi east of Aiea sugar refinery.	3.34	1969-93	12-30-92	4.13	678	03-18-80	9.97	4,860
16228600 Moanalua Str at Tripler Hospital	Lat 21°21'52", long 157°54'05", on right bank 0.5 mi west of Tripler Hospital and 1.6 mi northeast of Aliamanu School.	4.44	1971-93	12-30-92	14.22	e750	03-18-80	21.0	6,200
16228900 Kalihi Str nr Kaneohe	Lat 21°22'35", long 157°49'32", on right bank 800 ft downstream from Likelike Highway and 2.8 mi southwest of Castle High School in kaneohe.	0.60	1967-71≠, 1972-93	12-30-92	3.75	565	01-08-80	5.60	1,700
16235400 Waolani Str at Honolulu	Lat 21°20'00", long 157°51'04", at Wyllie Street bridge and 1.8 mi northeast of Honolulu Post Office.	1.28	1958-93	12-30-92	3.68	1,090	05-14-63	6.14	2,500
16237500 Pauoa Str at Honolulu	Lat 21°19'18", long 157°51'03", at Lusitana Street bridge and 1.1 mi northeast of Honolulu Post Office.	1.43	1958-93	12-30-92	1.27	719	05-14-63	4.65	2,200
16247100 Manoa-Palolo Drainage Canal at Moiliili	Lat 21°17'24", long 157°49'17", on left bank at Kaimuki High School, 0.3 mi downstream from confluence of Manoa and Palolo Strs, and 0.6 mi upstream from point of discharge into Ala Ala Wai Canal.	10.6	1968-93	12-30-92	87.13	2,730	12-18-67	12.6	10,100
16247500 Wailupe Gulch at Aina Haina	Lat 21°17'46", long 157°45'29", at Ani Street bridge and 1.0 mi upstream from Kalanianaole Highway in Aina Haina.	2.35	1958-93	12-30-92	1.35	385	12-18-67	5.72	3,600
16247900 Kuliouou Valley at Kuliouou	Lat 21°17'50", long 157°43'35", at Kuliouou, 300 ft downstream of single-lane wooden bridge, and 0.6 mi upstream from Highway 72.	1.18	1958-59, 1970-93	12-30-92	27.75	e230	12-31-87	36.55	4,700
16248800 Inoaole Str at Waimanalo	Lat 21°29'31", long 157°42'40", 30 ft upstream from culvert on Hihimanu Street and 0.8 mi northwest of Waimanalo Post Office.	1.21	1958-93	12-30-92	4.55	e300	05-07-81	7.55	1,600
16249000 Waimanalo Str at Waimanalo	Lat 21°21'12", long 157°43'52", on right bank 40 ft upstream from Highway 72 and 2.3 mi northeast of Waimanalo Post Office.	2.16	1967-70≠, 1971-93	12-30-92	3.87	1,800	03-06-63	10.0	4,560
16249100 Kaelepulu Str tributary at Kailua	Lat 21°21'44", long 157°44'22", 30 ft upstream from Kalanianaole Highway, 1.6 mi northwest of Waimanalo School, and 2.4 mi south of Kailua Post Office.	0.16	1963-93	12-30-92	6.31	355	12-31-87	7.53	476
16264800 Kawainui Canal at Kailua	Lat 21°24'15", long 157°45'28", at head of canal and 1.2 mi northwest of Kailua Post Office.	11.0	1957-60, 1963-64, 1967-93b	12-30-92	2.74	-	01-12-75	5.82	-

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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 Oahu--Continued								
16265000 Kawa Str at Kaneohe	Lat 21°24'32", long 157°47'36", 50 ft upstream from bridge on Kaneohe Bay Drive at Kaneohe, 0.2 mi northeast of Castle High School, and 0.6 mi upstream from mouth.	1.19	1965, 1968-74, 1977-93	12-30-92	7.02	776	02-01-69	17.90	5,290
16274499 Keaahala Str at Kamehameha Highway, at Kaneohe	Lat 21°25'12", long 157°48'15", 35 ft upstream from bridge on Kamehameha Highway in Kaneohe.	0.62	1959-93	12-30-92	-	e150	05-02-65	11.50	2,750
16279500 Heeia Str at Kaneohe	Lat 21°25'17", long 157°49'01", 60 ft downstream from culvert on Kahekili Highway, 0.7 mi west of Kaneohe Post Office, and 0.8 mi southwest of Heeia.	1.80	1965-66, 1968-93	12-30-92	-	e400	05-02-65	9.50	5,600
16283480 Ahuimanu Str nr Kahaluu	Lat 21°27'04", long 157°50'13", at bridge on Ahuimanu Road and 0.8 mi south of Kahaluu.	2.31	1963-93	12-26-92	4.90	e250	02-01-69	11.8	7,300
16304500 Kaluanui Str at Hauula	Lat 21°35'57", long 157°54'24", on left downstream wingwall of concrete bridge, 1.2 mi southeast of cemetery in Hauula, and 1.4 mi northeast of Sacred Falls.	2.12	1958-93	11-26-92	4.77	e600	01-06-82	6.95	4,920
16310501 Malaekahana Str at altitude 30 ft, nr Kahuku	Lat 21°39'47", long 157°57'11", at abandoned plantation railroad bridge, 1.1 mi southwest of junction of plantation road and Highway 83, and 1.2 mi south of Kahuku Hospital.	4.05	1958-93	11-26-92	4.81	e100	04-15-63	12.10	4,640
16311000 Oio Str nr Kahuku	Lat 21°41'32", long 157°59'48", 0.6 mi southwest of junction of plantation road and Highway 83 and 2.7 mi west of Kahuku Hospital.	2.13	1958-93	11-26-92	2.43	e45	05-02-65	8.13	1,390
16317800 Kaunala Gulch nr Sunset Beach	Lat 21°40'59", long 158°02'12", on downstream left bank wingwall of road bridge on Highway 83 nr Sunset Beach and 2.9 mi northeast of Waimea.	1.98	1973-93	11-26-92	6.79	e75	11-20-90	6.01	450
16318000 Paumalu Gulch at Sunset	Lat 21°40'19", long 158°02'28" 0.4 mi upstream from Highway 83 at Sunset Beach and 2.2 mi northeast of Waimea.	2.59	1968-93	11-26-92	3.59	e100	04-19-74	4.97	982
16331000 Waimea Gulch nr 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	1968-93	11-26-92	0.84	e10	03-18-80	11.2	2,030
16340000 Anahulu Riv nr 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	1958-93	12-26-92	4.24	996	04-19-74	15.8	15,900
16350000 Opaeula Str nr 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	1956-93	12-26-92	16.37	711	04-19-74	20.7	7,600

e Estimated

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 Date	Gage height (ft)	Discharge (ft^3/s)	Period of record max Date	Gage height (ft)	Discharge (ft^3/s)
			Hawaii, Island of Molokai						
16411320 Kakaako Gulch abv Kamakahi Gulch, nr 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	1964-93	12-12-92	-	e<1.0	11-12-65	4.80	670
16411400 Kakaako Gulch nr 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≠, 1973-93	10-13-92	-	e20	02-11-89	8.47	2,860
16411600 Kaunala Gulch nr Mauna Loa	Lat 21°07'01", long 157°15'43", at Sand Haul Road, 3.2 mi east east of Laau Point lighthouse, and 3.3 mi southwest of Mauna Loa.	0.28	1964-93	10-13-92	0.89	10	12-25-84	3.87	151
16411640 Halena Gulch nr 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	1965-93	10-13-92	1.73	140	01-11-74	8.20	2,920
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	1964-93	No flow.			12-08-73	3.30	86
16413500 Manawainui Gulch nr Kualapuu	Lat 21°07'42", long 157°03'25", at bridge on Highway 46, 0.5 mi south of Holomua School, and 2.3 misouthwest of Kualapuu.	10.4	1965-93	11-21-92	-	e250	04-04-89	-	3,620
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	1964-93	11-26-92	1.38	453	04-13-65	2.61	1,250
16419000 Pohakupili Gulch nr 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	1964-93	07-22-93	6.32	126	11-04-66	8.93	989
			Hawaii, 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≠, 1973-93	12-31-92	5.90	419	11-04-88	8.96	1,180
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	1967-93	12-31-92	9.91	3,930	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≠, 1969-93	12-31-92	7.10	725	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	1963-93	11-26-92	-	e20	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	1963-93	11-26-92	14.71	2,480	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	1965-93	12-27-92	9.41	9,370	08-01-82	11.03	16,880

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

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: 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								
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 Kaialinui 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 Kaialinui 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 norhtwest 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

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						
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	1964-93	12-31-92	2.16	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	1963-93	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≠, 1971-93	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	1972-93	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	1972-93	No flow.			02-11-82	13.73	526
			Hawaii, 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	1968-93	Records being reviewed.					
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	1965-93	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	1963-93	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≠, 1973-93	Records being reviewed.					
16717650 Kapehu Str nr 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	1963-93	Records being reviewed.					
16717800 Pohakupuka Str nr Papaaloa	Lat 19°57'20", long 155°11'20", right bank 200 ft downstream from Highway 19, 2.8 mi northwest of Honohina, and 3.0 mi southwestof Papaaloa.	2.76	1963-80≠, 1983-93	Records being reviewed.					
16717850 Keehia Gulch nr 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	1963-93	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	1963-93	Records being reviewed.					

≠ Operated as a continuous-record gaging station

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 Date	Gage height (ft)	Discharge (ft^3/s)	Period of record max Date	Gage height (ft)	Discharge (ft^3/s)
	Hawaii, Island of Hawaii--Continued								
16717950 Honokaia Gulch tributary nr Honokaa	Lat 20°02'58", long 155°32'19", at culvert 4.8 mi southwest of Honokaa Hospital, and 5.5 mi southeast of Kukuihaele.	2.42	1963-93			Records being reviewed.			
16752600 Hapahapai Gulch at Kapaau	Lat 20°14'00", long 155°48'00", at Highway 27, 300 ft east of Kapaau Post Office.	1.52	1963-93			Records being reviewed.			
16755800 Luahine Gulch nr Waimea	Lat 20°03'11", long 155°44'35", on culvert 5.1 mi northwest of Waimea and 5.7 mi east of Kawaihae.	0.32	1963-93			Records being reviewed.			
16756500 Keanuiomano Str nr Kamuela	Lat 201'48", long 155°42'05", on left bank 150 ft upstream from Highway 25 at Waiaka and 2.0 mi west of Kamuela.	4.3	1964-72≠, 1973-93			Records being reviewed.			
16759040 Paiakuli Reservoir tributary nr Waimea	Lat 20°02'16", long 155°38'08", at Highway 19, 2.1 mi west of Puukapu Reservoir, and 2.6 norhteast of Waimea.	0.27	1963-93			Records being reviewed.			
16759060 Kamakoa Gulch nr Waimea	Lat 19°57'32", long 155°41'02", at bridge, 1.4 mi north of Saddle Road Junction, and 4.5 mi south of Waimea	50.6	1963-93			Records being reviewed.			
16759080 Popoo Gulch nr Waikii	Lat 19°52'11", long 155°43'51", at bridge on Highway 19, 2.0 mi north of Keamuku, and 5.2 mi west of Waikii.	33.1	1963-93			Records being reviewed.			
16759180 Keopu Str nr Kailua	Lat 19°38'54", long 155°58'15", at county road bridge, 1.9 mi east of Kailua, and 2.3 mi northwest of Holualoa Post Office.	2.61	1962, 1965-93			Records being reviewed.			
16759300 Waiaha Str at Luawai, nr Holualoa	Lat 19°38'12", long 155°55'45", on right bank at Luawai, 1.8 mi northeast of Holualoa School and 4.2 mi southeast of Honokohau School.	8.74	1961-71≠, 1972-93			Records being reviewed.			
16762000 Alapai Gulch at Naalehu	Lat 19°04'00", long 155°35'19", at debris catchment outlet of Naalehu Watershed Protection Project and 0.2 mi upstream from Highway 11 at Naalehu.	2.87	1963-93			Records being reviewed.			
16767000 Ninole Gulch nr Punaluu	Lat 19°10'44", long 155°33'46", on right bank 300 ft downstream from forest-reserve boundary, 4.6 mi northwest of Punaluu, and 6.0 mi north of Honuapo.	15.5	1966-82≠, 1983-93			Records being reviewed.			
16770000 Hionamoa Gulch at Pahala	Lat 19°11'45", long 155°29'11", at bridge, 0.6 mi southwest of Pahala and 4.1 mi north of Punaluu.	9.41	1963-93			Records being reviewed.			
16770500 Paauau Gulch at Pahala	Lat 19°12'39", long 155°28'48", on right bank 100 ft downstream from bridge on Wood Valley Road and 0.7 mi north of Pahala.	1.74	1962-79≠, 1980-93			Records being reviewed.			

≠ Operated as a continuous-record gaging station

Discharge measurements made at miscellaneous sites during water year 1993

Station No.	Station name	Location	Measured previously (water years)	Measurements Date	Measurements Discharge (ft^3/s)
		Hawaii, Island of Maui			
16588000	Wailoa ditch at Honopou, near Huelo	Lat 20°53'20", long 156°15'19", on right bank 100 ft downstream from intake at Honopou Stream, 0.5 mi west of Lupi, and 2.2 mi southwest of Huelo.	1924-87≠, 1988-92	01-13-93 03-02-93 07-19-93	107 299 282
16589000	New Hamakua ditch at Honopou, near Huelo	Lat 20°53'28", long 156°15'22", on right bank 15 ft upstream from tunnel portal, 600 ft downstream from Honopou Stream crossing and 2.1 mi southwest of Huelo.	1919-85≠, 1986-92	01-13-93 01-13-93 03-02-93 07-19-93 07-22-93 07-22-93	1.65 1.66 151 153 162 159
16592000	Lowrie ditch at Honopou Gulch, near Huelo	Lat 20°54'57", long 156°15'08", on left bank 0.2 mi downstream from siphon across Honopou Stream, 1.6 mi west of Huelo, and 2.7 mi northwest of Kailua.	1911-26≠, 1931-85≠, 1986-92	01-12-93 01-12-93 04-20-93 07-20-93	15.3 15.6 102 80.7
16594000	Haiku ditch at Honopou Gulch, near Kailua	Lat 20°55'07", long 156°14'58", on right bank on west side of Honopou Gulch, 160 ft below Hana Highway, 2.5 mi northwest of Kailua, and 5.0 mi east of Haiku.	1911≠, 1914≠, 1916-28≠, 1931-85≠, 1986-92	01-12-93 01-12-93 04-20-93 04-20-93 07-20-93 07-20-93 07-23-93 07-23-93 07-23-93	4.02 3.92 105 103 108 107 47.5 41.1 37.8

≠ Operated as a continuous-record gaging station

Water-quality partial-record stations are particular sites where chemical-quality, and/or sediment data are collected systematically over a period of years for use in hydrologic analyses. A schematic diagram showing water-quality stations in Kamooalii Stream basin, Kaneohe, Oahu is shown in figures 15 and the data are listed in downstream order.

WATER QUALITY DATA, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

HAWAII, ISLAND OF OAHU

16227100 - HALAWA STREAM BELOW H1 (LAT 21°22'17" LONG 157°55'57")

DATE	TIME	DISCHARGE, INST. CUBIC FEET PER SECOND	SPECIFIC CONDUCTANCE (US/CM)	PH WATER WHOLE FIELD (STANDARD UNITS)	TEMPERATURE AIR (DEG C)	TEMPERATURE WATER (DEG C)	TURBIDITY (NTU)	BAROMETRIC PRESSURE (MM OF HG)	OXYGEN, DISSOLVED (MG/L)	OXYGEN, DISSOLVED (PERCENT SATURATION)	COLIFORM, FECAL, 0.7 UM-MF (COLS./ 100 ML)
NOV 1992											
03...	1030	3.2	281	8.8	24.5	22.5	8.0	760	10.0	116	--
DEC											
08...	1125	2.6	316	9.5	27.0	26.0	3.4	766	11.0	135	920
JAN 1993											
15...	1045	1.2	655	8.7	--	21.0	0.40	766	11.4	127	--
FEB											
24...	1315	0.04	1100	9.9	25.5	27.5	1.6	765	14.0	177	110
APR											
22...	1035	E0.06	1250	9.4	26.5	30.0	1.9	766	11.7	155	--
MAY											
25...	1050	E0.19	805	9.2	25.5	31.5	1.5	766	12.2	165	1400
JUN											
22...	1310	0.08	895	9.5	30.5	37.0	1.7	763	10.0	149	--
JUL											
22...	1205	E190	90	7.8	31.0	24.5	270	762	8.2	98	--
SEP											
07...	1100	2.2	600	9.3	29.5	33.5	0.30	764	10.3	145	--
23...	1025	7.1	165	8.0	27.5	24.0	270	764	8.4	100	>30000

DATE	TIME	HARDNESS TOTAL (MG/L AS CACO3)	CALCIUM DISSOLVED (MG/L AS CA)	MAGNESIUM, DISSOLVED (MG/L AS MG)	SODIUM, DISSOLVED (MG/L AS NA)	SODIUM PERCENT	SODIUM ADSORPTION RATIO	POTASSIUM, DISSOLVED (MG/L AS K)	ALKALINITY LAB (MG/L AS CACO3)	SULFATE DISSOLVED (MG/L AS SO4)	CHLORIDE, DISSOLVED (MG/L AS CL)
FEB 1993											
24...	1315	270	50	36	97	43	3	3.8	30	53	310
SEP											
23...	1025	51	12	5.1	12	33	0.7	1.1	51	6.6	14

DATE	TIME	FLUORIDE, DISSOLVED (MG/L AS F)	SILICA, DISSOLVED (MG/L AS SIO2)	SOLIDS, RESIDUE AT 180 DEG. C DISSOLVED (MG/L)	SOLIDS, SUM OF CONSTITUENTS, DISSOLVED (MG/L)	SOLIDS, DISSOLVED (TONS PER AC-FT)	RESIDUE TOTAL AT 105 DEG. C, SUSPENDED (MG/L)	NITROGEN, NO2+NO3 TOTAL (MG/L AS N)	NITROGEN, AMMONIA TOTAL (MG/L AS N)	NITROGEN, AMMONIA + ORGANIC TOTAL (MG/L AS N)	PHOSPHORUS TOTAL (MG/L AS P)	ALUMINUM, TOTAL RECOVERABLE (UG/L AS AL)
DEC 1992												
08...	1125	--	--	--	--	--	<1	<0.050	<0.010	<0.20	0.010	--
FEB 1993												
24...	1315	<0.10	16	604	584	0.82	<1	--	--	0.50	0.010	130
MAY												
25...	1050	--	--	--	--	--	<1	--	--	0.30	0.020	--
SEP												
23...	1025	0.10	11	97	93	0.13	118	--	--	0.20	0.100	8200

DATE	TIME	ALUMINUM, DISSOLVED (UG/L AS AL)	ARSENIC TOTAL (UG/L AS AS)	BARIUM, TOTAL RECOVERABLE (UG/L AS BA)	BARIUM, DISSOLVED (UG/L AS BA)	BERYLLIUM, TOTAL RECOVERABLE (UG/L AS BE)	CADMIUM TOTAL RECOVERABLE (UG/L AS CD)	CHROMIUM, TOTAL RECOVERABLE (UG/L AS CR)	COBALT, TOTAL RECOVERABLE (UG/L AS CO)	COBALT, DISSOLVED (UG/L AS CO)	COPPER, TOTAL RECOVERABLE (UG/L AS CU)	IRON, TOTAL RECOVERABLE (UG/L AS FE)
FEB 1993												
24...	1315	<10	<1	<100	22	<10	<1	9	<1	<3	4	150
SEP												
23...	1025	40	<1	<100	<2	<10	<1	24	7	<3	14	6900

> Actual value is known to be greater than the value shown
< Actual value is known to be less than the value shown
E Estimated

WATER QUALITY DATA, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

HAWAII, ISLAND OF OAHU--Continued

16227100 - HALAWA STREAM BELOW H1--Continued

DATE	IRON, DIS-SOLVED (UG/L AS FE)	LEAD, TOTAL RECOV-ERABLE (UG/L AS PB)	LITHIUM TOTAL RECOV-ERABLE (UG/L AS LI)	LITHIUM DIS-SOLVED (UG/L AS LI)	MANGA-NESE, TOTAL RECOV-ERABLE (UG/L AS MN)	MANGA-NESE, DIS-SOLVED (UG/L AS MN)	MERCURY TOTAL RECOV-ERABLE (UG/L AS HG)	MOLYB-DENUM, TOTAL RECOV-ERABLE (UG/L AS MO)	MOLYB-DENUM, DIS-SOLVED (UG/L AS MO)	NICKEL, TOTAL RECOV-ERABLE (UG/L AS NI)	NICKEL, DIS-SOLVED (UG/L AS NI)
FEB 1993											
24...	5	<1	40	<4	<10	2	<0.10	<1	<10	2	2
SEP											
23...	11	2	<10	<4	190	5	0.20	<1	<10	14	<1

DATE	SELE-NIUM, TOTAL (UG/L AS SE)	SELE-NIUM, DIS-SOLVED (UG/L AS SE)	SILVER, TOTAL RECOV-ERABLE (UG/L AS AG)	SILVER, DIS-SOLVED (UG/L AS AG)	STRON-TIUM, DIS-SOLVED (UG/L AS SR)	VANA-DIUM, DIS-SOLVED (UG/L AS V)	ZINC, TOTAL RECOV-ERABLE (UG/L AS ZN)	CARBON, ORGANIC TOTAL (MG/L AS C)	OIL AND GREASE, TOTAL RECOV. GRAVI-METRIC (MG/L)	ALDRIN, TOTAL (UG/L)	CHLOR-DANE, TOTAL (UG/L)
FEB 1993											
24...	<1	<1	<1	<1.0	490	9	20	7.2	<1	<0.010	<0.1
SEP											
23...	<1	<1	<1	<1.0	55	<6	50	6.2	<1	<0.010	<0.1

DATE	CHLOR-DYRIFOS TOTAL RECOVER (UG/L)	DDD, TOTAL (UG/L)	DDE, TOTAL (UG/L)	DDT, TOTAL (UG/L)	DEF TOTAL (UG/L)	DI-AZINON, TOTAL (UG/L)	DI-ELDRIN TOTAL (UG/L)	DI-SYSTOH TOTAL (UG/L)	2, 4-DP TOTAL (UG/L)	2,4-D, TOTAL (UG/L)
FEB 1993										
24...	<0.01	<0.010	<0.010	<0.010	<0.01	0.02	<0.010	<0.01	<0.01	<0.01
SEP										
23...	<0.01	<0.010	<0.010	<0.010	<0.01	<0.01	<0.010	<0.01	<0.01	<0.01

DATE	ENDO-SULFAN, TOTAL (UG/L)	ENDRIN WATER UNFLTRD REC (UG/L)	ETHION, TOTAL (UG/L)	FONOFOS (DY-FONATE) WATER WHOLE TOT.REC (UG/L	HEPTA-CHLOR, TOTAL (UG/L)	HEPTA-CHLOR EPOXIDE TOTAL (UG/L)	LINDANE TOTAL (UG/L)	MALA-THION, TOTAL (UG/L)	METH-OXY-CHLOR, TOTAL (UG/L)	METHYL PARA-THION, TOTAL (UG/L)
FEB 1993										
24...	<0.010	<0.010	<0.01	<0.01	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01
SEP										
23...	<0.010	<0.010	<0.01	<0.01	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01

DATE	MIREX, TOTAL (UG/L)	NAPH-THA-LENES, POLY-CHLOR. TOTAL (UG/L)	PARA-THION, TOTAL (UG/L)	PCB, TOTAL (UG/L)	PER-THANE TOTAL (UG/L)	PHORATE TOTAL (UG/L)	SILVEX, TOTAL (UG/L)	TOX-APHENE, TOTAL (UG/L)	TOTAL TRI-THION (UG/L)	2,4,5-T TOTAL (UG/L)
FEB 1993										
24...	<0.01	<0.10	<0.01	<0.1	<0.1	<0.01	<0.01	<1	<0.01	<0.01
SEP										
23...	<0.01	<0.10	<0.01	<0.1	<0.1	<0.01	<0.01	<1	<0.01	<0.01

< Actual value is known to be less than the value shown

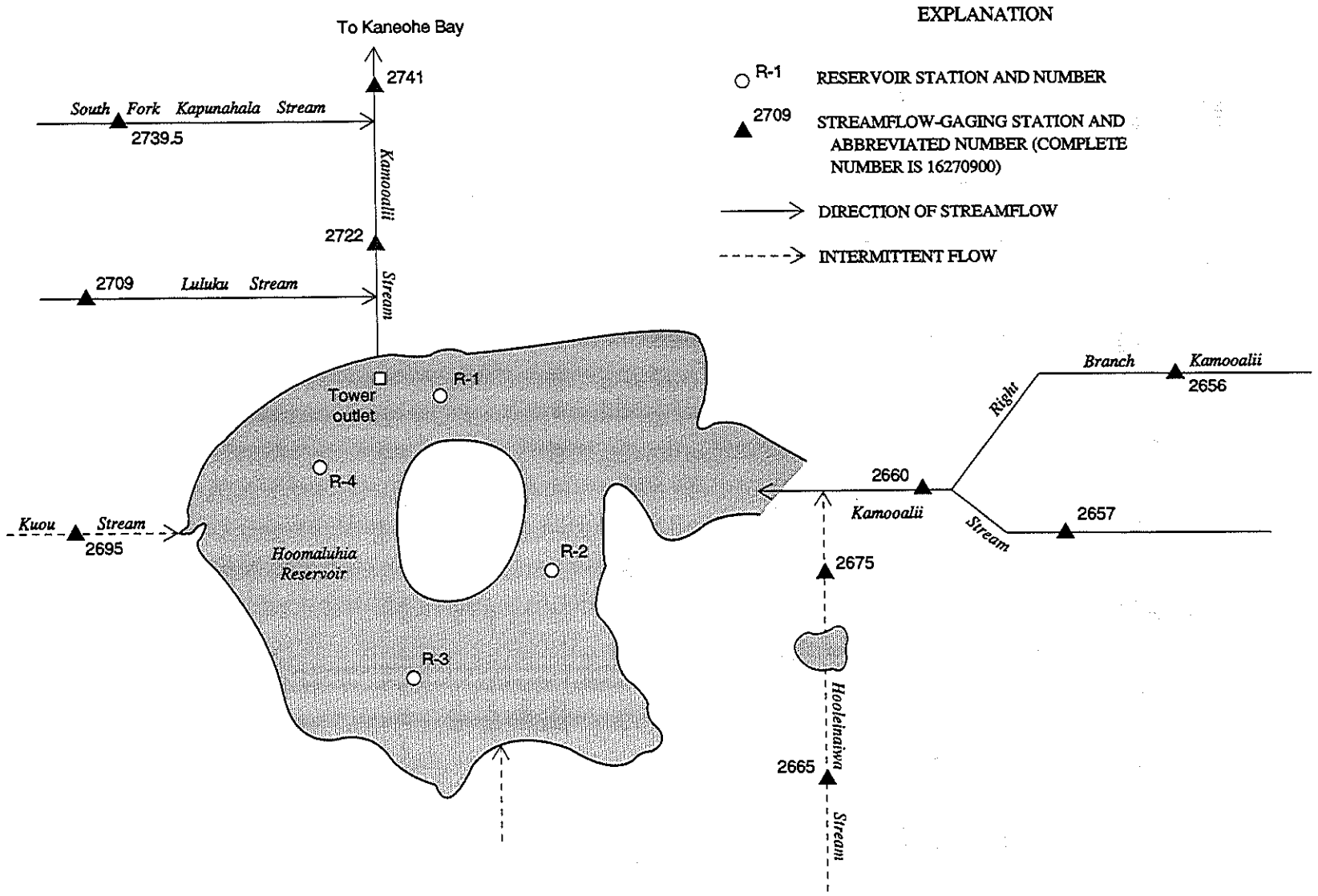

Figure 15. Diagram showing water-quality stations in Kamooalii Stream basin, Kaneohe, Oahu.

WATER QUALITY DATA, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

HAWAII, ISLAND OF OAHU--Continued

16265700 - KAMOOALII STREAM AT ALTITUDE 200 FT, NEAR KANEOHE (LAT 21°23'12" LONG 157°47'56")

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND	SPE-CIFIC CON-DUCT-ANCE (US/CM)	PH WATER WHOLE FIELD (STAND-ARD UNITS)	TEMPER-ATURE AIR (DEG C)	TEMPER-ATURE WATER (DEG C)	TUR-BID-ITY (NTU)	BARO-METRIC PRES-SURE (MM OF HG)	OXYGEN, DIS-SOLVED (MG/L)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION)
NOV 1992										
05...	1315	1.2	235	6.8	25.0	21.0	1.3	755	8.1	92
DEC										
10...	1045	2.3	225	7.6	22.0	21.0	2.1	762	8.3	93
JAN 1993										
13...	1410	2.4	232	7.3	20.5	20.0	0.90	759	8.5	94
MAR										
01...	1430	1.2	235	6.6	22.5	21.5	0.90	764	8.1	92
APR										
21...	0945	0.42	220	6.8	23.5	22.0	0.60	763	6.9	79
MAY										
25...	1110	0.30	223	6.8	23.0	22.5	0.70	762	6.7	77
JUN										
22...	1345	0.12	210	6.4	27.0	22.0	0.10	760	6.2	71
JUL										
23...	0930	0.29	232	6.8	23.5	22.5	0.20	760	6.2	72
SEP										
01...	1145	0.22	225	6.2	24.5	23.0	0.30	758	6.0	70
21...	1140	0.21	215	6.4	26.5	22.5	0.20	757	5.2	61

DATE	TIME	COLI-FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML)	RESIDUE TOTAL AT 105 DEG. C, SUS-PENDED (MG/L)	NITRO-GEN, NO2+NO3 TOTAL (MG/L AS N)	NITRO-GEN, AMMONIA TOTAL (MG/L AS N)	NITRO-GEN,AM-MONIA + ORGANIC TOTAL (MG/L AS N)	PHOS-PHORUS TOTAL (MG/L AS P)
DEC 1992							
10...	1045	77	1	0.300	<0.010	<0.20	0.020
MAR 1993							
01...	1430	K27	<1	--	--	<0.20	0.020
MAY							
25...	1110	180	<1	--	--	<0.20	0.020
SEP							
21...	1140	90	2	--	--	<0.20	0.030

< Actual value is known to be less than the value shown
K Results based on colony count outside acceptance range (non-ideal colony count)

WATER QUALITY DATA, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

HAWAII, ISLAND OF OAHU--Continued

16266500 - HOOLEINAIWA STREAM AT ALTITUDE 220 FT, NEAR KANEOHE (LAT 21°23'06" LONG 157°48'16")

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND	SPE-CIFIC CON-DUCT-ANCE (US/CM)	PH WATER WHOLE FIELD (STAND-ARD UNITS)	TEMPER-ATURE AIR (DEG C)	TEMPER-ATURE WATER (DEG C)	TUR-BID-ITY (NTU)	BARO-METRIC PRES-SURE (MM OF HG)	OXYGEN, DIS-SOLVED (MG/L)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION)
NOV 1992										
05...	1140	0.26	178	6.5	25.0	22.5	0.30	755	6.9	81
DEC										
10...	1200	0.55	186	6.6	24.5	23.0	0.60	760	7.1	83
JAN 1993										
14...	1100	0.51	180	7.0	20.5	21.5	0.40	761	7.8	89
FEB										
25...	1238	0.22	165	6.2	23.0	22.0	0.60	758	8.2	94
APR										
20...	1110	0.13	160	6.6	20.0	21.5	1.4	760	5.6	64
MAY										
24...	1050	0.08	155	6.6	24.0	22.5	0.90	761	5.9	68
JUN										
22...	1220	0.04	160	6.6	26.5	23.0	0.20	759	4.0	47
JUL										
22...	1538	0.38	155	6.9	24.0	23.5	1.4	761	6.6	78
SEP										
02...	1120	0.19	148	6.8	27.5	23.0	0.20	755	6.4	75
21...	1125	0.20	150	6.9	25.0	22.5	0.40	755	6.6	77

DATE	TIME	COLI-FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML)	RESIDUE TOTAL AT 105 DEG. C, SUS-PENDED (MG/L)	NITRO-GEN, NO2+NO3 TOTAL (MG/L AS N)	NITRO-GEN, AMMONIA TOTAL (MG/L AS N)	NITRO-GEN, AMMONIA + ORGANIC TOTAL (MG/L AS N)	PHOS-PHORUS TOTAL (MG/L AS P)
DEC 1992							
10...	1200	90	<1	0.250	<0.010	<0.20	<0.010
FEB 1993							
25...	1238	K7	<1	--	--	<0.20	<0.010
MAY							
24...	1050	170	<1	--	--	<0.20	<0.010
SEP							
21...	1125	180	3	--	--	<0.20	<0.010

< Actual value is known to be less than the value shown
K Results based on colony count outside acceptance range (non-ideal colony count)

WATER QUALITY DATA, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

HAWAII, ISLAND OF OAHU--Continued

16267500 - HOOLEINAIWA STREAM ABOVE CONFLUENCE WITH KAMOOALII STR, NR KANEOHE (LAT 21°23'18" LONG 157° 48'18")

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND	SPE-CIFIC CON-DUCT-ANCE (US/CM)	PH WATER WHOLE FIELD (STAND-ARD UNITS)	TEMPER-ATURE AIR (DEG C)	TEMPER-ATURE WATER (DEG C)	TUR-BID-ITY (NTU)	BARO-METRIC PRES-SURE (MM OF HG)	OXYGEN, DIS-SOLVED (MG/L)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION)
NOV 1992										
05...	1030	0.61	199	6.8	26.0	22.5	10	757	7.8	91
DEC										
10...	1040	1.0	195	6.9	23.5	22.5	6.6	760	7.8	90
JAN 1993										
14...	0940	1.0	190	7.6	19.5	20.0	9.3	763	7.8	86
FEB										
25...	1045	0.50	190	6.7	24.0	22.0	31	760	7.6	87
APR										
21...	1025	0.40	187	7.6	24.5	22.0	5.4	762	8.1	93
MAY										
24...	0950	0.41	198	7.3	25.0	24.0	9.3	761	7.4	88
JUN										
22...	1045	0.26	193	7.6	26.5	25.5	3.5	760	7.6	93
JUL										
22...	1425	2.9	180	7.2	26.0	24.0	5.5	760	7.8	93
SEP										
02...	0940	0.93	183	7.0	27.5	23.5	6.1	756	6.6	78
21...	0955	0.70	193	7.2	24.5	23.0	4.0	757	7.4	87

DATE	TIME	COLI-FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML)	RESIDUE TOTAL AT 105 DEG. C, SUS-PENDED (MG/L)	NITRO-GEN, NO2+NO3 TOTAL (MG/L AS N)	NITRO-GEN, AMMONIA TOTAL (MG/L AS N)	NITRO-GEN, AM-MONIA + ORGANIC TOTAL (MG/L AS N)	PHOS-PHORUS TOTAL (MG/L AS P)
DEC 1992							
10...	1040	120	22	0.083	0.030	<0.20	0.020
FEB 1993							
25...	1045	210	30	--	--	<0.20	0.020
MAY							
24...	0950	100	7	--	--	<0.20	<0.010
SEP							
21...	0955	800	3	--	--	<0.20	0.020

< Actual value is known to be less than the value shown

WATER QUALITY DATA, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

HAWAII, ISLAND OF OAHU--Continued

16269500 - KUOU STREAM AT ALTITUDE 220 FT, NEAR KANEOHE (LAT 21°23'30" LONG 157°48'44")

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND	SPE-CIFIC CON-DUCT-ANCE (US/CM)	PH WATER WHOLE FIELD (STAND-ARD UNITS)	TEMPER-ATURE AIR (DEG C)	TEMPER-ATURE WATER (DEG C)	TUR-BID-ITY (NTU)	BARO-METRIC PRES-SURE (MM OF HG)	OXYGEN, DIS-SOLVED (MG/L)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION)
NOV 1992 03...	1220	0.12	310	7.1	23.0	22.5	0.40	756	7.3	85
DEC 10...	1115	0.08	315	6.7	24.5	22.0	1.2	762	6.3	72
JAN 1993 15...	1430	0.07	300	7.4	21.5	21.0	1.1	760	8.2	92
FEB 25...	1345	0.03	310	6.5	23.5	21.5	0.80	758	8.7	99
APR 20...	1325	E0.01	285	7.4	--	21.0	0.70	762	8.4	94
MAY 25...	1130	0.00	--	--	--	--	--	--	--	--
JUN 22...	1130	0.00	--	--	--	--	--	--	--	--
JUL 22...	1145	0.17	215	6.7	--	23.0	3.2	760	7.6	89
SEP 02...	1400	E0.03	332	6.7	24.5	22.5	1.8	756	2.6	30
SEP 21...	1130	0.00	--	--	--	--	--	--	--	--

DATE	TIME	COLI-FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML)	RESIDUE TOTAL AT 105 DEG. C, SUS-PENDED (MG/L)	NITRO-GEN, NO2+NO3 TOTAL (MG/L AS N)	NITRO-GEN, AMMONIA TOTAL (MG/L AS N)	NITRO-GEN, AM-MONIA + ORGANIC TOTAL (MG/L AS N)	PHOS-PHORUS TOTAL (MG/L AS P)
DEC 1992 10...	1115	270	<1	0.350	0.010	<0.20	<0.010
FEB 1993 25...	1345	230	4	--	--	<0.20	<0.010

< Actual value is known to be less than the value shown
E Estimated

WATER QUALITY DATA, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

HAWAII, ISLAND OF OAHU--Continued

16274100 - KANEOHE STREAM BELOW KAM HWY (LAT 21°24'54" LONG 157°48'03")

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND	SPE-CIFIC CON-DUCT-ANCE (US/CM)	PH WATER WHOLE FIELD (STAND-ARD UNITS)	TEMPER-ATURE AIR (DEG C)	TEMPER-ATURE WATER (DEG C)	TUR-BID-ITY (NTU)	BARO-METRIC PRES-SURE (MM OF HG)	OXYGEN, DIS-SOLVED (MG/L)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML)
NOV 1992											
05...	0930	8.3	225	8.6	23.5	21.5	1.4	763	9.9	112	--
DEC											
09...	1000	16	202	7.8	24.5	23.0	5.7	766	9.5	110	2500
JAN 1993											
13...	1000	17	210	8.3	21.0	20.0	2.9	765	9.5	104	--
FEB											
26...	1500	11	203	9.0	27.0	28.0	18	764	9.0	115	3100
APR											
20...	1155	12	200	8.6	--	23.0	11	767	9.1	105	--
MAY											
24...	0940	8.7	195	8.8	25.0	24.5	13	767	9.4	112	2800
JUN											
23...	1350	7.5	202	9.3	34.5	31.0	1.9	765	8.9	119	--
JUL											
23...	1340	17	218	9.0	28.5	27.5	2.7	766	9.2	116	--
SEP											
01...	1435	11	202	8.7	25.5	26.0	5.3	761	8.5	105	--
22...	1120	8.1	198	8.8	29.0	29.5	5.7	763	9.0	118	2300

DATE	TIME	HARD-NESS TOTAL (MG/L AS CACO3)	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)	SODIUM, DIS-SOLVED (MG/L AS NA)	SODIUM PERCENT	SODIUM AD-SORP-TION RATIO	POTAS-SIUM, DIS-SOLVED (MG/L AS K)	ALKA-LINITY LAB (MG/L AS CACO3)	SULFATE DIS-SOLVED (MG/L AS SO4)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)
FEB 1993											
26...	1500	61	11	8.1	17	37	0.9	1.3	62	6.6	23
SEP											
22...	1120	58	11	7.4	16	37	0.9	1.1	59	7.7	20

DATE	TIME	FLUO-RIDE, DIS-SOLVED (MG/L AS F)	SILICA, DIS-SOLVED (MG/L AS SIO2)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L)	SOLIDS, DIS-SOLVED (TONS PER AC-FT)	RESIDUE TOTAL AT 105 DEG. C, SUS-PENDED (MG/L)	NITRO-GEN, NO2+NO3 TOTAL (MG/L AS N)	NITRO-GEN, AMMONIA TOTAL (MG/L AS N)	NITROGEN, AMMONIA + ORGANIC TOTAL (MG/L AS N)	PHOS-PHORUS TOTAL (MG/L AS P)	ALUM-INUM, TOTAL RECOV-ERABLE (UG/L AS AL)
DEC 1992												
09...	1000	--	--	--	--	--	25	0.450	0.020	<0.20	0.030	--
FEB 1993												
26...	1500	<0.10	21	113	125	0.15	18	--	--	0.20	0.030	770
MAY												
24...	0940	--	--	--	--	--	9	--	--	<0.20	0.020	--
SEP												
22...	1120	0.10	23	114	122	0.16	15	--	--	<0.20	0.030	470

DATE	TIME	ALUM-INUM, DIS-SOLVED (UG/L AS AL)	ARSENIC TOTAL (UG/L AS AS)	BARIUM, TOTAL RECOV-ERABLE (UG/L AS BA)	BARIUM, DIS-SOLVED (UG/L AS BA)	BERYL-LIUM, TOTAL RECOV-ERABLE (UG/L AS BE)	CADMIUM TOTAL RECOV-ERABLE (UG/L AS CD)	CHRO-MIUM, TOTAL RECOV-ERABLE (UG/L AS CR)	COBALT, TOTAL RECOV-ERABLE (UG/L AS CO)	COBALT, DIS-SOLVED (UG/L AS CO)	COPPER, TOTAL RECOV-ERABLE (UG/L AS CU)	IRON, TOTAL RECOV-ERABLE (UG/L AS FE)
FEB 1993												
26...	1500	20	1	<100	3	<10	<1	7	1	<3	4	1300
SEP												
22...	1120	20	<1	<100	3	<10	<1	2	<1	<3	2	880

< Actual value is known to be less than the value shown

WATER QUALITY DATA, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

HAWAII, ISLAND OF OAHU--Continued

16274100 - KANEOHE STREAM BELOW KAM HWY--Continued

DATE	IRON, DIS-SOLVED (UG/L AS FE)	LEAD, TOTAL RECOV-ERABLE (UG/L AS PB)	LITHIUM TOTAL RECOV-ERABLE (UG/L AS LI)	LITHIUM DIS-SOLVED (UG/L AS LI)	MANGA-NESE, TOTAL RECOV-ERABLE (UG/L AS MN)	MANGA-NESE, DIS-SOLVED (UG/L AS MN)	MERCURY TOTAL RECOV-ERABLE (UG/L AS HG)	MOLYB-DENUM, TOTAL RECOV-ERABLE (UG/L AS MO)	MOLYB-DENUM, DIS-SOLVED (UG/L AS MO)	NICKEL, TOTAL RECOV-ERABLE (UG/L AS NI)	NICKEL, DIS-SOLVED (UG/L AS NI)
FEB 1993 26...	13	3	<10	<4	50	8	0.10	<1	<10	3	<1
SEP 22...	55	1	<10	<4	70	4	0.20	<1	<10	2	<1

DATE	SELE-NIUM, TOTAL (UG/L AS SE)	SELE-NIUM, DIS-SOLVED (UG/L AS SE)	SILVER, TOTAL RECOV-ERABLE (UG/L AS AG)	SILVER, DIS-SOLVED (UG/L AS AG)	STRON-TIUM, DIS-SOLVED (UG/L AS SR)	VANA-DIUM, DIS-SOLVED (UG/L AS V)	ZINC, TOTAL RECOV-ERABLE (UG/L AS ZN)	CARBON, ORGANIC TOTAL (MG/L AS C)	OIL AND GREASE, TOTAL RECOV. GRAVI-METRIC (MG/L)	ALDRIN, TOTAL (UG/L)	CHLOR-DANE, TOTAL (UG/L)
FEB 1993 26...	<1	<1	<1	<1.0	84	7	20	3.1	<1	<0.010	<0.1
SEP 22...	<1	<1	<1	<1.0	78	<6	10	2.5	<1	<0.010	<0.1

DATE	CHLOR-DYRIFOS TOTAL RECOVER (UG/L)	DDD, TOTAL (UG/L)	DDE, TOTAL (UG/L)	DDT, TOTAL (UG/L)	DEF TOTAL (UG/L)	DI-AZINON, TOTAL (UG/L)	DI-ELDRIN TOTAL (UG/L)	DI-SYSTON TOTAL (UG/L)	2, 4-DP TOTAL (UG/L)	2,4-D, TOTAL (UG/L)
FEB 1993 26...	<0.01	<0.010	<0.010	<0.010	<0.01	<0.01	0.020	<0.01	<0.01	<0.01
SEP 22...	<0.01	<0.010	<0.010	<0.010	<0.01	<0.01	0.030	<0.01	<0.01	<0.01

DATE	ENDO-SULFAN, TOTAL (UG/L)	ENDRIN WATER UNFLTRD REC (UG/L)	ETHION, TOTAL (UG/L)	FONOFOS (DY-FONATE) WATER WHOLE TOT.REC (UG/L	HEPTA-CHLOR, TOTAL (UG/L)	HEPTA-CHLOR EPOXIDE TOTAL (UG/L)	LINDANE TOTAL (UG/L)	MALA-THION, TOTAL (UG/L)	METH-OXY-CHLOR, TOTAL (UG/L)	METHYL PARA-THION, TOTAL (UG/L)
FEB 1993 26...	<0.010	<0.010	<0.01	<0.01	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01
SEP 22...	<0.010	<0.010	<0.01	<0.01	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01

DATE	MIREX, TOTAL (UG/L)	NAPH-THA-LENES, POLY-CHLOR. TOTAL (UG/L)	PARA-THION, TOTAL (UG/L)	PCB, TOTAL (UG/L)	PER-THANE TOTAL (UG/L)	PHORATE TOTAL (UG/L)	SILVEX, TOTAL (UG/L)	TOX-APHENE, TOTAL (UG/L)	TOTAL TRI-THION (UG/L)	2,4,5-T TOTAL (UG/L)
FEB 1993 26...	<0.01	<0.10	<0.01	<0.1	<0.1	<0.01	<0.01	<1	<0.01	<0.01
SEP 22...	<0.01	<0.10	<0.01	<0.1	<0.1	<0.01	<0.01	<1	<0.01	<0.01

< Actual value is known to be less than the value shown

WATER QUALITY DATA, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

HAWAII, ISLAND OF OAHU--Continued

212335157482601 HOOMALUHIA RES SEC 1-1 NR KANEOHE, OAHU, HI (LAT 21°23'35" LONG 157°48'26")

DATE	TIME	SAMPLING DEPTH (FEET)	SPECIFIC CONDUCTANCE (US/CM)	PH WATER WHOLE FIELD (STANDARD UNITS)	TEMPERATURE WATER (DEG C)	BAROMETRIC PRESSURE (MM OF HG)	OXYGEN, DISSOLVED (MG/L)	OXYGEN, DISSOLVED (PERCENT SATURATION)
MAR 1993								
04...	0953	1.00	194	7.6	22.0	763	7.3	84
04...	0954	3.00	194	7.6	22.0	763	7.3	83
04...	0955	5.00	194	7.6	22.0	763	7.2	82
04...	0956	7.00	194	7.6	22.0	763	7.1	81
04...	0957	8.00	194	7.5	22.0	763	6.9	79
JUN								
24...	0944	1.00	184	7.4	27.0	761	6.8	86
24...	0946	3.00	186	7.4	27.0	761	6.8	86
24...	0948	5.00	186	7.4	27.0	761	6.8	86
24...	0950	7.00	184	7.5	27.0	761	6.6	83
24...	0952	8.00	186	7.4	27.0	761	5.6	70
SEP								
23...	1015	1.00	178	7.3	27.0	761	6.3	79
23...	1016	3.00	180	7.3	27.0	761	6.3	79
23...	1017	5.00	182	7.3	26.5	761	6.2	78
23...	1018	7.00	184	7.3	26.5	761	4.1	51
23...	1019	8.00	184	7.3	26.0	761	4.0	50

WATER QUALITY DATA, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

HAWAII, ISLAND OF OAHU--Continued

212335157482602 HOOMALUHIA RES SEC 1-2 NR KANEOHE, OAHU, HI (LAT 21°23'35" LONG 157°48'26")

DATE	TIME	SAMPLING DEPTH (FEET)	SPECIFIC CONDUCTANCE (US/CM)	PH WATER WHOLE FIELD (STANDARD UNITS)	TEMPERATURE WATER (DEG C)	BAROMETRIC PRESSURE (MM OF HG)	OXYGEN, DISSOLVED (MG/L)	OXYGEN, DISSOLVED (PERCENT SATURATION)
MAR 1993								
04...	0946	1.00	194	7.6	22.0	763	7.3	83
04...	0947	3.00	194	7.6	22.0	763	7.3	83
04...	0948	5.00	194	7.6	22.0	763	7.2	82
04...	0949	7.00	194	7.6	22.0	763	7.1	82
04...	0950	9.00	194	7.6	22.0	763	7.0	80
JUN								
24...	0935	1.00	184	7.4	27.0	761	6.8	86
24...	0936	3.00	186	7.4	27.0	761	6.7	84
24...	0937	5.00	186	7.4	27.0	761	6.8	86
24...	0939	7.00	186	7.4	27.0	761	6.6	83
24...	0940	9.00	190	7.4	26.5	761	4.8	60
SEP								
23...	1007	1.00	178	7.3	27.0	761	6.3	79
23...	1008	3.00	180	7.3	27.0	761	6.3	79
23...	1009	5.00	182	7.3	26.5	761	6.3	79
23...	1010	7.00	184	7.3	26.5	761	5.0	62
23...	1011	9.00	180	7.3	26.0	761	5.3	65

WATER QUALITY DATA, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

HAWAII, ISLAND OF OAHU--Continued

212335157482603 - HOOMALUHIA RES SEC 1-3 NR KANEOHE (LAT 21°23'35" LONG 157°48'26")

DATE	TIME	SAMPLING DEPTH (FEET)	SPECIFIC CONDUCTANCE (US/CM)	PH WATER WHOLE FIELD (STANDARD UNITS)	TEMPERATURE WATER (DEG C)	TURBIDITY (NTU)	BAROMETRIC PRESSURE (MM OF HG)	OXYGEN, DISSOLVED (MG/L)	OXYGEN, DISSOLVED (PERCENT SATURATION)	COLIFORM, FECAL, 0.7 UM-MF (COLS./100 ML)	HARDNESS TOTAL (MG/L AS CACO3)
MAR 1993											
04...	0934	1.00	194	7.6	22.0	2.4	763	7.2	83	K5	--
04...	0936	3.00	194	7.6	22.0	--	763	7.3	83	--	--
04...	0938	5.00	194	7.6	22.0	--	763	7.2	82	--	--
04...	0939	7.00	194	7.6	22.0	2.3	763	7.1	82	K4	--
04...	0940	9.00	194	7.6	22.0	--	763	7.1	81	--	--
04...	0942	11.0	202	7.3	21.5	5.2	763	5.8	66	K10	--
04...	0945	--	194	7.6	22.0	3.6	763	7.1	82	--	58
JUN											
24...	0922	1.00	184	7.4	27.0	0.30	761	6.8	86	--	--
24...	0924	3.00	186	7.4	27.0	--	761	6.8	86	--	--
24...	0926	5.00	186	7.4	27.0	--	761	6.8	86	--	--
24...	0927	7.00	186	7.4	27.0	0.40	761	6.6	83	--	--
24...	0929	9.00	192	7.4	26.5	--	761	4.4	55	--	--
24...	0931	11.0	192	7.3	26.0	2.0	761	5.3	65	--	--
SEP											
23...	0953	1.00	182	7.3	26.5	1.3	761	6.3	80	100	--
23...	0956	3.00	182	7.3	26.5	--	761	6.3	79	--	--
23...	0958	5.00	182	7.3	26.5	--	761	6.2	78	--	--
23...	1000	7.00	184	7.3	26.5	1.3	761	4.9	61	58	--
23...	1001	9.00	180	7.3	26.0	--	761	5.2	64	--	--
23...	1002	11.0	178	7.3	25.0	6.8	761	5.4	66	>1200	--
23...	1005	--	184	7.3	26.5	2.5	761	4.9	61	--	43

DATE	TIME	CALCIUM DISSOLVED (MG/L AS CA)	MAGNESIUM, DISSOLVED (MG/L AS MG)	SODIUM, DISSOLVED (MG/L AS NA)	SODIUM PERCENT	SODIUM ADSORPTION RATIO	POTASSIUM, DISSOLVED (MG/L AS K)	ALKALINITY LAB (MG/L AS CACO3)	SULFATE DISSOLVED (MG/L AS SO4)	CHLORIDE, DISSOLVED (MG/L AS CL)	FLUORIDE, DISSOLVED (MG/L AS F)	SILICA, DISSOLVED (MG/L AS SIO2)
MAR 1993												
04...	0945	8.4	9.0	17	38	1	1.2	56	6.0	23	<0.10	21
SEP												
23...	1005	6.0	6.9	13	39	0.9	0.20	52	7.8	17	0.10	16

DATE	TIME	SOLIDS, RESIDUE AT 180 DEG. C DISSOLVED (MG/L)	SOLIDS, SUM OF CONSTITUENTS, DISSOLVED (MG/L)	SOLIDS, DISSOLVED (TONS PER AC-FT)	RESIDUE TOTAL AT 105 DEG. C, SUSPENDED (MG/L)	NITROGEN, AMMONIA + ORGANIC TOTAL (MG/L AS N)	PHOSPHORUS TOTAL (MG/L AS P)	ALUMINUM, TOTAL RECOVERABLE (UG/L AS AL)	ALUMINUM, DISSOLVED (UG/L AS AL)	ARSENIC TOTAL (UG/L AS AS)	BARIUM, TOTAL RECOVERABLE (UG/L AS BA)	BARIUM, DISSOLVED (UG/L AS BA)
MAR 1993												
04...	0945	122	11	0.17	--	--	--	170	40	<1	<100	6
04...	1053	--	--	--	<1	<0.20	0.010	--	--	--	--	--
04...	1056	--	--	--	<1	<0.20	0.020	--	--	--	--	--
04...	1100	--	--	--	8	<0.20	0.030	--	--	--	--	--
SEP												
23...	0953	--	--	--	1	<0.20	0.01	--	--	--	--	--
23...	1000	--	--	--	4	0.20	0.020	--	--	--	--	--
23...	1002	--	--	--	3	<0.20	0.030	--	--	--	--	--
23...	1005	101	9	0.14	--	--	--	270	20	2	<100	5

> Actual value is known to be greater than the value shown
< Actual value is known to be less than the value shown
K Results based on colony count outside the acceptance range (non-ideal colony count)

WATER QUALITY DATA, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

HAWAII, ISLAND OF OAHU--Continued

212335157482603 - HOOMALUHIA RES SEC 1-3 NR KANEOHE--Continued

DATE	TIME	BERYLLIUM, TOTAL RECOVERABLE (UG/L AS BE)	CADMIUM TOTAL RECOVERABLE (UG/L AS CD)	CHROMIUM, TOTAL RECOVERABLE (UG/L AS CR)	COBALT, TOTAL RECOVERABLE (UG/L AS CO)	COBALT, DISSOLVED (UG/L AS CO)	COPPER, TOTAL RECOVERABLE (UG/L AS CU)	IRON, TOTAL RECOVERABLE (UG/L AS FE)	IRON, DISSOLVED (UG/L AS FE)	LEAD, TOTAL RECOVERABLE (UG/L AS PB)	LITHIUM TOTAL RECOVERABLE (UG/L AS LI)	LITHIUM DISSOLVED (UG/L AS LI)
MAR 1993 04...	0945	<10	<1	2	<1	<3	1	350	21	1	<10	<4
SEP 23...	1005	<10	<1	<1	<1	<3	2	480	19	2	<10	<4

DATE	MANGANESE, TOTAL RECOVERABLE (UG/L AS MN)	MANGANESE, DISSOLVED (UG/L AS MN)	MERCURY TOTAL RECOVERABLE (UG/L AS HG)	MOLYBDENUM, TOTAL RECOVERABLE (UG/L AS MO)	MOLYBDENUM, DISSOLVED (UG/L AS MO)	NICKEL, TOTAL RECOVERABLE (UG/L AS NI)	NICKEL, DISSOLVED (UG/L AS NI)	SELENIUM, TOTAL (UG/L AS SE)	SELENIUM, DISSOLVED (UG/L AS SE)	SILVER, TOTAL RECOVERABLE (UG/L AS AG)	SILVER, DISSOLVED (UG/L AS AG)	STRONTIUM, DISSOLVED (UG/L AS SR)
MAR 1993 04...	40	7	<0.10	<1	<10	2	<1	<1	<1	<1	<1.0	84
SEP 23...	40	10	0.20	<1	<10	1	<1	<1	<1	<1	<1.0	65

DATE	VANADIUM, DISSOLVED (UG/L AS V)	ZINC, TOTAL RECOVERABLE (UG/L AS ZN)	CARBON, ORGANIC TOTAL (MG/L AS C)	OIL AND GREASE, TOTAL RECOV. GRAVIMETRIC (MG/L)	ALDRIN, TOTAL (UG/L)	CHLORDANE, TOTAL (UG/L)	CHLORDYRIFOS TOTAL RECOVER (UG/L)	DDD, TOTAL (UG/L)	DDE, TOTAL (UG/L)	DDT, TOTAL (UG/L)	DEF TOTAL (UG/L)	DIAZINON, TOTAL (UG/L)
MAR 1993 04...	<6	<10	2.0	<1	<0.010	<0.1	<0.01	<0.010	<0.010	<0.010	<0.01	<0.01
SEP 23...	<6	<10	2.0	<1	<0.010	<0.1	<0.01	<0.010	<0.010	<0.010	<0.01	<0.01

DATE	DIELDRIN TOTAL (UG/L)	DISYSTON TOTAL (UG/L)	2,4-D, TOTAL (UG/L)	2, 4-DP TOTAL (UG/L)	2,4,5-T TOTAL (UG/L)	ENDOSULFAN, TOTAL (UG/L)	ENDRIN WATER UNFLTRO REC (UG/L)	ETHION, TOTAL (UG/L)	FONOFOS (OYFONATE) WATER WHOLE TOT.REC (UG/L	HEPTACHLOR, TOTAL (UG/L)	HEPTACHLOR EPOXIDE TOTAL (UG/L)	LINDANE TOTAL (UG/L)
MAR 1993 04...	<0.010	<0.01	<0.01	<0.0	<0.01	<0.010	<0.010	<0.01	<0.01	<0.010	<0.010	<0.010
SEP 23...	<0.010	<0.01	<0.01	<0.0	<0.01	<0.010	<0.010	<0.01	<0.01	<0.010	<0.010	<0.010

DATE	MALATHION, TOTAL (UG/L)	METHOXYCHLOR, TOTAL (UG/L)	METHYL PARATHION, TOTAL (UG/L)	MIREX, TOTAL (UG/L)	NAPHTHALENES, POLYCHLOR. TOTAL (UG/L)	PARATHION, TOTAL (UG/L)	PCB, TOTAL (UG/L)	PERTHANE TOTAL (UG/L)	PHORATE TOTAL (UG/L)	SILVEX, TOTAL (UG/L)	TOXAPHENE, TOTAL (UG/L)	TOTAL TRITHION (UG/L)
MAR 1993 04...	<0.01	<0.01	<0.01	<0.01	<0.10	<0.01	<0.1	<0.1	<0.01	<0.01	<1	<0.01
SEP 23...	<0.01	<0.01	<0.01	<0.01	<0.10	<0.01	<0.1	<0.1	<0.01	<0.01	<1	<0.01

< Actual value is known to be less than the value shown

WATER QUALITY DATA, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

HAWAII, ISLAND OF OAHU--Continued

212331157482501 HOOMALUHIA RES SEC 2-1 NR KANEOHE, OAHU, HI (LAT 21°23'31" LONG 157°48'25")

DATE	TIME	SAMPLING DEPTH (FEET)	SPECIFIC CONDUCTANCE (US/CM)	PH WATER WHOLE FIELD (STANDARD UNITS)	TEMPERATURE WATER (DEG C)	BAROMETRIC PRESSURE (MM OF HG)	OXYGEN, DISSOLVED (MG/L)	OXYGEN, DISSOLVED (PERCENT SATURATION)
MAR 1993								
04...	1026	1.00	194	7.6	22.0	763	7.3	83
04...	1027	3.00	194	7.6	22.0	763	7.3	83
04...	1028	5.00	194	7.6	22.0	763	7.3	83
04...	1029	7.00	194	7.6	22.0	763	7.2	82
04...	1030	8.00	194	7.5	22.0	763	7.1	82
JUN								
24...	1125	1.00	186	7.5	27.0	761	6.6	83
24...	1126	3.00	186	7.6	27.0	761	6.6	83
24...	1127	5.00	186	7.6	27.0	761	6.5	82
24...	1129	7.00	186	7.5	27.0	761	6.0	76
24...	1130	8.00	186	7.5	27.0	761	5.9	74
SEP								
23...	1152	1.00	180	7.2	27.0	761	6.2	78
23...	1153	3.00	180	7.3	26.0	761	6.1	75
23...	1154	5.00	182	7.3	26.5	761	5.8	73
23...	1155	7.00	180	7.3	26.5	761	5.5	68
23...	1156	8.00	182	7.3	25.5	761	5.0	61

WATER QUALITY DATA, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

HAWAII, ISLAND OF OAHU--Continued

212331157482502 - HOOMALUHIA RES SEC 2-2 NR KANEOHE (LAT 21°23'31" LONG 157°48'25")

DATE	TIME	SAMPLING DEPTH (FEET)	SPECIFIC CONDUCTANCE (US/CM)	PH WATER WHOLE FIELD (STANDARD UNITS)	TEMPERATURE WATER (DEG C)	BAROMETRIC PRESSURE (MM OF HG)	OXYGEN, DISSOLVED (MG/L)	OXYGEN, DISSOLVED (PERCENT SATURATION)
MAR 1993								
04...	1016	1.00	194	7.6	22.0	763	7.4	84
04...	1017	3.00	194	7.6	22.0	763	7.4	84
04...	1018	5.00	194	7.6	22.0	763	7.3	84
04...	1019	7.00	194	7.6	22.0	763	7.3	83
04...	1021	9.00	194	7.6	22.0	763	7.2	82
04...	1023	11.0	196	7.5	22.0	763	7.1	81
JUN								
24...	1131	1.00	184	7.6	27.5	761	6.6	84
24...	1132	3.00	186	7.6	27.0	761	6.6	83
24...	1133	5.00	186	7.6	27.0	761	6.6	83
24...	1134	7.00	186	7.6	27.0	761	6.5	82
24...	1135	9.00	186	7.5	27.0	761	4.6	58
24...	1136	11.0	196	7.5	25.5	761	3.8	47
SEP								
23...	1146	1.00	180	7.3	27.0	761	6.4	80
23...	1147	3.00	180	7.3	27.0	761	6.4	80
23...	1148	5.00	182	7.4	26.5	761	6.1	76
23...	1149	7.00	178	7.4	26.5	761	5.6	70
23...	1150	9.00	182	7.3	24.0	761	5.2	62
23...	1151	11.0	178	7.3	24.5	761	4.7	57

WATER QUALITY DATA, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

HAWAII, ISLAND OF OAHU--Continued

212331157482503 HOOMALUHIA RES SEC 2-3 NR KANEOHE, OAHU, HI (LAT 21°23'31" LONG 157°48'25")

DATE	TIME	SAMPLING DEPTH (FEET)	SPECIFIC CONDUCTANCE (US/CM)	PH WATER WHOLE FIELD (STANDARD UNITS)	TEMPERATURE WATER (DEG C)	BAROMETRIC PRESSURE (MM OF HG)	OXYGEN, DISSOLVED (MG/L)	OXYGEN, DISSOLVED (PERCENT SATURATION)
MAR 1993								
04...	1009	1.00	194	7.6	22.0	763	7.4	85
04...	1010	3.00	194	7.6	22.0	763	7.6	87
04...	1011	5.00	194	7.6	22.0	763	7.3	83
04...	1012	7.00	194	7.6	22.0	763	7.2	83
04...	1013	9.00	194	7.6	22.0	763	7.2	83
JUN								
24...	1137	1.00	184	7.5	27.5	761	6.4	81
24...	1138	3.00	184	7.5	27.5	761	6.4	81
24...	1139	5.00	186	7.5	27.0	761	6.5	82
24...	1140	7.00	186	7.5	27.0	761	6.2	78
24...	1141	9.00	190	7.5	26.5	761	4.4	55
SEP								
23...	1140	1.00	180	7.4	27.0	761	6.4	80
23...	1141	3.00	180	7.4	27.0	761	6.4	80
23...	1142	5.00	180	7.4	27.0	761	6.4	80
23...	1143	7.00	182	7.4	26.5	761	5.4	67
23...	1144	9.00	182	7.3	25.0	761	4.8	58

WATER QUALITY DATA, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

HAWAII, ISLAND OF OAHU--Continued

212329157483101 HOOMALUHIA RES SEC 3-1 NR KANEOHE, OAHU, HI (LAT 21°23'29" LONG 157°48'31")

DATE	TIME	SAMPLING DEPTH (FEET)	SPECIFIC CONDUCTANCE (US/CM)	PH WATER WHOLE FIELD (STANDARD UNITS)	TEMPERATURE WATER (DEG C)	BAROMETRIC PRESSURE (MM OF HG)	OXYGEN, DISSOLVED (MG/L)	OXYGEN, DISSOLVED (PERCENT SATURATION)
MAR 1993								
04...	1103	1.00	194	7.6	22.0	763	7.6	87
04...	1104	3.00	194	7.6	22.0	763	7.6	87
04...	1105	5.00	194	7.6	22.0	763	7.6	87
04...	1106	7.00	194	7.6	22.0	763	7.5	86
04...	1108	8.00	194	7.6	22.0	763	7.5	86
JUN								
24...	1046	1.00	184	7.5	27.5	761	5.8	74
24...	1047	3.00	184	7.5	27.5	761	5.8	74
24...	1048	5.00	184	7.6	27.5	761	5.7	72
24...	1049	7.00	186	7.5	27.0	761	5.7	72
24...	1050	8.00	186	7.5	27.0	761	5.7	72
SEP								
23...	1117	1.00	180	7.5	27.0	761	6.2	78
23...	1118	3.00	180	7.5	27.0	761	6.2	78
23...	1119	5.00	180	7.5	26.5	761	6.2	78
23...	1120	7.00	182	7.4	26.5	761	5.0	62
23...	1121	8.00	186	7.4	26.0	761	3.2	40

WATER QUALITY DATA, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

HAWAII, ISLAND OF OAHU--Continued

212329157483102 - HOOMALUHIA RES SEC 3-2 NR KANEOHE (LAT 21°23'29" LONG 157°48'31")

DATE	TIME	SAMPLING DEPTH (FEET)	SPECIFIC CONDUCTANCE (US/CM)	PH WATER WHOLE FIELD (STANDARD UNITS)	TEMPERATURE WATER (DEG C)	TURBIDITY (NTU)	BAROMETRIC PRESSURE (MM OF HG)	OXYGEN, DISSOLVED (MG/L)	OXYGEN, DISSOLVED (PERCENT SATURATION)
MAR 1993									
04...	1053	1.00	194	7.6	22.0	2.1	763	7.6	87
04...	1055	3.00	194	7.5	22.0	--	763	7.6	87
04...	1056	5.00	194	7.6	22.0	2.2	763	7.6	87
04...	1057	7.00	194	7.6	22.0	--	763	7.5	86
04...	1058	9.00	194	7.6	22.0	--	763	7.6	87
04...	1100	10.0	194	7.6	22.0	17	763	7.5	85
JUN									
24...	1039	1.00	184	7.5	27.5	0.20	761	6.2	79
24...	1040	3.00	186	7.6	27.0	--	761	6.2	78
24...	1041	5.00	186	7.6	27.0	0.40	761	6.1	77
24...	1042	7.00	186	7.5	27.0	--	761	6.0	76
24...	1043	9.00	186	7.5	27.0	--	761	5.8	73
24...	1044	10.0	186	7.5	27.0	3.8	761	5.6	70
SEP									
23...	1124	1.00	180	7.4	27.0	0.70	761	6.4	81
23...	1125	5.00	182	7.4	26.5	0.80	761	6.2	77
23...	1126	7.00	182	7.4	26.5	--	761	4.9	61
23...	1127	9.00	186	7.3	26.0	--	761	3.6	44
23...	1128	3.00	180	7.4	27.0	--	761	6.4	80
23...	1129	10.0	186	7.3	25.5	2.8	761	3.9	48

DATE	TIME	COLIFORM, FECAL, 0.7 UM-MF (COLS./ 100 ML)	RESIDUE TOTAL AT 105 DEG. C, SUSPENDED (MG/L)	NITROGEN, AMMONIA + ORGANIC TOTAL (MG/L AS N)	PHOSPHORUS TOTAL (MG/L AS P)
MAR 1993					
04...	1053	K2	<1	<0.20	0.010
04...	1056	K2	<1	<0.20	0.020
04...	1100	K6	24	0.20	0.090
SEP					
23...	1124	K15	1	0.20	0.010
23...	1125	K170	2	0.20	0.020
23...	1129	K10	3	<0.20	0.020

< Actual value is known to be less than the value shown
K Results based on colony count outside the acceptance range (non-ideal colony count)

WATER QUALITY DATA, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

HAWAII, ISLAND OF OAHU--Continued

212329157483103 HOOMALUHIA RES SEC 3-3 NR KANEOHE, OAHU, HI (LAT 21°23'29" LONG 157°48'31")

DATE	TIME	SAMPLING DEPTH (FEET)	SPECIFIC CONDUCTANCE (US/CM)	PH WATER WHOLE FIELD (STANDARD UNITS)	TEMPERATURE WATER (DEG C)	BAROMETRIC PRESSURE (MM OF HG)	OXYGEN, DISSOLVED (MG/L)	OXYGEN, DISSOLVED (PERCENT SATURATION)
MAR 1993								
04...	1042	1.00	194	7.6	22.0	763	7.5	86
04...	1044	3.00	194	7.6	22.0	763	7.5	86
04...	1045	5.00	194	7.6	22.0	763	7.5	86
04...	1047	7.00	194	7.6	22.0	763	7.4	85
04...	1048	9.00	194	7.6	22.0	763	7.4	85
04...	1049	11.0	194	7.6	22.0	763	7.3	83
JUN								
24...	1029	1.00	184	7.5	27.0	761	6.6	83
24...	1030	3.00	186	7.5	27.0	761	6.5	82
24...	1031	5.00	186	7.6	27.0	761	6.6	83
24...	1032	7.00	186	7.5	27.0	761	6.4	81
24...	1033	9.00	186	7.5	27.0	761	6.4	81
24...	1034	11.0	186	7.4	27.5	761	5.2	66
SEP								
23...	1132	1.00	180	7.3	27.0	761	6.5	81
23...	1133	3.00	182	7.3	26.5	761	6.3	79
23...	1134	5.00	182	7.3	26.5	761	6.2	78
23...	1135	7.00	182	7.4	26.0	761	4.3	53
23...	1136	9.00	186	7.3	26.0	761	3.4	42
23...	1137	11.0	186	7.2	25.5	761	3.7	45

WATER QUALITY DATA, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

HAWAII, ISLAND OF OAHU--Continued

212335157483001 HOOMALUHIA RES SEC 4-1 NR KANEOHE, OAHU, HI (LAT 21°23'35" LONG 157°48'30")

DATE	TIME	SAMPLING DEPTH (FEET)	SPECIFIC CONDUCTANCE (US/CM)	PH WATER WHOLE FIELD (STANDARD UNITS)	TEMPERATURE WATER (DEG C)	BAROMETRIC PRESSURE (MM OF HG)	OXYGEN, DISSOLVED (MG/L)	OXYGEN, DISSOLVED (PERCENT SATURATION)
MAR 1993								
04...	1137	1.00	194	7.6	22.0	763	7.5	86
04...	1139	3.00	194	7.6	22.0	763	7.6	87
04...	1140	5.00	194	7.6	22.0	763	7.5	86
04...	1142	7.00	194	7.6	22.0	763	7.4	85
04...	1143	8.00	194	7.6	22.0	763	7.4	85
JUN								
24...	1014	1.00	186	7.5	27.0	761	6.5	82
24...	1015	3.00	186	7.5	27.0	761	6.5	82
24...	1016	5.00	186	7.5	27.0	761	6.4	81
24...	1017	7.00	186	7.5	27.0	761	6.3	79
24...	1018	8.00	186	7.5	27.0	761	6.1	77
SEP								
23...	1045	1.00	178	7.4	27.0	761	6.4	80
23...	1046	3.00	180	7.4	27.0	761	6.4	80
23...	1047	5.00	182	7.4	26.5	761	6.4	80
23...	1048	7.00	182	7.4	26.5	761	5.4	67
23...	1049	8.00	178	7.4	26.5	761	5.0	62

WATER QUALITY DATA, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

HAWAII, ISLAND OF OAHU--Continued

212335157483002 - HOOMALUHIA RES SEC 4-2 NR KANEOHE (LAT 21°23'35" LONG 157°48'30")

DATE	TIME	SAMPLING DEPTH (FEET)	SPECIFIC CONDUCTANCE (US/CM)	PH WATER WHOLE FIELD (STANDARD UNITS)	TEMPERATURE WATER (DEG C)	BAROMETRIC PRESSURE (MM OF HG)	OXYGEN, DISSOLVED (MG/L)	OXYGEN, DISSOLVED (PERCENT SATURATION)
MAR 1993								
04...	1130	1.00	194	7.6	22.0	763	7.5	86
04...	1131	3.00	194	7.6	22.0	763	7.5	86
04...	1132	5.00	194	7.6	22.0	763	7.5	85
04...	1133	7.00	194	7.6	22.0	763	7.4	85
04...	1134	9.00	194	7.6	22.0	763	7.3	83
JUN								
24...	1008	1.00	184	7.5	27.0	761	6.6	83
24...	1009	3.00	186	7.5	27.0	761	6.5	82
24...	1010	5.00	184	7.5	27.0	761	6.5	82
24...	1011	7.00	186	7.5	27.0	761	6.5	82
24...	1012	9.00	186	7.5	27.0	761	6.3	79
SEP								
23...	1038	1.00	180	7.4	27.0	761	6.4	80
23...	1039	3.00	182	7.4	26.5	761	6.4	80
23...	1040	5.00	182	7.4	26.5	761	6.4	80
23...	1041	7.00	180	7.4	26.5	761	6.2	77
23...	1042	9.00	186	7.4	26.0	761	3.4	42

WATER QUALITY DATA, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

HAWAII, ISLAND OF OAHU--Continued

212335157483003 HOOMALUHIA RES SEC 4-3 NR KANEOHE, OAHU, HI (LAT 21°23'35" LONG 157°48'30")

DATE	TIME	SAMPLING DEPTH (FEET)	SPECIFIC CONDUCTANCE (US/CM)	PH WATER WHOLE FIELD (STANDARD UNITS)	TEMPERATURE WATER (DEG C)	BAROMETRIC PRESSURE (MM OF HG)	OXYGEN, DISSOLVED (MG/L)	OXYGEN, DISSOLVED (PERCENT SATURATION)
MAR 1993								
04...	1119	1.00	194	7.6	22.0	763	7.5	86
04...	1121	3.00	194	7.6	22.0	763	7.4	85
04...	1122	5.00	194	7.6	22.0	763	7.4	85
04...	1123	7.00	194	7.6	22.0	763	7.3	84
04...	1124	9.00	194	7.6	22.0	763	7.3	84
04...	1126	11.0	194	7.6	22.0	763	7.2	83
JUN								
24...	1000	1.00	184	7.5	27.0	761	6.8	86
24...	1001	3.00	186	7.5	27.0	761	6.8	86
24...	1002	5.00	186	7.5	27.0	761	6.7	84
24...	1003	7.00	186	7.5	27.0	761	6.6	83
24...	1004	9.00	186	7.5	27.0	761	6.6	83
24...	1005	11.0	190	7.5	26.5	761	4.6	57
SEP								
23...	1032	1.00	180	7.4	26.5	761	6.4	80
23...	1033	3.00	182	7.4	26.5	761	6.4	80
23...	1034	5.00	182	7.4	26.5	761	6.3	79
23...	1035	7.00	180	7.4	26.5	761	6.1	76
23...	1036	9.00	186	7.4	26.0	761	3.6	44
23...	1037	11.0	186	7.3	25.5	761	3.4	42

WATER QUALITY DATA, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

HAWAII, ISLAND OF OAHU--Continued

212336157482601 - HOOMALUHIA RESERVOIR AT OUTLET, NEAR KANEOHE (LAT 21°23'36" LONG 157°48'26")

DATE	TIME	TEMPERATURE WATER (DEG C)	OXYGEN, DISSOLVED (MG/L)
JUN 1993			
18...	1300	26.5	6.6
18...	1400	26.5	6.9
18...	1500	26.5	6.6
18...	1600	26.5	6.6
18...	1700	26.5	6.4
18...	1800	27.0	6.7
18...	1900	27.0	6.8
18...	2000	26.5	6.7
18...	2100	26.5	6.8
18...	2200	26.5	6.5
18...	2300	26.5	6.4
18...	2400	26.5	6.5
19...	0100	26.5	6.4
19...	0200	26.5	6.3
19...	0300	26.5	6.2
19...	0400	26.0	6.2
19...	0500	26.0	6.2
19...	0600	26.0	6.2
19...	0700	26.0	6.2
19...	0800	26.0	6.3
19...	0900	26.0	6.3
19...	1000	26.0	6.2
19...	1100	26.0	6.6
19...	1200	26.5	6.7
19...	1300	26.5	6.6

HAWAII, ISLAND OF KAUAI

220057159210301. Local number 2-0021-01.

LOCATION.--Lat 22°00'57", long 159°21'04", Hydrologic Unit 20070000, 1.0 mi south southwest of Wailua County Golf Course, and 1.3 mi north of Hanamaulu Park. Owner: State of Hawaii, DOWALD.

AQUIFER.--Waimea Canyon Volcanic Series, Pliocene age.

WELL CHARACTERISTICS.--Drilled basal water table; depth 276 ft, casing diameter 8 in., cased to 196 ft.

DATUM.--Elevation of land surface datum is 166 ft. Measuring point: Top of 4-in. galvanized coupling, 166.70 ft. above mean sea level.

PERIOD OF RECORD.--Occasional measurements June 1980 to June 1993. Water-level recorder, June 1993 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 15.71 ft above mean sea level, Nov. 19, 1982; lowest measured, 12.65 ft above mean sea level, Oct. 28, 1991.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 9	13.65	FEB 22	13.32	MAY 13	13.23	JUN 14	13.31	JUN 23	13.30	AUG 6	13.87
JAN 11	13.60	APR 7	13.01								

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	---	---	---	---	---	---	---	---	13.42	13.81	13.78
2	---	---	---	---	---	---	---	---	---	13.45	13.81	13.78
3	---	---	---	---	---	---	---	---	---	13.47	13.82	13.75
4	---	---	---	---	---	---	---	---	---	13.48	13.84	13.74
5	---	---	---	---	---	---	---	---	---	13.49	13.85	13.75
6	---	---	---	---	---	---	---	---	---	13.50	13.85	13.76
7	---	---	---	---	---	---	---	---	---	13.53	13.84	13.76
8	---	---	---	---	---	---	---	---	---	13.55	13.84	13.78
9	---	---	---	---	---	---	---	---	---	13.56	13.85	13.80
10	---	---	---	---	---	---	---	---	---	13.58	13.85	13.82
11	---	---	---	---	---	---	---	---	---	13.61	13.85	13.82
12	---	---	---	---	---	---	---	---	---	13.62	13.85	13.82
13	---	---	---	---	---	---	---	---	---	13.64	13.85	13.86
14	---	---	---	---	---	---	---	---	---	13.65	13.84	13.88
15	---	---	---	---	---	---	---	---	13.27	13.67	13.84	13.90
16	---	---	---	---	---	---	---	---	13.27	13.70	13.86	13.93
17	---	---	---	---	---	---	---	---	13.27	13.70	13.86	13.95
18	---	---	---	---	---	---	---	---	13.27	13.71	13.86	13.97
19	---	---	---	---	---	---	---	---	13.27	13.69	13.85	14.01
20	---	---	---	---	---	---	---	---	13.27	13.71	13.83	14.05
21	---	---	---	---	---	---	---	---	13.28	13.73	13.82	14.08
22	---	---	---	---	---	---	---	---	13.30	13.73	13.82	14.10
23	---	---	---	---	---	---	---	---	13.30	13.72	13.81	14.12
24	---	---	---	---	---	---	---	---	13.30	13.74	13.81	14.16
25	---	---	---	---	---	---	---	---	13.31	13.73	13.81	14.21
26	---	---	---	---	---	---	---	---	13.33	13.76	13.80	14.24
27	---	---	---	---	---	---	---	---	13.35	13.77	13.78	14.27
28	---	---	---	---	---	---	---	---	13.38	13.78	13.78	14.29
29	---	---	---	---	---	---	---	---	13.40	13.79	13.78	14.33
30	---	---	---	---	---	---	---	---	13.41	13.80	13.78	14.38
31	---	---	---	---	---	---	---	---	---	13.81	13.77	---
MEAN	---	---	---	---	---	---	---	---	---	13.65	13.83	13.97
MAX	---	---	---	---	---	---	---	---	---	13.81	13.86	14.38
MIN	---	---	---	---	---	---	---	---	---	13.42	13.77	13.74

JUNE 15 TO SEP. 30, 1993 MAX 14.42 SEP. 30 MIN 13.01 APR. 7

HAWAII, ISLAND OF KAUAI--Continued

220018159444702. Local number 2-0044-13

LOCATION.--Lat 22°00'18", long 159°44'47", Hydrologic Unit 20070000, 1.8 mi northeast of Kokole Point, and 2.8 mi northwest of Kekaha School. Owner: Kekaha Sugar Co.

AQUIFER.--Waimea Canyon Volcanic Series, Pliocene age.

WELL CHARACTERISTICS.--Drilled artesian well, depth 206 ft; casing diameter 12 in, cased to 165 ft.

DATUM.--Elevation of land surface datum is 8 ft. Measuring point: Top of standpipe 10.61 ft above mean sea level. From July 27, 1977 to Sept.10, 1981, before standpipe was extended, measuring point elevation at top of standpipe was at 9.11 ft above mean sea level.

PERIOD OF RECORD.--
WATER LEVEL: Occasional measurements July 1977 to current year.
WATER QUALITY: Occasional measurements October 1981 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 10.23 ft above mean sea level, Oct. 13, 1992 and Feb. 16, 1993; lowest measured, 8.33 ft above mean sea level, Mar. 29, 1984.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 13	10.23	DEC 7	10.08	FEB 16	10.23	APR 12	9.86	JUN 21	9.55	AUG 9	10.09

HAWAII, ISLAND OF KAUAI--Continued

220019159444801. Local number 2-0044-14.

LOCATION.--Lat 22°00'19", long 159°44'48", Hydrologic Unit 20070000, 1.8 mi northeast of Kokole Point, and 2.8 mi northwest of Kekaha School. Owner: Kekaha Sugar Co.

AQUIFER.--Waimea Canyon Volanic Series, Pliocene age.

WELL CHARACTERISTICS.--Drilled artesian well, depth 245 ft, casing diameter 12 in., cased to 164 ft.

DATUM.--Elevation of land-surface datum is 8 ft. Measuring point: Top of standpipe, 11.49 ft above mean sea level. Prior to June 1979 nonrecording gage at datum 0.25 ft lower.

PERIOD OF RECORD.--Occasional measurements, 1937 to 1962 (measured by Kekaha Sugar Co.). Water-level recorder, June 1979 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 11.07 ft above mean sea level, Dec. 20, 1937; lowest measured, 7.52 ft above mean sea level, Aug. 15, 1947.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	10.12	10.31	10.15	10.35	10.29	10.20	10.04	9.93	9.77	9.78	9.96	9.97
2	10.12	10.25	10.15	10.34	10.32	10.17	10.03	9.94	9.72	9.80	9.96	9.90
3	10.13	10.23	10.15	10.32	10.29	10.21	10.03	9.96	9.69	9.80	9.97	9.90
4	10.14	10.23	10.14	10.32	10.34	10.21	10.03	9.94	9.68	9.83	9.94	9.90
5	10.14	10.22	10.12	10.30	10.31	10.25	10.05	9.91	9.67	9.82	10.03	9.92
6	10.15	10.23	10.12	10.33	10.28	10.25	10.04	9.91	9.66	9.81	9.99	9.98
7	10.16	10.24	10.12	10.29	10.29	10.26	10.01	9.92	9.62	9.83	9.95	9.95
8	10.18	10.26	10.12	10.30	10.29	10.26	9.97	9.92	9.60	9.85	10.01	9.88
9	10.20	10.23	10.13	10.31	10.32	10.23	9.97	9.92	9.63	9.85	10.04	9.89
10	10.21	10.14	10.14	10.26	10.30	10.12	9.97	9.92	9.70	9.81	10.03	9.94
11	10.24	10.13	10.18	10.23	10.31	10.15	9.95	9.93	9.65	9.73	10.05	9.91
12	10.26	10.11	10.24	10.21	10.34	10.14	9.95	9.93	9.63	9.73	10.03	9.95
13	10.25	10.09	10.28	10.18	10.32	10.24	9.94	9.94	9.64	9.77	10.05	9.93
14	10.22	10.08	10.25	10.18	10.29	10.28	9.97	9.94	9.65	9.68	10.06	9.88
15	10.21	10.06	10.23	10.18	10.29	10.24	9.98	10.00	9.75	9.64	10.08	9.94
16	10.21	10.06	10.25	10.16	10.28	10.15	9.99	10.03	9.78	9.67	10.12	9.94
17	10.21	10.09	10.24	10.17	10.27	10.11	10.01	10.05	9.76	9.68	10.08	9.90
18	10.22	10.13	10.23	10.19	10.27	10.17	10.01	10.05	9.77	9.63	9.99	9.98
19	10.23	10.09	10.23	10.21	10.27	10.18	9.97	10.04	9.76	9.61	9.99	10.01
20	10.24	10.08	10.24	10.23	10.25	10.19	9.92	10.01	9.77	9.61	10.04	9.99
21	10.25	10.08	10.24	10.25	10.25	10.18	9.95	9.92	9.77	9.61	10.04	9.97
22	10.26	10.08	10.21	10.23	10.25	10.15	9.98	9.89	9.77	9.66	10.01	10.02
23	10.25	10.09	10.19	10.25	10.23	10.16	9.98	9.90	9.78	9.83	10.03	9.99
24	10.25	10.06	10.22	10.28	10.22	10.16	10.00	9.89	9.79	9.90	9.98	10.00
25	10.24	10.05	10.23	10.28	10.24	10.16	9.99	9.89	9.79	9.91	9.98	10.04
26	10.25	10.12	10.26	10.28	10.22	10.13	10.00	9.87	9.80	9.91	10.04	10.07
27	10.24	10.16	10.28	10.28	10.23	10.13	9.97	9.86	9.80	9.86	10.04	10.08
28	10.25	10.15	10.26	10.35	10.21	10.13	9.95	9.84	9.81	9.88	10.05	10.08
29	10.26	10.14	10.31	10.34	---	10.07	9.93	9.83	9.79	9.85	10.06	10.05
30	10.28	10.15	10.36	10.30	---	10.03	9.93	9.88	9.77	9.94	10.07	10.04
31	10.30	---	10.35	10.33	---	10.07	---	9.88	---	9.97	10.04	---
MEAN	10.22	10.14	10.21	10.27	10.28	10.17	9.98	9.93	9.73	9.78	10.02	9.97
MAX	10.30	10.31	10.36	10.35	10.34	10.28	10.05	10.05	9.81	9.97	10.12	10.08
MIN	10.12	10.05	10.12	10.16	10.21	10.03	9.92	9.83	9.60	9.61	9.94	9.88

WTR YEAR 1993 MAX 10.58 FEB. 5 MIN 9.44 JUL. 18-19

HAWAII, ISLAND OF KAUAI--Continued

220016159442701. Local number, 2-0044-15.

LOCATION.--Lat 22°00'16", long 159°44'27", Hydrologic Unit 20070000, 2.5 mi Northwest from Kekaha School and, 1.8 mi Northeast of Kokole Point. Owner: Kekaha Sugar Co.

AQUIFER.--Waimea Canyon Volcanic Series, Pliocene age.

WELL CHARACTERISTICS.--Drilled artesian well; depth 63.1 ft, 12 ft concrete casing, cased to 63.1 ft.

DATUM.--Elevation of land-surface datum is 50 ft. Measuring point is the south top of concrete ring at 57.84 ft above mean sea level.

PERIOD OF RECORD.--
WATER LEVEL: Occasional measurements 1973 to current year.
WATER QUALITY: Occasional measurements 1973 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 11.73 ft above mean sea level, Jan. 24, 1978; lowest measured, 4.16 ft above mean sea level, May 10, 1977.

REMARKS.--Water used for irrigation of sugar cane.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 13	9.98	DEC 7	9.84	FEB 16	10.07	APR 12	9.03	JUN 28	8.67	AUG 9	9.61

220134159205401. Local number 2-0120-02.

LOCATION.--Lat 22°01'34", long 159°20'54", Hydrologic unit 20070000, .3 mi southwest of Wailua County Golf Course and 1.6 mi south southwest of Wailua River Mouth. Owner: State of Hawaii, DOWALD.

AQUIFER.--Waimea Canyon Volcanic Series, Pliocene age.

WELL CHARACTERISTICS.--Drilled artesian well; depth 312 ft, casing diameter 6 in., cased to 60 ft.

DATUM.--Elevation of land-surface datum is 11 ft. Measuring point is the top of 10 in. plastic pipe, 11.36 ft above mean sea level. Prior to June 24, 1980 measuring point was the top of 6 in. steel casing, 11.93 ft above mean sea level.

PERIOD OF RECORD.--
WATER LEVEL: Occasional measurements 1973 to 1980, 1987 to current year.
WATER QUALITY: Occasional measurements 1982 to 1987.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 11.79 ft above mean sea level, Feb. 21, 1974; lowest measured, 8.08 ft above mean sea level, Oct. 12, 1978.

REMARKS.--Well affected by pumping of nearby well.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 9	10.68	JAN 11	10.87	FEB 22	9.92	APR 7	9.45	JUN 23	8.86	AUG 6	9.67

HAWAII, ISLAND OF KAUAI--Continued

220148159453502. Local number, 2-0145-11.

LOCATION.--Lat 22°01'48", long 159°43'35", Hydrologic Unit 20070000, 1.0 mi Southeast from Mana Camp and 3.3 mi north of Kokole Point. Owner: Kekaha Sugar Co.

AQUIFER.--Waimea Canyon Volcanic Series, Pliocene age.

WELL CHARACTERISTICS.--Drilled artesian well; depth 31.5 ft, probably obstructed; casing diameter 12 in, cased depth unknown.

DATUM.--Elevation of land-surface datum is 29 ft. Measuring point is the top of steel pipe 29.23 ft above mean sea level.

PERIOD OF RECORD.--Occasional measurements, 1973 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 24.30 ft above mean sea level, Oct. 13, 1992; lowest water level measured, 15.63 ft above mean sea level, Aug. 9, 1993.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 13	24.30	DEC 7	20.00	FEB 16	21.88	APR 12	18.19	JUN 21	17.15	AUG 9	15.63

220354159205601. Local number, 2-0320-01

LOCATION.--Lat 22°03'54", long 159°20'56", Hydrologic unit 20070000, 0.6 mi east of Sleeping Giant Mountain, and 1.3 mi northwest of Wailua River bridge. Owner: Kauai County, Department of Water.

AQUIFER.--Koloa Volcanic Series, Pleistocene age.

WELL CHARACTERISTICS.--Drilled basal water-table well, depth 240 ft, casing diameter 8 in., cased to 193 ft.

DATUM.--Elevation of land-surface datum is 155 ft. Measuring point: Top edge of steel pump-base at breather hole, 155.98 ft above mean sea level.

PERIOD OF RECORD.--
WATER LEVEL: Ocasional measurements, February 1960, June 1973 to current year.
WATER QUALITY: 1960, 1966, 1972-80, 1985-89, 1991, 1993.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 20.04 ft above mean sea level, Feb. 17, 1960; lowest measured, 3.31 ft below mean sea level, May 27, 1977.

REMARKS.--Water used for public supply. Water level affected by pumping of nearby well.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 9	3.36	DEC 4	4.77	FEB 19	3.96	APR 2	5.98	JUN 25	6.53	AUG 5	3.95

HAWAII, ISLAND OF KAUAI--Continued

220354159205602. Local number, 2-0320-03.

LOCATION.--Lat 22°03'54", long 159°20'56", Hydrologic Unit 20070000, 0.6 mi east of Sleeping Giant Mountain, and 1.3 mi northwest of Wailua River bridge. Owner: Kauai County, Dept. of Water.

AQUIFER.--Koloa Volcanic Series, Pleistocene age.

WELL CHARACTERISTICS.--Drilled basal water-table well; depth 302 ft; casing diameter 14 in, cased to 168 ft.

DATUM.--Elevation of land-surface datum is 156 ft. Measuring point is the top edge of steel pump base at breather hole, 156.94 ft above mean sea level.

PERIOD OF RECORD.--
Water level: Occasional measurements, Aug. 1976 to current year.
Water quality: Occasional measurements, 1972, 1976 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 13.91 ft above mean sea level, Nov. 19, 1982; lowest water level measured, 0.35 ft below mean sea level, Sept. 22, 1979.

REMARKS.--Water is used for public supply. Water level affected by pumping of nearby well.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 9	3.33	DEC 4	5.14	FEB 19	4.04	APR 2	6.30	JUN 25	6.84	AUG 6	5.34

220341159453901. Local number, 2-0345-04.

LOCATION.--Lat 22°03'41", long 159°43'39", Hydrologic Unit 20070000, 1.7 mi north northeast from Mana Camp and 1.7 mi east southeast from Nohili Point. Owner: Kekaha Sugar Co.

AQUIFER.--Waimea Canyon Volcanic Series, Pliocene age.

WELL CHARACTERISTICS.--Drilled artisian well; depth 66 ft, concrete casing, diameter 12 ft, cased to 66 ft.

DATUM.--Elevation of land-surface datum 57 ft. Measuring point is the top of concrete ring (south side) at 60.80 ft above mean sea level.

PERIOD OF RECORD.--
Water level: Occasional measurements 1972 to current year.
Water quality: Occasional measurements 1972 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 6.90 ft above mean sea level, Jan. 31, 1974; lowest measured, 1.42 ft below mean sea level, Jan. 22, 1985.

REMARKS.--Water is used for irrigation of sugar cane.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 11	5.54	DEC 7	6.13	FEB 16	6.37	APR 12	4.25	JUN 28	2.26	AUG 9	3.10

HAWAII, ISLAND OF KAUAI--Continued

220825159185301. Local number 2-0818-03.

LOCATION.--Lat 22°08'25", long 159°18'53", Hydrologic Unit 20070000, 1.3 mi southwest of Kahala Point and 0.2 mi south of Anahola School. Owner: Kauai County, Dept. of Water.

AQUIFER.--Koloa Volcanic Series, Pliocene age.

WELL CHARACTERISTICS.--Drilled basal water table; depth 466 ft, casing diameter 12 in., cased to 290 ft above mean sea level.

DATUM.--Elevation of land surface datum is 267 ft. Measuring point: Top of west side of 4 1/2-in. pipe at 268.99 ft above mean sea level.

PERIOD OF RECORD.--Occasional measurements Oct. 1991 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 12.03 ft above mean sea level, Feb. 14, 1992; lowest measured, 11.38 ft above mean sea level, Aug. 6, 1993.

REMARKS.--Water used for future public supply. Water level affected by nearby well.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 4	11.84	FEB 19	11.65	APR 2	11.60	JUN 25	11.52	AUG 6	11.38

221038159203801. Local number, 2-1020-03.

LOCATION.--Lat 22°10'38", long 159°20'38", Hydrologic Unit, 2.6 mi south of Kulikoa Point and 2.6 mi northwest of Kuaehu Point. Owner: Amfac Properties Development Corp.

AQUIFER.--Waimea Canyon Volcanic Series, Pliocene age.

WELL CHARACTERISTICS.--Drilled basal water table well; depth 700 ft.

DATUM.--Elevation of land-surface datum 358 ft. Measuring point is the top of airvent pipe after removing 2 in. elbow on the southwest side of base, elevation 359.04 ft above mean sea level.

PERIOD OF RECORD.--
Water level: Occasional measurements 1972 to current year.
Water quality: Occasional measurements 1972 to 1991.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 144.56 ft above mean sea level, Mar. 30, 1990; lowest measured, 42.69 ft above mean sea level, Oct. 4, 1973.

REMARKS.--Water is used for public supply and truck farming irrigation.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 21	124.19	DEC 11	124.16	JAN 28	124.98	APR 14	122.85	JUN 23	128.86	AUG 13	115.72

HAWAII, ISLAND OF KAUAI--Continued

221150159264501. Local number, 2-1126-01.

LOCATION.--Lat 22°11'50", long 159°26'45", Hydrologic Unit 20070000, 1.2 mi south of Princeville Airport terminal and 4.0 mi east southeast of Puupoa Point. Owner: Princeville Hanalei.

AQUIFER.--Koloa Volcanic Series, Pliocene age.

WELL CHARACTERISTICS.--Drilled basal water-table well; depth 763 ft; casing diameter 14 in, cased to 435 ft.

DATUM.--Elevation of land-surface datum 348 ft. Measuring point is the top of 3/4-in pipe, in 1-in hole on southside of pump base, after removing airline connection, 349.64 ft above mean sea level.

PERIOD OF RECORD.--
Water level: Occasional measurements 1972 to current year.
Water quality: Occasional measurements 1977 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest weater level measured, 43.36 ft above mean sea level, June 3, 1974; lowest water level measured, 9.24 ft below mean sea level, Aug. 10,1983.

REMARKS.--Water used for public supply and irrigation of golf course. Water level affected by nearby well.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1991 TO SEPTEMBER 1992

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 17	-4.12	DEC 23	-0.64	FEB 17	3.67	APR 7	4.95	JUN 23	4.82	AUG 13	5.45

221247159324801. Local number, 2-1232-01.

LOCATION.--Lat 22°12'47", long 159°32'48", Hydrologic Unit 20070000, 0.9 mi southwest of Kolokoko Point and 1.5 mi southeast of Haena Point. Owner: Kauai County, Dept. of Water.

AQUIFER.--Koloa Volcanic Series, Pliocene age.

WELL CHARACTERISTICS.--Drilled basal water table well; depth 188 ft; casing diameter 6 in, cased to 140 ft.

DATUM.--Elevation of land-surface datum is 65 ft. Measuring point is the top of 1 in. pipe .06 ft above flange, 66.56 ft above mean sea level.

PERIOD OF RECORD.--
Water level: Occasional measurements 1972 to current year.
Water quality: Occasional measurements 1975 to current year.

REVISED RECORDS.--WDR HI-93-1: 1988-92(The minimum water level for the period of record.)

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 23.48 ft above mean sea level, June 3, 1974; lowest measured, 2.56 ft above mean sea level, Apr. 11, 1977.

REMARKS.--Water used for public supply.

REVISIONS.--The minimum water level for the period of record reported for water years 1988 to 1992 have been revised to 2.56 ft above mean sea level, Apr. 11, 1977. The value previously reported was taken while well was being pumped.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 4	9.90	FEB 19	9.45	APR 2	7.53	JUN 25	5.71	AUG 6	4.69

HAWAII, ISLAND OF KAUAI--Continued

221318159335901. Local number, 2-1333-01.

LOCATION.--Lat 22°13'18", long 159°33'59", Hydrologic Unit 20070000, .6 mi south southwest of Haena Point and 1.2 mi east southeast of Kailiu Point. Owner: Kauai County, Dept. of Water.

AQUIFER.--Waimea Canyon Volcanic Series, Pliocene age.

WELL CHARACTERISTICS.--Drilled basal water-table well; depth 159 ft; casing diameter 8 in, cased to 104 ft.

DATUM.--Elevation of land-surface datum 83 ft. Measuring point is the top of unthreaded hole after removing 1 in pipe, 0.22 ft above hole on pump base, 82.45 ft above mean sea level.

PERIOD OF RECORD.--
Water level: Occasional measurements 1972 to current year.
Water quality: Occasional measurements 1972 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 11.35 ft above mean sea level, Dec. 8, 1989; lowest water level measured, 4.37 ft below mean sea level, Jan. 13, 1975.

REMARKS.--Water used for public supply.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 9	9.01	DEC 4	9.06	FEB 19	9.64	APR 2	9.27	JUN 25	8.60	AUG 6	8.54

215434159263301. Local number, 2-5426-03.

LOCATION.--Lat 21°54'34", long 159°26'33", Hydrologic Unit 20070000, 0.6 mi northeast of Koloa Mill and 2.6 mi north of Makahuena Point. Owner: Grove Farm Co. Inc.

AQUIFER.--Koloa Volcanic Series, Pliocene age.

WELL CHARACTERISTICS.--Drilled basal water-table well; depth 318 ft; casing diameter 12 in, cased to 176 ft.

DATUM.--Elevation of land-surface datum is 221 ft. Measuring point is the top of 1 in hole on southwest side of flange, 222.30 ft above mean sea level.

PERIOD OF RECORD.--Occasional measurements of water level 1972 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 34.83 ft above mean sea level, Jan. 10, 1974; lowest water level measured, 5.05 ft above mean sea level, Mar. 10, 1975.

REMARKS.--Water used for irrigation and washing of sugar cane at mill.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER OCTOBER 1992 TO SEPTEMBER 1993

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 8	26.40	JAN 11	26.76	MAR 12	23.51	SEP 27	24.71

HAWAII, ISLAND OF KAUAI--Continued

215454159274201. Local number, 2-5427-01.

LOCATION.--Lat 22°54'54", long 159°27'42", Hydrologic Unit 20070000, 0.1 mi west of the southwest corner of Waita Reservoir and 2.7 mi northeast of Kaulala Point. Owner: Kauai County, Dept. of Water.

AQUIFER.--Koloa Volcanic Series, Pleistocene age.

WELL CHARACTERISTICS.--Drilled basal water-table well; depth 456 ft; casing diameter 12 in, cased to 263 ft.

DATUM.--Elevation of land surface datum is 245 ft. Measuring point is the top of 1/2 in. pipe on pump base 246.77 ft above mean sea level.

PERIOD OF RECORD.--
Water level: Occasional measurements 1972 to current year.
Water quality: Occasional measurements 1972 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 40.04 ft above mean sea level, July 15, 1974; lowest water level measured, 22.07 ft above mean sea level, Mar. 3, 1983.

REMARKS.--Water used for public supply. Water level affected by nearby well.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 8	34.63	FEB 11	35.09	APR 1	34.93	JUN 24	35.02	AUG 5	34.97

215536159263501. Local number, 2-5526-01.

LOCATION.--Lat 21°55'36", long 159°26'35", Hydrologic Unit 20070000, 3.7 mi north of Makahuena Point and 2.5 mi southeast of Knudsen Gap. Owner: McBryde Sugar Co.

AQUIFER.--Koloa Volcanic Series, Pleistocene age.

WELL CHARACTERISTICS.--Drilled basal water-table well; depth 1010 ft; casing diameter 20 in, cased to 400 ft.

DATUM.--Elevation of land-surface is 355 ft. Measuring point is the top of 1 in. hole on top of pipe flange, southeast side of pump, 355.28 ft above mean sea level.

PERIOD OF RECORD.--
Water level: Occasional measurements 1977 to current year.
Water quality: Occasional measurements 1977 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 108.83 ft above mean sea level, Jun. 4, 1992; lowest measured, 22.67 ft below mean sea level, July 27, 1978.

REMARKS.--Water used for sugar cane irrigation.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 8	94.66	DEC 3	93.73	JAN 11	99.31	FEB 11	100.45	APR 1	102.14

HAWAII, ISLAND OF KAUAI--Continued

215522159342601. Local number, 2-5534-03.

LOCATION.--Lat 21°55'22", long 159°34'26", Hydrologic Unit 20070000, 1.9 mi north from Weli Point and 2.9 mi northeast from Puolo Point. Owner: Kauai County, Dept. of Water.

AQUIFER.--Koloa Volcanic Series, Pliocene age.

WELL CHARACTERISTICS.--Drilled basal water-table well; depth 108 ft; casing diameter 9 in, cased to 108 ft.

DATUM.--Elevation of land surface datum 78 ft. Measuring point is the top of pump base east side, 78.97 ft above mean sea level. Measuring point is the top of 3/4-in galvanized pipe on northwest side of pump base from June 4, 1992.

PERIOD OF RECORD.--
Water level: Occasional measurements 1972 to current year.
Water quality: Occasional measurements 1972 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 22.91 ft above mean sea level, Feb. 1, 1990; lowest water level measured, 9.19 ft above mean sea level, Oct. 13, 1978.

REMARKS.--Water used for public supply.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1992TO SEPTEMBER 1993

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 8	15.98	DEC 3	14.34	JAN 28	17.16	APR 1	17.65	JUN 24	15.01	AUG 5	15.61

HAWAII, ISLAND OF KAUAI--Continued

215607159344301. Local number 2-5634-01.

LOCATION.--Lat 21°56'07", long 159°34'43", Hydrologic Unit 20070000, 2.7 mi north of Weli Point and 3.3 mi northeast of Puolo Point. Owner: State of Hawaii.

AQUIFER.--Koloa Volcanic Series, Pliocene age.

WELL CHARACTERISTICS.--Drilled basal water-table, depth 508 ft, casing diameter 8 in., cased to 507 ft.

DATUM.--Elevation of land-surface datum is 439 ft. Measuring point: Top of casing 440.62 ft above mean sea level.

PERIOD OF RECORD.--Water level recorder, February 1986 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 17.83 ft above mean sea level, Jan. 15-16 1992; lowest measured, 15.87 ft above mean sea level, Nov. 1, 1989

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	16.78	16.80	16.74	16.91	---	16.86	16.85	16.59	16.44	16.30	16.54	16.49
2	16.77	16.78	16.74	16.91	---	16.88	16.84	16.58	16.44	16.32	16.54	16.46
3	16.78	16.78	16.73	16.92	---	16.89	16.84	16.59	16.44	16.35	16.55	16.44
4	16.77	16.77	16.71	16.95	---	16.88	16.85	16.58	16.46	16.37	16.56	16.45
5	16.76	16.76	16.70	16.96	---	16.88	16.87	16.57	16.46	16.38	16.56	16.45
6	16.75	16.75	16.69	16.98	---	16.89	16.84	16.56	16.45	16.38	16.55	16.43
7	16.75	16.75	16.69	16.93	---	16.91	16.83	16.55	16.44	16.40	16.55	16.41
8	16.76	16.77	16.69	---	---	16.92	16.83	16.55	16.43	16.41	16.56	16.40
9	16.76	16.78	16.69	---	---	16.92	16.85	16.54	16.42	16.41	16.57	16.40
10	16.76	16.77	16.70	---	---	16.90	16.82	16.53	16.39	16.42	16.56	16.40
11	16.77	16.77	16.73	---	---	16.92	16.81	16.54	16.38	16.44	16.56	16.38
12	16.79	16.76	16.76	---	17.03	16.94	16.80	16.54	16.37	16.44	16.56	16.36
13	16.78	16.77	16.78	---	17.01	16.96	16.78	16.54	16.38	16.43	16.55	16.37
14	16.77	16.76	16.74	---	16.98	16.99	16.78	16.55	16.37	16.43	16.55	16.36
15	16.77	16.74	16.76	---	16.98	16.93	16.77	16.55	16.36	16.44	16.56	16.35
16	16.76	16.75	16.78	---	16.97	16.90	16.80	16.56	16.36	16.47	16.57	16.35
17	16.75	16.78	16.76	---	16.98	16.91	16.84	16.58	16.34	16.47	16.58	16.36
18	16.74	16.81	16.75	---	16.97	16.92	16.83	16.57	16.32	16.47	16.57	16.36
19	16.73	16.77	16.76	---	16.96	16.90	16.81	16.55	16.32	16.46	16.57	16.37
20	16.73	16.76	16.78	---	16.95	16.89	16.80	16.53	16.33	16.47	16.55	16.37
21	16.74	16.78	16.78	---	16.95	16.89	16.79	16.52	16.33	16.48	16.55	16.36
22	16.73	16.78	16.76	---	16.94	16.89	16.79	16.52	16.33	16.49	16.55	16.34
23	16.72	16.79	16.76	---	16.92	16.87	16.79	16.51	16.33	16.49	16.56	16.33
24	16.72	16.78	16.79	---	16.92	16.85	16.79	16.49	16.32	16.51	16.55	16.36
25	16.73	16.75	16.80	---	16.91	16.86	16.78	16.49	16.30	16.49	16.55	16.38
26	16.74	16.75	16.81	---	16.90	16.84	16.75	16.46	16.31	16.53	16.54	16.37
27	16.72	16.78	16.81	---	16.89	16.84	16.69	16.44	16.32	16.52	16.53	16.36
28	16.72	16.75	16.80	---	16.88	16.83	16.64	16.43	16.32	16.52	16.53	16.34
29	16.74	16.74	16.84	---	---	16.83	16.60	16.43	16.31	16.51	16.52	16.34
30	16.77	16.74	16.89	---	---	16.84	16.60	16.43	16.29	16.52	16.51	16.37
31	16.79	---	16.88	---	---	16.84	---	16.43	---	16.53	16.49	---
MEAN	16.75	16.77	16.76	---	---	16.89	16.79	16.53	16.37	16.45	16.55	16.38
MAX	16.79	16.81	16.89	---	---	16.99	16.87	16.59	16.46	16.53	16.58	16.49
MIN	16.72	16.74	16.69	---	---	16.83	16.60	16.43	16.29	16.30	16.49	16.33

WTR YEAR 1993 MAX 17.09 FEB. 12 MIN 16.24 JUN. 30

HAWAII, ISLAND OF KAUAI--Continued

215845159232101. Local number, 2-5823-01.

LOCATION.--Lat 21°58'45", long 159°23'21", Hydrologic Unit 20070000, 3.5 mi northwest of Ninini Point, and 2.4 mi west from Lihue Airport terminal. Owner: Kauai County, Department of Water.

AQUIFER.--Koloa Volcanic Series, Pliocene age.

WELL CHARACTERISTICS.--Drilled perch water-table well; depth 36 ft; casing diameter 6 ft, cased to 36 ft. Lateral tunnels connected to well extends 450 ft upstream and 502 ft downstream of well.

DATUM.--Elevation of land surface is 214.5 ft. Measuring point is the top of eight inch plastic pipe, 216.65 ft above mean sea level.

PERIOD OF RECORD.--Water level recorder, July 14, 1992 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 202.32 ft above mean sea level, Dec. 4, 1992; lowest measured, 198.43 ft above mean sea level, Sep. 11, 1993.

REMARKS.--Water used for public supply.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1991 TO SEPTEMBER 1992
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	---	---	---	---	---	---	---	---	---	199.39	199.98
2	---	---	---	---	---	---	---	---	---	---	199.57	200.45
3	---	---	---	---	---	---	---	---	---	---	199.41	200.79
4	---	---	---	---	---	---	---	---	---	---	199.31	200.66
5	---	---	---	---	---	---	---	---	---	---	199.26	200.59
6	---	---	---	---	---	---	---	---	---	---	198.98	200.54
7	---	---	---	---	---	---	---	---	---	---	198.95	200.28
8	---	---	---	---	---	---	---	---	---	---	198.93	200.41
9	---	---	---	---	---	---	---	---	---	---	198.93	200.54
10	---	---	---	---	---	---	---	---	---	---	198.92	200.86
11	---	---	---	---	---	---	---	---	---	---	198.86	200.83
12	---	---	---	---	---	---	---	---	---	---	198.83	202.18
13	---	---	---	---	---	---	---	---	---	---	198.85	202.26
14	---	---	---	---	---	---	---	---	---	---	198.87	202.24
15	---	---	---	---	---	---	---	---	---	199.94	198.91	202.29
16	---	---	---	---	---	---	---	---	---	200.15	198.95	202.24
17	---	---	---	---	---	---	---	---	---	199.91	199.08	202.14
18	---	---	---	---	---	---	---	---	---	200.07	199.08	202.08
19	---	---	---	---	---	---	---	---	---	199.99	199.08	202.14
20	---	---	---	---	---	---	---	---	---	199.92	198.98	202.13
21	---	---	---	---	---	---	---	---	---	199.78	198.99	202.13
22	---	---	---	---	---	---	---	---	---	199.88	199.12	201.84
23	---	---	---	---	---	---	---	---	---	199.93	199.18	199.92
24	---	---	---	---	---	---	---	---	---	199.74	199.88	200.74
25	---	---	---	---	---	---	---	---	---	199.69	201.12	201.96
26	---	---	---	---	---	---	---	---	---	199.56	201.46	202.07
27	---	---	---	---	---	---	---	---	---	199.45	199.82	202.06
28	---	---	---	---	---	---	---	---	---	199.37	200.22	201.30
29	---	---	---	---	---	---	---	---	---	199.41	200.16	200.59
30	---	---	---	---	---	---	---	---	---	199.20	200.10	200.46
31	---	---	---	---	---	---	---	---	---	199.30	200.03	---
MEAN	---	---	---	---	---	---	---	---	---	---	199.39	201.29
MAX	---	---	---	---	---	---	---	---	---	---	201.46	202.29
MIN	---	---	---	---	---	---	---	---	---	---	198.83	199.92

JULY 15 TO SEP. 30 MAX 202.31 SEP. 15 MIN 198.91 AUG. 11,12

HAWAII, ISLAND OF KAUAI--Continued

215845159232101 - 2-5823-01 TU8 LIHUE--Continued

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	200.26	200.16	200.36	201.20	---	200.41	200.34	200.40	200.11	199.84	199.34	198.96
2	200.33	200.17	200.25	201.15	---	200.42	200.32	200.37	200.08	199.83	200.05	199.75
3	200.40	200.13	200.65	201.13	---	200.43	200.32	200.36	200.03	199.87	200.23	199.89
4	200.42	200.03	201.11	201.12	---	200.45	200.32	200.34	200.02	199.87	200.49	199.93
5	200.22	200.08	201.41	---	---	200.45	200.32	200.27	200.01	199.87	200.58	200.05
6	200.12	199.97	201.29	---	---	200.45	200.36	200.23	200.05	199.83	200.55	200.06
7	200.53	200.59	201.04	---	---	200.47	200.31	200.21	200.07	199.77	200.50	199.97
8	200.56	200.12	200.91	---	---	200.48	200.32	200.22	200.05	199.77	200.51	199.38
9	200.56	200.14	200.55	---	---	200.51	200.38	200.23	200.06	199.77	200.57	198.59
10	200.58	200.18	200.42	---	---	200.49	200.37	200.24	200.07	199.75	200.57	198.47
11	200.70	200.55	200.51	---	---	200.44	200.35	200.23	200.06	199.72	200.12	198.45
12	201.04	200.08	200.28	---	---	200.42	200.34	200.29	200.10	199.70	199.23	198.55
13	201.22	200.20	200.57	---	---	200.42	200.33	200.31	200.11	199.69	199.28	198.58
14	201.05	199.98	200.90	---	---	200.49	200.31	200.54	200.09	199.63	199.30	198.51
15	201.02	199.84	200.24	---	---	200.44	200.34	200.43	200.05	199.54	199.28	198.95
16	201.00	200.22	200.81	---	---	200.43	200.34	200.38	200.00	199.52	199.24	199.70
17	200.99	200.28	200.27	---	---	200.47	200.42	200.38	199.96	199.50	199.26	199.84
18	200.92	200.16	200.19	---	---	200.40	200.35	200.38	199.96	199.49	199.76	199.93
19	200.78	200.52	200.13	---	---	200.38	200.36	200.35	199.97	199.48	200.48	200.02
20	200.70	200.12	200.13	---	200.58	200.38	200.37	200.35	199.98	199.51	200.67	200.08
21	200.67	199.86	200.16	---	200.56	200.39	200.38	200.34	199.98	199.51	200.80	199.97
22	200.66	199.84	200.27	---	200.53	200.39	200.37	200.31	199.95	199.51	200.71	199.94
23	200.62	199.95	200.35	---	200.53	200.39	200.49	200.30	199.93	199.49	200.62	199.91
24	200.69	200.21	200.45	---	200.51	200.38	200.55	200.28	199.95	199.49	200.44	199.89
25	200.75	200.30	200.53	---	200.47	200.42	200.56	200.25	199.94	199.51	199.91	200.02
26	200.69	200.53	201.55	---	200.46	200.45	200.52	200.23	199.98	199.53	199.14	200.11
27	200.38	200.65	201.34	---	200.44	200.47	200.44	200.21	200.00	199.54	198.95	200.21
28	200.25	200.67	201.06	---	200.42	200.45	200.54	200.19	200.01	199.48	198.91	200.22
29	200.19	200.09	201.05	---	---	200.44	200.45	200.17	199.99	199.41	198.92	200.18
30	200.56	200.96	201.58	---	---	200.41	200.43	200.15	199.91	199.39	198.83	200.21
31	200.65	---	201.35	---	---	200.37	---	200.14	---	199.36	198.67	---
MEAN	200.63	200.22	200.70	---	---	200.43	200.39	200.29	200.02	199.62	199.87	199.61
MAX	201.22	200.96	201.58	---	---	200.51	200.56	200.54	200.11	199.87	200.80	200.22
MIN	200.12	199.84	200.13	---	---	200.37	200.31	200.14	199.91	199.36	198.67	198.45

WTR YEAR 1993 MAX 202.32 DEC. 4 MIN 198.43 SEP. 11

HAWAII, ISLAND OF KAUAI--Continued

215803159401201. Local number, 2-5840-01.

LOCATION.--Lat 21°58'03", long 159°40'12", Hydrologic Unit 20070000, 0.7 mi north of Waimea Recreational Pier State Park, and 2.4 mi east northeast of Oomano Point. Owner: Kauai County, Dept. of Water.

AQUIFER.--Waimea Canyon Volcanic Series, Pliocene age.

WELL CHARACTERISTICS.--Drilled basal-table well; depth 190 ft; casing diameter 8 in, cased to 167 ft.

DATUM.--Elevation of land surface is 167 ft. Measuring point is the top of 1 in. hole on pump base, 168.08 ft above mean sea level.

PERIOD OF RECORD.--
Water level: Occasional measurements 1973 to current year.
Water quality: Occasional measurements 1972-89.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 13.10 ft above mean sea level, Jan. 26, 1989; lowest measured, 5.26 ft above mean sea level, July 24, 1985.

REMARKS.--Water used for public supply.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 3	8.50	FEB 11	9.13	JUN 24	8.79

215843159422901. Local number, 2-5842-03.

LOCATION.--Lat 21°58'43", long 159°42'28", Hydrologic Unit 20070000, 1.0 mi north of Oomano Point and 3.5 mi east of Kokole Point. Owner: Kekaha Sugar Co.

AQUIFER.--Waimea Canyon Volcanic Series, Pliocene age.

WELL CHARACTERISTICS.--Drilled artesian well; depth 27 ft; diameter 15 ft; uncased.

DATUM.--Elevation of land surface is 46 ft. Measuring point is the top of H-Beam on east side of pump base, 22.96 ft above mean sea level. Obtained nearby elevation from Kekaha Sugar Co. Levels run to measuring point on June 15, 1972.

PERIOD OF RECORD.--
Water level: Recording station 1973-79. Occasional measurements 1979 to current year.
Water quality: Occasional measurements 1972 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 9.45 ft above mean sea level, Jan. 16, 1974; lowest measured, 2.58 ft below mean sea level, July 11, 1977.

REMARKS.--Water used for irregation and for cleaning sugar cane at mill.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 13	6.01	FEB 16	6.19

HAWAII, ISLAND OF KAUAI--Continued

215857159430101. Local number, 2-5843-01.

LOCATION.--Lat 21°58'57", long 159°43'01", Hydrologic Unit 20070000, 2.7 mi east northeast from Kokole Point and 1.4 mi north northwest of Oomano Point. Owner: Kauai County, Dept. of Water.

AQUIFER.--Waimea Canyon Volcanic Series, Pliocene age.

WELL CHARACTERISTICS.--Drilled artesian well; depth 53 ft, casing diameter 15 ft, cased to 10 ft.

DATUM.--Elevation of land surface is 57 ft. Measuring point is the top west side of concrete shaft 57.70 ft above mean sea level.

PERIOD OF RECORD.--
Water level: Occasional measurements 1972, 1985 to current year.
Water quality: One measurement in 1972.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 9.52 ft above mean sea level, Feb. 5, 1990; lowest measured, 8.32 ft below mean sea level, Dec. 16, 1985 and June 19, 1986.

REMARKS.--Well used as a standby for public supply.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 8	9.20	DEC 3	9.33	FEB 11	9.33	APR 1	8.68	JUN 21	8.48	AUG 5	8.61

215958159214301. Local number 2-5921-01.

LOCATION.--Lat 21°59'58", long 159°21'43", Hydrologic Unit 20070000, 1.0 mi west of Hanamaulu Beach Park and 3.3 mi south southwest of Lydgate State Park. Owner: Kauai County, Department of Water.

AQUIFER.--Waimea Canyon Volcanic Series, Pliocene age.

WELL CHARACTERISTICS.--Drilled basal water-table well, depth 540 ft, casing diameter 14 in., cased to 315 ft.

DATUM.--Elevation of land-surface datum is 302 ft. Measuring point: Top of I-beam, elevation 302.68 ft, above mean sea level.

PERIOD OF RECORD.--Occasional measurements, July 1980 to September 1985. Water-level recorder, October 1985 to July 1992. Occasional measurements from Oct. 1992 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 17.69 ft above mean sea level, Nov. 26, 1985; lowest measured, 13.39 ft above mean sea level, Aug. 25, 1980.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 9	14.19	JAN 11	14.32	JAN 28	14.64	APR 8	14.82	JUN 23	15.15	AUG 13	15.74

HAWAII, ISLAND OF KAUAI--Continued

215901159235201. Local number, 2-5923-07.

LOCATION.--Lat 21°59'01", long 159°23'52", Hydrologic Unit 20070000, 4.2 mi northwest of Ninini Point and 3.4 mi west from Lihue Airport terminal. Owner: Kauai County, Dept. of Water.

AQUIFER.--Koloa Volcanic Series, Pliocene age.

WELL CHARACTERISTICS.--Drilled perch water-table well; depth 200 ft, casing diameter 12 in, cased to 200 ft.

DATUM.--Elevation of land surface is 364 ft. Measuring point is the top of pump base opening, after removing copper fittings, 365.48 ft above mean sea level.

PERIOD OF RECORD.--
Water level: Occasional measurements 1985 to current year.
Water quality: Occasional measurements 1985 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 226.86 ft above mean sea level, Dec. 8, 1989; lowest water level measured, 213.17 ft above mean sea level, Jun. 7, 1991.

REMARKS.--Water used for public supply. Water level affected by nearby well.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 4	218.50	FEB 12	219.60	APR 2	218.63	JUN 25	218.10	AUG 6	216.40

215906159395601. Local number, 2-5939-01.

LOCATION.--Lat 21°59'06", long 159°39'56", Hydrologic Unit 20070000, 2.3 mi north northeast of Waimea Recreational Pier State Park, and 3.2 mi northeast from Oomano Point. Owner: Kauai County, Dept. of Water.

AQUIFER.--Waimea Canyon Volcanic Series, Pliocene age.

WELL CHARACTERISTICS.--Drilled basal water-table well; depth 40 ft, 6.5 ft diameter, uncased.

DATUM.--Elevation of land surface is 42 ft. Measuring point is the top west side of concrete base 41.61 ft above mean sea level.

PERIOD OF RECORD.--
Water level: Occasional measurements 1972 to current year.
Water quality: Occasional measurements 1972 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 10.43 ft above mean sea level, Jan. 14, 1988; lowest water level measured, 6.05 ft below mean sea level, Sep. 8, 1980.

REMARKS.--Water is used for public supply.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 8	9.56	DEC 3	9.63	FEB 11	9.98	APR 1	9.38	JUN 24	9.35	AUG 5	9.42

HAWAII, ISLAND OF KAUAI--Continued

215937159434201. Local number, 2-5943-01.

LOCATION.--Lat 21°59'37", long 159°43'42", Hydrologic Unit 20070000, 2.2 mi northeast of Kokole Point and 2.4 mi northwest of Oomano Point. Owner: Kekaha Sugar Co.

AQUIFER.--Koloa Volcanic Series, Pliocene age.

WELL CHARACTERISTICS.--Drilled basal water-table well. Well is a 45 degree inclined Maui type shaft from 59 ft to 16 ft elevation and a vertical pump 10 ft in diameter and 15 ft deep with a lateral tunnel extending into the hillside at the bottom of the shaft.

DATUM.--Elevation of land surface is 60 ft. Measuring point is the top of I-beam supporting pump platform, 13.61 ft above mean sea level.

PERIOD OF RECORD.--
Water level: Occasional measurements 1972 to current year.
Water quality: Occasional measurements 1972 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 10.62 ft above mean sea level, Oct. 16, 1989; lowest water level measured, 0.07 ft above mean sea level, Sep. 17, 1979.

REMARKS.--Water used for irrigation of sugar cane.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 7	9.59	FEB 16	9.82	APR 12	8.79	JUN 28	8.94	AUG 5	9.04

HAWAII, ISLAND OF OAHU

211907157594701. Local number, 3-1959-05.

LOCATION.--Lat 21°19'06", long 157°59'46", Hydrologic Unit 20060000, 600 ft northwest of Ewa Beach Park, and 1.2 mi southeast of Campbell High School. Owner: Hawaii Institute of Geophysics.

AQUIFER.--Basalt of Koolau Volcanic Series, Tertiary age.

WELL CHARACTERISTICS.--Drilled basal water-table well, depth 1,110 ft, 5-in. PVC casing, bottom 12 ft perforated.

DATUM.--Elevation of land surface datum is 6 ft. Measuring point: Top of 5-in. PVC casing, 6.40 ft above mean sea level.

REMARKS.--Geophysical log and water-quality records are available in files of district office.

PERIOD OF RECORD.--Water-level recorder, December 1966 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 5.38 ft above mean sea level, Jan. 17, 1969; lowest, 2.81 ft below mean sea level, Aug. 25, 1977.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.58	.66	.88	1.78	1.96	1.69	1.12	.60	.51	.31	.57	.30
2	.53	.70	.89	1.82	1.97	1.68	1.07	.62	.49	.30	.60	.30
3	.53	.73	.88	1.86	1.93	1.68	1.03	.62	.47	.29	.59	.30
4	.54	.76	.88	1.92	1.94	1.67	1.02	.62	.46	.32	.55	.32
5	.51	.67	.93	1.95	1.93	1.67	1.01	.59	.46	.34	.55	.33
6	.50	.62	.97	2.03	1.89	1.67	.97	.57	.47	.33	.52	.32
7	.53	.61	.96	2.02	1.90	1.68	.94	.56	.45	.31	.47	.29
8	.51	.61	.93	2.04	1.90	1.68	.92	.57	.43	.36	.45	.27
9	.47	.60	.94	2.10	1.95	1.65	.91	.58	.44	.41	.43	.26
10	.50	.58	.94	2.10	1.94	1.65	.87	.60	.41	.42	.40	.27
11	.60	.56	.98	2.09	1.92	1.65	.87	.60	.39	.37	.38	.27
12	.68	.54	1.09	2.07	1.92	1.65	.91	.59	.40	.33	.37	.26
13	.78	.53	1.15	1.98	1.93	1.69	.93	.64	.44	.28	.32	.28
14	.80	.54	1.09	1.95	1.92	1.76	.95	.65	.44	.23	.33	.28
15	.80	.55	1.04	1.95	1.91	1.77	.95	.68	.43	.21	.34	.28
16	.78	.55	1.02	1.95	1.87	1.63	.95	.70	.40	.19	.37	.28
17	.78	.59	1.00	1.96	1.88	1.55	.97	.71	.40	.20	.40	.26
18	.79	.61	.97	1.96	1.84	1.55	.96	.71	.36	.25	.38	.26
19	.78	.58	1.02	1.92	1.87	1.58	.88	.68	.33	.27	.39	---
20	.73	.57	1.08	1.91	1.89	1.59	.82	.65	.35	.27	.36	---
21	.68	.64	1.10	1.91	1.83	1.58	.76	.60	.33	.27	.34	---
22	.66	.67	1.05	1.89	1.79	1.54	.74	.56	.30	.41	.35	---
23	.62	.69	1.06	1.91	1.77	1.48	.72	.56	.26	.51	.36	---
24	.59	.67	1.11	1.96	1.76	1.42	.70	.54	.24	.51	.34	---
25	.59	.65	1.19	1.94	1.75	1.34	.69	.52	.21	.49	.31	---
26	.60	.76	1.28	1.90	1.74	1.28	.67	.50	.25	.49	.29	---
27	.57	.84	1.40	1.89	1.74	1.25	.64	.50	.32	.49	.25	---
28	.57	.87	1.43	1.91	1.74	1.24	.62	.50	.36	.47	.25	---
29	.57	.88	1.51	1.95	---	1.21	.60	.53	.37	.45	.27	---
30	.59	.88	1.64	1.97	---	1.18	.59	.53	.35	.45	.28	---
31	.62	---	1.72	2.00	---	1.17	---	.54	---	.47	.26	---
MEAN	.63	.66	1.10	1.95	1.87	1.54	.86	.59	.38	.35	.39	---
MAX	.80	.88	1.72	2.10	1.97	1.77	1.12	.71	.51	.51	.60	---
MIN	.47	.53	.88	1.78	1.74	1.17	.59	.50	.21	.19	.25	---

WTR YEAR 1993 MAX 2.35 JAN 9 MIN 0.01 JULY 17

HAWAII, ISLAND OF OAHU--Continued

212154158015201. Local number, 3-2101-03.

LOCATION.--Lat 21°21'54", long 158°01'52", Hydrologic Unit 20060000, 0.4 mi southeast of Honouliuli, and 0.5 mi north of Ewa Hospital. Owner: State of Hawaii.

AQUIFER.--Basalt of Koolau Volcanic Series, Tertiary age.

WELL CHARACTERISTICS.--Drilled artesian well, depth 355 ft, 6-in. PVC casing, cased to 165 ft. Well was modified in January 1958 and May 1982.

DATUM.--Elevation of land-surface datum is 15 ft. Measuring point: Top of horizontal flange below petcock, 13.31 ft above mean sea level.

REMARKS.--Water-quality records for 1910-16, 1920-21, 1923-75, 1978-81, are available in files of district office.

PERIOD OF RECORD.--Occasional measurements, April 1910 to June 1921, September 1923 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 29.16 ft above mean sea level, April 1918; lowest observed, less than 11.2 ft, above mean sea level (below petcock then in use), Sept. 2, and Oct. 19, 1977.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 21	14.96	DEC 21	16.21	JAN 22	15.33	MAR 19	16.78	JUN 30	14.91	SEP 3	14.70

HAWAII, ISLAND OF OAHU--Continued

212123157535501. Local number, 3-2153-05.

LOCATION.--Lat 21°21'23", long 157°53'55", Hydrologic Unit 20060000, 0.4 mi northwest of Moanalua Elementary School, and 0.5 mi southwest of Tripler Hospital, in Moanalua. Owner: Honolulu Board of Water Supply.

AQUIFER.--Basalt of Koolau Volcanic Series, Tertiary age.

WELL CHARACTERISTICS.--Drilled basal water-table well, depth 1,246 ft, 6-in. PVC casing, cased to 24 ft, perforated from 24 to 1,246 ft. Well was modified and deepened August 1980.

DATUM.--Elevation of land-surface datum is 35 ft. Measuring point: Top of 6-in. PVC casing, 37.90 ft, revised, above mean sea level.

REMARKS.--Geophysical logs are available in files of district office.

PERIOD OF RECORD.--
WATER LEVEL: Water-level recorder, March 1981 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 22.53 ft above mean sea level, Jan. 9, 1983; lowest 16.56 ft above mean sea level, July 24, 1987.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	17.99	18.09	18.33	18.71	18.98	18.95	18.47	17.97	17.73	17.40	17.44	17.49
2	17.94	18.09	18.30	18.79	19.05	18.94	18.41	17.98	17.68	17.36	17.45	17.50
3	17.93	18.14	18.18	18.81	19.00	18.89	18.43	17.90	17.65	17.40	17.44	17.48
4	17.95	18.17	18.28	18.81	18.99	18.86	18.46	17.98	17.65	17.46	17.39	17.48
5	17.91	18.18	18.27	18.88	18.97	18.87	18.42	17.90	17.67	17.41	17.38	17.49
6	17.90	18.13	18.28	18.87	18.99	18.95	18.39	17.90	17.69	17.40	17.32	17.43
7	17.90	18.09	18.26	18.86	19.01	18.92	18.33	17.87	17.69	17.40	17.35	17.42
8	17.93	18.09	18.25	18.89	19.00	18.87	18.31	17.87	17.70	17.36	17.52	17.39
9	17.90	18.04	18.30	18.95	19.08	18.87	18.28	17.86	17.70	17.36	17.54	17.44
10	17.91	18.08	18.27	18.83	19.08	18.81	18.24	17.89	17.68	17.34	17.53	17.46
11	17.92	18.12	18.29	18.89	19.06	18.77	18.25	17.88	17.63	17.33	17.55	17.45
12	17.95	18.12	18.29	18.95	19.10	18.77	18.22	17.85	17.65	17.33	17.54	17.42
13	18.02	18.03	18.38	18.93	19.07	18.78	18.24	17.92	17.60	17.35	17.54	17.42
14	18.09	18.04	18.31	18.95	19.06	18.86	18.20	17.96	17.57	17.30	17.53	17.39
15	18.10	18.05	18.30	18.94	19.07	18.82	18.20	17.96	17.60	17.29	17.53	17.40
16	18.10	18.07	18.27	18.92	19.02	18.79	18.13	17.95	17.55	17.28	17.54	17.38
17	18.09	18.08	18.25	18.95	19.00	18.73	18.17	17.91	17.54	17.27	17.65	17.35
18	18.17	18.10	18.22	18.98	18.94	18.73	18.16	18.04	17.50	17.27	17.63	17.34
19	18.14	18.12	18.26	18.96	18.92	18.72	18.17	18.02	17.55	17.28	17.56	17.39
20	18.16	18.09	18.30	18.92	18.94	18.70	18.15	17.93	17.59	17.31	17.52	17.38
21	18.12	18.09	18.28	18.95	18.92	18.69	18.09	17.86	17.55	17.28	17.50	17.27
22	18.15	18.16	18.28	18.96	18.92	18.69	18.07	17.78	17.54	17.33	17.49	17.29
23	18.13	18.16	18.27	18.95	18.94	18.67	18.06	17.83	17.49	17.42	17.50	17.35
24	18.12	18.15	18.33	18.99	18.94	18.64	18.07	17.82	17.45	17.44	17.52	17.39
25	18.16	18.11	18.44	18.97	18.90	18.58	18.07	17.81	17.42	17.47	17.51	17.43
26	18.19	18.20	18.47	18.96	18.83	18.55	18.03	17.75	17.46	17.46	17.44	17.43
27	18.16	18.24	18.56	18.95	18.95	18.55	18.03	17.77	17.48	17.47	17.46	17.43
28	18.14	18.24	18.51	18.96	19.02	18.58	17.98	17.76	17.47	17.45	17.41	17.39
29	18.14	18.26	18.59	18.95	---	18.56	17.93	17.71	17.46	17.45	17.44	17.39
30	18.08	18.26	18.63	18.96	---	18.51	17.93	17.75	17.41	17.44	17.43	17.40
31	18.09	---	18.65	19.00	---	18.49	---	17.75	---	17.44	17.45	---
MEAN	18.05	18.13	18.34	18.92	18.99	18.75	18.20	17.88	17.58	17.37	17.49	17.41
MAX	18.19	18.26	18.65	19.00	19.10	18.95	18.47	18.04	17.73	17.47	17.65	17.50
MIN	17.90	18.03	18.18	18.71	18.83	18.49	17.93	17.71	17.41	17.27	17.32	17.27

WTR YEAR 1993 MAX 19.23 FEB 15 MIN 17.14 JUL 19

HAWAII, ISLAND OF OAHU--Continued

212238157561101. Local number, 3-2256-10.

LOCATION.--Lat 21°22'38", long 157°56'11", Hydrologic Unit 20060000, 0.4 mi southwest of Aiea School, and 0.5 mi east of McGrew Point. Owner: U.S. Navy.

AQUIFER.--Basalt of Koolau Volcanic Series, Tertiary age.

WELL CHARACTERISTICS.--Drilled artesian well, depth 173 ft, casing diameter 12 in., cased to 143 ft.

DATUM.--Elevation of land-surface datum is 10 ft. Measuring point: Top of 10-inch stilling pipe for water-level recorder, 26.15 ft above mean sea level.

REMARKS.--Water-quality records for 1923, 1928-30, 1934-68, 1972, 1974-75 are available in files of district office.

PERIOD OF RECORD.-- Occasional measurements, January 1928 to February 1931, September 1934 to August 1966. Water-level recorder, September 1966 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 25.90 ft above mean sea level, Jan. 16, 1928; lowest, 12.97 ft above mean sea level, Oct. 5, 1978.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	14.63	14.81	14.81	15.49	15.90	15.73	15.32	14.78	14.62	14.29	14.35	14.21
2	14.59	14.77	14.83	15.56	15.89	15.70	15.28	14.80	14.59	14.28	14.36	14.21
3	14.63	14.75	14.82	15.60	15.86	15.69	15.19	14.79	14.57	14.27	14.37	14.20
4	14.66	14.75	14.81	15.67	15.87	15.68	15.16	14.80	14.57	14.26	14.37	14.20
5	14.59	14.74	14.85	15.67	15.87	15.67	15.15	14.77	14.56	14.26	14.36	14.20
6	14.55	14.72	14.91	15.73	15.86	15.71	15.13	14.70	14.57	14.26	14.35	14.21
7	14.56	14.75	14.89	15.74	15.90	15.75	15.10	14.67	14.54	14.26	14.35	14.22
8	14.56	14.77	14.86	15.76	15.86	15.70	15.06	14.67	14.51	14.25	14.36	14.21
9	14.54	14.71	14.85	15.83	15.87	15.64	15.09	14.67	14.49	14.24	14.37	14.21
10	14.59	14.66	14.86	15.88	15.85	15.63	15.08	14.68	14.46	14.24	14.36	14.20
11	14.62	14.64	14.88	15.84	15.87	15.61	15.09	14.69	14.42	14.23	14.36	14.19
12	14.63	14.61	14.96	15.83	15.86	15.60	15.05	14.67	14.41	14.22	14.35	14.19
13	14.66	14.58	14.99	15.82	15.87	15.66	15.03	14.73	14.43	14.22	14.34	14.18
14	14.69	14.63	14.95	15.79	15.93	15.73	15.02	14.76	14.44	14.21	14.33	14.18
15	14.73	14.67	14.93	15.81	15.96	15.69	14.99	14.79	14.43	14.20	14.33	14.17
16	14.74	14.62	14.92	15.87	15.92	15.62	14.97	14.81	14.41	14.19	14.33	14.16
17	14.81	14.61	14.91	15.90	15.94	15.58	15.00	14.82	14.39	14.18	14.33	14.15
18	14.85	14.63	14.88	15.88	15.92	15.57	15.03	14.80	14.37	14.17	14.33	14.14
19	14.81	14.61	14.89	15.85	15.91	15.57	14.98	14.76	14.35	14.17	14.32	14.15
20	14.77	14.60	14.97	15.85	15.91	15.62	14.94	14.74	14.35	14.17	14.32	14.15
21	14.72	14.66	15.01	15.86	15.91	15.66	14.88	14.69	14.36	14.17	14.32	14.15
22	14.71	14.70	15.02	15.83	15.84	15.61	14.83	14.69	14.35	14.17	14.32	14.14
23	14.70	14.74	15.03	15.89	15.79	15.56	14.80	14.72	14.34	14.20	14.33	14.14
24	14.74	14.71	15.08	15.93	15.76	15.53	14.80	14.68	14.32	14.27	14.33	14.14
25	14.74	14.70	15.14	15.88	15.75	15.48	14.84	14.63	14.31	14.32	14.32	14.16
26	14.71	14.75	15.19	15.85	15.74	15.40	14.80	14.60	14.30	14.33	14.31	14.17
27	14.67	14.79	15.25	15.82	15.79	15.43	14.76	14.58	14.30	14.34	14.28	14.18
28	14.68	14.82	15.26	15.84	15.80	15.43	14.75	14.56	14.30	14.34	14.25	14.18
29	14.70	14.85	15.29	15.84	---	15.34	14.73	14.56	14.30	14.34	14.24	14.18
30	14.74	14.82	15.35	15.89	---	15.29	14.72	14.60	14.30	14.34	14.23	14.17
31	14.77	---	15.41	15.96	---	15.34	---	14.63	---	14.33	14.22	---
MEAN	14.68	14.71	14.99	15.81	15.86	15.59	14.99	14.70	14.42	14.25	14.33	14.18
MAX	14.85	14.85	15.41	15.96	15.96	15.75	15.32	14.82	14.62	14.34	14.37	14.22
MIN	14.54	14.58	14.81	15.49	15.74	15.29	14.72	14.56	14.30	14.17	14.22	14.14
MED	14.69	14.71	14.93	15.84	15.87	15.62	15.01	14.69	14.41	14.25	14.33	14.18

WTR YEAR 1993 MAX 15.99 FEB 15, 17 MIN 14.13 SEP 23, 24

HAWAII, ISLAND OF OAHU--Continued

212340158001901. Local number, 3-2300-18.

LOCATION.--Lat 21°23'40", long 158°00'19", Hydrologic Unit 20060000, 700 ft south of August Ahrens School, and 1,400 ft northeast of L'Orange Park, Waipahu. Owner: Honolulu Board of Water Supply.

AQUIFER.--Basalt of Koolau Volcanic Series, Tertiary age.

WELL CHARACTERISTICS.--Drilled basal-water table well, depth 1,090 ft, casing diameter 12 in., cased to 38 ft. Well was deepened May 1980 and modified February 1984. Prior to May 1980, well depth 205 ft.

DATUM.--Elevation of land-surface datum is 26 ft. Measuring point: Top of casing, 27.73 ft above mean sea level.

REMARKS.--Geophysical logs are available in files of district office.

PERIOD OF RECORD.--
WATER LEVEL: Water-level recorder, November 1982 to July 1983, March 1984 to November 30, 1987. Occasional measurements, October 1987 to current year.
WATER QUALITY: 1930, 1942-45, 1947-49, 1951-54, 1968, 1983, 1985-86, 1991.

EXTREMES FOR PERIOD OF RECORD.--Highest water level 22.40 ft above mean sea level, Jan. 4, 1983; lowest 14.01 ft above mean sea level, Sept. 14, 1985.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 22	15.83	DEC 22	16.53	FEB 1	18.03	MAR 23	17.13	JUN 30	15.30	SEP 3	15.18

212659158004102. Local number, 3-2600-04.

LOCATION.--Lat 21°26'59", long 158°00'41", Hydrologic Unit 20060000, 30 ft south of Waiahole ditch, and 1.1 mi. east southeast of Kipapa School in Mililani. Owner: Honolulu Board of Water Supply.

AQUIFER.--Basalt of Koolau Volcanic Series, Tertiary age.

WELL CHARACTERISTICS.--Drilled basal water-table well, depth 815 ft, casing diameter 16 in., cased to 705 ft.

DATUM.--Elevation of land-surface datum is 665 ft. Measuring point: Top of 16-inch casing, 666.62 ft. revised, above mean sea level.

PERIOD OF RECORD.--
WATER LEVEL: Water-level recorder, October 1983 to September 10, 1987. Occasional measurements, October 1987 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 24.49 ft above mean sea level, Apr. 5, 1989; lowest 16.74 ft above mean sea level, Sept.14, 1985.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 9	18.88	DEC 11	19.02	FEB 2	20.32	APR 7	19.66	JUN 1	18.69	JUL 13	18.66

HAWAII, ISLAND OF OAHU--Continued

212927158014801. Local number, 3-2901-07.

LOCATION.--Lat 21°29'27", long 158°01'48", Hydrologic Unit 20060000, across the main gate of Wheeler AFB, and 1,200 ft south of Wahiawa bridge on Kaukonohua Stream. Owner: U.S. Army.

AQUIFER.--Basalt of Koolau Volcanic Series, Tertiary age.

WELL CHARACTERISTICS.--Dug high-level water-table well, size 8 x 8 ft, length of 30-degree inclined shaft 1,148 ft.

DATUM.--Elevation of land-surface datum is 850 ft. Measuring point: Top of pump chamber floor at recorder, 287.00 ft above mean sea level.

REMARKS.--Water-level recorder is located on the pump chamber floor at the bottom of shaft. Water from this well is used for public supply.

PERIOD OF RECORD.--
WATER LEVEL: Water-level recorder, November 1938 to current year.
WATER QUALITY: 1966-72, 1975 to 1991.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 284.40 ft above mean sea level, May 12, 1969; lowest, 269.52 ft above mean sea level, Dec. 5, 1978.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993
MAXIMUM VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	275.96	275.38	275.62	275.40	275.51	275.27	274.85	275.14	275.23	274.85	274.73	274.83
10	275.93	275.38	275.57	275.82	275.84	275.68	274.77	275.13	275.00	274.58	274.70	274.43
15	---	275.71	275.17	275.75	275.37	275.27	274.71	275.11	274.45	274.71	274.30	274.81
20	---	275.68	275.18	275.35	275.33	275.12	275.21	275.14	274.96	274.66	274.72	274.84
25	275.83	275.69	275.77	275.85	275.86	275.53	274.96	274.46	274.87	274.63	274.78	274.86
EOM	275.94	275.70	275.78	275.90	275.74	274.91	275.08	274.91	274.81	274.29	274.83	274.93

Note: Well being pumped throughout the year.

NONPUMPING VALUES

Water levels are read after all pumps in the pump chamber are turned off for two hours.

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 3	275.80	JAN 11	275.88	FEB 1	275.96	SEP 1	274.96

HAWAII, ISLAND OF OAHU--Continued

213327157524401. Local number, 3-3352-01.

LOCATION.--Lat 21°33'27", long 157°52'44", Hydrologic Unit 20060000, at mouth of Kahana Valley, and 700 ft southwest of Kamehameha Highway, Kahana. Owner: Mary E. Foster Estate.

AQUIFER.--Basalt of Koolau Volcanic Series, Tertiary age.

WELL CHARACTERISTICS.--Drilled artesian well, depth 441 ft, casing diameter 10 in., cased to 177 ft.

DATUM.--Elevation of land-surface datum is 6 ft. Measuring point: Top of "T", 7.31 ft above mean sea level.

PERIOD OF RECORD.--
WATER LEVEL: Occasional measurements, April 1935 to 1990.
WATER QUALITY: 1935 to 1991.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 21.3 ft above mean sea level, Mar. 29, 1966; lowest measured, 12.61 ft above mean sea level, July 5, 1984.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
FEB 4	15.91	APR 12	15.45	JUN 3	14.74	AUG 10	13.93

213446158104901. Local number, 3-3410-08.

LOCATION.--Lat 21°34'46", long 158°10'49", Hydrologic Unit 20060000, 0.5 mi east of Dillingham Airfield, and 1.1 mi southeast of Mokuleia Beach Park. Owner: Waialua Sugar Company, Inc.

AQUIFER.--Basalt of Waianae Volcanic Series, Tertiary age.

WELL CHARACTERISTICS.--Drilled artesian well, depth 447 ft, casing diameter 1 inch, cased to 410 ft, perforated from 410 to 447 ft.

DATUM.--Elevation of land-surface datum is 12 ft. Measuring point: Top of 12-inch stilling well, 20.53 ft above mean sea level.

PERIOD OF RECORD.--
WATER LEVEL: Water-level recorder, January 1963 to February 1972. Occasional measurements, January 1929 to December 1962, March 1972 to current year.
WATER QUALITY: 1929 to 1985, 1989 to 1991.

EXTREMES FOR PERIOD OF RECORD.--Highest water level 19.98 ft above mean sea level, Jan. 5, 1969; lowest 16.08 ft above mean sea level, Aug.6, 1929.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 21	19.02	DEC 15	19.00	JAN 27	18.72	APR 6	18.52	MAY 28	18.51	JUL 16	18.47

HAWAII, ISLAND OF OAHU--Continued

214125158013401. Local number, 3-4101-03.

LOCATION.--Lat 21°41'25", long 158°01'34", Hydrologic Unit 20060000, 1,500 ft northeast of UH agriculture experiment Station in Waialee, and 1.9 mi northeast of Sunset Beach. Owner: State of Hawaii.

AQUIFER.--Basalt of Koolau Volcanic Series, Tertiary age.

WELL CHARACTERISTICS.--Drilled artesian well, depth 61 ft, casing diameter 8 in., cased to 36 ft.

DATUM.--Elevation of land-surface datum is 22 ft. Measuring point: Top of 4-in. pipe, 21.89 ft above mean sea level.

REMARKS.--Water-quality records for 1929-74 are available in files of district office.

PERIOD OF RECORD.--Occasional measurements, February 1929 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 15.60 ft above mean sea level, Nov. 14, 1932; lowest measured, 10.97 ft above mean sea level, July 1, 1977.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
FEB 3	13.88	APR 12	13.47	JUN 3	13.15	JUL 30	13.40

HAWAII, ISLAND OF MOLOKAI

210425156483001. Local number, 4-0448-02.

LOCATION.--Lat 21°04'25", long 156°48'30", Hydrologic Unit 20050000, 100 ft north of Highway 45, and 0.8 mi west of Pukoo. Owner: P. Friel.

AQUIFER.--East Molokai Volcanic Series, Pliocene age.

WELL CHARACTERISTICS.--Dug basal water-table well, size 4 x 6 ft, depth 22 ft.

DATUM.--Elevation of land-surface datum is 19 ft. Measuring point: Top of 2 x 2 inch steel plate bolted to top of concrete wall of well, 21.23 ft above mean sea level.

REMARKS.-- Water-quality records for 1970-1973 are available in files of district office.

PERIOD OF RECORD.--
WATER LEVEL: Water-level recorder, August 1970 to January 1973. Occasional measurements, February 1973 to current year.
WATER QUALITY: 1970-73, 1993.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 6.11 ft above mean sea level, Nov. 26, 1970; lowest measured, 3.67 ft above mean sea level, Feb. 8, 1977.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 5	4.45	NOV 30	5.07	FEB 1	4.41	APR 5	4.20	JUN 7	4.11	AUG 2	4.76

210402156495801. Local number, 4-0449-01.

LOCATION.--Lat 21°04'02", long 156°49'58", Hydrologic Unit 20050000, 1,800 ft north of Ualapue Fishpond, and 0.5 mi northeast of Kilohana School. Owner: County of Maui.

AQUIFER.--East Molokai Volcanic Series, Pliocene age.

WELL CHARACTERISTICS.--Dug basal water-table well, size 4 x 6 ft, depth 42 ft, lined with concrete to 42 ft; two infiltration tunnels, total length 214 ft.

DATUM.--Elevation of land-surface datum is 42 ft. Measuring point: Top of steel plate, 42.42 ft above mean sea level.

REMARKS.--Water from this well is used for public supply.

PERIOD OF RECORD.--
WATER LEVEL: Occasional measurements, 1938-39, 1941-63, November 1972 to current year.
WATER QUALITY: 1948, 1952-56, 1970-91, 1993.

EXTREMES FOR PERIOD OF RECORD:--Highest water level measured, 6.05 ft above mean sea level, Jan. 19, 1950; lowest measured, 2.09 ft above mean sea level, Sept. 16, 1975.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 5	3.48	NOV 30	3.65	FEB 1	3.49	APR 5	3.05	JUN 7	3.28	AUG 2	3.55

HAWAII, ISLAND OF MOLOKAI--Continued

210419156570501. Local number, 4-0457-01.

LOCATION.--Lat 21°04'19", long 156°57'05", Hydrologic Unit 20050000, 0.5 mi northwest of Kakahaia Fishpond, and 0.5 mi northeast of Moku. Owner: County of Maui.

AQUIFER.--Basalt of East Molokai Volcanic Series, Pliocene age.

WELL CHARACTERISTICS.--Dug basal water-table well, size 4 x 4 ft, depth 38 ft, lined with concrete to 38 ft; two infiltration tunnels, total length 229 ft.

DATUM.--Elevation of land-surface datum is 38 ft. Measuring point: Top of steel plate, 37.37 ft, above mean sea level.

REMARKS.--Water from this well is used for public supply. Water level taken after pump turned off for one half hour.

PERIOD OF RECORD.--
WATER LEVEL: Occasional measurements, June 1947 to November 1960, January 1962 to February 1963, November 1972 to current year.
WATER QUALITY: 1948, 1954-56, 1960, 1962, 1971, 1973-91, 1993.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 2.78 ft above mean sea level, Feb. 5, 1991; lowest measured, 1.47 ft above mean sea level, June 24, 1955.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 5	2.09	NOV 30	2.31	FEB 1	2.15	APR 5	2.09	JUN 7	2.07	AUG 2	2.09

210605157012001. Local number, 4-0601-01.

LOCATION.--Lat 21°06'05", long 157°01'20", Hydrologic Unit 20050000, 0.6 mi north of Kaunakakai School, and 0.9 mi east of Kalanianaole Colony. Owner: Molokai Ranch.

AQUIFER.--Basalt of East Molokai Volcanic Series, Pliocene age.

WELL CHARACTERISTICS.--Drilled basal water-table well, depth 59 ft, casing diameter 12 inch, cased to 20 ft.

DATUM.--Elevation of land-surface datum is 51 ft. Measuring point: Top of 15-inch surface casing, 51.95 ft above mean sea level.

PERIOD OF RECORD.--
WATER LEVEL: Occasional measurements, May 1954 to current year.
WATER QUALITY: 1954 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 3.30 ft above mean sea level, Jan. 20, 1969; lowest measured, 1.60 ft above mean sea level, Dec. 5, 1964.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 8	2.82	DEC 3	3.01	FEB 4	2.88	APR 9	2.87	JUN 11	2.77	AUG 5	2.79

HAWAII, ISLAND OF MOLOKAI--Continued

210711157000501. Local number, 4-0700-01.

LOCATION.--Lat 21°07'11", long 157°00'05", Hydrologic Unit 20050000, 2.3 mi northeast of Kaunakakai, and 2.4 mi north of Kamiloloa. Owner: Kaluakoi Corporation.

AQUIFER.--East Molokai Volcanic Series.

WELL CHARACTERISTICS.--Drilled basal water-table well, depth 1,080 ft, casing diameter 20 inch, cased to 956 ft, perforated from 956 to 1056 ft.

DATUM.--Measuring point: Top of casing, 979.00 ft, land-surface datum.

REMARKS.--Water-quality records for 1973-75 are available in files of district office.

PERIOD OF RECORD.--Occasional measurements, July 1976 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 975.25 ft below land-surface datum, Apr. 27, 1988; lowest measured, 976.23 ft below land-surface datum, Sept. 10, 1986.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 3	975.56	FEB 4	975.45	APR 7	975.61	AUG 5	975.80

203908156041201. Local number, 6-3904-01.

LOCATION.--Lat 20°39'08", long 156°04'12", Hydrologic Unit 20020000, 1,300 ft northwest of Kakanoni Point, and 0.7 mi west of Kipahulu School. Owner: Cordelia May.

AQUIFER.--Hana Volcanic Series, Pleistocene age.

WELL CHARACTERISTICS.--Drilled basal water-table well, depth 150 ft, casing diameter 4 inch.

DATUM.--Elevation of land-surface datum is 133 ft. Measuring point: Top of 1-inch pipe nipple, 133.61 ft above mean sea level.

REMARKS.--Water-quality records for 1978 are available in files of district office.

PERIOD OF RECORD.--Occasional measurements, July 1978 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 2.97 ft above mean sea level, Jun. 29, 1988; lowest measured, 0.70 ft above mean sea level, July 2, 1986.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 21	2.19	JAN 21	1.71	MAR 12	1.53	MAY 6	2.15	JUN 30	2.58	AUG 25	2.46
DEC 11	2.18										

203912156255901. Local number, 6-3925-01.

LOCATION.--Lat 20°39'12", long 156°25'59", Hydrologic Unit 20020000, 0.8 mi east of Keawalai Church, and 0.9 mi southeast of intersection of Kihei and Makena roads. Owner: State of Hawaii.

AQUIFER.--Hana Volcanic Series, Pleistocene age.

WELL CHARACTERISTICS.--Drilled basal water-table well, depth 382 ft, casing diameter 8 inch, cased to 343 ft. perforated from 343 to 363 ft.

DATUM.--Elevation of land-surface datum is 352 ft. Measuring point: Top of 2-inch pipe attached to the casing cover, 352.29 ft above mean sea level.

REMARKS.--Water-quality records for 1964 are available in files of district office.

PERIOD OF RECORD.--Occasional measurements, August 1964, June 1972 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 0.47 ft above mean sea level, Aug. 24, 1964; lowest measured, 0.41 ft below mean sea level, May 4, 1977.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 27	0.19	JAN 29	0.24	APR 22	-0.05	AUG 18	-0.04

HAWAII, ISLAND OF MAUI--Continued

204827156242201. Local number, 6-4824-01.

LOCATION.--Lat 20°48'27", long 156°24'22", Hydrologic Unit 20020000, on Waiakoa Road 1,000 ft south of intersection with Kalaloa gulch, and 4 mi east of Kihei. Owner: state of Hawaii.

AQUIFER.--Kula volcanic series, Pleistocene age.

WELL CHARACTERISTICS.--Drilled basal water-table well, depth 647 ft, casing diameter 12 inch, cased to 598 ft, screened from 598 to 638 ft.

DATUM.--Elevation of land-surface datum is 593 ft. Measuring point: Top of 3-inch pipe attached to the steel casing cover, 594.75 ft above mean sea level.

REMARKS.--Water-quality records for 1971, 1973 are available in files of district office.

PERIOD OF RECORD.--Occasional measurements, March 1971, May 1972 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 5.20 ft above mean sea level, Jan. 17, 1974; lowest measured, 3.65 ft above mean sea level, Jan. 27, 1977.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 10	4.65	FEB 16	4.47	APR 1	4.31	MAY 10	4.43	JUL 7	4.33	AUG 27	4.45
DEC 29	4.75										

204818156310301. Local number, 6-4831-01.

LOCATION.--Lat 20°48'18", long 156°31'03", Hydrologic Unit 20020000, on sugar plantation road 0.7 mi north of Maalaea, and 0.9 mi southwest of intersection of Honoapiilani Highway and Kihei Road. Owner: State of Hawaii.

AQUIFER.--Wailuku Volcanic Series, Piliocene age.

WELL CHARACTERISTICS.--Drilled basal water-table well, depth 219 ft, casing diameter 8 inch, cased to 187 ft.

DATUM.--Elevation of land-surface datum is 166 ft. Measuring point: Top of 8-inch casing, 166.60 ft above mean sea level.

REMARKS.--Water-quality records for 1965-67 are available in files of district office.

PERIOD OF RECORD.--Water-level recorder, January to July 1974. Occasional measurements, September 1972 to December 1973, August 1974 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 5.76 ft above mean sea level, Nov. 30, 1983; lowest measured, 4.74 ft above mean sea level, Mar. 16, 1977.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 29	5.50	FEB 10	5.46	MAR 29	5.29	APR 23	5.28	JUN 21	5.30	AUG 23	5.36
DEC 21	5.60										

HAWAII, ISLAND OF MAUI--Continued

204909156281401. Local number, 6-4928-02.

LOCATION.--Lat 20°48'27", long 156°28'14", Hydrologic Unit 20020000, at Puunene Airport on Mokulele Highway 2.3 mi north of intersection with Kihei Road, Kihei. Owner: Hawaiian Commercial and Sugar Co.

AQUIFER.--Honomanu Volcanic Series, Pliocene age.

WELL CHARACTERISTICS.--Dug basal water-table well, 6 x 9 ft vertical shaft, depth 53 ft.

DATUM.--Elevation of land-surface datum is 50 ft. Measuring point: Top of angle iron at well, 50.08 ft above mean sea level.

REMARKS.--Water-quality records for 1973 are available in files of district office.

PERIOD OF RECORD.--Water-level recorder, March 1972 to September 1984. Occasional measurements, October 1984 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 5.09 ft above mean sea level, Jan. 12, 1980; lowest measured, 3.05 ft above mean sea level, Mar. 5, 6, 1977.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 27	4.00	JAN 29	4.18	MAR 30	3.85	APR 22	3.87	JUN 18	3.88	AUG 18	4.05
DEC 18	4.18										

205140156304501. Local number, 6-5130-01.

LOCATION.--Lat 20°51'40", long 156°30'45", Hydrologic Unit 20020000, 0.5 mi northwest of Waikapu, and 1.0 mi southeast of Wailuku Heights. Owner: State of Hawaii.

AQUIFER.--Wailuku Volcanic Series, Pliocene age.

WELL CHARACTERISTICS.--Drilled basal water-table well, depth 757 ft, casing diameter 8 inch, cased to 569 ft, perforated from 569 to 609 ft.

DATUM.--Elevation of land-surface datum is 551 ft. Measuring point: Top of 6-inch pipe coupling, 551.33 ft above mean sea level.

PERIOD OF RECORD.--Occasional measurements, June 1974 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 30.90 ft above mean sea level, Oct. 13, 1982; lowest measured, 11.36 ft above mean sea level, Jan. 27, 1976.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 10	14.16	FEB 16	13.49	MAY 10	14.30	MAY 14	14.40	JUL 7	14.09	AUG 27	13.58
DEC 29	14.35	APR 1	14.44								

HAWAII, ISLAND OF MAUI--Continued

205154156303801. Local number, 6-5130-02.

LOCATION.--Lat 20°51'54", long 156°30'38", Hydrologic Unit 20020000, 0.6 mi northwest of Waikapu, and 1.0 mi south- east of Wailuku Heights. Owner: State of Hawaii.

AQUIFER.--Wailuku Volcanic Series, Pliocene age.

WELL CHARACTERISTICS.--Drilled basal water-table well, depth 1,020 ft, casing diameter 20 inch, cased to 520 ft, perforated from 520 to 570 ft.

DATUM.--Elevation of land-surface datum is 518 ft. Measuring point: Top of casing, 519.33 ft above mean sea level.

REMARKS.--Water-quality records for 1974 are available in files of district office.

PERIOD OF RECORD.--Water-level recorder, August 1983 to September 1984. Occasional measurements, October 1984 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 15.03 ft above mean sea level, Jul. 15, 1987; lowest measured, 12.66 ft above mean sea level, Aug. 27, 1993.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 10	12.97	FEB 16	12.83	APR 1	12.84	MAY 10	12.83	JUL 7	12.76	AUG 27	12.66
DEC 29	13.02										

205412156193801. Local number, 6-5419-01.

LOCATION.--Lat 20°54'12", long 156°19'38", Hydrologic Unit 20020000, 0.9 mi south of Haiku Cannery, and 2 mi north west of Kaupakulua between the Haiku-Kokomo road and Maliko Gulch. Owner: State of Hawaii

AQUIFER.--Honomanu Volcanic Series, Pliocene age.

WELL CHARACTERISTICS.--Drilled basal water-table well, depth 150 ft, casing diameter 4 inch, cased to 829 ft, perforated from 829 to 859 ft.

DATUM.--Elevation of land-surface datum is 828 ft. Measuring point: Top of 6-inch pipe coupling, 828.44 ft above mean sea level.

REMARKS.--Water level readings are affected by oil floating on top of the water.

PERIOD OF RECORD.--Occasional measurements, October 1984 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 5.60 ft above mean sea level, May 2, 1989; lowest measured, 4.36 ft above mean sea level, July 9, 1985.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1991 TO SEPTEMBER 1992

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 10	a---	JAN 30	5.10	APR 1	a---	MAY 5	a---	JUL 7	a---	AUG 27	a---

a Site visited, unable to make measurement

HAWAII, ISLAND OF MAUI--Continued

205419156304401. Local number, 6-5430-03.

LOCATION.--Lat 20°54'19", long 156°30'44", Hydrologic Unit 20020000, 2,000 ft north of Puuohala Village, and 0.5 mi northwest of Wailuku Sugar Mill reservoir. Owner: Wailuku Sugar Co.

AQUIFER.--Wailuku Volcanic Series, Pliocene age.

WELL CHARACTERISTICS.--Drilled basal water-table well, depth 580 ft, 1.5-inch PVC casing, cased to 400 ft, perforated from 400 to 580 ft.

DATUM.--Elevation of land-surface datum is 415 ft. Measuring point: Top of 1-inch galvanized pipe, 416.75 ft above mean sea level.

PERIOD OF RECORD.--Water-level recorder, August 1982 to February 1984. Occasional measurements, March 1984 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 22.09 ft above mean sea level, Dec. 31, 1982; lowest measured, 13.23 ft above mean sea level, Aug. 23, 1993.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 5	14.71	JAN 26	15.47	MAR 29	14.71	APR 29	14.38	JUN 18	13.63	AUG 23	13.23
DEC 21	15.02										

205405156305401. Local number, 6-5430-05.

LOCATION.--Lat 20°45'59", long 156°30'56", Hydrologic Unit 20020000, 1.0 mi southwest of intersection of Malaihi Road and Highway 33, and 1.2 mi south of Waihee. Owner: State of Hawaii.

AQUIFER.--Wailuku Volcanic Series, Pliocene age.

WELL CHARACTERISTICS.--Drilled basal water-table well, depth 1,400 ft, casing diameter 10 inch, cased to 400 ft.

DATUM.--Elevation of land-surface datum is 380 ft. Measuring point: Top of 10-inch casing, 380.84 ft., revised, above mean sea level.

PERIOD OF RECORD.--
WATER LEVEL: Occasional measurements, August 1983 to May 1986. Water-level recorder, June 1986 to current year.
WATER QUALITY: 1982, 1985 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 18.20 ft above mean sea level, Dec. 14, 1989; lowest measured, 11.70 ft above mean sea level, Sept. 12, 1993.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	12.27	12.90	13.08	e13.61	13.54	13.04	12.72	12.57	12.42	12.03	11.79	11.85
10	12.33	12.80	13.12	e13.76	13.52	13.02	12.59	12.56	12.35	11.93	11.79	11.78
15	12.63	12.80	13.16	e13.62	13.40	13.06	12.60	12.63	12.29	11.92	11.79	11.80
20	12.63	12.78	13.14	e13.64	13.39	13.00	12.74	12.60	12.21	11.91	11.85	11.85
25	12.62	13.05	e13.04	e13.57	13.29	12.90	12.71	12.56	12.10	11.91	11.81	11.85
EOM	12.60	13.09	e13.36	13.66	13.19	12.84	12.59	12.51	12.02	11.88	11.85	11.86

WTR YEAR 1993 MAX 13.86 Jan. 10 MIN 11.70 Sept. 12.

e Estimated based on well Test Hole B (6-5431-01)

HAWAII, ISLAND OF MAUI--Continued

205437156310501. Local number, 6-5431-01.

LOCATION.--Lat 20°54'37", long 156°31'05", Hydrologic Unit 20020000, 0.5 mi southwest of Waiehu Village, and 1.4 mi southwest of intersection of Mialaihi Road and Kahekili Highway. Owner: Wailuku Sugar Co.

AQUIFER.--Wailuku Volcanic Series, Pliocene age.

WELL CHARACTERISTICS.--Drilled basal water-table well, depth 555 ft, 1.5-inch PVC casing, cased to 515 ft, perforated from 515 to 555 ft.

DATUM.--Elevation of land-surface datum is 493 ft. Measuring point: Top of 1.5-inch PVC casing, 492.51 ft above mean sea level.

PERIOD OF RECORD.--Water-level recorder, August 1982 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 19.52 ft above mean sea level, Jan. 2, 1983; lowest measured, 10.98 ft above mean sea level, Aug. 29, 1991, Aug. 14, 1993.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	11.79	12.56	12.67	13.26	13.20	12.56	12.20	12.06	11.83	11.35	11.10	11.16
10	11.89	12.39	12.70	13.41	13.17	12.55	12.05	12.04	11.74	11.23	11.08	11.10
15	12.28	12.38	12.72	13.28	13.01	12.64	12.06	12.09	11.67	11.25	11.05	11.12
20	12.24	12.36	12.68	13.29	12.92	12.56	12.24	12.13	11.55	11.24	11.14	11.17
25	12.21	12.66	12.65	13.20	12.83	12.45	12.20	12.08	11.41	11.24	11.14	11.16
EOM	12.20	12.70	13.01	13.37	12.72	12.35	12.09	11.98	11.33	11.20	11.20	11.20

WTR YEAR 1993 MAX 13.52 ft Jan. 8, 10, 12 MIN 10.98 ft Aug. 14.

205617156311101. Local number, 6-5631-01.

LOCATION.--Lat 20°56'17", long 156°31'11", Hydrologic Unit 20020000, 2,000 ft southwest of Waihee Farm, and 1.3 mi northwest of Waiehu Golf Course. Owner: Wailuku Sugar Co.

AQUIFER.--Wailuku Volcanic Series, Pliocene age.

WELL CHARACTERISTICS.--Drilled basal water-table well, depth 300 ft, 1.5-inch PVC casing, cased to 260 ft, perforated from 260 to 300 ft.

DATUM.--Elevation of land-surface datum is 248 ft. Measuring point: Top of 1.5-inch PVC pipe, 248.05 ft above mean sea level.

PERIOD OF RECORD.--Water-level recorder, August 1982 to September 1984. Occasional measurements, October 1984 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 18.83 ft above mean sea level, Dec. 6, 1982; lowest measured, 14.15 ft above mean sea level, Aug. 23, 1993.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 5	14.57	JAN 26	14.95	APR 29	14.53	JUN 18	14.41	JUL 7	14.27	AUG 23	14.15
DEC 21	14.79	MAR 29	14.67								

HAWAII, ISLAND OF MAUI--Continued

205651156313201. Local number, 6-5631-02.

LOCATION.--Lat 20°56'51", long 156°31'32", Hydrologic Unit 20020000, 0.9 mi northwest of Waihee School, and 0.9 mi upstream from mouth of Waihee river. Owner: Hawaiian Investments.

AQUIFER.--Wailuku Volcanic Series, Pliocene age.

WELL CHARACTERISTICS.--Drilled basal water-table well, depth 387 ft, casing diameter 16 inch, cased to 290 ft, perforated from 290 to 310 ft.

DATUM.--Elevation of land-surface datum is 281 ft. Measuring point: Top of 16-inch casing, 284.78 ft above mean sea level.

PERIOD OF RECORD.--Water-level recorder, April 1988 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 12.05 ft above mean sea level, Oct. 22, Nov. 2, 10-11, 1989. Lowest water level measured, 8.70 ft Sept. 12-15, 1993.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	8.89	9.09	9.23	9.36	9.45	9.19	9.14	a--	a--	8.89	8.81	8.78
10	8.92	9.16	a-	9.36	9.37	9.17	9.13	a--	a--	8.88	8.80	8.76
15	8.95	9.16	a-	9.30	9.32	9.24	9.09	a--	a--	8.86	8.80	8.74
20	8.98	9.21	a-	9.30	9.24	9.20	9.07	a--	8.95	8.87	8.84	8.76
25	9.00	9.23	a-	9.33	9.21	9.17	9.07	a--	8.93	8.85	8.81	8.79
EOM	9.02	9.25	9.34	9.37	9.19	9.11	a--	a--	8.90	8.81	8.79	8.83

WTR YEAR 1993 MAX --- MIN ---

205856156400101. Local number, 6-5840-01.

LOCATION.--Lat 20°58'56", long 156°40'01", Hydrologic Unit 20020000, on sugar plantation road 0.9 mi east of Kahana, and 1.5 mi southwest of Honokahua. Owner: State of Hawaii.

AQUIFER.--Honolua Volcanic Series, Pliocene age.

WELL CHARACTERISTICS.--Drilled basal water-table well, depth 274 ft, casing diameter 8 inch, cased to 264 ft, perforated from 264 to 274 ft. Hole was drilled to depth of 284 ft but plugged back 10 ft with cement.

DATUM.--Elevation of land-surface datum is 257 ft. Measuring point: Top of 9-inch casing, 257.45 ft above mean sea level. Levels of Aug. 11, 1993.

REMARKS.--Water-quality records for 1964, 1980 are available in files of district office.

Recorder discontinued, periodic measurement only.

PERIOD OF RECORD.--Occasional measurements, March 1972 to July 1975. Water-level recorder, August 1975 to June 25, 1993.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 3.68 ft above mean sea level, Sept. 20, 1981; lowest, 2.40 ft above mean sea level May 4, 5, 1985.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	3.13	3.26	3.22	3.35	3.30	3.09	3.16	3.11	3.10	a--	a--	a--
10	3.21	3.28	3.17	3.24	3.14	3.12	3.18	3.09	3.09	a--	a--	a--
15	3.19	3.24	3.30	3.05	3.08	3.25	3.16	3.15	3.14	a--	a--	a--
20	3.16	3.37	3.25	3.05	2.99	3.13	3.11	3.11	3.04	a--	a--	a--
25	3.20	3.38	3.24	3.11	2.95	3.05	3.15	3.09	a--	a--	a--	a--
EOM	3.29	3.29	3.36	3.15	3.00	3.02	3.09	3.10	a--	a--	a--	a--

Oct. 1 to June 24, 1993 MAX 3.54 ft Nov. 23 MIN 2.86 June 19, 20.

a No water level record

HAWAII, ISLAND OF HAWAII

190602155325901. Local number, 8-0632-01.

LOCATION.--Lat 19°06'02", long 155°32'59", Hydrologic Unit 20010000, 0.9 mi north of Whittington Park, and 3.3 mi northeast of Naalehu. Owner: Kau Agribusiness (formerly Kau Sugar Company).

AQUIFER.--Ninole Volcanic Series, Pleistocene age.

WELL CHARACTERISTICS.--Drilled basal water-table, depth 140 ft, casing diameter 14 inch, cased to 105 ft, perforated from 105 to 125 ft.

DATUM.--Elevation of land-surface datum is 102 ft. Measuring point: 1-inch hole in pump base, 103.26 ft above mean sea level.

REMARKS.--Water-quality records for 1972 and 1973 are available in files of district office.

PERIOD OF RECORD.--Occasional measurements, April 1972 to current year.

REVISED RECORDS.--WDR HI-91-1: 1984-90(The units of the minimum water level for the period of record.)

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 2.39 ft above mean sea level, Oct. 19, 1978; lowest measured, 0.21 ft above mean sea level, June 19, 1989.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV. 9	1.62	APR. 6	1.38	JUL. 2	2.16

193017154502101. Local number, 8-3080-02.

LOCATION.--Lat 19°30'17", long 154°50'21", Hydrologic Unit 20010000, 0.5 mi south of intersection of Highway 132, and Highway 137 near Pahoa. Owner: County of Hawaii.

AQUIFER.--Puna Volcanic Series, Holocene age.

WELL CHARACTERISTICS.--Dug basal water-table well, depth 46 ft, casing diameter 66 inch, with two horizontal infiltration tunnels 2 x 50 ft extending in opposite directions from 3 ft above bottom of well.

DATUM.--Elevation of land-surface datum is 39 ft. Measuring point: Top of steel manhole cover at 1-inch hole, 39.50 ft above mean sea level.

REMARKS.--Water from this well is used for public supply and at times, water level affected by pumping.

PERIOD OF RECORD.--
WATER LEVEL: Occasional measurements, March 1972 to current year.
WATER QUALITY: 1972-81, 1983 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 4.77 ft above mean sea level, Mar. 2, 1989; lowest measured, 1.18 ft above mean sea level, June 3, 1985.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
Nov 16	4.55	Jan 12	a---	May 14	a---	Sep 29	a---

a No measurement made, well pumping

HAWAII, ISLAND OF HAWAII--Continued

193339154594801. Local number, 8-3389-01.

LOCATION.--Lat 19°33'39", long 154°59'48", Hydrologic Unit 20010000, 3.5 mi northwest of Pahoa airstrip, and 5.5 mi southeast of Keaau. Owner: County of Hawaii.

AQUIFER.--Puna Volcanic Series, Holocene age.

WELL CHARACTERISTICS.--Drilled basal water-table well, depth 475 ft, casing diameter 8 inch, cased to 403 ft, perforated from 403 to 475 ft.

DATUM.--Elevation of land-surface datum is 427 ft. Measuring point: Top of casing, 428.14 ft above mean sea level.

REMARKS.--Water-quality records for 1961 are available in files of district office.

PERIOD OF RECORD.--Occasional measurements, September 1974 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 27.76 ft above mean sea level, revised, Nov. 27, 1990; lowest measured, 9.92 ft above mean sea level, Jun. 9, 1992.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
Nov 16	12.20	Apr 13	17.67	Jul 1	15.82	Sep 27	17.13

194222155035101. Local number, 8-4203-04.

LOCATION.--Lat 19°42'22", long 155°03'51", Hydrologic Unit 20010000, 0.5 mi east of Hawaii Technical School, and 1.0 mi south of Hilo airport terminal. Owner: Hawaii Electric Light Company.

AQUIFER.--Kahuku Volcanic Series, Pleistocene age.

WELL CHARACTERISTICS.--Drilled basal water-table well, depth 201 ft, casing diameter 16 inch, cased to 63 ft.

DATUM.--Elevation of land-surface datum is 47 ft. Measuring point: Top of 3-inch nipple above casing; 46.54 ft above mean sea level.

REMARKS.--Water-quality records for 1961 are available in files of district office. Water level affected by pumping of nearby industrial wells.

PERIOD OF RECORD.--Occasional measurements, July 1973 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 11.34 ft above mean sea level, Nov. 26, 1990; lowest measured, 5.80 ft above mean sea level, Mar. 12, 1986.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
Nov 16	6.89	Mar 12	6.87	Jul 1	6.12	Sep 29	7.04

HAWAII, ISLAND OF HAWAII--Continued

195947155485801. Local number, 8-5948-01.

LOCATION.--Lat 19°59'47", long 155°48'58", Hydrologic Unit 20010000, 0.7 mi east of Hapuna Beach Park, and 3.1 mi southeast of Kawaihae. Owner: State of Hawaii.

AQUIFER.--Hamakua Volcanic Series, Pleistocene age.

WELL CHARACTERISTICS.--Drilled basal water-table well, depth 268 ft, casing diameter 10 inch, cased to 246 ft, screened from 246 to 266 ft.

DATUM.--Elevation of land-surface datum is 244 ft. Measuring point: Hole in pumpbase, 246.47 ft above mean sea level.

REMARKS.--Water from this well is used for irrigation.

PERIOD OF RECORD.--
WATER LEVEL: Occasional measurements, April 1970, March 1973 to current year.
WATER QUALITY: 1970, 1973 to current year.

REVISED RECORDS.--WDR HI-91-1: 1976-80(Water level data), 1976-90 (Maximum and minimum water levels for the period of record).

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 4.75 ft above mean sea level, Jul. 16, 1993; lowest measured, 1.38 ft above mean sea level, Sep. 28, 1979.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
Dec 8	4.49	May 12	4.65	Jul 16	4.75

200132155471101. Local number, 8-6147-01.

LOCATION.--Lat 20°01'32", long 155°47'10", Hydrologic Unit 20010000, on Highway 26, 3.1 mi east of Kawaihae, and 2.8 mi northeast of Hapuna Beach Park. Owner: State of Hawaii.

AQUIFER.--Pololu Volcanic Series, Pleistocene age.

WELL CHARACTERISTICS.--Drilled basal water-table well, depth 1,008 ft, casing diameter 8 inch, cased to 997 ft, perforated from 997 to 1,008 ft. Hole was drilled to 1,040 ft but was finally plugged back to 1,008 ft.

DATUM.--Elevation of land-surface datum is 982 ft. Measuring point: Top of pipe coupling on casing cover 982.8 ft, revised, above mean sea level.

REMARKS.--Water-quality records for 1963-64 are available in files of district office.

PERIOD OF RECORD.--Occasional measurements, June to July 1963, June 1973 to current year.

REVISED RECORDS.--WRD HI-91-1: 1975-90(Station ID number.)

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 6.23 ft above mean sea level, May 1, 1987; lowest measured, 4.82 ft above mean sea level, Sept. 20, 1976.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 18	5.87	MAR 11	5.75	MAR 11	5.18	MAR 11	5.28	JUL 16	5.13

HAWAII, ISLAND OF HAWAII--Continued

201603155521801. Local number, 8-7652-01.

LOCATION.--Lat 20°16'03", long 155°52'18", Hydrologic Unit 20010000, 0.3 mi west of Upolu Point Airfield, 3.1 mi northwest of Hawi, and 1.9 mi west of Hoea Camp. Owner: Kohala Corporation.

AQUIFER.--Pololu Volcanic Series, Pleistocene age.

WELL CHARACTERISTICS.--Dug basal water-table well, with horizontal infiltration tunnels from pump sump.

DATUM.--Elevation of land-surface datum is 33 ft. Measuring point: Top of 4-inch steel I-beam placed across sump, 7.75 ft above mean sea level.

PERIOD OF RECORD.--
WATER LEVEL: Occasional measurements, March 1973 to current year.
WATER QUALITY: 1973 to current year.

REVISED RECORDS.--WDR HI-91-1: 1988-90(The maximum water level for the period of record.)

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 3.09 ft above mean sea level, Aug. 22, 1974; lowest measured, 1.45 ft above mean sea level, July 9, 1975, Jan. 16, 1980.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 8	2.65	MAY 12	2.48

WATER QUALITY DATA, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

STATION NUMBER	LOCAL IDENT-I-FIER	LAT-I-TUDE	LONG-I-TUDE	DATE	TIME	SPE-CIFIC CON-DUCT-ANCE (US/CM)	TEMPER-ATURE WATER (DEG C)	CHLO-RIDE, (MG/L AS CL)
			HAWAII, ISLAND OF KAUAI					
220018159444702	2-0044-13 W34 KEKAHA	22 00 18 N	159 44 47 W	10-16-92	1300	500	24.0	76
				12-08-92	1150	498	22.0	80
				02-17-93	1100	500	22.5	75
				04-13-93	1130	495	26.0	78
				06-24-93	1100	495	22.5	79
				08-10-93	1245	440	22.5	76
220016159442701	2-0044-15 S14 KEKAHA	22 00 16 N	159 44 27 W	10-13-92	0925	645	23.5	110
				12-07-92	0845	705	22.5	120
				02-16-93	0915	675	21.5	110
				04-12-93	0830	780	23.0	140
				06-21-93	0840	1330	22.5	320
				08-09-93	0900	795	23.5	180
220136159205501	2-0120-01 W7 WAILUA	22 01 36 N	159 20 55 W	01-11-93	0950	848	24.0	160
				02-22-93	0850	850	24.5	160
				04-07-93	1420	850	26.0	150
				06-23-93	1300	875	27.0	170
				08-06-93	1450	895	26.0	170
220354159205601	2-0320-01 W9-1A WAIL	22 03 54 N	159 20 56 W	12-04-92	1220	310	24.0	45
				04-02-93	0835	387	24.0	43
220354159205602	2-0320-03 W9-1B WAIL	22 03 54 N	159 20 56 W	10-09-92	1400	415	25.5	42
				02-19-93	0835	392	24.0	47
				06-25-93	0830	395	27.5	47
				08-06-93	0850	393	27.5	46
220341159453901	2-0345-04 S16 SAKIMA	22 03 41 N	159 45 39 W	10-13-92	1030	630	22.5	110
				12-07-92	0940	620	22.0	100
				02-16-93	0950	640	21.5	110
				04-12-93	0900	1050	22.0	240
				06-21-93	0905	1900	22.5	510
				08-09-93	0940	1650	22.5	450
220530159450401	2-0545-01 W59 KAULAU	22 05 30 N	159 45 07 W	12-07-92	0950	770	23.0	150
				02-16-93	1020	790	22.0	150
				04-12-93	0930	790	23.0	140
				06-21-93	0930	755	24.5	150
				08-09-93	1005	780	24.5	150
220827159185401	2-0818-01 W90A ANAHO	22 08 27 N	159 18 54 W	12-04-92	0905	263	24.0	22
				06-25-93	0930	235	25.5	20
220826159185401	2-0818-02 W90B ANAHO	22 08 26 N	159 18 54 W	10-09-92	0950	205	24.0	20
				02-19-93	0930	252	23.5	20
				04-02-93	0915	240	24.0	19
				08-06-93	1020	300	24.0	22
221141159252501	2-1125-01 N1 KILAUEA	22 11 41 N	159 25 25 W	10-09-92	1025	170	24.0	15
				12-11-92	0900	170	21.0	16
				02-19-93	1010	182	23.0	17
				06-25-93	1310	158	27.0	14
221141159252502	2-1125-02 N2 KILAUEA	22 11 41 N	159 25 25 W	04-02-93	1000	177	25.5	14
				08-06-93	1055	165	24.5	16
221150159264501	2-1126-01 KALIHIWAI	22 11 50 N	159 26 45 W	02-17-93	0840	215	21.5	24
				06-23-93	0830	208	24.0	20
221151159265001	2-1126-02 KALIHIWAI	22 11 51 N	159 26 50 W	10-21-92	0850	230	23.0	26
				12-22-92	0740	230	22.5	26
				04-07-93	0840	205	22.0	21
				08-13-93	0810	140	23.0	22

WATER QUALITY DATA, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

STATION NUMBER	LOCAL IDENT-I-FIER	LAT-I-TUDE	LONG-I-TUDE	DATE	TIME	SPE-CIFIC CON-DUCT-ANCE (US/CM)	TEMPER-ATURE WATER (DEG C)	CHLO-RIDE, (MG/L AS CL)
			HAWAII, ISLAND OF KAUAI--Continued					
221201159293401	2-1229-03 W73 HANALE	22 12 01 N	159 29 34 W	10-09-92	1240	240	23.0	30
				12-22-92	0830	240	23.0	30
				02-19-93	1305	240	23.0	29
				04-02-93	1235	240	23.5	25
				06-25-93	1230	240	24.5	30
				08-06-93	1250	240	23.5	30
221247159324801	2-1232-01 W67 WAINIH	22 12 47 N	159 32 48 W	10-09-92	1210	145	23.0	21
				12-04-92	1045	140	22.5	20
				02-19-93	1130	135	24.5	22
				04-02-93	1120	135	24.5	20
				06-25-93	1100	132	27.5	21
				08-06-93	1215	135	26.0	20
221318159335901	2-1333-01 W66 HAENA	22 13 18 N	159 33 59 W	10-09-92	1140	175	24.5	19
				12-04-92	1010	210	22.0	19
				02-19-93	1110	218	21.5	20
				04-02-93	1040	215	22.0	20
				06-25-93	1035	195	25.5	21
				08-06-93	1150	209	23.0	20
215454159274201	2-5427-01 W16A KOLOA	21 54 54 N	159 27 42 W	12-03-92	0930	235	23.0	24
				12-03-92	0935	235	23.0	25
				04-01-93	1400	239	23.5	26
				06-24-93	0800	240	23.0	25
215455159274201	2-5427-02 W16B KOLOA	21 54 55 N	159 27 42 W	02-11-93	0800	223	23.0	24
				08-05-93	0900	225	23.0	24
215536159263501	2-5526-01 KOLOA	21 55 36 N	159 26 35 W	06-24-93	0835	228	23.5	22
				08-05-93	0930	225	23.0	21
215528159303001	2-5530-02 W23 LAWAI	21 55 28 N	159 30 30 W	12-07-92	1350	250	23.0	28
				02-16-93	1445	245	22.5	27
				04-27-93	1745	260	22.0	25
				06-24-93	1355	252	23.0	25
				08-05-93	1530	250	23.0	28
215535159302601	2-5530-03 W22 LAWAI	21 55 35 N	159 30 26 W	10-08-92	1015	207	23.0	24
				12-14-92	0840	218	22.5	25
				02-16-93	1440	220	22.0	24
				04-27-93	1750	222	22.0	25
				06-24-93	1350	218	25.5	28
				08-05-93	1335	218	23.5	24
215522159342601	2-5534-03 W25-1 HANA	21 55 22 N	159 34 26 W	10-08-92	1040	323	28.5	31
				12-03-92	1450	465	24.0	40
				01-28-93	0935	420	24.0	38
				04-01-93	0900	470	23.5	41
				06-24-93	1300	440	24.0	41
				08-05-93	1040	405	30.5	38
215635159355001	2-5635-01 S7 HANAPEP	21 56 35 N	159 35 50 W	10-08-92	1330	675	23.5	130
				12-03-92	1240	700	23.0	140
				02-11-93	1345	700	23.0	140
				04-12-93	1015	700	24.0	130
				07-16-93	0915	690	23.5	130
				08-09-93	1400	650	23.0	140
215854159424601	2-5842-02 S11 KEKAHA	21 58 54 N	159 42 46 W	10-13-92	1240	615	25.0	85
				12-07-92	1240	650	24.5	95
				02-16-93	1330	625	24.0	91
				04-12-93	1145	635	24.5	92
				06-21-93	1115	665	25.0	98
				08-09-93	1205	675	25.0	100

WATER QUALITY DATA, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

STATION NUMBER	LOCAL IDENTIFIER	LATITUDE	LONGITUDE	DATE	TIME	SPECIFIC CONDUCTANCE (US/CM)	TEMPERATURE WATER (DEG C)	CHLORIDE, (MG/L AS CL)
			HAWAII, ISLAND OF KAUAI--Continued					
215843159422901	2-5842-03 S10 KEKAHA	21 58 43 N	159 42 29 W	10-13-92	1315	690	24.5	120
				02-16-93	1350	630	23.5	100
				04-12-93	1130	905	24.5	190
				06-21-93	1140	1280	24.5	290
				08-09-93	1230	1160	24.5	250
215901159235301	2-5923-01 KILOHANA A	21 59 01 N	159 23 53 W	10-09-92	0805	185	22.0	18
				02-12-93	0745	185	20.5	20
				04-02-93	0750	192	23.0	18
				06-25-93	0750	220	25.0	18
				08-06-93	0830	240	25.5	18
215901159235201	2-5923-07 KILOHANA I	21 59 01 N	159 23 52 W	10-09-92	0755	190	23.0	20
				12-04-92	1330	190	27.5	20
				02-12-93	0730	182	24.5	20
				04-02-93	0740	190	23.5	20
				06-25-93	0740	192	24.5	20
				08-06-93	0755	185	24.5	20
215906159395601	2-5939-01 S9 WAIMEA	21 59 06 N	159 39 56 W	10-08-92	1245	478	25.5	74
				12-03-92	1140	495	23.0	90
				02-11-93	1100	390	22.0	54
				04-01-93	1100	295	23.5	20
				06-24-93	1015	250	24.0	18
				08-05-93	1305	265	24.0	17
215937159434201	2-5943-01 S13 KEKAHA	21 59 37 N	159 43 42 W	12-07-92	0815	805	24.5	150
				02-16-93	0850	800	23.5	140
				04-12-93	0810	840	24.0	150
				06-21-93	0815	975	24.0	180
				08-05-93	0830	890	24.5	170

WATER QUALITY DATA, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

STATION NUMBER	LOCAL IDENTIFIER	LATITUDE	LONGITUDE	DATE	TIME	SPECIFIC CONDUCTANCE (US/CM)	TEMPERATURE WATER (DEG C)	CHLORIDE, (MG/L AS CL)
			HAWAII, ISLAND OF OAHU					
211646157465201	3-1646-01 W1-B WAIAL	21 16 46 N	157 46 52 W	10-23-92	1210	700	21.5	--
				12-21-92	1055	720	21.5	--
				02-02-93	1305	704	21.5	--
				03-23-93	0930	800	21.5	--
				06-28-93	1030	855	21.5	220
				09-20-93	1010	880	21.5	--
211832157515501	3-1851-19 W102 TUBEA	21 18 32 N	157 51 55 W	10-23-92	1035	30500	24.0	11000
				12-24-92	0945	32000	24.0	12000
				02-02-93	1540	33500	24.0	12000
				03-20-93	0905	32500	24.5	12000
				06-29-93	b0815	--	--	--
				09-20-93	b1315	--	--	--
211832157515502	3-1851-19 W102 TUBEB	21 18 32 N	157 51 55 W	10-23-92	1030	12100	24.0	--
				12-24-92	0940	12700	24.0	--
				02-02-93	1330	13000	24.0	--
				03-20-93	0930	13000	24.0	--
				06-29-93	0850	12500	24.0	--
				09-20-93	1315	13800	24.0	--
212133158035501	3-2103-03 S14 MAKAKI	21 21 33 N	158 03 55 W	10-22-92	0910	1110	23.5	240
				12-22-92	0900	1060	23.5	240
				02-04-93	0900	1120	23.5	240
				03-24-93	0850	1150	23.5	250
				07-07-93	1010	1000	23.5	240
				09-09-93	0930	1060	23.5	240
212106157533701	3-2153-02 W153 MOANA	21 21 06 N	157 53 37 W	10-22-92	1450	468	22.0	95
				12-22-92	1430	480	22.0	97
				01-22-93	1000	480	21.5	97
				03-23-93	1050	480	22.0	93
				06-29-93	0930	465	22.0	95
				09-10-93	1245	480	22.0	97
212259157554201	3-2255-35 W189-3A	21 22 59 N	157 55 42 W	02-04-93	1115	1240	22.0	--
				03-24-93	1350	1220	21.5	--
				07-07-93	0845	860	22.5	--
				09-10-93	1015	1150	22.0	--
212258157554201	3-2255-36 W189-3B	21 22 58 N	157 55 42 W	10-22-92	1430	990	22.0	--
				03-24-93	1350	940	23.0	--
				09-10-93	1015	925	22.5	--
212238157561102	3-2256-12 W187-C	21 22 39 N	157 56 09 W	10-21-92	1123	835	23.0	220
				12-22-92	1340	850	22.5	220
				02-04-93	1025	835	22.0	220
				03-23-93	1610	845	23.5	220
				06-28-93	1345	800	24.5	220
				09-10-93	b1045	--	--	--
212343158001001	3-2300-11 W238 WAIPH	21 23 43 N	158 00 10 W	10-22-92	1230	850	22.5	--
				12-22-92	1135	865	22.5	--
				02-01-93	1455	830	22.5	--
				03-23-93	1540	830	22.5	--
				06-29-93	1415	800	22.5	--
				09-03-93	1245	800	22.5	--
212358158010901	3-2301-09,10 W247-IJ	21 23 58 N	158 01 09 W	10-22-92	1135	800	22.5	--
				02-01-93	1425	825	22.5	--
				03-24-93	1150	802	22.5	--
				06-30-93	1030	701	22.5	--
				09-03-93	1205	725	23.0	--
212313158032401	3-2303-07 HONOULIULI MONI	21 23 13 N	158 03 24 W	09-30-93	a1200	646	--	140
				09-30-93	a1225	929	--	230
				09-30-93	a1255	1250	--	330
				09-30-93	a1320	6700	--	2100
				09-30-93	a1400	12200	--	4000

a Collected by non-USGS agency
b Site visited, unable to collect sample

WATER QUALITY DATA, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

STATION NUMBER	LOCAL IDENTIFIER	LATITUDE	LONGITUDE	DATE	TIME	SPECIFIC CONDUCTANCE (US/CM)	TEMPERATURE WATER (DEG C)	CHLORIDE, (MG/L AS CL)
			HAWAII, ISLAND OF OAHU--Continued					
212332157582201	3-2358-02 W201	21 23 32 N	157 58 22 W	10-22-92	1355	1050	21.0	--
				12-22-92	1250	1060	21.0	--
				02-03-93	1010	1100	21.0	--
				03-23-93	1340	1100	21.0	--
				06-28-93	1430	1000	21.5	--
				09-10-93	0900	900	21.0	--
212342157584301	3-2358-22 W204-4	21 23 42 N	157 58 43 W	10-22-92	1300	1200	20.5	--
				12-22-92	1200	1300	20.5	--
				02-03-93	1120	1470	20.5	--
				03-23-93	1450	1420	20.5	--
				06-29-93	1335	1100	20.0	--
				09-03-93	1405	1120	21.0	--
212343157584701	3-2358-29 W204-9	21 23 43 N	157 58 47 W	10-22-92	1305	1660	20.5	--
				12-22-92	1205	1740	20.5	--
				02-03-93	1125	2450	20.5	--
				03-23-93	1445	2480	21.0	--
				06-29-93	1325	2390	20.5	--
				09-03-93	1400	2300	20.5	--
212336157591801	3-2359-05 W204-11	21 23 36 N	157 59 18 W	10-22-92	1320	2270	22.0	--
				12-22-92	1220	2400	22.0	--
				02-03-93	1135	2610	22.5	--
				03-23-93	1500	2580	23.0	--
				06-29-93	1350	2120	22.5	--
				09-03-93	1345	2100	22.5	--
212422157485601	3-2448-01 W416	21 24 22 N	157 48 56 W	02-01-93	b0915	--	--	--
				05-21-93	b0900	--	--	--
				08-10-93	b0910	--	--	--
212556157500301	3-2550-01 W407-16	21 25 56 N	157 50 03 W	02-05-93	1155	135	23.0	18
				02-05-93	1205	135	23.0	18
				05-21-93	1305	135	23.0	17
				08-10-93	0950	140	23.0	18
212506157582301	3-2558-10 S16	21 25 06 N	157 58 23 W	10-21-92	1500	260	21.5	--
				12-21-92	1455	262	21.5	--
				02-03-93	1055	262	21.5	--
				03-23-93	1400	255	21.5	--
				06-30-93	0910	225	21.5	--
				09-10-93	0930	245	21.5	--
212617158033801	3-2603-01 W330-8	21 26 17 N	158 03 38 W	10-22-92	1015	340	23.0	51
				02-04-93	1315	342	23.0	48
				03-24-93	1305	350	22.5	47
				06-30-93	1420	342	23.0	--
				09-03-93	1110	325	23.0	48
212803158000701	3-2800-01 W250-4A	21 28 03 N	158 00 06 W	10-16-92	0800	152	21.5	17
				12-15-92	0740	152	21.5	20
				12-15-92	0740	152	21.5	18
				01-21-93	1615	152	21.5	17
				04-06-93	1500	152	21.5	17
				06-01-93	1100	152	21.5	16
				07-13-93	1400	150	21.5	18
212828158092001	3-2809-06 TU WAIANAE	21 28 27 N	158 09 20 W	10-08-92	1345	360	22.5	--
				12-11-92	1055	370	22.5	--
				03-30-93	1040	380	22.5	--
				07-07-93	1020	382	22.5	--
212859158124301	3-2812-01 S1	21 28 59 N	158 12 43 W	10-08-92	1425	725	25.0	--
				12-07-92	1410	690	25.0	--
				01-21-93	1245	725	25.0	--
				03-30-93	1440	710	25.5	--

b Site visited, unable to collect sample

WATER QUALITY DATA, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

STATION NUMBER	LOCAL IDENTIFIER	LATITUDE	LONGITUDE	DATE	TIME	SPECIFIC CONDUCTANCE (US/CM)	TEMPERATURE WATER (DEG C)	CHLORIDE, (MG/L AS CL)
			HAWAII, ISLAND OF OAHU--Continued					
212927158014801	3-2901-07 S4	21 29 27 N	158 01 48 W	10-20-92	1205	172	21.0	17
				12-15-92	0900	172	21.5	18
				12-15-92	0900	172	21.5	19
				02-02-93	0900	172	21.5	18
				04-05-93	1200	175	21.5	19
				06-02-93	1330	172	21.0	18
				08-20-93	0915	172	22.0	20
212945158014301	3-2901-09 W330-6	21 29 45 N	158 01 43 W	10-20-92	1350	192	22.0	21
				04-05-93	1240	192	22.0	21
				05-28-93	1435	195	22.0	20
				07-08-93	1500	192	22.0	20
212939158112301	3-2911-02 TU MAKAHA	21 29 39 N	158 11 23 W	10-19-92	1020	260	21.0	25
				01-21-93	1150	255	21.0	26
				05-19-93	1225	255	21.0	25
213224158135901	3-3213-06 W277-101	21 32 24 N	158 13 59 W	10-19-92	1430	880	23.5	210
				12-11-92	1150	880	23.5	220
				01-21-93	1330	880	23.5	210
				04-05-93	1020	880	23.5	180
				05-19-93	1415	875	23.5	210
				07-07-93	1410	875	24.5	210
213243157510001	3-3251-01 W406	21 32 43 N	157 51 00 W	02-04-93	1440	900	23.0	230
				04-12-93	1510	910	23.0	230
				06-03-93	1610	900	23.0	240
				08-10-93	1625	980	23.0	240
213327157524401	3-3352-01 W405	21 33 27 N	157 52 43 W	02-04-93	1405	255	23.0	34
				04-12-93	1440	250	23.0	34
				06-03-93	1540	240	23.0	34
				08-10-93	1600	260	23.0	34
213429158055501	3-3405-01 W323-1	21 34 29 N	158 05 55 W	10-15-92	1540	390	22.5	--
				05-26-93	1440	395	22.0	--
213427158055501	3-3405-02 W323-2	21 34 27 N	158 05 55 W	03-19-93	1415	410	22.0	--
				07-12-93	1420	395	22.0	--
213411158074501	3-3407-25 W320	21 34 11 N	158 07 45 W	10-21-92	1045	1500	23.0	--
				05-28-93	1210	1550	23.0	--
213444158075501	3-3407-30 W318-2	21 34 44 N	158 07 55 W	10-21-92	1030	8100	25.0	2400
				04-06-93	1100	4600	24.5	1300
				05-28-93	1220	6500	24.5	1800
				07-16-93	1150	6700	25.0	2000
213512158061601	3-3506-03 TO 04 W329 A-B	21 35 12 N	158 06 16 W	10-20-92	1030	440	22.5	--
				01-27-93	1020	435	22.0	--
				04-06-93	1040	440	22.0	--
				05-28-93	1005	440	22.0	--
213636158053701	3-3605-03 W334-C	21 36 36 N	158 05 37 W	10-20-92	0905	1900	21.0	--
				01-27-93	0950	1500	21.0	--
				04-06-93	0900	1830	21.0	--
				05-28-93	0940	1800	21.0	--
				07-16-93	0920	1800	21.0	--
213636158053702	3-3605-21 W334-U	21 36 35 N	158 05 40 W	10-20-92	0920	1300	21.5	--
				12-15-92	1115	1290	21.5	--
				01-27-93	1000	1300	21.5	--
				04-06-93	0915	1300	21.0	--
				05-28-93	0950	1280	21.0	--
				07-16-93	0935	1290	21.0	--

WATER QUALITY DATA, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

STATION NUMBER	LOCAL IDENT-I-FIER	LAT-I-TUDE	LONG-I-TUDE	DATE	TIME	SPE-CIFIC CON-DUCT-ANCE (US/CM)	TEMPER-ATURE WATER (DEG C)	CHLO-RIDE, (MG/L AS CL)
			HAWAII, ISLAND OF OAHU--Continued					
213656157550401	3-3655-01 W394	21 36 56 N	157 55 04 W	02-04-93	1325	200	21.5	35
				04-12-93	1420	235	21.5	34
				06-03-93	1515	240	21.5	34
				08-10-93	1525	245	21.5	33
213902157561601	3-3956-04 W366	21 39 02 N	157 56 16 W	02-04-93	1200	365	21.5	66
				04-12-93	1400	350	22.0	64
				06-03-93	0900	350	22.0	--
				08-10-93	1445	350	22.0	51
214157158000101	3-4100-01 W338	21 41 57 N	158 00 01 W	10-02-92	1400	300	--	49
				02-03-93	1220	300	21.0	51
				04-12-93	1134	325	21.5	56
				06-03-93	1300	300	21.5	58
				07-30-93	1300	298	22.0	52
214131158011601	3-4101-08 W337-6	21 41 31 N	158 01 16 W	02-03-93	1435	220	20.5	33
				04-12-93	b1100	--	--	--
				06-03-93	b1405	--	--	--
				07-30-93	b1415	--	--	--
214233157583501	3-4258-04 W345	21 42 33 N	157 58 35 W	02-03-93	1110	1700	23.5	480
				04-12-93	1230	1650	24.0	480
				06-03-93	1215	1750	24.0	470
				08-10-93	1300	1700	24.5	470

b Site visited, unable to collect sample

WATER QUALITY DATA, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

STATION NUMBER	LOCAL IDENT-I-FIER	LAT-I-TUDE	LONG-I-TUDE	DATE	TIME	SPE-CIFIC CON-DUCT-ANCE (US/CM)	TEMPER-ATURE WATER (DEG C)	CHLO-RIDE, (MG/L AS CL)
			HAWAII, ISLAND OF MOLOKAI					
210425156483001	4-0448-02 S8	21 04 25 N	156 48 30 W	11-30-92	1125	410	23.5	26
				02-01-93	1415	380	23.0	25
				04-05-93	1320	400	23.5	22
				06-07-93	1410	385	23.5	25
				08-02-93	1525	400	23.5	25
210402156495801	4-0449-01 S6	21 04 02 N	156 49 58 W	10-05-92	1450	320	20.0	57
				11-30-92	1450	320	21.0	58
				02-01-93	1500	300	19.5	58
				04-05-93	1345	340	20.5	59
				06-07-93	1500	320	20.5	60
				08-02-93	1555	330	--	60
210419156570501	4-0457-01 S4	21 04 19 N	156 57 05 W	10-05-92	1610	400	22.5	86
				11-30-92	1555	380	21.5	80
				02-01-93	1540	330	22.0	69
				04-05-93	1500	400	23.0	86
				06-07-93	1600	370	23.5	80
				08-02-93	1640	340	22.5	71
210605157012001	4-0601-01 W11	21 06 06 N	157 01 11 W	10-08-92	0825	350	24.0	27
				12-03-92	1230	240	24.0	15
				02-04-93	1115	300	24.0	15
				04-09-93	0740	310	23.5	18
				06-11-93	0835	320	24.0	24
				08-05-93	1025	330	24.0	27
210856157011201	4-0801-01 W16	21 08 56 N	157 01 12 W	10-01-92	a0900	440	--	98
				11-02-92	a1420	440	--	100
				12-01-92	a0530	440	--	100
				01-05-93	a0940	430	--	100
				02-03-93	a1455	440	--	100
				03-02-93	a0946	410	--	93
				04-01-93	a1430	440	--	100
				05-03-93	a1440	400	--	100
				06-07-93	a1445	450	--	110
				07-07-93	a0735	460	--	110
				08-12-93	a0545	440	--	96
				09-16-93	b1240	--	--	--
210857156010701	4-0801-02	21 08 57 N	157 01 07 W	10-01-92	a0825	380	--	78
				11-02-92	a0830	370	--	76
				12-01-92	a0600	370	--	77
				01-05-93	a0859	380	--	80
				02-03-93	a0935	380	--	82
				03-02-93	a0920	385	--	82
				04-01-93	a0830	380	--	82
				05-03-93	a0825	380	--	82
				06-03-93	a0600	380	--	81
				07-07-93	a0815	380	--	81
				08-12-93	a0630	370	--	71
				09-16-93	a1240	370	--	76
				09-30-93	b1300	393	--	--
210903157013001	4-0901-01 W17	21 09 03 N	157 01 30 W	10-01-92	a0830	c291	--	56
				11-02-92	a0840	c236	--	41
				12-01-92	a0835	c289	--	56
				12-31-92	a0830	c241	--	43
				02-01-93	a0845	c239	--	44
				03-02-93	a0830	c314	--	59
				04-01-93	a0830	c292	--	56
				04-30-93	a0830	c287	--	56
				06-01-93	a0835	c236	--	42
				06-30-93	a0830	c238	--	43
				07-31-93	a0830	c232	--	41
				08-31-93	a0840	c280	--	55
				09-30-93	a0840	c236	--	42

a Collected by non-USGS agency
b Site visited, unable to collect sample
c Laboratory specific conductance

WATER QUALITY DATA, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

STATION NUMBER	LOCAL IDENT-I-FIER	LAT-I-TUDE	LONG-I-TUDE	DATE	TIME	SPE-CIFIC CON-DUCT-ANCE (US/CM)	TEMPER-ATURE WATER (DEG C)	CHLO-RIDE, (MG/L AS CL)
			HAWAII, ISLAND OF MAUI					
203835156065001	6-3806-01 PUNAHOU SPRINGS	20 38 35 N	156 06 50 W	10-21-92	b1130	--	--	--
				12-11-92	b1130	--	--	--
				12-16-92	1145	850	19.5	240
				03-12-93	1225	725	20.0	180
				06-03-93	b1440	--	--	--
				08-25-93	b1030	--	--	--
203947156261201	6-3926-03 WAILEA 8	20 39 47 N	156 26 13 W	10-27-92	b1350	--	--	--
				12-18-92	b1100	--	--	--
				01-29-93	b1110	--	--	--
				03-30-93	1205	2750	19.0	750
				06-18-93	1100	2800	21.5	780
				08-18-93	1235	3100	19.0	870
204601156001501	6-4600-01 W55	20 46 01 N	156 00 15 W	10-20-92	b1445	--	--	--
				12-10-92	1255	380	--	78
				01-22-93	b0745	--	--	--
				03-11-93	1240	440	21.5	71
				05-06-93	1040	440	21.5	70
				06-30-93	b0750	--	--	--
				08-24-93	b1100	--	--	--
204633156003201	6-4600-03 WAKIU B	20 46 36 N	156 00 30 W	10-21-92	b0725	--	--	--
				12-11-92	b0805	--	--	--
				01-22-93	b0810	--	--	--
				03-11-93	1310	220	19.0	36
				05-06-93	1025	280	20.0	64
				06-30-93	0730	300	19.5	42
				08-24-93	1040	240	19.5	44
204635156270101	6-4627-14 W226	20 46 35 N	156 27 01 W	10-27-92	1135	1500	23.0	280
				01-29-93	0930	1630	23.0	290
				04-22-93	1240	1600	23.5	280
				08-18-93	1050	1600	23.5	270
204845156255001	6-4825-01 S15	20 48 45 N	156 25 50 W	11-10-92	b1225	--	--	--
				02-16-93	b1015	--	--	--
				04-01-93	b1045	--	--	--
				05-10-93	b1030	--	--	--
				07-07-93	b1220	--	--	--
				08-27-93	1100	1100	24.0	--
204931156371201	6-4937-01 S10	20 49 31 N	156 37 12 W	10-29-92	1145	1350	24.5	310
				12-18-92	b1205	--	--	--
				02-10-93	b1305	--	--	--
				03-29-93	b1320	--	--	--
				04-23-93	b1010	--	--	--
				06-21-93	1315	925	24.0	180
				08-23-93	b1000	--	--	--
205014156212701	6-5021-01 PUKALANI	20 50 14 N	156 21 27 W	12-14-92	b1220	--	--	--
				12-21-92	1055	2500	21.0	630
				01-27-93	b1300	--	--	--
				03-31-93	b1505	--	--	--
				04-26-93	1000	c2260	--	630
				05-17-93	0800	c2000	--	630
				08-19-93	b1300	--	--	--
205102156282501	6-5128-02 S16	20 51 02 N	156 28 25 W	11-10-92	b1205	--	--	--
				02-16-93	b1000	--	--	--
				04-01-93	b1025	--	--	--
				05-10-93	b1015	--	--	--
				07-07-93	b1205	--	--	--
				08-27-93	b1045	--	--	--

b Site visited, unable to collect sample
c Laboratory specific conductance

WATER QUALITY DATA, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

STATION NUMBER	LOCAL IDENTIFIER	LATITUDE	LONGITUDE	DATE	TIME	SAMPLE DEPTH DISTANCE BELOW MSL FEET	SPECIFIC CONDUCTANCE LAB (US/CM)	CHLORIDE, (MG/L AS CL)
			HAWAII, ISLAND OF MAUI--Continued					
205243156243201	6-5224-02 S22	20 52 43 N	156 24 32 W	11-10-92	b1410	--	--	--
				02-16-93	b1055	--	--	--
				04-01-93	b1220	--	--	--
				05-10-93	b1215	--	--	--
				07-07-93	b1410	--	--	--
				08-27-93	b1150	--	--	--
205329156305502	6-5330-09 W15A	20 53 29 N	156 30 55 W	11-03-92	b1305	--	--	--
				12-15-92	b1405	--	--	--
				02-10-93	b1400	--	--	--
				03-29-93	b1430	--	--	--
				04-23-93	b1420	--	--	--
				06-23-93	b1345	--	--	--
				08-23-93	1345	650	22.0	140
205329156305501	6-5330-10 W15B	20 53 29 N	156 30 55 W	11-03-92	b1305	--	--	--
				12-15-92	b1405	--	--	--
				02-10-93	b1400	--	--	--
				03-29-93	b1430	--	--	--
				04-23-93	b1405	--	--	--
				06-23-93	b1350	--	--	--
				08-23-93	b1340	--	--	--
205330156305401	6-5330-11 W15F	20 53 30 N	156 30 54 W	11-03-92	1305	480	22.0	90
				12-15-92	1355	500	22.0	91
				02-10-93	b1400	--	--	--
				03-29-93	b1430	--	--	--
				04-23-93	b1410	--	--	--
				06-23-93	b1355	--	--	--
				08-23-93	1350	470	22.5	82
205322156394501	6-5339-01 W291	20 53 22 N	156 39 45 W	10-28-92	b1105	--	--	--
				12-10-92	b1030	--	--	--
				01-28-93	0920	610	21.0	120
				03-29-93	b1010	--	--	--
				04-21-93	b1255	--	--	--
				06-17-93	b1150	--	--	--
				08-11-93	b1040	--	--	--
205320156394501	6-5339-02 W292	20 53 20 N	156 39 45 W	10-28-92	b1100	--	--	--
				12-16-92	b1030	--	--	--
				01-28-93	b0930	--	--	--
				03-29-93	b1010	--	--	--
				04-21-93	b1250	--	--	--
				06-17-93	b1155	--	--	--
				08-11-93	b1035	--	--	--
205343156401101	6-5340-01 S5	20 53 43 N	156 40 11 W	10-28-92	b1030	--	--	--
				12-16-92	b1045	--	--	--
				01-28-93	1025	880	21.5	--
				03-29-93	1025	1230	21.5	--
				04-21-93	1400	1230	21.5	310
				06-17-93	1230	1500	22.0	--
				08-11-93	1105	1200	22.0	--
205416156244301	6-5424-01 S24	20 54 16 N	156 24 43 W	11-10-92	b1400	--	--	--
				02-16-93	b1315	--	--	--
				04-01-93	b1215	--	--	--
				05-10-93	b1210	--	--	--
				07-07-93	b1400	--	--	--
				08-27-93	b1200	--	--	--

b Site visited, unable to collect sample

WATER QUALITY DATA, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

STATION NUMBER	LOCAL IDENTIFIER	LATITUDE	LONGITUDE	DATE	TIME	SAMPLE DEPTH DISTANCE BELOW MSL FEET	SPECIFIC CONDUCTANCE LAB (US/CM)	CHLORIDE, (MG/L AS CL)
HAWAII, ISLAND OF MAUI--Continued								
205405156305401	6-5430-05 WAIEHU MONITOR	20 54 59 N	156 30 54 W	11-24-92	a0940	200	211	9.5
				11-24-92	a1000	400	437	96
				11-24-92	a1020	500	434	96
				11-24-92	a1045	600	497	110
				11-24-92	a1120	675	2030	580
				11-24-92	a1145	750	15000	5500
				11-24-92	a1220	800	44200	17000
				11-24-92	a1255	825	47400	19000
				11-24-92	a1320	850	48500	19000
				11-24-92	a1355	900	49300	19000
				02-18-93	a0900	200	210	11
				02-18-93	a0918	400	427	94
				02-18-93	a0937	500	405	90
				02-18-93	a1006	600	535	130
				02-18-93	a1032	675	2170	610
				02-18-93	a1058	750	16900	6300
				02-18-93	a1134	800	44400	17000
				02-18-93	a1204	825	46500	18000
				02-18-93	a1244	850	47900	18000
				02-18-93	a13[illegible]	900	48900	19000
				05-18-93	a0935	200	210	8.5
				05-18-93	a1000	400	445	99
				05-18-93	a1025	500	444	100
				05-18-93	a1045	600	556	130
				05-18-93	a1110	675	2260	650
				05-18-93	a1140	750	18200	6600
				05-18-93	a1205	800	44600	17000
				05-18-93	a1235	825	47500	19000
				05-18-93	a1300	850	48000	18000
				05-18-93	a1335	900	49300	18000
				08-17-93	a0935	200	208	11
				08-17-93	a0955	400	467	110
				08-17-93	a1015	500	465	110
				08-17-93	a1040	600	497	120
				08-17-93	a1105	675	2230	650
				08-17-93	a1140	750	20400	7400
				08-17-93	a1210	800	44800	17000
				08-17-93	a1240	825	47500	18000
				08-17-93	a1310	850	48300	18000
				08-17-93	a1340	900	49100	19000

STATION NUMBER	LOCAL IDENTIFIER	LATITUDE	LONGITUDE	DATE	TIME	SPECIFIC CONDUCTANCE (US/CM)	TEMPERATURE WATER (DEG C)	CHLORIDE, (MG/L AS CL)
205511156222101	6-5522-01 S31	20 55 11 N	156 22 21 W	11-10-92	b1350	--	--	--
				02-16-93	b1240	--	--	--
				04-01-93	b1205	--	--	--
				05-10-93	b1155	--	--	--
				07-07-93	b1340	--	--	--
				08-27-93	b1210	--	--	--
205651156401001	6-5640-01 S36	20 56 51 N	156 40 10 W	10-28-92	b1030	--	--	--
				12-16-92	b1045	--	--	--
				01-28-93	1055	470	20.5	--
				03-29-93	b1050	--	--	--
				04-21-93	b1330	--	--	--
				06-17-93	1250	650	21.0	--
				08-11-93	b1030	--	--	--

a Collected by non-USGS agency
b Site visited, unable to collect sample

WATER QUALITY DATA, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

STATION NUMBER	LOCAL IDENT-I-FIER	LAT-I-TUDE	LONG-I-TUDE	DATE	TIME	SPE-CIFIC CON-DUCT-ANCE (US/CM)	TEMPER-ATURE WATER (DEG C)	CHLO-RIDE, (MG/L AS CL)
HAWAII, ISLAND OF MAUI--Continued								
205837156384601	6-5838-01 NAPILI A	20 58 37 N	156 38 46 W	10-28-92	1330	700	20.5	170
				12-16-92	b1230	--	--	--
				01-28-93	b1310	--	--	--
				03-29-93	b1220	--	--	--
				04-21-93	b1120	--	--	--
				06-17-93	b1320	--	--	--
				08-11-93	b1335	--	--	--
205838156383101	6-5838-02 NAPILI B	20 58 38 N	156 38 31 W	10-28-92	1350	330	20.0	67
				12-16-92	1240	340	19.5	68
				01-28-93	b1330	--	--	--
				03-29-93	1235	350	20.0	70
				04-21-93	b1130	--	--	--
				04-23-93	1245	340	19.5	72
				06-17-93	1335	370	20.5	78
				08-11-93	1340	410	20.0	81
205848156383601	6-5838-04 NAPILI	20 58 48 N	156 38 36 W	12-16-92	1255	800	19.5	210
				01-28-93	1330	840	20.0	210
				04-21-93	1200	800	20.0	210
				08-11-93	1400	850	20.0	210

b Site visited, unable to collect sample

WATER QUALITY DATA, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

STATION NUMBER	LOCAL IDENTIFIER	LATITUDE	LONGITUDE	DATE	TIME	SPECIFIC CONDUCTANCE (US/CM)	TEMPERATURE WATER (DEG C)	CHLORIDE, (MG/L AS CL)
			HAWAII, ISLAND OF HAWAII					
190347155354301	8-0335-01 NAALEHU W1	19 03 47 N	155 35 43 W	11-09-92	b1745	--	--	--
				04-06-93	1355	121	19.0	10
				07-02-93	b1310	--	--	--
190832155310901	8-0831-02 NINOLE A	19 08 32 N	155 31 09 W	12-09-92	1645	690	18.5	180
				04-06-93	1305	700	18.5	200
				07-02-93	1515	810	18.5	210
191108155281701	8-1128-02 PALIMA	19 11 08 N	155 28 17 W	11-09-92	b1600	--	--	--
				04-06-93	1155	112	19.0	14
				07-02-93	b1220	--	--	--
191114155294801	8-1129-01	19 11 14 N	155 29 48 W	11-09-92	b1700	--	--	--
				04-06-93	1235	87	18.0	4.6
				07-02-93	b1250	--	--	--
191219155291601	8-1229-01 PAHALA	19 12 25 N	155 29 22 W	11-09-92	1635	98	17.5	2.0
				04-06-93	1215	86	17.5	4.0
				07-02-93	1200	97	17.5	3.0
192646155532001	8-2653-01 KEEI C	19 26 46 N	155 33 20 W	12-11-92	0900	335	19.0	73
				04-15-93	1430	340	19.5	74
				05-26-93	b1005	370	--	--
				08-04-93	0940	370	19.5	69
192738155534201	8-2753-01 W12-4	19 27 31 N	155 53 41 W	12-11-92	0830	670	19.5	170
				04-15-93	1405	695	19.5	190
				05-26-93	b --	720	19.5	--
				08-04-93	0910	660	19.5	150
192731155534101	8-2753-02 W12-8	19 27 22 N	155 53 38 W	12-11-92	0845	1120	19.0	320
				04-15-93	1420	1160	19.0	340
				05-26-93	b0955	1220	--	--
				08-04-93	0925	1180	19.5	290
192924154564701	8-2986-01 W9-5B	19 29 24 N	154 56 47 W	11-16-92	1115	122	23.5	5.0
				11-16-92	b1205	--	--	--
				01-12-93	b1430	--	--	--
				05-14-93	b0950	--	--	--
				09-27-93	b1410	--	--	--
192923154564701	8-2986-02 W9-5A	19 29 23 N	154 56 47 W	11-16-92	b1146	--	--	--
				01-12-93	1410	130	23.0	6.0
				05-14-93	b0930	--	--	--
				09-27-93	1355	130	23.5	7.0
193017154502101	8-3080-02 S9	19 30 17 N	154 50 21 W	11-16-92	b1315	--	--	--
				01-12-93	1545	845	25.0	120
				05-14-93	1035	990	25.5	140
				09-29-93	1055	1150	25.5	170
193113154555801	8-3185-01 W9-11 HAWN SHOR	19 31 13 N	154 55 58 W	11-16-92	1345	115	21.5	12
				03-12-93	1245	110	21.5	12
				05-14-93	1215	98	21.5	12
				09-29-93	1155	128	21.5	14
193510155570801	8-3557-01 W12-5	19 35 10 N	155 57 08 W	12-10-92	b0855	--	--	--
				04-15-93	1310	335	20.0	60
				08-04-93	1425	280	20.0	47
193505155570801	8-3557-02 W12-6	19 35 05 N	155 57 08 W	12-10-92	0920	805	20.5	230
				04-15-93	1330	760	20.5	210
				08-04-93	1400	820	20.5	200
193508155570701	8-3557-03 KAHALUU C	19 35 08 N	155 57 07 W	12-10-92	b0820	--	--	--
				04-15-93	1255	300	20.0	58
				08-04-93	1415	225	20.0	32

b Site visited, unable to collect sample

WATER QUALITY DATA, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

STATION NUMBER	LOCAL IDENT-I-FIER	LAT-I-TUDE	LONG-I-TUDE	DATE	TIME	SPE-CIFIC CON-DUCT-ANCE (US/CM)	TEMPER-ATURE WATER (DEG C)	CHLO-RIDE, (MG/L AS CL)
HAWAII, ISLAND OF HAWAII--Continued								
193505155570701	8-3557-04 KAHALUU D	19 35 05 N	155 57 07 W	12-10-92	0910	420	20.5	100
				04-15-93	1320	420	20.5	99
				08-04-93	1350	475	20.5	100
193502155572301	8-3557-05 KAH SHAFT	19 35 02 N	155 57 23 W	12-10-92	1215	900	20.0	250
				04-15-93	1135	1080	20.0	310
				08-05-93	0825	920	20.0	260
193805155020201	8-3802-03 KEAAU 1	19 38 05 N	155 02 02 W	11-16-92	1430	76	19.0	3.8
				03-12-93	1320	75	19.0	4.5
				05-14-93	1250	67	19.0	3.8
				09-29-93	1230	82	19.0	6.0
194037155035301	8-4003-01 W8-3	19 40 37 N	155 03 53 W	11-16-92	1455	77	20.5	3.2
				03-12-93	1340	79	20.0	6.8
				07-01-93	1120	78	20.5	5.7
				09-29-93	1255	82	20.5	4.7
194222155034801	8-4203-06 W8-2B	19 42 22 N	155 03 48 W	11-16-92	1540	140	24.5	20
				03-12-93	1445	115	24.5	16
				07-01-93	1050	142	22.0	22
				09-29-93	1405	132	24.5	18
194337155041801	8-4304-01 WAIAKEA DUG WEL	19 43 37 N	155 04 18 W	11-17-92	1305	37000	21.5	13000
				03-12-93	1500	35000	20.0	13000
				07-01-93	1005	30000	21.0	10000
				09-29-93	1535	41000	21.0	14000
194818155582301	8-4858-02 KONA VILLAGE	19 48 18 N	155 58 23 W	12-11-92	b1045	--	--	--
				04-16-93	b1145	--	--	--
				08-03-93	1515	2350	20.5	490
195035155054501	8-5005-01 W7-1	19 50 35 N	155 05 45 W	11-17-92	1445	195	21.5	14
				03-12-93	1600	180	20.5	13
				07-01-93	1400	195	20.0	13
				09-29-93	1455	205	21.0	13
195043155053801	8-5005-02 MAKAI	19 50 43 N	155 05 38 W	11-17-92	1435	182	23.0	15
				03-12-93	1550	190	22.0	20
				07-01-93	1355	240	22.0	25
				09-29-93	1445	235	22.0	24
195049155051601	8-5005-04 SALT WTR 2	19 50 49 N	155 05 16 W	11-17-92	1415	20500	18.0	6800
				03-12-93	1610	20500	18.0	6900
				07-01-93	1345	19700	18.0	6400
				09-29-93	1435	20000	18.0	6600
195546155462001	8-5546-01 WAIKOLOA WATER	19 55 46 N	155 46 20 W	11-18-92	b1250	--	--	--
				03-22-93	1500	575	28.0	110
				07-15-93	b1215	--	--	--
195546155480301	8-5548-01 PARKER 1	19 55 46 N	155 48 03 W	11-18-92	b1015	--	--	--
				07-15-93	b1050	--	--	--
195724155455301	8-5745-01 PARKER 5	19 57 24 N	155 45 53 W	11-18-92	1150	280	27.0	27
				03-22-93	b1440	--	--	--
				07-15-93	1125	300	27.0	28
195722155455201	8-5745-02 PARKER 4	19 57 22 N	155 45 52 W	11-18-92	1140	280	26.5	28
				03-22-93	b1415	--	--	--
				07-15-93	b1145	--	--	--
195728155455401	8-5745-03 WAIKOLOA WELL 1	19 57 28 N	155 45 54 W	11-18-92	b1100	--	--	--
				03-22-93	1430	265	27.0	28
				07-15-93	1130	282	27.0	26
195929155462501	8-5946-01 LALAMILO A	19 59 30 N	155 46 30 W	12-08-92	1230	470	26.5	90
				03-11-93	b1400	--	--	--
				06-18-93	b1615	--	--	--

b Site visited, unable to collect sample

WATER QUALITY DATA, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

STATION NUMBER	LOCAL IDENT-I-FIER	LAT-I-TUDE	LONG-I-TUDE	DATE	TIME	SPE-CIFIC CON-DUCT-ANCE (US/CM)	TEMPER-ATURE WATER (DEG C)	CHLO-RIDE, (MG/L AS CL)
HAWAII, ISLAND OF HAWAII--Continued								
195912155464201	8-5946-02 LALAMILO B	19 59 14 N	155 46 39 W	12-08-92	1215	360	26.0	54
				03-11-93	b1335	--	--	--
				06-18-93	1650	380	26.0	51
195939155464201	8-5946-03 LALAMILO C	19 59 34 N	155 46 45 W	12-08-92	b1245	--	--	--
				03-11-93	1350	515	27.0	100
				06-18-93	1025	565	27.5	100
195953155464701	8-5946-04 LALAMILO D	19 59 53 N	155 46 47 W	06-18-93	1640	540	26.0	100
195947155485801	8-5948-01 HAPUNA PRK	19 59 47 N	155 48 58 W	12-08-92	1145	1750	25.5	490
				05-12-93	1200	1890	26.0	500
				07-16-93	1420	1900	26.0	490
201603155521801	8-7652-01 S1 WAIKANE	20 16 03 N	155 52 18 W	12-08-92	1350	1950	21.0	570
				05-12-93	1335	2210	21.5	610

b Site visited, unable to collect sample

WATER QUALITY DATA, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

HAWAII, ISLAND OF OAHU

213445158044301 - 3-3404-01 T132 (LAT 21°34'45" LONG 158°04'43")

DATE	TEMPERATURE WATER (DEG C)	SPECIFIC CONDUCTANCE (US/CM)	ACROLEIN TOTAL (UG/L)	ACRYLONITRILE TOTAL (UG/L)	BENZENE 1,2,4-TRICHLORO-WAT UNF REC (UG/L)	1,2,3-TRICHLORO BENZENE WAT, WH REC (UG/L)	BENZENE 1,3-DICHLORO-WATER UNFLTRD REC (UG/L)	BENZENE 1,4-DICHLORO-WATER UNFLTRD REC (UG/L)	ISOPROPYLBENZENE WATER WHOLE REC (UG/L)	BENZENE N-BUTYL WATER UNFLTRD REC (UG/L)	BENZENE N-PROPY WATER UNFLTRD REC (UG/L)
SEP 1993 02...	22.5	212	<20	<20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20

DATE	BENZENE O-CHLORO-WATER UNFLTRD REC (UG/L)	BENZENE SEC BUTYL-WATER UNFLTRD REC (UG/L)	BENZENE TERT-BUTYL-WATER UNFLTRD REC (UG/L)	BENZENE TOTAL (UG/L)	BROMOBENZENE WATER, WHOLE, TOTAL (UG/L)	BROMOFORM TOTAL (UG/L)	CARBON-TETRACHLORIDE TOTAL (UG/L)	CHLOROBENZENE TOTAL (UG/L)	CHLORODIBROMOMETHANE TOTAL (UG/L)	CHLOROETHANE TOTAL (UG/L)	2-CHLOROETHYL-VINYL-ETHER TOTAL (UG/L)
SEP 1993 02...	<0.20	<0.20	<0.20	<0.2	<0.2	<0.2	<0.2	<0.20	<0.2	<0.2	<1.0

DATE	CHLOROFORM TOTAL (UG/L)	CIS-1,2-DICHLOROETHENE WATER TOTAL (UG/L)	CIS 1,3-DICHLOROPROPENE TOTAL (UG/L)	DIBROMOCHLOROPROPANE WATER WHOLE TOT.REC (UG/L)	DIBROMOMETHANE WATER WHOLE RECOVER (UG/L)	DICHLOROBROMOMETHANE TOTAL (UG/L)	DICHLORODIFLUOROMETHANE TOTAL (UG/L)	1,1-DICHLOROETHANE TOTAL (UG/L)	1,1-DICHLOROETHYLENE TOTAL (UG/L)	1,1-DICHLOROPROPENE, WAT, WH TOTAL (UG/L)	1,2-DIBROMOETHANE WATER WHOLE TOTAL (UG/L)
SEP 1993 02...	<0.2	<0.2	<0.2	<1.0	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2

DATE	1,2-DICHLOROETHANE TOTAL (UG/L)	1,2-DICHLOROPROPANE TOTAL (UG/L)	2,2-DICHLOROPROPANE WAT, WH TOTAL (UG/L)	ETHANE, 1,1,2,2 TETRACHLORO-WAT UNF REC (UG/L)	ETHANE, 1112-TETRACHLORO-WAT UNF REC (UG/L)	ETHYLBENZENE TOTAL (UG/L)	FREON-113 WATER UNFLTRD REC (UG/L)	HEXACHLOROBUTADIENE TOTAL (UG/L)	MESITYLENE WATER UNFLTRD REC (UG/L)	METHANE BROMOCHLORO-WAT UNFLTRD REC (UG/L)	METHYL ETHER TERT-BUTYL WAT UNF REC (UG/L)
SEP 1993 02...	<0.2	0.2	<0.2	<0.2	<0.2	<0.2	<0.5	<0.2	<0.20	<0.20	<1.0

DATE	METHYLBROMIDE TOTAL (UG/L)	METHYLCHLORIDE TOTAL (UG/L)	METHYLENE CHLORIDE TOTAL (UG/L)	NAPHTHALENE TOTAL (UG/L)	O-CHLOROTOLUENE WATER WHOLE TOTAL (UG/L)	P-ISOPROPYLTOLUENE WATER WHOLE REC (UG/L)	1,3-DICHLOROPROPANE WAT. WH TOTAL (UG/L)	PSEUDOCUMENE WATER UNFLTRD REC (UG/L)	STYRENE TOTAL (UG/L)	TETRACHLOROETHYLENE TOTAL (UG/L)	TOLUENE P-CHLOR WATER UNFLTRD REC (UG/L)
SEP 1993 02...	<0.2	<0.2	<0.2	<0.2	<0.2	<0.20	<0.2	<0.20	<0.2	<0.2	<0.20

DATE	TOLUENE TOTAL (UG/L)	1,2-TRANSDICHLOROETHENE TOTAL (UG/L)	TRANS-1,3-DICHLOROPROPENE TOTAL (UG/L)	1,1,1-TRICHLOROETHANE TOTAL (UG/L)	1,1,2-TRICHLOROETHANE TOTAL (UG/L)	TRICHLOROETHYLENE TOTAL (UG/L)	TRICHLOROFLUOROMETHANE TOTAL (UG/L)	123-TRICHLOROPROPANE WATER WHOLE TOTAL (UG/L)	VINYL CHLORIDE TOTAL (UG/L)	XYLENE WATER UNFLTRD REC (UG/L)	ALACHLOR, WATER, DISS, REC, (UG/L)
SEP 1993 02...	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	1.0	<0.2	<0.20	<0.05

DATE	AMETRYN WATER, DISS, REC, (UG/L)	ATRAZINE, WATER, DISS, REC (UG/L)	CYANAZINE, WATER, DISS, REC (UG/L)	DEETHYL ATRAZINE, WATER, DISS, REC (UG/L)	DEISOPROPYL ATRAZIN WATER, DISS, REC (UG/L)	METOLACHLOR WATER DISSOLV (UG/L)	METRIBUZIN SENCOR WATER DISSOLV (UG/L)	PROMETON, WATER, DISS, REC (UG/L)	PROMETRYN, WATER, DISS, REC (UG/L)	PROPAZINE WATER DISS REC (UG/L)	SIMAZINE, WATER, DISS, REC (UG/L)
SEP 1993 02...	<0.05	<0.05	<0.20	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

< Actual value is known to be less than the value shown

WATER QUALITY DATA, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

HAWAII, ISLAND OF OAHU--Continued

213512158061602 - 3-3506-03 W329-A (LAT 21°35'12" LONG 158°06'16")

DATE	TEMPERATURE WATER (DEG C)	SPECIFIC CONDUCTANCE (US/CM)	ALACHLOR, WATER, DISS, REC, (UG/L)	AMETRYN WATER, DISS, REC, (UG/L)	ATRAZINE, WATER, DISS, REC (UG/L)	CYANAZINE, WATER, DISS, REC (UG/L)	DEETHYL ATRAZINE, WATER, DISS, REC (UG/L)
SEP 1993 01...	22.5	423	<0.05	<0.05	<0.05	<0.20	<0.05

DATE	DEISOPROPYL ATRAZIN WATER, DISS, REC (UG/L)	METOLACHLOR WATER DISSOLV (UG/L)	METRIBUZIN SENCOR WATER DISSOLV (UG/L)	PROMETON, WATER, DISS, REC (UG/L)	PROMETRYN, WATER, DISS, REC (UG/L)	PROPAZINE WATER DISS REC (UG/L)	SIMAZINE, WATER, DISS, REC (UG/L)
SEP 1993 01...	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

213636158054002 - 3-3605-01-23 W334A-W (LAT 21°36'36" LONG 158°05'40")

DATE	TEMPERATURE WATER (DEG C)	SPECIFIC CONDUCTANCE (US/CM)	ALACHLOR, WATER, DISS, REC, (UG/L)	AMETRYN WATER, DISS, REC, (UG/L)	ATRAZINE, WATER, DISS, REC (UG/L)	CYANAZINE, WATER, DISS, REC (UG/L)	DEETHYL ATRAZINE, WATER, DISS, REC (UG/L)
SEP 1993 01...	21.5	1630	<0.05	<0.05	<0.05	<0.20	<0.05

DATE	DEISOPROPYL ATRAZIN WATER, DISS, REC (UG/L)	METOLACHLOR WATER DISSOLV (UG/L)	METRIBUZIN SENCOR WATER DISSOLV (UG/L)	PROMETON, WATER, DISS, REC (UG/L)	PROMETRYN, WATER, DISS, REC (UG/L)	PROPAZINE WATER DISS REC (UG/L)	SIMAZINE, WATER, DISS, REC (UG/L)
SEP 1993 01...	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

< Actual value is known to be less than the value shown

WATER QUALITY DATA, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

HAWAII, ISLAND OF OAHU--Continued

213622158054701 - 3-3605-25 T57 (LAT 21°36'22" LONG 158°05'47")

DATE	TEMPERATURE WATER (DEG C)	SPECIFIC CONDUCTANCE (US/CM)	ALACHLOR, WATER, DISS, REC, (UG/L)	AMETRYN WATER, DISS, REC, (UG/L)	ATRAZINE, WATER, DISS, REC (UG/L)	CYANAZINE, WATER, DISS, REC (UG/L)	DEETHYL ATRAZINE, WATER, DISS, REC (UG/L)
SEP 1993 01...	22.5	1440	<0.05	<0.05	<0.05	<0.20	<0.05

DATE	DEISOPROPYL ATRAZIN WATER, DISS, REC (UG/L)	METOLACHLOR WATER DISSOLV (UG/L)	METRIBUZIN SENCOR WATER DISSOLV (UG/L)	PROMETON, WATER, DISS, REC (UG/L)	PROMETRYN, WATER, DISS, REC (UG/L)	PROPAZINE WATER DISS REC (UG/L)	SIMAZINE, WATER, DISS, REC (UG/L)
SEP 1993 01...	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

< Actual value is known to be less than the value shown

WATER QUALITY DATA, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

HAWAII, ISLAND OF MAUI

205427156392301 · 6-5439-02 WAIHIKULI 2 (LAT 20°54'27" LONG 156°39'23")

DATE	TIME	FLOW RATE, INSTANTANEOUS (G/M)	PUMP OR FLOW PERIOD PRIOR TO SAMPLING (MIN)	SPECIFIC CONDUCTANCE (US/CM)	TEMPERATURE WATER (DEG C)	TURBIDITY (NTU)	HARDNESS TOTAL (MG/L AS CACO3)	CALCIUM DISSOLVED (MG/L AS CA)	MAGNESIUM, DISSOLVED (MG/L AS MG)	SODIUM, DISSOLVED (MG/L AS NA)	SODIUM PERCENT
JUL 1993 03...	1030	1000	7200	271	21.0	<0.10	48	6.2	7.9	37	61

DATE	SODIUM ADSORPTION RATIO	POTASSIUM, DISSOLVED (MG/L AS K)	ALKALINITY LAB (MG/L AS CACO3)	SULFATE DISSOLVED (MG/L AS SO4)	CHLORIDE, DISSOLVED (MG/L AS CL)	FLUORIDE, DISSOLVED (MG/L AS F)	SILICA, DISSOLVED (MG/L AS SIO2)	SOLIDS, RESIDUE AT 180 DEG. C DISSOLVED (MG/L)	SOLIDS, SUM OF CONSTITUENTS, DISSOLVED (MG/L)	SOLIDS, DISSOLVED (TONS PER AC-FT)
JUL 1993 03...	2	2.3	76	6.4	29	0.30	47	185	182	0.25

DATE	ALUMINUM, TOTAL RECOVERABLE (UG/L AS AL)	ALUMINUM, DISSOLVED (UG/L AS AL)	ARSENIC TOTAL (UG/L AS AS)	BARIUM, TOTAL RECOVERABLE (UG/L AS BA)	BARIUM, DISSOLVED (UG/L AS BA)	BERYLLIUM, TOTAL RECOVERABLE (UG/L AS BE)	CADMIUM TOTAL RECOVERABLE (UG/L AS CD)	CHROMIUM, TOTAL RECOVERABLE (UG/L AS CR)	COBALT, TOTAL RECOVERABLE (UG/L AS CO)	COBALT, DISSOLVED (UG/L AS CO)
JUL 1993 03...	20	<10	<1	<100	<2	<10	<1	1	<1	<3

DATE	COPPER, TOTAL RECOVERABLE (UG/L AS CU)	IRON, TOTAL RECOVERABLE (UG/L AS FE)	IRON, DISSOLVED (UG/L AS FE)	LEAD, TOTAL RECOVERABLE (UG/L AS PB)	LITHIUM TOTAL RECOVERABLE (UG/L AS LI)	LITHIUM DISSOLVED (UG/L AS LI)	MANGANESE, TOTAL RECOVERABLE (UG/L AS MN)	MANGANESE, DISSOLVED (UG/L AS MN)	MERCURY TOTAL RECOVERABLE (UG/L AS HG)	MOLYBDENUM, TOTAL RECOVERABLE (UG/L AS MO)
JUL 1993 03...	3	<10	23	<1	<10	<4	<10	<1	<0.10	<1

DATE	MOLYBDENUM, DISSOLVED (UG/L AS MO)	NICKEL, TOTAL RECOVERABLE (UG/L AS NI)	NICKEL, DISSOLVED (UG/L AS NI)	SELENIUM, TOTAL (UG/L AS SE)	SELENIUM, DISSOLVED (UG/L AS SE)	SILVER, TOTAL RECOVERABLE (UG/L AS AG)	SILVER, DISSOLVED (UG/L AS AG)	STRONTIUM, DISSOLVED (UG/L AS SR)	VANADIUM, DISSOLVED (UG/L AS V)	ZINC, TOTAL RECOVERABLE (UG/L AS ZN)
JUL 1993 03...	<10	<1	<1	<1	<1	<1	<1.0	45	53	<10

< Actual value is known to be less than the value shown

WATER QUALITY DATA, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

HAWAII, ISLAND OF HAWAII

193209155553901 - 8-3255-02 KAINALIU TEST WELL, HAWAII (LAT 19°32'09" LONG 155°55'39")

DATE	TIME	FLOW RATE, INSTANTANEOUS (G/M)	PUMP OR FLOW PERIOD PRIOR TO SAMPLING (MIN)	SPECIFIC CONDUCTANCE (US/CM)	TEMPERATURE WATER (DEG C)	TURBIDITY (NTU)	HARDNESS TOTAL (MG/L AS CACO3)	CALCIUM DISSOLVED (MG/L AS CA)	MAGNESIUM, DISSOLVED (MG/L AS MG)	SODIUM, DISSOLVED (MG/L AS NA)	SODIUM PERCENT
AUG 1993 09...	0915	1700	8580	121	20.0	0.20	26	5.8	2.8	13	50

DATE	SODIUM ADSORPTION RATIO	POTASSIUM, DISSOLVED (MG/L AS K)	ALKALINITY LAB (MG/L AS CACO3)	SULFATE DISSOLVED (MG/L AS SO4)	CHLORIDE, DISSOLVED (MG/L AS CL)	FLUORIDE, DISSOLVED (MG/L AS F)	SILICA, DISSOLVED (MG/L AS SIO2)	SOLIDS, RESIDUE AT 180 DEG. C DISSOLVED (MG/L)	SOLIDS, SUM OF CONSTITUENTS, DISSOLVED (MG/L)	SOLIDS, DISSOLVED (TONS PER AC-FT)
AUG 1993 09...	1	2.0	40	11	4.2	0.30	48	97	111	0.13

DATE	ALUMINUM, TOTAL RECOVERABLE (UG/L AS AL)	ALUMINUM, DISSOLVED (UG/L AS AL)	ARSENIC TOTAL (UG/L AS AS)	BARIUM, TOTAL RECOVERABLE (UG/L AS BA)	BARIUM, DISSOLVED (UG/L AS BA)	BERYLLIUM, TOTAL RECOVERABLE (UG/L AS BE)	CADMIUM TOTAL RECOVERABLE (UG/L AS CD)	CHROMIUM, TOTAL RECOVERABLE (UG/L AS CR)	COBALT, TOTAL RECOVERABLE (UG/L AS CO)	COBALT, DISSOLVED (UG/L AS CO)
AUG 1993 09...	<10	<10	<1	<100	<2	<10	<1	<1	<1	<3

DATE	COPPER, TOTAL RECOVERABLE (UG/L AS CU)	IRON, TOTAL RECOVERABLE (UG/L AS FE)	IRON, DISSOLVED (UG/L AS FE)	LEAD, TOTAL RECOVERABLE (UG/L AS PB)	LITHIUM TOTAL RECOVERABLE (UG/L AS LI)	LITHIUM DISSOLVED (UG/L AS LI)	MANGANESE, TOTAL RECOVERABLE (UG/L AS MN)	MANGANESE, DISSOLVED (UG/L AS MN)	MERCURY TOTAL RECOVERABLE (UG/L AS HG)	MOLYBDENUM, TOTAL RECOVERABLE (UG/L AS MO)
AUG 1993 09...	4	30	9	<1	<10	<4	<10	1	0.20	<1

DATE	MOLYBDENUM, DISSOLVED (UG/L AS MO)	NICKEL, TOTAL RECOVERABLE (UG/L AS NI)	NICKEL, DISSOLVED (UG/L AS NI)	SELENIUM, TOTAL (UG/L AS SE)	SELENIUM, DISSOLVED (UG/L AS SE)	SILVER, TOTAL RECOVERABLE (UG/L AS AG)	SILVER, DISSOLVED (UG/L AS AG)	STRONTIUM, DISSOLVED (UG/L AS SR)	VANADIUM, DISSOLVED (UG/L AS V)	ZINC, TOTAL RECOVERABLE (UG/L AS ZN)
AUG 1993 09...	<10	<1	<1	<1	<1	<1	<1.0	20	48	<10

< Actual value is known to be less than the value shown

WATER QUALITY DATA, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

HAWAII, ISLAND OF HAWAII--Continued

200325155374001 8-6337-02 PUUKAPU SHALLOW WELL, WAIMEA (LAT 20°03'25" LONG 155°37'40")

DATE	TIME	TURBIDITY (NTU)	HARDNESS TOTAL (MG/L AS CACO3)	CALCIUM DISSOLVED (MG/L AS CA)	MAGNESIUM, DISSOLVED (MG/L AS MG)	SODIUM, DISSOLVED (MG/L AS NA)	SODIUM PERCENT	SODIUM ADSORPTION RATIO	POTASSIUM, DISSOLVED (MG/L AS K)	ALKALINITY LAB (MG/L AS CACO3)	SULFATE DISSOLVED (MG/L AS SO4)	CHLORIDE, DISSOLVED (MG/L AS CL)
APR 1993 05...	0905	8.2	2	6.7	2.2	7.3	37	0.6	0.90	36	1.3	6.2

DATE	FLUORIDE, DISSOLVED (MG/L AS F)	SILICA, DISSOLVED (MG/L AS SIO2)	SOLIDS, RESIDUE AT 180 DEG. C DISSOLVED (MG/L)	SOLIDS, SUM OF CONSTITUENTS, DISSOLVED (MG/L)	SOLIDS, DISSOLVED (TONS PER AC-FT)	ALUMINUM, TOTAL RECOVERABLE (UG/L AS AL)	ALUMINUM, DISSOLVED (UG/L AS AL)	ARSENIC TOTAL (UG/L AS AS)	BARIUM, TOTAL RECOVERABLE (UG/L AS BA)	BARIUM, DISSOLVED (UG/L AS BA)	BERYLLIUM, TOTAL RECOVERABLE (UG/L AS BE)	CADMIUM TOTAL RECOVERABLE (UG/L AS CD)
APR 1993 05...	<0.10	23	6	70	0.09	150	30	<1	<100	2	<10	<1

DATE	CHROMIUM, TOTAL RECOVERABLE (UG/L AS CR)	COBALT, TOTAL RECOVERABLE (UG/L AS CO)	COBALT, DISSOLVED (UG/L AS CO)	COPPER, TOTAL RECOVERABLE (UG/L AS CU)	IRON, TOTAL RECOVERABLE (UG/L AS FE)	IRON, DISSOLVED (UG/L AS FE)	LEAD, TOTAL RECOVERABLE (UG/L AS PB)	LITHIUM TOTAL RECOVERABLE (UG/L AS LI)	LITHIUM DISSOLVED (UG/L AS LI)	MANGANESE, TOTAL RECOVERABLE (UG/L AS MN)	MANGANESE, DISSOLVED (UG/L AS MN)	MERCURY TOTAL RECOVERABLE (UG/L AS HG)
APR 1993 05...	<1	<1	<	<1	690	350	<1	<10	<4	10	8	<0.10

DATE	MOLYBDENUM, TOTAL RECOVERABLE (UG/L AS MO)	MOLYBDENUM, DISSOLVED (UG/L AS MO)	NICKEL, TOTAL RECOVERABLE (UG/L AS NI)	NICKEL, DISSOLVED (UG/L AS NI)	SELENIUM, TOTAL (UG/L AS SE)	SELENIUM, DISSOLVED (UG/L AS SE)	SILVER, TOTAL RECOVERABLE (UG/L AS AG)	SILVER, DISSOLVED (UG/L AS AG)	STRONTIUM, DISSOLVED (UG/L AS SR)	VANADIUM, DISSOLVED (UG/L AS V)	ZINC, TOTAL RECOVERABLE (UG/L AS ZN)
APR 1993 05...	<1	<10	2	<1	<1	<1	<1	<1.0	140	<6	70

< Actual value is known to be less than the value shown

HAWAII, ISLAND OF KAUAI

220523159341201. State Key Number 1042.0 Waialae Raingage near Waimea, Kauai.

LOCATION.--Lat 22°05'23", long 159°34'12", Hydrologic Unit 20070000, on ridge 6.4 mi southeast of Kokee Lodge, and 11.0 mi northeast of Waimea.

PERIOD OF RECORD.--1911 to current year. Prior to October 1992, unpublished records in files of the Geological Survey and at the National Weather Service.

GAGE.--Standard 8-inch National Weather Service accumulation rain gage, with a custom-made reduced 1 to 2 ratio raingage catchment. Elevation of gage is 4,000 ft from topographic map.

REMARKS.--Records good. Cumulative rainfall read in nearest tenths of an inch.

RAINFALL ACCUMULATED (INCHES), WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993
INTERMITTENT READINGS

Period	Rainfall
May 27 to Oct. 14	27.6
Oct. 14 to Dec. 16	17.2
Dec. 16 to Mar. 15	35.6
Mar. 15 to Jul. 07	8.8
Jul. 07 to Oct. 05	16.4

220504159321401. State Key Number 1045.0 Waialeale trail Raingage near Lihue, Kauai.

LOCATION.--Lat 22°05'04", long 159°32'14", Hydrologic Unit 20070000, 14.0 mi west of Kapaa Beach Park and 8.4 mi south of Hanalei Bay.

PERIOD OF RECORD.--1962 to current year. Prior to October 1992, unpublished records in files of the Geological Survey and at the National Weather Service.

GAGE.--Standard 8-inch National Weather Service accumulation raingage, with a custom-made 1 to 2 reduced ratio raingage catchment. Elevation of gage is 4,560 ft from topographic map.

REMARKS.--Records good. Cumulative rainfall read in nearest tenths of an inch.

RAINFALL ACCUMULATED (INCHES), WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993
INTERMITTENT READINGS

Period	Rainfall
Mar. 27 to Oct. 14	59.8
Oct. 14 to Dec. 16	38.4
Dec. 16 to Mar. 15	51.0
Mar. 15 to Jul. 07	22.0
Jul. 07 to Oct. 05	30.2

HAWAII, ISLAND OF KAUAI--Continued

220427159300201. State Key Number 1047.0 Mount Waialeale Raingage near Lihue, Kauai.

LOCATION.--Lat 22°04'27", long 159°30'02", Hydrologic Unit 20070000, 9.2 mi south of Hanalei Bay and 11.6 mi west of Kapaa Beach Park.

PERIOD OF RECORD.--1910 to current year. Prior to October 1992, unpublished records in files of the Geological Survey and at the National Weather Service.

GAGE.--Custom-made 1 to 10 ratio accumulation raingage with a 300 inch capacity. Tipping-bucket raingage with a recorder. Elevation of gage is 5,150 feet from topographic map.

REMARKS.--Records poor. Rainfall recorded in hundredths of an inch.

RAINFALL ACCUMULATED (INCHES), WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993
DAILY SUM VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	.40	2.97	.00	---	---	.19	.11	.31	.42	.04	---
2	---	.00	1.43	.00	---	---	.04	.34	.38	.15	.69	---
3	---	.08	11.84	.00	---	---	.11	1.30	.11	.19	.08	---
4	---	.00	3.76	.32	---	---	.08	.31	.15	.23	.15	---
5	---	.04	1.62	.95	---	---	.54	.31	.77	.19	.00	---
6	---	.16	.87	.63	---	---	1.30	.11	.92	.19	.00	---
7	---	.87	.48	.28	---	---	1.30	3.71	2.10	.08	.92	---
8	---	.71	.44	.79	---	---	2.87	.31	1.87	.00	1.30	---
9	---	2.93	.44	.44	---	---	.23	.31	.50	.73	.38	---
10	---	1.27	2.02	.12	---	---	.04	.31	.08	.27	.99	---
11	---	.87	4.12	.08	---	---	.34	1.80	.34	.69	1.30	---
12	---	.12	.95	.04	---	---	.57	1.91	.34	.50	1.61	---
13	---	1.94	.00	.24	---	---	.54	.08	.00	1.15	.69	---
14	a1.46	.55	.00	.36	---	---	.31	2.18	.04	.42	1.19	---
15	6.10	.08	.32	.87	---	---	.04	.08	.00	.00	.11	---
16	1.19	.40	1.11	.40	---	---	.00	.42	.46	1.07	.65	---
17	1.11	.36	6.33	.08	---	---	.04	.46	1.84	1.57	1.80	---
18	.04	4.51	.75	.04	---	---	1.19	.23	1.57	1.30	.31	---
19	.00	.16	3.13	.08	---	---	1.03	.38	1.53	1.57	3.52	---
20	.00	.00	1.50	.20	---	---	.69	.80	1.07	2.14	.00	---
21	.08	.00	.83	.63	---	---	.15	.00	.31	2.53	.61	---
22	.00	.00	2.85	.00	---	---	.61	.00	.11	1.26	.65	---
23	.67	.00	4.43	.00	---	---	.77	.00	.31	1.26	.15	---
24	.99	.00	.32	.00	---	---	.27	.80	.27	3.41	.65	---
25	2.57	3.36	8.95	.00	---	---	1.15	.00	1.19	2.33	1.61	---
26	2.14	.32	2.38	.00	---	---	.23	.11	.96	2.37	.15	---
27	.44	.83	.36	.00	---	---	2.56	.04	.57	.96	.04	---
28	.63	.28	6.69	.08	---	---	.08	.00	1.87	1.95	.19	---
29	.67	.32	10.25	b.48	---	---	.73	.00	.57	1.30	.19	---
30	1.39	1.66	3.29	---	---	c.00	1.19	.00	.92	.42	.04	d---
31	.08	---	.04	---	---	.27	---	.23	---	.00	1.49	---
TOTAL	---	22.22	84.47	---	---	---	19.19	16.64	21.46	30.65	21.50	---

a Partial daily record from 0845 hrs to 2400 hrs. Total accumulated rainfall from Oct. 1 (0001 hrs) to Oct. 14 (0845 hrs) is 3.98 inches.
b Partial daily record from 0001 hrs to 1200 hrs.
c Partial daily record from 1330 hrs to 2400 hrs. Total accumulated rainfall from Jan. 29 (1200 hrs) to Mar. 30 (1330 hrs) is 16.6 inches.
d Total accumulated rainfall from Sept. 1 (0001 hrs) to Sep. 30 (2400 hrs) is 15.3 inches.

HAWAII, ISLAND OF KAUAI--Continued

220356159281401. State Key Number 1051.0 North Wailua ditch Raingage near Lihue, Kauai.

LOCATION.--Lat 22°03'56", long 159°28'14", Hydrologic Unit 20070000, 4.0 mi west of Wailua Reservoir and 2.0 mi east southeast of Waialeale Raingage.

PERIOD OF RECORD.--1928 to current year. Prior to October 1992, unpublished records in files of the Geological Survey and at the National Weather Service.

GAGE.--Standard 8-inch National Weather Service non-recording rain gage. Elevation of gage is 1,110 ft from topographic map.

REMARKS.--Records good. Cumulative rainfall read in nearest tenths of an inch.

RAINFALL ACCUMULATED (INCHES), WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993
INTERMITTENT READINGS

Period	Rainfall
Sep. 28 to Oct. 05	0.3
Oct. 05 to Oct. 26	5.9
Oct. 26 to Nov. 30	10.8
Nov. 30 to Dec. 28	35.7
Dec. 28 to Jan. 25	12.3
Jan. 25 to Feb. 19	3.2
Feb. 19 to Mar. 29	4.4
Mar. 29 to Apr. 26	5.1
Apr. 26 to May 31	9.9
May 31 to Jun. 28	7.8
Jun. 28 to Jul. 26	11.8
Jul. 26 to Aug. 30	17.7
Aug. 30 to Sep. 27	7.2
Sep. 27 to Oct. 04	7.2

HAWAII, ISLAND OF KAUAI--Continued

220443159235601. State Key Number 1068.0 Left Branch Opaekaa Raingage near Kapaa, Kauai.

LOCATION.--Lat 22°04'43", long 159°23'56", Hydrologic Unit 20070000, in USGS streamgage station 16071500 on left bank, 5.0 mi west of Kapaa Beach Park and 0.7 mi northeast of Wailua Reservoir.

PERIOD OF RECORD.--1960 to current year. Prior to October 1992, unpublished records in files of the Geological Survey and at the National Weather Service.

GAGE.--Standard 8-inch National Weather Service rain gage with tipping bucket attachment and recorder. Elevation of gage is 470 ft from topographic map.

REMARKS.--Records fair. Rainfall recorded in tenths of an inch.

RAINFALL ACCUMULATED (INCHES), WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993
DAILY SUM VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	---	---	.0	.0	.2	.1	.0	.0	.1	.1	.0
2	---	---	---	.0	.0	.0	.0	.0	.1	.0	.0	.1
3	---	---	---	.0	.0	.0	.1	.1	.0	.0	.0	.0
4	---	---	---	.1	.0	.0	.0	.1	.0	.1	.0	.1
5	a.0	---	---	.4	.0	.1	.1	.0	.1	.1	.0	.0
6	.3	---	---	.6	.0	.6	.1	.0	.0	.1	.0	.0
7	.7	---	---	.0	.0	.7	.3	.8	.2	.0	.3	.0
8	.0	---	---	.4	1.1	.1	.3	.0	.3	.0	.3	.0
9	.0	---	---	.0	.3	.2	.0	.1	.1	.2	.0	.0
10	.0	---	b.8	.0	.0	.1	.0	.1	.0	.0	.2	.0
11	.1	---	.6	.0	.0	.0	.0	.3	.2	.3	.2	.1
12	9.7	---	.1	.0	.0	.0	.0	2.0	.4	1.5	.0	.3
13	3.2	---	.0	.1	.1	.0	.2	.0	.0	1.0	.3	.2
14	.0	---	.0	.0	.0	.0	.0	2.5	.1	.0	.2	.0
15	3.8	---	.0	.0	.0	.0	.0	.2	.0	.0	.1	.0
16	.3	---	1.6	.0	.0	.0	.1	.0	.1	.1	.0	.0
17	---	---	3.1	.0	.0	.0	.2	.0	.1	.3	.4	.1
18	---	---	.3	.0	.0	.0	.2	.1	.4	.6	.5	.0
19	---	---	1.4	.0	.0	.0	.1	.0	.7	.6	.7	1.0
20	---	---	.7	.0	.0	.0	.1	.6	.2	.6	.0	.0
21	---	---	.4	.2	.1	.0	.0	.0	.0	.3	.1	.0
22	---	---	1.7	.0	.0	.0	1.3	.0	.0	.6	.0	.0
23	---	---	4.0	.0	.2	.0	1.9	.0	.0	.7	.0	.0
24	---	---	1.3	.0	.0	.0	.0	.2	.3	.8	.0	.0
25	---	---	12.0	.0	.6	.1	.1	.0	.2	1.2	.6	.0
26	---	---	6.1	.0	.0	.0	.0	.0	.3	.4	.0	.1
27	---	---	1.0	.0	.0	.0	.4	.0	.1	.3	.0	.0
28	---	---	1.8	.0	.0	.0	.0	.0	.7	1.0	.0	.1
29	---	---	7.0	.2	---	.0	.0	.0	.1	.3	.0	.3
30	---	---	2.5	.0	---	.0	.1	.0	.0	.6	.0	.4
31	---	---	.0	.0	---	.0	---	.0	---	.1	.8	---
TOTAL	---	---	---	2.0	2.4	2.1	5.7	7.1	4.7	11.9	4.8	2.8

a Partial daily record from 1320 hrs to 2400 hrs. Total accumulated rainfall from Oct. 1 (0001 hrs) to Oct. 5 (1320 hrs) is 0.1 inches.
b Partial daily record from 1415 hrs to 2400 hrs. Total accumulated rainfall from Oct. 17 (0001 hrs) to Dec. 10 (1415 hrs) is 13.5 inches.

HAWAII, ISLAND OF KAUAI--Continued

220817159374401. State Key Number 1080.0 Paukahana Raingage near Waimea, Kauai.

LOCATION.--Lat 22°08'17", long 159°37'44", Hydrologic Unit 20070000, 2.0 mi east of Kokee lodge and 7.0 mi south southwest of Kailiu Point.

PERIOD OF RECORD.--1910 to current year. Prior to October 1992, unpublished records in files of the Geological Survey and at the National Weather Service.

GAGE.--Standard 8-inch National Weather Service accumulation rain gage. Elevation of gage is 3,700 ft from topographic map.

REMARKS.--Records poor. Rain gage found vandalized Jun. 28. No record Apr. 7 to Sep 30. Cumulative rainfall read in nearest tenths of an inch.

RAINFALL ACCUMULATED (INCHES), WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993
INTERMITTENT READINGS

Period	Rainfall
Aug. 18 to Oct. 23	14.2
Oct. 23 to Dec. 14	13.4
Dec. 14 to Feb. 04	15.3
Feb. 04 to Apr. 07	4.8

220739159373001. State Key Number 1082.0 Waiakoali Raingage near Waimea, Kauai.

LOCATION.--Lat 22°07'39", long 159°37'30", Hydrologic Unit 20070000, 2.4 mi east southeast of Kokee Lodge and 7.4 mi south southwest of Kailiu Point.

PERIOD OF RECORD.--1910 to current year. Prior to October 1992, unpublished records in files of the Geological Survey and at the National Weather Service.

GAGE.--Standard 8-inch National Weather Service accumulation rain gage with a custom made reduced 1 to 2 ratio raingage catchment. Elevation of gage is 3,420 ft from topographic map.

REMARKS.--Records good. Cumulative rainfall read in nearest tenths of an inch.

RAINFALL ACCUMULATED (INCHES), WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993
INTERMITTENT READINGS

Period	Rainfall
Aug. 18 to Oct. 23	19.2
Oct. 23 to Dec. 14	13.6
Dec. 14 to Feb. 04	15.3
Feb. 04 to Apr. 07	5.6
Apr. 07 to Jun. 28	4.8
Jun. 28 to Aug. 12	3.0
Aug. 12 to Oct. 18	9.2

HAWAII, ISLAND OF KAUAI--Continued

220713159361201. State Key Number 1083.0 Mohihi crossing Raingage near Waimea, Kauai.

LOCATION.--Lat 22°07'13", long 159°36'12", Hydrologic Unit 20070000, 3.8 mi east of Kokee Lodge and 7.5 mi south of Kailiu Point.

PERIOD OF RECORD.--1910 to current year. Prior to October 1992, unpublished records in files of the Geological Survey and at the National Weather Service.

GAGE.--Standard 8-inch National Weather Service rain gage with tipping bucket attachment with recorder. Elevation of gage is 3,420 ft from topographic map.

REMARKS.--Records good. Rainfall recorded in tenths of an inch.

RAINFALL ACCUMULATED (INCHES), WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993
DAILY SUM VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.0	.3	.0	.1	.0	.4	.0	.0	.0	---	.1	.0
2	.0	.2	.0	.0	.0	.0	.0	.0	.0	---	.0	.0
3	.0	.1	1.0	.1	.0	.0	.0	.1	.0	---	.0	.0
4	.0	.0	.9	.3	.1	.0	.0	.0	.0	---	.0	.1
5	.0	.0	.2	.9	.3	.4	.0	.0	.0	---	.0	.0
6	.1	.0	.0	.4	.0	.2	.0	.0	.0	---	.0	.0
7	.4	.0	.0	.3	.0	.1	.2	.3	.1	---	.1	.0
8	.0	.1	.1	.1	.3	.0	.0	.1	.1	---	.1	.0
9	.0	.3	.0	.2	.0	.6	.0	.1	.0	---	.0	.0
10	.0	.0	.2	.1	.1	.0	.0	.0	.0	---	.1	.0
11	.0	.1	.3	.2	.0	.0	.0	.0	.0	---	.2	.0
12	1.3	.0	.0	.1	.1	.0	.0	.1	.0	---	.0	.1
13	.0	.2	.0	.2	.7	.0	.0	.1	.0	---	.0	.0
14	.2	.1	.0	.0	.0	.7	.1	.3	.0	---	.0	.0
15	.4	.0	.0	.2	.0	.0	.0	.0	.0	---	.1	.0
16	.1	.0	.1	.0	.0	.0	.0	.2	.1	---	.0	.0
17	.1	.0	.5	.0	.0	.0	.0	.2	.0	---	1.2	.0
18	.0	.9	.0	.0	.0	.0	.5	.1	.2	---	.5	.0
19	.0	.0	.1	.0	.0	.0	.2	.1	.3	---	.2	.0
20	.0	.0	.1	.0	.0	.0	.0	.1	.1	---	.3	.0
21	.0	.0	.0	.0	.0	.0	.0	.0	.1	b---	.1	.0
22	.0	.1	.2	.1	.0	.0	.0	.0	.0	.1	.0	.0
23	.0	.0	.2	.0	.1	.0	.0	.0	.0	.0	.0	.1
24	.3	.0	.0	.0	.0	.0	.0	.0	.0	.2	.0	.0
25	.1	.2	1.2	.0	.0	.0	.0	.0	.1	.2	.0	.0
26	.1	.0	.5	.0	.0	.0	.0	.0	.1	.3	.0	.0
27	.0	.4	.0	.0	.0	.0	.1	.0	.1	.2	.0	.1
28	.1	.0	.3	.0	.0	.0	.0	.0	a.1	.1	.0	.2
29	.1	.0	1.2	.2	---	.0	.1	.0	---	.0	.0	.2
30	.0	.1	.5	.0	---	.0	.2	.0	---	.1	.0	.1
31	.0	---	.0	.3	---	.0	---	.0	---	.1	.1	---
TOTAL	3.3	3.1	7.6	3.8	1.7	2.4	1.4	1.8	---	---	3.1	0.9

a Partial daily record from 0001 hrs to 1400 hrs.
b Total accumulated rainfall from June 28 (1400 hrs) to July 21 (2400 hrs) is 1.1 inches.

HAWAII, ISLAND OF KAUAI--Continued

220927159355001. State Key Number 1084.0 Kilohana Raingage near Hanalei, Kauai.

LOCATION.--Lat 22°09'27", long 159°35'50", Hydrologic Unit 20070000, 4.1 mi east southeast of Kalalau Beach and 4.9 mi south southwest of Kailiu Point.

PERIOD OF RECORD.--1910 to current year. Prior to October 1992, unpublished records in files of the Geological Survey and at the National Weather Service.

GAGE.--Standard 8-inch National Weather Service accumulation rain gage, with a custom-made reduced 1 to 4 ratio raingage catchment. Elevation of gage is 4,000 ft from topographic map.

REMARKS.--Records good. Cumulative rainfall read in nearest tenths of an inch.

RAINFALL ACCUMULATED (INCHES), WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993
INTERMITTENT READINGS

Period	Rainfall
May 27 to Oct. 14	25.2
Oct. 14 to Dec. 16	20.0
Dec. 16 to Mar. 15	11.2
Mar. 15 to Jul. 07	9.6
Jul. 07 to Oct. 05	12.8

220703159351201. State Key Number 1085.0 Mohihi-Koaie divide Raingage near Waimea, Kauai.

LOCATION.--Lat 22°07'03", long 159°35'12", Hydrologic Unit 20070000, 5.0 mi east of Kokee Lodge and 7.5 mi south of Kailiu Point.

PERIOD OF RECORD.--1910 to current year. Prior to October 1992, unpublished records in files of the Geological Survey and at the National Weather Service.

GAGE.--Standard 8-inch National Weather Service accumulation rain gage. Elevation of gage is 4,000 ft from topographic map.

REMARKS.--Records good. Cumulative rainfall read in nearest tenths of an inch.

RAINFALL ACCUMULATED (INCHES), WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993
INTERMITTENT READINGS

Period	Rainfall
May 27 to Oct. 14	22.9
Oct. 14 to Dec. 16	19.8
Dec. 16 to Mar. 15	22.6
Mar. 15 to Jul. 07	4.8
Jul. 07 to Oct. 05	12.1

HAWAII, ISLAND OF OAHU

212304157542201. State Key Number 771.9 North Halawa Raingage near Honolulu, Oahu.

LOCATION.--Lat 21°23'04", Long 157°54'22", (Waipahu quadrangle, 1983, 1:24000), Hydrologic Unit 20060000, on right bank, 0.6 mi north of Oahu Prison, 1.0 mi south of Keaiwa Heiau, and 1.7 mi east of Aiea High School.

PERIOD OF RECORD.--February 1, 1983 to current year. Prior to October 1992, unpublished records in files of the U.S. Geological Survey.

GAGE.--Standard 8-inch National Weather Service recording raingage. Elevation of gage is 180 ft from topographic map.

REMARKS.--Records poor. Cumulative rainfall read in nearest tenths of an inch.

RAINFALL ACCUMULATED (INCHES), WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993
INTERMITTENT READINGS

Period	Rainfall
Aug. 07 to Oct. 07	5.1
Oct. 07 to Dec. 14	7.3
Dec. 14 to Jan. 19	9.7
Jan. 19 to Mar. 18	0.4
Mar. 18 to May 26	4.4
May 26 to July 06	0.5
July 06 to Sep. 07	9.1
Sep. 07 to Dec. 06	5.3

212253157522201. State Key Number 772.0 Moanalua Raingage near Honolulu, Oahu.

LOCATION.--Lat 21°22'53", Long 157°52'22", Hydrologic Unit 20060000, 1.8 mi northeast of Tripler Hospital, and 5.0 mi north of Honolulu Post Office.

PERIOD OF RECORD.--1927 to 1978, 1979 to current year. Prior to October 1992, unpublished records in files of the U.S. Geological Survey.

GAGE.--Standard 8-inch National Weather Service raingage with tipping- bucket attachment. Housed with recording crest-gage. Elevation of gage is 340 ft from topographic map.

REMARKS.--Records good. Cumulative rainfall read in nearest tenths of an inch. Tipping-bucket malfunctioned throughout the year.

RAINFALL ACCUMULATED (INCHES), WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993
INTERMITTENT READINGS

Period	Rainfall
Aug. 13 to Oct. 19	17.2
Oct. 19 to Dec. 17	14.6
Dec. 17 to Jan. 27	15.2
Jan. 27 to Mar. 22	3.1
Mar. 22 to June 14	13.9
June 14 to Aug. 31	20.0
Aug. 31 to Sep. 30	a---

a No record

HAWAII, ISLAND OF OAHU--Continued

212346157533701. State Key Number 772.1 North Halawa Raingage near Aiea, Oahu.

LOCATION.--Lat 21°23'46", Long. 157°53'37", Hydrologic Unit 20060000, 2.7 mi above confluence with South Halawa Stream, 2.7 mi northeast of Aiea Post office, and 6.5 mi northwest of Honolulu.

PERIOD OF RECORD.--August 1929 to June 1933, July 1953 to current year. Prior to October 1992, unpublished records in files of the U.S. Geological Survey.

GAGE.--12-inch collector and 10-inch storage tank with float-type recorder system. Elevation of gage is 320 ft from topographic map.

REMARKS.--Records good. Rainfall recorded in tenths of an inch.

RAINFALL ACCUMULATED (INCHES), WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993
DAILY SUM VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.0	.3	---	.0	.0	.1	.0	.1	.0	.0	.0	---
2	.0	.0	---	.0	.0	.0	.0	.0	.0	.2	.2	---
3	.0	.0	---	.0	.0	.0	.0	.1	.0	.1	.0	---
4	.0	.0	---	.2	.0	.0	.0	.0	.0	.2	.0	---
5	.0	.0	---	.0	.0	.0	.4	.1	.1	.2	.1	---
6	.0	.0	---	.5	.0	.2	.1	.0	.1	.0	.0	---
7	.2	.0	---	.1	.0	.0	.5	.2	.4	.0	.1	---
8	.0	.0	---	.1	.4	.1	.3	.8	.5	.1	.1	b---
9	.0	1.0	---	.1	.9	.3	.0	.1	.1	.2	.1	---
10	.0	.2	---	.0	.0	.1	.0	.2	.0	.2	.7	---
11	.0	.3	a.0	.0	.0	.0	.0	1.1	.0	.1	.7	---
12	1.5	.1	.0	.0	.0	.0	.0	.3	.1	.1	.0	---
13	.5	.6	.0	.0	.1	.0	.1	.0	.0	.0	.0	---
14	.0	.1	.0	.0	.0	.0	.1	.5	.0	.1	.0	---
15	.1	.1	.0	.1	.0	.0	.0	.0	.0	.1	.3	---
16	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0	1.2	---
17	.0	.1	.0	.0	.0	.0	.0	.5	.1	.1	.1	---
18	.0	.0	.0	.0	.0	.0	.0	.2	.1	.5	.0	---
19	.1	.3	.2	.0	.0	.0	.8	.2	.1	.9	.6	---
20	.0	.0	.3	.0	.0	.1	.2	.0	.0	.1	.0	---
21	.1	.0	.5	.0	.0	.0	.0	.0	.0	2.2	.0	---
22	.2	.0	.3	.0	.1	.0	.1	.0	.1	1.1	.2	---
23	.2	.0	2.3	.0	.0	.0	.1	.1	.0	.1	.0	---
24	.3	.0	.0	.0	.1	.1	.1	.0	.0	.8	.1	---
25	.5	.3	.6	.0	.2	.0	.1	.0	.3	.9	.0	---
26	.2	.2	2.6	.0	.0	.0	.3	.1	.2	.4	.0	---
27	.8	---	.2	.0	.0	.0	3.2	.0	.0	.8	.0	---
28	.2	---	.0	.0	.0	.0	.1	.1	.1	.2	.0	---
29	.0	---	.2	.0	---	.0	.1	.1	.1	.1	.0	---
30	.1	---	2.3	.0	---	.0	.5	.0	.2	.0	.0	c---
31	.2	---	.0	.0	---	.0	---	.0	---	.0	---	---
TOTAL	5.4	----	---	1.1	1.8	1.0	7.1	4.8	2.6	9.8	---	---

a Partial daily record from 1300 hrs to 2400 hrs. Total accumulated rainfall from Nov. 27 (0001 hrs) to Dec. 11 (1300 hrs) is 3.7 inches.
b Total accumulated rainfall from Aug. 31 (0001 hrs) to Sep. 8 (1115 hrs) is 1.8 inches.
c Total accumulated rainfall from Sep. 8 (1115 hrs) to Oct. 12 (1500 hrs) is 4.0 inches.

HAWAII, ISLAND OF OAHU--Continued

212359157502601. State Key Number 772.3 Moanalua Raingage No.1 at altitude 1,000 feet near Honolulu, Oahu.

LOCATION.-- Lat 21°23'59", Long-157°50'26", (Kaneohe quadrangle, 1959, 1:24000), Hydrologic Unit 20060000, 2.7 mi southwest of Kaneohe post office, and 4.2 mi northeast of Tripler Hospital.

PERIOD OF RECORD.--June 25, 1968 to current year. Prior to October 1992, unpublished records in files of the U.S. Geological Survey.

GAGE.--Standard 8-inch National Weather Service collector and 7 5/6-inch can with recorder. Elevation of gage is 1,000 ft from topographic map.

REMARKS.--Records good. Rainfall recorded in hundredths of an inch.

RAINFALL ACCUMULATED (INCHES), WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993
DAILY SUM VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.10	1.30	1.70	---	.00	.02	.10	.00	.00	.20	.30	.20
2	.00	.00	.10	---	.00	.00	.00	.00	.00	.10	.90	.00
3	.00	.00	.70	---	.00	.00	.20	.30	.00	.00	.00	.00
4	.00	.00	.70	---	.00	.01	.00	.00	.00	.30	.30	.00
5	.20	.00	.20	---	.00	.00	.80	.10	.20	.50	.10	.00
6	.20	.20	.20	---	.00	.00	.00	.10	.20	.00	.10	.00
7	3.20	.00	.00	---	.00	.09	1.50	.30	1.60	.40	.50	.00
8	.00	.30	.10	---	.12	.11	.50	.70	.40	.00	.30	.10
9	.00	1.50	.30	---	.11	.01	.00	.00	.00	.80	.00	.20
10	.00	.50	.20	---	.01	.01	.10	.10	.00	.30	1.10	.30
11	.10	.80	.00	---	.00	.00	.00	1.10	.20	.90	1.00	.00
12	2.50	.10	.20	---	.00	.00	.40	.60	.00	.00	.30	.50
13	.60	1.40	.00	---	.01	.00	.00	.00	.00	.30	.80	.70
14	.20	.80	.00	---	.00	.00	.00	1.20	.00	.60	.00	.00
15	1.00	.10	.00	---	.00	.00	.00	.00	.00	.00	.20	.00
16	.50	.00	1.20	---	.00	.00	.00	.00	.00	.20	1.10	.60
17	.20	.80	a.10	---	.00	.01	.10	.50	.10	.10	.50	.20
18	.00	.00	---	---	.00	.00	.40	.50	.20	.50	.40	.20
19	.00	.70	---	---	.00	.00	.60	.20	.30	1.80	.60	.90
20	.30	.00	---	---	.00	.13	1.50	.00	.00	.60	.10	.20
21	1.00	.90	---	---	.01	.01	.10	.00	.00	4.20	.00	.00
22	.80	1.30	---	---	.01	.00	.90	.00	.20	6.30	.10	.80
23	.30	.00	---	---	.03	.00	.10	.00	.00	.30	.00	.20
24	.20	.00	---	---	.00	.20	.30	.20	.00	2.40	.20	.00
25	1.10	1.10	---	---	.03	.10	.00	.00	.20	.90	.00	1.20
26	.60	.80	---	b.00	.00	.00	1.00	.00	.40	.60	.00	.00
27	.40	.50	---	.00	.00	.00	1.40	.00	.10	.50	.00	.00
28	.20	.00	---	.01	.00	.00	.00	.00	.00	.70	.00	.00
29	.20	.40	---	.02	---	.10	.10	.00	2.10	.40	.00	.70
30	.00	.30	---	.00	---	.00	.20	.00	.60	.00	.00	.20
31	.20	---	---	.01	---	.00	---	.30	---	.40	e6.50	---
TOTAL	14.10	13.80	---	---	0.33	0.80	10.30	6.20	6.80	24.30	15.40	7.20

a Partial daily record from 0001 hrs to 1300 hrs.
b Partial daily record from 1200 hrs to 2400 hrs. Total accumulated rainfall from Dec. 17 (1300 hrs) to Jan. 26 (1200 hrs) is 13.9 inches.
e Estimated

HAWAII, ISLAND OF OAHU--Continued

212329157510501. State key No. 772.6 Moanalua Raingage near Kaneohe, Oahu.

LOCATION--Lat 21°23'29", Long: 157°51'05", (Kaneohe quadrangle, 1959, 1:24000), Hydrologic Unit 20060000, in USGS streamgage station 16227500, on left bank 3.3 mi northeast of Tripler Hospital, and 3.6 mi southwest of Kaneohe post office.

PERIOD OF RECORD.--October 1, 1968 to current year, prior to October 1992 unpublished records in files of the U.S. Geological Survey.

GAGE.--Standard 8-inch National Weather Service collector attached to 7 5/16-inch rain can. Elevation of gage is 660 ft from topographic map.

REMARKS.--Records fair. Rainfall recorded in tenths of an inch.

RAINFALL ACCUMULATED (INCHES), WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993
DAILY SUM VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.0	1.4	1.8	.0	.0	.2	.2	.2	.1	---	---	.4
2	.0	.0	.1	.0	.0	.0	.0	.2	.0	---	---	.0
3	.0	.0	.7	.0	.0	.0	.0	.3	.0	---	---	.0
4	.0	.0	.7	.2	.0	.0	.0	.2	.0	---	---	.2
5	.3	.0	.3	.0	.0	.1	.6	.1	.2	---	---	.0
6	.0	.2	.2	.5	.0	.1	.0	.0	.2	---	---	.0
7	2.2	.0	.0	.0	.0	1.0	1.5	.3	1.2	---	---	.0
8	.0	.2	.2	.0	1.6	.4	.4	.8	.6	---	---	.1
9	.0	1.8	.3	.1	1.0	.7	.1	.0	.1	---	---	.3
10	.0	.5	.4	.0	.1	.1	.0	.2	.1	---	---	.2
11	.0	.8	.3	.0	.0	.0	.0	2.4	.1	---	---	.2
12	2.5	.1	.3	.0	.0	.0	.3	.2	.0	---	---	.8
13	.6	1.4	.0	.0	.0	.0	.0	.0	.0	---	---	.7
14	.2	.7	.0	.0	.0	.0	.0	1.0	a.0	---	---	.0
15	.9	.0	.0	.3	.0	.0	.0	.1	---	---	---	.3
16	.5	.0	.5	.0	.0	.0	.0	.0	---	---	---	.2
17	.0	1.0	.0	.0	.0	.0	.1	.8	---	---	---	.2
18	.0	.0	.0	.0	.0	.0	.3	.6	---	---	---	.1
19	.1	.6	.6	.2	.0	.0	1.1	.2	---	---	---	.5
20	.0	.0	.5	.3	.0	.3	1.6	.2	---	---	---	.7
21	.8	.2	1.0	.0	.0	.0	.0	.1	---	---	---	.3
22	1.0	.5	.7	.0	.2	.1	.7	.0	---	---	---	.4
23	.3	.0	2.8	.0	.3	.0	.3	.0	---	---	---	.1
24	.2	.0	.2	.0	.0	.0	.3	.3	---	---	---	.0
25	1.2	1.4	1.5	.0	.4	.0	.3	.0	---	---	---	1.4
26	.4	.9	2.7	.0	.0	.0	.4	.0	---	---	---	.0
27	.6	.4	.5	.1	.0	.0	2.3	.0	---	---	---	.0
28	.3	.0	.8	.0	.0	.0	.0	.0	---	---	---	.0
29	.2	.5	.1	.2	---	.0	.2	.0	---	---	---	.5
30	.2	.3	3.9	.0	---	.1	.2	.0	---	---	---	.3
31	.0	---	.1	.1	---	.0	---	.2	---	---	b2.4	---
TOTAL	12.5	12.9	21.2	2.0	3.6	3.1	10.9	8.4	---	---	---	7.9

a Partial daily record from 0001 hrs to 1130 hrs.
b Partial daily record from 1030 hrs to 2400 hrs. Total accumulated rainfall from June 14 (1130 hrs) to Aug. 31 (1030 hrs) is 41.1 inches.

HAWAII, ISLAND OF OAHU--Continued

212029157523601. State Key Number 773.3 Kalihi Raingage at Kalihi, Oahu.

LOCATION.--Lat 21°20'29", Long 157°52'36", Hydrologic Unit 20060000, in USGS streamgage station 16229300 on left bank, 0.4 mi northwest of Bishop Museum, and 2.4 mi northwest of Honolulu post office.

PERIOD OF RECORD.--July 1962 to current year. Prior to October 1992, unpublished records in files of the U.S. Geological Survey.

GAGE.--Standard 8-inch National Weather Service raingage with tipping- bucket attachment and recorder. Elevation of gage is 70 ft from topographic map.

REMARKS.--Record poor. Rainfall recorded in tenths of an inch.

RAINFALL ACCUMULATED (INCHES), WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993
DAILY SUM VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.0	.6	.1	.0	.0	.0	---	---	---	f.0	---	.1
2	.0	.0	.0	.0	.0	.0	---	---	---	.0	---	.0
3	.0	.0	.1	.0	.0	.0	---	---	---	.0	---	.0
4	.0	.0	.2	.2	.0	.0	---	---	---	.1	---	.0
5	.0	.0	.2	.0	.0	.0	---	---	---	.0	---	.0
6	.0	.0	.0	.6	.0	.0	---	---	---	.1	---	.0
7	.1	.0	.0	.0	.0	.0	---	---	---	.0	---	.0
8	.0	.1	.0	.0	.2	.0	---	---	---	.0	---	.0
9	.0	.4	.1	.0	.3	.0	---	---	---	.0	---	.0
10	.0	.1	.1	.0	.0	.0	---	---	---	.0	---	.2
11	.0	.1	.3	.0	.0	.0	---	---	---	.0	---	.0
12	2.3	.0	.0	.0	.0	.0	---	---	---	.0	---	.2
13	.3	.1	.0	.0	.0	.0	---	---	---	.0	---	.0
14	.0	.0	.0	.0	.0	.0	---	---	---	.1	---	.0
15	.1	.0	.0	.0	.0	.0	---	---	---	.0	---	.0
16	.1	.0	.0	.0	.0	.0	---	---	c.0	.0	---	.0
17	.0	.1	.0	.0	.0	.0	---	---	.1	.0	---	.0
18	.0	.0	.0	.0	.0	.0	---	---	.1	.1	---	.0
19	.0	.3	.0	.0	.0	.0	---	---	.0	.3	h.7	.3
20	.2	.0	.0	.0	.0	.0	---	---	d.0	.0	.0	.0
21	.0	.0	.2	.0	.0	.0	---	---	---	1.5	.0	.0
22	.1	.0	.2	.0	.0	.0	---	---	---	.5	.1	.0
23	.1	.0	1.7	.0	.0	.0	---	---	---	.0	.0	.1
24	.0	.0	.1	.0	.0	.0	---	---	---	.9	.0	.0
25	.3	.2	1.3	.0	.2	.0	---	---	---	.5	.0	.1
26	.1	.1	2.4	.0	.0	.0	---	---	---	.1	.0	.0
27	.2	.1	.8	.0	.0	.0	b---	---	---	.3	.0	.0
28	.0	.0	.0	.1	.0	a.0	---	---	---	.0	.0	.0
29	.1	.0	.0	.0	---	---	---	---	---	.1	.0	.0
30	.2	.1	3.3	.0	---	---	---	---	---	.0	.0	.0
31	.1	---	.0	.0	---	---	---	---	---	g.0	.0	---
TOTAL	4.3	2.3	11.1	0.9	0.7	---	---	---	---	---	---	1.0

a Partial daily record from 0001 hrs to 2100 hrs.
b Total accumulated rainfall from Mar. 28 (2100 hrs) to Apr. 27 (1245 hrs) is 1.3 inches.
c Partial daily record from 0830 hrs to 2400 hrs. Total accumulated rainfall from Apr. 27 (1245 hrs) to June 16 (0830 hrs) is 3.0 inches.
d Partial daily record from 0001 hrs to 0200 hrs.
f Partial daily record from 0900 hrs to 2400 hrs. Total accumulated rainfall from June 20 (0200 hrs) to July 1 (0900 hrs) is 0.4 inches.
g Partial daily record from 0001 hrs to 1515 hrs.
h Partial daily record from 1015 hrs to 2400 hrs. Total accumulated rainfall from July 31 (1515 hrs) to Aug. 19 (1015 hrs) is 5.2 inches.

HAWAII, ISLAND OF OAHU--Continued

212342157484401. State Key Number 781.11 Luluku Raingage at altitude 220 ft. near Kaneohe, Oahu.

LOCATION.--Lat 21°23'42", Long 157°48'44", Hydrologic Unit 20060000, in USGS streamgage station 16270900 on right bank, 0.5 mi upstream from mouth, 1.4 mi southwest of Castle High School, and 1.9 mi South of Kaneohe Post office.

PERIOD OF RECORD.--1960 to current year. Station was relocated 400 ft upstream 1984. Prior to October 1992, unpublished records in files of the U.S. Geological Survey.

GAGE.--Standard 8-inch National Weather Service tipping-bucket raingage. Elevation of gage is 200 ft. (from Corps of Engineers).

REMARKS.--Records good. Rainfall recorded in tenths of an inch.

RAINFALL ACCUMULATED (INCHES), WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993
DAILY SUM VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.0	1.2	.6	.0	.0	.0	.0	---	.1	.0	.0	.1
2	.0	.1	.0	.0	.0	.0	.0	---	.0	.0	.3	.0
3	.0	.0	.2	.0	.0	.0	.0	---	.0	.0	.0	.0
4	.0	a.0	.1	.2	.0	.0	.0	---	.0	.2	.1	.0
5	.0	---	.1	.0	.0	.1	.2	---	.0	.0	.0	.0
6	.0	---	.0	.5	.0	.0	.0	---	.0	.2	.1	.0
7	1.3	---	.0	.1	.0	.2	.6	---	.5	.1	.1	.0
8	.0	---	.0	.0	1.0	.7	.1	---	.1	.0	.1	.0
9	.0	---	.1	.1	.9	.0	.1	---	.0	.0	.0	.0
10	.0	---	.0	.0	.0	.0	.0	---	.0	.0	.5	.1
11	.1	---	.1	.0	.0	.0	.0	---	.0	.8	.2	.1
12	2.3	---	.0	.0	.0	.0	.1	---	.0	.6	.4	.3
13	.2	---	.0	.0	.0	.0	.0	---	.0	.3	.1	.2
14	.1	---	.0	.0	.0	.0	.0	---	.0	.0	.0	.1
15	.3	---	.0	.0	.0	.0	.0	---	.0	.1	.1	.1
16	.5	b.0	.2	.0	.0	.0	.0	---	.0	.0	.4	.3
17	.0	.1	.1	.0	.0	.0	.0	---	.0	.0	.2	.2
18	.1	.0	.0	.0	.0	.0	.0	d.0	.1	.2	.0	.0
19	.0	.5	.1	.0	.0	.0	.0	.0	.0	1.0	.0	.1
20	.1	.2	.3	.1	.0	.0	.4	.1	.0	.1	.0	.2
21	.7	1.4	.3	.0	.1	.1	.0	.1	.0	1.5	.0	.0
22	.4	1.6	.1	.0	.0	.0	.1	.0	.1	1.9	.3	.5
23	.0	.0	.9	.0	.1	.0	.0	.0	.0	.1	.0	.6
24	.2	.0	.0	.0	.0	.0	.1	.0	.0	.5	.5	.9
25	.4	.2	1.4	.0	.1	.1	.0	.0	.0	.2	.0	.3
26	.2	2.2	2.2	.0	.0	.0	c.7	.0	.1	.1	.0	.8
27	.1	.6	.2	.0	.0	.0	---	.0	.0	.1	.0	.0
28	.2	.0	.0	.0	.0	.0	---	.0	.0	.2	.0	.0
29	.1	.1	.0	.3	---	.0	---	.0	.1	.2	.0	.2
30	.0	.1	4.2	.0	---	.0	---	.0	.0	.0	.0	.1
31	.5	---	.0	.0	---	.0	---	.0	---	.1	1.0	---
TOTAL	7.8	---	11.2	1.3	2.2	1.2	---	---	1.1	8.5	4.4	5.2

a Partial daily record from 0001 hrs to 1020 hrs.
b Partial daily record from 1100 hrs to 2400 hrs. Total accumulated rainfall from Nov. 4 (1020 hrs) to Nov. 16 (1100 hrs) is 1.8 inches.
c Partial daily record from 0001 hrs to 1030 hrs.
d Partial daily record from 1100 hrs to 2400 hrs. Total accumulated rainfall from Apr. 26 (1030 hrs) to May. 18 (1100 hrs) is 6.0 inches.<

HAWAII, ISLAND OF OAHU--Continued

212322157474401. State Key Number 781.9 Right Branch Kamooalii Raingage near Kaneohe, Oahu.

LOCATION.--Lat 21°23'22" Long 157°47'44", Hydrologic Unit Code 20060000, in USGS streamgage station 16265600 on left bank, 0.3 mi south of Hawaiian Memorial Park Cemetery, 1.0 mi northwest of Pali Golf Course, and 1.3 mi south of Castle High School.

PERIOD OF RECORD.--February 1983 to current year. Prior to 1992, unpublished records in files of the U.S. Geological Survey.

GAGE.--Standard 8-inch National Weather Service raingage. Elevation of gage is 210 ft from topographic map.

REMARKS.--Records poor. Rainfall recorded in tenths of an inch. Volumetric totals were used from October 1 to December 29, daily record from December 30 to August 22, and no record August 23 to the end of the year.

RAINFALL ACCUMULATED (INCHES), WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993
DAILY SUM VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	---	---	.0	.0	.0	.0	.0	.0	.0	.0	---
2	---	---	---	.0	.0	.0	.0	.0	.0	.0	.2	---
3	---	---	---	.0	.0	.0	.0	.1	.1	.0	.0	---
4	---	---	---	.1	.0	.0	.0	.1	.0	.1	.1	---
5	---	---	---	.0	.0	.0	.2	.0	.0	.0	.0	---
6	---	---	---	.6	.0	.0	.0	.0	.0	.2	.2	---
7	---	---	---	.0	.0	.2	.6	.1	.5	.1	.0	---
8	---	---	---	.0	1.2	.6	.1	.0	.1	.0	.2	---
9	---	---	---	.1	.3	.1	.0	.0	.0	.1	.0	---
10	---	---	---	.0	.0	.1	.0	.0	.0	.1	.7	---
11	---	---	---	.0	.0	.0	.0	.1	.^	2.0	.4	---
12	---	---	---	.0	.0	.0	.0	1.6	.0	.1	.0	---
13	---	---	---	.1	.0	.0	.1	.0	.0	.1	.1	---
14	---	---	---	.0	.0	.0	.0	.2	.0	.0	.0	---
15	---	---	---	.1	.0	.0	.0	.0	.0	.1	.1	---
16	---	a---	---	.0	.0	.0	.0	.0	.0	.0	.3	---
17	---	---	---	.0	.0	.0	.0	.2	.0	.0	.0	---
18	---	---	---	.0	.0	.0	.0	.1	.1	.1	.0	---
19	---	---	---	.0	.0	.0	.1	.1	.1	1.1	.1	---
20	---	---	---	.0	.0	.0	.1	.1	.0	.0	.0	---
21	---	---	---	.1	.0	.0	.0	.0	.0	1.4	.0	---
22	---	---	---	.0	.0	.0	.1	.0	.0	1.7	.3	---
23	---	---	---	.0	.0	.0	.1	.0	.0	.0	---	---
24	---	---	---	.0	.0	.0	.1	.0	.0	.4	---	---
25	---	---	---	.0	.1	.0	.0	.0	.0	.2	---	---
26	---	---	---	.0	.0	.0	.6	.0	.0	.1	---	---
27	---	---	---	.0	.0	.0	.4	.0	.0	.0	---	---
28	---	---	---	.0	.0	.0	.0	.0	.0	.4	---	---
29	---	---	---	.5	---	.0	.0	.0	.3	.1	---	---
30	---	---	b4.4	.0	---	.0	.3	.0	.1	.0	---	c---
31	---	---	.0	.0	---	.0	---	.0	---	.0	---	---
TOTAL	---	---	---	1.6	1.6	1.0	2.8	2.7	1.3	8.4	---	---

a Total accumulated rainfall from Aug. 27 (1445 hrs) to Nov. 16 (1400 hrs) is 17.9 inches.
b Partial daily record from 1015 hrs to 2400 hrs. Total accumulated rainfall from Nov. 16 (1400 hrs) to Dec. 30 (1015 hrs) is 17.2 inches.
c Rain catchment plugged. No record from Aug. 23 (0001 hrs) to Oct. 28 (1425 hrs).

HAWAII, ISLAND OF OAHU--Continued

212114157435001. State Key Number 794.3 Waimanalo Raingage at Waimanalo, Oahu.

LOCATION.--Lat 21°21'14" LONG 157°43'50", Hydrologic Unit 20060000, in USGS streamgage station 16249000, 260 ft downstream from Kalanianaole Highway, and 2.3 mi northwest of Waimanalo post office.

PERIOD OF RECORD.--January 1967 to current year. Prior to October 1992, unpublished records in files of the U.S. Geological Survey.

GAGE.--Standard 8-inch National Weather Service raingage with recorder on tipping-bucket system. Elevation of gage is 20 ft from topographic map.

REMARKS.--Records fair. Rainfall recorded in tenths of an inch.

RAINFALL ACCUMULATED (INCHES), WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993
DAILY SUM VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.0	1.1	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0
2	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
4	.0	.0	.0	.0	.0	.0	.0	.0	.0	.1	.0	.0
5	.0	.0	.0	.5	.0	.0	.0	.0	.0	.0	.0	.0
6	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.6	.0
7	.6	.0	.0	.0	.8	.2	.1	.1	.2	.0	.0	.0
8	.0	.0	.0	.1	.2	.1	.1	.0	.0	.0	.0	.0
9	.0	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
10	.0	.1	.1	.0	.0	.0	.0	.1	.0	.0	.0	.2
11	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.3	.0
12	4.5	.0	.2	.0	.0	.0	.0	.1	.0	.0	.0	.0
13	1.3	.2	.0	.0	.0	.0	.0	.0	.1	.0	.0	.0
14	.0	.1	.0	.3	.0	.0	.0	.0	.0	.0	.0	.0
15	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
16	.1	.0	.1	.0	.0	.0	.0	.0	.0	.0	.2	.4
17	.0	.1	.0	.0	.0	.0	.0	.1	.0	.0	.1	.0
18	.0	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0
19	.0	.3	.0	.0	.0	.0	.2	.1	.1	.5	.0	.0
20	.2	.3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
21	.2	1.8	.1	.0	.0	.0	.0	.0	.1	1.3	.0	.0
22	.1	1.0	.2	.0	.1	.0	.0	.0	.0	1.2	.0	.2
23	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.1	.2
24	.1	.0	.3	.0	.0	.0	.2	.0	.0	.1	.2	.1
25	.2	.2	2.4	.0	.0	.0	.3	.0	.0	.0	.0	.0
26	.0	1.1	1.5	.0	.0	.0	.0	.0	.0	.1	.0	1.0
27	.0	1.8	.3	.1	.0	.0	.0	.0	.0	.0	.0	.2
28	.1	.0	.0	.4	.0	.0	.0	.0	.0	.1	.0	.0
29	.0	.0	1.4	.0	---	.0	.0	.0	.0	.1	.0	.0
30	.1	.0	5.0	.0	---	.0	.0	.0	.0	.0	.0	.0
31	.3	---	.0	.0	---	.0	---	.0	---	.0	.3	---
TOTAL	7.9	8.2	11.8	1.4	1.1	0.3	1.0	0.5	0.5	3.5	1.8	2.3

WTR YR 1993 TOTAL 40.3

HAWAII, ISLAND OF OAHU--Continued

212813157574001. State Key Number 832.2 Kipapa Raingage near Wahiawa, Oahu.

LOCATION.--Lat 21°28'13", Long 157°57'50", Hydrologic Unit 20060000, in USGS streamgage station 16212800, on left bank of stream 1700 ft below Forest Reserve Boundary, 4.9 mi southeast of Wahiawa post office, and 6.3 mi northeast of Waipahu.

PERIOD OF RECORD.--January 2, 1957 to current year. Prior to October 1992, unpublished records in files of the U.S. Geological Survey.

GAGE.--Standard 8-inch National Weather Service collector attached to tipping-bucket counter and recorder. Elevation of gage is 690 ft from topographic map.

REMARKS.--Records good. Rainfall recorded in tenths of an inch.

RAINFALL ACCUMULATED (INCHES), WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993
DAILY SUM VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.0	.9	.4	---	.1	.2	.0	.0	.0	.2	.0	1.8
2	.0	.0	.0	---	.0	.0	.0	.1	.0	.0	.5	.0
3	.0	.0	.1	---	.0	.1	.0	.5	.1	.2	.0	.0
4	.0	.0	1.1	---	.0	.0	.0	.2	.0	.2	.0	.4
5	.0	.0	.4	---	.1	.0	.5	.0	.2	.2	.0	.0
6	.0	.2	.1	---	.0	.0	.0	.0	.0	.2	.1	.0
7	.2	.5	.1	---	.0	.0	.1	.2	.4	.0	.1	.0
8	.0	.3	.0	---	.1	.2	.1	1.2	.7	.0	.0	.0
9	.0	1.7	1.1	---	1.0	.4	.0	.4	.1	.4	.2	.0
10	.0	.3	.6	---	.0	.0	.0	.2	.1	.0	.3	.4
11	.0	.6	1.2	---	.0	.0	.0	.2	.0	.0	.4	.0
12	1.9	.0	.0	---	.0	.0	.2	.1	.1	.0	.0	.5
13	.5	.6	.0	---	.1	.0	.0	.0	.0	.0	.0	.2
14	1.0	.0	.0	---	.0	.1	.0	.5	.0	.0	.0	.0
15	.2	.0	.0	---	.0	.1	.0	.0	.0	.0	.0	.1
16	.2	.0	.0	---	.0	.0	.0	.0	.0	.0	1.3	.0
17	.0	.2	.0	---	.0	.0	.0	.4	.3	.1	.2	b.2
18	.0	.0	.1	---	.0	.0	.0	.4	.2	.5	.0	---
19	.0	.5	.1	---	.0	.0	.9	.2	.1	.5	1.3	---
20	.0	.0	.1	---	.0	.0	.0	.1	.0	.1	.1	---
21	.1	.0	.1	---	.0	.0	.0	.3	.2	1.9	.1	---
22	.3	.1	.5	a.0	.1	.0	.0	.0	.0	1.1	.0	---
23	.2	.0	.4	.0	.1	.0	.9	.0	.1	.0	.0	---
24	.5	.0	.0	.0	.1	.1	.0	.0	.0	1.2	.5	---
25	.5	.1	.0	.0	.0	.0	.3	.0	.3	.4	.0	---
26	.1	.1	.7	.0	.0	.0	.5	.0	.0	.7	.0	---
27	.4	.4	.2	.0	.0	.0	1.2	.0	.0	.6	.0	---
28	.2	.0	---	.0	.0	.0	.1	.0	.1	.1	.0	---
29	.1	.2	---	.3	---	.0	.4	.0	.0	.2	.0	---
30	.4	.2	---	.0	---	.0	.8	.0	.3	.0	.0	c---
31	.1	---	---	.0	---	.0	---	.1	---	.0	.5	---
TOTAL	6.9	6.9	---	---	1.7	1.2	6.0	5.1	3.3	8.8	5.6	---

a Partial daily record from 0900 hrs to 2400 hrs. Total accumulated rainfall from Dec. 28 (0001 hrs) to Jan. 22 (0900 hrs) is 11.5 inches.
b Partial daily record from 0001 hrs to 0600 hrs.
c Total accumulated rainfall from Sep. 17 (0600 hrs) to Oct. 18 (1000 hrs) is 4.5 inches.<

HAWAII, ISLAND OF OAHU--Continued

212650157521001. State Key Number 839.11 Waihee at ridge crossing Raingage near Heeia, Oahu.

LOCATION.--Lat 21°26'50", Long 157°52'10", Hydrologic Unit 20060000, approximately 1,000 ft downstream from USGS streamgage station 16283600.

PERIOD OF RECORD.--Oct. 13, 1963 to current year. Prior to October 1992, unpublished records in files of the U.S. Geological Survey.

GAGE.--Standard 8-inch National Weather Service raingage. Elevation of gage is 400 ft from topographic map.

REMARKS.--Records fair. Cummulative rainfall read in nearest tenths of an inch.

RAINFALL ACCUMULATED (INCHES), WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993
INTERMITTENT READINGS

Period	Rainfall
Sep. 10 to Oct. 29	16.4
Oct. 29 to Dec. 28	a>24.0
Dec. 28 to Mar. 08	10.1
Mar. 08 to June 25	6.3
June 25 to Aug. 20	19.4
Aug. 20 to Oct. 13	14.9

> Actual value is known to be greater than the value shown
a Can overflowed

HAWAII, ISLAND OF OAHU--Continued

212434157495601. State Key Number 839.3 Haiku Raingage near Heeia, Oahu.

LOCATION.--Lat 21°24'34", Long 157°49'56", approximately 1,600 ft inside of security fence at Haiku, on the right side of roadway.

PERIOD OF RECORD.--February 1, 1983 to current year. Prior to October 1992, unpublished records on file with U.S. Geological Survey.

GAGE.--Standard 8-inch National Weather Service receiver and 7 5/16-inch storage can with recorder. Elevation of gage is 195 ft from topographic map.

REMARKS.--Records good. Rainfall recorded in tenths of an inch.

RAINFALL ACCUMULATED (INCHES), WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993
DAILY SUM VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.0	1.3	.8	.0	.0	.0	.0	.0	.0	.0	.0	.2
2	.0	.0	.2	.0	.0	.0	.0	.0	.0	.0	.4	.0
3	.0	.0	.4	.0	.0	.0	.0	.2	.0	.0	.0	.0
4	.0	.0	.2	.2	.0	.0	.0	.1	.1	.2	.0	.0
5	.0	.0	.0	.0	.0	.0	.3	.0	.0	.1	.0	.0
6	.0	.0	.0	.5	.0	.0	.0	.0	.0	.0	.2	.0
7	1.6	.0	.0	.0	.0	.2	1.1	.0	.8	.0	.0	.0
8	.0	.0	.0	.0	.7	.7	.1	.3	.2	.0	.2	.0
9	.0	.5	.0	.1	.6	.1	.0	.0	.0	.0	.0	.2
10	.0	.0	.1	.0	.0	.0	.0	.0	.0	.2	.2	.0
11	.2	.4	.0	.0	.0	.0	.0	.0	.0	.6	.5	.2
12	2.1	.0	.0	.0	.0	.0	.0	1.1	.0	.2	.0	.0
13	.5	.7	.0	.0	.0	.0	.0	.0	.0	.8	.2	.7
14	.6	.3	.0	.0	.0	.0	.0	1.1	.0	.0	.0	.0
15	.8	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
16	.3	.0	.5	.0	.0	.0	.0	.0	.0	.0	.3	.1
17	.2	.3	.0	.0	.0	.2	.0	.4	.0	.0	.3	.0
18	.0	.0	.0	.0	.0	.0	.0	.0	.0	.2	.2	.0
19	.0	.7	.2	.0	.0	.0	.3	.0	.0	.8	.6	.4
20	.0	.2	.2	.0	.0	.0	.2	.0	.0	.2	.0	.4
21	.6	1.3	.6	.2	.0	.0	.0	.0	.0	2.1	.0	.0
22	.2	1.7	.3	.0	.0	.0	.0	.0	.0	2.5	.2	.8
23	.0	.0	1.6	.0	.0	.0	.1	.0	.0	.2	.0	.9
24	.0	.0	.3	.0	.0	.0	.0	.0	.0	.5	.7	.5
25	.5	.3	1.6	.0	.1	.0	.0	.0	.0	.5	.0	.4
26	.4	2.1	2.5	.0	.0	.0	.6	.0	.5	.2	.0	.4
27	.3	.3	.3	.0	.0	.0	.8	.0	.0	.0	.0	.0
28	.0	.0	.0	.0	.0	.0	.0	.0	.0	.3	.0	3.1
29	.0	.2	.0	.2	---	.0	.0	.0	.3	.3	.0	.3
30	.2	.2	3.1	.0	---	.0	.2	.0	.4	.0	.0	.0
31	.0	---	.0	.0	---	.0	---	.0	---	.4	1.7	---
TOTAL	8.5	10.5	12.9	1.2	1.4	1.2	3.7	3.2	2.3	10.3	5.7	8.6

WTR YR 1993 TOTAL 69.5

HAWAII, ISLAND OF OAHU--Continued

212642157521001. State Key Number 839.9 South Fork Waihee Raingage near Heeia, Oahu.

LOCATION.--LAT 21°26'42", Long 157°52'10", Hydrologic Unit 20060000, 50 ft north of streamgage station 16283600, on side of a hill approximately 40 ft above station.

PERIOD OF RECORD.--Oct. 13, 1963 to current year. Prior to October 1992, unpublished records in files of the U.S. Geological Survey.

GAGE.--Standard 8-inch National Weather Service collector with 24-inch tall standard 8-inch can.

REMARKS.--Cumulative rainfall read in nearest tenths of an inch.

RAINFALL ACCUMULATED (INCHES), WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993
INTERMITTENT READINGS

Period	Rainfall
June 25 to Oct. 29	16.6
Oct. 29 to Dec. 22	19.5
Dec. 22 to May 05	7.6
May 05 to June 25	6.7
June 25 to Aug. 20	19.7
Aug. 20 to Oct. 13	14.3

213048158105801. State Key Number 842.1 Makaha Raingage near Makaha, Oahu.

LOCATION.--Lat 21°30'48", Long 158°10'58", Hydrologic Unit 20060000, on right bank, 1.5 mi northeast of Kaneaki Heiau, and 3.4 mi northeast of Makaha.

PERIOD OF RECORD.--July 1959 to current year. Prior to October 1992, unpublished records in files of the U.S. Geological Survey.

GAGE.--Standard 8-inch National Weather Service collector and 7 5/16-inch rain can, non-recording raingage. Housed along with water-stage recorder in surface water station (16211600). Elevation of gage is 957 ft from topographic map.

REMARKS.--Cummulative rainfall only on visit by visit basis, read in nearest tenths of an inch.

RAINFALL ACCUMULATED (INCHES), WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993
INTERMITTENT READINGS

Period	Rainfall
Aug. 05 to Oct. 19	8.0
Oct. 19 to Dec. 07	7.4
Dec. 07 to Jan. 21	12.4
Jan. 21 to Mar. 30	3.5
Mar. 30 to May 19	3.9
May 19 to Jul. 07	0.7
Jul. 07 to Oct. 21	8.7

HAWAII, ISLAND OF OAHU--Continued

213205157571001. State Key Number 882.3 Poamoho Raingage No. 3 near Wahiawa, Oahu.

LOCATION.--Lat 21°32'05", Long 157°57'10", (Hauula quadrangle, 1966, 1:24000), Hydrologic Unit 20060000, on right side of Poamoho trail, 0.2 mi northeast from trail marker.

PERIOD OF RECORD.--July 12, 1967 to current year. Prior to October 1992, unpublished records in files of the U.S. Geological Survey.

GAGE.--Standard 8-inch National Weather Service raingage with recorder. Elevation of gage is 1,800 ft from topographic map.

REMARKS.--Record good. Cumulative rainfall read in nearest tenths of an inch.

RAINFALL ACCUMULATED (INCHES), WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993
INTERMITTENT READINGS

Period	Rainfall
Sep. 08 to Dec. 04	a---
Dec. 04 to Jan. 26	a---
Jan. 26 to Apr. 15	a---
Apr. 15 to July 06	28.9
July 26 to Oct. 05	a---

a Station vandalized, no record

HAWAII, ISLAND OF OAHU--Continued

213211157562400. State Key Number 882.4 Poamoho Raingage No. 2 near Wahiawa, Oahu.

LOCATION.--Lat 21°32'11", Long 157°56'24", Hydrologic Unit 20060000, on Poamoho trail 1.0 mi west of junction with Koolau Summit trail, and 5.3 mi northeast of Leilehua High School in Waihawa.

PERIOD OF RECORD.--June 8, 1967 to current year. Prior to October 1992, unpublished records in files of the U.S. Geological Survey.

GAGE.--Standard 8-inch National Weather Service raingage with recorder. Elevation of gage is 1,960 ft from topographic map.

REMARKS.--Record good. Rainfall recorded in hundredths of an inch.

RAINFALL ACCUMULATED (INCHES), WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993
DAILY SUM VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	1.31	1.45	.00	.00	.20	.14	.05	.08	.10	.63	.25
2	.00	.07	.25	.00	.05	.01	.02	.04	.15	.10	2.00	.00
3	.00	.00	2.80	.40	.00	.00	.05	.26	.07	.00	.03	.00
4	.00	.00	1.32	.40	.00	.15	.02	.09	.07	.70	.30	.85
5	.31	.00	.43	.62	.20	.04	1.32	.23	.33	.50	.10	.02
6	.00	.25	.40	.65	.03	.31	.06	.18	.30	.06	.60	.05
7	.73	.30	.01	.27	.02	.77	1.72	.60	1.45	.08	.15	.01
8	.00	.22	.03	.05	1.42	.83	.72	1.70	.73	.06	.48	.10
9	.00	1.20	.50	.37	4.62	.40	.17	.15	.09	1.22	.05	.13
10	.00	.20	.60	.05	.10	.03	.02	.40	.38	.11	.60	.40
11	.03	1.22	2.43	.05	.01	.00	.08	2.30	.15	.43	2.07	.82
12	1.53	.33	1.15	.00	.01	.00	.18	2.25	.30	.01	.20	.58
13	.30	3.04	.00	.05	.22	.00	.22	.08	.01	.00	.30	1.12
14	.17	.68	.01	.11	.00	.20	.03	1.55	.22	.19	.18	.10
15	.71	.30	.03	.23	.00	.00	.03	.16	.06	.16	.15	.40
16	.35	.00	1.20	.22	.00	.00	.06	.18	.66	.38	1.30	.20
17	.37	1.80	.18	.08	.01	.00	.02	.80	.40	.17	.50	.17
18	.13	.03	.16	.00	.03	.09	.30	.64	.47	.80	.01	.42
19	.05	.77	.72	.12	.00	.00	.93	.48	.38	1.47	.80	.90
20	.24	.01	.72	.10	.02	.95	.60	.30	.05	.86	.06	.60
21	.76	.06	.90	.50	.20	.03	.05	.95	.13	2.80	.18	.00
22	.52	.23	1.59	.00	.30	.05	.80	.00	.47	8.45	.50	.44
23	.32	.15	6.85	.00	.20	.00	.18	.10	.30	.43	.01	1.40
24	.38	.00	2.16	.00	.15	.23	.77	.60	.05	2.33	1.46	1.45
25	1.05	1.12	2.73	.00	.40	.18	.30	.00	.40	.82	.08	.02
26	.52	1.66	1.33	.30	.00	.02	1.82	.00	.20	.31	.00	2.04
27	.58	1.58	.80	.00	.00	.05	3.70	.03	.05	1.10	.00	.01
28	.30	.00	2.20	.01	.00	.02	.15	.01	.15	.61	.16	.03
29	.20	.95	.32	.40	---	.03	.20	.00	.26	1.20	.03	.70
30	.95	.82	2.05	.00	---	.01	.53	.01	.45	.01	.02	.40
31	.40	---	.02	.19	---	.00	---	.42	---	.08	1.80	---
TOTAL	10.90	18.30	35.34	5.17	7.99	4.60	15.19	14.56	8.81	25.54	14.75	13.61

WTR YR 1993 TOTAL 174.76

HAWAII, ISLAND OF OAHU--Continued

213215157552800. State Key Number 883.12 Poamoho raingage No. 1 near Wahiawa, Oahu.

LOCATION.--Lat 21°32'15", Long 157°55'28", Hydrologic Unit 20060000, at junction of Poamoho and Koolau summit trails, and 6.2 mi northeast of Leilehua High School in Wahiawa.

PERIOD OF RECORD.--June 1967 to current year. Prior to October 1992, unpublished records in files of the U.S. Geological Survey.

GAGE.--Standard 8-inch National Weather Service raingage with recorder. Elevation is 2,480 ft from topographic map.

REMARKS.--Records good. Rainfall recorded in hundredths of an inch.

RAINFALL ACCUMULATED (INCHES), WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993
DAILY SUM VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	1.66	1.43	.02	.00	.07	.20	.05	.04	.10	1.50	.33
2	.01	.00	.38	.02	.00	.00	.00	.00	.07	.20	1.78	.00
3	.00	.00	2.40	.42	.00	.00	.00	.23	.05	.05	.01	.05
4	.02	.00	1.27	.52	.00	.27	.10	.03	.08	.70	.33	1.68
5	.28	.00	.18	.81	.13	.01	.95	.15	.22	.38	.01	.09
6	.00	.33	.21	.72	.00	.10	.04	.09	.09	.10	.22	.02
7	1.65	.17	.00	.22	.00	.83	1.40	.20	1.32	.18	.24	.01
8	.03	.10	.00	.00	1.80	1.60	.82	1.42	.58	.01	.40	.20
9	.00	.60	.30	.40	3.72	.10	.05	.15	.04	1.40	.08	.15
10	.00	.60	.55	.05	.10	.00	.00	.15	.10	.19	.50	.23
11	.17	1.00	1.00	.00	.05	.00	.01	2.20	.20	.57	1.40	.62
12	1.30	.16	1.37	.00	.00	.00	.20	3.15	.39	.00	.20	.20
13	.40	2.40	.01	.12	.39	.00	.18	.00	.00	.12	.30	1.15
14	.10	.80	.01	.00	.00	.20	.00	.81	.41	.19	.10	.05
15	.70	.05	.02	.30	.00	.05	.05	.05	.00	.18	.18	.33
16	.43	.04	2.24	.02	.00	.00	.00	.20	.50	.25	1.48	.52
17	.63	1.80	.28	.08	.00	.00	.09	.80	.30	.10	.21	.15
18	.20	.05	.02	.00	.00	.03	.20	.44	.30	.92	.00	.94
19	.00	.70	.90	.24	.00	.00	.40	.58	.40	1.20	.80	2.20
20	.43	.25	.68	.30	.00	.60	.62	.60	.08	.98	.02	.72
21	.84	.90	.46	.22	.09	.09	.00	1.52	.10	2.50	.03	.00
22	.29	.75	1.61	.01	.10	.00	1.03	.00	.30	8.40	.47	.20
23	.11	.18	9.05	.00	.11	.00	.10	.23	.10	.53	.06	3.47
24	.23	.02	3.65	.00	.08	.22	.55	.32	.00	1.50	1.67	1.40
25	.90	.70	4.34	.00	.25	.24	.20	.00	.40	.60	.05	.20
26	.30	2.13	1.35	.00	.00	.00	1.81	.07	.30	.30	.00	2.39
27	.60	.70	1.22	.00	.00	.00	2.39	.00	.04	.70	.01	.13
28	.18	.05	2.30	.09	.00	.00	.07	.00	.15	.60	.20	.16
29	.60	.80	.88	.50	---	.05	.04	.12	.48	1.10	.02	.65
30	.24	.68	2.40	.00	---	.00	.60	.00	.48	.00	.40	.33
31	.36	---	.00	.10	---	.00	---	.35	---	.05	2.67	---
TOTAL	11.00	17.62	40.51	5.16	6.82	4.46	12.10	13.91	7.52	24.10	15.34	18.57

WTR YR 1993 TOTAL 177.11

HAWAII, ISLAND OF OAHU--Continued

213221157541501. State Key Number 884.3 Punaluu Raingage near Punaluu, Oahu.

LOCATION.--Lat 21°32'21", Long 157°54'15", Hydrologic Unit 20060000, 4.9 mi south of Hauula School, and 1.5 mi south of USGS streamgage station on Punaluu ditch 16302000.

PERIOD OF RECORD.--July 14, 1967 to current year. Prior to October 1992, unpublished records in files of the U.S. Geological Survey.

GAGE.--Standard 8-inch National Weather Service collector with 3-inch diameter, 5-feet high measuring can. Elevation of gage is 750 ft from topographic map.

REMARKS.--Cummulative rainfall read in nearest tenths of an inch.

RAINFALL ACCUMULATED (INCHES), WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993
INTERMITTENT READINGS

Period	Rainfall
Aug. 24 to Dec. 17	47.2
Dec. 17 to Apr. 05	29.0
Apr. 05 to May 20	11.1
May 20 to July 27	20.0
July 27 to Oct. 04	29.6

213238157530701. State Key Number 886.4 Kahana Raingage at altitude 30 feet near Kahana, Oahu.

LOCATION.--Lat 21°32'38", Long 157°53'07", Hydrologic Unit 20060000, on right bank, 600 ft upstream from Kawa Stream, 1.1 mi southwest of Kahana, and 2.2 mi southwest of Swanzy Beach Park in Kaawa.

PERIOD OF RECORD.--December 1958 to current year. Prior to October 1992, unpublished records in files of the U.S. Geological Survey.

GAGE.--Standard 8-inch National Weather Service non-recording raingage. Housed with stream flow equipment at station (16296500). Elevation of gage is 30 ft from topographic map.

REMARKS.--Cummulative totals taken on a visit-by visit basis read in nearest tenths of an inch.

RAINFALL ACCUMULATED (INCHES), WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993
INTERMITTENT READINGS

Period	Rainfall
Sep. 18 to Nov. 06	10.9
Nov. 06 to Jan. 14	34.9
Jan. 14 to Mar. 09	7.0
Mar. 09 to May 14	10.4
May 14 to July 16	0.0
July 16 to Oct. 08	36.9

HAWAII, ISLAND OF OAHU--Continued

213000157513401. State Key Number 886.6 Waikane Raingage at altitude 75 ft. at Waikane, Oahu.

LOCATION.--Lat 21°30'00", Long 157°51'34", Hydrologic Unit 20060000, in USGS streamgage station 16294900, 0.3 mi downstream from Waikeekee Stream, 0.7 mi west of Waikane, and 1.2 mi northwest of Waiahole School.

PERIOD OF RECORD.--December 1959 to current year. Prior to October 1992, unpublished records in files of the U.S. Geological Survey.

GAGE.--Standard 8-inch National Weather Service non-recording raingage.

REMARKS.--Cummulative rainfall read in nearest tenths of an inch.

RAINFALL ACCUMULATED (INCHES), WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993
INTERMITTENT READINGS

Period	Rainfall
Sep. 01 to Oct. 27	18.6
Oct. 27 to Jan. 06	a>24.0
Jan. 06 to Mar. 12	3.7
Mar. 12 to May 19	5.9
May 19 to July 15	5.3
July 15 to Sep. 23	19.2
Sep. 23 to Oct. 13	3.8

> Actual value is known to be more than the value shown
a Can overflowed

HAWAII, ISLAND OF OAHU--Continued

213725158010401. State Key Number 897.1 Kamananui Raingage at Pupukea Military Road near Maunawai, Oahu

LOCATION.--Lat 21°37'25", long 158°01'04", Hydrologic Unit 20060000, on left bank, 75.0 ft upstream from Pupukea Military Road, and 3.5 mi southeast of Maunawai.

PERIOD OF RECORD.--July 1, 1963 to current year. Prior to October 1992, unpublished records in files of the Geological Survey.

GAGE.--Standard 8-inch National Weather Service recording rain gage. Elevation of gage is 590 ft from topographic map.

REMARKS.--Records good. Rainfall recorded in tenths of an inch.

RAINFALL ACCUMULATED (INCHES), WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993
DAILY SUM VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.0	1.2	.3	.0	.0	.1	.0	.0	.0	.0	.0	.0
2	.0	.0	.1	.0	.0	.0	.0	.0	.0	.0	.4	.0
3	.0	.0	.0	.3	.0	.0	.0	.2	.0	.0	.0	.0
4	.0	.0	1.0	.8	.0	.0	.0	.2	.0	.4	.1	.0
5	.0	.0	.2	.5	.3	.0	.8	.0	.3	.4	.0	.0
6	.0	.0	.2	1.3	.0	.1	.1	.1	.1	.0	.2	.0
7	1.7	.0	.0	.0	.0	.2	.4	.1	.5	.1	.0	.0
8	.0	.2	.0	.0	.9	.6	.1	1.8	.1	.0	.1	.0
9	.0	.9	.2	.2	1.8	.3	.1	.0	.0	.0	.1	.0
10	.0	.1	.5	.1	.0	.0	.0	.2	.1	.1	.3	.1
11	.0	.5	1.0	.0	.0	.0	.0	.5	.1	.1	.3	.3
12	1.6	.1	.0	.0	.0	.0	.0	1.2	.2	.0	.2	.2
13	.0	1.6	.0	.1	.4	.0	.1	.0	.0	.2	.0	.3
14	.0	.1	.0	.0	.0	.2	.0	.0	.1	.0	.1	.1
15	.3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.1	.1
16	.2	.0	.0	.1	.0	.0	.0	.0	.0	.0	1.2	.1
17	.2	.1	.0	.0	.0	.0	.1	.4	.2	.1	.2	.0
18	.0	.0	.0	.0	.0	.0	.2	.1	.4	.6	.0	.0
19	.0	.1	.2	.1	.0	.0	.2	.2	.1	.6	1.8	.0
20	.1	.0	.1	.0	.0	.1	.2	.1	.0	.1	.0	.0
21	.1	.4	.5	.2	.0	.0	.0	.2	.2	1.4	.1	.0
22	.1	.5	.6	.0	.0	.0	.0	.0	.4	3.6	.2	.0
23	.3	.0	.5	.0	.1	.0	.0	.0	.1	.2	.1	.1
24	.4	.0	.1	.0	.0	.0	.3	.1	.0	.8	.4	.0
25	.6	.5	1.1	.0	.0	.1	.1	.0	.2	.6	.0	.0
26	.1	.9	1.2	.0	.0	.0	.4	.0	.1	.1	.0	.3
27	.1	1.4	.3	.0	.0	.0	.5	.0	.0	.4	.0	.0
28	.1	.0	.0	.0	.0	.0	.0	.0	.0	.4	.0	.0
29	.1	.1	.0	.5	---	.0	.2	.0	.2	.5	.0	.2
30	.2	.1	1.7	.0	---	.0	.6	.0	.0	.0	1.2	.2
31	.1	---	.0	.2	---	.0	---	.2	---	.0	1.8	---
TOTAL	6.3	8.8	9.8	4.4	3.5	1.7	4.4	5.6	3.4	10.7	8.9	2.0

WTR YR 1993 TOTAL 69.5

HAWAII, ISLAND OF OAHU--Continued

213608158011101. State Key Number 897.9 Pupukea Rd. Raingage at altitude 1,600 ft near Haleiwa, Oahu.

LOCATION.--Lat 21°36'08", Long 158°01'11", Hydrologic Unit 20060000, 4.3 mi southeast of Maunawai, 5.5 mi east of Haleiwa Beach Park, and 400 ft left of the road on the ridge.

PERIOD OF RECORD.--Nov. 1, 1967 to current year. Prior to October 1992, unpublished records in files of the U.S. Geological Survey.

GAGE.--Standard 8-inch National Weather Service rain collector attached to a 8-inch storage tank and recorder. Elevation of gage is 1,160 ft from topographic map.

REMARKS.--Records good. Rainfall recorded in hundredths of an inch.

RAINFALL ACCUMULATED (INCHES), WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993
DAILY SUM VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	1.56	.24	.00	.00	.48	.12	.12	.24	.00	.24	.00
2	.00	.00	.00	.00	.00	.00	.00	.00	.24	.00	.24	.72
3	.00	.00	.12	.36	.00	.00	.00	.24	.60	.12	.36	.00
4	.12	.00	.96	1.08	.00	.12	.00	.12	.72	.60	.12	.00
5	.00	.00	.72	.36	.24	.00	.60	.00	.48	.36	.00	.00
6	.00	.00	.48	1.80	.00	.36	.24	.12	.12	.00	.24	.00
7	.84	.12	.00	.12	.00	.72	.48	.48	.36	.48	.12	1.44
8	.00	.24	.00	.12	.84	.12	.12	1.68	.36	.12	.00	.36
9	.00	1.08	.36	.24	1.80	.48	.00	.00	.00	.12	.00	.84
10	.00	.24	.48	.00	.00	.00	.00	.48	.00	.12	.72	.12
11	.00	.36	.60	.36	.00	.60	.00	.24	.12	.12	.12	.12
12	1.20	.12	1.20	.00	.00	.84	.12	.72	.00	.00	.12	.24
13	.24	1.92	.00	.24	.48	.00	.12	.00	.00	.36	.00	.60
14	.00	.24	.00	.00	.00	.36	.00	.36	.00	.12	.00	.12
15	.72	.00	.00	.12	.00	.00	.00	.00	.24	.00	.12	.12
16	.12	.00	.24	.12	.00	.00	.00	.12	.24	.00	1.20	.12
17	.24	.00	.36	.00	.00	.00	.00	.36	.48	.12	.72	.00
18	.00	.00	.12	.00	.00	.00	.24	.84	.36	.72	.00	.00
19	.24	.12	.24	.00	.00	.00	.48	.36	.12	.60	2.12	.24
20	.24	.00	.00	.12	.00	.24	.00	.60	.00	.12	.16	.12
21	.00	.84	.60	.12	.12	.00	.00	.00	.12	2.04	.24	.00
22	.24	.60	.48	.00	.12	.00	.12	.00	.12	1.56	.12	.00
23	.24	.00	.48	.00	.12	.00	.00	.00	.12	.60	.00	.00
24	.36	.00	.00	.00	.00	.00	.24	.12	.00	.60	.40	.84
25	.72	.84	.60	.00	.12	.00	.36	.00	.36	.60	.00	.00
26	.00	.60	1.44	.00	.00	.00	.36	.36	.12	.36	.00	1.08
27	.36	.36	.48	.00	.00	.00	.48	.48	.36	1.01	.24	.00
28	.24	.00	.00	.12	.72	.12	.36	.00	.00	.31	.12	.00
29	.24	.00	.00	.72	---	.24	.48	.00	.96	.48	.60	.12
30	.00	.12	1.68	.00	---	.00	.84	.00	.48	.00	.11	.12
31	.12	---	.00	.12	---	.00	---	.12	---	.00	1.45	---
TOTAL	6.48	9.36	11.88	6.12	4.56	4.68	5.76	7.92	7.32	11.64	9.88	7.32

WTR YR 1993 TOTAL 92.92

HAWAII, ISLAND OF MOLOKAI

210843156551801. State Key Number 540.1 Waikolu Raingage at altitude 900 ft, near Kalaupapa, Molokai.

LOCATION.--Lat 21°08'43", long 156°55'18", Hydrologic Uniy 20050000, on left bank near USGS streamgage station 16405500, 1.8 miles southwest of Haupu Bay, 2.3 miles upstream from mouth and 5.2 miles southeast of Kalaupapa.

PERIOD OF RECORD.--1957 to current year. Prior to October 1992, unpublished records in files of the Geological Survey and at the National Weather Service.

GAGE.--Standard raingage with reduced 1 to 2 catchment. Elevation of gage is 900 ft from topographic map.

REMARKS.--Records good. Cumulative rainfall read in nearest tenths of an inch.

RAINFALL ACCUMULATED (INCHES), WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993
INTERMITTENT READINGS

PERIOD	RAINFALL
Jul. 30 to Oct. 14	23.8
Oct. 14 to Dec. 02	42.4
Dec. 02 to Feb. 03	17.4
Feb. 03 to Apr. 27	27.8
Apr. 27 to Jun. 09	10.6
Jun. 09 to Aug. 04	15.2
Aug. 04 to Oct. 06	16.0

210807156524601. State Key Number 543.1 Pelekunu Raingage at altitude 700 ft near Kalaupapa, Molokai.

LOCATION.--Lat 21°08'07", long 156°52'46", Hydrologic Unit 20050000, on Puu Hoi Ridge, 2.0 miles south of former village of Pelekunu, and 5.7 miles north of Kamalo.

PERIOD OF RECORD.--1968 to current year. Prior to October 1992, unpublished records in files of the Geological Survey and at the National Weather Service.

GAGE.--Standard raingage with reduced 1 to 2 catchment. Elevation of gage is 700 ft from topographic map.

REMARKS.--Records good. Cumulative rainfall read in nearest tenths of an inch.

RAINFALL ACCUMULATED (INCHES), WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993
INTERMITTENT READINGS

PERIOD	RAINFALL
June 04 to Oct. 15	36.2
Oct. 15 to Jan. 19	47.0
Jan. 19 to May 05	29.4
May 05 to Jul. 30	18.6
Jul. 30 to Oct. 29	12.6

HAWAII, ISLAND OF MOLOKAI--Continued

211039157123101. State Key Number 551.5 Kakaako Raingage near Mauna Loa, Molokai.

LOCATION.--Lat 21°10'39", long 157°12'31", Hydrologic Unit 20050000, in the USGS streamgage station 16411400 on left bank, 1.0 miles downstream of Kamakahi gulch, 3.0 miles north of Mauna Loa school.

PERIOD OF RECORD.--1964 to current year. Prior to October 1992, unpublished records in files of the Geological Survey and at the National Weather Service.

GAGE.--Standard 8-inch National Weather Service rain gage with recording tipping bucket attachment. Elevation of gage is 380 ft from topographic map.

REMARKS.--Records poor. Rainfall recorded in tenths of an inch.

RAINFALL ACCUMULATED (INCHES), WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993
DAILY SUM VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	---	---	---	c---	---	---	.0	.0	.0	.0	---
2	---	---	---	---	---	---	---	.0	.0	.0	f.0	---
3	---	---	---	---	---	---	---	.0	.0	.0	---	---
4	---	---	---	---	---	---	---	.0	.0	.0	---	---
5	a---	---	---	---	---	---	---	.0	.0	.0	---	---
6	---	---	---	---	---	---	---	.0	.0	.0	---	---
7	---	---	---	---	---	---	d.0	.0	.0	.0	---	---
8	---	---	---	---	---	---	.0	.0	.0	.0	---	---
9	---	---	---	---	---	---	.0	.0	.0	.0	---	---
10	---	---	---	---	---	---	.0	.0	.0	.0	---	---
11	---	---	---	---	---	---	.0	.0	.0	.0	---	---
12	---	---	---	---	---	---	.0	.0	.0	.0	---	---
13	---	---	---	---	---	---	.0	.0	.0	.0	---	---
14	---	---	---	---	---	---	.0	.0	.0	.0	---	---
15	---	---	---	---	---	---	.0	.0	.0	.0	---	---
16	---	---	---	---	---	---	.0	.0	.0	.0	---	---
17	---	---	---	---	---	---	.0	.7	.0	.0	---	---
18	---	---	---	---	---	---	.0	.0	.0	.0	---	---
19	---	---	---	---	---	---	.2	.0	.0	.0	---	---
20	---	---	---	---	---	---	.0	.0	.0	.0	---	---
21	---	---	---	---	---	---	.0	.0	.0	.0	---	---
22	---	---	---	---	---	---	.0	.0	.0	.0	---	---
23	---	---	---	---	---	---	.0	.0	.0	.0	---	---
24	---	---	---	---	---	---	.0	.0	.0	.2	---	---
25	---	---	---	---	---	---	.0	.0	.0	.0	---	---
26	---	---	---	---	---	---	.0	.0	.0	.0	---	---
27	---	---	---	---	---	---	.0	.0	.0	.0	---	---
28	---	---	---	---	---	---	.0	.0	.0	.0	---	---
29	---	---	---	---	---	---	.0	.0	.0	.0	---	---
30	---	b---	---	---	---	---	.0	.0	.0	.0	---	g---
31	---	---	---	---	---	---	---	.0	---	.0	---	---
TOTAL	---	---	---	---	---	---	---	0.7	0.0	0.2	---	---

a Total accumulated rainfall from July 27, 1992 (1120 hrs) to Oct. 5 (1055 hrs) is 2.4 inches.
b Total accumulated rainfall from Oct. 5 (1055 hrs) to Nov. 30 (1225 hrs) is 6.8 inches.
c Total accumulated rainfall from Nov. 30 (1225 hrs) to Feb. 1 (1325 hrs) is 5.9 inches.
d Partial daily record from 0935 hrs to 2400 hrs. Total accumulated rainfall from Feb. 1 (1325 hrs) to Apr. 7 (0935 hrs) is 0.8 inches.
f Partial daily record from 0001 hrs to 1135 hrs.
g Total accumulated rainfall from Aug. 2 (1135 hrs) to Oct. 4 (1155 hrs) is 0.7 inches.

HAWAII, ISLAND OF MAUI

203721156151601. State Key Number 255.0 Kepuni Gulch Raingage near Kaupo, Maui.

LOCATION.--Lat 20°37'21", long 156°15'16", Hydrologic Unit 20020000, in USGS streamgage station 16500100 on right bank, 120 ft upstream from bridge on Hwy 31, 400 ft upstream from Kamole Gulch, 1.1 miles east of Kahikinui house and 8.5 miles west of Kaupo.

PERIOD OF RECORD.--1964 to current year. Prior to October 1992, unpublished records in files of the Geological Survey and at the National Weather Service.

GAGE.--Standard 8-inch National Weather Service rain gage with recording tipping bucket attachment. Elevation of gage is 740 ft from topographic map.

REMARKS.--Records good. Rainfall recorded in tenths of an inch.

RAINFALL ACCUMULATED (INCHES), WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993
DAILY SUM VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.0	.0	.0	6.9	.2	.0	.0	.0	.0	.0	.2	.0
2	.0	.7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
3	.0	.0	.3	.0	.0	.0	.0	.0	.0	.0	.0	.4
4	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
5	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
6	.0	.0	.0	1.2	.0	.0	.0	.0	.0	.0	.0	.0
7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
8	.0	.0	.0	.0	.0	.4	.0	.0	.0	.0	.0	.0
9	.0	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
10	.0	.0	.0	.0	1.0	.0	.0	.0	.0	.0	.0	.0
11	.0	.0	.0	.0	.2	.0	.0	.0	.0	.0	.0	.0
12	.0	.0	.0	.0	.0	.0	.0	.1	.0	.5	.0	.0
13	.0	.0	.0	.0	.0	.2	.0	.0	.0	.0	.0	.0
14	.2	.0	.0	.0	.0	.2	.0	.0	.0	2.5	.0	.0
15	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
16	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
17	.0	.1	.0	.0	.0	.0	.0	.0	.6	.0	.0	.0
18	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
19	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
20	.0	.0	.0	.0	.8	.0	.0	.0	.0	1.0	.0	.0
21	.0	1.5	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
22	.0	.2	.0	2.0	.0	.0	.0	.0	.0	.0	.0	.0
23	.0	.0	.4	.0	.0	.0	.0	.0	.0	.0	.0	.0
24	.0	.0	.1	.0	.0	.0	.0	.0	.0	.7	.0	.2
25	.0	.0	.7	.0	.0	.0	.0	.0	.0	.0	.0	5.4
26	.0	.4	.4	.0	.0	.0	.1	.0	.0	.0	.0	.0
27	.0	.0	5.6	.0	.0	.0	.3	.0	.0	.0	.0	.0
28	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	2.3	.0
29	.0	.5	.2	1.8	---	.0	.0	.0	.0	.0	.0	.0
30	.0	.0	.2	.0	---	.0	.0	.0	.0	.0	.0	.0
31	.0	---	2.7	.0	---	.0	---	.0	---	.0	.0	---
TOTAL	0.2	3.5	10.6	11.9	2.2	0.8	0.4	0.1	0.6	4.7	2.5	6.0

WTR YR 1993 TOTAL 43.5

HAWAII, ISLAND OF MAUI--Continued

204923156371501. State Key Number 297.0 Olowalu Raingage at Olowalu, Maui.

LOCATION.--Lat 20°49'23", long 156°37'15", Hydrologic Unit 20020000, in USGS streamgage station 16646200 on downstream side of center pier of plantation road bridge, 0.6 miles northeast of Olowalu, 5.5 miles southeast of Lahaina.

PERIOD OF RECORD.--1964 to current year. Prior to October 1992, unpublished records in files of the Geological Survey and at the National Weather Service.

GAGE.--Standard 8-inch National Weather Service rain gage with recording tipping bucket attachment. Elevation of gage is 130 ft from topographic map.

REMARKS.--Records good. Rainfall recorded in tenths of an inch.

RAINFALL ACCUMULATED (INCHES), WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993
DAILY SUM VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.0	.0	.1	2.2	.0	.0	.0	.0	.0	.0	.0	.0
2	.0	.6	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
4	.0	.0	.0	.3	.0	.0	.0	.0	.0	.0	.0	.0
5	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
6	.0	.0	.0	.3	.0	.0	.0	.0	.0	.0	.0	.0
7	.0	.0	.0	.2	.0	.0	.0	.0	.0	.0	.0	.0
8	.0	.0	.0	.0	.0	.2	.0	.0	.0	.0	.0	.0
9	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
10	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
11	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
12	.6	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.6
13	.4	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
14	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
15	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
16	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
17	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
18	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
19	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
20	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
21	.0	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
22	.0	.5	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
23	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
24	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
25	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
26	.0	.0	.0	.0	.0	.0	.0	.0	.0	.1	.0	.0
27	.0	.0	2.2	.0	.0	.0	.0	.0	.0	.1	.0	.0
28	.0	.0	.0	.2	.0	.0	.0	.0	.0	.0	.0	.0
29	.0	.0	.0	1.0	---	.0	.0	.0	.0	.0	.0	.0
30	.0	.0	.0	.0	---	.0	.0	.0	.0	.0	.0	.0
31	.0	---	.8	.0	---	.0	---	.0	---	.0	.0	---
TOTAL	1.0	1.2	3.1	4.2	0.0	0.2	0.0	0.0	0.0	0.2	0.0	0.6

WTR YR 1993 TOTAL 10.5

HAWAII, ISLAND OF MAUI--Continued

204606156270301. State Key Number 311.3 Kulanihakoi Raingage near Kihei, Maui.

LOCATION.--Lat 20°46'06", long 156°27'03", Hydrologic Unit 20020000, in USGS streamgage station 16660000 on right bank, 0.5 miles northeast of Lihue cemetery, 0.8 miles upstream from mouth, and 1.3 miles southeast of Kihei.

PERIOD OF RECORD.--1963 to current year. Prior to October 1992, unpublished records in files of the Geological Survey and at the National Weather Service.

GAGE.--Standard 8-inch National Weather Service rain gage with recording tipping bucket attachment. Elevation of gage is 35 ft from topographic map.

REMARKS.--Records good. Rainfall recorded in tenths of an inch.

RAINFALL ACCUMULATED (INCHES), WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993
DAILY SUM VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.0	.0	.0	2.5	.0	.0	.0	.0	.0	.0	.0	.0
2	.0	.8	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
4	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
5	.0	.0	.0	.1	.1	.0	.0	.0	.0	.0	.0	.0
6	.0	.0	.0	.5	.0	.0	.0	.0	.0	.0	.0	.0
7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
8	.0	.0	.0	.1	.0	.1	.0	.0	.0	.0	.0	.0
9	.0	.0	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
10	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
11	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
12	.4	.0	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0
13	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0	.0	.0
14	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0	.0
15	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
16	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.2	.0
17	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
18	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
19	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.2	.0
20	.0	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
21	.0	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
22	.0	1.2	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
23	.0	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
24	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
25	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
26	.0	.0	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
27	.0	.0	2.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
28	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
29	.0	.0	.0	.7	---	.0	.0	.0	.0	.0	.0	.0
30	.0	.0	.0	.0	---	.0	.0	.0	.0	.0	.0	.0
31	.0	---	1.0	.0	---	.0	---	.0	---	.0	.0	---
TOTAL	0.4	2.3	3.2	3.9	0.2	0.2	0.0	0.1	0.0	0.0	0.4	0.0

WTR YR 1993 TOTAL 10.7

HAWAII, ISLAND OF HAWAII

191027155355801. State Key Number 12.13 Hilea Gulch Tributary Raingage near Honuapo, Hawaii.

LOCATION.--Lat 19°10'27", long 155°35'58", Hydrologic Unit 20010000, at USGS streamgage station 16764000, 6.6 mi northwest of Honuapo, and 6.7 mi west of Punaluu.

PERIOD OF RECORD.--1967 to current year. Prior to October 1992, unpublished records in files of the Geological Survey.

GAGE.--Standard 8-inch National Weather Service non-recording rain gage. Elevation of gage is 2,940 ft from topographic map.

REMARKS.--Records good. Cumulative rainfall read in nearest tenths of an inch.

RAINFALL ACCUMULATED (INCHES), WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993
INTERMITTENT READINGS

Period	Rainfall
Sep. 02 to Oct. 19	23.5
Oct. 19 to Dec. 04	17.6
Dec. 04 to Dec. 22	1.5
Dec. 22 to Mar. 10	19.5
Mar. 10 to Jun. 03	19.0
Jun. 03 to Jul. 07	14.4
Jul. 07 to Sep. 20	28.8
Sep. 20 to Oct. 18	12.7

193812155554501. State Key Number 70.7 Waiaha Raingage at Luawai, near Holualoa, Hawaii.

LOCATION.--Lat 19°38'12", long 155°55'45", Hydrologic Unit 20010000, 20 ft downstream of recording crest gage Waiaha Stream at Luawai, near Holualoa (16759300) on right bank, 1.8 mi northeast of Holualoa School, and 4.2 mi southeast of Honokohau School.

PERIOD OF RECORD.--1960 to current year. Prior to October 1992, unpublished records in files of the Geological Survey.

GAGE.--Standard 8-inch National Weather Service non-recording rain gage. Elevation of gage is 2,580 ft from topographic map.

REMARKS.--Records fair. Cumulative rainfall read in nearest tenths of an inch.

RAINFALL ACCUMULATED (INCHES), WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993
INTERMITTENT READINGS

Period	Rainfall
Sep. 17 to Dec. 10	6.6
Dec. 10 to Jun. 14	6.3
Jun. 14 to Aug. 03	10.1
Aug. 03 to Oct. 06	12.1

HAWAII, ISLAND OF HAWAII--Continued

194117155174801. State Key Number 83.0 Quarry at Saddle Road Raingage, Hawaii.

LOCATION.--Lat 19°41'17", long 155°17'48", Hydrologic Unit 20010000, 200 ft north of 16 mi marker on Saddle Road west of Hilo, at old quarry site.

PERIOD OF RECORD.--1967 to current year. Prior to October 1992, unpublished records in files of the Geological Survey.

GAGE.--Standard 8-inch National Weather Service non-recording rain gage. Elevation of gage is 4,140 ft from topographic map.

REMARKS.--Records good. Cumulative rainfall read in nearest tenths of an inch.

RAINFALL ACCUMULATED (INCHES), WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993
INTERMITTENT READINGS

Period	Rainfall
Sep. 16 to Dec. 11	20.1
Dec. 11 to Mar. 03	12.7
Mar. 03 to Jul. 16	a>24.0
Jul. 16 to Aug. 03	20.0
Aug. 03 to Aug. 23	6.7
Aug. 23 to Sep. 30	7.2

194602155091801. State Key Number 125.12 Honolii Raingage near Papaikou, Hawaii.

LOCATION.--Lat 19°46'02", long 155°09'18", Hydrologic Unit 20010000, 15 ft. north of USGS streamgage station 16717000 on left bank, 0.7 mi. downstream from Pohakupaa Stream, 4.1 mi. west of Papaikou, and 4.8 mi. northwest of Hilo Post Office.

PERIOD OF RECORD.--1990 to current year. Prior to October 1992, unpublished records in files of the Geological Survey and at the National Weather Service.

GAGE.--Non-standard 8-inch National Oceanic and Atmospheric Administration rain gage. Elevation of gage is 1,540 ft from topographic map.

REMARKS.--Records fair. Cumulative rainfall read in nearest tenths of an inch.

RAINFALL ACCUMULATED (INCHES), WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993
INTERMITTENT READINGS

Period	Rainfall
Sep. 11 to Jan. 14	20.4
Jan. 14 to Mar. 16	16.5
Mar. 16 to May 18	a>21.3
May 18 to Jul. 20	a>19.1
Jul. 20 to Aug. 17	a>20.7
Aug. 17 to Oct. 13	17.0

> Actual value is known to be more than the value shown
a Some spillage occured during measurement

HAWAII, ISLAND OF HAWAII--Continued

200517155404201. State Key Number 185.4 Upper Hamakua ditch Raingage below Kawaiki Stream near Kamuela, Hawaii.

LOCATION.--Lat 20°05'17", long 155°40'42", Hydrologic Unit 20010000, 15 ft from USGS streamgage station 16720500 on right bank, and 800 ft downstream of Kawaiki Stream.

PERIOD OF RECORD.--1964 to current year. Prior to October 1992, unpublished records in files of the Geological Survey.

GAGE.--Standard 8-inch National Weather Service non-recording rain gage. Elevation of gage is 4,020 ft from topographic map.

REMARKS.--Records fair. Cumulative rainfall read in nearest tenths of an inch.

RAINFALL ACCUMULATED (INCHES), WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993
INTERMITTENT READINGS

Period	Rainfall
Sep. 09 to Oct. 14	21.5
Oct. 14 to Nov. 20	14.9
Nov. 20 to Dec. 21	16.7
Dec. 21 to Feb. 05	21.5
Feb. 05 to Apr. 08	a>28.5
Apr. 08 to Jun. 22	a>28.4
Jun. 22 to Aug. 26	a>26.6
Aug. 26 to Sep. 02	1.7
Sep. 02 to Sep. 21	4.9
Sep. 21 to Oct. 21	5.6

> Actual value is known to be more than the value shown
a Can overflowed

HAWAII, ISLAND OF HAWAII--Continued

200815155383301. State Key Number 185.5 Waimanu Raingage near Kamuela, Hawaii.

LOCATION.--Lat 20°08'15", long 155°38'33", Hydrologic Unit 20010000, in streamgage station 16737500, 8.25 mi north northeast of Kamuela Post Office, and 3.85 mi northwest of Waipio Valley Lookout.

PERIOD OF RECORD.--1991 to current year. Prior to October 1992, unpublished records in files of the Geological Survey and at the National Weather Service.

GAGE.--Standard 8-inch National Weather Service rain gage with recording tipping bucket attachment. Elevation of gage is 15 ft from topographic map.

REMARKS.--Records fair. Rainfall recorded in tenths of an inch.

RAINFALL ACCUMULATED (INCHES), WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993
DAILY SUM VALUES

DAY	OCT	NOV	OEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.0	.0	.2	1.6	.0	---	---	---	.8	.0	.2	.4
2	.1	.9	.2	.0	.0	---	---	---	.3	.3	.3	.0
3	.0	.1	.0	.0	.0	---	---	---	.0	1.2	.2	.0
4	.1	.4	.2	.2	.0	---	---	b.0	.5	.5	.2	.0
5	.1	.6	.1	.6	.0	---	---	.1	.2	.1	.0	.0
6	.0	.3	.0	2.3	.0	---	---	.0	.1	.0	.2	.0
7	.1	.0	.0	.0	.0	---	---	.0	.0	.0	.3	.0
8	.4	.0	.0	.0	.0	---	---	.3	.3	.0	.3	.0
9	.3	.3	1.1	.0	.0	---	---	.4	.1	.0	.6	.3
10	.2	.0	.7	.0	.0	---	---	.3	.2	.0	.5	.5
11	.1	.0	1.3	.0	.0	---	---	.0	.5	.6	.4	.6
12	.2	.6	.0	.0	.0	---	---	.6	.0	.0	1.0	.0
13	.1	.5	.0	.0	.0	---	---	.0	.0	.0	.4	.0
14	.1	1.4	.4	.1	.0	---	---	.1	.0	.0	1.0	.0
15	.1	.8	.2	.0	.0	---	---	.7	.4	.1	.4	.0
16	.1	.0	.1	.0	.1	---	---	.2	.1	.2	.9	.0
17	.0	.0	.0	.0	a.0	---	---	.0	.0	.3	.1	.2
18	.1	.0	.0	.0	---	---	---	.2	.2	.4	4.1	.0
19	.1	.0	.2	.0	---	---	---	.5	.2	.6	.0	.8
20	.0	.0	.0	.0	---	---	---	.4	.0	.5	.0	.7
21	.0	.3	1.0	.0	---	---	---	.1	.2	2.2	.2	.0
22	.0	2.1	.3	.0	---	---	---	.0	.0	1.6	.2	.0
23	.0	2.3	.0	.0	---	---	---	.0	.0	.6	.5	1.4
24	.0	.3	.0	.0	---	---	---	.5	.0	.4	.6	.0
25	.0	.5	.0	.0	---	---	---	.1	.7	.0	.0	.0
26	.1	.4	.1	.0	---	---	---	.4	.6	.3	.0	.0
27	.0	.2	.2	.0	---	---	---	.1	.5	1.1	1.1	.0
28	.0	.0	.0	.0	---	---	---	.1	.4	.2	.1	.2
29	.0	1.4	.0	.0	---	---	---	.0	.1	.2	.0	.0
30	.0	.0	.0	.0	---	---	---	.0	.0	.6	.0	.2
31	.0	---	.1	.0	---	---	---	.4	---	.0	1.1	---
TOTAL	2.3	13.4	6.4	4.8	---	---	---	---	6.4	12.0	14.9	5.3

a Partial daily record from 0001 hrs to 1330 hrs.
b Partial daily record from 1200 hrs to 2400 hrs. Total accumulated rainfall from Feb. 17 (1330 hrs) to May 4 (1200 hrs) is greater than 21.7 inches.

HAWAII, ISLAND OF HAWAII--Continued

200148155420501. State Key Number 190.4 Keanuiomano Raingage near Kamuela, Hawaii

LOCATION.--Lat 20°01'48", long 155°42'05", Hydrologic Unit 20010000, in USGS streamgage station 16756500 on left bank, 150 ft upstream from junction of State Highway 19 and 25, and 2.0 mi west of Kamuela.

PERIOD OF RECORD.--1963 to current year. Prior to October 1992, unpublished records in files of the Geological Survey.

GAGE.--Standard 8-inch National Weather Service non-recording rain gage. Elevation of gage is 2,410 ft from topographic map.

REMARKS.--Records fair. Cumulative rainfall read in nearest tenths of an inch.

RAINFALL ACCUMULATED (INCHES), WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993
INTERMITTENT READINGS

Period	Rainfall
Jul. 22 to Dec. 03	8.7
Dec. 03 to Mar. 03	7.2
Mar. 03 to Jun. 21	3.5
Jun. 21 to Sep. 30	2.7

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