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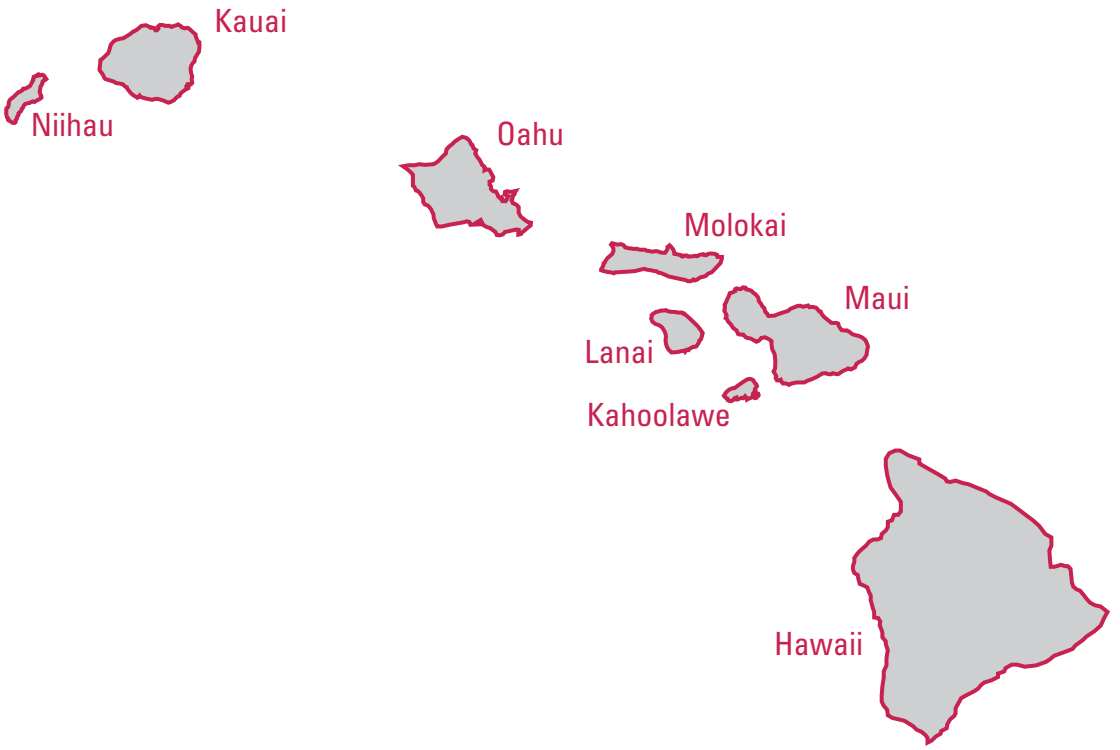
Water Resources Data
Hawaii and other Pacific Areas
Water Year 2002

Volume 1. Hawaii

Water-Data Report HI-02-1



U.S. Department of the Interior
U.S. Geological Survey

Prepared in cooperation with the State of Hawaii Department of Land and Natural Resources, Commission on Water Resource Management and with other agencies

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By M.F. Wong, D.C. Nishimoto, P.C. Teeters and R.I. Taogoshi

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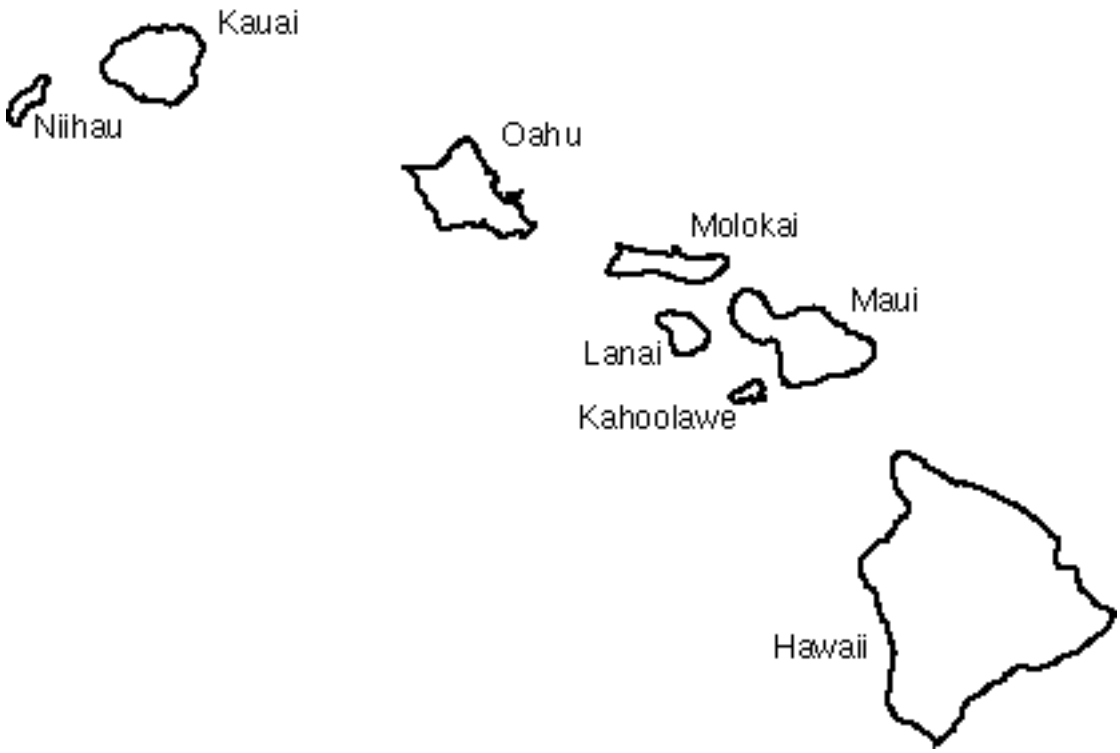

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UNITED STATES DEPARTMENT OF THE INTERIOR

GALE A. NORTON, Secretary

U.S. GEOLOGICAL SURVEY

Charles G. Groat, Director

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2004

PREFACE

This annual hydrologic data report of Hawaii 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, American Virgin Islands, selected islands in the Caribbean, Commonwealth of the Northern Mariana Islands, Guam, American Samoa, Republic of Palau, and selected islands in the Pacific. 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.

This report contains hydrologic data for Hawaii. It is the culmination of a concerted effort by 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 U.S. Geological Survey policy and established guidelines, the Hawaii District discipline specialists, Stephen Anthony, Richard Fontaine, and Stephen Gingerich, reviewed and verified the data, and the following individuals contributed significantly to the collection, processing, and tabulation of the data:

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13. ABSTRACT *(Maximum 200 words)*

Water resources data for the 2002 water year for Hawaii consist of records of stage, discharge, and water quality of streams and springs; water levels and quality of water wells; and rainfall totals.

- Water discharge for 71 gaging stations on streams, springs, and ditches.
- Discharge data for 93 crest-stage partial-record stations.
- Water-quality data for 5 streams, 28 partial-record stations, and 65 wells.
- Water levels for 83 observation wells.
- Rainfall data for 38 rainfall stations.

These data represent that part of the National Water Data System operated by the U.S. Geological Survey and cooperating Federal, State, and other local agencies in Hawaii.

14. SUBJECT TERMS
*Hawaii, *Hydrologic data, *Surface water, *Water quality, *Ground water, Gaging stations, Flow rate, Chemical analyses, Sediment, Water temperature, Sampling sites, Water analyses, Water levels, Rainfall accumulation.

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SURFACE-WATER STATIONS, IN DOWNSTREAM ORDER, FOR WHICH RECORDS ARE PUBLISHED IN THIS VOLUME

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.

GROUND-WATER WELLS, BY COUNTY, FOR WHICH RECORDS ARE PUBLISHED IN THIS VOLUME

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

HAWAII

GROUND-WATER WELLS, BY COUNTY, FOR WHICH RECORDS ARE PUBLISHED IN THIS VOLUME

RAINFALL STATIONS, BY COUNTY, FOR WHICH RECORDS ARE PUBLISHED IN THIS VOLUME

Letters after station number designate type of station: (r) recording, and (n) non-recording

HAWAII

DISCONTINUED SURFACE-WATER OR STAGE-ONLY STATIONS

The following continuous record streamflow or stage-only stations in Hawaii have been discontinued or converted to partial-record stations. Daily records were collected and are stored in NWIS 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 River below Kekaha Ditch intake near 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, 1975-96
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 Ditch 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

DISCONTINUED SURFACE-WATER OR STAGE-ONLY STATIONS--Continued

Station number	Station name	Drainage area (mi^2)	Period of record
ISLAND OF KAUAI--Continued			
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
16077000	Makaleha ditch near Kealia	--	1936-98
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
16091000	Lower Anahola Ditch nr Kealia	--	1937-83, 1985-95
16092000	Lower Anahola Ditch at makai weir nr Kealia	--	1909-10
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

DISCONTINUED SURFACE-WATER OR STAGE-ONLY STATIONS--Continued

Station number	Station name	Drainage area (mi^2)	Period of record
ISLAND OF OAHU--Continued			
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 Springs 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
16225800	North Halawa Stream near Kaneohe	1.64	1991-99
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
16232000	Nuuanu Stream below res 2 wasteway, nr Honolulu	3.35	1913-96
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
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
16249900	Maunawili Ditch abv Anianinui Tunnel nr Waimanalo	--	1990-2000
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	1922, 1956-67, 1971-96
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 canal at Kailua Rd at Kailua	--	1961-65
16264500	Kawainui Swamp canal at Wanaao Rd at Kailua	--	1961-64
16265600	Right Branch Kamooalii Stream	1.11	1983-97
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
16270900	Luluku Str at alt. 220 ft nr Kaneohe	0.44	1960-63, 1965-98
16271000	North Luluku Ditch nr Kaneohe	--	1914-16

DISCONTINUED SURFACE-WATER OR STAGE-ONLY STATIONS--Continued

Station number	Station name	Drainage area (mi^2)	Period of record
ISLAND OF OAHU--Continued			
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
16273950	SF Kapunahala Str at Kaneohe	0.40	1983-98
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
16283600	South Fork Waihee Stream near Heeia	0.03	1962-96
16283700	North Fork Waihee Stream near Heeia	0.03	1962-96
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
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
16325000	Kamananui Str at Pupukea Military Rd nr Maunawai	3.13	1963-2001
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
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
16403900	Kawainui Stream near Pelekunu	1.17	1968-79, 1980-96
16404000	Pelekunu Str nr Pelekunu	2.59	1919-29, 1937-47,1948-57, 1971-82
16404200	Pilipililau Str nr Pelekunu	0.49	1968-97
16405000	Lanipuni Str nr Pelekunu	1.09	1919-29, 1937-57
16406000	Waikolu Str at alt. 650 ft nr Kalaupapa	2.99	1920-23
16408000	Waikolu Str bl pipeline crossing nr Kalaupapa	3.68	1919-32, 1937-96
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

DISCONTINUED SURFACE-WATER OR STAGE-ONLY STATIONS--Continued

Station number	Station name	Drainage area (mi^2)	Period of record
ISLAND OF MOLOKAI--Continued			
16411300	Kakaako Gulch at Hwy 46 nr Mauna Loa	0.18	1964-85
16415000	EF Kawela Gulch	0.45	1946-71
ISLAND OF MAUI			
16416000	Punaula Gulch nr Pukoo	0.24	1947-72
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
16509000	Hanawi Str below government road, nr Nahiku	5.03	1932-47, 1992-95
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 SURFACE-WATER OR STAGE-ONLY 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

DISCONTINUED SURFACE-WATER OR STAGE-ONLY STATIONS--Continued

Station number	Station name	Drainage area (mi^2)	Period of record
ISLAND OF MAUI--Continued			
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
16619000	Kahakuloa Str at Kahaluloa nr Waihee	4.00	1912-13
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			
16700000	Waiakea Stream nr Mountain View	17.4	1930-95
16700950	Lyman Springs no. 2 nr Piihonua	--	1981-95
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
16713000	Wailuku River at Hilo	256	1977-79, 1980-95
16716000	Honolii Str nr Hilo	8.00	1924-32

DISCONTINUED SURFACE-WATER OR STAGE-ONLY STATIONS--Continued

Station number	Station name	Drainage area (mi^2)	Period of record
ISLAND OF HAWAII--Continued			
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
16720300	Kawaiki Stream near Kamuela	0.45	1968-99
16720500	Upper Hamakua Ditch below Kawaiki Str nr Kamuela	--	1964-79, 1980-2002
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
16724800	Upper Hamakua Ditch abv Alakahi Str nr Kamuela	--	1968-2000
16727000	Upper Hamakua Ditch abv Puukapu Res nr Kamuela	--	1977-2000
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
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, 1963-72
16747000	E Br Honokane nui Str at alt 1,300 ft 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 770 ft nr Honokane	5.41	1901
16749000	W Br Honokane nui Str at alt 1,370 ft nr Honokane	1.81	1901
16749500	W Br Honokane nui Str at alt 775 ft 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
16764000	Hilea Gulch tributary nr Honuapo	9.17	1966-97
16765000	Hilea Gulch tributary 2 nr Honuapo	1.86	1966-82
16767000	Ninole Gulch nr Punaluu	15.5	1966-82

DISCONTINUED SURFACE-WATER OR STAGE-ONLY STATIONS--Continued

The following continuous water-quality stations in Hawaii have been discontinued. Daily records were collected and are stored in NWIS 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 Wahiawa	4.29	S	1973-82
16213000	Waikele Str nr Waipahu	45.70	C,T	1973-81
				1999-01
			S	1972-93
16227500	Moanalua Str nr Kaneohe	0.94	S	1971-78
16242500	Manoa Str at Kanewai Field	5.99	C,T	1999-01
16270500	Kamooalii Str blw Kuou Str nr Kaneohe	3.21	S	1972-76
16284200	Waihee Str nr Kahaluu	0.97	C,T	1999-01
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

Volume 1--HAWAII

INTRODUCTION

The U.S. Geological Survey (USGS), in cooperation with State, local, and other Federal agencies, obtains a large amount of data pertaining to the water resources of Hawaii 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. 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.”

This report includes records on both surface and ground water in the State. Specifically, it contains: (1) Discharge records for 71 stream-gaging stations and 93 crest-stage partial-record streamflow stations; (2) water-quality records for 5 streamflow-gaging stations, and 28 partial-record streamflow stations; (3) water-level records for 83 observation wells; (4) water-quality records for 65observation wells; and (5) accumulated rainfall records for 38 rainfall stations.

This series of annual reports for Hawaii began with the 1961 fiscal year (State of Hawaii) with a report that contained only data relating to the quantities of surface water. For the 1964 fiscal 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 include, in one volume, data on quantities of surface water, quality of surface and ground water, and ground-water levels. Beginning with the 1993 water year, accumulated rainfall data were included in the report.

Prior to introduction of this series (through June 30, 1960, for Hawaii) and for several water years concurrent with it, water-resources data for Hawaii 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 not out of print, may be purchased from the U.S. Geological Survey, Branch of Information Services, Box 25286, Denver, Colorado 80225-0286. For further ordering information, telephone (303) 202-4700.

Publications similar to this report are published annually by the U.S. 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-02-1.” For archiving and general distribution, the reports for 1971-74 water years also are identified 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.

Additional information, including current prices, for ordering specific reports may be obtained from the District office at the address given on the back of the title page or by telephone at (808) 587-2400.

COOPERATION

The U.S. Geological Survey and organizations of the State of Hawaii (and formerly the Territory 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 agreements with the USGS are:

Hawaii Department of Land and Natural Resources, Commission on Water Resource Management, Ernest Lau, Deputy Director.
Hawaii Department of Land and Natural Resources, Engineering Division, Eric Hirano, Chief Engineer.
Hawaii Department of Land and Natural Resources, Land Division, Dierdre Mamiya, Administrator.
Hawaii Department of Transportation, Rodney Haraga, Director.
Hawaii Department of Agriculture, Agricultural Resources Division, Brian Kau, Administrator.
City and County of Honolulu, Board of Water Supply, Clifford Jamile, Manager and Chief Engineer.
City and County of Honolulu, Department of Planning and Permitting, Eric Crispin, Director and Chief Engineer.
City and County of Honolulu, Department of Environmental Services, Frank Doyle, Director.
National Tropical Botanical Garden, Charles Wichman Jr., Assistant Director.
Maui County Board of Water Supply, George Tengan, Director.
Kauai County Department of Water, Edward Tschupp, Director.

Hawaii County Department of Water Supply, Milton Pavao, P.E., Manager.

Hawaii Agribusiness Development Corporation, Alfredo Lee, Administrator.

Assistance in the form of funds or services was given by the U.S. Army Corps of Engineers, U.S. Army Hawaii Garrison, National Weather Service, and Hawaii County Department of Public Works.

The following organizations aided in collecting records: East Kauai Water Co., Ltd. and East Maui Irrigation Co., Ltd.

SUMMARY OF HYDROLOGIC CONDITIONS

In general, the 2002 water year was wetter than the previous year. Intense rainfall resulted in localized flooding on Windward Oahu on May 6, 2002. No other major floods affected the State during the year.

Surface Water

Substantial variations of streamflow during the 2002 water year were recorded at four index stations (fig. 1). These stations are all on streams that are undiverted or unregulated, so that increases or decreases in streamflow can be considered primarily the result of rainfall fluctuations. Annual mean discharges for the 2002 water year at stations 16068000, 16229000, 16587000 and 16717000 were 104 percent, 122 percent, 102 percent and 124 percent of the long-term (1961–2000 water years for all stations except 16717000; 1967–2000 for station 16717000) median annual mean discharges at these stations respectively (fig. 1).

Monthly mean flows at the four index stations did not indicate consistently wet or dry weather across the state for most of the year. An exception was the month of April, when all four stations had monthly means flows in the lowest 25 percent of the long-term records for that month. Streamflow at station 16068000 on Kauai exceeded the long-term median monthly mean streamflow in January, February, March, May, and June. Streamflow at station 16229000 on Oahu exceeded the long-term median monthly mean in January, February, March, and May. Streamflow at station 16587000 on Maui exceeded the long-term median monthly mean in October, November, December, February, March, July, and September. Streamflow at station 16717000 on Hawaii exceeded the long-term median monthly mean in all months except March and April.

Instantaneous peak flows at stations 16068000,16229000, 16587000, and 167107100 during the 2002 water year were much lower than the peak flows for the period of record at these stations (table 1).

Table 1.--Comparison of peak discharge for 2002 water year with the peak discharge for the period of record at four representative stations

Station Number	Station name	Water year 2002		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	Mar. 25	4,660	Nov. 12, 1955	18,400
16229000	Kalihi Stream near Honolulu, Oahu	Jan. 26	1,760	Nov. 18, 1930	12,400
16587000	Honopou Stream near Huelo, Maui	Mar. 6	340	Nov. 18, 1930	5,710
16717000	Honolii Stream near Papaikou, Hawaii	Jan. 29	6,410	May 23, 1978	22,600

Ground Water

Ground-water levels are affected by several factors, including rainfall, pumping, evapotranspiration, and, in coastal areas, tides. Ground-water levels at three continuously monitored observation wells in Hawaii fluctuated throughout the year, but were generally higher than in water year 2001.

Water levels at well 2-5634-01 (station number 215607159344301) near Hanapepe on Kauai rose between October and February and declined in March. Water levels rose again between April and June, and then declined gradually for the rest of the water year. Water levels at well 3-2256-10 (station number 212238157561101) near Pearl Harbor on Oahu showed roughly the same pattern, with water levels reaching their highest point in May. Water levels at well 6-5431-01 (station number 20543715631050) near Wailuku, Maui increased from October to February, fluctuated between March and May, declined between June and August, and then remained relatively steady for the rest of the year.

Rainfall

The Hawaiian Islands have extreme variability in annual rainfall amounts owing to strong orographic effects. The wettest location in Hawaii is considered to be Mount Waialeale on Kauai, with an average rainfall of approximately 433 inches per year. Areas of very low rainfall are found on the leeward side of the larger islands, particularly Maui and Hawaii.

In water year 2002, rainfall amounts were near long-term normal amounts. Rainfall at the USGS-National Weather Service gage on Mount Waialeale totaled 415.50 inches or about 96 percent of the mean annual rainfall of 433 inches per year. The Poamoho 1 rain gage at the crest of the Koolau Range on Oahu recorded 197.21 inches, about 72 percent of the long-term average annual rainfall of approximately 275 inches per year. The Kepuni Gulch rain gage on the leeward side of Haleakala on Maui recorded 32.23 inches, slightly more than 100 percent of the mean annual rainfall of approximately 30 inches.

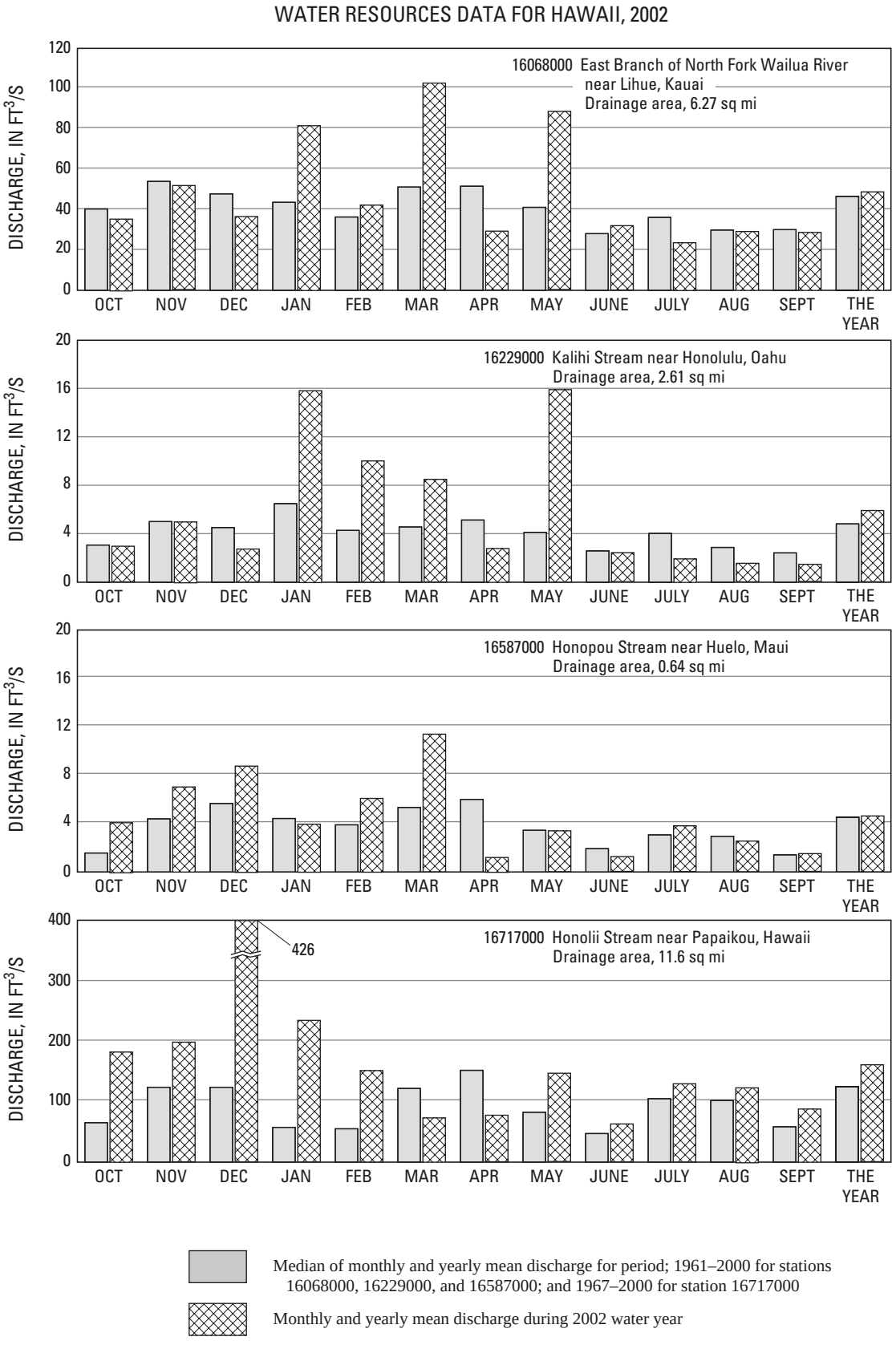

Figure 1. Discharge during 2002 water year compared with median discharge for four representative gaging stations.

SPECIAL NETWORKS AND PROGRAMS

Hydrologic Benchmark Network is a network of 50 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 human activities.

National Stream-Quality Accounting Network (NASQAN) monitors the water quality of large rivers within four of the Nation's largest river basins--the Mississippi, Columbia, Colorado, and Rio Grande. The network consists of 39 stations. Samples are collected with sufficient frequency that the flux of a wide range of constituents can be estimated. The objective of NASQAN is to characterize the water quality of these large rivers by measuring concentration and mass transport of a wide range of dissolved and suspended constituents, including nutrients, major ions, dissolved and sediment-bound heavy metals, common pesticides, and inorganic and organic forms of carbon. This information will be used (1) to describe the long-term trends and changes in concentration and transport of these constituents; (2) to test findings of the National Water-Quality Assessment Program (NAWQA); (3) to characterize processes unique to large-river systems such as storage and re-mobilization of sediments and associated contaminants; and (4) to refine existing estimates of off-continent transport of water, sediment, and chemicals for assessing human effects on the world's oceans and for determining global cycles of carbon, nutrients, and other chemicals.

The National Atmospheric Deposition Program/National Trends Network (NADP/NTN) provides continuous measurement and assessment of the chemical climate of precipitation throughout the United States. As the lead federal agency, the USGS works together with over 100 organizations to accomplish the following objectives; (1) Provide a long-term, spatial and temporal record of atmospheric deposition generated from a network of 191 precipitation chemistry monitoring sites. (2) Provide the mechanism to evaluate the effectiveness of the significant reduction in SO2 emissions that began in 1995 as implementation of the Clean Air Act Amendments (CAAA) occurred. (3) Provide the scientific basis and nationwide evaluation mechanism for implementation of the Phase II CAAA emission reductions for SO2 and NOx scheduled to begin in 2000.

Data from the network, as well as information about individual sites, are available through the world wide web at:

http://nadp.sws.uiuc.edu/

The National Water-Quality Assessment (NAWQA) Program of the U.S. Geological Survey is a long-term program with goals to describe the status and trends of water-quality conditions for a large, representative part of the Nation's ground- and surface-water resources; provide an improved understanding of the primary natural and human factors affecting these observed conditions and trends; and provide information that supports development and evaluation of management, regulatory, and monitoring decisions by other agencies.

Assessment activities are being conducted in 53 study units (major watersheds and aquifer systems) that represent a wide range of environmental settings nationwide and that account for a large percentage of the Nation's water use. A wide array of chemical constituents will be measured in ground water, surface water, streambed sediments, and fish tissues. The coordinated application of comparative hydrologic studies at a wide range of spatial and temporal scales will provide information for decision making by water-resources managers and a foundation for aggregation and comparison of findings to address water-quality issues of regional and national interest.

Communication and coordination between USGS personnel and other local, State, and federal interests are critical components of the NAWQA Program. Each study unit has a local liaison committee consisting of representatives from key federal, State, and local water resources agencies, Indian nations, and universities in the study unit. Liaison committees typically meet semiannually to discuss their information needs, monitoring plans and progress, desired information products, and opportunities to collaborate efforts among the agencies.

Additional information about the NAWQA Program is available through the world wide web at:

http://wwwrvares.er.usgs.gov/nawqa/nawqa_home.html

Additional information about the island of Oahu NAWQA Program is available through the world wide web at:

http://hi.water.usgs.gov/nawqa

EXPLANATION OF THE RECORDS

The surface-water and ground-water records published in this report are for the 2002 water year that began October 1, 2001 and ended September 30, 2002. 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, ground-water level data, and rainfall accumulation data. The locations of the stations and wells where the data were collected are shown in figures 5–25. The following sections of the introductory 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 a streamgage, well, or rain gage, 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 wells 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, and for rainfall stations.

Downstream Order System

Since October 1, 1950, the order of listing hydrologic-station records in U.S. Geological 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 indicates 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, miscellaneous surface-water sites, and rainfall stations 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 locational 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 2).

Local Identifier Well-Numbering System

In addition to the latitude-longitude based site identification number, wells in the State of Hawaii 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 3 and 4).

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 constructed within the grid as 01 and increase chronologically, with few exceptions, to the latest.

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

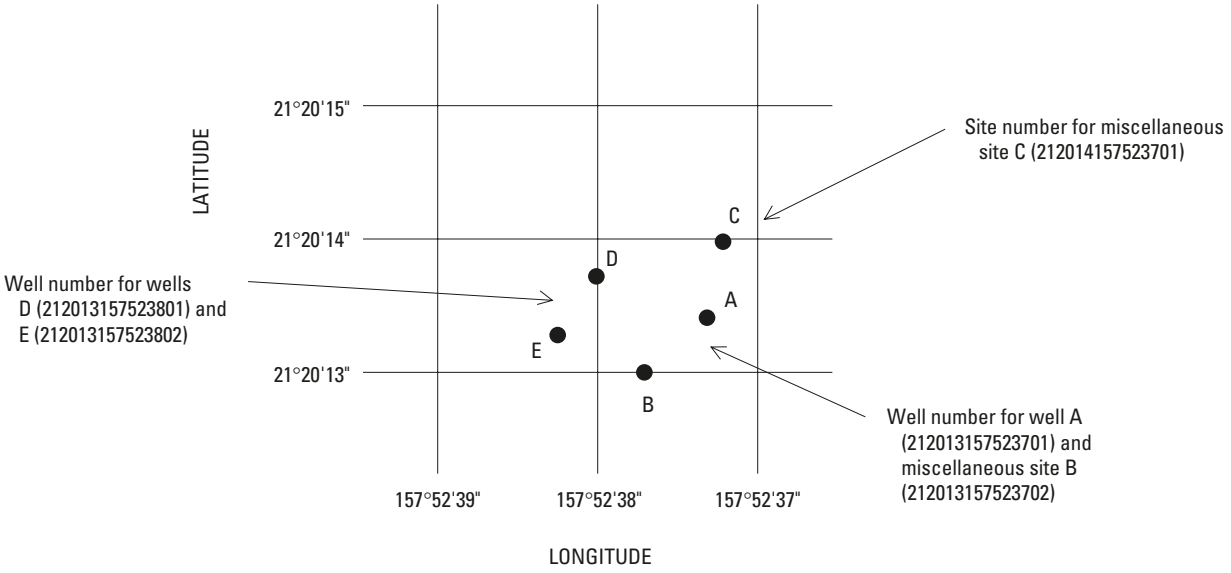

Figure 2. System for numbering wells and miscellaneous sites.

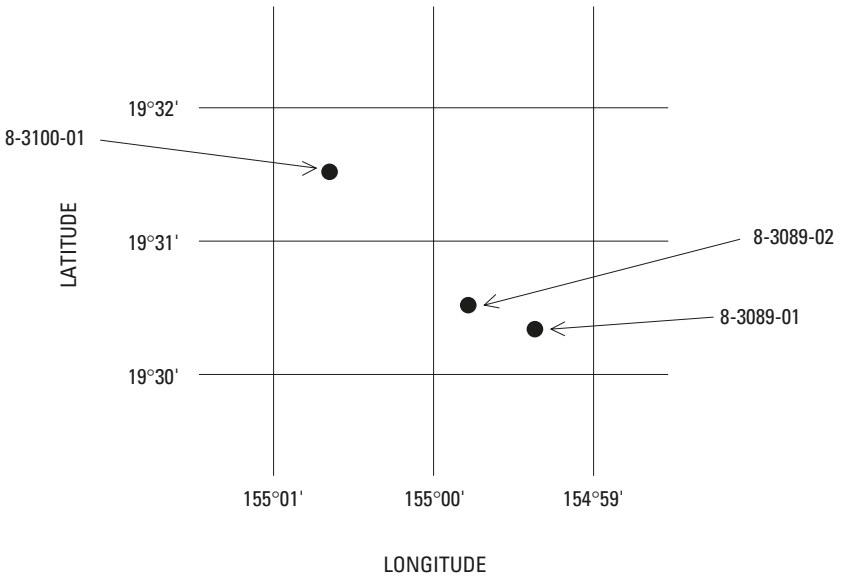

Figure 3. Local well numbering system.

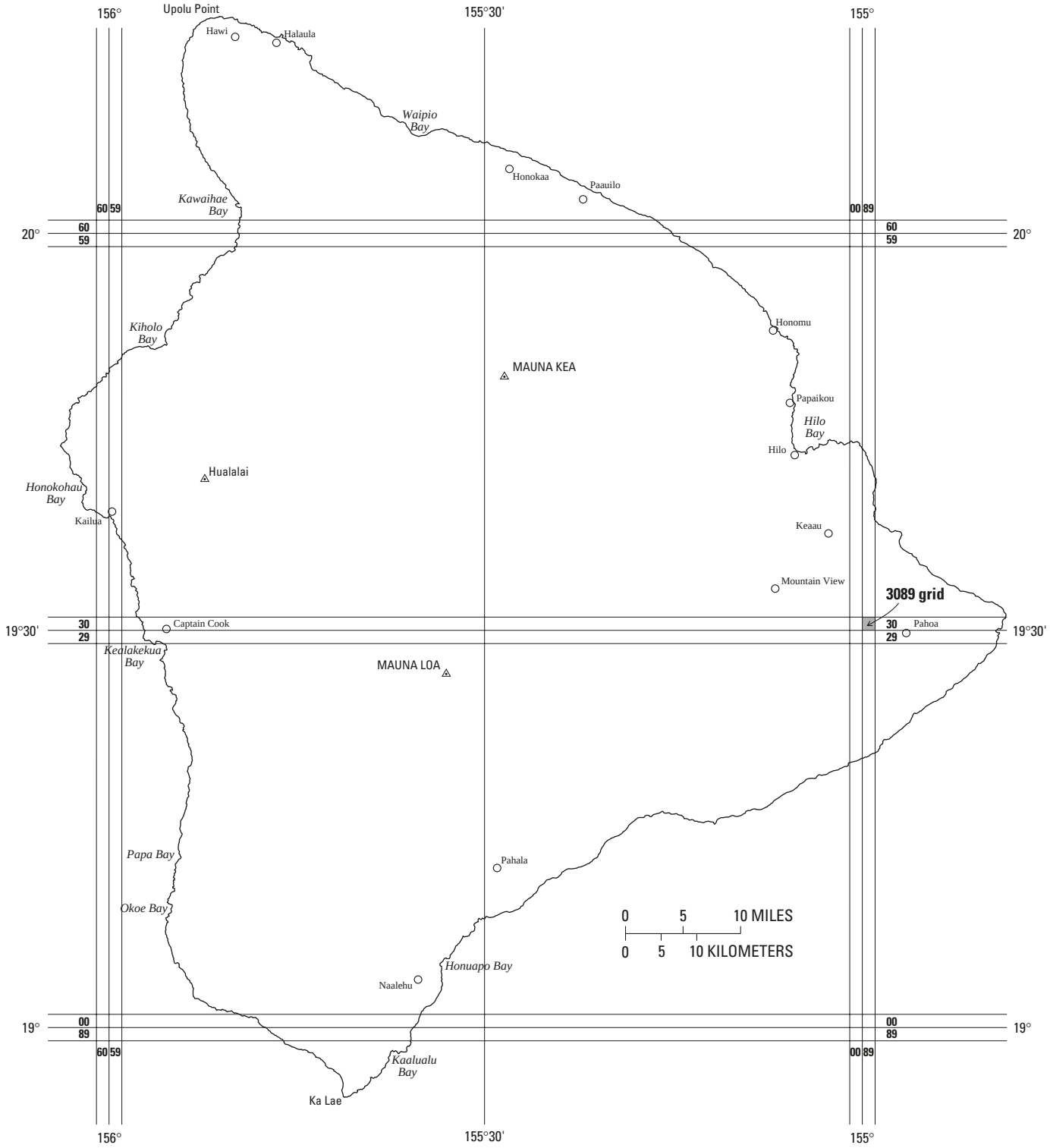

Figure 4. Map of Hawaii showing system for determining local well numbers.

Local State Key Numbering System

In addition to the latitude-longitude based site identification number, rainfall stations in the State of Hawaii are assigned State key numbers. The numbering system was devised in 1948 by the authors of “A Key to Rain Gages in Hawaii.” The numbers run from 1 to 1145, proceeding from south to north up the island chain. However, within each five-minute latitude band, numbers proceed from west to east. Following are the blocks of numbers assigned to each island.

Island	State Key Number
Hawaii	1-223
Maui	248-497
Molokai	500-563
Lanai	650-696
Oahu	700-912
Kauai	925-1145

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 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 period 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 5–14.

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, together 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 electronic data loggers, 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 U.S. Geological Survey as a result of experience accumulated since 1880. These methods are described in standard textbooks, Water-Supply Paper 2175, and the U.S. Geological Survey Techniques of Water-Resources Investigations (TWRI), Book 3, Chapter A1 to A19 and Book 8, Chapters A2 and B2. The methods are consistent with the American Society for Testing and Materials (ASTM) standards and generally follow the standards of the International Organization for Standards (ISO).

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 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 station 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. In addition, beginning with the 1992 water year, a graphical hydrograph is included for surface-water discharge stations.

The records published for each continuous-record surface-water discharge station (gaging station) now consist of five parts, the station manuscript; 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; 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; and a hydrograph of the daily mean values of discharge for the current water year. Summary statistics were not included for certain sites where these data would be misleading. Contact the U.S. Geological Survey Hawaii 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.

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 vicinity 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 National Mapping Division of the U.S. 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 manuscript 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 U.S. 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 do 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 content. Unless otherwise qualified, the maximum discharge or content 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 content, 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 the peak discharge 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 artificial control. 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 District 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 acre-feet (line headed "AC-FT").

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 instantaneous 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 extensive 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.)

MAXIMUM PEAK FLOW.--The maximum instantaneous peak discharge occurring for the water year or designated period. Occasionally the maximum flow for a year may occur at midnight at the beginning or end of the year, on a recession from or rise toward a higher peak in the adjoining year. In this case, the maximum peak flow is given in the table and the maximum flow may be reported in a footnote or in the REMARKS paragraph in the manuscript.

MAXIMUM PEAK STAGE.--The maximum instantaneous peak stage occurring for the water year or designated period. Occasionally the maximum stage for a year may occur at midnight at the beginning or end of the year, on a recession from or rise toward a higher peak in the adjoining year. In this case, the maximum peak stage is given in the table and the maximum stage may be reported in the REMARKS paragraph in the manuscript or in a footnote. If the dates of occurrence for the maximum peak stage and maximum peak flow are different, 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.

HYDROGRAPH.--The hydrograph gives a graphical presentation of the mean discharge for each day of the water year. Where possible, the same scale is used in order to facilitate visual comparison between gaging stations.

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 manuscript.

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 published 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 three 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 because of 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 U.S. Geological Survey 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 U.S. Geological Survey 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 5–9 and 15.

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 Measurements 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 on site when the samples are taken. Procedures for on-site measurements and for collecting, treating, and shipping samples are given in publications on Techniques of Water-Resources Investigations Book 1, Chapter D2; Book 3, Chapter A1, A3, and A4; Book 9, Chapters A1–A9. These references are listed in the PUBLICATIONS ON TECHNIQUES OF WATER-RESOURCES INVESTIGATIONS section of this report. These methods are consistent with ASTM standards and generally follow ISO standards. Also, detailed information on collecting, treating, and shipping samples may be obtained from the U.S. Geological Survey Hawaii District office.

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 apparent 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 frequently taken at the time discharge measurements are made 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 U.S. Geological Survey Hawaii District 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.

For stations with daily suspended-sediment records, mean daily suspended-sediment concentrations and loads are computed and published for each day of the water year. During periods of unchanging flow and sediment concentration, daily suspended-sediment loads are computed as the product of daily mean streamflow, daily mean suspended-sediment concentrations, and 0.0027, a conversion factor. 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. Methods used in the computation of sediment records are described in the TWRI Book 3, Chapters C1 and C3. These methods are consistent with ASTM standards and generally follow ISO standards.

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 and chloride are analyzed locally. All other samples are analyzed in the U.S. Geological Survey National Water-Quality Laboratory in Arvada, Colorado. The USGS National Water-Quality Laboratory collects quality-control data on a continuing basis to evaluate selected analytical methods to determine long-term method detection levels (LT-MDL's) and laboratory reporting levels (LRL's). These values are re-evaluated each year on the basis of the most recent quality-control data and, consequently, may change from year to year.

This reporting procedure limits the occurrence of false positive error. The chance of falsely reporting a concentration greater than the LT-MDL for a sample in which the analyte is not present is 1 percent or less. Application of the LRL limits the occurrence of false negative error. The chance of falsely reporting a non-detection for a sample in which the analyte is present at a concentration equal to or greater than the LRL is 1 percent or less.

Accordingly, concentrations are reported as <LRL for samples in which the analyte was either not detected or did not pass identification. Analytes that are detected at concentrations between the LT-MDL and LRL and that pass identification criteria are estimated. Estimated concentrations will be noted with a remark code of "E." These data should be used with the understanding that their uncertainty is greater than that of data reported without the "E" remark code.

Methods used to analyze sediment samples and to compute sediment records are described in the TWRI Book 5, Chapter C1. Methods used by the U.S. Geological Survey laboratories are given in TWRI Book 1, Chapter D2; Book 3, Chapter C2; and Book 5, Chapter A1, A3, A4, and A5. These methods are consistent with ASTM standards and generally follow ISO standards.

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 in this report 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, NWIS, and subsequently to its web-based National data system, NWISWeb [http://water.usgs.gov/nwis/nwis]. 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 NWIS or NWISWeb to ensure the most recent updates. Updates to NWISWeb are currently made on an annual basis.

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 surface-water-quality data in this report:

PRINTED OUTPUT	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.
K	Results based on colony count outside the acceptance range (non-ideal colony count).
L	Biological organism count less than 0.5 percent (organism may be observed rather than counted).
D	Biological organism count equal to or greater than 15 percent (dominant).
V	Analyte was detected in both the environmental sample and the associated blanks
&	Biological organism estimated as dominant.

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). 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 began using new trace-element protocols at some stations in water year 1994.

Change in National Trends Network Procedures

*NOTE.--Sample handling procedures at all National Trends Network stations were changed substantially on January 11, 1994, in order to reduce contamination from the sample shipping container. The data for samples before and after that date are different and not directly comparable. A tabular summary of the differences based on a special intercomparison study, is available from the NADP Program Office, Illinois State Water Survey, 2204 Griffith Drive, Champaign, IL 61820-7495 (217-333-7873).

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 16–20.

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.

Most methods for collecting and analyzing water samples are described in the U.S. Geological Survey TWRI publications referred to in the "On-site Measurements and Sample Collection" and the "Laboratory Measurements" sections in this data report. In addition, the TWRI Book 1, Chapter D2, describes guidelines for the collection and field analysis of ground-water samples for selected constituents. The values reported in this report represent water-quality conditions at the time of sampling as much as possible, consistent with available sampling techniques and methods of analysis. These methods are consistent with ASTM standards and generally follow ISO standards. All samples were obtained by trained personnel. The wells sampled were pumped long enough to assure that the water collected came directly from the aquifer and had not stood for a long time in the well casing where it would have been exposed to the atmosphere and to the material, possibly metal, comprising the casings.

Tables of water-level data are presented by islands. 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, a 7-digit number based on the local identifier well-numbering system (page 5).

Water-level records are obtained from direct measurements with a steel or electrical tape or from the graph, digital record, or electronic record 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 every day. When complete water-level data for a day is not available, the day is noted with three dashes (---).

Water levels are reported 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 three parts, the station description, the data table of mean daily water levels observed during the current water year, and a hydrograph of water levels observed during the past 5 years. 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 landline 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-U.S. Geological 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 U.S. 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 occurrence.

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 of water levels are listed. For wells equipped with a recorder, only abbreviated tables are published; generally, only water-level lows are listed for every fifth day and at the end of the month (eom). 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 USGS WATER DATA

Real-time streamflow, water level, and rainfall data collected by the USGS in Hawaii are available at:

http://hi.water.usgs.gov

Some water-quality and ground-water data also are available through the WWW. In addition, data can be provided in various machine-readable formats on magnetic tape or 3-1/2 inch floppy disk. 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 district offices (see address on the back of the title page).

DEFINITION OF TERMS

Specialized technical terms related to streamflow, water-quality, and other hydrologic data, as used in this report, are defined below. Definitions of common terms such as algae, water level, and precipitation are given in standard dictionaries. Not all terms defined in this alphabetical list apply to every State. See also table for converting inch/pound units to International System (SI) units on the inside of the back cover.

Acid neutralizing capacity (ANC) is the equivalent sum of all bases or base-producing materials, solutes plus particulates, in an aqueous system that can be titrated with acid to an equivalence point. This term designates titration of an "unfiltered" sample (formerly reported as alkalinity).

Acre-foot (AC-FT, acre-ft) is a unit of volume, commonly used to measure quantities of water used or stored, equivalent to the volume of water required to cover 1 acre to a depth of 1 foot and equivalent to 43,560 cubic feet, 325,851 gallons, or 1,233 cubic meters. (See also "Annual runoff")

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

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. (See also "Biomass" and "Dry weight")

Alkalinity is the capacity of solutes in an aqueous system to neutralize acid. This term designates titration of a "filtered" sample.

Annual runoff is the total quantity of water that is discharged ("runs off") from a drainage basin in a year. Data reports may present annual runoff data as volumes in acre-feet, as discharges per unit of drainage area in cubic feet per second per square mile, or as depths of water on the drainage basin in inches.

Annual 7-day minimum is the lowest mean value for any 7-consecutive-day period in a year. Annual 7-day minimum values are reported herein for the calendar year and the water year (October 1 through September 30). Most low-flow frequency analyses use a climatic year (April 1-March 31), which tends to prevent the low-flow period from being artificially split between adjacent years. 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.)

Aroclor is the registered trademark for a group of poly-chlorinated biphenyls that were manufactured by the Monsanto Company prior to 1976. Aroclors are assigned specific 4-digit reference numbers dependent upon molecular type and degree of substitution of the biphenyl ring hydrogen atoms by chlorine atoms. The first two digits of a numbered aroclor represent the molecular type, and the last two digits represent the percentage weight of the hydrogen-substituted chlorine.

Artificial substrate is a device that is purposely placed in a stream or lake for colonization of organisms. The artificial substrate simplifies the community structure by standardizing the substrate from which each sample is collected. Examples of artificial substrates are basket samplers (made of wire cages filled with clean streamside rocks) and multiplate samplers (made of hardboard) for benthic organism collection, and plexiglass strips for periphyton collection. (See also "Substrate")

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. Ash mass of zooplankton and phytoplankton is expressed in grams per cubic meter (g/m^3), and periphyton and benthic organisms in grams per square meter (g/m^2). (See also "Biomass" and "Dry mass")

Aspect is the direction toward which a slope faces with respect to the compass.

Bacteria are microscopic unicellular organisms, typically spherical, rodlike, or spiral and threadlike in shape, often clumped into colonies. Some bacteria cause disease, whereas 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.

Bankfull stage, as used in this report, is the stage at which a stream first overflows its natural banks formed by floods with 1- to 3-year recurrence intervals.

Base discharge (for peak discharge) is a discharge value, determined for selected stations, above which peak discharge data are published. The base discharge at each station is selected so that an average of about three peak flows per year will be published. (See also "Peak flow")

Base flow is sustained flow of a stream in the absence of direct runoff. It includes natural and human-induced streamflows. Natural base flow is sustained largely by ground-water discharge.

Bedload is material in transport that is supported primarily by the streambed. In this report, bedload is considered to consist of particles in transit from the bed to an elevation equal to the top of the bedload sampler nozzle (ranging from 0.25 to 0.5 foot) that are retained in the bedload sampler. A sample collected with a pressure-differential bedload sampler also may contain a component of the suspended load.

Bedload discharge (tons per day) is the rate of sediment moving as bedload, reported as dry weight, that passes through a cross section in a given time. NOTE: Bedload discharge values in this report may include a component of the suspended-sediment discharge. A correction may be necessary when computing the total sediment discharge by summing the bedload discharge and the suspended-sediment discharge. (See also "Bedload," "Dry weight," "Sediment," and "Suspended-sediment discharge")

Bed material is the sediment mixture of which a stream-bed, lake, pond, reservoir, or estuary bottom is composed. (See also "Bedload" and "Sediment")

Benthic organisms are the group of organisms inhabiting 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. They are useful as indicators of water quality.

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 given time, expressed as mass per unit area or volume of habitat.

Biomass pigment ratio is an indicator of the total proportion of periphyton that are autotrophic (plants). This is also called the Autotrophic Index.

Blue-green algae (*Cyanophyta*) are a group of phytoplankton organisms having a blue pigment, in addition to the green pigment called chlorophyll. Blue-green algae often cause nuisance conditions in water. Concentrations are expressed as a number of cells per milliliter (cells/mL) of sample. (See also "Phytoplankton")

Bottom material (See "Bed material")

Bulk electrical conductivity is the combined electrical conductivity of all material within a doughnut-shaped volume surrounding an induction probe. Bulk conductivity is affected by different physical and chemical properties of the material including the dissolved solids content of the pore water and lithology and porosity of the rock.

Cells/volume refers to the number of cells of any organism that 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 volume, and are generally reported as cells or units per milliliter (mL) or liter (L).

Cells volume (biovolume) determination is one of several common methods used to estimate biomass of algae in aquatic systems. Cell members of algae are frequently used in aquatic surveys as an indicator of algal production. However, cell numbers alone cannot represent true biomass because of considerable cell-size variation among the algal species. Cell volume (μm^3) is determined by obtaining critical cell measurements or cell dimensions (for example, length, width, height, or radius) for 20 to 50 cells of each important species to obtain an average biovolume per cell. Cells are categorized according to the correspondence of their cellular shape to the nearest geometric solid or combinations of simple solids (for example, spheres, cones, or cylinders). Representative formulae used to compute biovolume are as follows:

sphere $4/3\ \pi r^3$ cone $1/3\ \pi r^3 h$ cylinder $\pi r^3 h$.

pi (π) is the ratio of the circumference to the diameter of a circle; pi = 3.14159….

From cell volume, total algal biomass expressed as biovolume ($\mu m^3/mL$) is thus determined by multiplying the number of cells of a given species by its average cell volume and then summing these volumes for all species.

Cfs-day (See "Cubic foot per second-day")

Channel bars, as used in this report, are the lowest prominent geomorphic features higher than the channel bed.

Chemical oxygen demand (COD) is a measure of the chemically oxidizable material in the water and furnishes an approximation of the amount of organic and reducing material present. The determined value may correlate with BOD or with carbonaceous organic pollution from sewage or industrial wastes. [See also "Biochemical oxygen demand (BOD)"]

Clostridium perfringens *(C. perfringens)* is a spore-forming bacterium that is common in the feces of human and other warm-blooded animals. Clostridial spores are being used experimentally as an indicator of past fecal contamination and presence of microorganisms that are resistant to disinfection and environmental stresses. (See also "Bacteria")

Coliphages are viruses that infect and replicate in coliform bacteria. They are indicative of sewage contamination of water and of the survival and transport of viruses in the environment.

Color unit is produced by 1 milligram per liter of platinum in the form of the chloroplatinate ion. Color is expressed in units of the platinum-cobalt scale.

Confined aquifer is a term used to describe an aquifer containing water between two relatively impermeable bound-aries. The water level in a well tapping a confined aquifer stands above the top of the confined aquifer and can be higher or lower than the water table that may be present in the material above it. In some cases, the water level can rise above the ground surface, yielding a flowing well.

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.

Continuous-record station is a site where data are collected with sufficient frequency to define daily mean values and variations within a day.

Control designates a feature in the channel that physically affects the water-surface elevation and thereby determines the stage-discharge relation at the gage. This feature may be a constriction of the channel, a bedrock outcrop, a gravel bar, 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 saltwater.

Cubic foot per second (CFS, ft^3/s) is the rate of discharge representing a volume of 1 cubic foot passing a given point in 1 second. It is equivalent to approximately 7.48 gallons per second or approximately 449 gallons per minute, or 0.02832 cubic meters per second. The term "second-foot" sometimes is used synonymously with "cubic foot per second" but is now obsolete.

Cubic foot per second-day (CFS-DAY, Cfs-day, [$(ft^3/s)/d$]) 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, 1.98347 acre-feet, 646,317 gallons, or 2,446.6 cubic meters. The daily mean discharges reported in the daily value data tables are numerically equal to the daily volumes in cfs-days, and the totals also represent volumes in cfs-days.

Cubic foot per second per square mile [CFSM, $(ft^3/s)/mi^2$] is the average number of cubic feet of water flowing per second from each square mile of area drained, assuming the runoff is distributed uniformly in time and area. (See also "Annual runoff")

Daily mean suspended-sediment concentration is the time-weighted concentration of suspended sediment passing a stream cross section during a 24-hour day. (See also “Sediment” and “Suspended-sediment concentration”)

Daily-record station is a site where data are collected with sufficient frequency to develop a record of one or more data values per day. The frequency of data collection can range from continuous recording to periodic sample or data collection on a daily or near-daily basis.

Data collection platform (DCP) is an electronic instrument that collects, processes, and stores data from various sensors, and transmits the data by satellite data relay, line-of-sight radio, and/or landline telemetry.

Data logger is a microprocessor-based data acquisition system designed specifically to acquire, process, and store data. Data are usually downloaded from onsite data loggers for entry into office data systems.

Datum is a surface or point relative to which measurements of height and/or horizontal position are reported. A vertical datum is a horizontal surface used as the zero point for measurements of gage height, stage, or elevation; a horizontal datum is a reference for positions given in terms of latitude-longitude, State Plane coordinates, or UTM coordinates. (See also “Gage datum,” “Land-surface datum,” “National Geodetic Vertical Datum of 1929,” and “North American Vertical Datum of 1988”)

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. (See also “Phytoplankton”)

Diel is of or pertaining to a 24-hour period of time; a regular daily cycle.

Discharge, or **flow**, is the rate that matter passes through a cross section of a stream channel or other water body per unit of time. The term commonly refers to the volume of water (including, unless otherwise stated, any sediment or other constituents suspended or dissolved in the water) that passes a cross section in a stream channel, canal, pipeline, etc., within a given period of time (cubic feet per second). Discharge also can apply to the rate at which constituents, such as suspended sediment, bedload, and dissolved or suspended chemicals, pass through a cross section, in which cases the quantity is expressed as the mass of constituent that passes the cross section in a given period of time (tons per day).

Dissolved refers to that material in a representative water sample that passes through a 0.45-micrometer membrane filter. This is a convenient operational definition used by Federal and State agencies that collect water-quality data. Determinations of “dissolved” constituent concentrations are made on sample water that has been filtered.

Dissolved oxygen (DO) is the molecular oxygen (oxygen gas) dissolved in water. The concentration in water is a function of atmospheric pressure, temperature, and dissolved-solids concentration of the water. The ability of water to retain oxygen decreases with increasing temperature or dissolved-solids concentration. Photosynthesis and respiration by plants commonly cause diurnal variations in dissolved-oxygen concentration in water from some streams.

Dissolved-solids concentration in water is the quantity of dissolved material in a sample of water. It is determined either analytically by the “residue-on-evaporation” method, or mathematically by totaling the concentrations of individual constituents reported in a comprehensive chemical analysis. During the analytical determination, the bicarbonate (generally a major dissolved component of water) is converted to carbonate. In the mathematical calculation, the bicarbonate value, in milligrams per liter, is multiplied by 0.4926 to convert it to carbonate. Alternatively, alkalinity concentration (as mg/L $CaCO_3$) can be converted to carbonate concentration by multiplying by 0.60.

Diversity index (H) (Shannon index) is a numerical expression of evenness of distribution of aquatic organisms. The formula for diversity index is:

$$\bar{d} = -\sum_{i=1}^{s} \frac{n_i}{n} \log_2 \frac{n_i}{n}$$

where n_i is the number of individuals per taxon, n is the total number of individuals, and s is the total number of taxa in the sample of the community. Index values range from zero, when all the organisms in the sample are the same, to some positive number, when some or all of the organisms in the sample are different.

Drainage area of a stream at a specific location is that area upstream from the location, measured in a horizontal plane, that has a common outlet at the site for its surface runoff from precipitation that normally drains by gravity into a stream. Drainage areas given herein include all closed basins, or noncontributing areas, within the area unless otherwise specified.

Drainage basin is a part of the Earth's surface that contains a drainage system with a common outlet for its surface runoff. (See "Drainage area")

Dry mass refers to the mass of residue present after drying in an oven at 105 °C, 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. (See also "Ash mass," "Biomass," and "Wet mass")

Dry weight refers to the weight of animal tissue after it has been dried in an oven at 65 °C until a constant weight is achieved. Dry weight represents total organic and inorganic matter in the tissue. (See also "Wet weight")

Embeddedness is the degree to which gravel-sized and larger particles are surrounded or enclosed by finer-sized particles. (See also "Substrate embeddedness class")

Enterococcus bacteria are commonly found in the feces of humans and other warmblooded animals. Although some strains are ubiquitous and not related to fecal pollution, the presence of enterococci in water is an indication of fecal pollution and the possible presence of enteric pathogens. Enterococcus bacteria are those bacteria that produce pink to red colonies with black or reddish-brown precipitate after incubation at 41 °C on mE agar (nutrient medium for bacterial growth) and subsequent transfer to EIA medium. Enterococci include *Streptococcus feacalis, Streptococcus feacium, Streptococcus avium,* and their variants. (See also "Bacteria")

EPT Index is the total number of distinct taxa within the insect orders Ephemeroptera, Plecoptera, and Trichoptera. This index summarizes the taxa richness within the aquatic insects that are generally considered pollution sensitive; the index usually decreases with pollution.

Escherichia coli *(E. coli)* are bacteria present in the intestine and feces of warmblooded animals. *E. coli* are a member species of the fecal coliform group of indicator bacteria. In the laboratory, they are defined as those bacteria that produce yellow or yellow-brown colonies on a filter pad saturated with urea substrate broth after primary culturing for 22 to 24 hours at 44.5 °C on mTEC medium (nutrient medium for bacterial growth). Their concentrations are expressed as number of colonies per 100 mL of sample. (See also "Bacteria")

Estimated (E) concentration value is reported when an analyte is detected and all criteria for a positive result are met. If the concentration is less than the method detection limit (MDL), an 'E' code will be reported with the value. If the analyte is qualitatively identified as present, but the quantitative determination is substantially more uncertain, the National Water Quality Laboratory will identify the result with an 'E' code even though the measured value is greater than the MDL. A value reported with an 'E' code should be used with caution. When no analyte is detected in a sample, the default reporting value is the MDL preceded by a less than sign (<).

Euglenoids (*Euglenophyta*) are a group of algae that are usually free-swimming and rarely creeping. They have the ability to grow either photosynthetically in the light or heterotrophically in the dark. (See also "Phytoplankton")

Extractable organic halides (EOX) are organic compounds that contain halogen atoms such as chlorine. These organic compounds are semivolatile and extractable by ethyl acetate from air-dried streambed sediment. The ethyl acetate extract is combusted, and the concentration is determined by microcoulometric determination of the halides formed. The concentration is reported as micrograms of chlorine per gram of the dry weight of the streambed sediment.

Fecal coliform bacteria are present in the intestines or feces of warmblooded animals. They often are used as indicators of the sanitary quality of the water. In the laboratory, they are defined as all organisms that produce blue colonies within 24 hours when incubated at 44.5 °C plus or minus 0.2 °C on M-FC medium (nutrient medium for bacterial growth). Their concentrations are expressed as number of colonies per 100 mL of sample. (See also "Bacteria")

Fecal streptococcal bacteria are present in the intestines of warmblooded animals and are ubiquitous in the environment. They are characterized as gram-positive, cocci bacteria that are capable of growth in brain-heart infusion broth. In the laboratory, they are defined as all the organisms that produce red or pink colonies within 48 hours at 35 °C plus or minus 1.0 °C

on KF-streptococcus medium (nutrient medium for bacterial growth). Their concentrations are expressed as number of colonies per 100 mL of sample. (See also "Bacteria")

Fire algae (*Pyrrhophyta*) are free-swimming unicells characterized by a red pigment spot. (See also "Phytoplankton")

Flow-duration percentiles are values on a scale of 100 that indicate the percentage of time for which a flow is not exceeded. For example, the 90th percentile of river flow is greater than or equal to 90 percent of all recorded flow rates.

Gage datum is a horizontal surface used as a zero point for measurement of stage or gage height. This surface usually is located slightly below the lowest point of the stream bottom such that the gage height is usually slightly greater than the maximum depth of water. Because the gage datum itself is not an actual physical object, the datum usually is defined by specifying the elevations of permanent reference marks such as bridge abutments and survey monuments, and the gage is set to agree with the reference marks. Gage datum is a local datum that is maintained independently of any national geodetic datum. However, if the elevation of the gage datum relative to the national datum (North American Vertical Datum of 1988 or National Geodetic Vertical Datum of 1929) has been determined, then the gage readings can be converted to elevations above the national datum by adding the elevation of the gage datum to the gage reading.

Gage height (G.H.) is the water-surface elevation, in feet above the gage datum. If the water surface is below the gage datum, the gage height is negative. Gage height often is used interchangeably with the more general term "stage," although gage height is more appropriate when used in reference to a reading on a gage.

Gage values are values that are recorded, transmitted, and/or computed from a gaging station. Gage values typically are collected at 5-, 15-, or 30-minute intervals.

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

Gas chromatography/flame ionization detector (GC/FID) is a laboratory analytical method used as a screening technique for semivolatile organic compounds that are extractable from water in methylene chloride.

Geomorphic channel units, as used in this report, are fluvial geomorphic descriptors of channel shape and stream velocity. Pools, riffles, and runs are types of geomorphic channel units considered for National Water-Quality Assessment (NAWQA) Program habitat sampling.

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

Habitat, as used in this report, includes all nonliving (physical) aspects of the aquatic ecosystem, although living components like aquatic macrophytes and riparian vegetation also are usually included. Measurements of habitat are typically made over a wider geographic scale than are measurements of species distribution.

Habitat quality index is the qualitative description (level 1) of instream habitat and riparian conditions surrounding the reach sampled. Scores range from 0 to 100 percent with higher scores indicative of desirable habitat conditions for aquatic life. Index only applicable to wadable streams.

Hardness of water is a physical-chemical characteristic that commonly is recognized by the increased quantity of soap required to produce lather. It is computed as the sum of equivalents of polyvalent cations (primarily calcium and magnesium) and is expressed as the equivalent concentration of calcium carbonate ($CaCO_3$).

High tide is the maximum height reached by each rising tide. The high-high and low-high tides are the higher and lower of the two high tides, respectively, of each tidal day. *See NOAA web site: http://www.co-ops.nos.noaa.gov/tideglos.html*

Hilsenhoff's Biotic Index (HBI) is an indicator of organic pollution that uses tolerance values to weight taxa abundances; usually increases with pollution. It is calculated as follows:

$$HBI = sum\frac{(n)(a)}{N}$$

where *n* is the number of individuals of each taxon, *a* is the tolerance value of each taxon, and *N* is the total number of organisms in the sample.

Horizontal datum (See "Datum")

Hydrologic index stations referred to in this report are continuous-record gaging stations that have been selected as representative of streamflow patterns for their respective regions. Station locations are shown on index maps.

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

Inch (IN., in.), as used in this report, refers to the depth to which the drainage area would be covered with water if all of the runoff for a given time period were uniformly distributed on it. (See also "Annual runoff")

Instantaneous discharge is the discharge at a particular instant of time. (See also "Discharge")

Island, as used in this report, is a mid-channel bar that has permanent woody vegetation, is flooded once a year on average, and remains stable except during large flood events.

Laboratory reporting level (LRL) is generally equal to twice the yearly determined long-term method detection level (LT-MDL). The LRL controls false negative error. The probability of falsely reporting a nondetection for a sample that contained an analyte at a concentration equal to or greater than the LRL is predicted to be less than or equal to 1 percent. The value of the LRL will be reported with a "less than" (<) remark code for samples in which the analyte was not detected. The National Water Quality Laboratory (NWQL) collects quality-control data from selected analytical methods on a continuing basis to determine LT-MDLs and to establish LRLs. These values are reevaluated annually on the basis of the most current quality-control data and, therefore, may change. [Note: In several previous NWQL documents (NWQL Technical Memorandum 98.07, 1998), the LRL was called the nondetection value or NDV—a term that is no longer used.]

Land-surface datum (lsd) is a datum plane that is approximately at land surface at each ground-water observation well.

Latent heat flux (often used interchangeably with latent heat-flux density) is the amount of heat energy that converts water from liquid to vapor (evaporation) or from vapor to liquid (condensation) across a specified cross-sectional area per unit time. Usually expressed in watts per square meter.

Light-attenuation coefficient, also known as the extinction coefficient, is a measure of water clarity. Light is attenuated according to the Lambert-Beer equation:

$$I = I_o e^{-\lambda L}$$

where I_o is the source light intensity, I is the light intensity at length L (in meters) from the source, λ is the light-attenuation coefficient, and e is the base of the natural logarithm. The light-attenuation coefficient is defined as

$$\lambda = -\frac{1}{L} log_e \frac{I}{I_o} \cdot$$

Lipid is any one of a family of compounds that are insoluble in water and that make up one of the principal components of living cells. Lipids include fats, oils, waxes, and steroids. Many environmental contaminants such as organochlorine pesticides are lipophilic.

Long-term method detection level (LT-MDL) is a detection level derived by determining the standard deviation of a minimum of 24 method detection limit (MDL) spike sample measurements over an extended period of time. LT-MDL data are collected on a continuous basis to assess year-to-year variations in the LT-MDL. The LT-MDL controls false positive error.

The chance of falsely reporting a concentration at or greater than the LT-MDL for a sample that did not contain the analyte is predicted to be less than or equal to 1 percent.

Low tide is the minimum height reached by each falling tide. The high-low and low-low tides are the higher and lower of the two low tides, respectively, of each tidal day. *See NOAA web site: http://www.co-ops.nos.noaa.gov/tideglos.html*

Macrophytes are the macroscopic plants in the aquatic environment. The most common macrophytes are the rooted vascular plants that usually are arranged in zones in aquatic ecosystems and restricted in the area by the extent of illumination through the water and sediment deposition along the shoreline.

Mean concentration of suspended sediment (Daily mean suspended-sediment concentration) is the time-weighted concentration of suspended sediment passing a stream cross section during a given time period. (See also "Daily mean suspended-sediment concentration" and "Suspended-sediment concentration")

Mean discharge (MEAN) is the arithmetic mean of individual daily mean discharges during a specific period. (See also "Discharge")

Mean high or **low tide** is the average of all high or low tides, respectively, over a specific period.

Mean sea level is a local tidal datum. It is the arithmetic mean of hourly heights observed over the National Tidal Datum Epoch. Shorter series are specified in the name; for example, monthly mean sea level and yearly mean sea level. In order that they may be recovered when needed, such datums are referenced to fixed points known as benchmarks. (See also "Datum")

Measuring point (MP) is an arbitrary permanent reference point from which the distance to water surface in a well is measured to obtain water level.

Membrane filter is a thin microporous material of specific pore size used to filter bacteria, algae, and other very small particles from water.

Metamorphic stage refers to the stage of development that an organism exhibits during its transformation from an immature form to an adult form. This developmental process exists for most insects, and the degree of difference from the immature stage to the adult form varies from relatively slight to pronounced, with many intermediates. Examples of metamorphic stages of insects are egg-larva-adult or egg-nymph-adult.

Method detection limit (MDL) is the minimum concentration of a substance that can be measured and reported with 99-percent confidence that the analyte concentration is greater than zero. It is determined from the analysis of a sample in a given matrix containing the analyte. At the MDL concentration, the risk of a false positive is predicted to be less than or equal to 1 percent.

Methylene blue active substances (MBAS) are apparent detergents. The determination depends on the formation of a blue color when methylene blue dye reacts with synthetic anionic detergent compounds.

Micrograms per gram (UG/G, µg/g) is a unit expressing the concentration of a chemical constituent as the mass (micrograms) of the element per unit mass (gram) of material analyzed.

Micrograms per kilogram (UG/KG, µg/kg) is a unit expressing the concentration of a chemical constituent as the mass (micrograms) of the constituent per unit mass (kilogram) of the material analyzed. One microgram per kilogram is equivalent to 1 part per billion.

Micrograms per liter (UG/L, µg/L) is a unit expressing the concentration of chemical constituents in water as mass (micrograms) of constituent per unit volume (liter) of water. One thousand micrograms per liter is equivalent to 1 milligram per liter. One microgram per liter is equivalent to 1 part per billion.

Microsiemens per centimeter (US/CM, µS/cm) is a unit expressing the amount of electrical conductivity of a solution as measured between opposite faces of a centimeter cube of solution at a specified temperature. Siemens is the International System of Units nomenclature. It is synonymous with mhos and is the reciprocal of resistance in ohms.

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

Minimum reporting level (MRL) is the smallest measured concentration of a constituent that may be reliably reported by using a given analytical method.

Miscellaneous site, miscellaneous station, or miscellaneous sampling site is a site where streamflow, sediment, and/or water-quality data or water-quality or sediment samples are collected once, or more often on a random or discontinuous basis to provide better areal coverage for defining hydrologic and water-quality conditions over a broad area in a river basin.

Most probable number (MPN) is an index of the number of coliform bacteria that, more probably than any other number, would give the results shown by the laboratory examination; it is not an actual enumeration. MPN is determined from the distribution of gas-positive cultures among multiple inoculated tubes.

Multiple-plate samplers are artificial substrates of known surface area used for obtaining benthic invertebrate samples. They consist of a series of spaced, hardboard plates on an eyebolt.

Nanograms per liter (NG/L, ng/L) is a unit expressing the concentration of chemical constituents in solution as mass (nanograms) of solute per unit volume (liter) of water. One million nanograms per liter is equivalent to 1 milligram per liter.

National Geodetic Vertical Datum of 1929 (NGVD of 1929) is a fixed reference adopted as a standard geodetic datum for elevations determined by leveling. It was formerly called "Sea Level Datum of 1929" or "mean sea level." Although the datum was derived from the mean sea level at 26 tide stations**,** it does not necessarily represent local mean sea level at any particular place. *See NOAA web site: http://www.ngs.noaa.gov/faq.shtml#WhatVD29VD88* (See "North American Vertical Datum of 1988")

Natural substrate refers to any naturally occurring immersed or submersed solid surface, such as a rock or tree, upon which an organism lives. (See also "Substrate")

Nekton are the consumers in the aquatic environment and consist of large free-swimming organisms that are capable of sustained, directed mobility.

Nephelometric turbidity unit (NTU) is the measurement for reporting turbidity that is based on use of a standard suspension of formazin. Turbidity measured in NTU uses nephelometric methods that depend on passing specific light of a specific wavelength through the sample.

North American Vertical Datum of 1988 (NAVD 1988) is a fixed reference adopted as the official civilian vertical datum for elevations determined by Federal surveying and mapping activities in the United States. This datum was established in 1991 by minimum-constraint adjustment of the Canadian**,** Mexican, and United States first-order terrestrial leveling networks.

Open or **screened interval** is the length of unscreened opening or of well screen through which water enters a well, in feet below land surface.

Organic carbon (OC) is a measure of organic matter present in aqueous solution, suspension, or bottom sediment. May be reported as dissolved organic carbon (DOC), particulate organic carbon (POC), or total organic carbon (TOC).

Organic mass or **volatile mass** of a living substance is the difference between the dry mass and ash mass and represents the actual mass of the living matter. Organic mass is expressed in the same units as for ash mass and dry mass. (See also "Ash mass," "Biomass," and "Dry mass")

Organism count/area refers to the number of organisms collected and enumerated in a sample and adjusted to the number per area habitat, usually square meter (m^2), acre, or hectare. Periphyton, benthic organisms, and macrophytes are expressed in these terms.

Organism count/volume refers to the number of organisms collected and enumerated in a sample and adjusted to the number per sample volume, usually milliliter (mL) or liter (L). Numbers of planktonic organisms can be expressed in these terms.

Organochlorine compounds are any chemicals that contain carbon and chlorine. Organochlorine compounds that are important in investigations of water, sediment, and biological quality include certain pesticides and industrial compounds.

Parameter code is a 5-digit number used in the USGS computerized data system, National Water Information System (NWIS), to uniquely identify a specific constituent or property.

Partial-record station is a site where discrete measurements of one or more hydrologic parameters are obtained over a period of time without continuous data being recorded or computed. A common example is a crest-stage gage partial-record station at which only peak stages and flows are recorded.

Particle size is the diameter, in millimeters (mm), of a particle determined by sieve or sedimentation methods. The sedimentation method utilizes the principle of Stokes law to calculate sediment particle sizes. Sedimentation methods (pipet, bottom-withdrawal tube, visual-accumulation tube, sedigraph) 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, as used in this report, agrees with the recommendation 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	>0.004 - 0.062	Sedimentation
Sand	>0.062 - 2.0	Sedimentation/sieve
Gravel	>2.0 - 64.0	Sieve
Cobble	>64 - 256	Manual measurement
Boulder	>256	Manual measurement

The particle-size distributions given in this report are not necessarily representative of all particles in transport in the stream. For the sedimentation method, most of the organic matter 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.

Peak flow (peak stage) is an instantaneous local maximum value in the continuous time series of streamflows or stages, preceded by a period of increasing values and followed by a period of decreasing values. Several peak values ordinarily occur in a year. The maximum peak value in a year is called the annual peak; peaks lower than the annual peak are called secondary peaks. Occasionally, the annual peak may not be the maximum value for the year; in such cases, the maximum value occurs at midnight at the beginning or end of the year, on the recession from or rise toward a higher peak in the adjoining year. If values are recorded at a discrete series of times, the peak recorded value may be taken as an approximation of the true peak, which may occur between the recording instants. If the values are recorded with finite precision, a sequence of equal recorded values may occur at the peak; in this case, the first value is taken as the peak.

Percent composition or **percent of total** 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, weight, mass, or volume.

Percent shading is a measure of the amount of sunlight potentially reaching the stream. A clinometer is used to measure left and right bank canopy angles. These values are added together, divided by 180, and multiplied by 100 to compute percentage of shade.

Periodic-record station is a site where stage, discharge, sediment, chemical, physical, or other hydrologic measurements are made one or more times during a year but at a frequency insufficient to develop a daily record.

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

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

pH of water is the negative logarithm of the hydrogen-ion activity. Solutions with pH less than 7.0 standard units are termed "acidic," and solutions with a pH greater than 7.0 are termed "basic." Solutions with a pH of 7.0 are neutral. The presence and concentration of many dissolved chemical constituents found in water are affected, in part, by the hydrogen-ion activity of water. Biological processes including growth, distribution of organisms, and toxicity of the water to organisms also are affected, in part, by the hydrogen-ion activity of water.

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

Picocurie (PC, pCi) is one trillionth (1×10^{-12}) of the amount of radioactive nuclide represented by a curie (Ci). A curie is the quantity of radioactive nuclide that yields 3.7×10^{10} radioactive disintegrations per second (dps). A picocurie yields 0.037 dps, or 2.22 dpm (disintegrations per minute).

Plankton is the community of suspended, floating, or weakly swimming organisms that live in the open water of lakes and rivers. Concentrations are expressed as a 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.

Polychlorinated naphthalenes (PCNs) are industrial chemicals that are mixtures of chlorinated naphthalene compounds. They have properties and applications similar to polychlorinated biphenyls (PCBs) and have been identified in commercial PCB preparations.

Pool, as used in this report, is a small part of a stream reach with little velocity, commonly with water deeper than surrounding areas.

Primary productivity is a measure of the rate at which new organic matter is formed and accumulated through photo-synthetic and chemosynthetic activity of producer organisms (chiefly, green plants). The rate of primary production is estimated by measuring the amount of oxygen released (oxygen method) or the amount of carbon assimilated (carbon method) by the plants.

Primary productivity (carbon method) is expressed as milligrams of carbon per area per unit time [mg C/(m^2/time)] for periphyton and macrophytes or per volume [mg C/(m^3/time)] for phytoplankton. The carbon method defines the amount of carbon dioxide consumed as measured by radioactive carbon (carbon-14). The carbon-14 method is of greater sensitivity than the oxygen light and dark bottle method and is preferred for use with unenriched water samples. Unit time may be either the hour or day, depending on the incubation period. (See also "Primary productivity")

Primary productivity (oxygen method) is expressed as milligrams of oxygen per area per unit time [mg O/(m^2/time)] for periphyton and macrophytes or per volume [mg O/(m^3/time)] for phytoplankton. The oxygen method defines production and respiration rates as estimated from changes in the measured dissolved-oxygen concentration. The oxygen light and dark bottle method is preferred if the rate of primary production is sufficient for accurate measurements to be made within 24 hours. Unit time may be either the hour or day, depending on the incubation period. (See also "Primary productivity")

Radioisotopes are isotopic forms of elements that exhibit radioactivity. Isotopes are varieties of a chemical element that differ in atomic weight but are very nearly alike in chemical properties. The difference arises because the atoms of the isotopic forms of an element differ in the number of neutrons in the nucleus; for example, ordinary chlorine is a mixture of isotopes having atomic weights of 35 and 37, and the natural mixture has an atomic weight of about 35.453. Many of the elements similarly exist as mixtures of isotopes, and a great many new isotopes have been produced in the operation of nuclear devices such as the cyclotron. There are 275 isotopes of the 81 stable elements, in addition to more than 800 radioactive isotopes.

Reach, as used in this report, is a length of stream that is chosen to represent a uniform set of physical, chemical, and biological conditions within a segment. It is the principal sampling unit for collecting physical, chemical, and biological data.

Recoverable from bed (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. (See also “Bed material”)

Recurrence interval, also referred to as return period, is the average time, usually expressed in years, between occurrences of hydrologic events of a specified type (such as exceedances of a specified high flow or nonexceedance of a specified low flow). The terms “return period” and “recurrence interval” do not imply regular cyclic occurrence. The actual times between occurrences vary randomly, with most of the times being less than the average and a few being substantially greater than the average. For example, the 100-year flood is the flow rate that is exceeded by the annual maximum peak flow at intervals whose average length is 100 years (that is, once in 100 years, on average); almost two-thirds of all exceedances of the 100-year flood occur less than 100 years after the previous exceedance, half occur less than 70 years after the previous exceedance, and about one-eighth occur more than 200 years after the previous exceedance. Similarly, the 7-day, 10-year low flow ($7Q_{10}$) is the flow rate below which the annual minimum 7-day-mean flow dips at intervals whose average length is 10 years (that is, once in 10 years, on average); almost two-thirds of the nonexceedances of the $7Q_{10}$ occur less than 10 years after the previous nonexceedance, half occur less than 7 years after, and about one-eighth occur more than 20 years after the previous nonexceedance. The recurrence interval for annual events is the reciprocal of the annual probability of occurrence. Thus, the 100-year flood has a 1-percent chance of being exceeded by the maximum peak flow in any year, and there is a 10-percent chance in any year that the annual minimum 7-day-mean flow will be less than the $7Q_{10}$.

Replicate samples are a group of samples collected in a manner such that the samples are thought to be essentially identical in composition.

Return period (See “Recurrence interval”)

Riffle, as used in this report, is a shallow part of the stream where water flows swiftly over completely or partially submerged obstructions to produce surface agitation.

River mileage is the curvilinear distance, in miles, measured upstream from the mouth along the meandering path of a stream channel in accordance with Bulletin No. 14 (October 1968) of the Water Resources Council and typically is used to denote location along a river.

Run, as used in this report, is a relatively shallow part of a stream with moderate velocity and little or no surface turbulence.

Runoff is the quantity of water that is discharged (“runs off”) from a drainage basin during a given time period. Runoff data may be presented as volumes in acre-feet, as mean discharges per unit of drainage area in cubic feet per second per square mile, or as depths of water on the drainage basin in inches. (See also “Annual runoff”)

Sea level, as used in this report, refers to local mean sea level.

Sediment is solid material that originates mostly from disintegrated rocks; when transported by, suspended in, or deposited from water, it is referred to as “fluvial sediment.” Sediment 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 affected by environmental and land-use factors. Some major factors are topography, soil characteristics, land cover, and depth and intensity of pre-cipitation.

Sensible heat flux (often used interchangeably with latent sensible heat-flux density) is the amount of heat energy that moves by turbulent transport through the air across a specified cross-sectional area per unit time and goes to heating (cooling) the air. Usually expressed in watts per square meter.

Seven-day, 10-year low flow ($7Q_{10}$) is the discharge below which the annual 7-day minimum flow falls in 1 year out of 10 on the long-term average. The recurrence interval of the $7Q_{10}$ is 10 years; the chance that the annual 7-day minimum flow will be less than the $7Q_{10}$ is 10 percent in any given year. (See also "Annual 7-day minimum" and "Recurrence interval")

Shelves, as used in this report, are streambank features extending nearly horizontally from the flood plain to the lower limit of persistent woody vegetation.

Sodium adsorption ratio (SAR) is the expression of relative activity of sodium ions in exchange reactions within soil and is an index of sodium or alkali hazard to the soil. Sodium hazard in water is an index that can be used to evaluate the suitability of water for irrigating crops.

Soil heat flux (often used interchangeably with soil heat-flux density) is the amount of heat energy that moves by conduction across a specified cross-sectional area of soil per unit time and goes to heating (or cooling) the soil. Usually expressed in watts per square meter.

Soil-water content is the water lost from the soil upon drying to constant mass at 105 °C; expressed either as mass of water per unit mass of dry soil or as the volume of water per unit bulk volume of soil.

Specific electrical conductance (conductivity) is a measure of the capacity of water (or other media) to conduct an electrical current. It is expressed in microsiemens per centimeter at 25 °C. Specific electrical conductance is a function of the types and quantity of dissolved substances in water and can be used for approximating the dissolved-solids content of the water. Commonly, the concentration of dissolved solids (in milligrams per liter) is from 55 to 75 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.

Stable isotope ratio (per MIL) is a unit expressing the ratio of the abundance of two radioactive isotopes. Isotope ratios are used in hydrologic studies to determine the age or source of specific water, to evaluate mixing of different water, as an aid in determining reaction rates, and other chemical or hydrologic processes.

Stage (See "Gage height")

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

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.

Substrate is the physical surface upon which an organism lives.

Substrate embeddedness class is a visual estimate of riffle streambed substrate larger than gravel that is surrounded or covered by fine sediment (<2mm, sand or finer). Below are the class categories expressed as the percentage covered by fine sediment:

0	no gravel or larger substrate	3	26-50 percent
1	> 75 percent	4	5-25 percent
2	51-75 percent	5	< 5 percent

Surface area of a lake is that area (acres) encompassed by the boundary of the lake as shown on USGS topographic maps, or other available maps or photographs. Because surface area changes with lake stage, surface areas listed in this report represent those determined for the stage at the time the maps or photographs were obtained.

Surficial bed material is the upper surface (0.1 to 0.2 foot) of the bed material that is sampled using U.S. Series Bed-Material Samplers.

Suspended (as used in tables of chemical analyses) refers to the amount (concentration) of undissolved material in a water-sediment mixture. It is defined operationally as the material retained on a 0.45-micrometer filter.

Suspended, recoverable is the amount of a given constituent that is in solution after the part of a representative suspended water-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 comparability of analytical data, equivalent digestion procedures are 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 directly analyzing the suspended mate-rial collected on the filter or, more commonly, by difference, on the basis of determinations of (1) dissolved and (2) total recoverable concentrations of the constituent. (See also "Suspended")

Suspended sediment is the sediment maintained in suspension by the upward components of turbulent currents or that exists in suspension as a colloid. (See also "Sediment")

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 foot above the bed) expressed as milligrams of dry sediment per liter of water-sediment mixture (mg/L). The analytical technique uses the mass of all of the sediment and the net weight of the water-sediment mixture in a sample to compute the suspended-sediment concentration. (See also "Sediment" and "Suspended sediment")

Suspended-sediment discharge (tons/d) is the rate of sediment transport, as measured by dry mass or volume, that passes a cross section in a given time. It is calculated in units of tons per day as follows: concentration (mg/L) x discharge (ft^3/s) x 0.0027. (See also "Sediment," "Suspended sediment," and "Suspended-sediment concentration")

Suspended-sediment load is a general term that refers to a given characteristic of the material in suspension that passes a point during a specified period of time. The term needs to be qualified, such as "annual suspended-sediment load" or "sand-size suspended-sediment load," and so on. It is not synonymous with either suspended-sediment discharge or concentration. (See also "Sediment")

Suspended, total is the total amount of a given constituent in the part of a water-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. 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 directly analyzing portions of the suspended material collected on the filter or, more commonly, by difference, on the basis of determinations of (1) dissolved and (2) total concentrations of the constituent. (See also "Suspended")

Suspended solids, total residue at 105 °C concentration is the concentration of inorganic and organic material retained on a filter, expressed as milligrams of dry material per liter of water (mg/L). An aliquot of the sample is used for this analysis.

Synoptic studies are short-term investigations of specific water-quality conditions during selected seasonal or hydro-logic periods to provide improved spatial resolution for critical water-quality conditions. For the period and conditions sampled, they assess the spatial distribution of selected water-quality conditions in relation to causative factors, such as land use and contaminant sources.

Taxa (Species) richness is the number of species (taxa) present in a defined area or sampling unit.

Taxonomy is the division of biology concerned with the classification and naming of organisms. The classification of organisms is based upon a hierarchial 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*

Thalweg is the line formed by connecting points of minimum streambed elevation (deepest part of the channel).

Thermograph is an instrument that continuously records variations of temperature on a chart. The more general term "temperature recorder" is used in the table descriptions and refers to any instrument that records temperature whether on a chart, a tape, or any other medium.

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 resulting from the mixing of flow proportionally to the duration of the concentration.

Tons per acre-foot (T/acre-ft) is the dry mass (tons) of a constituent per unit volume (acre-foot) of water. It is computed by multiplying the concentration of the constituent, in milligrams per liter, by 0.00136.

Tons per day (T/DAY, tons/d) is a common chemical or sediment discharge unit. It is the quantity of a substance in solution, in suspension, or as bedload that passes a stream section during a 24-hour period. It is equivalent to 2,000 pounds per day, or 0.9072 metric tons per day.

Total is the amount of a given constituent in a representative whole-water (unfiltered) 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 determined at least 95 percent of the constituent in the sample.)

Total coliform bacteria are a particular group of bacteria that are used as indicators of possible sewage pollution. This group includes coliforms that inhabit the intestine of warmblooded animals and those that inhabit soils. They are characterized as aerobic or facultative anaerobic, gram-negative, nonspore-forming, rod-shaped bacteria that ferment lactose with gas formation within 48 hours at 35 °C. In the laboratory, these bacteria are defined as all the organisms that produce colonies with a golden-green metallic sheen within 24 hours when incubated at 35 °C plus or minus 1.0 °C on M-Endo medium (nutrient medium for bacterial growth). Their concentrations are expressed as number of colonies per 100 milliliters of sample. (See also "Bacteria")

Total discharge is the quantity of a given constituent, measured as dry mass or volume, that passes a stream cross section per unit of time. When referring to constituents other than water, this term needs to be qualified, such as "total sediment discharge," "total chloride discharge," and so on.

Total in bottom material is the 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."

Total length (fish) is the straight-line distance from the anterior point of a fish specimen's snout, with the mouth closed, to the posterior end of the caudal (tail) fin, with the lobes of the caudal fin squeezed together.

Total load refers to all of a constituent in transport. When referring to sediment, it includes suspended load plus bed load.

Total organism count is the number of organisms collected and enumerated in any particular sample. (See also "Organism count/volume")

Total recoverable is the amount of a given constituent in a whole-water sample after a 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 for whole-water samples, equivalent digestion procedures are required of all laboratories performing such analyses because different digestion procedures may produce different analytical results.

Total sediment discharge is the mass of suspended-sediment plus bed-load transport, measured as dry weight, that passes a cross section in a given time. It is a rate and is reported as tons per day. (See also "Bedload," "Bedload discharge," "Sediment," "Suspended sediment," and "Suspended-sediment concentration")

Total sediment load or **total load** is the sediment in transport as bedload and suspended-sediment load. The term may be qualified, such as "annual suspended-sediment load" or "sand-size suspended-sediment load," and so on. It differs from total sediment discharge in that load refers to the material, whereas discharge refers to the quantity of material, expressed in units of mass per unit time. (See also "Sediment," "Suspended-sediment load," and "Total load")

Transect, as used in this report, is a line across a stream perpendicular to the flow and along which measurements are taken, so that morphological and flow characteristics along the line are described from bank to bank. Unlike a cross section, no attempt is made to determine known elevation points along the line.

Turbidity is the reduction in the transparency of a solution due to the presence of suspended and some dissolved substances. The measurement technique records the collective optical properties of the solution that cause light to be scattered and attenuated rather than transmitted in straight lines; the higher the intensity of scattered or attenuated light, the higher the value of the turbidity. Turbidity is expressed in nephelometric turbidity units (NTU). Depending on the method used, the turbidity units as NTU can be defined as the intensity of light of a specified wavelength scattered or attenuated by suspended particles or absorbed at a method specified angle, usually 90 degrees, from the path of the incident light. Currently approved methods for the measurement of turbidity in the USGS include those that conform to U.S. EPA Method 180.1, ASTM D1889-00, and ISO 7027. Measurements of turbidity by these different methods and different instruments are unlikely to yield equivalent values.

Ultraviolet (UV) absorbance (absorption) at 254 or 280 nanometers is a measure of the aggregate concentration of the mixture of UV absorbing organic materials dissolved in the analyzed water, such as lignin, tannin, humic substances, and various aromatic compounds. UV absorbance (absorption) at 254 or 280 nanometers is measured in UV absorption units per centimeter of pathlength of UV light through a sample.

Unconfined aquifer is an aquifer whose upper surface is a water table free to fluctuate under atmospheric pressure. (See "Water-table aquifer")

Vertical datum (See "Datum")

Volatile organic compounds (VOCs) are organic compounds that can be isolated from the water phase of a sample by purging the water sample with inert gas, such as helium, and subsequently analyzed by gas chromatography. Many VOCs are human-made chemicals that are used and produced in the manufacture of paints, adhesives, petroleum products, pharmaceuticals, and refrigerants. They are often components of fuels, solvents, hydraulic fluids, paint thinners, and dry cleaning agents commonly used in urban settings. VOC contamination of drinking-water supplies is a human health concern because many are toxic and are known or suspected human carcinogens.

Water table is that surface in a ground-water body at which the water pressure is equal to the atmospheric pressure.

Water-table aquifer is an unconfined aquifer within which the water table is found.

Water year in USGS reports dealing with surface-water supply is the 12-month period October 1 through September 30. The water year is designated by the calendar year in which it ends and which includes 9 of the 12 months. Thus, the year ending September 30, 2002, is called the "2002 water year."

WDR is used as an abbreviation for "Water-Data Report" in the REVISED RECORDS paragraph to refer to State annual hydrologic-data reports. (WRD was used as an abbreviation for "Water-Resources Data" in reports published prior to 1976.)

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 the 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.

Wet mass is the mass of living matter plus contained water. (See also “Biomass” and “Dry mass”)

Wet weight refers to the weight of animal tissue or other substance including its contained water. (See also “Dry weight”)

WSP is used as an acronym for “Water-Supply Paper” in reference to previously published reports.

Zooplankton is the animal part of the plankton. Zooplankton are capable of extensive movements within the water column and often are large enough to be seen with the unaided eye. Zooplankton are secondary consumers feeding upon bacteria, phytoplankton, and detritus. Because they are the grazers in the aquatic environment, the zooplankton are a vital part of the aquatic food web. The zooplankton community is dominated by small crustaceans and rotifers. (See also “Plankton”)

TECHNIQUES OF WATER-RESOURCES INVESTIGATIONS OF THE U.S. GEOLOGICAL SURVEY

The USGS publishes a series of manuals titled the "Techniques of Water-Resources Investigations" that describe procedures for planning and conducting specialized work in water-resources investigations. The material in these manuals 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. Each chapter then is limited to a narrow field of the section subject matter. This publication format permits flexibility when revision or printing is required.

Manuals in the Techniques of Water-Resources Investigations series, which are listed below, are available online at http://water.usgs.gov/pubs/twri/. Printed copies are available for sale from the USGS, Information Services, Box 25286, Federal Center, Denver, Colorado 80225 (an authorized agent of the Superintendent of Documents, Government Printing Office). Please telephone "1-888-ASK-USGS" for current prices, and refer to the title, book number, section number, chapter number, and mention the "U.S. Geological Survey Techniques of Water-Resources Investigations." Other products can be viewed online at http://www.usgs.gov/sales.html, or ordered by telephone or by FAX to (303)236-4693. Order forms for FAX requests are available online at http://mac.usgs.gov/isb/pubs/forms/. Prepayment by major credit card or by a check or money order payable to the "U.S. Geological Survey" is required.

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Section D. Water Quality

1–D1. *Water temperature—Influential factors, field measurement, and data presentation,* by H.H. Stevens, Jr., J.F. Ficke, and G.F. Smoot: USGS–TWRI book 1, chap. D1. 1975. 65 p.

1–D2. *Guidelines for collection and field analysis of ground-water samples for selected unstable constituents,* by W.W. Wood: USGS–TWRI book 1, chap. D2. 1976. 24 p.

Book 2. Collection of Environmental Data

Section D. Surface Geophysical Methods

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, chap. D1. 1974. 116 p.

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Section E. Subsurface Geophysical Methods

2–E1. *Application of borehole geophysics to water-resources investigations,* by W.S. Keys and L.M. MacCary: USGS–TWRI book 2, chap. E1. 1971. 126 p.

2–E2. *Borehole geophysics applied to ground-water investigations,* by W.S. Keys: USGS–TWRI book 2, chap. E2. 1990. 150 p.

Section F. Drilling and Sampling Methods

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, chap. F1. 1989. 97 p.

Book 3. Applications of Hydraulics

Section A. Surface-Water Techniques

3–A1. *General field and office procedures for indirect discharge measurements,* by M.A. Benson and Tate Dalrymple: USGS–TWRI book 3, chap. A1. 1967. 30 p.

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3–A8. *Discharge measurements at gaging stations,* by T.J. Buchanan and W.P. Somers: USGS–TWRI book 3, chap. A8. 1969. 65 p.

3–A9. *Measurement of time of travel in streams by dye tracing,* by F.A. Kilpatrick and J.F. Wilson, Jr.: USGS–TWRI book 3, chap. A9. 1989. 27 p.

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3–A12. *Fluorometric procedures for dye tracing,* Revised, by J.F. Wilson, Jr., E.D. Cobb, and F.A. Kilpatrick: USGS–TWRI book 3, chap. A12. 1986. 34 p.

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3–A14. *Use of flumes in measuring discharge,* by F.A. Kilpatrick and V.R. Schneider: USGS–TWRI book 3, chap. A14. 1983. 46 p.

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3–A20. *Simulation of soluble waste transport and buildup in surface waters using tracers,* by F.A. Kilpatrick: USGS–TWRI book 3, chap. A20. 1993. 38 p.

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3–B2. *Introduction to ground-water hydraulics, a programed text for self-instruction,* by G.D. Bennett: USGS–TWRI book 3, chap. B2. 1976. 172 p.

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3–B8. *System and boundary conceptualization in ground-water flow simulation*, by T.E. Reilly: USGS–TWRI book 3, chap. B8. 2001. 29 p.

Section C. Sedimentation and Erosion Techniques

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3–C3. *Computation of fluvial-sediment discharge*, by George Porterfield: USGS–TWRI book 3, chap. C3. 1972. 66 p.

Book 4. Hydrologic Analysis and Interpretation

Section A. Statistical Analysis

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4–B3. *Regional analyses of streamflow characteristics*, by H.C. Riggs: USGS–TWRI book 4, chap. B3. 1973. 15 p.

Section D. Interrelated Phases of the Hydrologic Cycle

4–D1. *Computation of rate and volume of stream depletion by wells*, by C.T. Jenkins: USGS–TWRI book 4, chap. D1. 1970. 17 p.

Book 5. Laboratory Analysis

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5–A1. *Methods for determination of inorganic substances in water and fluvial sediments*, by M.J. Fishman and L.C. Friedman, editors: USGS–TWRI book 5, chap. A1. 1989. 545 p.

5–A2. *Determination of minor elements in water by emission spectroscopy*, by P.R. Barnett and E.C. Mallory, Jr.: USGS–TWRI book 5, chap. A2. 1971. 31 p.

5–A3. *Methods for the determination of organic substances in water and fluvial sediments*, edited by R.L. Wershaw, M.J. Fishman, R.R. Grabbe, and L.E. Lowe: USGS–TWRI book 5, chap. A3. 1987. 80 p.

5–A4. *Methods for collection and analysis of aquatic biological and microbiological samples*, by L.J. Britton and P.E. Greeson, editors: USGS–TWRI book 5, chap. A4. 1989. 363 p.

5–A5. *Methods for determination of radioactive substances in water and fluvial sediments*, by L.L. Thatcher, V.J. Janzer, and K.W. Edwards: USGS–TWRI book 5, chap. A5. 1977. 95 p.

5–A6. *Quality assurance practices for the chemical and biological analyses of water and fluvial sediments*, by L.C. Friedman and D.E. Erdmann: USGS–TWRI book 5, chap. A6. 1982. 181 p.

Section C. Sediment Analysis

5–C1. *Laboratory theory and methods for sediment analysis*, by H.P. Guy: USGS–TWRI book 5, chap. C1. 1969. 58 p.

Book 6. Modeling Techniques

Section A. Ground Water

6–A1. *A modular three-dimensional finite-difference ground-water flow model*, by M.G. McDonald and A.W. Harbaugh: USGS–TWRI book 6, chap. A1. 1988. 586 p.

6–A2. *Documentation of a computer program to simulate aquifer-system compaction using the modular finite-difference ground-water flow model*, by S.A. Leake and D.E. Prudic: USGS–TWRI book 6, chap. A2. 1991. 68 p.

6–A3. *A modular finite-element model (MODFE) for areal and axisymmetric ground-water-flow problems, Part 1: Model Description and User's Manual*, by L.J. Torak: USGS–TWRI book 6, chap. A3. 1993. 136 p.

6–A4. *A modular finite-element model (MODFE) for areal and axisymmetric ground-water-flow problems, Part 2: Derivation of finite-element equations and comparisons with analytical solutions*, by R.L. Cooley: USGS–TWRI book 6, chap. A4. 1992. 108 p.

6–A5. *A modular finite-element model (MODFE) for areal and axisymmetric ground-water-flow problems, Part 3: Design philosophy and programming details*, by L.J. Torak: USGS–TWRI book 6, chap. A5. 1993. 243 p.

6–A6. *A coupled surface-water and ground-water flow model (MODBRANCH) for simulation of stream-aquifer interaction*, by Eric D. Swain and Eliezer J. Wexler: USGS–TWRI book 6, chap. A6. 1996. 125 p.

6–A7. *User's guide to SEAWAT: A computer program for simulation of three-dimensional variable-density ground-water flow*, by Weixing Guo and Christian D. Langevin: USGS–TWRI book 6, chap. A7. 2002. 77 p.

Book 7. Automated Data Processing and Computations

Section C. Computer Programs

7–C1. *Finite difference model for aquifer simulation in two dimensions with results of numerical experiments*, by P.C. Trescott, G.F. Pinder, and S.P. Larson: USGS–TWRI book 7, chap. C1. 1976. 116 p.

7–C2. *Computer model of two-dimensional solute transport and dispersion in ground water*, by L.F. Konikow and J.D. Bredehoeft: USGS–TWRI book 7, chap. C2. 1978. 90 p.

7–C3. *A model for simulation of flow in singular and interconnected channels*, by R.W. Schaffranek, R.A. Baltzer, and D.E. Goldberg: USGS–TWRI book 7, chap. C3. 1981. 110 p.

Book 8. Instrumentation

Section A. Instruments for Measurement of Water Level

8–A1. *Methods of measuring water levels in deep wells*, by M.S. Garber and F.C. Koopman: USGS–TWRI book 8, chap. A1. 1968. 23 p.

8–A2. *Installation and service manual for U.S. Geological Survey manometers*, by J.D. Craig: USGS–TWRI book 8, chap. A2. 1983. 57 p.

Section B. Instruments for Measurement of Discharge

8–B2. *Calibration and maintenance of vertical-axis type current meters*, by G.F. Smoot and C.E. Novak: USGS–TWRI book 8, chap. B2. 1968. 15 p.

Book 9. Handbooks for Water-Resources Investigations

Section A. National Field Manual for the Collection of Water-Quality Data

9–A1. *National field manual for the collection of water-quality data: Preparations for water sampling*, by F.D. Wilde, D.B. Radtke, Jacob Gibs, and R.T. Iwatsubo: USGS–TWRI book 9, chap. A1. 1998. 47 p.

9–A2. *National field manual for the collection of water-quality data: Selection of equipment for water sampling*, edited by F.D. Wilde, D.B. Radtke, Jacob Gibs, and R.T. Iwatsubo: USGS–TWRI book 9, chap. A2. 1998. 94 p.

9–A3. *National field manual for the collection of water-quality data: Cleaning of equipment for water sampling*, edited by F.D. Wilde, D.B. Radtke, Jacob Gibs, and R.T. Iwatsubo: USGS–TWRI book 9, chap. A3. 1998. 75 p.

9–A4. *National field manual for the collection of water-quality data: Collection of water samples*, edited by F.D. Wilde, D.B. Radtke, Jacob Gibs, and R.T. Iwatsubo: USGS–TWRI book 9, chap. A4. 1999. 156 p.

9–A5. *National field manual for the collection of water-quality data: Processing of water samples*, edited by F.D. Wilde, D.B. Radtke, Jacob Gibs, and R.T. Iwatsubo: USGS–TWRI book 9, chap. A5. 1999, 149 p.

9–A6. *National field manual for the collection of water-quality data: Field measurements*, edited by F.D. Wilde and D.B. Radtke: USGS–TWRI book 9, chap. A6. 1998. Variously paginated.

9–A7. *National field manual for the collection of water-quality data: Biological indicators*, edited by D.N. Myers and F.D. Wilde: USGS–TWRI book 9, chap. A7. 1997 and 1999. Variously paginated.

9–A8. *National field manual for the collection of water-quality data: Bottom-material samples*, by D.B. Radtke: USGS–TWRI book 9, chap. A8. 1998. 48 p.

9–A9. *National field manual for the collection of water-quality data: Safety in field activities*, by S.L. Lane and R.G. Fay: USGS–TWRI book 9, chap. A9. 1998. 60 p.

Surface-Water Station Records for Kauai

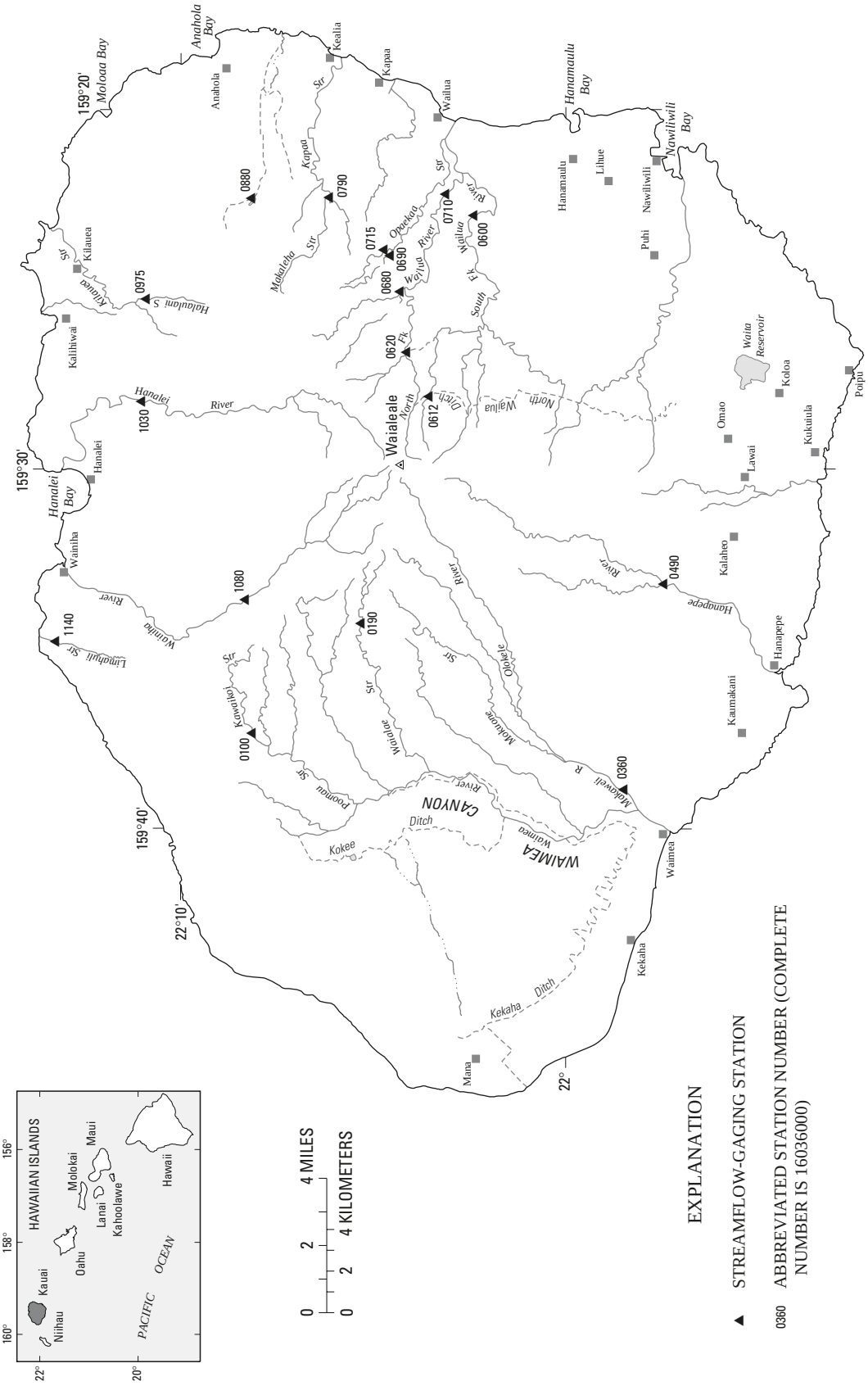


Figure 5. Locations of streamflow-gaging stations on Kauai.

HAWAII, ISLAND OF KAUAI

16010000 KAWAIKOI STREAM NEAR WAIMEA

LOCATION.--Lat 22°08'09", long 159°37'22", Hydrologic Unit 20070000, on left bank 0.2 mi upstream from Kokee-Mohihi Road crossing, 2.5 mi east of Kokee Lodge, and 12.5 mi north of Waimea.

DRAINAGE AREA.--3.95 mi^2.

PERIOD OF RECORD.--April 1909 to October 1912, December 1912 to March 1913, May 1913 to June 1915, August 1915 to May 1916, July to December 1916, July 1919 to current year. Monthly discharge only for some periods, published in WSP 1319.

REVISED RECORDS.--WSP 555: 1920-21. WSP 1185: 1914-17(M), 1920-38(M), 1940-43(M), 1947(M). WSP 1719: 1912, 1921-25, 1927-32, 1936. WSP 2137: Drainage area.

GAGE.--Water-stage recorder and concrete control. Elevation of gage is 3,420 ft above mean sea level, by barometer. Prior to May 26, 1910, nonrecording gage at site 300 ft downstream at different datum.

REMARKS.--Records computed by Roy Taogoshi. Records good. No diversion upstream.

AVERAGE DISCHARGE.--85 years (water years 1912, 1914, 1920-2002), 34.2 ft^3/s (24,790 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 11,300 ft^3/s, January 13, 1967, gage height, 15.33 ft, from rating curve extended above 470 ft^3/s on basis of slope-area measurements at gage heights 12.12 ft and 13.43 ft; minimum, 1.14 ft^3/s, September 21, 22, 1953.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,100 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Nov. 26	2045	*2,090	*7.73				

Minimum discharge, 2.5 ft^3/s, September 29-30, gage height, 1.88 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	103	33	12	14	27	9.7	17	6.2	6.4	9.2	5.9	3.9
2	14	70	13	11	19	33	15	5.3	6.2	17	5.0	4.1
3	8.1	57	11	9.7	21	17	13	4.8	6.0	13	5.2	4.1
4	6.2	36	16	8.9	65	48	12	4.9	5.8	8.7	7.8	4.9
5	11	23	22	8.6	20	26	12	5.0	5.7	5.7	5.8	4.1
6	13	15	14	14	16	14	11	21	5.3	5.0	6.9	4.8
7	10	64	15	11	14	12	10	272	5.7	13	99	16
8	12	185	20	9.4	79	10	9.8	42	5.5	28	25	6.5
9	7.0	26	29	19	30	9.2	9.5	23	11	17	20	5.1
10	28	17	17	24	15	8.8	8.9	12	16	34	8.7	6.7
11	43	20	11	11	13	8.5	8.2	11	11	34	6.7	5.9
12	9.8	14	11	8.8	51	8.5	7.8	103	8.6	11	18	4.4
13	6.7	17	289	8.0	74	9.6	7.5	50	25	7.0	14	4.1
14	6.2	12	84	7.5	26	9.1	7.3	15	19	6.0	8.2	26
15	5.9	10	28	7.1	26	8.1	7.0	13	10	8.1	6.5	16
16	6.0	9.2	27	6.6	16	193	6.6	10	7.7	7.2	5.5	25
17	6.2	8.5	41	6.6	13	224	6.9	8.5	5.9	13	4.7	21
18	7.1	8.0	46	129	12	29	11	8.8	5.4	22	4.6	7.0
19	11	7.5	61	381	11	17	7.4	11	7.5	11	25	4.9
20	6.5	7.1	19	402	17	14	17	88	9.7	6.8	15	4.1
21	8.3	6.7	14	278	12	11	22	64	11	5.8	6.7	3.7
22	30	6.4	13	77	10	10	8.5	28	38	17	5.3	3.4
23	21	6.1	73	34	9.6	9.6	6.7	13	12	11	5.1	3.1
24	11	5.9	17	24	9.3	22	6.0	11	8.5	8.3	4.9	3.0
25	7.0	5.7	13	20	159	410	5.8	9.4	6.6	10	4.4	3.0
26	5.8	256	16	18	18	99	5.8	8.6	5.9	7.4	4.1	2.9
27	299	222	12	81	12	28	5.5	8.1	5.4	5.8	4.1	2.9
28	114	81	11	118	11	20	5.3	8.1	4.6	5.1	5.5	2.7
29	25	22	35	60	---	114	8.2	7.9	4.2	34	7.7	2.6
30	16	14	15	72	---	37	9.4	7.3	4.1	21	6.1	2.5
31	24	---	25	58	---	20	---	6.8	---	8.1	4.6	---
TOTAL	881.8	1265.1	1030	1937.2	805.9	1489.1	288.1	886.7	283.7	410.2	356.0	208.4
MEAN	28.4	42.2	33.2	62.5	28.8	48.0	9.60	28.6	9.46	13.2	11.5	6.95
MAX	299	256	289	402	159	410	22	272	38	34	99	26
MIN	5.8	5.7	11	6.6	9.3	8.1	5.3	4.8	4.1	5.0	4.1	2.5
AC-FT	1750	2510	2040	3840	1600	2950	571	1760	563	814	706	413

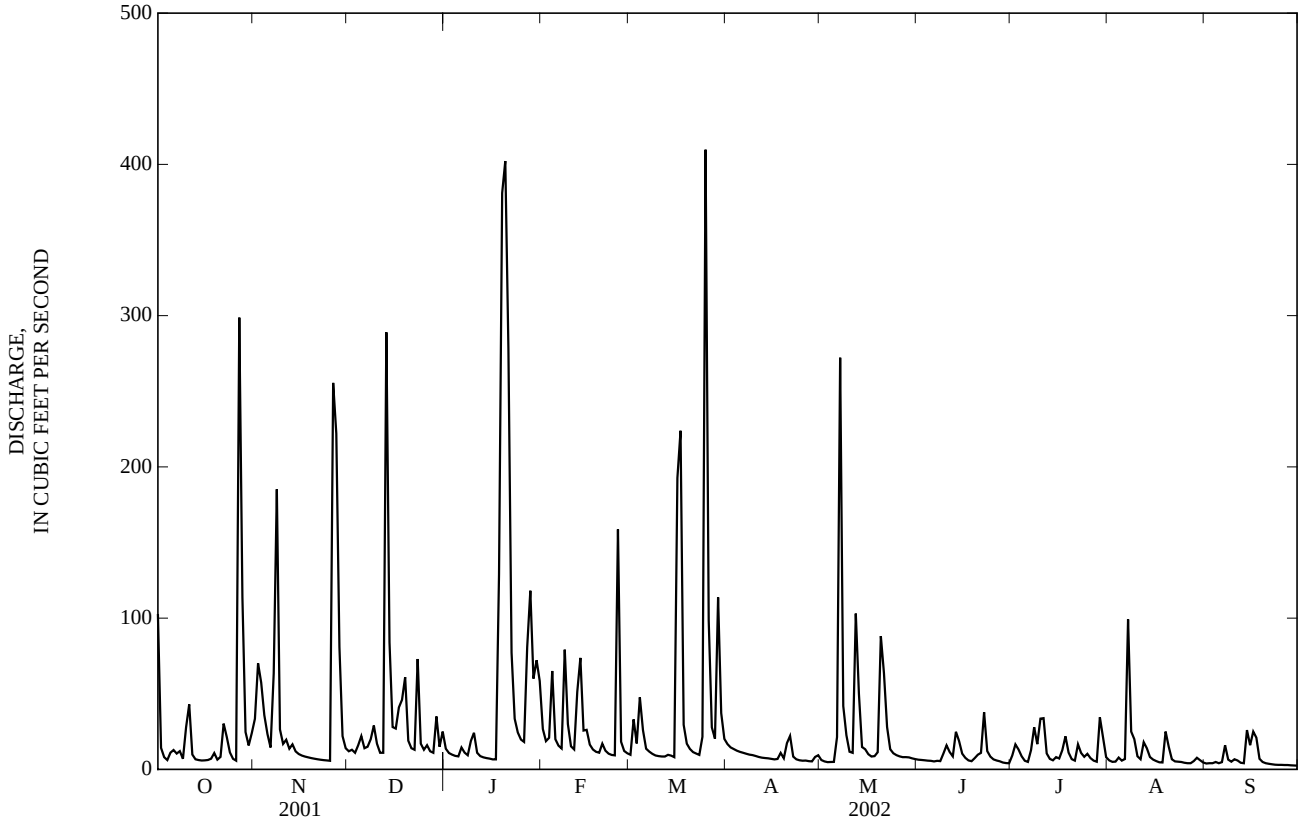
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1911 - 2002, BY WATER YEAR (WY)

MEAN	21.6	44.6	53.1	53.4	41.6	48.4	45.9	27.1	17.1	23.3	21.4	14.4
MAX	60.3	170	176	343	165	152	115	86.2	68.7	94.7	195	58.1
(WY)	1917	1929	1968	1921	1956	1951	1980	1927	1978	1989	1950	1992
MIN	3.34	4.16	11.9	3.23	4.26	6.15	5.74	3.38	3.58	5.18	2.54	1.86
(WY)	1985	1964	1923	1945	1945	1926	1992	1966	1951	1922	1984	1953

HAWAII, ISLAND OF KAUAI

16010000 KAWAIKOI STREAM NEAR WAIMEA--Continued

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1912 - 2002	
ANNUAL TOTAL	9278.6		9842.2			
ANNUAL MEAN	25.4		27.0		34.2	
HIGHEST ANNUAL MEAN					60.7	1982
LOWEST ANNUAL MEAN					15.3	1945
HIGHEST DAILY MEAN	473	Feb 9	410	Mar 25	2620	Jan 15 1921
LOWEST DAILY MEAN	2.5	Feb 2	2.5	Sep 30	1.1	Sep 21 1953
ANNUAL SEVEN-DAY MINIMUM	2.7	Jan 21	2.8	Sep 24	1.2	Sep 17 1953
ANNUAL RUNOFF (AC-FT)	18400		19520		24790	
10 PERCENT EXCEEDS	55		59		74	
50 PERCENT EXCEEDS	10		11		13	
90 PERCENT EXCEEDS	3.9		5.1		4.3	



HAWAII, ISLAND OF KAUAI

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.

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 above mean sea level (from topographic map).

REMARKS.--Records computed by Roy Taogoshi. Records good. No diversion upstream.

AVERAGE DISCHARGE.--61 years (water years 1921-31, 1953-2002), 21.4 ft^3/s (15,490 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 4,530 ft^3/s, January 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 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	2045	*1,840	*5.36	Jan 28	2000	1,560	4.95

Minimum discharge, 2.0 ft^3/s, Sept. 24-26, 29-30, gage height, 0.79 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	16	35	8.7	7.7	26	4.1	8.3	4.6	3.4	27	2.9	2.5
2	6.0	44	28	5.4	13	4.7	6.8	3.3	3.2	9.2	2.7	2.5
3	3.8	38	11	4.9	11	4.7	5.9	2.8	3.2	5.4	3.2	2.4
4	3.2	14	68	4.2	12	5.2	5.4	2.6	3.2	4.0	4.1	5.3
5	22	9.2	38	3.9	9.4	6.3	5.0	2.8	3.2	3.4	3.4	4.1
6	10	7.0	73	4.9	7.5	20	4.6	44	3.2	3.5	3.3	3.9
7	8.2	7.5	19	4.1	6.5	11	4.3	144	3.4	6.9	57	11
8	11	35	22	4.8	12	6.0	4.0	26	4.9	12	16	4.8
9	5.5	11	34	8.4	12	4.5	4.3	10	5.6	6.0	20	4.7
10	25	6.6	20	14	7.0	4.1	3.9	6.5	14	7.1	7.4	4.9
11	27	5.7	11	6.0	5.8	3.9	3.7	6.0	39	10	8.1	3.6
12	7.0	5.2	11	4.6	6.5	3.8	3.5	130	7.6	5.6	26	2.7
13	4.6	11	253	3.9	26	8.8	3.4	49	6.6	3.8	11	2.4
14	6.4	6.0	257	3.5	10	5.7	3.3	15	5.9	3.8	6.9	19
15	4.9	4.6	33	3.2	7.4	15	3.2	13	4.4	3.9	5.2	11
16	4.3	4.0	18	3.1	6.0	20	3.1	6.8	3.5	13	3.9	15
17	6.3	3.6	28	3.2	5.2	46	3.2	5.2	3.0	8.0	3.3	14
18	4.9	3.3	18	46	4.7	12	3.2	5.7	16	16	3.2	4.7
19	5.3	3.2	39	191	4.4	7.3	3.1	9.2	19	11	3.2	3.2
20	5.9	3.0	16	265	4.5	5.5	6.0	101	8.6	6.6	3.1	2.7
21	7.1	2.8	15	114	4.1	4.7	9.9	19	8.7	4.5	2.9	2.5
22	15	2.7	10	81	3.9	4.3	4.9	8.8	35	9.3	2.6	2.3
23	9.4	2.7	9.4	20	3.8	4.0	3.7	13	9.0	6.6	2.7	2.1
24	6.0	2.6	8.0	12	4.0	46	3.3	7.7	5.1	4.7	2.5	2.0
25	4.1	2.5	6.3	9.4	43	507	3.0	5.8	4.0	3.9	2.4	2.0
26	3.6	159	5.7	83	8.6	88	3.6	4.7	3.5	3.7	2.4	2.6
27	186	195	4.9	160	5.5	23	4.0	4.2	3.2	3.3	2.8	3.0
28	63	115	5.4	292	4.6	12	4.8	4.8	3.0	2.9	3.8	2.3
29	14	20	21	87	---	89	4.8	5.1	2.7	3.1	13	2.0
30	9.0	10	10	133	---	20	10	4.3	2.7	3.2	4.5	2.0
31	23	---	15	85	---	11	---	3.7	---	3.1	3.0	---
TOTAL	527.5	769.2	1116.4	1668.2	274.4	1007.6	140.2	668.6	237.8	214.5	236.5	147.2
MEAN	17.0	25.6	36.0	53.8	9.80	32.5	4.67	21.6	7.93	6.92	7.63	4.91
MAX	186	195	257	292	43	507	10	144	39	27	57	19
MIN	3.2	2.5	4.9	3.1	3.8	3.8	3.0	2.6	2.7	2.9	2.4	2.0
AC-FT	1050	1530	2210	3310	544	2000	278	1330	472	425	469	292

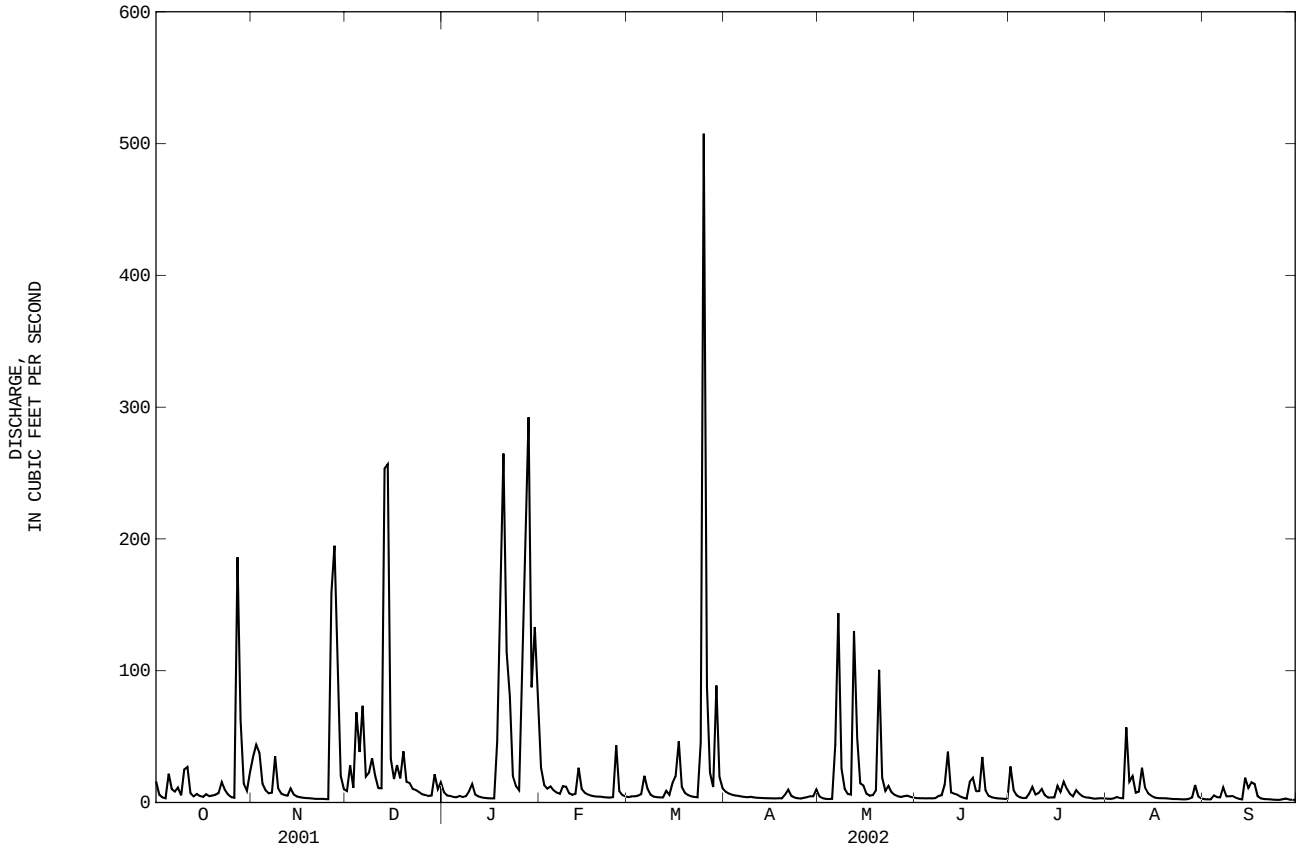
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1920 - 2002, BY WATER YEAR (WY)

MEAN	15.8	32.7	34.1	33.2	27.0	27.4	24.8	13.4	10.1	15.4	12.2	10.8
MAX	52.1	105	106	166	155	106	92.4	45.3	39.4	58.0	44.9	56.0
(WY)	1995	1965	1968	1921	1956	1982	1974	1965	1978	1989	1959	1922
MIN	2.49	5.58	4.16	3.63	2.44	2.15	1.87	1.81	1.89	2.56	2.86	1.67
(WY)	1927	1927	1923	2001	1983	1926	1966	1966	1975	1984	1952	1975

HAWAII, ISLAND OF KAUAI

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

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1920 - 2002	
ANNUAL TOTAL	7057.8		7008.1			
ANNUAL MEAN	19.3		19.2		21.4	
HIGHEST ANNUAL MEAN					40.9	1982
LOWEST ANNUAL MEAN					8.94	1926
HIGHEST DAILY MEAN	707	Feb 9	507	Mar 25	1440	Dec 1 1957
LOWEST DAILY MEAN	2.0	Mar 29	2.0	Sep 24	0.99	May 17 1966
ANNUAL SEVEN-DAY MINIMUM	2.2	Sep 9	2.3	Sep 24	1.1	May 26 1966
ANNUAL RUNOFF (AC-FT)	14000		13900		15490	
10 PERCENT EXCEEDS	35		38		45	
50 PERCENT EXCEEDS	6.0		5.8		6.5	
90 PERCENT EXCEEDS	2.5		3.0		2.6	



HAWAII, ISLAND OF KAUAI

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. WRD HI-01-01 1991-2000 (P)

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 computed by Roy Taogoshi. Records good. Olokele ditch diverts all low flow from the headwaters of the Olokele River 9 mi upstream for irrigation in vicinity of Makaweli. A 5 ft^3/s capacity ditch diverts water 0.1 mi upstream of station for irrigation of taro in the vicinity of the station.

AVERAGE DISCHARGE.--59 years (water years 1944-2002), 85.1 ft^3/s (61,660 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 26,000 ft^3/s, January 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)
Nov 26	2130	4,780	9.22	Jan 28	2045	*5,140	*9.49

Minimum discharge, 7.3 ft^3/s, Aug. 17, gage height, 2.48 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	28	80	48	24	275	17	81	26	27	125	11	12
2	12	95	68	20	106	17	71	17	24	44	10	11
3	10	91	28	20	77	17	65	16	23	24	11	16
4	9.8	37	179	18	64	18	60	17	22	18	11	53
5	166	25	146	17	58	24	49	42	20	15	10	17
6	28	32	237	19	55	149	39	358	19	14	10	11
7	13	29	64	17	52	96	37	917	26	20	181	30
8	14	53	47	18	54	26	31	342	29	19	49	15
9	12	23	73	26	50	21	29	101	27	15	59	18
10	56	17	57	33	42	28	27	105	50	13	23	19
11	67	16	31	22	62	26	24	69	172	14	55	15
12	17	14	32	19	86	20	22	654	40	13	158	11
13	16	42	494	17	149	27	21	472	36	13	37	10
14	26	16	1010	16	86	46	21	191	30	12	20	81
15	12	13	249	15	82	64	20	120	22	13	16	35
16	13	13	65	14	64	62	20	85	19	49	14	45
17	14	12	62	14	26	59	21	68	19	21	12	42
18	11	12	43	34	22	29	24	83	104	58	11	15
19	12	12	119	327	20	22	20	144	108	25	11	13
20	12	12	45	500	18	19	37	630	42	17	11	13
21	11	9.9	40	515	18	18	61	150	46	13	11	14
22	13	8.6	26	397	17	17	40	125	160	15	11	14
23	15	8.6	24	84	17	16	23	165	43	17	11	13
24	12	8.7	22	59	17	164	20	76	31	12	11	12
25	12	8.7	20	48	91	2140	23	57	22	11	11	13
26	37	301	20	242	25	659	56	49	17	12	83	13
27	254	600	19	983	19	205	54	40	15	12	15	15
28	133	388	19	1400	17	107	25	42	15	11	13	13
29	29	101	98	818	---	394	41	47	14	25	46	12
30	19	43	32	821	---	178	84	37	14	20	14	12
31	59	---	30	711	---	103	---	31	---	13	14	---
TOTAL	1142.8	2121.5	3447	7268	1669	4788	1146	5276	1236	703	960	613
MEAN	36.9	70.7	111	234	59.6	154	38.2	170	41.2	22.7	31.0	20.4
MAX	254	600	1010	1400	275	2140	84	917	172	125	181	81
MIN	9.8	8.6	19	14	17	16	20	16	14	11	10	10
AC-FT	2270	4210	6840	14420	3310	9500	2270	10460	2450	1390	1900	1220

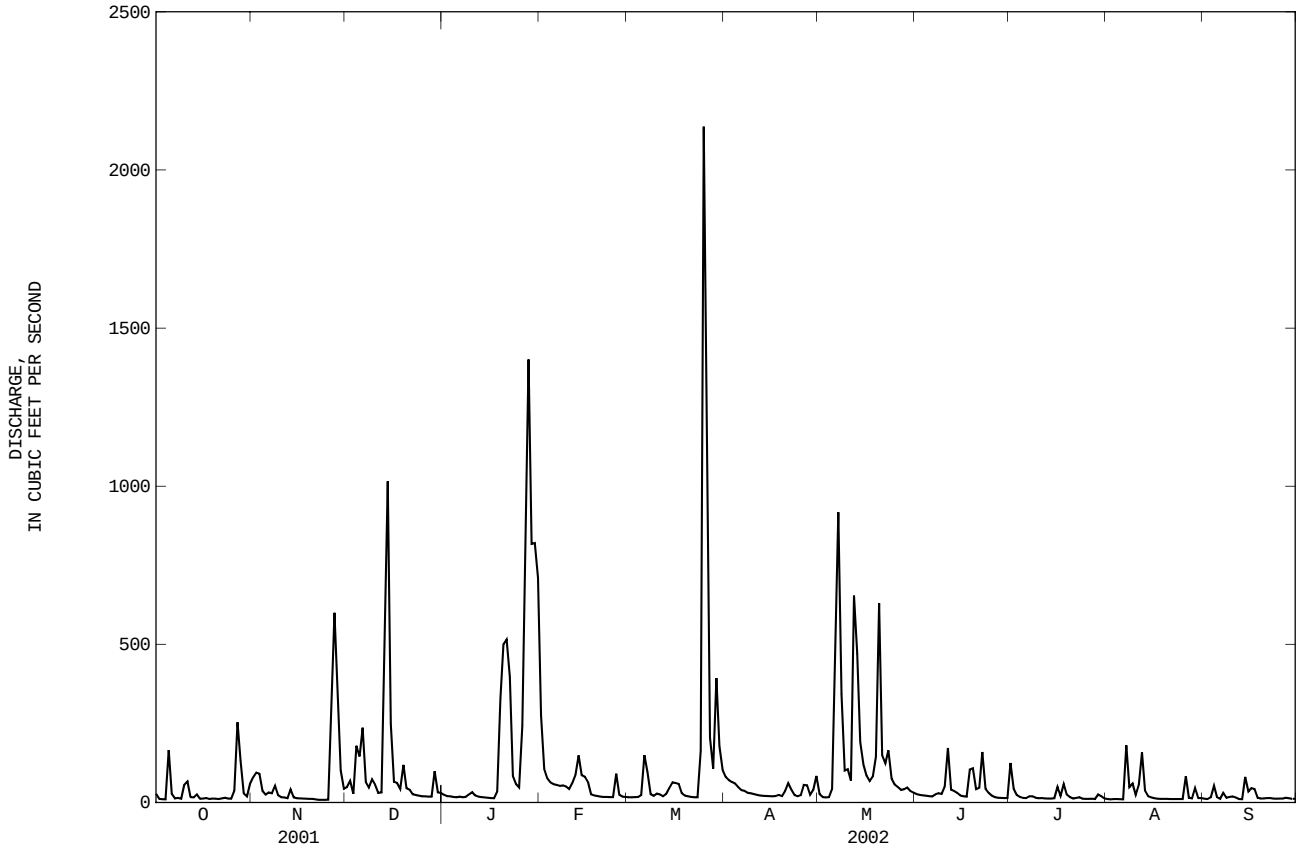
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1943 - 2002, BY WATER YEAR (WY)

MEAN	58.8	122	140	129	115	126	97.1	57.1	38.6	52.6	50.3	36.2
MAX	311	491	577	441	774	609	419	283	106	222	328	204
(WY)	1995	1991	1993	1989	1956	1982	1963	1965	1996	1989	1950	1994
MIN	11.7	15.2	18.0	9.49	12.0	10.6	11.6	13.2	9.56	10.0	14.2	9.54
(WY)	1960	1951	1977	1945	1978	1959	1992	2000	1951	1984	1944	1962

HAWAII, ISLAND OF KAUAI

16036000 MAKAWELI RIVER NEAR WAIMEA--Continued

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR	FOR 2002 WATER YEAR		WATER YEARS 1943 - 2002	
ANNUAL TOTAL		30387.7			
ANNUAL MEAN		83.3		85.1	
HIGHEST ANNUAL MEAN				204	1982
LOWEST ANNUAL MEAN				31.1	1984
HIGHEST DAILY MEAN		2140	Mar 25	5170	Dec 1 1957
LOWEST DAILY MEAN		8.6	Nov 23	4.3	Jul 19 1951
ANNUAL SEVEN-DAY MINIMUM		9.8	Nov 19	5.7	Oct 21 1944
ANNUAL RUNOFF (AC-FT)		60270		61660	
10 PERCENT EXCEEDS		164		170	
50 PERCENT EXCEEDS		25		27	
90 PERCENT EXCEEDS		12		12	



HAWAII, ISLAND OF KAUAI

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 January 22, 1921, nonrecording gage and December 16, 1926, to June 30, 1951, water-stage recorder, at same site at datum 1.00 ft higher.

REMARKS.--Records computed by Roy Taogoshi. Records good. Koula ditch diverts water 3.0 mi upstream of station for irrigation in vicinity of Makaweli.

AVERAGE DISCHARGE.--78 years (water years 1918-20, 1928-2002), 83.5 ft^3/s (60,510 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 39,000 ft^3/s, April 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)
Jan 27	0015	*9,590	*8.67	May 20	1500	5,910	7.27
Mar 25	2300	7,700	8.00				

Minimum discharge, 10 ft^3/s, Oct. 4, 9, gage height, 1.26 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	21	42	93	15	393	14	77	24	22	84	16	15
2	11	71	116	15	196	14	28	18	21	62	15	15
3	11	95	46	14	145	14	28	17	21	33	16	17
4	11	29	200	14	119	14	42	17	24	21	17	37
5	190	19	134	14	105	14	73	63	20	18	16	18
6	21	24	207	15	96	127	71	623	20	18	19	17
7	12	24	79	13	90	157	69	1550	37	21	206	25
8	12	43	80	14	95	22	44	500	27	23	64	16
9	11	14	110	18	81	15	21	155	23	18	44	19
10	42	12	82	18	75	17	20	234	57	17	25	36
11	31	12	28	15	74	16	19	134	131	19	66	20
12	14	12	22	14	59	14	19	906	30	16	134	15
13	14	31	265	13	55	37	18	354	29	16	35	15
14	19	12	768	13	20	19	18	267	28	17	20	91
15	14	12	185	12	19	127	18	166	36	17	17	28
16	16	12	67	12	18	143	17	127	34	46	16	30
17	14	12	53	12	18	31	25	110	29	20	16	24
18	20	12	66	16	17	16	18	136	56	77	16	16
19	13	11	106	69	17	14	16	341	120	41	16	16
20	15	11	65	332	16	14	19	1050	38	28	16	16
21	12	11	58	392	16	13	43	239	59	18	15	16
22	32	11	29	330	15	13	70	191	155	23	15	15
23	14	11	20	96	15	13	41	128	50	25	15	15
24	12	11	18	72	15	68	17	77	30	17	15	15
25	12	11	17	65	69	1660	17	69	22	16	15	15
26	66	121	17	542	15	702	54	58	20	16	141	15
27	203	409	16	1470	15	199	121	43	19	16	19	15
28	50	175	17	1500	14	155	196	38	19	16	19	15
29	15	83	43	918	---	394	119	37	18	31	23	15
30	12	61	19	901	---	161	112	27	18	18	15	16
31	49	---	16	954	---	111	---	24	---	17	29	---
TOTAL	989	1414	3042	7898	1882	4328	1450	7723	1213	825	1111	638
MEAN	31.9	47.1	98.1	255	67.2	140	48.3	249	40.4	26.6	35.8	21.3
MAX	203	409	768	1500	393	1660	196	1550	155	84	206	91
MIN	11	11	16	12	14	13	16	17	18	16	15	15
AC-FT	1960	2800	6030	15670	3730	8580	2880	15320	2410	1640	2200	1270

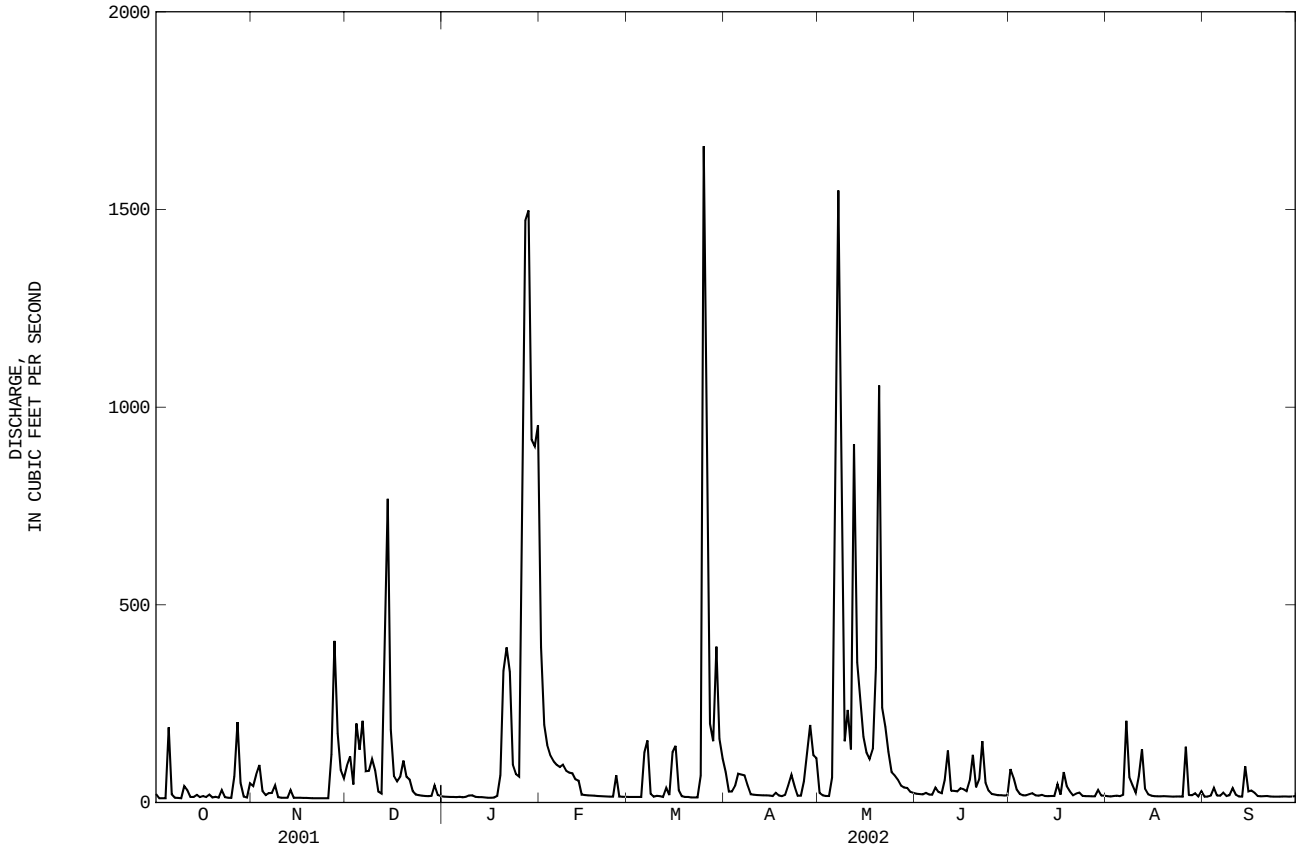
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1917 - 2002, BY WATER YEAR (WY)

MEAN	60.9	104	114	109	97.8	112	92.5	67.1	52.6	71.8	70.3	52.0
MAX	240	430	720	578	657	803	470	249	175	202	222	190
(WY)	1995	1991	1920	1920	1932	1918	1963	2002	1978	1989	1931	1994
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

HAWAII, ISLAND OF KAUAI

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

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR	FOR 2002 WATER YEAR		WATER YEARS 1917 - 2002	
ANNUAL TOTAL		32525			
ANNUAL MEAN		89.1		83.5	
HIGHEST ANNUAL MEAN				182	1918
LOWEST ANNUAL MEAN				30.6	1953
HIGHEST DAILY MEAN		1660	Mar 25	10900	Dec 3 1919
LOWEST DAILY MEAN		11	Oct 2	5.3	May 21 1954
ANNUAL SEVEN-DAY MINIMUM		11	Nov 17	6.4	May 10 1954
ANNUAL RUNOFF (AC-FT)		64510		60510	
10 PERCENT EXCEEDS		179		172	
50 PERCENT EXCEEDS		21		29	
90 PERCENT EXCEEDS		13		15	



HAWAII, ISLAND OF KAUAI

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 November 18, 1918, at site 0.3 mi upstream at different datum. November 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 computed by Roy Taogoshi. Records good. Lihue and Hanamaulu ditches divert water upstream of station for irrigation of sugarcane in vicinity of Lihue.

AVERAGE DISCHARGE.--85 years (water years 1913-18, 1920, 1922-24, 1926-56, 1959-2002), 117 ft^3/s (84,840 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 87,300 ft^3/s, April 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, August 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)
Jan 28	2145	9,840	15.88	Mar 25	2345	*14,700	*16.98
Mar 7	0545	6,360	14.77				

Minimum discharge, 23 ft^3/s, Nov. 24, gage height, 2.10 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	83	166	162	66	553	70	207	93	85	186	62	77
2	47	178	228	64	286	69	166	60	91	205	49	68
3	55	199	122	63	217	68	171	54	72	137	52	132
4	55	119	181	60	188	64	157	57	75	101	59	263
5	384	105	224	58	154	70	158	108	84	60	48	119
6	152	142	250	58	137	218	134	750	87	52	57	92
7	93	166	160	56	111	965	124	1190	128	57	238	117
8	82	197	137	55	95	164	121	676	111	65	113	92
9	76	128	150	55	82	110	114	337	104	52	135	86
10	134	109	148	54	68	144	107	692	228	46	124	110
11	149	100	110	50	70	93	88	453	308	53	219	89
12	109	95	109	50	76	83	84	1200	139	44	585	66
13	98	147	156	53	130	156	89	612	129	41	175	60
14	186	97	447	51	91	112	87	786	113	40	113	164
15	118	87	306	46	99	183	85	422	92	39	94	107
16	127	83	173	43	97	589	82	312	84	111	83	87
17	116	76	144	42	92	249	95	248	81	76	67	92
18	140	71	97	59	87	130	141	280	143	171	68	65
19	115	69	248	89	82	100	102	506	238	124	68	59
20	119	55	171	160	80	86	70	981	138	120	62	56
21	94	28	169	388	75	77	99	385	137	79	58	58
22	111	26	124	452	75	74	87	379	281	85	53	56
23	92	24	109	108	74	69	71	340	157	78	52	50
24	78	24	98	89	74	240	62	308	130	62	52	48
25	74	61	91	68	184	3250	72	250	95	57	57	47
26	127	151	86	244	88	1960	136	176	86	54	282	45
27	305	656	81	1010	76	634	176	152	78	51	84	45
28	190	325	77	2580	73	633	287	160	73	48	83	44
29	110	146	110	1320	---	643	240	146	69	58	97	45
30	94	111	77	1240	---	370	277	122	67	73	60	53
31	155	---	71	1010	---	267	---	96	---	74	115	---
TOTAL	3868	3941	4816	9741	3514	11940	3889	12331	3703	2499	3464	2492
MEAN	125	131	155	314	126	385	130	398	123	80.6	112	83.1
MAX	384	656	447	2580	553	3250	287	1200	308	205	585	263
MIN	47	24	71	42	68	64	62	54	67	39	48	44
AC-FT	7670	7820	9550	19320	6970	23680	7710	24460	7340	4960	6870	4940

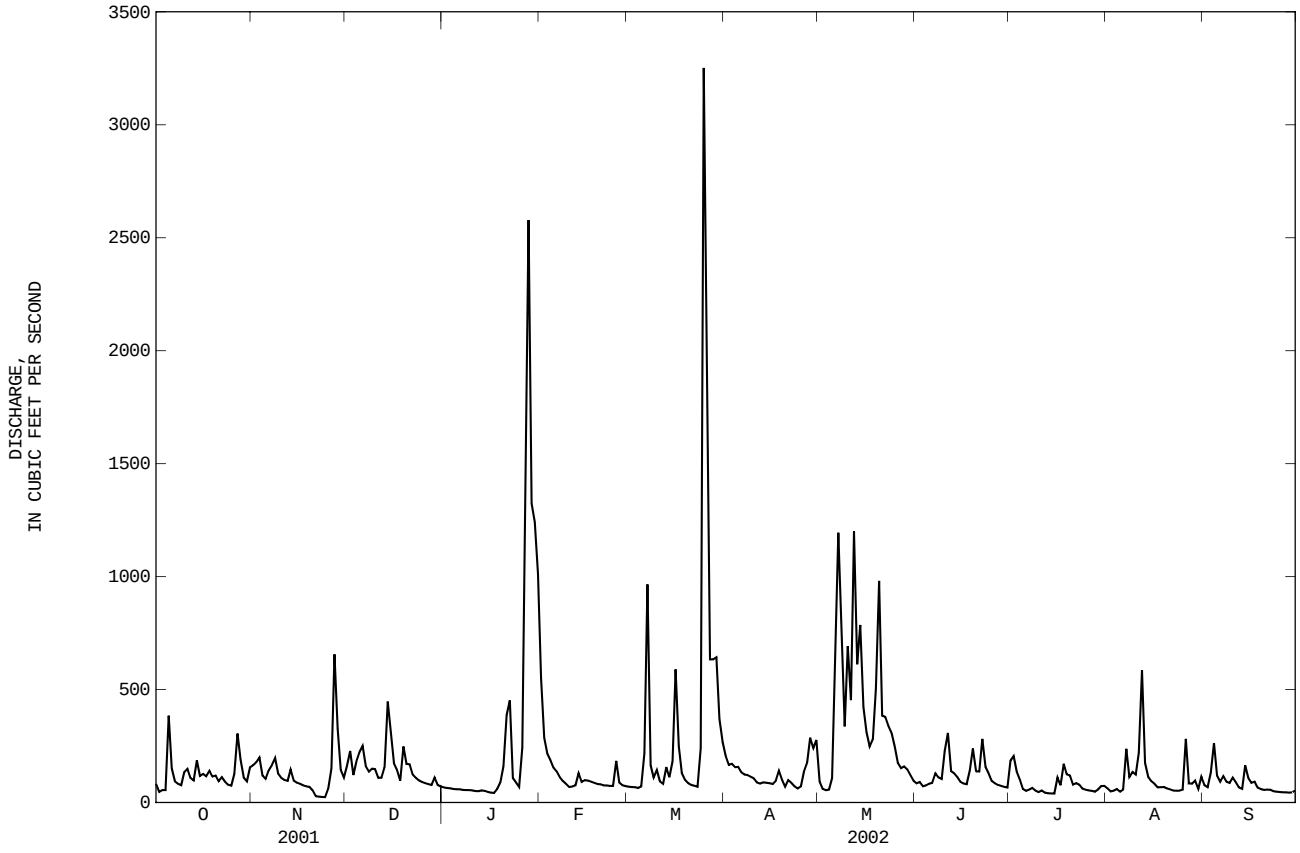
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1912 - 2002, BY WATER YEAR (WY)

MEAN	93.0	172	172	175	125	148	134	101	59.1	78.2	84.3	76.3
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

HAWAII, ISLAND OF KAUAI

16060000 SOUTH FORK WAILUA RIVER NEAR LIHUE--Continued

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR	FOR 2002 WATER YEAR		WATER YEARS 1912 - 2002	
ANNUAL TOTAL		66209			
ANNUAL MEAN		181		117	
HIGHEST ANNUAL MEAN				284	1982
LOWEST ANNUAL MEAN				17.3	1984
HIGHEST DAILY MEAN		3250	Mar 25	13800	Jan 16 1921
LOWEST DAILY MEAN		24	Nov 24	1.8	Sep 17 1953
ANNUAL SEVEN-DAY MINIMUM		41	Nov 19	1.8	Sep 16 1953
ANNUAL RUNOFF (AC-FT)		131300		84840	
10 PERCENT EXCEEDS		317		264	
50 PERCENT EXCEEDS		98		42	
90 PERCENT EXCEEDS		54		4.8	



HAWAII, ISLAND OF KAUAI

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 September 2002 (discontinued).

GAGE.--Water-stage recorder and concrete control. Elevation of gage is 1,070 ft above mean sea level (from topographic map).

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

AVERAGE DISCHARGE.--37 years (water years 1966-2002), 21.6 ft^3/s (15,660 acre-ft/yr).

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

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge, 28 ft^3/s, March 7; minimum daily discharge, .03 ft^3/s, April 1.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	8.5	20	19	16	18	20	0.03	12	6.5	0.82	19	19
2	9.9	21	19	16	16	21	9.3	11	6.8	11	18	20
3	14	20	18	16	13	20	21	11	12	22	19	21
4	14	19	20	16	13	21	21	11	20	16	19	22
5	21	19	19	16	9.8	22	22	13	19	8.2	18	20
6	18	20	20	16	8.4	26	21	16	19	7.0	18	20
7	17	19	18	16	5.9	28	21	18	20	9.2	21	20
8	17	20	18	16	5.3	19	20	16	21	10	20	19
9	18	19	18	16	6.2	18	20	14	21	5.9	20	19
10	20	18	18	16	5.2	21	20	15	23	5.5	20	20
11	20	18	18	16	4.9	17	19	13	24	5.2	22	19
12	19	18	18	16	4.9	17	19	13	22	4.7	23	18
13	20	19	19	16	13	19	19	11	22	4.3	20	18
14	21	18	22	16	11	17	18	11	21	4.2	19	20
15	19	18	20	16	16	10	18	9.8	20	12	19	18
16	20	18	18	16	16	1.5	14	9.6	20	20	19	19
17	19	18	18	16	16	0.20	9.4	9.4	21	20	18	18
18	20	18	18	16	16	0.06	4.9	10	24	21	19	18
19	19	18	19	18	15	0.06	0.96	12	26	21	18	18
20	19	17	18	19	18	0.05	0.08	13	24	21	18	18
21	18	17	18	20	21	0.05	0.30	10	24	19	18	18
22	18	17	18	18	20	0.05	0.15	11	26	19	18	18
23	18	17	17	17	20	0.05	3.5	9.9	24	19	18	18
24	18	17	17	16	20	0.61	5.8	10	24	19	18	17
25	18	17	17	16	24	2.5	7.9	9.6	22	19	19	17
26	18	20	17	18	21	0.49	10	9.1	22	18	22	17
27	22	22	17	23	21	0.21	9.4	9.0	21	18	19	17
28	20	20	17	25	21	0.10	11	8.6	21	18	19	17
29	18	18	17	22	---	0.15	12	7.5	21	19	20	18
30	18	17	17	23	---	0.04	13	7.0	14	19	19	17
31	20	---	17	23	---	0.04	---	6.8	---	19	20	---
TOTAL	559.4	557	564	546	399.6	302.16	370.72	347.3	611.3	435.02	597	558
MEAN	18.0	18.6	18.2	17.6	14.3	9.75	12.4	11.2	20.4	14.0	19.3	18.6
MAX	22	22	22	25	24	28	22	18	26	22	23	22
MIN	8.5	17	17	16	4.9	0.04	0.03	6.8	6.5	0.82	18	17
AC-FT	1110	1100	1120	1080	793	599	735	689	1210	863	1180	1110

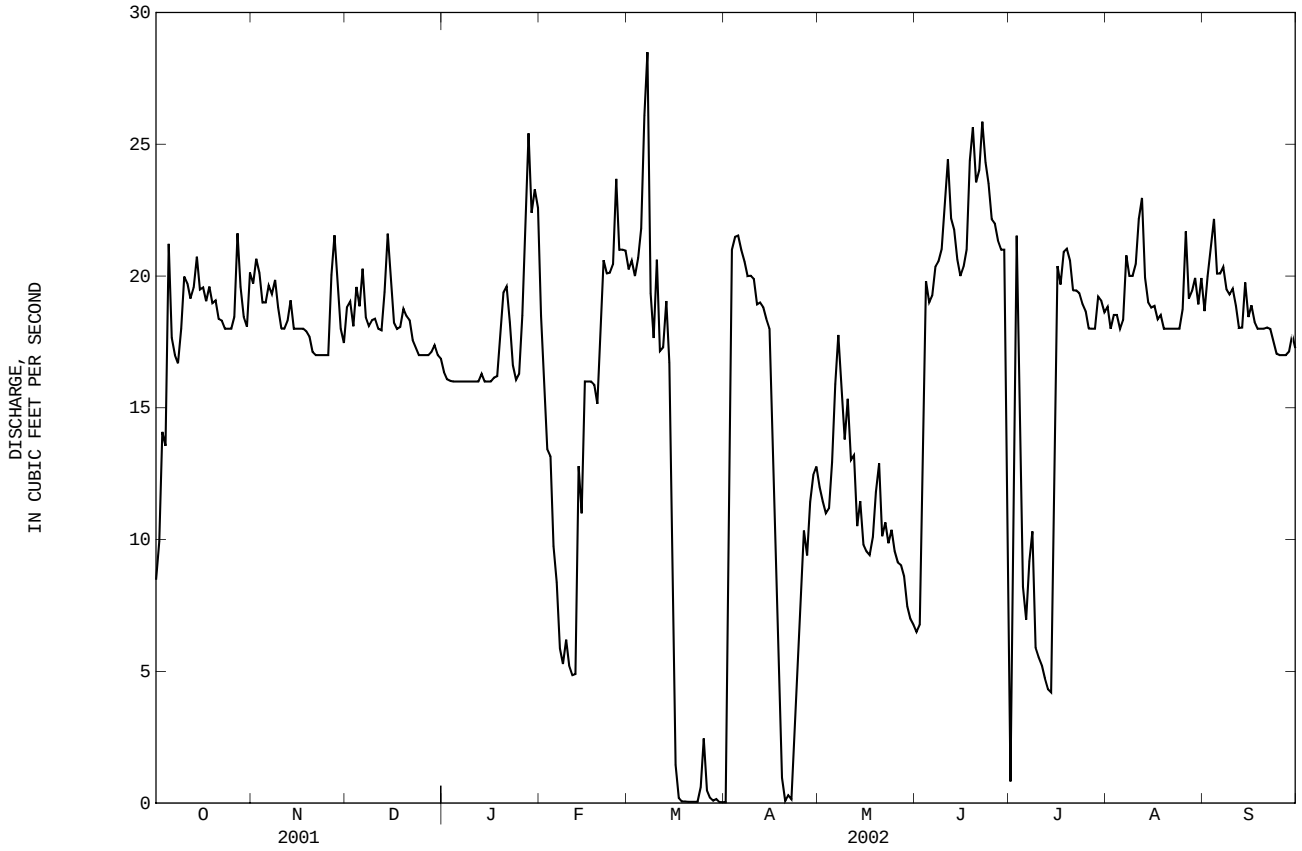
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1965 - 2002, BY WATER YEAR (WY)

MEAN	22.3	22.6	21.2	20.3	20.4	21.1	22.1	21.8	21.8	22.5	22.3	21.5
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	0.42	0.065	0.21	0.14	0.097	0.16	3.89	16.2	13.7
(WY)	1993	1983	1991	1993	1991	1991	1991	1991	1991	1991	1994	1991

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR	FOR 2002 WATER YEAR		WATER YEARS 1965 - 2002	
ANNUAL TOTAL		5856.69			
ANNUAL MEAN		16.0		21.6	
HIGHEST ANNUAL MEAN				30.3	1969
LOWEST ANNUAL MEAN				6.64	1991
HIGHEST DAILY MEAN		29	Mar 7	58	Oct 11 1966
LOWEST DAILY MEAN		0.03	Mar 31	0.00	Jan 1 1965
ANNUAL SEVEN-DAY MINIMUM		0.07	Mar 17	0.00	Jan 1 1965
ANNUAL RUNOFF (AC-FT)		11620		15660	
10 PERCENT EXCEEDS		21		29	
50 PERCENT EXCEEDS		18		22	
90 PERCENT EXCEEDS		6.1		16	

HAWAII, ISLAND OF KAUAI

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



HAWAII, ISLAND OF KAUAI

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 September 2002 (discontinued).

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

REMARKS.--Records computed by Roy Taogoshi. Records fair. Ditch diverts water from North Fork Wailua River for irrigation in vicinity of Lihue.

AVERAGE DISCHARGE.--65 years (water years 1938-2002), 8.92 ft^3/s (6,460 acre-ft/yr).

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

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge, 6.2 ft^3/s, March 25; minimum daily discharge, no flow on many days.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	2.2	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.37	0.00	0.00	0.59	0.00
13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.00	0.00	0.00	0.00
14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.00	0.00	0.00	0.00
15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.00	0.00	0.00
16	0.00	0.00	0.00	0.00	0.00	0.10	0.00	0.02	0.00	0.00	0.00	0.00
17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00
25	0.00	0.00	0.00	0.00	0.00	6.2	0.00	0.00	0.00	0.00	0.00	0.00
26	0.00	0.02	0.00	0.00	0.00	0.34	0.00	0.00	0.00	0.00	0.00	0.00
27	0.00	0.02	0.00	0.00	0.00	0.10	0.00	0.00	0.00	0.00	0.00	0.00
28	0.00	0.00	0.00	1.8	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00
29	0.00	0.00	0.00	0.02	---	0.00	0.00	0.00	0.00	0.00	0.00	0.00
30	0.00	0.00	0.00	0.01	---	0.00	0.00	0.00	0.00	0.00	0.00	0.00
31	0.00	---	0.00	0.00	---	0.00	---	0.00	---	0.00	0.00	---
TOTAL	0.00	0.04	0.00	1.83	0.00	9.03	0.00	0.64	0.00	0.00	0.59	0.00
MEAN	0.000	0.001	0.000	0.059	0.000	0.29	0.000	0.021	0.000	0.000	0.019	0.000
MAX	0.00	0.02	0.00	1.8	0.00	6.2	0.00	0.37	0.00	0.00	0.59	0.00
MIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AC-FT	0.00	0.08	0.00	3.6	0.00	18	0.00	1.3	0.00	0.00	1.2	0.00

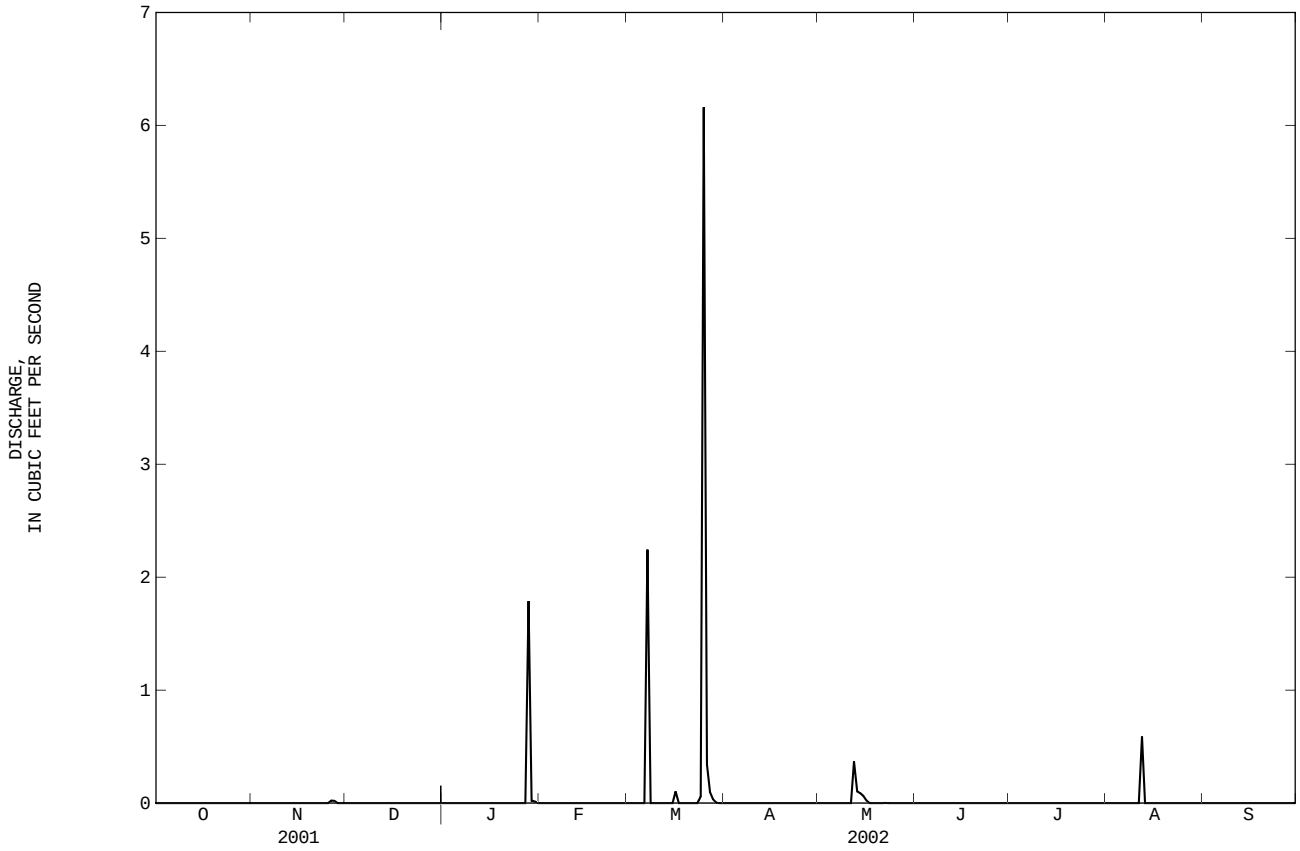
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1938 - 2002, BY WATER YEAR (WY)

MEAN	11.5	5.55	4.10	5.78	7.97	7.01	8.02	8.85	14.0	10.5	10.5	13.2
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	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
(WY)	1999	1938	1991	1939	1938	1939	1939	1963	1938	2001	1964	2001

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR	FOR 2002 WATER YEAR	WATER YEARS 1938 - 2002
ANNUAL TOTAL	1.67	12.13	
ANNUAL MEAN	0.005	0.033	8.92
HIGHEST ANNUAL MEAN			22.1 1984
LOWEST ANNUAL MEAN			0.033 2002
HIGHEST DAILY MEAN	1.1 Jun 8	6.2 Mar 25	71 Apr 3 1948
LOWEST DAILY MEAN	0.00 Jan 1	0.00 Oct 1	0.00 Oct 1 1937
ANNUAL SEVEN-DAY MINIMUM	0.00 Jan 1	0.00 Oct 1	0.00 Oct 1 1937
ANNUAL RUNOFF (AC-FT)	3.3	24	6460
10 PERCENT EXCEEDS	0.00	0.00	33
50 PERCENT EXCEEDS	0.00	0.00	0.28
90 PERCENT EXCEEDS	0.00	0.00	0.00

HAWAII, ISLAND OF KAUAI

16062000 STABLE STORM DITCH NEAR LIHUE--Continued



HAWAII, ISLAND OF KAUAI

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 December 31, 1914, nonrecording gage at site 725 ft downstream at different datum. December 31, 1914 to May 10, 1934, water-stage recorder
at site 75 ft upstream at present datum.

REMARKS.--Records computed by Clayton Yoshida. Records good. No diversion upstream.

AVERAGE DISCHARGE.--87 years (water years 1913-14, 1916-17, 1920-2002), 48.0 ft^3/s (34,790 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 18,400 ft^3/s, November 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)
Nov 26	2130	3,570	6.77	Mar 25	0115	*4,660	*7.59
Jan 28	2115	4,310	7.34	May 14	1145	1,920	5.23
Mar 7	0430	3,200	6.46				

Minimum discharge, 14 ft^3/s, Oct. 4-5, Jan. 15-17, gage height, 1.08 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	32	46	38	19	126	21	47	25	29	34	20	21
2	17	71	46	18	82	21	41	22	28	36	18	97
3	15	70	32	18	66	20	37	21	28	36	19	51
4	15	45	60	17	63	23	35	20	27	26	20	67
5	70	39	50	17	53	21	34	30	26	23	18	38
6	28	45	56	17	44	44	31	110	25	21	24	35
7	21	44	37	16	39	284	29	195	27	22	53	33
8	19	65	35	16	58	41	27	121	25	25	30	28
9	18	39	31	16	41	32	26	67	30	21	39	28
10	29	34	30	16	35	40	24	125	53	20	28	26
11	36	32	28	15	32	28	23	62	58	23	48	24
12	22	31	26	15	34	34	22	374	38	20	138	22
13	34	44	37	17	65	42	21	147	32	19	38	21
14	43	28	77	15	40	29	21	259	28	19	29	44
15	28	27	52	15	34	62	21	97	26	20	25	27
16	29	25	37	14	30	149	20	69	24	23	22	29
17	25	25	34	14	29	134	22	57	23	26	21	26
18	25	23	44	18	27	52	26	58	36	34	22	22
19	25	22	52	43	26	42	23	74	53	26	21	20
20	25	22	36	91	26	36	21	120	33	29	20	21
21	25	21	37	93	24	33	30	164	30	22	19	20
22	27	21	30	66	23	31	22	99	51	25	18	19
23	26	20	33	34	23	29	20	69	37	23	17	18
24	21	20	27	28	22	157	19	55	34	20	17	18
25	20	19	25	26	58	980	21	48	28	20	17	17
26	49	236	24	29	25	328	36	43	26	19	32	17
27	160	261	23	111	23	133	33	44	25	19	21	17
28	89	81	22	570	21	101	44	41	23	18	23	16
29	41	46	21	387	---	101	54	37	23	18	25	16
30	34	34	20	506	---	67	40	33	22	20	18	16
31	47	---	19	236	---	53	---	31	---	21	39	---
TOTAL	1095	1536	1119	2513	1169	3168	870	2717	948	728	899	854
MEAN	35.3	51.2	36.1	81.1	41.8	102	29.0	87.6	31.6	23.5	29.0	28.5
MAX	160	261	77	570	126	980	54	374	58	36	138	97
MIN	15	19	19	14	21	20	19	20	22	18	17	16
AC-FT	2170	3050	2220	4980	2320	6280	1730	5390	1880	1440	1780	1690

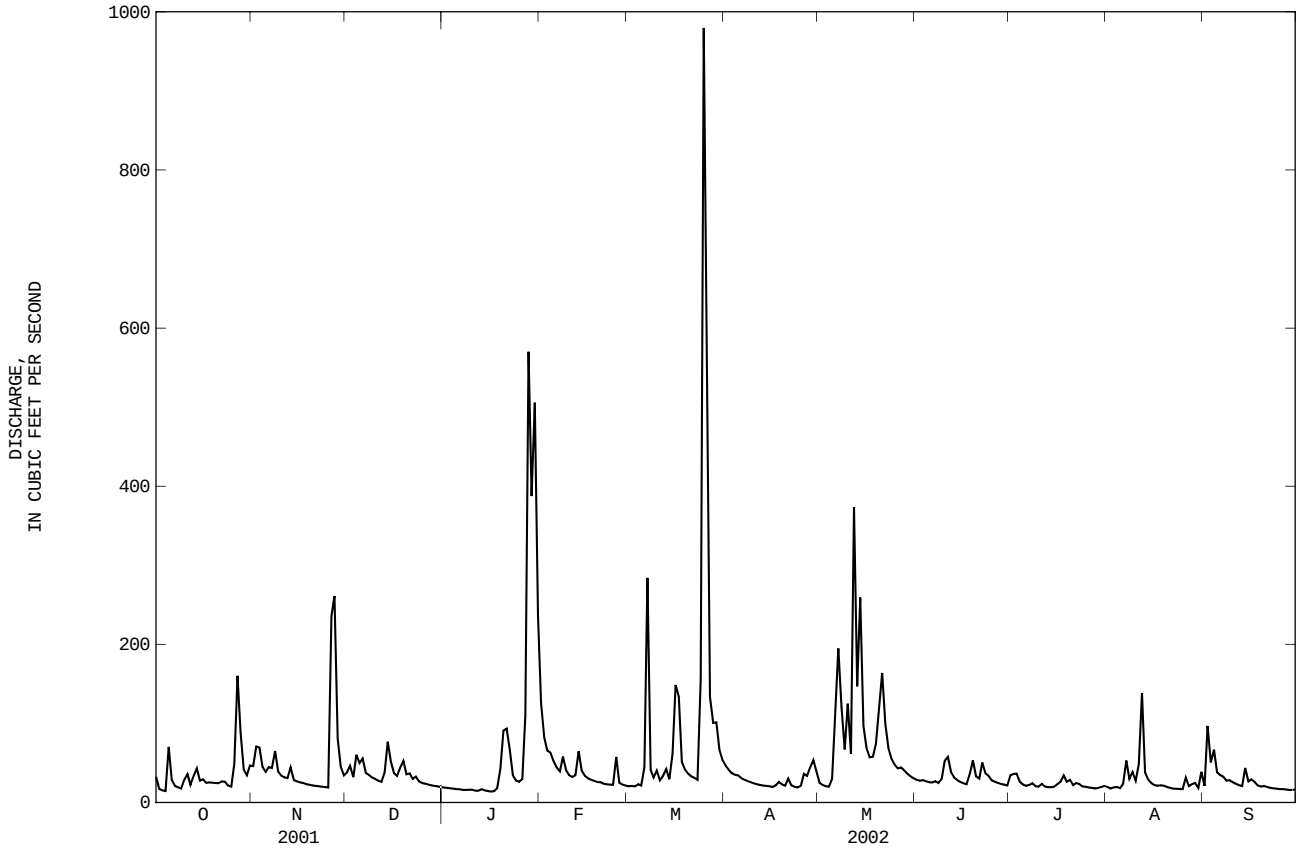
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1912 - 2002, BY WATER YEAR (WY)

MEAN	41.3	60.5	59.7	59.1	47.8	55.9	56.2	46.9	33.1	38.5	39.4	36.7
MAX	94.6	226	157	392	197	270	173	144	84.9	78.4	111	112
(WY)	1983	1991	1988	1921	1994	1982	1927	1967	1978	1980	1948	1994
MIN	12.4	16.8	12.3	11.0	8.88	11.0	10.6	9.81	13.0	12.3	11.5	11.9
(WY)	1954	1934	1964	1986	1986	1970	1926	1926	1969	1926	1984	1953

HAWAII, ISLAND OF KAUAI

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

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1912 - 2002	
ANNUAL TOTAL	0		17728			
ANNUAL MEAN	0.000		48.6		48.0	
HIGHEST ANNUAL MEAN					95.5	1982
LOWEST ANNUAL MEAN					21.3	1984
HIGHEST DAILY MEAN	261	Nov 27	980	Mar 25	2570	Feb 13 1994
LOWEST DAILY MEAN	15	Oct 3	14	Jan 16	7.0	Jul 8 1926
ANNUAL SEVEN-DAY MINIMUM	21	Nov 19	15	Jan 11	8.2	Mar 5 1986
ANNUAL RUNOFF (AC-FT)	0.00		35160		34790	
10 PERCENT EXCEEDS	70		80		84	
50 PERCENT EXCEEDS	33		29		31	
90 PERCENT EXCEEDS	21		18		16	



HAWAII, ISLAND OF KAUAI

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 September 2002 (discontinued).

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

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

AVERAGE DISCHARGE.--65 years (water years 1938-2002), 15.7 ft^3/s (11,350 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 17 ft^3/s, January 31, February 1; minimum daily discharge .08 ft^3/s, October 4.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.6	8.8	9.7	9.4	17	9.6	8.0	7.7	6.6	8.4	7.3	6.0
2	2.1	8.7	10	9.2	16	9.6	7.8	7.7	6.6	8.5	7.3	5.8
3	0.17	8.6	10	8.9	16	9.4	7.6	7.5	6.6	8.4	7.4	5.9
4	0.08	8.6	10	8.9	16	9.4	7.5	7.4	6.5	8.4	7.3	5.9
5	0.19	8.5	10	8.8	16	9.3	7.4	7.4	6.4	8.4	7.2	5.8
6	1.3	8.4	11	8.6	15	9.3	7.3	7.6	6.5	8.6	6.6	5.8
7	5.5	8.4	11	8.3	15	9.4	7.3	7.8	6.5	8.6	6.4	5.7
8	7.0	8.3	11	7.6	15	9.4	7.2	7.9	6.5	8.5	6.5	5.6
9	7.2	8.3	11	7.2	15	9.4	7.1	7.9	6.6	8.4	6.8	5.4
10	7.6	8.2	11	7.2	15	9.5	6.9	8.0	6.7	8.3	7.0	5.6
11	8.2	8.0	11	6.9	14	9.4	6.7	8.0	7.4	8.3	7.4	5.7
12	8.0	7.2	11	6.8	14	9.5	6.6	8.3	7.7	8.3	7.7	6.0
13	7.7	7.5	11	6.9	12	9.6	6.6	8.9	7.7	8.3	7.9	6.0
14	8.3	6.7	11	6.9	9.5	9.6	6.6	9.1	7.6	8.2	7.9	6.4
15	8.4	6.3	12	6.9	9.4	9.6	6.7	9.0	7.6	8.2	7.8	6.5
16	8.4	6.2	12	6.9	9.4	9.8	6.6	8.8	7.4	8.1	7.7	6.4
17	8.2	6.2	12	6.8	9.3	9.9	6.6	8.4	6.5	8.0	7.7	6.7
18	7.3	6.2	12	6.9	9.3	9.7	6.6	8.4	5.8	8.0	7.6	6.9
19	6.4	6.2	12	7.0	9.3	9.4	6.6	8.4	6.5	8.0	7.5	7.1
20	6.3	5.9	12	7.2	9.3	9.2	6.6	8.4	7.2	8.0	7.4	7.2
21	5.9	5.7	12	7.7	9.3	8.9	6.7	8.4	7.8	8.0	7.2	7.7
22	6.0	5.6	11	8.0	9.3	8.5	6.6	8.3	8.3	8.0	7.1	7.8
23	6.1	5.8	11	8.2	9.4	8.2	6.6	8.0	8.5	8.0	7.0	7.6
24	5.9	5.9	11	8.3	9.3	8.2	6.8	7.5	8.7	7.7	6.8	7.5
25	5.7	5.9	11	8.5	9.4	9.0	6.8	7.0	8.8	7.4	6.7	7.4
26	7.0	6.6	11	8.6	9.6	9.6	7.6	6.9	8.8	7.4	6.8	7.4
27	8.8	9.0	10	8.9	9.6	9.7	7.9	6.9	8.7	7.4	6.6	7.4
28	8.9	9.4	10	9.3	9.6	9.5	7.7	6.9	8.7	7.4	6.5	7.3
29	8.9	9.6	9.9	13	---	9.1	7.7	6.9	8.5	7.4	6.4	7.1
30	8.8	9.6	9.7	16	---	8.7	7.7	6.8	8.4	7.3	6.2	7.0
31	8.9	---	9.5	17	---	8.3	---	6.7	---	7.3	6.2	---
TOTAL	191.84	224.3	336.8	266.8	337.0	287.7	212.4	242.9	222.1	249.2	219.9	196.6
MEAN	6.19	7.48	10.9	8.61	12.0	9.28	7.08	7.84	7.40	8.04	7.09	6.55
MAX	8.9	9.6	12	17	17	9.9	8.0	9.1	8.8	8.6	7.9	7.8
MIN	0.08	5.6	9.5	6.8	9.3	8.2	6.6	6.7	5.8	7.3	6.2	5.4
AC-FT	381	445	668	529	668	571	421	482	441	494	436	390

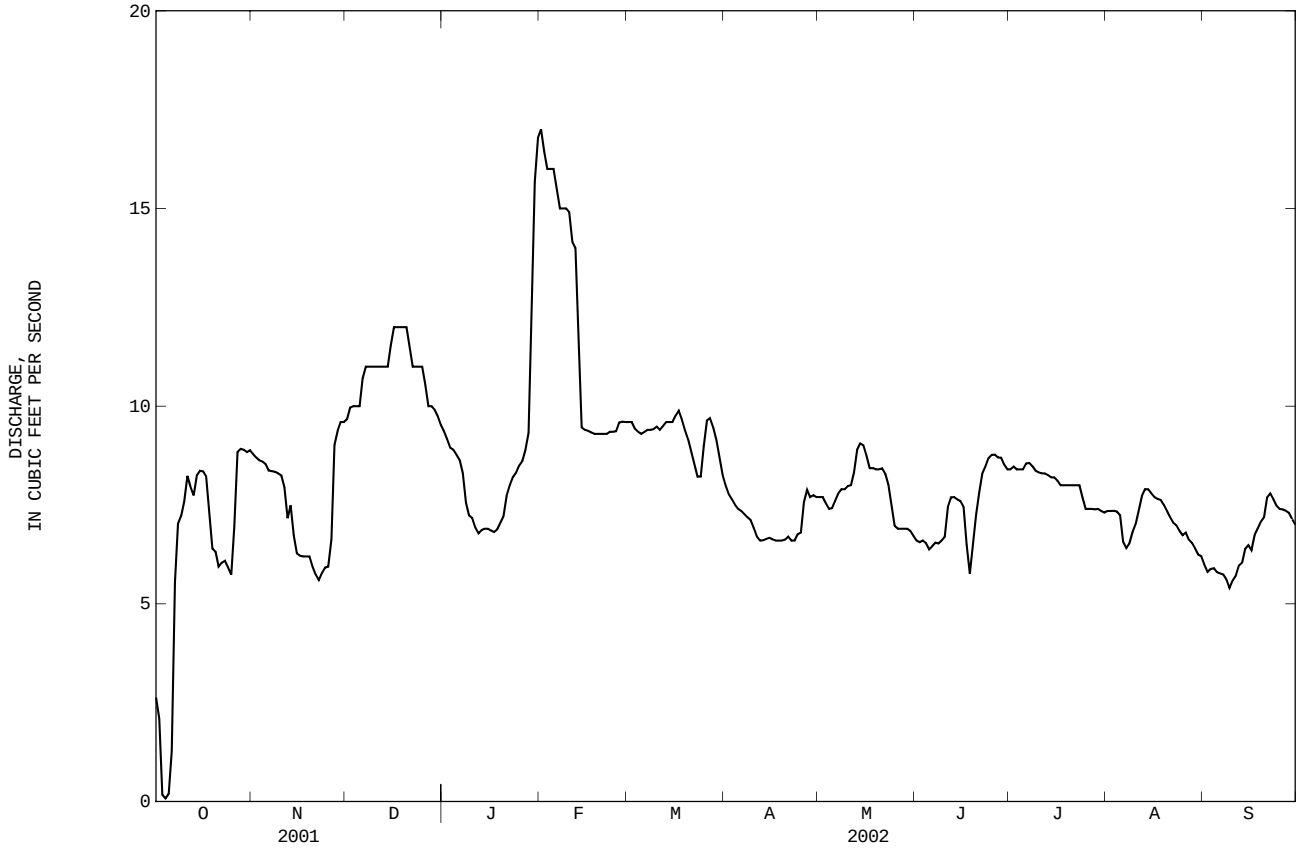
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1937 - 2002, BY WATER YEAR (WY)

MEAN	18.4	12.2	9.31	10.6	11.8	12.3	13.3	15.9	20.3	21.5	21.2	22.0
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	0.19	0.009	0.20	0.071	0.41	0.90	1.08	2.29	7.09	5.72	3.89
(WY)	1969	1965	1955	1968	1969	1956	1963	1965	1997	1997	1954	1946

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1937 - 2002	
ANNUAL TOTAL	3348.26		2987.54			
ANNUAL MEAN	9.17		8.19		15.7	
HIGHEST ANNUAL MEAN					32.9	1938
LOWEST ANNUAL MEAN					5.95	1997
HIGHEST DAILY MEAN	22	Apr 13	17	Jan 31	63	Jun 4 1937
LOWEST DAILY MEAN	0.00	Jun 22	0.08	Oct 4	0.00	May 15 1940
ANNUAL SEVEN-DAY MINIMUM	0.05	Jun 21	1.7	Oct 1	0.00	May 15 1940
ANNUAL RUNOFF (AC-FT)	6640		5930		11350	
10 PERCENT EXCEEDS	18		11		30	
50 PERCENT EXCEEDS	8.4		7.9		15	
90 PERCENT EXCEEDS	0.16		6.2		0.99	

HAWAII, ISLAND OF KAUAI

16069000 WAILUA DITCH NEAR KAPAA--Continued



HAWAII, ISLAND OF KAUAI

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 above mean sea level (from topographic map).

REMARKS.--Records computed by Clayton Yoshida. Records good. Wailua ditch (station 16069000) diverts water upstream for irrigation in vicinities of Kapaa and Wailua.

AVERAGE DISCHARGE.--50 years (water years 1953-2002), 118 ft^3/s (85,130 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 53,200 ft^3/s, November 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, October 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)
Jan 28	2145	5,380	8.13	Mar 25	0145	*7,080	*9.05
Mar 7	0500	5,570	8.24				

Minimum discharge, 22 ft^3/s, Jan. 16, 17, gage height, 1.51 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	91	98	91	34	398	31	153	55	76	76	30	45
2	54	115	124	34	227	31	127	46	74	83	25	139
3	53	132	73	32	170	30	93	41	77	69	26	126
4	45	83	160	31	176	32	85	38	58	48	33	213
5	246	71	138	30	134	37	85	50	50	57	34	96
6	84	90	170	29	113	130	76	360	45	54	51	73
7	54	87	92	28	101	737	67	747	50	57	108	74
8	47	122	81	28	132	109	60	420	46	59	45	62
9	33	71	75	27	108	78	60	196	47	52	74	55
10	49	60	75	28	86	141	55	348	124	50	52	47
11	76	55	60	25	81	75	52	187	150	56	156	40
12	42	53	57	24	79	75	47	876	73	49	385	35
13	53	93	75	27	159	114	42	415	64	47	101	34
14	107	50	266	26	99	83	41	597	54	46	69	75
15	54	45	176	24	63	146	40	284	47	47	55	60
16	52	42	93	23	55	504	38	198	49	48	45	48
17	50	40	80	22	51	404	40	156	64	38	41	50
18	48	38	74	35	47	161	72	159	93	71	42	34
19	51	36	133	78	44	132	53	308	122	52	40	30
20	48	35	88	159	44	113	64	527	56	53	37	29
21	44	34	90	245	36	102	93	301	42	36	34	32
22	46	32	66	197	36	97	66	277	114	39	32	31
23	44	30	68	77	35	87	55	209	68	35	31	28
24	38	30	55	67	34	357	51	174	60	29	31	27
25	35	29	50	52	123	2540	71	136	44	27	35	26
26	76	348	48	118	44	1030	101	108	46	26	123	25
27	329	589	45	433	35	459	137	105	40	25	46	25
28	177	232	42	1390	33	360	234	111	38	24	47	25
29	78	103	48	1070	---	370	173	104	36	31	55	25
30	62	73	39	1210	---	228	130	90	35	37	36	30
31	93	---	37	779	---	178	---	82	---	29	70	---
TOTAL	2359	2916	2769	6382	2743	8971	2461	7705	1942	1450	1989	1639
MEAN	76.1	97.2	89.3	206	98.0	289	82.0	249	64.7	46.8	64.2	54.6
MAX	329	589	266	1390	398	2540	234	876	150	83	385	213
MIN	33	29	37	22	33	30	38	38	35	24	25	25
AC-FT	4680	5780	5490	12660	5440	17790	4880	15280	3850	2880	3950	3250

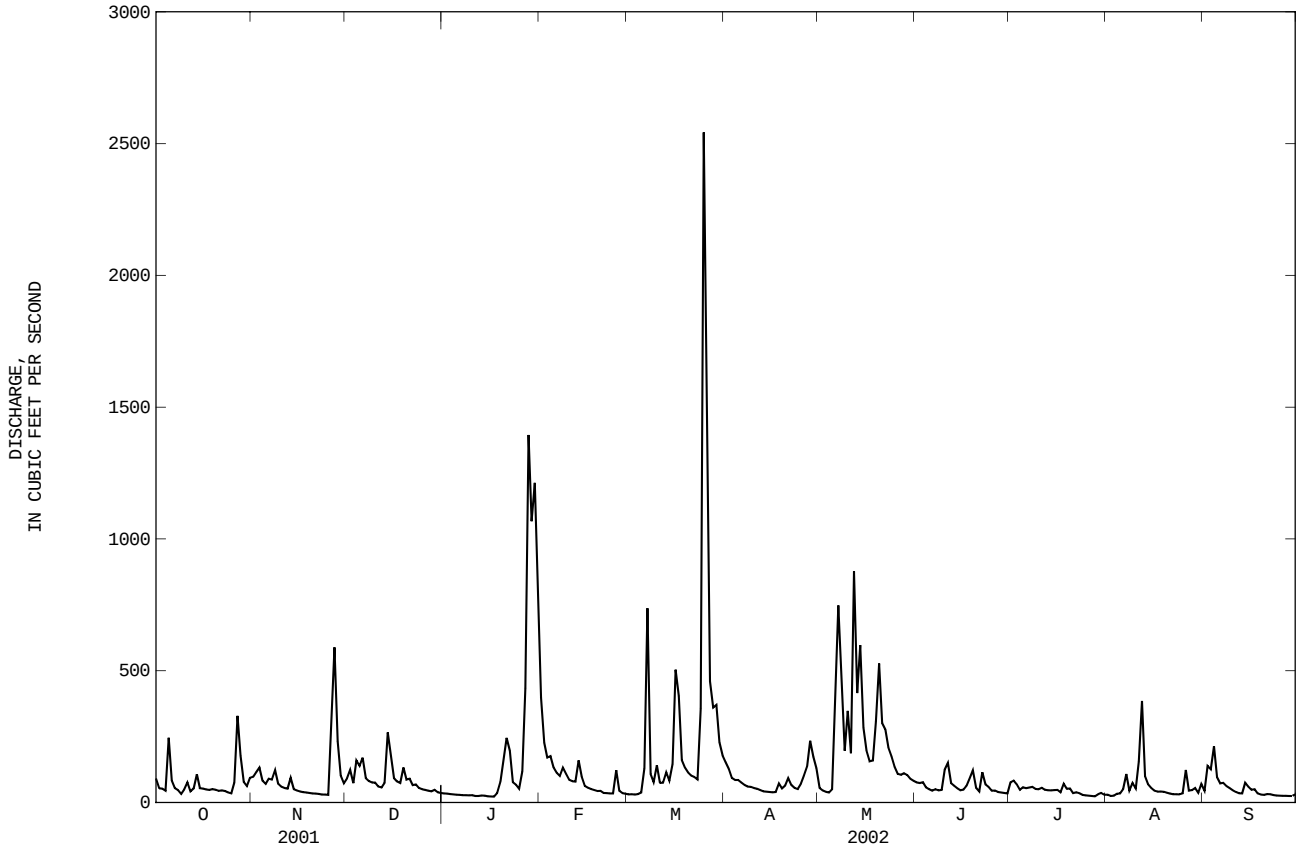
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1952 - 2002, BY WATER YEAR (WY)

MEAN	96.4	180	161	145	127	141	146	116	63.3	87.4	83.7	62.8
MAX	255	591	459	529	522	730	474	418	247	230	223	273
(WY)	1983	1991	1993	1956	1979	1982	1971	1967	1980	1980	1958	1994
MIN	2.54	19.1	7.74	6.90	4.43	4.76	15.0	7.45	5.78	5.22	5.80	3.17
(WY)	1954	1977	1984	1986	1978	1978	1966	2000	1957	1953	1984	1953

HAWAII, ISLAND OF KAUAI

16071000 NORTH FORK WAILUA RIVER NEAR KAPAA--Continued

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1952 - 2002	
ANNUAL TOTAL	28140.7		43326			
ANNUAL MEAN	77.1		119		118	
HIGHEST ANNUAL MEAN					262	1982
LOWEST ANNUAL MEAN					25.7	1984
HIGHEST DAILY MEAN	603	Feb 9	2540	Mar 25	7350	Jan 25 1956
LOWEST DAILY MEAN	9.1	Jul 5	22	Jan 17	2.2	Oct 21 1953
ANNUAL SEVEN-DAY MINIMUM	13	Jul 1	24	Jan 11	2.4	Oct 20 1953
ANNUAL RUNOFF (AC-FT)	55820		85940		85130	
10 PERCENT EXCEEDS	151		230		247	
50 PERCENT EXCEEDS	53		59		65	
90 PERCENT EXCEEDS	21		31		8.8	



HAWAII, ISLAND OF KAUAI

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 computed by Roy Taogoshi. Records good, except periods of no gage height record which is poor.. Recording rain gage located at station.

AVERAGE DISCHARGE.--42 years (water years 1961-2002), 2.54 ft^3/s (1,840 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,060 ft^3/s, December 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, September 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 26	1515	76	2.36	Mar 25	0200	116	2.75
Nov 26	2130	83	2.44	May 21	1515	*119	*2.77
Jan 30	0915	102	2.62				

Minimum discharge, e0.64 ft^3/s, Oct. 8,25-26, gage height, 0.79 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	e0.75	1.6	e1.7	1.1	5.6	1.3	5.0	1.6	3.2	1.6	1.1	1.0
2	e0.72	1.8	e2.0	1.1	4.1	1.3	4.3	1.5	2.9	1.6	0.93	1.1
3	e0.70	1.9	e1.5	1.1	3.6	1.2	3.9	1.5	2.9	1.6	0.97	1.3
4	e0.70	1.7	e2.4	1.1	3.4	1.3	3.7	1.5	2.6	1.5	0.98	1.3
5	e1.0	1.5	e2.1	1.0	2.9	1.2	e3.6	1.6	2.5	1.4	0.93	1.1
6	e0.81	1.5	e2.2	1.0	2.7	1.5	e3.5	2.7	2.5	1.4	0.93	1.0
7	e0.70	1.5	e1.9	1.0	2.5	1.9	e3.4	4.2	2.5	1.4	1.0	1.00
8	e0.64	2.1	e1.6	1.0	2.7	1.4	e3.2	3.6	2.3	1.4	1.0	0.96
9	e0.69	1.5	e1.4	0.94	2.4	1.3	3.0	2.6	2.5	1.3	1.4	0.93
10	0.73	1.4	e1.4	0.89	2.2	1.5	2.9	3.7	2.9	1.2	1.0	0.93
11	0.88	1.4	e1.3	0.87	2.2	1.3	2.7	2.9	2.9	1.2	1.1	0.91
12	0.74	1.4	e1.3	0.87	2.1	1.5	2.7	14	2.4	1.2	7.9	0.89
13	0.70	1.5	1.7	0.95	2.5	1.6	2.6	9.3	2.3	1.2	1.8	0.87
14	0.85	1.3	1.9	0.88	2.2	1.4	2.5	13	2.2	1.2	1.3	1.0
15	0.78	1.2	1.7	0.87	2.0	1.3	2.4	7.5	2.0	1.2	1.2	0.86
16	0.75	1.2	1.6	0.87	1.9	6.2	2.3	5.6	2.0	1.2	1.1	0.81
17	0.73	1.2	1.6	0.86	1.8	4.1	2.3	4.8	1.9	1.2	1.0	0.81
18	0.73	1.2	1.6	0.88	1.8	2.5	2.3	4.5	2.1	1.3	1.0	0.81
19	0.74	e1.1	1.8	0.91	1.8	2.1	2.2	4.1	2.2	1.2	1.0	0.81
20	0.72	e1.1	1.6	1.0	1.7	1.9	2.1	3.9	2.0	1.2	0.94	0.81
21	0.70	e1.0	1.6	1.0	1.6	1.8	2.3	15	1.9	1.2	0.93	0.81
22	0.70	e1.0	1.5	0.96	1.6	1.8	2.0	8.4	2.2	1.2	0.91	0.78
23	0.72	e1.0	1.5	0.85	1.6	1.7	1.9	6.3	1.9	1.1	0.91	0.75
24	0.69	e0.99	1.4	0.83	1.6	5.3	1.8	5.4	1.9	1.1	0.91	0.76
25	0.66	e0.98	1.3	0.83	2.2	40	1.8	4.9	1.8	1.0	0.87	0.75
26	10	e6.8	1.3	0.89	1.5	22	2.0	4.4	1.7	0.99	1.0	0.75
27	3.8	e7.4	1.2	1.0	1.4	13	1.7	4.2	1.7	0.95	0.92	0.75
28	2.7	e3.0	1.2	11	1.3	10	1.6	4.1	1.7	0.97	0.96	0.74
29	1.8	e1.9	1.2	12	---	9.2	1.7	3.8	1.6	1.00	0.90	0.70
30	1.5	e1.6	1.2	28	---	6.6	1.8	3.6	1.5	0.99	0.87	0.69
31	1.6	---	1.2	9.1	---	5.6	---	3.4	---	0.96	1.6	---
TOTAL	39.93	54.77	48.9	85.65	64.9	154.8	79.2	157.6	66.7	37.96	39.36	26.68
MEAN	1.29	1.83	1.58	2.76	2.32	4.99	2.64	5.08	2.22	1.22	1.27	0.89
MAX	10	7.4	2.4	28	5.6	40	5.0	15	3.2	1.6	7.9	1.3
MIN	0.64	0.98	1.2	0.83	1.3	1.2	1.6	1.5	1.5	0.95	0.87	0.69
AC-FT	79	109	97	170	129	307	157	313	132	75	78	53

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1960 - 2002, BY WATER YEAR (WY)

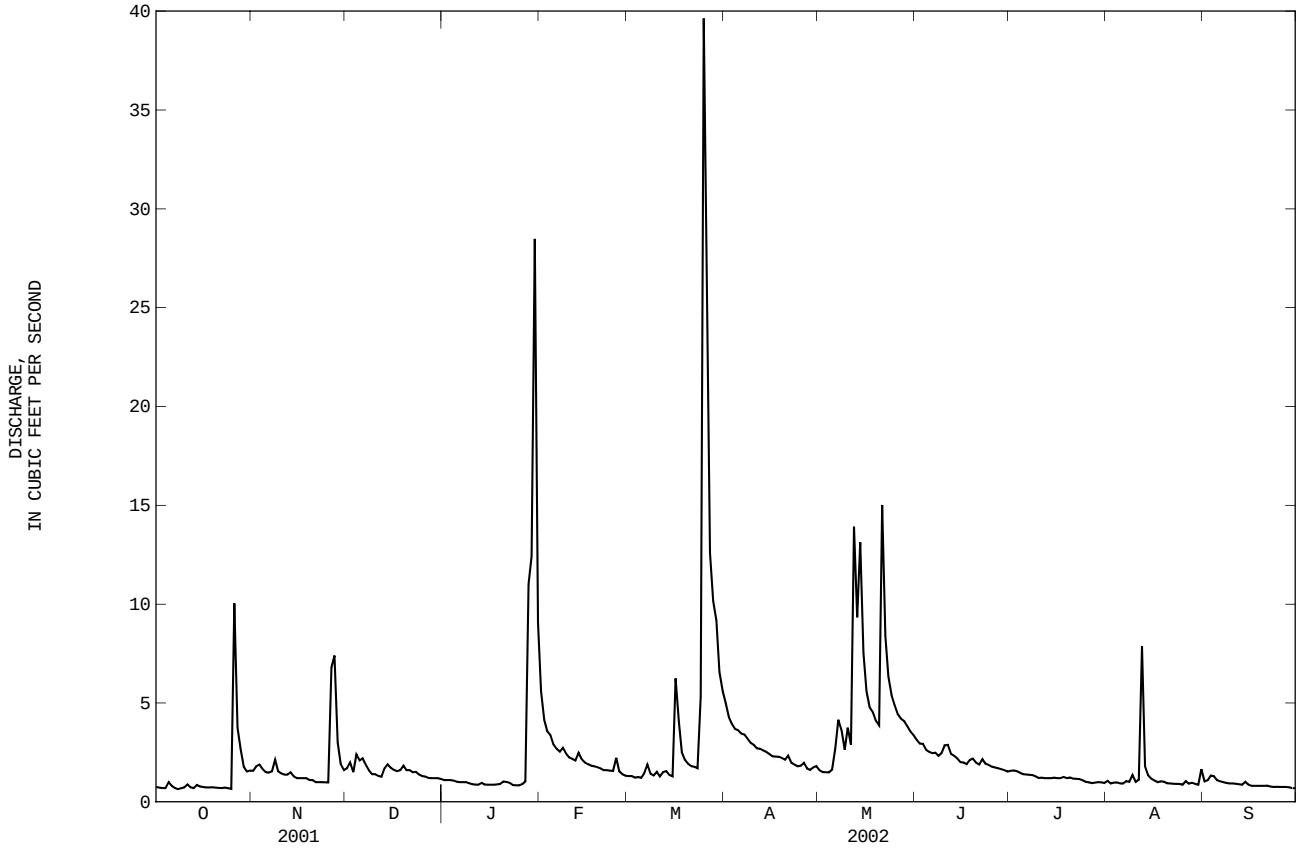
MEAN	2.15	3.79	3.68	3.16	2.53	2.79	3.07	2.74	1.79	1.65	1.59	1.51
MAX	8.29	14.3	11.0	12.4	10.8	14.7	11.8	9.66	5.68	3.80	4.24	4.67
(WY)	1961	1966	1992	1989	1994	1982	1982	1965	1980	1989	1982	1980
MIN	0.42	0.59	0.56	0.58	0.50	0.50	0.73	0.62	0.29	0.59	0.36	0.38
(WY)	1985	1964	1963	1977	1986	1978	1998	1966	1968	1968	1984	1975

HAWAII, ISLAND OF KAUAI

16071500 LEFT BRANCH OPAEKAA STREAM NEAR KAPAA--Continued

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1960 - 2002	
ANNUAL TOTAL	411.20		856.45			
ANNUAL MEAN	1.13		2.35		2.54	
HIGHEST ANNUAL MEAN					5.72	1982
LOWEST ANNUAL MEAN					0.92	1984
HIGHEST DAILY MEAN	10	Oct 26	40	Mar 25	218	Dec 14 1991
LOWEST DAILY MEAN	0.59	Jan 12	0.64	Oct 8	0.09	Sep 28 1968
ANNUAL SEVEN-DAY MINIMUM	0.59	Jan 18	0.70	Oct 19	0.10	Jun 6 1968
ANNUAL RUNOFF (AC-FT)	816		1700		1840	
10 PERCENT EXCEEDS	1.6		4.1		4.4	
50 PERCENT EXCEEDS	0.89		1.5		1.7	
90 PERCENT EXCEEDS	0.68		0.81		0.67	

e Estimated



HAWAII, ISLAND OF KAUAI

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 September 2002 (discontinued). 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 November 26, 1936, at site 61 ft upstream at datum 2.52 ft higher.

REMARKS.--Records computed by Clayton Yoshida. Records good. Ditch diverts water from Kapaa Stream for irrigation in vicinity of Kapaa.

AVERAGE DISCHARGE.--84 years (water years 1918-20, 1922-2002), 6.26 ft^3/s (4,540 acre-ft/yr).

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

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge, 29 ft^3/s, March 25, minimum daily discharge, 0.21 ft^3/s, February 1.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	10	9.9	6.1	4.3	0.21	8.7	16	5.5	4.6	6.8	6.1	0.88
2	8.8	11	5.8	4.3	0.83	9.1	14	5.3	7.6	6.8	6.0	8.3
3	7.9	10	5.6	4.2	1.3	8.7	14	5.2	11	6.7	5.9	14
4	7.6	10	5.7	4.2	0.66	9.4	13	5.1	11	6.0	5.8	11
5	11	9.7	5.3	4.1	0.57	9.2	14	14	8.2	6.3	5.5	7.8
6	9.7	9.7	5.3	4.3	0.99	11	13	22	6.2	6.2	7.7	7.7
7	9.3	9.9	5.1	4.2	1.3	11	12	11	5.2	6.0	8.4	7.8
8	8.9	10	5.0	4.2	1.3	9.6	11	9.8	5.2	6.2	7.6	7.6
9	8.1	9.8	4.9	6.0	0.99	8.7	11	9.3	4.9	5.5	7.6	7.6
10	8.4	9.4	4.8	8.1	0.92	9.6	11	8.4	4.4	7.3	7.3	7.5
11	10	9.2	4.7	7.2	0.74	8.9	9.9	4.9	4.2	9.9	7.2	7.4
12	9.5	9.3	4.7	7.0	4.2	8.8	9.8	12	4.8	9.0	4.4	7.4
13	9.8	9.9	4.9	8.4	6.5	9.4	9.7	6.6	5.2	6.8	5.6	7.4
14	9.9	9.1	5.2	7.7	6.0	8.9	9.9	8.0	5.2	4.7	7.7	8.5
15	9.4	8.7	5.0	7.1	5.8	8.7	9.9	5.8	5.2	4.6	6.9	7.8
16	9.5	8.4	4.7	6.8	5.7	13	9.5	5.3	5.1	4.5	6.5	7.9
17	9.3	8.2	4.7	6.5	5.6	13	10	5.4	5.3	3.9	5.8	6.5
18	9.6	8.0	4.9	6.7	5.3	11	10	5.5	5.4	3.8	5.5	4.9
19	9.4	7.8	4.9	13	5.1	11	10	4.1	5.2	7.7	5.8	4.7
20	9.5	7.6	4.7	18	7.4	10	9.9	6.4	4.6	10	5.6	4.7
21	9.0	7.5	4.8	18	9.3	10	11	11	8.8	10	5.6	5.6
22	9.4	7.3	4.5	16	8.8	10	11	0.84	13	9.2	6.9	6.0
23	9.8	7.3	4.3	12	8.9	10	10	0.81	10	6.5	7.6	5.9
24	9.2	7.2	4.1	6.6	9.0	13	9.7	0.67	5.0	6.4	7.4	5.9
25	8.5	7.0	4.0	3.1	11	29	10	3.1	5.3	6.4	7.5	6.8
26	9.6	8.4	4.4	3.0	9.5	21	12	4.5	4.8	6.3	8.1	7.4
27	11	0.85	4.7	3.1	9.1	19	9.4	6.3	4.1	6.0	7.6	7.3
28	10	3.8	4.6	5.7	8.8	19	7.2	9.0	6.2	5.6	5.6	7.4
29	9.7	6.2	4.6	3.3	---	19	6.7	6.4	7.6	5.6	3.4	7.5
30	9.2	5.9	4.6	4.6	---	17	6.0	4.4	7.5	5.6	2.3	7.4
31	9.9	---	4.4	1.2	---	16	---	4.5	---	5.8	1.3	---
TOTAL	290.9	247.05	151.0	212.9	135.81	380.7	320.6	211.12	190.8	202.1	192.2	214.58
MEAN	9.38	8.23	4.87	6.87	4.85	12.3	10.7	6.81	6.36	6.52	6.20	7.15
MAX	11	11	6.1	18	11	29	16	22	13	10	8.4	14
MIN	7.6	0.85	4.0	1.2	0.21	8.7	6.0	0.67	4.1	3.8	1.3	0.88
AC-FT	577	490	300	422	269	755	636	419	378	401	381	426

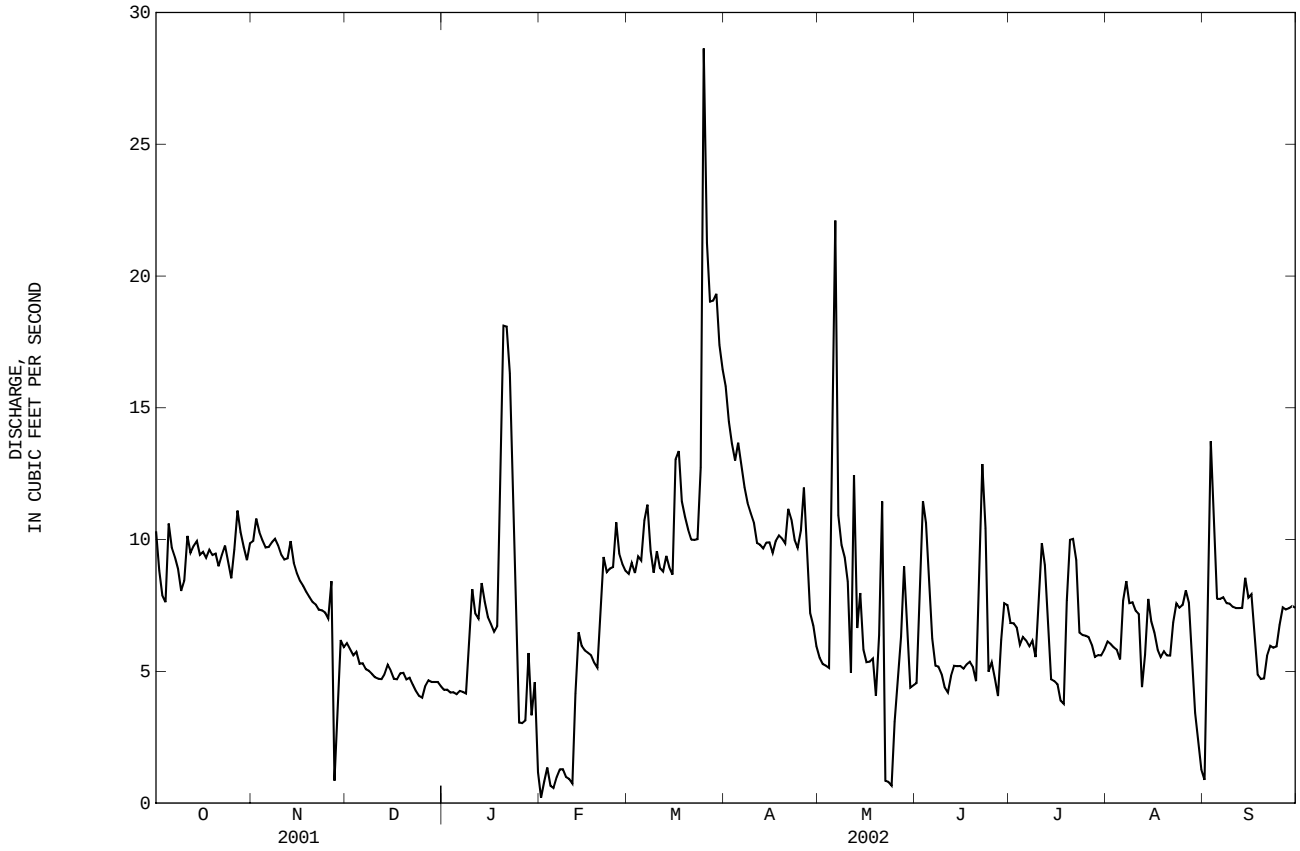
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1918 - 2002, BY WATER YEAR (WY)

MEAN	5.99	5.22	4.71	4.56	4.97	5.78	6.63	7.66	7.59	8.11	8.39	7.03
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	0.27	0.044	0.073	0.012	0.042	0.22	0.27	0.32	1.57	1.66	1.88	0.72
(WY)	1961	1952	1949	1943	1956	1968	1945	1965	1962	1987	1995	1946

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1918 - 2002	
ANNUAL TOTAL	2864.53		2749.76			
ANNUAL MEAN	7.85		7.53		6.26	
HIGHEST ANNUAL MEAN					21.0	1918
LOWEST ANNUAL MEAN					2.23	1965
HIGHEST DAILY MEAN	19	Sep 6	29	Mar 25	94	Oct 25 1926
LOWEST DAILY MEAN	0.05	Mar 16	0.21	Feb 1	0.00	Jun 4 1922
ANNUAL SEVEN-DAY MINIMUM	0.23	Mar 15	0.82	Jan 31	0.00	Nov 13 1925
ANNUAL RUNOFF (AC-FT)	5680		5450		4540	
10 PERCENT EXCEEDS	12		11		14	
50 PERCENT EXCEEDS	8.0		7.3		4.7	
90 PERCENT EXCEEDS	4.1		4.2		0.25	

HAWAII, ISLAND OF KAUAI

16079000 KAPAHI DITCH NEAR KEALIA--Continued



HAWAII, ISLAND OF KAUAI

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 September 2002 (discontinued). 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 benchmark).
December 9, 1921 to June 2, 1934, at site 480 ft upstream at different datum.

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

AVERAGE DISCHARGE.--78 years (water years, 1923-25, 1928-2002), 4.07 ft^3/s (2,950 acre-ft/yr).

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

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge, 9.2 ft^3/s, October 5, minimum daily discharge, no flow for several days.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	5.7	1.3	2.7	0.45	0.03	0.00	0.10	0.04	0.08	1.3	0.93	0.02
2	2.7	1.9	4.0	0.41	0.04	0.00	0.10	0.04	0.08	1.3	0.94	0.05
3	2.2	1.3	2.4	0.41	0.04	0.00	0.10	0.04	0.07	1.3	1.1	0.05
4	2.0	0.94	3.2	0.35	0.04	0.00	0.09	0.02	0.08	1.1	1.1	0.14
5	9.2	0.72	2.8	0.31	0.02	0.00	0.09	0.09	0.08	1.1	1.1	0.04
6	6.3	0.85	3.4	0.31	0.02	0.00	0.08	0.23	0.08	1.1	1.3	0.04
7	4.6	1.5	2.0	0.26	0.02	0.04	0.08	0.28	0.10	1.2	1.5	0.04
8	3.5	1.8	1.7	0.27	0.04	0.03	0.07	0.12	0.09	1.3	1.0	0.02
9	2.9	0.91	1.5	0.98	0.02	0.03	0.07	0.08	0.10	1.1	1.1	0.03
10	5.1	0.56	1.3	1.0	0.02	0.04	0.05	0.15	0.08	1.3	1.0	0.02
11	4.1	0.43	1.2	0.22	0.02	0.04	0.04	0.08	0.07	1.4	1.4	0.02
12	0.68	0.40	1.2	0.00	0.03	0.02	0.04	0.69	0.06	1.1	5.6	0.02
13	0.86	0.86	1.8	0.09	0.03	0.01	0.04	0.29	0.05	1.2	0.10	0.02
14	1.8	0.23	4.1	0.04	0.02	0.00	0.04	0.35	0.04	1.3	0.04	0.09
15	0.80	0.15	3.3	0.03	0.02	0.00	0.04	0.15	0.04	1.4	0.04	0.03
16	0.67	0.14	2.5	0.00	0.02	0.64	0.04	0.12	0.04	1.5	0.04	0.03
17	0.67	0.14	1.9	0.00	0.02	0.11	0.04	0.10	0.04	1.3	0.04	0.02
18	0.94	0.12	2.6	0.02	0.02	0.06	0.05	0.13	0.70	1.3	0.04	0.02
19	0.73	0.10	3.5	0.07	0.02	0.08	0.13	0.10	1.3	0.98	0.04	0.02
20	0.79	0.10	2.6	0.05	0.01	0.08	0.07	0.13	0.94	1.1	0.05	0.03
21	0.46	0.09	2.9	0.05	0.00	0.08	0.08	0.60	1.00	0.99	0.05	0.02
22	0.90	0.08	1.7	0.06	0.00	0.08	0.07	0.11	1.4	1.1	0.04	0.02
23	0.87	0.08	2.3	0.03	0.00	0.08	0.06	0.08	1.1	1.0	0.05	0.02
24	0.53	0.09	1.4	0.00	0.00	0.25	0.06	0.08	1.1	1.0	0.08	0.02
25	0.45	0.09	1.1	0.00	0.00	2.0	0.06	0.08	1.0	1.1	0.07	0.02
26	0.32	3.0	1.9	0.02	0.00	0.57	0.09	0.08	1.1	1.1	0.14	0.01
27	1.7	7.2	1.0	0.03	0.00	0.41	0.05	0.08	1.1	1.1	0.08	0.00
28	1.2	6.1	0.90	0.28	0.00	0.33	0.05	0.08	1.1	1.0	0.11	0.00
29	0.59	3.5	0.75	0.06	---	0.31	0.06	0.08	1.1	1.7	0.08	0.00
30	0.44	2.3	0.63	0.42	---	0.17	0.06	0.09	1.1	0.85	0.04	0.02
31	0.94	---	0.55	0.04	---	0.10	---	0.09	---	0.91	0.17	---
TOTAL	64.64	36.98	64.83	6.26	0.50	5.56	2.00	4.68	15.22	36.53	19.37	0.88
MEAN	2.09	1.23	2.09	0.20	0.018	0.18	0.067	0.15	0.51	1.18	0.62	0.029
MAX	9.2	7.2	4.1	1.0	0.04	2.0	0.13	0.69	1.4	1.7	5.6	0.14
MIN	0.32	0.08	0.55	0.00	0.00	0.00	0.04	0.02	0.04	0.85	0.04	0.00
AC-FT	128	73	129	12	1.0	11	4.0	9.3	30	72	38	1.7

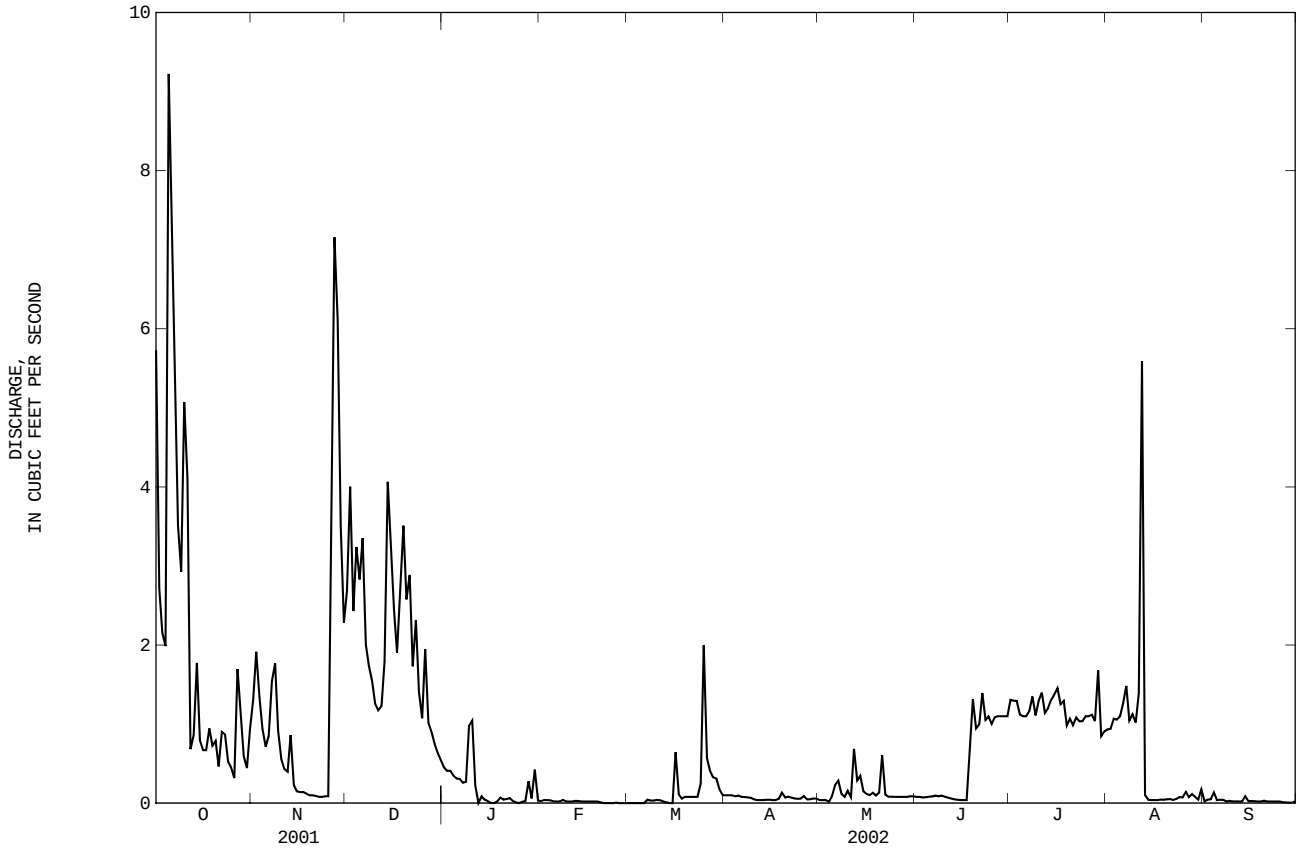
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1922 - 2002, BY WATER YEAR (WY)

MEAN	4.37	3.39	2.21	2.26	3.08	3.44	4.53	4.64	4.61	6.04	5.29	4.68
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	0.007	0.004	0.002	0.003	0.004	0.000	0.001	0.009	0.000	0.003	0.005	0.002
(WY)	1995	1992	1961	1933	1969	1993	1993	1993	1993	1993	1993	1991

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1922 - 2002	
ANNUAL TOTAL	1354.15		257.45			
ANNUAL MEAN	3.71		0.71		4.07	
HIGHEST ANNUAL MEAN					8.00	1987
LOWEST ANNUAL MEAN					0.13	1992
HIGHEST DAILY MEAN	11	Feb 10	9.2	Oct 5	62	Nov 12 1947
LOWEST DAILY MEAN	0.08	Nov 22	0.00	Jan 12	0.00	Dec 11 1923
ANNUAL SEVEN-DAY MINIMUM	0.09	Nov 19	0.00	Feb 21	0.00	Dec 15 1923
ANNUAL RUNOFF (AC-FT)	2690		511		2950	
10 PERCENT EXCEEDS	7.3		1.8		9.9	
50 PERCENT EXCEEDS	3.1		0.10		2.8	
90 PERCENT EXCEEDS	0.90		0.02		0.03	

HAWAII, ISLAND OF KAUAI

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



HAWAII, ISLAND OF KAUAI

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.--1.19 mi^2, revised (Drainage area of 1.9 mi^2 published in the data report for water years 1977-94 was in error;
the correct figure is 1.19 mi^2).

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

REVISED RECORDS.--WSP 2137: Drainage area. WDR HI-95-1: Drainage area.

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

REMARKS.--Records computed by Clayton Yoshida. Records good, except for periods of no gage height record which are poor.

AVERAGE DISCHARGE.--44 years (water years 1959-2002), 11.8 ft^3/s (8,530 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 4,140 ft^3/s, February 13, 1994, gage height, 9.76 ft; minimum, 1.8 ft^3/s, September 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)
Nov 26	2115	1,720	6.84	May 12	0800	*2,870	*8.42
Mar 25	0030	1,470	6.42				

Minimum discharge, 4.4 ft^3/s, Jan. 16, 17, 18, gage height, 0.81 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	6.0	8.3	8.3	5.2	18	e4.6	e7.1	6.1	6.2	9.4	6.5	7.2
2	5.0	15	12	5.1	12	e6.0	e6.6	5.7	6.1	8.9	6.2	7.7
3	4.8	13	7.8	e5.0	10	e4.9	e6.3	5.5	6.0	8.7	6.3	7.3
4	4.7	14	11	4.9	9.2	e5.8	e6.1	5.3	6.0	7.1	6.2	14
5	29	9.3	10	4.9	9.2	e5.6	e6.2	8.8	5.8	6.4	6.2	8.5
6	8.5	9.8	15	4.8	7.7	e12	e5.7	46	6.2	6.2	8.5	8.3
7	6.5	13	8.1	4.7	7.0	e30	e5.6	64	6.3	6.2	17	8.7
8	5.7	13	7.2	4.6	33	e6.8	e5.4	42	6.2	6.4	9.7	7.3
9	5.4	8.6	7.4	5.6	10	e5.8	e5.3	22	9.3	5.9	13	7.2
10	6.9	7.3	6.6	5.4	7.8	e7.2	e5.1	44	11	5.9	12	9.0
11	7.3	6.8	6.4	4.7	7.1	e5.5	e5.1	25	8.5	6.2	16	6.9
12	5.7	6.8	6.4	4.6	7.8	e5.1	e5.0	179	7.5	5.8	54	6.5
13	8.2	8.0	7.1	4.8	19	e6.9	e4.9	29	12	5.7	18	6.3
14	11	6.2	17	4.6	10	e5.3	e4.9	27	8.9	5.8	11	13
15	7.2	5.9	11	4.5	e7.4	e6.6	e4.8	15	7.0	5.8	8.8	7.8
16	7.3	5.7	7.9	4.5	e6.3	e33	e4.8	11	6.4	6.2	7.8	8.6
17	6.4	5.6	7.3	4.4	e5.8	e30	5.3	9.4	6.3	6.5	7.3	7.7
18	7.1	5.4	14	4.5	e5.5	e9.0	6.7	11	9.5	11	7.3	6.6
19	7.0	5.3	16	5.3	e5.4	e7.0	24	13	12	7.0	6.9	6.4
20	6.8	5.1	9.4	8.2	e6.4	e6.2	16	15	7.8	7.3	6.7	6.4
21	6.0	5.0	10	10	e5.1	e5.7	16	11	7.6	6.4	6.3	6.2
22	6.3	4.9	7.6	20	e4.9	e5.5	7.9	11	12	6.7	6.1	5.9
23	6.5	4.9	7.0	9.1	e4.8	e5.2	6.6	9.5	8.5	6.3	6.2	5.8
24	6.0	4.9	6.5	6.6	e4.8	e24	6.2	12	8.2	5.9	6.2	5.7
25	5.7	4.7	6.3	6.7	e13	e114	6.0	8.5	7.0	5.9	5.9	5.6
26	5.5	126	6.4	7.3	e5.6	e24	9.2	7.7	6.6	5.9	11	5.8
27	8.6	74	6.0	37	e5.1	e13	6.3	7.4	6.3	6.5	7.1	5.7
28	6.7	34	5.7	119	e4.8	e10	6.3	7.2	6.2	6.0	8.9	5.5
29	5.5	13	5.6	64	---	e13	7.9	6.9	6.0	21	12	5.4
30	5.3	8.9	5.4	106	---	e8.9	9.4	6.6	6.0	13	7.2	5.3
31	7.8	---	5.3	36	---	e7.7	---	6.3	---	7.5	11	---
TOTAL	226.4	452.4	267.7	522.0	252.7	434.3	222.7	677.9	229.4	229.5	323.3	218.3
MEAN	7.30	15.1	8.64	16.8	9.03	14.0	7.42	21.9	7.65	7.40	10.4	7.28
MAX	29	126	17	119	33	114	24	179	12	21	54	14
MIN	4.7	4.7	5.3	4.4	4.8	4.6	4.8	5.3	5.8	5.7	5.9	5.3
AC-FT	449	897	531	1040	501	861	442	1340	455	455	641	433

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1958 - 2002, BY WATER YEAR (WY)

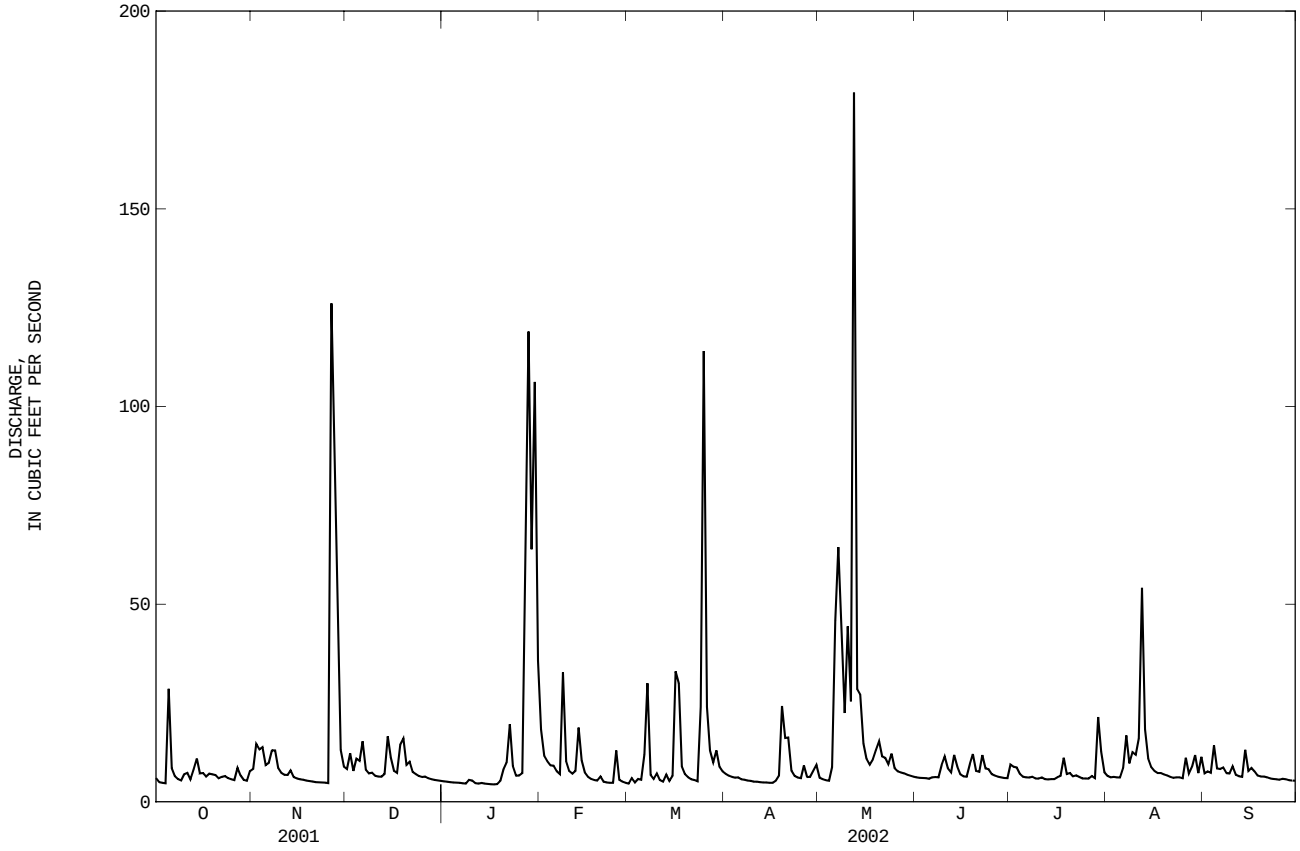
MEAN	10.2	16.2	13.8	11.8	11.2	13.2	14.7	12.1	8.52	11.1	10.2	8.30
MAX	24.6	49.7	43.1	28.4	54.8	42.7	35.1	22.5	29.1	27.1	23.7	15.7
(WY)	1983	1996	1988	1989	1994	1982	1971	1965	1978	1989	1991	1994
MIN	4.40	5.73	3.79	3.45	3.20	4.15	5.06	4.38	4.27	5.05	3.95	3.93
(WY)	1985	1977	1986	1986	1986	1995	1992	2000	1959	1975	1973	1975

HAWAII, ISLAND OF KAUAI

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

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1958 - 2002	
ANNUAL TOTAL	3131.4					
ANNUAL MEAN	8.58				11.8	
HIGHEST ANNUAL MEAN					19.6	1982
LOWEST ANNUAL MEAN					7.01	1984
HIGHEST DAILY MEAN	126	Nov 26	179	May 12	879	Feb 13 1994
LOWEST DAILY MEAN	3.8	Jan 24	4.3	Apr 15	1.9	Sep 5 1968
ANNUAL SEVEN-DAY MINIMUM	3.9	Feb 1	4.4	Apr 10	2.4	Sep 2 1968
ANNUAL RUNOFF (AC-FT)	6210				8530	
10 PERCENT EXCEEDS	14				20	
50 PERCENT EXCEEDS	6.4				7.4	
90 PERCENT EXCEEDS	4.3				4.6	

e Estimated



HAWAII, ISLAND OF KAUAI

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.--18.7 mi^2.

PERIOD OF RECORD.--January 1912 to November 1919, water years 1962-63 (annual maximum), 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. WDR HI-00-1: Drainage area.

GAGE.--Water stage recorder and crest-stage gage. Datum of gage is 60.0 ft above mean sea level (from topographic map). January 1, 1912 to November 20, 1919, nonrecording gage at site 0.3 mi downstream at different datum. January 26 to December 26, 1962, crest-stage gage at site 0.5 mi downstream at different datum. Water-stage recorder and crest-stage at site 0.5 mi downstream at different datum from December 27, 1962 to May 10, 2000.

REMARKS.--Records computed by Clayton Yoshida. Records good. No diversions upstream.

AVERAGE DISCHARGE (since diversion to Hanalei tunnel ended).--10 years (water years 1993-2002), 204 ft^3/s (147,700 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 44,600 ft^3/s, November 3, 1995, gage height, 15.81 ft, from rating curve extended above 26,600 ft^3/s; minimum, 31 ft^3/s, September 30, October 1, 2, 5, 12, 13, November 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)
Nov 26	2045	10,600	8.67	Mar 25	0030	12,100	9.20
Jan 28	2045	*13,100	*9.57				

Minimum discharge, 77 ft^3/s, Jan. 16, 17, gage height, 1.55 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	175	200	169	95	458	100	152	127	106	195	e117	105
2	102	286	207	93	265	136	139	113	103	172	e99	162
3	91	271	148	91	224	106	130	106	103	155	e128	177
4	89	213	317	90	252	131	126	102	104	128	e120	313
5	445	174	232	88	185	125	128	153	99	109	e111	168
6	156	218	330	88	156	315	116	592	101	107	e156	175
7	121	310	179	86	141	976	111	1160	109	114	296	186
8	111	610	175	85	468	159	107	559	107	126	174	139
9	98	213	189	95	215	130	104	315	137	105	199	136
10	179	162	163	92	156	171	100	437	205	108	168	125
11	202	147	136	83	141	123	98	304	300	123	308	111
12	122	133	130	82	167	112	96	1530	151	101	565	105
13	157	183	276	88	339	163	94	435	164	97	201	102
14	175	120	812	83	197	117	94	495	150	99	150	242
15	133	111	364	80	176	152	92	251	119	105	128	146
16	146	106	217	79	145	1070	90	197	110	151	116	168
17	123	102	191	81	132	957	102	173	105	123	111	140
18	141	97	219	119	122	222	136	215	205	163	114	110
19	127	94	279	344	120	164	156	388	254	137	123	103
20	129	92	184	672	147	141	155	632	154	135	112	111
21	115	91	180	787	112	128	168	282	159	109	100	104
22	133	89	141	592	107	122	122	212	285	117	95	95
23	136	87	210	297	103	114	100	179	170	109	97	91
24	111	85	135	180	105	736	95	163	152	99	95	89
25	103	84	123	160	361	4880	118	147	127	e117	102	87
26	127	1530	127	608	126	734	179	133	120	e104	203	87
27	660	1120	114	1500	111	340	166	141	111	e111	115	85
28	344	424	108	3100	104	260	363	143	106	e100	162	85
29	154	193	108	1520	---	337	255	126	103	e226	190	85
30	131	152	102	1840	---	206	209	116	101	e161	113	87
31	189	---	100	992	---	169	---	110	---	e130	130	---
TOTAL	5225	7697	6365	14190	5335	13596	4101	10036	4320	3936	4898	3919
MEAN	169	257	205	458	191	439	137	324	144	127	158	131
MAX	660	1530	812	3100	468	4880	363	1530	300	226	565	313
MIN	89	84	100	79	103	100	90	102	99	97	95	85
AC-FT	10360	15270	12620	28150	10580	26970	8130	19910	8570	7810	9720	7770

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1993 - 2002, BY WATER YEAR (WY)

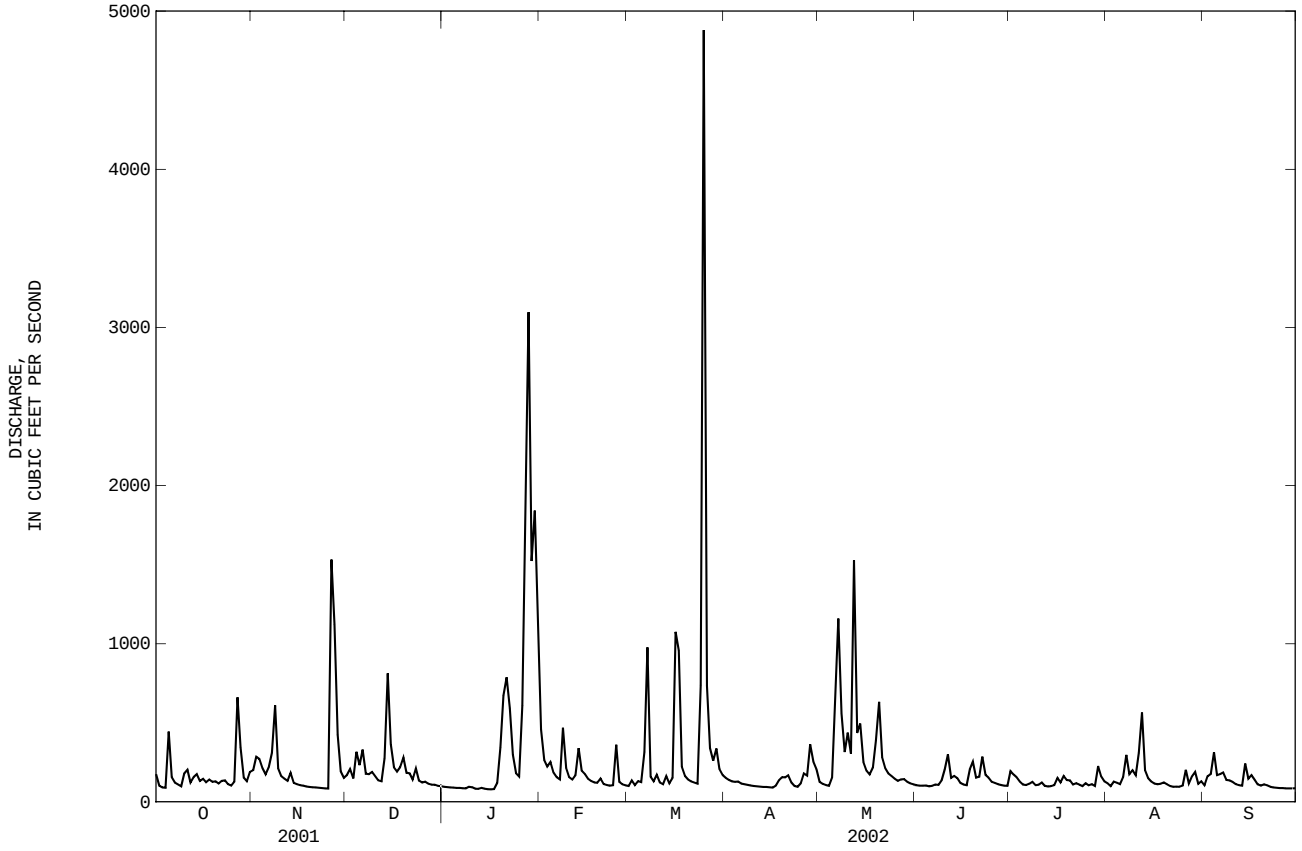
MEAN	201	279	247	233	196	182	233	182	164	182	156	195
MAX	304	599	459	458	392	439	370	418	251	247	199	523
(WY)	1995	1996	1993	2002	1994	2002	1997	1997	1994	2000	1995	1994
MIN	138	143	185	80.9	79.8	88.0	76.6	84.6	71.5	127	136	77.5
(WY)	1994	1993	1996	2001	2000	1993	1993	1995	1993	2002	1993	1993

HAWAII, ISLAND OF KAUAI

16103000 HANALEI RIVER NEAR HANALEI--Continued

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1993 - 2002	
ANNUAL TOTAL	68106		83618			
ANNUAL MEAN	187		229		204	
HIGHEST ANNUAL MEAN					258	1997
LOWEST ANNUAL MEAN					152	1993
HIGHEST DAILY MEAN	2280	Feb 9	4880	Mar 25	7100	Nov 9 1995
LOWEST DAILY MEAN	66	Jan 22	79	Jan 16	54	Jul 8 1993
ANNUAL SEVEN-DAY MINIMUM	67	Jan 18	82	Jan 11	57	Jul 3 1993
ANNUAL RUNOFF (AC-FT)	135100		165900		147700	
10 PERCENT EXCEEDS	343		362		370	
50 PERCENT EXCEEDS	127		136		133	
90 PERCENT EXCEEDS	81		95		82	

e Estimated



HAWAII, ISLAND OF KAUAI

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 power plant 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.

REVISED RECORDS.--WSP 770: 1932-33. WSP 1719: 1916. WSP 1937: 1918. WSP 2137: Drainage area. WRD HI-00-1: 1953-99 (P).

GAGE.--Water-stage recorder. Elevation of gage is 960 ft above mean sea level (from topographic map).

REMARKS.--Records computed by Roy Taogoshi. Records fair. No diversion upstream.

AVERAGE DISCHARGE.--47 years (water years 1953-55, 1959-2002), 138 ft^3/s (100,100 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 20,200 ft^3/s, April 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, 31 ft^3/s, September 29, 1965.

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)
Nov 26	2000	*5,720	*6.16	No other peak greater than base discharge.			

Minimum discharge, 38 ft^3/s, Sept. 28, gage height, 1.20 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	157	163	122	53	165	56	61	51	47	271	63	48
2	73	223	135	51	91	82	56	48	46	123	48	49
3	58	165	112	49	85	64	53	45	46	104	78	80
4	54	107	355	48	108	95	52	44	54	73	69	158
5	360	86	146	47	77	106	52	139	48	59	60	72
6	94	120	277	50	68	319	51	436	52	68	85	98
7	86	113	110	48	62	151	50	968	91	98	313	113
8	84	285	126	49	125	70	48	319	85	100	132	76
9	60	97	125	54	87	62	48	129	96	62	129	91
10	175	72	112	64	66	77	47	210	125	87	119	75
11	140	76	82	50	65	61	46	113	202	97	203	53
12	83	72	77	47	109	56	45	473	89	59	257	48
13	120	124	496	51	189	62	45	153	92	52	85	54
14	100	59	1040	48	97	56	45	115	75	58	65	191
15	82	53	202	46	86	67	44	81	57	79	56	99
16	98	51	126	47	70	266	43	68	53	149	51	140
17	67	49	124	62	64	365	69	62	51	97	49	93
18	98	47	163	177	59	103	57	117	188	162	60	58
19	72	46	162	509	56	78	46	262	207	108	62	51
20	86	45	123	857	62	67	119	541	98	89	59	48
21	83	44	110	490	55	62	112	123	142	68	51	48
22	105	43	71	326	53	64	77	88	250	87	46	47
23	84	42	105	97	52	59	52	75	103	79	49	43
24	61	42	70	73	89	344	50	62	84	63	50	42
25	56	41	61	83	292	1240	80	57	61	69	51	41
26	52	564	61	458	81	249	96	52	62	55	148	41
27	850	570	55	758	65	109	96	54	53	57	63	41
28	328	323	54	1090	60	81	89	67	50	50	87	40
29	107	93	74	436	---	204	107	61	48	73	102	54
30	84	66	59	517	---	94	89	52	48	63	51	54
31	184	---	63	583	---	68	---	49	---	68	59	---
TOTAL	4141	3881	4998	7318	2538	4837	1925	5114	2703	2727	2800	2146
MEAN	134	129	161	236	90.6	156	64.2	165	90.1	88.0	90.3	71.5
MAX	850	570	1040	1090	292	1240	119	968	250	271	313	191
MIN	52	41	54	46	52	56	43	44	46	50	46	40
AC-FT	8210	7700	9910	14520	5030	9590	3820	10140	5360	5410	5550	4260

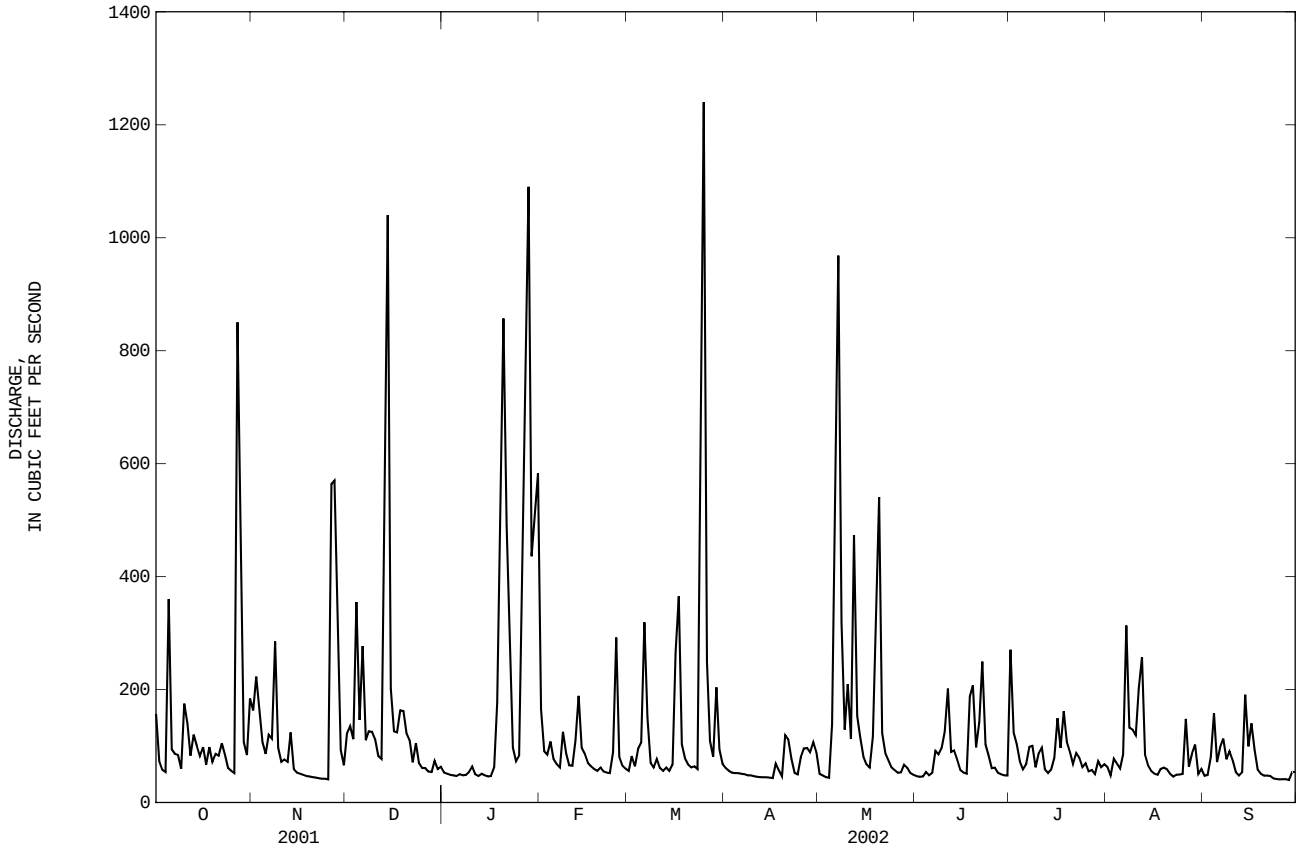
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1952 - 2002, BY WATER YEAR (WY)

MEAN	115	186	167	145	142	166	175	123	103	132	114	95.0
MAX	228	414	384	371	492	611	504	238	187	315	272	249
(WY)	1983	1991	1968	1989	1969	1982	1971	1967	1978	1989	1982	1994
MIN	42.8	72.7	54.1	44.6	36.5	52.2	52.8	51.9	53.1	50.4	62.9	44.0
(WY)	1985	1964	1984	1986	1978	1970	1992	1966	1993	1984	1971	1993

HAWAII, ISLAND OF KAUAI

16108000 WAINIHA RIVER NEAR HANALEI--Continued

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1952 - 2002	
ANNUAL TOTAL	45393		45128			
ANNUAL MEAN	124		124		138	
HIGHEST ANNUAL MEAN					243	1982
LOWEST ANNUAL MEAN					84.8	1984
HIGHEST DAILY MEAN	1740	Feb 9	1240	Mar 25	3650	Nov 21 1974
LOWEST DAILY MEAN	36	Mar 28	40	Sep 28	32	Oct 22 1984
ANNUAL SEVEN-DAY MINIMUM	38	Mar 24	42	Sep 22	33	Oct 16 1984
ANNUAL RUNOFF (AC-FT)	90040		89510		100100	
10 PERCENT EXCEEDS	237		253		261	
50 PERCENT EXCEEDS	76		74		79	
90 PERCENT EXCEEDS	45		48		49	



HAWAII, ISLAND OF KAUAI

16114000 LIMAHULI STREAM NEAR WAINIHA

LOCATION.--Lat 22°13'15", long 159°34'48", Hydrologic Unit 20070000, on left bank 0.2 mi upstream from intersection with Kuhio Highway, and entrance to Haena State Park.

DRAINAGE AREA.--1.36 mi^2.

PERIOD OF RECORD.--October 1994 to current year.

GAGE.--Water-stage recorders and natural control. Elevation of gage is 200 ft above mean sea level, by altimeter.

REMARKS.--Records computed by Clayton Yoshida. Records good except for discharge above 200 cfs which are poor. Limahuli Gardens diverts water through a 4-inch pipe, upstream of station.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 985 ft^3/s, December 11, 2000, gage height, 5.24 ft; minimum, 3.5 ft^3/s, on several days.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 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	2100	*412	*3.75	No other peak greater than base discharge.			

Minimum discharge, 3.8 ft^3/s, on several days, gage height, 0.40 ft.

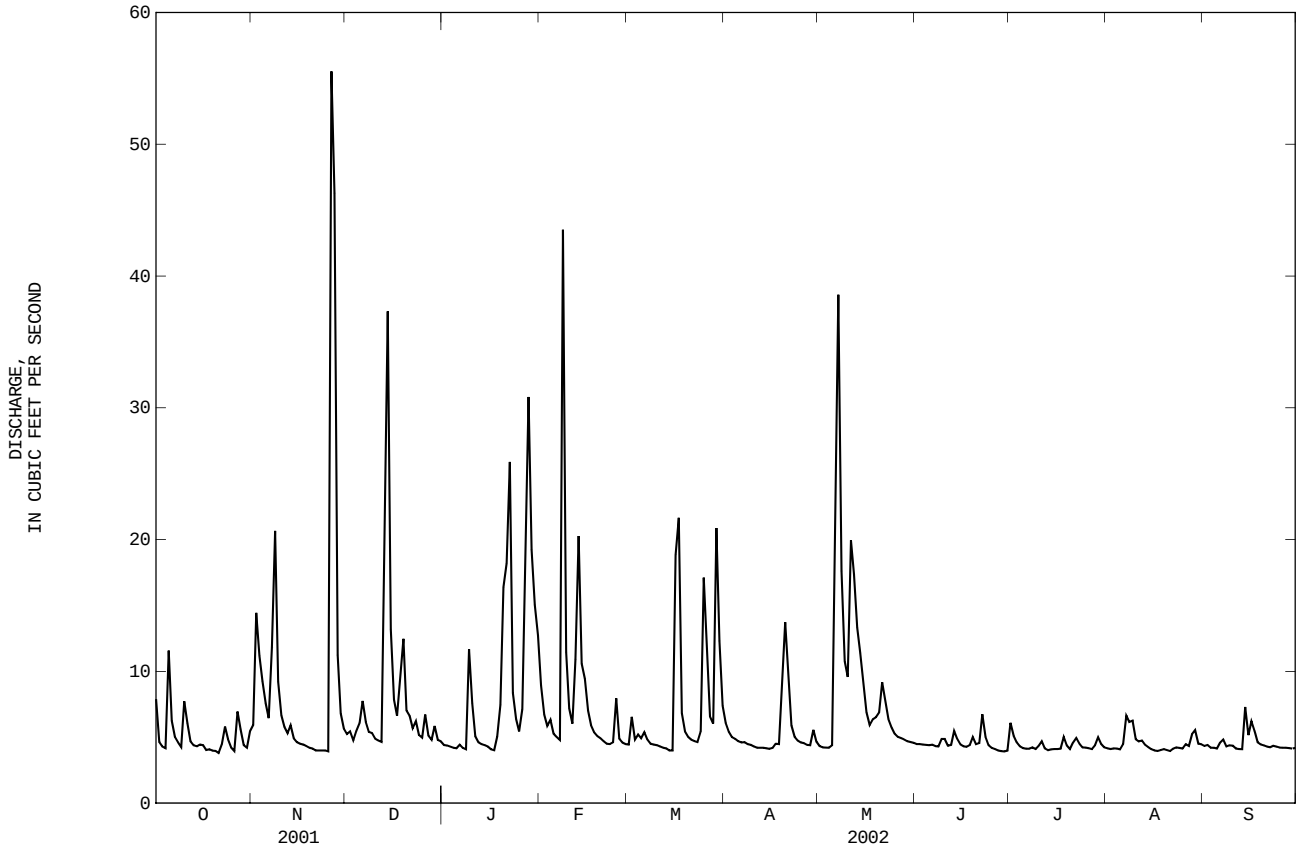
DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	7.9	5.9	5.2	4.4	8.9	4.4	6.1	4.3	4.5	6.1	4.2	4.3
2	4.6	14	5.4	4.4	6.7	6.6	5.4	4.2	4.5	5.1	4.1	4.4
3	4.3	11	4.8	4.3	5.9	4.8	5.0	4.2	4.4	4.6	4.2	4.2
4	4.2	9.2	5.5	4.2	6.3	5.2	4.9	4.2	4.4	4.3	4.1	4.2
5	12	7.6	6.1	4.2	5.3	4.9	4.7	4.4	4.4	4.2	4.1	4.1
6	6.3	6.5	7.7	4.4	5.0	5.4	4.6	19	4.4	4.1	4.5	4.6
7	5.0	12	6.2	4.2	4.8	4.8	4.6	39	4.3	4.1	6.6	4.8
8	4.6	21	5.4	4.1	44	4.5	4.5	18	4.3	4.2	6.2	4.3
9	4.3	9.2	5.3	12	11	4.5	4.4	11	4.9	4.1	6.3	4.4
10	7.7	6.7	4.9	7.6	7.2	4.4	4.3	9.6	4.9	4.3	4.9	4.4
11	6.1	5.8	4.8	5.1	6.0	4.3	4.2	20	4.4	4.7	4.7	4.2
12	4.7	5.3	4.6	4.6	11	4.2	4.2	17	4.4	4.2	4.8	4.1
13	4.4	5.9	21	4.5	20	4.2	4.2	13	5.5	4.0	4.4	4.1
14	4.3	4.9	37	4.4	11	4.0	4.2	11	4.9	4.1	4.3	7.3
15	4.5	4.6	13	4.3	9.4	4.0	4.1	8.9	4.5	4.1	4.1	5.2
16	4.4	4.5	7.8	4.1	7.0	19	4.2	6.9	4.3	4.1	4.0	6.2
17	4.0	4.4	6.6	4.0	5.9	22	4.5	5.9	4.3	4.1	4.0	5.5
18	4.1	4.3	9.8	5.1	5.4	6.8	4.5	6.4	4.4	5.0	4.0	4.6
19	4.0	4.2	12	7.5	5.1	5.4	8.9	6.5	5.0	4.4	4.1	4.5
20	4.0	4.1	7.0	16	4.9	5.0	14	6.9	4.5	4.1	4.0	4.4
21	3.8	4.0	6.6	18	4.7	4.8	9.8	9.2	4.6	4.6	4.0	4.3
22	4.5	4.0	5.7	26	4.5	4.7	5.9	7.8	6.7	4.9	4.1	4.2
23	5.8	4.0	6.2	8.4	4.5	4.6	5.0	6.4	5.0	4.5	4.2	4.3
24	4.8	4.0	5.2	6.4	4.6	5.4	4.8	5.7	4.4	4.2	4.2	4.3
25	4.2	3.9	5.0	5.4	8.0	17	4.6	5.3	4.2	4.2	4.1	4.2
26	4.0	56	6.7	7.1	4.9	11	4.6	5.0	4.1	4.2	4.5	4.2
27	6.9	46	5.1	15	4.6	6.6	4.4	4.9	4.0	4.1	4.3	4.2
28	5.6	11	4.8	31	4.5	6.0	4.4	4.8	4.0	4.4	5.2	4.2
29	4.4	6.8	5.9	19	---	21	5.6	4.7	3.9	5.0	5.5	4.1
30	4.2	5.6	4.8	15	---	12	4.7	4.6	4.0	4.5	4.5	4.2
31	5.4	---	4.7	13	---	7.4	---	4.6	---	4.2	4.5	---
TOTAL	159.0	296.4	240.8	277.7	231.1	228.9	159.3	283.4	136.1	136.7	140.7	136.0
MEAN	5.13	9.88	7.77	8.96	8.25	7.38	5.31	9.14	4.54	4.41	4.54	4.53
MAX	12	56	37	31	44	22	14	39	6.7	6.1	6.6	7.3
MIN	3.8	3.9	4.6	4.0	4.5	4.0	4.1	4.2	3.9	4.0	4.0	4.1
AC-FT	315	588	478	551	458	454	316	562	270	271	279	270

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1995 - 2002, BY WATER YEAR (WY)

MEAN	6.94	9.19	11.3	10.2	8.53	7.90	13.2	9.79	7.24	7.54	7.14	6.52
MAX	9.62	12.5	14.5	23.8	12.1	15.7	32.6	22.4	12.2	9.28	9.84	9.32
(WY)	1996	1996	2001	1997	2001	1997	1997	1997	1996	1998	1995	1996
MIN	5.14	6.26	7.43	4.34	4.64	4.22	5.32	4.69	4.54	4.41	4.54	4.09
(WY)	2002	2000	1995	2001	2000	2001	2002	2000	2002	2002	2002	2001

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1995 - 2002	
ANNUAL TOTAL	2474.8		2426.1			
ANNUAL MEAN	6.78		6.65		8.79	
HIGHEST ANNUAL MEAN					13.5	1997
LOWEST ANNUAL MEAN					6.65	2002
HIGHEST DAILY MEAN	101	Feb 9	56	Nov 26	238	Jan 4 1997
LOWEST DAILY MEAN	3.6	Jun 24	3.8	Oct 21	3.6	Jun 24 2001
ANNUAL SEVEN-DAY MINIMUM	3.7	Jun 18	4.0	Nov 19	3.7	Jun 18 2001
ANNUAL RUNOFF (AC-FT)	4910		4810		6370	
10 PERCENT EXCEEDS	11		11		13	
50 PERCENT EXCEEDS	4.6		4.7		6.3	
90 PERCENT EXCEEDS	3.9		4.1		4.4	



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Surface-Water Station Records for Oahu

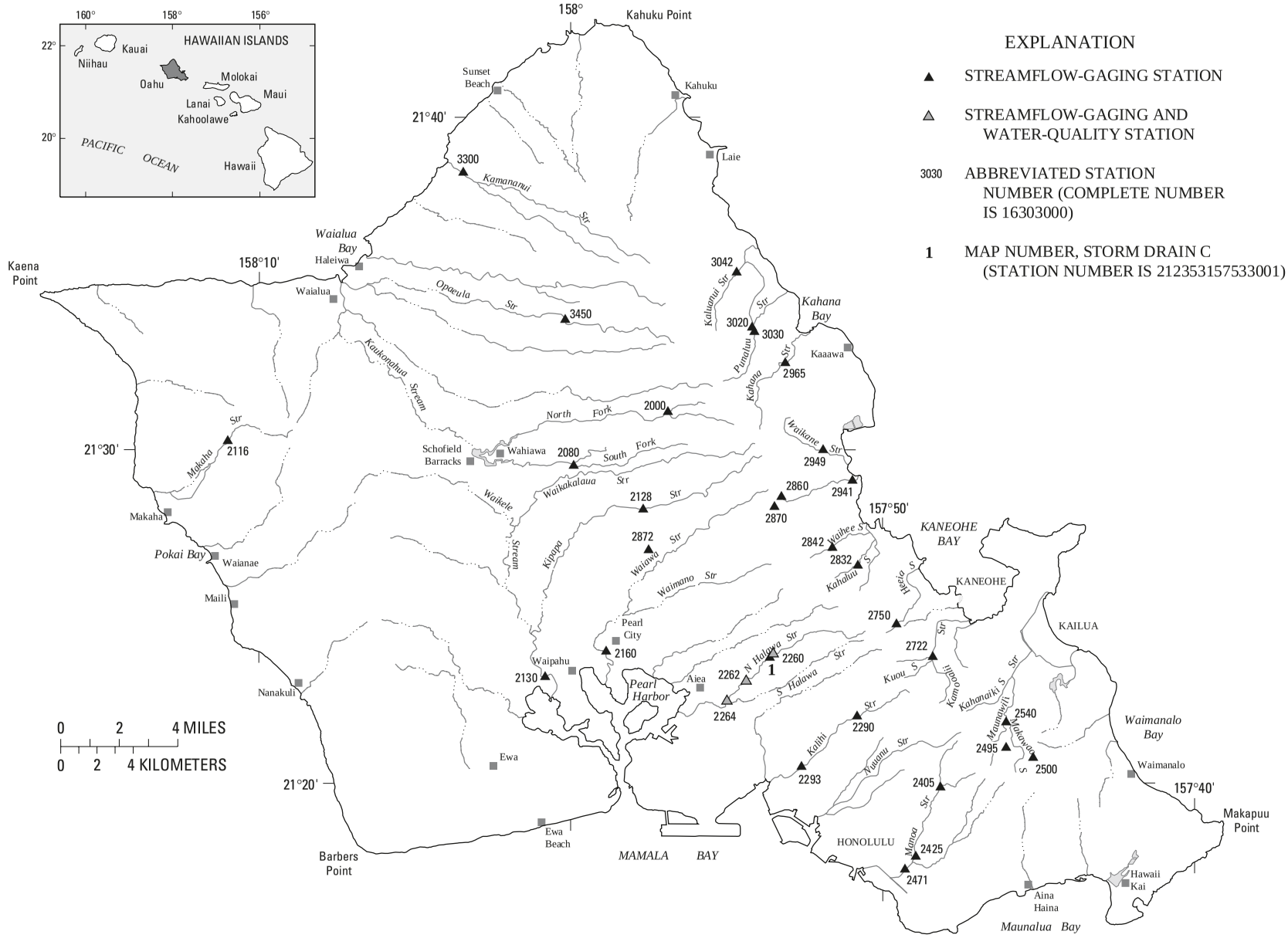


Figure 6. Locations of streamflow-gaging stations on Oahu.

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 above mean sea level (from topographic map).

REMARKS.--Records computed by S.T.M. Young. Records good except for discharges above 200 ft^3/s, which are poor.

AVERAGE DISCHARGE.--79 years (water years 1914-24, 1927-52, 1961-2002), 16.2 ft^3/s (11,730 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 5,640 ft^3/s, October 28, 1981, gage height, 13.2 ft, from rating curve extended above 110 ft^3/s on basis of slope-area measurement at gage height, 12.46 ft; minimum, 0.12 ft^3/s, March 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)
Jan 27	0045	2,070	9.43	May 6	0600	*2,870	*10.36
Jan 28	2345	1,450	7.87				

Minimum discharge, 0.99 ft^3/s, Apr. 16, gage height, 1.55 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

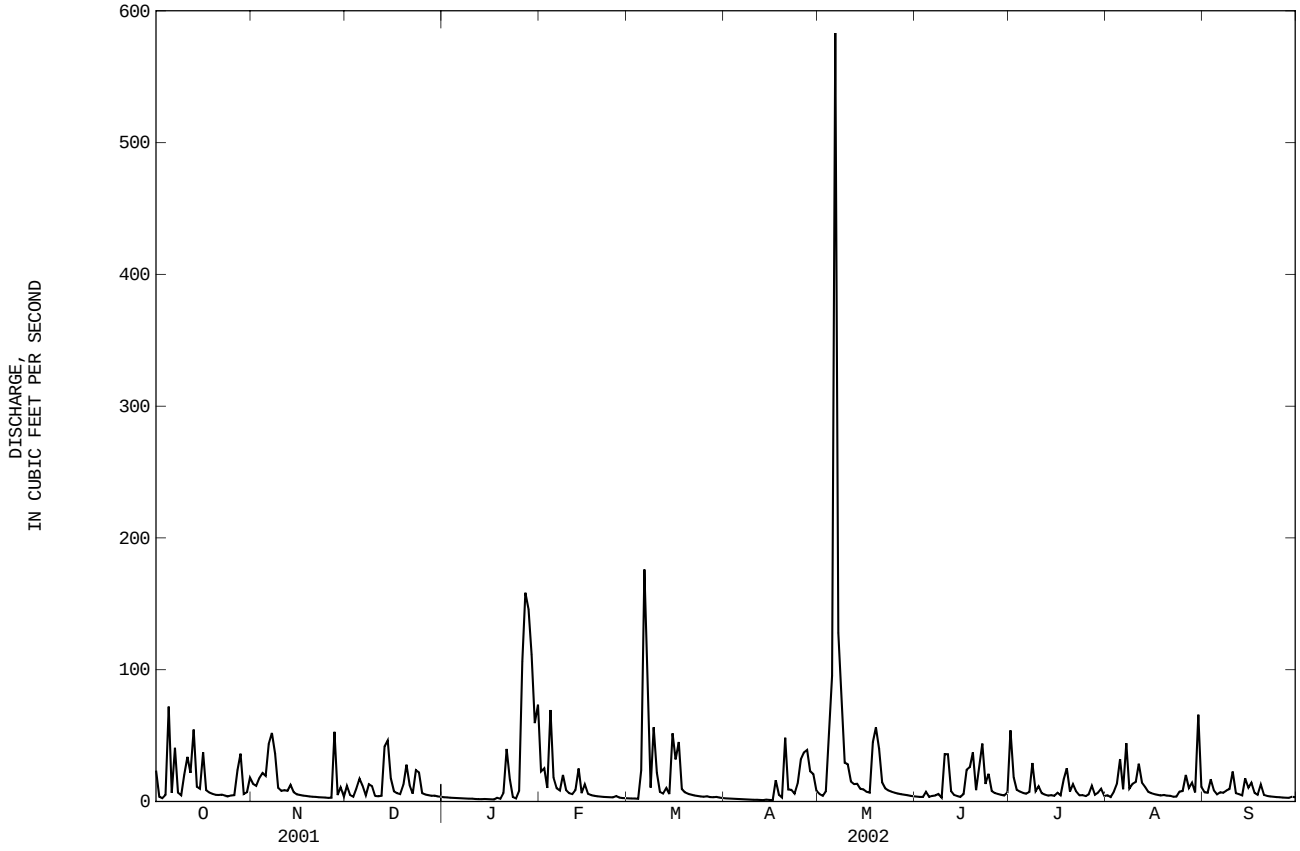
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	23	13	12	3.2	23	2.4	2.4	5.7	3.7	54	4.7	7.0
2	3.6	12	4.9	3.1	25	2.3	2.3	4.3	3.4	18	3.4	6.6
3	2.5	18	3.5	2.9	10	2.3	2.1	7.7	3.5	8.9	7.4	17
4	5.1	22	9.8	2.7	69	2.1	2.0	57	7.3	7.5	13	8.3
5	72	19	17	2.7	18	24	1.9	95	3.4	6.6	32	5.4
6	6.6	43	12	2.5	10	176	1.8	583	4.3	5.9	9.3	7.0
7	41	52	4.7	2.4	8.3	102	1.7	128	4.6	7.3	44	6.7
8	6.8	36	13	2.2	20	11	1.5	87	5.7	29	9.8	8.4
9	4.7	10	12	2.1	8.6	56	1.5	30	3.0	7.8	13	9.4
10	20	8.2	4.3	2.2	6.3	22	1.4	28	36	12	15	23
11	34	8.6	4.0	2.0	5.6	7.4	1.3	15	36	6.2	29	6.3
12	22	8.1	4.4	1.8	8.6	6.1	1.2	13	7.9	5.2	14	5.6
13	55	13	42	1.8	25	10	1.1	13	4.9	4.5	11	4.6
14	11	7.0	46	1.9	6.3	5.6	1.4	9.6	4.1	4.9	7.4	18
15	9.6	5.4	18	1.8	13	52	1.2	9.2	3.5	4.3	6.3	11
16	37	4.9	7.7	1.7	5.8	32	1.0	7.4	5.7	6.6	5.5	14
17	8.6	4.5	6.3	1.5	4.8	45	16	6.6	24	4.7	5.1	6.5
18	6.7	4.2	5.5	2.7	4.4	9.5	5.1	45	26	17	4.6	5.1
19	5.7	3.9	13	2.0	4.0	6.9	3.0	56	37	25	5.0	13
20	5.1	3.6	28	6.4	3.7	5.8	48	40	8.6	7.5	4.5	4.9
21	4.9	3.4	12	40	3.5	5.2	9.2	14	26	13	4.4	4.2
22	5.2	3.3	5.9	17	3.4	4.6	8.9	9.9	44	7.6	3.7	3.8
23	4.4	3.1	24	3.3	3.2	4.2	5.9	8.3	13	4.7	3.7	3.6
24	3.8	3.0	22	2.3	3.1	3.9	14	7.3	21	4.9	7.4	3.4
25	4.6	2.8	6.3	8.0	4.1	3.6	32	6.6	7.9	4.1	8.0	3.2
26	4.8	2.9	5.4	106	3.0	3.9	37	6.0	6.4	5.4	20	3.0
27	24	53	4.8	158	2.6	3.4	39	5.6	5.7	12	10	2.9
28	36	5.0	4.4	146	2.5	3.2	23	5.1	5.1	5.2	14	2.7
29	5.7	11	4.5	112	---	3.5	21	4.8	4.6	6.8	6.8	3.6
30	7.1	3.7	3.9	59	---	3.0	8.2	4.3	6.8	9.7	66	3.2
31	18	---	3.6	73	---	2.6	---	4.0	---	4.2	11	---
TOTAL	498.5	387.6	364.9	774.2	304.8	621.5	296.1	1316.4	373.1	320.5	399.0	221.4
MEAN	16.1	12.9	11.8	25.0	10.9	20.0	9.87	42.5	12.4	10.3	12.9	7.38
MAX	72	53	46	158	69	176	48	583	44	54	66	23
MIN	2.5	2.8	3.5	1.5	2.5	2.1	1.0	4.0	3.0	4.1	3.4	2.7
AC-FT	989	769	724	1540	605	1230	587	2610	740	636	791	439

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1913 - 2002, BY WATER YEAR (WY)

MEAN	13.2	17.4	15.0	14.6	12.5	18.6	19.7	16.2	13.4	18.4	18.1	15.0
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	0.36	0.40	0.28	1.39	0.67	2.63	4.22	1.81	1.95
(WY)	1985	1934	1990	1986	1986	1983	1966	1992	1951	1951	1971	1975

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

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1913 - 2002	
ANNUAL TOTAL	4680.52		5878.0			
ANNUAL MEAN	12.8		16.1		16.2	
HIGHEST ANNUAL MEAN					29.5	1932
LOWEST ANNUAL MEAN					9.11	1984
HIGHEST DAILY MEAN	96	Jun 5	583	May 6	975	Feb 27 1935
LOWEST DAILY MEAN	0.85	Feb 8	1.0	Apr 16	0.12	Mar 13 1941
ANNUAL SEVEN-DAY MINIMUM	1.0	Feb 2	1.2	Apr 10	0.13	Mar 5 1986
ANNUAL RUNOFF (AC-FT)	9280		11660		11730	
10 PERCENT EXCEEDS	32		37		36	
50 PERCENT EXCEEDS	6.7		6.5		7.1	
90 PERCENT EXCEEDS	2.2		2.6		1.7	



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 (from U.S. Coast and Geodetic Survey trig station).

REMARKS.--Records computed by S.T.M. Young. Records good except for periods of no gage height record which are poor. Prior to 1960, water was diverted from reservoirs upstream of station for use at Schofield Barracks.

AVERAGE DISCHARGE.--40 years (water years 1961-62, 1965-2002), 21.0 ft^3/s (15,240 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 5,460 ft^3/s, April 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)
Jan 27	0245	1,170	5.17	May 6	0730	*3,910	*9.34
Jan 29	0200	1,330	5.47				

Minimum discharge, 1.5 ft^3/s, Apr. 12, 13, gage height, 1.26 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	e33	e18	5.9	4.6	36	3.8	3.4	4.1	2.7	29	3.7	6.1
2	e5.4	e17	7.3	4.3	39	3.6	3.1	3.1	2.5	22	3.0	6.4
3	e3.8	e25	5.1	4.2	18	3.4	2.9	2.5	2.4	10	3.5	6.7
4	e7.5	e29	4.9	3.9	103	3.4	2.8	52	2.7	6.9	5.1	6.1
5	e96	e27	8.2	3.9	45	10	2.7	50	2.8	5.2	20	4.0
6	e9.7	e58	12	3.9	19	104	2.5	942	2.3	5.6	8.6	4.2
7	e56	e70	6.2	3.6	15	140	2.4	207	2.5	11	51	4.9
8	e10	e49	5.9	3.7	27	18	2.2	60	5.0	66	19	4.4
9	e7.1	e14	24	4.2	20	13	2.0	37	2.6	20	8.7	5.7
10	e28	e12	7.6	4.8	11	57	1.8	26	2.6	19	12	6.9
11	e47	e12	5.9	4.7	9.9	8.8	1.7	16	61	11	12	5.9
12	e31	e12	7.0	4.6	9.3	6.6	1.6	14	11	7.7	18	3.4
13	e74	e18	38	4.5	67	13	1.5	16	6.3	6.2	15	3.2
14	e16	e10	47	4.7	13	10	1.6	11	3.9	5.6	7.2	9.2
15	e14	9.9	33	4.9	22	30	1.7	8.8	3.0	5.5	5.4	13
16	e51	8.9	12	5.0	12	55	1.7	7.2	4.9	5.2	4.6	19
17	e12	8.1	11	5.1	8.5	72	4.0	6.3	4.2	6.0	4.1	11
18	e9.8	7.4	11	4.5	7.6	16	5.4	9.2	11	10	3.8	5.0
19	e8.5	6.8	23	4.7	7.0	9.5	4.6	37	27	17	4.0	16
20	e7.5	6.3	18	6.9	6.4	7.7	38	18	9.7	9.8	4.9	6.0
21	e7.3	5.7	12	75	5.9	6.7	20	8.8	13	6.6	3.9	4.0
22	e7.7	5.3	8.3	39	5.4	6.0	4.6	7.1	39	18	3.1	3.3
23	e6.6	5.0	21	7.5	5.2	5.5	2.7	5.8	14	5.9	3.0	2.9
24	e5.7	4.7	28	4.2	4.9	5.2	2.1	5.1	23	5.7	19	2.6
25	e6.8	4.4	9.8	3.3	5.2	5.0	9.9	4.6	9.1	6.5	5.2	2.4
26	e7.1	4.5	7.3	78	5.2	5.4	82	4.2	6.4	4.4	4.3	2.3
27	e33	e71	6.5	209	4.3	4.6	48	4.0	5.2	5.9	9.3	2.1
28	e49	e7.4	5.9	210	3.9	4.3	9.1	3.7	4.6	5.4	20	1.9
29	e8.4	8.1	6.5	373	---	4.9	9.5	3.5	4.0	8.8	9.4	1.9
30	e10	6.4	5.7	70	---	4.6	11	3.2	3.8	6.9	17	2.0
31	e25	---	5.5	83	---	3.8	---	2.9	---	5.2	12	---
TOTAL	693.9	540.9	409.5	1242.7	535.7	640.8	286.5	1580.1	292.2	358.0	319.8	172.5
MEAN	22.4	18.0	13.2	40.1	19.1	20.7	9.55	51.0	9.74	11.5	10.3	5.75
MAX	96	71	47	373	103	140	82	942	61	66	51	19
MIN	3.8	4.4	4.9	3.3	3.9	3.4	1.5	2.5	2.3	4.4	3.0	1.9
AC-FT	1380	1070	812	2460	1060	1270	568	3130	580	710	634	342

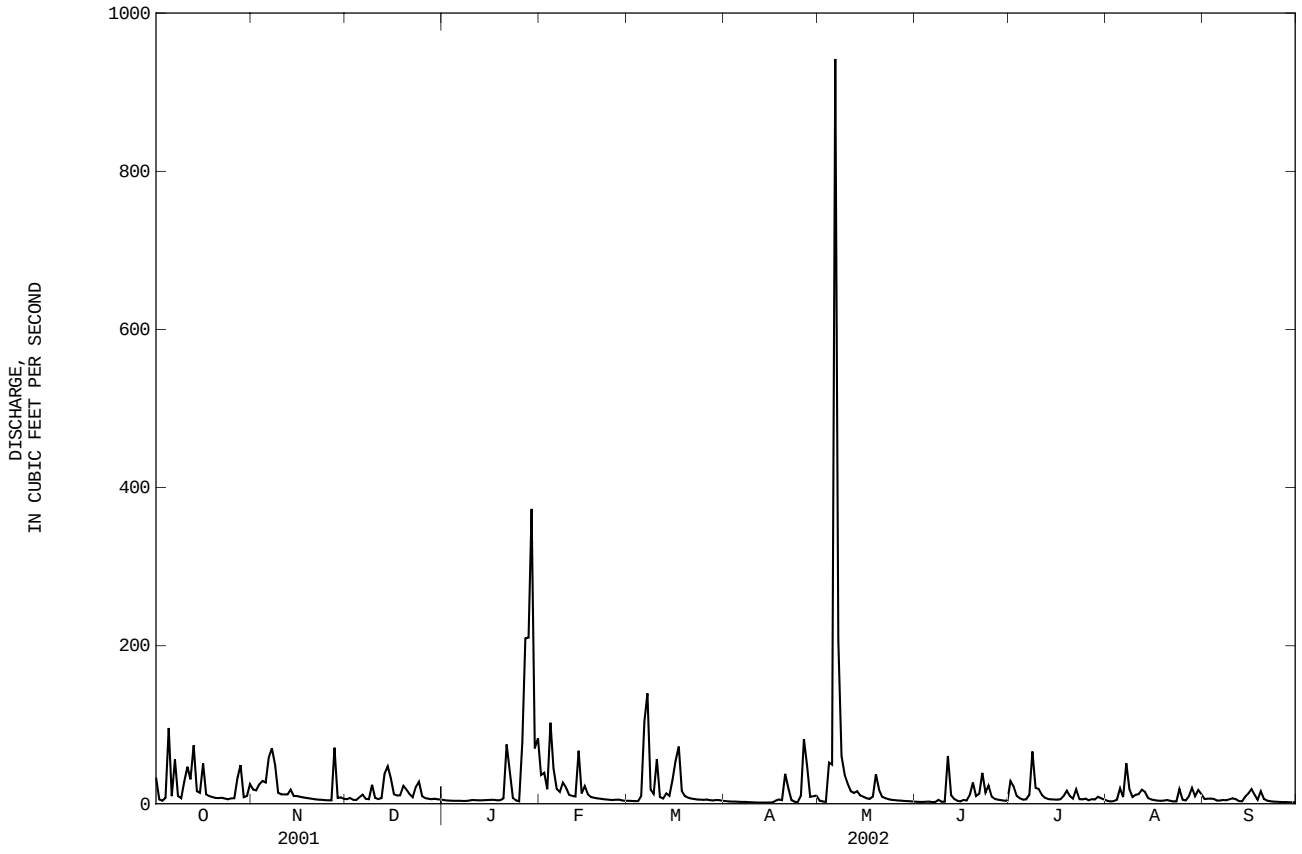
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1961 - 2002, BY WATER YEAR (WY)

MEAN	17.2	27.4	22.0	20.4	16.3	25.4	29.4	20.8	16.9	25.5	18.2	14.4
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	0.32	3.54	2.07	0.38	0.11	0.66	2.45	0.51	3.40	4.25	3.04	1.43
(WY)	1985	1963	1990	1986	1986	1983	1992	1992	1968	1968	1971	1975

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

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1961 - 2002	
ANNUAL TOTAL	5488.77		7072.6			
ANNUAL MEAN	15.0		19.4		21.0	
HIGHEST ANNUAL MEAN					37.2	1982
LOWEST ANNUAL MEAN					11.1	1984
HIGHEST DAILY MEAN	220	Jun 5	942	May 6	1050	Feb 1 1969
LOWEST DAILY MEAN	0.37	Feb 8	1.5	Apr 13	0.00	Dec 24 1960
ANNUAL SEVEN-DAY MINIMUM	0.52	Feb 2	1.7	Apr 10	0.00	Jan 19 1977
ANNUAL RUNOFF (AC-FT)	10890		14030		15240	
10 PERCENT EXCEEDS	38		41		48	
50 PERCENT EXCEEDS	8.4		6.9		8.9	
90 PERCENT EXCEEDS	2.3		3.0		1.9	

e Estimated



16211600 MAKAHA STREAM NEAR MAKAHA

LOCATION.--Lat 21°30'16", long 158°10'59", Hydrologic Unit 20060000, on right bank, 0.8 mi northeast of Kaneaki Heiau, and 2.9 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 benchmark).

REMARKS.--Records computed by Vaughn Kunishige. Records fair. Honolulu Board of Water Supply wells upstream of station may influence flows at gage. Recording rain gage located at station.

AVERAGE DISCHARGE.--43 years (water years 1960-2002), 1.72 ft^3/s (1,250 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 2,680 ft^3/s, November 14, 1996, gage height, 9.54 ft, from high-water profile of slope-area measurement; no flow at times.

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)
Mar 17	0900	*193	*3.04				

Minimum discharge, no flow on many days.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

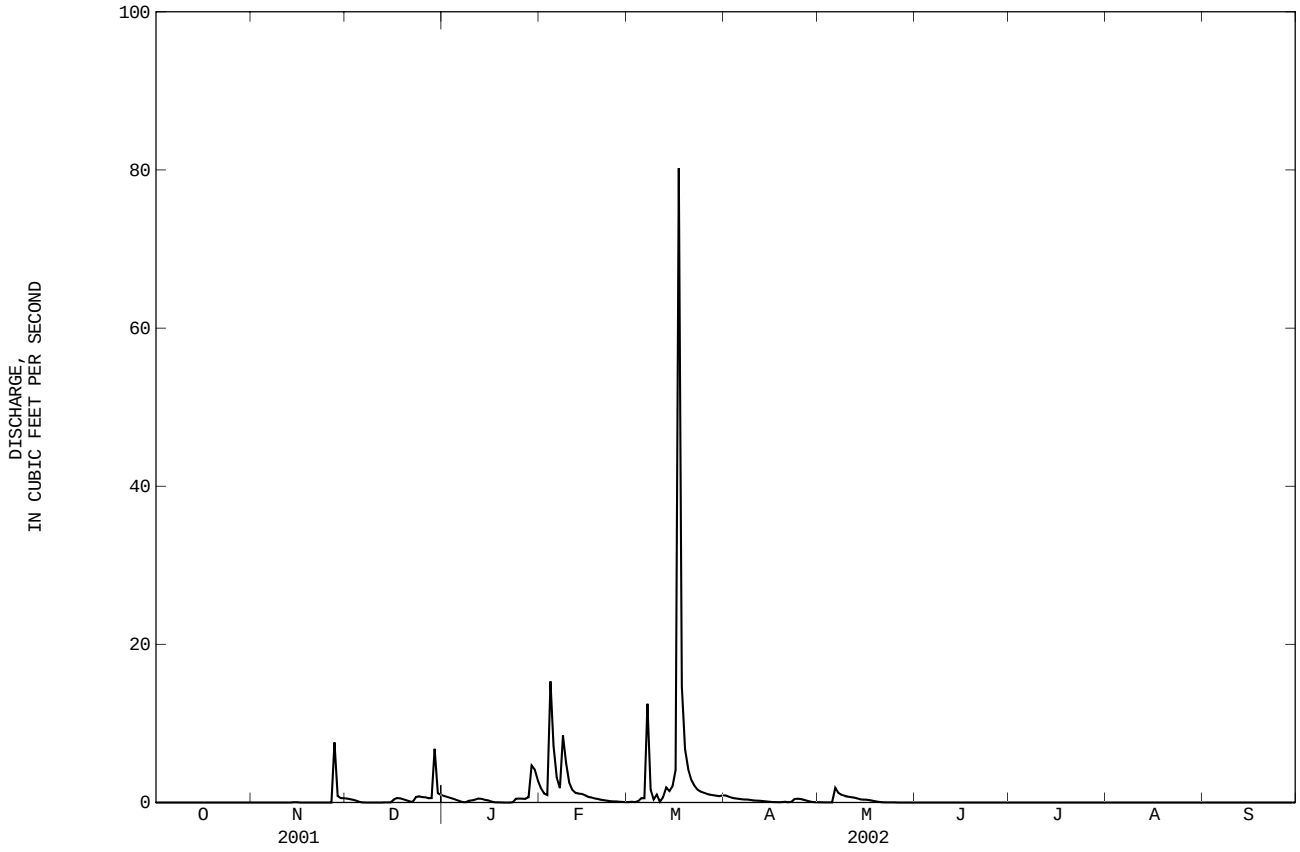
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.00	0.00	0.50	0.82	1.8	0.06	0.88	0.03	0.00	0.00	0.00	0.00
2	0.00	0.00	0.41	0.70	1.1	0.09	0.72	0.02	0.00	0.00	0.00	0.00
3	0.00	0.00	0.33	0.59	0.95	0.06	0.59	0.02	0.00	0.00	0.00	0.00
4	0.00	0.00	0.21	0.47	15	0.15	0.53	0.02	0.00	0.00	0.00	0.00
5	0.00	0.00	0.08	0.31	7.2	0.55	0.47	0.02	0.00	0.00	0.00	0.00
6	0.00	0.00	0.02	0.15	3.2	0.55	0.41	1.8	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.05	1.8	12	0.38	1.2	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.03	8.5	1.6	0.37	0.97	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.22	4.9	0.40	0.32	0.84	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.28	2.5	1.00	0.27	0.75	0.00	0.00	0.00	0.00
11	0.00	0.00	0.00	0.36	1.6	0.10	0.24	0.69	0.00	0.00	0.00	0.00
12	0.00	0.00	0.00	0.50	1.2	0.67	0.22	0.62	0.00	0.00	0.00	0.00
13	0.00	0.00	0.02	0.47	1.1	1.9	0.18	0.53	0.00	0.00	0.00	0.00
14	0.00	0.03	0.01	0.34	1.1	1.5	0.14	0.41	0.00	0.00	0.00	0.00
15	0.00	0.04	0.00	0.28	0.92	2.1	0.09	0.35	0.00	0.00	0.00	0.00
16	0.00	0.00	0.38	0.14	0.72	4.1	0.06	0.35	0.00	0.00	0.00	0.00
17	0.00	0.00	0.56	0.04	0.63	80	0.05	0.30	0.00	0.00	0.00	0.00
18	0.00	0.00	0.53	0.02	0.53	15	0.04	0.23	0.00	0.00	0.00	0.00
19	0.00	0.00	0.41	0.01	0.45	6.8	0.06	0.14	0.00	0.00	0.00	0.00
20	0.00	0.00	0.28	0.00	0.36	4.2	0.09	0.07	0.00	0.00	0.00	0.00
21	0.00	0.00	0.14	0.00	0.30	2.9	0.04	0.03	0.00	0.00	0.00	0.00
22	0.00	0.00	0.08	0.00	0.24	2.1	0.08	0.02	0.00	0.00	0.00	0.00
23	0.00	0.00	0.68	0.04	0.18	1.6	0.45	0.02	0.00	0.00	0.00	0.00
24	0.00	0.00	0.79	0.47	0.14	1.4	0.47	0.01	0.00	0.00	0.00	0.00
25	0.00	0.00	0.68	0.50	0.15	1.2	0.44	0.01	0.00	0.00	0.00	0.00
26	0.00	0.00	0.65	0.48	0.10	1.1	0.34	0.00	0.00	0.00	0.00	0.00
27	0.00	7.6	0.54	0.47	0.07	0.99	0.22	0.00	0.00	0.00	0.00	0.00
28	0.00	0.82	0.57	0.66	0.06	0.93	0.11	0.00	0.00	0.00	0.00	0.00
29	0.00	0.56	6.8	4.7	---	0.86	0.06	0.00	0.00	0.00	0.00	0.00
30	0.00	0.54	1.2	4.2	---	0.81	0.03	0.00	0.00	0.00	0.00	0.00
31	0.00	---	0.96	2.8	---	0.91	---	0.00	---	0.00	0.00	---
TOTAL	0.00	9.59	16.83	20.10	56.80	147.63	8.35	9.45	0.00	0.00	0.00	0.00
MEAN	0.000	0.32	0.54	0.65	2.03	4.76	0.28	0.30	0.000	0.000	0.000	0.000
MAX	0.00	7.6	6.8	4.7	15	80	0.88	1.8	0.00	0.00	0.00	0.00
MIN	0.00	0.00	0.00	0.00	0.06	0.06	0.03	0.00	0.00	0.00	0.00	0.00
AC-FT	0.00	19	33	40	113	293	17	19	0.00	0.00	0.00	0.00

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1959 - 2002, BY WATER YEAR (WY)

MEAN	0.67	1.84	2.73	3.97	3.09	3.00	2.44	1.35	0.57	0.45	0.33	0.34
MAX	3.66	20.6	15.0	22.7	16.3	11.5	15.7	5.33	1.72	1.31	1.44	2.19
(WY)	1983	1997	1965	1982	1976	1962	1963	1965	1978	1986	1983	1974
MIN	0.000	0.000	0.038	0.002	0.000	0.11	0.13	0.085	0.000	0.000	0.000	0.000
(WY)	1976	1995	1995	2001	2001	2001	1993	2000	2000	2000	1995	1961

16211600 MAKAHA STREAM NEAR MAKAHA--Continued

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1959 - 2002	
ANNUAL TOTAL	48.84		268.75			
ANNUAL MEAN	0.13		0.74		1.72	
HIGHEST ANNUAL MEAN					4.58	1997
LOWEST ANNUAL MEAN					0.073	2001
HIGHEST DAILY MEAN	7.6	Nov 27	80	Mar 17	283	Feb 7 1976
LOWEST DAILY MEAN	0.00	Jan 1	0.00	Oct 1	0.00	Sep 25 1960
ANNUAL SEVEN-DAY MINIMUM	0.00	Jan 1	0.00	Oct 1	0.00	Aug 28 1961
ANNUAL RUNOFF (AC-FT)	97		533		1250	
10 PERCENT EXCEEDS	0.46		1.1		3.3	
50 PERCENT EXCEEDS	0.00		0.00		0.50	
90 PERCENT EXCEEDS	0.00		0.00		0.00	



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 above mean sea level (from topographic map).

REMARKS.--Records computed by Vaughn Kunishige. Records fair except for estimated period which is poor. At times, a small amount of water is diverted from the gage pool for domestic use. Recording rain gage located at station.

AVERAGE DISCHARGE.--45 years (water years 1958-2002), 10.6 ft^3/s (7,670 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 6,370 ft^3/s, March 21, 1991, 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)
Jan 29	0130	1,440	7.94	May 6	0630	*4,770	*11.65

Minimum discharge, 0.20 ft^3/s, Sept. 28, gage height, 1.94 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	13	10	2.1	1.4	36	e1.8	e2.9	3.8	1.3	15	1.6	2.2
2	3.5	7.4	2.5	1.1	21	e1.7	e2.6	2.6	1.2	8.1	0.90	1.3
3	1.2	6.8	1.8	1.0	14	e1.6	e2.3	2.1	1.3	3.3	0.69	1.0
4	8.9	5.8	1.5	0.99	59	e1.6	e2.1	80	1.3	1.8	0.68	2.1
5	67	13	2.3	0.93	27	e7.0	2.0	40	1.1	1.3	3.4	0.96
6	9.3	24	4.7	0.88	14	e50	1.9	750	1.2	1.1	3.6	0.62
7	11	56	2.2	0.81	11	e80	1.8	151	1.2	1.1	4.2	1.1
8	4.3	36	1.7	0.72	19	e15	1.7	44	1.0	4.6	2.7	0.76
9	2.2	9.4	2.9	0.63	16	e9.5	1.6	24	0.85	4.1	1.3	0.50
10	1.9	6.2	1.9	0.72	8.4	e20	1.6	17	0.89	4.3	1.1	0.52
11	4.4	4.6	1.5	0.69	7.1	e6.4	1.5	10	12	4.1	8.9	0.67
12	2.8	3.7	1.8	0.63	6.5	e4.0	1.4	10	2.7	1.6	10	0.47
13	4.0	3.4	20	0.61	22	e9.6	1.4	12	1.3	1.0	5.3	0.45
14	3.2	3.2	41	0.59	9.4	e7.0	1.4	7.1	0.97	0.79	2.6	0.40
15	1.6	2.5	31	0.68	16	e19	1.4	8.4	0.84	0.69	1.5	0.48
16	1.4	2.1	7.9	0.77	e8.9	e27	1.3	4.7	0.74	0.66	1.2	1.2
17	1.5	1.8	4.6	0.75	e6.0	e33	1.7	3.8	0.75	0.65	0.76	0.88
18	1.1	1.6	3.5	1.5	e5.0	e16	2.8	4.1	2.2	0.82	0.56	0.62
19	0.87	1.5	3.7	2.0	e4.5	e11	4.0	13	8.8	15	0.52	15
20	0.69	1.4	11	3.5	e4.0	9.0	40	8.5	3.8	4.5	0.61	2.2
21	0.69	1.3	6.1	24	e3.5	7.2	13	4.7	2.6	2.5	0.78	0.99
22	1.0	1.2	3.2	7.6	e3.0	6.0	4.1	3.5	18	7.8	0.51	0.59
23	1.0	1.1	15	4.0	e2.7	5.2	2.7	2.9	5.7	2.1	0.43	0.40
24	0.70	1.0	19	1.9	e2.6	4.8	2.4	2.5	5.3	1.4	0.41	0.30
25	0.59	1.0	4.9	1.3	e2.7	4.3	5.8	2.2	2.7	1.3	2.0	0.29
26	0.67	1.0	2.9	51	e2.7	4.5	16	2.1	1.5	1.1	2.6	0.31
27	68	80	2.3	123	e2.2	4.2	14	1.9	1.1	0.86	2.8	0.36
28	71	9.0	1.8	205	e1.9	4.1	7.6	1.9	0.87	1.8	1.4	0.30
29	10	3.7	2.5	262	---	4.5	10	1.7	0.71	1.6	1.9	0.29
30	7.9	2.6	2.5	66	---	e4.1	10	1.5	0.68	6.0	7.1	0.34
31	11	---	1.7	86	---	e3.3	---	1.4	---	5.7	7.5	---
TOTAL	316.41	302.3	211.5	852.70	336.1	382.4	163.0	1222.4	84.60	106.67	79.55	37.60
MEAN	10.2	10.1	6.82	27.5	12.0	12.3	5.43	39.4	2.82	3.44	2.57	1.25
MAX	71	80	41	262	59	80	40	750	18	15	10	15
MIN	0.59	1.0	1.5	0.59	1.9	1.6	1.3	1.4	0.68	0.65	0.41	0.29
AC-FT	628	600	420	1690	667	758	323	2420	168	212	158	75

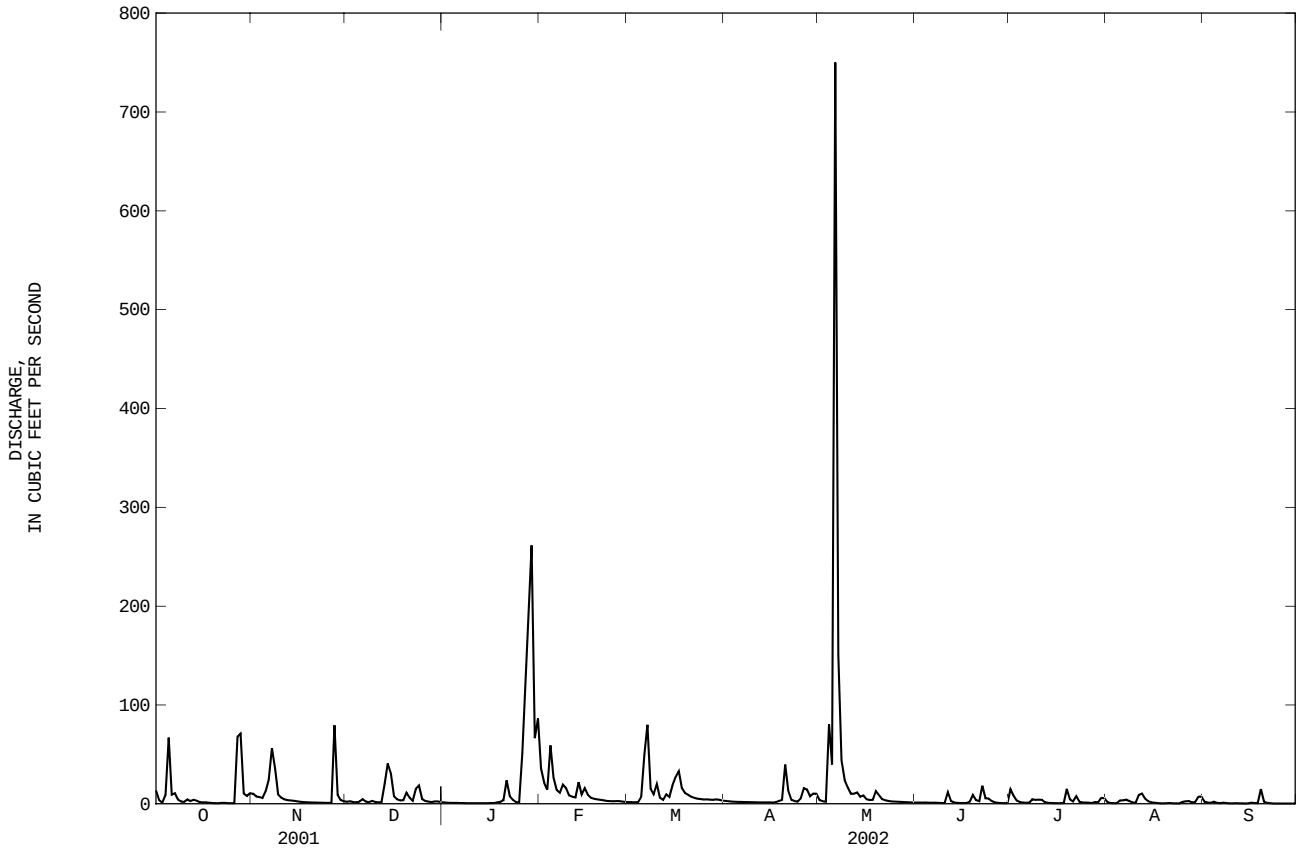
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1957 - 2002, BY WATER YEAR (WY)

MEAN	9.68	14.6	12.3	11.5	9.75	15.4	14.7	9.43	5.63	9.62	8.00	5.81
MAX	49.6	61.8	42.2	32.1	54.4	98.4	60.9	39.4	21.9	28.1	37.5	23.6
(WY)	1982	1966	1988	1989	1969	1991	1963	2002	1978	1989	1958	1994
MIN	0.84	0.23	0.83	0.17	0.19	0.021	0.33	0.39	0.16	0.47	0.30	0.49
(WY)	1958	1963	1990	1977	1978	1983	1966	1992	1959	1968	1971	1998

16212800 KIPAPA STREAM NEAR WAHIAWA--Continued

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1957 - 2002	
ANNUAL TOTAL	2445.94		4095.23			
ANNUAL MEAN	6.70		11.2		10.6	
HIGHEST ANNUAL MEAN					25.2	1982
LOWEST ANNUAL MEAN					3.85	1998
HIGHEST DAILY MEAN	100	Apr 25	750	May 6	852	Apr 15 1963
LOWEST DAILY MEAN	0.06	Jan 27	0.29	Sep 25	0.00	Jun 18 1959
ANNUAL SEVEN-DAY MINIMUM	0.13	Jan 18	0.31	Sep 24	0.00	Jun 18 1959
ANNUAL RUNOFF (AC-FT)	4850		8120		7670	
10 PERCENT EXCEEDS	15		19		24	
50 PERCENT EXCEEDS	1.8		2.6		2.8	
90 PERCENT EXCEEDS	0.36		0.69		0.37	

e Estimated



16213000 WAIKELE STREAM AT WAIPAHU

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 former sugar refinery at Waipahu.

DRAINAGE AREA.--45.7 mi^2.

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 (by stadia survey). Prior to July 1, 1960, at site 300 ft downstream at datum 1.30 ft higher.

REMARKS.--Records computed by Vaughn Kunishige. Records poor.

AVERAGE DISCHARGE.--49 years (water years 1953-59, 1961-2002), 39.8 ft^3/s (28,850 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 13,600 ft^3/s, November 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 February 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)
Nov 27	0400	3,000	6.48	Mar 7	1659	2,490	5.99
Jan 27	0145	1,830	5.33	Mar 13	1549	1,450	4.92
Jan 29	0300	4,080	7.37	May 6	unknown	*5,630	*8.56

Minimum daily discharge, 8.2 ft^3/s, Mar. 5.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	11	33	20	13	101	10	11	14	16	13	15	15
2	21	26	20	11	47	9.8	10	11	15	23	13	13
3	13	22	19	9.8	33	11	10	11	17	15	13	12
4	12	21	18	11	66	11	9.5	97	16	13	14	12
5	70	24	17	10	79	8.2	9.7	59	17	12	12	11
6	39	34	25	11	33	123	10	e2200	16	13	13	11
7	19	56	21	10	25	397	9.8	e450	15	12	21	11
8	20	220	18	10	35	86	10	e135	14	12	16	11
9	13	45	18	10	43	35	9.5	e75	13	16	14	10
10	13	31	18	10	21	132	9.7	e50	12	15	15	11
11	12	24	14	10	18	29	10	e33	16	17	16	11
12	13	23	15	10	16	21	10	e32	17	16	21	9.9
13	11	20	60	11	40	152	9.8	e36	14	14	16	11
14	16	19	53	10	27	34	9.6	e28	13	13	16	11
15	15	18	69	11	21	23	9.2	26	13	13	14	11
16	14	18	32	11	27	171	9.4	22	13	13	13	11
17	13	15	22	10	17	154	9.4	20	13	12	13	11
18	13	16	20	20	16	51	9.2	18	13	13	12	10
19	13	15	18	16	14	30	18	22	14	14	12	13
20	12	14	17	22	12	23	82	24	18	22	12	16
21	13	15	24	43	13	20	52	23	15	16	12	11
22	11	14	17	34	12	18	16	20	24	16	11	11
23	13	13	16	24	12	17	12	19	25	15	12	10
24	12	12	34	15	11	16	10	17	18	12	13	10
25	41	12	26	12	11	15	9.5	18	16	12	12	10
26	15	13	17	148	9.9	14	12	18	14	12	12	10
27	46	586	15	478	9.5	14	32	18	14	12	11	11
28	196	65	13	339	11	13	16	16	14	13	11	11
29	41	31	28	1000	---	18	13	18	13	12	11	10
30	23	23	15	144	---	14	18	16	12	20	11	11
31	22	---	14	140	---	13	---	15	---	20	16	---
TOTAL	796	1478	733	2613.8	780.4	1683.0	466.3	3561	460	451	423	336.9
MEAN	25.7	49.3	23.6	84.3	27.9	54.3	15.5	115	15.3	14.5	13.6	11.2
MAX	196	586	69	1000	101	397	82	2200	25	23	21	16
MIN	11	12	13	9.8	9.5	8.2	9.2	11	12	12	11	9.9
AC-FT	1580	2930	1450	5180	1550	3340	925	7060	912	895	839	668

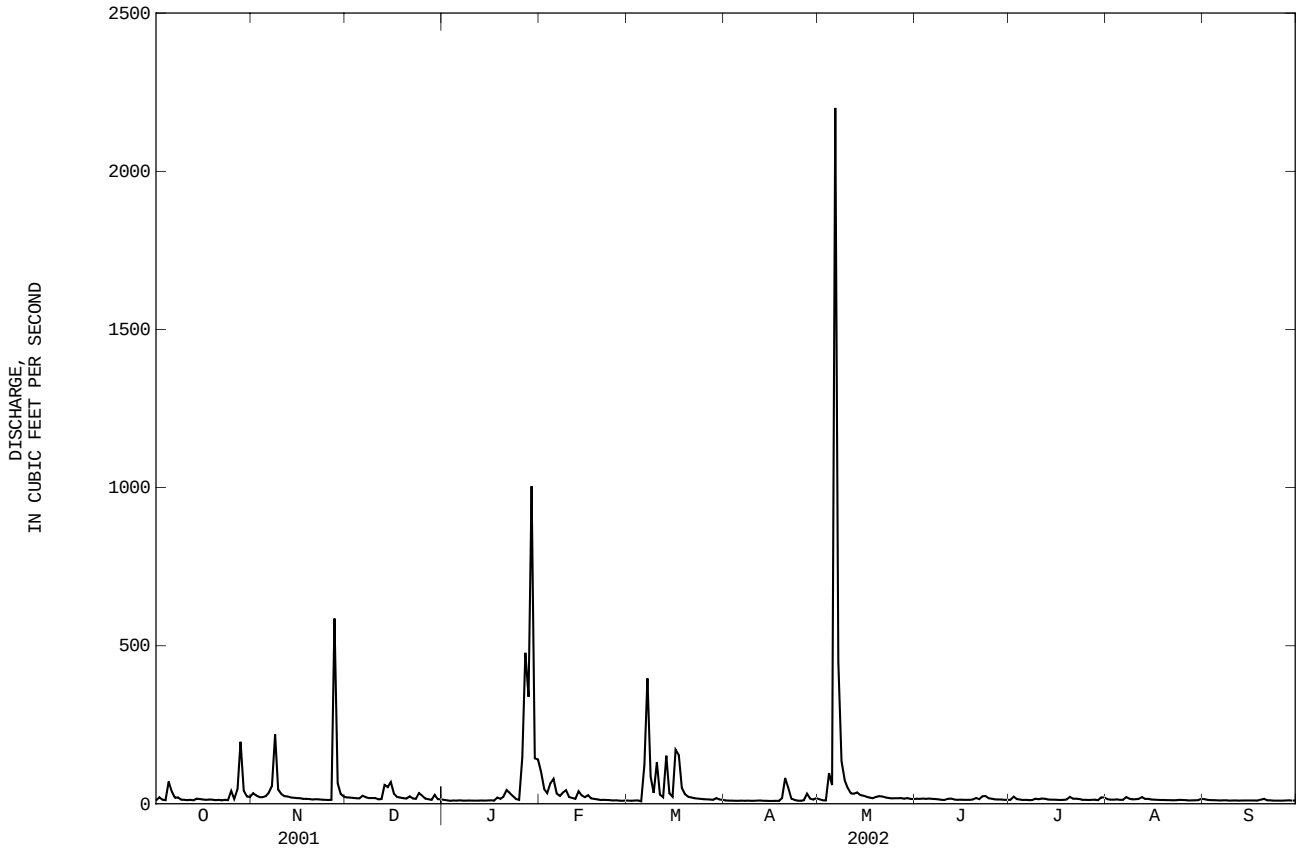
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1953 - 2002, BY WATER YEAR (WY)

MEAN	32.3	49.4	48.8	59.6	52.5	52.7	48.4	33.7	23.8	28.9	25.7	22.1
MAX	97.8	198	146	222	179	195	235	115	51.5	76.8	90.0	68.1
(WY)	1992	1966	1966	1969	1955	1991	1963	2002	1980	1989	1958	1994
MIN	7.22	12.2	13.3	14.7	7.72	6.13	15.5	14.9	10.6	9.08	7.50	6.28
(WY)	1978	1954	1954	1986	1978	1978	2002	1954	1981	1985	1984	1975

16213000 WAIKELE STREAM AT WAIPAHU--Continued

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1953 - 2002	
ANNUAL TOTAL	9315.1		13782.4			
ANNUAL MEAN	25.5		37.8		39.8	
HIGHEST ANNUAL MEAN					77.3	1969
LOWEST ANNUAL MEAN					18.5	1954
HIGHEST DAILY MEAN	586	Nov 27	2200	May 6	2590	Mar 21 1991
LOWEST DAILY MEAN	8.4	Jul 21	8.2	Mar 5	0.61	Feb 25 1978
ANNUAL SEVEN-DAY MINIMUM	11	Sep 21	9.5	Apr 12	2.5	Feb 24 1978
ANNUAL RUNOFF (AC-FT)	18480		27340		28850	
10 PERCENT EXCEEDS	39		46		62	
50 PERCENT EXCEEDS	16		15		24	
90 PERCENT EXCEEDS	12		10		12	

e Estimated



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 (State of Hawaii benchmark).

REMARKS.--Records computed by V.E. Kunishige. Records poor. Occasional small irrigation diversion and return flow upstream.

AVERAGE DISCHARGE.--50 years (water years 1953-2002), 32.8 ft^3/s (23,760 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 27,900 ft^3/s, October 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, 1.0 ft^3/s, October 24, 2001, September 22, 2002.

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)
Jan 27	0215	3,820	12.34	May 6	0645	*9,680	*17.19
Jan 29	0200	8,450	16.37				

Minimum daily discharge, 1.1 ft^3/s, Oct. 24, and estimated periods June 28 - July 1, and July 14 - 18.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.4	6.0	e2.1	e1.7	e35	e2.3	e3.9	e3.8	e1.6	e1.1	1.2	2.6
2	1.6	3.5	e2.0	e1.7	e13	e2.2	e3.5	e3.2	e1.6	e2.9	1.2	1.9
3	1.6	3.7	e2.1	e1.6	e11	e2.1	e3.2	e25	e1.7	e1.8	1.2	1.7
4	1.4	3.6	e2.1	e1.6	e101	e2.0	e2.9	94	e1.8	e1.5	1.2	1.6
5	140	10	e2.0	e1.5	e23	e5.9	e2.7	61	e1.5	e1.3	1.2	1.6
6	25	43	e2.2	e1.5	e8.8	e193	e2.6	2380	e1.6	e1.2	1.2	1.7
7	30	174	e1.7	e1.5	e8.0	e74	e2.5	453	e1.7	e1.2	1.2	1.7
8	19	174	e1.6	e1.4	e10	e12	e2.3	e53	e1.5	e1.2	1.2	1.6
9	e3.9	19	e1.5	e1.4	e8.4	e17	e2.2	e29	e1.3	e1.8	1.2	1.6
10	e2.0	8.2	e1.5	e1.4	e7.2	e75	e2.0	e20	e1.2	e1.6	1.2	1.6
11	e2.7	4.3	e1.5	1.3	e6.9	e8.7	e1.9	e13	e1.3	e1.7	1.2	1.7
12	e8.7	e2.8	e2.1	1.3	e6.7	e7.0	e1.8	e13	e1.4	e1.3	e1.8	1.5
13	e4.6	e2.6	e55	1.2	e9.6	e8.1	e1.8	e15	e1.5	e1.2	e1.4	1.3
14	e4.8	e2.6	71	1.3	e7.2	e7.3	e1.7	e9.0	e1.4	e1.1	e1.3	1.3
15	e2.4	e2.4	84	1.3	e8.0	e7.0	e1.7	e11	e1.3	e1.1	e1.2	1.3
16	e1.7	e2.2	e13	1.3	e7.1	e115	e1.7	e5.8	e1.2	e1.1	e1.2	1.3
17	e1.5	e2.2	e3.9	1.3	e6.5	e111	e1.8	e4.8	e1.2	e1.1	e1.2	1.3
18	e1.4	e2.1	e2.4	5.4	e5.7	e10	e1.8	e5.0	e1.6	e1.1	e1.2	1.3
19	e1.3	e2.1	e1.8	2.6	e5.0	e8.8	e1.8	e17	e2.1	e3.0	e1.2	1.3
20	e1.2	e2.1	e3.2	1.8	e4.8	e8.9	e4.0	e11	e1.5	e1.8	e1.2	1.3
21	e1.3	e2.0	e5.1	39	e4.3	e7.9	e13	e5.7	e1.4	e1.5	e1.4	1.3
22	e1.2	e2.0	e1.9	23	e3.7	e7.4	e8.0	e4.5	e2.5	e2.4	e1.3	1.3
23	e1.2	e1.9	e50	8.7	e3.5	e7.1	e4.0	e3.5	e2.2	e1.4	e1.2	1.3
24	1.1	e1.9	31	3.5	e3.2	e6.7	e3.2	e3.0	e1.6	e1.3	e1.2	1.3
25	33	e1.9	e5.5	2.3	e3.2	e5.8	e5.0	e2.7	e1.4	e1.3	e1.2	1.3
26	1.5	e3.1	e2.2	291	e3.0	e5.5	e11	e2.5	e1.3	1.3	e1.5	1.3
27	27	307	e1.9	712	e2.8	e5.2	e6.0	e2.4	e1.2	1.3	e1.6	1.3
28	268	29	e1.9	380	e2.6	e5.0	e4.2	e2.3	e1.1	1.2	e1.3	1.2
29	22	e3.9	e2.5	1560	---	e5.4	e6.0	e2.0	e1.1	1.2	e1.4	1.2
30	6.2	e2.3	e1.8	147	---	e4.9	e4.5	e1.8	e1.1	1.2	e4.0	1.2
31	3.4	---	e1.7	172	---	e4.5	---	1.6	---	1.2	e10	---
TOTAL	622.1	825.4	362.2	3372.6	319.2	742.7	112.7	3258.6	44.9	45.4	51.0	43.9
MEAN	20.1	27.5	11.7	109	11.4	24.0	3.76	105	1.50	1.46	1.65	1.46
MAX	268	307	84	1560	101	193	13	2380	2.5	3.0	10	2.6
MIN	1.1	1.9	1.5	1.2	2.6	2.0	1.7	1.6	1.1	1.1	1.2	1.2
AC-FT	1230	1640	718	6690	633	1470	224	6460	89	90	101	87

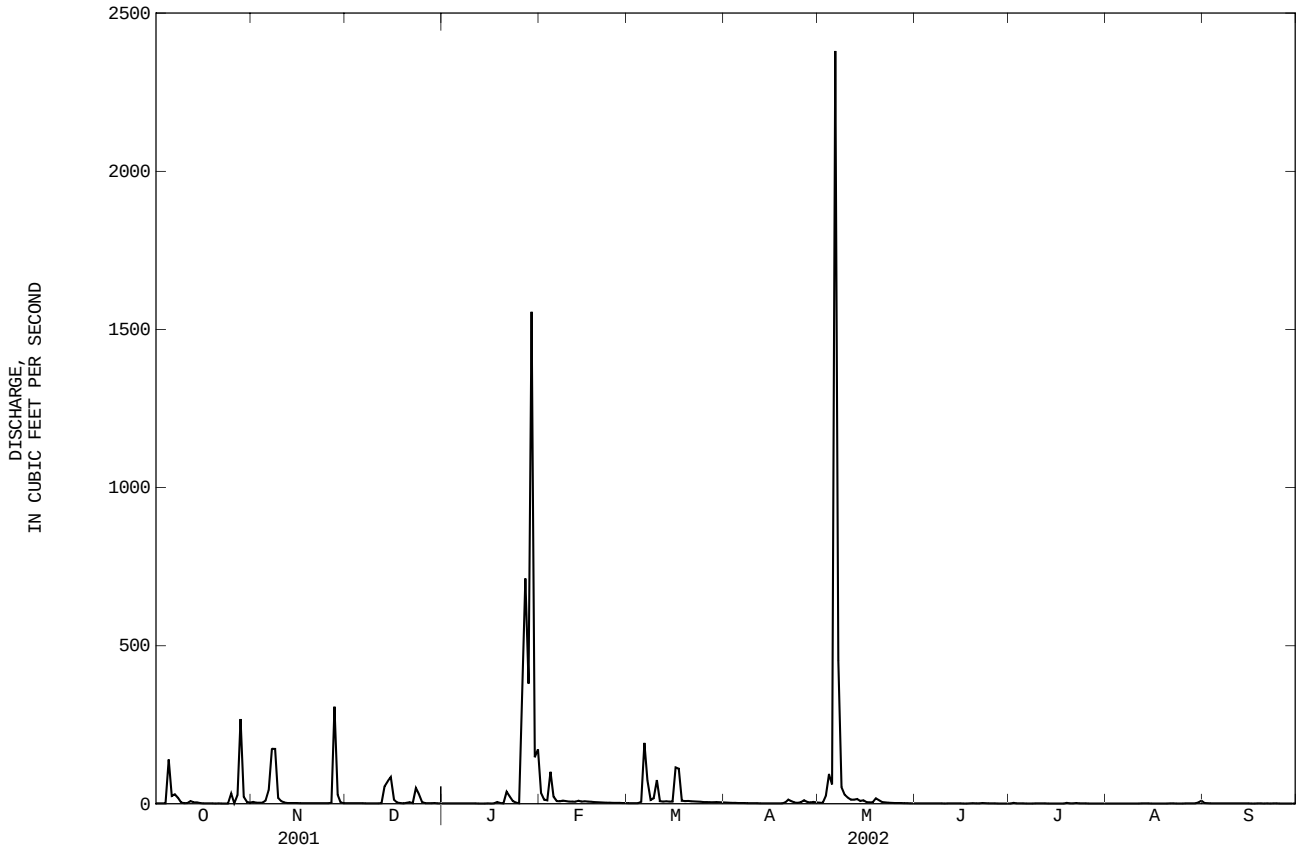
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1952 - 2002, BY WATER YEAR (WY)

MEAN	27.9	52.2	43.1	45.3	35.9	50.1	39.6	24.1	14.9	25.6	20.6	13.7
MAX	131	295	351	199	208	336	241	131	72.9	149	128	104
(WY)	1967	1997	1988	1969	1955	1980	1974	1965	1987	1970	1982	1992
MIN	1.55	2.54	1.69	1.39	1.66	1.43	1.75	1.44	1.43	1.40	1.28	1.28
(WY)	1985	1990	2001	2001	1986	2000	1992	2000	1984	1984	1984	1984

16216000 WAIAWA STREAM NEAR PEARL CITY--Continued

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1952 - 2002	
ANNUAL TOTAL	4434.75		9800.7			
ANNUAL MEAN	12.2		26.9		32.8	
HIGHEST ANNUAL MEAN					80.8	1982
LOWEST ANNUAL MEAN					7.56	1984
HIGHEST DAILY MEAN	307	Nov 27	2380	May 6	5150	Mar 24 1994
LOWEST DAILY MEAN	0.89	Mar 11	1.1	Oct 24	0.89	Mar 11 2001
ANNUAL SEVEN-DAY MINIMUM	0.96	Mar 10	1.1	Jul 12	0.96	Mar 10 2001
ANNUAL RUNOFF (AC-FT)	8800		19440		23760	
10 PERCENT EXCEEDS	27		25		46	
50 PERCENT EXCEEDS	2.2		2.1		6.2	
90 PERCENT EXCEEDS	1.3		1.2		1.9	

e Estimated



HAWAII, ISLAND OF OAHU

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 above mean sea level (from topographic map).

REMARKS.--Records computed by Vaughn Kunishige. Records fair. Recording rain gage located at station.

AVERAGE DISCHARGE.--52 years (water years 1930-32, 1954-2002), 5.15 ft^3/s (3,730 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 6,650 ft^3/s, February 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 430 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Jan 27	0000	644	9.02	May 6	1200	*689	*9.15
Jan 29	0015	531	8.67				

Minimum discharge, no flow on many days.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

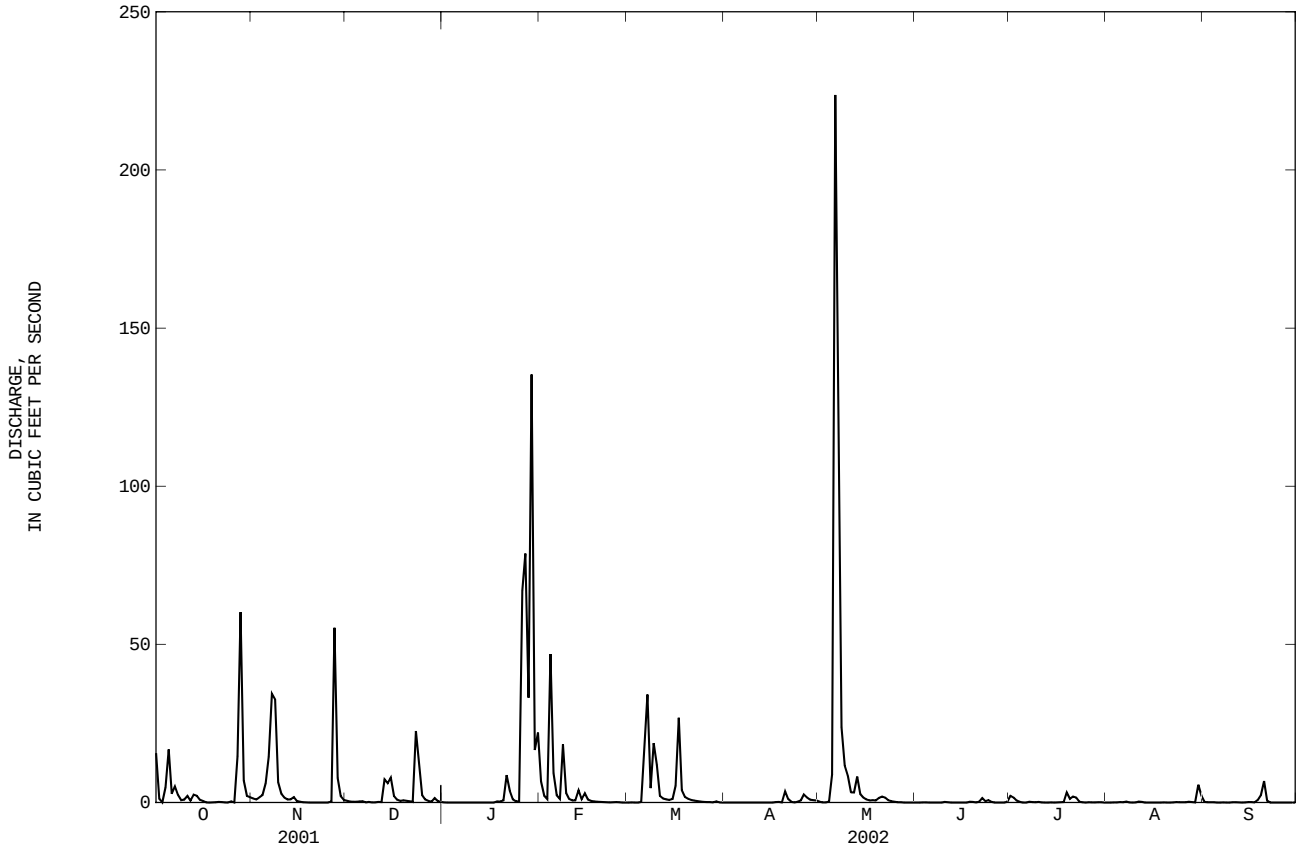
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	16	1.3	0.57	0.06	6.7	0.00	0.00	0.22	0.00	2.1	0.00	0.20
2	1.2	0.93	0.27	0.01	2.2	0.05	0.00	0.04	0.00	1.5	0.00	0.07
3	0.04	1.6	0.25	0.00	1.1	0.00	0.00	0.03	0.01	0.60	0.03	0.09
4	4.8	2.3	0.22	0.00	47	0.00	0.01	0.27	0.02	0.18	0.02	0.08
5	17	6.1	0.34	0.00	9.3	0.19	0.00	8.8	0.00	0.01	0.14	0.00
6	2.8	14	0.41	0.00	2.3	16	0.00	224	0.00	0.00	0.09	0.00
7	5.1	34	0.04	0.00	1.2	34	0.00	114	0.00	0.22	0.31	0.05
8	2.4	33	0.21	0.00	18	4.5	0.00	24	0.00	0.14	0.03	0.00
9	0.75	6.4	0.04	0.00	3.0	19	0.00	12	0.00	0.08	0.00	0.00
10	0.91	2.8	0.02	0.00	1.1	12	0.00	8.6	0.19	0.20	0.01	0.11
11	2.0	1.5	0.19	0.00	0.66	2.1	0.00	3.2	0.09	0.01	0.29	0.06
12	0.61	0.93	0.15	0.00	0.69	1.3	0.00	3.2	0.00	0.00	0.20	0.01
13	2.5	1.0	7.3	0.00	3.9	1.0	0.00	8.2	0.00	0.00	0.00	0.00
14	2.1	1.7	6.1	0.00	1.1	0.79	0.00	2.7	0.00	0.03	0.00	0.02
15	0.83	0.51	7.9	0.00	2.9	1.1	0.00	1.5	0.00	0.00	0.00	0.12
16	0.45	0.26	2.1	0.00	0.90	5.3	0.00	0.96	0.00	0.01	0.00	0.12
17	0.03	0.09	0.89	0.00	0.50	27	0.12	0.62	0.00	0.07	0.00	0.03
18	0.00	0.01	0.49	0.33	0.34	3.9	0.18	0.74	0.24	0.12	0.00	0.75
19	0.02	0.00	0.68	0.27	0.25	1.8	0.05	0.66	0.21	3.2	0.05	2.3
20	0.09	0.00	0.54	0.65	0.19	1.1	3.5	1.4	0.06	1.2	0.00	6.7
21	0.19	0.00	0.39	8.6	0.12	0.79	1.1	1.9	0.23	1.9	0.00	0.61
22	0.11	0.00	0.20	3.7	0.08	0.60	0.21	1.5	1.4	1.6	0.03	0.00
23	0.05	0.00	23	0.98	0.05	0.44	0.01	0.72	0.39	0.24	0.12	0.00
24	0.00	0.00	12	0.31	0.07	0.31	0.22	0.39	0.73	0.07	0.06	0.00
25	0.35	0.00	2.3	0.38	0.14	0.20	0.63	0.26	0.17	0.00	0.07	0.00
26	0.00	0.30	0.96	67	0.07	0.13	2.5	0.11	0.00	0.11	0.10	0.00
27	15	55	0.48	79	0.00	0.12	1.5	0.07	0.00	0.05	0.22	0.00
28	60	7.8	0.24	33	0.00	0.05	0.89	0.01	0.00	0.02	0.15	0.00
29	7.0	2.0	1.4	135	---	0.32	0.76	0.00	0.00	0.11	0.03	0.00
30	2.1	0.81	0.46	17	---	0.05	0.65	0.00	0.26	0.08	5.6	0.00
31	1.6	---	0.21	22	---	0.01	---	0.00	---	0.00	2.2	---
TOTAL	146.03	174.34	70.35	368.29	103.86	134.15	12.33	420.10	4.00	13.85	9.75	11.32
MEAN	4.71	5.81	2.27	11.9	3.71	4.33	0.41	13.6	0.13	0.45	0.31	0.38
MAX	60	55	23	135	47	34	3.5	224	1.4	3.2	5.6	6.7
MIN	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AC-FT	290	346	140	731	206	266	24	833	7.9	27	19	22

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1929 - 2002, BY WATER YEAR (WY)

MEAN	3.38	7.62	7.38	6.59	7.35	7.69	6.85	4.68	1.81	3.48	3.49	2.07
MAX	16.3	50.6	35.0	26.0	76.3	37.8	33.3	30.1	7.86	23.0	21.6	17.1
(WY)	1959	1966	1930	1988	1932	1968	1932	1965	1932	1954	1982	1931
MIN	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
(WY)	1933	1954	1990	1977	1931	1931	1931	1931	1931	1953	1962	1953

16226000 NORTH HALAWA STREAM NEAR AIEA--Continued

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1929 - 2002	
ANNUAL TOTAL	800.76		1468.37			
ANNUAL MEAN	2.19		4.02		5.15	
HIGHEST ANNUAL MEAN					15.7	1932
LOWEST ANNUAL MEAN					1.41	1984
HIGHEST DAILY MEAN	60	Oct 28	224	May 6	956	Nov 18 1930
LOWEST DAILY MEAN	0.00	Jan 1	0.00	Oct 18	0.00	Sep 14 1929
ANNUAL SEVEN-DAY MINIMUM	0.00	Jan 1	0.00	Nov 19	0.00	Sep 14 1929
ANNUAL RUNOFF (AC-FT)	1590		2910		3730	
10 PERCENT EXCEEDS	5.0		6.8		11	
50 PERCENT EXCEEDS	0.21		0.20		0.36	
90 PERCENT EXCEEDS	0.00		0.00		0.00	



212353157533001 NORTH HALAWA VALLEY HIGHWAY STORM DRAIN C NEAR AIEA

LOCATION.--Lat 21°23'53", long 157°53'30", Hydrologic Unit 2006000, on manhole 6.1 mi west of Kaneohe Elementary School, 1.65 mi northeast of Halawa Prison, and 1.05 mi east of Keaiwa Heiau.

PERIOD OF RECORD.--September 1998 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 336.22 ft from Hawaii State Department of Transportation levels.

REMARKS.--Records computed by Vaughn Kunishige. Records poor.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 37 ft^3/s, October 29, 2000, gage height, 4.63 ft, no flow at times during the year.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 30 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
May 6	1113	*32	*4.27	No other peak greater than base discharge.			

Minimum discharge, no flow on many days.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.83	0.11	0.10	0.00	0.14	0.00	0.00	0.06	0.00	0.59	0.01	0.10
2	0.00	0.20	0.00	0.00	0.02	0.15	0.00	0.00	0.02	0.29	0.06	0.09
3	0.02	0.24	0.04	0.00	0.01	0.00	0.00	0.05	0.07	0.13	0.10	0.19
4	0.32	0.25	0.04	0.00	1.7	0.07	0.25	0.41	0.07	0.04	0.06	0.03
5	0.69	0.16	0.14	0.00	0.12	0.58	0.02	1.3	0.03	0.00	0.21	0.02
6	0.13	0.53	0.15	0.05	0.07	1.1	0.00	3.5	0.07	0.02	0.19	0.04
7	0.61	0.98	0.00	0.01	0.00	0.90	0.05	1.5	0.07	0.30	0.28	0.13
8	0.01	0.20	0.13	e0.00	0.86	0.00	0.00	0.36	0.00	0.21	0.06	0.00
9	0.01	0.00	0.00	e0.00	0.01	0.88	0.00	0.23	0.00	0.16	0.03	0.02
10	0.37	0.03	0.02	e0.00	0.00	0.02	0.00	0.17	0.40	0.29	0.05	0.22
11	0.27	0.00	0.12	0.00	0.00	0.00	0.00	0.00	0.16	0.06	0.40	0.09
12	0.00	0.01	0.04	0.00	0.55	0.00	0.00	0.48	0.00	0.00	e0.22	0.08
13	0.51	0.15	0.00	0.00	0.51	0.13	0.00	0.17	0.03	0.00	e0.00	0.00
14	0.00	0.00	e0.15	0.00	0.02	0.08	0.01	0.00	0.03	0.12	0.07	0.18
15	0.17	0.00	e0.40	0.00	0.49	0.16	0.01	0.00	0.04	0.05	0.00	0.20
16	0.11	0.00	e0.02	0.01	0.02	0.51	0.03	0.00	0.06	0.06	0.01	0.24
17	0.00	0.00	e0.01	0.01	0.00	1.0	0.22	0.00	0.07	0.20	0.01	0.08
18	0.00	0.01	e0.00	0.08	0.00	0.00	0.25	0.27	0.39	0.24	0.01	0.56
19	0.09	e0.00	0.00	0.05	0.00	0.00	0.09	0.16	0.32	0.59	0.13	0.09
20	0.06	e0.00	0.00	0.11	0.02	0.00	0.79	0.22	0.17	0.00	0.05	0.15
21	0.13	e0.00	0.00	0.16	0.00	0.00	0.02	0.33	0.41	0.43	0.00	0.00
22	0.12	e0.00	0.00	0.04	0.00	0.00	0.02	0.02	0.44	0.12	0.14	0.00
23	0.07	e0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.15	0.00	0.23	0.00
24	0.02	e0.00	0.00	0.00	0.07	0.00	0.27	0.00	0.18	0.04	0.12	0.00
25	0.32	e0.00	0.00	0.28	0.23	0.00	0.51	0.03	0.00	0.00	0.19	0.00
26	0.00	e0.10	0.00	3.0	0.11	0.00	0.51	0.00	0.00	0.27	0.16	0.03
27	1.4	1.4	0.00	1.2	0.00	0.02	0.20	0.03	0.01	0.07	0.29	0.00
28	0.82	0.01	0.00	1.3	0.01	0.00	0.06	0.00	0.00	0.14	0.21	0.00
29	0.00	0.05	0.00	2.1	---	0.25	0.21	0.00	0.00	0.16	0.06	0.05
30	0.03	0.02	0.00	0.74	---	0.00	0.00	0.00	0.42	0.11	0.65	0.01
31	0.24	---	0.00	1.0	---	0.00	---	0.00	---	0.00	0.07	---
TOTAL	7.35	4.45	1.36	10.14	4.96	5.85	3.52	9.29	3.61	4.69	4.07	2.60
MEAN	0.24	0.15	0.044	0.33	0.18	0.19	0.12	0.30	0.12	0.15	0.13	0.087
MAX	1.4	1.4	0.40	3.0	1.7	1.1	0.79	3.5	0.44	0.59	0.65	0.56
MIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AC-FT	15	8.8	2.7	20	9.8	12	7.0	18	7.2	9.3	8.1	5.2

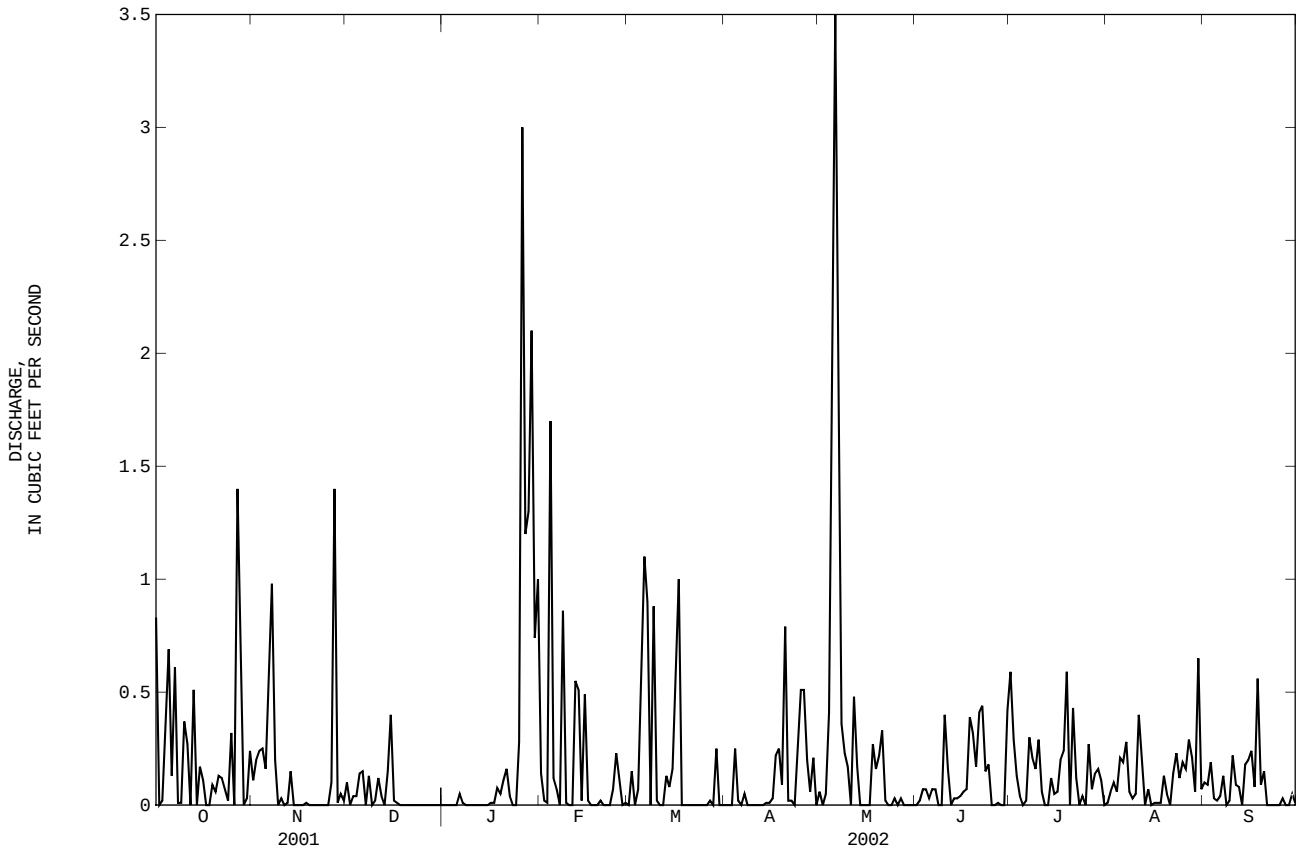
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1998 - 2002, BY WATER YEAR (WY)

MEAN	0.16	0.23	0.19	0.27	0.14	0.20	0.25	0.15	0.13	0.17	0.16	0.11
MAX	0.24	0.37	0.35	0.42	0.19	0.28	0.33	0.30	0.17	0.22	0.20	0.17
(WY)	2002	1999	2000	2000	1999	1999	2001	2002	2001	2000	2000	2000
MIN	0.088	0.13	0.044	0.041	0.035	0.14	0.12	0.056	0.10	0.097	0.12	0.087
(WY)	1999	2000	2002	2001	2000	2000	2002	2000	2000	2001	1999	2002

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1998 - 2002	
ANNUAL TOTAL	54.89		61.89			
ANNUAL MEAN	0.15		0.17		0.18	
HIGHEST ANNUAL MEAN					0.21	1999
LOWEST ANNUAL MEAN					0.16	2001
HIGHEST DAILY MEAN	1.8	Sep 16	3.5	May 6	3.5	May 6 2002
LOWEST DAILY MEAN	0.00	Jan 4	0.00	Oct 2	0.00	Sep 23 1998
ANNUAL SEVEN-DAY MINIMUM	0.00	Jul 1	0.00	Nov 19	0.00	Feb 24 1999
ANNUAL RUNOFF (AC-FT)	109		123		131	
10 PERCENT EXCEEDS	0.46		0.48		0.50	
50 PERCENT EXCEEDS	0.04		0.04		0.06	
90 PERCENT EXCEEDS	0.00		0.00		0.00	

e Estimated

212353157533001 NORTH HALAWA VALLEY HIGHWAY STORM DRAIN C NEAR AIEA--Continued



212353157533001 NORTH HALAWA VALLEY, STORM DRAIN C NEAR AIEA (LAT 21°23'53" LONG 157°53'30")

DATE	TIME	SAMPLE TYPE	GAGE HEIGHT (FEET) (00065)	DIS-CHARGE, IN CUBIC FEET PER SECOND (00060)	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SAM-PLING METHOD, CODES (82398)	PH WATER WHOLE FIELD (STAND-ARD UNITS) (00400)	PH WATER WHOLE LAB (STAND-ARD UNITS) (00403)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	SPE-CIFIC CON-DUCT-ANCE LAB (US/CM) (90095)	TEMPER-ATURE WATER (DEG C) (00010)	RESIDUE TOTAL AT 105 DEG. C, SUS-PENDED (MG/L) (00530)
OCT												
28...	0615	H	--	6.5	--	50	7.3	7.7	55	58	--	<10
JAN												
26...	1855	H	--	11	--	50	7.3	7.4	39	41	--	20
26...	1719	9	1.68	--	3.0	50	7.7	7.4	78	67	--	64
28...	2257	H	--	6.6	--	50	7.4	7.4	--	41	--	<10
29...	1120	9	1.38	--	.98	70	6.4	6.9	314	327	22.5	<10
APR												
20...	1520	9	3.25	--	19	50	--	7.6	--	88	--	
20...	1522	9	3.36	--	20	50	--	7.7	--	76	--	
20...	1524	9	3.50	--	22	50	--	7.6	--	68	--	
20...	1526	9	3.63	--	24	50	--	7.5	--	60	--	
20...	1528	9	3.46	--	22	50	--	7.7	--	53	--	
20...	1534	9	2.61	--	12	50	--	7.4	--	52	--	
20...	1541	9	2.68	--	13	50	--	7.5	--	53	--	
20...	1654	9	2.22	--	7.8	50	--	7.5	--	46	--	
MAY												
05...	1208	H	--	11	--	50	--	7.3	--	51	--	103
06...	1250	9	2.04	--	6.1	70	7.1	8.1	44	52	--	<10

DATE	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L) (70300)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N) (00608)	NITRO-GEN, AM-MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)	NITRO-GEN, NITRITE DIS-SOLVED (MG/L AS N) (00613)	PHOS-PHORUS DIS-SOLVED (MG/L AS P) (00666)	PHOS-PHORUS TOTAL (MG/L AS P) (00665)	OXYGEN DEMAND, CHEM-ICAL (HIGH LEVEL) (MG/L) (00340)	CADMIUM WATER UNFLTRD TOTAL (UG/L AS CD) (01027)	COPPER, TOTAL RECOV-ERABLE (UG/L AS CU) (01042)	LEAD, TOTAL RECOV-ERABLE (UG/L AS PB) (01051)
OCT											
28...	28	<.04	<.10	<.05	<.008	<.06	<.06	<10	E.02	1.4	<1
JAN											
26...	20	<.04	.14	<.05	<.008	<.06	E.05	20	.09	12.4	3
26...	30	<.04	.53	E.03	<.008	<.06	.18	40	.31	34.3	12
28...	20	<.04	.12	<.05	<.008	<.06	<.06	<10	.05	5.6	2
29...	192	<.04	.12	.55	<.008	E.03	E.03	<10	.04	1.9	<1
APR											
20...	--	--	--	--	--	--	--	--	.26	21.2	6
20...	--	--	--	--	--	--	--	--	.14	17.9	5
20...	--	--	--	--	--	--	--	--	.12	12.6	4
20...	--	--	--	--	--	--	--	--	.06	7.4	2
20...	--	--	--	--	--	--	--	--	.08	9.9	3
20...	--	--	--	--	--	--	--	--	.06	5.4	1
20...	--	--	--	--	--	--	--	--	.07	5.6	1
20...	--	--	--	--	--	--	--	--	.05	5.9	<1
MAY											
05...	16	<.04	.47	E.03	<.008	<.06	.08	30	.19	19.4	6
06...	19	<.04	.18	E.04	E.004	<.06	E.04	10	.13	13.4	4

212353157533001 NORTH HALAWA VALLEY, STORM DRAIN C NEAR AIEA (LAT 21°23'53" LONG 157°53'30")--Continued

DATE	ZINC, TOTAL RECOV-ERABLE (UG/L AS ZN) (01092)	OIL AND GREASE, TOTAL RECOV. GRAVI-METRIC (MG/L) (00556)	HYDRO-CARBONS PET.WAT FREON CHR.IR. RECOV. (MG/L) (45501)
OCT			
28...	12	--	--
JAN			
26...	142	--	--
26...	133	E5	<2
28...	21	--	--
29...	13	<7	<2
APR			
20...	74	--	--
20...	57	--	--
20...	42	--	--
20...	27	--	--
20...	34	--	--
20...	22	--	--
20...	26	--	--
20...	20	--	--
MAY			
05...	93	--	--
06...	59	<7	<2

< -- Less than
E -- Estimated value

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.

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

GAGE.--Water-stage recorder. Elevation of gage is 160 ft above mean sea level (from topographic map).

REMARKS.--Records computed by S.T.M. Young. Records good, except for periods when the bubbler intake was buried which are poor.

AVERAGE DISCHARGE.--19 years (water years 1984-2002), 4.87 ft^3/s (3,530 acre-ft/yr).

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

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 450 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Jan 27	0015	*961	*10.83	May 6	1210	707	10.27
Jan 29	0028	562	9.89				

Minimum discharge, no flow on many days.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	15	1.0	0.74	0.17	16	0.11	0.02	0.11	0.03	2.5	0.02	0.40
2	1.3	0.69	0.29	0.09	6.4	0.08	0.02	0.03	0.03	2.5	0.01	0.11
3	0.16	1.1	0.26	0.04	3.6	0.06	0.02	0.02	0.02	0.91	0.02	0.05
4	3.8	2.3	0.21	0.03	72	0.05	0.01	0.04	0.05	0.22	0.01	0.12
5	14	5.3	0.39	0.02	23	0.13	0.01	12	0.02	0.09	0.02	0.02
6	3.0	12	0.85	0.02	7.4	31	0.01	226	0.05	0.05	0.02	0.01
7	4.7	33	0.19	0.02	4.0	56	0.01	e115	0.04	0.15	0.15	0.01
8	2.7	31	0.19	0.02	33	17	0.01	26	0.04	0.26	0.02	0.01
9	0.89	5.8	0.25	0.01	9.6	23	0.01	17	0.03	0.11	0.01	0.00
10	0.97	2.8	0.13	0.01	3.9	22	0.01	12	0.04	0.14	0.02	0.01
11	2.0	e1.3	0.19	0.01	2.5	4.3	0.01	5.3	0.14	0.07	0.01	0.00
12	0.56	0.54	0.27	0.01	2.3	2.4	0.00	e4.9	0.02	0.04	0.12	0.00
13	2.2	0.58	8.7	0.01	11	1.7	0.00	e11	0.02	0.02	0.03	0.00
14	2.3	1.4	7.7	0.00	3.7	1.0	0.00	4.4	0.02	0.02	0.05	0.01
15	0.77	0.34	9.8	0.00	9.3	1.6	0.00	2.4	0.01	0.02	0.02	0.00
16	0.34	0.20	e3.3	0.00	3.7	9.2	0.00	1.2	0.01	0.01	0.01	0.05
17	0.23	0.12	1.5	0.00	2.2	38	0.00	0.71	0.00	0.02	0.01	0.01
18	0.15	0.10	0.79	0.11	1.3	7.5	0.03	0.71	0.00	0.04	0.01	0.41
19	0.09	0.07	1.2	0.04	0.79	3.1	0.00	0.94	0.02	2.8	0.02	4.4
20	0.10	0.05	0.69	0.50	0.62	1.8	4.0	2.2	0.02	2.0	0.01	7.7
21	0.08	0.04	0.43	5.7	0.43	0.83	1.7	2.6	0.05	1.9	0.01	1.4
22	0.09	0.03	0.23	2.5	0.27	0.49	0.14	2.6	2.0	2.3	0.00	0.04
23	0.06	0.03	23	0.55	0.20	0.34	0.02	1.0	0.68	0.32	0.00	0.02
24	0.04	0.02	13	0.08	0.18	0.24	0.02	0.41	0.96	0.09	0.00	0.01
25	0.22	0.02	3.5	0.10	0.56	0.23	0.39	0.37	0.33	0.05	0.00	0.01
26	0.09	0.18	1.8	74	0.34	0.13	3.3	0.22	0.09	0.04	0.00	0.00
27	10	e60	0.70	97	0.18	0.03	2.2	0.14	0.05	0.02	0.00	0.00
28	61	e8.0	0.39	34	0.12	0.02	0.83	0.08	0.03	0.02	0.03	0.00
29	6.3	e3.0	1.8	165	---	0.09	0.56	0.06	0.02	0.03	0.01	0.00
30	2.1	1.4	0.58	e29	---	0.07	0.41	0.06	0.05	0.05	5.5	0.00
31	1.4	---	0.45	38	---	0.03	---	0.05	---	0.02	3.8	---
TOTAL	136.64	172.41	83.52	447.04	218.59	222.53	13.74	449.55	4.87	16.81	9.94	14.80
MEAN	4.41	5.75	2.69	14.4	7.81	7.18	0.46	14.5	0.16	0.54	0.32	0.49
MAX	61	60	23	165	72	56	4.0	226	2.0	2.8	5.5	7.7
MIN	0.04	0.02	0.13	0.00	0.12	0.02	0.00	0.02	0.00	0.01	0.00	0.00
AC-FT	271	342	166	887	434	441	27	892	9.7	33	20	29

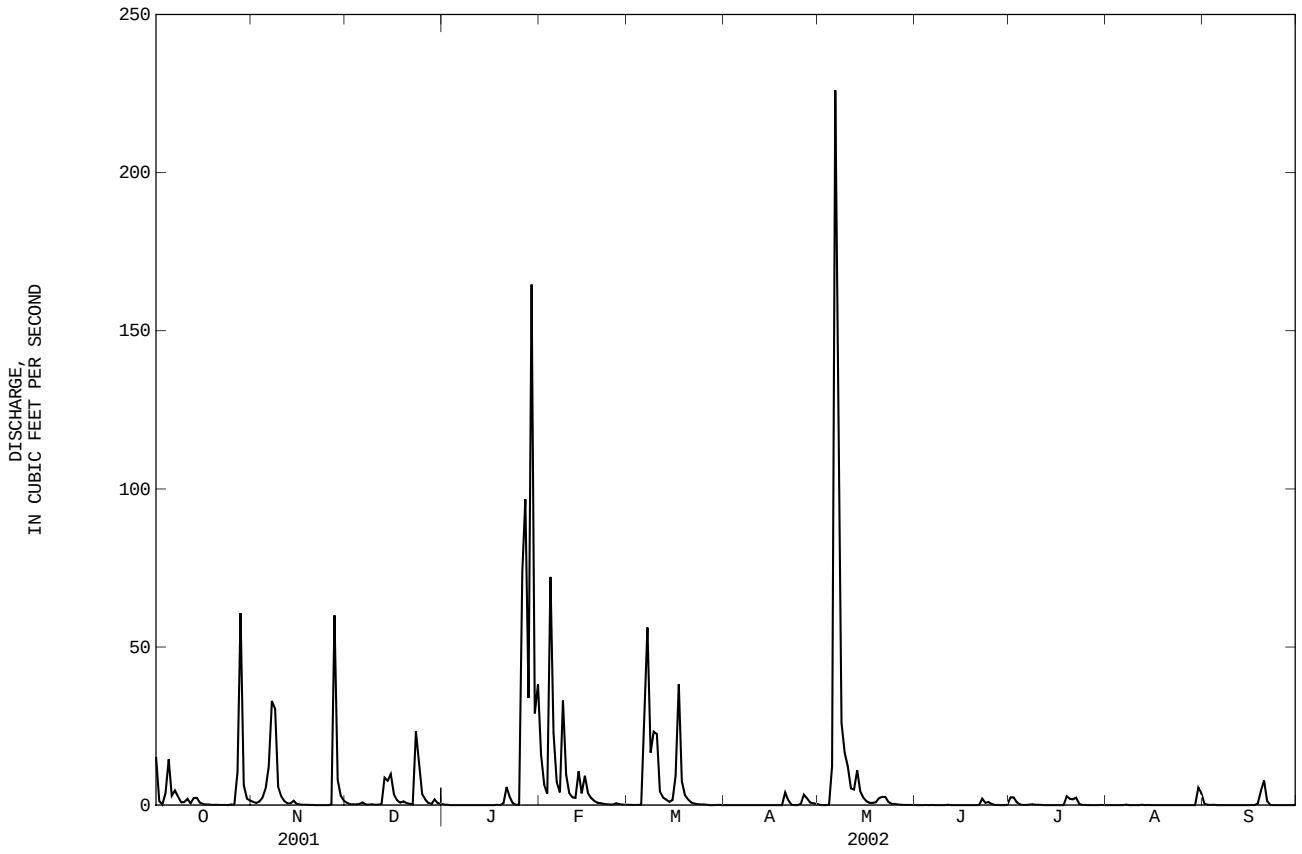
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1983 - 2002, BY WATER YEAR (WY)

MEAN	3.51	7.35	7.57	7.11	3.96	7.28	6.16	3.18	1.91	3.75	2.62	2.62
MAX	9.71	29.1	40.6	29.6	17.4	31.0	35.3	15.5	7.84	15.0	10.0	12.6
(WY)	1992	1997	1988	1988	1989	1991	1989	1988	1987	1989	1991	1992
MIN	0.000	0.059	0.008	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
(WY)	1985	1990	1990	1986	1983	1983	1983	1992	1984	1984	1984	1984

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1983 - 2002	
ANNUAL TOTAL	854.34		1790.44			
ANNUAL MEAN	2.34		4.91		4.87	
HIGHEST ANNUAL MEAN					10.1	1988
LOWEST ANNUAL MEAN					1.43	1984
HIGHEST DAILY MEAN	61	Oct 28	226	May 6	476	Mar 24 1994
LOWEST DAILY MEAN	0.00	Jan 6	0.00	Jan 14	0.00	Feb 1 1983
ANNUAL SEVEN-DAY MINIMUM	0.00	Jan 6	0.00	Apr 11	0.00	Feb 1 1983
ANNUAL RUNOFF (AC-FT)	1690		3550		3530	
10 PERCENT EXCEEDS	5.6		9.4		10	
50 PERCENT EXCEEDS	0.18		0.16		0.42	
90 PERCENT EXCEEDS	0.00		0.01		0.00	

e Estimated

16226200 NORTH HALAWA STREAM NEAR HONOLULU--Continued



WATER-QUALITY RECORDS

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

PERIOD OF DAILY RECORD.--
SUSPENDED SEDIMENT DISCHARGE: February 1983 to September 30, 1999 (discontinued).

EXTREMES FOR PERIOD OF RECORD.--Sediment concentrations: maximum daily mean 5,360 mg/L (estimated), November 14, 1996; 0 mg/L on many days in 1983-86, 1988, 1990, 1992-95, 1997-99.
Sediment discharge: maximum daily 5,310 tons, March 24, 1994; 0.0 tons on many days in 1983-86, 1990, 1992-95, 1997-99.

INSTRUMENTATION.--Automatic water-quality (point) sampler since September 1998.

WATER-QUALITY DATA, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DATE	TIME	SAMPLE TYPE	GAGE HEIGHT (FEET) (00065)	DIS-CHARGE, IN CUBIC FEET PER SECOND (00060)	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SAM-PLING METHOD, CODES (82398)	PH WATER WHOLE FIELD (STAND-ARD UNITS) (00400)	PH WATER WHOLE LAB (STAND-ARD UNITS) (00403)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	SPE-CIFIC CON-DUCT-ANCE LAB (US/CM) (90095)	TEMPER-ATURE WATER (DEG C) (00010)	RESIDUE TOTAL AT 105 DEG. C, SUS-PENDED (MG/L) (00530)
OCT												
28...	1535	9	7.17	--	34	10	7.1	7.9	157	163	21.6	<10
28...	0033	H	--	47	--	50	7.6	7.7	128	134	--	33
JAN												
26...	1953	H	--	303	--	50	7.1	6.8	82	92	--	2010
26...	1834	9	7.50	--	59	50	7.5	7.2	83	90	--	<10
28...	2352	H	--	269	--	50	7.2	7.1	61	70	--	1160
29...	1245	9	8.02	--	118	30	7.6	7.6	175	181	20.0	34
APR												
20...	1917	H	--	41	--	50	--	7.6	--	107	--	--
MAY												
05...	1551	H	--	69	--	50	--	7.2	--	82	--	227
06...	1045	9	8.72	--	238	30	7.4	7.5	74	81	--	440

DATE	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L) (70300)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N) (00608)	NITRO-GEN,AM-MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)	NITRO-GEN, NITRITE DIS-SOLVED (MG/L AS N) (00613)	PHOS-PHORUS DIS-SOLVED (MG/L AS P) (00666)	PHOS-PHORUS TOTAL (MG/L AS P) (00665)	OXYGEN DEMAND, CHEM-ICAL (HIGH LEVEL) (MG/L) (00340)	CADMIUM WATER UNFLTRD TOTAL (UG/L AS CD) (01027)	COPPER, TOTAL RECOV-ERABLE (UG/L AS CU) (01042)	LEAD, TOTAL RECOV-ERABLE (UG/L AS PB) (01051)
OCT											
28...	96	<.04	.17	.05	<.008	<.06	<.06	10	<.04	1.2	<1
28...	82	<.04	.54	<.05	<.008	<.06	.07	30	<.04	1.7	<1
JAN											
26...	56	<.04	7.2	.20	<.008	<.06	1.75	290	.34	94.0	11
26...	54	<.04	.85	.10	<.008	E.04	.22	30	.11	17.0	4
28...	46	<.04	4.0	.07	<.008	<.06	1.22	160	.19	59.4	5
29...	110	<.04	.23	.21	<.008	<.06	E.05	10	<.04	3.9	<1
APR											
20...	--	--	--	--	--	--	--	--	.07	11.1	3
MAY											
05...	45	<.04	2.0	<.05	<.008	<.06	.34	60	.10	20.3	3
06...	39	<.04	.77	.06	<.008	<.06	.50	30	.15	39.1	3

>WATER-QUALITY RECORDS

DATE	ZINC, TOTAL RECOV- ERABLE (UG/L AS ZN) (01092)	OIL AND GREASE, TOTAL RECOV. GRAVI- METRIC (MG/L) (00556)	HYDRO- CARBONS PET.WAT FREON CHR.IR. RECOV. (MG/L) (45501)
OCT			
28...	<1	<7	<2
28...	<1	--	--
JAN			
26...	135	--	--
26...	46	<7	<2
28...	74	--	--
29...	11	<7	<2
APR			
20...	37	--	--
MAY			
05...	42	--	--
06...	61	<7	<2

< -- Less than
E -- Estimated value

16226400 NORTH HALAWA STREAM NEAR QUARANTINE STATION AT HALAWA

LOCATION.--Lat 21°22'28", long 157°54'59", Hydrologic Unit 20060000, on left bank, 0.9 mi west of Oahu Prison, 1.4 mi north of Salt Lake Elementary School, and 1.2 mi northeast of Radford High School.

DRAINAGE AREA.--4.68 mi^2.

PERIOD OF RECORD.--October 2001 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 60 ft above mean sea level (from topographic map).

REMARKS.--Records computed by V.E. Kunishige. Records fair.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 2,245 ft^3/s, January 26, 2002, gage height, 9.10 ft; no flow on many days.

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)
Jan 26	2346	*2,245	*9.10	May 6	0513	1,124	7.95
Jan 29	0030	1,156	7.59				

Minimum discharge, no flow on many days.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	e16	0.58	0.25	0.00	19	e0.00	e0.00	e0.00	0.00	0.25	0.00	0.00
2	e0.65	0.14	0.01	0.00	8.9	e0.00	e0.00	e0.00	0.00	0.38	0.00	0.00
3	e0.00	0.44	0.00	0.00	4.8	e0.00	e0.00	e0.00	0.00	0.09	0.00	0.00
4	e3.8	1.8	0.00	0.00	70	e0.00	e0.00	e0.00	0.00	0.00	0.00	0.00
5	e15	6.1	0.00	0.00	24	e0.00	e0.00	20	0.00	0.00	0.00	0.00
6	e2.8	12	0.80	0.00	9.5	47	e0.00	324	0.00	0.00	0.00	0.00
7	e4.8	33	0.00	0.00	5.4	85	e0.00	162	0.00	0.00	0.00	0.00
8	e2.3	31	0.00	e0.00	34	18	e0.00	25	0.00	0.00	0.00	0.00
9	e0.78	7.3	0.00	e0.00	12	36	e0.00	13	0.00	0.00	0.00	0.00
10	e0.88	2.4	0.00	e0.00	5.3	38	e0.00	9.5	0.00	0.00	0.00	0.00
11	e1.7	0.73	0.00	0.00	2.7	9.7	e0.00	4.4	0.00	0.00	0.00	0.00
12	e0.37	0.11	0.00	0.00	2.3	4.5	e0.00	4.1	0.00	0.00	0.00	0.00
13	e2.1	0.00	10	0.00	12	2.8	e0.00	9.7	0.00	0.00	0.00	0.00
14	e2.2	0.51	8.6	0.00	4.5	1.3	e0.00	3.8	0.00	0.00	0.00	0.00
15	e0.25	0.00	11	0.00	8.5	2.2	e0.00	1.6	0.00	0.00	0.00	0.00
16	e0.00	0.00	3.7	0.00	3.7	21	e0.00	0.59	0.00	0.00	0.00	0.00
17	e0.00	0.00	1.3	0.00	1.6	56	e0.00	0.14	0.00	0.00	0.00	0.00
18	e0.00	0.00	0.44	0.21	0.69	18	e0.00	0.08	0.00	0.00	0.00	0.00
19	e0.00	0.00	0.76	0.00	0.26	8.0	e0.00	0.20	0.00	0.52	0.00	0.53
20	e0.00	0.00	0.22	1.6	e0.00	3.8	5.4	0.97	0.00	0.50	0.00	3.7
21	e0.00	0.00	0.07	14	e0.00	1.7	2.5	1.4	0.00	0.55	0.00	0.68
22	e0.00	0.00	0.00	9.3	e0.00	0.59	e0.00	2.1	0.00	1.3	0.00	0.00
23	e0.00	0.00	22	2.4	e0.00	e0.01	e0.00	e0.35	0.00	0.00	0.00	0.00
24	e0.00	0.00	15	0.17	e0.00	e0.00	e0.00	e0.04	0.00	0.00	0.00	0.00
25	e0.00	0.00	4.2	0.08	e0.00	e0.00	e0.00	e0.00	0.00	0.00	0.00	0.00
26	e0.00	0.34	1.2	200	e0.00	e0.00	8.4	e0.00	0.00	0.00	0.00	0.00
27	e10	77	0.23	195	e0.00	e0.00	6.4	e0.00	0.00	0.00	0.00	0.00
28	72	9.9	0.00	71	e0.00	e0.00	2.4	e0.00	0.00	0.00	0.00	0.00
29	8.3	3.0	1.4	271	---	e0.00	1.2	e0.00	0.00	0.02	0.00	0.00
30	1.9	0.77	0.24	34	---	e0.00	0.78	0.00	0.00	0.00	1.5	0.00
31	0.91	---	0.20	41	---	e0.00	---	0.00	---	0.00	1.2	---
TOTAL	146.74	187.12	81.62	839.76	229.15	353.60	27.08	582.97	0.00	3.61	2.70	4.91
MEAN	4.73	6.24	2.63	27.1	8.18	11.4	0.90	18.8	0.000	0.12	0.087	0.16
MAX	72	77	22	271	70	85	8.4	324	0.00	1.3	1.5	3.7
MIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AC-FT	291	371	162	1670	455	701	54	1160	0.00	7.2	5.4	9.7

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 2002 - 2002, BY WATER YEAR (WY)

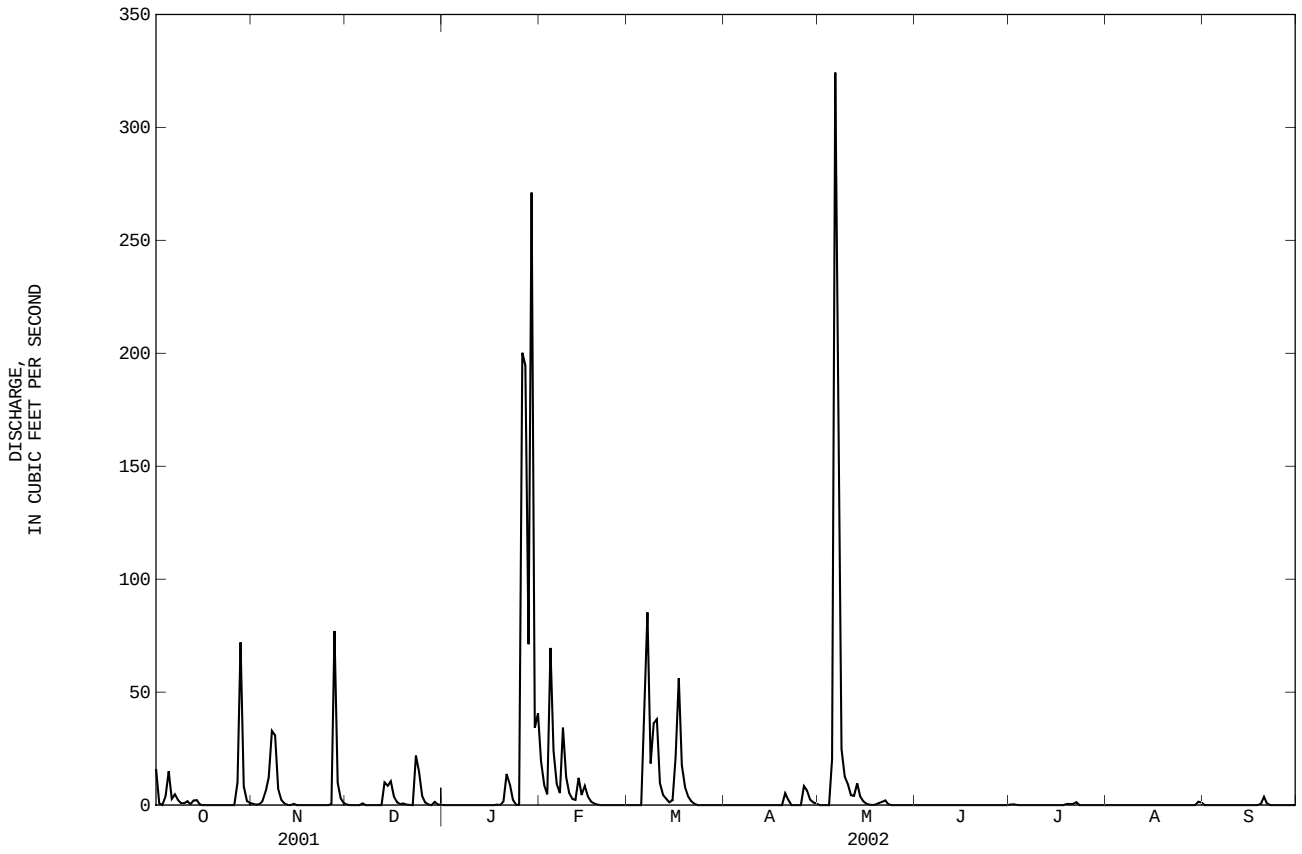
MEAN	4.73	6.24	2.63	27.1	8.18	11.4	0.90	18.8	0.000	0.12	0.087	0.16
MAX	4.73	6.24	2.63	27.1	8.18	11.4	0.90	18.8	0.000	0.12	0.087	0.16
(WY)	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002
MIN	4.73	6.24	2.63	27.1	8.18	11.4	0.90	18.8	0.000	0.12	0.087	0.16
(WY)	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002

SUMMARY STATISTICS FOR 2002 WATER YEAR

ANNUAL TOTAL	2459.26	
ANNUAL MEAN	6.74	
HIGHEST DAILY MEAN	324	May 6
LOWEST DAILY MEAN	0.00	Oct 3
ANNUAL SEVEN-DAY MINIMUM	0.00	Oct 16
ANNUAL RUNOFF (AC-FT)	4880	
10 PERCENT EXCEEDS	10	
50 PERCENT EXCEEDS	0.00	
90 PERCENT EXCEEDS	0.00	

e Estimated

16226400 NORTH HALAWA STREAM NEAR QUARANTINE STATION AT HALAWA--Continued



WATER-QUALITY RECORDS

PERIOD OF RECORD.--October 27, 2001 to current year.

INSTRUMENTATION.--Automatic water-quality (point) sampler since October 2001.

DATE	TIME	SAMPLE TYPE	GAGE HEIGHT (FEET) (00065)	DIS-CHARGE, IN CUBIC FEET PER SECOND (00060)	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SAM-PLING METHOD, CODES (82398)	PH WATER WHOLE FIELD (STAND-ARD UNITS) (00400)	PH WATER WHOLE LAB (STAND-ARD UNITS) (00403)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	SPE-CIFIC CON-DUCT-ANCE LAB (US/CM) (90095)	TEMPER-ATURE WATER (DEG C) (00010)	RESIDUE TOTAL AT 105 DEG. C, SUS-PENDED (MG/L) (00530)
OCT												
28...	1400	9	5.12	--	50	10	7.4	7.7	151	157	21.8	11
JAN												
26...	1927	H	--	401	--	50	7.3	6.9	--	103	--	2370
29...	1044	9	6.01	--	166	10	7.8	7.6	173	163	21.0	114
29...	0006	H	--	355	--	50	7.1	7.0	72	79	--	1140
APR												
20...	1952	H	--	34	--	50	--	7.5	--	115	--	--
20...	2010	9	4.89	--	32	50	--	7.5	--	115	--	--
20...	2022	9	4.86	--	30	50	--	7.4	--	114	--	--
MAY												
06...	1045	9	6.56	--	289	30	7.8	7.6	68	84	21.0	310
05...	1730	H	--	43	--	50	--	7.2	--	86	--	188

DATE	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L) (70300)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N) (00608)	NITRO-GEN, AM-MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)	NITRO-GEN, NITRITE DIS-SOLVED (MG/L AS N) (00613)	PHOS-PHORUS DIS-SOLVED (MG/L AS P) (00666)	PHOS-PHORUS TOTAL (MG/L AS P) (00665)	OXYGEN DEMAND, CHEM-ICAL (HIGH LEVEL) (MG/L) (00340)	CADMIUM WATER UNFLTRD TOTAL (UG/L AS CD) (01027)	COPPER, TOTAL RECOV-ERABLE (UG/L AS CU) (01042)	LEAD, TOTAL RECOV-ERABLE (UG/L AS PB) (01051)
OCT											
28...	92	<.04	.23	E.04	<.008	<.06	E.04	10	<.04	1.2	<1
JAN											
26...	58	<.04	7.8	.22	<.008	<.06	1.97	380	.52	119	23
29...	98	<.04	.46	.24	<.008	<.06	.20	20	E.03	10.3	<1
29...	50	<.04	3.7	.09	<.008	<.06	1.22	130	.20	60.2	6
APR											
20...	--	--	--	--	--	--	--	--	.24	53.6	9
20...	--	--	--	--	--	--	--	--	.07	16.9	2
20...	--	--	--	--	--	--	--	--	.04	12.2	2
MAY											
06...	43	<.04	.84	.07	<.008	<.06	.47	20	.10	24.2	3
05...	52	<.04	1.3	<.05	<.008	<.06	.28	--	.08	17.5	3

DATE	ZINC, TOTAL RECOV-ERABLE (UG/L AS ZN) (01092)	OIL AND GREASE, TOTAL RECOV. GRAVI-METRIC (MG/L) (00556)	HYDRO-CARBONS PET.WAT FREON CHR.IR. RECOV. (MG/L) (45501)
OCT			
28...	<1	<7	<2
JAN			
26...	193	--	--
29...	13	<7	<2
29...	79	--	--
APR			
20...	102	--	--
20...	28	--	--
20...	18	--	--
MAY			
06...	39	<7	<2
05...	33	--	--

< -- Less than
E -- Estimated value

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16229000 KALIHI STREAM NEAR HONOLULU

LOCATION.--Lat 21°21'59", 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.

PERIOD OF RECORD.--September 1913 to April 1914, July 1914 to current year. Monthly discharge only for some periods, published in WSP 1319.
CHEMICAL ANALYSES: Water years 1972, 1974-93, 1996, quarterly.

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 (by stadia survey). Prior to October 12, 1923, at datum 2.00 ft lower.

REMARKS.--Records computed by H.A. Jeppesen. Records fair.

AVERAGE DISCHARGE.--88 years (water years 1915-2002), 6.36 ft^3/s (4,610 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, about 12,400 ft^3/s, November 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, October 22, 1933, July 29, 1966.

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)
Jan 26	2330	*1,760	*9.25	May 7	0045	958	7.94
Jan 29	0545	717	7.37				

Minimum discharge, 0.75 ft^3/s, Sept. 13, 28-30, gage height, 2.10 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

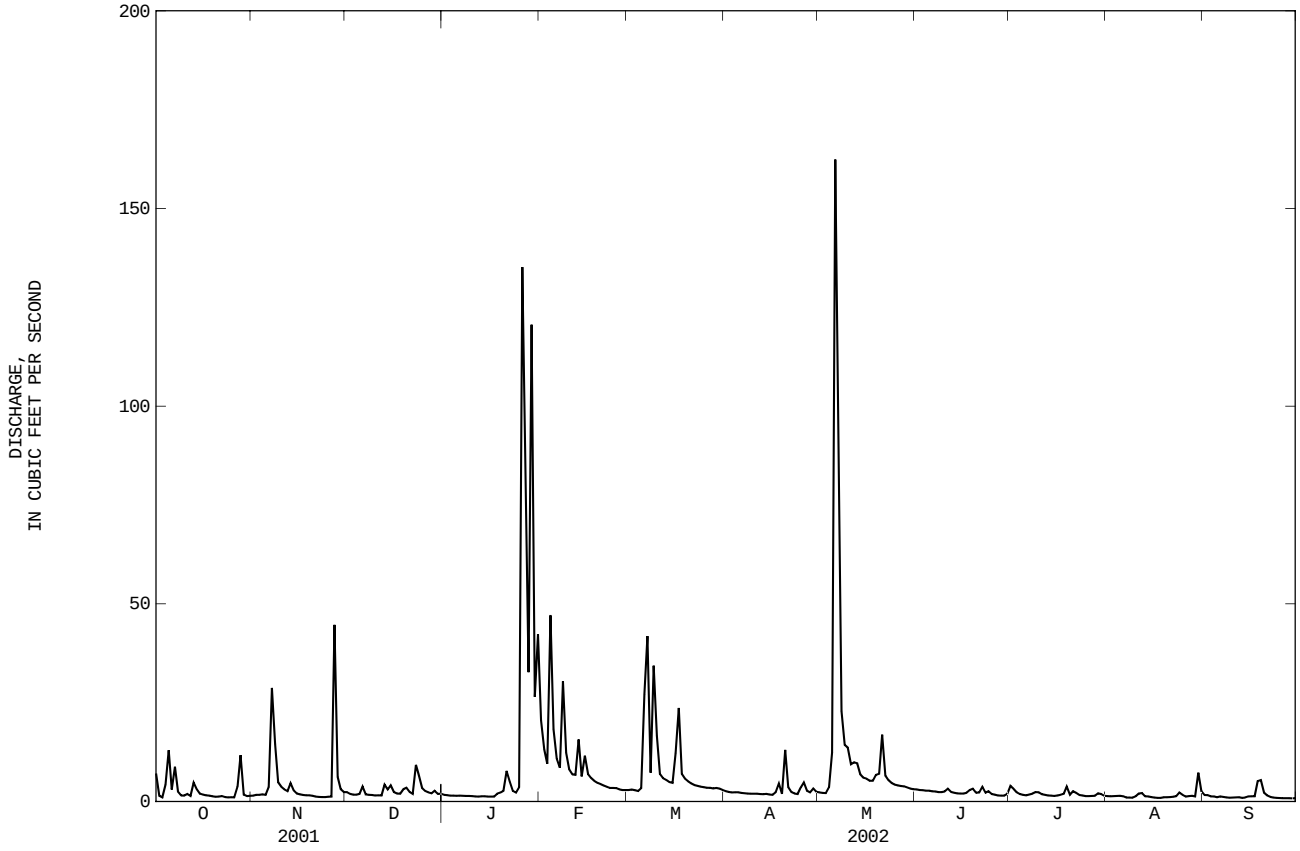
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	7.1	1.5	2.4	1.7	21	2.9	2.6	2.3	3.0	3.9	1.4	1.6
2	1.4	1.7	1.9	1.6	13	3.0	2.4	2.2	2.9	3.2	1.3	1.6
3	1.0	1.7	1.7	1.5	9.5	2.9	2.3	2.1	2.8	2.3	1.3	1.3
4	4.3	1.8	1.7	1.5	47	2.6	2.3	3.6	2.7	1.9	1.4	1.3
5	13	1.7	1.9	1.4	18	3.4	2.3	12	2.7	1.7	1.4	1.1
6	3.0	3.6	3.8	1.5	11	27	2.2	162	2.6	1.6	1.3	1.3
7	8.8	29	1.8	1.5	8.5	42	2.1	125	2.5	1.8	0.99	1.2
8	2.5	15	1.7	1.4	30	7.3	2.0	23	2.4	2.0	0.98	1.1
9	1.5	4.9	1.6	1.4	12	34	2.0	14	2.4	2.4	0.94	0.97
10	1.5	3.7	1.5	1.4	8.1	17	2.0	14	2.5	2.3	1.3	0.98
11	1.9	3.0	1.6	1.3	6.9	7.0	2.0	9.4	3.2	1.8	2.0	1.0
12	1.4	2.6	1.5	1.3	6.8	5.9	1.9	9.9	2.4	1.7	2.1	1.1
13	4.8	4.6	4.3	1.3	16	5.5	1.9	9.7	2.2	1.5	1.3	0.91
14	3.1	2.8	3.0	1.3	6.4	4.9	1.9	6.9	2.1	1.5	1.3	1.0
15	2.0	2.0	4.1	1.2	12	4.7	1.8	6.0	2.0	1.4	1.1	1.3
16	1.7	1.8	2.4	1.2	6.9	12	1.7	5.8	2.0	1.5	0.99	1.3
17	1.6	1.6	2.0	1.3	5.9	24	2.3	5.2	2.2	1.7	0.92	1.3
18	1.5	1.6	2.0	2.0	5.2	7.0	4.6	5.2	2.9	2.0	0.91	5.1
19	1.3	1.6	3.1	2.2	4.7	5.8	1.9	6.7	3.2	3.8	1.1	5.4
20	1.2	1.4	3.5	2.7	4.4	5.1	13	7.0	2.2	1.7	1.1	2.2
21	1.3	1.2	2.4	7.7	4.1	4.6	3.6	17	2.3	2.6	1.1	1.5
22	1.4	1.2	1.9	5.0	3.7	4.2	2.4	6.5	3.7	2.2	1.2	1.2
23	1.1	1.1	9.3	2.7	3.4	3.9	2.0	5.4	2.2	1.7	1.3	1.0
24	1.0	1.1	6.5	2.2	3.4	3.8	1.9	4.7	2.6	1.5	2.3	0.94
25	1.1	1.2	3.4	3.6	3.4	3.6	3.6	4.3	1.9	1.4	1.7	0.90
26	1.0	1.2	2.7	135	3.1	3.5	4.9	4.1	1.7	1.3	1.3	0.84
27	3.7	45	2.3	85	2.9	3.5	2.7	3.9	1.5	1.4	1.4	0.84
28	12	6.2	2.1	33	2.9	3.3	2.3	3.8	1.5	1.4	1.4	0.83
29	1.7	3.1	2.7	121	---	3.4	3.3	3.5	1.5	2.1	1.3	0.78
30	1.4	2.4	1.9	26	---	3.3	2.4	3.3	2.0	1.9	7.3	0.82
31	1.5	---	2.0	42	---	2.9	---	3.1	---	1.4	2.6	---
TOTAL	91.8	151.3	84.7	493.9	280.2	264.0	84.3	491.6	71.8	60.6	48.03	42.71
MEAN	2.96	5.04	2.73	15.9	10.0	8.52	2.81	15.9	2.39	1.95	1.55	1.42
MAX	13	45	9.3	135	47	42	13	162	3.7	3.9	7.3	5.4
MIN	1.0	1.1	1.5	1.2	2.9	2.6	1.7	2.1	1.5	1.3	0.91	0.78
AC-FT	182	300	168	980	556	524	167	975	142	120	95	85

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1914 - 2002, BY WATER YEAR (WY)

MEAN	4.51	7.23	8.24	9.01	7.06	8.38	8.20	6.43	3.66	4.44	4.94	4.43
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	0.29	0.46	0.74	0.50	0.34	0.74	0.63	0.27	0.32	0.60	0.43	0.30
(WY)	1985	1954	1977	1977	1978	1926	1926	1926	1966	1984	1984	1984

16229000 KALIHI STREAM NEAR HONOLULU--Continued

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1914 - 2002	
ANNUAL TOTAL	961.02		2164.94			
ANNUAL MEAN	2.63		5.93		6.36	
HIGHEST ANNUAL MEAN					13.5	1923
LOWEST ANNUAL MEAN					2.04	1984
HIGHEST DAILY MEAN	52	Jun 5	162	May 6	951	Jan 19 1923
LOWEST DAILY MEAN	0.50	Sep 10	0.78	Sep 29	0.11	Jul 29 1966
ANNUAL SEVEN-DAY MINIMUM	0.58	Sep 6	0.85	Sep 24	0.15	May 15 1926
ANNUAL RUNOFF (AC-FT)	1910		4290		4610	
10 PERCENT EXCEEDS	4.1		9.6		11	
50 PERCENT EXCEEDS	1.5		2.2		2.8	
90 PERCENT EXCEEDS	0.79		1.2		0.96	



HAWAII, ISLAND OF OAHU

16229300 KALIHI STREAM AT KALIHI

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.

PERIOD OF RECORD.--Water year 1962 (annual maximum), July 1962 to current year.
CHEMICAL ANALYSES: Water years 1970-74, 1975-93, quarterly.
SUSPENDED-SEDIMENT DISCHARGE: Water years 1969-74, 1975-93, quarterly.

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

REMARKS.--Records computed by Heather Jeppesen. Records good.

AVERAGE DISCHARGE.--40 years (water years 1963-2002), 9.82 ft^3/s (7,110 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 7,110 ft^3/s, April 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 ft^3/s, October 13-14, 1999.

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 and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Jan 27	0000	*2,950	*6.60	May 7	0115	1,040	4.11

Minimum discharge, 0.68 ft^3/s, Sept. 29, gage height, 0.58 ft.

CORRECTIONS.--A revised records section was incorrectly published in the Hawaii Data Reports for water years 1996-2001. This revised records section has been deleted effective with the current water year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	8.4	3.0	4.9	2.6	29	4.0	4.0	2.8	4.0	5.0	1.5	2.8
2	2.5	3.0	3.7	2.6	e23	3.9	4.0	2.7	3.9	4.3	1.4	3.0
3	1.6	3.5	3.3	2.5	e19	4.3	3.7	2.6	3.7	3.4	1.5	1.6
4	5.3	4.6	3.3	2.3	e60	3.7	3.7	3.0	3.8	2.7	1.8	2.9
5	14	3.7	4.7	2.3	e30	4.7	4.1	14	3.5	2.5	1.8	1.4
6	3.8	6.4	13	2.3	e18	29	3.7	191	3.5	2.2	1.6	1.3
7	16	32	4.0	2.3	12	44	3.5	199	3.1	3.0	3.3	1.4
8	4.7	22	4.2	2.1	39	9.9	3.3	30	3.1	3.7	1.4	1.4
9	2.9	7.0	4.3	2.1	18	34	3.1	18	3.0	4.0	1.3	1.2
10	3.6	4.8	3.1	1.9	12	23	3.1	16	3.5	3.2	1.3	1.4
11	3.4	3.8	3.2	1.7	9.9	9.6	3.0	12	4.6	2.4	1.9	1.6
12	2.6	3.2	3.2	1.7	9.8	7.8	2.9	12	3.3	2.2	3.1	1.4
13	5.2	4.9	19	1.7	23	6.8	3.2	16	2.8	1.8	1.6	1.2
14	4.5	4.3	8.3	1.8	10	6.4	3.1	9.7	2.6	1.8	1.7	1.4
15	2.9	2.7	8.2	1.6	14	6.2	2.8	8.5	2.6	1.8	1.6	1.9
16	2.7	2.5	5.0	1.6	8.9	19	2.8	7.4	2.7	2.0	1.3	2.5
17	2.2	2.3	4.4	2.0	7.8	32	3.9	6.7	3.0	2.1	1.1	1.3
18	2.0	2.2	4.0	9.1	6.8	11	5.7	6.9	4.4	2.4	1.1	1.2
19	1.8	2.2	7.2	11	6.4	7.8	2.9	8.9	4.5	4.7	1.1	9.6
20	1.8	2.2	6.4	14	6.1	6.6	15	8.6	3.0	2.6	1.1	2.2
21	1.8	2.1	4.6	30	5.6	6.3	5.8	21	3.6	3.4	1.2	2.4
22	2.7	2.1	3.6	9.3	5.2	5.8	3.5	11	6.1	4.1	1.1	1.5
23	1.6	2.1	12	5.1	4.9	5.4	3.2	7.2	3.4	2.2	1.3	1.2
24	1.4	2.1	9.4	3.5	4.9	5.2	3.1	6.2	3.7	2.1	3.1	1.2
25	4.2	2.1	5.5	4.9	5.3	5.0	5.8	5.6	2.7	1.8	1.7	1.0
26	1.7	2.7	4.3	237	4.9	4.9	6.2	5.1	2.6	1.7	1.3	1.1
27	20	102	3.7	188	4.2	5.0	4.1	4.9	2.5	1.9	1.7	1.0
28	28	13	3.4	35	4.1	4.9	3.9	4.8	2.3	1.7	1.9	1.0
29	5.0	6.4	5.5	216	---	5.0	4.5	4.5	2.1	2.6	1.4	0.83
30	3.0	4.7	3.1	42	---	5.0	3.3	4.2	2.9	2.3	8.9	0.88
31	3.0	---	3.3	50	---	4.1	---	4.1	---	1.7	3.4	---
TOTAL	164.3	259.6	175.8	890.0	401.8	330.3	124.9	654.4	100.5	83.3	59.5	54.81
MEAN	5.30	8.65	5.67	28.7	14.3	10.7	4.16	21.1	3.35	2.69	1.92	1.83
MAX	28	102	19	237	60	44	15	199	6.1	5.0	8.9	9.6
MIN	1.4	2.1	3.1	1.6	4.1	3.7	2.8	2.6	2.1	1.7	1.1	0.83
AC-FT	326	515	349	1770	797	655	248	1300	199	165	118	109

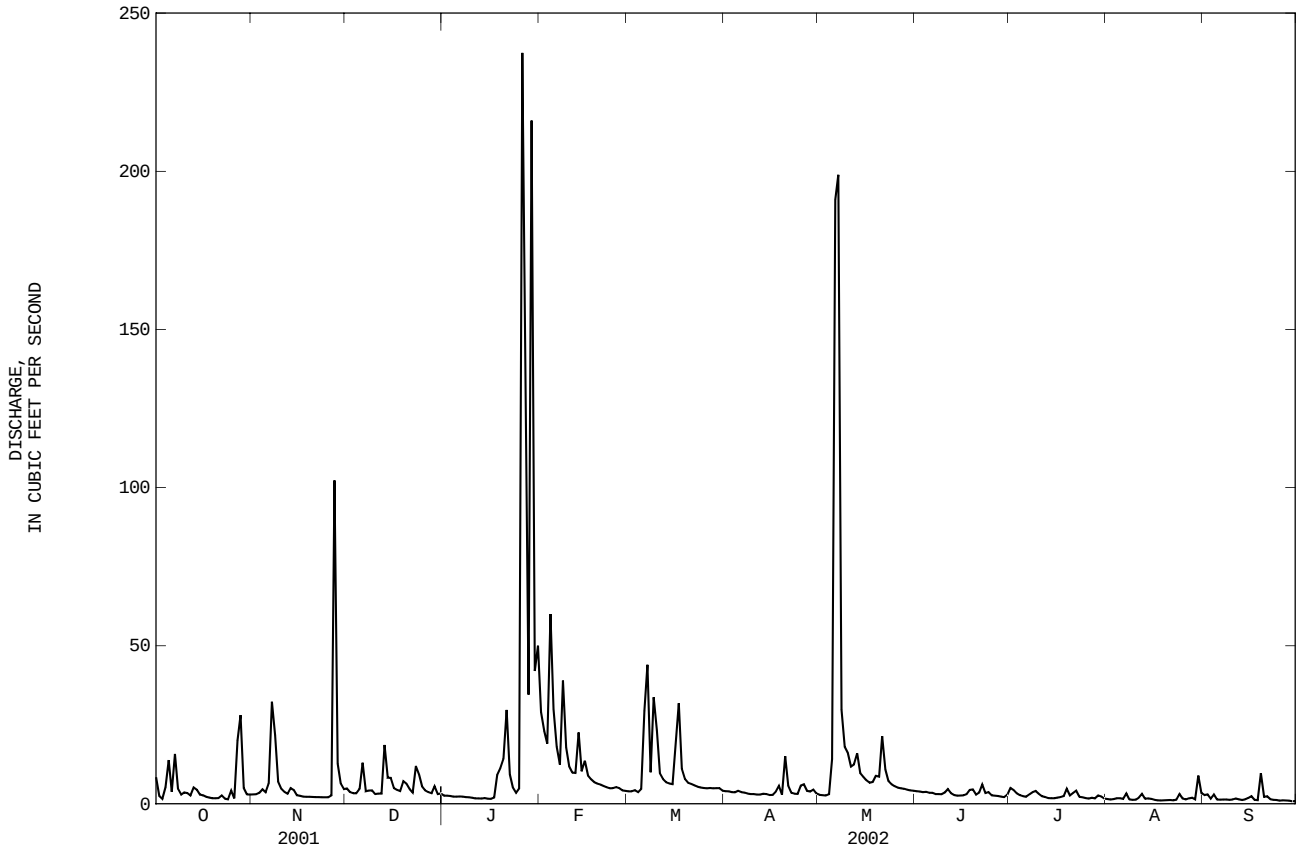
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1962 - 2002, BY WATER YEAR (WY)

MEAN	6.54	13.4	14.1	13.5	10.6	14.8	12.9	9.28	5.20	7.40	5.75	4.55
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	0.95	2.15	1.15	0.82	0.78	1.15	1.65	1.49	0.87	1.17	0.83	0.64
(WY)	1985	1981	1977	1977	1978	1983	1992	1966	1966	1984	1984	1984

16229300 KALIHI STREAM AT KALIHI--Continued

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1962 - 2002	
ANNUAL TOTAL	1652.79		3299.21			
ANNUAL MEAN	4.53		9.04		9.82	
HIGHEST ANNUAL MEAN					21.3	1982
LOWEST ANNUAL MEAN					3.13	1984
HIGHEST DAILY MEAN	102	Nov 27	237	Jan 26	781	Feb 1 1969
LOWEST DAILY MEAN	0.86	Sep 12	0.83	Sep 29	0.05	Oct 14 1999
ANNUAL SEVEN-DAY MINIMUM	0.97	Sep 9	1.0	Sep 24	0.36	Oct 14 1984
ANNUAL RUNOFF (AC-FT)	3280		6540		7110	
10 PERCENT EXCEEDS	7.6		15		17	
50 PERCENT EXCEEDS	2.4		3.5		3.6	
90 PERCENT EXCEEDS	1.4		1.5		1.3	

e Estimated



16240500 WAIAKEAKUA STREAM AT HONOLULU

LOCATION.--Lat 21°19'52", long 157°48'08", 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 benchmark). Prior to May 20, 1914, nonrecording gage at site 200 ft upstream at different datum. May 20, 1914 to January 16, 1921, water-stage recorder at site 30 ft upstream at different datum. August 18, 1925 to March 15, 1928, water-stage recorder at present site at datum 2.99 ft lower. March 16, 1928 to October 18, 1933, water-stage recorder at present site at datum 0.41 ft higher.

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

AVERAGE DISCHARGE.--84 years (water years 1914-20, 1926-2002), 4.85 ft3/s (3,510 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 3,090 ft3/s, January 16, 1921, gage height, 10.4 ft, from floodmarks, site and datum then in use, from rating curve extended above 58 ft3/s; minimum, 0.6 ft3/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)
Jan 26	1730	1,050	4.20	May 6	1015	383	3.20
Jan 29	0530	*1,090	*4.25				

Minimum daily discharge, 1.6 ft^3/s, Jan. 16.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	12	2.7	2.9	2.1	6.2	2.5	2.6	2.9	2.6	5.3	2.5	3.0
2	3.4	2.5	2.2	2.1	4.9	2.7	2.6	2.8	2.5	4.9	2.4	3.2
3	2.7	2.8	2.1	2.1	3.9	2.7	2.6	2.7	2.7	3.1	2.6	2.7
4	3.6	3.4	2.2	2.1	18	2.6	2.7	3.2	2.6	2.5	3.0	2.8
5	14	2.6	2.5	2.1	6.9	4.6	2.8	11	2.5	2.3	2.6	2.4
6	3.2	8.7	8.2	2.2	4.4	21	2.6	47	2.7	2.3	2.8	2.3
7	9.5	23	2.7	2.1	3.7	13	2.7	36	2.5	2.9	3.6	2.3
8	3.3	7.9	2.6	1.9	11	4.3	2.5	8.3	2.5	3.2	2.7	2.6
9	2.8	3.2	2.5	1.7	4.6	12	2.6	6.1	2.5	2.9	2.4	2.3
10	2.6	2.6	2.3	1.8	3.4	6.4	2.5	6.6	2.8	3.7	2.4	2.2
11	2.4	2.5	2.3	1.7	3.4	4.2	2.5	4.8	3.2	3.0	3.4	2.5
12	2.1	2.1	2.2	1.7	5.6	3.8	2.5	5.0	2.6	2.8	5.2	2.5
13	2.5	5.9	5.0	1.7	13	3.9	2.5	4.9	2.4	2.5	2.8	2.2
14	2.0	2.6	3.4	1.8	3.9	3.6	2.4	3.9	2.4	2.6	2.6	2.1
15	2.4	2.2	4.2	1.7	7.0	4.1	2.4	3.4	2.5	2.5	2.4	2.4
16	2.1	2.1	2.7	1.6	3.6	3.7	2.4	3.2	2.4	2.5	2.3	2.2
17	1.9	2.0	2.5	1.7	3.2	10	3.8	3.1	2.5	2.4	2.2	2.0
18	1.9	2.0	2.6	2.5	3.0	4.3	3.5	3.6	3.1	2.9	2.1	3.9
19	1.9	2.0	5.4	2.2	2.9	3.6	2.5	6.7	3.7	6.2	2.2	4.1
20	1.8	1.9	5.5	5.3	2.8	3.5	8.0	6.5	2.6	3.0	2.2	2.3
21	2.0	1.9	3.1	9.1	2.8	3.2	3.4	4.4	3.2	5.0	2.1	2.2
22	2.2	1.9	2.7	4.7	2.7	3.0	2.8	3.6	6.3	5.2	2.0	2.1
23	2.0	1.8	6.4	2.6	2.7	3.0	2.6	3.1	2.8	3.1	2.7	2.0
24	1.8	1.8	5.5	2.1	2.7	2.9	2.6	3.0	3.9	2.9	4.5	2.0
25	2.7	1.8	2.9	3.0	3.5	2.9	3.4	2.9	2.5	2.6	3.4	1.9
26	2.0	1.8	2.6	67	2.7	2.9	3.8	2.9	2.3	2.8	2.6	1.9
27	3.1	21	2.3	19	2.6	2.9	3.4	2.8	2.3	3.0	2.7	1.8
28	7.9	3.5	2.2	8.4	2.5	2.9	3.3	2.8	2.2	3.1	3.8	1.8
29	2.4	2.5	3.4	80	---	3.9	4.5	2.8	2.2	3.4	2.9	1.8
30	2.0	2.5	2.1	8.8	---	3.2	3.1	2.7	2.8	3.7	8.8	1.9
31	2.9	---	2.2	14	---	2.8	---	2.6	---	2.7	4.1	---
TOTAL	109.1	125.2	101.4	260.8	137.6	150.1	91.6	205.3	83.8	101.0	94.0	71.4
MEAN	3.52	4.17	3.27	8.41	4.91	4.84	3.05	6.62	2.79	3.26	3.03	2.38
MAX	14	23	8.2	80	18	21	8.0	47	6.3	6.2	8.8	4.1
MIN	1.8	1.8	2.1	1.6	2.5	2.5	2.4	2.6	2.2	2.3	2.0	1.8
AC-FT	216	248	201	517	273	298	182	407	166	200	186	142

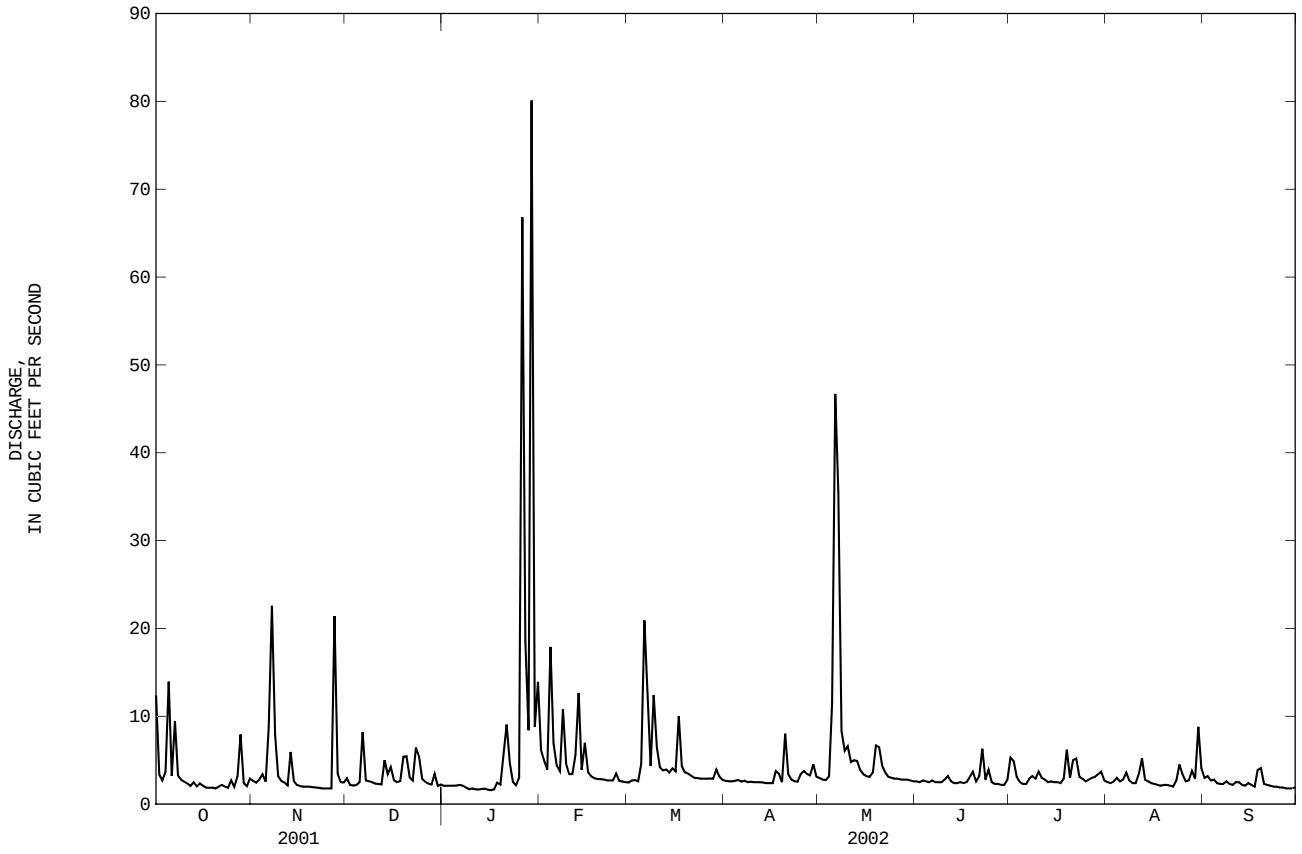
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1913 - 2002, BY WATER YEAR (WY)

MEAN	4.16	5.22	5.28	4.94	4.44	5.35	5.60	5.11	4.14	4.89	4.79	4.14
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	0.87	1.27	0.87	1.31	1.27
(WY)	1946	1934	1920	1977	1920	1926	1926	1926	1920	1926	1984	1984

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1913 - 2002	
ANNUAL TOTAL	1135.2		1531.3			
ANNUAL MEAN	3.11		4.20		4.85	
HIGHEST ANNUAL MEAN					8.23	1988
LOWEST ANNUAL MEAN					1.94	1920
HIGHEST DAILY MEAN	39	Jun 5	80	Jan 29	183	Mar 24 1994
LOWEST DAILY MEAN	1.3	Jul 28	1.6	Jan 16	0.62	Feb 26 1920
ANNUAL SEVEN-DAY MINIMUM	1.5	Jul 6	1.7	Jan 11	0.75	May 23 1926
ANNUAL RUNOFF (AC-FT)	2250		3040		3510	
10 PERCENT EXCEEDS	4.9		6.3		8.0	
50 PERCENT EXCEEDS	2.3		2.7		3.5	
90 PERCENT EXCEEDS	1.6		2.0		1.8	

HAWAII, ISLAND OF OAHU

16240500 WAIAKEAKUA STREAM AT HONOLULU--Continued



16242500 MANOA STREAM AT KANEWAI FIELD

LOCATION.--Lat 21°17'47", long 157°48'56", Hydrologic Unit 20060000, on left bank, 0.5 mi northeast of Kaimuki High School, 0.4 mi northwest of St. Louis High School, and 0.3 mi upstream from confluence with Palolo Stream.

DRAINAGE AREA.--5.99 mi^2.

PERIOD OF RECORD.--January 1999 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 22 ft above mean sea level, from topographic map.

REMARKS.--Records computed by Heather Jeppesen. Records fair.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 2,320 ft^3/s, Jan. 26, 2002, gage height, 15.59 ft. Minimum discharge, 2.1 ft^3/s, Jun. 28, 2000, gage height, 8.91 ft; minimum gage height, 8.80 ft., Jan. 16, Sep. 30, 2002.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 400 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Nov 27	0400	492	11.63	Mar 7	0500	454	11.52
Jan 26	1800	*2,320	*15.59	May 6	1045	496	11.64
Jan 29	0600	2,270	15.50				

Minimum discharge, 2.4 ft^3/s, on several days, gage height, 8.80 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	20	7.1	7.6	4.1	21	4.9	4.4	4.9	3.4	7.7	4.8	6.8
2	4.0	6.0	5.9	3.9	17	5.1	4.2	4.5	3.3	7.1	4.5	7.7
3	3.3	7.8	5.1	3.7	12	5.2	4.0	4.7	3.8	e6.0	5.1	8.7
4	4.7	11	5.1	3.5	52	4.4	4.5	5.0	3.5	e4.6	6.4	14
5	27	8.3	6.5	3.5	21	7.0	4.2	26	3.3	3.7	6.4	5.0
6	6.5	24	26	4.5	14	63	4.0	123	3.7	3.5	5.7	5.2
7	26	63	6.8	3.3	11	46	4.2	116	3.2	6.3	9.6	4.6
8	7.3	29	6.5	e3.1	27	11	3.7	28	3.0	8.2	5.9	6.1
9	6.2	9.7	6.0	e2.9	13	34	3.7	15	3.2	8.4	5.1	4.5
10	7.2	7.5	5.0	e2.9	9.1	20	3.5	10	4.0	8.2	5.3	4.2
11	6.3	6.9	4.6	2.8	8.1	9.2	3.4	7.2	6.9	6.1	5.7	5.1
12	4.5	5.8	5.9	2.8	18	7.9	3.3	10	3.4	5.3	8.8	5.4
13	7.1	14	19	2.8	50	8.3	3.2	11	3.4	4.6	4.7	3.8
14	4.8	6.5	9.0	3.1	12	6.7	3.2	6.4	3.4	4.7	4.5	3.7
15	4.9	5.5	11	2.6	18	9.9	3.2	5.8	3.3	4.4	4.2	5.0
16	5.2	4.9	6.6	2.5	9.9	7.5	3.4	5.3	3.3	4.7	4.0	5.0
17	4.0	4.5	6.4	3.1	8.4	35	7.4	4.9	3.4	4.3	3.8	3.6
18	3.6	4.2	7.1	21	7.7	10	7.4	5.9	5.4	6.5	3.7	5.2
19	3.4	4.0	15	10	7.1	7.6	4.6	10	5.7	13	3.7	10
20	3.2	3.7	13	26	6.7	6.8	27	13	3.6	6.3	3.4	4.2
21	4.3	3.5	7.8	41	6.3	6.4	7.3	7.1	3.7	10	3.1	3.7
22	5.0	3.3	6.3	13	6.0	6.1	4.7	5.9	11	14	2.9	3.2
23	3.7	3.1	14	7.1	5.8	5.8	4.6	5.2	4.9	6.3	3.2	3.0
24	3.0	2.9	10	5.7	5.7	5.6	4.2	4.8	5.8	6.0	6.7	2.9
25	11	2.7	6.4	8.1	11	5.5	6.3	4.4	4.0	4.9	4.0	2.8
26	4.0	2.6	5.7	175	6.2	5.2	9.4	4.2	3.5	4.8	3.2	2.7
27	18	108	5.2	80	5.4	5.1	8.7	4.0	3.2	5.0	3.3	2.6
28	34	12	4.8	27	5.2	4.9	8.0	3.8	3.0	5.1	10	2.5
29	6.0	7.4	9.8	239	---	11	9.1	3.7	2.8	5.8	3.7	2.5
30	4.8	6.8	4.9	34	---	6.8	5.9	3.6	4.5	6.6	19	2.5
31	7.5	---	5.5	45	---	4.7	---	3.7	---	4.9	7.3	---
TOTAL	260.5	385.7	258.5	787.0	394.6	376.6	174.7	467.0	122.6	197.0	171.7	146.2
MEAN	8.40	12.9	8.34	25.4	14.1	12.1	5.82	15.1	4.09	6.35	5.54	4.87
MAX	34	108	26	239	52	63	27	123	11	14	19	14
MIN	3.0	2.6	4.6	2.5	5.2	4.4	3.2	3.6	2.8	3.5	2.9	2.5
AC-FT	517	765	513	1560	783	747	347	926	243	391	341	290

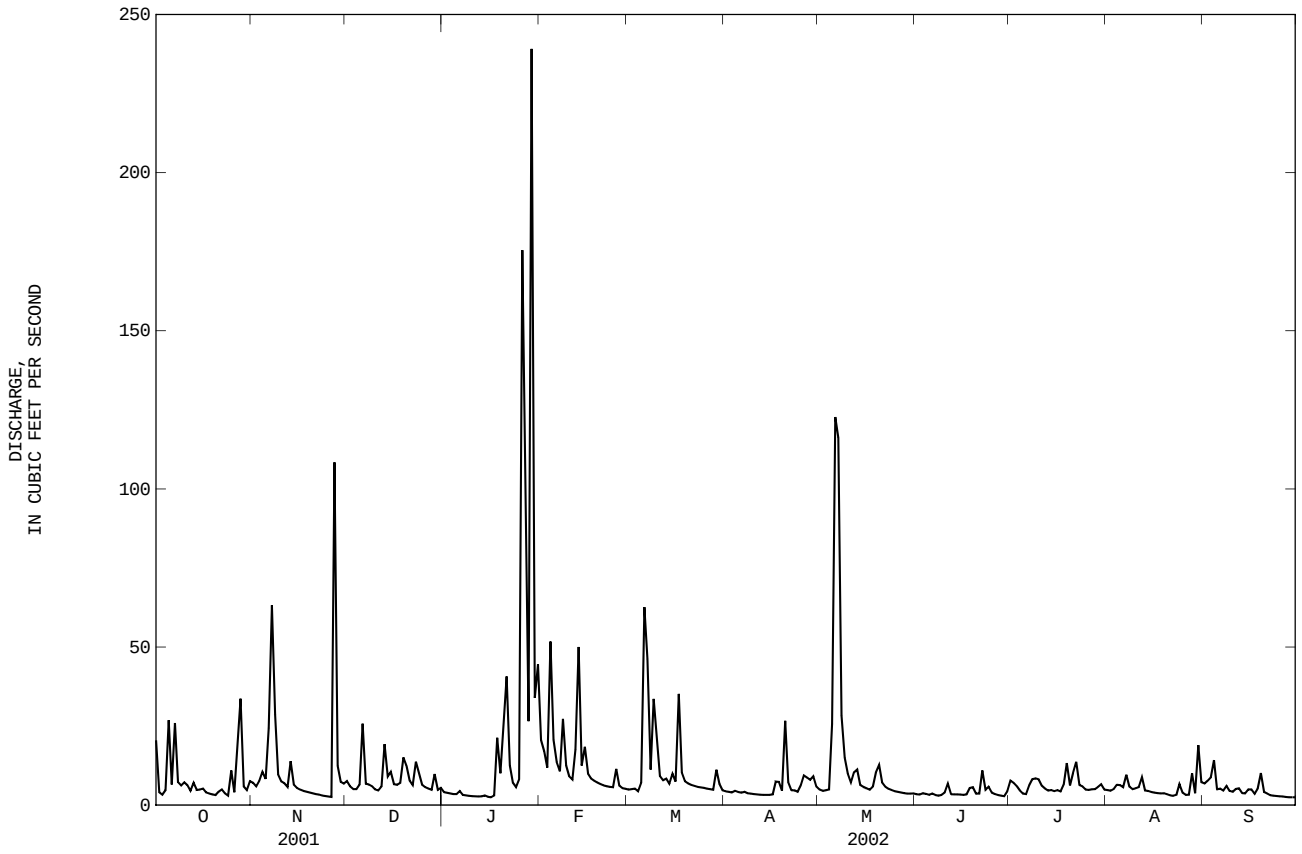
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1999 - 2002, BY WATER YEAR (WY)

MEAN	7.92	12.9	11.3	18.4	9.97	10.9	12.4	8.48	6.18	8.39	8.22	6.86
MAX	9.02	18.0	20.7	26.8	14.1	22.5	16.6	15.1	10.0	13.3	10.3	13.1
(WY)	2001	2001	2000	2000	2002	1999	1999	2002	2001	1999	2000	2000
MIN	6.35	7.93	4.67	3.02	5.54	4.45	5.82	4.87	4.09	4.29	5.54	3.89
(WY)	2000	2000	2001	2001	2000	2000	2002	2000	2002	2001	2002	1999

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1999 - 2002	
ANNUAL TOTAL	2851.5		3742.1			
ANNUAL MEAN	7.81		10.3		9.69	
HIGHEST ANNUAL MEAN					10.8	2000
LOWEST ANNUAL MEAN					7.98	2001
HIGHEST DAILY MEAN	125	Jun 5	239	Jan 29	239	Jan 29 2002
LOWEST DAILY MEAN	1.9	Jul 10	2.5	Jan 16	1.9	Jul 10 2001
ANNUAL SEVEN-DAY MINIMUM	2.0	Jan 22	2.6	Sep 24	2.0	Jan 22 2001
ANNUAL RUNOFF (AC-FT)	5660		7420		7020	
10 PERCENT EXCEEDS	13		18		17	
50 PERCENT EXCEEDS	5.0		5.5		5.4	
90 PERCENT EXCEEDS	2.6		3.2		3.0	

e Estimated

16242500 MANOA STREAM AT KANEWAI FIELD--Continued



16247100 MANOA-PALOLO DRAINAGE CANAL AT MOILIILI

LOCATION.--Lat 21°17'24", long 157°49'17", on left bank at Kaimuki High School, and 0.3 mi downstream from confluence of Manoa and Palolo Streams, and 0.6 mi upstream from point of discharge into Ala Wai Canal.

DRAINAGE AREA.--10.6 mi^2.

PERIOD OF RECORD.--Annual maximum, water years 1968-99. October 1, 1999 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 5 ft above mean sea level (from topographic map). October 1, 1967 to November 29, 1972 crest-stage gage at site 1,800 feet upstream at same datum. November 29, 1972 to current year crest-stage gage at site 160 feet upstream at same datum.

REMARKS.--Records computed by Heather Jeppesen. Records poor due to tidal backwater.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 10,100 ft^3/s, December 18, 1967, gage height, 12.60 feet, site then in use, from slope-area measurement of peak flow; minimum daily discharge, 2.4 ft^3/s, April 5, 2001.

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

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Nov 27	1030	1,020	4.39	Jan 29	0605	*4,600	*8.20
Jan 26	1805	4,040	7.75				

Minimum daily discharge, 2.7 ft^3/s, Sept 30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	33	9.2	10	5.5	35	8.4	6.3	5.7	5.1	e16	5.6	9.0
2	6.7	6.3	7.8	5.2	28	8.4	5.9	5.3	5.0	e13	5.2	11
3	4.4	12	6.2	5.0	20	8.9	5.6	5.6	5.5	e12	6.0	12
4	7.1	16	6.0	4.8	83	7.8	7.1	8.8	5.4	e10	7.8	20
5	37	9.0	7.1	4.7	38	12	5.8	32	4.8	e8.5	8.5	6.9
6	8.3	34	32	7.2	23	94	5.5	183	5.5	e8.2	6.6	7.0
7	33	83	8.0	4.6	18	59	6.2	156	4.8	e11	14	6.3
8	8.8	46	8.0	4.6	52	18	5.2	37	4.5	e16	8.0	8.2
9	6.8	14	6.9	4.3	25	40	5.0	22	4.5	e13	6.1	5.5
10	7.9	9.5	5.8	4.4	17	32	4.7	23	6.4	e9.8	7.0	5.2
11	7.9	8.3	5.3	4.0	15	14	4.5	15	12	e8.4	8.2	9.1
12	4.8	6.4	6.9	3.9	24	11	4.3	30	5.1	e7.7	15	9.6
13	8.4	19	25	3.9	80	12	4.3	31	4.5	e7.6	6.9	4.8
14	5.3	10	11	4.0	21	9.6	4.3	13	4.2	e7.6	6.5	4.7
15	5.4	6.2	13	3.7	31	15	4.3	11	4.8	e7.3	5.6	6.3
16	5.8	5.6	8.0	3.4	17	11	4.2	9.9	5.1	6.0	5.1	6.1
17	e4.8	5.3	8.7	4.5	15	65	9.4	9.2	5.4	5.6	4.7	4.3
18	e4.0	4.9	9.4	25	14	18	8.4	11	8.9	9.0	4.5	5.6
19	3.6	4.7	20	19	13	12	4.7	19	e10	19	4.8	17
20	3.4	4.4	17	33	11	9.6	47	25	e6.0	9.2	4.4	7.0
21	4.8	4.1	10	66	10	8.7	11	15	e6.0	13	4.2	5.2
22	5.9	4.0	7.7	19	9.9	8.2	6.2	12	e20	20	4.0	5.7
23	4.1	3.8	21	9.6	9.6	7.8	5.7	9.5	e9.3	8.5	5.3	4.0
24	3.3	3.6	19	6.9	9.4	7.4	5.3	8.5	e12	8.4	14	3.9
25	15	3.6	9.1	9.7	20	7.2	7.6	7.7	e7.8	6.7	8.3	3.7
26	4.1	4.1	7.4	269	10	6.9	11	7.3	e7.6	7.1	6.0	3.5
27	29	219	6.8	123	9.0	7.0	9.8	6.7	e6.9	7.1	6.3	3.2
28	46	23	6.0	51	8.6	7.3	10	5.9	e6.8	7.0	18	3.0
29	6.3	11	12	416	---	19	12	5.7	e6.9	9.5	9.6	2.9
30	4.8	8.5	6.4	63	---	13	7.7	5.5	e13	9.3	32	2.7
31	8.7	---	7.8	68	---	7.2	---	5.3	---	6.1	13	---
TOTAL	338.4	598.5	335.3	1255.9	666.5	565.4	239.0	741.6	213.8	307.6	261.2	203.4
MEAN	10.9	19.9	10.8	40.5	23.8	18.2	7.97	23.9	7.13	9.92	8.43	6.78
MAX	46	219	32	416	83	94	47	183	20	20	32	20
MIN	3.3	3.6	5.3	3.4	8.6	6.9	4.2	5.3	4.2	5.6	4.0	2.7
AC-FT	671	1190	665	2490	1320	1120	474	1470	424	610	518	403

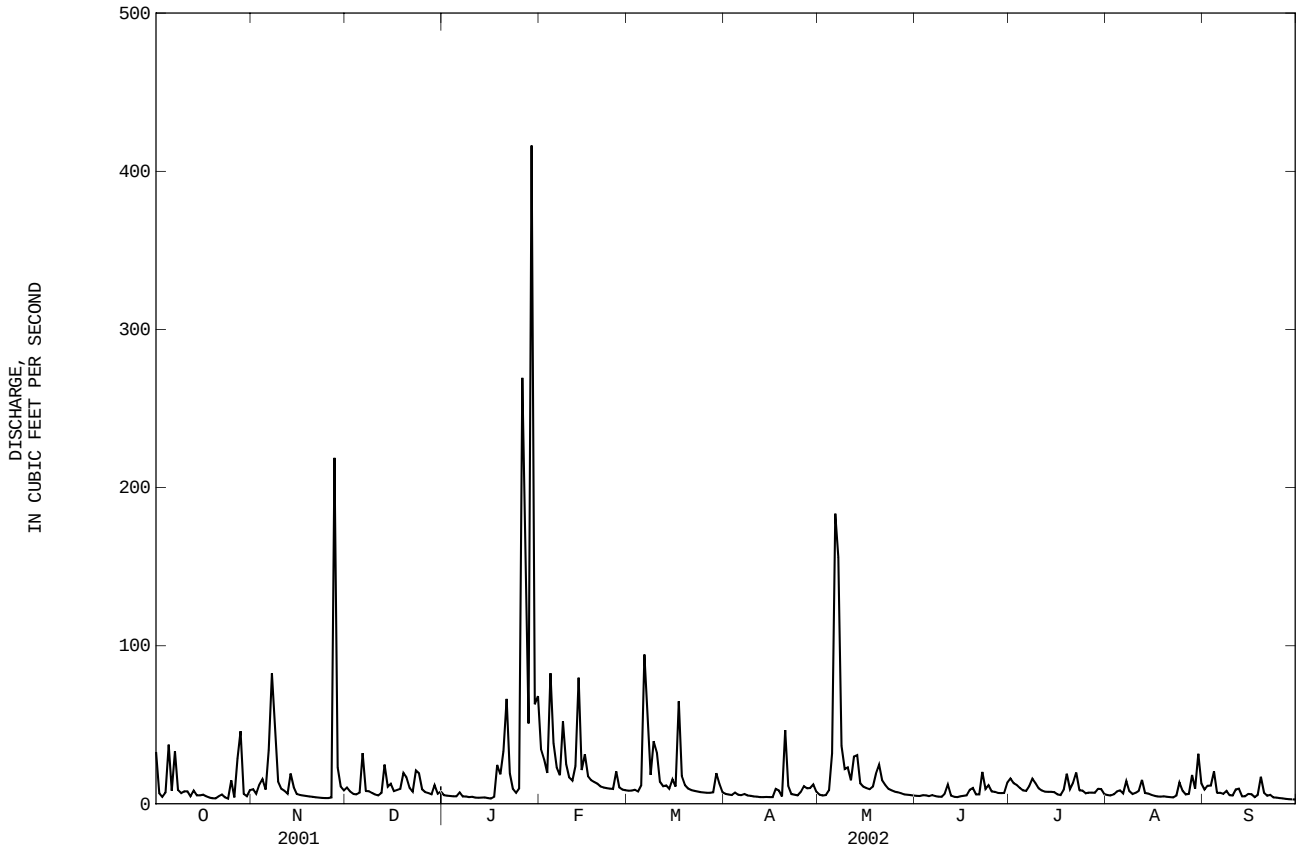
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1999 - 2002, BY WATER YEAR (WY)

MEAN	9.91	16.0	14.6	27.3	14.5	10.1	13.6	12.8	8.33	12.0	11.4	9.92
MAX	11.4	19.9	26.8	40.5	23.8	18.2	21.0	23.9	12.6	17.5	13.1	16.9
(WY)	2001	2002	2000	2002	2002	2002	2000	2002	2001	1999	2000	2000
MIN	7.46	9.03	6.37	6.06	6.08	5.16	7.97	4.75	5.24	5.24	8.43	6.04
(WY)	2000	2000	2001	2001	2000	2000	2002	2000	2000	2001	2002	2001

16247100 MANOA-PALOLO DRAINAGE CANAL AT MOILIILI--Continued

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1999 - 2002	
ANNUAL TOTAL	3844.7		5726.6			
ANNUAL MEAN	10.5		15.7		13.2	
HIGHEST ANNUAL MEAN					15.7	2002
LOWEST ANNUAL MEAN					10.1	2001
HIGHEST DAILY MEAN	219	Nov 27	416	Jan 29	416	Jan 29 2002
LOWEST DAILY MEAN	2.4	Apr 5	2.7	Sep 30	2.4	Apr 5 2001
ANNUAL SEVEN-DAY MINIMUM	2.9	Jul 4	3.3	Sep 24	2.9	Jul 4 2001
ANNUAL RUNOFF (AC-FT)	7630		11360		9590	
10 PERCENT EXCEEDS	20		29		23	
50 PERCENT EXCEEDS	6.3		7.9		6.9	
90 PERCENT EXCEEDS	3.6		4.4		4.0	

e Estimated



16249500 MAUNAWILI DITCH AT AINONI SPRING

LOCATION.--Lat 21°21'08", long 157°46'03", on left bank about 1,000 ft below Siphon 8, 3.2 mi east of Waimanalo Elementary School, and 3.8 mi northeast of Manoa Elementary School.

PERIOD OF RECORD.--June 1991 to September 2002 (discontinued).

GAGE.--Water-stage recorder and concrete control. Elevation of gage is 440 ft above mean sea level (from topographic map).

REMARKS.--Records computed by M.T.J. Ball. Records good. At times flow is diverted above gage by Waimanalo Irrigation System, State Department of Agriculture.

AVERAGE DISCHARGE.--11 years (water years 1992-2002) 1.09 ft^3/s (790 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 2.9 ft^3/s, May 20, 1997; minimum daily, no flow at times.

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge, 2.1 ft^3/s, Jan. 31; minimum daily, 0.20 ft^3/s on Feb. 10.

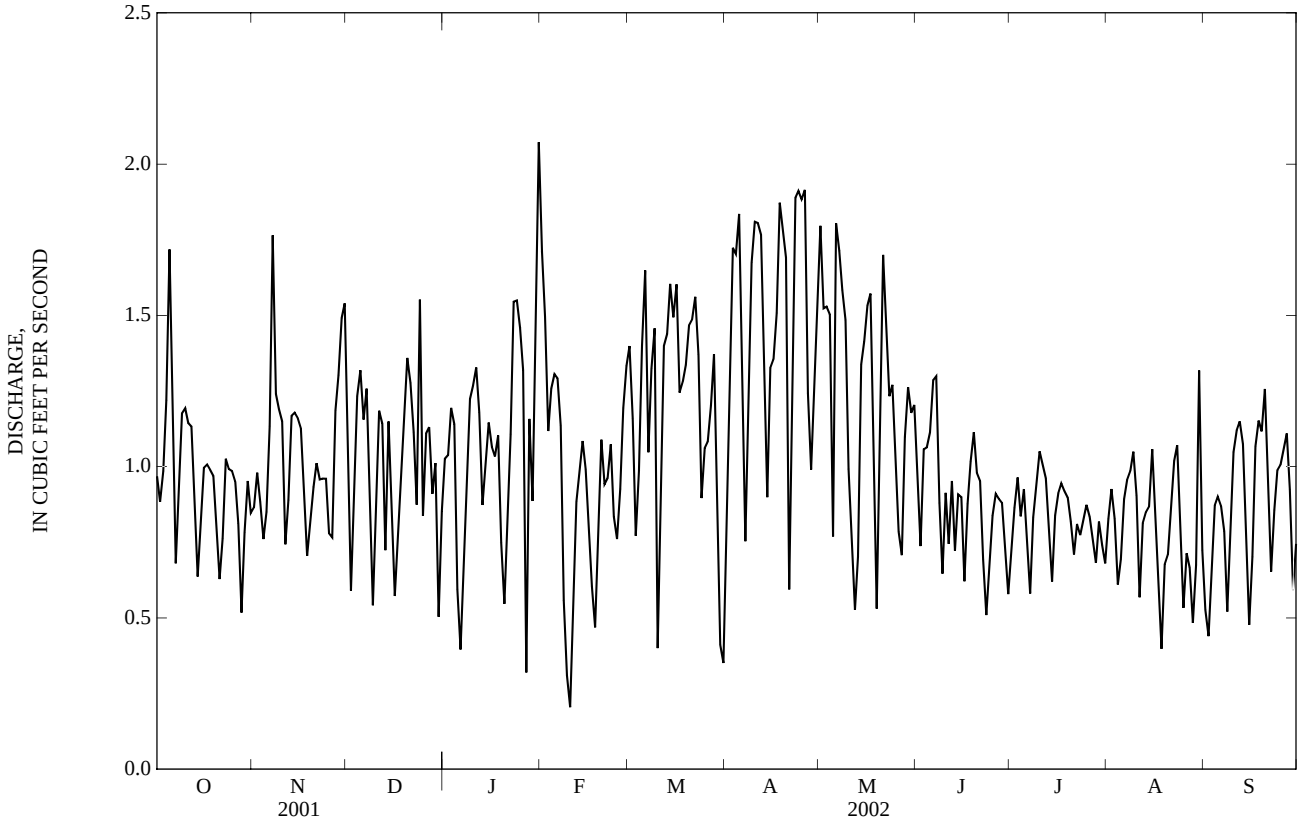
DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.97	0.87	1.0	1.0	1.7	1.4	0.97	1.8	0.93	0.74	0.83	0.53
2	0.88	0.98	0.59	1.0	1.5	1.2	1.3	1.5	0.74	0.86	0.93	0.44
3	0.99	0.88	0.95	1.2	1.1	0.77	1.7	1.5	1.1	0.96	0.83	0.65
4	1.2	0.76	1.2	1.1	1.3	0.99	1.7	1.5	1.1	0.84	0.61	0.87
5	1.7	0.85	1.3	0.59	1.3	1.4	1.8	0.77	1.1	0.93	0.69	0.90
6	1.0	1.1	1.2	0.40	1.3	1.6	1.5	1.8	1.3	0.75	0.89	0.87
7	0.68	1.8	1.3	0.75	1.1	1.0	0.75	1.7	1.3	0.58	0.96	0.79
8	0.97	1.2	0.83	1.00	0.56	1.3	1.3	1.6	0.88	0.83	0.99	0.52
9	1.2	1.2	0.54	1.2	0.31	1.5	1.7	1.5	0.65	0.94	1.0	0.80
10	1.2	1.1	0.81	1.3	0.20	0.40	1.8	0.99	0.91	1.1	0.90	1.0
11	1.1	0.74	1.2	1.3	0.52	0.78	1.8	0.75	0.74	1.0	0.57	1.1
12	1.1	0.89	1.1	1.2	0.88	1.4	1.8	0.53	0.95	0.96	0.81	1.1
13	0.90	1.2	0.72	0.87	0.97	1.4	1.4	0.70	0.72	0.79	0.85	1.1
14	0.64	1.2	1.1	0.99	1.1	1.6	0.90	1.3	0.91	0.62	0.87	0.81
15	0.81	1.2	0.88	1.1	0.99	1.5	1.3	1.4	0.90	0.84	1.1	0.48
16	1.00	1.1	0.57	1.1	0.81	1.6	1.4	1.5	0.62	0.91	0.84	0.70
17	1.0	0.90	0.82	1.0	0.60	1.2	1.5	1.6	0.88	0.94	0.57	1.1
18	0.99	0.71	1.0	1.1	0.47	1.3	1.9	0.92	1.0	0.92	0.40	1.2
19	0.97	0.81	1.2	0.75	0.79	1.3	1.8	0.53	1.1	0.90	0.68	1.1
20	0.80	0.93	1.4	0.55	1.1	1.5	1.7	0.99	0.98	0.82	0.71	1.3
21	0.63	1.0	1.3	0.85	0.94	1.5	0.59	1.7	0.95	0.71	0.85	0.89
22	0.76	0.96	1.1	1.1	0.96	1.6	1.4	1.4	0.69	0.81	1.0	0.65
23	1.0	0.96	0.87	1.5	1.1	1.4	1.9	1.2	0.51	0.77	1.1	0.86
24	0.99	0.96	1.6	1.5	0.83	0.90	1.9	1.3	0.68	0.82	0.79	0.99
25	0.99	0.78	0.84	1.5	0.76	1.1	1.9	1.0	0.84	0.87	0.53	1.0
26	0.95	0.77	1.1	1.3	0.93	1.1	1.9	0.78	0.91	0.83	0.71	1.1
27	0.81	1.2	1.1	0.32	1.2	1.2	1.2	0.71	0.89	0.76	0.67	1.1
28	0.52	1.3	0.91	1.2	1.3	1.4	0.99	1.1	0.88	0.68	0.48	0.93
29	0.78	1.5	1.0	0.89	---	1.0	1.3	1.3	0.72	0.82	0.68	0.59
30	0.95	1.5	0.50	1.4	---	0.41	1.6	1.2	0.58	0.74	1.3	0.74
31	0.85	---	0.85	2.1	---	0.35	---	1.2	---	0.68	0.72	---
TOTAL	29.33	31.35	30.88	33.16	26.62	37.10	44.70	37.77	26.46	25.72	24.86	26.21
MEAN	0.95	1.04	1.00	1.07	0.95	1.20	1.49	1.22	0.88	0.83	0.80	0.87
MAX	1.7	1.8	1.6	2.1	1.7	1.6	1.9	1.8	1.3	1.1	1.3	1.3
MIN	0.52	0.71	0.50	0.32	0.20	0.35	0.59	.53	0.51	0.58	0.40	0.44
AC-FT	58	62	61	66	53	74	89	75	52	51	49	52

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1991 - 2002, BY WATER YEAR (WY)

MEAN	1.17	1.18	0.96	0.83	0.89	1.05	1.07	1.31	1.19	1.16	1.22	1.20
MAX	2.01	1.84	1.86	1.89	1.60	1.76	1.63	1.64	1.80	1.76	1.76	1.90
(WY)	1992	1992	1992	1992	1995	1992	1992	1994	1994	1991	1991	1992
MIN	0.81	0.70	0.11	0.096	0.24	0.34	0.47	0.99	0.86	0.72	0.80	0.78
(WY)	1997	1997	2001	2001	1999	1996	2001	2001	2001	2001	2002	1997

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1991 - 2002	
ANNUAL TOTAL	267.30		274.16			
ANNUAL MEAN	0.73		1.03		1.10	
HIGHEST ANNUAL MEAN					1.75	1992
LOWEST ANNUAL MEAN					0.66	2001
HIGHEST DAILY MEAN	1.8	Nov 7	2.1	Jan 31	2.9	May 20 1997
LOWEST DAILY MEAN	0.08	Jan 3	0.20	Feb 10	0.00	Jan 1 1993
ANNUAL SEVEN-DAY MINIMUM	0.09	Jan 17	0.65	Feb 7	0.00	Jan 12 1999
ANNUAL RUNOFF (AC-FT)	530		742		790	
10 PERCENT EXCEEDS	1.2		1.5		1.8	
50 PERCENT EXCEEDS	0.82		0.98		1.1	
90 PERCENT EXCEEDS	0.10		0.62		0.44	


DISCHARGE,
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16250000 MAUNAWILI DITCH NEAR WAIMANALO

LOCATION.--Lat 21°20'45", long 157°45'10", Hydrologic unit 20060000, on left bank about 80 ft downstream from Aniani Nui Ridge tunnel, and 3.5 mi. west of Waimanalo Post Office.

PERIOD OF RECORD.--March 1954 to September 1968, October 1993 to September 2002 (discontinued).

GAGE.--Water-stage recorder with concrete Columbus type control. Altitude of gage is 390 ft above mean sea level (from topographic map). Prior to July 12, 1993, water stage recorder at same site with different datum.

REMARKS.--Records computed by M.T.J. Ball. Records fair. Ditch diverts from headwaters of Maunawili and Makawao Streams for irrigation in vicinity of Waimanalo.

AVERAGE DISCHARGE.--23 years (water years 1955-68, 1994-2002) 2.07 ft^3/s (1,500 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 11 ft^3/s, March 5, 1958; minimum daily, no flow at times.

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge, 2.4 ft^3/s, May 6-7; minimum daily, 0.40 ft^3/s, March 31.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

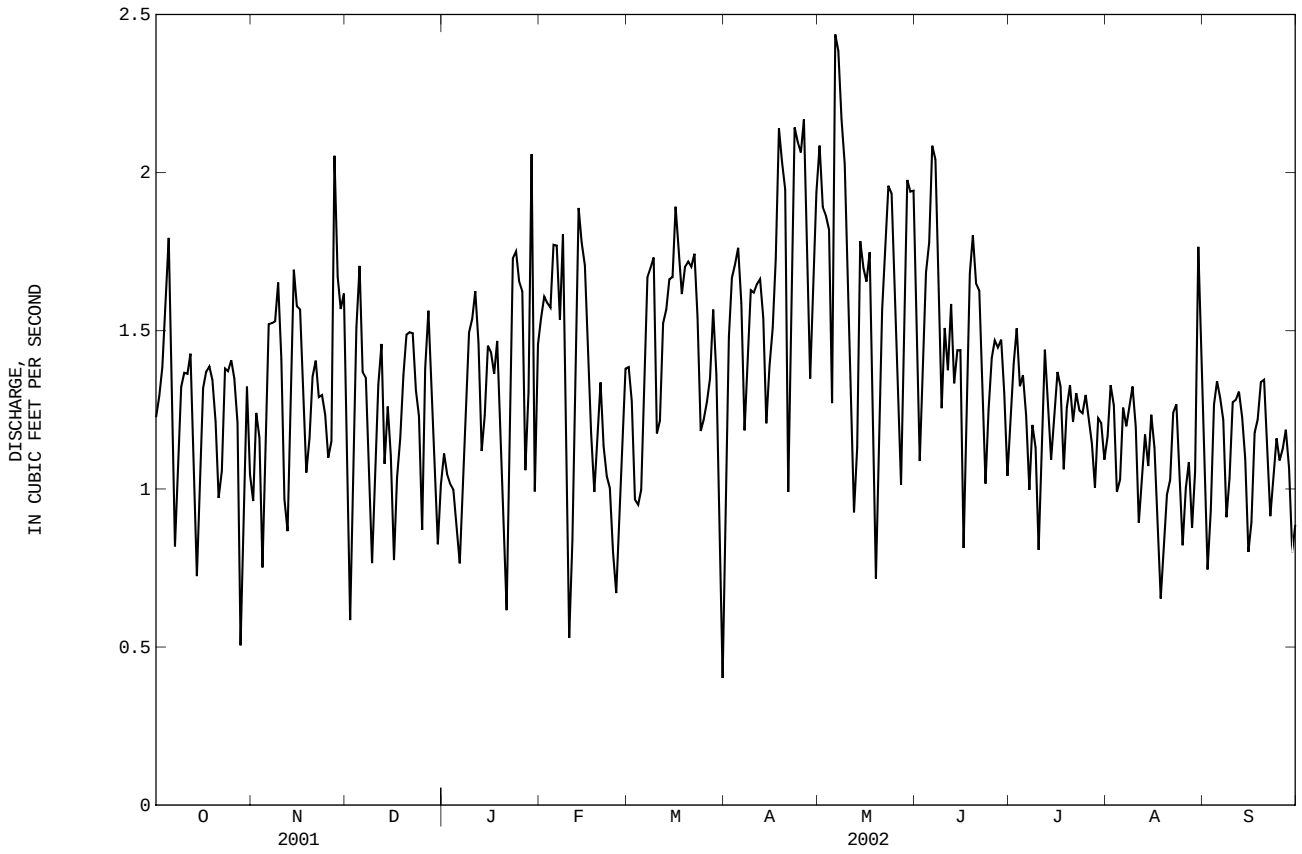
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.2	0.96	1.2	1.1	1.5	1.4	0.99	2.1	1.7	1.2	1.2	0.93
2	1.3	1.2	0.59	1.0	1.6	1.3	1.5	1.9	1.1	1.4	1.3	0.75
3	1.4	1.2	0.98	1.0	1.6	0.97	1.7	1.9	1.5	1.5	1.3	0.93
4	1.6	0.75	1.5	1.00	1.6	0.95	1.7	1.8	1.7	1.3	0.99	1.3
5	1.8	1.1	1.7	0.89	1.8	1.00	1.8	1.3	1.8	1.4	1.0	1.3
6	1.2	1.5	1.4	0.76	1.8	1.3	1.6	2.4	2.1	1.2	1.3	1.3
7	0.82	1.5	1.4	0.98	1.5	1.7	1.2	2.4	2.0	1.00	1.2	1.2
8	1.1	1.5	1.0	1.3	1.8	1.7	1.4	2.2	1.6	1.2	1.3	0.91
9	1.3	1.7	0.77	1.5	1.4	1.7	1.6	2.0	1.3	1.1	1.3	1.0
10	1.4	1.4	1.1	1.5	0.53	1.2	1.6	1.5	1.5	0.81	1.2	1.3
11	1.4	0.97	1.3	1.6	0.84	1.2	1.6	1.2	1.4	1.2	0.89	1.3
12	1.4	0.87	1.5	1.5	1.5	1.5	1.7	0.93	1.6	1.4	1.0	1.3
13	1.1	1.3	1.1	1.1	1.9	1.6	1.5	1.1	1.3	1.3	1.2	1.2
14	0.72	1.7	1.3	1.2	1.8	1.7	1.2	1.8	1.4	1.1	1.1	1.1
15	0.96	1.6	1.1	1.5	1.7	1.7	1.4	1.7	1.4	1.2	1.2	0.80
16	1.3	1.6	0.77	1.4	1.5	1.9	1.5	1.7	0.81	1.4	1.1	0.89
17	1.4	1.3	1.0	1.4	1.2	1.7	1.7	1.7	1.3	1.3	0.84	1.2
18	1.4	1.1	1.2	1.5	0.99	1.6	2.1	1.1	1.7	1.1	0.65	1.2
19	1.3	1.2	1.4	1.1	1.2	1.7	2.0	0.72	1.8	1.3	0.83	1.3
20	1.2	1.4	1.5	0.83	1.3	1.7	1.9	1.3	1.6	1.3	0.98	1.3
21	0.97	1.4	1.5	0.62	1.1	1.7	0.99	1.6	1.6	1.2	1.0	1.1
22	1.1	1.3	1.5	1.1	1.0	1.7	1.5	1.8	1.3	1.3	1.2	0.91
23	1.4	1.3	1.3	1.7	1.0	1.5	2.1	2.0	1.0	1.2	1.3	1.0
24	1.4	1.2	1.2	1.8	0.80	1.2	2.1	1.9	1.2	1.2	1.1	1.2
25	1.4	1.1	0.87	1.7	0.67	1.2	2.1	1.6	1.4	1.3	0.82	1.1
26	1.3	1.2	1.4	1.6	0.95	1.3	2.2	1.3	1.5	1.2	1.0	1.1
27	1.2	2.1	1.6	1.1	1.2	1.3	1.7	1.0	1.4	1.1	1.1	1.2
28	0.50	1.7	1.3	1.3	1.4	1.6	1.3	1.4	1.5	1.0	0.88	1.1
29	0.84	1.6	1.1	2.1	---	1.4	1.7	2.0	1.3	1.2	1.1	0.80
30	1.3	1.6	0.82	0.99	---	0.75	1.9	1.9	1.0	1.2	1.8	0.89
31	1.0	---	1.0	1.5	---	0.40	---	1.9	---	1.1	1.2	---
TOTAL	37.71	40.35	37.40	39.67	37.18	43.57	49.28	51.15	43.81	37.71	34.38	32.91
MEAN	1.22	1.34	1.21	1.28	1.33	1.41	1.64	1.65	1.46	1.22	1.11	1.10
MAX	1.8	2.1	1.7	2.1	1.9	1.9	2.2	2.4	2.1	1.5	1.8	1.3
MIN	0.50	0.75	0.59	0.62	0.53	0.40	0.99	0.72	0.81	0.81	0.65	0.75
AC-FT	75	80	74	79	74	86	98	101	87	75	68	65

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1954 - 2002, BY WATER YEAR (WY)

MEAN	2.42	2.13	1.47	1.44	1.35	1.60	2.13	2.64	2.67	2.47	2.45	2.43
MAX	4.36	3.87	3.24	3.22	2.68	3.89	4.07	4.90	4.52	4.02	4.74	4.61
(WY)	1955	1955	1961	1955	1957	1956	1966	1955	1955	1955	1954	1954
MIN	1.00	0.85	0.026	0.000	0.000	0.097	0.39	1.19	1.14	0.92	1.11	0.61
(WY)	1998	1998	1968	1968	1968	1968	1963	1965	1997	1997	2002	1968

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1954 - 2002	
ANNUAL TOTAL	403.99		485.12			
ANNUAL MEAN	1.11		1.33		2.07	
HIGHEST ANNUAL MEAN					3.43	1955
LOWEST ANNUAL MEAN					1.06	1997
HIGHEST DAILY MEAN	2.1	Nov 27	2.4	May 6	11	Mar 5 1958
LOWEST DAILY MEAN	0.46	Aug 19	0.40	Mar 31	0.00	Dec 27 1955
ANNUAL SEVEN-DAY MINIMUM	0.54	Feb 28	0.94	Aug 15	0.00	Dec 27 1955
ANNUAL RUNOFF (AC-FT)	801		962		1500	
10 PERCENT EXCEEDS	1.5		1.8		3.7	
50 PERCENT EXCEEDS	1.2		1.3		1.8	
90 PERCENT EXCEEDS	0.63		0.91		0.61	

16250000 MAUNAWILI DITCH NEAR WAIMANALO--Continued



16254000 MAKAWAO STREAM NEAR KAILUA

LOCATION.--Lat 21°21'49", long 157°46'02", Hydrologic Unit 20060000, on left bank 650 ft upstream of confluence with Maunawili Stream, 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 above mean sea level (from topographic map). Prior to January 1, 1958, nonrecording gage at sites about 200 ft upstream at different datums.

REMARKS.--Records computed by M.T.J. Ball. Records good. Maunawili ditch diverts water 1.5 mi upstream of station for irrigation in vicinity of Waimanalo. Records do not include flow of Maunawili ditch (stations 16249500 and 16250000).

AVERAGE DISCHARGE.--46 years (water years 1914-15, 1959-2002), 4.87 ft^3/s (3,530 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 6,000 ft^3/s, February 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, September 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)
Jan 29	0545	*443	*5.14	No other peak greater than base discharge.			

Minimum discharge, 0.89 ft^3/s, on several days.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

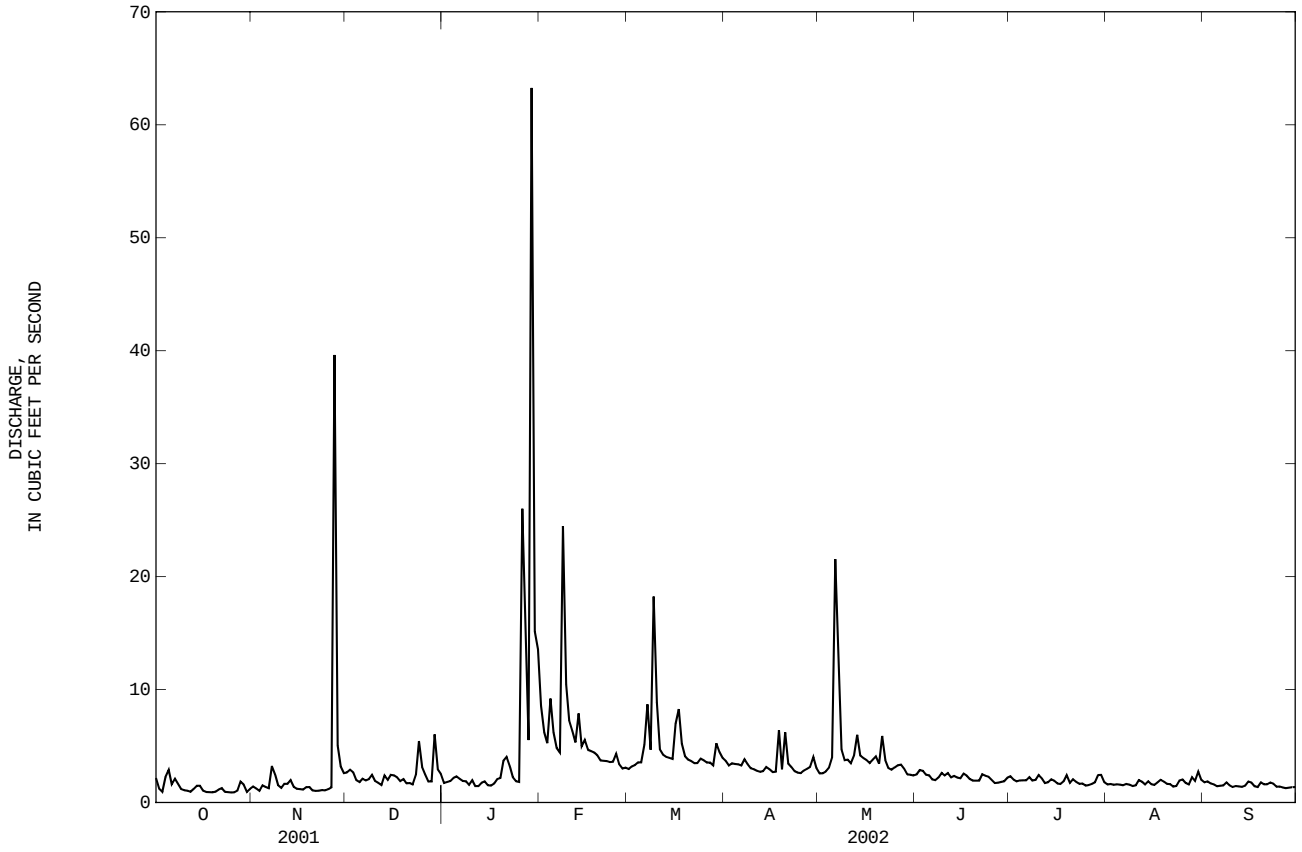
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.2	1.4	2.7	1.7	8.6	3.0	3.7	2.6	2.5	2.3	1.6	1.8
2	1.2	1.2	2.9	1.8	6.2	3.2	3.3	2.6	2.9	2.0	1.6	1.9
3	0.94	1.0	2.7	1.9	5.3	3.3	3.5	2.7	2.8	1.9	1.6	1.7
4	2.3	1.5	2.0	2.2	9.2	3.5	3.4	3.1	2.5	1.9	1.6	1.6
5	2.9	1.4	1.8	2.3	6.2	3.5	3.4	4.0	2.4	2.0	1.6	1.4
6	1.6	1.3	2.1	2.1	4.8	5.1	3.3	22	2.0	2.0	1.5	1.5
7	2.1	3.2	2.0	1.9	4.4	8.7	3.8	12	2.0	2.2	1.6	1.5
8	1.7	2.5	2.1	1.9	24	4.7	3.4	4.7	2.2	2.0	1.6	1.8
9	1.2	1.5	2.4	1.6	10	18	3.0	3.8	2.6	2.0	1.5	1.5
10	1.1	1.3	1.9	2.0	7.3	8.9	2.9	3.8	2.4	2.4	1.5	1.4
11	1.0	1.6	1.7	1.5	6.3	4.7	2.8	3.5	2.6	2.1	2.0	1.4
12	0.94	1.7	1.5	1.5	5.3	4.2	2.7	4.1	2.2	1.7	1.8	1.4
13	1.2	2.0	2.4	1.8	7.9	4.0	2.8	6.0	2.4	1.8	1.6	1.4
14	1.5	1.4	2.0	1.9	5.0	3.9	3.1	4.2	2.2	2.0	1.9	1.5
15	1.5	1.2	2.4	1.5	5.5	3.8	2.9	3.9	2.2	1.9	1.6	1.9
16	1.0	1.2	2.4	1.5	4.7	7.0	2.7	3.8	2.6	1.7	1.6	1.8
17	0.93	1.1	2.2	1.7	4.5	8.3	2.7	3.5	2.4	1.6	1.8	1.4
18	0.92	1.4	1.9	2.1	4.4	5.2	6.4	3.8	2.1	1.9	2.0	1.4
19	0.91	1.4	2.1	2.2	4.2	4.1	2.9	4.1	1.9	2.4	1.9	1.8
20	0.96	1.1	1.7	3.7	3.7	3.8	6.2	3.4	1.9	1.7	1.7	1.6
21	1.1	1.0	1.7	4.0	3.7	3.7	3.5	5.9	1.9	2.1	1.6	1.6
22	1.3	1.0	1.6	3.2	3.7	3.5	3.1	3.7	2.5	1.8	1.4	1.8
23	0.95	1.1	2.4	2.2	3.6	3.5	2.8	3.1	2.4	1.7	1.5	1.7
24	0.91	1.1	5.4	1.9	3.6	3.9	2.6	2.9	2.3	1.7	1.9	1.4
25	0.89	1.2	3.1	1.8	4.3	3.7	2.6	3.1	2.0	1.5	2.0	1.4
26	0.91	1.3	2.5	26	3.4	3.5	2.8	3.3	1.7	1.5	1.7	1.3
27	1.1	40	1.9	15	3.0	3.5	3.0	3.4	1.8	1.6	1.6	1.3
28	1.8	5.0	1.9	5.5	3.1	3.3	3.2	3.0	1.8	1.8	2.2	1.3
29	1.6	3.2	6.0	63	---	5.2	4.0	2.5	1.9	2.4	1.9	1.4
30	0.94	2.6	2.9	15	---	4.5	3.1	2.5	2.2	2.4	2.7	1.4
31	1.2	---	2.5	14	---	3.9	---	2.4	---	1.8	2.0	---
TOTAL	40.80	87.9	74.8	190.4	165.9	153.1	99.6	137.4	67.3	59.8	54.1	46.3
MEAN	1.32	2.93	2.41	6.14	5.92	4.94	3.32	4.43	2.24	1.93	1.75	1.54
MAX	2.9	40	6.0	63	24	18	6.4	22	2.9	2.4	2.7	1.9
MIN	0.89	1.0	1.5	1.5	3.0	3.0	2.6	2.4	1.7	1.5	1.4	1.3
AC-FT	81	174	148	378	329	304	198	273	133	119	107	92

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1913 - 2002, BY WATER YEAR (WY)

MEAN	2.90	5.40	6.63	8.10	6.73	7.26	6.33	5.14	3.22	2.65	2.50	2.41
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	0.99	1.22	1.24	1.11	1.25	1.17	1.40	1.15	1.16	1.10	1.00
(WY)	1976	1963	1978	1973	1978	1978	2001	1973	1973	2001	2001	1975

16254000 MAKAWAO STREAM NEAR KAILUA--Continued

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1913 - 2002	
ANNUAL TOTAL	616.80		1177.40			
ANNUAL MEAN	1.69		3.23		4.87	
HIGHEST ANNUAL MEAN					11.1	1982
LOWEST ANNUAL MEAN					1.31	1973
HIGHEST DAILY MEAN	40	Nov 27	63	Jan 29	518	Dec 31 1987
LOWEST DAILY MEAN	0.76	Jul 27	0.89	Oct 25	0.50	Sep 8 1964
ANNUAL SEVEN-DAY MINIMUM	0.91	Jul 24	1.0	Oct 19	0.67	Sep 8 1964
ANNUAL RUNOFF (AC-FT)	1220		2340		3530	
10 PERCENT EXCEEDS	2.4		5.0		8.3	
50 PERCENT EXCEEDS	1.3		2.2		2.7	
90 PERCENT EXCEEDS	0.94		1.3		1.4	



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.

PERIOD OF RECORD.--November 1976 to current year.

REVISED RECORDS.--WDR HI-92-1: 1991(M).

GAGE.--Water-stage recorder and concrete control. Datum of gage is 116.39 ft above mean sea level (levels by Corps of Engineers).

REMARKS.--Records computed by A.K. Seid. Records good below 400 ft^3/s and poor above that. Flow regulated by a flood-control dam upstream.

AVERAGE DISCHARGE.--25 years (water years 1977-2002), 10.1 ft^3/s (7,340 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,760 ft^3/s, January 25, 1996, gage height, 5.72 ft, from rating curve extended above 200 ft^3/s; minimum, 0.22 ft^3/s , September 25-26, 2000.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 360 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Mar 9	2145	373	3.46	May 6	2100	*758	*4.32

Minimum discharge, 0.56 ft^3/s, Oct. 18, 25, 26, gage height, 1.14 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

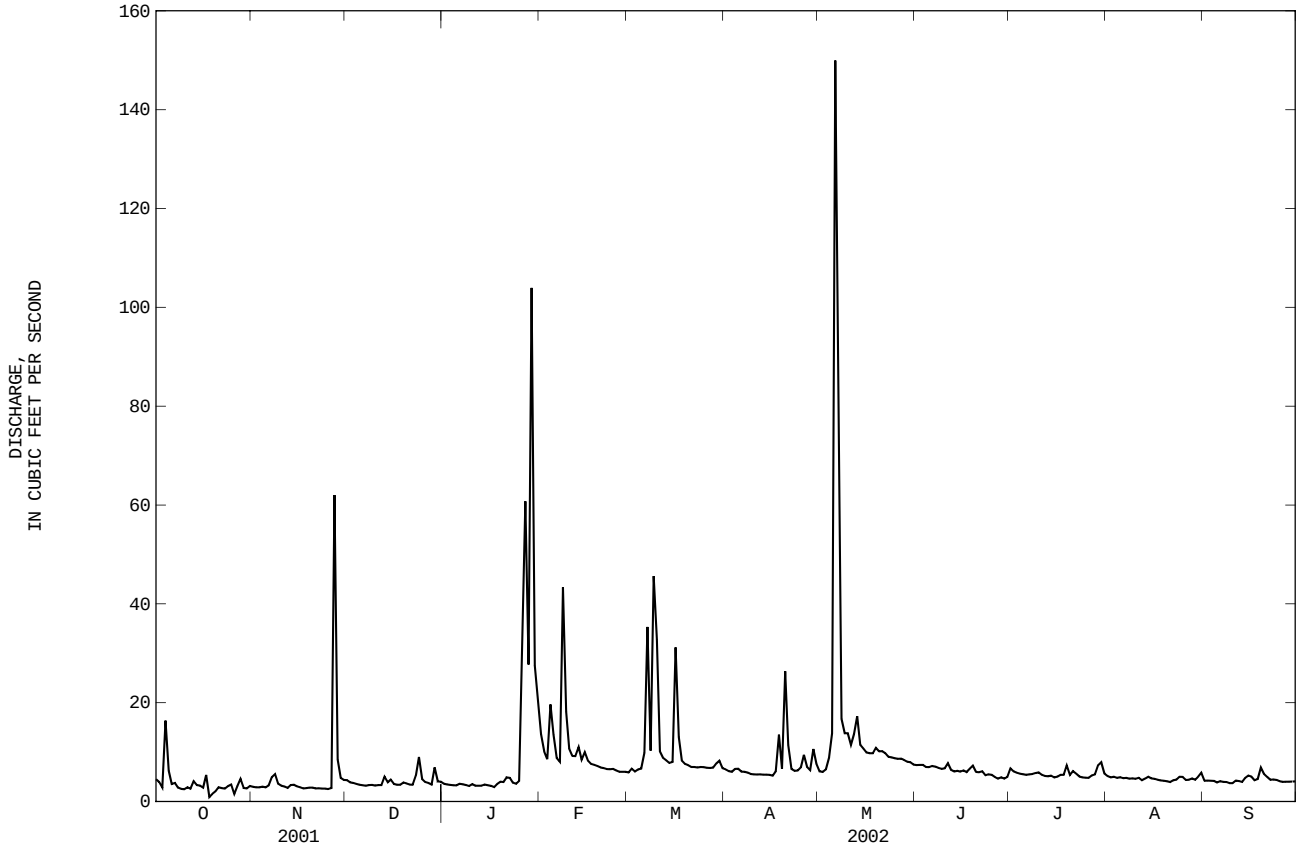
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	4.5	3.0	4.3	3.6	14	5.9	6.5	6.1	7.4	6.7	5.1	4.2
2	3.9	2.9	3.9	3.5	10	6.6	6.2	6.0	7.4	6.1	4.9	4.2
3	2.8	2.9	3.8	3.4	8.6	6.1	6.0	6.5	7.4	5.8	5.0	4.2
4	16	3.0	3.6	3.3	20	6.5	6.6	8.9	7.0	5.6	4.8	4.2
5	6.3	2.9	3.4	3.3	14	6.7	6.6	14	7.0	5.5	4.9	3.8
6	3.5	3.3	3.3	3.6	8.8	9.9	6.0	150	7.2	5.4	4.7	4.1
7	3.7	4.9	3.2	3.5	8.0	35	6.0	67	7.1	5.5	4.8	4.0
8	2.8	5.6	3.3	3.3	43	10	5.8	17	6.8	5.6	4.6	3.9
9	2.5	3.6	3.4	3.1	18	46	5.6	14	6.6	5.8	4.7	3.7
10	2.5	3.2	3.2	3.5	11	33	5.5	14	6.7	5.9	4.6	3.7
11	2.9	3.0	3.3	3.2	9.2	10	5.5	11	7.8	5.4	4.8	4.2
12	2.6	2.7	3.3	3.2	9.2	8.8	5.5	14	6.4	5.2	4.3	4.1
13	4.1	3.3	5.0	3.2	11	8.3	5.4	17	6.1	5.1	4.6	3.9
14	3.3	3.4	3.9	3.4	8.4	7.8	5.4	11	6.2	5.2	5.0	4.7
15	3.2	3.1	4.4	3.3	10	8.0	5.4	11	6.0	4.9	4.7	5.2
16	2.8	2.9	3.5	3.2	8.2	31	5.2	9.9	6.3	5.0	4.6	5.0
17	5.4	2.6	3.4	2.9	7.6	13	6.1	9.8	5.9	5.4	4.4	4.3
18	0.90	2.7	3.4	3.6	7.4	8.3	14	9.8	6.7	5.4	4.3	4.5
19	1.6	2.8	3.8	4.0	7.2	7.6	6.6	11	7.3	7.3	4.2	6.9
20	2.1	2.8	3.6	3.9	6.9	7.3	26	10	6.0	5.4	4.1	5.6
21	2.9	2.6	3.4	4.9	6.7	7.0	11	10	5.9	6.1	3.9	5.0
22	2.7	2.7	3.4	4.8	6.6	7.0	6.6	9.8	6.1	5.6	4.3	4.4
23	2.6	2.6	5.3	3.8	6.5	6.9	6.2	9.1	5.3	5.0	4.4	4.5
24	3.1	2.6	9.0	3.6	6.6	7.0	6.3	8.9	5.5	4.9	5.0	4.4
25	3.4	2.5	4.5	4.2	6.3	6.9	6.9	8.8	5.4	4.8	5.0	4.1
26	1.5	2.7	3.9	32	6.0	6.8	9.5	8.6	5.0	4.8	4.3	4.0
27	3.2	62	3.8	61	6.0	6.8	7.0	8.7	4.6	5.3	4.4	4.0
28	4.6	8.5	3.4	28	6.0	6.9	6.3	8.4	4.9	5.5	4.7	4.0
29	2.7	4.8	6.9	104	---	7.7	11	8.1	4.6	7.3	4.4	4.0
30	2.7	4.4	4.1	28	---	8.2	7.7	7.9	5.0	7.9	5.0	4.1
31	3.1	---	4.0	20	---	6.7	---	7.5	---	5.7	5.8	---
TOTAL	109.90	160.0	124.7	362.3	291.2	353.7	224.4	513.8	187.6	175.1	144.3	130.9
MEAN	3.55	5.33	4.02	11.7	10.4	11.4	7.48	16.6	6.25	5.65	4.65	4.36
MAX	16	62	9.0	104	43	46	26	150	7.8	7.9	5.8	6.9
MIN	0.90	2.5	3.2	2.9	6.0	5.9	5.2	6.0	4.6	4.8	3.9	3.7
AC-FT	218	317	247	719	578	702	445	1020	372	347	286	260

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1977 - 2002, BY WATER YEAR (WY)

MEAN	7.55	10.6	11.5	14.5	11.7	12.8	11.6	10.3	8.36	7.45	6.95	6.84
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	3.29	4.02	4.05	3.83	4.03	3.82	3.44	2.65	2.75	2.89	2.27
(WY)	1985	2000	2002	1977	1978	1978	2001	2000	2000	2001	2001	2001

16272200 KAMOOALII STREAM BELOW LULUKU STREAM NEAR KANEOHE--Continued

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1977 - 2002	
ANNUAL TOTAL	1478.60		2777.90			
ANNUAL MEAN	4.05		7.61		10.1	
HIGHEST ANNUAL MEAN					22.0	1982
LOWEST ANNUAL MEAN					4.32	2001
HIGHEST DAILY MEAN	62	Nov 27	150	May 6	723	Jan 1 1988
LOWEST DAILY MEAN	0.90	Oct 18	0.90	Oct 18	0.29	Oct 10 1984
ANNUAL SEVEN-DAY MINIMUM	1.9	Sep 1	2.3	Oct 18	0.30	Oct 10 1984
ANNUAL RUNOFF (AC-FT)	2930		5510		7340	
10 PERCENT EXCEEDS	5.2		10		16	
50 PERCENT EXCEEDS	3.4		5.3		7.0	
90 PERCENT EXCEEDS	2.5		3.1		3.8	



16275000 HAIKU STREAM NEAR HEEIA

LOCATION.--Lat 21°24'45", long 157°49'35", 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.

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 April 28, 1914, nonrecording gage and April 28, 1914 to October 25, 1919, water-stage recorder, at same site at different datums.

REMARKS.--Records computed by M.T.J Ball. Records poor. Honolulu Board of Water Supply has diverted ground water from tunnel in drainage area since 1943.

AVERAGE DISCHARGE (since diversion from tunnel began).--54 years (water years 1944-77, 1983-2002), 2.19 ft^3/s, (1,590 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, September 17, 1961.

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)
May 6	2130	*402	*3.13	No other peak greater than base discharge.			

Minimum daily discharge, 1.2 ft^3/s, on several days.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

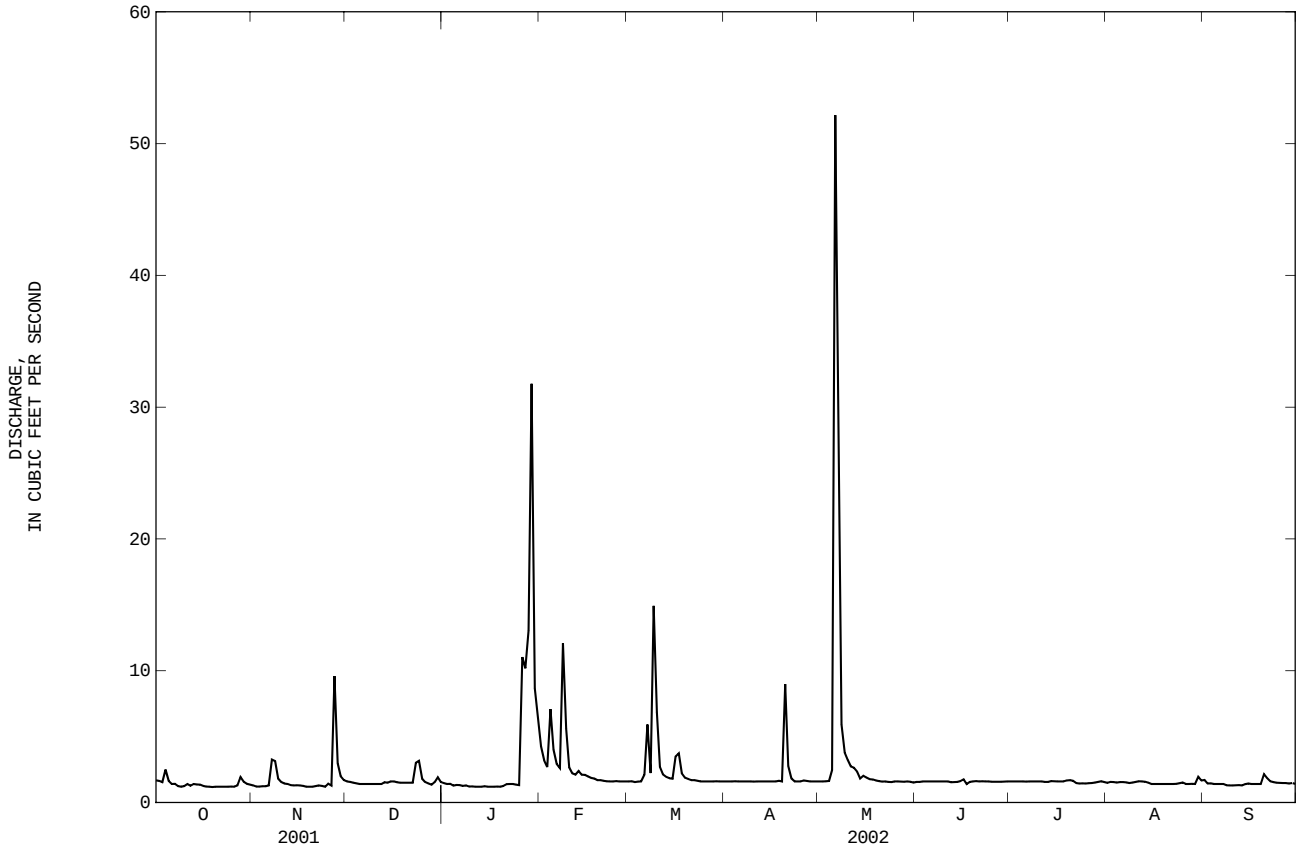
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.7	1.3	1.6	1.5	4.3	1.6	1.6	1.6	1.6	1.6	1.5	1.7
2	1.6	1.2	1.6	1.4	3.2	1.6	1.6	1.6	1.6	1.6	1.6	1.4
3	1.5	1.2	1.5	1.4	2.7	1.6	1.6	1.6	1.6	1.6	1.6	1.5
4	2.5	1.2	1.5	1.3	7.1	1.6	1.6	1.6	1.6	1.6	1.5	1.4
5	1.6	1.2	1.4	1.3	4.0	1.6	1.6	2.5	1.6	1.6	1.6	1.4
6	1.4	1.3	1.4	1.3	2.9	2.1	1.6	52	1.6	1.6	1.6	1.4
7	1.4	3.3	1.4	1.3	2.6	5.9	1.6	18	1.6	1.6	1.5	1.4
8	1.2	3.1	1.4	1.3	12	2.2	1.6	5.9	1.6	1.6	1.5	1.3
9	1.2	1.8	1.4	1.2	5.6	15	1.6	3.8	1.6	1.6	1.5	1.3
10	1.3	1.5	1.4	1.2	2.7	6.9	1.6	3.2	1.6	1.6	1.6	1.3
11	1.4	1.4	1.4	1.2	2.2	2.7	1.6	2.7	1.6	1.6	1.6	1.3
12	1.3	1.4	1.4	1.2	2.1	2.1	1.6	2.6	1.5	1.6	1.6	1.3
13	1.4	1.3	1.5	1.2	2.4	1.9	1.6	2.3	1.6	1.6	1.6	1.3
14	1.4	1.3	1.5	1.2	2.1	1.8	1.6	1.8	1.6	1.6	1.5	1.4
15	1.4	1.3	1.6	1.2	2.1	1.8	1.6	2.0	1.6	1.6	1.4	1.4
16	1.3	1.3	1.6	1.2	2.0	3.5	1.6	1.9	1.8	1.6	1.4	1.4
17	1.2	1.3	1.5	1.2	1.9	3.7	1.6	1.8	1.4	1.6	1.4	1.4
18	1.2	1.2	1.5	1.2	1.8	2.2	1.6	1.7	1.6	1.6	1.4	1.4
19	1.2	1.2	1.5	1.2	1.7	1.9	1.6	1.7	1.6	1.7	1.4	1.4
20	1.2	1.2	1.5	1.3	1.7	1.8	9.0	1.6	1.6	1.7	1.4	2.1
21	1.2	1.3	1.5	1.4	1.6	1.7	2.8	1.6	1.6	1.7	1.4	1.9
22	1.2	1.3	1.5	1.4	1.6	1.7	1.8	1.6	1.6	1.5	1.4	1.6
23	1.2	1.3	3.0	1.4	1.6	1.6	1.6	1.6	1.6	1.4	1.4	1.6
24	1.2	1.2	3.2	1.4	1.6	1.6	1.6	1.6	1.6	1.4	1.5	1.5
25	1.2	1.4	1.8	1.3	1.6	1.6	1.6	1.6	1.6	1.4	1.5	1.5
26	1.2	1.3	1.5	11	1.6	1.6	1.7	1.6	1.6	1.5	1.4	1.5
27	1.3	9.6	1.4	10	1.6	1.6	1.6	1.6	1.6	1.5	1.4	1.5
28	1.9	3.0	1.3	13	1.6	1.6	1.6	1.6	1.6	1.5	1.4	1.4
29	1.6	2.0	1.5	32	---	1.6	1.6	1.6	1.6	1.6	1.4	1.5
30	1.4	1.7	1.9	8.7	---	1.6	1.6	1.6	1.6	1.6	1.9	1.4
31	1.4	---	1.6	6.3	---	1.6	---	1.5	---	1.5	1.7	---
TOTAL	43.2	54.1	49.8	113.2	79.9	81.3	56.9	129.4	47.9	48.8	46.6	43.9
MEAN	1.39	1.80	1.61	3.65	2.85	2.62	1.90	4.17	1.60	1.57	1.50	1.46
MAX	2.5	9.6	3.2	32	12	15	9.0	52	1.8	1.7	1.9	2.1
MIN	1.2	1.2	1.3	1.2	1.6	1.6	1.6	1.5	1.4	1.4	1.4	1.3
AC-FT	86	107	99	225	158	161	113	257	95	97	92	87

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1944 - 2002, BY WATER YEAR (WY)

MEAN	1.90	2.71	2.62	2.64	2.46	3.17	2.48	2.33	1.41	1.55	1.57	1.45
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	0.32	0.33	0.64	0.94	0.86	0.60	0.50	0.51	0.38	0.41	0.56	0.36
(WY)	1946	1946	1960	1977	1963	1946	1946	1961	1946	1945	1961	1945

16275000 HAIKU STREAM NEAR HEEIA--Continued

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1944 - 2002	
ANNUAL TOTAL	529.5		795.0			
ANNUAL MEAN	1.45		2.18		2.19	
HIGHEST ANNUAL MEAN					4.82	1965
LOWEST ANNUAL MEAN					0.67	1946
HIGHEST DAILY MEAN	13	Feb 12	52	May 6	620	May 2 1965
LOWEST DAILY MEAN	1.1	Jun 29	1.2	Oct 8	0.29	Jul 13 1945
ANNUAL SEVEN-DAY MINIMUM	1.1	Aug 26	1.2	Oct 17	0.29	Oct 19 1945
ANNUAL RUNOFF (AC-FT)	1050		1580		1590	
10 PERCENT EXCEEDS	1.6		2.6		2.6	
50 PERCENT EXCEEDS	1.4		1.6		1.5	
90 PERCENT EXCEEDS	1.1		1.3		0.93	



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.

DRAINAGE AREA.--0.84 mi^2.

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

REVISED RECORDS.--WDR HI-01-1:Drainage Area.

GAGE.--Water-stage recorder and concrete control. Elevation of gage is 150 ft above mean sea level (from topographic map).

REMARKS.--Records computed by H.A. Jeppesen. 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.--19 years (water years 1984-2002), 3.06 ft^3/s (2,220 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1100 ft^3/s (revised), September 18, 1994, gage height, 6.05 ft; minimum, 0.47 ft^3/s on October 20-27, 2001.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 399 ft^3/s (revised) and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Jan 28	2345	400	3.57	May 6	0545	671	4.45
Mar 16	1345	*741	*4.70				

Minimum discharge, 0.47 ft^3/s, on several days, gage height, 1.05 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

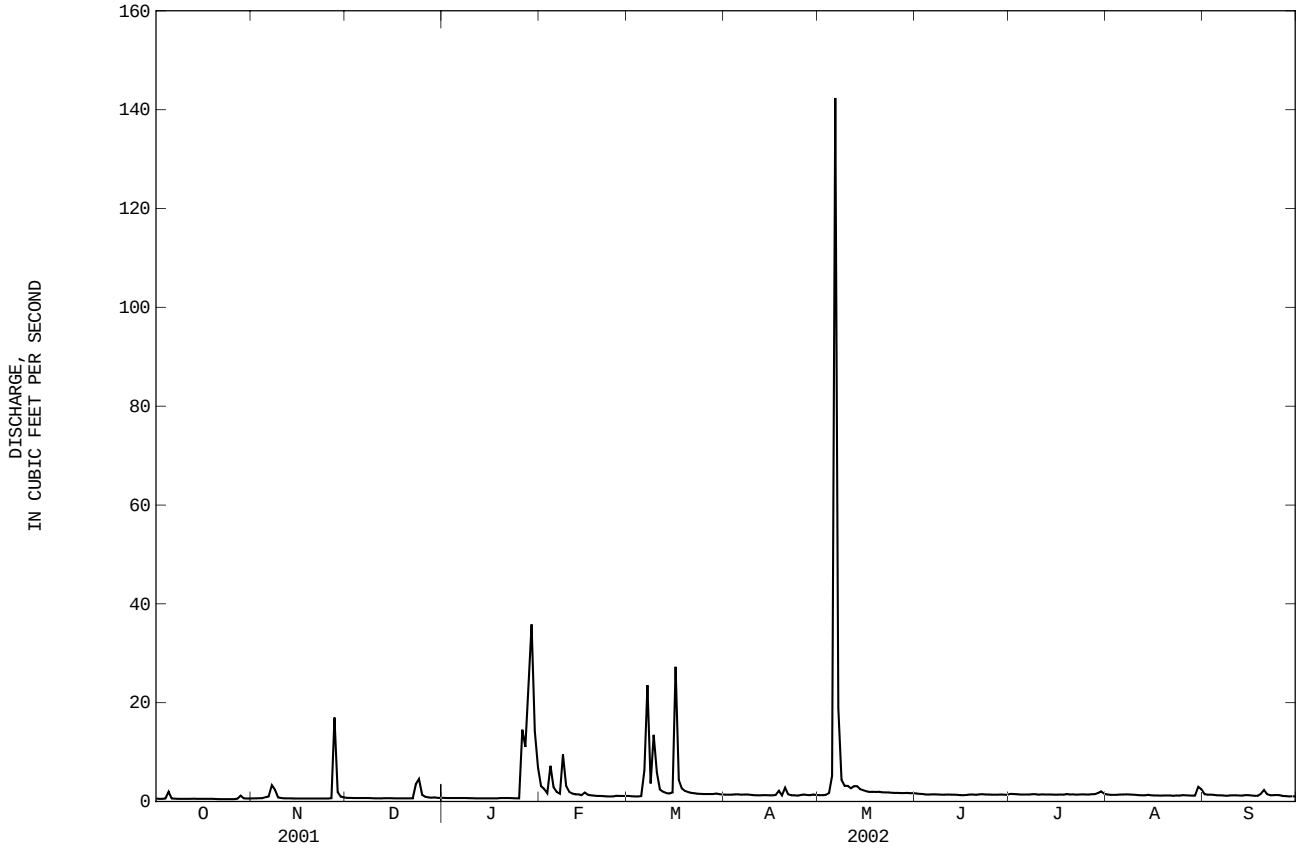
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.62	0.64	0.75	0.72	3.1	1.1	1.4	1.3	1.6	1.5	1.4	1.5
2	0.55	0.64	0.74	0.69	2.5	1.1	1.4	1.3	1.6	1.5	1.3	1.4
3	0.53	0.67	0.70	0.69	1.7	1.0	1.4	1.3	1.5	1.5	1.4	1.4
4	0.61	0.67	0.69	0.69	7.2	1.0	1.5	1.7	1.4	1.4	1.3	1.3
5	2.0	0.87	0.69	0.69	2.9	1.1	1.4	5.2	1.4	1.4	1.4	1.2
6	0.61	1.0	0.69	0.69	1.9	6.3	1.4	142	1.5	1.4	1.4	1.2
7	0.58	3.3	0.69	0.69	1.6	24	1.4	19	1.4	1.4	1.4	1.2
8	0.55	2.3	0.69	0.69	9.5	3.6	1.4	4.4	1.4	1.5	1.4	1.2
9	0.55	0.83	0.66	0.67	3.1	13	1.4	3.2	1.4	1.5	1.4	1.2
10	0.55	0.71	0.64	0.67	2.0	5.9	1.3	3.2	1.4	1.4	1.3	1.3
11	0.55	0.65	0.62	0.64	1.6	2.4	1.3	2.7	1.4	1.4	1.3	1.2
12	0.55	0.64	0.64	0.64	1.4	2.0	1.3	3.1	1.4	1.4	1.3	1.2
13	0.56	0.64	0.69	0.64	1.5	1.7	1.3	3.1	1.4	1.4	1.3	1.2
14	0.55	0.62	0.67	0.65	1.3	1.6	1.3	2.5	1.4	1.4	1.3	1.3
15	0.55	0.59	0.68	0.64	1.8	1.8	1.3	2.2	1.3	1.4	1.3	1.3
16	0.55	0.59	0.64	0.64	1.3	27	1.3	2.1	1.3	1.4	1.2	1.2
17	0.55	0.59	0.64	0.64	1.3	4.4	1.3	1.9	1.3	1.4	1.2	1.2
18	0.55	0.59	0.64	0.64	1.2	2.6	2.2	2.0	1.4	1.4	1.2	1.2
19	0.53	0.59	0.64	0.69	1.1	2.1	1.2	1.9	1.4	1.5	1.2	1.5
20	0.50	0.59	0.64	0.70	1.1	1.9	2.8	2.0	1.4	1.4	1.2	2.3
21	0.47	0.59	0.64	0.71	1.1	1.7	1.4	1.9	1.4	1.4	1.2	1.5
22	0.47	0.59	0.64	0.69	1.0	1.7	1.3	1.8	1.5	1.4	1.2	1.3
23	0.47	0.59	3.6	0.66	1.0	1.6	1.3	1.8	1.4	1.4	1.2	1.3
24	0.47	0.59	4.6	0.64	1.0	1.5	1.2	1.8	1.4	1.4	1.2	1.3
25	0.47	0.59	1.4	0.64	1.2	1.5	1.3	1.7	1.4	1.4	1.3	1.3
26	0.47	0.68	0.95	15	1.1	1.5	1.4	1.7	1.4	1.4	1.2	1.1
27	0.58	17	0.84	11	1.1	1.5	1.3	1.7	1.4	1.5	1.2	1.1
28	1.2	1.9	0.75	24	1.1	1.5	1.3	1.7	1.4	1.5	1.2	1.0
29	0.63	1.0	0.82	36	---	1.6	1.4	1.7	1.4	1.7	1.2	1.0
30	0.59	0.82	0.74	14	---	1.5	1.3	1.7	1.4	2.0	3.0	1.0
31	0.62	---	0.74	6.9	---	1.4	---	1.7	---	1.6	2.5	---
TOTAL	19.03	42.07	29.16	123.65	57.7	122.6	42.5	225.3	42.4	45.3	42.6	38.4
MEAN	0.61	1.40	0.94	3.99	2.06	3.95	1.42	7.27	1.41	1.46	1.37	1.28
MAX	2.0	17	4.6	36	9.5	27	2.8	142	1.6	2.0	3.0	2.3
MIN	0.47	0.59	0.62	0.64	1.0	1.0	1.2	1.3	1.3	1.4	1.2	1.0
AC-FT	38	83	58	245	114	243	84	447	84	90	84	76

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1984 - 2002, BY WATER YEAR (WY)

MEAN	2.79	3.45	3.33	3.52	3.32	3.80	3.19	3.11	2.46	2.66	2.43	2.64
MAX	6.69	10.6	9.56	8.65	7.55	11.8	10.6	7.27	4.78	5.89	5.78	5.81
(WY)	1992	1991	1988	1988	1989	1991	1989	2002	1991	1989	1991	1992
MIN	0.61	1.15	0.86	0.80	1.03	0.77	0.84	0.85	0.73	0.67	0.67	0.55
(WY)	2002	2001	2001	2001	1986	2001	2001	1984	1984	2001	1984	2001

16283200 KAHALUU STREAM NEAR AHUIMANU--Continued

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1984 - 2002	
ANNUAL TOTAL	322.65		830.71			
ANNUAL MEAN	0.88		2.28		3.06	
HIGHEST ANNUAL MEAN					5.97	1991
LOWEST ANNUAL MEAN					0.90	2001
HIGHEST DAILY MEAN	17	Nov 27	142	May 6	142	May 6 2002
LOWEST DAILY MEAN	0.47	Oct 21	0.47	Oct 21	0.47	Oct 21 2001
ANNUAL SEVEN-DAY MINIMUM	0.47	Oct 20	0.47	Oct 20	0.47	Oct 20 2001
ANNUAL RUNOFF (AC-FT)	640		1650		2220	
10 PERCENT EXCEEDS	0.94		2.5		4.8	
50 PERCENT EXCEEDS	0.73		1.3		2.4	
90 PERCENT EXCEEDS	0.55		0.61		0.85	



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 above mean sea level (from topographic map).

REMARKS.--Records computed by M.T.J. Ball. Records good except for estimated period, which is poor. Honolulu Board of Water Supply diverts water from tunnel and wells in drainage area.

AVERAGE DISCHARGE.--28 years (water years 1975-2002), 6.07 ft^3/s (4,390 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,530 ft^3/s, March 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, April 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)
Jan 28	2345	464	5.66	May 6	0545	*1,110	*7.20
Mar 16	1345	918	6.82				

Minimum discharge, 4.0 ft^3/s, on many days, gage height, 2.68 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	4.3	4.3	4.3	4.6	9.1	5.6	6.0	6.1	6.7	6.4	e5.7	e5.7
2	4.1	4.3	4.3	4.6	7.4	5.6	6.0	6.1	6.9	6.1	e5.6	e5.6
3	4.1	4.2	4.3	4.5	6.6	5.6	6.0	7.4	6.8	6.1	e5.6	e5.6
4	4.3	4.2	4.2	4.5	11	5.6	6.0	8.2	6.8	6.1	e5.6	e5.6
5	6.9	4.3	4.2	4.6	7.0	5.7	6.0	12	6.8	6.1	e5.7	e5.4
6	4.4	4.9	4.3	4.6	6.3	13	6.0	195	6.8	6.2	e5.7	e5.4
7	4.3	7.3	4.3	4.5	6.1	18	6.0	39	6.7	6.3	e5.7	e5.3
8	4.3	5.8	4.3	4.6	13	7.9	6.0	13	6.8	6.3	e5.7	e5.2
9	4.2	4.8	4.3	4.6	7.2	15	6.0	10	6.8	6.3	e5.6	e5.3
10	4.1	4.5	4.2	4.5	6.4	10	6.0	9.0	6.8	6.3	e5.6	e5.3
11	4.1	4.4	4.2	4.6	6.2	7.3	6.0	8.1	6.8	6.3	e5.5	e5.3
12	4.0	4.3	4.2	4.6	6.0	6.8	6.0	8.3	6.7	6.3	e5.5	e5.3
13	4.2	4.3	4.3	4.6	6.0	6.6	6.0	8.3	6.7	6.3	e5.5	e5.1
14	4.0	4.3	4.4	4.6	5.8	6.3	6.0	7.7	6.7	6.3	e5.6	e5.2
15	4.0	4.3	4.8	4.5	5.9	6.8	6.0	7.3	6.8	6.3	e5.5	e5.2
16	4.0	4.3	4.4	4.5	5.7	37	6.0	7.1	6.7	e6.2	e5.5	e5.1
17	4.0	4.3	4.3	4.6	5.6	13	6.1	7.1	6.8	e6.3	e5.4	e5.0
18	4.0	4.3	4.3	4.6	5.6	8.1	6.2	7.1	6.8	e6.1	e5.4	4.9
19	4.0	4.3	4.3	4.6	5.6	7.2	6.1	7.1	6.8	e6.2	e5.4	5.1
20	4.0	4.3	4.3	4.7	5.6	6.8	7.3	7.1	6.7	e5.9	e5.4	5.1
21	4.1	4.3	4.3	4.7	5.6	6.6	6.4	7.0	6.7	e5.9	e5.4	4.9
22	4.0	4.2	4.3	5.3	5.5	6.4	6.1	6.9	6.9	e5.8	e5.3	4.9
23	4.0	4.3	7.1	4.8	5.6	6.3	6.1	6.9	6.7	e5.9	e5.3	4.9
24	4.0	4.3	6.7	4.6	5.6	6.3	6.1	6.9	6.7	e5.9	e5.3	4.9
25	4.0	4.3	5.1	4.7	5.6	6.2	6.6	6.9	6.7	e5.9	e5.4	4.9
26	4.0	4.4	4.9	23	5.6	6.1	6.6	6.9	6.7	e5.9	e5.4	4.9
27	4.6	17	4.8	18	5.6	6.2	6.3	6.9	6.7	e5.9	e5.3	4.9
28	4.8	5.8	4.7	34	5.6	6.1	6.1	6.9	6.7	e5.9	e5.3	4.8
29	4.3	4.9	4.8	52	---	6.1	6.2	6.8	6.7	e6.1	e5.3	4.8
30	4.1	4.5	4.6	19	---	6.0	6.1	6.8	6.7	e6.2	e7.2	4.8
31	4.3	---	4.6	16	---	6.0	---	6.8	---	e5.8	e6.6	---
TOTAL	131.5	149.7	142.1	277.6	182.8	266.2	184.3	456.7	202.6	189.6	173.0	154.4
MEAN	4.24	4.99	4.58	8.95	6.53	8.59	6.14	14.7	6.75	6.12	5.58	5.15
MAX	6.9	17	7.1	52	13	37	7.3	195	6.9	6.4	7.2	5.7
MIN	4.0	4.2	4.2	4.5	5.5	5.6	6.0	6.1	6.7	5.8	5.3	4.8
AC-FT	261	297	282	551	363	528	366	906	402	376	343	306

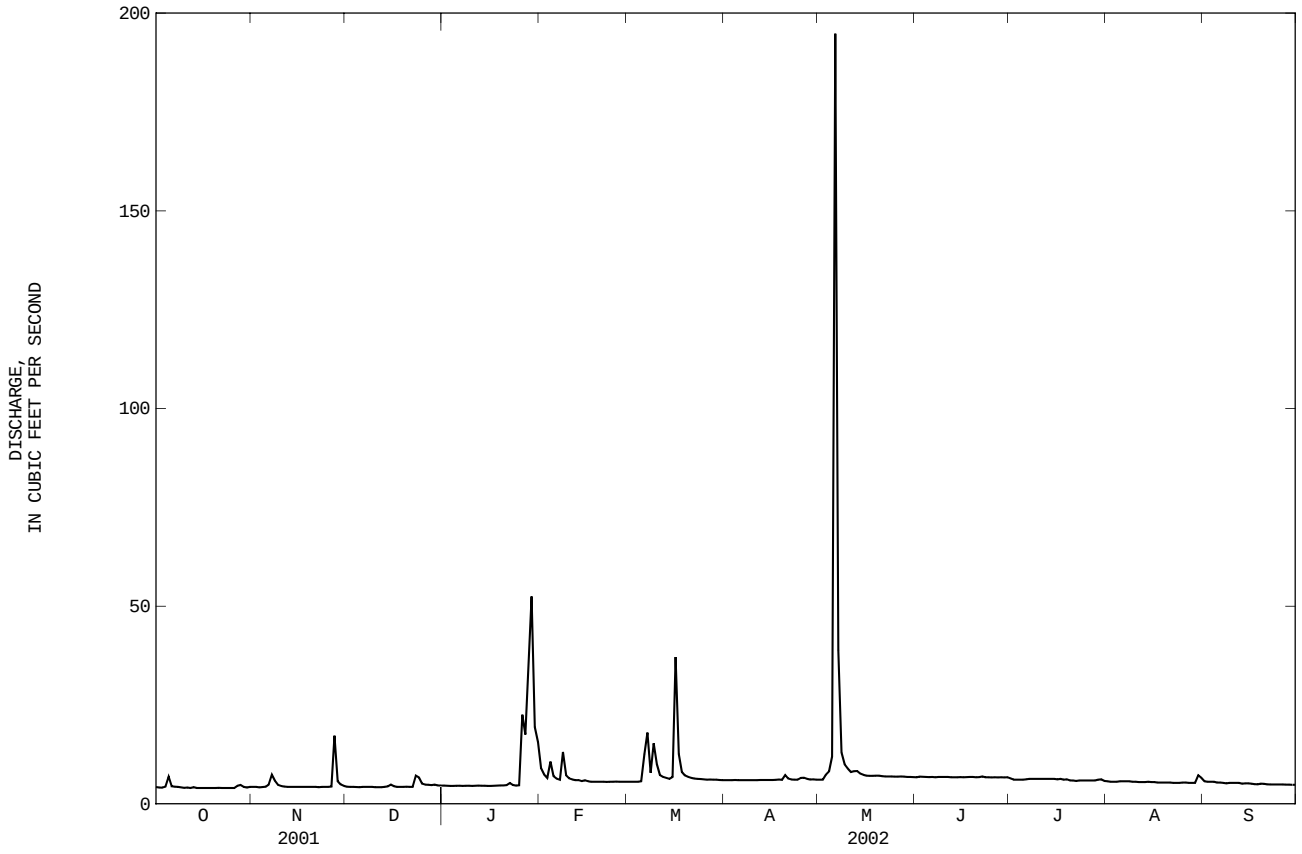
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1975 - 2002, BY WATER YEAR (WY)

MEAN	5.59	6.39	6.31	6.73	6.35	7.12	6.12	6.04	5.54	5.64	5.50	5.45
MAX	9.81	14.3	15.5	12.1	13.2	17.7	15.1	14.7	8.88	9.95	10.6	9.43
(WY)	1983	1991	1988	1988	1979	1991	1989	2002	1982	1989	1982	1982
MIN	2.70	3.97	3.60	3.71	3.05	2.85	2.72	3.18	3.36	2.40	2.61	2.74
(WY)	1976	2000	1976	1977	1977	1977	1977	1977	1976	1977	1976	1976

16284200 WAIHEE STREAM NEAR KAHALUU--Continued

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1975 - 2002	
ANNUAL TOTAL	1555.5		2539.4			
ANNUAL MEAN	4.26		6.96		6.07	
HIGHEST ANNUAL MEAN					9.36	1982
LOWEST ANNUAL MEAN					3.32	1977
HIGHEST DAILY MEAN	17	Nov 27	193	May 6	193	May 6 2002
LOWEST DAILY MEAN	3.5	Jul 22	4.0	Oct 12	1.3	Apr 15 1977
ANNUAL SEVEN-DAY MINIMUM	3.6	Jul 20	4.0	Oct 14	1.4	Apr 12 1977
ANNUAL RUNOFF (AC-FT)	3090		5040		4390	
10 PERCENT EXCEEDS	4.5		7.6		7.4	
50 PERCENT EXCEEDS	4.1		6.0		5.4	
90 PERCENT EXCEEDS	3.9		4.3		3.9	

e Estimated



16286000 WAIAHOLE TUNNEL WASTEWAY AT INTAKE 31, NEAR WAIAHOLE

LOCATION.--Lat 21°28'30", long 157°53'15", Hydrologic Unit 20060000, on left bank 150 ft downstream from wasteway gates at Waiahole tunnel intake No. 31 and 2.2 miles west of Waiahole School.

PERIOD OF RECORD.--January 1951 to May 1969 , November 2001 to current year. Record from 1969-2000 were kept by Waiahole Irrigation Company.

GAGE.--Water-stage recorder and Parshall Flume. Elevation of gage is 742.7 ft above mean sea level (levels from Waiahole Water Co.).

REMARKS.--Records computed by Ben Shimizu. Records fair, except for discharges above 50 ft^3/s, which are poor. Station measures releases from Waiahole tunnel to Waiahole Stream.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge; 99 ft^3/s, November 12, 1965; minimum daily, no flow most of the time each year, prior to December 19,1994.

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge; 78 ft^3/s, May 6, 2002; minimum daily, 13 ft^3/s on August 17, 2002.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

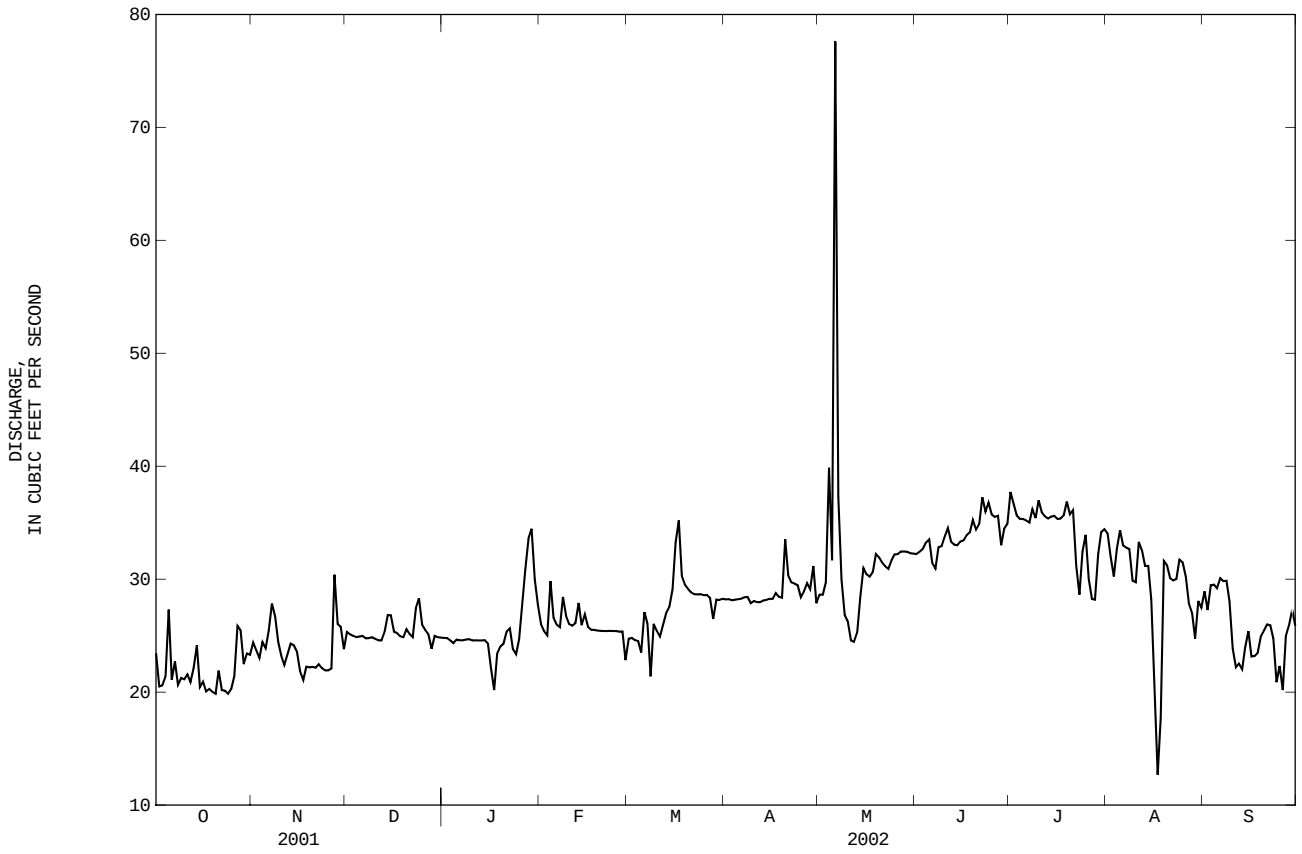
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	23	24	25	25	26	25	28	29	32	38	34	29
2	20	24	25	25	25	25	28	29	32	37	32	27
3	21	23	25	25	25	25	28	30	33	36	30	29
4	21	24	25	24	30	25	28	40	33	35	33	30
5	27	24	25	25	27	24	28	32	34	35	34	29
6	21	25	25	25	26	27	28	78	31	35	33	30
7	23	28	25	25	26	26	28	37	31	35	33	30
8	21	27	25	25	28	21	28	30	33	36	33	30
9	21	24	25	25	27	26	28	27	33	35	30	28
10	21	23	25	25	26	25	28	26	34	37	30	24
11	22	22	25	25	26	25	28	25	35	36	33	22
12	21	23	25	25	26	26	28	24	33	36	33	23
13	22	24	25	25	28	27	28	25	33	35	31	22
14	24	24	27	25	26	28	28	28	33	36	31	24
15	20	24	27	24	27	29	28	31	33	36	28	25
16	21	22	25	22	26	33	28	30	33	35	19	23
17	20	21	25	20	26	35	29	30	34	35	13	23
18	20	22	25	23	26	30	28	31	34	36	18	23
19	20	22	25	24	25	30	28	32	35	37	32	25
20	20	22	26	24	25	29	34	32	34	36	31	25
21	22	22	25	25	25	29	30	31	35	36	30	26
22	20	22	25	26	25	29	30	31	37	31	30	26
23	20	22	27	24	25	29	30	31	36	29	30	25
24	20	22	28	23	25	29	29	32	37	32	32	21
25	20	22	26	25	25	29	28	32	36	34	31	22
26	21	22	26	28	25	29	29	32	36	30	30	20
27	26	30	25	31	25	28	30	32	36	28	28	25
28	25	26	24	34	23	26	29	32	33	28	27	26
29	22	26	25	34	---	28	31	32	35	32	25	27
30	23	24	25	30	---	28	28	32	35	34	28	26
31	23	---	25	28	---	28	---	32	---	34	28	---
TOTAL	671	710	786	794	725	853	861	995	1019	1065	910	765
MEAN	21.6	23.7	25.4	25.6	25.9	27.5	28.7	32.1	34.0	34.4	29.4	25.5
MAX	27	30	28	34	30	35	34	78	37	38	34	30
MIN	20	21	24	20	23	21	28	24	31	28	13	20
AC-FT	1330	1410	1560	1570	1440	1690	1710	1970	2020	2110	1800	1520

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1951 - 2002, BY WATER YEAR (WY)

MEAN	1.98	4.62	9.55	7.82	8.99	5.57	3.37	3.00	2.64	2.68	2.62	2.28
MAX	21.6	26.3	35.6	42.0	39.9	27.5	28.7	32.1	34.0	34.4	29.4	25.5
(WY)	2002	1966	1968	1968	1968	2002	2002	2002	2002	2002	2002	2002
MIN	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
(WY)	1954	1952	1953	1954	1951	1952	1951	1951	1951	1951	1951	1951

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1951 - 2002	
ANNUAL TOTAL	7807.4		10154			
ANNUAL MEAN	21.4		27.8		3.74	
HIGHEST ANNUAL MEAN					27.8	2002
LOWEST ANNUAL MEAN					0.000	1961
HIGHEST DAILY MEAN	30	Nov 27	78	May 6	99	Nov 12 1965
LOWEST DAILY MEAN	8.4	Feb 28	13	Aug 17	0.00	Feb 1 1951
ANNUAL SEVEN-DAY MINIMUM	15	Feb 26	20	Oct 17	0.00	Feb 1 1951
ANNUAL RUNOFF (AC-FT)	15490		20140		2710	
10 PERCENT EXCEEDS	25		34		20	
50 PERCENT EXCEEDS	21		27		0.00	
90 PERCENT EXCEEDS	17		22		0.00	

16286000 WAIAHOLE TUNNEL WASTEWAY AT INTAKE 31, NEAR WAIAHOLE--Continued



16287000 WAIAHOLE TUNNEL AT NORTH PORTAL, NEAR WAIAHOLE

LOCATION.--Lat 21°28'15", long 157°53'30", Hydrologic Unit 20060000, on right bank in Waiahole tunnel directly below crest of Koolau Ridge and 2.6 miles southwest of Waiahole School.

PERIOD OF RECORD.--January 1951 to May 1969, October 2000 to current year. Record from 1969-2000 were kept by Waiahole Irrigation Company.

GAGE.--Water-stage recorder and Parshall Flume. Elevation of gage is 752.5 ft above mean sea level (levels from Waiahole Water Co.).

REMARKS.--Records computed by Ben Shimizu. Records good, except for estimated daily discharges, which are fair. Station measures the diversion of water from the windward to leeward side of the Koolau mountains.

ETREMES FOR PERIOD OF RECORD.--Maximum daily discharge; 125 cfs, July 28, 1954; minimum daily, 1.8 cfs on May 13, 2001, June 30,2001.

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge; 20 ft^3/s, August 17; minimum daily, 1.8 ft^3/s for several days in February.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	4.4	2.3	2.2	e2.1	e2.8	2.4	2.6	3.0	2.8	3.7	3.5	5.0
2	5.4	2.8	2.2	e2.1	2.9	2.3	2.5	2.9	2.9	3.7	4.6	6.3
3	5.2	3.7	e2.0	e2.1	2.5	2.6	2.6	3.1	2.7	3.5	5.4	5.4
4	4.7	2.3	e2.1	e2.2	2.7	2.7	2.7	3.1	2.7	3.4	3.4	4.4
5	4.6	3.3	e2.2	e2.1	e2.5	4.8	2.7	2.5	2.7	3.4	3.4	4.6
6	6.0	3.7	e2.1	e2.1	e2.2	6.0	2.7	3.9	4.1	3.4	3.4	4.1
7	3.3	3.4	e2.1	e2.1	e2.0	11	2.6	3.1	4.7	3.3	3.2	4.0
8	5.5	2.4	e2.0	e2.1	e2.0	9.3	2.7	2.7	3.4	3.2	3.2	4.0
9	5.0	2.7	e2.0	e2.1	e2.0	7.7	3.0	2.6	3.4	3.2	5.1	5.5
10	5.3	3.5	e2.0	e2.0	e2.0	7.3	2.7	2.5	3.3	3.1	5.5	9.2
11	5.2	4.3	e1.9	e2.0	e2.0	5.4	2.7	2.5	3.3	3.1	3.5	9.9
12	5.4	3.2	e1.9	e2.0	e1.8	3.9	2.8	2.4	3.4	2.9	3.4	10
13	4.8	2.2	e2.0	e2.0	e1.8	3.8	2.6	2.7	3.5	2.9	6.5	10
14	2.1	2.1	e2.1	e1.9	e2.1	2.6	2.6	2.4	3.4	2.9	5.0	9.1
15	5.8	2.6	e2.2	e2.0	e2.0	2.6	2.6	2.5	3.4	2.8	6.8	7.8
16	5.6	4.5	e2.0	e4.1	e2.0	2.7	2.6	2.5	3.3	2.8	14	9.5
17	6.1	5.5	e1.9	e6.1	e2.0	3.0	2.7	2.4	3.2	2.8	20	9.2
18	5.6	4.0	e2.0	e3.1	e2.0	2.4	2.6	2.6	3.3	2.7	16	9.0
19	5.9	4.0	e2.2	e2.1	e2.0	2.2	2.7	2.6	3.1	2.8	3.6	8.6
20	6.1	4.0	e2.1	e2.0	e1.8	2.2	2.8	2.6	3.2	2.8	3.5	7.2
21	3.9	4.0	e2.1	e2.5	e1.8	2.2	2.5	2.7	3.1	2.8	4.3	6.6
22	6.0	3.5	e2.1	e2.0	e1.8	2.2	2.2	2.6	3.3	5.9	4.4	4.9
23	6.0	4.0	e2.2	e2.5	e1.8	2.3	2.3	2.7	3.2	7.8	4.5	7.6
24	6.1	4.3	e2.2	e3.0	e1.8	2.3	2.2	2.7	3.1	5.2	3.2	11
25	6.3	4.3	e2.1	e1.9	e1.8	2.1	3.7	2.7	3.1	3.6	3.2	9.4
26	5.3	4.1	e2.0	e2.0	e1.8	2.1	4.5	2.6	3.1	6.2	4.7	11
27	3.5	3.0	e2.1	e2.1	e1.8	2.4	2.8	2.7	3.1	7.8	6.3	6.8
28	4.1	2.2	e3.2	e2.3	3.9	3.9	2.6	2.7	5.0	7.8	7.1	6.1
29	4.7	2.1	e2.4	e2.6	---	2.5	2.8	2.8	3.7	5.7	8.8	4.9
30	3.3	3.5	e2.3	e1.9	---	2.5	4.2	2.8	3.6	6.3	7.5	6.1
31	4.1	---	e2.0	e3.6	---	2.4	---	2.8	---	3.8	7.2	---
TOTAL	155.3	101.5	65.9	74.7	59.6	113.8	83.3	84.4	100.1	125.3	184.2	217.2
MEAN	5.01	3.38	2.13	2.41	2.13	3.67	2.78	2.72	3.34	4.04	5.94	7.24
MAX	6.3	5.5	3.2	6.1	3.9	11	4.5	3.9	5.0	7.8	20	11
MIN	2.1	2.1	1.9	1.9	1.8	2.1	2.2	2.4	2.7	2.7	3.2	4.0
AC-FT	308	201	131	148	118	226	165	167	199	249	365	431

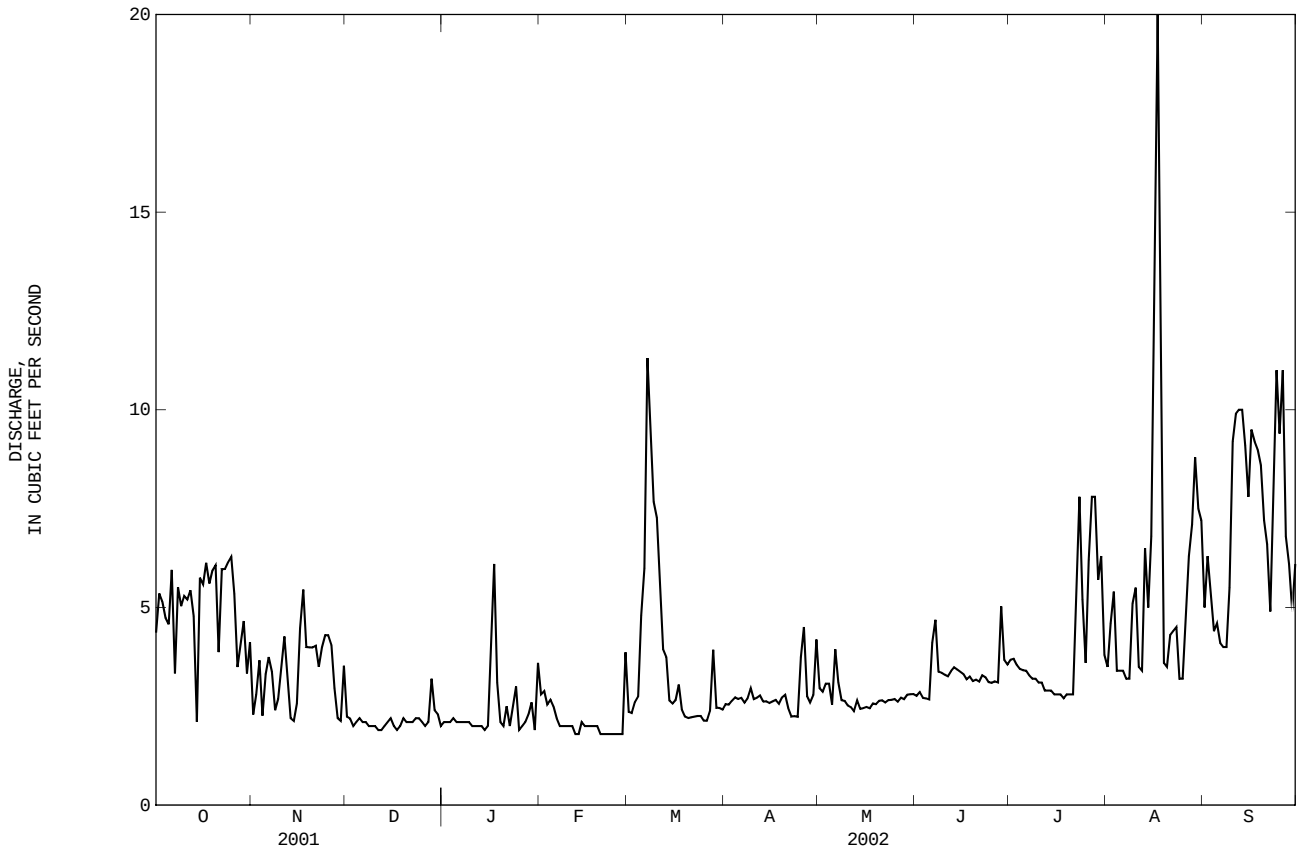
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 2001 - 2002, BY WATER YEAR (WY)

MEAN	6.86	4.75	3.65	3.55	3.98	6.82	4.20	5.05	5.91	6.10	6.82	6.74
MAX	8.70	6.11	5.16	4.69	5.83	9.97	5.62	7.37	8.48	8.16	7.70	7.24
(WY)	2001	2001	2001	2001	2001	2001	2001	2001	2001	2001	2001	2002
MIN	5.01	3.38	2.13	2.41	2.13	3.67	2.78	2.72	3.34	4.04	5.94	6.25
(WY)	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	2001

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 2001 - 2002	
ANNUAL TOTAL	2271.8		1365.3			
ANNUAL MEAN	6.22		3.74		5.38	
HIGHEST ANNUAL MEAN					7.02	2001
LOWEST ANNUAL MEAN					3.74	2002
HIGHEST DAILY MEAN	19	Feb 28	20	Aug 17	20	Aug 17 2002
LOWEST DAILY MEAN	1.8	May 13	1.8	Feb 12	1.8	May 13 2001
ANNUAL SEVEN-DAY MINIMUM	2.0	Dec 7	1.8	Feb 20	1.8	Feb 20 2002
ANNUAL RUNOFF (AC-FT)	4510		2710		3900	
10 PERCENT EXCEEDS	10		6.3		9.3	
50 PERCENT EXCEEDS	6.0		3.0		5.0	
90 PERCENT EXCEEDS	2.2		2.0		2.1	

e Estimated

16287000 WAIAHOLE TUNNEL AT NORTH PORTAL, NEAR WAIAHOLE--Continued



16287200 WAIAHOLE TUNNEL AT ADIT 8, NEAR WAIPAHU

LOCATION.--Lat 21°27'00", long 157°57'30", Hydrologic Unit 20060000, on left bank at adit 8, 2,700 ft. downstream from Ewa Forest Reserve, and 5.2 miles northeast of Waipahu Post Office.

PERIOD OF RECORD.--August 1956 to May 1969, November 23, 2001 to current year. Record from 1969-2000 were kept by Waiahole Irrigation Company.

GAGE.--Water-stage recorder and concrete control. Elevation of gage is 709.0 ft. above mean sea level (levels from Waiahole Water Co.).

REMARKS.--Records computed by Vaughn Kunishige. Records good. Records represent entire flow of Waiahole water-development tunnel; water is used for irrigation of diversified agriculturre.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge; 151 ft^3/s, October 23, 1958; minimum daily, 8.0 ft^3/s, November 29, 2001.

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge; 28 ft^3/s, August 17; minimum daily discharge, 8.0 ft^3/s, November 29.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

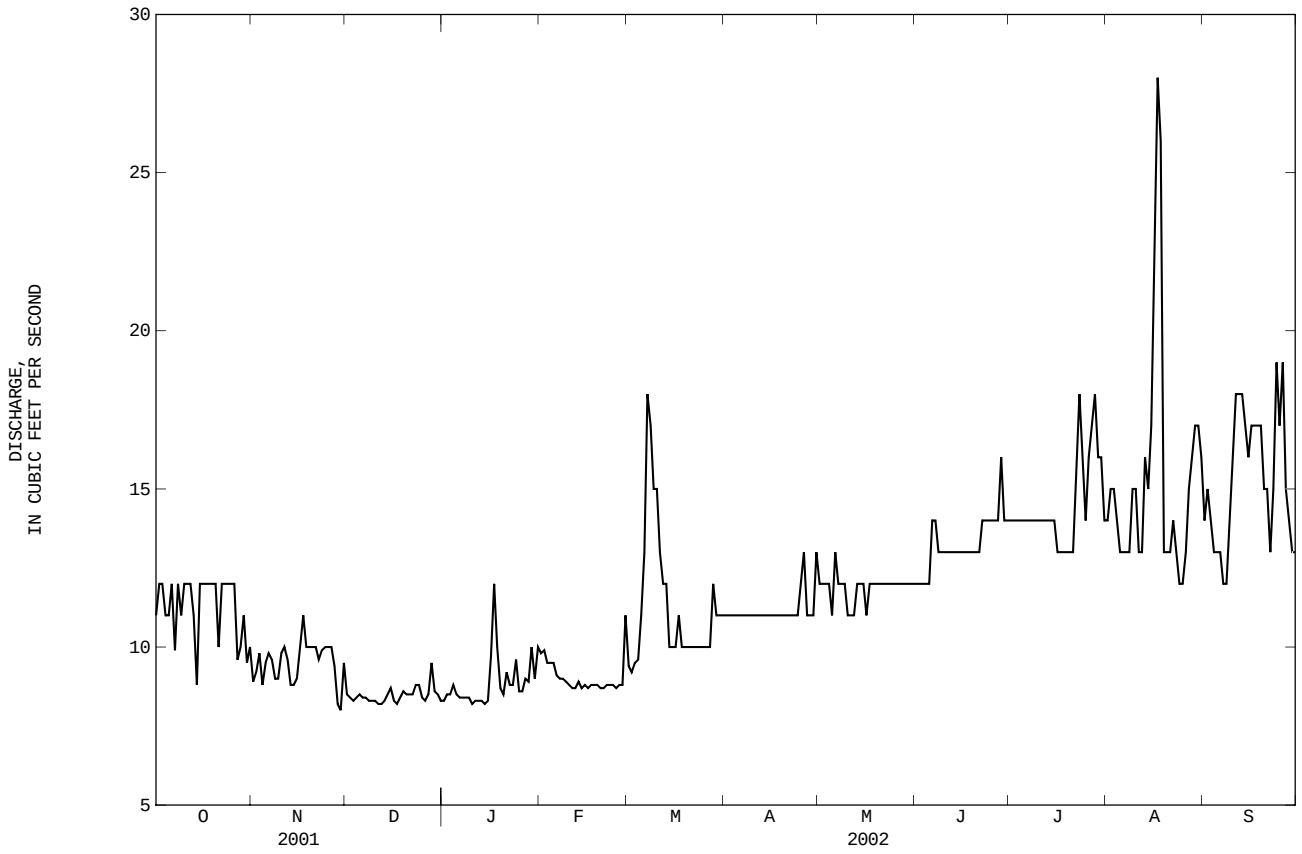
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	11	8.9	8.5	8.3	9.8	9.4	11	12	12	14	14	14
2	12	9.2	8.4	8.5	9.9	9.2	11	12	12	14	15	15
3	12	9.8	8.3	8.5	9.5	9.5	11	12	12	14	15	14
4	11	8.8	8.4	8.8	9.5	9.6	11	12	12	14	14	13
5	11	9.5	8.5	8.5	9.5	11	11	11	12	14	13	13
6	12	9.8	8.4	8.4	9.1	13	11	13	14	14	13	13
7	9.9	9.6	8.4	8.4	9.0	18	11	12	14	14	13	12
8	12	9.0	8.3	8.4	9.0	17	11	12	13	14	13	12
9	11	9.0	8.3	8.4	8.9	15	11	12	13	14	15	14
10	12	9.8	8.3	8.2	8.8	15	11	11	13	14	15	16
11	12	10	8.2	8.3	8.7	13	11	11	13	14	13	18
12	12	9.6	8.2	8.3	8.7	12	11	11	13	14	13	18
13	11	8.8	8.3	8.3	8.9	12	11	12	13	14	16	18
14	8.8	8.8	8.5	8.2	8.7	10	11	12	13	14	15	17
15	12	9.0	8.7	8.3	8.8	10	11	12	13	14	17	16
16	12	10	8.3	9.7	8.7	10	11	11	13	13	21	17
17	12	11	8.2	12	8.8	11	11	12	13	13	28	17
18	12	10	8.4	10	8.8	10	11	12	13	13	26	17
19	12	10	8.6	8.7	8.8	10	11	12	13	13	13	17
20	12	10	8.5	8.5	8.7	10	11	12	13	13	13	15
21	10	10	8.5	9.2	8.7	10	11	12	13	13	13	15
22	12	9.6	8.5	8.8	8.8	10	11	12	14	16	14	13
23	12	9.9	8.8	8.8	8.8	10	11	12	14	18	13	15
24	12	10	8.8	9.6	8.8	10	11	12	14	16	12	19
25	12	10	8.4	8.6	8.7	10	12	12	14	14	12	17
26	12	10	8.3	8.6	8.8	10	13	12	14	16	13	19
27	9.6	9.4	8.5	9.0	8.8	10	11	12	14	17	15	15
28	10	8.2	9.5	8.9	11	12	11	12	16	18	16	14
29	11	8.0	8.6	10	---	11	11	12	14	16	17	13
30	9.5	9.5	8.5	9.0	---	11	13	12	14	16	17	13
31	10	---	8.3	10	---	11	---	12	---	14	16	---
TOTAL	349.8	285.2	262.4	275.2	253.0	349.7	335	368	398	449	473	459
MEAN	11.3	9.51	8.46	8.88	9.04	11.3	11.2	11.9	13.3	14.5	15.3	15.3
MAX	12	11	9.5	12	11	18	13	13	16	18	28	19
MIN	8.8	8.0	8.2	8.2	8.7	9.2	11	11	12	13	12	12
AC-FT	694	566	520	546	502	694	664	730	789	891	938	910

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1956 - 2002, BY WATER YEAR (WY)

MEAN	48.7	45.3	37.3	38.9	36.3	45.0	47.6	49.1	46.3	48.5	48.3	46.9
MAX	69.8	63.2	63.3	58.2	65.8	63.8	68.0	73.7	61.6	66.2	66.1	62.1
(WY)	1959	1965	1965	1959	1965	1965	1969	1969	1965	1965	1967	1958
MIN	11.3	9.51	8.46	8.88	9.04	11.3	11.2	11.9	13.3	14.3	13.9	12.7
(WY)	2002	2002	2002	2002	2002	2002	2002	2002	2002	2001	2001	2001

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1956 - 2002	
ANNUAL TOTAL	4621.7		4257.3			
ANNUAL MEAN	12.7		11.7		46.7	
HIGHEST ANNUAL MEAN					61.8	1965
LOWEST ANNUAL MEAN					11.7	2002
HIGHEST DAILY MEAN	24	Feb 28	28	Aug 17	151	Oct 23 1958
LOWEST DAILY MEAN	8.0	Nov 29	8.0	Nov 29	8.0	Nov 29 2001
ANNUAL SEVEN-DAY MINIMUM	8.3	Dec 7	8.3	Dec 7	8.3	Dec 7 2001
ANNUAL RUNOFF (AC-FT)	9170		8440		33850	
10 PERCENT EXCEEDS	16		15		62	
50 PERCENT EXCEEDS	13		11		49	
90 PERCENT EXCEEDS	8.8		8.5		17	

16287200 WAIAHOLE TUNNEL AT ADIT 8, NEAR WAIPAHU--Continued



16294100 WAIAHOLE STREAM ABOVE KAMEHAMEHA HIGHWAY

LOCATION.--Lat 21°29'05", long 157°50'57", Hydrologic Unit 20060000, on left bank 300 ft upstream from Kamehameha Highway, 0.4 miles southwest of Waiahole Elementary School, 1.8 miles northwest of Kahaluu Elementary School.

PERIOD OF RECORD.--Miscellaneous streamflow measurements 1988-1990, 1995. August 2001 to current year. Unpublished record from Aug-Sept 2001 available at USGS Hawaii District Office.

GAGE.--Water-stage recorder. Elevation of gage is 14 ft above mean sea level (from NGS benchmark F16).

REMARKS.--Records computed by Heather Jeppesen. Records good, except for discharges above 300 ft^3/s, which are poor, and for the estimated daily discharge, which is fair. Flow is regulated by releases from Waiahole Tunnel.

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge; e1150 ft^3/s, May 6, 2002; minimum daily, 25 ft^3/s on August 17, 2002.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 499 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Nov 27	0430	774	8.15	Apr 20	1715	933	8.39
Jan 29	0045	1,490	9.38	May 4	0315	1,620	9.62
Mar 09	2230	538	7.78	May 6	0700	*3,980	*13.52
Mar 16	1445	1,560	9.50				

Minimum daily discharge, 25 ft^3/s, Aug. 17.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	30	31	38	39	55	40	42	39	49	46	43	40
2	27	30	38	39	49	40	42	39	48	45	41	38
3	27	30	37	39	46	39	41	52	48	43	40	40
4	28	32	37	39	67	39	42	237	48	43	42	39
5	40	31	37	40	52	38	41	74	48	43	44	39
6	29	37	37	40	47	55	41	e1150	46	42	43	40
7	30	50	37	40	45	99	41	270	45	42	43	39
8	27	42	36	39	65	44	41	105	46	44	41	39
9	27	34	36	39	51	81	40	76	46	43	39	38
10	27	32	36	39	45	60	40	66	46	45	40	35
11	28	31	36	39	44	42	40	58	48	43	44	33
12	27	32	36	39	44	42	40	57	45	42	42	33
13	29	33	38	40	48	42	40	61	44	42	42	33
14	31	33	40	40	43	41	40	56	44	42	41	35
15	27	32	42	39	46	43	40	57	43	42	38	36
16	28	31	38	37	43	134	39	54	43	42	32	34
17	27	30	38	35	42	178	40	53	43	43	25	34
18	27	32	37	39	42	67	41	53	44	43	27	34
19	26	31	37	41	42	57	40	55	46	45	41	37
20	26	31	38	42	42	53	101	53	44	43	41	36
21	29	31	37	44	41	51	48	51	44	44	39	36
22	27	32	37	45	41	49	41	51	47	40	39	37
23	27	31	48	41	41	47	40	50	44	38	39	35
24	27	32	54	40	41	47	40	49	45	40	41	31
25	27	32	41	42	41	46	39	48	43	41	41	32
26	29	35	39	63	41	46	41	49	43	40	39	30
27	40	120	38	70	41	45	41	51	42	38	37	35
28	38	46	37	143	38	43	40	50	41	38	37	36
29	30	41	41	252	---	45	43	51	42	44	35	37
30	30	38	40	99	---	44	39	50	42	49	40	35
31	30	---	40	70	---	43	---	49	---	45	39	---
TOTAL	902	1103	1201	1693	1283	1740	1284	3214	1347	1320	1215	1076
MEAN	29.1	36.8	38.7	54.6	45.8	56.1	42.8	104	44.9	42.6	39.2	35.9
MAX	40	120	54	252	67	178	101	1150	49	49	44	40
MIN	26	30	36	35	38	38	39	39	41	38	25	30
AC-FT	1790	2190	2380	3360	2540	3450	2550	6370	2670	2620	2410	2130

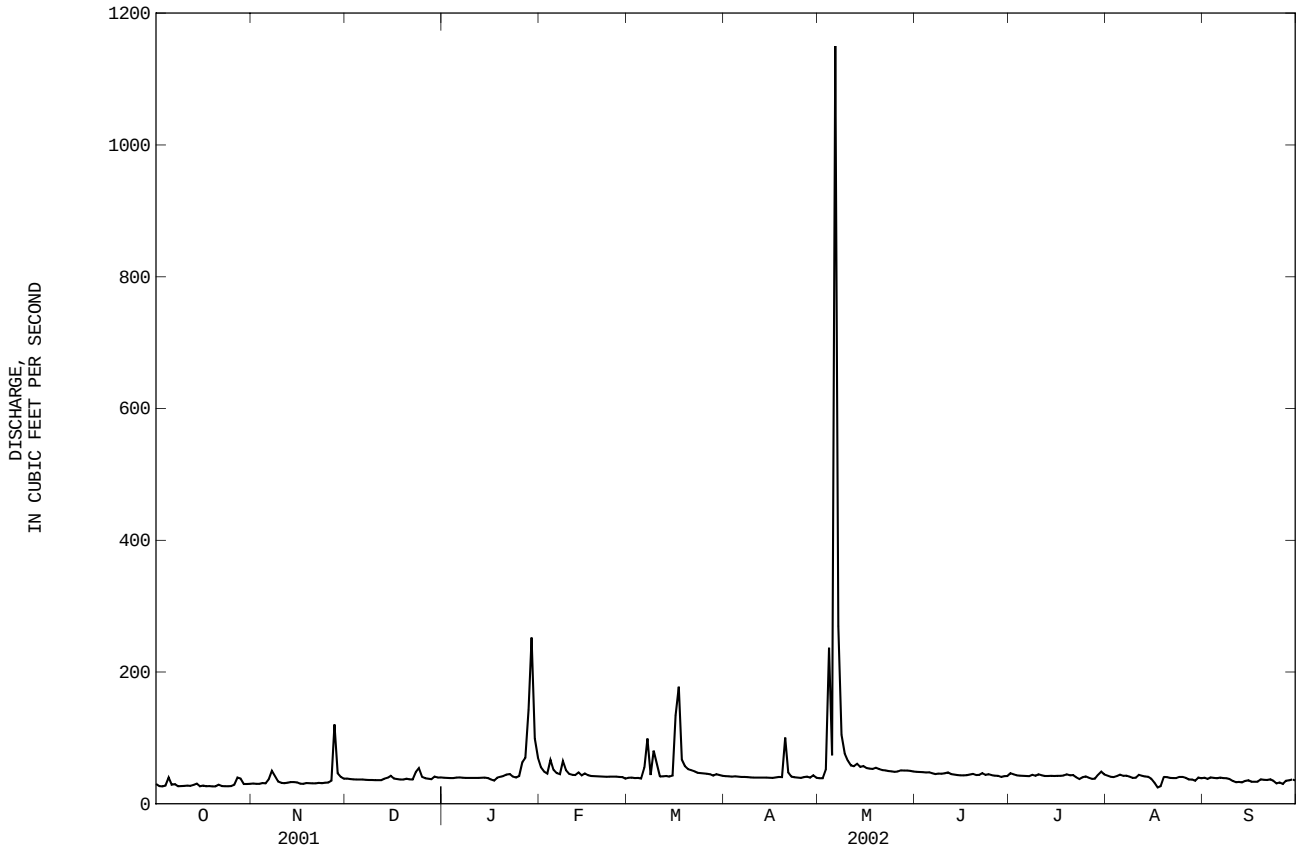
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 2001 - 2002, BY WATER YEAR (WY)

MEAN	29.1	36.8	38.7	54.6	45.8	56.1	42.8	104	44.9	42.6	39.2	35.9
MAX	29.1	36.8	38.7	54.6	45.8	56.1	42.8	104	44.9	42.6	39.2	35.9
(WY)	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002
MIN	29.1	36.8	38.7	54.6	45.8	56.1	42.8	104	44.9	42.6	39.2	35.9
(WY)	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002

16294100 WAIAHOLE STREAM ABOVE KAMEHAMEHA HIGHWAY--Continued

SUMMARY STATISTICS	FOR 2002 WATER YEAR		WATER YEARS 2001 - 2002	
ANNUAL TOTAL	17378			
ANNUAL MEAN	47.6		47.6	
HIGHEST ANNUAL MEAN			47.6	2002
LOWEST ANNUAL MEAN			47.6	2002
HIGHEST DAILY MEAN	1150	May 6	1150	May 6 2002
LOWEST DAILY MEAN	25	Aug 17	25	Aug 17 2002
ANNUAL SEVEN-DAY MINIMUM	27	Oct 17	27	Oct 17 2001
ANNUAL RUNOFF (AC-FT)	34470		34490	
10 PERCENT EXCEEDS	53		53	
50 PERCENT EXCEEDS	41		41	
90 PERCENT EXCEEDS	31		31	

e Estimated



16294900 WAIKANE STREAM AT ALTITUDE 75 FT, AT WAIKANE

LOCATION.--Lat 21°30'00", long 157°51'54", 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, WDR HI-94-1: 1993 (M).

GAGE.--Water-stage recorder and concrete control. Elevation of gage is 75 ft above mean sea level (from topographic map).

REMARKS.--Records computed by M.T.J. Ball. Records good except for period of estimated daily discharges, which are poor. Waiahole tunnel diverts ground water from tunnels upstream of station. Elevation of the Waiahole tunnel is 800 ft (from topographic map).

AVERAGE DISCHARGE.--42 years (water years 1961-2002), 8.50 ft^3/s (6,160 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 8,800 ft^3/s, February 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, October 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)
Mar 7	1645	879	6.09	May 6	unknown	*2,240	*9.12
May 4	0230	1,170	6.92				

Minimum discharge, 1.5 ft^3/s, Oct. 19, 20, gage height, 1.35 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	6.2	3.5	3.2	2.9	20	3.9	4.9	3.3	e4.7	e4.9	e2.4	e2.7
2	2.4	3.2	3.1	2.8	15	4.1	4.7	3.0	e4.7	e3.8	e2.3	e2.5
3	1.9	3.2	2.9	2.7	11	3.7	4.5	6.6	e4.6	e3.1	e2.2	e3.3
4	2.0	3.0	3.0	2.6	56	3.9	4.6	85	e4.4	e2.7	e2.2	e2.6
5	12	3.4	2.9	2.5	25	3.8	4.2	27	e4.4	e2.6	e4.2	e2.5
6	3.7	6.2	2.7	2.5	15	11	4.0	e700	e4.3	e2.5	e2.6	e2.4
7	2.2	23	2.6	2.5	12	91	3.9	e200	e4.2	e2.7	e2.5	e2.3
8	1.9	16	2.6	2.4	33	19	3.7	e93	e4.0	e2.5	e2.3	e2.3
9	1.8	5.9	2.5	2.5	17	38	3.6	e33	e3.8	e3.0	e2.2	e2.3
10	1.8	4.3	2.4	2.7	12	28	3.5	e24	e5.0	e2.7	e2.5	e2.7
11	1.9	3.8	2.4	2.4	10	13	3.4	e16	e5.8	e2.5	e3.0	e2.3
12	1.8	3.3	2.4	2.4	9.6	11	3.3	e12	e5.0	e2.3	e2.3	e2.3
13	1.9	3.2	2.8	2.3	12	15	3.2	e11	e4.2	e2.3	e15	e2.2
14	1.8	3.1	3.3	2.4	8.5	11	3.2	e17	e4.2	e2.2	e6.0	e2.3
15	1.9	2.8	4.9	2.2	13	9.9	3.2	e11	e4.1	e2.2	e3.3	e2.2
16	1.8	2.7	2.9	2.1	8.5	68	3.1	e9.0	e4.0	e2.2	e2.7	e2.2
17	1.6	2.5	2.5	2.1	7.1	61	3.3	e7.5	e4.2	e2.2	e2.6	e2.2
18	1.6	2.4	2.4	2.5	6.4	27	3.4	e8.5	e4.5	e2.3	e2.4	e2.1
19	1.5	2.3	2.5	2.6	6.0	18	3.2	e13	e6.0	e3.0	e2.4	e2.1
20	1.5	2.2	2.8	3.3	5.5	15	29	e14	e4.0	e2.5	e2.3	e2.5
21	1.6	2.2	2.6	3.9	5.2	12	6.6	e9.0	e4.8	e2.5	e2.3	e2.4
22	1.6	2.1	2.3	3.2	4.9	11	3.8	e7.0	e6.5	e2.3	e2.2	e2.2
23	1.6	2.1	12	2.7	4.7	9.5	3.4	e6.5	e5.0	e2.1	e2.2	e2.1
24	1.6	2.1	26	2.5	4.5	8.5	3.2	e6.0	e4.5	e2.2	e2.5	e2.1
25	1.7	2.1	6.6	2.6	4.4	7.9	3.2	e5.9	e3.8	e2.1	e2.6	e2.0
26	2.3	2.2	4.5	11	4.1	7.0	6.1	e5.8	e3.3	e2.1	e2.7	e2.0
27	16	39	3.8	40	4.0	6.9	4.0	e5.7	e3.1	e2.2	e2.5	e2.1
28	14	6.8	3.5	94	4.0	6.3	3.2	e5.3	e3.0	e2.2	e2.4	e2.0
29	4.0	4.3	3.9	127	---	6.4	5.2	e4.9	e2.9	e2.4	e2.3	e2.1
30	3.2	3.5	3.2	62	---	5.7	4.4	e4.9	e2.8	e8.0	e6.0	e2.0
31	3.6	---	3.1	33	---	5.2	---	e4.7	---	e3.5	e3.5	---
TOTAL	104.4	166.4	128.3	432.3	338.4	541.7	143.0	1359.6	129.8	85.8	98.6	69.0
MEAN	3.37	5.55	4.14	13.9	12.1	17.5	4.77	43.9	4.33	2.77	3.18	2.30
MAX	16	39	26	127	56	91	29	700	6.5	8.0	15	3.3
MIN	1.5	2.1	2.3	2.1	4.0	3.7	3.1	3.0	2.8	2.1	2.2	2.0
AC-FT	207	330	254	857	671	1070	284	2700	257	170	196	137

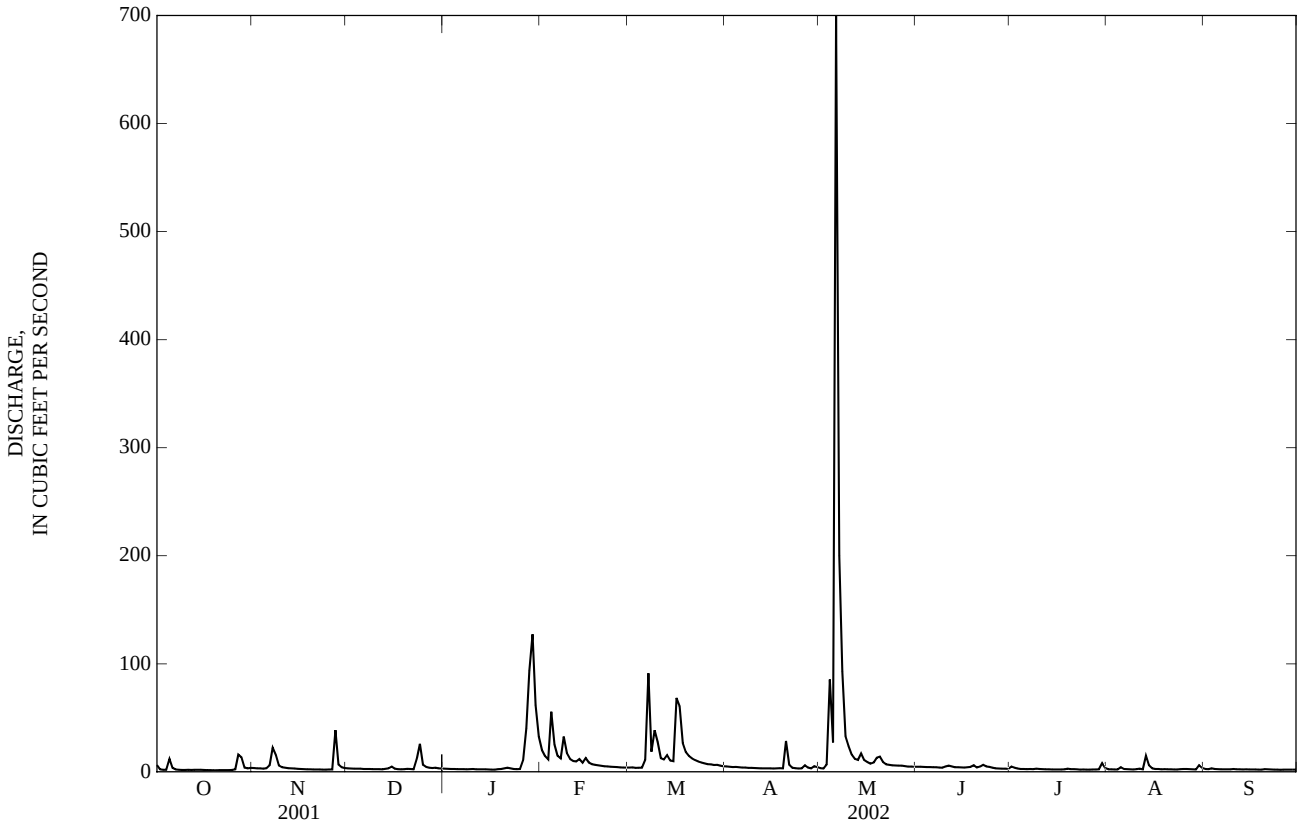
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1960 - 2002, BY WATER YEAR (WY)

MEAN	6.46	11.0	9.16	11.3	11.5	12.3	9.96	9.02	5.29	6.07	5.18	5.07
MAX	31.0	55.7	44.1	45.6	65.5	53.1	49.3	43.9	16.2	30.2	25.0	22.1
(WY)	1992	1966	1988	1988	1994	1982	1963	2002	1977	1987	1967	1986
MIN	1.55	2.13	2.23	1.67	1.78	2.03	2.65	1.98	1.83	1.76	1.58	1.38
(WY)	1985	1963	1978	1977	1978	1978	1998	2000	1984	1984	1984	1984

16294900 WAIKANE STREAM AT ALTITUDE 75 FT, AT WAIKANE--Continued

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1960 - 2002	
ANNUAL TOTAL	1349.6		3597.3			
ANNUAL MEAN	3.70		9.86		8.50	
HIGHEST ANNUAL MEAN					16.7	2002
LOWEST ANNUAL MEAN					3.33	1984
HIGHEST DAILY MEAN	56	Jun 5	700	May 6	868	Feb 4 1965
LOWEST DAILY MEAN	1.5	Oct 19	1.5	Oct 19	1.1	Oct 17 1975
ANNUAL SEVEN-DAY MINIMUM	1.6	Oct 17	1.6	Oct 17	1.3	Sep 19 1984
ANNUAL RUNOFF (AC-FT)	2680		7140		6160	
10 PERCENT EXCEEDS	5.1		15		13	
50 PERCENT EXCEEDS	2.6		3.3		4.0	
90 PERCENT EXCEEDS	1.8		2.1		2.1	

e Estimated



HAWAII, ISLAND OF OAHU

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 above mean sea level (from topographic map).

REMARKS.--Records computed by Ben Shimizu. Records good up to 100 cfs and fair above that. Waiahole tunnel diverts water from tributaries and tunnels upstream of station. Elevation of the Waiahole tunnel is 800 ft (from topographic map). Recording rain gage located 50 ft from the streamgage at an elevation of 80 ft.

AVERAGE DISCHARGE.--43 years (water years 1960-2002), 36.3 ft^3/s (26,320 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 7,580 ft^3/s, May 6, 2002, gage height, 9.39 ft, from rating curve extended above 530 ft^3/s on basis of computation of peak flow over weir at gage height 8.10 ft; minimum, 9.9 ft^3/s, June 5, 2000.

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)
Jan 27	0115	1,980	5.21	Apr 20	1630	1,610	4.79
Mar 7	0600	2,660	5.90	May 6	2145	*7,580	*9.39

Minimum discharge, 15 ft^3/s, on several days, gage height, 1.14 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

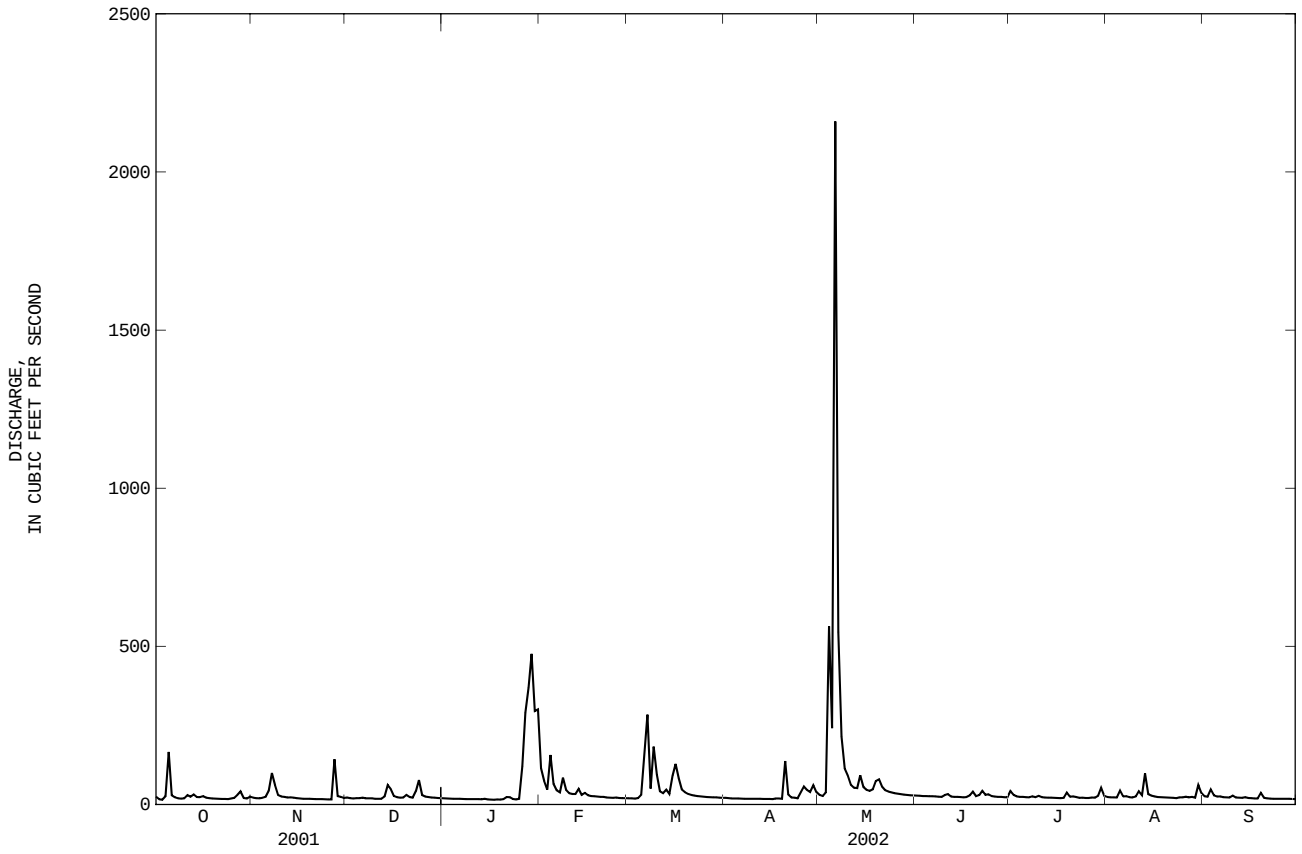
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	25	22	22	20	115	19	21	30	28	42	24	26
2	17	20	20	19	74	20	20	27	27	30	22	25
3	15	20	19	18	47	19	19	38	27	26	23	47
4	26	21	20	18	157	20	19	564	26	24	22	29
5	166	24	20	18	65	31	19	241	26	24	44	25
6	29	43	22	18	45	154	19	2160	26	23	25	25
7	23	99	19	17	38	284	18	545	25	23	26	23
8	20	61	19	17	85	50	18	215	25	26	23	22
9	19	30	20	17	46	183	18	114	24	23	22	22
10	19	25	18	17	36	94	18	92	29	27	25	28
11	30	24	18	17	33	42	18	62	33	23	42	22
12	24	22	18	17	33	36	18	53	25	22	29	22
13	32	23	25	16	49	47	18	52	24	22	98	21
14	24	22	61	18	31	33	18	92	24	21	33	23
15	23	20	49	16	37	91	17	55	24	21	28	21
16	26	19	26	16	29	128	17	46	23	21	25	20
17	22	18	23	15	27	82	19	43	24	20	24	19
18	20	18	22	16	26	48	19	48	29	21	23	19
19	19	18	22	15	25	39	18	74	41	38	23	37
20	18	18	30	17	24	33	137	80	26	25	22	21
21	18	17	23	23	24	30	32	56	30	26	22	20
22	18	17	21	23	22	28	22	45	44	23	21	19
23	18	17	42	17	21	26	21	41	31	21	20	18
24	17	17	77	16	21	26	19	38	32	22	22	18
25	19	16	30	18	22	25	39	36	26	21	22	18
26	21	16	25	121	21	24	57	34	25	20	25	18
27	31	143	24	290	20	23	46	33	24	22	23	18
28	41	27	22	369	20	23	39	31	24	22	24	18
29	20	24	22	476	---	22	61	30	23	28	21	17
30	19	21	21	295	---	22	39	29	23	53	62	17
31	25	---	20	300	---	21	---	29	---	27	37	---
TOTAL	844	882	820	2290	1193	1723	863	5033	818	787	902	678
MEAN	27.2	29.4	26.5	73.9	42.6	55.6	28.8	162	27.3	25.4	29.1	22.6
MAX	166	143	77	476	157	284	137	2160	44	53	98	47
MIN	15	16	18	15	20	19	17	27	23	20	20	17
AC-FT	1670	1750	1630	4540	2370	3420	1710	9980	1620	1560	1790	1340

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1959 - 2002, BY WATER YEAR (WY)

MEAN	32.1	44.0	37.3	37.7	36.2	43.3	44.3	40.4	27.0	31.9	30.2	29.2
MAX	55.1	170	101	94.9	141	176	137	162	56.5	90.5	73.7	84.7
(WY)	1992	1991	1988	1988	1969	1982	1963	2002	1978	1987	1978	1994
MIN	12.6	14.5	14.5	12.9	13.2	14.5	19.3	13.3	13.8	15.0	13.6	13.3
(WY)	1985	1963	1978	1977	1978	2000	1992	2000	2000	1984	1984	1975

16296500 KAHANA STREAM AT ALTITUDE 30 FT, NEAR KAHANA--Continued

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1959 - 2002	
ANNUAL TOTAL	9909		16833			
ANNUAL MEAN	27.1		46.1		36.3	
HIGHEST ANNUAL MEAN					67.2	1982
LOWEST ANNUAL MEAN					20.1	1984
HIGHEST DAILY MEAN	212	Feb 9	2160	May 6	2160	May 6 2002
LOWEST DAILY MEAN	13	Jan 22	15	Oct 3	10	Jun 5 2000
ANNUAL SEVEN-DAY MINIMUM	13	Feb 2	16	Jan 13	11	May 31 2000
ANNUAL RUNOFF (AC-FT)	19650		33390		26320	
10 PERCENT EXCEEDS	41		61		57	
50 PERCENT EXCEEDS	21		24		23	
90 PERCENT EXCEEDS	15		18		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 above mean sea level (from topographic map).

REMARKS.--Records computed by Heather Jeppesen. Records good except for October 1 to December 12, which are poor. Ditch diverts water from Punaluu Stream for irrigation in Punaluu Valley.

AVERAGE DISCHARGE.--49 years (water years 1954-2002), 8.36 ft^3/s (6,060 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 54 ft^3/s, October 31, 1964; no flow at times.

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge, 17 ft^3/s on several days; 0.17 ft^3/s, January 29, 30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

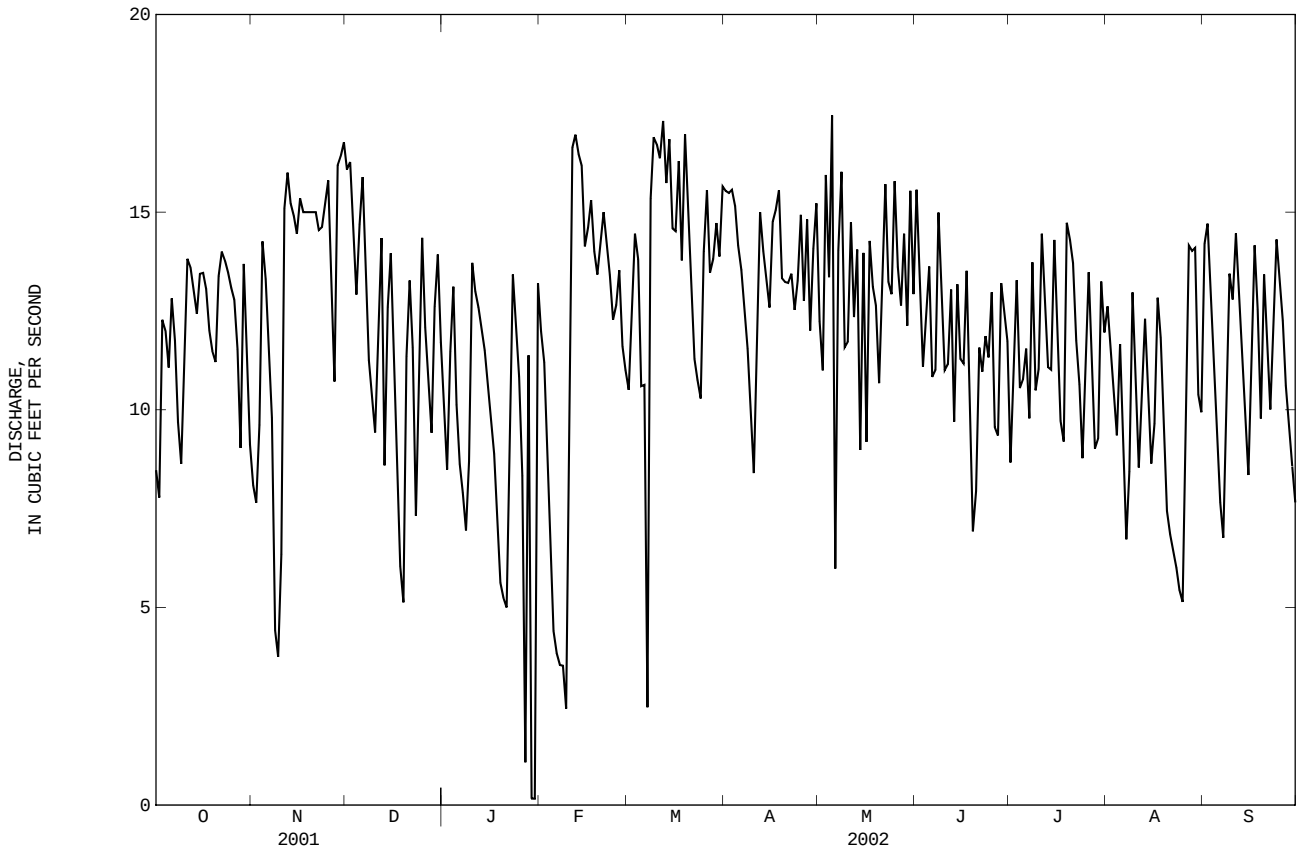
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	8.5	8.1	16	10	12	11	16	12	16	8.7	13	14
2	7.8	7.7	16	8.5	11	13	15	11	14	11	11	15
3	12	9.6	14	11	9.7	14	16	16	11	13	10	13
4	12	14	13	13	7.5	14	15	13	12	11	9.4	11
5	11	13	15	10	4.4	11	14	17	14	11	12	9.3
6	13	12	16	8.6	3.8	11	14	6.0	11	12	9.3	7.7
7	12	9.8	13	7.9	3.5	2.5	13	14	11	9.8	6.7	6.8
8	9.7	4.4	11	7.0	3.5	15	12	16	15	14	8.4	9.1
9	8.6	3.8	10	8.7	2.4	17	9.8	12	13	10	13	13
10	11	6.3	9.4	14	6.0	17	8.4	12	11	11	11	13
11	14	15	12	13	17	16	12	15	11	14	8.5	14
12	14	16	14	13	17	17	15	12	13	13	10	13
13	13	15	8.6	12	16	16	14	14	9.7	11	12	12
14	12	15	13	12	16	17	13	9.0	13	11	10	9.8
15	13	14	14	10	14	15	13	14	11	14	8.6	8.3
16	13	15	11	9.6	15	15	15	9.2	11	12	9.6	11
17	13	15	8.0	8.9	15	16	15	14	14	9.7	13	14
18	12	15	6.0	7.1	14	14	16	13	9.8	9.2	12	13
19	11	15	5.1	5.6	13	17	13	13	6.9	15	9.2	9.8
20	11	15	11	5.2	14	15	13	11	7.9	14	7.4	13
21	13	15	13	5.0	15	13	13	14	12	14	6.8	12
22	14	15	12	9.7	14	11	13	16	11	12	6.4	10
23	14	15	7.3	13	13	11	13	13	12	11	6.0	12
24	13	15	11	12	12	10	13	13	11	8.8	5.4	14
25	13	16	14	11	13	14	15	16	13	12	5.1	13
26	13	14	12	8.3	14	16	13	14	9.6	13	8.4	12
27	12	11	11	1.1	12	13	15	13	9.4	11	14	11
28	9.0	16	9.4	11	11	14	12	14	13	9.0	14	9.5
29	14	16	13	0.17	---	15	14	12	12	9.3	14	8.6
30	11	17	14	0.17	---	14	15	16	12	13	10	7.7
31	9.1	---	12	13	---	16	---	13	---	12	9.9	---
TOTAL	366.7	388.7	364.8	279.54	318.8	430.5	408.2	407.2	350.3	359.5	304.1	339.6
MEAN	11.8	13.0	11.8	9.02	11.4	13.9	13.6	13.1	11.7	11.6	9.81	11.3
MAX	14	17	16	14	17	17	16	17	16	15	14	15
MIN	7.8	3.8	5.1	0.17	2.4	2.5	8.4	6.0	6.9	8.7	5.1	6.8
AC-FT	727	771	724	554	632	854	810	808	695	713	603	674

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1953 - 2002, BY WATER YEAR (WY)

MEAN	9.22	7.77	6.40	6.25	6.30	7.15	8.60	8.88	9.67	10.1	10.2	10.1
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	0.002	0.000	0.001	0.003	0.011	0.046	0.015	0.027	0.020	0.003	0.002	0.001
(WY)	1981	1981	1981	1981	1981	1979	1979	1981	1979	1980	1974	1980

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1953 - 2002	
ANNUAL TOTAL	4420.0		4317.94			
ANNUAL MEAN	12.1		11.8		8.36	
HIGHEST ANNUAL MEAN					15.2	1964
LOWEST ANNUAL MEAN					0.23	1981
HIGHEST DAILY MEAN	17	Nov 30	17	Nov 30	54	Oct 31 1964
LOWEST DAILY MEAN	3.8	Nov 9	0.17	Jan 29	0.00	Dec 7 1963
ANNUAL SEVEN-DAY MINIMUM	8.4	Feb 9	4.4	Feb 4	0.00	Jan 5 1969
ANNUAL RUNOFF (AC-FT)	8770		8560		6060	
10 PERCENT EXCEEDS	15		15		17	
50 PERCENT EXCEEDS	12		12		7.7	
90 PERCENT EXCEEDS	8.9		7.9		0.31	

16302000 PUNALUU DITCH NEAR PUNALUU--Continued



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 March 20-21, 1991 was restored and water-stage recorder installed on March 29, 1993. Masonry control and elevation of gage is 212 ft above mean sea level (from topographic map). Prior to March 29, 1993, datum 2.00 ft higher.

REMARKS.--Records computed by Heather Jeppesen. Records good, except for estimated days and above 50 ft^3/s, which are poor. Records do not include flow of Punaluu ditch (see station 16302000).

AVERAGE DISCHARGE.--49 years (water years 1954-2002), 16.4 ft^3/s (11,870 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 6,900 ft^3/s, March 20, 1991, gage height, 10.02 ft, from rating curve extended above 170 ft^3/s on basis of slope-area measurements at gage heights 7.77 ft and 9.60 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)
Mar 7	0430	1,230	5.86	May 6	2045	*3,690	*8.50
May 4	0130	2,260	7.23				

Minimum daily discharge, 0.40 ft^3/s, Nov. 24.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	17	9.8	2.8	5.1	52	7.1	3.4	12	e5.0	e17	5.9	5.2
2	4.8	9.8	2.3	6.7	33	5.1	3.3	11	e6.0	e11	6.9	3.9
3	e0.68	4.6	5.5	3.3	24	3.0	3.3	32	e9.0	6.6	7.2	8.5
4	4.6	1.0	6.9	1.7	70	4.9	3.5	226	e8.0	8.6	8.1	7.6
5	50	1.8	2.7	4.5	39	15	4.1	70	e6.0	8.3	8.2	8.3
6	5.9	7.1	e3.0	6.0	30	61	4.6	e734	e9.0	7.6	8.6	10
7	3.9	27	e5.0	6.4	26	142	5.7	e218	e8.0	9.2	12	10
8	4.6	23	e6.0	7.3	55	20	6.4	e53	e4.0	6.0	9.5	8.1
9	6.0	18	e8.0	5.7	34	44	8.0	e36	e6.0	8.1	5.1	4.1
10	1.7	8.2	e7.6	0.54	24	24	9.2	e29	e10	8.7	7.4	5.1
11	3.2	0.90	e5.0	0.50	9.4	12	5.6	e18	e12	4.8	15	2.9
12	1.4	1.0	e3.0	0.75	7.7	8.6	2.5	e18	e7.0	6.4	15	4.2
13	2.6	1.6	10	1.5	8.5	38	3.5	e16	e9.3	7.5	8.2	5.9
14	1.7	2.3	12	2.3	6.6	11	4.3	e31	e6.0	7.4	8.9	8.6
15	1.0	1.4	8.5	2.6	9.2	17	4.9	e17	e7.0	4.4	9.5	8.2
16	1.8	0.61	6.3	3.4	6.8	27	2.7	e19	e7.0	6.7	8.1	5.4
17	1.6	0.51	7.9	4.2	5.4	32	2.4	e12	e5.0	8.3	5.3	2.7
18	2.0	0.61	9.6	6.2	6.1	17	3.6	e16	e11	8.7	6.1	7.9
19	3.5	0.62	10	7.6	6.6	9.8	4.6	e23	e18	5.3	8.1	28
20	2.9	0.51	5.6	9.2	5.2	9.8	34	e27	e12	4.8	9.6	5.4
21	0.76	0.83	2.4	10	4.1	10	7.9	e17	e10	5.3	10	5.8
22	0.51	1.1	3.3	5.9	4.7	12	5.1	e11	e15	6.6	10	7.0
23	0.61	0.75	20	0.67	5.3	12	5.3	e13	e10	7.5	11	4.9
24	0.83	0.40	29	0.98	6.2	12	4.6	e12	e11	8.9	12	2.7
25	1.6	0.51	6.5	2.6	6.2	7.4	5.9	e8.0	e7.0	6.1	12	3.7
26	2.0	2.3	6.5	22	4.8	5.3	12	e9.0	e9.4	4.6	9.4	4.5
27	10	56	6.6	80	6.2	7.1	13	e10	e9.6	6.8	3.6	5.8
28	18	6.4	7.3	161	6.7	6.3	14	e8.0	e6.0	8.8	4.1	6.8
29	3.5	3.2	4.1	222	---	5.4	32	e10	e6.0	11	3.4	7.5
30	6.0	2.0	2.2	162	---	5.7	14	e5.0	e7.0	12	19	7.9
31	9.2	---	4.2	112	---	3.6	---	e8.0	---	7.5	19	---
TOTAL	173.89	193.85	219.8	864.64	502.7	595.1	233.4	1729.0	256.3	240.5	286.2	206.6
MEAN	5.61	6.46	7.09	27.9	18.0	19.2	7.78	55.8	8.54	7.76	9.23	6.89
MAX	50	56	29	222	70	142	34	734	18	17	19	28
MIN	0.51	0.40	2.2	0.50	4.1	3.0	2.4	5.0	4.0	4.4	3.4	2.7
AC-FT	345	385	436	1720	997	1180	463	3430	508	477	568	410

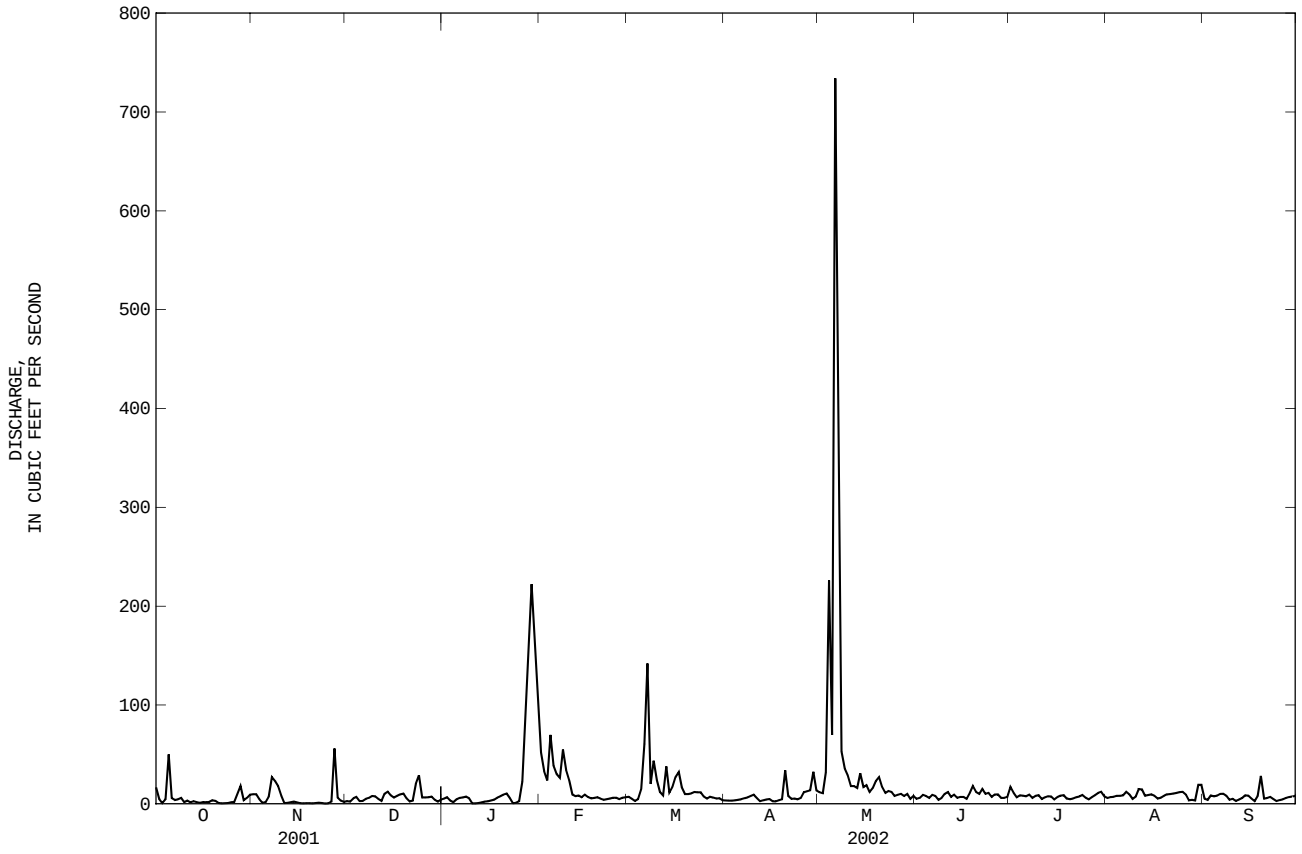
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1953 - 2002, BY WATER YEAR (WY)

MEAN	13.3	19.5	19.7	20.5	20.5	21.0	20.7	17.2	10.9	11.6	11.0	9.96
MAX	38.7	74.7	64.5	40.9	76.3	73.1	84.6	64.9	35.4	39.0	36.9	29.9
(WY)	1959	1991	1965	1988	1969	1982	1963	1965	1982	1974	1982	1994
MIN	0.28	4.58	0.23	2.11	0.58	3.19	2.37	1.00	0.000	0.000	0.31	0.49
(WY)	1958	1960	1960	2001	1964	1993	1954	1961	1953	1953	1961	1961

16303000 PUNALUU STREAM NEAR PUNALUU--Continued

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1953 - 2002	
ANNUAL TOTAL	2507.08		5501.98			
ANNUAL MEAN	6.87		15.1		16.4	
HIGHEST ANNUAL MEAN					35.4	1982
LOWEST ANNUAL MEAN					7.17	2000
HIGHEST DAILY MEAN	110	Feb 9	734	May 6	1010	Apr 15 1963
LOWEST DAILY MEAN	0.23	Jan 17	0.40	Nov 24	0.00	Jun 1 1953
ANNUAL SEVEN-DAY MINIMUM	0.67	Nov 19	0.67	Nov 19	0.00	Jun 1 1953
ANNUAL RUNOFF (AC-FT)	4970		10910		11870	
10 PERCENT EXCEEDS	14		25		29	
50 PERCENT EXCEEDS	3.9		7.0		11	
90 PERCENT EXCEEDS	0.88		2.0		2.4	

e Estimated



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 above mean sea level (from topographic map).

REMARKS.--Records computed by Heather Jeppesen. Records good except for discharges greater than 80 ft^3/s, and estimated days, which are poor. No diversion upstream of station.

AVERAGE DISCHARGE.--35 years (water years 1968-2002), 4.27 ft^3/s (3,090 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 2,390 ft^3/s, January 6, 1982, gage height, 11.90 ft, from rating curve extended above 14 ft^3/s on basis of slope-area measurement at gage height 10.84 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)
May 6	2230	*1,250	*9.20	No other peak greater than base discharge.			

Minimum discharge, 0.09 ft^3/s, Apr. 17, gage height, 4.60 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	23	2.9	1.8	0.81	7.7	0.31	0.37	e1.4	0.40	6.2	1.5	1.8
2	1.6	2.0	1.3	0.71	5.7	2.3	0.32	e1.1	0.37	2.9	1.2	1.6
3	0.80	2.3	0.84	0.62	2.9	1.9	0.27	e7.2	0.47	1.3	1.1	6.6
4	18	2.3	3.9	0.54	43	2.2	0.30	e47	0.49	1.1	1.3	2.0
5	30	2.0	2.4	0.48	6.3	14	0.32	e22	0.39	0.72	5.4	1.2
6	2.6	5.1	2.1	0.45	3.0	35	0.25	173	0.32	0.56	2.0	1.9
7	2.4	13	1.0	0.41	2.3	27	0.22	96	0.32	0.93	3.8	1.3
8	1.5	10	0.74	0.34	30	3.2	0.19	24	0.26	4.0	2.0	1.0
9	1.1	2.4	1.1	0.33	4.5	11	0.17	11	0.23	1.9	1.6	0.82
10	2.5	1.7	0.64	1.3	2.2	5.0	0.14	12	0.35	5.7	1.8	1.3
11	6.8	1.6	0.50	0.42	1.7	1.6	0.13	3.9	1.0	1.6	7.0	0.77
12	1.9	1.3	0.48	0.28	1.9	1.4	0.12	4.9	0.61	1.2	8.4	0.69
13	3.7	2.0	8.4	0.26	6.4	5.9	0.11	5.8	0.31	0.85	3.6	0.58
14	1.4	4.7	12	0.80	2.0	1.5	0.15	6.2	0.26	0.69	1.9	4.1
15	1.3	1.4	7.3	0.33	8.2	3.1	0.16	2.8	0.20	0.61	1.5	1.3
16	3.3	1.0	1.9	0.22	1.7	3.7	0.11	1.9	0.17	0.99	1.2	0.94
17	1.3	0.89	1.9	0.19	1.3	25	1.4	1.6	0.17	0.61	1.1	0.76
18	1.2	0.78	2.0	0.19	1.1	2.5	1.4	2.5	2.5	1.9	0.91	4.7
19	0.93	0.69	2.8	0.50	0.96	1.5	0.67	8.7	7.8	8.1	1.3	16
20	0.75	0.62	4.9	3.7	0.86	1.2	14	6.9	1.0	1.9	0.97	1.1
21	0.75	0.54	2.3	3.3	0.71	1.0	2.0	2.3	2.2	4.7	0.95	0.84
22	0.72	0.48	1.4	4.0	0.62	0.90	0.74	1.6	9.0	1.9	0.78	0.66
23	0.70	0.41	25	0.96	0.54	0.80	0.75	1.4	3.2	1.1	1.4	0.57
24	0.53	0.37	17	0.46	0.55	0.83	0.42	1.2	6.2	3.2	2.2	0.48
25	2.2	0.34	2.5	2.0	0.57	1.2	2.9	1.1	1.4	1.7	2.1	0.41
26	1.2	0.33	2.2	19	0.48	1.1	e3.8	0.94	0.91	1.1	2.5	0.35
27	14	39	1.6	34	0.36	0.87	e1.3	0.82	0.66	2.1	1.4	0.32
28	15	2.0	1.3	73	0.32	0.96	2.0	0.74	0.53	2.0	6.3	0.28
29	1.6	1.1	2.4	76	---	0.65	17	0.63	0.42	6.6	1.5	0.25
30	1.1	0.82	1.2	45	---	0.91	e4.1	0.53	0.37	7.3	17	0.32
31	6.7	---	1.0	35	---	0.55	---	0.48	---	2.4	3.0	---
TOTAL	150.58	104.07	115.90	305.60	137.87	159.08	55.81	451.64	42.51	77.86	88.71	54.94
MEAN	4.86	3.47	3.74	9.86	4.92	5.13	1.86	14.6	1.42	2.51	2.86	1.83
MAX	30	39	25	76	43	35	17	173	9.0	8.1	17	16
MIN	0.53	0.33	0.48	0.19	0.32	0.31	0.11	0.48	0.17	0.56	0.78	0.25
AC-FT	299	206	230	606	273	316	111	896	84	154	176	109

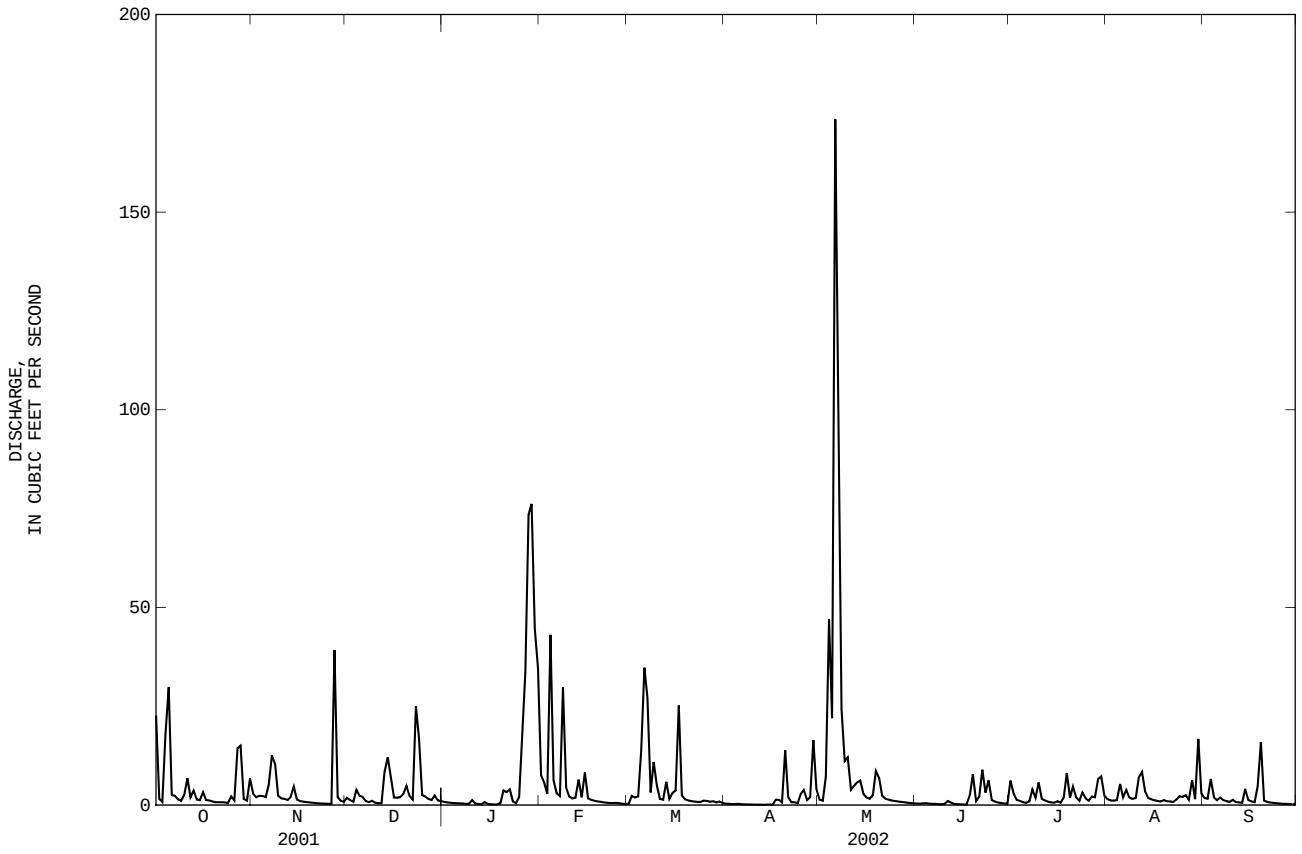
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1967 - 2002, BY WATER YEAR (WY)

MEAN	3.36	5.76	4.89	5.27	4.41	5.33	5.63	3.91	2.79	3.96	3.22	2.94
MAX	7.68	19.0	17.7	17.9	19.7	32.2	19.3	14.6	7.72	11.7	8.37	9.34
(WY)	1992	1991	1988	1988	1979	1982	1989	2002	1987	1982	1991	1994
MIN	0.27	1.66	0.48	0.26	0.37	0.14	0.87	0.52	0.61	0.21	0.53	0.22
(WY)	1985	1981	1977	1986	2000	1983	1979	2000	1981	1971	1984	1975

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1967 - 2002	
ANNUAL TOTAL	1194.21		1744.57			
ANNUAL MEAN	3.27		4.78		4.27	
HIGHEST ANNUAL MEAN					9.94	1982
LOWEST ANNUAL MEAN					2.04	1984
HIGHEST DAILY MEAN	39	Nov 27	173	May 6	230	Feb 1 1969
LOWEST DAILY MEAN	0.08	Jan 28	0.11	Apr 13	0.00	Jul 24 1971
ANNUAL SEVEN-DAY MINIMUM	0.11	Jan 23	0.13	Apr 10	0.00	Sep 14 1975
ANNUAL RUNOFF (AC-FT)	2370		3460		3090	
10 PERCENT EXCEEDS	8.6		8.8		9.3	
50 PERCENT EXCEEDS	1.3		1.4		1.4	
90 PERCENT EXCEEDS	0.27		0.33		0.26	

e Estimated

16304200 KALUANUI STREAM NEAR PUNALUU--Continued



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, 5.9 mi northeast of Waialua School, and 7.4 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 November 20, 1990 was restored and water-stage recorder installed on February 25, 1993. Control rebuilt about 75 ft downstream of gage. Elevation of gage is 20 ft above mean sea level (from topographic map). Prior to May 18, 1966, datum 2.00 ft higher.

REMARKS.--Records computed by S.T.M. Young. Records fair. Small diversion upstream of station.

AVERAGE DISCHARGE.--28 years (water years 1975-2002), 18.5 ft^3/s (13,430 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 16,800 ft^3/s, November 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 27	0500	*2,290	*7.93	Jan 29	0230	1,430	6.82
Jan 28	2215	1,800	7.33	May 6	0930	2,000	7.59

Minimum discharge, 0.05 ft^3/s, Sept. 30, gage height, 1.46 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

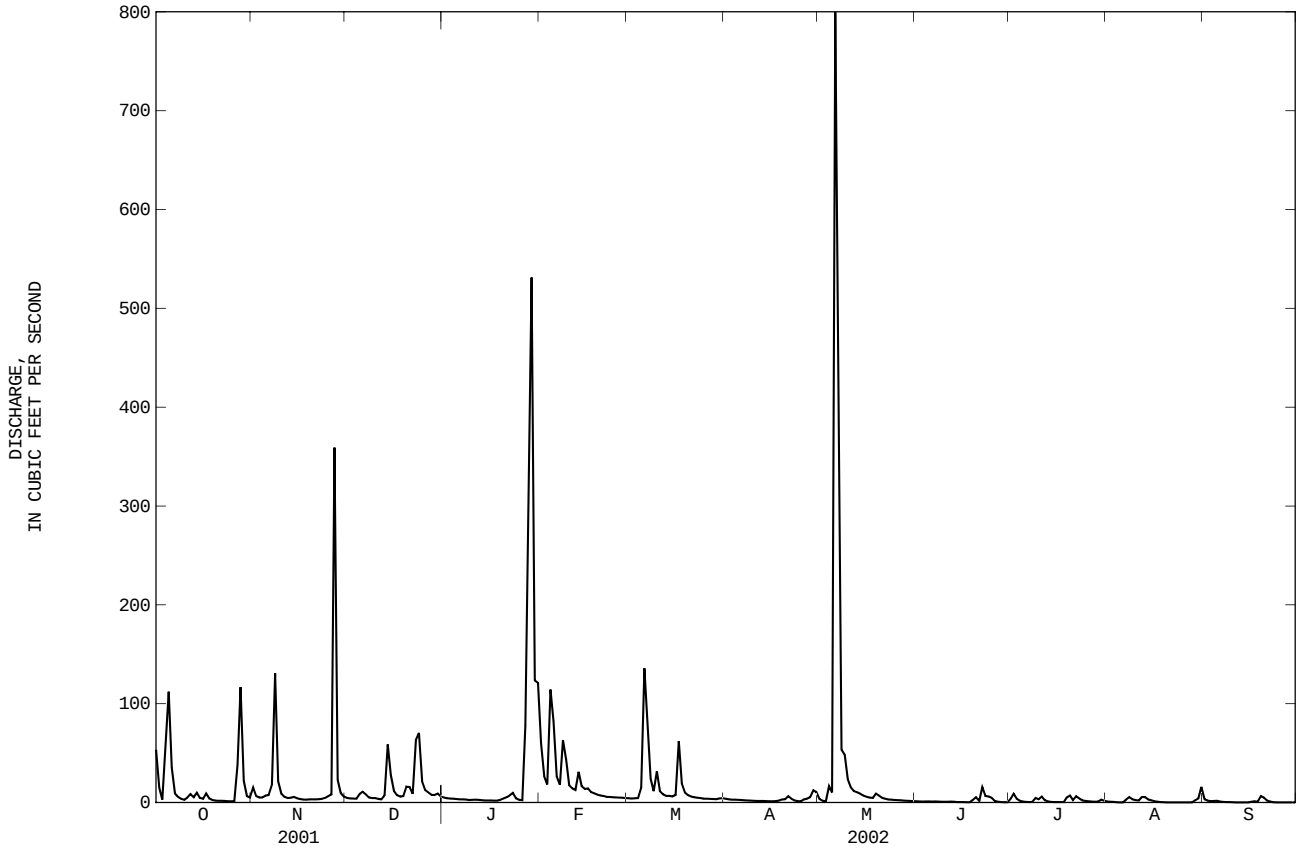
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	53	15	4.7	5.0	60	4.3	3.8	3.5	1.3	3.4	1.00	3.2
2	15	6.4	4.2	4.3	26	4.1	3.2	1.7	1.1	8.9	0.69	1.8
3	3.0	5.0	4.0	4.1	18	4.4	2.9	1.1	1.0	3.8	0.55	1.4
4	50	5.1	3.8	3.8	114	4.4	2.9	17	1.1	1.7	0.27	1.5
5	112	7.1	8.5	3.5	82	15	2.7	10	1.2	0.90	0.13	1.8
6	35	7.6	11	3.2	26	136	2.5	799	1.00	0.55	0.12	0.97
7	9.3	18	8.2	3.1	18	78	2.2	408	1.1	0.48	3.0	0.64
8	5.8	131	5.1	3.0	63	24	2.1	53	0.91	0.57	5.5	0.41
9	3.6	21	4.4	2.6	43	11	1.9	48	0.75	4.4	3.2	0.48
10	2.7	8.9	4.6	2.6	18	32	1.7	24	0.72	3.2	2.4	0.29
11	5.0	5.8	3.6	2.9	14	11	1.6	15	0.82	6.0	2.1	0.08
12	8.6	4.5	3.2	2.7	13	8.2	1.5	11	0.87	2.3	5.7	0.07
13	5.3	4.8	7.0	2.3	31	6.6	1.5	10	0.77	1.2	5.5	0.12
14	9.9	5.6	59	2.1	16	6.8	1.4	8.9	0.51	0.59	3.1	0.17
15	4.6	4.3	28	2.0	14	6.1	1.3	6.9	0.43	0.46	2.2	0.18
16	3.7	3.5	12	2.0	14	7.6	1.2	5.8	0.37	0.42	1.2	0.83
17	9.2	3.0	7.4	1.8	10	62	1.5	5.0	0.34	0.41	0.68	1.2
18	4.0	2.9	5.9	1.9	9.1	19	2.0	4.6	0.35	0.45	0.41	0.83
19	2.5	3.1	6.6	2.8	7.8	10	3.1	9.0	2.5	5.1	0.22	6.4
20	1.9	3.1	16	4.0	7.1	7.2	3.3	6.9	5.2	7.1	0.14	4.9
21	1.7	3.2	16	5.3	6.6	6.0	6.5	4.7	1.7	2.4	0.12	1.9
22	1.7	3.3	8.9	7.3	5.7	5.3	3.8	3.8	16	6.3	0.16	0.92
23	1.6	3.7	63	9.7	5.6	4.8	2.1	3.1	6.6	4.0	0.15	0.34
24	1.3	4.6	70	4.1	5.3	4.5	1.4	2.9	6.1	2.1	0.11	0.10
25	1.3	6.4	21	2.7	5.1	3.8	1.3	2.5	4.7	1.5	0.08	0.08
26	1.5	8.1	13	2.4	5.0	3.8	3.2	2.4	1.6	1.3	0.16	0.08
27	38	359	10	78	4.8	3.6	3.8	2.2	0.74	0.99	0.19	0.07
28	117	23	7.8	328	4.5	3.5	5.3	1.9	0.42	0.72	0.19	0.07
29	22	9.6	7.6	531	---	3.4	12	1.7	0.35	0.89	2.3	0.07
30	6.5	6.0	9.0	124	---	4.1	11	1.6	0.34	2.8	4.1	0.05
31	4.9	---	5.9	121	---	4.3	---	1.4	---	1.7	16	---
TOTAL	541.6	692.6	439.4	1273.2	646.6	504.8	94.7	1476.6	60.89	76.63	61.67	30.95
MEAN	17.5	23.1	14.2	41.1	23.1	16.3	3.16	47.6	2.03	2.47	1.99	1.03
MAX	117	359	70	531	114	136	12	799	16	8.9	16	6.4
MIN	1.3	2.9	3.2	1.8	4.5	3.4	1.2	1.1	0.34	0.41	0.08	0.05
AC-FT	1070	1370	872	2530	1280	1000	188	2930	121	152	122	61

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1975 - 2002, BY WATER YEAR (WY)

MEAN	11.7	30.8	21.1	30.5	20.4	30.9	24.9	15.2	8.87	12.5	9.42	6.26
MAX	54.1	168	107	143	96.9	155	168	58.3	52.9	52.7	46.2	19.9
(WY)	1992	1991	1988	1988	1979	1982	1989	1988	1978	1989	1995	1994
MIN	0.006	2.60	0.67	0.094	0.022	0.85	0.64	0.95	0.65	0.98	0.58	0.006
(WY)	1985	1990	1977	1986	1978	1998	1992	1984	2000	1984	1984	1984

16330000 KAMANANUI STREAM AT MAUNAWAI--Continued

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1975 - 2002	
ANNUAL TOTAL	3720.31		5899.64			
ANNUAL MEAN	10.2		16.2		18.5	
HIGHEST ANNUAL MEAN					50.3	1982
LOWEST ANNUAL MEAN					4.81	1984
HIGHEST DAILY MEAN	359	Nov 27	799	May 6	1940	Jan 1 1988
LOWEST DAILY MEAN	0.05	Feb 8	0.05	Sep 30	0.00	Sep 15 1975
ANNUAL SEVEN-DAY MINIMUM	0.11	Feb 2	0.07	Sep 24	0.00	Sep 15 1975
ANNUAL RUNOFF (AC-FT)	7380		11700		13430	
10 PERCENT EXCEEDS	20		22		30	
50 PERCENT EXCEEDS	3.2		3.8		3.9	
90 PERCENT EXCEEDS	0.34		0.42		0.28	



16345000 OPAEULA STREAM NEAR WAHIAWA

LOCATION.--Lat 21°33'55", long 158°00'10", Hydrologic Unit 20060000, 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 above mean sea level (from topographic map).

REMARKS.--Records computed by S.T.M. Young. Records good. No diversion upstream of station.

AVERAGE DISCHARGE.--43 years (water years 1960-2002), 13.5 ft^3/s (9,770 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, 6.98 ft, and 10.12 ft; maximum gage height, 13.20 ft, November 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)
Nov 27	0400	1,390	6.98	May 6	0730	*3,010	*10.38
Jan 29	0245	2,020	8.26				

Minimum discharge, 0.66 ft^3/s, June 15, 16, Sept. 30, gage height, 1.36 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

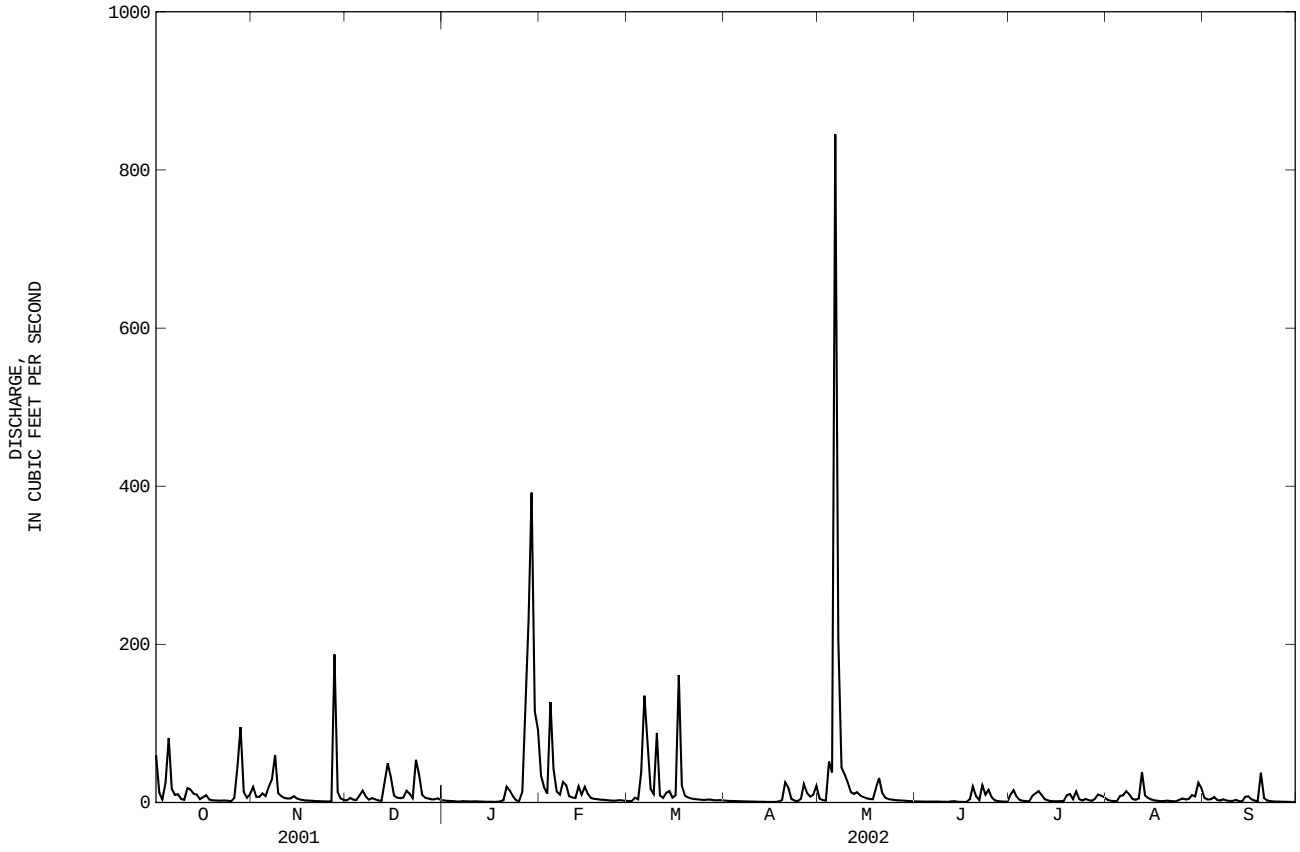
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	60	20	2.6	2.6	34	1.9	2.5	4.8	1.4	9.9	3.5	5.5
2	13	7.2	5.6	2.2	19	1.8	2.1	3.0	1.3	16	2.2	3.8
3	3.9	7.3	3.6	2.0	11	6.1	1.9	2.4	1.2	7.1	1.8	4.1
4	25	11	3.2	1.8	127	4.0	1.8	52	1.2	3.1	1.7	6.9
5	82	8.0	9.1	1.4	42	38	1.7	38	1.2	2.3	8.3	3.4
6	18	19	15	1.2	14	135	1.6	845	1.2	1.7	9.1	2.4
7	9.6	29	7.5	1.7	9.8	83	1.5	206	1.1	1.7	14	4.0
8	10	60	3.5	1.6	26	17	1.3	44	1.1	8.4	10	2.5
9	4.4	12	5.4	1.4	22	11	1.1	36	1.0	12	4.5	1.9
10	3.3	7.9	4.0	1.4	7.9	88	1.1	26	0.87	14	3.4	1.9
11	18	5.8	2.5	1.5	6.3	8.8	1.0	13	0.84	9.2	5.0	3.2
12	16	5.1	2.2	1.4	5.7	5.9	0.93	11	1.4	3.9	38	1.8
13	11	5.2	24	1.1	21	12	0.86	13	1.7	2.6	8.9	1.4
14	9.9	8.1	50	0.94	10	15	0.80	9.1	1.0	1.8	5.6	7.3
15	4.3	5.0	32	0.89	20	6.0	0.78	6.9	0.75	1.6	3.7	7.8
16	6.9	3.8	8.9	0.89	11	9.1	0.75	5.3	0.67	1.5	2.9	4.0
17	9.3	2.9	6.2	0.84	5.6	161	0.77	4.4	0.81	1.8	2.2	2.4
18	3.8	2.5	5.4	0.91	4.7	21	1.4	4.1	3.9	1.9	1.8	1.8
19	2.8	2.3	6.2	1.4	4.1	8.6	2.8	18	20	9.1	1.8	37
20	2.6	2.1	15	2.7	3.7	6.2	25	31	8.1	11	2.4	5.6
21	2.3	1.8	11	20	3.3	5.0	19	13	2.9	3.9	1.9	2.6
22	2.4	1.7	5.6	15	3.0	4.5	4.1	5.8	22	14	1.7	1.8
23	2.5	1.6	54	8.1	2.7	3.9	2.3	4.4	10	4.0	1.6	1.4
24	2.1	1.4	36	2.9	2.4	3.5	1.7	3.7	16	2.4	3.4	1.2
25	1.7	1.3	9.9	1.6	2.4	3.2	4.5	3.2	6.6	4.3	5.0	1.1
26	5.9	1.3	6.1	13	3.0	3.5	23	2.8	2.8	3.0	3.7	0.97
27	46	187	5.0	132	2.6	3.8	12	2.6	1.8	2.2	4.6	0.90
28	95	13	4.0	230	2.1	3.0	7.5	2.4	1.4	4.6	9.2	0.80
29	13	5.1	3.9	392	---	2.7	9.8	2.1	1.1	10	7.7	0.71
30	5.9	3.3	5.2	115	---	2.9	21	1.8	0.96	8.6	25	0.68
31	10	---	3.2	92	---	2.9	---	1.6	---	6.6	18	---
TOTAL	500.6	441.7	355.8	1051.47	426.3	678.3	156.59	1416.4	116.30	184.2	212.6	120.86
MEAN	16.1	14.7	11.5	33.9	15.2	21.9	5.22	45.7	3.88	5.94	6.86	4.03
MAX	95	187	54	392	127	161	25	845	22	16	38	37
MIN	1.7	1.3	2.2	0.84	2.1	1.8	0.75	1.6	0.67	1.5	1.6	0.68
AC-FT	993	876	706	2090	846	1350	311	2810	231	365	422	240

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1959 - 2002, BY WATER YEAR (WY)

MEAN	10.9	18.2	15.5	16.3	13.4	19.8	20.2	12.5	7.51	11.6	8.54	7.45
MAX	30.7	71.9	52.6	54.1	66.9	90.0	75.7	45.7	24.9	29.3	31.0	24.9
(WY)	1982	1991	1988	1988	1969	1982	1989	2002	1978	1989	1982	1994
MIN	0.057	2.90	1.29	0.37	0.32	0.35	1.57	1.37	1.59	0.95	1.51	0.52
(WY)	1985	1963	1977	1977	1978	1983	1966	2000	2000	1971	1984	1975

16345000 OPAEULA STREAM NEAR WAHIAWA--Continued

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1959 - 2002	
ANNUAL TOTAL	3773.50		5661.12			
ANNUAL MEAN	10.3		15.5		13.5	
HIGHEST ANNUAL MEAN					29.7	1982
LOWEST ANNUAL MEAN					7.12	1998
HIGHEST DAILY MEAN	187	Nov 27	845	May 6	845	May 6 2002
LOWEST DAILY MEAN	0.27	Jan 23	0.67	Jun 16	0.00	Jan 24 1977
ANNUAL SEVEN-DAY MINIMUM	0.35	Jan 21	0.84	Apr 11	0.00	Oct 24 1984
ANNUAL RUNOFF (AC-FT)	7480		11230		9770	
10 PERCENT EXCEEDS	25		25		28	
50 PERCENT EXCEEDS	5.0		4.0		4.5	
90 PERCENT EXCEEDS	0.95		1.2		0.94	



Surface-Water Station Records for Molokai

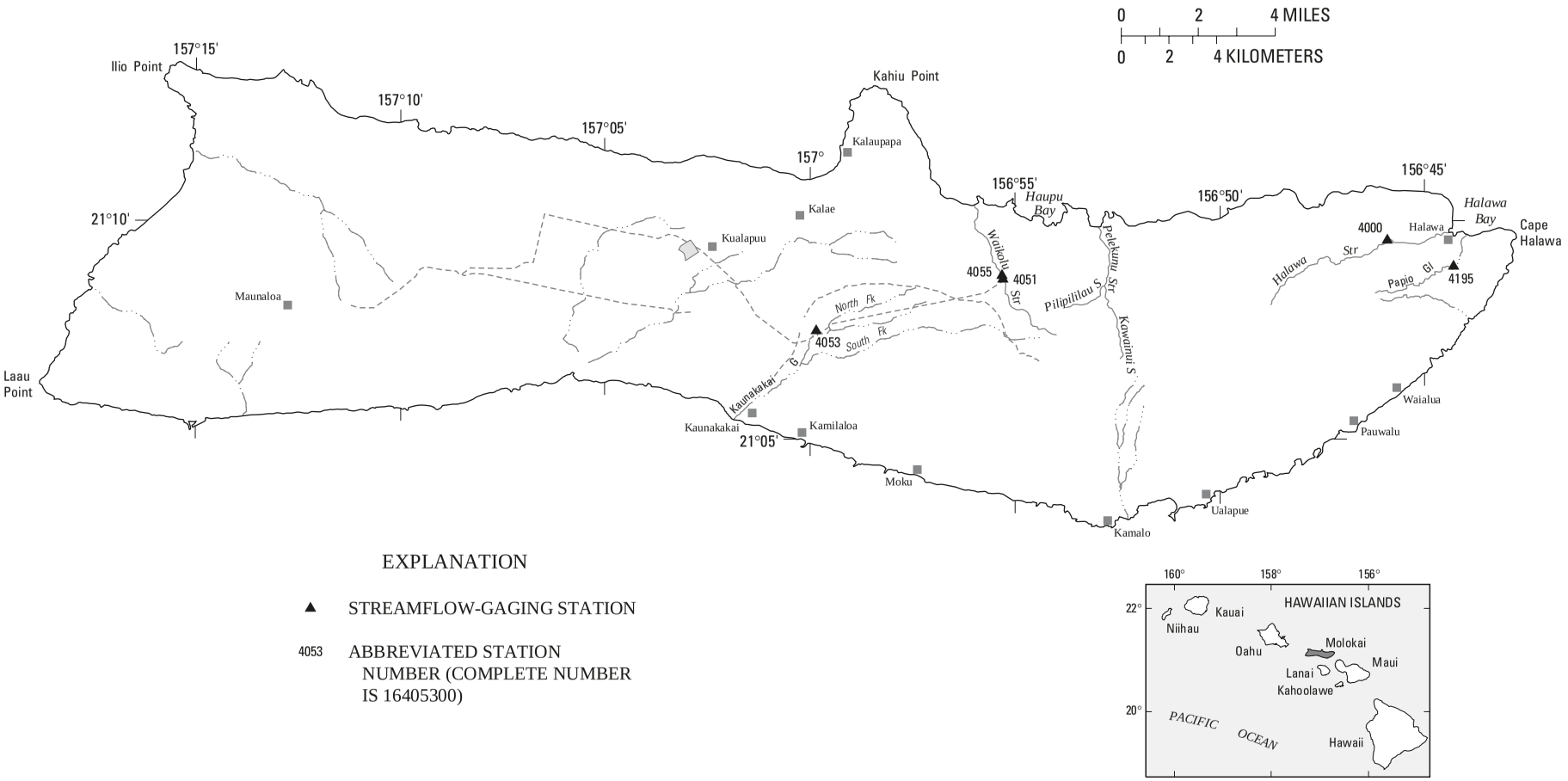


Figure 7. Locations of streamflow-gaging stations on Molokai.

16400000 HALAWA STREAM NEAR HALAWA

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.

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 above mean sea level (from topographic map). Prior to June 25, 1923, at site 350 ft upstream of gage at different datum. June 25, 1923 to July 18, 1932, and November 17, 1937 to February 3, 1965, at present site at datum 2.00 ft higher.

REMARKS.--Records computed by Roy Taogoshi. Records fair. No diversion upstream.

AVERAGE DISCHARGE.--78 years (water years 1918-31, 1939-2002), 29.6 ft^3/s (21,420 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 26,900 ft^3/s, February 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 November 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)
Oct 24	2015	2,230	8.92	Jan 26	2030	2,020	8.60
Nov 27	0600	2,020	8.60	Jan 29	1645	2,210	8.88
Jan 22	0800	*2,360	*9.09				

Minimum discharge, 3.2 ft^3/s, Sept. 28, 29, gage height, 1.62 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

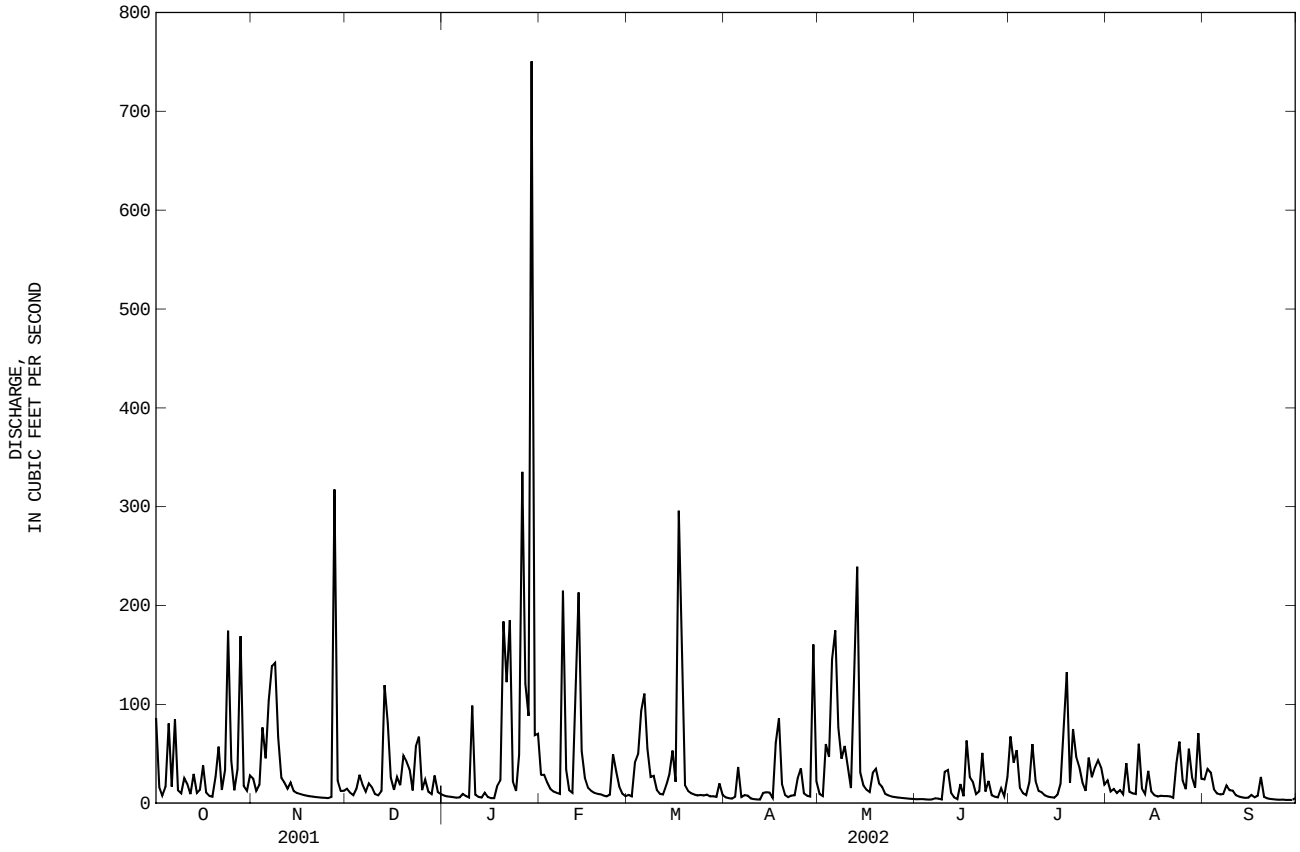
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	86	25	15	7.7	29	8.4	5.8	9.3	4.0	67	23	24
2	16	12	11	6.8	29	6.9	5.1	7.3	4.1	41	12	34
3	7.6	19	8.0	6.5	21	41	4.6	60	4.1	54	14	31
4	16	77	14	6.0	14	50	6.6	47	3.8	16	10	14
5	81	45	29	5.6	12	93	37	146	3.6	10	13	9.8
6	17	104	19	5.8	10	111	6.2	175	3.9	8.1	8.9	8.8
7	85	139	12	9.3	9.3	55	8.2	77	4.9	21	40	9.3
8	13	142	20	7.1	215	27	7.7	45	4.5	60	12	18
9	10	67	16	5.7	34	28	4.8	58	3.7	22	9.9	13
10	25	26	9.1	99	13	13	4.1	37	32	12	9.3	13
11	19	21	7.9	8.6	10	9.4	3.8	15	34	11	60	8.0
12	9.1	15	12	6.4	89	8.8	3.6	95	10	7.9	15	6.7
13	30	21	119	5.7	213	18	10	239	5.9	6.5	9.2	6.0
14	10	12	81	11	53	29	11	31	4.2	6.1	33	5.4
15	13	10	26	6.2	26	53	11	18	19	5.6	12	5.6
16	38	9.2	14	5.1	16	22	5.2	14	7.0	8.7	8.1	8.4
17	11	8.4	27	5.0	12	296	61	11	63	20	6.8	5.9
18	7.4	7.7	18	17	10	138	86	31	26	73	7.6	7.4
19	6.5	7.1	48	23	9.5	18	20	35	21	132	7.3	26
20	27	6.7	42	184	8.9	12	8.1	20	9.1	21	7.1	6.4
21	57	6.3	34	122	7.7	9.9	6.1	17	12	75	6.8	4.9
22	13	5.9	13	185	6.9	8.7	7.6	9.3	51	47	5.4	4.3
23	33	5.6	58	22	8.5	7.8	8.0	7.8	12	36	40	3.9
24	174	5.4	67	12	49	8.4	25	6.8	22	21	62	3.7
25	43	5.1	13	49	32	7.8	35	6.2	8.0	13	23	3.5
26	13	6.1	24	335	17	8.6	10	5.8	6.5	46	14	3.6
27	34	317	12	121	9.4	6.8	7.4	5.4	6.0	26	55	3.4
28	169	23	9.2	88	7.1	7.1	6.7	5.0	15	36	26	3.3
29	17	12	28	751	---	6.4	160	4.8	7.1	43	16	3.3
30	12	12	11	69	---	20	22	4.4	27	36	71	5.1
31	28	---	9.1	70	---	8.3	---	4.2	---	19	25	---
TOTAL	1120.6	1172.5	826.3	2255.5	971.3	1137.3	597.6	1247.3	434.4	1000.9	662.4	299.7
MEAN	36.1	39.1	26.7	72.8	34.7	36.7	19.9	40.2	14.5	32.3	21.4	9.99
MAX	174	317	119	751	215	296	160	239	63	132	71	34
MIN	6.5	5.1	7.9	5.0	6.9	6.4	3.6	4.2	3.6	5.6	5.4	3.3
AC-FT	2220	2330	1640	4470	1930	2260	1190	2470	862	1990	1310	594

16400000 HALAWA STREAM NEAR HALAWA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1917 - 2002, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	26.4	36.5	35.9	33.9	29.1	36.9	39.6	27.0	18.8	25.6	24.9	20.5
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 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1917 - 2002	
ANNUAL TOTAL	8874.9		11725.8			
ANNUAL MEAN	24.3		32.1		29.6	
HIGHEST ANNUAL MEAN					47.4	1965
LOWEST ANNUAL MEAN					17.4	1975
HIGHEST DAILY MEAN	317	Nov 27	751	Jan 29	1240	Feb 4 1965
LOWEST DAILY MEAN	2.8	Jan 8	3.3	Sep 28	0.86	Sep 1 1971
ANNUAL SEVEN-DAY MINIMUM	3.4	Jan 2	3.5	Sep 23	0.90	Aug 26 1971
ANNUAL RUNOFF (AC-FT)	17600		23260		21420	
10 PERCENT EXCEEDS	57		74		65	
50 PERCENT EXCEEDS	12		13		13	
90 PERCENT EXCEEDS	4.1		5.4		4.8	



HAWAII, ISLAND OF MOLOKAI

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 September 2002 (discontinued).

GAGE.--Water-stage recorder and concrete control. Elevation of gage is 989 ft above mean sea level, from tunnel plans.

REMARKS.--Records computed by Phillip Teeters. Records good. Tunnel diverts water 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.--36 years (water years 1967-2002), 4.85 ft^3/s (3,510 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 41 ft^3/s, March 19, 1986; no flow at times.

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge, 27 ft^3/s, March 17; minimum daily discharge, 0.74 ft^3/s, September 29.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

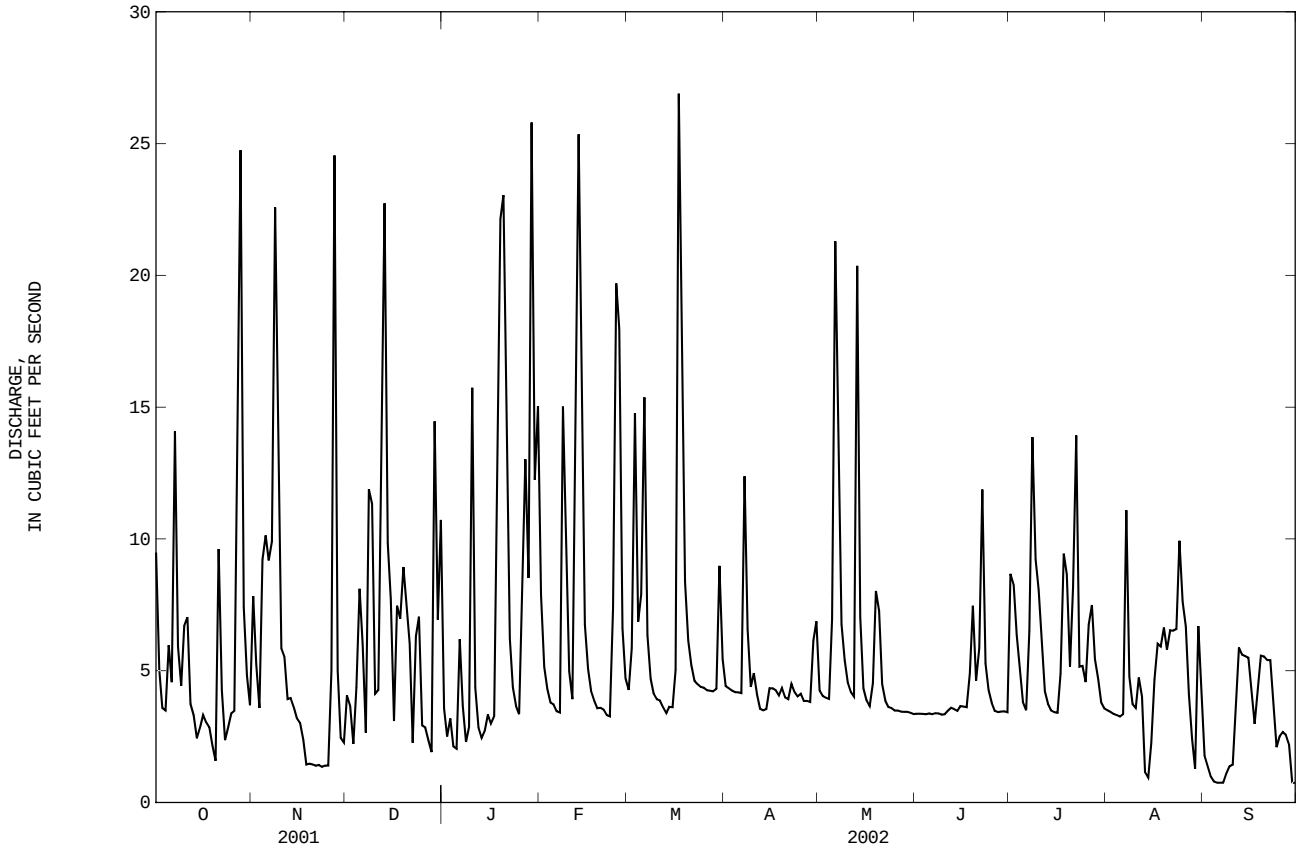
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	9.5	7.8	4.1	3.6	7.9	4.3	4.4	4.2	3.4	8.7	3.5	1.8
2	5.0	5.3	3.7	2.5	5.1	5.9	4.3	4.0	3.4	8.3	3.4	1.4
3	3.6	3.6	2.2	3.2	4.3	15	4.2	4.0	3.4	6.4	3.4	0.99
4	3.5	9.2	4.4	2.1	3.8	6.9	4.2	3.9	3.3	5.0	3.3	0.79
5	6.0	10	8.1	2.0	3.7	7.9	4.2	7.0	3.4	3.8	3.3	0.75
6	4.6	9.2	6.0	6.2	3.5	15	4.1	21	3.3	3.5	3.3	0.75
7	14	9.9	2.6	3.7	3.4	6.3	12	11	3.4	6.5	11	0.75
8	5.9	23	12	2.3	15	4.7	6.6	6.8	3.4	14	4.8	1.1
9	4.4	12	11	2.9	9.6	4.1	4.4	5.4	3.3	9.2	3.7	1.4
10	6.7	5.9	4.1	16	5.0	3.9	4.9	4.6	3.4	8.1	3.6	1.4
11	7.0	5.5	4.3	4.4	3.9	3.9	4.1	4.2	3.5	6.1	4.7	4.0
12	3.7	3.9	13	2.8	17	3.6	3.6	4.0	3.6	4.2	4.0	5.9
13	3.3	4.0	23	2.5	25	3.4	3.5	20	3.5	3.7	1.2	5.6
14	2.4	3.6	9.8	2.7	12	3.6	3.5	7.0	3.5	3.5	0.94	5.5
15	2.8	3.2	7.7	3.3	6.7	3.6	4.3	4.3	3.7	3.4	2.3	5.5
16	3.3	3.0	3.1	3.0	5.1	5.0	4.3	3.9	3.6	3.4	4.7	4.2
17	3.0	2.4	7.5	3.3	4.2	27	4.3	3.7	3.6	4.9	6.0	3.0
18	2.9	1.4	7.0	13	3.9	19	4.1	4.5	4.9	9.4	5.9	4.2
19	2.2	1.5	8.9	22	3.6	8.4	4.3	8.0	7.5	8.7	6.6	5.6
20	1.6	1.4	7.6	23	3.6	6.1	4.0	7.3	4.6	5.2	5.8	5.5
21	9.6	1.4	6.0	14	3.5	5.2	3.9	4.5	5.9	8.2	6.5	5.4
22	4.3	1.4	2.3	6.2	3.3	4.6	4.5	3.9	12	14	6.5	5.4
23	2.4	1.4	6.3	4.4	3.3	4.5	4.2	3.6	5.3	5.2	6.6	3.8
24	2.8	1.4	7.0	3.7	7.4	4.4	4.0	3.6	4.3	5.2	9.9	2.1
25	3.4	1.4	2.9	3.4	20	4.4	4.1	3.5	3.8	4.6	7.6	2.5
26	3.5	5.0	2.9	8.6	18	4.3	3.9	3.5	3.5	6.7	6.7	2.7
27	8.5	25	2.4	13	6.6	4.2	3.9	3.4	3.4	7.5	4.1	2.6
28	25	5.0	1.9	8.5	4.7	4.2	3.8	3.4	3.5	5.4	2.4	2.2
29	7.4	2.5	14	26	---	4.3	6.1	3.4	3.5	4.7	1.3	0.74
30	4.8	2.3	6.9	12	---	9.0	6.9	3.4	3.4	3.8	6.7	0.75
31	3.7	---	11	15	---	5.4	---	3.4	---	3.6	3.9	---
TOTAL	170.8	172.6	213.7	239.3	213.1	212.1	138.6	178.4	124.3	194.9	147.64	88.32
MEAN	5.51	5.75	6.89	7.72	7.61	6.84	4.62	5.75	4.14	6.29	4.76	2.94
MAX	25	25	23	26	25	27	12	21	12	14	11	5.9
MIN	1.6	1.4	1.9	2.0	3.3	3.4	3.5	3.4	3.3	3.4	0.94	0.74
AC-FT	339	342	424	475	423	421	275	354	247	387	293	175

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1966 - 2002, BY WATER YEAR (WY)

MEAN	4.14	5.74	5.67	5.24	4.99	5.67	5.75	4.64	4.25	4.62	3.95	3.39
MAX	8.05	10.2	10.8	12.5	12.5	13.8	12.8	12.3	9.49	9.89	7.22	5.81
(WY)	1996	1988	1997	1987	1990	1986	1986	1987	1998	1986	1985	1994
MIN	1.80	1.86	0.41	0.086	0.010	0.009	0.001	0.037	0.016	0.055	0.004	0.24
(WY)	1972	1992	1968	1968	1968	1968	1967	1967	1974	1974	1974	1974

16405100 MOLOKAI TUNNEL AT EAST PORTAL--Continued

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1966 - 2002	
ANNUAL TOTAL	1978.49		2093.76			
ANNUAL MEAN	5.42		5.74		4.85	
HIGHEST ANNUAL MEAN					8.19	1987
LOWEST ANNUAL MEAN					1.31	1974
HIGHEST DAILY MEAN	27	Feb 14	27	Mar 17	41	Mar 19 1986
LOWEST DAILY MEAN	0.67	Feb 23	0.74	Sep 29	0.00	Mar 30 1967
ANNUAL SEVEN-DAY MINIMUM	0.73	Feb 21	0.93	Sep 2	0.00	Mar 30 1967
ANNUAL RUNOFF (AC-FT)	3920		4150		3510	
10 PERCENT EXCEEDS	9.4		11		9.9	
50 PERCENT EXCEEDS	4.6		4.2		3.7	
90 PERCENT EXCEEDS	2.0		2.4		1.1	



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 above mean sea level, from tunnel plans.

REMARKS.--Records computed by Phillip Teeters. Records good. Tunnel diverts water 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.--37 years (water years 1966-2002), 7.37 ft^3/s (5,340 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 39 ft^3/s, April 8, 9, 1986, January 2, 26, 1988, and March 3, 1989; minimum daily, 1.8 ft^3/s, October 15, 1967, August 27, 1992.

EXTREMES FOR CURRENT YEAR.--Maximun daily discharge, 32 ft^3/s, October 28; minimum daily discharge, 3.1 ft^3/s, September 4-7.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

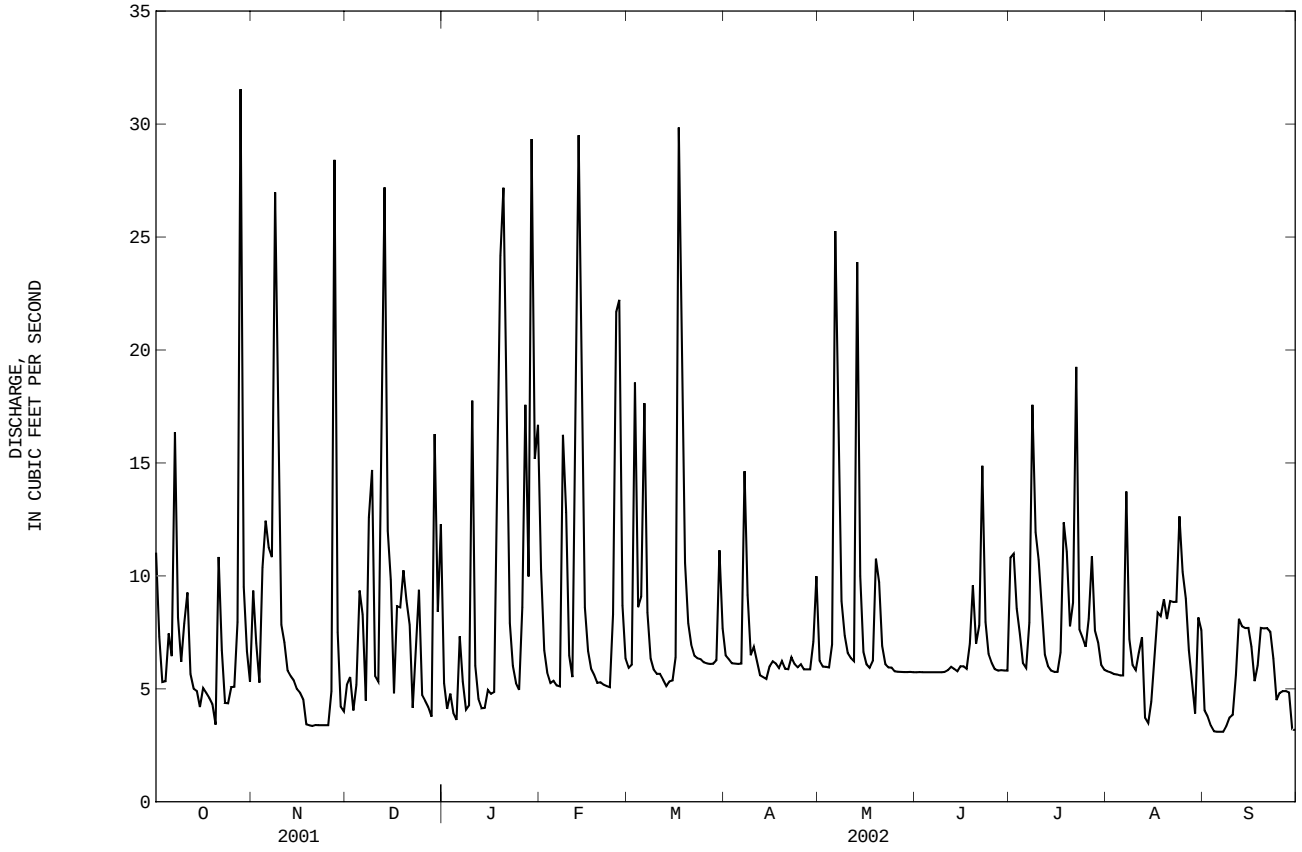
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	11	9.3	5.2	5.2	10	5.9	6.5	6.2	5.7	11	5.8	4.1
2	7.3	7.0	5.5	4.1	6.7	6.1	6.3	6.0	5.7	11	5.7	3.8
3	5.3	5.3	4.0	4.8	5.7	19	6.1	6.0	5.7	8.6	5.7	3.4
4	5.3	10	5.2	3.9	5.3	8.6	6.1	5.9	5.7	7.4	5.6	3.1
5	7.4	12	9.3	3.6	5.4	9.1	6.1	7.0	5.7	6.1	5.6	3.1
6	6.4	11	8.3	7.3	5.1	18	6.1	25	5.7	5.9	5.6	3.1
7	16	11	4.5	5.3	5.1	8.4	15	15	5.7	7.9	14	3.1
8	8.2	27	13	4.1	16	6.3	9.2	8.9	5.7	18	7.2	3.4
9	6.2	14	15	4.3	13	5.9	6.5	7.4	5.7	12	6.1	3.7
10	7.9	7.8	5.6	18	6.5	5.7	6.9	6.6	5.7	11	5.8	3.8
11	9.3	7.1	5.3	6.0	5.5	5.7	6.2	6.4	5.8	8.6	6.6	5.6
12	5.7	5.8	13	4.6	18	5.4	5.6	6.2	6.0	6.5	7.3	8.1
13	5.0	5.6	27	4.1	30	5.1	5.5	24	5.9	6.0	3.7	7.8
14	4.9	5.4	12	4.2	15	5.3	5.4	10	5.8	5.8	3.5	7.7
15	4.2	5.0	9.8	5.0	8.6	5.4	6.0	6.6	6.0	5.7	4.4	7.7
16	5.0	4.8	4.8	4.8	6.7	6.4	6.2	6.1	6.0	5.8	6.5	6.9
17	4.8	4.5	8.7	4.9	5.9	30	6.1	5.9	5.9	6.6	8.4	5.3
18	4.6	3.4	8.6	14	5.6	24	5.9	6.2	7.0	12	8.2	6.0
19	4.3	3.4	10	24	5.3	11	6.2	11	9.6	11	9.0	7.7
20	3.4	3.4	8.9	27	5.3	7.9	5.9	9.7	7.0	7.8	8.1	7.7
21	11	3.4	7.8	18	5.2	7.0	5.9	6.9	7.8	8.8	8.9	7.7
22	6.7	3.4	4.2	7.9	5.1	6.5	6.4	6.1	15	19	8.8	7.5
23	4.4	3.4	7.0	6.0	5.1	6.4	6.1	5.9	8.0	7.6	8.9	6.3
24	4.4	3.4	9.4	5.2	8.3	6.3	6.0	5.9	6.5	7.3	13	4.5
25	5.1	3.4	4.7	5.0	22	6.2	6.1	5.8	6.1	6.9	10	4.8
26	5.1	4.9	4.5	8.6	22	6.1	5.9	5.8	5.9	8.1	9.0	4.9
27	8.0	28	4.2	18	8.7	6.1	5.9	5.8	5.8	11	6.7	4.9
28	32	7.5	3.8	10	6.4	6.1	5.9	5.7	5.8	7.6	5.2	4.8
29	9.5	4.2	16	29	---	6.3	7.1	5.7	5.8	7.0	3.9	3.2
30	6.7	4.0	8.4	15	---	11	10	5.8	5.8	6.1	8.2	3.2
31	5.3	---	12	17	---	7.7	---	5.7	---	5.8	7.6	---
TOTAL	230.4	228.4	265.7	298.9	267.5	274.9	199.1	251.2	194.5	269.9	223.0	156.9
MEAN	7.43	7.61	8.57	9.64	9.55	8.87	6.64	8.10	6.48	8.71	7.19	5.23
MAX	32	28	27	29	30	30	15	25	15	19	14	8.1
MIN	3.4	3.4	3.8	3.6	5.1	5.1	5.4	5.7	5.7	5.7	3.5	3.1
AC-FT	457	453	527	593	531	545	395	498	386	535	442	311

16405300 MOLOKAI TUNNEL AT WEST PORTAL--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1965 - 2002, BY WATER YEAR (WY)

MEAN	6.56	8.19	8.01	7.55	7.45	8.19	8.34	7.25	6.88	7.26	6.47	5.94
MAX	10.6	14.0	13.8	14.4	15.9	15.5	15.6	15.8	12.8	13.2	10.2	9.21
(WY)	1996	1999	1991	1988	1990	1986	1986	1987	1998	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 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1965 - 2002	
ANNUAL TOTAL	2690.6		2860.4			
ANNUAL MEAN	7.37		7.84		7.37	
HIGHEST ANNUAL MEAN					11.4	1987
LOWEST ANNUAL MEAN					3.46	1974
HIGHEST DAILY MEAN	32	Feb 14	32	Oct 28	39	Apr 8 1986
LOWEST DAILY MEAN	2.7	Mar 2	3.1	Sep 4	1.8	Oct 15 1967
ANNUAL SEVEN-DAY MINIMUM	2.9	Mar 1	3.3	Sep 3	1.9	May 3 1976
ANNUAL RUNOFF (AC-FT)	5340		5670		5340	
10 PERCENT EXCEEDS	11		13		13	
50 PERCENT EXCEEDS	6.5		6.1		6.2	
90 PERCENT EXCEEDS	4.0		4.2		3.1	



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 above mean sea level (from topographic map). Prior to July 1, 1962, at site 200 ft upstream of gage at datum 6.14 ft higher.

REMARKS.--Records computed by Matt Wong. Records fair except estimated daily discharges, which are poor. Since November 16, 1960, low flows diverted 400 ft upstream into Molokai tunnel (16405100, 16405300). Hawaii Departmant of Agriculture diverts flow into transmountain tunnel for irrigation in west central Molokai.

AVERAGE DISCHARGE (since Molokai tunnel diversion began).--41 years (water years 1961, 1963-2002), 5.75 ft^3/s (4,160 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 3,570 ft^3/s, January 25, 1982, gage height, 6.64 ft, from rating curve extended above 43 ft^3/s on basis of slope-area measurements at gage heights 5.24 ft and 6.64 ft; no flow at times since 1984.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of October 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 27	0515	*1,650	*5.15	Feb 8	1345	645	3.82
Jan 26	1915	1,130	4.57	Mar 17	0945	993	4.38

Minimum discharge, 0.00 ft^3/s, on many days, gage height, 0.46 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.5	0.00	0.00	0.02	e1.1	0.39	e0.01	0.63	0.43	0.80	0.44	0.43
2	0.00	0.00	0.00	0.00	e0.01	1.4	e0.00	0.58	0.45	0.79	0.38	0.52
3	0.00	0.00	0.00	0.00	e0.00	11	e0.00	0.58	0.47	0.45	0.35	0.48
4	0.00	0.00	0.18	0.00	e0.00	0.82	e0.00	0.56	0.52	0.43	0.34	0.36
5	0.00	0.60	1.3	0.00	e0.00	1.2	e0.00	3.0	0.53	0.42	0.38	0.29
6	0.00	0.34	0.38	0.38	e0.00	6.2	e0.00	18	0.53	0.35	0.43	0.38
7	1.8	1.0	0.00	0.00	e0.00	0.83	e3.0	2.7	0.53	0.46	1.8	0.49
8	0.00	21	4.4	0.00	54	0.47	e0.08	0.79	0.46	3.0	0.44	0.72
9	0.00	1.2	4.4	1.1	e2.4	0.47	e0.00	0.73	0.43	0.94	0.44	0.92
10	0.00	0.00	0.00	20	e0.00	0.47	e0.00	0.64	0.47	0.73	0.44	0.99
11	0.00	0.00	0.05	0.04	e0.00	0.53	e0.00	0.64	0.53	0.53	0.51	0.53
12	0.00	0.00	6.3	0.00	22	0.53	e0.00	0.64	0.58	0.43	0.59	0.01
13	0.00	0.00	51	0.00	29	0.53	e0.00	25	0.64	0.43	0.38	0.00
14	0.00	0.00	2.9	0.00	2.8	0.58	e0.00	1.1	0.64	0.37	0.39	0.00
15	0.00	0.00	2.0	0.00	e0.17	0.64	e0.00	0.64	0.64	0.34	0.43	0.00
16	0.00	0.00	0.00	0.00	e0.00	0.90	e0.00	0.64	0.64	0.35	0.41	0.00
17	0.00	0.00	2.1	0.00	e0.00	219	e0.00	0.57	0.64	0.42	0.20	0.00
18	0.00	0.00	1.3	3.6	e0.00	24	e0.53	0.53	0.55	1.2	0.22	0.00
19	0.00	0.00	2.9	14	e0.00	0.85	0.53	1.1	0.56	0.99	0.04	0.00
20	0.00	0.00	1.7	28	e0.00	e0.38	0.53	1.0	0.53	0.48	0.00	0.00
21	0.20	0.00	1.1	5.0	e0.00	e0.31	0.53	0.64	0.53	5.6	0.00	0.00
22	0.00	0.00	0.00	0.20	e0.13	e0.25	0.56	0.61	1.9	6.5	0.00	0.00
23	0.00	0.00	2.0	0.00	0.27	e0.15	0.63	0.53	0.61	0.51	0.00	0.00
24	0.00	0.00	1.2	0.00	0.78	e0.11	0.57	0.53	0.53	0.44	0.00	0.00
25	0.00	0.00	0.00	0.00	20	e0.10	0.53	0.53	0.53	0.44	0.00	0.00
26	0.00	3.4	0.00	81	14	e0.08	0.53	0.53	0.51	1.4	0.00	0.00
27	6.8	181	0.00	e14	0.83	e0.03	0.53	0.53	0.44	0.92	0.00	0.00
28	76	2.6	0.00	e2.5	0.43	e0.03	0.53	0.51	0.38	0.46	0.00	0.00
29	0.03	0.00	30	128	---	e0.09	0.94	0.44	0.42	0.43	0.00	0.00
30	0.00	0.00	1.0	4.2	---	e0.97	0.90	0.43	0.42	0.43	2.7	0.00
31	0.00	---	3.3	e8.3	---	e0.04	---	0.45	---	0.43	1.3	---
TOTAL	87.33	211.14	119.51	310.34	147.92	273.35	10.93	65.80	17.04	31.47	12.61	6.12
MEAN	2.82	7.04	3.86	10.0	5.28	8.82	0.36	2.12	0.57	1.02	0.41	0.20
MAX	76	181	51	128	54	219	3.0	25	1.9	6.5	2.7	0.99
MIN	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.43	0.38	0.34	0.00	0.00
AC-FT	173	419	237	616	293	542	22	131	34	62	25	12

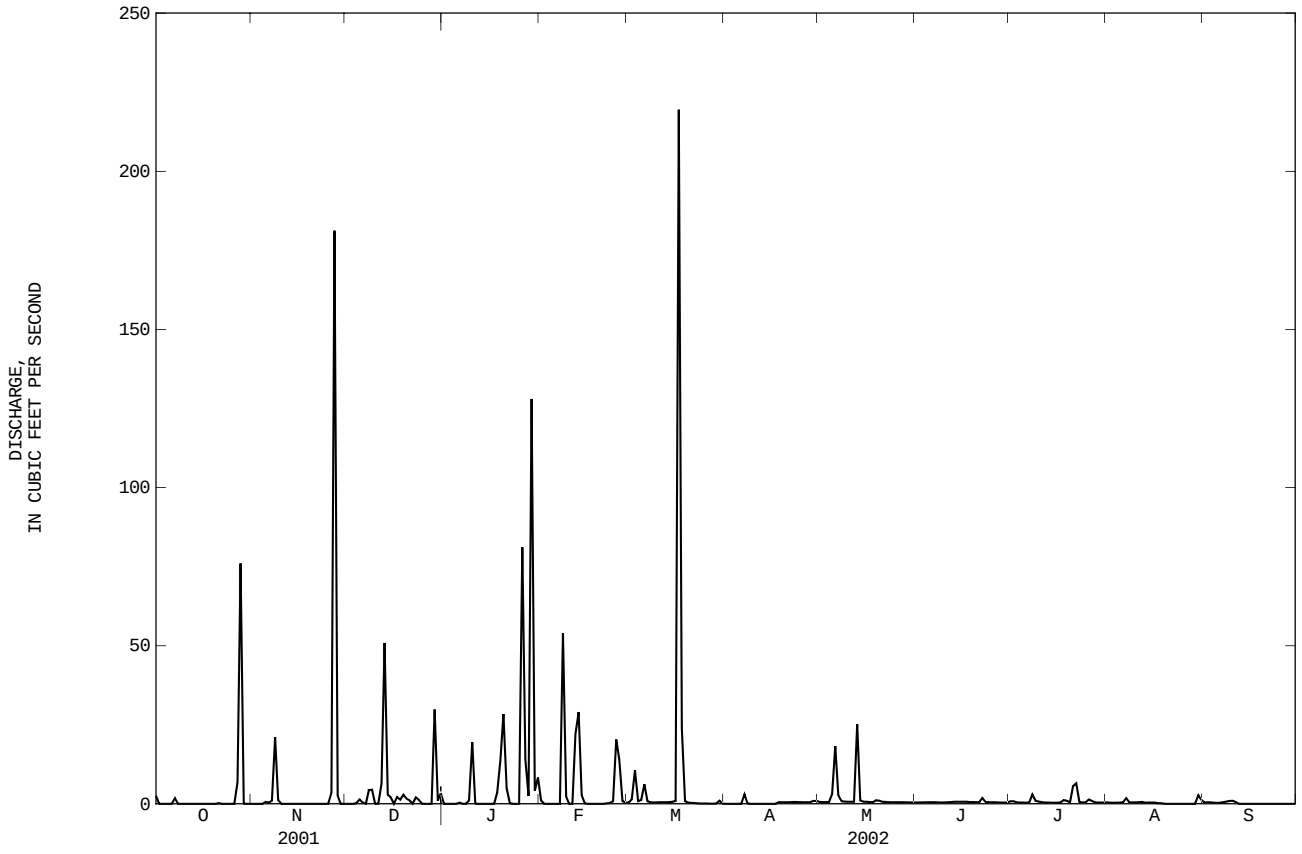
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1961 - 2002, BY WATER YEAR (WY)

MEAN	3.02	8.30	8.79	10.5	8.35	8.54	9.08	4.37	2.27	2.69	1.96	1.34
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	0.000	0.000	0.22	0.15	0.000	0.18	0.36	0.000	0.000	0.000	0.010	0.000
(WY)	1985	2000	2001	2001	2000	2001	2002	2001	1985	2001	1996	1996

16405500 WAIKOLU STREAM AT ALTITUDE 900 FT, NEAR KALAUPAPA--Continued

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1961 - 2002	
ANNUAL TOTAL	542.75		1293.56			
ANNUAL MEAN	1.49		3.54		5.75	
HIGHEST ANNUAL MEAN					11.8	1965
LOWEST ANNUAL MEAN					0.52	2001
HIGHEST DAILY MEAN	181	Nov 27	219	Mar 17	847	Apr 8 1989
LOWEST DAILY MEAN	0.00	Jan 1	0.00	Oct 2	0.00	Sep 12 1984
ANNUAL SEVEN-DAY MINIMUM	0.00	Jan 4	0.00	Oct 8	0.00	Sep 12 1984
ANNUAL RUNOFF (AC-FT)	1080		2570		4160	
10 PERCENT EXCEEDS	1.3		3.0		10	
50 PERCENT EXCEEDS	0.00		0.43		1.2	
90 PERCENT EXCEEDS	0.00		0.00		0.00	

e Estimated



16419500 PAPIO GULCH AT HALAWA

LOCATION.--Lat 21°08'55", long 156°44'16", Hydrologic Unit 20050000, on left bank 200 ft downstream from concrete 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 above mean sea level (from topographic map).

REMARKS.--Records computed by Clayton Yoshida. Records fair except for estimated daily discharges which are poor. Diversion upstream of station for domestic use at Puu O Hoku Ranch.

AVERAGE DISCHARGE.--39 years (water years 1964-2002), 0.78 ft^3/s (568 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 2,720 ft^3/s, April 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)
Jan 29	1715	*392	*5.00	No other peak greater than base discharge.			

Minimum discharge, 0.00 ft^3/s, on many days, gage height, 0.28 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.00	0.00	0.00	0.00	e0.70	e0.00	e0.00	e0.00	e0.00	0.00	0.03	0.05
2	0.00	0.00	0.00	0.00	e0.50	e0.00	e0.00	e0.00	e0.00	0.00	0.00	0.0
3	0.00	0.00	0.00	0.00	e0.00	e0.00	e0.00	e0.00	e0.00	0.00	0.00	e0.12
4	0.00	0.00	0.00	0.00	e0.00	e0.00	e0.00	e0.00	e0.00	0.00	0.00	e0.10
5	0.00	0.00	0.00	0.00	e0.00	e0.00	e0.00	e0.00	e0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	e0.00	e0.00	e0.00	e0.00	e0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	e0.00	e0.00	e0.00	e0.00	e0.00	0.00	0.00	0.00
8	0.00	1.8	0.00	0.00	e6.5	e0.00	e0.00	e0.00	e0.00	0.00	0.00	0.00
9	0.00	0.08	0.00	0.00	e1.7	e0.00	e0.00	e0.00	e0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.04	e0.00	e0.00	e0.00	e0.00	e0.00	0.00	0.00	0.00
11	0.00	0.00	0.00	0.07	e0.00	e0.00	e0.00	e0.00	e0.00	0.00	0.00	0.00
12	0.00	0.00	0.00	0.00	e1.1	e0.00	e0.00	e1.2	0.00	0.00	0.00	0.00
13	0.00	0.00	0.00	0.00	e5.8	e0.00	e0.00	e6.9	0.00	0.00	0.00	0.00
14	0.00	0.00	0.00	0.00	e1.0	e1.5	e0.00	e1.7	0.00	0.00	0.00	0.00
15	0.00	0.00	0.00	0.00	e0.00	e0.00	e0.00	e0.46	0.00	0.00	0.00	0.00
16	0.00	0.00	0.00	0.00	e0.00	e0.00	e0.00	e0.00	0.00	0.00	0.00	0.00
17	0.00	0.00	0.00	0.00	e0.00	e2.5	e0.00	e0.00	0.00	0.00	0.00	0.00
18	0.00	0.00	0.00	0.00	e0.00	e4.0	e0.00	e0.00	0.00	0.00	0.00	0.00
19	0.00	0.00	0.00	0.00	e0.00	e0.00	e0.00	e0.00	0.00	0.29	0.00	0.00
20	0.00	0.00	0.00	1.5	e0.00	e0.00	e0.00	e0.00	0.00	0.24	0.00	0.00
21	0.00	0.00	0.00	3.8	e0.00	e0.00	e0.00	e0.00	0.00	0.0	0.00	0.00
22	0.00	0.00	0.00	6.4	e0.00	e0.00	e0.00	e0.00	0.00	0.29	0.00	0.00
23	0.00	0.00	0.00	0.87	e0.00	e0.00	e0.00	e0.00	0.00	0.11	0.00	0.00
24	0.00	0.00	0.40	0.23	e0.00	e0.00	e0.00	e0.00	0.00	0.13	0.00	0.00
25	0.00	0.00	0.06	0.40	e0.00	e0.00	e0.00	e0.00	0.00	0.01	0.00	0.00
26	0.00	0.00	0.00	6.6	e0.00	e0.00	e0.00	e0.00	0.00	0.00	0.00	0.00
27	0.00	14	0.00	8.5	e0.00	e0.00	e0.00	e0.00	0.00	0.00	0.00	0.00
28	0.00	1.1	0.00	1.1	e0.00	e0.00	e0.00	e0.00	0.00	0.00	0.00	0.00
29	0.00	0.08	0.52	56	---	e0.00	e0.00	e0.00	0.00	0.06	0.00	0.00
30	0.00	0.00	0.18	6.8	---	e0.00	e0.00	e0.00	0.00	0.60	0.00	0.00
31	0.00	---	0.01	e2.3	---	e0.00	---	e0.00	---	0.13	0.10	---
TOTAL	0.00	17.06	1.17	94.61	17.30	8.00	0.00	10.26	0.00	1.86	0.13	0.27
MEAN	0.000	0.57	0.038	3.05	0.62	0.26	0.000	0.33	0.000	0.060	0.004	0.009
MAX	0.00	14	0.52	56	6.5	4.0	0.00	6.9	0.00	0.60	0.10	0.12
MIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AC-FT	0.00	34	2.3	188	34	16	0.00	20	0.00	3.7	0.3	0.5

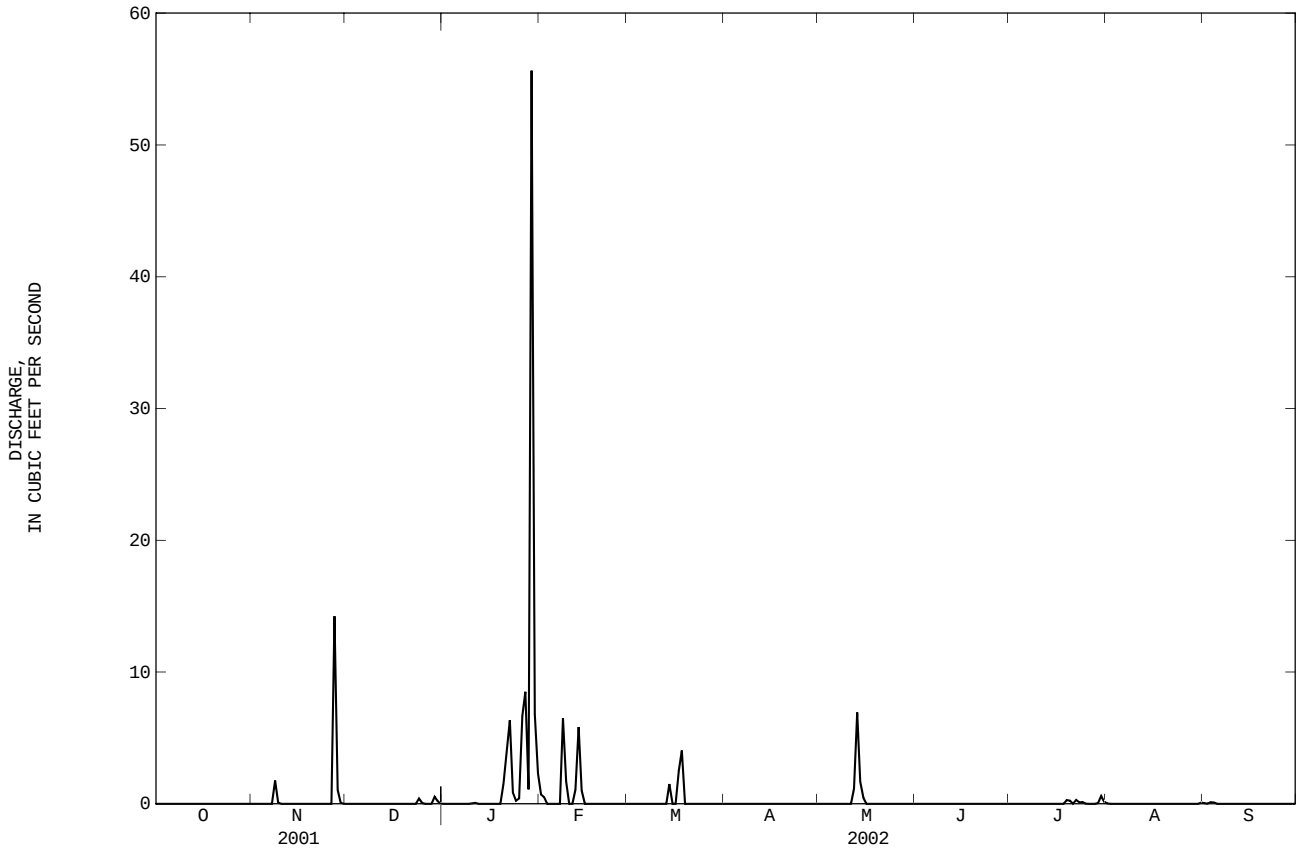
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1963 - 2002, BY WATER YEAR (WY)

MEAN	0.47	1.11	1.00	1.27	1.10	1.29	1.28	0.63	0.30	0.41	0.29	0.28
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	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
(WY)	1972	1972	1972	1977	1973	2001	2001	1975	1964	1972	1964	1964

16419500 PAPIO GULCH AT HALAWA--Continued

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1963 - 2002	
ANNUAL TOTAL	18.23		150.66			
ANNUAL MEAN	0.050		0.41		0.78	
HIGHEST ANNUAL MEAN					2.32	1989
LOWEST ANNUAL MEAN					0.062	2001
HIGHEST DAILY MEAN	14	Nov 27	56	Jan 29	164	Apr 13 1965
LOWEST DAILY MEAN	0.00	Jan 1	0.00	Oct 1	0.00	Jul 5 1963
ANNUAL SEVEN-DAY MINIMUM	0.00	Jan 1	0.00	Oct 1	0.00	Aug 3 1963
ANNUAL RUNOFF (AC-FT)	36		299		568	
10 PERCENT EXCEEDS	0.00		0.15		1.4	
50 PERCENT EXCEEDS	0.00		0.00		0.18	
90 PERCENT EXCEEDS	0.00		0.00		0.00	

e Estimated



Surface-Water Station Records for Maui

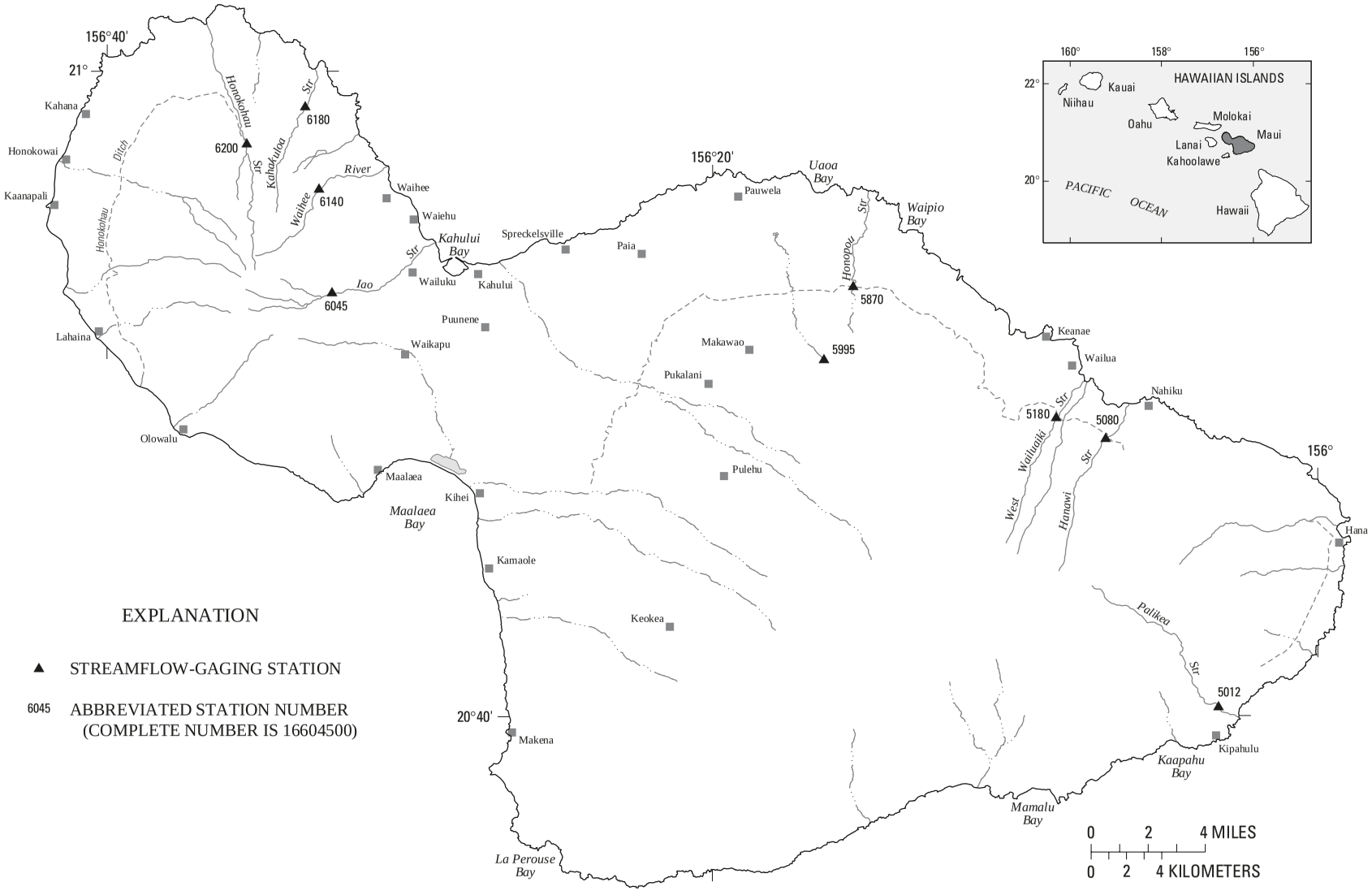


Figure 8. Locations of streamflow-gaging stations on Maui.

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 September 1997; Oct. 2001 to Sept. 2002 (peak discharges and discharge measurements only).

REVISED RECORDS.--WDR HI-94-1: 1989-93 (P).

GAGE.--Water-stage recorder. Elevation of the gage is 420 ft. above mean sea level (from topographic map).

REMARKS.--Water year 2002 daily record not used due to equipment failure.

AVERAGE DISCHARGE.--9 years (water years 1989-97), 56.8 ft^3/s (41,150 acre ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 14,700 ft^3/s, September 18, 1994 from rating curve extended on the basis of flow over dam computation; minimum, no flow , on many days.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,680 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Oct 24	2245	*6,450	*8.03	May 13	2200	5,270	7.44
Nov 27	0945	4,100	6.76				

Minimum discharge, 2.00 ft^3/s, Sept. 23, 24.

DISCHARGE MEASUREMENTS MADE IN WATER YEAR 2002.--

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Oct 25	1300	49.1	1.98	May 15	1055	10.4	1.42
Feb 19	1145	5.61	1.28	Jul 10	1110	7.04	1.33
Mar 20	1133	4.71	1.21	Sep 24	1128	1.90	1.00

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 November 1, 1921, at site 50 ft downstream at datum 0.12 ft lower.

REMARKS.--Records computed by Matt Wong. Records good except discharges above 1,300 ft^3/s which are fair. No diversion upstream of station.

AVERAGE DISCHARGE.--80 years (water years 1923-2002), 23.9 ft^3/s (17,290 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, about 5,570 ft^3/s, January 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, October 28 to November 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 27	0945	1,860	6.76	Mar 6	0245	1,780	6.60
Jan 20	0115	*2,030	*7.08	Mar 17	1215	1,890	6.82

Minimum discharge, 2.2 ft^3/s, June 9, gage height, 0.19 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

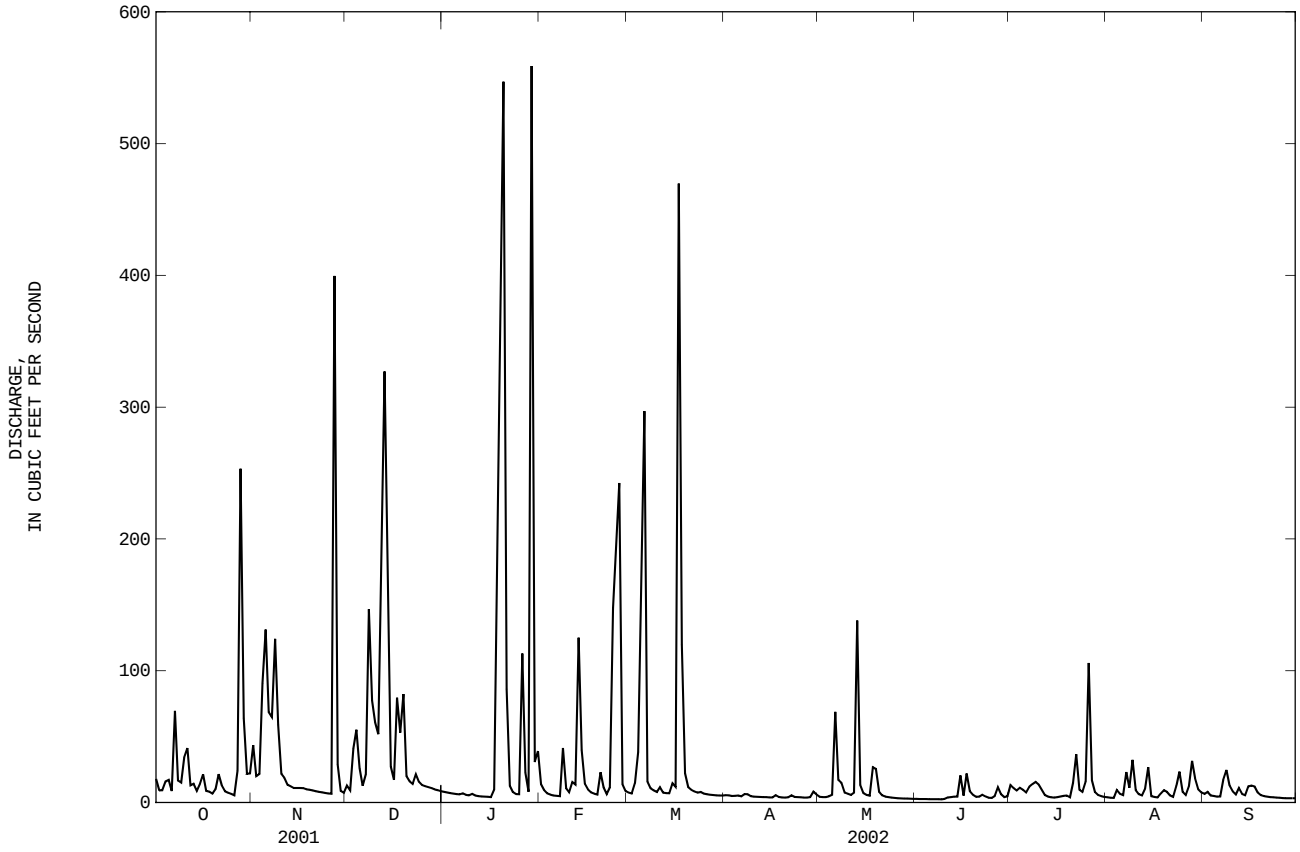
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	18	44	13	8.1	14	7.4	5.5	4.4	2.7	13	3.9	6.5
2	9.1	20	9.2	7.6	9.3	6.8	5.4	4.1	2.7	11	3.7	8.1
3	9.3	22	41	7.1	6.8	15	5.0	4.1	2.6	9.1	3.5	5.4
4	16	90	55	6.8	5.9	38	5.0	4.7	2.6	11	9.5	5.0
5	17	131	26	6.5	5.3	156	5.3	5.8	2.5	9.7	6.5	4.5
6	8.7	69	13	6.2	5.1	297	4.7	69	2.5	7.6	5.6	4.5
7	70	65	21	6.9	4.8	16	6.5	17	2.5	12	23	17
8	17	124	147	5.8	41	11	6.3	15	2.5	14	11	25
9	15	59	77	5.4	11	9.2	4.8	7.5	2.4	16	32	13
10	34	22	61	6.6	7.8	8.0	4.5	6.7	2.8	14	9.3	8.5
11	41	19	52	5.3	15	12	4.3	5.7	3.9	9.5	6.3	6.0
12	13	13	144	4.8	14	7.5	4.2	7.4	4.1	5.7	5.3	11
13	14	12	327	4.6	125	7.1	4.1	138	4.5	4.5	10	6.4
14	8.8	11	150	4.4	40	7.0	4.0	13	4.5	4.0	27	5.4
15	14	11	27	4.3	14	15	3.9	7.2	21	3.8	4.8	12
16	21	11	17	4.1	9.9	12	3.9	5.8	5.2	4.1	4.2	13
17	8.9	11	80	9.7	7.6	470	5.5	5.2	22	4.6	3.9	12
18	8.3	10	53	106	6.7	120	4.3	27	8.5	5.1	6.7	7.6
19	6.7	9.7	82	269	6.1	22	3.8	26	6.0	5.3	9.3	5.6
20	10	9.2	20	547	23	12	3.7	8.1	4.3	4.0	8.1	4.8
21	21	8.6	16	86	12	9.6	4.0	5.4	4.5	15	5.3	4.5
22	13	8.2	14	13	6.5	8.4	5.5	4.5	5.9	37	4.2	4.1
23	8.4	7.7	22	8.0	11	7.5	4.2	4.1	4.6	9.7	13	3.9
24	7.3	7.3	16	6.4	148	8.0	4.1	3.8	3.6	8.0	23	3.8
25	6.6	6.9	13	6.3	200	6.8	4.0	3.5	3.4	16	8.1	3.6
26	5.4	6.7	12	113	242	6.3	3.7	3.3	4.9	106	5.7	3.4
27	24	400	12	23	14	6.0	3.7	3.2	12	17	12	3.3
28	253	29	11	8.2	8.9	5.7	4.1	3.1	6.1	8.0	32	3.2
29	64	8.9	9.9	559	---	5.5	8.2	3.0	4.1	5.7	18	3.2
30	22	7.4	9.3	31	---	5.3	6.2	2.9	4.7	4.8	9.9	3.2
31	22	---	8.6	39	---	5.3	---	2.8	---	4.3	7.6	---
TOTAL	806.5	1253.6	1559.0	1919.1	1014.7	1323.4	142.4	421.3	163.6	399.5	332.4	217.5
MEAN	26.0	41.8	50.3	61.9	36.2	42.7	4.75	13.6	5.45	12.9	10.7	7.25
MAX	253	400	327	559	242	470	8.2	138	22	106	32	25
MIN	5.4	6.7	8.6	4.1	4.8	5.3	3.7	2.8	2.4	3.8	3.5	3.2
AC-FT	1600	2490	3090	3810	2010	2620	282	836	325	792	659	431

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1914 - 2002, BY WATER YEAR (WY)

MEAN	15.2	29.9	32.4	30.6	30.7	40.7	35.9	19.9	11.1	15.9	16.8	11.5
MAX	101	110	129	123	182	235	161	68.2	61.2	62.0	66.2	52.3
(WY)	1942	1991	1947	1979	1969	1980	1989	1987	1997	1997	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

16508000 HANAWI STREAM NEAR NAHIKU--Continued

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1914 - 2002	
ANNUAL TOTAL	6813.8		9549.0			
ANNUAL MEAN	18.7		26.2		23.9	
HIGHEST ANNUAL MEAN					52.6	1969
LOWEST ANNUAL MEAN					7.59	1926
HIGHEST DAILY MEAN	399	Nov 27	559	Jan 29	1610	Jan 25 1948
LOWEST DAILY MEAN	2.0	Mar 6	2.4	Jun 9	0.90	Oct 31 1984
ANNUAL SEVEN-DAY MINIMUM	2.2	Feb 28	2.5	Jun 3	0.96	Oct 25 1984
ANNUAL RUNOFF (AC-FT)	13520		18940		17290	
10 PERCENT EXCEEDS	40		54		50	
50 PERCENT EXCEEDS	7.0		8.1		7.0	
90 PERCENT EXCEEDS	2.6		3.9		2.8	



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 October 3, 1974, at present site at datum 0.50 ft higher.

REMARKS.--Records computed by Matt Wong. Records Poor. No diversion upstream of station. Water is diverted by Koolau Ditch, 500 ft downstream, for domestic supply and irrigation of sugarcane in central Maui.

AVERAGE DISCHARGE.--82 years (water years 1915, 1917, 1923-2002), 34.7 ft^3/s (25,140 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 9,900 ft^3/s, January 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)
Oct 28	0530	1,990	7.76	Mar 6	0315	3,200	9.10
Nov 27	0700	2,910	8.81	Mar 17	1230	4,010	9.84
Jan 20	0000	*6,460	*11.77				

Minimum discharge, 1.6 ft^3/s, June 25, gage height, 0.51 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	25	48	19	e9.1	25	e12	8.2	3.5	2.9	e13	e6.5	11
2	15	32	15	e8.8	e9.6	e9.7	7.3	2.9	2.8	e9.9	e5.5	11
3	14	35	35	e9.7	e8.9	24	6.4	3.1	2.7	e8.7	e5.0	8.3
4	31	108	43	e8.5	e7.7	47	10	5.5	2.7	e9.9	e13	7.6
5	28	174	31	e8.4	e7.0	223	10	5.1	2.5	e8.7	e9.0	6.6
6	16	83	19	e8.2	e5.3	356	6.3	50	2.7	5.1	e8.0	7.2
7	82	103	31	10	e5.2	26	11	15	3.0	e9.9	e38	19
8	32	219	149	e7.6	89	e17	10	15	3.0	e12	e20	30
9	28	80	88	e7.1	27	e11	6.2	7.8	2.4	e16	e46	16
10	43	37	74	12	e14	e9.7	5.2	8.1	3.0	e13	e20	11
11	55	31	71	e7.0	26	24	4.5	6.8	8.1	e9.9	e14	9.0
12	26	22	255	e6.3	22	e11	4.2	5.4	8.5	e6.4	e12	12
13	23	18	486	e6.0	164	e11	4.0	94	7.1	e5.3	e20	8.6
14	17	15	119	e5.8	51	e9.7	3.8	18	12	e4.8	e80	8.7
15	21	14	45	e5.6	22	25	3.5	9.4	37	e4.4	e14	13
16	33	13	e28	e5.5	e16	24	3.5	7.7	9.7	e4.6	7.5	14
17	17	11	79	40	e14	1010	7.1	6.3	22	e5.7	6.6	13
18	e14	11	63	199	e12	161	4.2	26	11	e8.0	11	9.6
19	13	10	86	499	e12	36	3.5	26	7.8	e7.0	12	8.0
20	17	9.7	e26	908	e22	e21	3.2	10	6.1	e6.6	11	7.0
21	37	9.4	e21	103	19	e18	3.2	7.6	6.9	e20	8.0	6.3
22	22	8.9	e18	e16	e16	e12	5.2	6.3	7.6	e60	6.6	5.8
23	15	8.6	28	e10	27	10	3.5	5.5	5.7	e17	16	5.3
24	13	8.2	17	e8.4	164	9.4	3.2	4.9	4.9	e13	28	5.0
25	11	8.1	e13	e8.2	282	8.3	3.0	4.5	5.0	e26	12	4.7
26	9.7	8.2	e13	107	322	7.7	2.7	4.1	5.0	e160	9.5	4.3
27	34	607	e12	39	26	7.0	2.7	3.9	e12	e30	16	4.0
28	500	54	e11	e11	e16	6.5	3.2	3.7	e7.6	e18	44	3.8
29	93	18	e10	347	---	6.1	6.3	3.5	5.1	e10	21	3.9
30	e33	13	e9.6	42	---	6.1	6.9	3.2	5.1	e8.0	18	4.3
31	e32	---	e9.4	31	---	6.6	---	3.0	---	e7.0	18	---
TOTAL	1349.7	1817.1	1924.0	2494.2	1431.7	2165.8	162.0	375.8	221.9	537.9	556.2	278.0
MEAN	43.5	60.6	62.1	80.5	51.1	69.9	5.40	12.1	7.40	17.4	17.9	9.27
MAX	500	607	486	908	322	1010	11	94	37	160	80	30
MIN	9.7	8.1	9.4	5.5	5.2	6.1	2.7	2.9	2.4	4.4	5.0	3.8
AC-FT	2680	3600	3820	4950	2840	4300	321	745	440	1070	1100	551

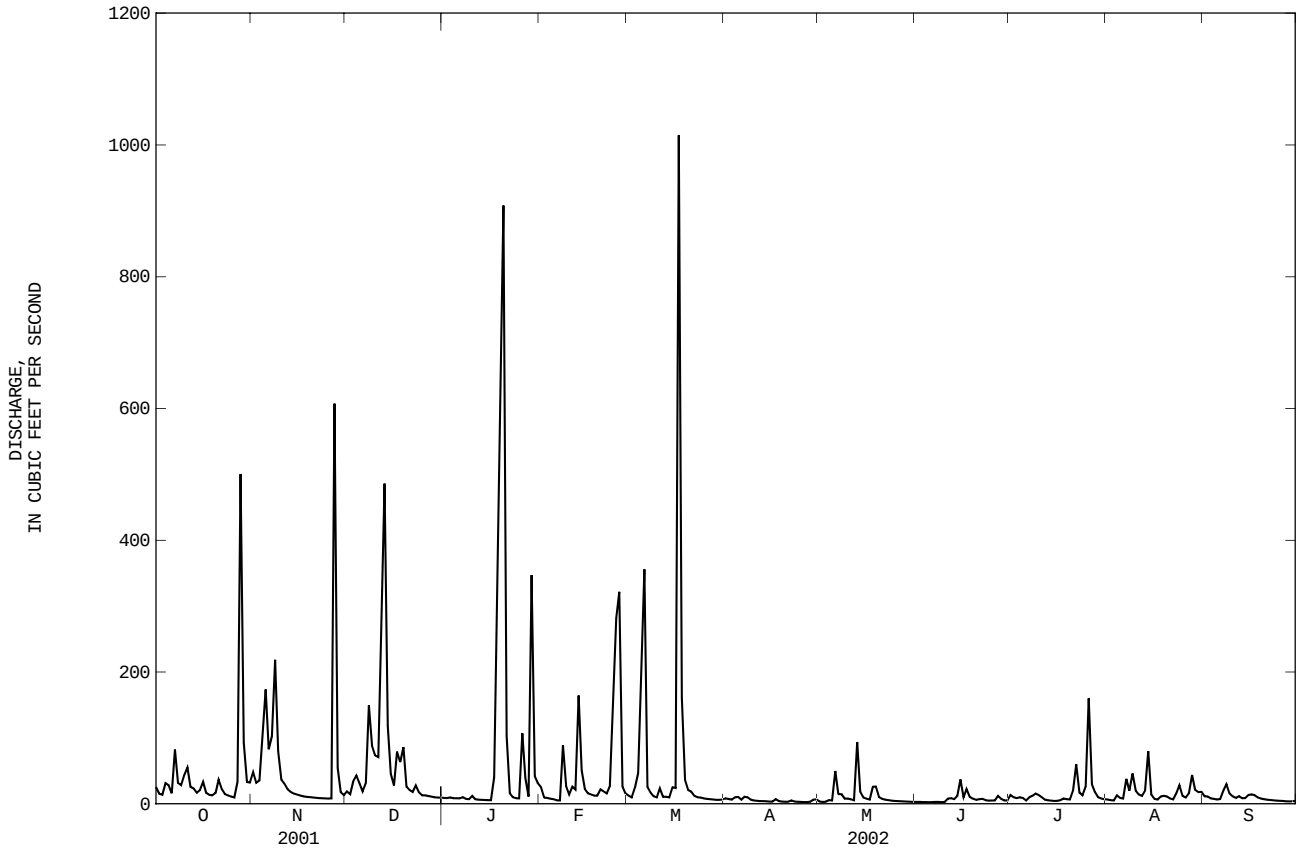
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1914 - 2002, BY WATER YEAR (WY)

MEAN	24.0	45.9	48.2	42.0	45.7	55.6	53.6	28.9	16.6	24.8	25.7	18.0
MAX	133	198	200	192	222	303	221	88.4	67.7	99.4	111	101
(WY)	1942	1922	1937	1979	1932	1942	1989	1914	1997	1914	1914	1914
MIN	0.88	4.06	2.82	2.01	2.65	2.04	4.17	3.86	2.37	1.72	2.85	1.68
(WY)	1985	1992	1981	1977	1995	1926	1992	1945	1981	1922	1973	1974

16518000 WEST WAILUAIKI STREAM NEAR KEANAE--Continued

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1914 - 2002	
ANNUAL TOTAL	9081.6		13314.3			
ANNUAL MEAN	24.9		36.5		34.7	
HIGHEST ANNUAL MEAN					67.3	1980
LOWEST ANNUAL MEAN					14.5	1981
HIGHEST DAILY MEAN	607	Nov 27	1010	Mar 17	2260	Jan 26 1948
LOWEST DAILY MEAN	1.7	Feb 2	2.4	Jun 9	0.62	Jul 23 1922
ANNUAL SEVEN-DAY MINIMUM	1.8	Jan 27	2.7	Jun 3	0.71	Oct 25 1984
ANNUAL RUNOFF (AC-FT)	18010		26410		25140	
10 PERCENT EXCEEDS	49		72		74	
50 PERCENT EXCEEDS	10		11		10	
90 PERCENT EXCEEDS	2.4		4.2		3.3	

e Estimated



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 steel weir plate. 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 computed by Matt Wong. Records good except for discharges above 100 ft^3/s, which are fair. No diversion upstream of station.

AVERAGE DISCHARGE.--91 years (water years 1912-2002), 4.79 ft^3/s (3,470 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 5,710 ft^3/s, November 18, 1930, gage height, 7.28 ft from rating curve extended above 110 ft^3/s by test of physical 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)
Mar 6	0215	*340	*3.20	Mar 17	1330	290	3.11

Minimum discharge, 0.51 ft^3/s, May 2, 3, gage height, 0.47 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

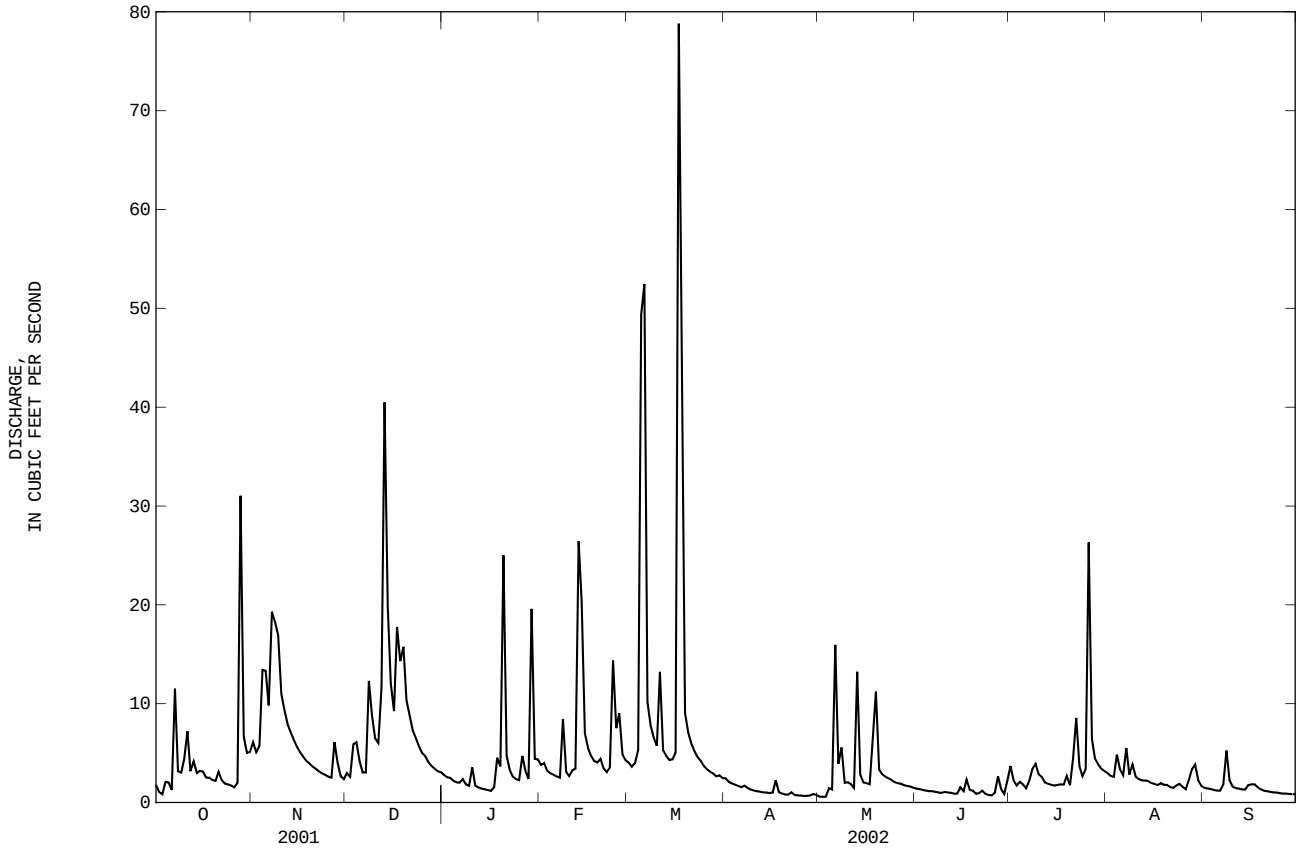
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.8	6.1	3.0	2.8	3.8	4.0	2.5	0.60	1.4	3.7	3.0	1.5
2	1.0	5.1	2.6	2.6	4.0	3.6	2.1	0.59	1.4	2.2	2.7	1.4
3	0.84	5.7	5.9	2.5	3.2	4.0	1.9	0.58	1.3	1.7	2.6	1.4
4	2.1	13	6.1	2.2	2.9	5.3	1.8	1.4	1.2	2.1	4.8	1.3
5	2.0	13	4.2	2.0	2.8	49	1.7	1.3	1.1	1.8	3.3	1.2
6	1.3	9.8	3.0	2.0	2.6	52	1.5	16	1.1	1.4	2.8	1.2
7	12	19	3.0	2.4	2.5	10	1.7	3.9	1.1	2.2	5.5	1.8
8	3.1	18	12	1.8	8.4	7.8	1.5	5.6	1.0	3.4	2.8	5.3
9	3.0	17	8.7	1.7	3.1	6.6	1.3	2.0	0.96	3.9	3.8	2.3
10	4.4	11	6.5	3.5	2.7	5.7	1.2	2.1	1.1	2.9	2.6	1.6
11	7.2	9.4	6.0	1.7	3.2	13	1.1	1.9	1.0	2.6	2.4	1.5
12	3.2	7.9	12	1.5	3.4	5.3	1.1	1.5	0.98	2.0	2.2	1.4
13	4.1	7.1	40	1.4	26	4.7	1.0	13	0.88	1.9	2.2	1.3
14	3.0	6.4	20	1.3	20	4.3	1.0	2.9	0.91	1.8	2.2	1.3
15	3.2	5.7	12	1.3	7.0	4.4	0.95	2.0	1.5	1.7	2.0	1.8
16	3.1	5.1	9.2	1.2	5.5	5.0	1.0	2.0	1.2	1.8	1.9	1.8
17	2.5	4.6	18	1.6	4.7	79	2.2	1.8	2.3	1.8	1.8	1.8
18	2.5	4.2	14	4.5	4.2	28	1.0	7.0	1.3	1.8	1.9	1.6
19	2.3	3.9	16	3.7	4.0	9.0	0.90	11	1.2	2.7	1.8	1.3
20	2.2	3.6	10	25	4.4	7.1	0.81	3.3	0.88	1.7	1.8	1.2
21	3.1	3.4	8.7	4.7	3.5	6.0	0.81	2.9	0.94	4.4	1.6	1.1
22	2.3	3.2	7.3	3.3	3.1	5.2	1.0	2.6	1.2	8.6	1.5	1.1
23	1.9	2.9	6.5	2.6	3.5	4.6	0.75	2.4	0.87	3.7	1.7	1.0
24	1.8	2.8	5.7	2.4	14	4.2	0.73	2.3	0.75	2.7	1.9	1.0
25	1.7	2.6	5.0	2.2	7.5	3.7	0.70	2.1	0.72	3.4	1.6	0.96
26	1.5	2.5	4.7	4.7	9.0	3.4	0.66	2.0	0.96	26	1.3	0.90
27	2.0	6.1	4.1	3.3	4.9	3.1	0.68	1.9	2.6	6.4	2.3	0.90
28	31	4.0	3.7	2.4	4.3	2.9	0.70	1.7	1.3	4.4	3.4	0.86
29	6.7	2.7	3.4	20	---	2.6	0.86	1.7	0.86	3.9	3.9	0.84
30	5.0	2.4	3.2	4.4	---	2.7	0.76	1.6	2.2	3.4	2.2	0.85
31	5.1	---	3.1	4.4	---	2.5	---	1.5	---	3.2	1.7	---
TOTAL	126.94	208.2	267.6	121.1	168.2	348.7	35.91	103.17	36.21	115.2	77.2	43.51
MEAN	4.09	6.94	8.63	3.91	6.01	11.2	1.20	3.33	1.21	3.72	2.49	1.45
MAX	31	19	40	25	26	79	2.5	16	2.6	26	5.5	5.3
MIN	0.84	2.4	2.6	1.2	2.5	2.5	0.66	0.58	0.72	1.4	1.3	0.84
AC-FT	252	413	531	240	334	692	71	205	72	228	153	86

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1912 - 2002, BY WATER YEAR (WY)

MEAN	2.76	5.49	6.13	5.49	5.19	7.17	7.47	4.99	2.74	3.56	3.95	2.58
MAX	15.9	21.4	20.0	20.9	24.5	33.0	43.4	24.3	9.97	14.6	18.1	14.6
(WY)	1942	1991	1947	1921	1969	1942	1989	1916	1914	1997	1982	1992
MIN	0.15	0.25	1.04	0.57	0.62	0.79	0.58	0.84	0.37	0.41	0.40	0.25
(WY)	1985	1963	1981	2001	1983	1992	1992	1933	2000	1981	1973	1984

16587000 HONOPOU STREAM NEAR HUELO--Continued

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1912 - 2002	
ANNUAL TOTAL	1175.73		1651.94			
ANNUAL MEAN	3.22		4.53		4.79	
HIGHEST ANNUAL MEAN					9.88	1914
LOWEST ANNUAL MEAN					1.73	1981
HIGHEST DAILY MEAN	40	Dec 13	79	Mar 17	305	Apr 7 1989
LOWEST DAILY MEAN	0.35	Jan 20	0.58	May 3	0.11	Oct 27 1984
ANNUAL SEVEN-DAY MINIMUM	0.40	Jan 16	0.68	Apr 27	0.11	Oct 26 1984
ANNUAL RUNOFF (AC-FT)	2330		3280		3470	
10 PERCENT EXCEEDS	6.9		9.0		9.9	
50 PERCENT EXCEEDS	1.9		2.6		2.4	
90 PERCENT EXCEEDS	0.51		1.0		0.74	



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 above mean sea level (from topographic map).

REMARKS.--Records computed by Phillip Teeters. Records fair. Tunnel diverts water from Opana Gulch for agricultural and domestic use in the Kokomo, Makawao, and Pukalani areas.

AVERAGE DISCHARGE.--37 years (water years 1966-2002), 3.17 ft^3/s (2,300 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 18 ft^3/s, March 31, 1982, April 12, 1986, March 23, 1994; minimum daily discharge, 0.11 ft^3/s, November 5-10, 1973, October 5, 6, 25, 26, 1974.

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge, 14 ft^3/s, Dec. 13; minimum daily discharge, 0.38 ft^3/s, Sept. 28,29.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

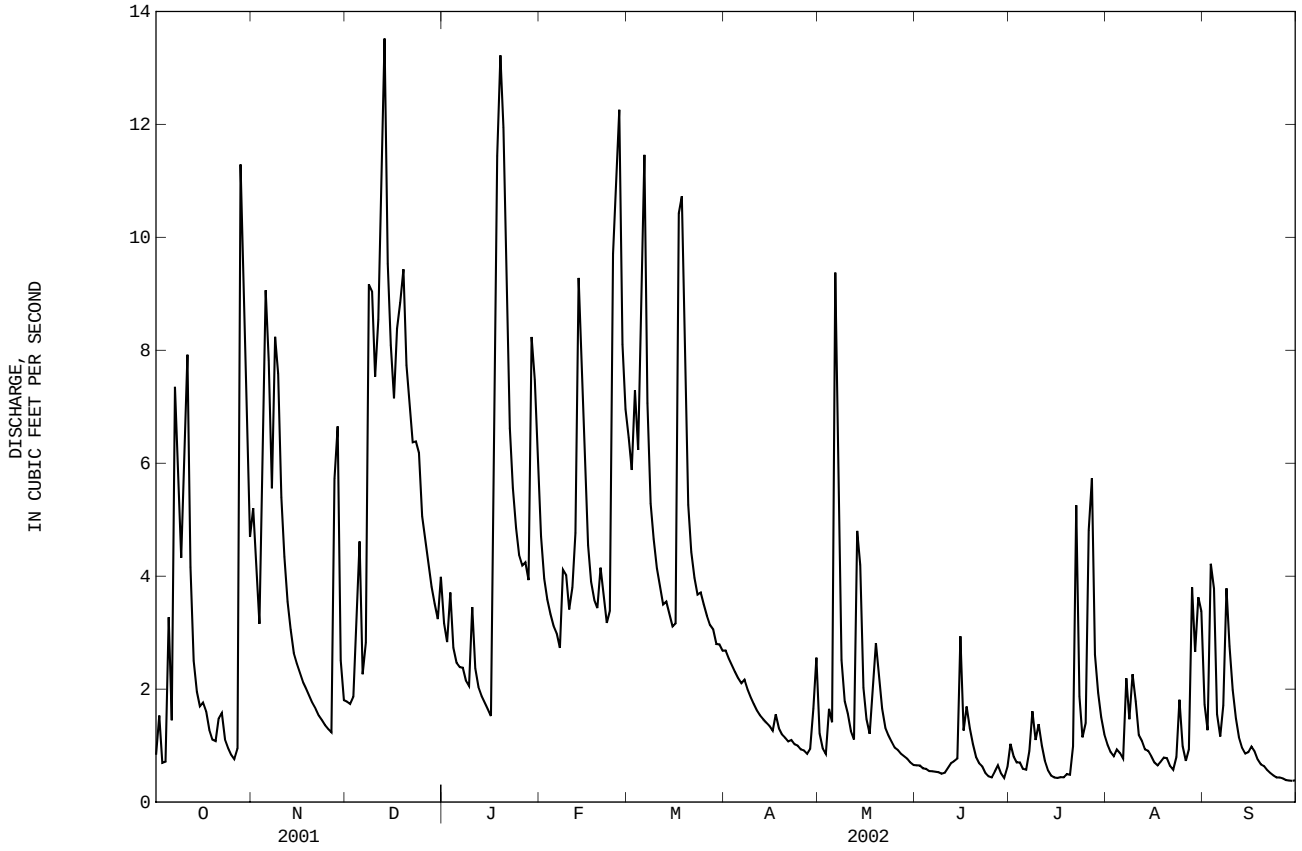
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.84	5.2	1.8	3.2	4.7	6.5	2.7	1.2	0.65	1.0	1.0	1.7
2	1.5	4.2	1.7	2.8	4.0	5.9	2.5	0.95	0.65	0.81	0.89	1.3
3	0.70	3.2	1.9	3.7	3.6	7.3	2.4	0.85	0.60	0.70	0.81	4.2
4	0.71	6.7	3.1	2.7	3.3	6.2	2.3	1.7	0.59	0.70	0.93	3.8
5	3.3	9.1	4.6	2.5	3.1	9.0	2.2	1.4	0.55	0.59	0.87	1.6
6	1.4	7.8	2.3	2.4	3.0	11	2.1	9.4	0.55	0.57	0.77	1.2
7	7.4	5.6	2.8	2.4	2.7	7.1	2.2	5.2	0.54	0.90	2.2	1.7
8	5.6	8.2	9.2	2.1	4.1	5.3	2.0	2.5	0.53	1.6	1.5	3.8
9	4.3	7.6	9.0	2.1	4.0	4.7	1.9	1.8	0.50	1.1	2.3	2.8
10	5.6	5.4	7.5	3.5	3.4	4.1	1.7	1.6	0.52	1.4	1.8	2.0
11	7.9	4.3	8.5	2.4	3.8	3.8	1.6	1.3	0.60	1.0	1.2	1.5
12	4.2	3.5	12	2.0	4.8	3.5	1.5	1.1	0.69	0.73	1.1	1.1
13	2.5	3.1	14	1.9	9.3	3.6	1.5	4.8	0.73	0.56	0.93	0.96
14	2.0	2.6	9.5	1.8	8.0	3.3	1.4	4.2	0.77	0.47	0.91	0.86
15	1.7	2.5	8.1	1.6	6.2	3.1	1.3	2.0	2.9	0.44	0.81	0.89
16	1.8	2.3	7.1	1.5	4.6	3.2	1.3	1.5	1.3	0.43	0.70	0.98
17	1.6	2.1	8.4	5.2	3.9	10	1.6	1.2	1.7	0.44	0.65	0.90
18	1.3	2.0	8.9	11	3.6	11	1.3	2.0	1.3	0.44	0.71	0.76
19	1.1	1.9	9.4	13	3.4	7.5	1.2	2.8	1.0	0.50	0.79	0.67
20	1.1	1.8	7.7	12	4.2	5.3	1.1	2.2	0.80	0.48	0.78	0.64
21	1.5	1.6	7.0	8.3	3.7	4.4	1.1	1.7	0.69	0.99	0.64	0.57
22	1.6	1.5	6.4	6.6	3.2	4.0	1.1	1.3	0.63	5.3	0.57	0.52
23	1.1	1.5	6.4	5.6	3.4	3.7	1.0	1.2	0.51	1.9	0.80	0.47
24	0.96	1.4	6.2	4.9	9.7	3.7	1.0	1.1	0.46	1.1	1.8	0.44
25	0.84	1.3	5.1	4.4	11	3.5	0.93	0.97	0.44	1.4	0.99	0.44
26	0.76	1.2	4.6	4.2	12	3.3	0.92	0.92	0.54	4.8	0.73	0.42
27	0.95	5.7	4.2	4.2	8.1	3.1	0.86	0.86	0.65	5.7	0.93	0.39
28	11	6.7	3.8	3.9	7.0	3.1	0.94	0.81	0.51	2.6	3.8	0.38
29	9.3	2.5	3.5	8.2	---	2.8	1.7	0.77	0.43	1.9	2.7	0.38
30	6.9	1.8	3.2	7.5	---	2.8	2.6	0.70	0.62	1.5	3.6	0.39
31	4.7	---	4.0	5.8	---	2.7	---	0.66	---	1.2	3.4	---
TOTAL	96.16	114.3	191.9	143.4	145.8	158.5	47.95	60.69	22.95	43.25	41.61	37.76
MEAN	3.10	3.81	6.19	4.63	5.21	5.11	1.60	1.96	0.77	1.40	1.34	1.26
MAX	11	9.1	14	13	12	11	2.7	9.4	2.9	5.7	3.8	4.2
MIN	0.70	1.2	1.7	1.5	2.7	2.7	0.86	0.66	0.43	0.43	0.57	0.38
AC-FT	191	227	381	284	289	314	95	120	46	86	83	75

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1965 - 2002, BY WATER YEAR (WY)

MEAN	1.89	3.35	4.01	3.69	3.70	4.64	5.04	3.43	2.13	2.55	2.13	1.53
MAX	5.40	7.97	9.19	7.55	9.04	11.1	9.35	7.42	6.38	8.17	4.98	5.69
(WY)	1984	1968	1971	1989	1969	1982	1968	1987	1997	1997	1969	1992
MIN	0.14	0.25	0.65	0.22	0.36	0.51	0.27	1.28	0.50	0.40	0.19	0.15
(WY)	1985	1992	1977	1977	1978	1983	1992	1992	1999	1981	1974	1984

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1965 - 2002	
ANNUAL TOTAL	812.20		1104.27			
ANNUAL MEAN	2.23		3.03		3.17	
HIGHEST ANNUAL MEAN					5.34	1969
LOWEST ANNUAL MEAN					1.45	1981
HIGHEST DAILY MEAN	14	Dec 13	14	Dec 13	18	Mar 31 1982
LOWEST DAILY MEAN	0.21	Jul 17	0.38	Sep 28	0.11	Nov 5 1973
ANNUAL SEVEN-DAY MINIMUM	0.25	Jul 5	0.41	Sep 24	0.11	Nov 4 1973
ANNUAL RUNOFF (AC-FT)	1610		2190		2300	
10 PERCENT EXCEEDS	5.7		7.5		7.8	
50 PERCENT EXCEEDS	1.2		1.9		2.2	
90 PERCENT EXCEEDS	0.38		0.61		0.39	

16599500 OPANA TUNNEL AT KAILIILI--Continued



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 above mean sea level (from topographic map).

REMARKS.--Records computed by Phillip Teeters. Records fair, above 370 cfs records poor. No appreciable diversion upstream of station.

AVERAGE DISCHARGE.--19 years (water years 1984-2002), 64.2 ft^3/s (46,520 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge 6,260 ft^3/s, January 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, May 1996, several days in October and November 1996.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum discharge known, 7,540 ft^3/s, December 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)
Jan 26	1830	*4,390	*7.57	Jan 29	1145	1,360	4.39

Minimum discharge, 17 ft^3/s, on several days, gage height, 0.85 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	82	54	60	54	109	42	25	24	19	136	43	48
2	35	36	49	60	79	37	23	23	27	94	36	30
3	31	39	40	66	56	47	22	21	23	83	33	121
4	82	103	64	43	48	59	22	24	21	54	57	89
5	63	169	67	38	44	234	21	53	18	41	63	58
6	31	107	42	37	37	252	23	e247	25	36	56	49
7	105	163	43	34	34	119	179	189	20	102	97	70
8	40	269	64	32	57	71	56	207	20	100	38	88
9	39	262	50	33	38	71	36	138	18	83	55	57
10	62	138	42	39	32	47	32	118	32	83	47	44
11	102	106	43	31	45	69	29	82	31	47	62	39
12	50	58	88	30	94	39	27	49	25	37	39	37
13	66	49	150	30	244	50	26	e237	22	33	31	35
14	37	40	85	28	159	72	24	73	25	32	29	45
15	43	35	76	27	95	79	24	47	72	39	28	71
16	79	32	63	27	65	37	30	39	31	38	27	59
17	37	30	116	58	50	223	115	33	65	65	26	43
18	38	27	87	110	44	194	37	131	71	48	43	69
19	30	25	114	90	40	89	25	152	47	84	31	35
20	40	24	76	189	39	63	25	78	28	42	30	28
21	44	23	65	118	34	51	24	45	30	146	25	26
22	31	22	45	74	32	42	49	38	62	166	24	26
23	26	22	41	52	32	36	25	35	31	111	88	25
24	22	21	38	41	122	33	32	33	41	82	76	33
25	22	20	35	55	176	33	26	28	29	70	80	35
26	21	37	33	e520	176	30	23	27	38	e204	46	22
27	119	216	32	200	69	30	40	26	81	117	43	20
28	e319	170	29	110	48	31	32	23	51	68	44	21
29	129	81	105	290	---	38	43	22	34	47	44	20
30	66	63	47	191	---	37	28	21	66	40	54	19
31	51	---	113	155	---	29	---	19	---	43	37	---
TOTAL	1942	2441	2002	2862	2098	2284	1123	2282	1103	2371	1432	1362
MEAN	62.6	81.4	64.6	92.3	74.9	73.7	37.4	73.6	36.8	76.5	46.2	45.4
MAX	319	269	150	520	244	252	179	247	81	204	97	121
MIN	21	20	29	27	32	29	21	19	18	32	24	19
AC-FT	3850	4840	3970	5680	4160	4530	2230	4530	2190	4700	2840	2700

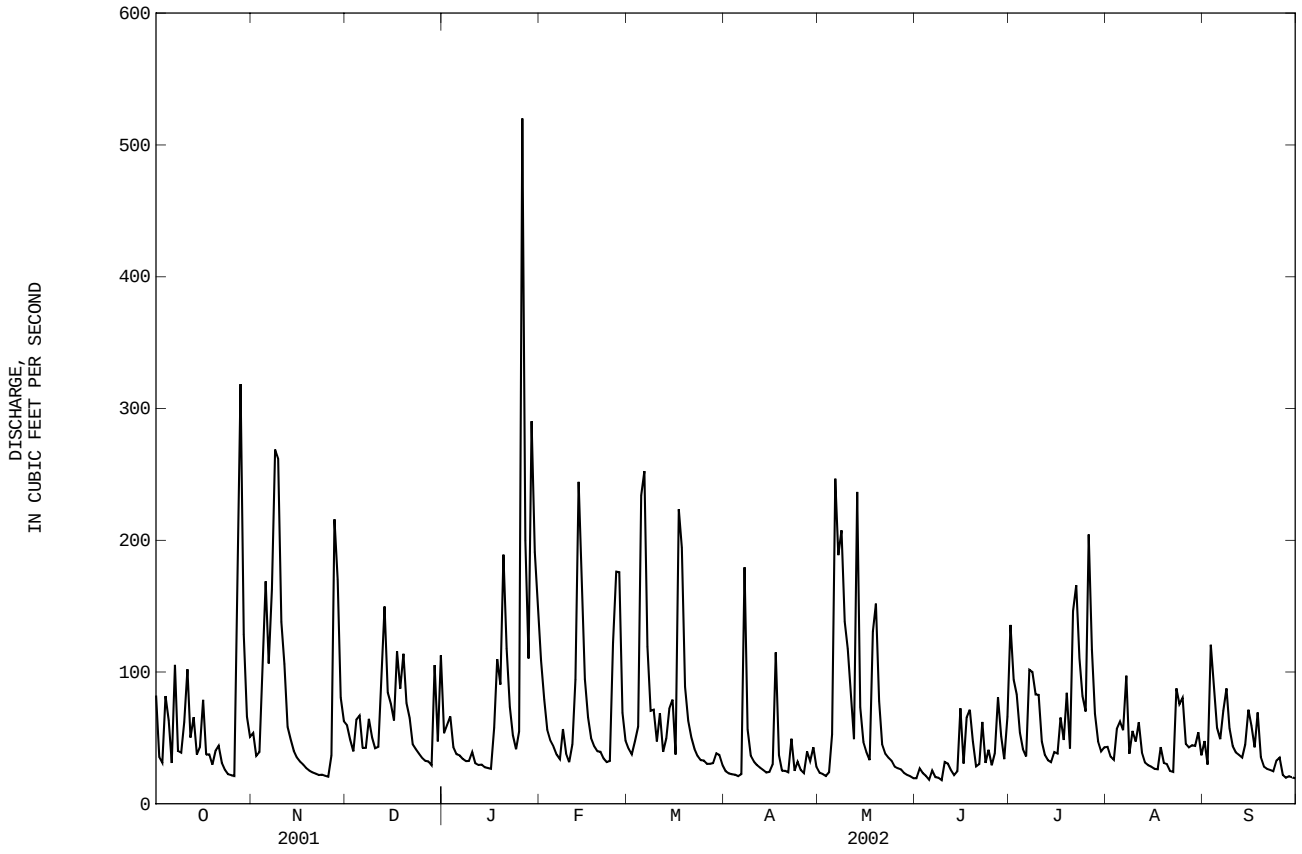
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1983 - 2002, BY WATER YEAR (WY)

MEAN	51.9	70.4	63.2	69.0	56.8	76.1	80.8	62.9	57.3	69.3	60.8	48.3
MAX	103	132	103	149	108	176	230	136	110	137	97.0	133
(WY)	1984	1998	1997	1988	1994	1994	1989	1987	1998	1994	1993	1992
MIN	11.9	20.5	18.3	23.5	24.0	23.6	20.8	23.4	24.4	25.2	26.0	15.8
(WY)	1985	1985	1985	2001	2000	1998	1992	1999	1985	1984	1984	1984

16604500 IAO STREAM AT KEPANIWAI PARK, NEAR WAILUKU--Continued

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1983 - 2002	
ANNUAL TOTAL	19465		23302			
ANNUAL MEAN	53.3		63.8		64.2	
HIGHEST ANNUAL MEAN					93.4	1994
LOWEST ANNUAL MEAN					41.4	1985
HIGHEST DAILY MEAN	319	Oct 28	520	Jan 26	913	Apr 10 1986
LOWEST DAILY MEAN	16	Feb 7	18	Jun 5	11	Oct 7 1984
ANNUAL SEVEN-DAY MINIMUM	17	Jan 18	21	Jun 3	11	Oct 16 1984
ANNUAL RUNOFF (AC-FT)	38610		46220		46520	
10 PERCENT EXCEEDS	105		125		132	
50 PERCENT EXCEEDS	39		43		41	
90 PERCENT EXCEEDS	19		24		20	

e Estimated



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 December 31, 1913, due to Waihee canal diverted water upstream.

GAGE.--Water-stage recorder. Elevation of gage is 605 ft above mean sea level (from topographic map).

REMARKS.--Records computed by Phillip Teeters. Records fair. No diversion upstream of station.

AVERAGE DISCHARGE.--18 years (water years 1985-2002), 78.1 ft^3/s (56,560 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 9,660 ft^3/s, January 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, 14 ft^3/s, July 13, 1995.

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)
Oct 28	0230	2,220	5.03	Jan 26	1645	8,390	8.48
Nov 27	0700	2,850	5.54	May 13	0745	*8,490	*8.52
Jan 18	1015	2,240	5.05				

Minimum discharge, 37 ft^3/s, Oct. 25, 26, 27, gage height, 1.54 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

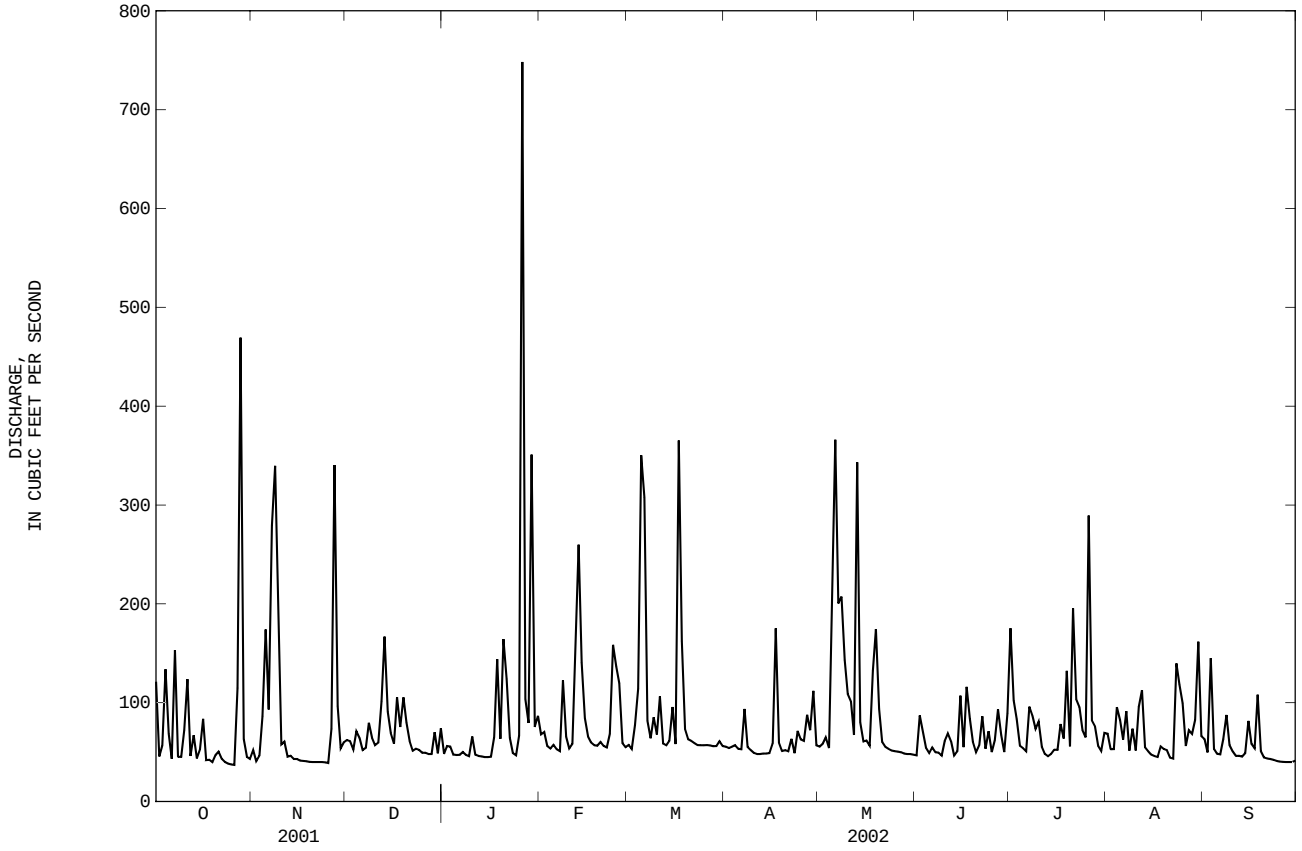
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	121	52	62	48	68	57	56	55	47	175	69	63
2	46	41	61	56	70	53	54	58	87	102	53	50
3	57	46	53	56	56	77	55	65	71	83	53	145
4	134	86	71	48	54	114	57	54	54	56	95	53
5	69	174	64	47	57	350	53	152	49	54	82	48
6	43	93	52	47	53	308	53	366	55	51	63	48
7	153	279	54	50	51	82	94	200	50	96	91	63
8	45	340	80	47	122	64	55	207	49	87	51	88
9	45	225	64	46	66	85	52	143	46	74	74	57
10	72	58	57	66	54	68	49	109	61	81	52	51
11	124	61	60	47	58	106	48	101	69	56	96	46
12	46	45	101	46	132	59	48	67	61	48	113	46
13	67	46	167	46	260	57	48	343	46	46	55	45
14	43	43	91	45	141	62	49	80	51	48	51	49
15	52	43	69	45	84	96	49	61	107	52	47	82
16	84	41	59	45	66	58	59	62	55	52	46	58
17	42	41	106	65	60	365	175	56	116	78	45	54
18	42	41	75	144	57	162	59	132	84	64	56	108
19	40	40	105	63	56	74	51	174	60	132	53	51
20	47	40	80	164	60	63	52	94	50	56	52	45
21	50	40	61	124	56	61	51	60	57	195	44	43
22	43	40	51	64	55	59	63	55	86	104	43	43
23	40	40	53	49	68	57	49	53	53	96	140	42
24	38	40	52	47	158	57	71	52	71	72	118	41
25	37	39	49	67	137	57	63	51	50	65	99	40
26	37	73	49	748	120	57	61	50	62	289	56	40
27	115	340	48	104	59	57	88	50	93	82	72	40
28	469	96	48	79	55	56	72	49	67	76	68	40
29	63	54	70	351	---	56	112	48	50	56	82	40
30	45	60	49	75	---	61	57	48	89	51	162	41
31	43	---	74	87	---	56	---	47	---	69	66	---
TOTAL	2352	2657	2135	3016	2333	2994	1903	3142	1946	2646	2247	1660
MEAN	75.9	88.6	68.9	97.3	83.3	96.6	63.4	101	64.9	85.4	72.5	55.3
MAX	469	340	167	748	260	365	175	366	116	289	162	145
MIN	37	39	48	45	51	53	48	47	46	46	43	40
AC-FT	4670	5270	4230	5980	4630	5940	3770	6230	3860	5250	4460	3290

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1984 - 2002, BY WATER YEAR (WY)

MEAN	68.8	82.6	71.8	76.7	67.6	87.5	89.3	77.4	71.3	85.3	76.1	70.2
MAX	91.7	150	109	186	106	179	276	143	118	136	99.6	160
(WY)	1986	1991	1988	1988	1988	1994	1989	1987	1987	1994	1991	1992
MIN	27.4	36.8	31.3	29.4	42.2	43.7	36.6	41.5	43.4	52.3	46.1	32.9
(WY)	1985	1985	1985	1985	1993	1992	1992	1996	1984	2001	1984	1984

16614000 WAIHEE RIVER AT DAM NEAR WAIHEE--Continued

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1984 - 2002	
ANNUAL TOTAL	23040		29031			
ANNUAL MEAN	63.1		79.5		78.1	
HIGHEST ANNUAL MEAN					106	1994
LOWEST ANNUAL MEAN					57.5	1985
HIGHEST DAILY MEAN	469	Oct 28	748	Jan 26	1160	Jan 28 1988
LOWEST DAILY MEAN	32	Jul 7	37	Oct 25	22	Jan 18 1985
ANNUAL SEVEN-DAY MINIMUM	32	Jul 4	40	Nov 19	23	Jan 18 1985
ANNUAL RUNOFF (AC-FT)	45700		57580		56560	
10 PERCENT EXCEEDS	108		132		132	
50 PERCENT EXCEEDS	46		57		55	
90 PERCENT EXCEEDS	37		45		39	



16618000 KAHAKULOA STREAM NEAR HONOKOHAU
(Hydrologic Benchmark 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.

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 above mean sea level (from topographic map).

REMARKS.--Records computed by Clayton Yoshida. Records good. No diversion upstream of station.

AVERAGE DISCHARGE.--53 years (water years 1940-42, 1948-70, 1976-2002), 17.7 ft^3/s (12,820 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 4,220 ft^3/s, January 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, January 22, 28, 29, February 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)
Jan 26	1700	*3,740	*9.85	May 13	0745	1,700	7.65
May 6	1345	1,130	6.73				

Minimum discharge, 4.2 ft^3/s, Sept. 26, gage height, 1.86 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

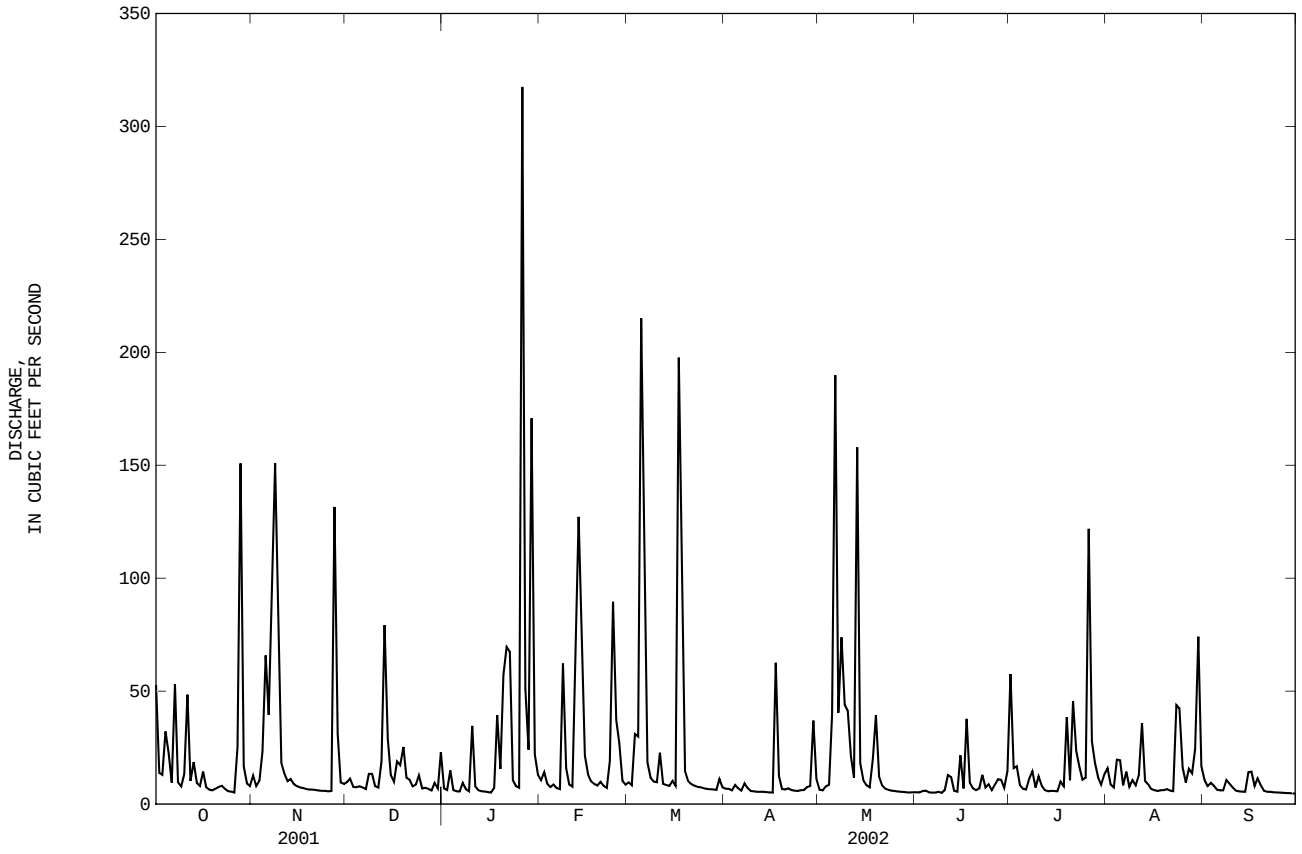
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	53	13	9.8	6.9	11	9.7	6.8	6.4	5.2	58	16	11
2	14	8.0	11	6.2	14	8.4	6.8	6.1	5.2	16	8.7	8.0
3	13	10	7.7	15	9.0	31	6.1	7.8	5.8	17	7.4	9.4
4	32	23	7.5	6.2	7.6	30	8.5	8.5	6.0	8.4	20	8.1
5	22	66	7.9	5.7	8.7	215	7.0	40	5.2	6.9	19	6.4
6	9.5	40	7.4	5.6	7.1	131	6.0	190	5.1	6.5	8.3	6.1
7	53	81	6.7	9.4	6.6	19	9.1	40	5.1	11	14	6.1
8	9.8	151	13	6.6	62	12	7.1	74	5.4	14	7.7	11
9	7.9	81	13	5.7	16	10	5.8	44	5.0	7.4	11	9.1
10	13	18	7.9	35	8.7	9.7	5.7	41	6.2	12	8.3	7.4
11	49	14	7.3	7.9	7.7	23	5.5	21	13	8.1	13	6.0
12	10	10	19	6.1	58	9.0	5.5	12	12	6.2	36	5.7
13	19	11	79	5.7	127	8.5	5.5	158	5.9	5.7	10	5.6
14	9.4	8.9	29	5.6	73	8.1	5.3	18	5.5	5.9	8.7	5.5
15	8.0	8.0	13	5.3	21	10	5.2	10	22	5.9	6.7	14
16	14	7.4	10	5.1	13	8.1	5.1	8.4	7.0	5.7	6.2	14
17	7.5	7.1	19	7.2	10	198	63	7.5	38	9.9	5.8	8.1
18	6.4	6.7	17	39	8.9	114	12	20	9.4	7.9	6.2	11
19	6.1	6.5	25	16	8.3	15	6.7	39	7.1	39	6.2	8.3
20	6.8	6.5	12	57	9.9	10	6.4	12	6.2	11	6.6	5.9
21	7.6	6.3	11	70	8.1	8.9	6.9	8.3	6.9	46	6.0	5.5
22	8.1	6.0	7.9	67	7.2	8.2	6.2	6.9	13	24	5.7	5.4
23	6.8	5.9	8.7	11	19	7.7	6.0	6.3	7.4	16	44	5.3
24	5.8	5.9	13	8.0	90	7.5	5.8	6.0	8.8	11	42	5.2
25	5.6	5.7	7.0	7.2	37	7.1	6.2	5.8	6.2	12	16	5.1
26	5.1	5.8	7.3	317	27	6.7	6.3	5.6	8.5	122	9.6	5.1
27	25	132	6.7	51	10	6.6	7.5	5.5	11	28	16	4.9
28	151	31	6.0	24	8.6	6.6	7.9	5.4	11	18	14	4.9
29	17	9.6	9.4	171	---	6.3	37	5.2	7.2	12	24	4.8
30	9.1	9.0	6.9	22	---	11	11	5.2	15	8.6	74	4.7
31	7.9	---	23	13	---	7.4	---	5.3	---	13	17	---
TOTAL	612.4	794.3	429.1	1018.4	694.4	963.5	289.9	829.2	275.3	573.1	494.1	217.6
MEAN	19.8	26.5	13.8	32.9	24.8	31.1	9.66	26.7	9.18	18.5	15.9	7.25
MAX	151	151	79	317	127	215	63	190	38	122	74	14
MIN	5.1	5.7	6.0	5.1	6.6	6.3	5.1	5.2	5.0	5.7	5.7	4.7
AC-FT	1210	1580	851	2020	1380	1910	575	1640	546	1140	980	432

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1939 - 2002, BY WATER YEAR (WY)

MEAN	15.2	20.6	18.5	18.3	17.4	24.5	23.4	17.1	12.1	16.1	16.5	11.9
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

16618000 KAHAKULOA STREAM NEAR HONOKOHAU--Continued
(Hydrologic Benchmark Network Station)

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1939 - 2002	
ANNUAL TOTAL	5109.0		7191.3			
ANNUAL MEAN	14.0		19.7		17.7	
HIGHEST ANNUAL MEAN					30.8	1942
LOWEST ANNUAL MEAN					11.0	1981
HIGHEST DAILY MEAN	151	Oct 28	317	Jan 26	696	Mar 10 1942
LOWEST DAILY MEAN	3.9	Jul 9	4.7	Sep 30	2.7	Jan 28 1985
ANNUAL SEVEN-DAY MINIMUM	4.0	Jul 6	5.0	Sep 24	2.8	Feb 6 1985
ANNUAL RUNOFF (AC-FT)	10130		14260		12820	
10 PERCENT EXCEEDS	30		41		35	
50 PERCENT EXCEEDS	7.0		8.5		8.9	
90 PERCENT EXCEEDS	4.4		5.6		5.2	



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.

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, October 1990 to current year. Record since October 1990 equivalent to earlier records.

REVISED RECORDS.--WSP 1937: Drainage area. WDR HI-79-1: 1927-48(M), 1949-78(P). WDR HI-00-1: 1991-99 (P).

GAGE.--Water-stage recorders. Elevation of gage is 870 ft above mean sea level (from topographic map). Prior to March 7, 1913, nonrecording gage at site just below Honokohau Ditch intake at different datum. Prior to October 1, 1990, at site 250 ft downstream of gage at datum 26.67 ft lower.

REMARKS.--Records computed by Roy Taogoshi. Records fair. No diversion upstream of station. All medium and low flow, together with the inflow from two development tunnels downstream of station, is diverted into Honokohau Ditch.

AVERAGE DISCHARGE.--84 years (water years 1914-19, 1923-88, 1991-2002), 39.1 ft^3/s (28,340 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 7,260 ft^3/s, January 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, January 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)
Oct 28	0345	1,100	3.86	Mar 6	0100	1,080	3.85
Nov 27	0715	1,600	4.18	May 6	1345	1,360	4.04
Jan 18	1030	1,270	3.98	May 13	0745	1,680	4.22
Jan 26	1915	*2,180	*4.46	Sep 3	1445	1,360	4.04
Jan 29	1130	1,350	4.03				

Minimum discharge, 15 ft^3/s, Oct. 25, 26, 27, gage height, 1.41 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

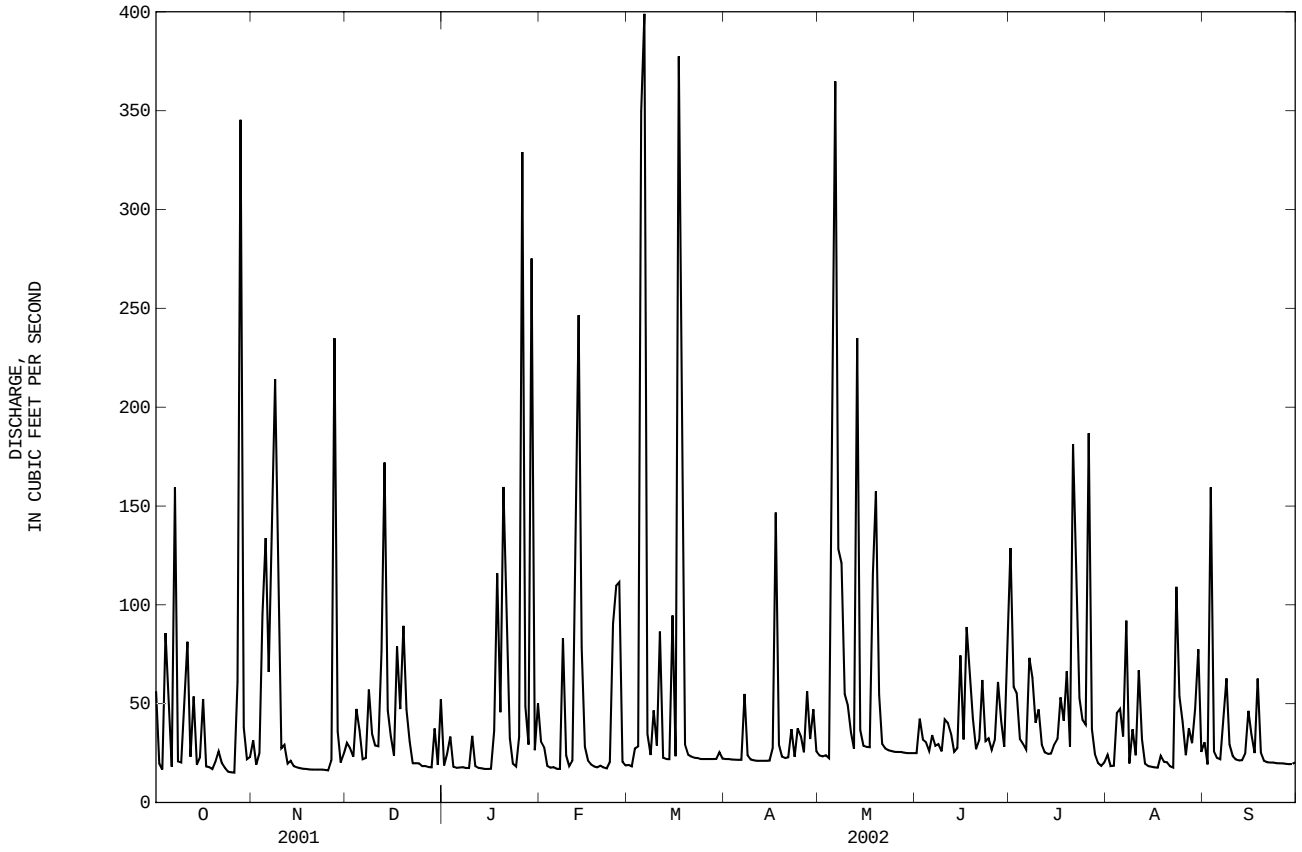
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	56	31	30	19	31	19	22	24	25	129	24	30
2	20	19	27	25	28	18	22	23	42	59	18	19
3	17	25	23	33	19	27	22	24	32	55	19	159
4	86	95	47	18	18	28	22	22	30	32	45	26
5	54	134	36	18	18	350	22	104	26	30	47	23
6	18	66	22	18	17	399	22	365	34	27	33	22
7	159	139	22	18	17	35	55	128	29	73	92	41
8	21	214	57	17	83	24	24	121	29	63	20	63
9	20	111	35	17	24	47	22	55	26	40	37	29
10	47	27	29	34	18	29	21	49	42	47	24	24
11	81	29	28	18	21	86	21	35	40	29	67	22
12	23	20	76	18	105	23	21	27	35	25	32	21
13	54	21	172	17	247	22	21	235	26	25	20	21
14	19	18	47	17	79	22	21	37	27	25	18	25
15	23	18	34	17	28	95	21	29	74	29	18	46
16	52	17	24	17	21	23	28	28	32	32	18	34
17	18	17	79	36	19	377	147	28	89	53	18	25
18	18	17	47	116	18	105	29	116	64	41	24	63
19	17	17	89	46	18	29	23	157	43	66	21	25
20	21	17	47	160	19	24	22	55	27	28	20	21
21	26	17	31	88	18	23	23	30	32	181	18	20
22	20	17	20	33	17	23	37	27	62	117	18	20
23	17	17	20	20	20	22	23	26	31	53	109	20
24	16	17	20	18	90	22	38	26	32	42	54	20
25	15	16	18	33	110	22	34	26	27	39	41	20
26	15	21	18	329	111	22	25	26	32	187	24	20
27	61	235	18	49	21	22	56	26	61	37	38	20
28	345	36	18	29	19	22	32	25	41	24	30	19
29	38	20	37	275	---	22	47	25	28	20	47	19
30	22	25	19	26	---	25	26	25	88	18	78	20
31	23	---	52	50	---	22	---	25	---	20	26	---
TOTAL	1422	1473	1242	1629	1254	2029	949	1949	1206	1646	1098	937
MEAN	45.9	49.1	40.1	52.5	44.8	65.5	31.6	62.9	40.2	53.1	35.4	31.2
MAX	345	235	172	329	247	399	147	365	89	187	109	159
MIN	15	16	18	17	17	18	21	22	25	18	18	19
AC-FT	2820	2920	2460	3230	2490	4020	1880	3870	2390	3260	2180	1860

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1913 - 2002, BY WATER YEAR (WY)

MEAN	31.7	41.3	40.7	36.1	36.9	44.0	48.2	40.9	34.4	40.1	41.0	30.6
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

16620000 HONOKOHAU STREAM NEAR HONOKOHAU--Continued

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1913 - 2002	
ANNUAL TOTAL	12332		16834			
ANNUAL MEAN	33.8		46.1		39.1	
HIGHEST ANNUAL MEAN					68.3	1914
LOWEST ANNUAL MEAN					24.1	1926
HIGHEST DAILY MEAN	345	Oct 28	399	Mar 6	781	Apr 7 1938
LOWEST DAILY MEAN	13	Feb 2	15	Oct 25	8.0	Aug 10 1920
ANNUAL SEVEN-DAY MINIMUM	14	Jan 16	17	Nov 19	8.5	Feb 6 1985
ANNUAL RUNOFF (AC-FT)	24460		33390		28340	
10 PERCENT EXCEEDS	69		93		79	
50 PERCENT EXCEEDS	20		26		24	
90 PERCENT EXCEEDS	14		18		13	



Surface-Water Station Records for Hawaii

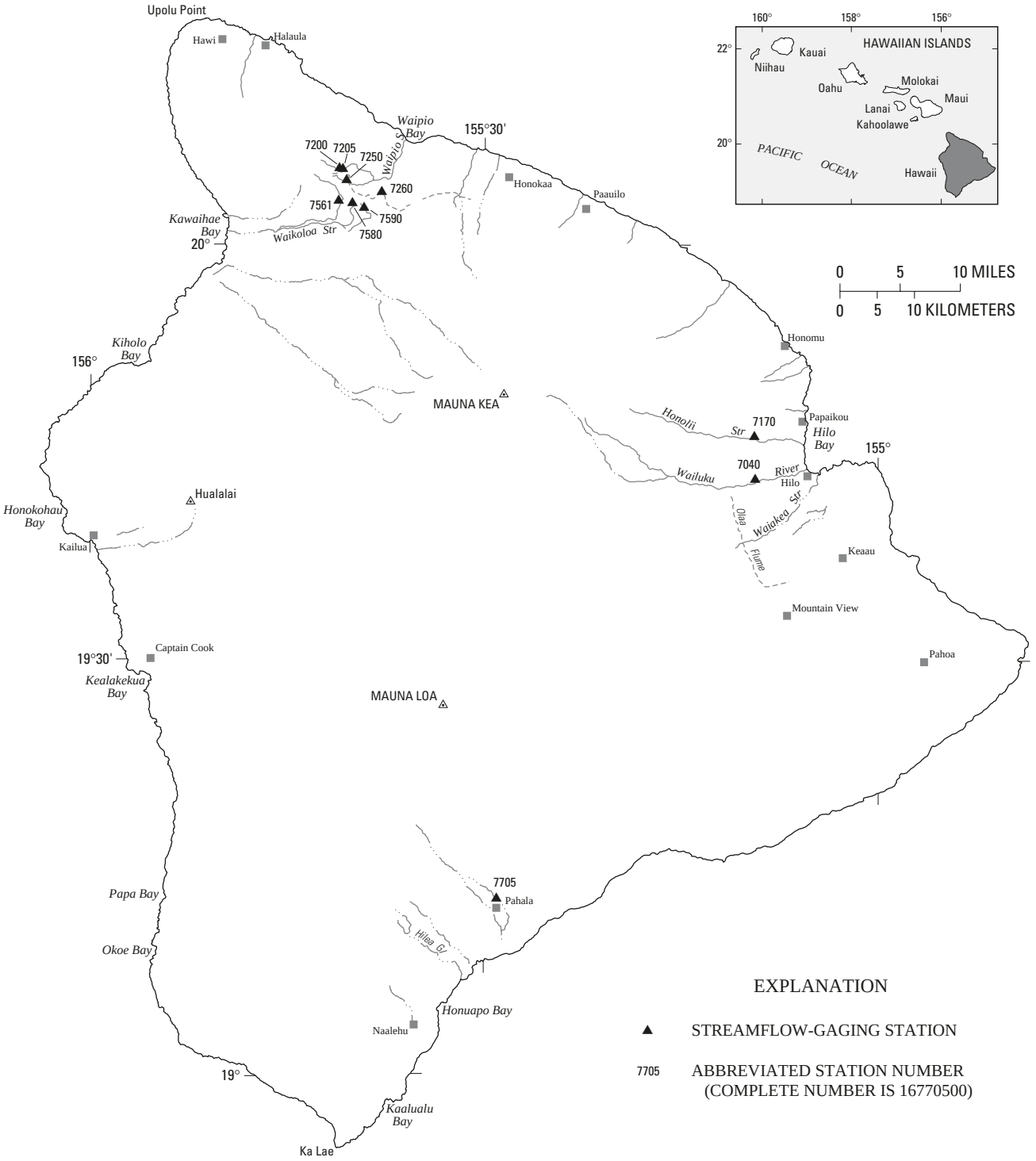


Figure 9. Locations of streamflow-gaging stations on Hawaii.

16704000 WAILUKU RIVER AT PIIHONUA

LOCATION.--Lat 19°42'56", long 155°09'12", Hydrologic Unit 20010000, on right bank 0.2 mi downstream from Hookelekele Stream, 0.9 mi west of Piihonua, and 4.1 mi west of Hilo Post Office. Prior to November 16, 1977, at site directly across river, on left bank.

DRAINAGE AREA.--230 mi^2, of which a portion probably is noncontributing.

PERIOD OF RECORD.--July 1928 to July 1940, October 1940 to December 1947, April 1948 to current year. Monthly discharge only July 1928, published in WSP 1319. Prior to July 1960, published as "above Hilo Boarding School ditch intake, near Hilo."

REVISED RECORDS.--WSP 865: 1929-36(M). WSP 965: 1941. WDR HI-80-1: 1929-79(P). WDR HI-81-1: 1940(M).

GAGE.--Water-stage recorder. Elevation of gage is 1,090 ft above mean sea level (from topographic map). Prior to November 16, 1977, at site directly across river, on left bank at same datum.

REMARKS.--Records computed by Gary Sanchez. Records good except for estimated daily discharges, which are poor. Kapehu ditch diverted water from Kapehu Stream into Wailuku River upstream 1938-63. Department of Water Supply diverted about 6 ft^3/s of water upstream of gage untill 1967. Hydroelectric plant diverts variable amounts of water up to 160 ft^3/s about 1 mi upstream of gage and discharges it about 500 ft below gage (from 1993).

AVERAGE DISCHARGE.--71 years (water years 1929-39, 1942-47, 1949-2002), 278 ft^3/s (201,800 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 80,200 ft^3/s, August 11, 1940, gage height, 28.6 ft, from floodmarks, from rating curve extended above 13,000 ft^3/s based on slope-area measurement at gage height 26.16 ft; minimum, 0.15 ft^3/s, January 20, 1981.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 12,800 ft^3/s, Dec. 13, gage height, 15.67 ft; minimum discharge, 13 ft^3/s, Apr. 16, 17, gage height, 1.71 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	44	201	172	55	1170	140	24	175	42	83	e74	74
2	47	172	239	50	515	106	27	139	38	77	e62	62
3	39	134	2440	46	289	82	27	289	29	105	e122	56
4	194	169	847	43	214	67	23	463	30	300	e257	66
5	342	432	745	39	166	118	21	663	26	152	e125	63
6	98	557	314	42	133	379	19	2240	25	126	e100	56
7	896	235	227	40	110	256	18	891	24	108	e308	165
8	343	643	891	38	91	109	17	700	23	97	e160	390
9	311	724	1990	35	78	81	17	349	22	383	e135	251
10	179	340	1110	32	68	66	16	258	34	231	121	293
11	971	240	1020	29	61	57	15	183	64	156	109	169
12	543	178	2750	26	55	58	14	153	40	113	113	125
13	259	153	7580	25	50	113	15	141	57	86	464	116
14	203	131	6220	27	46	119	15	116	42	70	672	110
15	173	148	2050	25	42	93	14	94	52	61	140	128
16	153	105	980	21	39	112	13	80	e193	e86	104	132
17	165	89	780	29	36	95	40	73	e660	e64	82	147
18	141	78	1030	363	33	154	53	102	102	e84	87	117
19	123	68	831	1590	36	80	20	299	83	e70	97	104
20	104	60	440	229	39	66	16	154	68	e72	106	90
21	96	55	283	151	34	58	16	141	63	e150	93	76
22	85	50	222	113	29	51	19	132	53	e468	66	67
23	71	46	182	91	26	46	21	102	46	e294	140	68
24	261	43	152	74	135	42	19	82	41	e136	386	80
25	130	40	130	61	202	39	19	69	41	e235	112	62
26	81	86	114	241	3090	36	22	67	73	e584	95	53
27	68	1340	98	248	355	34	24	75	88	e367	83	50
28	184	2270	89	102	202	32	260	48	59	e154	80	45
29	171	406	77	4210	---	30	2020	45	50	e104	86	42
30	374	232	68	1460	---	27	391	53	48	e86	144	41
31	185	---	61	3720	---	25	---	46	---	e76	94	---
TOTAL	7034	9425	34132	13255	7344	2771	3235	8422	2216	5178	4817	3298
MEAN	227	314	1101	428	262	89.4	108	272	73.9	167	155	110
MAX	971	2270	7580	4210	3090	379	2020	2240	660	584	672	390
MIN	39	40	61	21	26	25	13	45	22	61	62	41
AC-FT	13950	18690	67700	26290	14570	5500	6420	16710	4400	10270	9550	6540

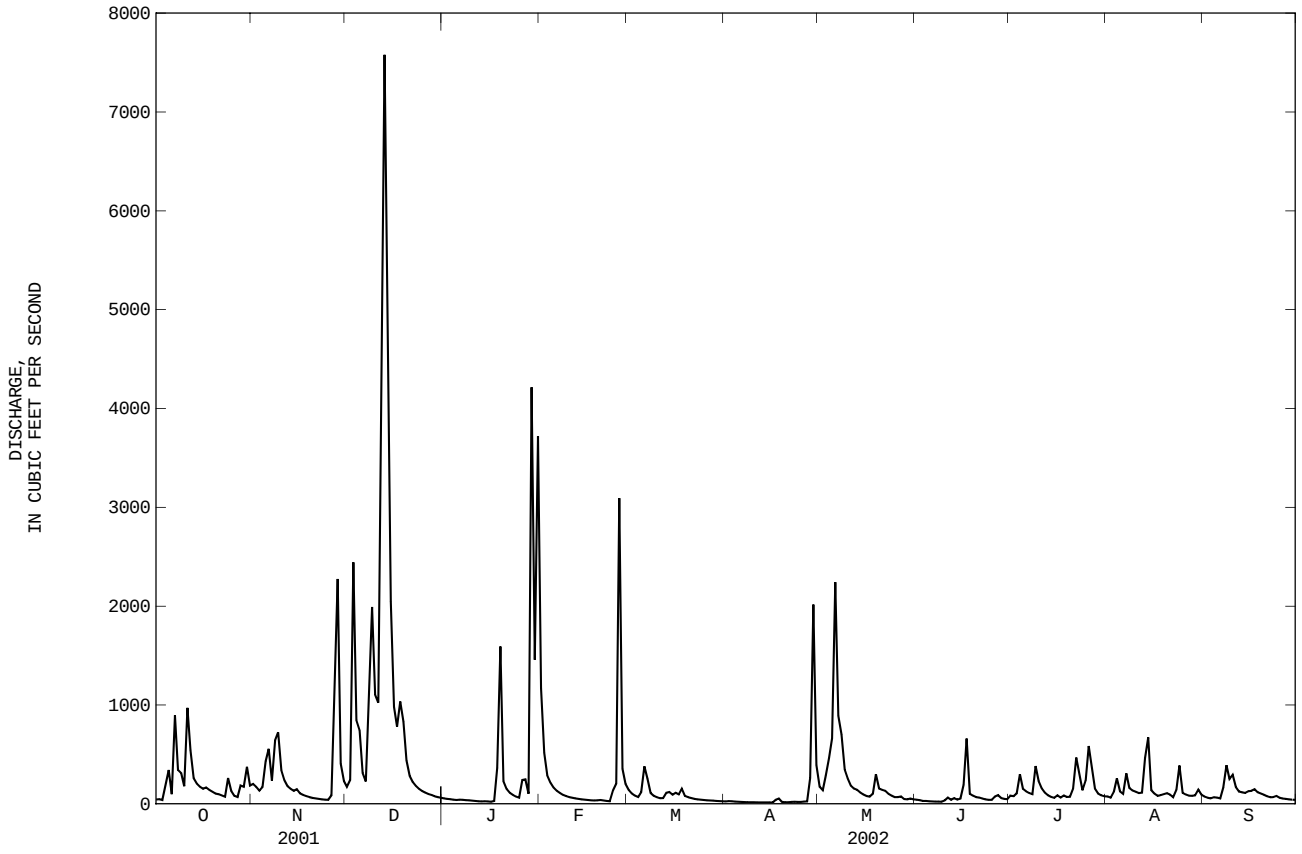
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1928 - 2002, BY WATER YEAR (WY)

MEAN	172	383	366	288	305	401	379	221	128	214	284	166
MAX	765	2238	1368	2061	2050	2026	2262	1246	715	1140	1989	992
(WY)	1942	1991	1971	1975	1969	1991	1986	1964	1941	1989	1930	1930
MIN	2.96	19.1	7.15	1.10	0.51	0.26	7.83	6.23	5.48	2.79	12.8	10.2
(WY)	1985	1934	1934	1981	1983	1983	1992	1992	1981	1981	1971	1974

16704000 WAILUKU RIVER AT PIIHONUA--Continued

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1928 - 2002	
ANNUAL TOTAL	95198.7		101127			
ANNUAL MEAN	261		277		278	
HIGHEST ANNUAL MEAN					588	1991
LOWEST ANNUAL MEAN					103	1981
HIGHEST DAILY MEAN	7580	Dec 13	7580	Dec 13	22200	Jan 8 1975
LOWEST DAILY MEAN	7.3	Feb 7	13	Apr 16	0.22	Mar 20 1983
ANNUAL SEVEN-DAY MINIMUM	8.8	Feb 1	15	Apr 10	0.23	Mar 17 1983
ANNUAL RUNOFF (AC-FT)	188800		200600		201800	
10 PERCENT EXCEEDS	563		549		599	
50 PERCENT EXCEEDS	61		95		80	
90 PERCENT EXCEEDS	18		27		13	

e Estimated



16717000 HONOLII STREAM NEAR PAPAIKOU

LOCATION.--Lat 19°46'00", long 155°09'16", Hydrologic Unit 20010000, 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.

DRAINAGE AREA.--11.6 mi^2.

PERIOD OF RECORD.--June 1911 to March 1913 (published as "at Kaiwiki, near Hilo"), February 1967 to current year.

REVISED RECORDS.--WDR HI-95-1: 1967-90 (maximum, 1988-90 (m), 1988-90).

GAGE.--Water-stage recorder. Elevation of gage is 1,540 ft above mean sea level (from topographic map). Prior to August 27, 1911, nonrecording gage and August 27, 1911 to March 24, 1913, water-stage recorder, at site 0.5 mi upstream at different datum.

REMARKS.--Records computed by Gary Sanchez. Records good. No diversion upstream. During period 1911-13, Honolii ditch diverted an average of about 3.2 ft^3/s upstream for fluming cane and domestic use.

AVERAGE DISCHARGE.--36 years (water years 1912, 1968-2002), 131 ft^3/s (94,860 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 22,600 ft^3/s, May 23, 1978, gage height, 20.00 ft, from floodmarks and from rating curve extended above 4,610 ft^3/s on basis of slope- area measurement at gage height 20.00 ft; minimum, 0.8 ft^3/s, January 31, 1912. Minimum discharge since February 1967 (period of no diversions), 1.0 ft^3/s, February 22-28, 1980.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 4,600 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Nov 27	1900	4,780	11.89	Jan 29	0945	*6,410	*13.34
Dec 13	2045	6,030	13.03	Feb 26	0030	5,300	12.38

Minimum discharge, 11 ft^3/s, Apr. 12, 13, 15, 16, 17, gage height, 2.34 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

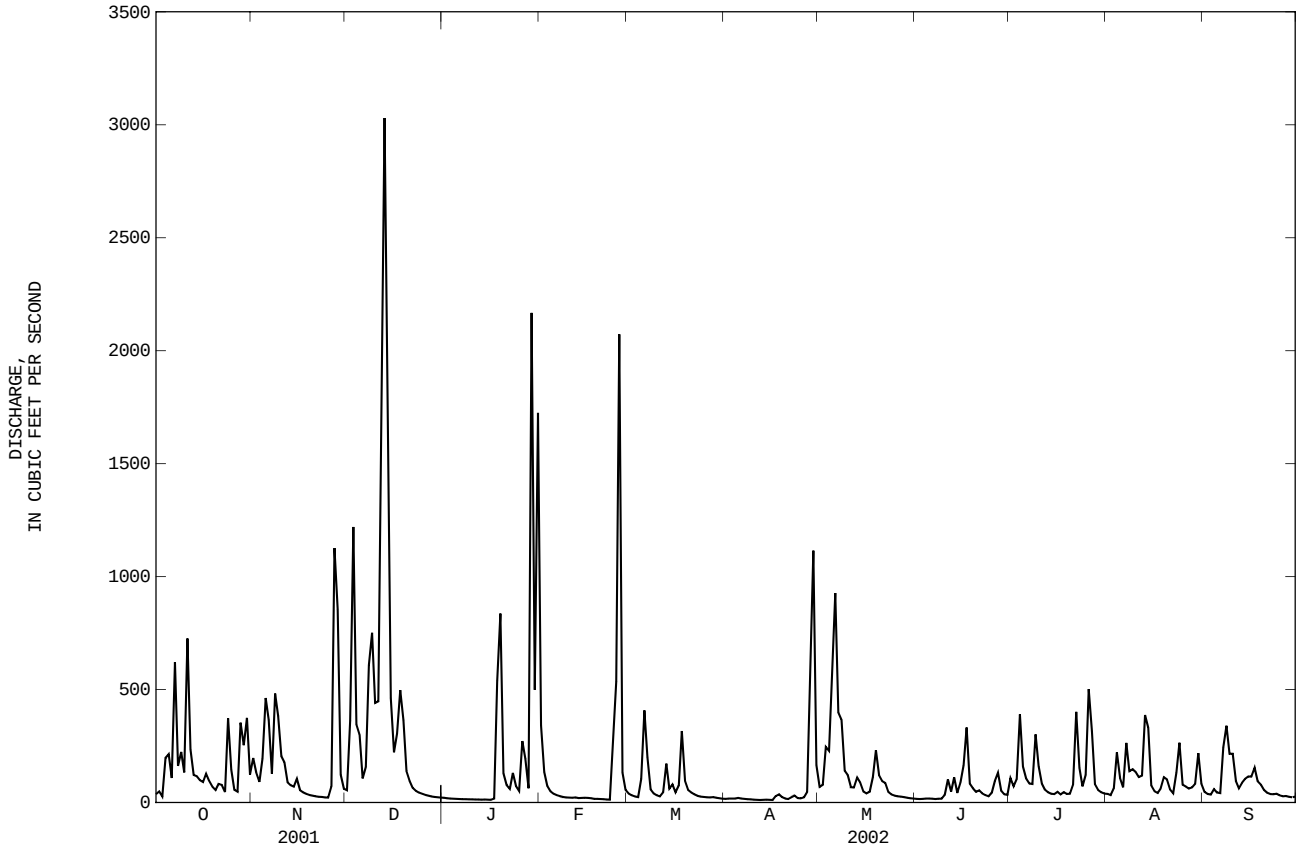
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	36	197	55	21	341	39	16	69	16	108	38	47
2	49	133	362	19	135	32	18	79	15	72	32	38
3	27	91	1220	18	74	27	17	246	16	103	63	35
4	198	194	346	17	50	24	17	229	17	390	222	59
5	213	462	300	16	39	104	20	528	17	159	108	45
6	108	365	107	15	32	408	18	927	16	106	67	42
7	621	127	157	15	28	200	16	400	15	84	264	243
8	162	482	608	14	25	58	14	367	17	82	139	339
9	223	382	751	14	23	40	14	141	16	302	147	216
10	133	205	440	14	22	32	13	122	33	161	135	216
11	726	178	448	13	21	27	12	68	102	84	113	95
12	235	89	1050	13	22	45	11	67	49	57	119	63
13	122	76	3030	12	19	172	12	111	111	45	387	88
14	116	70	1880	13	20	61	13	88	42	38	331	105
15	99	104	462	13	21	80	12	49	87	37	75	115
16	91	55	222	12	20	45	11	40	165	47	50	115
17	127	44	305	17	19	75	28	47	332	36	42	153
18	94	38	497	538	16	316	36	113	84	46	62	94
19	70	33	364	837	16	96	24	231	63	38	112	79
20	55	30	139	129	15	55	17	120	47	39	102	55
21	82	28	95	77	15	44	15	95	53	78	57	43
22	77	26	65	60	13	36	23	86	40	401	41	37
23	47	24	52	131	13	30	30	47	32	153	132	36
24	373	23	43	72	313	26	20	36	27	72	265	39
25	145	21	38	51	536	24	18	30	43	122	79	32
26	56	70	34	272	2070	23	22	27	94	502	70	28
27	48	1130	30	193	132	23	46	26	132	316	62	29
28	353	855	27	63	57	24	442	24	53	81	66	25
29	253	123	25	2170	---	21	1110	21	37	55	82	23
30	374	61	23	498	---	19	166	19	34	45	219	26
31	124	---	22	1720	---	17	---	17	---	39	84	---
TOTAL	5437	5716	13197	7067	4107	2223	2231	4470	1805	3898	3765	2560
MEAN	175	191	426	228	147	71.7	74.4	144	60.2	126	121	85.3
MAX	726	1130	3030	2170	2070	408	1110	927	332	502	387	339
MIN	27	21	22	12	13	17	11	17	15	36	32	23
AC-FT	10780	11340	26180	14020	8150	4410	4430	8870	3580	7730	7470	5080

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1968 - 2002, BY WATER YEAR (WY)

MEAN	81.7	194	168	131	122	204	187	95.0	73.1	118	117	80.3
MAX	222	783	625	648	752	1349	772	319	349	384	420	276
(WY)	1991	1995	1971	1975	1969	1980	1986	1989	1997	1989	1982	1994
MIN	9.70	18.7	10.5	5.64	4.80	6.71	12.5	11.4	8.61	9.66	13.9	8.81
(WY)	1985	1986	1984	1981	1980	1983	1992	1992	1981	1981	1973	1979

16717000 HONOLII STREAM NEAR PAPAIKOU--Continued

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1968 - 2002	
ANNUAL TOTAL	51128.6		56476			
ANNUAL MEAN	140		155		131	
HIGHEST ANNUAL MEAN					220	1991
LOWEST ANNUAL MEAN					53.1	1981
HIGHEST DAILY MEAN	3030	Dec 13	3030	Dec 13	6410	Dec 10 1999
LOWEST DAILY MEAN	7.4	Feb 7	11	Apr 12	1.0	Feb 23 1980
ANNUAL SEVEN-DAY MINIMUM	8.5	Feb 1	12	Apr 10	1.0	Feb 22 1980
ANNUAL RUNOFF (AC-FT)	101400		112000		94860	
10 PERCENT EXCEEDS	349		369		268	
50 PERCENT EXCEEDS	47		59		41	
90 PERCENT EXCEEDS	13		17		11	



16720000 KAWAINUI STREAM NEAR KAMUELA

LOCATION.--Lat 20°05'18", long 155°40'58", Hydrologic Unit 20010000, on left bank 125 ft upstream from Upper Hamakua ditch intake, and 4.5 mi north of Kamuela.

DRAINAGE AREA.--1.58 mi^2.

PERIOD OF RECORD.--January 1964 to current year.

REVISED RECORDS.--WDR HI-95-1: 1965-90 (m), 1970, 1971, 1979, 1984, 1990.

GAGE.--Water-stage recorder. Elevation of gage is 4,060 ft above mean sea level (from topographic map).

REMARKS.--Record computed by Dale Nishimoto. Records fair. No diversion upstream.

AVERAGE DISCHARGE.--38 years (water years 1965-2002), 15.1 ft^3/s (10,970 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 3,160 ft^3/s, November 18, 1979, gage height, 10.03 ft, from rating curve extended above 53 ft^3/s on basis of computations of peak flow over dam and slope-area measurement at gage height 10.03 ft; minimum, 0.01 ft^3/s, January 23-28, February 20-21, 1977, December 16-19, February 23-24, 1980.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 440 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Dec 13	0900	453	5.05	Feb 26	0715	*786	*6.10

Minimum discharge, 0.40 ft^3/s, on several days, gage height, 1.11 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

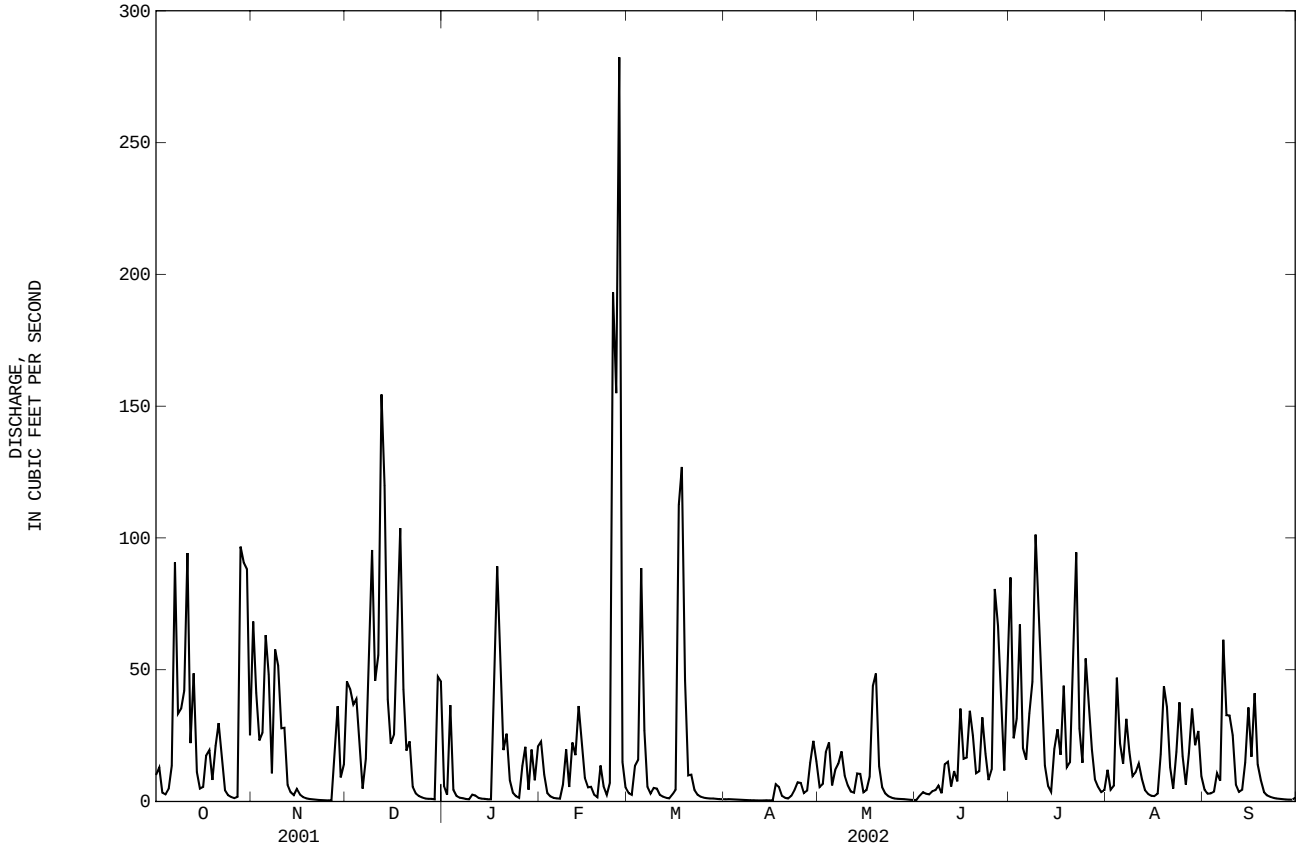
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	10	68	46	5.9	23	3.1	0.86	5.5	0.58	85	12	4.5
2	13	41	43	2.5	10	2.5	0.87	6.6	2.2	24	4.4	2.9
3	3.4	23	37	37	3.3	13	0.84	19	3.5	31	5.9	3.1
4	2.7	26	39	4.5	1.9	16	0.77	22	3.0	67	47	3.7
5	4.8	63	23	2.1	1.4	89	0.68	6.1	2.7	20	22	11
6	13	48	4.9	1.4	1.2	27	0.63	12	3.9	16	14	7.9
7	91	11	16	1.2	1.0	5.6	0.57	14	4.3	33	31	61
8	33	58	65	0.98	6.4	3.0	0.54	19	6.0	45	19	33
9	35	52	95	0.81	20	5.1	0.50	9.8	3.1	101	9.6	33
10	42	28	46	2.6	5.5	4.9	0.47	6.2	14	69	11	25
11	94	28	56	2.3	22	2.5	0.43	3.7	15	44	14	6.4
12	22	6.3	154	1.4	18	1.8	0.42	3.3	5.7	14	8.4	3.7
13	49	3.5	120	1.1	36	1.4	0.42	11	12	6.0	4.3	4.5
14	11	2.4	39	1.0	24	1.2	0.45	10	7.6	3.7	2.9	15
15	4.9	4.7	22	0.84	9.0	2.7	0.41	3.5	35	20	2.2	36
16	5.5	2.6	25	0.86	5.4	4.5	0.41	4.3	16	27	2.1	17
17	17	1.6	73	57	5.5	113	6.6	9.5	17	18	2.9	41
18	20	1.2	104	89	2.5	127	5.5	44	34	44	18	14
19	8.2	0.97	43	54	1.6	46	2.2	49	25	13	44	8.1
20	21	0.82	19	19	14	9.9	1.4	13	11	15	36	3.6
21	30	0.71	23	26	5.8	10	1.1	5.4	12	44	13	2.3
22	16	0.61	5.6	8.0	2.6	4.3	2.2	3.0	32	95	4.9	1.7
23	4.2	0.54	3.0	3.4	7.0	2.6	4.4	2.0	18	28	19	1.4
24	2.4	0.48	2.0	2.0	193	1.8	7.3	1.4	8.1	15	38	1.2
25	1.7	0.43	1.5	1.4	155	1.4	7.0	1.1	12	54	17	1.0
26	1.3	0.44	1.2	13	282	1.2	3.2	0.99	81	39	6.4	0.90
27	1.7	18	1.0	21	15	1.2	4.1	0.93	67	20	18	0.79
28	97	36	0.99	4.5	5.3	1.1	15	0.92	43	8.4	35	0.73
29	91	9.1	0.86	20	---	1.0	23	0.76	12	5.5	21	0.73
30	88	14	47	8.1	---	0.89	15	0.68	45	3.5	27	1.4
31	25	---	46	21	---	0.90	---	0.62	---	4.3	9.6	---
TOTAL	858.8	550.40	1202.05	413.89	877.4	505.59	107.27	289.30	551.68	1012.4	519.6	346.55
MEAN	27.7	18.3	38.8	13.4	31.3	16.3	3.58	9.33	18.4	32.7	16.8	11.6
MAX	97	68	154	89	282	127	23	49	81	101	47	61
MIN	1.3	0.43	0.86	0.81	1.0	0.89	0.41	0.62	0.58	3.5	2.1	0.73
AC-FT	1700	1090	2380	821	1740	1000	213	574	1090	2010	1030	687

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1964 - 2002, BY WATER YEAR (WY)

MEAN	9.89	16.9	15.7	14.9	12.8	20.5	22.4	12.3	14.0	18.9	15.3	8.66
MAX	27.7	55.8	41.4	62.5	40.6	98.0	67.5	36.0	37.7	37.0	31.8	27.5
(WY)	2002	1980	1971	1979	1969	1980	1986	1998	1998	1982	1982	1992
MIN	0.17	1.77	0.51	0.34	0.51	3.33	1.71	1.07	3.18	4.56	2.70	0.27
(WY)	1985	1990	1981	1981	1995	1983	1992	1999	1985	1981	1971	1965

16720000 KAWAINUI STREAM NEAR KAMUELA--Continued

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1964 - 2002	
ANNUAL TOTAL	6191.15		7234.93			
ANNUAL MEAN	17.0		19.8		15.1	
HIGHEST ANNUAL MEAN					26.3	1980
LOWEST ANNUAL MEAN					7.33	1981
HIGHEST DAILY MEAN	219	Feb 15	282	Feb 26	612	Nov 18 1979
LOWEST DAILY MEAN	0.14	Jan 12	0.41	Apr 15	0.01	Jan 23 1977
ANNUAL SEVEN-DAY MINIMUM	0.17	Jan 7	0.43	Apr 10	0.01	Jan 22 1977
ANNUAL RUNOFF (AC-FT)	12280		14350		10970	
10 PERCENT EXCEEDS	45		48		41	
50 PERCENT EXCEEDS	6.6		8.1		4.6	
90 PERCENT EXCEEDS	0.61		0.90		0.51	



16720500 UPPER HAMAKUA DITCH BELOW KAWAIKI STREAM, NEAR KAMUELA

LOCATION.--Lat 20°05'15", long 155°40'42", Hydrologic Unit 20010000, on right bank 800 ft downstream from Kawaiki Stream intake and 4.4 mi north of Kamuela.

PERIOD OF RECORD.--January 1964 to November 1979, October 1980 to September 2002 (discontinued).

GAGE.--Water-stage recorders and concrete control. Elevation of gage is 4,020 ft (from topographic map).

REMARKS.--Records computed by Dale Nishimoto. Records good. Ditch diverts from Kawainui and Kawaiki Streams for irrigation in vicinity of Kamuela. Rain gage located at station monitoring total rainfall between service dates.

AVERAGE DISCHARGE.-- 38 years (water years 1965-79; 1982-2002), 7.34 ft^3/s (5,320 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 49 ft^3/s, November 2, 1967; minimum daily discharge, no flow, July 8-9, 14-16, 1992, August 4-6, 1992.

EXTEMES FOR CURRENT YEAR.--Maximum daily discharge, 12 ft^3/s, for several days in October, November, and February; minimum daily discharge, 0.41 ft^3/s, April 16.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

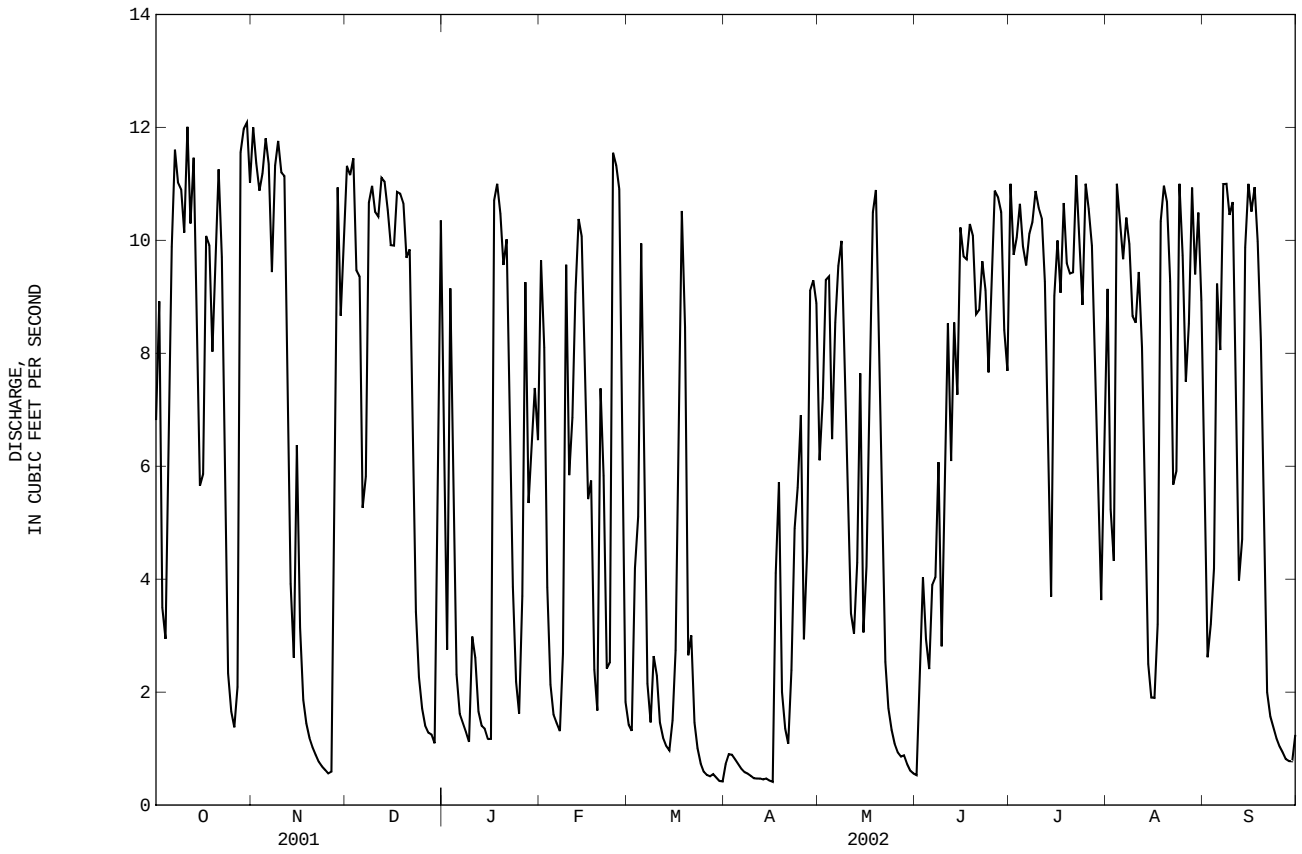
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	6.8	12	11	6.2	9.6	1.4	0.73	6.1	0.53	11	9.1	5.4
2	8.9	11	11	2.8	8.1	1.3	0.90	7.2	2.6	9.7	5.2	2.6
3	3.5	11	11	9.1	3.9	4.2	0.89	9.3	4.0	10	4.3	3.2
4	2.9	11	9.5	5.1	2.1	5.1	0.81	9.4	2.9	11	11	4.2
5	5.7	12	9.4	2.3	1.6	9.9	0.73	6.5	2.4	9.9	10	9.2
6	9.9	11	5.3	1.6	1.5	6.4	0.64	8.5	3.9	9.6	9.7	8.1
7	12	9.4	5.8	1.5	1.3	2.2	0.58	9.5	4.0	10	10	11
8	11	11	11	1.3	2.7	1.5	0.56	10	6.1	10	9.9	11
9	11	12	11	1.1	9.6	2.6	0.52	8.3	2.8	11	8.7	10
10	10	11	11	3.0	5.8	2.3	0.48	6.4	5.7	11	8.5	11
11	12	11	10	2.6	6.9	1.5	0.47	3.4	8.5	10	9.4	7.5
12	10	7.1	11	1.7	9.1	1.2	0.47	3.0	6.1	9.3	8.1	4.0
13	11	3.9	11	1.4	10	1.0	0.45	4.3	8.5	6.6	4.8	4.7
14	9.1	2.6	11	1.4	10	0.97	0.47	7.6	7.3	3.7	2.5	9.9
15	5.7	6.4	9.9	1.2	7.7	1.5	0.43	3.1	10	9.0	1.9	11
16	5.9	3.1	9.9	1.2	5.4	2.7	0.41	4.2	9.7	10	1.9	11
17	10	1.9	11	11	5.7	6.5	4.1	8.4	9.7	9.1	3.2	11
18	9.9	1.4	11	11	2.4	11	5.7	10	10	11	10	10
19	8.0	1.2	11	10	1.7	8.5	2.0	11	10	9.6	11	8.2
20	9.4	1.0	9.7	9.6	7.4	2.7	1.4	8.9	8.7	9.4	11	3.8
21	11	0.89	9.8	10	5.8	3.0	1.1	5.5	8.8	9.4	9.3	2.0
22	9.7	0.77	6.3	7.6	2.4	1.5	2.4	2.5	9.6	11	5.7	1.6
23	4.7	0.69	3.4	3.9	2.5	1.0	4.9	1.7	9.1	10	5.9	1.4
24	2.3	0.62	2.3	2.2	12	0.74	5.6	1.3	7.7	8.9	11	1.2
25	1.7	0.56	1.7	1.6	11	0.59	6.9	1.1	9.1	11	9.7	1.0
26	1.4	0.59	1.4	3.7	11	0.53	2.9	0.93	11	11	7.5	0.93
27	2.1	6.0	1.3	9.3	4.2	0.51	4.5	0.86	11	9.9	8.5	0.82
28	12	11	1.2	5.3	1.8	0.55	9.1	0.88	10	8.3	11	0.78
29	12	8.7	1.1	6.4	---	0.49	9.3	0.72	8.4	6.7	9.4	0.78
30	12	9.9	6.5	7.4	---	0.43	8.9	0.61	7.7	3.6	10	1.2
31	11	---	10	6.5	---	0.42	---	0.56	---	5.7	8.9	---
TOTAL	252.6	190.72	246.5	149.0	163.2	84.23	78.34	161.76	215.83	286.4	247.1	168.51
MEAN	8.15	6.36	7.95	4.81	5.83	2.72	2.61	5.22	7.19	9.24	7.97	5.62
MAX	12	12	11	11	12	11	9.3	11	11	11	11	11
MIN	1.4	0.56	1.1	1.1	1.3	0.42	0.41	0.56	0.53	3.6	1.9	0.78
AC-FT	501	378	489	296	324	167	155	321	428	568	490	334

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1964 - 2002, BY WATER YEAR (WY)

MEAN	5.80	7.74	6.71	5.68	5.34	7.72	9.05	7.15	8.44	10.2	8.43	5.77
MAX	14.0	21.0	17.5	11.9	17.1	16.0	22.1	16.2	16.5	20.5	18.7	13.4
(WY)	1965	1968	1971	1967	1969	1973	1970	1970	1966	1967	1966	1964
MIN	0.14	1.85	0.77	0.53	0.78	1.69	2.23	1.42	3.30	2.67	2.66	0.19
(WY)	1985	1996	1981	1981	1995	1974	1992	1999	1984	1984	1973	1965

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1964 - 2002	
ANNUAL TOTAL	2350.26		2244.19			
ANNUAL MEAN	6.44		6.15		7.34	
HIGHEST ANNUAL MEAN					11.3	1970
LOWEST ANNUAL MEAN					3.78	1984
HIGHEST DAILY MEAN	13	Feb 14	12	Oct 7	49	Nov 2 1967
LOWEST DAILY MEAN	0.25	Jan 12	0.41	Apr 16	0.00	Jul 8 1992
ANNUAL SEVEN-DAY MINIMUM	0.29	Jan 7	0.45	Apr 10	0.04	Dec 29 1980
ANNUAL RUNOFF (AC-FT)	4660		4450		5320	
10 PERCENT EXCEEDS	11		11		16	
50 PERCENT EXCEEDS	6.8		6.4		5.4	
90 PERCENT EXCEEDS	0.77		0.89		0.72	

16720500 UPPER HAMAKUA DITCH BELOW KAWAIKI STREAM, NEAR KAMUELA--Continued



16725000 ALAKAHI STREAM NEAR KAMUELA

LOCATION.--Lat 20°04'27", long 155°40'25", Hydrologic Unit 20010000, on right bank 25 ft upstream from Upper Hamakua ditch intake, and 3.5 mi north of Kamuela.

DRAINAGE AREA.--0.87 mi^2.

PERIOD OF RECORD.--January 1964 to current year.

REVISED RECORDS.--WDR HI-94-1: 1964-90.

GAGE.--Water-stage recorders. Elevation of gage is 3,900 ft above mean sea level (from topographic map).

REMARKS.--Records computed by Dale Nishimoto. Records fair except for estimated daily discharges, which are poor. Parker Ranch pipeline no longer diverts from tributary 0.4 mi upstream for ranch use in Kamuela area.

AVERAGE DISCHARGE.--38 years (water years 1965-2002), 7.97 ft^3/s (5,780 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,430 ft^3/s, January 11, 1967, gage height 8.65 ft, from rating curve extended above 28 ft^3/s on basis of computations of peak flow over dam and slope-area measurement at gage height 8.65 ft; maximum gage height, 12.80 ft, November 18, 1979; minimum, 0.03 ft^3/s on several days in 1965.

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)
Feb 26	0345	*337	*5.87	Mar 17	1530	182	4.61

Minimum discharge, 0.57 ft^3/s, Apr. 11, 12, 13, gage height, 1.42 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3.2	31	16	4.0	e11	3.6	0.79	3.2	0.78	55	9.8	2.6
2	5.2	18	16	2.3	e6.3	1.6	0.82	3.9	3.6	13	3.2	1.9
3	2.2	15	11	23	e2.7	3.9	0.84	12	3.8	18	4.1	2.6
4	2.0	14	12	3.3	e1.8	7.2	0.80	15	2.0	42	36	3.6
5	2.9	37	9.4	2.1	e1.4	59	0.72	3.0	1.8	11	11	7.7
6	4.3	27	3.1	1.3	e1.2	17	0.68	3.9	2.5	8.8	7.6	3.7
7	37	6.3	3.0	1.1	e1.1	3.3	0.65	6.7	2.5	16	13	37
8	15	42	19	1.0	e1.3	1.9	0.64	11	3.1	25	7.1	17
9	20	36	42	0.89	5.6	2.8	0.63	5.2	2.2	74	5.6	18
10	18	18	14	1.4	2.8	3.2	0.61	2.6	9.3	46	5.4	12
11	45	16	20	1.6	10	1.8	0.61	1.9	9.3	33	7.2	3.5
12	8.3	4.2	58	1.0	9.3	1.3	0.61	1.9	4.7	9.4	5.0	2.2
13	22	2.7	51	0.98	22	1.1	0.63	3.2	8.9	5.2	2.6	3.0
14	6.2	2.0	18	0.94	11	1.0	0.62	4.9	4.6	2.7	1.9	7.9
15	3.3	4.0	10	e0.87	5.0	1.5	0.63	2.1	21	14	1.6	22
16	2.8	2.6	9.3	e0.85	2.8	4.3	0.64	3.2	8.0	20	1.6	7.8
17	8.4	1.7	32	e20	3.1	64	3.6	6.1	10	14	2.5	25
18	9.4	1.4	54	e32	1.7	77	3.4	22	19	35	12	6.7
19	5.1	1.3	17	e22	1.3	26	1.5	20	14	8.0	23	3.5
20	8.6	1.2	11	e9.9	3.8	6.1	1.1	6.6	6.9	11	19	1.9
21	14	1.1	13	e12	2.7	5.5	0.97	2.7	6.2	34	5.6	1.4
22	8.5	1.1	4.1	e5.4	1.6	2.5	1.4	1.8	22	74	2.6	1.2
23	2.8	1.0	2.8	e2.8	1.7	1.6	2.5	1.4	12	18	12	1.0
24	1.8	0.97	2.3	e1.8	89	1.2	4.1	1.1	5.0	12	22	0.97
25	1.5	0.92	1.8	e1.3	83	1.0	4.3	1.0	7.7	43	9.0	0.89
26	1.4	0.91	1.2	e6.9	166	0.96	2.1	0.95	54	26	3.1	0.79
27	1.5	11	1.2	e11	11	0.94	3.1	0.91	39	11	10	0.74
28	53	22	1.1	e3.4	6.1	0.94	7.9	0.90	27	6.3	23	0.71
29	46	4.2	1.1	e9.7	---	0.87	13	0.86	7.4	4.8	14	0.73
30	50	5.9	14	e5.1	---	0.81	8.2	0.80	25	2.6	11	0.78
31	11	---	26	e10	---	0.77	---	0.78	---	4.5	4.9	---
TOTAL	420.4	330.50	494.4	199.93	466.3	304.69	68.09	151.60	343.28	697.3	296.4	198.81
MEAN	13.6	11.0	15.9	6.45	16.7	9.83	2.27	4.89	11.4	22.5	9.56	6.63
MAX	53	42	58	32	166	77	13	22	54	74	36	37
MIN	1.4	0.91	1.1	0.85	1.1	0.77	0.61	0.78	0.78	2.6	1.6	0.71
AC-FT	834	656	981	397	925	604	135	301	681	1380	588	394

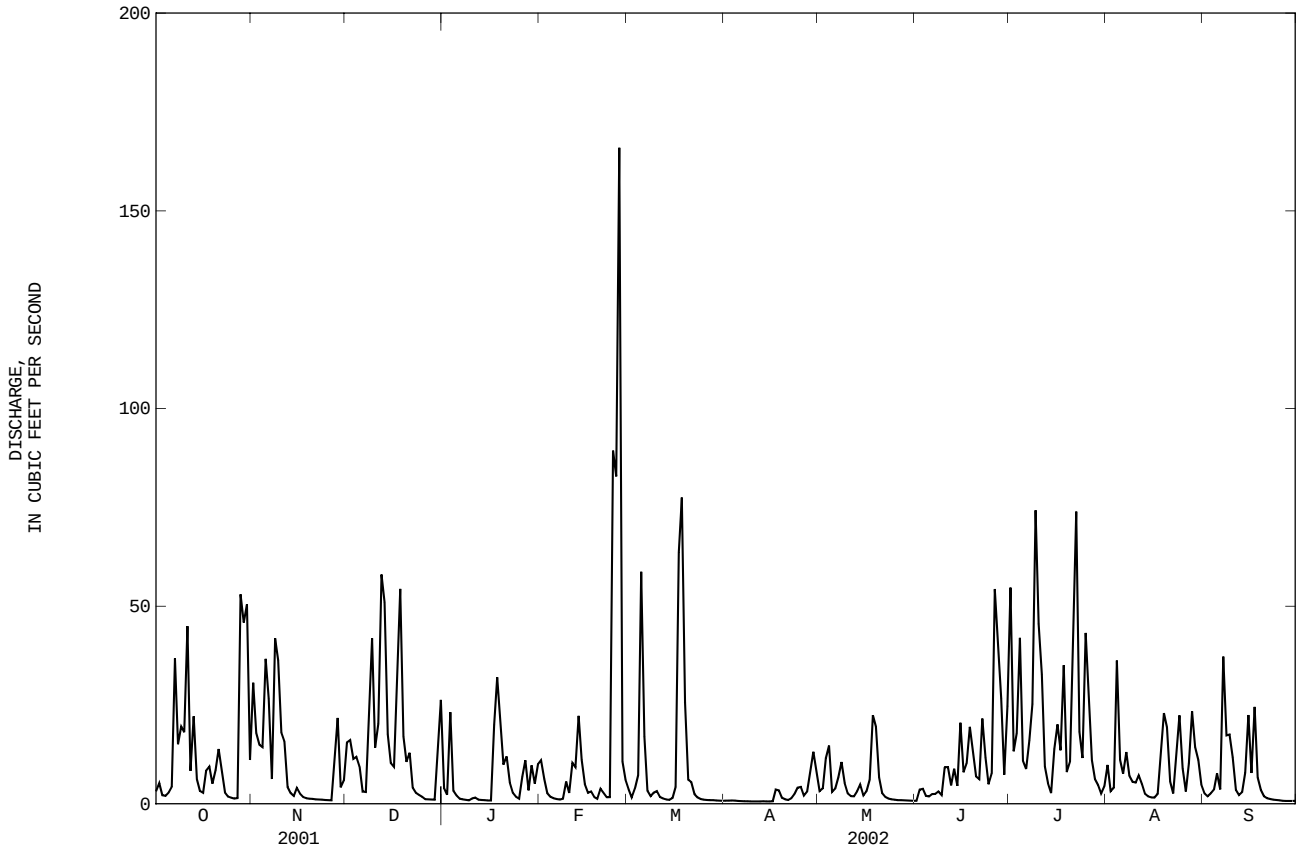
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1964 - 2002, BY WATER YEAR (WY)

MEAN	5.38	8.45	7.46	7.54	6.32	10.1	11.4	6.86	7.97	10.6	8.63	5.12
MAX	14.7	26.5	16.7	26.4	18.6	37.9	31.6	20.5	22.6	22.5	19.2	17.8
(WY)	1999	1980	1971	1979	1969	1980	1986	1998	1998	2002	2001	1992
MIN	0.31	1.07	0.54	0.46	0.40	1.27	0.82	0.78	2.04	2.38	1.72	0.087
(WY)	1985	1969	1981	1981	1993	1983	1992	1999	1985	1981	1971	1965

16725000 ALAKAHI STREAM NEAR KAMUELA--Continued

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1964 - 2002	
ANNUAL TOTAL	3647.51		3971.70			
ANNUAL MEAN	9.99		10.9		7.97	
HIGHEST ANNUAL MEAN					13.4	1994
LOWEST ANNUAL MEAN					3.39	1981
HIGHEST DAILY MEAN	150	Feb 15	166	Feb 26	338	Nov 18 1979
LOWEST DAILY MEAN	0.43	Jan 11	0.61	Apr 10	0.03	May 22 1965
ANNUAL SEVEN-DAY MINIMUM	0.46	Jan 7	0.62	Apr 9	0.04	Sep 22 1965
ANNUAL RUNOFF (AC-FT)	7230		7880		5780	
10 PERCENT EXCEEDS	26		26		20	
50 PERCENT EXCEEDS	4.1		4.3		3.2	
90 PERCENT EXCEEDS	0.71		0.93		0.60	

e Estimated



16726000 UPPER HAMAKUA DITCH ABOVE WAIMEA RESERVOIR DIVERSION, NEAR KAMUELA

LOCATION.--Lat 20°03'31", long 155°37'40", Hydrologic Unit 20010000, on left bank 500 ft upstream from diversion intake leading to Waimea Reservoir and 3.7 mi northeast of Kamuela Post Office.

PERIOD OF RECORD.--October 1974 to September 1983, September 1992 to September 1994 (discharge measurements only). October 1994 to current year.

REVISED RECORDS.--WDR HI-94-1: 1981, 1984-90.

GAGE.--Water-stage recorder and concrete control. Elevation of gage is 3,020 ft above mean sea level (from topographic map).

REMARKS.--Records computed by Gary sanchez. Records good, except for estimated daily discharges, which are poor. Ditch diverts from Kawainui, Kawaiki, and Alakahi Streams for use in vicinity of Kamuela.

AVERAGE DISCHARGE.--17 years (water years 1975-83, 1995-2002), 9.83 ft^3/s (7,120 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 48 ft^3/s, April 6, 1977; no flow at times.

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge, 29 ft^3/s, Jul 1; minimum daily discharge 0.00 ft^3/s, Feb 28.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	12	14	e16	6.3	12	1.3	e1.4	e16	1.4	29	18	10
2	12	14	e16	5.0	8.1	6.4	e1.7	e17	9.4	18	12	7.8
3	8.2	11	e16	13	5.3	12	e1.6	e19	12	20	11	10
4	6.6	13	9.8	6.0	4.6	17	e1.5	e19	6.1	19	19	11
5	9.4	16	9.9	4.9	3.8	25	e1.4	e16	5.6	16	17	15
6	8.7	15	6.9	4.3	3.4	17	e1.2	e18	7.3	16	15	11
7	12	11	6.4	3.9	3.0	10	e1.1	e20	7.7	17	16	19
8	12	18	13	3.3	5.7	6.8	e1.1	e20	11	20	13	17
9	12	18	21	2.8	19	7.7	e1.0	15	6.8	27	13	17
10	12	15	13	6.0	11	9.4	e0.94	11	11	22	13	16
11	13	13	14	6.0	13	5.3	e0.92	7.3	14	19	14	13
12	11	9.6	23	4.0	19	3.8	e0.92	7.5	10	16	13	9.0
13	11	8.2	25	3.3	20	3.0	e0.90	8.0	14	14	9.6	8.6
14	11	8.1	15	3.2	23	2.1	e0.92	14	13	11	6.7	14
15	9.0	12	9.9	2.6	17	3.6	e0.86	8.9	18	19	5.3	18
16	8.3	8.4	8.3	1.7	11	7.7	e0.82	14	14	18	5.4	16
17	9.6	6.1	19	18	13	e9.6	e6.4	17	15	17	8.7	17
18	9.9	4.7	23	20	6.5	e15	e8.6	19	19	20	17	15
19	9.9	3.9	13	18	3.6	e12	e3.4	20	17	16	17	12
20	10	3.5	14	11	4.3	e4.3	e2.4	17	16	16	16	8.0
21	12	3.0	12	14	3.0	e4.8	e2.0	12	14	23	14	5.4
22	11	2.7	6.9	7.2	2.5	e2.5	e3.9	6.6	17	27	9.9	4.2
23	8.6	2.4	5.8	5.1	3.7	e1.8	e7.5	4.4	16	17	13	3.4
24	6.2	2.2	5.4	4.4	26	e1.4	e8.4	3.2	14	15	19	2.9
25	4.6	2.0	5.0	3.9	15	e1.1	e10	2.6	16	20	16	2.5
26	3.6	2.0	4.3	11	11	e1.0	e4.7	2.2	27	19	12	2.3
27	3.8	7.0	3.9	13	0.01	e1.0	e6.9	2.0	23	16	13	2.0
28	16	3.9	3.5	5.9	0.00	e1.1	e19	2.0	21	17	17	1.8
29	13	e13	3.1	11	---	e0.95	e19	1.7	16	15	18	1.8
30	13	e14	5.7	7.6	---	e0.85	e19	1.5	17	11	16	1.9
31	11	---	15	13	---	e0.83	---	1.4	---	15	14	---
TOTAL	310.4	274.7	362.8	239.4	267.51	196.33	139.48	343.3	409.3	565	421.6	292.6
MEAN	10.0	9.16	11.7	7.72	9.55	6.33	4.65	11.1	13.6	18.2	13.6	9.75
MAX	16	18	25	20	26	25	19	20	27	29	19	19
MIN	3.6	2.0	3.1	1.7	0.00	0.83	0.82	1.4	1.4	11	5.3	1.8
AC-FT	616	545	720	475	531	389	277	681	812	1120	836	580

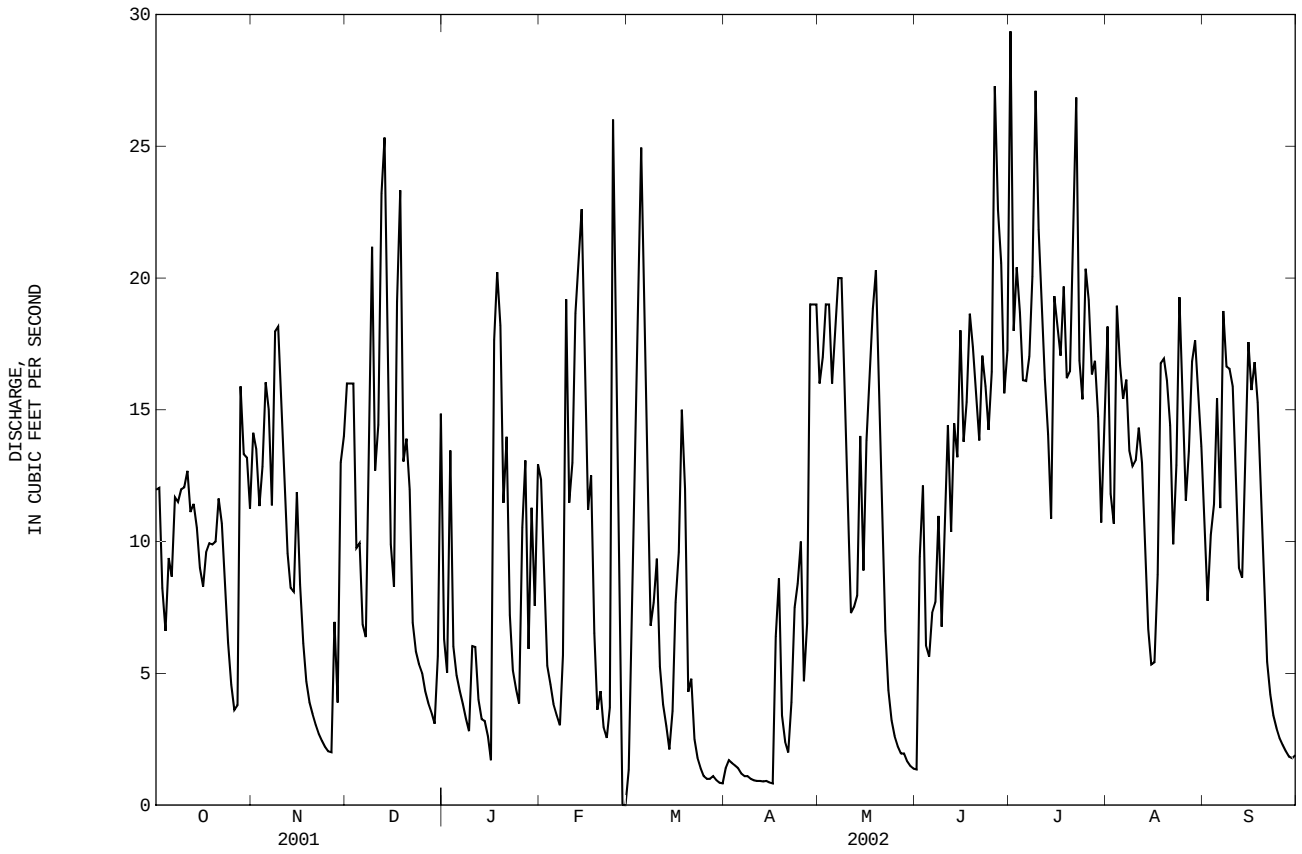
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1975 - 2002, BY WATER YEAR (WY)

MEAN	8.13	10.5	8.12	5.88	6.18	11.0	13.0	10.4	10.2	13.8	11.7	8.65
MAX	17.3	17.4	12.6	13.4	15.1	19.7	26.0	23.9	26.3	26.0	19.6	16.9
(WY)	1999	1977	1979	2000	1999	1982	1998	1998	1998	1978	1978	1982
MIN	1.18	2.82	0.79	0.31	0.63	3.61	2.76	2.05	3.03	2.84	2.23	2.95
(WY)	1975	1996	1981	1981	1995	1995	1981	1999	1981	1981	1979	1981

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1975 - 2002	
ANNUAL TOTAL	3515.59		3822.42			
ANNUAL MEAN	9.63		10.5		9.83	
HIGHEST ANNUAL MEAN					15.0	1998
LOWEST ANNUAL MEAN					3.80	1981
HIGHEST DAILY MEAN	40	Feb 15	29	Jul 1	48	Apr 6 1977
LOWEST DAILY MEAN	0.66	Jan 19	0.00	Feb 28	0.00	Oct 1 1974
ANNUAL SEVEN-DAY MINIMUM	0.76	Jan 7	0.90	Apr 10	0.00	Oct 1 1974
ANNUAL RUNOFF (AC-FT)	6970		7580		7120	
10 PERCENT EXCEEDS	18		19		23	
50 PERCENT EXCEEDS	9.3		11		7.0	
90 PERCENT EXCEEDS	1.8		2.0		0.75	

e Estimated

16726000 UPPER HAMAKUA DITCH ABOVE WAIMEA RESERVOIR DIVERSION, NEAR KAMUELA--Continued



16756100 KOHAKOHAU STREAM ABOVE DWS INTAKE, NEAR KAMUELA

LOCATION.--Lat 20°02'58", long 155°41'05", Hydrologic Unit 20010000, on right bank 200 ft upstream of Department of Water Supply dam and intake, 0.85 mi west of Puu Ohu, and 1.85 mi northwest of junction of Highways 19 and 190.

DRAINAGE AREA.--2.40 mi^2.

PERIOD OF RECORD.--June 1998 to current year.

GAGE.--Water-stage recorder. Datum of gage is 3,470 ft above mean sea level (from topographic map).

REMARKS.--Records computed by Gary Sanchez. Records fair except for estimated daily discharges, which are poor. Two Parker Ranch 4-in. pipelines divert water upstream at 4,250 ft and lower. Hawaii Department of Water Supply diverts water at dam 200 ft downstream for domestic use in the Kamuela and Kawaihae areas since August 20, 1973.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,460 ft^3/s, February 26, 2002, gage height, 6.81 ft from rating curve developed using flow-over-dam computations and high water marks at gage; minimum, 0.22 ft^3/s, March 15-17, 2000.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 400 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Oct 28	1045	408	4.90	Jan 3	0315	622	5.45
Dec 12	1600	658	5.53	Feb 26	0030	*1,460	*6.81
Dec 30	2100	428	4.96				

Minimum discharge, 0.39 ft^3/s, June 1, gage height, 1.54 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	e5.0	41	17	7.9	18	3.8	0.91	2.5	0.39	68	10	2.9
2	e8.0	33	16	3.8	8.0	2.5	0.84	2.1	0.90	21	3.4	2.0
3	e2.0	16	21	97	3.3	3.6	0.80	4.9	1.5	23	3.2	5.6
4	1.6	19	19	6.3	2.2	5.3	0.75	16	0.80	63	33	4.1
5	1.9	50	15	3.3	1.6	61	0.68	3.3	0.63	15	16	7.5
6	1.7	43	3.1	2.4	1.5	24	0.64	3.5	0.88	11	8.8	3.1
7	57	8.4	2.1	2.1	1.3	4.9	0.61	2.6	1.2	18	20	44
8	19	57	20	1.7	1.4	2.8	0.57	6.0	2.1	36	9.1	23
9	26	58	74	1.5	3.1	3.0	0.54	3.9	1.0	110	6.3	19
10	24	24	19	1.8	2.2	2.8	0.50	2.1	1.8	65	4.4	18
11	75	17	29	1.6	6.9	1.9	0.49	1.4	4.2	45	4.0	4.6
12	14	5.5	156	1.4	12	1.6	0.47	1.3	1.9	13	3.7	2.7
13	22	2.9	118	1.3	25	1.4	0.44	2.3	4.9	6.2	2.5	2.5
14	9.5	2.0	35	1.2	17	1.2	0.44	3.4	3.4	3.7	1.9	4.5
15	4.6	2.7	16	1.1	7.1	1.3	0.43	1.8	20	15	1.6	21
16	3.2	1.7	14	1.1	3.8	11	0.44	2.9	5.1	29	1.5	12
17	6.4	1.2	52	32	3.4	85	0.98	5.8	6.6	14	1.6	30
18	9.6	0.98	126	74	2.2	118	1.3	17	21	45	9.2	10
19	6.6	0.83	29	63	1.6	38	0.79	28	19	9.8	25	4.3
20	8.1	0.75	15	10	4.4	9.0	0.66	8.2	7.6	12	28	2.5
21	15	0.68	16	13	2.6	7.0	0.59	3.2	5.7	35	7.9	1.7
22	11	0.62	6.4	6.4	1.7	3.2	0.71	1.8	20	113	3.5	1.4
23	3.9	0.59	4.0	3.4	1.3	2.2	1.00	1.2	15	31	8.7	1.2
24	2.5	0.52	3.1	2.3	197	1.7	1.1	0.99	5.1	14	29	0.98
25	1.9	0.47	2.4	1.8	236	1.4	1.5	0.84	7.4	55	12	0.88
26	1.6	0.49	2.0	6.3	524	1.2	0.92	0.73	66	35	3.9	0.78
27	1.9	11	1.9	17	18	1.2	0.88	0.63	57	19	7.8	0.67
28	97	29	1.9	4.0	6.5	1.2	2.9	0.58	34	8.6	24	0.62
29	70	4.0	1.6	19	---	1.1	10	0.49	11	5.8	14	0.59
30	85	4.6	62	8.0	---	0.97	11	0.45	24	3.4	14	0.63
31	16	---	72	16	---	0.91	---	0.41	---	3.0	5.7	---
TOTAL	611.0	436.93	969.5	411.7	1113.1	404.18	43.88	130.32	350.10	945.5	323.7	232.75
MEAN	19.7	14.6	31.3	13.3	39.8	13.0	1.46	4.20	11.7	30.5	10.4	7.76
MAX	97	58	156	97	524	118	11	28	66	113	33	44
MIN	1.6	0.47	1.6	1.1	1.3	0.91	0.43	0.41	0.39	3.0	1.5	0.59
AC-FT	1210	867	1920	817	2210	802	87	258	694	1880	642	462

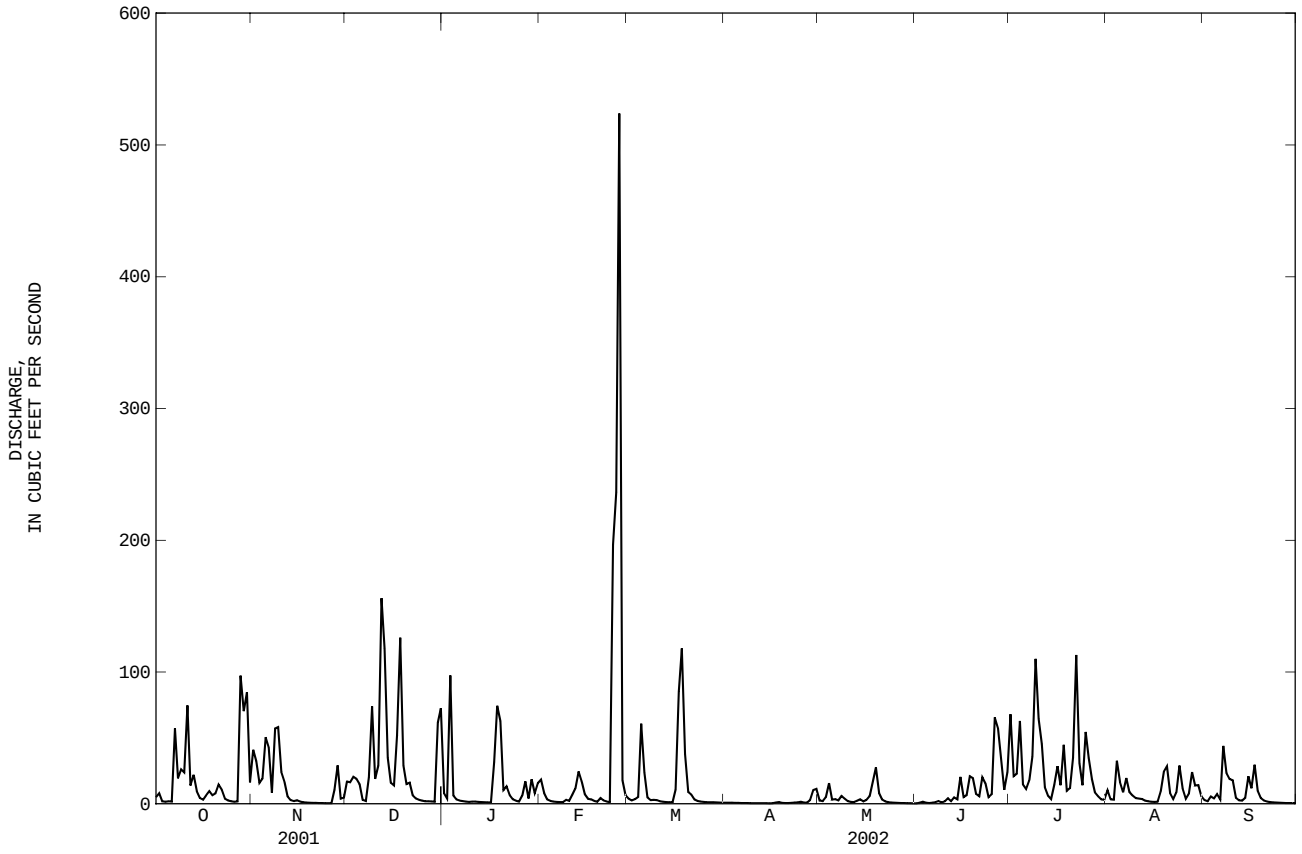
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1998 - 2002, BY WATER YEAR (WY)

MEAN	14.8	17.3	15.1	12.7	21.6	18.6	7.65	3.25	5.00	15.5	16.7	9.94
MAX	24.6	21.5	31.3	25.4	39.8	54.8	11.9	4.31	11.7	30.5	23.8	21.7
(WY)	1999	2000	2002	2000	2002	1999	2000	2000	2002	2002	2001	1998
MIN	3.32	14.6	1.32	0.38	0.52	2.47	1.46	0.50	2.01	6.85	10.4	6.23
(WY)	2000	2002	2001	2001	2000	2000	2002	1999	1999	1999	2002	1999

16756100 KOHAKOHAU STREAM ABOVE DWS INTAKE, NEAR KAMUELA--Continued

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1998 - 2002	
ANNUAL TOTAL	4616.99		5972.66			
ANNUAL MEAN	12.6		16.4		12.7	
HIGHEST ANNUAL MEAN					16.4	2002
LOWEST ANNUAL MEAN					9.41	2001
HIGHEST DAILY MEAN	284	Feb 15	524	Feb 26	524	Feb 26 2002
LOWEST DAILY MEAN	0.30	Jan 18	0.39	Jun 1	0.22	Mar 16 2000
ANNUAL SEVEN-DAY MINIMUM	0.31	Jan 7	0.46	Apr 10	0.23	Mar 12 2000
ANNUAL RUNOFF (AC-FT)	9160		11850		9200	
10 PERCENT EXCEEDS	33		42		32	
50 PERCENT EXCEEDS	3.5		4.2		3.0	
90 PERCENT EXCEEDS	0.44		0.79		0.48	

e Estimated



16758000 WAIKOLOA STREAM AT MARINE DAM NEAR KAMUELA

LOCATION.--Lat 20°02'48", long 155°39'58", Hydrologic Unit 20010000, on right bank 160 ft upstream from Marine Dam, 0.4 mi east of Puu Ohu, and 1.6 mi north of Kamuela.

DRAINAGE AREA.--1.18 mi^2.

PERIOD OF RECORD.--May 1947 to current year.

REVISED RECORDS.--WSP 1569: Drainage area. WSP 1937: 1948(M), 1949-51(P), 1952(M), 1954(M), 1955, 1956-57(P), 1958-60.

GAGE.--Water-stage recorder and concrete control. Elevation of gage is 3,460 ft above mean sea level (from topographic map).

REMARKS.--Records computed by Gary Sanchez. Records good. Parker Ranch diverts less than 1 ft^3/s through a 6-in. pipe upstream of gage.

AVERAGE DISCHARGE.--55 years (water years 1948-2002), 9.37 ft^3/s (6,790 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 3,410 ft^3/s, November 18, 1979, gage height, 6.84 ft, from rating curve extended above 120 ft^3/s on the basis of computations of flow over dam at gage heights 5.46 ft and 5.96 ft; minimum, 0.34 ft^3/s, June 5-6, 1992.

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)
Oct 28	1115	185	3.34
Feb 26	0030	*895	*4.94

Minimum discharge, 1.5 ft^3/s, Apr. 14, 15, 16, gage height, 1.46 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

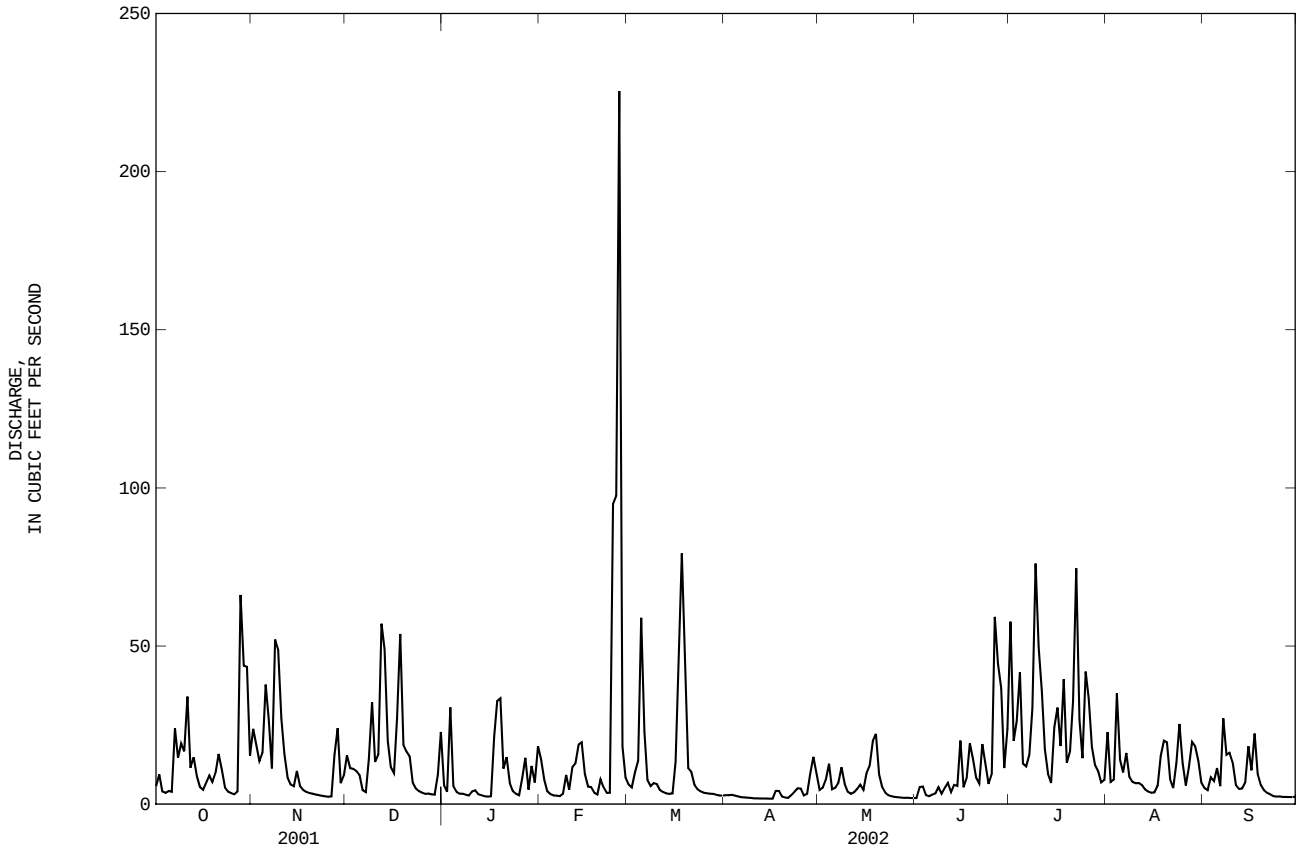
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	5.7	24	15	6.0	14	6.2	2.9	4.5	1.9	58	23	5.1
2	9.4	19	11	3.9	7.8	5.3	2.9	5.2	5.4	20	7.0	4.4
3	4.0	14	11	31	4.1	10	3.0	7.8	5.6	26	7.8	8.5
4	3.6	16	11	5.7	3.1	14	2.7	13	2.8	42	35	7.3
5	4.2	38	9.2	3.9	2.8	59	2.4	4.7	2.5	13	14	11
6	3.9	27	4.4	3.3	2.7	23	2.2	5.2	3.0	12	10	5.7
7	24	11	3.8	3.3	2.6	7.7	2.2	6.7	3.4	16	16	27
8	15	52	14	2.9	3.3	5.8	2.0	12	5.3	30	8.6	16
9	19	49	32	2.7	9.2	6.7	2.0	6.4	3.3	76	7.0	16
10	17	27	13	4.0	4.6	6.4	1.8	4.0	5.1	50	6.6	13
11	34	16	16	4.3	12	4.5	1.8	3.3	6.7	36	6.7	6.1
12	12	8.4	57	3.1	13	3.8	1.8	3.7	3.8	17	6.0	4.8
13	15	6.3	49	2.8	19	3.4	1.8	4.8	6.1	9.5	4.7	4.9
14	8.8	5.7	20	2.5	20	3.3	1.8	6.2	5.7	6.7	4.0	6.8
15	5.4	10	12	2.4	9.5	3.4	1.8	4.5	20	24	3.6	18
16	4.5	5.7	9.8	2.5	5.6	14	1.7	9.7	5.3	31	3.7	11
17	6.7	4.5	27	21	5.4	49	4.2	12	8.2	18	5.8	22
18	9.0	3.9	54	33	3.6	79	4.2	20	19	40	15	9.6
19	7.0	3.5	19	33	3.0	38	2.4	22	14	13	20	6.0
20	9.9	3.3	17	11	7.9	11	2.1	9.4	8.5	17	20	4.4
21	16	3.0	15	15	5.3	10	2.0	5.4	6.5	33	7.8	3.5
22	11	2.8	6.8	6.6	3.6	6.1	2.9	3.6	19	75	5.1	3.1
23	5.2	2.6	5.0	4.1	3.6	4.7	3.9	2.8	13	27	13	2.5
24	4.0	2.5	4.1	3.2	95	4.0	5.0	2.5	6.4	15	25	2.4
25	3.4	2.4	3.6	2.8	97	3.6	4.9	2.3	9.5	42	13	2.4
26	3.1	2.5	3.3	8.4	225	3.5	2.7	2.2	59	33	5.9	2.3
27	4.0	16	3.4	15	18	3.3	3.3	2.1	44	18	12	2.3
28	66	24	3.1	4.6	8.5	3.3	9.5	2.0	37	12	20	2.3
29	44	6.7	3.0	12	---	3.0	15	2.0	11	10	18	2.2
30	43	9.1	9.2	6.8	---	2.8	9.8	1.9	24	6.8	14	2.3
31	15	---	23	18	---	2.7	---	1.9	---	7.6	6.8	---
TOTAL	432.8	415.9	484.7	278.8	609.2	400.5	106.7	193.8	365.0	834.6	365.1	232.9
MEAN	14.0	13.9	15.6	8.99	21.8	12.9	3.56	6.25	12.2	26.9	11.8	7.76
MAX	66	52	57	33	225	79	15	22	59	76	35	27
MIN	3.1	2.4	3.0	2.4	2.6	2.7	1.7	1.9	1.9	6.7	3.6	2.2
AC-FT	858	825	961	553	1210	794	212	384	724	1660	724	462

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1947 - 2002, BY WATER YEAR (WY)

MEAN	6.18	8.96	9.70	8.54	7.84	10.7	12.8	9.02	8.97	12.1	11.3	6.05
MAX	18.2	43.7	31.4	38.7	23.0	52.1	43.4	22.1	28.4	21.3	26.9	24.9
(WY)	1984	1980	1958	1979	1960	1980	1986	1998	1998	1950	2002	1992
MIN	0.98	1.42	1.47	1.46	1.31	2.11	1.53	1.95	2.68	3.08	2.27	0.91
(WY)	1997	1963	1996	1953	1954	1983	1992	1999	1962	1961	1973	1965

16758000 WAIKOLOA STREAM AT MARINE DAM NEAR KAMUELA--Continued

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1947 - 2002	
ANNUAL TOTAL	3347.6		4720.00			
ANNUAL MEAN	9.17		12.9		9.37	
HIGHEST ANNUAL MEAN					17.8	1980
LOWEST ANNUAL MEAN					4.49	1981
HIGHEST DAILY MEAN	90	Feb 15	225	Feb 26	641	Nov 18 1979
LOWEST DAILY MEAN	1.3	Jan 17	1.7	Apr 16	0.37	Jun 3 1992
ANNUAL SEVEN-DAY MINIMUM	1.4	Jan 13	1.8	Apr 10	0.42	May 21 1992
ANNUAL RUNOFF (AC-FT)	6640		9360		6790	
10 PERCENT EXCEEDS	21		30		21	
50 PERCENT EXCEEDS	4.7		6.7		4.3	
90 PERCENT EXCEEDS	1.8		2.5		1.8	



16759000 HAUANI GULCH NEAR KAMUELA

LOCATION.--Lat 20°02'28", long 155°39'05", Hydrologic Unit 20010000, on left bank 800 ft downstream from small tributary, and 1.8 mi northeast of Kamuela.

DRAINAGE AREA.--0.47 mi^2.

PERIOD OF RECORD.--March 1956 to current year. Prior to July 1960, published as Hauani Stream near Kamuela.

REVISED RECORDS.--WSP 1569: Drainage area. WSP 1937: 1948(M), 1949-51(P), 1952(M), 1954(M), 1955, 1956-57(P), 1958-60.

GAGE.--Water-stage recorder. Concrete control since February 27, 1963. Elevation of gage is 3,117.42 ft above mean sea level (Hawaii County Department of Water Supply benchmark).

REMARKS.--Records computed by Gary Sanchez. Records good except for estimated daily discharges, which are poor. Diversion upstream for livestock and domestic use.

AVERAGE DISCHARGE.--46 years (water years 1957-2002), 1.75 ft^3/s (1,270 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 822 ft^3/s, November 18, 1979, gage height, 4.56 ft, from rating curve extended above 11 ft^3/s on basis of slope-conveyance study; maximum gage height, 4.65 ft, October 23, 1957; no flow at times.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 78 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Feb 26	0045	*439	*3.87	No other peak greater than base discharge.			

Minimum discharge, 0.31 ft^3/s, May 30, 31, June 1, gage height, 0.92 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.5	5.5	3.1	0.84	2.6	e0.98	e0.49	e0.75	0.34	21	3.7	0.87
2	2.0	3.4	1.7	0.65	1.3	e0.85	e0.51	e0.85	1.9	4.6	1.2	0.85
3	0.79	1.7	1.3	6.0	0.81	e1.6	e0.53	e1.2	0.91	7.3	1.2	0.86
4	0.75	1.9	1.4	0.88	0.69	e2.6	e0.47	e2.4	0.49	7.3	5.5	0.90
5	0.78	9.4	1.3	0.69	0.62	e12	e0.44	e0.78	0.54	2.0	2.4	1.2
6	0.69	4.5	0.76	0.61	0.59	e4.4	e0.40	e0.85	0.64	1.9	1.7	0.80
7	2.7	1.8	0.69	0.61	0.57	e1.2	e0.40	e1.1	0.56	2.4	2.8	6.8
8	2.0	17	1.8	0.56	0.72	e0.93	e0.38	e1.8	0.64	6.2	1.4	2.6
9	3.1	10	5.7	0.52	1.3	e1.1	e0.36	e1.0	0.43	24	1.2	3.0
10	3.6	4.7	1.9	0.80	0.71	e1.0	e0.35	0.58	0.82	13	1.2	1.9
11	5.4	2.7	1.8	0.68	1.7	e0.75	e0.35	0.51	0.79	8.3	1.1	1.00
12	1.8	1.3	10	0.55	1.6	e0.65	e0.35	0.54	0.55	3.4	0.98	0.88
13	1.8	1.0	8.7	0.51	3.3	e0.58	e0.35	0.66	0.81	1.8	0.87	0.82
14	1.1	0.95	3.4	0.50	3.3	e0.56	e0.35	0.76	0.95	1.2	0.80	0.82
15	0.83	1.1	1.8	0.47	1.4	e0.58	e0.33	0.64	2.9	6.4	0.77	3.1
16	0.75	0.86	1.4	0.50	0.90	e2.7	e0.33	1.4	0.78	6.7	0.73	1.4
17	0.83	0.77	5.6	4.1	0.81	e10	e0.69	1.8	1.4	5.4	1.9	3.0
18	0.90	0.71	13	6.1	0.65	e16	e0.71	4.0	5.0	8.9	2.4	1.2
19	0.81	0.67	3.2	8.0	0.59	e7.6	e0.44	4.2	2.8	2.6	3.2	0.86
20	1.0	0.65	3.1	1.9	1.5	e1.7	e0.40	1.5	1.3	3.0	2.9	0.74
21	1.6	0.61	2.2	2.5	0.85	e1.6	e0.38	0.82	0.83	13	1.3	0.67
22	1.2	0.59	1.1	1.2	0.62	e0.98	e0.51	0.63	3.6	24	0.93	0.62
23	0.71	0.59	0.88	0.80	0.75	e0.78	e0.67	0.53	2.2	5.5	3.0	0.59
24	0.61	0.57	0.77	0.69	30	e0.67	e0.82	0.48	1.1	3.1	5.1	0.56
25	0.57	0.55	0.70	0.61	32	e0.62	e0.82	0.43	1.6	10	2.0	0.52
26	0.52	0.59	0.67	6.9	e47	e0.60	e0.49	0.41	21	7.3	1.0	0.50
27	0.60	3.8	0.66	3.2	e3.3	e0.56	e0.56	0.39	14	3.3	1.6	0.50
28	17	4.3	0.62	0.90	e1.3	e0.56	e1.5	0.38	9.2	2.3	2.9	0.48
29	9.0	1.1	0.60	2.6	---	e0.53	e2.9	0.36	2.3	1.8	3.0	0.47
30	12	1.5	1.1	1.2	---	e0.49	e1.5	0.34	6.2	1.2	1.9	0.48
31	2.7	---	2.7	5.2	---	e0.47	---	0.34	---	1.3	1.0	---
TOTAL	79.64	84.81	83.65	61.27	141.48	75.64	18.78	32.43	86.58	210.2	61.68	38.99
MEAN	2.57	2.83	2.70	1.98	5.05	2.44	0.63	1.05	2.89	6.78	1.99	1.30
MAX	17	17	13	8.0	47	16	2.9	4.2	21	24	5.5	6.8
MIN	0.52	0.55	0.60	0.47	0.57	0.47	0.33	0.34	0.34	1.2	0.73	0.47
AC-FT	158	168	166	122	281	150	37	64	172	417	122	77

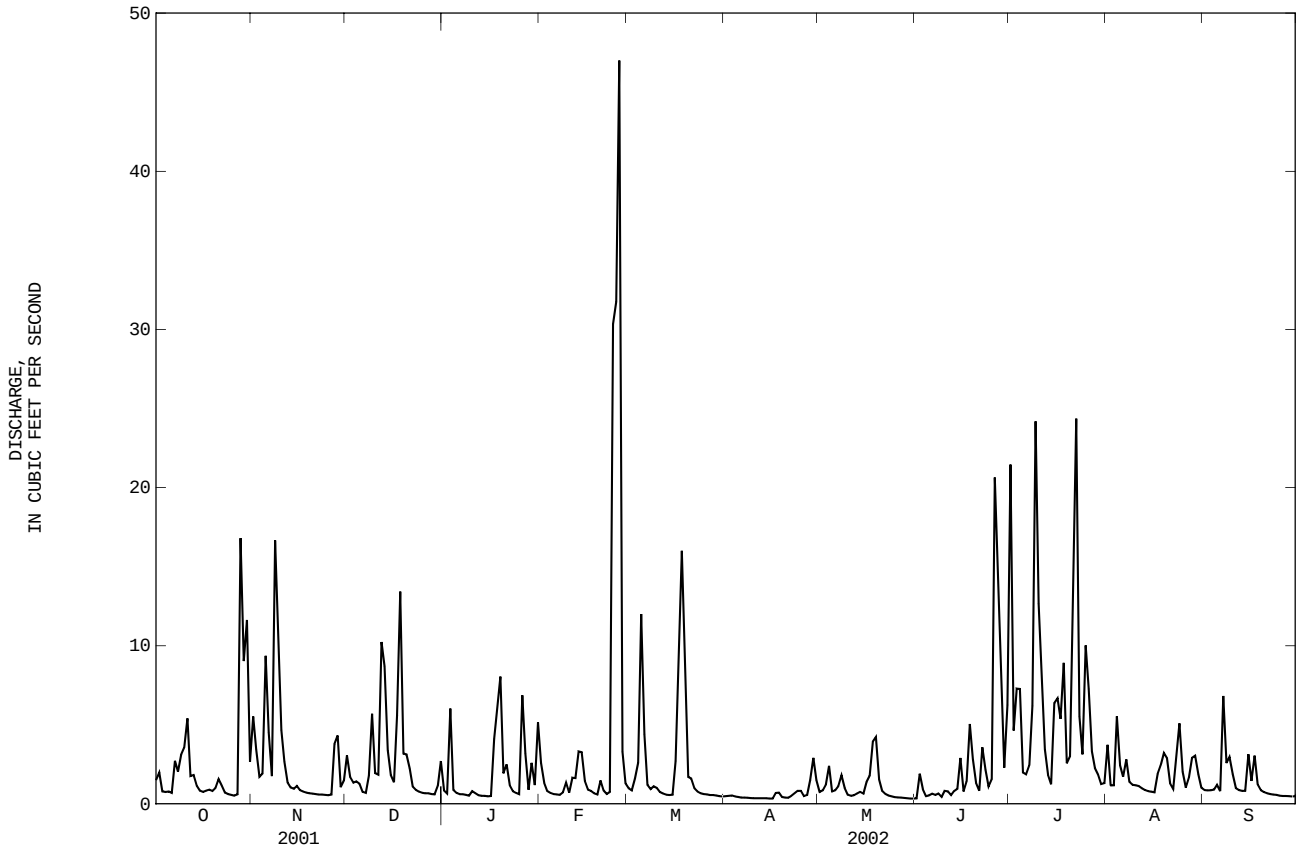
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1956 - 2002, BY WATER YEAR (WY)

MEAN	1.02	1.63	1.81	1.75	1.48	2.18	2.66	1.45	1.53	2.32	2.16	0.97
MAX	3.86	8.31	7.01	11.9	6.69	15.7	10.5	4.89	7.07	6.78	8.13	5.93
(WY)	1984	1980	1960	1979	1960	1980	1986	1998	1998	2002	1958	1992
MIN	0.007	0.000	0.071	0.046	0.089	0.10	0.20	0.20	0.16	0.15	0.12	0.000
(WY)	1985	1963	1996	1962	1983	1983	1981	1966	1981	1961	1965	1965

16759000 HAUANI GULCH NEAR KAMUELA--Continued

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1956 - 2002	
ANNUAL TOTAL	654.36		975.15			
ANNUAL MEAN	1.79		2.67		1.75	
HIGHEST ANNUAL MEAN					3.66	1998
LOWEST ANNUAL MEAN					0.48	1981
HIGHEST DAILY MEAN	29	Feb 15	47	Feb 26	108	Mar 24 1980
LOWEST DAILY MEAN	0.11	Jan 10	0.33	Apr 15	0.00	Jul 29 1961
ANNUAL SEVEN-DAY MINIMUM	0.12	Jan 7	0.34	Apr 10	0.00	Sep 8 1961
ANNUAL RUNOFF (AC-FT)	1300		1930		1270	
10 PERCENT EXCEEDS	4.5		6.2		3.9	
50 PERCENT EXCEEDS	0.72		1.1		0.54	
90 PERCENT EXCEEDS	0.17		0.50		0.09	

e Estimated



16770500 PAAUAU GULCH AT PAHALA

LOCATION.--Lat 19°12'39", long 155°28'48", Hydrologic Unit 20010000, on right bank 50 ft downstream from Wood Valley Road bridge and 0.7 mi north of Pahala.

DRAINAGE AREA.--1.74 mi^2.

PERIOD OF RECORD.--May 1962 to January 1979, annual maximum, water years 1994-98, October 1999 to June 2000 (gage heights only) annual maximum, water year 2001, October 2001 to current year.

REVISED RECORDS.--WDR HI-01-1: 1963 (P), 1965-77 (P), 1979-90 (P), 1997-98 (P).

GAGE.--Water-stage recorder. Elevation of gage is 972 ft above mean sea level (from stadia survey). Nonrecording gage water years 1994 to 1998 and 2001.

REMARKS.--Records computed by Dale Nishimoto. Records fair. No diversion upstream.

AVERAGE DISCHARGE.--17 years (water years 1963-78, 2002), 0.76 ft^3/s (554 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 4,480 ft^3/s, November 2, 2000, gage height, 12.02 ft, from floodmarks and culvert computation with road-over-flow section; no flow at times.

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)
Nov 28	0530	420	4.50	Apr 29	1115	205	3.61
Jan 29	1230	*1,150	*7.05	May 5	2330	652	5.40

Minimum discharge, no flow on many days.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

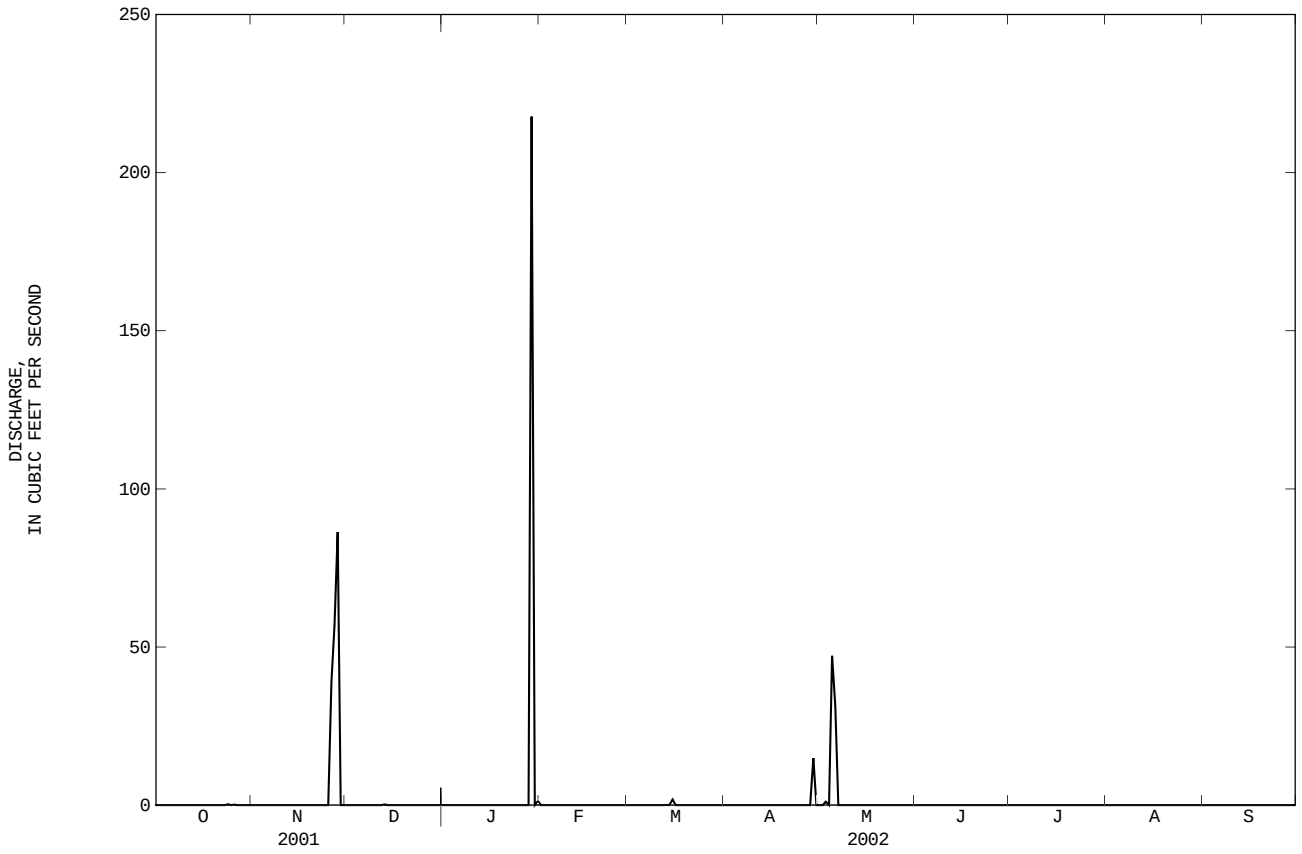
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.1	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	47	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	32	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00
13	0.00	0.00	0.24	0.00	0.00	0.07	0.00	0.00	0.00	0.00	0.00	0.00
14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	0.00	0.00	0.00	0.00	0.00	1.8	0.00	0.00	0.00	0.00	0.00	0.00
16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24	0.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26	0.19	39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
27	0.00	57	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28	0.00	86	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
29	0.00	0.00	0.00	218	---	0.00	15	0.00	0.00	0.00	0.00	0.00
30	0.00	0.00	0.00	0.04	---	0.00	0.00	0.00	0.00	0.00	0.00	0.00
31	0.00	---	0.00	1.3	---	0.00	---	0.00	---	0.00	0.00	---
TOTAL	0.48	182.00	0.24	219.34	0.00	1.89	15.00	80.11	0.00	0.00	0.00	0.00
MEAN	0.015	6.07	0.008	7.08	0.000	0.061	0.50	2.58	0.000	0.000	0.000	0.000
MAX	0.29	86	0.24	218	0.00	1.8	15	47	0.00	0.00	0.00	0.00
MIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AC-FT	1.0	361	0.5	435	0.00	3.7	30	159	0.00	0.00	0.00	0.00

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1962 - 2002, BY WATER YEAR (WY)

MEAN	0.45	1.55	0.55	3.87	0.82	0.21	0.61	0.52	0.044	0.049	0.20	0.12
MAX	5.65	9.19	7.01	29.5	8.12	1.54	6.89	2.58	0.27	0.25	1.81	1.06
(WY)	1969	1967	1974	1975	1976	1963	1963	2002	1978	1978	1977	1973
MIN	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
(WY)	1964	1963	1963	1963	1970	1970	1970	1974	1962	1962	1962	1964

SUMMARY STATISTICS	FOR 2002 WATER YEAR		WATER YEARS 1962 - 2002	
ANNUAL TOTAL	499.06			
ANNUAL MEAN	1.37		0.76	
HIGHEST ANNUAL MEAN			2.76	1975
LOWEST ANNUAL MEAN			0.055	1964
HIGHEST DAILY MEAN	218	Jan 29	720	Jan 8 1975
LOWEST DAILY MEAN	0.00	Oct 1	0.00	May 1 1962
ANNUAL SEVEN-DAY MINIMUM	0.00	Oct 1	0.00	May 20 1962
ANNUAL RUNOFF (AC-FT)	990		554	
10 PERCENT EXCEEDS	0.00		0.20	
50 PERCENT EXCEEDS	0.00		0.00	
90 PERCENT EXCEEDS	0.00		0.00	

16770500 PAAUAU GULCH AT PAHALA--Continued



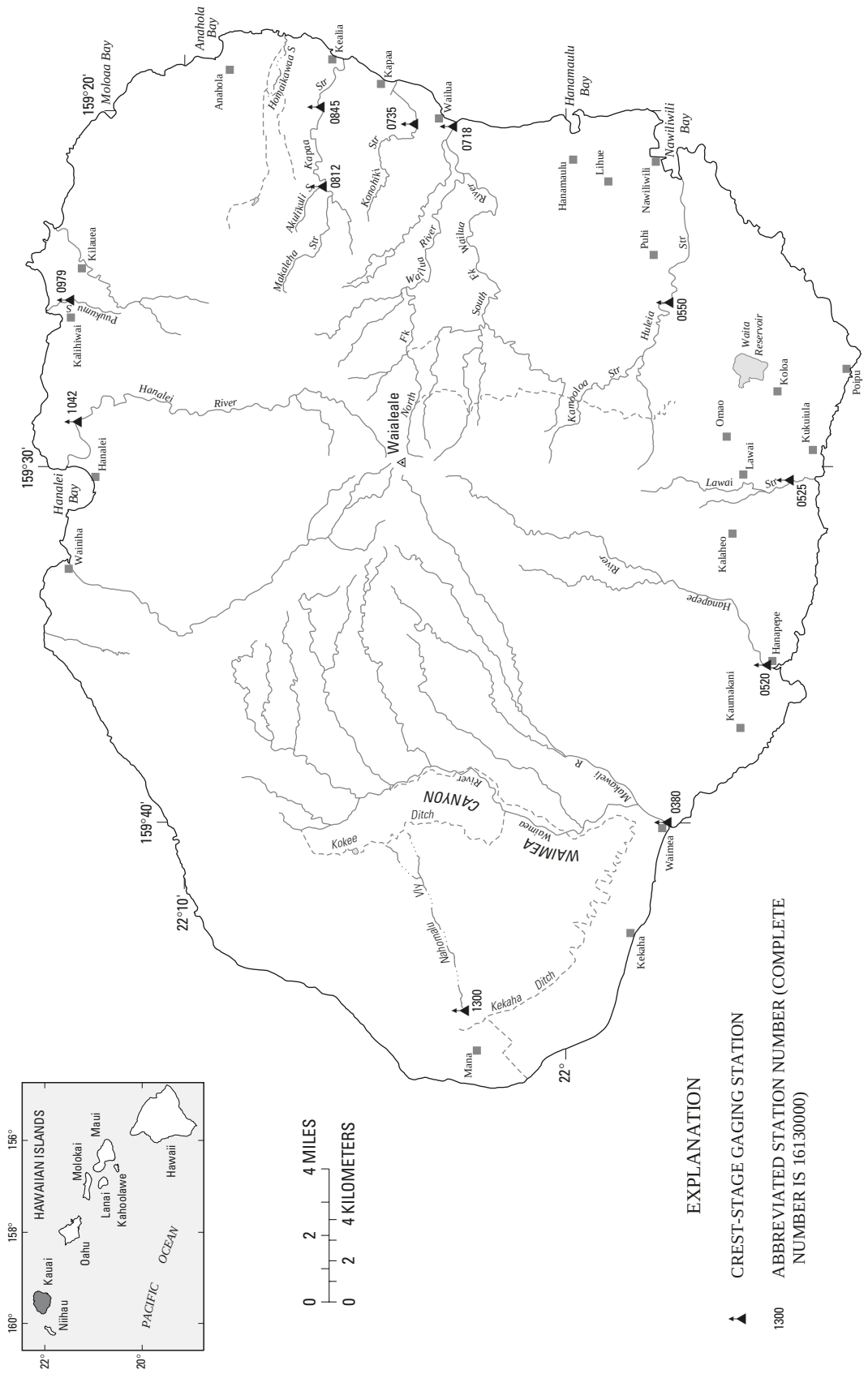


Figure 10. Locations of crest-stage gaging stations on Kauai.

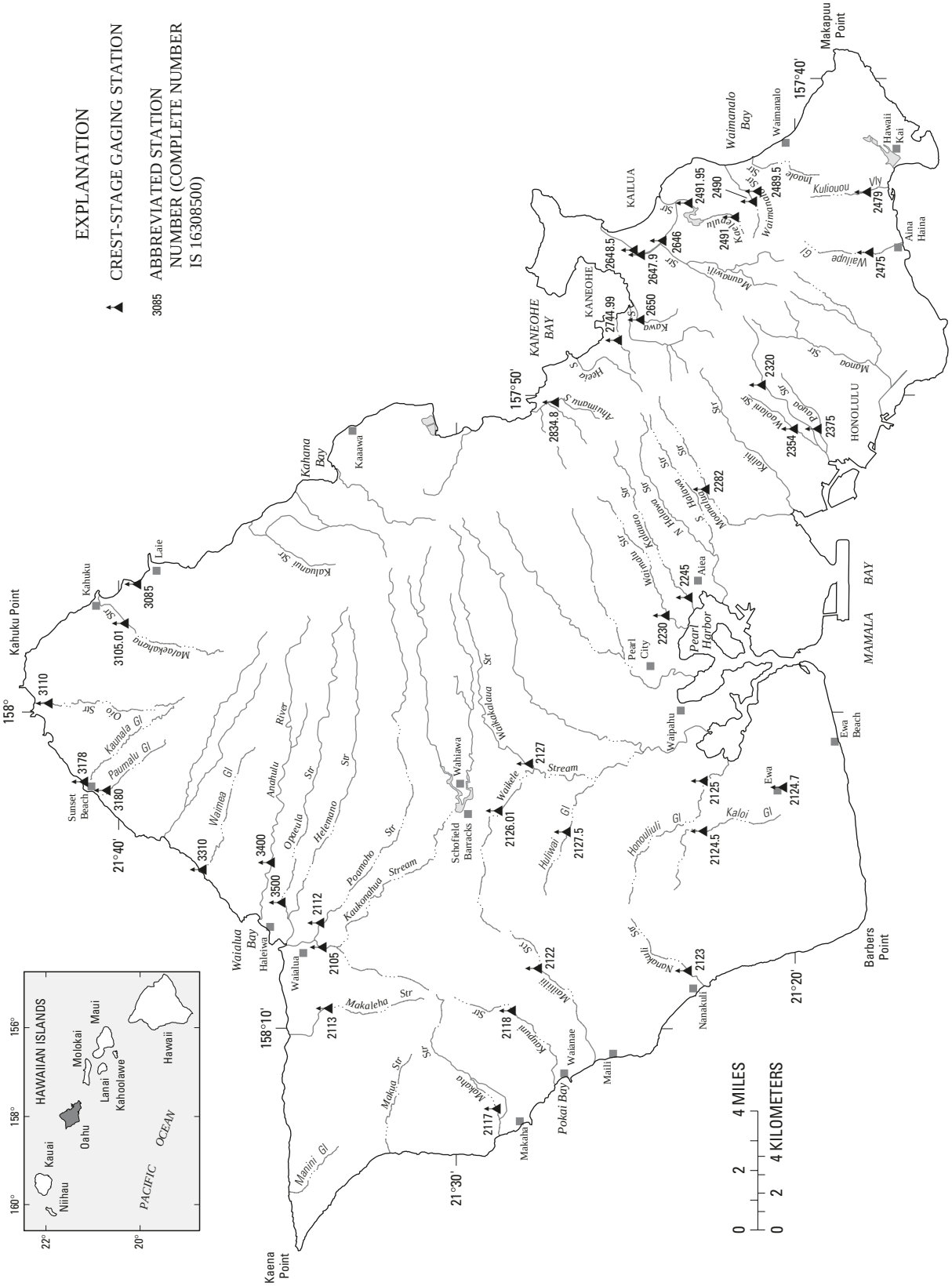


Figure 11. Locations of crest-stage gaging stations on Oahu.

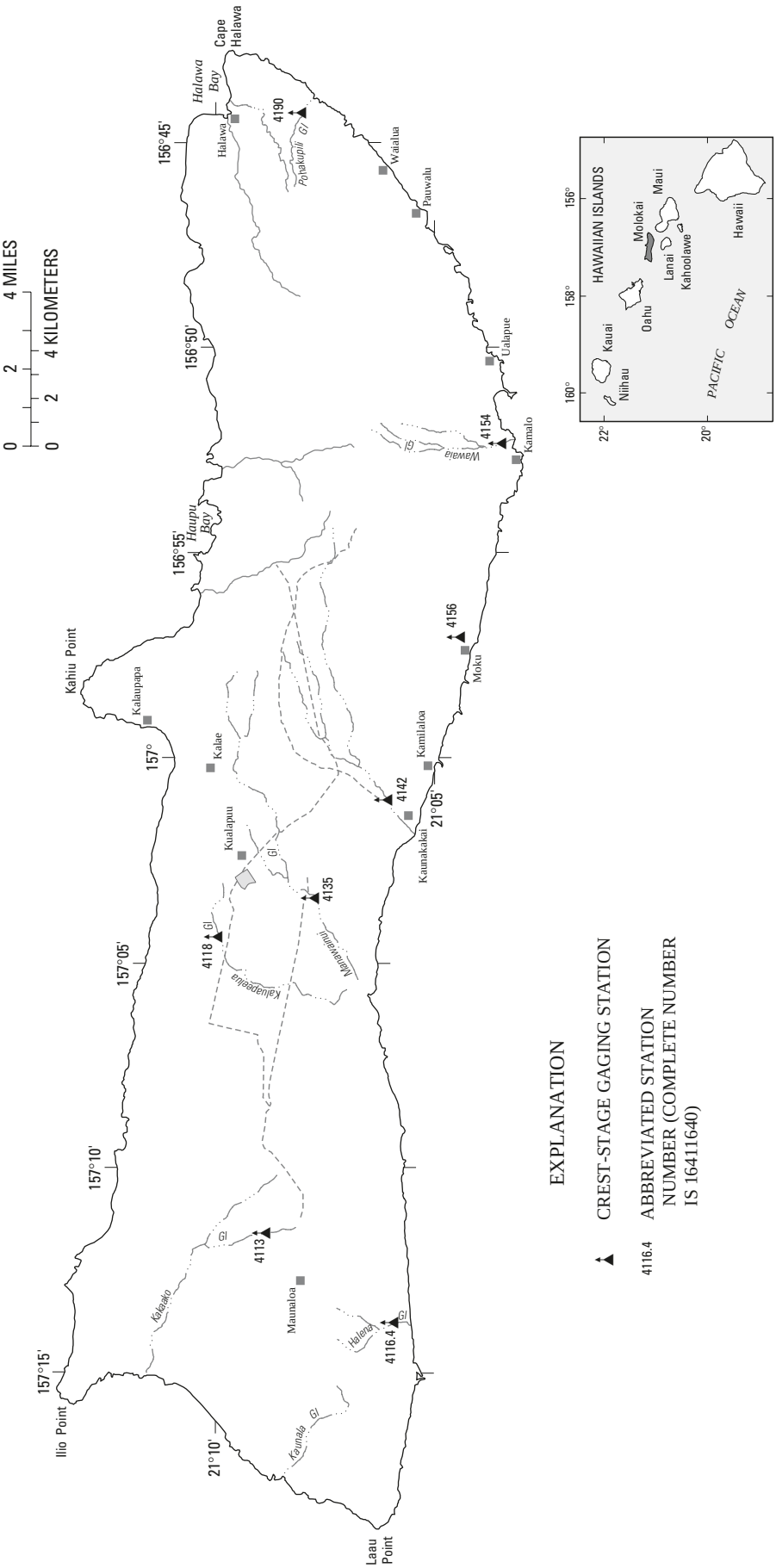


Figure 12. Locations of crest-stage gaging stations on Molokai.

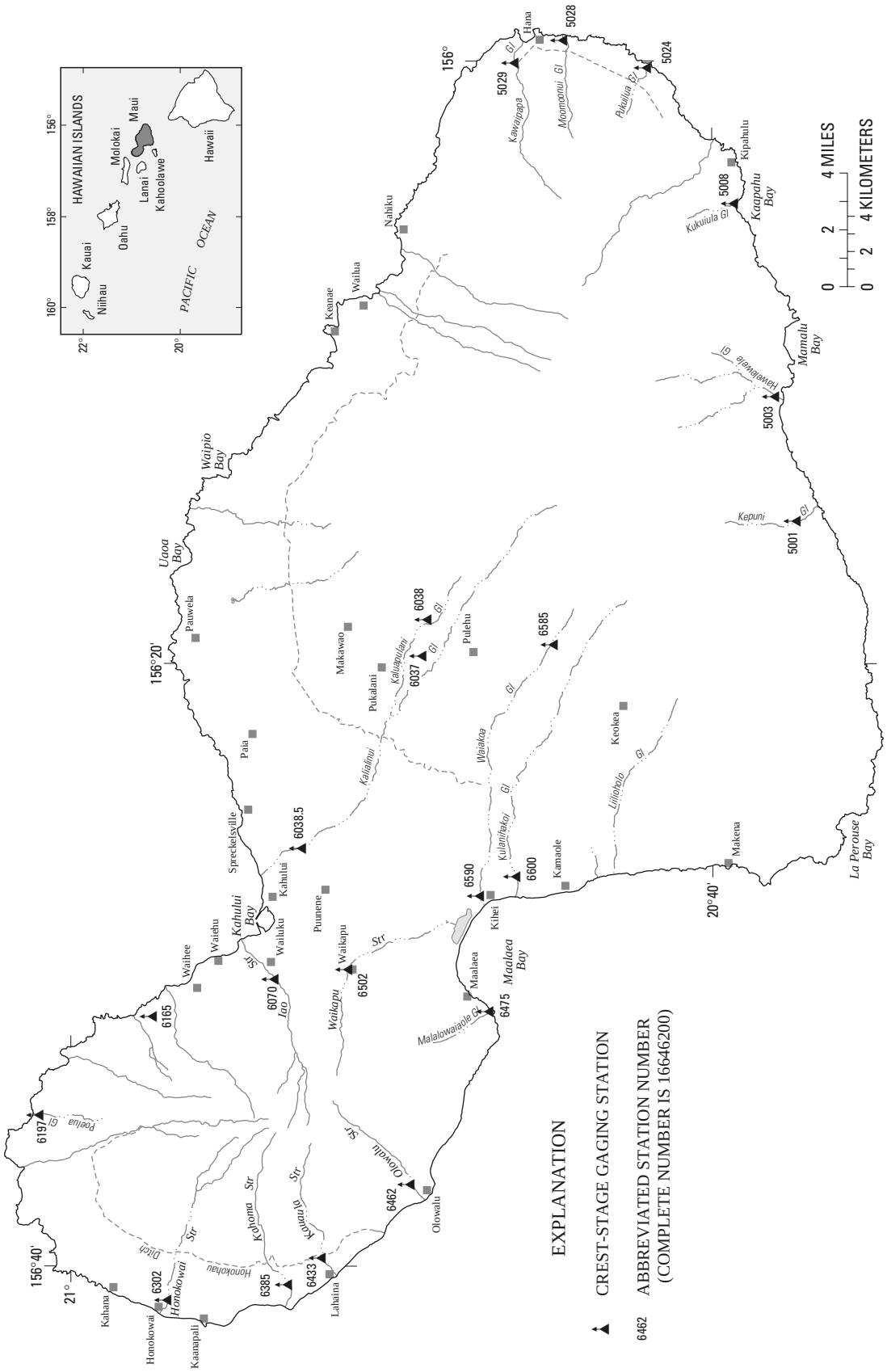


Figure 13. Locations of crest-stage gaging stations on Maui.

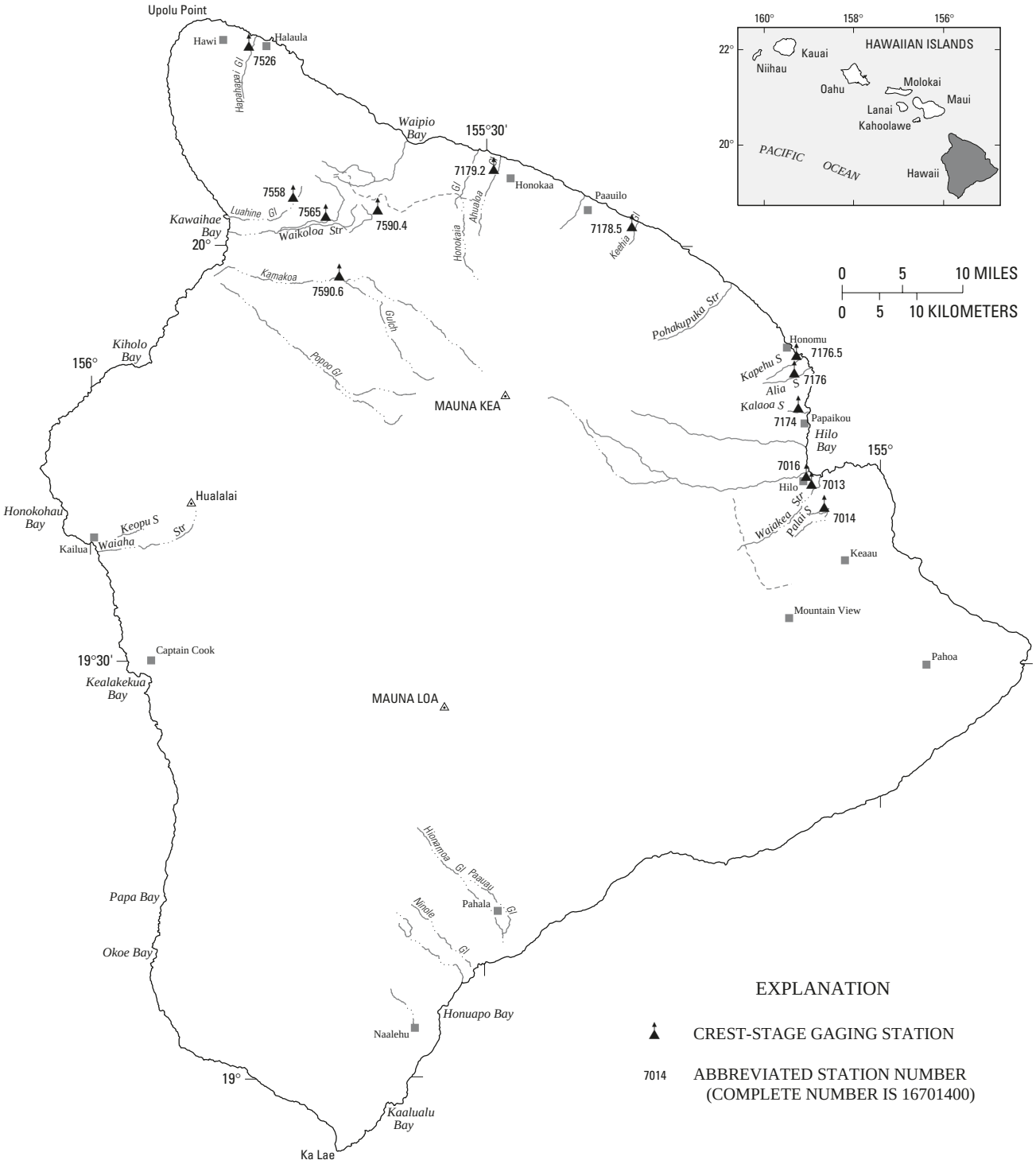


Figure 14. Locations of crest-stage gaging stations on Hawaii.

As the number of streams on which streamflow information is likely to be desired far exceeds the number of continuous-record stream-gaging stations feasible to operate at one time, the Geological Survey collects limited streamflow data at sites other than continuous-record 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 annual maximum stage and discharge at crest-stage stations, the second is a table of discharge measurements at low-flow partial-record stations, and the third is a table of discharge measurements at miscellaneous sites.

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 of 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 obtained 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 year 2002

Station name and number	Location	Drainage area (mi^2)	Period of record	Water year 2002 maximum			Period of record max		
				Date	Gage height (ft)	Discharge (ft^3/s)	Date	Gage height (ft)	Dis-charge (ft^3/s)
Island of Kauai									
16038000 Waimea River 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	1944-2002b	11-26-01	6.58	-	02-07-49	11.40	-
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	1950-2002b,r	01-27-02	4.54	-	04-15-63	11.30	-
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≠ 1973-2002	03-25-02	6.42	2,050	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≠, 1971-2002	03-25-02	16.26	11,000	11-28-70	22.40	26,800
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	1962-2002b	01-28-02	5.08	-	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, 1970-2002r	05-21-02	9.26	190	12-14-91	16.92	2,530
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	1964-2002r	05-21-02	6.46	412	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	1962-2002	03-25-02	12.80	7,720	12-14-91	23.11	30,300
16097900 Puukumu Str nr Kilauea	Lat 22°13′02″, 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, 1971-2002	05-12-02	7.98	456	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	1963-2002b,r	03-25-02	11.13	-	11-03-95	13.82	-
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≠, 1972-2002	03-25-02	4.17	86	04-15-72	7.15	2,120

≠ Operated as a continuous-record gaging station
b Gage height only
r Revised

16052000 peak gage height and discharge published for water years 1963-92 were revised in water-resources data report for Hawaii, water year 1993
16073500 peak gage height and discharge published for water year 1993 were revised in water-resources data report for Hawaii, water year 1999
16081200 peak gage heights and discharges published for water years 1993-98 were revised in water-resources data report for Hawaii, water year 1999
16104200 peak gage height published for water years 1983-92 were revised in water-resources data report for Hawaii, water year 1993

Annual maximum discharge at crest-stage partial-record stations during water year 2002--Continued

Station name and number	Location	Drainage area (mi^2)	Period of record	Water year 2002 maximum			Period of record max		
				Date	Gage height (ft)	Discharge (ft^3/s)	Date	Gage height (ft)	Dis-charge (ft^3/s)
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, 1968-2002	05-06-02	25.33	9,650	04-15-63	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	1967-2002	05-06-02	22.36	unknown	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 former sugar mill at Waialua.	4.15	1958-63, 1964-65≠, 1966-2002	01-29-02	8.51	unknown	11-13-65 11-14-96	7.41 9.41	3,640 -
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 Makaha Valley Road.	5.25	1966-2002	03-17-02	9.08	unknown	11-14-96	17.60	e5,000
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≠, 1973-2002	03-17-02	4.12	unknown	01-06-82	7.82	3,640
16212200 Mailiilii 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	1958-2002	2002	<0.98	unknown	01-06-82	7.20	2,460
16212300 Nanakuli Str at Nanakuli	Lat 21°23′08″, long 158°08′11″, on left bank 0.7 mi southwest of Nanaikapono Elementary School, 1.8 mi north of Kahe Point Electric Plant, and 0.6 mi upstream of Farrington Highway.	3.98	1968-2002	11-27-01	19.42	39	a2-7-76 10-20-85	26.20 26.28	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	1968-2002	11-27-01	3.43	unknown	11-25-75 01-08-80	7.89 7.45	- 724
16212470 Kaloi Gulch at railroad bridge at Ewa	Lat 21°20′19″, long 158°02′22″, at railroad bridge, 100 ft upstream of Coral Creek golf course pond, 0.6 mi south of Ewa Elementary School, and 2.3 mi south of Saint Francis Medical Center.	9.37	2001-2002		<3.96	unknown		unknown	
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	1956-2002	11-27-01	1.10	unknown	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, 1960-2002	11-27-01	6.26	322	01-06-82	22.50	1,850
16212700 Waikakalaua Str nr Wahiawa	Lat 21°27′50″, long 158°01′37″, 0.2 mi downstream from Kamehameha Highway and 2.4 mi south of Wahiawa Post Office.	6.93	1958-2002	05-06-02	12.74	2,310	04-15-63	16.50	4,820

Annual maximum discharge at crest-stage partial-record stations during water year 2002--Continued

Station name and number	Location	Drainage area (mi^2)	Period of record	Water year 2002 maximum			Period of record max		
				Date	Gage height (ft)	Discharge (ft^3/s)	Date	Gage height (ft)	Dis-charge (ft^3/s)
Island of Oahu--Continued									
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.	4.29	1974-2002	05-06-02	11.98	unknown	02-10-79 10-16-91	8.36 13.49	e600 -
16215400 Waimano Str nr Pearl City	Lat 21°25′11″, long 157°57′47″, at Komo Mai Drive bridge, 0.5 mi northwest of Pearl City High School and 1.7 mi northeast of Pearl City Post Office.	5.15	2002	05-06-02	unknown	unknown	05-06-02	unknown	unknown
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≠, 1973-2002	05-06-02	3.19	1,400	01-05-68 05-14-60	a6.82 a9.49	8,020 -
16224500 Kalauao Str at Moanalua Road, at Aiea	Lat 21°23′07″, long 157°56′22″, on right bank at upstream 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≠, 1984-91, 2000-2002	05-06-02	12.54	unknown	05-14-63	a6.63	2,580
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	1969-2002	01-27-02	6.37	2,490	03-18-80	9.97	4,860
16232000 Nuuanu Stream blw Reservoir 2 wasteway nr Honolulu	Lat 21°20′57″, long 157°49′40″, 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.	3.35	1913-96≠, 2002	01-26-02	7.08	unknown	01-16-21	a8.74	6,990
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.	1.29	1958-2002	01-26-02	2.77	unknown	05-14-63	a6.14	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	1958-2002	01-26-02	0.69	unknown	05-14-63	4.65	2,200
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	1958-2002	2002	<0.46	unknown	12-18-67 03-05-58	5.72 7.20	3,600 -
16247900 Kuliouou Valley at Kuliouou	Lat 21°17′50″, long 157°43′35″, at Kuliouou, 300 ft downstream from single-lane wooden bridge, and 0.6 mi upstream from Highway 72.	1.18	1958-59, 1970-2002	01-29-02	28.09	366	12-31-87	36.55	4,700
16248950 Kahawai Str at Waimanalo	Lat 21°21′04″, long 157°43′33″, on left bank 30 ft downstream from Kalanianaole Highway bridge, 1.9 mi northwest of Waimanalo Post Office, and 0.75 mi southwest of Bellows Air Force Station radio towers.	1.18	1998-2002	2002	<7.36	unknown	01-22-99	7.70	unknown
16249000 Waimanalo Str at Waimanalo	Lat 21°21′14″, long 157°43′50″, on right bank 260 ft downstream from Highway 72 and 2.3 mi northeast of Waimanalo Post Office.	2.16	1967-70≠, 1971-2002	11-27-01	3.80	unknown	02-14-85 03-06-63 11-26-70	10.82 - 10.00	- a4,560 a4,560

Annual maximum discharge at crest-stage partial-record stations during water year 2002--Continued

Station name and number	Location	Drainage area (mi^2)	Period of record	Water year 2002 maximum			Period of record max		
				Date	Gage height (ft)	Discharge (ft^3/s)	Date	Gage height (ft)	Dis-charge (ft^3/s)
Island of Oahu--Continued									
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	1963-2002	2002	<1.76	<34	12-31-87	7.53	467
16249195 Kaelepulu Stream at Keolu Drive bridge	Lat 21°22′55″, long 157°43′45″, at bridge on Keolu Drive, 0.2 mi south of St. John Vianney School and 1.2 mi east of Kailua High School.	2.73	2002b	11-27-02	9.66	-	11-27-02	9.66	-
16264600 Kawainui Marsh nr Levee Station 15+00	Lat 21°23′53″, long 157°45′07″, at Kawainui Marsh, 0.6 mi west of Kailua Elementary School and 1.1 mi southeast of Kalaheo High School. Datum of gage is at mean sea level.	11.0	2002b	05-07-02	4.54	-	05-07-02	4.54	-
16264790 Kawainui Marsh nr Levee Station 64+00	Lat 21°24′31″, long 157°45′33″, at Kawainui Marsh, 0.2 mi south of Kalaheo High School, and 1.2 mi northwest of Kailua Elementary School. Datum of gage is at mean sea level.	11.0	2002b	01-29-02	2.46	-	01-29-02	2.46	-
16264850 Kawainui Canal at Oneawa Street bridge	Lat 21°24′44″, long 157°45′25″, on Oneawa Street bridge and 0.15 mi southeast of Kalaheo High School. Datum of gage is at mean sea level.	11.0	2002b	12-31-01	2.52	-	12-31-01	2.52	-
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, 1977-2002	05-06-02	7.94	1,100	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 at Kaneohe.	0.62	1959-2002	05-06-02	2.58	483	05-02-65	11.50	2,750
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	1963-2002	03-16-02	5.32	509	02-01-69 11-25-70	a11.80 a14.30	7,300 7,300
16308500 Kahawainui Stream at Laie	Lat 21°39′25″, long 157°55′57″, 800 ft northeast of Zion Cemetery on upstream side of bridge at Kamehameha Highway.	4.79	1997-2002b	01-29-02	5.55	-	01-29-02	5.55	-
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	1958-2002	05-06-02	13.04	808	04-15-63 05-06-02	a12.10 c13.04	4,640 -
16311000 Oio Stream nr Kahuku	Lat 21°42′02″, long 157°59′43″, on left bank of stream 30 ft upstream of Highway 83 and 3.0 mi northwest of Kahuku Hospital.	2.27	1958-2002	05-06-02	7.32	160	05-02-65 11-14-96	a8.13 a8.63	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 near Sunset Beach and 2.9 mi northeast of Waimea.	1.98	1973-2002	11-27-01	5.91	663	11-27-01 10-19-99	5.91 r6.28	663 -

Annual maximum discharge at crest-stage partial-record stations during water year 2002--Continued

Station name and number	Location	Drainage area (mi^2)	Period of record	Water year 2002 maximum			Period of record max		
				Date	Gage height (ft)	Discharge (ft^3/s)	Date	Gage height (ft)	Dis-charge (ft^3/s)
Island of Oahu--Continued									
16318000 Paumalu Gulch at Sunset Beach	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	1968-2002	01-28-02	3.65	unknown	04-19-74 04-04-89	4.97 6.44	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	1968-2002	05-06-02	4.21	236	03-18-80	11.2	2,030
16340000 Anahulu River 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	1958-2002	05-06-02	8.49	3,590	04-19-74	15.80	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	1956-2002	05-06-02	15.63	3,210	04-19-74	20.7	7,600

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

≠ Operated as a continuous-record gaging station

a At old gage datum

b Gage height only

c At new gage datum

e Estimated

r Revised

Island of Molokai									
16411300 Kakaako Gulch at Highway 46 nr Mauna Loa	Lat 21°08′49″, long 157°11′36″, at Highway 46, 1.6 mi northeast of Mauna Loa, and 1.8 mi upstream from Kamakahi Gulch.	0.55	1964-85, 2002	01-29-02	<3.23	unknown	04-13-65	3.06	80
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	1965-2002	11-27-01	3.63	650	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	1964-2002	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 mi southwest of Kualapuu.	10.4	1965-87, 2000-2002r	01-26-02	unknown	unknown	04-04-89	-	3,620
16414200 Kaunakakai Gulch at alt 75 ft	Lat 21°03′50″, long 157°00′51″, on left bank 0.7 mi upstream of Highway 46, 0.4 mi northeast of Kaunakakai Post Office and 1.0 mi upstream from mouth.	7.05	2002	11-27-01	7.05	602	11-27-01	7.05	602
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	1964-2002	11-27-01	1.57	560	04-13-65	2.61	1,250

Annual maximum discharge at crest-stage partial-record stations during water year 2002--Continued

Station name and number	Location	Drainage area (mi^2)	Period of record	Water year 2002 maximum			Period of record max		
				Date	Gage height (ft)	Discharge (ft^3/s)	Date	Gage height (ft)	Dis-charge (ft^3/s)
Island of Molokai--Continued									
16415600 Kawela Gulch nr Moku	Lat 21°04′22″, long 156°57′03″, on left bank 1,000 ft upstream of Highway 45, and 5 mi southeast of Kaunakakai.	5.30	2002	11-27-01	6.76	3,190	11-27-01	6.76	3,190
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	1964-2002	01-29-02	unknown	unknown	11-04-66	8.93	989

< Actual value is known to be less than the value shown
r Revised
16413500 peak discharge published for water year 1988 and 1990-97 were revised in water-resources data report for Hawaii, water year 2001

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≠, 1973-2002	01-29-02	3.99	74.7	09-18-94	13.68	2,320
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	1967-2002	01-29-02	6.87	1,320	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≠, 1969-2002	01-29-02	<4.47	unknown	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	1963-2002	01-29-02	4.46	240	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	1963-2002	03-17-02	14.15	unknown	10-29-00	15.64	2,950
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	1965-2002	03-17-02	10.10	unknown	10-29-00	14.53	e22,200
16603700 Kalialinui 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	1967-2002	05-13-02	2.49	43.0	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	1963-2002	03-17-02	3.14	89	07-23-64	9.90	306
16603850 Kalialinui Gulch nr Kahului	Lat 20°52′49″, long 156°26′05″, 600 ft upstream from Hansen Road, 0.5 mi northeast of Puunene Hospital and 2.5 mi southeast of Kahului Post Office.	17.9	1967-2002	03-17-02	5.91	504	01-28-71	8.33	1,330

Annual maximum discharge at crest-stage partial-record stations during water year 2002--Continued

Station name and number	Location	Drainage area (mi^2)	Period of record	Water year 2002 maximum			Period of record max		
				Date	Gage height (ft)	Discharge (ft^3/s)	Date	Gage height (ft)	Dis-charge (ft^3/s)
Island of Maui--Continued									
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≠, 1952-2002	01-29-02	5.61	4,400	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 northwest of Waihee.	0.12	1964-2002	01-26-02	4.03	<37.0	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	1965-2002	01-26-02	10.43	388	03-16-68	15.22	1,760
16630200 Honokowai Str at Honokowai	Lat 20°56′58″, long 156°41′02″, 0.5 mi southeast of Honokowai and 1.1 mi northwest of Puukolii.	5.59	1962-63, 1965-2002	01-26-02	4.74	322	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≠ 1990-2002	01-29-02	1.73	unknown	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 Lahaina Lighthouse.	4.12	1960,1962, 1964-2002	01-29-02	4.16	431	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≠, 1973-2002	01-29-02	5.37	1,290	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	1964-2002	01-29-02	6.75	128	01-10-80	12.95	350
16650200 Waikapu Stream at Waikapu	Lat 20°51′20″, long 156°30′08″, 500 ft downstream from Highway 30 bridge in Waikapu.	3.45	2002	01-26-02	6.86	unknown	01-26-02	6.86	unknown
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 northeast of junction of Lower and Upper Kula Roads.	0.98	1964-2002	11-27-01	4.21	140	01-28-71	8.23	409
16659000 Waiakoa Gulch at Kihei	Lat 20°47′15″, long 156°27′42″, 0.3 mi northeast of Kihei and 0.4 mi upstream from mouth.	10.1	1963-2002	11-27-01	6.43	88	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≠, 1971-2002	03-17-02	0.76	311	01-28-71	9.40	4,460

Annual maximum discharge at crest-stage partial-record stations during water year 2002--Continued

Station name and number	Location	Drainage area (mi^2)	Period of record	Water year 2002 maximum			Period of record max		
				Date	Gage height (ft)	Discharge (ft^3/s)	Date	Gage height (ft)	Dis-charge (ft^3/s)
Island of Maui--Continued									

< Actual value is known to be less than the value shown
≠ Operated as a continuous-record gaging station
e Estimated
r Revised
16619700 peak gage height and discharge published for water year 1999 were revised in water-resources data report for Hawaii, water year 2000
16630200 peak gage height and discharge published for water years 1997 were revised in water-resources data report for Hawaii, water year 2000

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	1969-75, 1979, 1994-2002r	10-25-01	7.08	1,350	11-02-00	14.85	5,760
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	1965-71, 1979-80, 1994, 2002r	11-28-01	unknown	unknown	11-02-00	unknown	1,580
16701600 Alenaio Str at Hilo	Lat 19°43′10″, long 155°05′27″, 0.65 mi south of Hilo Post Office, 0.65 mi west of Kapiolani School, and 0.1 mi upstream from Kapiolani Street bridge.	8.62	1997-2002	10-25-01	8.51	unknown	11-02-00	13.12	6,300
16717400 Kalaoa Mauka Stream near Hilo	Lat 19°48′07″, long 155°06′03″, on upstream side of Hwy 19, 1.0 mi north of Papaikou, 5.1 mi north of Hilo Post Office.	0.24	1963-67, 1973-76, 1978-79, 1985, 2002r	02-26-02	6.76	152	02-20-79	20.60	400
16717600 Alia Str nr Hilo	Lat 19°50′38″, long 155°06′21″, on upstream right bank wingwall of culvert on Highway 19 at Pepeekeo 2.0 mi south of Honomu, and 8.0 mi north of Hilo.	0.58	1962-72≠, 1979, 1986, 1994-2002r	02-26-02	11.42	567	02-20-79	17.1	2,850
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	1963-68, 1975, 1979, 1985-86, 1994-2002r	02-26-02	16.86	2,140	02-20-79	29.93	3,320
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	1963-91, 1993-2002	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	1963-90, 1995-2002	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	1963-90, 1995-2002	11-28-01	4.91	unknown	01-09-80 01-26-99	11.42 e13.94	426
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	1963-90, 1994-2002	Records being reviewed.					
16756500 Keanuiomano Str nr Kamuela	Lat 20°01′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≠, 1973-2002r	02-26-02	7.86	1,470	04-20-68	10.02	3,540

Annual maximum discharge at crest-stage partial-record stations during water year 2002--Continued

Station name and number	Location	Drainage area (mi^2)	Period of record	Water year 2002 maximum			Period of record max		
				Date	Gage height (ft)	Discharge (ft^3/s)	Date	Gage height (ft)	Dis-charge (ft^3/s)
Island of Hawaii--Continued									
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 mi northeast of Waimea.	0.27	1963-70, 1994-2002r	01-26-02 02-26-02	3.02 6.15	114 f	01-11-67	5.63	340
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	1963-91, 1994-2002	Records being reviewed.					

≠ Operated as a continuous-record gaging station

e Estimated stage as 0.3 ft above top of 9.01 ft pipe plus base cap elevation of 4.63 ft (gage datum). Caused by debris pile at entrance of culvert.

f 16759040 probable backwater from debris in culvert entrance

r Revised

16701300 peak gage height and discharge published for water years 1976-78, 1980-90 were revised in water-resources data report for Hawaii, water year 1999; peak gage height and discharge published for water years 1991 and 1993 were revised in water-resources data report for Hawaii, water year 2001

16701400 peak gage height and discharge published for water years 1972-78, 1981-90 were revised in water-resources data report for Hawaii, water year 1999

16717400 peak gage height and discharge published for water years 1968-72, 1977, 1979-84, 1986-90 were revised in water-resources data report for Hawaii, water year 1999

16717600 peak gage height and discharge published for water years 1973-78, 1980-90, 1995-97 were revised in water-resources data report for Hawaii, water year 1998

16717650 peak gage height and discharge published for water years 1966, 1969-74, 1976-78, 1980-84, 1987-90, 1996, 1999-2000 were revised in water-resources data report for Hawaii, water year 2001

16756500 peak gage height and discharge published for water years 1964, 1975, 1978, 1991-96 were revised in water-resources data report for Hawaii, water year 1998

16759040 peak gage height and discharge published for water years 1966, 1971-90, 1994-98 were revised in water-resources data report for Hawaii, water year 1999

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 potential of the stream. The column headed "Period of record" shows the water years in which measurements were made at the same, or nearly the same, site.

Discharge measurements made at low-flow partial-record stations during water year 2002

Station name and number	Location	Drainage area (mi^2)	Period of record	Date	Measurement	
					Gage height (ft)	Discharge (ft^3/s)
Island of Oahu						
16238500 Waihi Stream at Honolulu	Lat 21°19′55″, long 157°48′12″, 100 ft upstream from bridge on Waaloa Way, 700 ft upstream from confluence with Waiakeakua Stream, and 4.2 mi northeast of Honolulu Post Office.	1.14	1913-21≠, 1925-83≠, 1999-2002	10-10-01	--	2.2
				01-08-02	--	0.61
				03-18-02	--	3.2
				09-13-02	--	0.52
16292600 Waianu Stream at Gate 30	Lat 21°28′59″, long 157°53′11″, 2.1 mi northwest of Waiahole Elementary and Intermediate School and 2.3 mi west of Waikane.	--	1995 2002	02-27-02	--	4.4
				05-22-02	--	5.6
				06-19-02	--	5.2
				07-17-02	--	4.2
				08-21-02	--	4.0
				09-19-02	--	4.0
16299280 Waianu Stream at alt 380 ft	Lat 21°29′08″, long 157°52′51″, 1.6 mi northwest of Waiahole Elementary and Intermediate School and 1.9 mi west of Waikane.	0.55	1959-61, 1995 2002	05-22-02	--	5.1
				06-19-02	--	5.7
				07-17-02	--	3.6
				08-21-02	--	3.9
				09-19-02	--	4.1
16292890 Waianu Stream above confluence with Uwau Stream	Lat 21°29′13″, long 157°52′27″, 1.2 mi northwest of Waiahole Elementary and Intermediate School and 1.5 mi west of Waikane.	0.67	1960, 1995 2002	05-22-02	--	6.0
				06-19-02	--	5.3
				07-17-02	--	3.5
				07-17-02	--	3.5
				08-21-02	--	3.8
				09-19-02	--	3.9
16292900 Uwau Stream at mouth	Lat 21°29′16″, long 157°52′27″, at road crossing Uwau Stream, 1.2 mi northwest of Waiahole Elementary and Intermediate School, and 1.5 mi west of Waikane.	0.56	1911, 1959-61, 1995 2002	05-22-02	--	1.1
				06-19-02	--	0.42
				07-17-02	--	0.22
				08-21-02	--	0.16
				09-19-02	--	0.21
16293100 Waianu Stream at Waiahole	Lat 21°29′01″, long 157°51′47″, at bridge crossing Waianu Stream, 0.5 mi west of Waiahole Elementary and Intermediate School, and 2.3 mi northwest of Kahaluu Elementary School.	1.65	1959-63, 1965-66, 1988-90, 1995 2002	05-22-02	--	11
				07-17-02	--	5.5
				08-21-02	--	4.9
				09-19-02	--	5.0
16294400 North Fork Waikane Stream at alt 220 ft	Lat 21°30′20″, long 157°52′41″, 2.0 mi northwest of Waiahole Elementary and Intermediate School, and 1.7 mi west of Waikane.	0.58	1988-90 2002	06-19-02	--	1.1
				07-17-02	--	0.60
				08-21-02	--	0.85
				09-18-02	--	0.56
16294500 South Fork Waikane Stream at alt 220 ft	Lat 21°30′17″, long 157°52′40″, 1.8 mi northwest of Waiahole Elementary and Intermediate School, and 1.7 mi west of Waikane.	0.67	1988-90 2002	06-19-02	--	0.71
				07-17-02	--	0.28
				08-21-02	--	0.35
				09-18-02	--	0.25
16294700 Waikeekee Stream at mouth	Lat 21°30′01″, long 157°52′12″, 1.4 mi northwest of Waiahole Elementary and Intermediate School, and 1.1 mi west of Waikane.	0.43	1959-61, 1988-90 2002	05-22-02	--	1.1
				06-19-02	--	0.45
				07-17-02	--	0.16
				08-21-02	--	0.06
				09-18-02	--	0.05

Station name and number	Location	Drainage area (mi^2)	Period of record	Date	Measurement: Gage height (ft)	Measurement: Discharge (ft^3/s)
		Island of Oahu--Continued				
16294800 Waikane Stream at alt 90 ft	Lat 21°30′04″, long 157°52′10″, 1.4 mi northwest of Waiahole Elementary and Intermediate School, and 1.1 mi west of Waikane.	1.57	1959-61, 1988-90 2002	05-22-02	--	4.6
				06-19-02	--	2.9
				07-17-02	--	1.4
				08-21-02	--	1.8
				09-18-02	--	1.4
16295195 Waikane Stream at Kamehmeha Hwy	Lat 21°29′56″, long 157°51′15″, 0.8 mi northeast of Waiahole Elementary and Intermediate School, and 0.1 mi south of Waikane.	2.50	1988-90 2002	05-22-02	--	6.8
				06-19-02	--	4.6
				07-17-02	--	1.9
				08-21-02	--	2.2
				09-18-02	--	1.6
16295995 Kahana Stream at Mauka trail crossing	Lat 21°32′17″, long 157°53′29″, 1.8 mi upstream from main bridge on Kamehameha Highway and 2.8 mi southwest of Kaaawa School.	3.18	1960-62, 1966, 1971-72, 1974-81, 1983-85, 1988-90 2002	05-22-02	--	42
				06-19-02	--	60
				07-17-02	--	19
				08-21-02	--	e18
				09-19-02	--	26
16297000 Kawa Stream near Kahana	Lat 21°32′33″, long 157°53′00″, 0.1 mi upstream from mouth and 2.3 mi southwest of Kaaua School.	2.09	1914-17≠, 1958b, 1961-62, 1966, 1971-72, 1974-81, 1983-85, 1988-90 2002	05-22-02	--	7.2
				06-19-02	--	2.7
				07-17-02	--	0.61
				08-21-02	--	2.3
				09-19-02	--	2.9
		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≠, 1988-2002	11-19-01	3.76	145
				02-20-02	6.05	285
				05-24-02	3.21	112
				09-12-02	4.63	194
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≠, 1986-2002	11-19-01	1.03	2.45
				02-20-02	1.13	3.64
				05-24-02	1.04	2.45
				09-12-02	2.18	36.8
				09-12-02	1.65	14.6
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≠, 1986-2002	11-19-01	2.82	21.2
				02-27-02	2.98	28.3
				05-29-02	2.64	15.3
				09-12-02	2.88	24.8
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≠, 1986-2002	11-19-01	0.55	3.49
				02-27-02	0.8	7.38
				05-29-02	0.4	1.9
				07-11-02	0.38	1.64

≠ Operated as a continuous-record gaging station

Discharge measurements made at miscellaneous sites during water year 2000-2001

Station name and number	Location	Measured previously (water years)	Date	Discharge (ft^3/s)
	Island of Hawaii			
16724000 Kawainui Stream at alt 775 ft near Waipio	Lat 20° 04'45", long 155°38'32", 250 ft upstream from confluence with Alakahi Stream, at alt 775 ft	1901-02 ≠	09-21-00	12
16731000 Koiawe Stream at alt 610 ft near Waipio	Lat 20°04'38", long 155°38'08", 100 ft upstream from mouth, at alt 610 ft	1901-02 ≠	09-21-00	6.4
16732150 Waima Stream at alt 385 ft near Waipio	Lat 20°04'42", long 155°37'22", 100 ft upstream from mouth, at alt 385 ft	1901-02 ≠	09-21-00	35
16732200 Wailoa Stream near Waipio	Lat 20°05'28", long 155°37'01", at alt 150 ft, 0.35 mi upstream from end of Waipio Valley road	1901-02 ≠ 1911-12 ≠ 1964-69 ≠	09-21-00 01-10-01 03-09-01 05-30-01 09-26-01	78 69 76 73 103
16732600 Lower Hamakua Ditch at Waima Flume near Waipio	Lat 20°04'05", long 155°37'36", 20 ft upstream from Waima intake, at alt 980 ft	1910-13 ≠	09-20-00 09-26-01	23 22
16732800 Lower Hamakua Ditch above Main Weir near Kukuihaele	Lat 20°06'52", long 155°35'06", 10 ft upstream from tunnel entrance, 600 ft upstream from Main Weir	--	09-20-00 09-26-01	22 22
200505155383801 Kawainui Stream above Lower Hamakua Ditch near Waipio	Lat 20°05'05", long 155°38'38", 50 ft upstream from diversion dam at start of Lower Hamakua Ditch in Waipio Valley, at alt 1070 ft	--	09-21-00 01-10-01 03-08-01 05-30-01 09-26-01	26 19 59 22 42
200502155383601 Lower Hamakua Ditch below Kawainui Stream near Waipio	Lat 20°05'02", long 155°38'36", 100 ft upstream from entrance to tunnel, 300 ft downstream from diversion dam at Kawainui Stream	--	09-20-00 09-26-01	22 15
200415155390001 Lower Hamakua Ditch above Alakahi Stream near Waipio	Lat 20°04'15", long 155°39'00", 10 ft upstream from tunnel adit, adit is first one upstream from Alakahi Stream diversion dam	--	09-20-00 09-26-01	20 13
200414155385901 Alakahi Stream below Lower Hamakua Ditch near Waipio	Lat 20°04'14", long 155°38'59", 250 ft downstream from Lower Hamakua Ditch diversion dam on Alakahi Stream, at alt 1,000 ft	--	09-20-00	19
200413155390301 Alakahi Stream above Lower Hamakua Ditch near Waipio	Lat 20°04'13", long 155°39'03", 200 ft upstream from Lower Hamakua Ditch diversion dam on Alakahi Stream, at alt 1,030 ft	--	01-10-01 03-08-01 05-30-01	14 26 14
200413155385901 Lower Hamakua Ditch below Alakahi Stream near Waipio	Lat 20°04'13", long 155°38'59", at first tunnel adit downstream from Alakahi Stream diversion dam	--	09-20-00 09-26-01	18 11
200430155381801 Waipio Stream below Alakahi Stream near Waipio	Lat 20°04'30", long 155°38'18", 100 ft downstream from mouth of Alakahi Stream, at alt 720 ft	--	09-21-00	32
200429155380001 Waipio Stream above Koiawe Stream near Waipio	Lat 20°04'29", long 155°38'00", 300 ft upstream from mouth of Koiawe Stream, at alt 595 ft	--	09-21-00	35

Station name and number	Location	Measured previously (water years)	Date	Discharge (ft^3/s)
	Island of Hawaii--Continued			
200354155380801 Lower Hamakua Ditch above Koiawe Stream near Waipio	Lat 20°03'54", long 155°38'08", 30 ft upstream from Koiawe Stream diversion dam, in tunnel	--	09-20-00 09-26-01	18 12
200351155380901 Koiawe Stream above Lower Hamakua Ditch near Waipio	Lat 20°03'51", long 155°38'09", 300 ft upstream from Lower Hamakau Ditch diversion dam on Koiawe Stream, at alt 1,020 ft	--	08-08-00 09-21-00 01-11-01 03-09-01 05-31-01 09-26-01	7.0 7.5 7.3 8.3 7.2 11
200353155380801 Lower Hamakua Ditch below Koiawe Stream near Waipio	Lat 20°03'53", long 155°38'08", 10 ft downstream from tunnel adit, adit is first one downstream from Koiawe Stream diversion dam	--	09-20-00 09-26-01	23 21
200351155372801 Waima Stream above Lower Hamakua Ditch near Waipio	Lat 20°03'51", long 155°37'28", 100 ft upstream from Lower Hamakua Ditch diversion dam on Waima Stream, at alt 1,040 ft	--	08-08-00 09-20-00 01-11-01 03-09-01 05-31-01 09-26-01	0.62 0.61 0.69 0.60 0.53 0.86
200424155370301 Lower Hamakua Ditch near Waipio	Lat 20°04'24", long 155°37'03", 0.8 mi downstream from Koiawe Stream diversion dam, in tunnel	--	09-20-00 09-26-01	25 20
200434155372001 Waipio Stream above Waima Stream near Waipio	Lat 20°04'34", long 155°37'20", 600 ft upstream from confluence with Waima Stream, at alt 400 ft	--	09-21-00	43
200542155354501 Lower Hamakua Ditch at Hiilawe Falls near Waipio	Lat 20°05'42", long 155°35'45", 30 feet downstream from Hiilawe Falls, upstream from leaking flume, in tunnel	--	09-20-00 08-09-01 09-26-01	27 25 22
200542155354101 Lower Hamakua Ditch at Hakalaoa Falls near Waipio	Lat 20°05'42", long 155°35'41", 20 ft downstream from Hakalaoa Falls and leaking flume, in tunnel	--	09-20-00 09-20-00 08-09-01 09-26-01	22 21 25 20

≠ Operated as a continuous-record gaging station

Discharge measurements made at miscellaneous sites during water year 2002

Station name and number	Location	Measured previously (water years)	Date and time	Discharge (ft^3/s)
		Island of Maui		
16516000 Kopiliula Stream near Keanae	Lat 20°49'05", long 156°08'12"	--	08-19-02 time=0850	10.1
16520000 East Wailuanui Stream near Keanae	Lat 20°49'24", long 156°08'37"	--	07-31-02 time=0922	2.59
			07-31-02 time=1442	2.56
204952156073501 Kopiliula Stream, middle habitat site	Lat 20°49'52.9", long 156°07'35.7"	--	08-22-02 time=0848	0.71
204959156072201 Kopiliula Stream, lower habitat site	Lat 20°49'59", long 156°07'22"	--	08-20-02 time=0938	2.38
			08-21-02 time=0820	2.11
205008156082901 Wailuanui Stream, middle habitat site	Lat 20°50'08", long 156°08'29"	--	08-01-02 time=0830	1.40
205036156080501 Wailuanui Stream, lower habitat site	Lat 20°50'36", long 156°08'05"	--	07-29-02 time=1150	2.35
			07-30-02 time=0833	2.65
			08-23-02 time=0905	1.60

Miscellaneous water-quality measurements during water year 2002

Station name and number	Location	Date and time	Discharge (ft^3/s)	Water temperature °C	Specific conductance (µS/cm)
		Island of Molokai			
210545157022201 Coconut Grove Springs near Kaunakakai	Lat 21°05′45″, long 157°02′22″, at Kapuaiwa Coconut Grove, 1.3 mi west of Kaunakakai on Hwy 460	04-10-02 time=0955	1.87	24.0	3,100
		06-12-02 time=1105	1.90	24.1	3,350
		09-06-02 time=0900	2.34	24.1	3,740
210432156484801 Pukoo Spring at Pukoo	Lat 21°04′32″, long 156°48′48″, at Pukoo, 15 mi east of Kaunakakai on Hwy 450, 300 ft towards ocean from Hwy	04-10-02 time=1152	0.34	25.3	531
		06-12-02 time=1005	0.21	24.1	518
		09-06-02 time=1130	0.31	24.6	510

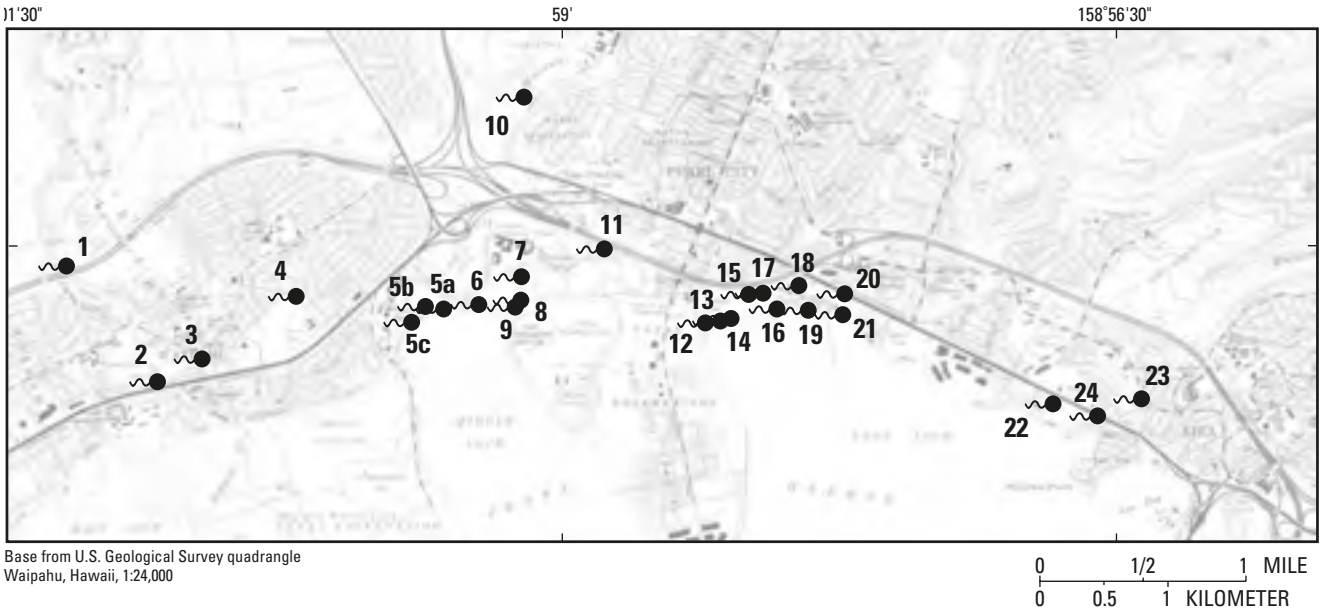


Figure 15. Map showing locations of Pearl Harbor Springs measuring sites, Oahu.

Discharge, specific conductance, and water-temperature measurements at low-flow stations, Pearl Harbor Springs, Oahu

Map number (see figure 15)	Station number	Station name	Location	Time	Date	Discharge (ft^3/s)	Specific conductance (µS/cm)	Water temperature (°C)
1	16212950	Waikele Stream below H-1 Freeway at Waipahu	Lat 21°23'39″, long 158°01'14″, below H-1 Freeway, 100 ft upstream from cane haul road, 0.7 mi northwest of Waipahu Sugar Mill, and 0.7 mi upstream from gaging station 16213000.	1119 1025	05/07/01 07/18/01	10.9 2.02	82 125	24.0 26.0
2	16213000	Waikele Stream at Waipahu	Lat 21°23′11″, long 158°00′49″, on left bank 300 ft upstream from bridge on Highway 90, and 0.3 mi southwest of former sugar refinery at Waipahu.	0951 0817	05/07/01 07/18/01	25.5 15.5	278 487	24.0 22.5
3	212317158003701	Kapakahi Stream above Farrington Highway	Lat 21°23′17″, long 158°00′37″, upstream from two 4-ft concrete pipe culverts in parking lot of shopping center at Hanawai Circle at Waipahu, 500 ft upstream from Farrington Highway.	1238 1130	05/07/01 07/18/01	1.38 1.43	489 550	23.5 23.5
4	212332158001201	Waipahu Drainage Canal above Paiwa Street	Lat 21°23′32″, long 158°00′12″, 1,500 ft upstream from Farrington Highway and 0.5 mi east of Waipahu Sugar Mill, upstream from Paiwa Street bridge.	0855 0925	05/07/01 07/18/01	1.82 1.40	530 560	22.5 24.0
5	212328157593601	Spring Outlet 2 West of Waiawa Spring	Lat 21°23′28″, long 157°59′36″, a 5×8 ft concrete box culvert 0.4 mi west of Waiawa Spring outlet and 1,200 ft east of Waipahu High School. Drains from former watercress fields (now covered) to Pearl Harbor.	1014 0835	05/08/01 07/19/01	0.22 0.27	3,480 4,500	24.0 25.0
6	212330157592201	Spring Outlet 1 West of Waiawa Spring	Lat 21°23′30″, long 157°59′22″, a 12-in. concrete pipe culvert 1,000 ft west of Waiawa Spring outlet and 2,500 ft east of Waipahu High School. Drains from former watercress fields (now covered) to Pearl Harbor.	1018 0914	05/08/01 07/19/01	0.48 0.45	4,090 4,430	24.0 23.0
7	16214000	Pearl Harbor Springs at Waiawa near Pearl City	Lat 21°23′36″, long 157°59′11″, near Leeward Community College, 0.7 mi west of Pearl City, and 9.8 mi northwest of Honolulu, about 350 ft upstream from the mouth.	0910 0749	05/08/01 07/19/01	11.8 11.1	3,180 3,300	23.5 23.0
10	16215800	Waiawa Stream above Kamehameha Highway near Pearl City	Lat 21°24′23″, long 157°59′10″, 50 ft downstream from old cane haul road in Pearl City Industrial Park, 2,000 ft upstream from Kamehameha Highway, and 0.6 mi upstream from gaging station 16216000.	1245 1005	05/08/01 07/18/01	4.39 Dry	148 --	23.5 --
11	16216100	Waiawa Stream below H-1 near Pearl City	Lat 21°23′44″, long 157°58′48″, below H-1 Freeway, 1,200 ft downstream from gaging station 16216000, and 2,000 ft east of Leeward Community College.	1252 1112	05/08/01 07/18/01	8.01 3.32	349 713	23.5 22.0
12	212325157581801	Puukapu Site 3	Lat 21°23′25″, long 157°58′18″, at a 3-ft concrete pipe 1,000 ft west of Waimano flood channel at mouth. Drains from watercress fields to Pearl Harbor.	1010 0922	05/08/01 07/19/01	1.14 1.27	1,220 1,200	21.0 21.0

Map number (see figure 15)	Station number	Station name	Location	Time	Date	Discharge (ft^3/s)	Specific conductance (µS/cm)	Water temperature (°C)
13	212325157581301	Puukapu Site 2	Lat 21°23′25″, long 157°58′13″, at two 4-ft concrete culverts on concrete roadway 100 ft north of old concrete gage house and 300 ft west of Waimano flood channel at mouth.	0926 0845	05/08/01 07/19/01	2.00 1.82	1,450 1,470	21.5 21.5
14	212326157580901	Puukapu Site 1	Lat 21°23′26″, long 157°58′09″, at two 3-ft concrete pipe culverts on right bank of Waimano flood channel at mouth. Drains from watercress fields to mouth of channel.	0848 0920	05/08/01 07/19/01	0.61 0.50	2,670 2,610	20.0 20.5
15	16216550	Waimano Flood Channel below H-1 at Pearl City	Lat 21°23′32″, long 157°58′08″, 100 ft below Pearl Harbor bikeway, 600 ft from mouth, and 1,600 ft west of Hawaiian Electric Co. power plant at Waiau.	1028 1005	05/08/01 07/18/01	0.62 0.64	385 344	22.0 22.5
17	212333157580101	Kaluaoopu Spring	Lat 21°23′33″, long 157°58′01″, at concrete bridge on bikeway, 700 ft west of No. 1 generator in the Hawaiian Electric Co. power plant. Measures the combined flow from the watercress fields and freeway storm drain.	0927 0820	05/07/01 07/18/01	5.98 6.46	905 960	-- 21.0
18	16219000	Hawaiian Electric Co. Tunnel at Waiau near Pearl City	Lat 21°23′33″, long 157°57′55″, concrete ditch at Hawaiian Electric Co. Waiau power plant, 20 ft downstream from tunnel portal, and 0.6 mi east of Pearl City.	1125 1055	05/08/01 07/19/01	1.96 2.08	917 968	20.5 21.0
19	212329157575001	Makai Spring at Hawaiian Electric Co. Power Plant	Lat 21°23′29″, long 157°57′50″, south of power plant at outlet of a 30-in. concrete pipe draining overflow from power plant and seepage from Old Rice Mill Spring into Pearl Harbor.	0847 0905	05/07/01 07/18/01	0.44 0.50	1,260 1,390	20.5 20.5
20	212331157574101	Waiau Spring below Kamehameha Highway	Lat 21°23′31″, long 157°57′41″, below Kamehameha Highway and 500 ft from outlet to Pearl Harbor. Drains from Waiau Springs.	1325 1429	05/07/01 07/18/01	1.24 1.13	335 358	22.0 22.0
22	16224000	Pearl Harbor Spring at Kalauao near Aiea	Lat 21°23′06″, long 157°56′46″, at Kamehameha Highway bridge, drains from Sumida watercress farm, 1.1 mi west of Aiea, and 7.6 mi northwest of Honolulu.	0850 0943	05/07/01 07/18/01	10.5 10.7	1,500 1,500	22.0 23.0
23	16224500	Kalauao Stream at Moanalua Road at Aiea	Lat 21°23′07″, long 157°56′22″, at Moanalua Road bridge, 0.4 mi northwest of Aiea Post Office, and 2.3 mi southeast of Pearl City Post Office.	1116 0829	05/07/01 07/18/01	1.00 3.31	344 516	24.0 21.5
24	16224550	Kalauao Stream above Kamehameha Highway at Aiea	Lat 21°23′02″, long 157°56′35″, above Kamehameha Highway and 1,300 ft from mouth, 1,000 ft downstream from gaging station 16224500, and 0.8 mi northwest of Aloha Stadium.	0951 0736	05/07/01 07/18/01	1.13 3.42	425 561	24.0 21.5

ANALYSES OF SAMPLES COLLECTED AT WATER-QUALITY PARTIAL-RECORD STATIONS

Water-quality partial-record stations are particular sites where chemical-qualtiy, and/or sediment data are collected systematically over a period of years for use in hydrologic analyses.

WATER-QUALITY DATA, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

HAWAII, ISLAND OF OAHU

16227100 HALAWA STREAM BELOW H-1 (LAT 21°23'46" LONG 157°55'57")

DATE	TIME	SAMPLE TYPE	GAGE HEIGHT (FEET) (00065)	DIS-CHARGE, IN CUBIC FEET PER SECOND (00060)	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SAM-PLING METHOD, CODES (82398)	PH WATER WHOLE FIELD (STAND-ARD UNITS) (00400)	PH WATER WHOLE LAB (STAND-ARD UNITS) (00403)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	SPE-CIFIC CON-DUCT-ANCE LAB (US/CM) (90095)	TEMPER-ATURE WATER (DEG C) (00010)	RESIDUE TOTAL AT 105 DEG. C, SUS-PENDED (MG/L) (00530)
OCT												
28...	1240	9	18.91	--	69	10	5.9	7.7	145	152	23.5	5380
JAN												
29...	1304	9	18.55	--	213	10	7.7	7.5	229	232	21.5	42
MAY												
06...	1311	9	17.83	--	870	30	7.4	7.3	70	87	21.4	1540

DATE	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L) (70300)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N) (00608)	NITRO-GEN, AM-MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)	NITRO-GEN, NITRITE DIS-SOLVED (MG/L AS N) (00613)	PHOS-PHORUS DIS-SOLVED (MG/L AS P) (00666)	PHOS-PHORUS TOTAL (MG/L AS P) (00665)	OXYGEN DEMAND, CHEM-ICAL (HIGH LEVEL) (MG/L) (00340)	CADMIUM WATER UNFLTRD TOTAL (UG/L AS CD) (01027)	COPPER, TOTAL RECOV-ERABLE (UG/L AS CU) (01042)	LEAD, TOTAL RECOV-ERABLE (UG/L AS PB) (01051)
OCT											
28...	90	<.04	.30	E.04	<.008	<.06	E.04	20	<.04	3.7	<1
JAN											
29...	136	<.04	.34	.56	<.008	<.06	.07	10	<.04	5.0	<1
MAY											
06...	44	<.04	4.5	.08	<.008	<.06	1.56	150	.30	73.8	9

DATE	ZINC, TOTAL RECOV-ERABLE (UG/L AS ZN) (01092)	OIL AND GREASE, TOTAL RECOV. GRAVI-METRIC (MG/L) (00556)	HYDRO-CARBONS PET.WAT FREON CHR.IR. RECOV. (MG/L) (45501)
OCT			
28...	7	<7	<2
JAN			
29...	6	<7	2
MAY			
06...	104	<7	<2

< -- Less than
E -- Estimated value

ANALYSES OF SAMPLES COLLECTED AT WATER-QUALITY PARTIAL-RECORD STATIONS--Continued

212356157531801 NORTH HALAWA STREAM AT BRIDGE 8 NEAR HALAWA (LAT 21°23'56" LONG 157°53'18")

DATE	TIME	SAMPLE TYPE	GAGE HEIGHT (FEET) (00065)	DIS-CHARGE, IN CUBIC FEET PER SECOND (00060)	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SAM-PLING METHOD, CODES (82398)	PH WATER WHOLE FIELD (STAND-ARD UNITS) (00400)	PH WATER WHOLE LAB (STAND-ARD UNITS) (00403)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	SPE-CIFIC CON-DUCT-ANCE LAB (US/CM) (90095)	TEMPER-ATURE WATER (DEG C) (00010)	RESIDUE TOTAL AT 105 DEG. C, SUS-PENDED (MG/L) (00530)
OCT												
28...	1310	9	96.58	--	45	10	7.2	7.8	146	152	21.5	<10
JAN												
29...	1010	9	97.18	--	88	30	7.3	7.4	124	128	20.0	50
MAY												
06...	1230	9	98.73	--	297	40	6.4	7.4	75	82	20.5	557

DATE	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L) (70300)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N) (00608)	NITRO-GEN, AM-MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)	NITRO-GEN, NITRITE DIS-SOLVED (MG/L AS N) (00613)	PHOS-PHORUS DIS-SOLVED (MG/L AS P) (00666)	PHOS-PHORUS TOTAL (MG/L AS P) (00665)	OXYGEN DEMAND, CHEM-ICAL (HIGH LEVEL) (MG/L) (00340)	CADMIUM WATER UNFLTRD TOTAL (UG/L AS CD) (01027)	COPPER, TOTAL RECOV-ERABLE (UG/L AS CU) (01042)	LEAD, TOTAL RECOV-ERABLE (UG/L AS PB) (01051)
OCT											
28...	86	<.04	.20	.05	<.008	<.06	E.03	10	<.04	2.0	<1
JAN											
29...	76	<.04	.30	.11	<.008	<.06	.08	10	<.04	4.9	<1
MAY											
06...	43	<.04	1.4	.06	<.008	<.06	.67	40	.11	32.7	2

DATE	ZINC, TOTAL RECOV-ERABLE (UG/L AS ZN) (01092)	OIL AND GREASE, TOTAL RECOV. GRAVI-METRIC (MG/L) (00556)	HYDRO-CARBONS PET.WAT FREON CHR.IR. RECOV. (MG/L) (45501)
OCT			
28...	2	<7	<2
JAN			
29...	7	<7	2
MAY			
06...	41	<7	<2

< -- Less than
E -- Estimated value

Ground-Water Station Records

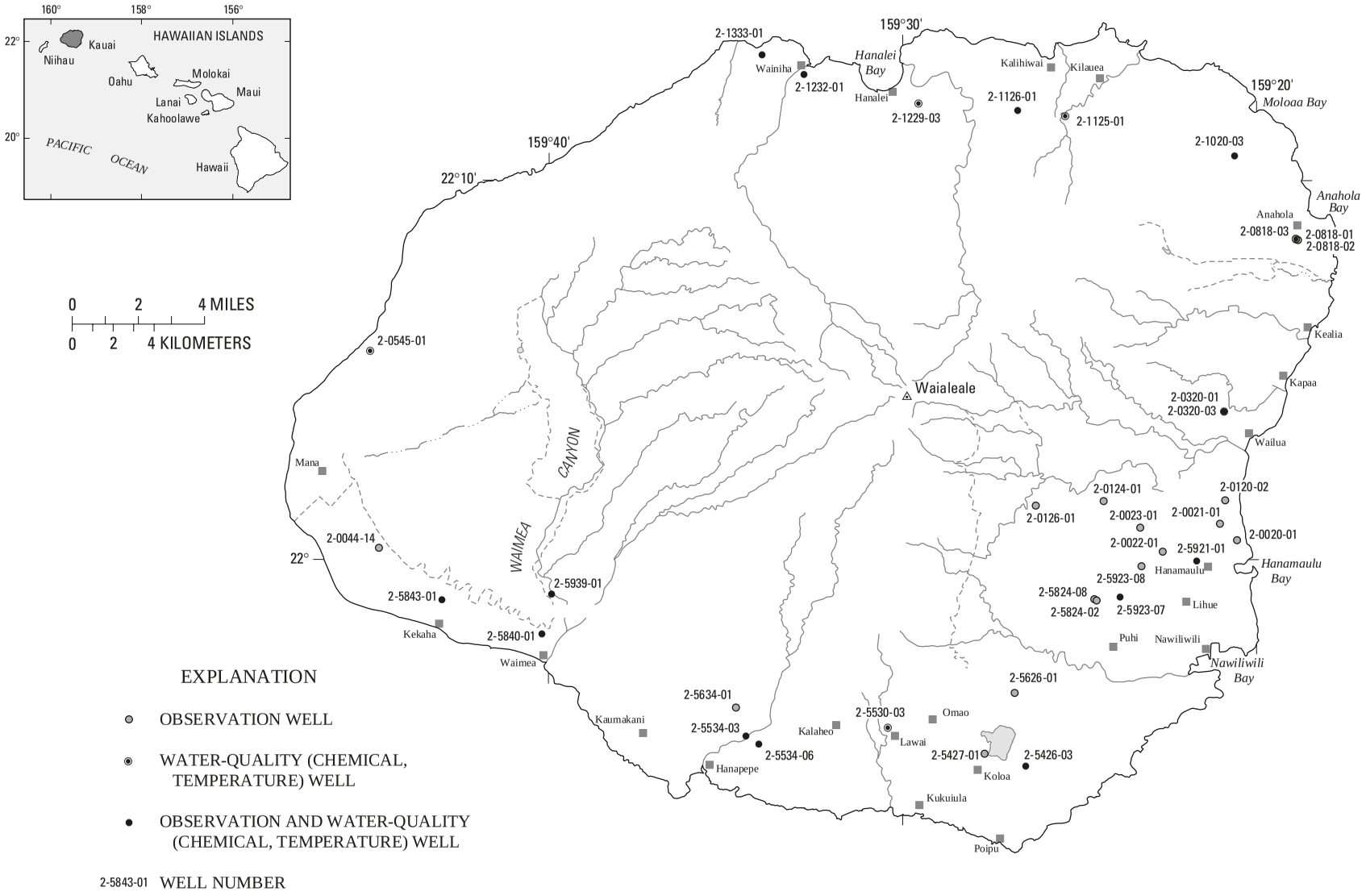


Figure 16. Locations of observation wells and ground-water quality sampling sites on Kauai.

HAWAII, ISLAND OF KAUAI

220057159210301. Local number 2-0021-01. Kalepa Ridge, Kauai.

LOCATION.--Lat 22°01', long 159°21', Hydrologic Unit 20070000, 1.0 mi southwest of Wailua County Golf Course, and 1.3 mi north of Hanamaulu Park. Owner: State of Hawaii.

AQUIFER.--Waimea Canyon Basalt, Miocene to Pliocene age.

WELL CHARACTERISTICS.--Drilled water-table well, depth 277 ft, casing diameter 8-in., cased to 196 ft.

DATUM.--Elevation of land-surface datum is 166 ft. Measuring point is the 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 November 1999. Occasional measurements, November 1999 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 15.86 ft above mean sea level, March 3, 1995; lowest water level measured, , 8.65 ft above mean sea level, March 4, 2002.

WATER LEVEL, IN FEET RELATIVE TO MEAN SEA LEVEL, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 15	8.77	DEC 27	8.75	MAR 04	8.65	APR 15	8.73	MAY 28	8.97	SEP 04	9.31

HAWAII, ISLAND OF KAUAI

220013159224001. Local number 2-0022-01, Hanamaulu W-1, Kauai.

LOCATION.--Lat 22°00', long 159°23', Hydrologic Unit 20070000, 3.2 mi north of Lihue, and 1.4 mi west of the nearest shoreline. Owner: Kauai County, Department of Water.

AQUIFER.--Koloa Volcanics, Pliocene to Pleistocene age.

WELL CHARACTERISTICS.--Drilled well, depth 700 ft; 20-in. solid casing: 0-58 ft; grouted: 0-58 ft; open hole: 58 ft to bottom.

DATUM.--Elevation of land-surface datum is 273 ft. Measuring point is the top of 4-in. stem welded to 20-in. casing, 277.67 ft above mean sea level.

PERIOD OF RECORD.--Water-level: occasional measurements, February 1997 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 251.64 ft above mean sea level, August 2, 1999; lowest water level measured, 234.61 ft above mean sea level, January 22, 2002.

REMARKS.--Well part of a network of observation wells in cooperation with the County of Kauai, Department of Water.

WATER LEVEL, IN FEET RELATIVE TO MEAN SEA LEVEL, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 15	235.33	JAN 22	234.61	APR 15	238.01	JUL 10	241.77
DEC 27	234.82	MAR 04	235.62	MAY 28	240.51	SEP 04	242.69

HAWAII, ISLAND OF KAUAI

220051159231801. Local number 2-0023-01. Pukaki Reservoir monitor well, Kauai.

LOCATION.--Lat 22°01', long 159°23', Hydrologic Unit 20070000, 2.5 mi northwest of Lihue, and 2.8 mi west of the nearest shoreline. Owner: U.S. Geological Survey.

AQUIFER.--Koloa Volcanics and Waimea Canyon Basalt, Miocene to Pleistocene age.

WELL CHARACTERISTICS.--Drilled well, depth 1,590 ft; 10-in. solid steel outer casing: 0-156 ft, annular space grouted: 0-156 ft, open hole: 156 ft to bottom. Well deepened in 2002 from 1,147 to 1,590 ft.

DATUM.--Elevation of land-surface datum is 319 ft. Measuring point is the top of 10-in. well casing, 320.12 ft above mean sea level.

PERIOD OF RECORD.--Water-level: occasional measurements, November 1996 to December 8, 1999. Continuous water-level recorder, December 1999 to October 2001. Occasional measurements October 2001 to September 4, 2002.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 191.13 ft above mean sea level, September 4, 2002; lowest water level measured, 163.85 ft above mean sea level, November 14, 1996.

REMARKS.--Well part of a network of observation wells in cooperation with the County of Kauai, Department of Water.

WATER LEVEL, IN FEET RELATIVE TO MEAN SEA LEVEL, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 01	174.87	MAR 20	180.49	MAY 28	190.19	SEP 04	191.13
FEB 05	182.86	APR 15	184.17	JUL 10	190.22		

HAWAII, ISLAND OF KAUAI

220019159444801. Local number 2-0044-14. Kaunalewa, Kauai.

LOCATION.--Lat 22°00', long 159°45', 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 Basalt, Miocene to Pliocene age.

WELL CHARACTERISTICS.--Drilled artesian well, depth 245 ft, casing diameter 13-in., cased to 164 ft.

DATUM.--Elevation of land-surface datum is 8 ft. Measuring point is the top of standpipe, 11.49 ft until February 9, 1997; changed measuring point to top of recorder shelf on February 10, 1997, 11.57 ft above mean sea level. Prior to June 1979, nonrecording gage at datum 0.25 ft lower.

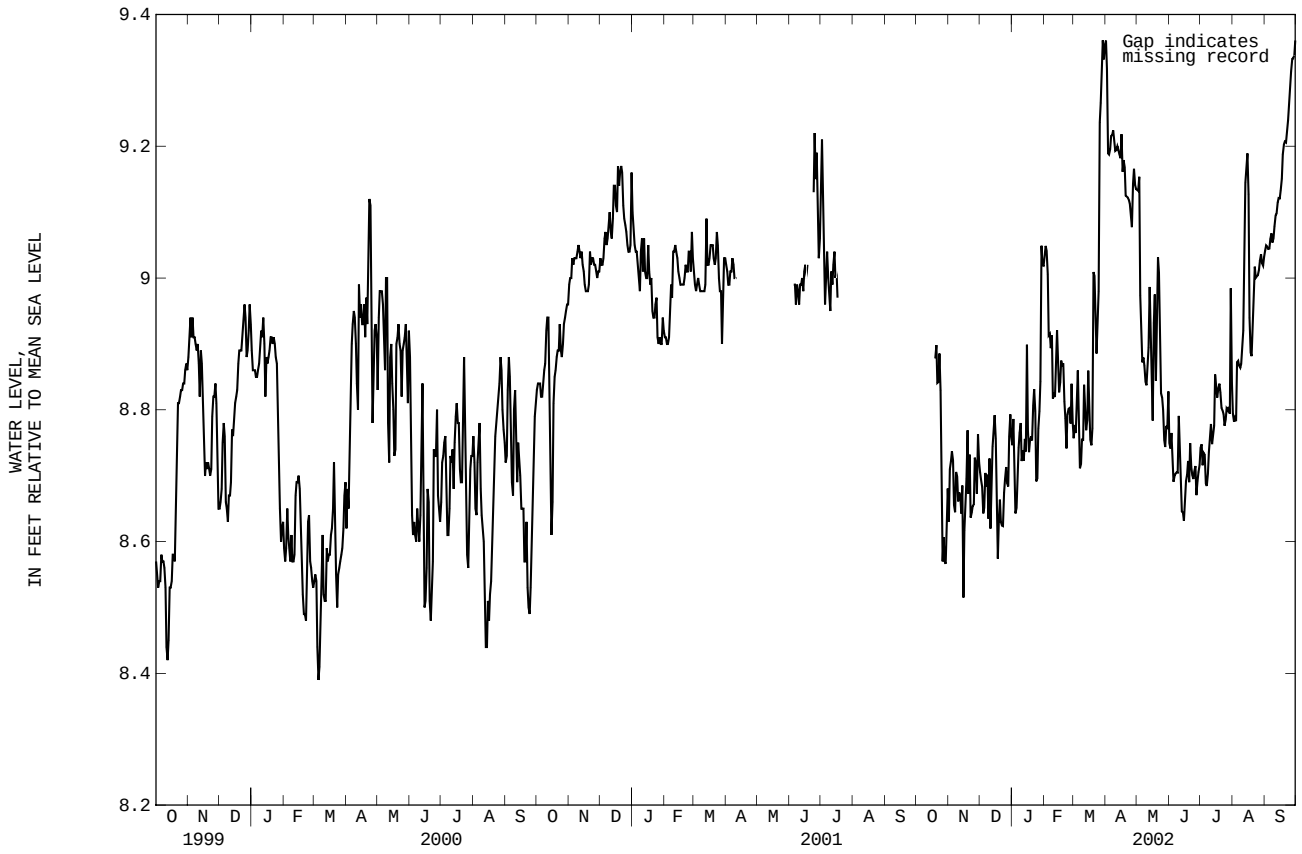
PERIOD OF RECORD.--Occasional measurements 1937 to 1962 (measured by Kekaha Sugar Company). Water-level recorder, June 1979 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 11.07 ft above mean sea level, December 20, 1937; lowest water level measured, 7.52 ft above mean sea level, August 15, 1947.

WATER LEVEL, IN FEET RELATIVE TO MEAN SEA LEVEL, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	8.63	8.71	8.75	9.03	8.76	9.36	9.13	8.75	8.74	8.79	9.04
2	---	8.71	8.69	8.79	9.05	8.78	9.32	9.13	8.74	8.75	8.78	9.05
3	---	8.72	8.68	8.72	9.04	8.76	9.19	9.15	8.76	8.72	8.79	9.05
4	---	8.74	8.64	8.64	9.01	8.82	9.19	8.97	8.72	8.73	8.78	9.04
5	---	8.72	8.65	8.65	8.91	8.86	9.20	8.92	8.69	8.73	8.87	9.04
6	---	8.66	8.70	8.70	8.92	8.80	9.22	8.87	8.70	8.69	8.87	9.06
7	---	8.64	8.68	8.74	8.89	8.71	9.22	8.88	8.70	8.68	8.87	9.07
8	---	8.71	8.70	8.77	8.91	8.72	9.22	8.87	8.71	8.70	8.86	9.05
9	---	8.70	8.63	8.78	8.82	8.76	9.21	8.84	8.70	8.74	8.87	9.06
10	---	8.66	8.73	8.72	8.83	8.75	9.19	8.84	8.79	8.76	8.90	9.08
11	---	8.67	8.62	8.74	8.82	8.84	9.19	8.87	8.73	8.78	8.92	9.09
12	---	8.67	8.70	8.72	8.86	8.80	9.20	8.89	8.69	8.75	9.08	9.10
13	---	8.64	8.74	8.76	8.92	8.77	9.19	8.99	8.65	8.76	9.14	9.11
14	---	8.68	8.77	8.74	8.86	8.78	9.19	8.92	8.64	8.78	9.17	9.12
15	---	8.52	8.79	8.90	8.83	8.86	9.18	8.84	8.63	8.85	9.19	9.12
16	---	8.62	8.76	8.77	8.84	8.79	9.22	8.78	8.67	8.84	9.13	9.13
17	---	8.66	8.64	8.74	8.87	8.75	9.16	8.93	8.69	8.82	8.94	9.15
18	---	8.70	8.57	8.75	8.87	8.75	9.18	8.98	8.70	8.83	8.89	9.19
19	8.88	8.77	8.63	8.76	8.87	8.77	9.17	8.84	8.72	8.84	8.88	9.20
20	8.90	8.67	8.66	8.75	8.81	9.01	9.12	8.91	8.69	8.83	8.92	9.21
21	8.84	8.73	8.63	8.81	8.79	9.00	9.12	9.03	8.75	8.80	8.96	9.21
22	8.84	8.64	8.62	8.83	8.74	8.93	9.12	9.01	8.71	8.80	9.02	9.22
23	8.89	8.64	8.62	8.80	8.79	8.89	9.12	8.92	8.70	8.79	9.00	9.24
24	8.83	8.65	8.67	8.69	8.80	8.93	9.11	8.83	8.69	8.78	9.00	9.26
25	8.65	8.66	8.69	8.70	8.80	8.98	9.09	8.82	8.71	8.78	9.00	9.29
26	8.57	8.73	8.71	8.77	8.78	9.24	9.08	8.80	8.71	8.80	9.01	9.31
27	8.61	8.72	8.69	8.80	8.84	9.27	9.14	8.75	8.67	8.80	9.03	9.33
28	8.57	8.67	8.68	8.84	8.78	9.32	9.17	8.74	8.69	8.80	9.04	9.33
29	8.57	8.76	8.76	9.05	---	9.36	9.14	8.78	8.71	8.79	9.02	9.34
30	8.62	8.72	8.79	9.02	---	9.33	9.13	8.77	8.72	8.98	9.02	9.36
31	8.68	---	8.76	9.02	---	9.35	---	8.83	---	8.84	9.03	---
MEAN	---	8.68	8.69	8.78	8.87	8.92	9.18	8.90	8.70	8.78	8.96	9.16
MAX	---	8.77	8.79	9.05	9.05	9.36	9.36	9.15	8.79	8.98	9.19	9.36
MIN	---	8.52	8.57	8.64	8.74	8.71	9.08	8.74	8.63	8.68	8.78	9.04

HAWAII, ISLAND OF KAUAI--Continued



HAWAII, ISLAND OF KAUAI

220133159242001. Local number, 2-0124-01. Northeast Kilohana monitor well.

LOCATION.--Lat 22°02', long 159°24', Hydrologic unit 20070000, 3.7 mi northwest of Lihue, and 3.8 mi west of the nearest shoreline. Owner: U.S. Geological Survey.

AQUIFER.--Koloa Volcanics, Pliocene to Pleistocene age.

WELL CHARACTERISTICS.--Drilled well, depth 1,033 ft, 10-in. solid steel outer casing: 0-161 ft; 4-in. solid steel casing: 0-80 ft; 4-in. alternating perforated/solid steel casing: 80-1,032 ft; annular space grouted: 0-160 ft; annular space open: 160-726 ft.

DATUM.--Elevation of land-surface datum is 466 ft. Measuring point is the top of 4-in. well casing, 467.12 ft above mean sea level.

PERIOD OF RECORD.--Water level: occasional measurements, started in November 1996. Continuous water level recorder, December 1996 to current year.

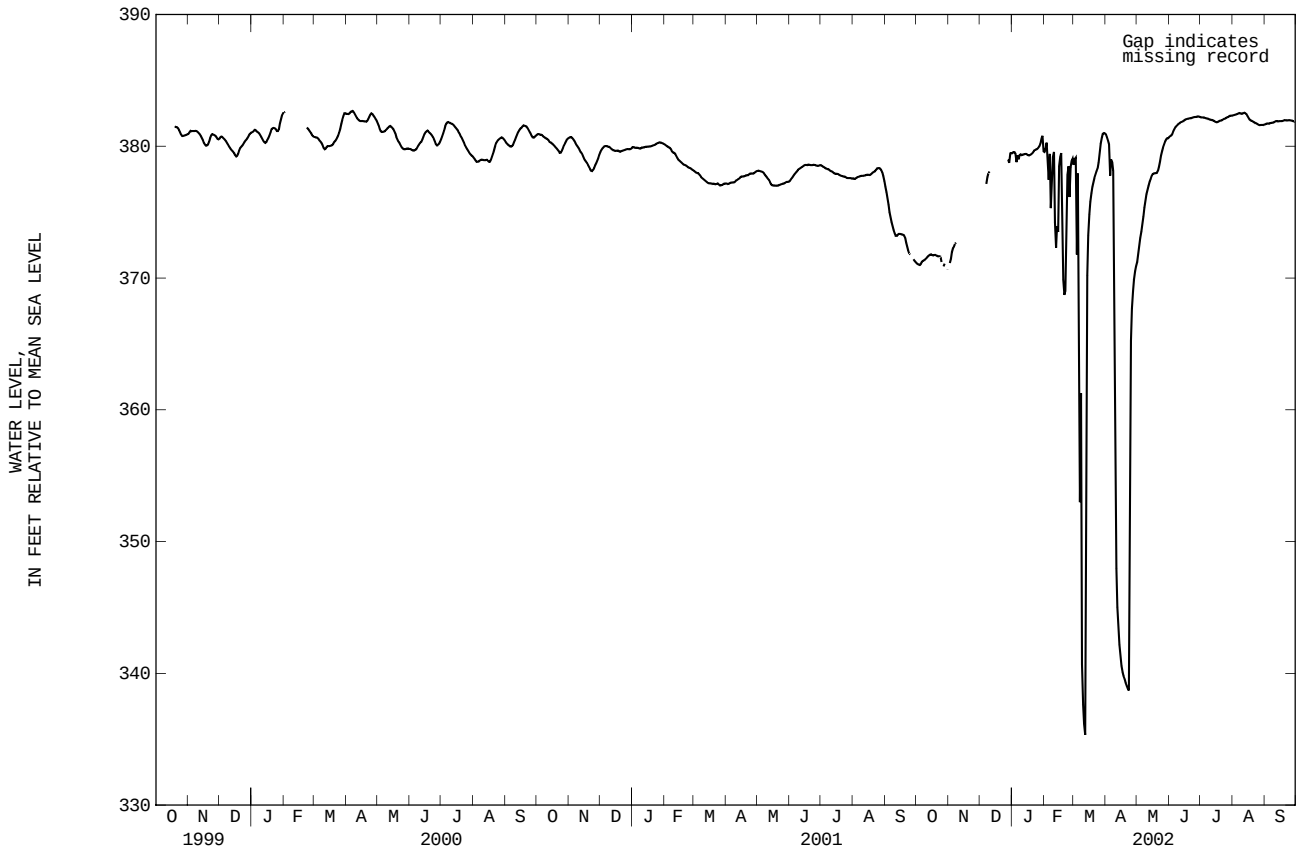
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 388.31 ft above mean sea level, May 19, 1998; lowest static water level measured, 368.10 ft above mean sea level, October 27, 1998. Lowest water level measured, 332.98 ft above sea level when nearby pump was running on Mar. 4, 2002.

REMARKS.--Well part of a network of observation wells in cooperation with the County of Kauai Department of Water. Water level affected by drilling of nearby well after August 2001.

WATER LEVEL, IN FEET RELATIVE TO MEAN SEA LEVEL, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	371.13	---	---	379.46	379.56	378.58	380.90	371.23	380.70	382.19	382.34	381.65
2	371.06	371.13	---	379.55	379.83	379.02	380.70	371.76	380.78	382.18	382.36	381.70
3	371.02	371.46	---	379.55	380.26	379.13	380.43	372.45	380.83	382.19	382.39	381.73
4	370.98	371.96	---	379.45	378.81	371.78	380.14	373.03	380.96	382.18	382.40	381.73
5	371.04	372.26	---	378.79	377.45	377.93	377.76	373.52	381.17	382.15	382.43	381.72
6	371.21	372.39	---	379.29	379.42	360.83	379.00	374.03	381.33	382.13	382.48	381.74
7	371.30	372.60	377.14	379.01	375.30	352.99	378.81	374.69	381.47	382.11	382.52	381.78
8	371.34	372.68	377.67	379.32	377.19	361.25	378.13	375.33	381.56	382.09	382.51	381.78
9	371.39	---	377.95	379.38	379.17	340.69	371.08	375.88	381.62	382.05	382.47	381.80
10	371.48	---	378.09	379.33	379.57	337.63	365.04	376.38	381.70	382.02	382.47	381.85
11	371.56	---	---	379.38	374.22	336.17	347.96	376.71	381.77	382.01	382.50	381.90
12	371.64	---	---	379.37	372.30	335.34	345.03	377.01	381.83	382.00	382.54	381.91
13	371.71	---	---	379.41	373.93	348.38	343.38	377.32	381.85	381.96	382.51	381.89
14	371.77	---	---	379.42	373.50	370.19	342.17	377.49	381.90	381.92	382.43	381.89
15	371.79	---	---	379.38	378.49	373.25	341.25	377.75	381.95	381.86	382.30	381.90
16	371.74	---	---	379.32	379.19	374.82	340.56	377.88	382.00	381.82	382.15	381.90
17	371.71	---	---	379.30	379.48	375.78	340.08	377.94	382.04	381.82	382.03	381.91
18	371.74	---	---	379.33	374.31	376.43	339.80	377.95	382.06	381.86	381.96	381.93
19	371.76	---	---	379.38	369.87	376.91	339.56	377.97	382.09	381.92	381.95	381.96
20	371.70	---	---	379.45	368.73	377.30	339.28	377.98	382.11	381.94	381.89	381.98
21	371.66	---	---	379.54	368.97	377.61	339.05	378.14	382.12	381.95	381.82	381.97
22	371.65	---	---	379.68	373.81	377.87	338.87	378.43	382.13	382.00	381.79	381.96
23	371.65	---	---	379.72	377.81	378.10	338.69	378.86	382.16	382.06	381.75	381.97
24	371.61	---	---	379.75	378.48	378.33	350.54	379.30	382.19	382.08	381.71	381.97
25	371.22	---	---	379.80	376.15	378.77	365.23	379.65	382.21	382.12	381.66	381.97
26	---	---	---	379.88	378.41	379.52	367.68	379.91	382.22	382.17	381.61	381.96
27	370.89	---	---	379.99	378.86	380.20	369.01	380.15	382.23	382.20	381.59	381.94
28	371.10	---	378.98	380.18	379.06	380.64	369.89	380.36	382.26	382.25	381.61	381.90
29	---	---	378.73	380.57	---	380.94	370.52	380.53	382.26	382.31	381.62	381.87
30	---	---	379.46	380.80	---	380.99	370.89	380.60	382.23	382.32	381.62	381.86
31	370.61	---	379.48	379.62	---	380.97	---	380.61	---	382.32	381.63	---
MEAN	---	---	---	379.56	376.50	369.62	359.05	377.12	381.79	382.07	382.10	381.87
MAX	---	---	---	380.80	380.26	380.99	380.90	380.61	382.26	382.32	382.54	381.98
MIN	---	---	---	378.79	368.73	335.34	338.69	371.23	380.70	381.82	381.59	381.65

HAWAII, ISLAND OF KAUAI--Continued



220126159261501. Local number, 2-0126-01. Northwest Kilohana monitor well, Kauai.

LOCATION.--Lat 22°01', long 159°26', Hydrologic unit 20070000, 5.3 northwest of Lihue, and 6.2 mi west of the nearest shoreline. Owner: U.S. Geological Survey.

AQUIFER.--Koloa Volcanics and Waimea Canyon Basalt, Miocene to Pleistocene age.

WELL CHARACTERISTICS.--Drilled well, depth 1,004 ft, 10-in. solid steel outer casing: 0-198 ft; 4-in. solid pvc casing: 0-126 ft; 4.5-in. perforated pvc casing: 126 ft to bottom; annular space grouted: 0-198 ft; annular space open: 198 ft to bottom.

DATUM.--Elevation of land-surface datum is 678 ft. Measuring point is the top of 4-in. well casing, 679.06 ft above mean sea level.

PERIOD OF RECORD.-- Water level: occasional measurements started in November 1996. Continuous water-level recorder, December 1996 to current year.

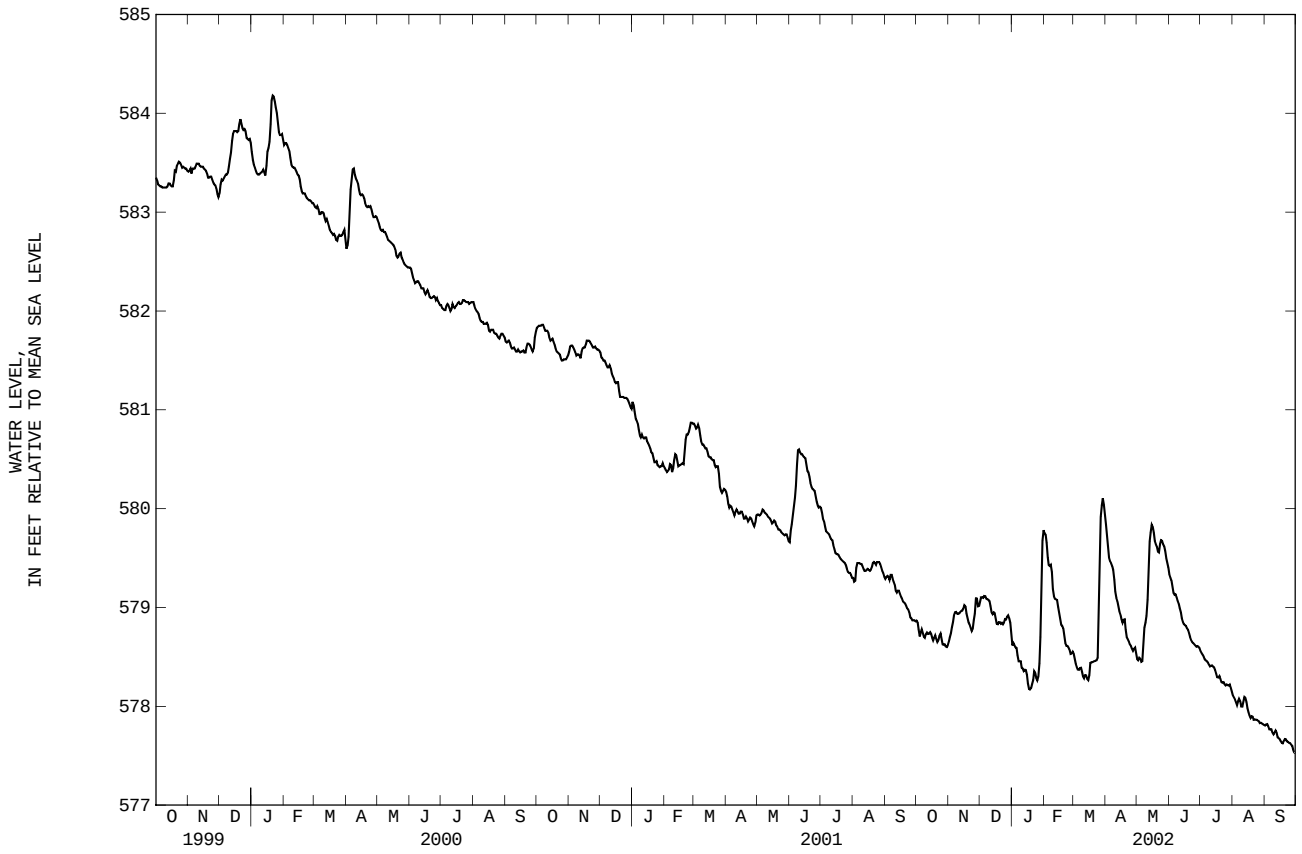
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 589.96 ft above mean sea level, December 23, 1996; lowest water level measured, 577.52 ft above mean sea level, September 30, 2002.

REMARKS.--Well part of network of observation wells in cooperation with the County of Kauai Department of Water.

WATER LEVEL, IN FEET RELATIVE TO MEAN SEA LEVEL, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	578.87	578.65	579.06	578.62	579.75	578.53	579.84	578.48	579.33	578.56	578.11	577.81
2	578.85	578.70	579.10	578.64	579.74	578.48	579.74	578.46	579.30	578.54	578.09	577.82
3	578.78	578.74	579.10	578.62	579.66	578.43	579.61	578.49	579.28	578.52	578.07	577.82
4	578.71	578.80	579.10	578.60	579.51	578.40	579.50	578.48	579.21	578.50	578.04	577.80
5	578.74	578.85	579.12	578.59	579.43	578.37	579.47	578.45	579.15	578.48	578.01	577.77
6	578.78	578.92	579.12	578.52	579.42	578.37	579.45	578.46	579.13	578.46	578.05	577.77
7	578.75	578.95	579.09	578.46	579.43	578.39	579.42	578.63	579.13	578.46	578.08	577.77
8	578.70	578.95	579.08	578.46	579.36	578.39	579.38	578.79	579.10	578.45	578.05	577.74
9	578.69	578.94	579.08	578.46	579.19	578.35	579.28	578.85	579.07	578.42	578.00	577.72
10	578.73	578.94	579.06	578.39	579.11	578.30	579.16	578.91	579.04	578.40	578.00	577.73
11	578.75	578.94	579.01	578.38	579.09	578.28	579.10	579.08	578.99	578.41	578.04	577.75
12	578.73	578.96	578.95	578.36	579.08	578.32	579.06	579.32	578.95	578.41	578.09	577.74
13	578.73	578.97	578.93	578.37	579.08	578.31	579.01	579.67	578.89	578.40	578.08	577.68
14	578.75	578.97	578.95	578.37	579.00	578.28	578.96	579.76	578.85	578.39	578.04	577.68
15	578.74	578.99	578.94	578.32	578.95	578.27	578.92	579.84	578.83	578.37	577.98	577.67
16	578.69	579.02	578.89	578.23	578.88	578.32	578.88	579.82	578.82	578.33	577.94	577.65
17	578.67	579.01	578.83	578.18	578.83	578.44	578.84	579.76	578.81	578.29	577.91	577.63
18	578.70	578.94	578.83	578.17	578.81	578.45	578.87	579.67	578.79	578.29	577.88	577.63
19	578.72	578.89	578.85	578.18	578.79	578.45	578.88	579.64	578.77	578.31	577.90	577.65
20	578.68	578.85	578.85	578.22	578.71	578.45	578.78	579.62	578.74	578.28	577.89	577.67
21	578.65	578.83	578.83	578.27	578.64	578.46	578.70	579.56	578.70	578.24	577.87	577.67
22	578.67	578.80	578.84	578.36	578.61	578.46	578.68	579.56	578.67	578.24	577.87	577.64
23	578.71	578.76	578.83	578.34	578.61	578.46	578.66	579.64	578.65	578.24	577.87	577.64
24	578.74	578.78	578.85	578.29	578.60	578.49	578.63	579.68	578.64	578.23	577.86	577.63
25	578.69	578.87	578.88	578.26	578.57	578.92	578.61	579.67	578.63	578.21	577.86	577.63
26	578.63	578.94	578.88	578.30	578.53	579.59	578.59	579.64	578.61	578.22	577.85	577.61
27	578.62	579.09	578.91	578.44	578.53	579.92	578.56	579.62	578.60	578.21	577.83	577.60
28	578.63	579.09	578.92	578.70	578.55	580.03	578.58	579.57	578.61	578.21	577.83	577.56
29	578.61	579.01	578.89	579.36	---	580.10	578.59	579.50	578.60	578.22	577.83	577.53
30	578.60	579.02	578.84	579.68	---	580.04	578.54	579.45	578.59	578.19	577.82	577.53
31	578.61	---	578.73	579.78	---	579.94	---	579.40	---	578.15	577.81	---
MEAN	578.71	578.91	578.95	578.51	579.02	578.71	579.01	579.27	578.88	578.34	577.95	577.68
MAX	578.87	579.09	579.12	579.78	579.75	580.10	579.84	579.84	579.33	578.56	578.11	577.82
MIN	578.60	578.65	578.73	578.17	578.53	578.27	578.54	578.45	578.59	578.15	577.81	577.53

HAWAII, ISLAND OF KAUAI--Continued



HAWAII, ISLAND OF KAUAI

220354159205602. Local number, 2-0320-03. Nonou W-B, Kauai.

LOCATION.--Lat 22°04', long 159°21', 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 Volcanics, Pliocene to Pleistocene age.

WELL CHARACTERISTICS.--Drilled water-table well, depth 302 ft; 14-in. casing diameter, cased to 168 ft.

DATUM.--Elevation of land-surface datum is 156 ft. Measuring point is the top of 1-in. hole on pump base on southeast side after removing elbow and nipple, 156.65 ft above mean sea level.

PERIOD OF RECORD.-- Water level: occasional measurements, August 1976 to current year. Water quality: occasional measurements, 1972, 1976 to current year.

REVISED RECORDS.--WDR HI-94-1: 1988-93 (the minimum water level for the period of record).

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 13.91 ft above mean sea level, November 19, 1982; lowest water level measured, 9.91 ft below mean sea level, August 21, 2002.

REMARKS.--Water is used for public supply. Water level affected by pumping and by nearby well.

WATER LEVEL, IN FEET RELATIVE TO MEAN SEA LEVEL, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 11	-8.35	DEC 19	-6.67	FEB 28	-9.72	APR 11	-8.80	JUN 05	-8.95	AUG 21	-9.91

HAWAII, ISLAND OF KAUAI

220825159185301. Local number 2-0818-03. Anahola C, Kauai.

LOCATION.--Lat 22°08', long 159°19', Hydrologic Unit 20070000, 1.3 mi southwest of Kahala Point, and 0.2 mi south of Anahola School. Owner: Kauai County, Department of Water.

AQUIFER.--Koloa Volcanics, Pliocene to Pleistocene age.

WELL CHARACTERISTICS.--Drilled water-table well, depth 466 ft, 12-in. casing diameter, cased to 290 ft.

DATUM.--Elevation of land-surface datum is 267 ft. Measuring point is the top of west side of 4 $\frac{1}{2}$-in. pipe at 268.98 ft above mean sea level.

PERIOD OF RECORD.--Occasional measurements, October 1991 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 12.64 ft above mean sea level, October 8, 1997; lowest water level measured, 7.34 ft above mean sea level, April 8, 1998, lowest water level measured with nearby pump on, 6.79 ft above mean sea level, February 15, 2000.

REMARKS.--Water for future public supply. Water level affected by pumping of nearby wells.

WATER LEVEL, IN FEET RELATIVE TO MEAN SEA LEVEL, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 11	10.36	DEC 19	10.62	FEB 28	10.33	APR 11	10.24	JUN 05	10.13	AUG 21	10.22

HAWAII, ISLAND OF KAUAI

221038159203801. Local number, 2-1020-03. Moloaa, Kauai.

LOCATION.--Lat 22°11', long 159°21', Hydrologic Unit 20070000, 2.6 mi south of Kulikoa Point, and 2.6 mi northwest of Kuaehu Point. Owner: Amfac Properties Development Corp.

AQUIFER.--Waimea Canyon Basalt, Miocene to Pliocene age.

WELL CHARACTERISTICS.--Drilled water-table well, depth 700 ft.

DATUM.--Elevation of land-surface datum is 358 ft. Measuring point is the top of temporary metal girder over well opening, elevation 358.52 ft above mean sea level.

PERIOD OF RECORD.-- Water level: occasional measurements, 1972 to current year. Water quality: occasional measurements, 1972 to 1991, 1997.

REVISED RECORDS.--WRD HI-94-1: 1988-93 (the minimum water level for the period of record).

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 144.56 ft above mean sea level, March 30, 1990; lowest water level measured, 66.17 ft above mean sea level, November 6, 1973, lowest water level measured with pump on, 42.69 ft above mean sea level, October 4, 1973.

REMARKS.--Pump is in the process of being replaced. Well unused at this time.

WATER LEVEL, IN FEET RELATIVE TO MEAN SEA LEVEL, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 09	89.59	DEC 05	90.74	FEB 13	92.50	APR 11	92.42	JUN 06	93.87	JUL 17	94.99

HAWAII, ISLAND OF KAUAI

221150159264501. Local number, 2-1126-01. Princeville W-1, Kauai.

LOCATION.--Lat 22°12', long 159°27', 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 Volcanics, Pliocene to Pleistocene age.

WELL CHARACTERISTICS.--Drilled water-table well, depth 763 ft; 14-in. casing diameter, cased to 435 ft.

DATUM.--Elevation of land-surface datum is 349 ft. Measuring point is the top of 3/4-in. pipe, in 1-in. hole on southside of pump base, after removing airline connection, 349.88 ft above mean sea level.

PERIOD OF RECORD.-- Water level: occasional measurements, 1972 to current year. Water quality: occasional measurements, 1977 to current year.

REVISED RECORDS.--WDR HI-94-1: 1988-93 (the minimum water level for the period of record).

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 43.36 ft above mean sea level, June 3, 1974; lowest water level measured, 4.12 ft below mean sea level, November 17, 1992, lowest water level measured with pump on, 10.30 ft below mean sea level, June 2, 1983.

REMARKS.--Water used for public supply and irrigation of golf course. Water level affected by pumping and by nearby well.

WATER LEVEL, IN FEET RELATIVE TO MEAN SEA LEVEL, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 09	6.53	DEC 05	7.46	FEB 13	8.23	APR 17	8.03	JUN 07	7.39	AUG 06	6.63

HAWAII, ISLAND OF KAUAI

221247159324801. Local number, 2-1232-01. Wainiha, Kauai.

LOCATION.--Lat 22°13', long 159°33', Hydrologic Unit 20070000, 0.9 mi southwest of Kolokoko Point, and 1.5 mi southeast of Haena Point. Owner: Kauai County, Department of Water.

AQUIFER.--Koloa Volcanics, Pliocene to Pleistocene age.

WELL CHARACTERISTICS.--Drilled water-table well, depth 188 ft, 6-in. casing diameter, cased to 140 ft.

DATUM.--Elevation of land-surface datum is 67 ft. Measuring point was the top of 1-in. pipe 0.06 ft above flange, 66.56 ft above mean sea level. New measuring point is the top of 1-in. pipe 0.16 ft above flange, 66.68 ft above mean sea level from levels of June 16, 1999.

PERIOD OF RECORD.-- Water level: occasional measurements, 1972 to current year. Water quality: occasional measurements, 1975 to current year.

REVISED RECORDS.--WDR HI-94-1: 1988-93 (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 water level measured, 4.69 ft above mean sea level, August 6, 1993, lowest water level measured with pump on, 10.04 ft below mean sea level, June 9, 1975.

REMARKS.--Water used for public supply. Water level affected by pumping.

WATER LEVEL, IN FEET RELATIVE TO MEAN SEA LEVEL, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 11	8.03	DEC 19	8.27	FEB 28	7.44	APR 11	6.49	JUN 05	no data	AUG 21	7.68

HAWAII, ISLAND OF KAUAI

221318159335901. Local number, 2-1333-01. Haena, Kauai.

LOCATION.--Lat 22°13', long 159°34', Hydrologic Unit 20070000, 0.6 mi south southwest of Haena Point, and 1.2 mi east southeast of Kailiu Point. Owner: Kauai County, Department of Water.

AQUIFER.--Waimea Canyon Basalt, Miocene to Pliocene age.

WELL CHARACTERISTICS.--Drilled water-table well, depth 159 ft; 8-in. casing diameter, cased to 104 ft.

DATUM.--Elevation of land-surface datum is 82 ft. Measuring point is the top of airline hole after removing plug, elevation 82.05 ft above mean sea level from levels of December 12, 1995.

PERIOD OF RECORD.-- Water level: occasional measurements, 1972 to current year. Water quality: occasional measurements, 1972 to current year.

REVISED RECORDS.--WRD HI-94-1: 1988-93 (the minimum water level for the period of record).

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 11.35 ft above mean sea level, December 8, 1989; lowest water level measured, 5.49 ft below mean sea level, June 7, 2001.

REMARKS.--Water used for public supply. Water level affected by pumping.

WATER LEVEL, IN FEET RELATIVE TO MEAN SEA LEVEL, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 11	-1.75	DEC 19	-1.21	FEB 28	6.25	APR 11	6.65	JUN 05	6.76	AUG 21	-1.99

HAWAII, ISLAND OF KAUAI

215434159263301. Local number, 2-5426-03. Koloa, Kauai.

LOCATION.--Lat 21°55', long 159°27', 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 Volcanics, Pliocene to Pleistocene age.

WELL CHARACTERISTICS.--Drilled water-table well, depth 318 ft, 12-in. casing diameter, cased to 176 ft.

DATUM.--Elevation of land-surface datum is 222 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.-- Water level: occasional measurements, 1972 to current year. Water quality: occasional measurements, 1997.

REVISED RECORDS.--WDR HI-94-1: 1988-93 (the minimum water level for the period of record).

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 34.83 ft above mean sea level, January 10, 1974; lowest water level measured, 15.48 ft above mean sea level, June 16, 1982, lowest water level measured with pump on, 5.05 ft above mean sea level, March 10, 1975.

REMARKS.--Water used for irrigation. Water level affected by pumping.

WATER LEVEL, IN FEET RELATIVE TO MEAN SEA LEVEL, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 10	25.29	DEC 21	25.53	MAR 01	25.28	APR 16	25.25	JUN 04	25.20	AUG 14	25.14

215454159274201. Local number, 2-5427-01. Koloa W-A, Kauai.

LOCATION.--Lat 21°55', long 159°28', 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, Department of Water.

AQUIFER.--Koloa Volcanics, Pliocene to Pleistocene age.

WELL CHARACTERISTICS.--Drilled water-table well, depth 455 ft; 12-in. casing diameter, cased to 263 ft.

DATUM.--Elevation of land-surface datum is 247 ft. Measuring point is the bottom edge of the east side opening on pump base 246.68 ft above mean sea level.

PERIOD OF RECORD.-- Water level: occasional measurements, 1972 to current year. Water quality: occasional measurements, 1972 to current year.

REVISED RECORDS.--WDR HI-94-1: 1988-94 (the minimum water level for the period of record).

REVISED RECORDS.--WDR HI-01-1: 1988-2001 (the maximum water level for the period of record).

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 39.74 ft above mean sea level, January 9, 1975; lowest water level measured, 27.97 ft above mean sea level, October 6, 1988, lowest water level measured with pump on, 22.77 ft above mean sea level, March 3, 1983.

REMARKS.--Water used for public supply. Water level affected by pumping and by nearby well.

WATER LEVEL, IN FEET RELATIVE TO MEAN SEA LEVEL, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 10	33.97	DEC 18	34.00	MAR 01	34.00	APR 10	33.73	JUN 04	33.80	AUG 20	33.58

HAWAII, ISLAND OF KAUAI

215522159342601. Local number, 2-5534-03. Hanapepe Town, Kauai.

LOCATION.--Lat 21°55', long 159°34', Hydrologic Unit 20070000, 1.9 mi north from Weli Point, and 2.9 mi northeast from Puolo Point. Owner: Kauai County, Department of Water.

AQUIFER.--Koloa Volcanics, Pliocene to Pleistocene age.

WELL CHARACTERISTICS.--Drilled water-table well, depth 109 ft; 9-in. casing diameter.

DATUM.--Elevation of land-surface datum is 79 ft. Measuring point is the top of 3/4-in. galvanized pipe on northwest side of pump base 78.78 ft above mean sea level.

PERIOD OF RECORD.-- Water level: occasional measurements, 1972 to current year. Water quality: occasional measurements, 1972 to current year.

REVISED RECORDS.--WDR HI-94-1: 1988-93 (the minimum water level for the period of record).

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 22.91 ft above mean sea level, February 1, 1990; lowest water level measured, 12.62 ft above mean sea level, May 20, 1986, lowest water level measured with pump on, 9.19 ft above mean sea level, October 13, 1978.

REMARKS.--Water used for public supply. Water level affected by pumping.

WATER LEVEL, IN FEET RELATIVE TO MEAN SEA LEVEL, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 10	15.78	DEC 18	19.00	MAR 01	17.95	APR 10	18.86	JUN 04	18.93	AUG 14	16.70

HAWAII, ISLAND OF KAUAI

215509159340401. Local number, 2-5534-06. Upper Eleele Reservoir, Kauai.

LOCATION.--Lat 21°55', long 159°34', Hydrologic Unit 20070000, 1.6 mi north of Weli Point and 2.4 mi northeast of Puolo Point. Owner: U.S. Geological Survey.

AQUIFER.--Koloa Volcanics, Pliocene to Pleistocene age.

WELL CHARACTERISTICS.--Drilled water-table well, depth 740 ft; 12 in solid steel outer casing: 0-100 ft.

DATUM.--Elevation of land surface is 385.48 ft. Measuring point is top of 4 inch pvc casing from September 9, 2002, 386.78 ft above mean sea level.

PERIOD OF RECORD.--Water-level recorder January 11, 2000 to present.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 17.62 ft above mean sea level, January 19, 2000; lowest water level measured, 11.02 ft above mean sea level, June 29, 2000.

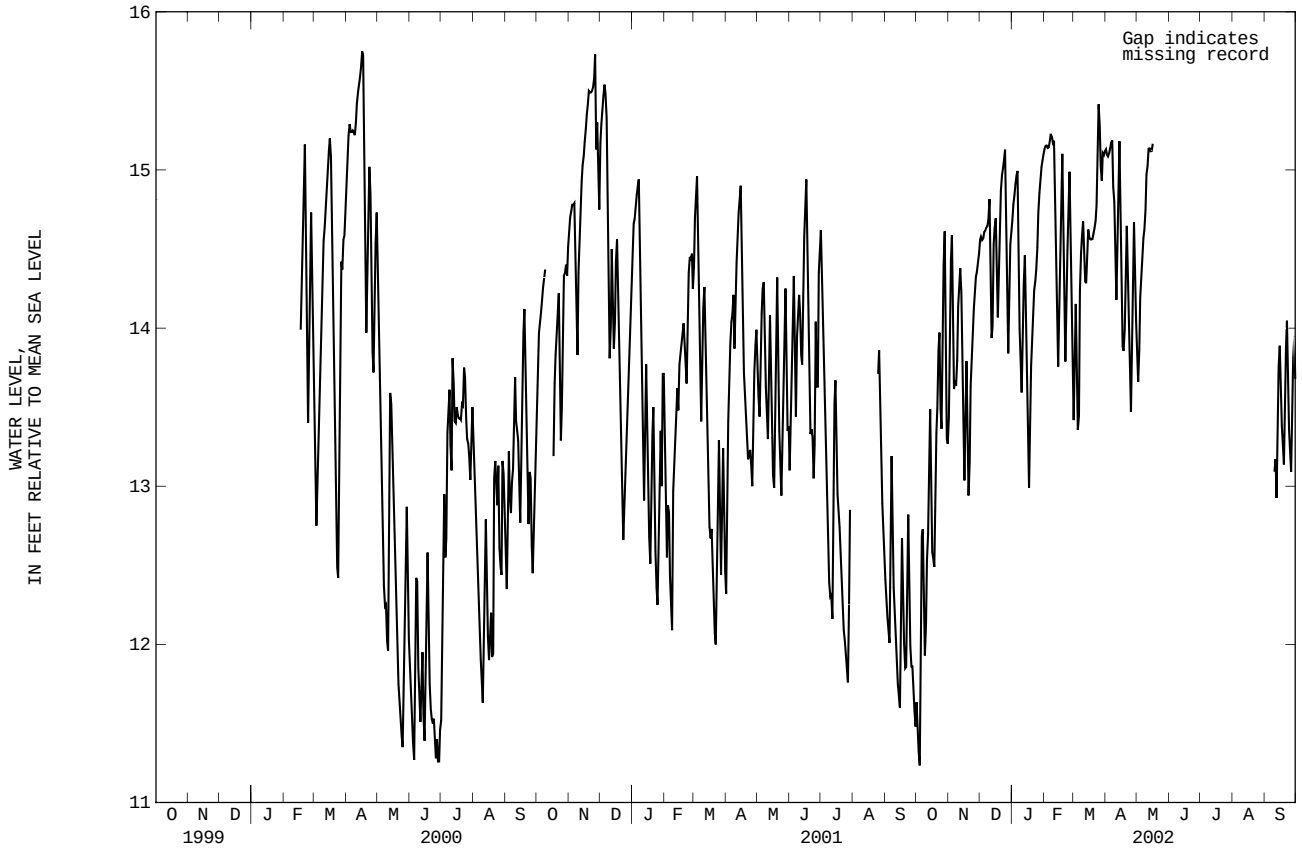
REMARKS.--Water level affected by pumping of nearby well.

WATER LEVEL, IN FEET RELATIVE TO MEAN SEA LEVEL, WATER YEAR OCTOBER 2000 TO SEPTEMBER 2001
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	13.73	14.61	15.17	14.51	13.35	14.39	12.32	13.77	13.10	14.62	---	12.41
2	13.87	14.70	15.29	14.66	12.83	14.70	12.78	13.57	13.73	14.20	---	12.29
3	13.97	14.74	15.39	14.69	12.55	14.82	13.41	13.44	13.98	13.63	---	12.17
4	14.04	14.78	15.47	14.77	12.88	14.96	13.66	13.73	14.18	13.36	---	12.08
5	14.10	14.78	15.54	14.84	12.83	14.54	13.90	14.09	14.33	13.12	---	12.01
6	14.19	14.79	15.48	14.90	12.43	13.92	14.04	14.25	13.93	12.87	---	12.80
7	14.26	14.46	15.33	14.94	12.28	13.60	14.09	14.29	13.44	12.69	---	13.19
8	14.32	14.06	14.73	14.38	12.09	13.41	14.21	13.96	13.95	12.54	---	12.79
9	14.37	13.83	14.14	13.75	12.97	13.71	13.87	13.63	14.07	12.39	---	12.36
10	---	14.35	13.81	13.45	13.17	14.13	14.20	13.49	14.21	12.30	---	12.19
11	---	14.53	14.01	13.14	13.36	14.26	14.41	13.30	14.10	12.31	---	12.01
12	---	14.70	14.50	12.91	13.50	13.86	14.56	13.62	13.83	12.16	---	11.87
13	---	14.93	14.12	13.28	13.62	13.41	14.73	14.08	13.77	12.87	---	11.75
14	---	15.03	13.87	13.77	13.48	13.13	14.82	13.73	14.07	13.52	---	11.67
15	---	15.09	14.04	13.52	13.77	12.90	14.90	13.27	14.58	13.67	---	11.60
16	---	15.18	14.42	12.96	13.83	12.74	14.42	13.07	14.79	13.39	---	12.07
17	13.19	15.26	14.56	12.68	13.90	12.67	13.92	12.99	14.94	12.95	---	12.67
18	13.65	15.35	14.10	12.51	13.96	12.73	13.72	13.40	14.48	12.83	---	12.42
19	13.83	15.42	13.48	12.78	14.03	12.40	13.58	13.97	13.88	12.74	---	12.01
20	13.96	15.50	13.21	13.32	13.89	12.23	13.48	14.32	13.58	12.56	---	11.85
21	14.09	15.49	13.02	13.50	13.76	12.07	13.33	13.86	13.33	12.43	---	11.86
22	14.22	15.49	12.88	13.11	13.65	12.00	13.17	13.35	13.36	12.27	---	12.31
23	13.83	15.50	12.66	12.59	14.14	12.45	13.20	13.12	13.31	12.09	---	12.82
24	13.29	15.52	12.99	12.36	14.35	13.00	13.23	12.94	13.05	12.02	---	12.45
25	13.49	15.58	13.51	12.25	14.45	13.29	13.13	13.31	13.26	11.93	13.71	11.99
26	14.10	15.73	13.71	12.60	14.43	12.91	13.00	13.81	14.04	11.83	13.86	11.86
27	14.33	15.13	13.87	13.10	14.47	12.44	13.35	14.09	13.63	11.76	13.53	11.86
28	14.35	15.30	13.99	13.35	14.25	12.77	13.72	14.25	13.63	12.25	13.14	11.73
29	14.40	14.98	14.11	13.00	---	13.24	13.89	13.88	14.35	12.85	12.89	11.58
30	14.33	14.75	14.22	13.71	---	12.89	13.99	13.35	14.51	---	12.76	11.48
31	14.51	---	14.35	13.71	---	12.46	---	13.38	---	---	12.57	---
MEAN	---	14.99	14.19	13.52	13.51	13.29	13.77	13.66	13.91	---	---	12.14
MAX	---	15.73	15.54	14.94	14.47	14.96	14.90	14.32	14.94	---	---	13.19
MIN	---	13.83	12.66	12.25	12.09	12.00	12.32	12.94	13.05	---	---	11.48

WATER LEVEL, IN FEET RELATIVE TO MEAN SEA LEVEL, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	11.63	13.44	14.56	14.68	15.13	13.42	15.13	13.88	---	---	---	---
2	11.45	13.82	14.58	14.78	15.15	13.74	15.10	13.66	---	---	---	---
3	11.32	14.44	14.56	14.84	15.15	14.15	15.08	13.86	---	---	---	---
4	11.23	14.59	14.57	14.91	15.14	13.83	15.10	14.20	---	---	---	---
5	12.01	14.11	14.61	14.97	15.14	13.36	15.14	14.35	---	---	---	---
6	12.69	13.61	14.62	14.99	15.18	13.45	15.17	14.46	---	---	---	---
7	12.73	13.67	14.63	14.51	15.23	14.24	15.19	14.57	---	---	---	---
8	12.38	13.64	14.65	13.99	15.21	14.47	14.90	14.62	---	---	---	---
9	11.93	13.80	14.69	13.80	15.17	14.58	14.80	14.75	---	---	---	---
10	12.12	14.14	14.82	13.59	15.18	14.67	14.60	14.97	---	---	---	13.09
11	12.53	14.27	14.50	13.86	14.79	14.52	14.18	15.03	---	---	---	13.17
12	12.70	14.38	13.94	14.28	14.47	14.30	14.66	15.13	---	---	---	12.93
13	13.12	14.23	14.01	14.46	14.06	14.28	14.98	15.14	---	---	---	13.25
14	13.49	13.59	14.53	14.06	13.76	14.45	15.18	15.12	---	---	---	13.76
15	13.04	13.28	14.63	13.52	14.18	14.62	14.76	15.12	---	---	---	13.89
16	12.58	13.04	14.69	13.22	14.66	14.57	14.15	15.17	---	---	---	13.63
17	12.55	13.37	14.35	12.99	14.90	14.56	13.88	---	---	---	---	13.38
18	12.49	13.79	14.07	13.32	15.10	14.56	13.86	---	---	---	---	13.25
19	12.88	13.44	14.49	13.76	14.70	14.56	13.99	---	---	---	---	13.14
20	13.34	12.94	14.73	13.91	14.09	14.60	14.41	---	---	---	---	13.47
21	13.50	13.15	14.87	14.07	13.79	14.63	14.65	---	---	---	---	13.88
22	13.86	13.63	14.97	14.24	14.02	14.68	14.32	---	---	---	---	14.05
23	13.97	13.80	15.01	14.29	14.49	14.78	13.91	---	---	---	---	13.73
24	13.49	13.95	15.07	14.37	14.69	15.13	13.68	---	---	---	---	13.36
25	13.36	14.12	15.13	14.51	14.99	15.42	13.47	---	---	---	---	13.21
26	13.90	14.23	14.65	14.73	14.54	15.28	13.88	---	---	---	---	13.09
27	14.40	14.33	14.09	14.86	13.94	15.02	14.46	---	---	---	---	13.45
28	14.61	14.35	13.84	14.92	13.67	14.93	14.67	---	---	---	---	13.81
29	13.92	14.42	14.18	15.02	---	15.11	14.33	---	---	---	---	13.95
30	13.30	14.48	14.53	15.06	---	15.10	14.05	---	---	---	---	13.68
31	13.27	---	14.61	15.10	---	15.12	---	---	---	---	---	---
MEAN	12.90	13.87	14.55	14.31	14.66	14.52	14.52	---	---	---	---	---
MAX	14.61	14.59	15.13	15.10	15.23	15.42	15.19	---	---	---	---	---
MIN	11.23	12.94	13.84	12.99	13.67	13.36	13.47	---	---	---	---	---



215630159265101. Local number, 2-5626-01. Puakukui Springs, Kauai.

LOCATION.--Lat 21°56', long 159°27', Hydrologic Unit 20070000, 5.7 mi south of Lihue, and 3.8 mi northwest of the nearest shoreline. Owner: U.S. Geological Survey.

AQUIFER.--Waimea Canyon Basalt, Miocene to Pliocene age.

WELL CHARACTERISTICS.--Drilled well, depth 802 ft; 12.25-in. solid steel outer casing: 0-156 ft; 4-in. solid pvc casing: 0-20 ft; annular space grouted: 0-256 ft; open hole: 256 ft to bottom.

DATUM.--Elevation of land-surface is 485 ft. Measuring point is the top of 4-in. well casing, 485.40 ft above mean sea level.

PERIOD OF RECORD.--Occasional measurements, 1996 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 180.15 ft above mean sea level, December 14, 1998; lowest water level measured, 173.49 ft above mean sea level, November 8, 1996.

REMARKS.--Well part of a network of observation wells in cooperation with the County of Kauai Department of Water.

WATER LEVEL, IN FEET RELATIVE TO MEAN SEA LEVEL, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 15	178.30	DEC 27	178.05	MAR 04	177.49	MAY 28	177.08	SEP 04	176.65
DEC 03	177.92	JAN 22	177.81	APR 15	177.25	JUL 10	176.83		

HAWAII, ISLAND OF KAUAI

215607159344301. Local number 2-5634-01. Hanapepe Ridge, Kauai.

LOCATION.--Lat 21°56', long 159°35', Hydrologic Unit 20070000, 2.7 mi north of Weli Point, and 3.3 mi northeast of Puolo Point. Owner: State of Hawaii.

AQUIFER.--Koloa Volcanics, Pliocene to Pleistocene age.

WELL CHARACTERISTICS.--Drilled water-table well, depth 508 ft, 8-in. casing diameter, cased to 507 ft.

DATUM.--Elevation of land-surface datum is 439 ft. Measuring point is the top of recorder shelf 440.68 ft above mean sea level.

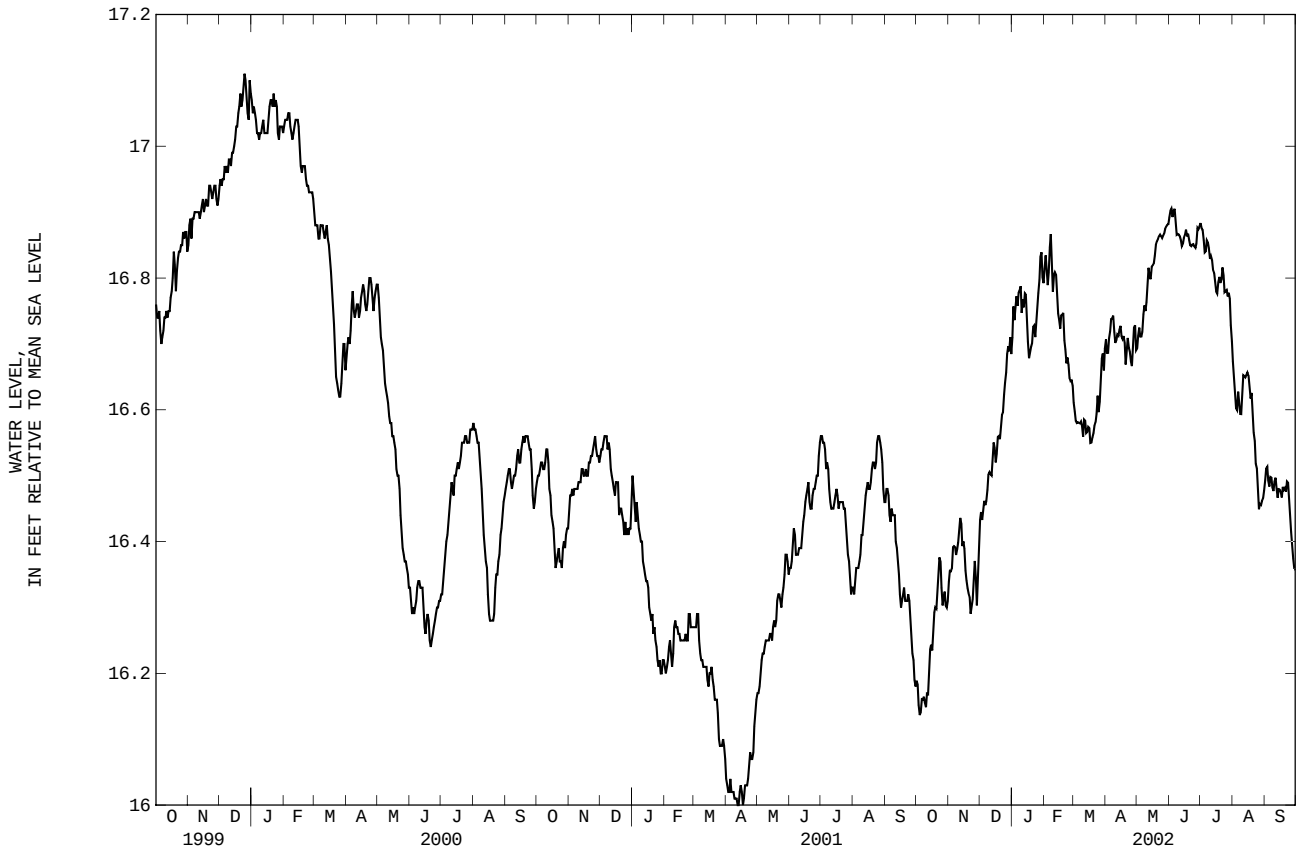
PERIOD OF RECORD.--Water-level recorder, February 1986 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 17.83 ft above mean sea level, January 15, 16, 1992; lowest water level measured, 15.87 ft above mean sea level, November 1, 1989.

WATER LEVEL, IN FEET RELATIVE TO MEAN SEA LEVEL, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	16.19	16.34	16.43	16.71	16.81	16.61	16.71	16.69	16.89	16.88	16.67	16.49
2	16.18	16.36	16.44	16.76	16.83	16.60	16.69	16.71	16.90	16.88	16.65	16.51
3	16.15	16.35	16.43	16.74	16.81	16.58	16.69	16.72	16.91	16.87	16.63	16.51
4	16.14	16.36	16.45	16.75	16.79	16.58	16.71	16.71	16.89	16.86	16.60	16.49
5	16.14	16.39	16.46	16.77	16.81	16.58	16.72	16.71	16.90	16.84	16.60	16.48
6	16.16	16.39	16.46	16.76	16.85	16.58	16.74	16.72	16.91	16.84	16.63	16.50
7	16.16	16.39	16.46	16.78	16.87	16.58	16.74	16.75	16.89	16.86	16.61	16.50
8	16.16	16.38	16.48	16.78	16.82	16.58	16.74	16.76	16.87	16.85	16.59	16.48
9	16.16	16.39	16.50	16.79	16.78	16.58	16.72	16.75	16.87	16.85	16.59	16.48
10	16.15	16.40	16.51	16.75	16.80	16.56	16.70	16.76	16.87	16.83	16.62	16.49
11	16.17	16.42	16.50	16.77	16.81	16.59	16.71	16.79	16.86	16.83	16.65	16.50
12	16.17	16.44	16.50	16.76	16.80	16.58	16.71	16.82	16.86	16.83	16.65	16.48
13	16.20	16.43	16.52	16.78	16.78	16.56	16.71	16.80	16.85	16.81	16.65	16.47
14	16.24	16.39	16.55	16.77	16.75	16.57	16.72	16.80	16.85	16.81	16.65	16.48
15	16.24	16.40	16.54	16.74	16.74	16.57	16.73	16.82	16.86	16.80	16.66	16.48
16	16.23	16.39	16.52	16.70	16.72	16.57	16.71	16.82	16.87	16.78	16.65	16.48
17	16.26	16.36	16.53	16.68	16.74	16.55	16.71	16.82	16.87	16.78	16.64	16.47
18	16.29	16.34	16.56	16.69	16.74	16.55	16.71	16.83	16.86	16.79	16.62	16.48
19	16.30	16.33	16.56	16.70	16.75	16.56	16.70	16.85	16.87	16.80	16.63	16.48
20	16.30	16.32	16.56	16.70	16.71	16.56	16.67	16.86	16.86	16.79	16.59	16.48
21	16.32	16.32	16.57	16.73	16.69	16.58	16.69	16.86	16.85	16.80	16.57	16.48
22	16.35	16.29	16.59	16.73	16.67	16.58	16.71	16.86	16.85	16.82	16.55	16.49
23	16.38	16.30	16.60	16.71	16.68	16.59	16.69	16.87	16.85	16.80	16.52	16.49
24	16.37	16.31	16.62	16.73	16.67	16.62	16.69	16.86	16.85	16.78	16.51	16.47
25	16.33	16.34	16.64	16.75	16.65	16.60	16.67	16.86	16.85	16.78	16.48	16.44
26	16.30	16.37	16.66	16.78	16.64	16.61	16.67	16.86	16.85	16.78	16.45	16.41
27	16.31	16.34	16.68	16.80	16.64	16.64	16.70	16.87	16.85	16.77	16.46	16.39
28	16.32	16.30	16.70	16.83	16.64	16.68	16.72	16.87	16.88	16.78	16.46	16.37
29	16.30	16.35	16.69	16.84	---	16.69	16.73	16.88	16.87	16.77	16.46	16.36
30	16.30	16.40	16.71	16.80	---	16.66	16.69	16.88	16.88	16.73	16.47	16.36
31	16.31	---	16.68	16.79	---	16.69	---	16.88	---	16.70	16.48	---
MEAN	16.24	16.36	16.55	16.75	16.75	16.59	16.71	16.81	16.87	16.81	16.58	16.47
MAX	16.38	16.44	16.71	16.84	16.87	16.69	16.74	16.88	16.91	16.88	16.67	16.51
MIN	16.14	16.29	16.43	16.68	16.64	16.55	16.67	16.69	16.85	16.70	16.45	16.36

HAWAII, ISLAND OF KAUAI--Continued



HAWAII, ISLAND OF KAUAI

215856159243201. Local number, 2-5824-02. Kilohana D, Kauai.

LOCATION.--Lat 21°59', long 159°24', Hydrologic Unit 20070000, 2.0 mi nwest of Lihue, and 3.5 mi northwest of the nearest shoreline. Owner: Kauai County, Department of Water.

AQUIFER.--Koloa Volcanics, Pliocene to Pleistocene age.

WELL CHARACTERISTICS.--Drilled water-table well, depth 250 ft, 12-in. solid casing: 0-60 ft; 12-in. perforated casing; 60-185 ft; 8-in. open hole: 185-200 ft; 6-in. open hole; 200-250 ft.

DATUM.--Elevation of land surface is 482 ft. Measuring point is top of the 12-in. well casing, 483.68 ft above mean sea level.

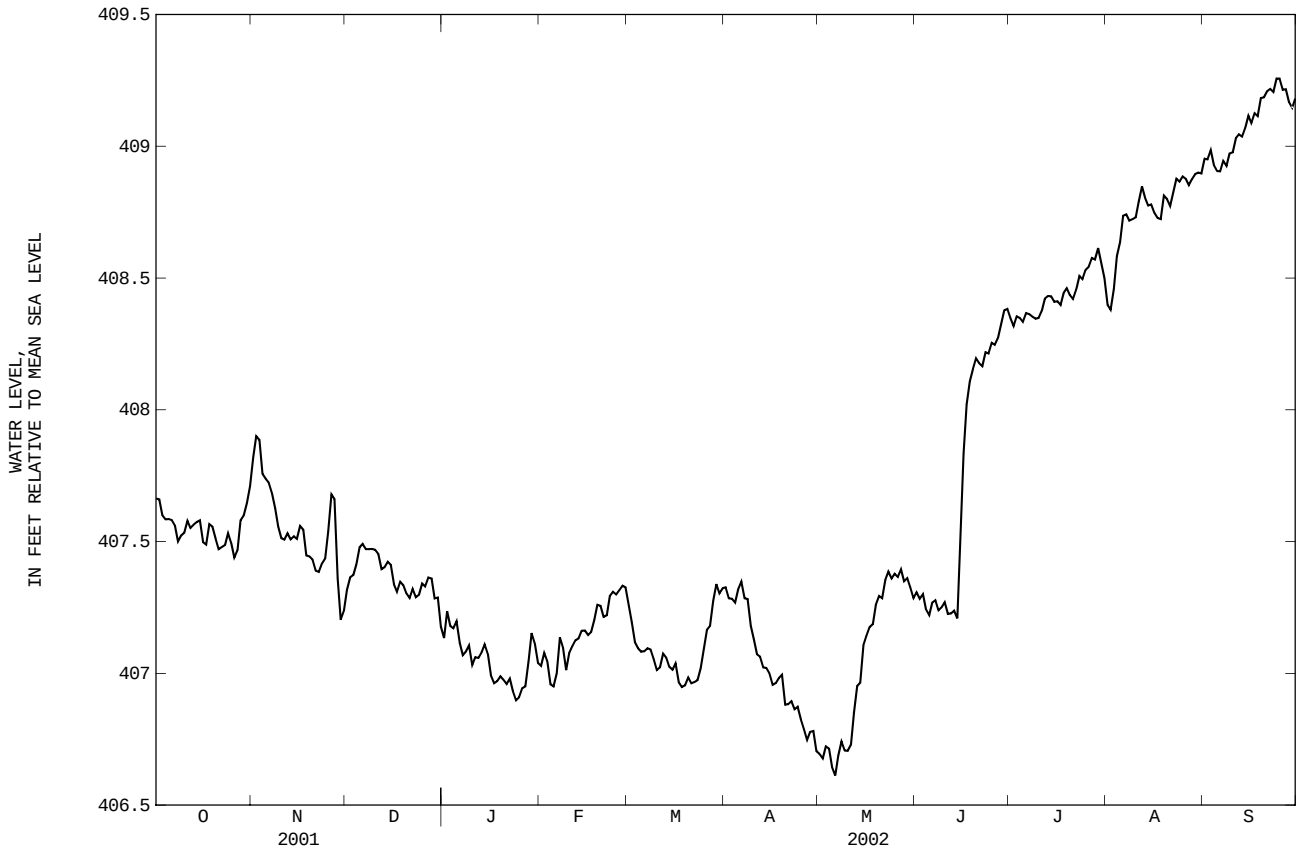
PERIOD OF RECORD.--Water-level recorder, December 1999 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 409.29 ft above mean sea level, September 25, 2002; lowest water level measured, 406.57 ft above mean sea level, May 6, 2002.

WATER LEVEL, IN FEET RELATIVE TO MEAN SEA LEVEL, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	407.66	407.82	407.32	407.13	407.03	407.26	407.33	406.69	407.31	408.35	408.40	408.95
2	407.66	407.90	407.36	407.24	407.08	407.19	407.28	406.68	407.28	408.32	408.38	408.95
3	407.60	407.89	407.37	407.18	407.05	407.12	407.28	406.72	407.30	408.35	408.46	408.98
4	407.58	407.76	407.41	407.17	406.96	407.10	407.27	406.71	407.24	408.35	408.58	408.93
5	407.59	407.74	407.48	407.20	406.95	407.08	407.32	406.64	407.22	408.33	408.64	408.91
6	407.58	407.72	407.49	407.12	407.00	407.08	407.35	406.61	407.27	408.37	408.74	408.90
7	407.56	407.68	407.47	407.07	407.14	407.09	407.29	406.69	407.28	408.36	408.74	408.94
8	407.50	407.63	407.47	407.08	407.10	407.09	407.28	406.74	407.24	408.35	408.72	408.93
9	407.52	407.56	407.47	407.11	407.01	407.05	407.18	406.71	407.25	408.35	408.72	408.97
10	407.53	407.51	407.47	407.03	407.08	407.01	407.13	406.71	407.27	408.35	408.73	408.98
11	407.58	407.51	407.45	407.06	407.10	407.02	407.07	406.73	407.23	408.38	408.79	409.03
12	407.55	407.53	407.40	407.06	407.13	407.07	407.06	406.85	407.23	408.42	408.85	409.04
13	407.56	407.51	407.40	407.08	407.13	407.06	407.02	406.95	407.24	408.43	408.81	409.04
14	407.57	407.52	407.42	407.11	407.16	407.02	407.02	406.96	407.21	408.43	408.77	409.07
15	407.58	407.51	407.41	407.07	407.16	407.01	407.00	407.11	407.51	408.41	408.78	409.12
16	407.50	407.56	407.34	406.99	407.15	407.04	406.96	407.14	407.84	408.41	408.75	409.09
17	407.49	407.55	407.31	406.96	407.16	406.97	406.96	407.18	408.02	408.40	408.73	409.13
18	407.57	407.45	407.35	406.97	407.20	406.95	406.98	407.19	408.11	408.44	408.72	409.11
19	407.56	407.44	407.33	406.99	407.26	406.95	406.99	407.26	408.15	408.46	408.81	409.18
20	407.51	407.43	407.30	406.98	407.26	406.98	406.88	407.29	408.19	408.43	408.80	409.19
21	407.47	407.39	407.29	406.96	407.21	406.96	406.88	407.29	408.18	408.42	408.77	409.21
22	407.48	407.38	407.32	406.98	407.22	406.97	406.89	407.35	408.17	408.46	408.82	409.22
23	407.49	407.42	407.29	406.93	407.29	406.97	406.86	407.39	408.22	408.51	408.88	409.21
24	407.53	407.44	407.30	406.90	407.31	407.02	406.87	407.36	408.21	408.50	408.87	409.26
25	407.49	407.54	407.34	406.91	407.30	407.09	406.83	407.38	408.25	408.53	408.89	409.26
26	407.44	407.68	407.33	406.94	407.31	407.16	406.79	407.37	408.25	408.54	408.88	409.21
27	407.47	407.66	407.36	406.95	407.33	407.18	406.75	407.39	408.27	408.58	408.85	409.22
28	407.58	407.36	407.36	407.05	407.33	407.27	406.78	407.35	408.33	408.57	408.88	409.17
29	407.60	407.20	407.28	407.15	---	407.34	406.78	407.36	408.38	408.61	408.89	409.14
30	407.65	407.24	407.29	407.11	---	407.30	406.70	407.33	408.38	408.56	408.90	409.18
31	407.71	---	407.18	407.04	---	407.32	---	407.29	---	408.50	408.90	---
MEAN	407.55	407.55	407.37	407.05	407.16	407.09	407.03	407.05	407.73	408.43	408.76	409.08
MAX	407.71	407.90	407.49	407.24	407.33	407.34	407.35	407.39	408.38	408.61	408.90	409.26
MIN	407.44	407.20	407.18	406.90	406.95	406.95	406.70	406.61	407.21	408.32	408.38	408.90

HAWAII, ISLAND OF KAUAI--Continued



HAWAII, ISLAND OF KAUAI

215803159401201. Local number, 2-5840-01. Waimea, Kauai.

LOCATION.--Lat 21°58', long 159°40', 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, Department of Water.

AQUIFER.--Waimea Canyon Basalt, Miocene to Pliocene age.

WELL CHARACTERISTICS.--Drilled water-table well, depth 190 ft, 8-in. casing diameter, cased to 167 ft.

DATUM.--Elevation of land-surface datum is 168 ft. Measuring point is the top of 1-in. hole on pump base, 168.17 ft above mean sea level.

PERIOD OF RECORD.-- Water level: occasional measurements, 1973 to current year. Water quality: occasional measurements, 1973 to current year.

REVISED RECORDS.--WDR HI-94-1: 1988-93 (the minimum water level for the period of record).

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 13.10 ft above mean sea level, January 26, 1989; lowest water level measured, 6.58 ft above mean sea level, July 19, 1990, lowest water level measured with pump on, 4.76 ft above mean sea level, December 8, 1980.

REMARKS.--Water used for public supply. Water level affected by pumping.

WATER LEVEL, IN FEET RELATIVE TO MEAN SEA LEVEL, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 10	8.67	DEC 18	8.31	MAR 01	8.65	APR 10	8.74	JUN 04	8.67	AUG 20	8.68

HAWAII, ISLAND OF KAUAI

215857159430101. Local number, 2-5843-01. Kekaha Shaft, Kauai.

LOCATION.--Lat 21°59', long 159°43', Hydrologic Unit 20070000, 2.7 mi east northeast from Kokole Point, and 1.4 mi north northwest of Oomano Point. Owner: Kauai County, Department of Water.

AQUIFER.--Waimea Canyon Basalt, Miocene to Pliocene age.

WELL CHARACTERISTICS.--Drilled water-table well, depth 55 ft, 15-ft casing diameter, cased to 10 ft.

DATUM.--Elevation of land surface is 57 ft. Measuring point was the top of $\frac{1}{4}$-in. steel plate 57.80 ft above mean sea level. Measuring point changed April 12, 2000, to top of 1-in. pipe, 57.97 ft above mean sea level.

PERIOD OF RECORD.-- Water level: occasional measurements, 1972, 1985 to current year. Water quality: occasional measurements, 1972, 1997 to current year.

REVISED RECORDS.--WDR HI-94-1: 1988-93 (the minimum water level for the period of record).

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 9.52 ft above mean sea level, February 5, 1990; lowest water level measured, 7.82 ft above mean sea level, April 25, 1988.

REMARKS.--Well used for public supply. Water level affected by pumping.

WATER LEVEL, IN FEET RELATIVE TO MEAN SEA LEVEL, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 10	8.69	DEC 18	8.79	MAR 01	8.75	APR 10	8.82	JUN 04	8.73	AUG 10	8.78

HAWAII, ISLAND OF KAUAI

215958159214301. Local number 2-5921-01. Kalepa Ridge, W-10, Kauai.

LOCATION.--Lat 22°00', long 159°22', 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 Basalt, Miocene to Pliocene age.

WELL CHARACTERISTICS.--Drilled water-table well, depth 540 ft, 14-in. casing diameter, cased to 315 ft.

DATUM.--Elevation of land-surface datum is 302 ft. Measuring point is the top of 1-in. pipe, northeast side of flange after removing the plug, elevation 302.66 ft above mean sea level.

PERIOD OF RECORD.-- Water level: occasional measurements, July 1980 to September 1985. Water-level recorder, October 1985 to July 1992. Occasional measurements, October 1992 to current year. Water quality: occasional measurements, 1997 to current year.

REVISED RECORDS.--WDR HI-94-1: 1988-93 (the minimum water level for the period of record).

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 17.69 ft above mean sea level, November 26, 1985; lowest water level measured, 8.21 ft above mean sea level, April 1, 2002.

REMARKS.--Water level affected by pumping.

WATER LEVEL, IN FEET RELATIVE TO MEAN SEA LEVEL, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 11	8.95	DEC 19	8.56	FEB 28	8.22	APR 11	8.21	JUN 05	8.87	AUG 21	9.09

HAWAII, ISLAND OF KAUAI

215901159235201. Local number 2-5923-07. Kilohana W-I, Kauai.

LOCATION.--Lat 21°59', long 159°24', Hydrologic Unit 20070000, 4.2 mi northwest of Ninini Point and 3.4 mi west from Lihue Airport terminal. Owner: Kauai County, Department of Water.

AQUIFER.--Koloa Volcanics, Pliocene to Pleistocene age.

WELL CHARACTERISTICS.--Drilled water-table well, depth 200 ft, 12-in. casing diameter, cased to 200 ft.

DATUM.--Elevation of land-surface datum is 364 ft. Measuring point is the top of 1-in. pump base opening, after removing copper fittings, 365.29 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, December 8, 1989; lowest water level measured, 207.40 ft above mean sea level, August 2, 2001.

REMARKS.--Water used for public supply. Water level affected by pumping and by nearby well.

WATER LEVEL, IN FEET RELATIVE TO MEAN SEA LEVEL, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 11	207.55	DEC 19	212.96	FEB 28	213.19	APR 11	215.55	JUN 05	213.09	AUG 21	212.94

215950159231601. Local number 2-5923-08. Hanamaulu monitor well, Kauai.

LOCATION.--Lat 22°00', long 159°23', Hydrologic Unit 20070000, 1.5 mi northwest of Lihue, and 2.8 mi west of the nearest shoreline. Owner: U.S. Geological Survey.

AQUIFER.--Koloa Volcanics, Pliocene to Pleistocene age.

WELL CHARACTERISTICS.---Drilled well, depth 1,002 ft, 12.75-in. solid steel outer casing: 0-124 ft; 4-in. solid pvc casing: 0-87 ft; 4-in. perforated pvc casing: 87 ft to bottom; annular space grouted: 0-124 ft; annular space gravel packed: 124 ft to bottom.

DATUM.--Elevation of land-surface datum is 272 ft. Measuring point is the top of 4-in. well casing, 273.49 ft above mean sea level.

PERIOD OF RECORD.--Water-level recorder, February 1996 to current year.

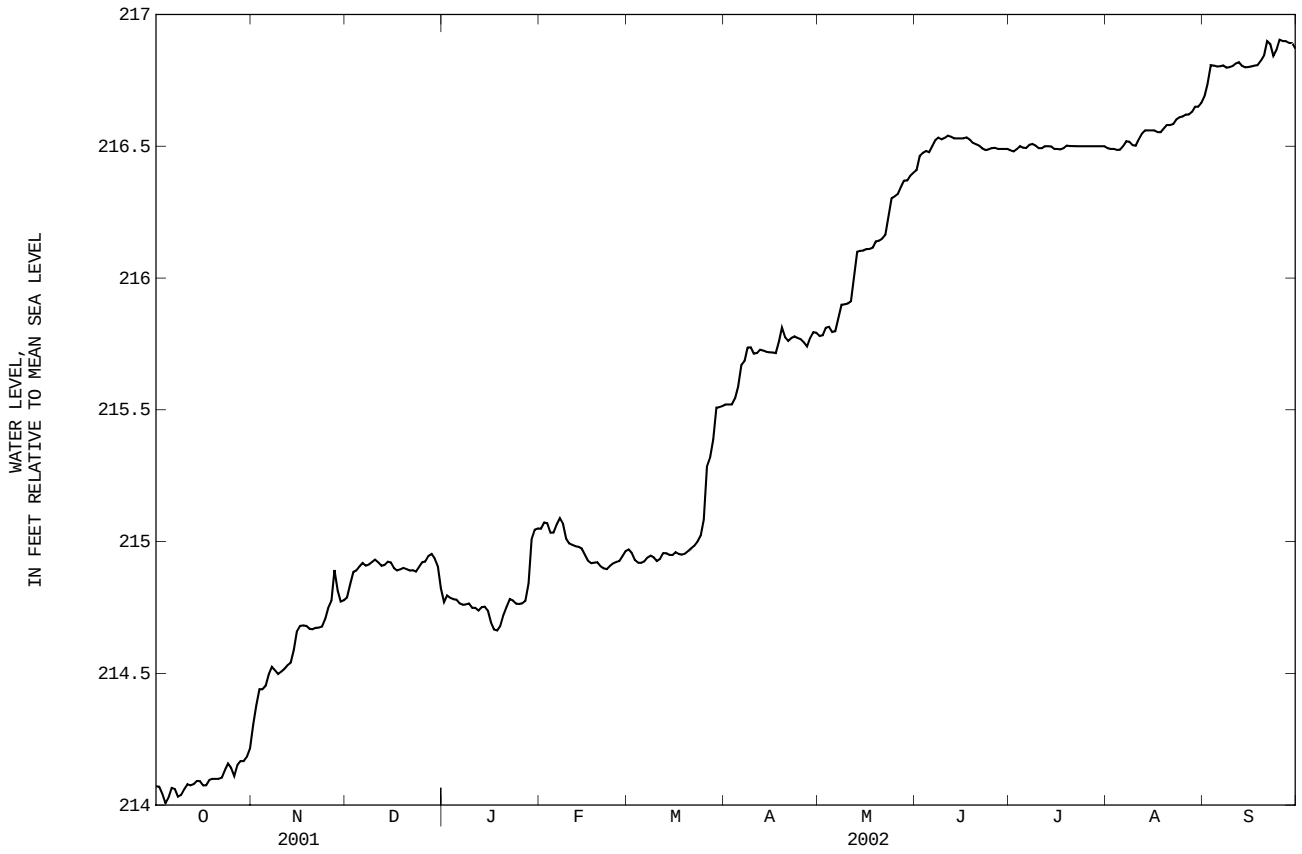
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 244.14 ft above mean sea level, April 10, 1997; lowest water level measured, 204.37 ft above mean sea level, January 20, 21, 1998.

REMARKS.--Well part of network of observation wells in cooperation with the County of Kauai Department of Water.

WATER LEVEL, IN FEET RELATIVE TO MEAN SEA LEVEL, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	214.07	214.30	214.79	214.77	215.05	214.97	215.52	215.78	216.41	216.48	216.49	216.69
2	214.07	214.38	214.84	214.80	215.07	214.96	215.52	215.78	216.46	216.48	216.49	216.74
3	214.04	214.44	214.88	214.79	215.07	214.93	215.52	215.81	216.48	216.49	216.49	216.81
4	214.01	214.44	214.89	214.78	215.03	214.92	215.54	215.81	216.48	216.50	216.49	216.81
5	214.03	214.45	214.91	214.78	215.03	214.92	215.59	215.80	216.48	216.49	216.49	216.80
6	214.07	214.50	214.92	214.77	215.06	214.92	215.67	215.80	216.50	216.49	216.50	216.80
7	214.06	214.52	214.91	214.76	215.09	214.94	215.68	215.85	216.52	216.51	216.52	216.81
8	214.03	214.51	214.91	214.76	215.07	214.95	215.74	215.90	216.53	216.51	216.52	216.80
9	214.04	214.50	214.92	214.77	215.01	214.94	215.74	215.90	216.53	216.50	216.50	216.80
10	214.06	214.51	214.93	214.75	214.99	214.93	215.71	215.90	216.53	216.49	216.50	216.80
11	214.08	214.52	214.92	214.75	214.99	214.93	215.72	215.91	216.54	216.49	216.53	216.81
12	214.07	214.53	214.91	214.74	214.98	214.96	215.73	216.00	216.54	216.50	216.55	216.82
13	214.08	214.54	214.91	214.75	214.98	214.96	215.72	216.10	216.53	216.50	216.56	216.80
14	214.09	214.59	214.92	214.75	214.97	214.95	215.72	216.10	216.53	216.50	216.56	216.80
15	214.09	214.66	214.92	214.74	214.95	214.95	215.72	216.10	216.53	216.49	216.56	216.80
16	214.07	214.68	214.90	214.69	214.93	214.96	215.72	216.11	216.53	216.49	216.56	216.80
17	214.08	214.68	214.89	214.67	214.92	214.95	215.72	216.11	216.53	216.49	216.55	216.81
18	214.10	214.68	214.89	214.66	214.92	214.95	215.76	216.12	216.52	216.49	216.55	216.81
19	214.10	214.67	214.90	214.68	214.92	214.95	215.81	216.14	216.51	216.50	216.57	216.82
20	214.10	214.67	214.90	214.72	214.91	214.96	215.78	216.14	216.51	216.50	216.58	216.85
21	214.10	214.67	214.89	214.75	214.90	214.97	215.76	216.15	216.50	216.50	216.58	216.90
22	214.10	214.67	214.89	214.78	214.90	214.98	215.77	216.16	216.49	216.50	216.58	216.89
23	214.13	214.68	214.89	214.78	214.91	215.00	215.78	216.23	216.49	216.50	216.60	216.84
24	214.16	214.71	214.90	214.76	214.92	215.02	215.77	216.30	216.49	216.50	216.61	216.87
25	214.14	214.75	214.92	214.76	214.92	215.08	215.77	216.31	216.49	216.50	216.61	216.90
26	214.11	214.78	214.92	214.77	214.93	215.28	215.76	216.32	216.49	216.50	216.62	216.90
27	214.15	214.89	214.95	214.78	214.94	215.32	215.74	216.35	216.49	216.50	216.62	216.90
28	214.17	214.81	214.95	214.84	214.96	215.39	215.77	216.37	216.49	216.50	216.63	216.89
29	214.17	214.77	214.94	215.01	---	215.51	215.79	216.37	216.49	216.50	216.65	216.89
30	214.18	214.78	214.91	215.05	---	215.51	215.79	216.39	216.49	216.50	216.65	216.87
31	214.21	---	214.82	215.05	---	215.51	---	216.40	---	216.50	216.66	---
MEAN	214.10	214.61	214.90	214.78	214.98	215.05	215.71	216.08	216.50	216.50	216.56	216.83
MAX	214.21	214.89	214.95	215.05	215.09	215.51	215.81	216.40	216.54	216.51	216.66	216.90
MIN	214.01	214.30	214.79	214.66	214.90	214.92	215.52	215.78	216.41	216.48	216.49	216.69

HAWAII, ISLAND OF KAUAI--Continued



HAWAII, ISLAND OF KAUAI

215906159395601. Local number, 2-5939-01. Waimea Shaft, Kauai.

LOCATION.--Lat 21°59', long 159°40', 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, Department of Water.

AQUIFER.--Waimea Canyon Basalt, Miocene to Pliocene age.

WELL CHARACTERISTICS.--Drilled water-table well, depth 43 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.

CORRECTIONS.-Station was inadvertantly ommited in ADR 2001. Table below is for water years 2001 and 2002.

REVISED RECORDS.--WDR HI-94-1: 1988-93 (the minimum water level for the period of record).

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 10.57 ft above mean sea level, December 11, 1986; lowest water level measured, 8.71 ft above mean sea level, March 9, 1981, lowest water level measured with pump on, 5.86 ft above mean sea level, May 7, 1975.

REMARKS.--Well is presently unused.

REVISIONS.--The maximum water level for the period of record reported for water years 1988 to 2000 has been revised to 10.57 ft above mean sea level, December 11, 1986.

WATER LEVEL, IN FEET RELATIVE TO MEAN SEA LEVEL, WATER YEAR OCTOBER 2000 TO SEPTEMBER 2001

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 10	9.17	DEC 08	9.17	JAN 29	9.05	APR 03	9.38	JUN 28	9.43	JUL 30	9.44

WATER LEVEL, IN FEET RELATIVE TO MEAN SEA LEVEL, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 18	9.28	DEC 18	9.32	MAR 01	9.28	APR 10	9.34	JUN 04	9.29	AUG 14	9.31

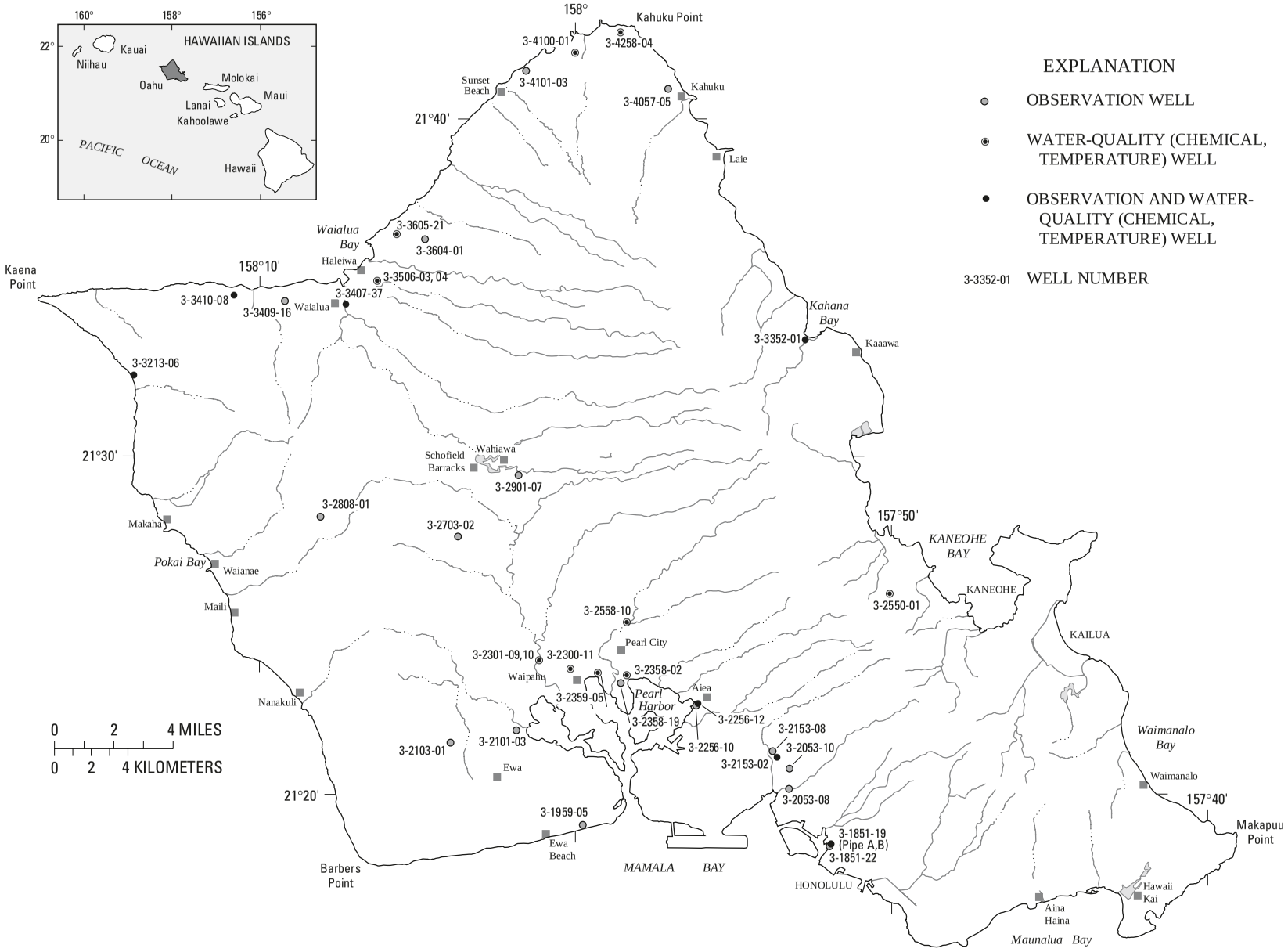


Figure 17. Locations of observation wells and ground-water quality sampling sites on Oahu.

HAWAII, ISLAND OF OAHU

211832157515501. Local number and name, 3-1851-19 Halekauwila Street, Pipe A, Oahu.

LOCATION.--Lat 21°19', long 157°52', Hydrologic Unit 20060000, corner of Richards and Halekauwila Streets, adjacent to Ala Moana Boulevard. Owner: Hawaiian Electric Company.

AQUIFER.--Koolau Basalt, Pleistocene to Pliocene age.

WELL CHARACTERISTICS.--Drilled flowing artesian well, $\frac{1}{2}$-in. galvanized pipe at 1,043 ft depth. Tube A is the pipe closer to Richards Street.

DATUM.--Elevation of land-surface datum is 6 ft. Measuring point is chiseled square inside of wooden cover of well, elevation 5.80 ft above mean sea level.

REMARKS.--Prior to October 1993, unpublished records are in files of the USGS Hawaii District office. Water level affected by high salinity of water (see water-quality section).

PERIOD OF RECORD.-- Water level: occasional measurements, April 1969, March 1973 to current year. Water quality: occasional measurements, 1973 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 20.16 ft above mean sea level, August 13, 1974; lowest measured, 4.44 ft above mean sea level, September 25, 2001.

WATER LEVEL, IN FEET RELATIVE TO MEAN SEA LEVEL, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 27	5.26	MAR 25	5.60	MAY 16	5.60	JUL 18	4.83	SEP 17	4.61

HAWAII, ISLAND OF OAHU

211832157515502. Local number and name, 3-1851-19 Halekauwila Street, Pipe B, Oahu.

LOCATION.--Lat 21°19', long 157°52', Hydrologic Unit 20060000, corner of Richards and Halekauwila Streets, adjacent to Ala Moana Boulevard. Owner: Hawaiian Electric Company.

AQUIFER.--Koolau Basalt, Pleistocene to Pliocene age.

WELL CHARACTERISTICS.--Drilled flowing artesian well, $\frac{1}{2}$-in. galvanized pipe at 988 ft depth. Tube B is the pipe furthest from Richards Street.

DATUM.--Elevation of land-surface datum is 6 ft. Measuring point is chiseled square inside of wooden cover of well, elevation 5.80 ft above mean sea level.

REMARKS.--Prior to October 1993, unpublished records in files of the USGS Hawaii District office. Water level affected by high salinity of water (see water-quality section).

PERIOD OF RECORD.-- Water level: occasional measurements, April 1969, March 1973 to current year. Water quality: occasional measurements, 1973 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 26.16 ft above mean sea level, February 3, 1983; lowest measured, 10.75 ft above mean sea level, September 25, 2001.

WATER LEVEL, IN FEET RELATIVE TO MEAN SEA LEVEL, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 27	11.76	MAR 25	13.68	MAY 16	12.58	JUL 16	11.80	SEP 17	11.24

HAWAII, ISLAND OF OAHU

211828157515801. Local number and name, 3-1851-22, Ala Moana Blvd., Oahu.

LOCATION.--Lat 21°18', long 157°52', Hydrologic Unit 20060000, northeast corner of the mini-park at the intersection of Richards Street and Ala Moana Boulevard. Owner: State of Hawaii.

AQUIFER.--Koolau Basalt, Pleistocene to Pliocene age.

WELL CHARACTERISTICS.--Drilled flowing artesian well, 3-in. PVC pipe casing, depth 1,142 ft, bottom 60 ft slotted.

DATUM.--Elevation of land-surface datum is 7 ft. Measuring point is northeast corner of manhole cover, 7.30 ft above mean sea level.

REMARKS.--Prior to October 1993, unpublished records in files of the USGS Hawaii District office.

PERIOD OF RECORD.-- Water level: water-level recorder, June 1983 to November 1986, occasional measurements, December 1982 to current year. Water quality: occasional measurements, 1982, 1987, 1998.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 22.74 ft above mean sea level, April 12, 1991; lowest measured, 14.24 ft, above mean sea level, September 25, 2001.

WATER LEVEL, IN FEET RELATIVE TO MEAN SEA LEVEL, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 27	15.78	MAR 25	16.25	MAY 16	16.20	JUL 16	15.54	SEP 17	15.13

HAWAII, ISLAND OF OAHU

211907157594701. Local number and name, 3-1959-05 Fort Weaver Road, Oahu.

LOCATION.--Lat 21°19', long 158°00', Hydrologic Unit 20060000, 600 ft northwest of Ewa Beach Park, and 1.2 mi southeast of Campbell High School. Owner: National Oceanic and Atmospheric Administration (NOAA).

AQUIFER.--Koolau Basalt, Pleistocene to Pliocene 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 5 ft. Measuring point is 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 USGS Hawaii district office.

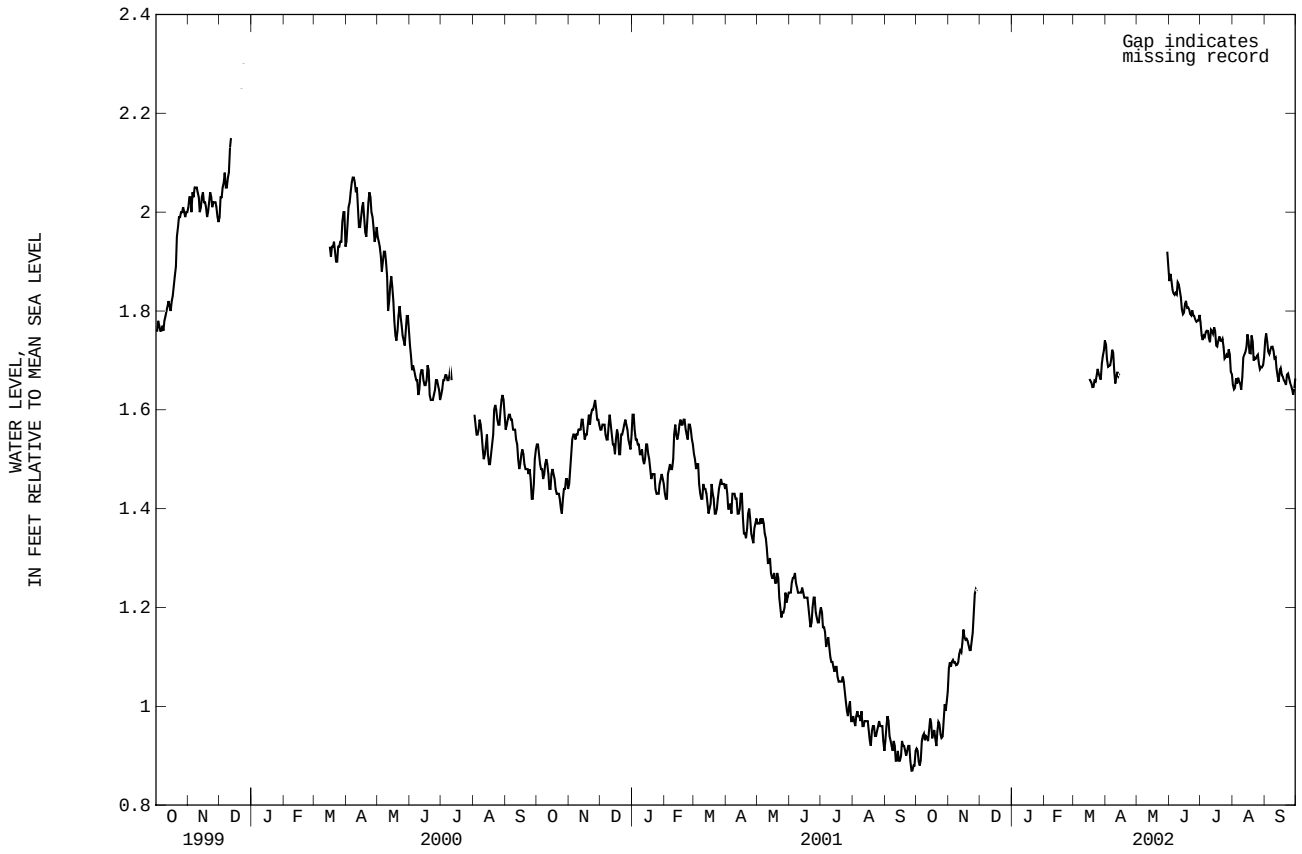
PERIOD OF RECORD.-- Water level: water-level recorder, December 1966 to January 1967, September 1968 to current year. Water quality: occasional measurements, August 1965, November 1966, and December 1968.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 5.38 ft above mean sea level, January 17, 1969; lowest measured, 2.81 ft below mean sea level, August 25, 1977.

WATER LEVEL, IN FEET RELATIVE TO MEAN SEA LEVEL, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.91	1.08	---	---	---	---	1.73	---	1.86	1.78	1.65	1.74
2	0.91	1.09	---	---	---	---	1.70	---	1.88	1.75	1.64	1.75
3	0.89	1.08	---	---	---	---	1.69	---	1.86	1.74	1.64	1.74
4	0.88	1.09	---	---	---	---	1.69	---	1.84	1.75	1.66	1.72
5	0.89	1.09	---	---	---	---	1.69	---	1.84	1.75	1.65	1.71
6	0.93	1.09	---	---	---	---	1.70	---	1.83	1.76	1.66	1.72
7	0.94	1.09	---	---	---	---	1.72	---	1.84	1.76	1.66	1.73
8	0.94	1.08	---	---	---	---	1.72	---	1.83	1.76	1.65	1.73
9	0.93	1.08	---	---	---	---	1.68	---	1.86	1.74	1.64	1.72
10	0.94	1.09	---	---	---	---	1.65	---	1.85	1.74	1.67	1.70
11	0.94	1.11	---	---	---	---	1.67	---	1.84	1.76	1.71	1.71
12	0.93	1.11	---	---	---	---	1.68	---	1.83	1.76	1.71	1.68
13	0.95	1.11	---	---	---	---	1.67	---	1.80	1.75	1.72	1.67
14	0.98	1.13	---	---	---	---	1.67	---	1.79	1.77	1.73	1.66
15	0.97	1.16	---	---	---	---	---	---	1.80	1.76	1.75	1.68
16	0.94	1.14	---	---	---	1.66	---	---	1.81	1.73	1.74	1.68
17	0.95	1.14	---	---	---	1.66	---	---	1.82	1.73	1.71	1.67
18	0.95	1.14	---	---	---	1.66	---	---	1.81	1.74	1.71	1.67
19	0.93	1.13	---	---	---	1.65	---	---	1.81	1.75	1.75	1.66
20	0.92	1.12	---	---	---	1.65	---	---	1.80	1.74	1.74	1.66
21	0.95	1.11	---	---	---	1.66	---	---	1.79	1.74	1.70	1.65
22	0.97	1.11	---	---	---	1.66	---	---	1.79	1.74	1.71	1.67
23	0.96	1.13	---	---	---	1.67	---	---	1.80	1.73	1.70	1.67
24	0.94	1.15	---	---	---	1.68	---	---	1.79	1.70	1.71	1.66
25	0.94	1.19	---	---	---	1.67	---	---	1.79	1.71	1.71	1.65
26	0.94	1.23	---	---	---	1.67	---	---	1.78	1.71	1.69	1.65
27	0.97	1.24	---	---	---	1.66	---	---	1.78	1.71	1.68	1.64
28	1.00	1.23	---	---	---	1.69	---	---	1.78	1.72	1.69	1.63
29	0.99	---	---	---	---	1.71	---	---	1.78	1.71	1.69	1.64
30	1.01	---	---	---	---	1.72	---	1.92	1.79	1.68	1.69	1.66
31	1.03	---	---	---	---	1.74	---	1.89	---	1.67	1.71	---
MEAN	0.95	---	---	---	---	---	---	---	1.82	1.74	1.69	1.68
MAX	1.03	---	---	---	---	---	---	---	1.88	1.78	1.75	1.75
MIN	0.88	---	---	---	---	---	---	---	1.78	1.67	1.64	1.63

HAWAII, ISLAND OF OAHU--Continued



HAWAII, ISLAND OF OAHU

212010157531501. Local number and name, 3-2053-08 Kalihi, Oahu.

LOCATION.--Lat 21°20', long 157°53', Hydrologic Unit 20060000, 0.5 mi west of Farrington High School, and 0.5 mi north of Puuhale School. Owner: Fasi Family Partners.

AQUIFER.--Koolau Basalt, Pleistocene to Pliocene age.

WELL CHARACTERISTICS.--Drilled flowing artesian well, depth 607 ft, 10-in. casing diameter. .

DATUM.--Elevation of land-surface datum is 10.5 ft. Measuring point is top of concrete manhole frame, elevation 10.48 ft above mean sea level.

REMARKS.--Prior to October 2001, unpublished records in files of the USGS Hawaii district office.

PERIOD OF RECORD.--Water level: occasional measurements, April 1910 to September 1931, January 1935 to December 1956, September 2000 to current year. Water quality: occasional measurements, January 1912 to October 1915, March 1924 to March 1928.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 31.42 ft above mean sea level, March 1911; lowest measured, 16.77 ft above mean sea level, September 25, 2001.

WATER LEVEL, IN FEET RELATIVE TO MEAN SEA LEVEL, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 27	17.69	MAR 25	17.72	MAY 16	17.77	JUL 18	17.55	SEP 17	17.23

HAWAII, ISLAND OF OAHU

212046157531401. Local number and name, 3-2053-10, Fort Shafter Well, Oahu.

LOCATION.--Lat 21°21', long 157°53', Hydrologic Unit 20060000, in Fort Shafter, about 1,000 ft east of Buckner Gate, and 100 ft north of Fort Shafter Elementary School. Owner: U.S. Army.

AQUIFER.--Koolau Basalt, Pleistocene to Pliocene age.

WELL CHARACTERISTICS.--Drilled well, depth 279 ft, 12-in. casing diameter, cased to 169 ft.

DATUM.--Elevation of land-surface datum is 20 ft. Measuring point is a chiseled "1 1" on top of 8-inch casing (flange removed), at south end of pump house (Bldg. 509), 24.90 ft above mean sea level.

REMARKS.--Prior to January 2000, unpublished records are available in files of USGS Hawaii District office.

PERIOD OF RECORD.--Occasional water quality measurements, December 1915 to November 1972. Occasional water level measurements, December 1915 to September 1931, January 2000 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 31.82 ft above mean sea level, April 1917; lowest measured, 17.09 ft above mean sea level, September 04, 2001.

WATER LEVEL, IN FEET RELATIVE TO MEAN SEA LEVEL, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 02	17.14	DEC 04	17.62	FEB 11	18.25	APR 01	18.15	JUN 03	18.07	AUG 01	17.61
NOV 01	17.41	JAN 02	18.08	MAR 01	18.10	MAY 01	17.85	JUL 03	17.84	SEP 03	17.55

212154158015201. Local number and name, 3-2101-03 Honouliuli, Oahu.

LOCATION.--Lat 21°22', long 158°02', Hydrologic Unit 20060000, 0.4 mi southeast of Honouliuli, and 0.5 mi north of St. Francis Hospital. Owner: State of Hawaii.

AQUIFER.--Koolau Basalt, Pleistocene to Pliocene age.

WELL CHARACTERISTICS.--Drilled flowing artesian well, depth 355 ft, 6-in. PVC casing, cased to 165 ft. Well casing was modified in January l958 and May 1982.

DATUM.--Elevation of land-surface datum is 15.38 ft. Measuring point is top of horizontal flange below petcock, 13.31 ft above mean sea level.

REMARKS.--Water-quality records for 1910-16, 1920-21, 1923-75, and 1978-81 are available in files of USGS Hawaii District office.

PERIOD OF RECORD.--Water level: 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 11.32 ft above mean sea level (below petcock then in use), September 2, and October 19, 1977.

WATER LEVEL, IN FEET RELATIVE TO MEAN SEA LEVEL, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 01	16.05	JAN 14	16.41	MAR 15	16.88	MAY 29	17.20	AUG 15	17.11	SEP 23	16.96

HAWAII, ISLAND OF OAHU

212132158035701. Local number and name, 3-2103-01 Puu Makakilo, Oahu.

LOCATION.--Lat 21°22', long 158°04', Hydrologic Unit 20060000, 1 mi east of Makakilo, and 2 mi north of Barbers Point Naval Air Station. Owner: U.S. Navy.

AQUIFER.--Waianae Volcanics, Pliocene age.

WELL CHARACTERISTICS.--Drilled well, depth 206 ft, 6-in. casing diameter, cased to 17 ft.

DATUM.--Elevation of land-surface datum is 210 ft. Measuring point is top of 6-in. pipe, elevation 211.70 ft above mean sea level.

REMARKS.--Prior to October 1993, unpublished records in files of the USGS Hawaii district office.

PERIOD OF RECORD.-- Water level: water-level recorder, September 1966 to December 1971. Occasional measurements, August 1942 to December 1942, January 1953 to September 1967, September 1972 to current year. Water quality: occasional measurements, 1942, 1953-68.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 18.81 ft above mean sea level, February 20, 1957; lowest measured, 14.11 ft above mean sea level, August 15, 2002.

WATER LEVEL, IN FEET RELATIVE TO MEAN SEA LEVEL, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 01	14.14	JAN 17	14.26	MAR 13	14.24	JUN 04	14.25	AUG 15	14.11	SEP 23	14.21

HAWAII, ISLAND OF OAHU

212117157534601. Local number and name, 3-2153-08 Tripler Army Medical Center, Oahu.

LOCATION.--Lat 21°21', long 157°54', Hydrologic Unit 20060000, 1,300 ft northwest of junction of H-1 freeway and Puuloa Road, and 0.5 mi south of Tripler Army Hospital. Owner: U.S. Army.

AQUIFER.--Koolau Basalt, Pleistocene to Pliocene age.

WELL CHARACTERISTICS.--Drilled well, depth 306 ft, 16-in. casing diameter, cased to 57 ft.

DATUM.--Elevation of land-surface datum is 28 ft. Measuring point is top of 3/4-in. copper overflow pipe at base of pump, 33.16 ft above mean sea level.

REMARKS.--Prior to May 1998, unpublished records in files of the USGS Hawaii District office.

PERIOD OF RECORD.--Occasional measurements, April 1945 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 23.79 ft above mean sea level, April 21, 1969; lowest measured, 16.79 ft above mean sea level, August 1, 2001.

WATER LEVEL, IN FEET RELATIVE TO MEAN SEA LEVEL, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 02	16.88	JAN 02	17.83	MAR 01	17.82	JUN 03	17.78	SEP 03	17.24
NOV 01	17.13	FEB 04	18.10	APR 01	17.87	JUL 03	17.41		
DEC 04	17.41	FEB 11	18.04	MAY 01	17.49	AUG 01	17.15		

HAWAII, ISLAND OF OAHU

212238157561101. Local number and name, 3-2256-10 Aiea, U.S. Navy (187-B), Oahu.

LOCATION.--Lat 21°23', long 157°56', Hydrologic Unit 20060000, 0.4 mi southwest of Aiea School, and 0.5 mi east of McGrew Point. Owner: U.S. Navy.

AQUIFER.--Koolau Basalt, Pleistocene to Pliocene age.

WELL CHARACTERISTICS.--Drilled flowing artesian well, depth 173 ft, 12-in. casing diameter, cased to 143 ft.

DATUM.--Elevation of land-surface datum is 10 ft. Measuring point is top of 10-in. 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 USGS Hawaii District office.

PERIOD OF RECORD.--Water level: occasional measurements, January 1928 to February 1931, September 1934 to August 1966. Water-level recorder, September 1966 to current year.

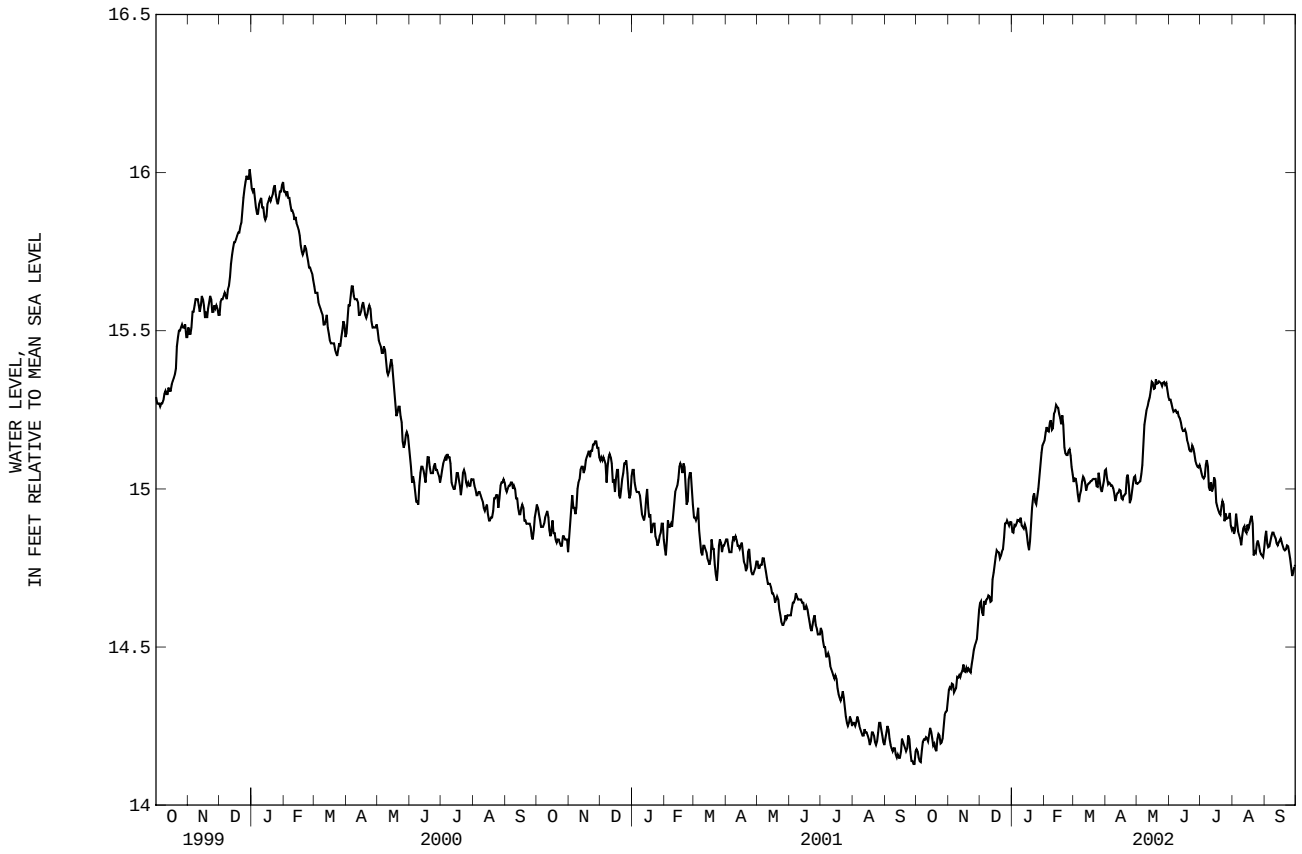
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 25.90 ft above mean sea level, January 16, 1928; lowest measured, 12.97 ft above mean sea level, October 5, 1978.

WATER LEVEL, IN FEET RELATIVE TO MEAN SEA LEVEL, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	14.18	14.36	14.64	14.86	15.15	15.02	15.06	15.02	15.28	15.06	14.88	14.85
2	14.17	14.37	14.64	14.86	15.18	15.03	15.04	15.02	15.28	15.05	14.86	14.87
3	14.15	14.37	14.61	14.89	15.20	15.03	15.02	15.02	15.27	15.04	14.87	14.83
4	14.14	14.38	14.60	14.88	15.18	15.01	15.02	15.02	15.25	15.03	14.92	14.82
5	14.14	14.38	14.65	14.89	15.18	14.98	15.02	15.05	15.24	15.04	14.90	14.82
6	14.17	14.36	14.63	14.90	15.21	14.96	15.01	15.08	15.25	15.08	14.86	14.83
7	14.20	14.36	14.65	14.90	15.22	14.98	15.01	15.14	15.25	15.09	14.85	14.85
8	14.21	14.37	14.65	14.90	15.19	15.00	15.00	15.20	15.24	15.07	14.84	14.86
9	14.21	14.41	14.66	14.91	15.19	15.02	14.98	15.23	15.24	15.01	14.82	14.86
10	14.21	14.40	14.66	14.88	15.24	15.04	14.96	15.25	15.23	14.99	14.85	14.85
11	14.21	14.41	14.64	14.88	15.24	15.03	14.98	15.26	15.22	15.02	14.88	14.84
12	14.20	14.40	14.65	14.87	15.27	15.02	14.99	15.28	15.21	14.99	14.88	14.83
13	14.22	14.42	14.71	14.89	15.26	14.99	14.99	15.29	15.19	15.00	14.87	14.82
14	14.24	14.42	14.74	14.88	15.26	15.01	15.00	15.31	15.18	15.04	14.86	14.83
15	14.23	14.44	14.76	14.85	15.24	15.02	14.99	15.34	15.18	15.03	14.89	14.84
16	14.21	14.42	14.79	14.83	15.22	15.02	14.97	15.34	15.19	14.96	14.88	14.84
17	14.19	14.42	14.81	14.81	15.20	15.02	14.97	15.32	15.18	14.95	14.89	14.83
18	14.19	14.43	14.80	14.83	15.23	15.02	14.98	15.32	15.15	14.93	14.90	14.82
19	14.18	14.43	14.80	14.89	15.20	15.03	14.98	15.35	15.14	14.92	14.91	14.81
20	14.17	14.43	14.78	14.94	15.13	15.03	14.98	15.33	15.13	14.92	14.89	14.81
21	14.21	14.42	14.79	14.97	15.11	15.03	15.04	15.33	15.12	14.94	14.79	14.81
22	14.22	14.42	14.80	14.99	15.11	15.03	15.04	15.34	15.12	14.96	14.80	14.82
23	14.22	14.45	14.81	14.96	15.11	15.01	15.01	15.34	15.14	14.95	14.80	14.82
24	14.19	14.47	14.85	14.95	15.12	15.01	14.95	15.33	15.13	14.90	14.83	14.80
25	14.20	14.49	e14.89	14.98	15.12	15.05	14.97	15.32	15.11	14.92	14.84	14.78
26	14.21	14.50	e14.89	15.00	15.10	15.02	14.99	15.34	15.09	14.91	14.82	14.76
27	14.24	14.51	e14.90	15.04	15.07	15.00	15.02	15.34	15.08	14.91	14.80	14.72
28	14.29	14.52	14.89	15.07	15.05	14.99	15.04	15.33	15.07	14.91	14.79	14.73
29	14.29	14.57	14.88	15.11	---	15.01	15.04	15.33	15.07	14.92	14.79	14.75
30	14.30	14.62	14.90	15.14	---	15.03	15.02	15.31	15.07	14.88	14.78	14.76
31	14.33	---	14.89	15.14	---	15.06	---	15.29	---	14.87	14.81	---
MEAN	14.21	14.43	14.75	14.93	15.18	15.02	15.00	15.25	15.18	14.98	14.85	14.82
MAX	14.33	14.62	14.90	15.14	15.27	15.06	15.06	15.35	15.28	15.09	14.92	14.87
MIN	14.14	14.36	14.60	14.81	15.05	14.96	14.95	15.02	15.07	14.87	14.78	14.72

e Estimated

HAWAII, ISLAND OF OAHU--Continued



HAWAII, ISLAND OF OAHU

212238157561102. Local number and name, 3-2256-12 Aiea, U.S. Navy (187-C), Oahu.

LOCATION.--Lat 21°23', long 157°56', Hydrologic Unit 20060000, 0.4 mi southwest of Aiea School, and 0.5 mi east of McGrew Point. Owner: U.S. Navy.

AQUIFER.--Koolau Basalt, Pleistocene to Pliocene age.

WELL CHARACTERISTICS.--Drilled flowing artesian well, depth 182 ft, 12-in. casing diameter, cased to 139 ft.

DATUM.--Elevation of land-surface datum is 9 ft. Measuring point is corner of concrete base next to faucet, 13.18 ft above mean sea level.

REMARKS.--Prior to October 1996, unpublished water-level records are available in files of USGS Hawaii District office.

PERIOD OF RECORD.-- Water level: occasional measurements, January 1928 to December 1931, 1934, 1946-47, 1966, November 1973 to current year. Water quality: occasional measurements, January 1928 to November 1929, 1930-31, 1934, 1947, December 1966, September 1972 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 26.07 ft above mean sea level, January 16, 1928; lowest measured, 13.15 ft above mean sea level, September 18, 1978.

WATER LEVEL, IN FEET RELATIVE TO MEAN SEA LEVEL, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 12	14.20	DEC 27	14.86	MAR 25	15.06	MAY 16	15.28	JUL 18	14.92	SEP 17	14.84

HAWAII, ISLAND OF OAHU

212318157583401. Local number and name, 3-2358-19 Pearl City Peninsula, Oahu.

LOCATION.--Lat 21°23', long 157°59', Hydrologic Unit 20060000, 0.3 mi southwest of Lehua Elementary School, and 0.7 mi south of Pearl City Elementary School. Owner: U.S. Navy.

AQUIFER.--Koolau Basalt, Pleistocene to Pliocene age.

WELL CHARACTERISTICS.--Drilled flowing artesian well, depth 172 ft, 17-in. casing diameter, cased to 112 ft.

DATUM.--Elevation of land-surface datum is 13.30 ft. Measuring point is 1-in. square chiseled on concrete base wall, northeast corner, elevation is 13.30 ft above mean sea level.

REMARKS.--Prior to October 1995, unpublished records are available in files of USGS Hawaii District office.

PERIOD OF RECORD.-- Water level: occasional measurements, September 1972, November 1973 to December 1988, and March 3, 1993 to current year. Water quality: occasional measurements, 1944, 1946, 1954, 1956-58, 1972-80.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 18.68 ft above mean sea level, December 7, 1982; lowest measured, 12.30 ft above mean sea level, September 18, 1978.

WATER LEVEL, IN FEET RELATIVE TO MEAN SEA LEVEL, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
JAN 03	14.04	MAR 25	14.08	MAY 16	13.98	JUL 16	14.33

HAWAII, ISLAND OF OAHU

212738158034301. Local number and name, 3-2703-02 Kunia basal monitor well, Oahu.

LOCATION.--Lat 21°28', long 158°04', Hydrologic Unit 20060000, 2.9 mi southwest of Kaala School, 0.4 mi southeast of Kunia school and 2.2 mi east of Mililani Golf Course. Owner: Del Monte Corporation.

AQUIFER.--Waianae Volcanics, Pliocene age.

WELL CHARACTERISTICS.--Drilled basal water-table well, depth 993.5 ft, 8-in.casing diameter, solid casing to 820.5 ft. and perforated casing from 820.5 ft to 971.1 ft.

DATUM.--Elevation of land-surface datum is 849.5 ft. Measuring point is top of 3-in. PVC pipe, elevation is 852.38 ft above mean sea level.

REMARKS.--Data is given to cooperator after each measurement.

PERIOD OF RECORD.--Water level: occasional measurements, January 2001 to current year.

EXTREMES FOR PERIOD OF RECORD.-- Highest water level measured, 19.89 ft above mean sea level, September 26, 2002; lowest measured, 18.25 ft above mean sea level, October 26, 2001.

WATER LEVEL, IN FEET RELATIVE TO MEAN SEA LEVEL, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 26	18.25	JAN 10	18.82	MAR 21	19.24	JUN 06	19.79	AUG 15	19.87	SEP 26	19.89

HAWAII, ISLAND OF OAHU

212813158080201. Local number and name, 3-2808-01 Nanakuli, Oahu.

LOCATION.--Lat 21°28', long 158°08', Hydrologic Unit 20060000, inside Lualualei Naval Ammunition Depot, 1,000 ft west from the intersection of Kolekole Road and Radford Street, at Building 492, and 3.3 mi north from the entrance of the depot. Owner: U.S. Navy.

AQUIFER.--Waianae Volcanics, Pliocene age.

WELL CHARACTERISTICS.--Depth 535 ft, cased to 179 ft, 12-in.-diameter steel casing to 179 ft, then 3-in. to 535 ft.

DATUM.--Elevation of land-surface datum is 435 ft. Measuring point is on pump 2 ft above base. Remove $^{1}/_{2}$-in. nipple, elevation 437.45 ft above mean sea level.

REMARKS.--Prior to October 1993, unpublished records in files of the USGS Hawaii District office.

PERIOD OF RECORD.-- Water level: occasional measurements, June 1956 to December 1957, June 1973 to December 1984, August 1988 to current year. Water quality: occasional measurements, October 1956 to December 1957, February 1972 to August 1988.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 441.81 ft above mean sea level, February 28, 1983; lowest measured, 420.78 ft above mean sea level, October 24, 1978.

WATER LEVEL, IN FEET RELATIVE TO MEAN SEA LEVEL, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 01	424.80	JAN 15	429.58	MAR 21	431.07	JUN 24	429.10	AUG 14	428.27

HAWAII, ISLAND OF KAUAI

212927158014801. Local number and name, 3-2901-07 Schofield Shaft, Oahu.

LOCATION.--Lat 21°29', long 158°02', Hydrologic Unit 20060000, across the main gate of Wheeler Air Force Base, and 1,200 ft south of Wahiawa bridge on Kaukonahua Stream. Owner: U.S. Army.

AQUIFER.--Koolau Basalt, Pleistocene to Pliocene age.

WELL CHARACTERISTICS.--Dug high-level water-table well, size 8 ft x 8 ft, length of 30-degree inclined shaft 1,148 ft.

DATUM.--Elevation of land-surface datum is 850 ft. Measuring point is top of 2-in pipe for float tape cable (cap removed) 287.16 ft above mean sea level.

REMARKS.--maximum daily water levels are published due to the fluctuations in the water level caused by pumping.

PERIOD OF RECORD.-- Water level: water-level recorder, November 1938 to current year. Water quality: occasional measurements, 1966-72, 1975 to current year.

REVISED RECORDS.--WDR HI-99-1: Elevation of land-surface datum and measuring point. WDR HI-99-1: (m) based on non-pumping values.

EXTREMES FOR PERIOD OF RECORD (Non-pumping values).--Highest water level measured, 284.40 ft above mean sea level, May 12, 1969; lowest measured, 270.82 ft above mean sea level, May 1, 1985.

WATER LEVEL, IN FEET RELATIVE TO MEAN SEA LEVEL, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MAXIMUM VALUES

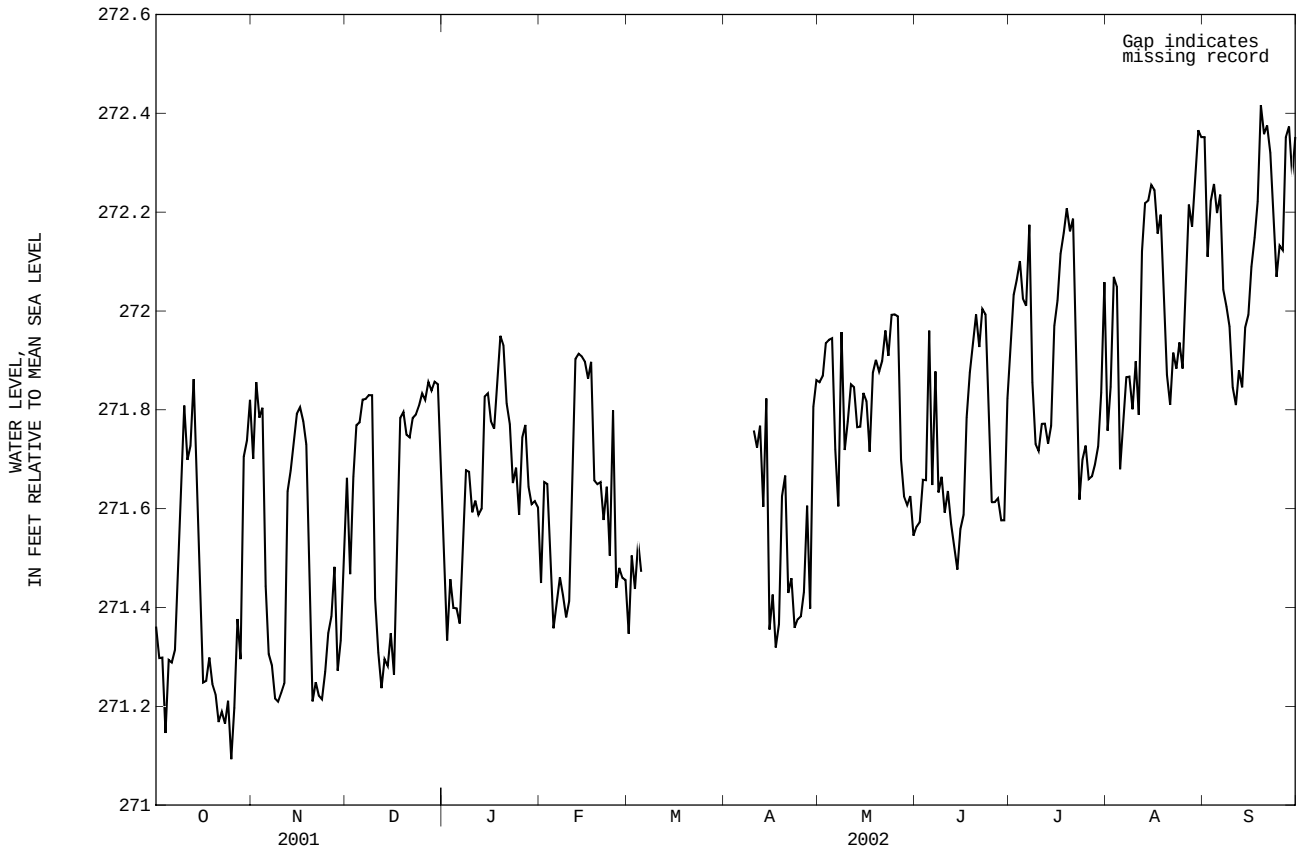
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	272.20	272.10	271.86	271.89	272.07	272.13	---	272.15	271.71	272.37	272.52	272.45
2	271.59	272.12	272.07	271.50	271.95	271.94	---	272.00	271.73	272.18	272.21	272.43
3	271.53	271.98	272.00	272.09	271.95	271.92	---	272.03	272.32	272.22	272.38	272.79
4	271.25	271.95	271.89	271.47	271.89	271.79	---	272.06	272.14	272.25	272.22	272.43
5	271.49	272.04	271.92	271.53	271.45	271.98	---	272.03	272.15	272.34	272.37	272.39
6	271.32	271.47	271.94	271.47	271.50	---	---	272.02	272.03	272.22	272.44	272.46
7	271.53	271.50	271.90	271.88	271.56	---	---	272.05	272.17	272.28	271.93	272.10
8	271.80	271.44	271.94	271.92	271.56	---	---	272.14	272.17	272.10	271.91	272.12
9	271.77	271.70	271.92	271.94	271.47	---	---	272.12	272.15	271.83	271.87	272.10
10	272.02	271.38	271.92	271.90	271.50	---	271.80	272.08	272.14	271.86	272.62	272.01
11	272.04	271.41	271.94	271.92	271.92	---	271.83	272.14	272.17	271.88	271.97	271.86
12	272.01	271.85	271.38	271.90	271.98	---	271.85	272.15	271.60	271.90	272.33	272.03
13	272.04	271.95	271.96	271.94	272.00	---	271.94	272.15	271.58	271.77	272.28	272.04
14	271.84	272.03	271.41	271.95	271.96	---	272.00	272.26	271.57	271.88	272.28	272.12
15	271.80	272.09	271.47	271.96	272.00	---	271.82	272.15	271.62	272.16	272.30	272.13
16	271.46	271.95	271.40	271.89	271.96	---	271.94	272.17	271.62	272.13	272.30	272.45
17	271.32	271.95	271.83	271.90	271.96	---	271.35	272.14	272.07	272.16	272.27	272.70
18	271.38	271.88	271.88	271.94	271.96	---	271.41	272.18	271.94	272.29	272.28	272.54
19	271.35	271.89	271.86	272.01	272.03	---	272.03	272.19	272.17	272.34	272.30	272.55
20	271.30	271.26	271.86	272.01	272.01	---	272.00	272.17	272.18	272.34	272.01	272.78
21	271.29	271.38	271.82	272.07	272.00	---	272.00	271.93	271.96	272.31	271.95	272.57
22	271.30	271.37	271.86	272.06	272.03	---	272.04	272.14	272.18	272.31	272.01	272.58
23	271.22	271.26	271.88	272.01	272.04	---	271.90	271.95	272.17	271.70	272.00	272.54
24	271.98	271.41	271.92	271.98	272.04	---	271.96	272.15	272.17	271.92	272.13	272.19
25	271.23	271.45	271.95	272.00	271.94	---	271.98	272.15	271.66	271.94	272.03	272.24
26	271.82	271.95	271.92	272.03	271.94	---	272.00	272.17	271.64	271.74	272.19	272.24
27	272.02	272.16	271.96	272.03	271.95	---	272.01	271.95	271.64	271.74	272.34	272.82
28	271.88	271.76	271.96	272.04	271.98	---	271.43	271.73	271.68	271.78	272.20	272.85
29	271.85	271.72	271.98	272.04	---	---	272.06	272.33	271.66	272.17	272.36	272.87
30	271.90	271.83	271.95	272.06	---	---	272.00	272.30	272.26	272.15	272.41	272.81
31	271.95	---	271.89	271.92	---	---	---	271.57	---	272.21	272.43	---
MEAN	271.66	271.74	271.85	271.91	271.88	---	---	272.09	271.94	272.08	272.22	272.41
MAX	272.20	272.16	272.07	272.09	272.07	---	---	272.33	272.32	272.37	272.62	272.87
MIN	271.22	271.26	271.38	271.47	271.45	---	---	271.57	271.57	271.70	271.87	271.86

NON-PUMPING VALUES

DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 01	272.20	MAY 01	272.15
NOV 01	272.10	MAY 14	272.26
NOV 02	272.12	MAY 29	272.33
NOV 27	272.16	MAY 30	272.30
DEC 02	272.02	JUN 03	272.32
DEC 03	272.00	JUL 01	272.37
JAN 03	272.09	AUG 01	272.52
FEB 01	272.07	AUG 10	272.62
MAR 01	272.13	SEP 03	272.79
APR 01	272.20	SEP 29	272.87

Note: Non-pumping water levels are measured after all pumps in the pump chamber are turned off for 2 hours.

HAWAII, ISLAND OF OAHU--Continued



HAWAII, ISLAND OF OAHU

213224158135901. Local number and name, 3-3213-06 Makua, U.S. Air Force, Oahu.

LOCATION.--Lat 21°32', long 158°14', Hydrologic Unit 20060000, along Farrington Highway, 1.2 mi north of Makua Cave, and 1 mi southeast of Yokohama Bay. Owner: U.S. Air Force.

AQUIFER.--Waianae Volcanics, Pliocene age.

WELL CHARACTERISTICS.--Drilled well, depth 50 ft, cased to 21 ft with 6-in. black steel pipe.

DATUM.--Elevation of land-surface datum is 26 ft. Measuring point is top of 6-in. casing, elevation is 26.47 ft above mean sea level.

REMARKS.--Prior to October 1993, unpublished records in files of the USGS Hawaii District office.

PERIOD OF RECORD.-- Water level: occasional measurements, October 1972 to current year. Water quality: occasional measurements, 1965, 1967, February 1972 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 7.92 ft above mean sea level, January 2, 1975; lowest measured, 6.39 ft above mean sea level, March 12, 2002.

WATER LEVEL, IN FEET RELATIVE TO MEAN SEA LEVEL, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 13	6.49	JAN 15	6.47	MAR 12	6.39	SEP 23	6.45

HAWAII, ISLAND OF OAHU

213327157524401. Local number and name, 3-3352-01 Kahana Valley, Oahu.

LOCATION.--Lat 21°33', long 157°53', Hydrologic Unit 20060000, at mouth of Kahana Valley, and 700 ft southwest of Kamehameha Highway, Kahana. Owner: State of Hawaii.

AQUIFER.--Koolau Basalt, Pleistocene to Pliocene age.

WELL CHARACTERISTICS.--Drilled flowing artesian well, depth 441 ft, 10-in. casing diameter, cased to 177 ft.

DATUM.--Elevation of land-surface datum is 6 ft. Measuring point is top of "T", 7.31 ft above mean sea level.

PERIOD OF RECORD.-- Water level: occasional measurements, April 1935 to 1990, 1992 to current year. Water quality: occasional measurements, 1935 to 1991, 1994 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 21.3 ft above mean sea level, March 29, 1966; lowest measured, 11.66 ft above mean sea level, December 17, 2001.

WATER LEVEL, IN FEET RELATIVE TO MEAN SEA LEVEL, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DATE	WATER LEVEL
DEC 17	11.66

HAWAII, ISLAND OF OAHU

213430158071601. Local number and name, 3-3407-37 Kiikii Exploratory Well, Oahu.

LOCATION.--Lat 21°34', long 158°07', Hydrologic Unit 20060000, 2.75 miles down Haleiwa Beach Road from Weed Circle heading southwest and 0.5 miles northeast of Waialua Elementary School. Owner: Dole Food Company, Inc.

AQUIFER.--Koolau Basalt, Pleistocene to Pliocene age

WELL CHARACTERISTICS.--Drilled flowing well, depth 135 ft., surface casing steel, diameter 8 5/8-in., inner casing 4 $^{1}/_{2}$-in. PVC, cased to 115 ft.

DATUM.--Elevation of land-surface datum is 5 ft. Measuring point is top of casing, 14.68 ft. above mean sea level.

REMARKS.--Prior to October 2000, unpublished records in files of the U.S. Geological Survey.

PERIOD OF RECORD.--Water level: occasional measurements, August 1994 to current year. Water quality: occasional measurements, October 2000 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 11.60 ft. above mean sea level, February 13, 1995; lowest 10.97 ft. above mean sea level, June 21, 2001.

WATER LEVEL, IN FEET RELATIVE TO MEAN SEA LEVEL, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 29	11.08	FEB 28	11.17	APR 25	11.04	AUG 20	11.09	SEP 26	11.31

213438158091101. Local number and name, 3-3409-16 Mokuleia, Oahu.

LOCATION.--Lat 21°35', long 158°09', Hydrologic Unit 20060000, 1.6 mi west of Waialua High School, 2.6 mi east of Mokuleia Beach Park along Farrington Highway. Owner: J. Mendonca.

AQUIFER.--Waianae Volcanics, Pliocene age.

WELL CHARACTERISTICS.--Drilled flowing artesian well, depth 518 ft, cased to 440 ft, diameter 10-in. to 396 ft, 8-in. to 440 ft.

DATUM.--Elevation of land-surface datum is 8 ft. Measuring point is chiseled 1-½-in. square on concrete, 3.7 ft in front of door of well shelter, elevation is 8.48 ft above mean sea level.

REMARKS.--Prior to October 1993, unpublished records in files of the USGS Hawaii District office.

PERIOD OF RECORD.-- Water level: occasional measurements, December 1924 to current year. Water quality: occasional measurements, 1924-84.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 21.3 ft above mean sea level, January 16, 1969; lowest measured, 16.20 ft above mean sea level, September 4, 2002.

WATER LEVEL, IN FEET RELATIVE TO MEAN SEA LEVEL, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 30	16.46	FEB 19	16.24	SEP 04	16.20	SEP 26	16.39

HAWAII, ISLAND OF OAHU

213446158104901. Local number and name, 3-3410-08 Kawaihapai, Mokuleia, Oahu.

LOCATION.--Lat 21°35', long 158°11', 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.--Waianae Volcanics, Pliocene age.

WELL CHARACTERISTICS.--Drilled flowing artesian well, depth 447 ft, 1-in. casing diameter, cased to 410 ft, perforated from 410 to 447 ft.

DATUM.--Elevation of land-surface datum is 12 ft. Measuring point is top of recorder shelf over 12-in. stilling well, 20.53 ft above mean sea level. On June 14, 2000, measuring point was changed to top of 1 ½ inch drain pipe at bottom of 12-inch stilling well, 14.50 ft above mean sea level.

REMARKS.--Prior to October 1993, unpublished records in files of the USGS Hawaii District office.

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: occasional measurements, 1929 to 1985, 1989 to 1991, 1994 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 19.98 ft above mean sea level, January 5, 1969; lowest measured, 16.08 ft above mean sea level, August 6, 1929.

WATER LEVEL, IN FEET RELATIVE TO MEAN SEA LEVEL, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 30	17.07	FEB 19	17.10	SEP 04	16.98	SEP 26	17.11

213626158044601. Local number and name, 3-3604-01 Kawailoa Deep Monitoring Well, Oahu.

LOCATION.--Lat 21°36', long 158°05', Hydrologic Unit 20060000, 12.6 miles northwest of Weed Circle and 1.0 miles north of Anahulu Gulch. Owner: Bishop Estate.

AQUIFER.--Koolau, Basalt, Pleistocene to Pliocene age

WELL CHARACTERISTICS.--Drilled well, depth 701 ft., surface casing diameter 8 5/8-in., cased to 69 ft., inner casing 4 ½-in., cased to 701 ft., bottom 400 ft. screened.

DATUM.--Elevation of land-surface datum is 308 ft. Measuring point is located on the top of the casing, 309.01 ft.above mean sea level.

REMARKS.-Prior to September 2000, unpublished records in files of the U.S. Geological Survey.

PERIOD OF RECORD.-- Water level: occasional measurements, January 1994 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 4.50 ft. above mean sea level, June 29, 1994; lowest 3.81 ft. above mean sea level, April 10, 1995.

WATER LEVEL, IN FEET RELATIVE TO MEAN SEA LEVEL, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 29	4.15	FEB 28	4.02	AUG 20	3.99

HAWAII, ISLAND OF OAHU

214053157570401. Local number and name, 3-4057-05 Kahuku, Oahu.

LOCATION.--Lat 21°41', long 157°57', Hydrologic Unit 20060000, 0.4 mi northeast of Kahuku Hospital, and 500 ft north of Kahuku High School.

AQUIFER.--Koolau Basalt, Pleistocene to Pliocene age.

WELL CHARACTERISTICS.--Drilled flowing artesian well, depth 397 ft, 12-in. metal casing, cased to 172 ft.

DATUM.--Elevation of land-surface datum is 9 ft. Measuring point is top of 10-in. standpipe, elevation is 16.01 ft above mean sea level.

REMARKS.--Prior to October 1993, unpublished records in files of the USGS Hawaii District office.

PERIOD OF RECORD.-- Water level: water-level recorder, August 1958 to December 1990. Occasional measurements, March 1911 to May 1918, March 1921, January 1926 to August 1958, December 1990 to current year. Water quality: occasional measurements, 1908, 1911-16, 1924-78.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 17.12 ft above mean sea level, January 1916; lowest measured, 8.00 ft above mean sea level, October 5, 1962.

WATER LEVEL, IN FEET RELATIVE TO MEAN SEA LEVEL, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 27	11.89	FEB 19	12.75	MAY 02	11.27	JUL 24	11.87	SEP 18	11.83

HAWAII, ISLAND OF OAHU

214125158013401. Local number and name, 3-4101-03 Waialee, Oahu.

LOCATION.--Lat 21°41', long 158°02', Hydrologic Unit 20060000, 1,500 ft northeast of University of Hawaii agriculture experiment station in Waialee, and 1.9 mi northeast of Sunset Beach. Owner: State of Hawaii.

AQUIFER.--Koolau Basalt, Pleistocene to Pliocene age.

WELL CHARACTERISTICS.--Drilled artesian well, depth 61 ft, 8-in. casing diameter, cased to 36 ft.

DATUM.--Elevation of land-surface datum is 22 ft. Measuring point is top of 4-in. pipe, 21.89 ft above mean sea level.

REMARKS.--Water-quality records for 1929-74 are available in files of USGS Hawaii 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, November 14, 1932; lowest measured, 10.97 ft above mean sea level, July 1, 1977.

WATER LEVEL, IN FEET RELATIVE TO MEAN SEA LEVEL, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 27	12.55	FEB 19	12.26	MAY 02	12.21	JUL 24	12.16	SEP 18	12.44

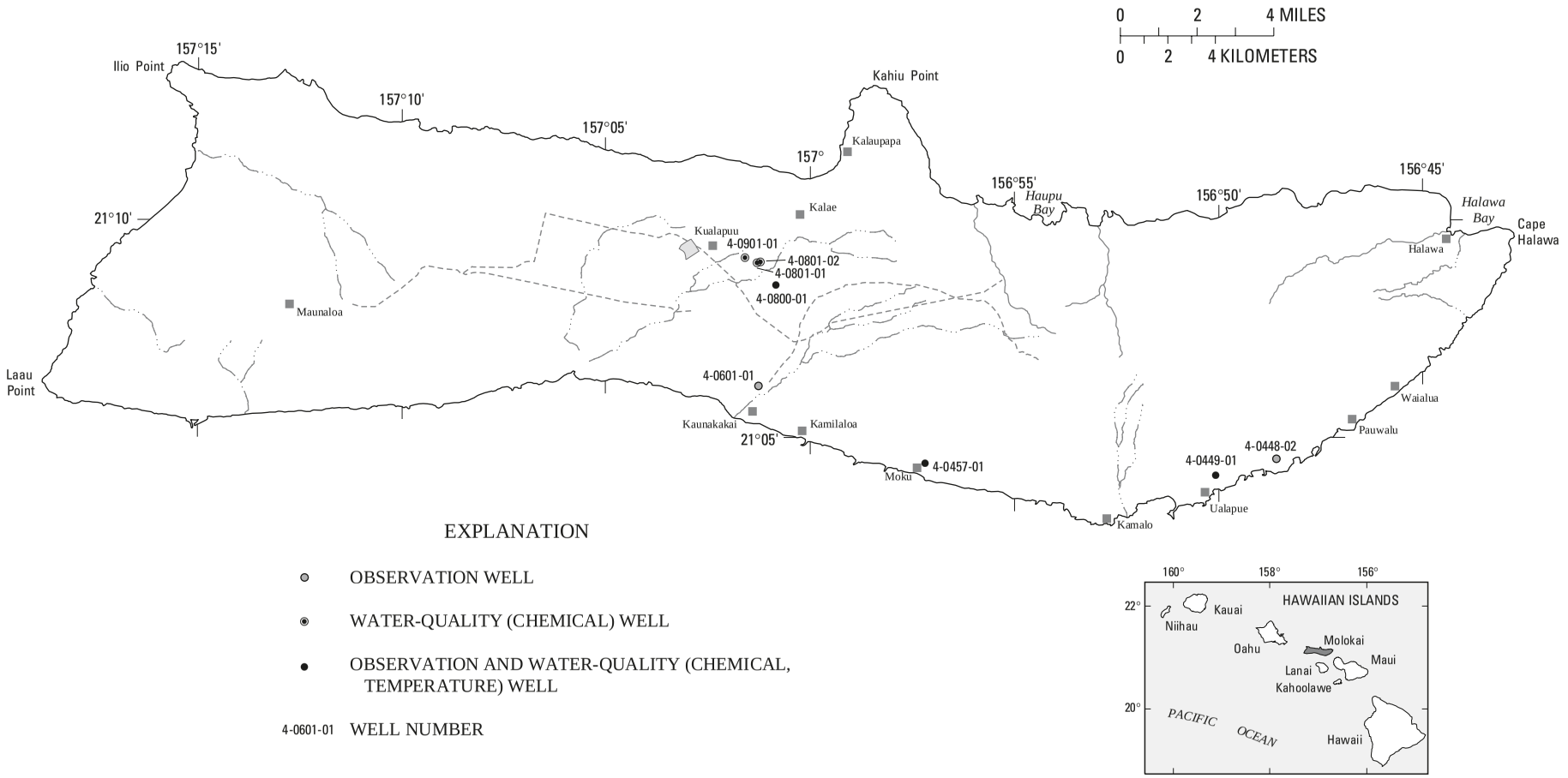


Figure 18. Locations of observation wells and ground-water quality sampling sites on Molokai.

210425156483001. Local number, 4-0448-02. Mapulehu Shaft 2, Molokai.

LOCATION.--Lat 21°04', long 156°48', Hydrologic Unit 20050000, 100 ft north of Highway 45, and 0.8 mi west of Pukoo.
Owner: P. Friel.

AQUIFER.--East Molokai Volcanics, Pliocene age.

WELL CHARACTERISTICS.--Dug basal water-table well, size 4 ft x 6 ft, depth 21 ft.

DATUM.--Elevation of land-surface datum is 19 ft. Measuring point is top of 2 in. x 2 in. steel plate bolted to top of concrete wall of well, 21.23 ft above mean sea level.

PERIOD OF RECORD.-- Water level: water-level recorder, August 1970 to January 1973. Occasional measurements, February 1973 to current year. Water quality: occasional measurements, 1970-73, 1993-2000.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 6.11 ft above mean sea level, November 26, 1970; lowest measured, 3.67 ft above mean sea level, February 8, 1977.

WATER LEVEL, IN FEET RELATIVE TO MEAN SEA LEVEL, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 09	4.03	DEC 11	4.22	APR 09	4.04	JUN 10	3.88	SEP 04	4.07

210402156495801. Local number, 4-0449-01. Ualapue Shaft, Molokai.

LOCATION.--Lat 21°04', long 156°50', 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 Volcanics, Pliocene age.

WELL CHARACTERISTICS.--Dug basal water-table well, size 4 ft 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 is top of steel plate, 42.42 ft above mean sea level.

REMARKS.--Water from this well is used for public supply; water level affected by pumping.

PERIOD OF RECORD.-- Water level: occasional measurements, 1938-39, 1941-63, November 1972 to current year. Water quality: occasional measurements, 1948, 1952-56, 1970-91, 1993 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 6.05 ft above mean sea level, January 19, 1950; lowest measured, 2.09 ft above mean sea level, September 16, 1975.

WATER LEVEL, IN FEET RELATIVE TO MEAN SEA LEVEL, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 09	3.02	DEC 11	3.14	APR 09	2.85	JUN 10	2.92	SEP 04	3.09

210419156570501. Local number, 4-0457-01. Kawela Shaft, Molokai.

LOCATION.--Lat 21°04', long 156°57', Hydrologic Unit 20050000, 0.5 mi northwest of Kakahaia Fishpond, and 0.5 mi northeast of Moku. Owner: County of Maui.

AQUIFER.--East Molokai Volcanics, Pliocene age.

WELL CHARACTERISTICS.--Dug basal water-table well, size 4 ft 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 is top of steel plate, 37.56 ft, above mean sea level. New M.P. August. 14, 2001.

REMARKS.--Water from this well is used for public supply. Water level measured after pump has been turned off for 30 minutes.

PERIOD OF RECORD.-- Water level: occasional measurements, June 1947 to November 1960, January 1962 to February 1963, November 1972 to current year. Water quality: occasional measurements, 1948, 1954-56, 1960, 1962, 1971, 1973- 91, 1993 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 2.78 ft above mean sea level, February 5, 1991; lowest measured, 1.47 ft above mean sea level, June 24, 1955.

WATER LEVEL, IN FEET RELATIVE TO MEAN SEA LEVEL, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 09	1.85	DEC 11	1.87	APR 10	1.69	JUN 10	1.63	SEP 06	1.75

HAWAII, ISLAND OF MOLOKAI

210605157012001. Local number, 4-0601-01. Kaunakakai, Molokai.

LOCATION.--Lat 21°06', long 157°01', Hydrologic Unit 20050000, 0.6 mi north of Kaunakakai School, and 0.9 mi east of Kalanianaole Colony. Owner: Molokai Ranch.

AQUIFER.--East Molokai Volcanics, Pliocene age.

WELL CHARACTERISTICS.--Drilled basal water-table well, depth 59 ft, 12-in. casing diameter, cased to 20 ft.

DATUM.--Elevation of land-surface datum is 51 ft. Measuring point is top of 15-in. surface casing, 51.95 ft above mean sea level.

PERIOD OF RECORD.-- Water level: occasional measurements, May 1954 to current year. Water quality: occasional measurements, 1954-2000.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 3.30 ft above mean sea level, January 20, 1969; lowest measured, 1.60 ft above mean sea level, December 5, 1964.

WATER LEVEL, IN FEET RELATIVE TO MEAN SEA LEVEL, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 09	2.62	DEC 11	2.61	APR 09	2.51	JUN 10	2.44	SEP 04	2.55

HAWAII, ISLAND OF MOLOKAI

210825157004301. Local number, 4-0800-01. Kualapuu Deep Monitor Well, Molokai.

LOCATION.--Lat 21°08', long 157°01', Hydrologic Unit 20050000, 2.5 mi southeast of Kualapuu School and 3.4 mi northeast of Kaunakakai. Owner: U.S. Geological Survey.

AQUIFER.--East Molokai Volcanics, Pliocene age.

WELL CHARACTERISTICS.--Drilled basal water-table, deep-monitor well, depth 1,530 ft, 4-in. casing diameter, cased to 1,530 ft (bottom 600 ft is perforated).

DATUM.--Elevation of land-surface datum is 982 ft. Measuring point is the top of 4-in. pipe, 982.59 ft above mean sea level.

PERIOD OF RECORD.-- Water level: occasional measurements, 2001 to current year. Water quality: occasional measurements, 2001 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 9.05 ft above mean sea level, February 1, 2001; lowest water level measured, 8.09 ft above mean sea level, April 30, 2002.

REMARKS.--Salinity profiles are measured in this well.

WATER SURFACE ELEVATION IN FEET RELATIVE TO MEAN SEA LEVEL, WATER YEAR OCTOBER 2000 TO SEPTEMBER 2001

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
FEB 01	9.05	APR 03	8.87	APR 23	8.85	JUL 13	8.68

WATER SURFACE ELEVATION IN FEET RELATIVE TO MEAN SEA LEVEL, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
JAN 25	8.49	APR 30	8.09	AUG 13	8.45

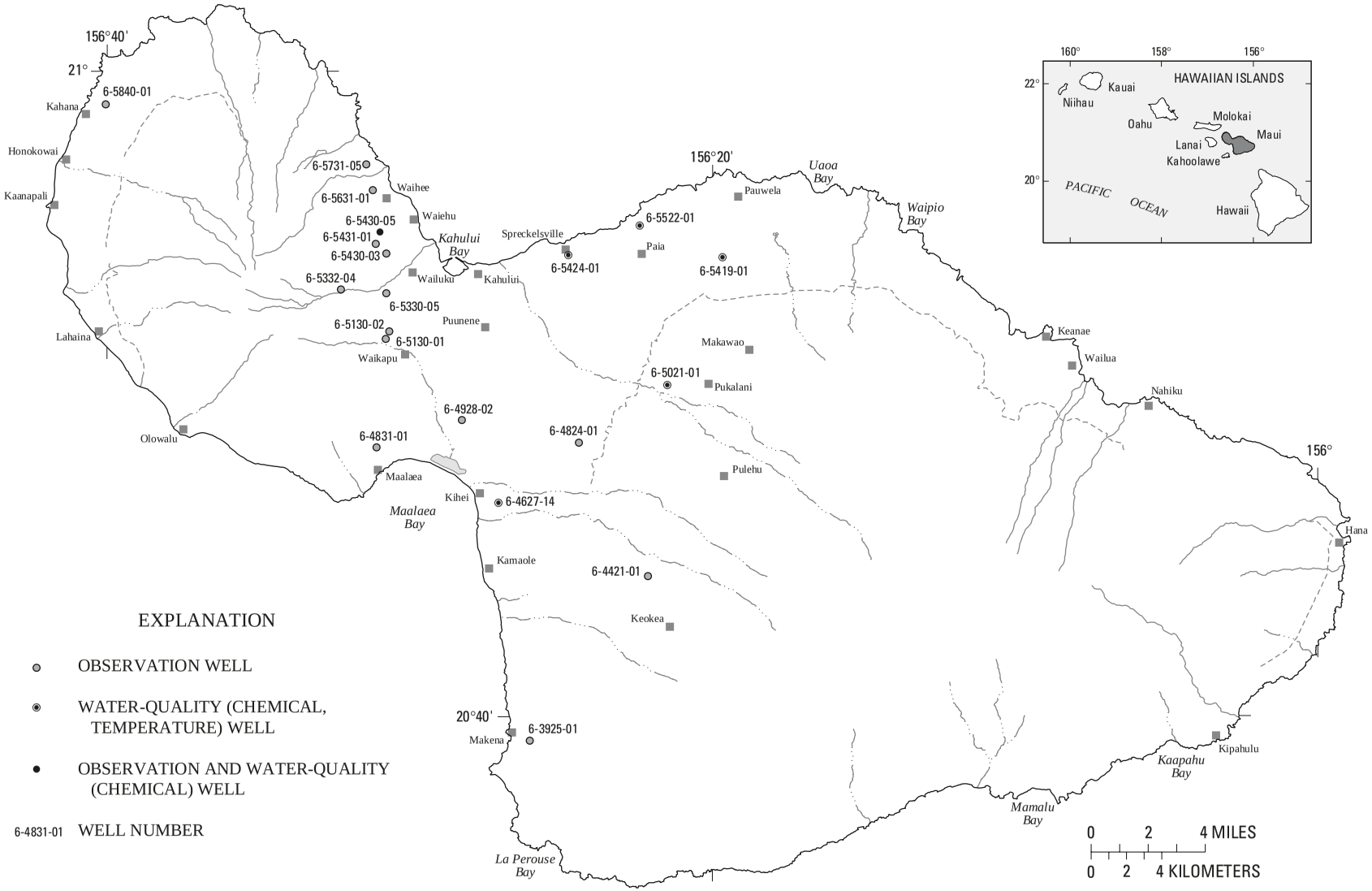


Figure 19. Locations of observation wells and ground-water quality sampling sites on Maui.

HAWAII, ISLAND OF MAUI

203912156255901. Local number, 6-3925-01. Makena, Maui.

LOCATION.--Lat 20°39', long 156°26', 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 Volcanics, Pleistocene age.

WELL CHARACTERISTICS.--Drilled basal water-table well, depth 382 ft, 8-in. casing diameter, cased to 343 ft, perforated from 343 to 363 ft.

DATUM.--Elevation of land-surface datum is 351 ft. Measuring point is top of 2-in. 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, August 24, 1964; lowest measured, 0.60 ft below mean sea level, May 24, 2001.

WATER LEVEL, IN FEET RELATIVE TO MEAN SEA LEVEL, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 29	-.26	FEB 01	-.10	MAY 08	-.36	AUG 01	-.36

HAWAII, ISLAND OF MAUI

204827156242201. Local number, 6-4824-01. Kihei exploratory well, Maui

LOCATION.--Lat 20°48', long 156°24', 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 Volcanics, Pleistocene age.

WELL CHARACTERISTICS.--Drilled basal water-table well, depth 646 ft, 12-in. casing diameter, cased to 598 ft, screened from 598 to 638 ft.

DATUM.--Elevation of land-surface datum is 593 ft. Measuring point is top of 3-in. pipe attached to the steel casing cover, 594.74 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, January 17, 1974; lowest measured, 3.58 ft above mean sea level, June 14, 2000.

WATER LEVEL, IN FEET RELATIVE TO MEAN SEA LEVEL, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 29	3.90	DEC 03	4.28	FEB 12	4.14	MAY 09	4.01	JUN 18	3.93	AUG 02	3.89

HAWAII, ISLAND OF MAUI

204818156310301. Local number, 6-4831-01. Maalaea, Maui.

LOCATION.--Lat 20°48', long 156°31', 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 Basalt, Pliocene age.

WELL CHARACTERISTICS.--Drilled basal water-table well, depth 219 ft, 8-in. casing diameter, cased to 187 ft.

DATUM.--Elevation of land-surface datum is 166 ft. Measuring point is top of 8-in. 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, November 30, 1983; lowest measured, 4.66 ft above mean sea level, June 12, 2000.

WATER LEVEL, IN FEET RELATIVE TO MEAN SEA LEVEL, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 29	4.77	DEC 03	5.05	FEB 01	5.00	MAY 08	4.79	JUN 17	4.79	AUG 01	4.75

HAWAII, ISLAND OF MAUI

204909156281401. Local number, 6-4928-02. Puunene Airport Shaft, Maui.

LOCATION.--Lat 20°49', long 156°28', 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 Basalt, Pliocene age.

WELL CHARACTERISTICS.--Dug basal water-table well, 6 ft x 9 ft vertical shaft, depth 52 ft.

DATUM.--Elevation of land-surface datum is 50 ft. Measuring point is 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, January 12, 1980; lowest measured, 3.05 ft above mean sea level, March 5, 6, 1977.

WATER LEVEL, IN FEET RELATIVE TO MEAN SEA LEVEL, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 29	3.44	DEC 03	3.89	FEB 12	3.75	MAY 08	3.60	JUN 17	3.46	AUG 01	3.47

HAWAII, ISLAND OF MAUI

205140156304501. Local number, 6-5130-01. Waikapu 1, Maui.

LOCATION.--Lat 20°52', long 156°31', Hydrologic Unit 20020000, 0.5 mi northwest of Waikapu, and 1.0 mi southeast of Wailuku Heights. Owner: State of Hawaii.

AQUIFER.--Wailuku Basalt, Pliocene age.

WELL CHARACTERISTICS.--Drilled basal water table well, depth 757 ft, 8-in. casing diameter, cased to 569 ft, perforated from 569 to 609 ft.

DATUM.--Elevation of land-surface datum is 551 ft. Measuring point is top of 6-in. 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, October 13, 1982; lowest measured, 11.21 ft above mean sea level, April 4, 2000.

WATER LEVEL, IN FEET RELATIVE TO MEAN SEA LEVEL, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 16	11.58	JAN 08	11.65	APR 02	12.16	JUL 02	12.11
DEC 04	11.58	FEB 21	12.09	MAY 14	12.26	AUG 20	12.38

HAWAII, ISLAND OF MAUI

205154156303801. Local number, 6-5130-02. Waikapu 2, Maui.

LOCATION.--Lat 20°52', long 156°31', Hydrologic Unit 20020000, 0.6 mi northwest of Waikapu, and 1.0 mi southeast of Wailuku Heights. Owner: State of Hawaii.

AQUIFER.--Wailuku Basalt, Pliocene age.

WELL CHARACTERISTICS.--Drilled basal water-table well, depth 1,020 ft, 20-in. casing diameter, cased to 520 ft, perforated from 520 to 570 ft.

DATUM.--Elevation of land-surface datum is 518 ft. Measuring point is 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, July 15, 1987; lowest measured, 11.08 ft above mean sea level, October 16, 2001.

WATER LEVEL, IN FEET RELATIVE TO MEAN SEA LEVEL, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 16	11.08	JAN 08	11.53	APR 02	11.55	JUL 02	11.31
DEC 04	11.28	FEB 21	11.50	MAY 14	11.48	AUG 20	11.20

HAWAII, ISLAND OF MAUI

205305156304401. Local number, 6-5330-05. Shaft 33, well 1, Maui.

LOCATION.--Lat 20°53', long 156°31', Hydrologic Unit 20020000, 1,500 ft southwest of Wailuku Elementary School, 1,500 ft southeast of Maui DWS water tank near intersection of Wailuku Heights Road and Iao Valley Road.

AQUIFER.--Wailuku Basalt, Pleistocene age.

WELL CHARACTERISTICS.--Three drilled wells in vault, at bottom of excavated inclined shaft. Vault floor about 32 ft above mean sea level, well nearest inclined shaft is measured. Depth 310 ft below vault floor, casing length unknown.

DATUM.--Elevation of land-surface datum is 401.51 ft. Datum of vault floor is 32.14 ft. Measuring point is the edge of steel plate, inside access hole cut through pump base casing, at cement floor level, 32.17 ft above mean sea level.

PERIOD OF RECORD.--Occasional measurements, February 1996 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 16.33 ft above mean sea level, April 22, 1997; lowest measured, 7.83 ft above mean sea level, October 16, 2001.

REMARKS.--Water level affected by pumping of adjacent well in shaft, and by other nearby wells.

WATER LEVEL, IN FEET RELATIVE TO MEAN SEA LEVEL, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 16	7.83	JAN 08	8.66	APR 02	9.19	JUL 02	8.71
DEC 03	8.09	FEB 21	9.11	MAY 14	9.19	AUG 20	10.34

HAWAII, ISLAND OF MAUI

205329156305502. Local number, 6-5330-09. Mokuhau Pump 2, Maui.

LOCATION.--Lat 20°53', long 156°31', Hydrologic Unit 20020000, .5 mi northwest of Wailuku and 0.6 mi west on Mokuhau Road from Market Street. Owner: State of Hawaii.

AQUIFER.--Wailuku Basalt, Pliocene age.

WELL CHARACTERISTICS.--Drilled water table well. Depth 600 ft, 18-in. casing diameter, length of casing 411 ft.

DATUM.--Elevation of land-surface datum is 354 ft. Measuring point is top of 1 1/2-in. pipe. 353.79 ft above mean sea level.

PERIOD FOR RECORD.--Chloride samples collected since 1972. Pump removed sometime in September to November 1998. Occasional measurements December 1998 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 12.04 ft above mean sea level, March 5, 1999; lowest measured, 3.88 ft above mean sea level, August 24, 1999.

REMARKS.--Water level affected by pumping of nearby well.

WATER LEVEL, IN FEET RELATIVE TO MEAN SEA LEVEL, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 16	6.61	JAN 08	10.61	APR 02	10.73	JUL 02	8.11
DEC 04	9.84	FEB 21	9.50	MAY 14	8.82	AUG 20	4.30

HAWAII, ISLAND OF MAUI

205312156321402. Local number, 6-5332-04. Kepaniwai observation well, Maui.

LOCATION.--Lat 20°53', long 156°32', Hydrologic Unit 20020000, 1.9 mi southwest of Puuohala Village, 1.9 mi west of Wailuku Elementary School, and 10 ft from pumping well 6-5332-05. Owner: State of Hawaii.

AQUIFER.--Wailuku Basalt, Pliocene age.

WELL CHARACTERISTICS.--Drilled water-table well, depth 254 ft.

DATUM.--Elevation of land-surface datum is 713 ft. Measuring point is top of 2-in. PVC pipe.

PERIOD OF RECORD.--Occasional measurements, October 1991 to current year. Prior to October 1995, unpublished records are in the files of the U.S. Geological Survey.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 39.41 ft below land-surface datum, July 1, 1996; lowest measured, 83.20 ft below land-surface datum, July 6, 2000.

REMARKS.--Water level affected by pumping of nearby well.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 16	81.56	JAN 08	80.80	APR 02	78.54	JUL 02	78.71
DEC 04	80.80	FEB 21	79.04	MAY 14	78.38	AUG 20	78.95

HAWAII, ISLAND OF MAUI

205419156304401. Local number, 6-5430-03. TH-E Waiehu, Maui.

LOCATION.--Lat 20°54', long 156°31', 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 Basalt, Pliocene age.

WELL CHARACTERISTICS.--Drilled basal water-table well, depth 580 ft, 1.5-in. PVC casing, cased to 400 ft, perforated from 400 to 580 ft.

DATUM.--Elevation of land-surface datum is 415 ft. Measuring point is top of 1-in. 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, December 31, 1982; lowest measured, 9.08 ft above mean sea level, October 1, 1999.

WATER LEVEL, IN FEET RELATIVE TO MEAN SEA LEVEL, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 16	9.43	JAN 08	11.55	APR 02	11.96	JUL 02	10.82
DEC 04	10.50	FEB 21	12.27	MAY 14	12.10	AUG 20	9.70

HAWAII, ISLAND OF MAUI

205405156305401. Local number, 6-5430-05. Waiehu deep monitor well, Maui

LOCATION.--Lat 20°55', long 156°31', 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 Basalt, Pliocene age.

WELL CHARACTERISTICS.--Drilled basal water-table well, depth 1,400 ft, 10-in. casing diameter, cased to 400 ft.

DATUM.--Elevation of land-surface datum is 380 ft. Measuring point is top of 10-in. casing, 380.84 ft 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, December 14, 1989; lowest measured, 7.66 ft above mean sea level, October 18, 1999.

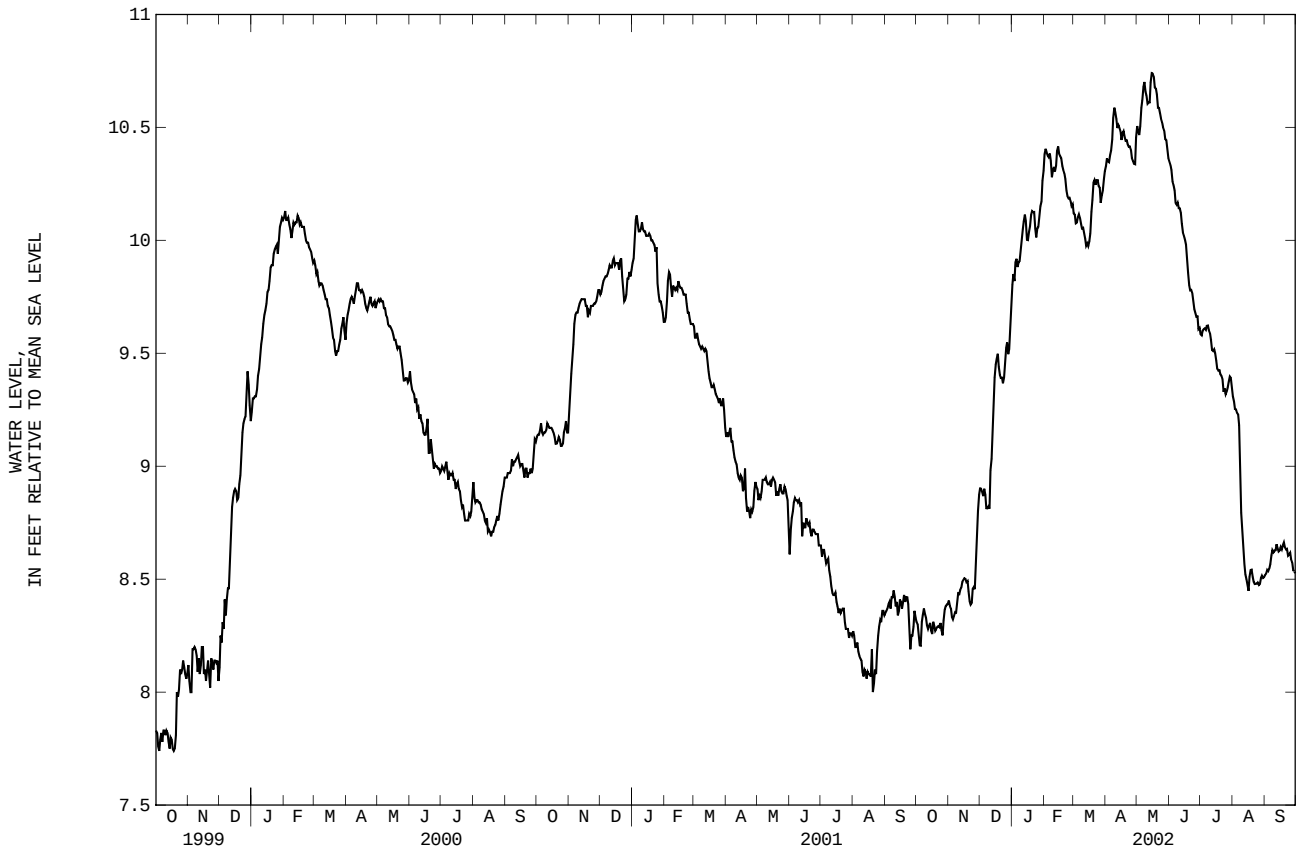
REMARKS.--Geophysical log and water-quality records are available in files at USGS Hawaii District Office.

WATER LEVEL, IN FEET RELATIVE TO MEAN SEA LEVEL, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	e8.31	8.41	8.90	9.80	10.38	10.12	e10.33	10.51	10.35	9.58	9.31	8.52
2	8.30	8.38	8.90	9.85	10.41	10.11	10.36	10.48	10.33	9.58	9.29	8.52
3	8.26	8.37	8.89	e9.82	10.39	10.08	10.35	10.47	10.31	e9.60	9.25	8.54
4	8.21	8.33	8.87	9.90	10.38	10.08	10.35	10.51	10.26	9.61	9.25	8.54
5	8.21	8.32	8.90	9.92	10.37	10.10	10.38	10.59	10.25	9.61	9.24	8.55
6	8.31	8.34	8.87	9.88	10.38	10.12	10.40	10.62	10.22	9.60	9.23	8.57
7	8.34	8.35	8.81	9.90	10.35	10.10	10.45	10.68	10.17	9.62	9.18	8.61
8	8.37	8.35	8.81	9.91	10.28	10.07	10.54	10.70	10.16	9.62	8.97	8.63
9	8.35	8.40	8.82	9.96	10.31	10.05	10.59	10.66	10.17	9.60	8.79	8.62
10	8.33	8.44	8.81	10.0	10.32	10.06	10.57	10.64	10.14	9.59	8.71	8.63
11	8.30	8.43	8.98	10.05	10.31	10.03	10.54	10.60	10.14	9.56	8.64	8.63
12	8.28	8.45	9.03	10.08	10.33	10.01	10.50	10.61	10.12	9.51	8.57	8.65
13	8.29	8.46	9.16	10.11	10.40	9.98	10.51	10.61	10.07	9.51	8.52	8.64
14	8.31	8.49	9.29	10.09	10.42	9.99	10.50	10.70	10.03	9.52	8.50	8.62
15	8.27	8.50	9.39	10.00	10.38	9.98	10.48	10.74	10.02	9.50	8.48	8.63
16	8.26	8.50	9.45	10.00	10.37	10.0	10.44	10.74	10.00	9.47	8.45	8.64
17	8.31	8.50	9.48	10.04	10.36	10.03	10.47	10.72	9.98	9.43	8.51	8.63
18	8.29	8.49	9.50	10.06	10.33	10.13	10.48	10.68	9.92	9.42	8.54	8.65
19	8.27	8.49	9.44	10.11	10.31	10.18	10.46	10.67	9.86	9.43	8.54	8.66
20	8.28	8.45	9.40	10.13	10.30	10.26	10.44	10.65	9.80	9.41	8.51	8.64
21	8.29	8.40	9.39	10.12	10.27	10.27	10.44	10.59	9.78	9.40	8.49	8.63
22	8.29	8.39	9.39	10.13	10.22	10.25	10.42	10.59	9.78	9.39	8.48	8.63
23	8.29	8.40	9.37	10.05	10.20	10.27	10.41	10.56	9.77	9.33	8.48	8.60
24	8.31	8.46	9.39	10.01	10.19	10.27	10.42	10.54	9.73	9.34	8.48	8.61
25	8.28	8.47	9.45	10.05	10.19	10.24	10.40	10.52	9.70	9.32	8.49	8.62
26	8.25	8.46	9.52	10.06	10.17	10.23	10.36	10.50	9.68	9.33	8.47	8.59
27	8.32	8.59	9.55	10.11	10.15	10.17	10.35	10.49	9.66	9.35	8.48	8.57
28	8.37	8.71	9.50	10.15	10.16	10.20	10.34	10.45	9.66	9.37	8.51	8.54
29	8.38	8.80	9.52	10.17	---	10.22	10.34	10.44	9.61	9.40	8.52	8.54
30	8.39	8.87	9.61	10.26	---	10.27	10.46	10.41	9.61	9.39	8.51	8.53
31	8.39	---	9.69	10.31	---	10.31	---	10.36	---	9.35	8.51	---
MEAN	8.30	8.47	9.23	10.03	10.31	10.13	10.44	10.58	9.98	9.48	8.71	8.60
MAX	8.39	8.87	9.69	10.31	10.42	10.31	10.59	10.74	10.35	9.62	9.31	8.66
MIN	8.21	8.32	8.81	9.80	10.15	9.98	10.33	10.36	9.61	9.32	8.45	8.52

e Estimated

HAWAII, ISLAND OF MAUI--Continued



HAWAII, ISLAND OF MAUI

205437156310501. Local number, 6-5431-01. TH-B Waiehu, Maui

LOCATION.--Lat 20°55', long 156°31', Hydrologic Unit 20020000, 0.5 mi southwest of Waiehu Village, and 1.4 mi southwest of intersection of Malaihi Road and Kahekili Highway. Owner: Wailuku Sugar Co.

AQUIFER.--Wailuku Basalt, Pliocene age.

WELL CHARACTERISTICS.--Drilled basal water-table well, depth 555 ft, 1.5-in. PVC casing, cased to 515 ft, perforated from 515 to 555 ft.

DATUM.--Elevation of land-surface datum is 493 ft. Measuring point is top of 1.5-in. PVC casing, 492.51 ft above mean sea level.

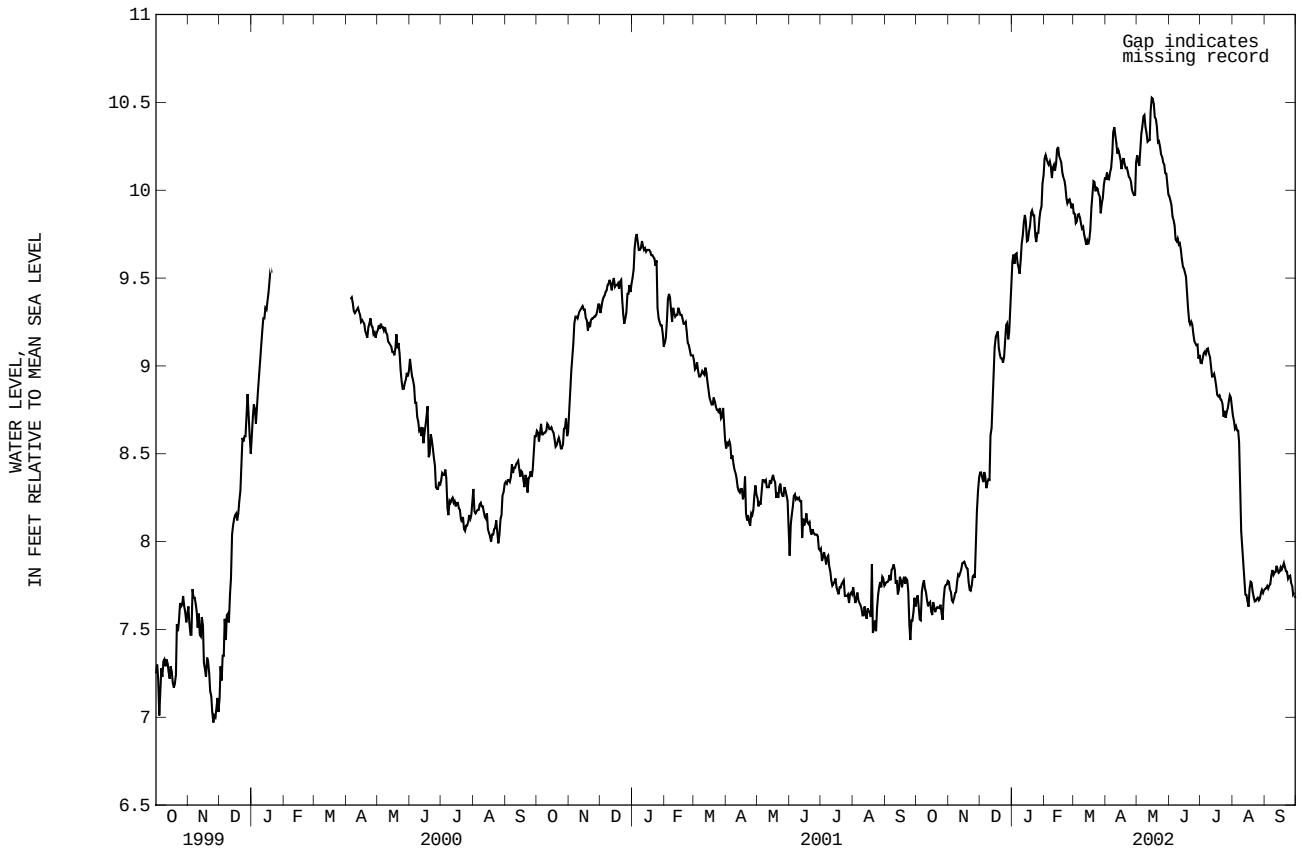
PERIOD OF RECORD.--Water-level recorder, August 1982 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 19.52 ft above mean sea level, January 2, 1983; lowest measured, 6.86 ft above mean sea level, November 26, 1999.

WATER LEVEL, IN FEET RELATIVE TO MEAN SEA LEVEL, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	7.67	7.77	8.39	9.59	10.18	9.87	10.06	10.20	9.97	9.02	8.72	7.73
2	7.69	7.73	8.39	9.63	10.20	9.86	10.10	10.17	9.94	9.02	8.68	7.73
3	7.63	7.71	8.37	9.58	10.18	9.81	10.06	10.14	9.92	9.04	8.64	7.75
4	7.56	7.67	8.34	9.63	10.16	9.82	10.06	10.21	9.85	9.07	8.66	7.73
5	7.55	7.66	8.40	9.64	10.15	9.86	10.10	10.32	9.83	9.08	8.63	7.75
6	7.71	7.67	8.37	9.59	10.16	9.86	10.13	10.36	9.80	9.07	8.63	7.76
7	7.75	7.71	8.30	9.56	10.14	9.85	10.20	10.42	9.72	9.10	8.56	7.81
8	7.78	7.71	8.33	9.52	10.07	9.81	10.33	10.43	9.71	9.10	8.27	7.84
9	7.74	7.77	8.35	9.60	10.13	9.78	10.36	10.36	9.72	9.07	8.06	7.81
10	7.71	7.81	8.35	9.69	10.14	9.79	10.32	10.33	9.69	9.05	7.95	7.82
11	7.67	7.80	8.60	9.74	10.11	9.75	10.26	10.28	9.70	9.00	7.86	7.83
12	7.63	7.82	8.65	9.81	10.15	9.72	10.21	10.28	9.66	8.94	7.77	7.86
13	7.65	7.84	8.82	9.86	10.23	9.69	10.23	10.29	9.61	8.94	7.70	7.84
14	7.66	7.88	8.99	9.82	10.25	9.71	10.20	10.45	9.56	8.95	7.70	7.82
15	7.61	7.88	9.10	9.71	10.20	9.69	10.17	10.53	9.55	8.93	7.66	7.83
16	7.58	7.89	9.16	9.71	10.18	9.72	10.12	10.52	9.53	8.88	7.63	7.85
17	7.66	7.87	9.18	9.77	10.16	9.78	10.17	10.49	9.51	8.84	7.73	7.84
18	7.62	7.85	9.20	9.79	10.10	9.90	10.18	10.41	9.41	8.83	7.77	7.86
19	7.60	7.85	9.10	9.87	10.08	9.97	10.15	10.40	9.33	8.83	7.76	7.88
20	7.62	7.77	9.06	9.88	10.06	10.05	10.13	10.36	9.25	8.81	7.71	7.86
21	7.63	7.72	9.04	9.86	10.02	10.05	10.13	10.27	9.24	8.80	7.69	7.83
22	7.62	7.72	9.04	9.86	9.95	9.99	10.11	10.28	9.25	8.79	7.66	7.83
23	7.62	7.75	9.02	9.74	9.93	10.01	10.08	10.25	9.24	8.71	7.66	7.79
24	7.64	7.80	9.05	9.70	9.94	10.01	10.07	10.21	9.18	8.74	7.67	7.80
25	7.60	7.81	9.13	9.76	9.95	9.98	10.05	10.19	9.14	8.70	7.68	7.80
26	7.55	7.79	9.23	9.76	9.92	9.97	10.00	10.16	9.13	8.74	7.67	7.77
27	7.67	8.02	9.24	9.84	9.90	9.87	9.98	10.15	9.12	8.76	7.68	7.75
28	7.74	8.17	9.15	9.88	9.92	9.93	9.97	10.10	9.12	8.79	7.71	7.69
29	7.75	8.29	9.19	9.91	---	9.96	9.97	10.09	9.04	8.83	7.73	7.70
30	7.76	8.36	9.33	10.04	---	10.03	10.16	10.04	9.06	8.82	7.71	7.68
31	7.78	---	9.45	10.09	---	10.07	---	9.97	---	8.76	7.72	---
MEAN	7.66	7.84	8.85	9.76	10.09	9.88	10.14	10.28	9.49	8.90	7.96	7.79
MAX	7.78	8.36	9.45	10.09	10.25	10.07	10.36	10.53	9.97	9.10	8.72	7.88
MIN	7.55	7.66	8.30	9.52	9.90	9.69	9.97	9.97	9.04	8.70	7.63	7.68

HAWAII, ISLAND OF MAUI--Continued



HAWAII, ISLAND OF MAUI

205617156311101. Local number, 6-5631-01. TH-A1 Waihee, Maui.

LOCATION.--Lat 20°56', long 156°31', 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 Basalt, Pliocene age.

WELL CHARACTERISTICS.--Drilled basal water-table well, depth 300 ft, 1.5-in. PVC casing, cased to 260 ft, perforated from 260 to 300 ft.

DATUM.--Elevation of land-surface datum is 248 ft. Measuring point is top of 1.5-in. 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, December 6, 1982; lowest measured, 10.80 ft above mean sea level, August 21, 2001.

WATER LEVEL, IN FEET RELATIVE TO MEAN SEA LEVEL, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 16	10.85	JAN 08	11.49	APR 02	11.61	JUL 02	11.50
DEC 04	11.02	FEB 21	11.61	MAY 14	11.85	AUG 20	11.40

HAWAII, ISLAND OF MOLOKAI

205705156312401. Local number, 6-5731-05. Kanoa Test Hole, Maui

LOCATION.-Lat 20°57', Long 156°31', Hydrologic Unit 20020000, 300 ft. west of highway 330 and 1.0 mile north of Waihee school.

AQUIFER.-Wailuku basalt, Pliocene age.

WELL CHARACTERISTICS.-Drilled basel water-table well, 2-in. PVC casing, depth is not available.

DATUM.-Elevation of land-surface datum is 309 ft. Measuring point is top of 2-in. well casing, 303.56 ft. above mean sea level.

REMARKS.-Water level affected by pumping.

PERIOD OF RECORD.-Water level: occasional measurements, Aug. 2001 to current year.

EXTREMES FOR PERIOD OF RECORD.-Highest water level measured, 4.90 ft. above mean sea level, Feb. 21, 2002; Lowest measured, 4.46 ft. above mean sea level, Aug. 21, 2001.

WATER LEVEL, IN FEET RELATIVE TO MEAN SEA LEVEL, WATER YEAR OCTOBER 2000 TO SEPTEMBER 2001

DATE	WATER LEVEL
AUG 21	4.46

WATER LEVEL, IN FEET RELATIVE TO MEAN SEA LEVEL, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
FEB 21	4.90	APR 02	4.61	MAY 14	4.80	JUL 02	4.52	AUG 20	4.68

HAWAII, ISLAND OF MAUI

205856156400101. Local number, 6-5840-01 Alaeloa, Maui.

LOCATION.--Lat 20°59', long 156°40', Hydrologic Unit 20020000, on pineapple plantation road 0.9 mi east of Kahana, and 1.5 mi southwest of Honokahua. Owner: State of Hawaii.

AQUIFER.--Honolua Volcanics, Pliocene age.

WELL CHARACTERISTICS.--Drilled basal water-table well, depth 274 ft, 8-in. casing diameter, 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 is top of 9-in. casing, 257.33 ft. above mean sea level. New M. P. June 12, 2001.

REMARKS.--Water-quality records for 1964 and 1980 are available in files of USGS Hawaii District Office.

PERIOD OF RECORD.--Occasional measurements, March 1972 to July 1975. Water- level recorder, August 1975 to June 1993. Occasional measurements, July 1993 to July 2001. Water level recorder July 12, 2001 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 3.68 ft above mean sea level, September 20, 1981; lowest, 2.40 ft above mean sea level May 4, 5, 1985, Feb. 26, 27 2002.

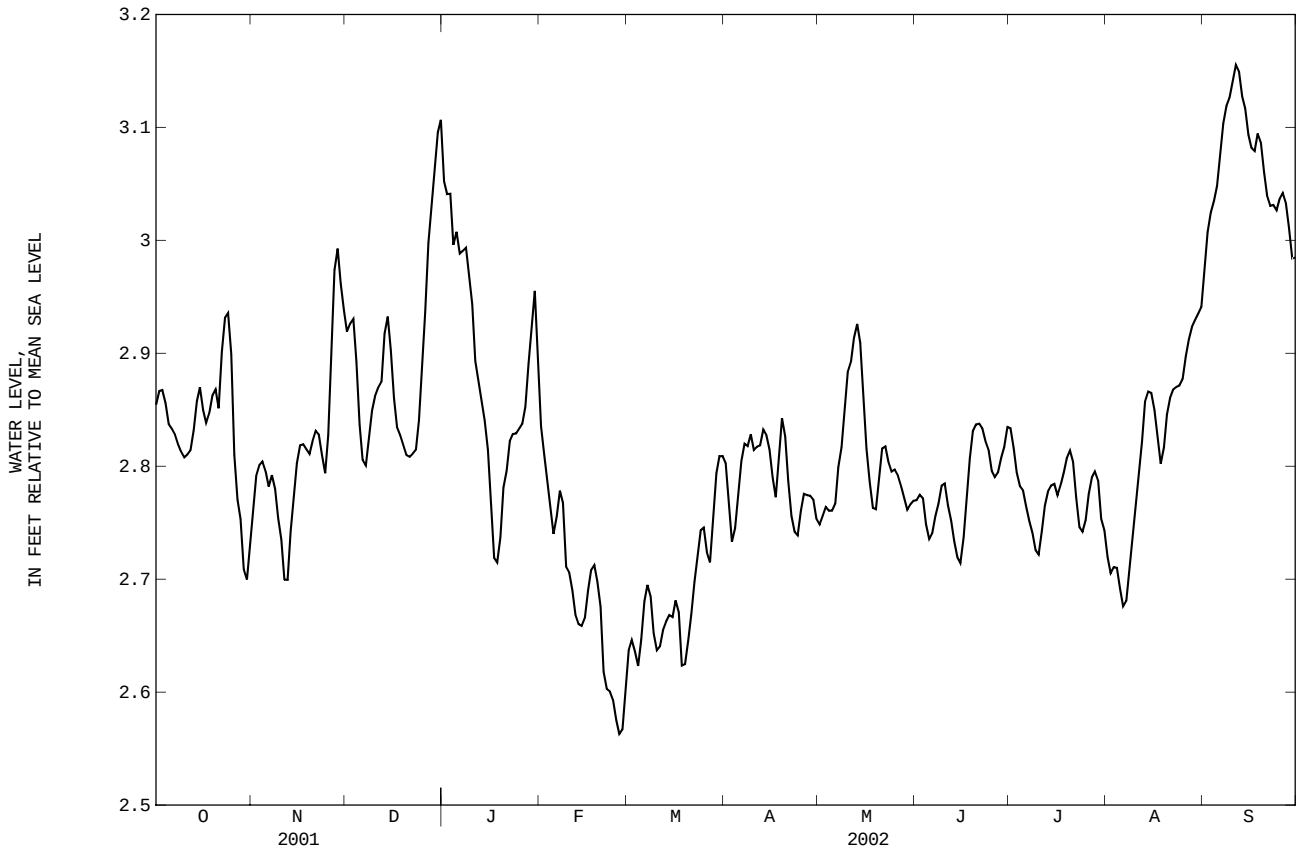
PRECIPITATION, TOTAL, INCHES, WATER YEAR OCTOBER 2000 TO SEPTEMBER 2001
DAILY SUM VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	---	---	---	---	---	---	---	---	---	2.89	3.04
2	---	---	---	---	---	---	---	---	---	---	2.91	3.07
3	---	---	---	---	---	---	---	---	---	---	2.89	3.10
4	---	---	---	---	---	---	---	---	---	---	2.89	3.11
5	---	---	---	---	---	---	---	---	---	---	2.89	3.11
6	---	---	---	---	---	---	---	---	---	---	2.89	3.10
7	---	---	---	---	---	---	---	---	---	---	2.92	3.09
8	---	---	---	---	---	---	---	---	---	---	2.96	3.07
9	---	---	---	---	---	---	---	---	---	---	2.99	3.06
10	---	---	---	---	---	---	---	---	---	---	3.00	3.05
11	---	---	---	---	---	---	---	---	---	---	3.01	3.02
12	---	---	---	---	---	---	---	---	---	---	3.02	3.00
13	---	---	---	---	---	---	---	---	---	2.98	3.02	2.99
14	---	---	---	---	---	---	---	---	---	2.97	3.04	2.98
15	---	---	---	---	---	---	---	---	---	2.95	3.06	2.98
16	---	---	---	---	---	---	---	---	---	2.93	3.05	2.98
17	---	---	---	---	---	---	---	---	---	2.94	3.02	2.99
18	---	---	---	---	---	---	---	---	---	2.96	2.99	2.98
19	---	---	---	---	---	---	---	---	---	2.98	2.96	2.97
20	---	---	---	---	---	---	---	---	---	3.00	2.96	2.96
21	---	---	---	---	---	---	---	---	---	3.02	2.99	2.94
22	---	---	---	---	---	---	---	---	---	3.03	3.01	2.93
23	---	---	---	---	---	---	---	---	---	3.03	3.02	2.90
24	---	---	---	---	---	---	---	---	---	3.03	3.03	2.89
25	---	---	---	---	---	---	---	---	---	3.03	3.04	2.87
26	---	---	---	---	---	---	---	---	---	3.01	3.04	2.87
27	---	---	---	---	---	---	---	---	---	2.99	3.05	2.86
28	---	---	---	---	---	---	---	---	---	2.97	3.05	2.85
29	---	---	---	---	---	---	---	---	---	2.96	3.03	2.86
30	---	---	---	---	---	---	---	---	---	2.93	3.02	2.86
31	---	---	---	---	---	---	---	---	---	2.90	3.02	---
MEAN	---	---	---	---	---	---	---	---	---	---	2.99	2.98
MAX	---	---	---	---	---	---	---	---	---	---	3.06	3.11
MIN	---	---	---	---	---	---	---	---	---	---	2.89	2.85

WATER LEVEL, IN FEET RELATIVE TO MEAN SEA LEVEL, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.85	2.76	2.92	3.05	2.84	2.64	2.80	2.75	2.77	2.83	2.72	2.97
2	2.87	2.79	2.93	3.04	2.81	2.65	2.77	2.76	2.77	2.82	2.71	3.01
3	2.87	2.80	2.93	3.04	2.79	2.64	2.73	2.76	2.77	2.79	2.71	3.02
4	2.86	2.80	2.89	3.00	2.77	2.62	2.75	2.76	2.75	2.78	2.71	3.04
5	2.84	2.80	2.84	3.01	2.74	2.65	2.78	2.76	2.74	2.78	2.69	3.05
6	2.83	2.78	2.81	2.99	2.76	2.68	2.80	2.77	2.74	2.76	2.68	3.08
7	2.83	2.79	2.80	2.99	2.78	2.69	2.82	2.80	2.76	2.75	2.68	3.10
8	2.82	2.78	2.83	2.99	2.77	2.68	2.82	2.82	2.77	2.74	2.71	3.12
9	2.81	2.75	2.85	2.97	2.71	2.65	2.83	2.85	2.78	2.73	2.74	3.13
10	2.81	2.73	2.86	2.94	2.71	2.64	2.81	2.88	2.78	2.72	2.77	3.14
11	2.81	2.70	2.87	2.89	2.69	2.64	2.82	2.89	2.77	2.74	2.79	3.16
12	2.81	2.70	2.88	2.88	2.67	2.66	2.82	2.91	2.75	2.77	2.82	3.15
13	2.83	2.74	2.92	2.86	2.66	2.66	2.83	2.93	2.73	2.78	2.86	3.13
14	2.86	2.77	2.93	2.84	2.66	2.67	2.83	2.91	2.72	2.78	2.87	3.12
15	2.87	2.80	2.90	2.81	2.67	2.67	2.81	2.86	2.71	2.78	2.87	3.09
16	2.85	2.82	2.86	2.77	2.69	2.68	2.79	2.82	2.74	2.77	2.85	3.08
17	2.84	2.82	2.83	2.72	2.71	2.67	2.77	2.79	2.77	2.78	2.83	3.08
18	2.85	2.82	2.83	2.71	2.71	2.62	2.81	2.76	2.81	2.79	2.80	3.09
19	2.86	2.81	2.82	2.74	2.70	2.62	2.84	2.76	2.83	2.81	2.82	3.09
20	2.87	2.82	2.81	2.78	2.68	2.65	2.83	2.79	2.84	2.81	2.85	3.06
21	2.85	2.83	2.81	2.80	2.62	2.67	2.79	2.82	2.84	2.80	2.86	3.04
22	2.90	2.83	2.81	2.82	2.60	2.70	2.76	2.82	2.83	2.77	2.87	3.03
23	2.93	2.81	2.81	2.83	2.60	2.72	2.74	2.80	2.82	2.75	2.87	3.03
24	2.94	2.79	2.84	2.83	2.59	2.74	2.74	2.80	2.81	2.74	2.87	3.03
25	2.90	2.83	2.90	2.83	2.58	2.75	2.76	2.80	2.80	2.75	2.88	3.04
26	2.81	2.91	2.94	2.84	2.56	2.72	2.78	2.79	2.79	2.78	2.90	3.04
27	2.77	2.97	3.00	2.85	2.57	2.71	2.77	2.78	2.79	2.79	2.91	3.03
28	2.75	2.99	3.03	2.89	2.60	2.75	2.77	2.77	2.81	2.80	2.92	3.01
29	2.71	2.96	3.06	2.92	---	2.79	2.77	2.76	2.82	2.79	2.93	2.98
30	2.70	2.94	3.10	2.96	---	2.81	2.75	2.77	2.83	2.75	2.94	2.98
31	2.73	---	3.11	2.89	---	2.81	---	2.77	---	2.74	2.94	---
MEAN	2.83	2.81	2.89	2.89	2.69	2.69	2.79	2.81	2.78	2.77	2.82	3.06
MAX	2.94	2.99	3.11	3.05	2.84	2.81	2.84	2.93	2.84	2.83	2.94	3.16
MIN	2.70	2.70	2.80	2.71	2.56	2.62	2.73	2.75	2.71	2.72	2.68	2.97

HAWAII, ISLAND OF MAUI--Continued



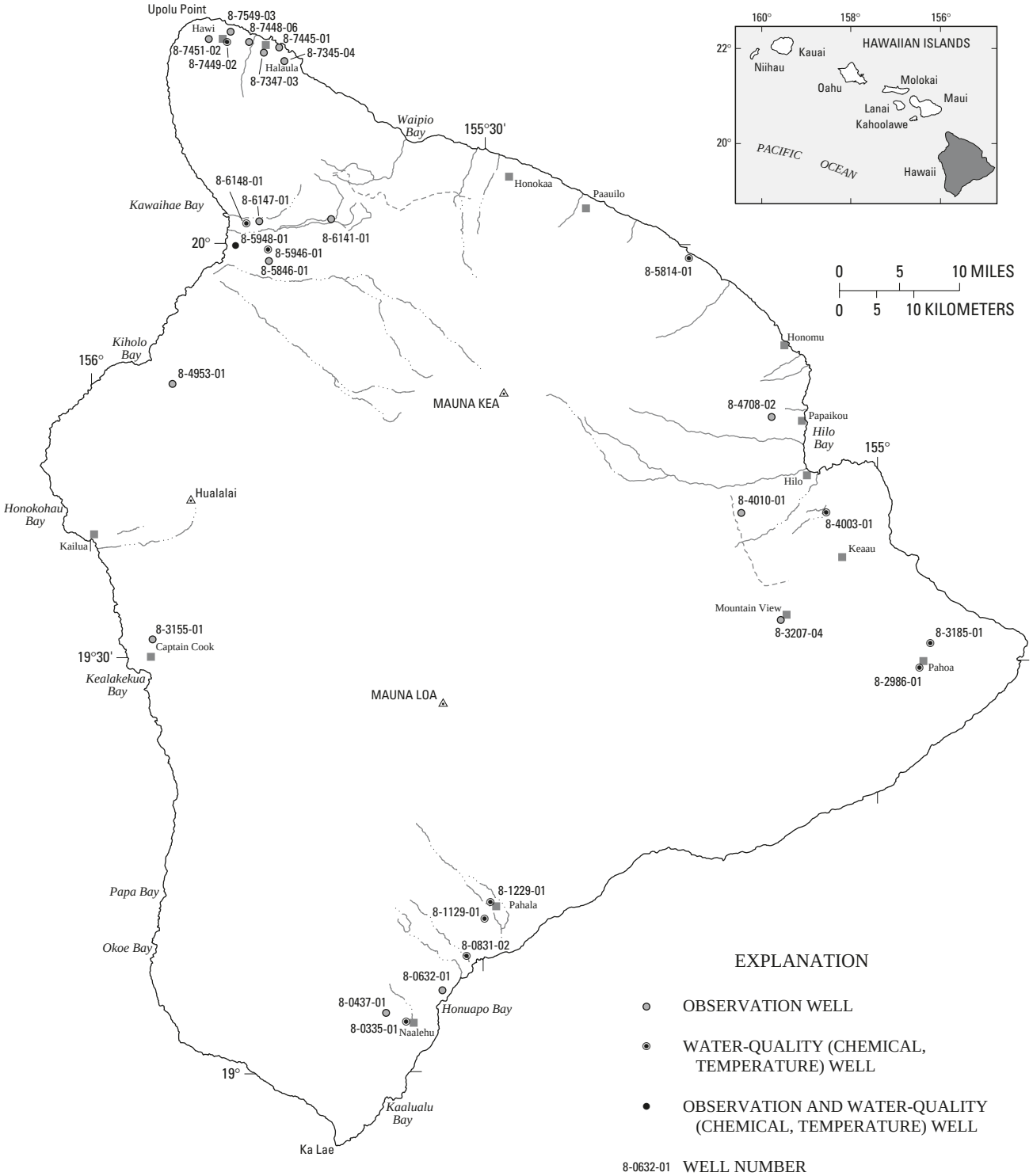


Figure 20. Locations of observation wells and ground-water quality sampling sites on Hawaii.

HAWAII, ISLAND OF HAWAII

190423155371501. Local number and name 8-0437-01 Waiohinu, Hawaii.

LOCATION.--Lat 19°04', long 155°37', Hydrologic Unit 20010000, 2,500 ft northwest of Waiohinu. Owner: U.S. Geological Survey.

AQUIFER.--Kau Basalt, Holocene and Pleistocene age.

WELL CHARACTERISTICS.--Drilled water-table well, depth 972 ft, 4-in. casing diameter, cased to 240 ft, screened from 240 to 972 ft.

DATUM.--Elevation of land-surface datum is 1,299 ft. Measuring point is top of 4-in. casing, 1,299.83 ft above mean sea level.

PERIOD OF RECORD.-- Water level: occasional measurements, September 1995, September 1997 to current year. Water quality: October 1994.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 1,016.03 ft above mean sea level, February 12, 2002; lowest measured, 1,012.17 ft above mean sea level, October 25, 1999.

WATER LEVEL, IN FEET RELATIVE TO MEAN SEA LEVEL, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 15	1012.76	NOV 23	1012.61	FEB 12	1016.03	MAY 16	1015.80	JUL 19	1015.46	AUG 23	1015.19

HAWAII, ISLAND OF HAWAII

190602155325901. Local number and name 8-0632-01 Honuapo W-2, Hawaii.

LOCATION.--Lat 19°06', long 155°33', 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 Basalt, Pleistocene age.

WELL CHARACTERISTICS.--Drilled water-table well, depth 140 ft, 14-in. casing diameter, cased to 105 ft, perforated from 105 to 125 ft.

DATUM.--Elevation of land-surface datum is 102 ft. Measuring point is "X" mark on pump base, 104.01 ft above mean sea level.

PERIOD OF RECORD.-- Water level: occasional measurements, April 1972 to current year. Water quality: occasional measurements, 1972-73.

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, October 19, 1978; lowest measured, 0.15 ft above mean sea level, May 26, 1998.

WATER LEVEL, IN FEET RELATIVE TO MEAN SEA LEVEL, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 15	1.77	NOV 23	1.83	FEB 12	1.05	MAY 16	1.83	JUL 19	1.72	AUG 23	1.06

HAWAII, ISLAND OF HAWAII

193117155550801. Local number and name 8-3155-01 Kealakekua, Hawaii.

LOCATION.--Lat 19°31', long 155°55', Hydrologic Unit 20010000, 0.3 mi east of Kealakekua Post Office and 0.6 mi north of Konawaena High School. Owner: U.S. Geological Survey.

AQUIFER.--Kau Basalt, Holocene and Pleistocene age.

WELL CHARACTERISTICS.--Drilled water-table well, depth 1,510 ft, 4-in. casing diameter, cased to 1,500 ft perforated from 1,250 to 1,500 ft.

DATUM.--Elevation of land-surface datum is 1,746.80 ft. Measuring point is top of aluminum cap on 4-in. casing, 1,745.84 ft above mean sea level.

REMARKS.--Water level may be affected by pumping well 50 ft away.

PERIOD OF RECORD.--Water level: occasional measurements, April 1992 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 469.06 ft above mean sea level, December 18, 1997; lowest measured, 455.32 ft above mean sea level, August 20, 2002.

WATER LEVEL, IN FEET RELATIVE TO MEAN SEA LEVEL, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 17	458.38	NOV 20	457.86	JUL 18	455.86	AUG 20	455.32		

HAWAII, ISLAND OF HAWAII

193251155072101. Local number and name 8-3207-04 Mt. View, Hawaii.

LOCATION.--Lat 19°32', long 155°07', Hydrologic Unit 20010000, 1.4 mi southwest of Mountain View. Owner: U.S. Geological Survey.

AQUIFER.--Kau Basalt, Holocene and Pleistocene age.

WELL CHARACTERISTICS.--Drilled water-table well, depth 1,143 ft, 4-in. casing and 8-in. casing diameter, from 0 to 75 ft, cased to 660 ft slotted from 660 to 1,120 ft, solid from 1,120 to 1,143 ft. Hole caved from 1,143 to 1,155 ft; hole grouted to 95 ft.

DATUM.--Elevation of land-surface datum is 1,687 ft. Measuring point is top of casing, 1,687.84 ft above mean sea level.

PERIOD OF RECORD.--Water level: occasional measurements, March 1995, December 1997 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 1,013.58 ft above mean sea level, May 19, 1999; lowest measured, 982.87 ft above mean sea level, May 26, 1998.

WATER LEVEL, IN FEET RELATIVE TO MEAN SEA LEVEL, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 15	989.31	NOV 19	987.81	FEB 12	1004.07	MAY 16	1001.19	JUL 19	999.81	AUG 23	998.32

HAWAII, ISLAND OF HAWAII

194035155102201. Local number and name 8-4010-01 Kaumana, Hawaii.

LOCATION.--Lat 19°41', long 155°10', Hydrologic Unit 20010000, 2 mi west of Kaumana at western end of Kaumana Estates subdivision. Owner: U.S. Geological Survey.

AQUIFER.--Kau Basalt, Holocene and Pleistocene age.

WELL CHARACTERISTICS.--Drilled water-table well, depth 1,375 ft, 4-in. casing diameter, cased to 732 ft, screened from 732 to 1,375 ft.

DATUM.--Elevation of land-surface datum is 1,796 ft. Measuring point is top of 4-in. casing, 1,796.29 ft above mean sea level.

PERIOD OF RECORD.--Occasional measurements, February 1995, January 1998 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 982.10 ft above mean sea level, November 8, 1999; lowest measured, 962.17 ft above mean sea level, January 21, 1999.

WATER LEVEL, IN FEET RELATIVE TO MEAN SEA LEVEL, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 18	975.57	JAN 08	971.68	MAY 16	975.55	AUG 23	978.09
NOV 19	974.41	JAN 28	971.70	JUL 15	977.41		

HAWAII, ISLAND OF HAWAII

194731155080401. Local number and name 8-4708-02 Kaieie Mauka, Hawaii.

LOCATION.--Lat 19°48', long 155°08', Hydrologic Unit 20010000, 3.0 mi up Kaieie Road near DWS water tank and 2.6 mi west-northwest of Papaikou Post Office. Owner: U.S. Geological Survey.

AQUIFER.--Hamakua Volcanics, Pleistocene age.

WELL CHARACTERISTICS.--Drilled water-table well, depth 1,030 ft, 4-in. casing diameter, cased to 790 ft, perforated section 790 to 1,030 ft.

DATUM.--Elevation of land-surface datum is 1,134.5 ft. Measuring point is top of 4-in. casing, 1,135.08 ft above mean sea level.

PERIOD OF RECORD.-- Water level: occasional measurements, June 1998 to current year. Water quality: aquifer test, November 1997, in files of Hawaii District office.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 145.96 ft above mean sea level, February 23, 2001; lowest measured, 144.06 ft above mean sea level, September 6, 2002.

WATER LEVEL, IN FEET RELATIVE TO MEAN SEA LEVEL, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 16	144.98	FEB 13	144.92	SEP 06	144.06
NOV 19	144.90	MAY 13	144.36		

HAWAII, ISLAND OF HAWAII

194945155534401. Local number and name 8-4953-01 Kiholo, Hawaii.

LOCATION.--Lat 19°50', long 155°54', Hydrologic Unit 20010000, 2.7 mi inland from Kiholo Bay. Owner: State of Hawaii.

AQUIFER.--Hualalai Volcanics, Holocene and Pleistocene age.

WELL CHARACTERISTICS.--Drilled water-table well, depth 971 ft, 12-in. casing diameter, cased to 926 ft, screened from 926 to 966 ft.

DATUM.--Elevation of land-surface datum is 931.65 ft. Measuring point is top of 7 $\frac{1}{4}$ in. (O.D.) casing, 932.48 ft above mean sea level.

REMARKS.--State exploratory well drilling program.

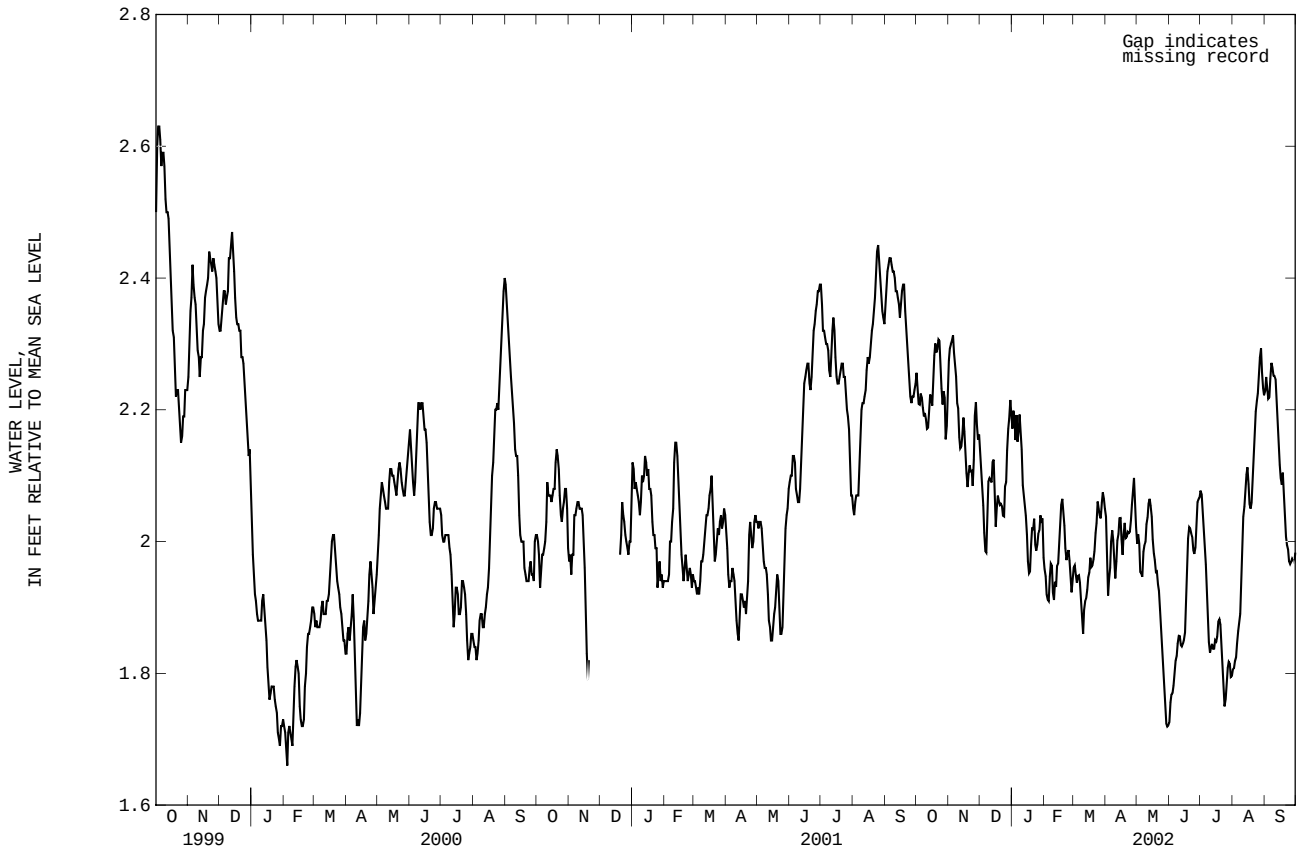
PERIOD OF RECORD.-- Water level: occasional measurements, June 1972 to September 1999; continuous water-level measurements September 30, 1999 to current year. Water quality: 1972.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 2.85 ft above mean sea level, June 6, 1972 (data from Hawaii State Department of Land and Natural Resources, Circular C63, 1973); lowest measured, 1.47 ft above mean sea level, November 21, 2000.

WATER LEVEL, IN FEET RELATIVE TO MEAN SEA LEVEL, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.26	2.27	2.14	2.17	1.96	1.96	2.04	2.00	1.73	2.08	1.81	2.23
2	2.23	2.29	2.11	2.20	1.95	1.96	1.96	2.01	1.76	2.07	1.81	2.25
3	2.21	2.30	2.09	2.19	1.92	1.95	1.92	2.00	1.77	2.05	1.82	2.23
4	2.21	2.30	2.05	2.15	1.91	1.94	1.94	1.95	1.77	2.02	1.82	2.22
5	2.22	2.31	2.01	2.19	1.91	1.95	1.96	1.95	1.78	1.99	1.85	2.22
6	2.22	2.29	1.99	2.15	1.95	1.95	2.00	1.95	1.80	1.97	1.86	2.25
7	2.20	2.27	1.98	2.17	1.97	1.94	2.02	1.98	1.82	1.93	1.88	2.27
8	2.19	2.25	2.03	2.19	1.96	1.91	2.00	1.99	1.83	1.88	1.89	2.26
9	2.19	2.21	2.09	2.17	1.92	1.89	1.97	2.00	1.85	1.85	1.93	2.25
10	2.19	2.20	2.10	2.14	1.91	1.86	1.94	2.03	1.86	1.83	1.99	2.25
11	2.17	2.16	2.09	2.09	1.94	1.90	1.97	2.04	1.86	1.84	2.04	2.25
12	2.17	2.14	2.09	2.07	1.93	1.91	2.00	2.06	1.84	1.84	2.05	2.22
13	2.20	2.14	2.12	2.05	1.96	1.91	2.01	2.06	1.84	1.84	2.08	2.18
14	2.22	2.16	2.12	2.04	1.97	1.93	2.04	2.05	1.85	1.84	2.10	2.15
15	2.22	2.19	2.07	2.01	2.00	1.95	2.04	2.04	1.85	1.85	2.11	2.12
16	2.21	2.17	2.02	1.97	2.03	1.95	2.00	2.00	1.86	1.85	2.09	2.10
17	2.24	2.13	2.05	1.95	2.06	1.98	1.98	1.98	1.91	1.86	2.06	2.09
18	2.28	2.10	2.07	1.95	2.06	1.96	2.01	1.97	1.96	1.88	2.05	2.10
19	2.30	2.08	2.06	2.00	2.04	1.96	2.03	1.95	2.00	1.88	2.06	2.08
20	2.29	2.10	2.06	2.02	2.02	1.97	2.01	1.95	2.02	1.87	2.09	2.05
21	2.29	2.12	2.06	2.02	1.99	1.99	2.01	1.93	2.02	1.84	2.12	2.01
22	2.31	2.11	2.05	2.03	1.97	2.01	2.01	1.93	2.01	1.82	2.17	2.00
23	2.30	2.11	2.04	2.00	1.98	2.03	2.01	1.90	2.01	1.78	2.20	1.99
24	2.27	2.08	2.04	1.99	1.99	2.06	2.01	1.86	1.99	1.75	2.21	1.97
25	2.23	2.12	2.08	2.00	1.97	2.05	2.03	1.82	1.98	1.76	2.22	1.97
26	2.21	2.19	2.09	2.01	1.94	2.04	2.06	1.79	1.99	1.78	2.26	1.97
27	2.23	2.21	2.14	2.02	1.92	2.04	2.08	1.77	2.03	1.81	2.28	1.97
28	2.22	2.18	2.17	2.04	1.94	2.06	2.10	1.75	2.06	1.82	2.29	1.97
29	2.16	2.15	2.19	2.03	---	2.07	2.06	1.72	2.06	1.81	2.26	1.97
30	2.18	2.16	2.21	2.04	---	2.06	2.02	1.72	2.07	1.79	2.23	1.98
31	2.21	---	2.20	1.98	---	2.05	---	1.72	---	1.80	2.22	---
MEAN	2.23	2.18	2.08	2.07	1.97	1.97	2.01	1.93	1.91	1.87	2.06	2.12
MAX	2.31	2.31	2.21	2.20	2.06	2.07	2.10	2.06	2.07	2.08	2.29	2.27
MIN	2.16	2.08	1.98	1.95	1.91	1.86	1.92	1.72	1.73	1.75	1.81	1.97

HAWAII, ISLAND OF HAWAII--Continued



HAWAII, ISLAND OF HAWAII

195947155485801. Local number and name 8-5948-01 Hapuna Beach Park, Hawaii.

LOCATION.--Lat 20°00', long 155°49', Hydrologic Unit 20010000, 0.7 mi east of Hapuna Beach Park, and 3.1 mi southeast of Kawaihae. Owner: State of Hawaii.

AQUIFER.--Hamakua Volcanics, Pleistocene age.

WELL CHARACTERISTICS.--Drilled water-table well, depth 268 ft, 10-in. casing diameter, cased to 246 ft, screened from 246 to 266 ft.

DATUM.--Elevation of land-surface datum is 244 ft. Measuring point is hole in pump base, 246.62 ft above mean sea level.

REMARKS.--Water from this well is used for irrigation, water level affected by pumping.

PERIOD OF RECORD.-- Water level: occasional measurements, April 1970, March 1973 to current year. Water quality: occasional measurements, 1970, 1973 to 2002.

REVISED RECORDS.--WDR HI-91-1: 1976-80 (water-level data), 1976-90 (extremes for the period of record).

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 4.83 ft above mean sea level, August 29, 1994; lowest measured, 1.38 ft above mean sea level, September 28, 1979.

WATER LEVEL, IN FEET RELATIVE TO MEAN SEA LEVEL, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 17	3.46	NOV 20	3.36	FEB 14	3.28	MAY 13	3.26	JUL 18	3.17	AUG 22	3.43

HAWAII, ISLAND OF HAWAII

200143155414201. Local number and name 8-6141-01 Waiaka Tank, Hawaii.

LOCATION.--Lat 20°02', long 155°42', Hydrologic Unit 20010000, 2.6 mi west of Kamuela Post Office. Owner: U.S. Geological Survey.

AQUIFER.--Hawi Volcanics, Pleistocene age.

WELL CHARACTERISTICS.--Drilled water-table well, depth 1,507 ft, 4-in. diameter steel casing, cased to 1,260 ft, 4-inch slotted casing from 1,260 to 1,507 ft.

DATUM.--Elevation of land-surface datum is 2,506.38 ft. Measuring point is paint mark at top of 4-inch casing at 2,507.00 ft above mean sea level.

REMARKS.--Drilling completed August 6, 1999.

PERIOD OF RECORD.--Water level: September 1999 to present.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 1,245.37 ft, November 2, 1999; lowest measured, 1,243.22 ft, August 22, 2002.

WATER LEVEL, IN FEET RELATIVE TO MEAN SEA LEVEL, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 16	1243.67	NOV 20	1243.69	FEB 13	1243.52	MAY 13	1243.41	JUL 17	1243.24	AUG 22	1243.22

HAWAII, ISLAND OF HAWAII

200132155471101. Local number and name 8-6147-01 Kawaihae W-3, Hawaii.

LOCATION.--Lat 20°02', long 155°47', 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 Volcanics, Pleistocene age.

WELL CHARACTERISTICS.--Drilled water-table well, depth 1,008 ft, 8-in. casing diameter, 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 is top of pipe coupling on casing cover 983.08 ft (revised, November 18, 1986) above mean sea level.

REMARKS.--Water-quality records for 1963-64 are available in files of Hawaii District office.

PERIOD OF RECORD.-- Water level: occasional measurements, June to July 1963, June 1973 to current year. Water quality: occasional measurements, 1994-97.

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, 4.66 ft above mean sea level, May 3, 1994.

WATER LEVEL, IN FEET RELATIVE TO MEAN SEA LEVEL, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 17	5.33	NOV 21	5.27	FEB 14	5.10	MAY 13	5.20	JUL 18	5.02	AUG 21	5.15

HAWAII, ISLAND OF HAWAII

201347155470501. Local number and name 8-7347-03 Halaula Makai E, Hawaii.

LOCATION.--Lat 20°14', long 155°47', Hydrologic Unit 20010000, near intersection of Highway 270 and Kauhola Point Lighthouse Road and 40 ft north of Kohala Sugar Company Halaula well. Owner: U.S. Geological Survey.

AQUIFER.--Pololu Volcanics, Pleistocene age.

WELL CHARACTERISTICS.--Drilled water-table well, depth 405 ft, 8-in. casing diameter, cased to 80 ft, open hole 80 to 405 ft.

DATUM.--Elevation of land-surface datum is 340.5 ft. Measuring point is top of casing, 340.99 ft above mean sea level.

PERIOD OF RECORD.--Water level: occasional measurements, July 1989, July 1990 to December 1990, September 1999 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 14.03 ft above mean sea level, September 10, 1990; lowest measured, 7.91 ft above mean sea level, April 26, 2001.

WATER level, in feet relative to mean sea level, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 16	8.19	FEB 13	8.31	JUL 17	8.44	SEP 30	8.60
NOV 21	8.33	MAY 14	8.57	AUG 22	8.66		

HAWAII, ISLAND OF HAWAII

201406155454401. Local number and name 8-7445-01 Hapuu Bay D, Hawaii.

LOCATION.--Lat 20°14', long 155°46', Hydrologic Unit 20010000, 7.5 mi east of Hawi. Owner: U.S. Geological Survey.

AQUIFER.--Pololu Basalt, Pleistocene age.

WELL CHARACTERISTICS.--Drilled water-table well, depth 460 ft, open hole.

DATUM.--Elevation of land-surface datum is 108.50 ft. Measuring point is top of casing, 0.11 ft above bolt head. Measuring point elevation is 108.76 ft.

PERIOD OF RECORD.-- Water level: Occasional measurements April 1989 to June 1995, October 1999 to current year. Water quality: April 1989, 1990, June 1994, 1995, September 2000, January 2001.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 8.55 ft above mean sea level, January 27, 1995; lowest measured, 6.41 ft above mean sea level, April 26, 2001.

WATER LEVEL, IN FEET RELATIVE TO MEAN SEA LEVEL, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 16	6.71	FEB 13	6.81	MAY 14	7.02	AUG 22	7.10
NOV 21	6.87	FEB 20	6.72	JUL 17	6.95		

HAWAII, ISLAND OF HAWAII

201429155480201. Local number and name 8-7448-06 Kohala F, Hawaii.

LOCATION.--Lat 20°14', long 155°48', Hydrologic Unit 20010000, 3.4 mi east of Hawi. Owner: U.S. Geological Survey.

AQUIFER.--Pololu Volcanics, Pleistocene age.

WELL CHARACTERISTICS.--Drilled water-table well, depth 440 ft, 8-in. casing diameter, cased to 123 ft, open hole 123 to 440 ft.

DATUM.--Elevation of land-surface datum is 411 ft. Measuring point is top of casing, 411.77 ft above mean sea level.

PERIOD OF RECORD.--Water level: occasional measurements, May 1990 to January 1991, October 1997 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 8.68 ft above mean sea level, May 25, 1999; lowest measured, 6.55 ft above mean sea level, April 26, 2001.

WATER LEVEL, IN FEET RELATIVE TO MEAN SEA LEVEL, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 16	6.91	NOV 21	7.05	FEB 13	7.18	MAY 14	7.42	JUL 17	7.66	AUG 21	7.62

HAWAII, ISLAND OF HAWAII

201517155493701. Local number and name 8-7549-03 Hawi Makai I, Hawaii.

LOCATION.--Lat 20°15', long 155°49', Hydrologic Unit 20010000, 1.15 mi north-northeast of intersection of Highways 250 and 270 in Hawi and 0.9 mi southeast of Alanahihi Point. Owner: U.S. Geological Survey.

AQUIFER.--Pololu Volcanics, Pleistocene age.

WELL CHARACTERISTICS.--Drilled water-table well, depth 440 ft, 10-in. casing diameter, cased to 130 ft, open hole 130 to 440 ft.

DATUM.--Elevation of land-surface datum is 299.5 ft. Measuring point is top of casing, 300.14 ft above mean sea level.

PERIOD OF RECORD.-- Water level: occasional measurements, May 1990 to September 1995, September 1999 to current year. Water quality: occasional measurements, March 1990, September 2000, January 2001.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 2.91 ft above mean sea level, December 10, 1991; lowest measured, 1.94 ft above mean sea level, April 11, 2000.

WATER LEVEL, IN FEET RELATIVE TO MEAN SEA LEVEL, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 16	2.49	FEB 13	2.26	MAY 14	2.17	AUG 22	2.21
NOV 21	2.56	FEB 20	2.27	JUL 17	2.26		

HAWAII, ISLAND OF KAUAI

WATER-QUALITY DATA, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

220136159205501 -- 2-0120-01 Kalepa Ridge W-7, Kauai, HI

Date	Time	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE WATER (DEG C) (00010)	CHLOR-IDE WATER UNFLTRD (MG/L) (99220)
OCT				
15...	0800	930	25.0	170
DEC				
27...	0800	920	25.0	170
FEB				
19...	0750	927	25.0	170
APR				
15...	1230	915	25.5	170
SEP				
04...	0745	824	25.5	140

220354159205602 -- 2-0320-03 Nonou W-B, Kauai, HI

Date	Time	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE WATER (DEG C) (00010)	CHLOR-IDE WATER UNFLTRD (MG/L) (99220)
OCT				
11...	0935	418	24.0	49
DEC				
19...	1000	406	24.0	44
FEB				
28...	1005	422	23.5	52
APR				
11...	0935	416	24.0	48
JUN				
05...	1010	420	24.0	51
AUG				
21...	1405	416	24.0	48

220530159450401 -- 2-0545-01 Kaulaula, Kauai, HI

Date	Time	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE WATER (DEG C) (00010)	CHLOR-IDE WATER UNFLTRD (MG/L) (99220)
OCT				
18...	1115	712	24.0	130
DEC				
18...	1240	704	23.0	130
MAR				
01...	0950	709	22.0	130
APR				
10...	1110	701	24.0	130
JUN				
04...	1215	712	24.5	130
AUG				
14...	0915	722	23.0	130

220827159185401 -- 2-0818-01 Anahola A, Kauai, HI

Date	Time	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE WATER (DEG C) (00010)	CHLOR-IDE WATER UNFLTRD (MG/L) (99220)
OCT				
11...	1020	221	24.0	19
DEC				
19...	1055	226	23.5	20
FEB				
28...	1115	225	23.5	19
APR				
11...	1035	224	24.0	19
JUN				
05...	1110	223	24.0	19
AUG				
21...	1310	223	24.0	19

220826159185401 -- 2-0818-02 Anahola B, Kauai, HI

Date	Time	SPECIFIC CONDUCTANCE (US/CM) (00095)	TEMPERATURE WATER (DEG C) (00010)	CHLORIDE WATER UNFLTRD (MG/L) (99220)
DEC 19...	1045	293	23.5	22
FEB 28...	1110	281	23.5	21
APR 11...	1025	275	24.0	20
JUN 05...	1100	270	24.0	21
AUG 21...	1300	261	23.5	20

221141159252501 -- 2-1125-01 Kilauea W-1, Kauai, HI

Date	Time	SPECIFIC CONDUCTANCE (US/CM) (00095)	TEMPERATURE WATER (DEG C) (00010)	CHLORIDE WATER UNFLTRD (MG/L) (99220)
OCT 11...	1325	165	24.5	15
DEC 19...	1410	181	23.0	17
FEB 28...	1355	176	23.0	16
APR 11...	1320	177	23.5	16
JUN 05...	1530	162	24.5	15
AUG 21...	1215	179	23.5	17

221150159264501 -- 2-1126-01 Princeville W-1, Kauai, HI

Date	Time	SPECIFIC CONDUCTANCE (US/CM) (00095)	TEMPERATURE WATER (DEG C) (00010)	CHLORIDE WATER UNFLTRD (MG/L) (99220)
OCT 09...	0800	148	22.0	16
DEC 05...	0825	184	22.0	20
FEB 13...	0800	187	22.0	20
APR 17...	0805	151	22.0	17
JUN 07...	0810	189	22.5	20
AUG 06...	0800	183	22.0	18

221201159293401 -- 2-1229-03 Maka Ridge, Kauai, HI

Date	Time	SPECIFIC CONDUCTANCE (US/CM) (00095)	TEMPERATURE WATER (DEG C) (00010)	CHLORIDE WATER UNFLTRD (MG/L) (99220)
OCT 11...	1250	396	24.0	73
DEC 19...	1345	402	24.0	75
FEB 28...	1335	410	24.0	77
APR 11...	1300	412	24.5	77
JUN 05...	1430	421	24.0	80
AUG 21...	1140	432	24.0	82

HAWAII, ISLAND OF KAUAI--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

221247159324801 -- 2-1232-01 Wainiha, Kauai, HI

Date	Time	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE WATER (DEG C) (00010)	CHLOR-IDE WATER UNFLTRD (MG/L) (99220)
OCT				
11...	1220	122	23.0	20
DEC				
19...	1310	123	23.0	20
FEB				
28...	1310	128	25.0	21
APR				
11...	1240	121	25.0	23
JUN				
05...	1300	135	23.5	22

221318159335901 -- 2-1333-01 Haena, Kauai, HI

Date	Time	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE WATER (DEG C) (00010)	CHLOR-IDE WATER UNFLTRD (MG/L) (99220)
OCT				
11...	1150	249	22.0	31
DEC				
19...	1230	264	21.5	35
FEB				
28...	1235	242	21.5	28
APR				
11...	1210	235	22.0	25
JUN				
05...	1230	233	22.0	23
AUG				
21...	1030	273	22.0	37

215454159274201 -- 2-5427-01 Koloa W-A, Kauai, HI

Date	Time	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE WATER (DEG C) (00010)	CHLOR-IDE WATER UNFLTRD (MG/L) (99220)
DEC				
18...	0805	238	23.0	26
MAR				
01...	0820	242	22.0	26
APR				
10...	0810	237	23.0	26
JUN				
04...	0810	238	23.0	25
AUG				
20...	0830	238	23.0	26

215455159274201 -- 2-5427-02 Koloa W-B, Kauai, HI

Date	Time	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE WATER (DEG C) (00010)	CHLOR-IDE WATER UNFLTRD (MG/L) (99220)
OCT				
10...	0810	230	23.0	24

215535159302601 -- 2-5530-03 Lawai, Kauai, HI

Date	Time	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE WATER (DEG C) (00010)	CHLOR-IDE WATER UNFLTRD (MG/L) (99220)
OCT				
10...	1315	243	25.0	27
DEC				
21...	0850	247	23.0	27
MAR				
01...	0845	249	22.0	27
APR				
10...	0825	246	23.0	26
JUN				
04...	1545	242	23.5	27
AUG				
20...	1030	246	23.5	27

215522159342601 -- 2-5534-03 Hanapepe Town, Kauai, HI

Date	Time	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE WATER (DEG C) (00010)	CHLOR-IDE WATER UNFLTRD (MG/L) (99220)
OCT				
10...	1040	442	24.0	34

215803159401201 -- 2-5840-01 Waimea, Kauai, HI

Date	Time	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE WATER (DEG C) (00010)	CHLOR-IDE WATER UNFLTRD (MG/L) (99220)
OCT				
10...	1005	520	24.0	87
DEC				
18...	0950	523	24.0	83
MAR				
01...	1125	581	24.0	100
APR				
10...	0920	589	24.0	110
JUN				
04...	1345	566	31.0	99
AUG				
20...	0915	559	24.0	95

215857159430101 -- 2-5843-01 Kekaha Shaft, Kauai, HI

Date	Time	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE WATER (DEG C) (00010)	CHLOR-IDE WATER UNFLTRD (MG/L) (99220)
OCT				
10...	0910	621	24.0	94
DEC				
18...	1115	617	24.0	91
MAR				
01...	1035	634	24.0	97
APR				
10...	0955	595	26.0	87
JUN				
04...	1305	599	24.5	90
AUG				
20...	0955	641	25.0	98

HAWAII, ISLAND OF KAUAI--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

215958159214301 -- 2-5921-01 Kalepa Ridge W-10, Kauai, HI

Date	Time	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE WATER (DEG C) (00010)	CHLOR-IDE WATER UNFLTRD (MG/L) (99220)
OCT				
11...	0850	491	25.5	57
DEC				
19...	0850	494	25.0	58
FEB				
28...	0915	494	25.0	58
APR				
11...	0850	482	25.5	55
JUN				
05...	0915	491	25.5	58
AUG				
21...	0845	484	25.5	56

215901159235201 -- 2-5923-07 Kilohana W-I, Kauai, HI

Date	Time	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE WATER (DEG C) (00010)	CHLOR-IDE WATER UNFLTRD (MG/L) (99220)
OCT				
11...	0810	186	23.0	19
DEC				
19...	0805	192	23.0	20
FEB				
28...	0815	193	23.0	19
APR				
11...	0800	194	24.0	19
JUN				
05...	0820	191	23.0	18
AUG				
21...	0800	191	23.0	19

215906159395601 -- 2-5939-01 Waimea Shaft, Kauai, HI

Date	Time	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE WATER (DEG C) (00010)	CHLOR-IDE WATER UNFLTRD (MG/L) (99220)
OCT				
18...	0855	344	24.0	33
DEC				
18...	1030	349	24.0	29
MAR				
01...	1200	362	24.5	32
APR				
10...	1300	391	24.5	37
JUN				
04...	1420	383	25.0	33
AUG				
14...	1115	385	24.0	29

211832157515501 -- 3-1851-19 Halekauwila Street, Pipe A, Oahu, HI

Date	Time	SPECIFIC CONDUCTANCE (US/CM) (00095)	TEMPERATURE WATER (DEG C) (00010)	CHLORIDE WATER UNFLTRD (MG/L) (99220)
DEC				
27...	1359	35400	25.0	14000
MAR				
25...	1416	34900	24.5	13000
MAY				
16...	1414	34400	24.5	13000
JUL				
16...	1219	34700	24.5	13000
SEP				
17...	1430	34700	25.0	13000

211832157515502 -- 3-1851-19 Halekauwila Street, Pipe B, Oahu, HI

Date	Time	SPECIFIC CONDUCTANCE (US/CM) (00095)	TEMPERATURE WATER (DEG C) (00010)	CHLORIDE WATER UNFLTRD (MG/L) (99220)
DEC				
27...	1350	21000	24.5	7700
MAR				
25...	1420	21400	24.5	7800
MAY				
16...	1402	21400	24.5	7800
JUL				
16...	1217	21400	24.0	7800
SEP				
17...	1420	21700	24.5	8000

212106157533701 -- 3-2153-02 Moanalua, Oahu, HI

Date	Time	SPECIFIC CONDUCTANCE (US/CM) (00095)	TEMPERATURE WATER (DEG C) (00010)	CHLORIDE WATER UNFLTRD (MG/L) (99220)
DEC				
27...	1206	502	22.0	100
MAR				
25...	1215	464	22.0	88
MAY				
16...	1215	506	22.0	110
JUL				
18...	1221	508	22.0	100
SEP				
17...	1308	502	22.0	100

212238157561102 -- 3-2256-12 Aiea US Navy (187-C), Oahu, HI

Date	Time	SPECIFIC CONDUCTANCE (US/CM) (00095)	TEMPERATURE WATER (DEG C) (00010)	CHLORIDE WATER UNFLTRD (MG/L) (99220)
OCT				
12...	1000	807	25.0	210
DEC				
27...	0923	821	23.5	210
MAR				
25...	1128	799	25.0	210
MAY				
16...	1140	831	23.5	220
JUL				
18...	1131	888	23.5	220
SEP				
17...	1221	841	23.5	220

212343158001001 -- 3-2300-11 Waipahu Street, Oahu, HI

Date	Time	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE WATER (DEG C) (00010)	CHLOR-IDE WATER UNFLTRD (MG/L) (99220)
DEC				
27...	1122	543	22.0	110
MAR				
25...	0948	548	22.0	120
MAY				
16...	0934	550	22.0	120
JUL				
16...	0920	545	22.0	110
SEP				
17...	0907	540	22.0	110

212358158010901 -- 3-2301-09,10 Waikele Gulch--composite, Oahu, HI

Date	Time	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE WATER (DEG C) (00010)	CHLOR-IDE WATER UNFLTRD (MG/L) (99220)
JAN				
03...	0950	663	22.5	140
MAR				
25...	0809	507	22.0	96
MAY				
16...	0806	428	22.5	70
JUL				
16...	0852	428	22.5	110
SEP				
17...	0846	612	22.0	130

212332157582201 -- 3-2358-02 Pearl City, US Navy, Oahu, HI

Date	Time	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE WATER (DEG C) (00010)	CHLOR-IDE WATER UNFLTRD (MG/L) (99220)
DEC				
27...	1042	1390	21.0	390
MAR				
25...	0925	1440	21.0	400
MAY				
16...	0837	1440	21.0	400
JUL				
16...	1001	1520	21.0	420
SEP				
17...	0942	1480	21.0	410

212336157591801 -- 3-2359-05 Waiawa Road, Oahu, HI

Date	Time	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE WATER (DEG C) (00010)	CHLOR-IDE WATER UNFLTRD (MG/L) (99220)
DEC				
27...	1020	2570	22.0	740
MAR				
25...	0834	2670	22.0	780
MAY				
16...	0950	2750	22.0	800
JUL				
18...	0905	2730	22.0	790
SEP				
17...	0924	2690	22.0	780

212556157500301 -- 3-2550-01 Heeia, Oahu, HI

Date	Time	SPECIFIC CONDUCTANCE (US/CM) (00095)	TEMPERATURE WATER (DEG C) (00010)	CHLORIDE WATER UNFLTRD (MG/L) (99220)
DEC 27...	1140	139	23.5	18
FEB 19...	1435	141	23.0	19
MAY 02...	1310	138	23.5	17
AUG 09...	1450	138	23.5	16
SEP 18...	1510	138	23.5	16

212506157582301 -- 3-2558-10 Waiawa Shaft, Oahu, HI

Date	Time	SPECIFIC CONDUCTANCE (US/CM) (00095)	TEMPERATURE WATER (DEG C) (00010)	CHLORIDE WATER UNFLTRD (MG/L) (99220)
JAN 03...	1015	240	24.5	39
MAR 25...	0854	240	22.0	37
MAY 16...	0919	235	22.0	37
JUL 18...	0925	234	25.5	37
SEP 17...	1003	231	23.5	35

212927158014801 -- 3-2901-07 Schofield Shaft, Oahu, HI

Date	Time	SPECIFIC CONDUCTANCE (US/CM) (00095)	TEMPERATURE WATER (DEG C) (00010)	CHLORIDE WATER UNFLTRD (MG/L) (99220)
OCT 30...	0855	169	21.0	17
FEB 28...	0908	170	21.5	17
APR 09...	0920	168	21.0	17
AUG 20...	0927	169	22.0	17

213224158135901 -- 3-3213-06 Makua US Air Force, Oahu, HI

Date	Time	SPECIFIC CONDUCTANCE (US/CM) (00095)	TEMPERATURE WATER (DEG C) (00010)	CHLORIDE WATER UNFLTRD (MG/L) (99220)
NOV 13...	1423	850	23.5	190
JAN 15...	1430	847	23.5	190
MAR 12...	1450	848	23.5	190

213327157524401 -- 3-3352-01 Kahana Valley, Oahu, HI

Date	Time	SPECIFIC CONDUCTANCE (US/CM) (00095)	TEMPERATURE WATER (DEG C) (00010)	CHLORIDE WATER UNFLTRD (MG/L) (99220)
DEC 17...	0920	265	22.5	37

213430158071601 -- 3-3407-37 Kiikii, Oahu, HI

Date	Time	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE WATER (DEG C) (00010)	CHLOR-IDE WATER UNFLTRD (MG/L) (99220)
OCT				
29...	1356	491	23.0	82
FEB				
28...	1235	497	22.5	81
APR				
25...	1235	499	23.0	81
AUG				
20...	1513	496	23.0	82
SEP				
26...	1312	482	23.0	81

213446158104901 -- 3-3410-08 Kawaihapai, Mokuleia, Oahu, HI

Date	Time	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE WATER (DEG C) (00010)	CHLOR-IDE WATER UNFLTRD (MG/L) (99220)
OCT				
30...	1505	757	22.0	150
FEB				
19...	1120	757	22.0	150
SEP				
04...	0937	588	22.0	150
26...	1208	604	22.5	150

213512158061601 -- 3-3506-03 TO 04 Composite--Haleiwa Batt., Oahu, HI

Date	Time	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE WATER (DEG C) (00010)	CHLOR-IDE WATER UNFLTRD (MG/L) (99220)
NOV				
14...	0950	419	23.0	70
FEB				
28...	1512	425	22.0	72
APR				
25...	0847	428	22.5	72
SEP				
04...	0844	423	23.0	71

214157158000101 -- 3-4100-01 Turtle Bay Golf Course, Oahu, HI

Date	Time	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE WATER (DEG C) (00010)	CHLOR-IDE WATER UNFLTRD (MG/L) (99220)
DEC				
27...	1010	317	20.5	56
FEB				
19...	0955	327	20.5	56
MAY				
02...	0935	317	20.5	54
AUG				
09...	0940	343	21.0	57
SEP				
18...	0940	328	21.0	57

214233157583501 -- 3-4258-04 Kahuku Air Field, Oahu, HI

Date	Time	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE WATER (DEG C) (00010)	CHLOR-IDE WATER UNFLTRD (MG/L) (99220)
DEC				
27...	0930	1740	22.5	490
FEB				
19...	0920	1750	22.5	490
MAY				
02...	0910	1740	23.0	480
AUG				
09...	0915	1760	22.5	490
SEP				
18...	0910	1740	22.5	490

HAWAII, ISLAND OF MOLOKAI

WATER-QUALITY DATA, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

210402156495801 -- 4-0449-01 Ualapue Shaft, Molokai, HI

Date	Time	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE WATER (DEG C) (00010)	CHLOR-IDE WATER UNFLTRD (MG/L) (99220)
OCT				
09...	1220	347	22.0	68
DEC				
11...	1425	336	20.6	64
APR				
09...	1540	335	20.7	64
JUN				
10...	1435	356	20.8	70
SEP				
04...	1425	351	20.9	68

210419156570501 -- 4-0457-01 Kawela Shaft, Molokai, HI

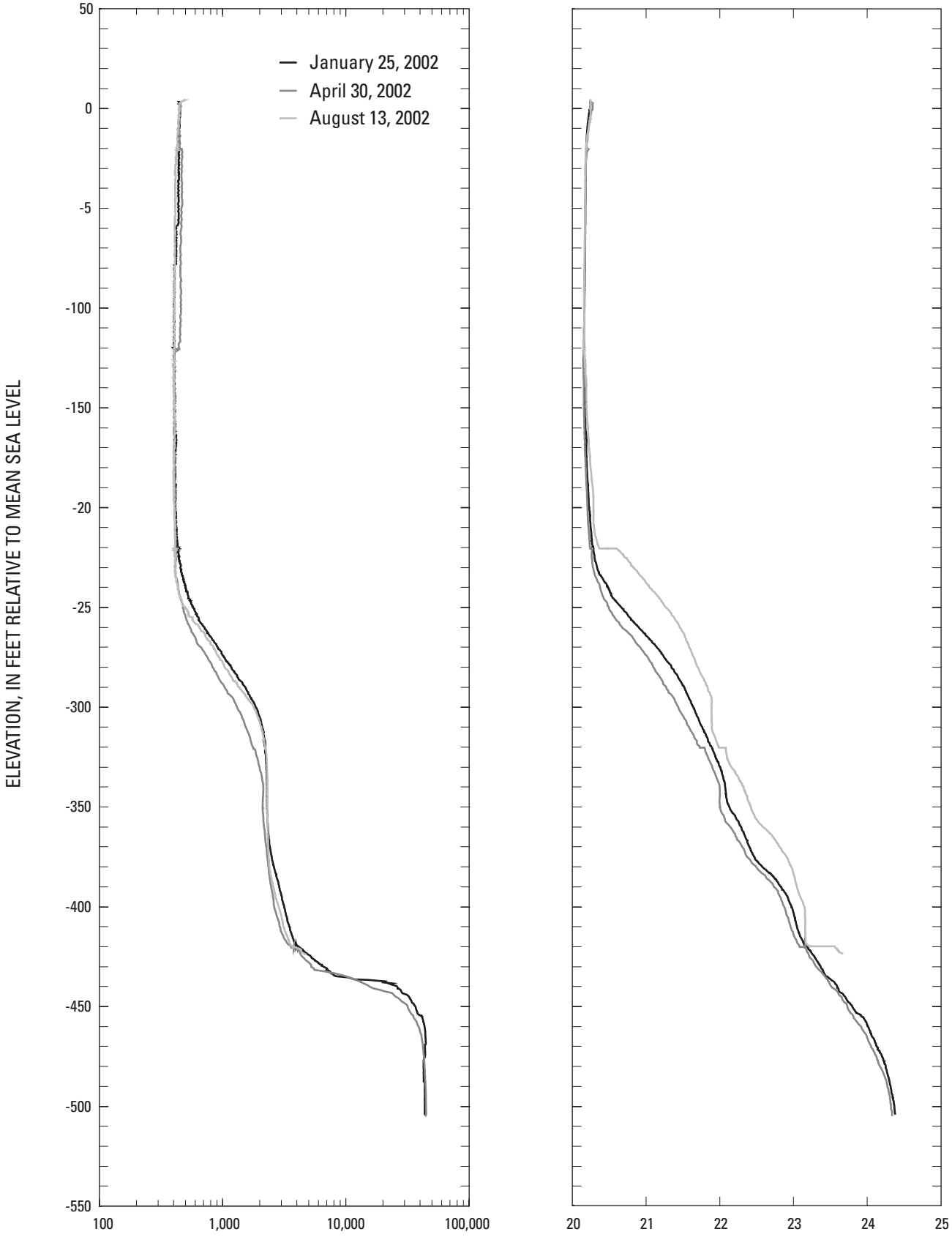
Date	Time	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE WATER (DEG C) (00010)	CHLOR-IDE WATER UNFLTRD (MG/L) (99220)
OCT				
09...	0955	486	21.9	110
DEC				
11...	1525	427	24.0	93
APR				
10...	1505	785	23.6	190
JUN				
10...	1535	879	23.5	220
SEP				
06...	1000	887	23.9	220

210856157011201 -- 4-0801-01 DHHL 1, Molokai, HI

Date	Time	TEMPER-ATURE WATER (DEG C) (00010)	CHLOR-IDE WATER UNFLTRD (MG/L) (99220)
MAR			
14...	0815	22.0	130
MAY			
20...	1330	22.0	120

210857156010701 -- 4-0801-02 DHHL 2, Molokai, HI

Date	Time	TEMPER-ATURE WATER (DEG C) (00010)	CHLOR-IDE WATER UNFLTRD (MG/L) (99220)
JAN			
31...	0823	21.5	79
MAR			
14...	0748	21.6	72
MAY			
20...	1250	21.0	72



Water-conductivity and -temperature profiles measured in the Kualapuu deep monitor well (4-0800-01) on January 25, April 30, August 13 2002, Molokai, Hawaii. Data available from USGS Hawaii District log archive.

HAWAII, ISLAND OF MAUI

WATER-QUALITY DATA, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

204407156215501 -- 6-4422-01 Waiohuli Exploratory Well, Kula, Maui, HI

Date	Time	SPECIFIC CONDUCTANCE (US/CM) (00095)	TEMPERATURE WATER (DEG C) (00010)	CHLORIDE WATER UNFLTRD (MG/L) (99220)
APR				
03...	1455	442	19.3	66

205014156212701 -- 6-5021-01 Pukalani, Maui, HI

Date	Time	CHLORIDE WATER UNFLTRD (MG/L) (99220)
MAR		
07...	0500	550

205412156193801 -- 6-5419-01 Haiku, Maui, HI

Date	Time	SPECIFIC CONDUCTANCE (US/CM) (00095)	TEMPERATURE WATER (DEG C) (00010)	CHLORIDE WATER UNFLTRD (MG/L) (99220)
OCT				
29...	1015	520	20.2	110
DEC				
03...	1255	504	20.2	110
FEB				
12...	1310	511	20.2	110
JUN				
18...	1510	517	20.2	110
AUG				
02...	1300	525	20.2	110

WATER-QUALITY DATA, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

205405156305401 -- 6-5430-05 Waiehu Deep Monitor Well, Maui, HI

Date	Time	SAMPLE DEPTH DIS-TANCE BELOW MSL FEET (78890)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE WATER (DEG C) (00010)	CHLOR-IDE WATER UNFLTRD (MG/L) (99220)
OCT					
01...	0945	200	223	22.0	15
01...	1003	400	220	22.0	14
01...	1022	600	594	22.0	150
01...	1044	650	3570	22.0	1100
01...	1110	675	8770	22.0	2800
01...	1135	700	29000	22.0	11000
01...	1200	725	42100	22.0	16000
01...	1224	750	46200	22.0	17000
01...	1250	800	48700	22.0	18000
01...	1320	1000	50300	22.0	19000
JAN					
03...	1015	200	225	22.3	14
03...	1035	400	447	21.6	99
03...	1055	600	608	21.8	150
03...	1120	650	3460	21.7	1100
03...	1145	675	10000	21.8	3600
03...	1210	700	31800	21.8	12000
03...	1235	725	42800	22.2	16000
03...	1300	750	47000	22.1	17000
03...	1325	800	49100	21.9	18000
03...	1355	1000	50600	22.2	19000
APR					
01...	1130	200	219	22.2	12
01...	1147	400	460	21.8	110
01...	1210	600	652	21.8	160
01...	1233	650	3380	21.4	1000
01...	1255	675	11100	21.6	3700
01...	1320	700	31600	21.2	12000
01...	1345	725	43200	21.4	16000
01...	1412	750	46800	21.5	18000
01...	1440	800	48900	21.6	18000
01...	1507	1000	50400	21.9	19000
JUL					
03...	1007	200	227	22.6	15
03...	1022	400	216	22.6	12
03...	1042	600	662	21.9	170
03...	1105	650	3430	22.9	1000
03...	1134	675	10200	22.9	3400
03...	1202	700	30800	22.5	12000
03...	1231	725	42100	22.2	16000
03...	1255	750	46600	22.4	17000
03...	1324	800	48000	22.2	18000
03...	1355	1000	50000	22.6	18000

205511156222101 -- 6-5522-01 Kuau Shaft, Maui, HI

Date	Time	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE WATER (DEG C) (00010)	CHLOR-IDE WATER UNFLTRD (MG/L) (99220)
MAY				
09...	1040	1310	21.9	290
JUN				
21...	1155	1310	21.9	300
AUG				
02...	1235	1340	21.8	300

HAWAII, ISLAND OF HAWAII

WATER-QUALITY DATA, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

190347155354301 -- 8-0335-01 Naalehu, HI

Date	Time	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE WATER (DEG C) (00010)	CHLOR-IDE WATER UNFLTRD (MG/L) (99220)
OCT				
15...	1220	94	26.5	8.7
NOV				
23...	1025	95	26.0	8.6
FEB				
12...	1115	98	22.5	8.2
MAY				
16...	1245	135	25.0	9.0

190832155310801 -- 8-0831-01 NINOLE TH1

Date	Time	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE WATER (DEG C) (00010)	CHLOR-IDE WATER UNFLTRD (MG/L) (99220)
OCT				
15...	1340	883	18.5	220
JUL				
19...	1210	890	18.5	230

190832155310901 -- 8-0831-02 Ninole, HI

Date	Time	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE WATER (DEG C) (00010)	CHLOR-IDE WATER UNFLTRD (MG/L) (99220)
NOV				
23...	1130	752	25.0	220
MAY				
16...	1305	915	20.0	210
AUG				
23...	1150	833	19.0	220

191114155294801 -- 8-1129-01 Pahala W-2, HI

Date	Time	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE WATER (DEG C) (00010)	CHLOR-IDE WATER UNFLTRD (MG/L) (99220)
OCT				
15...	1400	94	19.0	3.8
NOV				
23...	1145	97	25.0	4.2
MAY				
16...	1045	99	25.0	4.4
JUL				
19...	1230	94	18.5	4.0
AUG				
23...	1245	91	19.0	4.2

191219155291601 -- 8-1229-01 Pahala, HI

Date	Time	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE WATER (DEG C) (00010)	CHLOR-IDE WATER UNFLTRD (MG/L) (99220)
FEB				
12...	1320	100	23.0	4.2

192924154564701 -- 8-2986-01 Pahoa, W-2A, HI

Date	Time	SPECIFIC CONDUCTANCE (US/CM) (00095)	TEMPERATURE WATER (DEG C) (00010)	CHLORIDE WATER UNFLTRD (MG/L) (99220)
OCT				
18...	0720	152	20.5	7.2
NOV				
19...	1525	134	26.0	6.8
FEB				
11...	1500	143	23.5	6.6
MAY				
17...	0850	170	24.0	6.6
JUL				
15...	1415	142	30.0	6.9
AUG				
20...	1030	136	24.0	7.2

193113154555801 -- 8-3185-01 Hawaiian Shores 1 (Beaches), HI

Date	Time	SPECIFIC CONDUCTANCE (US/CM) (00095)	TEMPERATURE WATER (DEG C) (00010)	CHLORIDE WATER UNFLTRD (MG/L) (99220)
OCT				
18...	0745	136	21.0	16
NOV				
19...	1500	138	21.5	16
FEB				
11...	1445	128	21.5	15
MAY				
17...	0930	140	21.5	14
JUL				
15...	1430	127	21.5	15
AUG				
20...	1055	120	22.0	14

194037155035301 -- 8-4003-01 Panaewa 1, HI

Date	Time	SPECIFIC CONDUCTANCE (US/CM) (00095)	TEMPERATURE WATER (DEG C) (00010)	CHLORIDE WATER UNFLTRD (MG/L) (99220)
NOV				
19...	1615	82	21.5	4.8
FEB				
11...	1540	86	20.5	5.2
MAY				
16...	1440	94	23.0	5.2
JUL				
15...	1510	84	21.0	4.4
AUG				
20...	1200	80	23.0	4.8

194040155035201 -- 8-4003-02 Panaewa 2, HI

Date	Time	SPECIFIC CONDUCTANCE (US/CM) (00095)	TEMPERATURE WATER (DEG C) (00010)	CHLORIDE WATER UNFLTRD (MG/L) (99220)
OCT				
18...	0840	80	20.5	4.2

195856155142401 -- 8-5814-02 Laupahoehoe 2, HI

Date	Time	SPECIFIC CONDUCTANCE (US/CM) (00095)	TEMPERATURE WATER (DEG C) (00010)	CHLORIDE WATER UNFLTRD (MG/L) (99220)
OCT 16...	0920	323	19.5	60
NOV 23...	1430	294	25.0	64
FEB 13...	0945	330	19.5	60
MAY 13...	0920	325	20.0	54
JUL 17...	0945	319	20.5	60
AUG 21...	0750	290	20.0	54

195929155462501 -- 8-5946-01 Lalamilo, HI

Date	Time	SPECIFIC CONDUCTANCE (US/CM) (00095)	TEMPERATURE WATER (DEG C) (00010)	CHLORIDE WATER UNFLTRD (MG/L) (99220)
JUL 18...	0950	485	26.5	85
AUG 22...	1515	469	26.0	86

195912155464201 -- 8-5946-02 LALAMILO B

Date	Time	SPECIFIC CONDUCTANCE (US/CM) (00095)	TEMPERATURE WATER (DEG C) (00010)	CHLORIDE WATER UNFLTRD (MG/L) (99220)
OCT 17...	0940	353	26.0	46
NOV 21...	0915	355	26.0	47
FEB 14...	1050	342	26.0	41

195953155464701 -- 8-5946-04 LALAMILO D

Date	Time	SPECIFIC CONDUCTANCE (US/CM) (00095)	TEMPERATURE WATER (DEG C) (00010)	CHLORIDE WATER UNFLTRD (MG/L) (99220)
MAY 13...	1415	571	26.0	98

195947155485801 -- 8-5948-01 Hapuna Beach Park, HI

Date	Time	SPECIFIC CONDUCTANCE (US/CM) (00095)	TEMPERATURE WATER (DEG C) (00010)	CHLORIDE WATER UNFLTRD (MG/L) (99220)
OCT 17...	0900	1880	25.0	500
NOV 20...	1515	1870	26.0	500
FEB 14...	1005	1910	26.0	500
MAY 13...	1305	2020	26.0	500
JUL 18...	0905	1860	26.0	500
AUG 22...	1440	1800	28.0	500

200122155480901 -- 8-6148-01 Kawaihae W-1, HI

Date	Time	SPECIFIC CONDUCTANCE (US/CM) (00095)	TEMPERATURE WATER (DEG C) (00010)	CHLORIDE WATER UNFLTRD (MG/L) (99220)
FEB				
14...	0910	492	23.0	82
MAY				
13...	1220	572	26.0	94
JUL				
18...	0800	535	27.5	94
AUG				
21...	1045	516	30.0	94

201428155494201 -- 8-7449-02 Hawi H, HI

Date	Time	SPECIFIC CONDUCTANCE (US/CM) (00095)	TEMPERATURE WATER (DEG C) (00010)	CHLORIDE WATER UNFLTRD (MG/L) (99220)
OCT				
16...	1430	229	29.0	31
NOV				
21...	1215	224	26.0	30
FEB				
13...	1435	235	23.0	31
MAY				
14...	1230	231	29.0	29
JUL				
17...	1520	235	29.5	29
AUG				
22...	1100	198	29.0	28

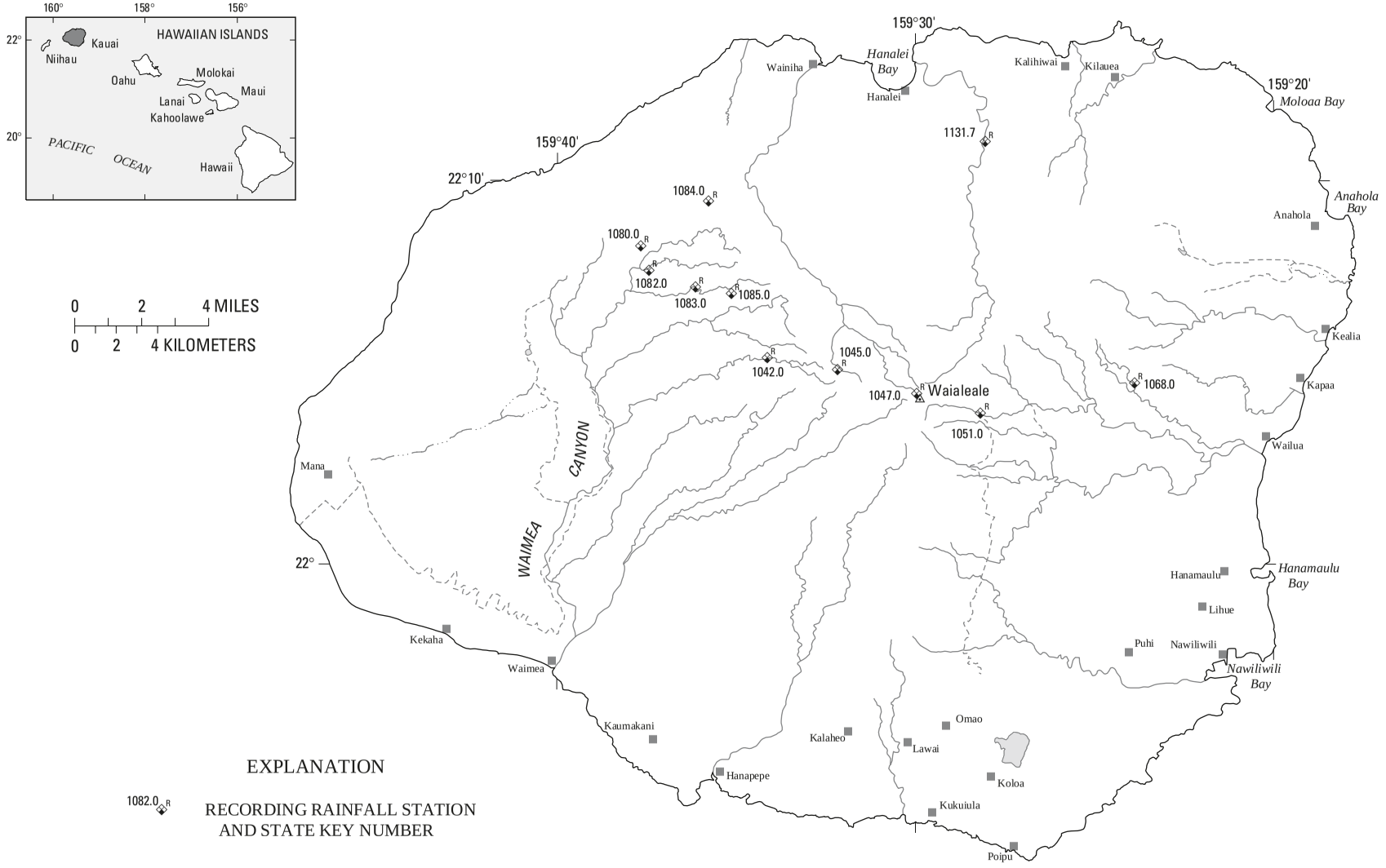


Figure 21. Locations of rainfall stations on Kauai.

HAWAII, ISLAND OF KAUAI

220523159341201. State Key Number 1042.0 Waialae rain gage 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 are in files of the U.S. Geological Survey and at the National Weather Service.

GAGE.--On May 24, 2001 the gage was changed to an electronic data logger with a tipping bucket catchment (0.01 inch per tip). Elevation of gage is 4,000 ft (from topographic map).
REMARKS.--Records good. Recording rainfall in hundredths of an inch.

PRECIPITATION, TOTAL, INCHES, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY SUM VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.33	0.35	0.11	0.01	0.00	0.00	0.00	0.00	0.00	0.14	0.02	0.00
2	0.01	0.52	0.17	0.11	0.00	0.25	0.00	0.00	0.00	0.00	0.00	0.38
3	0.00	0.22	0.02	0.03	0.25	0.00	0.00	0.05	0.02	0.00	0.07	0.01
4	0.00	0.09	0.69	0.00	0.04	0.24	0.02	0.18	0.02	0.00	0.01	0.22
5	0.27	0.01	0.14	0.16	0.03	0.00	0.04	0.21	0.00	0.01	0.01	0.01
6	0.06	0.05	0.40	0.25	0.00	0.27	0.00	0.54	0.04	0.04	0.07	0.08
7	0.24	0.27	0.03	0.15	0.01	0.00	0.00	1.81	0.04	0.05	0.20	0.00
8	0.05	0.22	0.27	0.30	0.57	0.00	0.05	0.02	0.11	0.02	0.19	0.01
9	0.17	0.00	0.32	0.40	0.00	0.00	0.14	0.00	0.11	0.01	0.00	0.02
10	0.31	0.05	0.09	0.00	0.00	0.18	0.00	0.01	0.18	0.03	0.01	0.00
11	0.06	0.01	0.06	0.00	0.07	0.01	0.00	0.02	0.14	0.01	0.22	0.00
12	0.01	0.13	0.05	0.00	0.33	0.78	0.00	2.33	0.03	0.00	0.19	0.00
13	0.03	0.05	2.89	0.00	0.11	0.01	0.00	0.01	0.10	0.00	0.07	0.06
14	0.02	0.00	1.24	0.00	0.01	0.34	0.00	0.30	0.01	0.13	0.08	0.20
15	0.02	0.00	0.00	0.00	0.03	0.72	0.00	0.00	0.01	0.00	0.08	0.02
16	0.03	0.00	0.13	0.01	0.00	0.40	0.00	0.00	0.00	0.00	0.00	0.15
17	0.01	0.00	0.13	0.30	0.00	0.38	0.09	0.00	0.00	0.05	0.00	0.00
18	0.06	0.00	0.40	1.54	0.00	0.02	0.01	0.17	0.14	0.00	0.00	0.00
19	0.09	0.00	0.09	1.92	0.09	0.01	0.14	0.88	0.04	0.05	0.03	0.00
20	0.05	0.00	0.00	2.83	0.03	0.00	1.10	0.71	0.01	0.02	0.00	0.07
21	0.14	0.00	0.05	0.65	0.00	0.00	0.01	0.08	0.11	0.08	0.00	0.12
22	0.35	0.00	0.00	0.77	0.00	0.00	0.00	0.14	0.01	0.01	0.02	0.00
23	0.14	0.00	0.16	0.00	0.00	0.00	0.00	0.13	0.00	0.01	0.04	0.00
24	0.01	0.00	0.00	0.00	0.62	2.31	0.00	0.03	0.00	0.00	0.00	0.00
25	0.06	0.00	0.09	0.08	0.28	4.50	0.06	0.00	0.01	0.01	0.01	0.10
26	0.33	4.17	0.02	2.21	0.00	0.26	0.27	0.00	0.02	0.00	0.00	0.33
27	2.98	2.46	0.00	0.60	0.00	0.01	0.00	0.06	0.00	0.00	0.09	0.05
28	0.30	0.79	0.95	2.86	0.00	0.40	0.67	0.25	0.00	0.01	0.05	0.00
29	0.03	0.00	0.09	0.34	---	1.20	0.22	0.02	0.00	0.35	0.07	0.00
30	0.09	0.00	0.35	1.11	---	0.00	0.05	0.01	0.12	0.00	0.00	0.01
31	0.16	---	0.35	0.11	---	0.01	---	0.00	---	0.01	0.00	---
TOTAL	6.41	9.39	9.29	16.74	2.47	12.30	2.87	7.96	1.27	1.04	1.53	1.84

CAL YR 2001 TOTAL 82.23
WTR YR 2002 TOTAL 73.11

HAWAII, ISLAND OF KAUAI

220504159321401. State Key Number 1045.0 Waialeale Trail rain gage 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 are in files of the U.S. Geological Survey and at the National Weather Service.

GAGE.--Electronic data logger with a tipping bucket catchment (0.01 in. per tip). Elevation of gage is 4,560 ft (from topographic map).

REMARKS.--Records fair. Recording rainfall in hundredths of an inch.

PRECIPITATION, TOTAL, INCHES, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY SUM VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.52	0.76	0.84	0.01	0.00	0.00	0.00	0.00	0.00	1.08	0.08	0.00
2	0.04	1.27	0.46	0.10	0.01	0.39	0.00	0.00	0.00	0.06	0.02	0.15
3	0.04	0.34	0.25	0.01	0.44	0.01	0.01	0.00	0.06	0.11	0.47	0.10
4	0.01	0.13	2.28	0.00	0.11	0.38	0.03	0.05	0.25	0.00	0.09	0.66
5	1.41	0.05	0.52	0.07	0.03	0.03	0.03	1.29	0.03	0.07	0.07	0.13
6	0.15	0.23	1.68	0.13	0.00	1.10	0.00	1.90	0.31	0.34	0.80	0.63
7	0.43	0.55	0.13	0.12	0.02	0.09	0.00	2.34	0.42	0.29	1.42	0.16
8	0.18	0.56	0.95	0.17	0.78	0.00	0.04	0.18	0.40	0.15	0.87	0.13
9	0.21	0.01	0.76	0.44	0.00	0.02	0.17	0.02	0.43	0.19	0.11	0.36
10	1.40	0.15	0.27	0.01	0.01	0.21	0.01	0.17	0.97	0.30	0.19	0.02
11	0.25	0.04	0.34	0.00	0.21	0.00	0.01	0.09	0.78	0.12	0.58	0.00
12	0.06	0.44	0.17	0.00	0.69	0.59	0.00	3.41	0.23	0.00	0.76	0.03
13	0.39	0.10	5.13	0.03	0.40	0.00	0.00	0.01	0.14	0.00	0.07	0.39
14	0.09	0.01	3.70	0.01	0.06	0.10	0.01	0.68	0.11	0.24	0.16	1.23
15	0.18	0.00	0.02	0.00	0.05	0.76	0.00	0.01	0.00	0.40	0.00	0.15
16	0.33	0.00	0.45	0.03	0.00	0.88	0.00	0.02	0.02	0.34	0.00	0.91
17	0.07	0.01	0.24	0.58	0.03	0.58	0.33	0.00	0.14	0.28	0.03	0.03
18	0.30	0.00	0.74	1.95	0.00	0.06	0.00	0.64	1.35	0.54	0.14	0.01
19	0.18	0.00	0.29	3.60	0.16	0.05	0.17	1.15	0.42	0.22	0.18	0.00
20	0.26	0.00	0.19	5.16	0.03	0.00	0.80	1.38	0.15	0.06	0.03	0.01
21	0.31	0.00	0.22	1.74	0.00	0.00	0.09	0.04	0.68	0.52	0.01	0.01
22	0.64	0.00	0.01	0.58	0.00	0.02	0.12	0.50	0.60	0.06	0.02	0.01
23	0.17	0.00	0.29	0.12	0.00	0.00	0.01	0.04	0.09	0.19	0.15	0.00
24	0.02	0.00	0.01	0.00	1.24	3.17	0.01	0.06	0.01	0.12	0.03	0.00
25	0.11	0.00	0.08	0.76	0.58	6.74	0.26	0.01	0.07	0.16	0.00	0.04
26	0.12	4.56	0.05	3.21	0.00	0.64	0.35	0.00	0.08	0.05	0.32	0.39
27	4.41	2.62	0.00	1.96	0.00	0.00	0.02	0.12	0.00	0.04	0.22	0.06
28	0.31	0.95	0.69	6.11	0.00	0.34	0.28	0.20	0.00	0.03	0.49	0.00
29	0.18	0.01	0.04	1.27	---	1.24	0.49	0.10	0.01	0.20	0.56	0.05
30	0.21	0.00	0.25	2.90	---	0.00	0.14	0.03	0.53	0.04	0.00	0.11
31	0.79	---	0.21	1.10	---	0.01	---	0.00	---	0.06	0.04	---
TOTAL	13.77	12.79	21.26	32.17	4.85	17.41	3.38	14.44	8.28	6.26	7.91	5.77

CAL YR 2001 TOTAL 155.72
WTR YR 2002 TOTAL 148.29

HAWAII, ISLAND OF KAUAI

220427159300201. State Key Number 1047.0 Mount Waialeale rain gage near Lihue, Kauai.

LOCATION.--Lat 22°04'27", long 159°30'02", Hydrologic Unit 20070000, 3/4 mi north of Kawaikini summit (5,240 ft).

PERIOD OF RECORD.--1910 to current year. Prior to October 1992, unpublished records are in files of the U.S. Geological Survey and at the National Weather Service.

GAGE.--Electronic data logger with a tipping bucket catchment (0.01 in. per tip). Elevation of gage is 5,150 ft (from topographic map).

REMARKS.--Records poor. Recorded rainfall read in hundredths of an inch.

PRECIPITATION, TOTAL, INCHES, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY SUM VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.66	1.41	2.57	0.00	---	---	---	---	---	---	0.49	0.03
2	0.04	2.46	0.65	0.04	---	---	---	---	---	---	0.22	1.18
3	0.14	0.94	1.01	---	---	---	---	---	---	---	1.28	1.75
4	0.17	0.78	3.05	---	---	---	---	---	---	---	0.70	3.04
5	6.15	0.58	0.15	---	---	---	---	---	---	---	0.75	0.44
6	0.50	3.14	0.70	---	---	---	---	---	---	---	1.85	0.79
7	0.51	1.30	0.03	---	---	---	---	---	---	---	2.31	0.65
8	0.34	1.85	0.00	---	---	---	---	---	---	---	2.23	0.60
9	0.27	0.42	0.00	---	---	---	---	---	---	---	1.08	1.11
10	2.77	0.54	0.00	---	---	---	---	---	---	---	2.37	1.51
11	0.96	0.08	0.00	---	---	---	---	---	---	---	6.14	0.04
12	1.02	1.49	0.00	---	---	---	---	---	---	---	4.15	0.13
13	2.34	0.42	0.00	---	---	---	---	---	---	---	0.04	1.02
14	0.92	0.00	1.81	---	---	---	---	---	---	---	0.13	2.18
15	1.16	0.00	0.00	---	---	---	---	---	---	---	0.00	0.41
16	1.01	0.00	0.00	---	---	---	---	---	---	---	0.09	1.53
17	0.50	0.00	0.00	---	---	---	---	---	---	---	0.32	0.26
18	1.56	0.00	0.00	---	---	---	---	---	---	---	0.37	0.02
19	0.56	0.00	0.00	---	---	---	---	---	---	---	0.42	0.00
20	1.10	0.00	0.00	---	---	---	---	---	---	---	0.21	0.04
21	0.34	0.00	0.00	---	---	---	---	---	---	---	0.01	0.35
22	1.17	0.00	0.00	---	---	---	---	---	---	---	0.07	0.00
23	0.35	0.00	0.00	---	---	---	---	---	---	---	0.38	0.00
24	0.01	0.00	0.01	---	---	---	---	---	---	---	0.21	0.00
25	0.40	0.02	0.00	---	---	---	---	---	---	---	0.62	0.05
26	0.78	8.35	0.00	---	---	---	---	---	---	---	4.98	0.13
27	6.13	7.51	0.00	---	---	---	---	---	---	---	0.66	0.03
28	0.82	3.34	0.27	---	---	---	---	---	---	---	0.96	1.13
29	0.41	0.10	0.00	---	---	---	---	---	---	---	0.87	0.81
30	0.79	0.30	0.00	---	---	---	---	---	---	---	0.11	0.49
31	2.51	---	0.00	---	---	---	---	---	---	1.09	1.20	---
TOTAL	37.39	35.03	10.25	---	---	---	---	---	---	---	35.22	19.72

CAL YR 2001 TOTAL 390.85
WTR YR 2002 TOTAL 415.50

No daily record Jan. 3 (0000)to April 4 (2400). Accumulation rainfall for this period is 128.00 inches.
No daily record Apr. 4 (0000) to July 30 (2400). Accumulation rainfall for this period is 148.76

HAWAII, ISLAND OF KAUAI

220356159281401. State Key Number 1051.0 North Wailua ditch rain gage 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 rain gage.

PERIOD OF RECORD.--1928 to current year. Prior to October 1992, unpublished records are in files of the U.S. Geological Survey and at the National Weather Service.

GAGE.--Electronic data logger with a tipping bucket catchment (0.01 inch per tip). Elevation of gage is 1,110 ft (from topographic map).

REMARKS.--Records good. Recording rainfall in hundredths of an inch.

PRECIPITATION, TOTAL, INCHES, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY SUM VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.44	0.43	1.24	7.47	0.03	0.00	0.01	0.01	0.07	1.34	0.13	0.00
2	0.00	0.71	0.26	0.01	0.12	0.24	0.00	0.00	0.27	0.47	0.02	1.97
3	0.25	0.38	0.18	0.00	0.66	0.00	0.27	0.04	0.40	0.29	0.38	0.71
4	0.03	0.15	1.37	0.00	0.08	0.31	0.16	1.66	0.10	0.02	0.34	1.59
5	2.14	0.14	0.39	0.00	0.12	0.33	0.00	2.72	0.31	0.03	0.12	0.14
6	0.22	0.75	0.85	0.03	0.01	1.48	0.00	4.02	0.33	0.14	0.53	0.56
7	0.08	0.27	0.11	0.02	0.00	6.31	0.00	0.92	0.21	0.30	0.54	0.40
8	0.09	0.44	0.25	0.02	0.76	0.23	0.01	0.25	0.29	0.16	0.77	0.26
9	0.05	0.05	0.37	0.16	0.00	0.86	0.01	1.56	1.14	0.02	0.56	0.28
10	1.08	0.05	0.29	0.00	0.00	0.27	0.00	0.25	0.82	0.15	0.76	0.30
11	0.19	0.00	0.31	0.00	0.06	0.00	0.00	3.64	0.92	0.14	2.49	0.01
12	0.05	0.63	0.09	0.03	0.35	0.77	0.00	0.04	0.62	0.02	2.02	0.10
13	1.08	0.22	1.15	0.17	0.90	1.00	0.02	2.55	0.38	0.02	0.09	0.19
14	0.77	0.00	1.48	0.01	0.05	0.00	0.00	0.09	0.06	0.17	0.13	0.69
15	0.34	0.00	0.41	0.00	0.12	1.06	0.00	0.16	0.01	0.29	0.00	0.06
16	0.40	0.00	0.19	0.05	0.02	3.64	0.40	0.18	0.00	0.50	0.02	0.34
17	0.28	0.00	0.09	0.35	0.04	0.72	1.87	0.90	0.01	0.35	0.21	0.09
18	0.50	0.00	0.58	0.62	0.00	0.00	0.14	2.88	1.41	0.59	0.29	0.00
19	0.22	0.00	0.27	1.17	0.17	0.00	0.43	1.29	0.72	0.53	0.17	0.00
20	0.18	0.00	0.42	1.79	0.02	0.00	0.32	0.24	0.15	0.26	0.05	0.30
21	0.27	0.00	0.26	1.39	0.00	0.00	0.39	1.36	0.39	0.28	0.03	0.16
22	0.22	0.00	0.00	0.27	0.00	0.20	0.03	0.05	0.60	0.05	0.07	0.00
23	0.14	0.00	0.37	0.47	0.01	0.00	0.08	0.59	0.34	0.16	0.11	0.00
24	0.01	0.00	0.00	0.01	1.09	4.26	1.08	0.01	0.02	0.08	0.02	0.00
25	0.00	0.00	0.00	0.53	0.59	10.90	1.83	0.00	0.05	0.07	0.70	0.01
26	1.16	3.48	0.00	1.42	0.00	1.86	0.00	0.46	0.11	0.11	1.46	0.01
27	1.71	2.24	0.00	2.62	0.00	1.28	1.77	0.45	0.00	0.12	0.38	0.21
28	0.14	0.51	0.44	7.59	0.00	0.52	1.39	0.15	0.00	0.02	0.41	0.03
29	0.01	0.11	0.06	3.14	---	1.07	0.04	0.09	0.00	0.89	0.23	0.24
30	0.20	0.13	0.06	4.52	---	0.00	0.03	0.01	0.26	0.30	0.07	0.14
31	0.79	---	0.02	1.97	---	0.00	---	0.00	---	0.21	0.68	---
TOTAL	13.04	10.69	11.51	35.83	5.20	37.31	10.28	26.57	9.99	8.08	13.78	8.79

CAL YR 2001 TOTAL 150.69
WTR YR 2002 TOTAL 191.07

HAWAII, ISLAND OF KAUAI

220443159235601. State Key Number 1068.0 Left Branch Opaekea rain gage near Kapaa, Kauai.

LOCATION.--Lat 22°04'43", long 159°23'56", Hydrologic Unit 20070000, in USGS stream-gaging 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 are in files of the U.S. Geological Survey and at the National Weather Service.

GAGE.--Electronic data logger with a tipping bucket catchment (0.01 in. per tip). Elevation of gage is 470 ft (from topographic map).

REMARKS.--Records fair. Recorded rainfall read in hundredths of an inch.

PRECIPITATION, TOTAL, INCHES, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY SUM VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.56	0.31	0.67	0.00	0.00	0.00	0.02	0.03	0.00	0.36	0.09	0.01
2	0.01	0.51	0.22	0.00	0.01	0.03	0.00	0.01	0.18	0.27	0.07	0.64
3	0.02	0.36	0.07	0.00	0.35	0.00	0.00	0.00	0.19	0.13	0.24	0.18
4	0.02	0.05	0.57	0.00	0.07	0.09	0.03	0.00	0.18	0.00	0.08	0.52
5	1.42	0.12	0.04	0.00	0.07	0.08	e0.14	0.55	0.12	0.00	0.00	0.11
6	0.06	0.20	0.22	0.00	0.01	0.89	e0.00	1.24	0.33	0.10	0.23	0.22
7	0.03	0.19	0.07	0.00	0.00	0.44	e0.00	0.71	0.22	0.07	0.17	0.10
8	0.02	0.33	0.08	0.00	0.66	0.00	e0.00	0.15	0.26	0.12	0.51	0.08
9	0.08	0.01	0.04	0.11	0.00	0.49	0.06	0.19	0.64	0.01	0.23	0.05
10	0.43	0.01	0.11	0.00	0.00	0.00	0.01	0.73	0.12	0.08	0.17	0.06
11	0.12	0.00	0.13	0.00	0.06	0.00	0.00	0.02	0.73	0.09	0.45	0.03
12	0.09	0.36	0.06	0.00	0.28	1.12	0.00	2.44	0.25	0.00	1.70	0.07
13	0.25	0.13	0.31	0.29	0.41	0.15	0.00	0.01	0.17	0.02	0.17	0.12
14	0.14	0.00	0.12	0.00	0.09	0.00	0.21	2.15	0.04	0.10	0.09	0.52
15	0.18	0.00	0.18	0.00	0.08	0.01	0.01	0.01	0.01	0.15	0.01	0.05
16	0.19	0.00	0.06	0.00	0.00	2.20	0.01	0.06	0.00	0.04	0.02	0.12
17	0.15	0.00	0.05	0.19	0.02	0.16	0.18	0.04	0.02	0.14	0.12	0.09
18	0.22	0.00	0.50	0.35	0.02	0.00	0.37	0.46	0.46	0.34	0.32	0.03
19	0.03	0.00	0.19	0.34	0.03	0.00	0.02	0.21	0.30	0.12	0.12	0.00
20	0.19	0.00	0.04	0.99	0.00	0.00	0.24	0.10	0.01	0.19	0.02	0.23
21	0.11	0.00	0.15	0.18	0.00	0.00	0.26	0.96	0.30	0.20	0.05	0.01
22	0.08	0.00	0.00	0.07	0.00	0.04	0.06	0.90	0.26	0.04	0.04	0.00
23	0.30	0.00	0.10	0.23	0.00	0.08	0.00	0.03	0.19	0.14	0.26	0.00
24	0.00	0.00	0.00	0.00	0.93	2.63	0.03	0.00	0.01	0.10	0.08	0.00
25	0.00	0.00	0.02	0.23	0.32	4.26	0.27	0.00	0.01	0.02	0.15	0.00
26	2.99	2.76	0.00	0.30	0.00	0.90	0.22	0.00	0.02	0.08	0.48	0.06
27	0.64	1.51	0.00	0.39	0.00	0.49	0.00	0.13	0.00	0.08	0.23	0.08
28	0.03	0.32	0.02	3.42	0.00	0.13	0.00	0.24	0.00	0.10	0.17	0.00
29	0.01	0.02	0.01	1.02	---	0.62	0.44	0.10	0.00	0.12	0.00	0.03
30	0.14	0.00	0.01	2.69	---	0.00	0.04	0.07	0.08	0.02	0.14	0.06
31	0.52	---	0.00	0.42	---	0.00	---	0.01	---	0.05	0.47	---
TOTAL	9.03	7.19	4.04	11.22	3.41	14.81	2.62	11.55	5.10	3.28	6.88	3.47

CAL YR 2001 TOTAL 63.41
WTR YR 2002 TOTAL 82.60

e Estimated

HAWAII, ISLAND OF KAUAI

220817159374401. State Key Number 1080.0 Paukahana rain gage 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 are in files of the U.S. Geological Survey and at the National Weather Service.

GAGE.--Electronic data logger with a tipping bucket catchment (0.01 inch per tip). Elevation of gage is 3,700 ft (from topographic map).

REMARKS.--Records fair. Recording rainfall in hundredths of an inch.

PRECIPITATION, TOTAL, INCHES, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY SUM VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.52	0.15	0.02	0.00	0.00	0.00	0.04	0.00	0.00	0.08	0.02	0.00
2	0.01	0.48	0.02	0.02	0.00	0.57	0.01	0.00	0.00	0.02	0.00	0.43
3	0.00	0.13	0.00	0.01	0.42	0.00	0.00	0.01	0.00	0.04	0.09	0.06
4	0.00	0.15	0.19	0.00	0.02	0.32	0.00	0.62	0.00	0.00	0.01	0.04
5	0.09	0.00	0.00	0.12	0.02	0.01	0.02	0.10	0.01	0.00	0.00	0.01
6	0.04	0.02	0.03	0.42	0.01	0.00	0.00	0.96	0.10	0.08	0.36	0.19
7	0.05	0.47	0.07	0.15	0.02	0.00	0.00	2.80	0.02	0.14	0.53	0.03
8	0.01	0.26	0.11	0.17	0.73	0.00	0.05	0.02	0.07	0.11	0.11	0.00
9	0.05	0.00	0.20	0.65	0.00	0.00	0.06	0.00	0.25	0.16	0.00	0.03
10	0.25	0.13	0.06	0.01	0.00	0.06	0.00	0.00	0.02	0.14	0.01	0.01
11	0.11	0.02	0.04	0.00	0.04	0.00	0.00	0.04	0.07	0.06	0.19	0.00
12	0.00	0.02	0.03	0.00	0.42	1.10	0.00	2.33	0.02	0.00	0.32	0.00
13	0.03	0.03	1.55	0.00	0.08	0.47	0.00	0.01	0.18	0.00	0.10	0.27
14	0.01	0.00	0.28	0.00	0.02	0.00	0.00	0.12	0.09	0.09	0.12	0.13
15	0.01	0.00	0.01	0.00	0.07	0.00	0.00	0.00	0.08	0.01	0.00	0.01
16	0.02	0.00	0.10	0.00	0.00	1.37	0.00	0.00	0.00	0.01	0.00	0.23
17	0.04	0.01	0.08	0.23	0.00	0.51	0.06	0.00	0.00	0.15	0.00	0.00
18	0.06	0.00	0.38	2.48	0.00	0.03	0.00	0.12	0.04	0.02	0.08	0.00
19	0.00	0.00	0.06	2.33	0.21	0.01	0.04	0.43	0.05	0.01	0.17	0.00
20	0.06	0.00	0.00	2.75	0.01	0.00	0.91	1.51	0.05	0.00	0.01	0.00
21	0.15	0.00	0.01	0.41	0.00	0.00	0.01	0.78	0.15	0.10	0.00	0.00
22	0.39	0.00	0.00	0.08	0.00	0.00	0.00	0.01	0.03	0.02	0.03	0.00
23	0.07	0.00	0.64	0.01	0.00	0.00	0.00	0.02	0.00	0.08	0.02	0.00
24	0.01	0.00	0.00	0.00	0.35	1.75	0.00	0.01	0.01	0.05	0.01	0.00
25	0.01	0.00	0.20	0.00	0.42	5.84	0.01	0.00	0.00	0.04	0.00	0.04
26	0.24	4.96	0.08	0.93	0.00	0.03	0.10	0.00	0.03	0.00	0.00	0.05
27	3.39	1.70	0.00	0.07	0.00	0.01	0.00	0.01	0.00	0.01	0.01	0.14
28	0.23	0.31	0.74	1.54	0.00	0.34	0.19	0.12	0.00	0.00	0.02	0.06
29	0.05	0.00	0.17	0.24	---	1.80	0.09	0.02	0.00	0.52	0.32	0.01
30	0.03	0.00	0.35	0.73	---	0.00	0.01	0.01	0.07	0.02	0.00	0.00
31	0.06	---	0.14	0.00	---	0.02	---	0.00	---	0.00	0.22	---
TOTAL	5.99	8.84	5.56	13.35	2.84	14.24	1.60	10.05	1.34	1.96	2.75	1.74

CAL YR 2001 TOTAL 56.01
WTR YR 2002 TOTAL 70.26

HAWAII, ISLAND OF KAUAI

220739159373001. State Key Number 1082.0 Waiakoali rain gage 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 are in files of the U.S. Geological Survey and at the National Weather Service.

GAGE.--Electronic data logger with tipping bucket catchment (0.01 inch per tip). Elevation of gage is 3,420 ft (from topographic map).

REMARKS.--Records fair. Recording rainfall in hundredths of an inch.

PRECIPITATION, TOTAL, INCHES, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY SUM VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.35	---	---	0.00	0.00	0.00	0.03	0.00	0.00	---	---	0.00
2	0.00	---	---	0.04	0.00	0.38	0.00	0.00	0.00	---	---	0.59
3	0.00	---	---	0.01	0.40	0.00	0.00	0.07	0.01	---	---	0.04
4	0.00	---	---	0.00	0.03	0.37	0.00	0.82	0.01	---	---	0.07
5	0.11	---	---	0.14	0.01	0.01	0.03	0.08	0.01	---	---	0.03
6	0.03	---	---	0.38	0.01	0.01	0.00	0.88	---	---	---	0.19
7	0.05	---	---	0.17	0.04	0.00	0.00	3.45	---	---	---	0.03
8	0.03	---	---	0.24	0.58	0.00	0.05	0.03	---	---	---	0.01
9	0.05	---	---	0.47	0.01	0.00	0.06	0.00	---	---	0.00	0.03
10	0.22	---	---	0.01	0.00	0.08	0.00	0.01	---	---	0.03	0.00
11	0.09	---	---	0.00	0.04	0.01	0.00	0.04	---	---	0.24	0.00
12	0.00	---	---	0.00	0.40	1.00	0.00	2.61	---	---	0.28	0.00
13	0.01	---	---	0.00	0.08	0.31	0.00	0.01	---	---	0.09	0.19
14	0.01	---	---	0.00	0.02	0.00	0.01	0.16	---	---	0.16	0.13
15	0.01	---	---	0.00	0.07	0.03	0.00	0.01	---	---	0.00	0.01
16	0.01	---	---	0.00	0.00	0.95	0.00	0.00	---	---	0.00	0.26
17	0.02	---	---	0.21	0.00	0.51	0.08	0.00	---	---	0.01	0.01
18	0.06	---	0.30	2.28	0.00	0.02	0.00	0.13	---	---	0.02	0.00
19	0.01	---	0.06	2.70	0.17	0.01	0.05	0.66	---	---	0.16	0.00
20	0.03	---	0.00	2.97	0.02	0.00	0.91	1.53	---	---	0.01	0.00
21	0.15	---	0.00	0.40	0.00	0.00	0.00	1.08	---	---	0.00	0.00
22	0.27	---	0.00	0.06	0.00	0.00	0.01	0.00	---	---	0.00	0.00
23	0.05	---	0.44	0.02	0.00	0.00	0.00	0.03	---	---	0.05	0.00
24	0.00	---	0.00	0.01	0.36	1.89	0.00	0.04	---	---	0.00	0.00
25	0.02	---	0.16	0.01	0.46	5.78	0.00	0.00	---	---	0.04	0.05
26	0.18	---	0.04	1.03	0.00	0.12	0.11	0.00	---	---	0.00	0.04
27	2.01	---	0.00	0.12	0.00	0.01	0.00	0.05	---	---	0.05	0.17
28	0.58	---	0.94	1.67	0.00	0.30	0.21	0.11	---	---	0.03	0.03
29	0.11	---	0.22	0.28	---	1.73	0.14	0.10	---	---	0.44	0.01
30	---	---	0.25	0.75	---	0.00	0.01	0.00	---	---	0.00	0.01
31	---	---	0.16	0.01	---	0.02	---	0.00	---	---	0.19	---
TOTAL	---	---	---	13.98	2.70	13.54	1.70	11.90	---	---	---	1.90

CAL YR 2001 TOTAL 56.69
WTR YR 2002 TOTAL 72.12

Catchment plugged Oct.30 (0000) to Dec. 17 (2400), estimated 13.69 inches.
No daily record June 6 (0000) to Aug. 8 (2400). Accumulation rainfall for this period is 3.85 inches.

HAWAII, ISLAND OF KAUAI

220713159361201. State Key Number 1083.0 Mohihi crossing rain gage 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 are in files of the U.S. Geological Survey and at the National Weather Service.

GAGE.--Electronic data logger with a tipping bucket catchment (0.01 in. per tip). Elevation of gage is 3,420 ft (from topographic map).

REMARKS.--Records good. Recording rainfall recorded in hundredths of an inch.

PRECIPITATION, TOTAL, INCHES, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY SUM VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.26	0.22	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.15	0.03	0.00
2	0.00	0.42	0.12	0.06	0.00	0.28	0.01	0.00	0.00	0.02	0.00	0.33
3	0.00	0.12	0.00	0.01	0.36	0.00	0.00	0.25	0.02	0.02	0.12	0.01
4	0.00	0.12	0.32	0.00	0.04	0.38	0.01	0.88	0.00	0.00	0.02	0.18
5	0.23	0.01	0.05	0.18	0.01	0.01	0.03	0.16	0.01	0.00	0.00	0.02
6	0.05	0.02	0.09	0.32	0.01	0.08	0.00	0.91	0.06	0.11	0.30	0.22
7	0.14	0.49	0.05	0.22	0.03	0.00	0.00	3.13	0.06	0.18	0.59	0.03
8	0.03	0.40	0.15	0.35	0.57	0.00	0.07	0.05	0.12	0.08	0.35	0.01
9	0.10	0.00	0.15	0.41	0.00	0.00	0.09	0.00	0.13	0.10	0.00	0.05
10	0.32	0.12	0.06	0.00	0.00	0.11	0.00	0.01	0.06	0.21	0.04	0.00
11	0.11	0.02	0.07	0.00	0.07	0.00	0.00	0.03	0.12	0.07	0.22	0.00
12	0.00	0.05	0.02	0.00	0.36	0.49	0.00	1.99	0.06	0.00	0.32	0.00
13	0.02	0.04	2.87	0.00	0.13	0.13	0.00	0.01	0.16	0.00	0.08	0.18
14	0.01	0.00	0.72	0.00	0.03	0.01	0.00	0.49	0.07	0.08	0.15	0.22
15	0.04	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.01	0.03	0.01	0.03
16	0.05	0.00	0.17	0.00	0.00	0.55	0.00	0.00	0.00	0.02	0.00	0.37
17	0.05	0.00	0.11	0.33	0.00	0.58	0.07	0.00	0.00	0.18	0.00	0.00
18	0.11	0.00	0.35	3.01	0.00	0.03	0.00	0.12	0.14	0.03	0.05	0.00
19	0.01	0.00	0.06	3.16	0.12	0.01	0.08	0.62	0.02	0.01	0.16	0.00
20	0.06	0.00	0.00	3.27	0.01	0.00	0.91	2.44	0.05	0.03	0.00	0.01
21	0.20	0.00	0.03	0.47	0.00	0.00	0.01	0.67	0.22	0.11	0.00	0.02
22	0.40	0.00	0.00	0.22	0.00	0.00	0.00	0.00	0.07	0.02	0.00	0.00
23	0.09	0.00	0.36	0.01	0.00	0.00	0.00	0.04	0.00	0.10	0.07	0.00
24	0.00	0.00	0.00	0.00	0.65	2.02	0.00	0.13	0.00	0.06	0.00	0.00
25	0.05	0.00	0.12	0.01	0.59	5.25	0.04	0.00	0.02	0.06	0.00	0.00
26	0.21	5.04	0.01	1.36	0.00	0.23	0.17	0.00	0.03	0.01	0.01	0.08
27	2.05	1.99	0.00	0.19	0.00	0.01	0.01	0.06	0.00	0.00	0.11	0.10
28	0.36	0.40	0.94	1.80	0.00	0.29	0.28	0.22	0.00	0.00	0.04	0.00
29	0.06	0.00	0.20	0.31	---	1.67	0.13	0.02	0.00	0.54	0.02	0.00
30	0.03	0.00	0.22	0.72	---	0.00	0.02	0.02	0.14	0.01	0.00	0.01
31	0.08	---	0.27	0.03	---	0.02	---	0.00	---	0.00	0.05	---
TOTAL	5.12	9.46	7.59	16.44	3.03	12.15	1.93	12.25	1.57	2.23	2.74	1.87

CAL YR 2001 TOTAL 70.37
WTR YR 2002 TOTAL 76.38

HAWAII, ISLAND OF KAUAI

220927159355001. State Key Number 1084.0 Kilohana rain gage 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 are in files of the U.S. Geological Survey and at the National Weather Service.

GAGE.--Electronic data logger with a tipping bucket catchment (0.01 in. per tip). Elevation of gage is 4,000 ft (from topographic map).

REMARKS.--Records fair. Recording rainfall in hundredths of an inch.

PRECIPITATION, TOTAL, INCHES, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY SUM VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.88	---	---	---	0.01	0.00	0.05	0.00	0.00	1.22	0.12	0.04
2	0.03	---	---	---	0.02	1.47	0.07	0.00	0.00	0.36	0.17	0.25
3	---	---	---	---	1.59	0.04	0.03	0.02	0.02	0.44	0.55	0.18
4	---	---	---	0.00	0.28	1.15	0.10	0.05	0.04	0.01	0.05	0.17
5	---	---	---	0.09	0.17	0.04	0.02	0.83	0.04	0.05	0.02	0.09
6	---	---	---	0.57	0.01	0.17	0.00	2.85	0.42	0.51	1.30	0.97
7	---	---	---	0.07	0.02	0.01	0.17	3.85	0.16	0.64	1.76	0.13
8	---	---	---	0.12	2.48	0.00	0.03	0.71	0.48	0.59	0.90	0.09
9	---	---	---	0.70	0.00	0.00	0.05	0.06	1.27	0.87	0.04	0.48
10	---	---	---	0.02	0.01	0.24	0.00	0.35	0.12	0.98	0.12	0.36
11	---	---	---	0.00	0.23	0.01	0.00	0.14	0.32	0.33	0.54	0.01
12	---	---	---	0.00	1.75	0.39	0.00	2.28	0.28	0.01	0.29	0.00
13	---	---	---	0.01	0.81	0.13	0.12	0.01	1.17	0.00	0.08	0.76
14	---	---	---	0.01	0.35	0.00	0.00	0.34	0.41	0.55	0.11	0.97
15	---	---	---	0.00	0.39	0.02	0.00	0.01	0.14	0.16	0.01	0.16
16	---	---	---	0.02	0.01	6.81	0.01	0.00	0.01	0.21	0.02	1.09
17	---	---	---	0.47	0.02	2.28	1.56	0.00	0.01	0.91	0.01	0.02
18	---	---	---	2.31	0.00	0.11	0.02	0.83	0.55	0.51	0.54	0.00
19	---	---	---	2.89	0.86	0.05	0.14	0.24	0.49	0.07	1.68	0.00
20	---	---	---	3.71	0.05	0.00	1.76	1.64	0.24	0.06	0.07	0.00
21	---	---	---	2.97	0.01	0.00	0.00	0.79	0.74	0.95	0.01	0.01
22	---	---	---	0.14	0.02	0.02	0.02	0.30	0.66	0.12	0.12	0.00
23	---	---	---	0.01	0.01	0.00	0.00	0.07	0.28	0.30	0.29	0.00
24	---	---	---	0.00	1.41	1.53	0.00	0.05	0.04	0.36	0.01	0.00
25	---	---	---	0.06	1.72	4.35	0.15	0.00	0.14	0.15	0.00	0.00
26	---	---	---	1.08	0.00	0.06	0.16	0.00	0.10	0.17	0.25	0.02
27	---	---	---	0.30	0.00	0.05	0.01	0.19	0.00	0.00	0.33	0.09
28	---	---	---	2.08	0.00	0.33	0.38	0.24	0.00	0.28	0.58	0.00
29	---	---	---	0.20	---	1.84	0.63	0.07	0.00	1.04	0.05	0.02
30	---	---	---	1.81	---	0.00	0.01	0.03	0.51	0.23	0.03	0.04
31	---	---	---	0.42	---	0.03	---	0.00	---	0.03	0.01	---
TOTAL	---	---	---	---	12.23	21.13	5.49	15.95	8.64	12.11	10.06	5.95

CAL YR 2001 TOTAL 168.11
WTR YR 2002 TOTAL 165.16

Estimated rainfall Oct. 3 (0000) to Dec. 31 (2400) 51.63 inches.
Estimated rainfall Jan. 1 (0000) to Jan. 3 (2400) 0.00 inches.

HAWAII, ISLAND OF KAUAI

220703159351201. State Key Number 1085.0 Mohihi-Koaie divide rain gage 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 are in files of the U.S. Geological Survey and at the National Weather Service.

GAGE.--Electronic data logger with tipping bucket catchment (0.01 inch per tip). Elevation of gage is 4,000 ft (from topographic map).

REMARKS.--Records good. Recording rainfall in hundredths of an inch.

PRECIPITATION, TOTAL, INCHES, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY SUM VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.23	0.20	0.18	0.00	0.00	0.00	0.00	0.00	0.00	0.15	0.03	0.00
2	0.01	0.47	0.16	0.07	0.00	0.27	0.01	0.00	0.00	0.01	0.01	0.22
3	0.01	0.12	0.01	0.02	0.41	0.00	0.00	0.02	0.03	0.00	0.08	0.01
4	0.00	0.11	0.45	0.00	0.01	0.29	0.02	0.33	0.00	0.00	0.02	0.26
5	0.32	0.01	0.07	0.17	0.02	0.00	0.01	0.12	0.00	0.01	0.01	0.02
6	0.05	0.06	0.19	0.23	0.00	0.14	0.00	0.90	0.05	0.05	0.18	0.14
7	0.20	0.46	0.06	0.15	0.02	0.00	0.00	2.05	0.08	0.10	0.43	0.02
8	0.02	0.40	0.20	0.30	0.45	0.00	0.06	0.04	0.13	0.04	0.37	0.02
9	0.13	0.00	0.16	0.37	0.01	0.00	0.08	0.00	0.13	0.05	0.01	0.05
10	0.38	0.12	0.06	0.01	0.00	0.10	0.00	0.01	0.06	0.13	0.04	0.00
11	0.11	0.02	0.08	0.00	0.05	0.00	0.00	0.03	0.12	0.04	0.29	0.01
12	0.01	0.08	0.03	0.00	0.31	0.38	0.00	1.71	0.07	0.00	0.37	0.01
13	0.05	0.06	2.27	0.00	0.06	0.27	0.00	0.01	0.12	0.00	0.06	0.15
14	0.03	0.00	0.72	0.00	0.01	0.02	0.00	0.33	0.06	0.07	0.08	0.25
15	0.06	0.00	0.00	0.00	0.03	0.04	0.00	0.00	0.02	0.02	0.00	0.01
16	0.07	0.00	0.13	0.00	0.00	0.78	0.00	0.00	0.00	0.03	0.00	0.26
17	0.05	0.00	0.08	0.24	0.00	0.50	0.05	0.00	0.00	0.14	0.00	0.01
18	0.12	0.00	0.26	2.33	0.00	0.00	0.00	0.08	0.17	0.03	0.07	0.00
19	0.03	0.00	0.05	2.92	0.10	0.00	0.08	0.47	0.03	0.02	0.08	0.00
20	0.05	0.00	0.00	2.83	0.03	0.00	0.72	1.62	0.02	0.03	0.01	0.00
21	0.20	0.00	0.04	0.41	0.00	0.00	0.00	0.68	0.09	0.11	0.00	0.06
22	0.49	0.00	0.00	0.17	0.00	0.01	0.01	0.02	0.02	0.01	0.01	0.00
23	0.09	0.00	0.36	0.01	0.01	0.00	0.00	0.04	0.00	0.04	0.07	0.00
24	0.00	0.00	0.00	0.00	0.55	1.71	0.00	0.02	0.00	0.02	0.01	0.00
25	0.03	0.00	0.12	0.02	0.35	3.98	0.06	0.00	0.02	0.03	0.00	0.03
26	0.23	4.44	0.02	1.61	0.00	0.25	0.22	0.00	0.01	0.01	0.02	0.06
27	2.31	1.97	0.00	0.24	0.00	0.00	0.00	0.03	0.00	0.00	0.12	0.02
28	0.59	0.54	0.78	1.74	0.00	0.24	0.44	0.20	0.00	0.02	0.04	0.00
29	0.05	0.00	0.12	0.22	---	1.48	0.12	0.02	0.00	0.96	0.01	0.00
30	0.04	0.00	0.22	0.85	---	0.00	0.01	0.02	0.14	0.03	0.00	0.02
31	0.09	---	0.28	0.04	---	0.02	---	0.00	---	0.01	0.02	---
TOTAL	6.05	9.06	7.10	14.95	2.42	10.48	1.89	8.75	1.37	2.16	2.44	1.63

CAL YR 2001 TOTAL 73.22
WTR YR 2002 TOTAL 68.30

HAWAII, ISLAND OF KAUAI

221101159280801. State Key Number 1131.7 Hanalei rain gage at Hanalei, Kauai.

LOCATION.--Lat 22°11'01", long 159°28'08", Hydrologic Unit 20070000, in USGS stream-gaging station 16103000 on left bank 2.3 mi southeast of Hanalei Bridge and 5.5 mi upstream from the river mouth.

PERIOD OF RECORD.--From May 8, 2001 to current year.

GAGE.--Electronic data logger with a tipping bucket catchment (0.01 in. per tip). Elevation of gage is 60 ft (from topographic map).

REMARKS.--Records good. Recording rainfall in hundredths of an inch.

PRECIPITATION, TOTAL, INCHES, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY SUM VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.17	0.51	0.59	0.00	0.01	0.00	0.00	0.00	0.00	1.17	---	0.13
2	0.03	1.07	0.13	0.00	0.01	0.71	0.00	0.00	0.00	0.17	---	0.55
3	0.01	0.19	0.34	0.00	0.21	0.01	0.00	0.00	0.02	0.38	---	0.07
4	0.06	0.49	0.94	0.00	0.06	0.07	0.03	0.09	0.20	0.01	---	0.87
5	2.05	0.12	0.16	0.00	0.21	0.04	0.03	0.98	0.26	0.09	---	0.16
6	0.11	0.41	0.49	0.09	0.00	1.03	0.00	1.72	0.21	0.12	---	0.63
7	0.17	0.82	0.10	0.01	0.01	0.16	0.02	1.93	0.14	0.16	0.39	0.28
8	0.04	0.57	0.30	0.03	1.91	0.00	0.00	0.49	0.29	0.10	0.62	0.05
9	0.20	0.04	0.56	0.94	0.00	0.25	0.00	0.34	0.71	0.00	0.45	0.23
10	0.97	0.03	0.10	0.00	0.00	0.17	0.00	0.67	0.43	0.25	0.78	0.05
11	0.14	0.01	0.25	0.00	0.06	0.00	0.00	0.99	0.33	0.06	0.70	0.09
12	0.02	0.30	0.15	0.00	0.69	0.04	0.00	3.86	0.11	0.02	1.19	0.02
13	0.49	0.06	0.73	0.17	1.10	0.66	0.00	0.00	0.42	0.03	0.11	0.27
14	0.42	0.00	1.10	0.00	0.31	0.02	0.01	0.29	0.22	0.15	0.06	1.04
15	0.65	0.01	0.06	0.01	0.18	0.12	0.00	0.02	0.00	0.15	0.00	0.20
16	0.27	0.19	0.17	0.01	0.01	1.02	0.00	0.10	0.04	0.15	0.06	0.72
17	0.33	0.01	0.11	0.09	0.01	0.79	0.38	0.01	0.17	0.30	0.04	0.02
18	0.48	0.00	1.20	0.62	0.00	0.01	2.19	1.06	0.67	0.51	0.08	0.01
19	0.23	0.00	0.08	0.48	0.01	0.00	0.39	0.21	0.27	0.07	0.23	0.00
20	0.11	0.00	0.07	1.06	0.01	0.00	0.32	0.11	0.12	0.05	0.11	0.04
21	0.07	0.00	0.26	2.00	0.00	0.00	0.02	0.36	0.60	0.35	0.00	0.01
22	0.48	0.00	0.03	0.36	0.00	0.03	0.19	0.00	0.56	0.09	0.19	0.00
23	0.22	0.00	0.20	0.01	0.00	0.00	0.00	0.00	0.26	0.07	0.16	0.00
24	0.01	0.00	0.00	0.00	0.35	3.65	0.02	0.03	0.05	0.17	0.09	0.00
25	0.12	0.01	0.08	0.22	0.52	4.28	0.12	0.00	0.03	---	0.05	0.00
26	0.28	5.27	0.18	1.23	0.01	0.37	0.94	0.00	0.09	---	0.76	0.02
27	0.57	1.45	0.00	3.74	0.00	0.06	0.00	0.12	0.01	---	0.27	0.01
28	0.02	0.10	0.01	4.62	0.00	0.28	0.15	0.15	0.00	---	0.88	0.01
29	0.06	0.00	0.01	1.04	---	0.52	0.78	0.02	0.00	---	0.19	0.03
30	0.12	0.00	0.01	2.52	---	0.00	0.02	0.01	0.44	---	0.24	0.03
31	0.43	---	0.23	0.68	---	0.00	---	0.00	---	---	0.06	---
TOTAL	9.33	11.66	8.64	19.93	5.68	14.29	5.61	13.56	6.65	---	---	5.54

WTR YR 2002 TOTAL 118.05

No daily record July 25 (0000) to Aug. 6 (2400). Accumulation rainfall for this period is 4.83 inches.

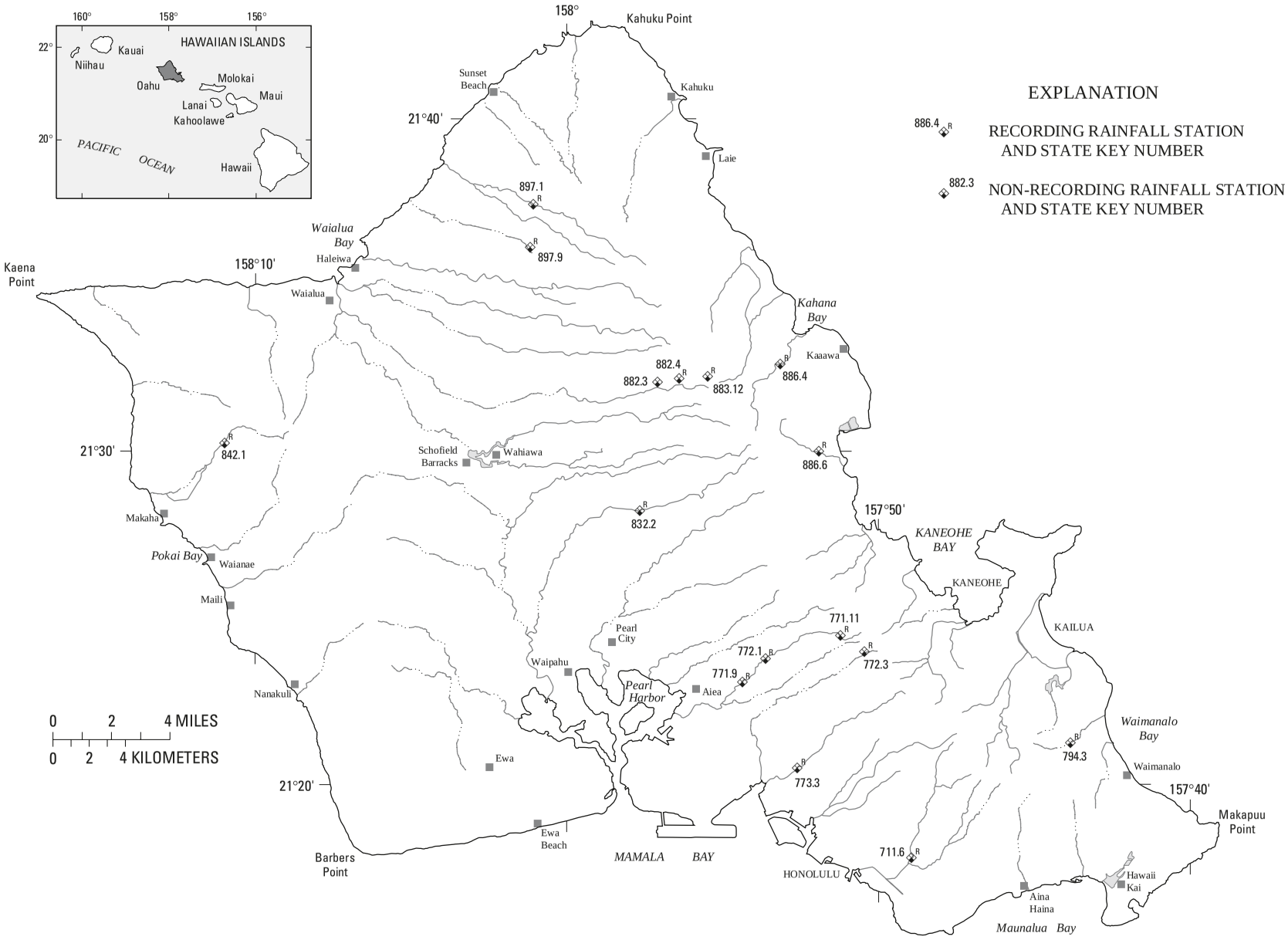


Figure 22. Locations of rainfall stations on Oahu.

HAWAII, ISLAND OF OAHU

211747157485601. State Key Number 711.6 Manoa rain gage at Kanewai Field at Honolulu, Oahu.

LOCATION.--Lat 21°17'47", long 157°48'56", Hydrologic Unit 20060000, in USGS stream-gaging station 16242500 on left bank, 0.5 mi northeast of Kaimuki High School, 0.4 mi northwest of St. Louis High School, and 0.3 mi upstream of confluence with Palolo Stream.

PERIOD OF RECORD.--Continuous-record station, May 14, 1999 to current year.

GAGE.--Standard 8-in. National Weather Service collector and 8-in. rain can with tipping-bucket attachment. An electronic data logger records rainfall at 15-minute intervals. Elevation of gage is 22 ft above mean sea level (from topographic map).

REMARKS.--Records poor. Rainfall recorded in hundredths of an inch.

PRECIPITATION, TOTAL, INCHES, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY SUM VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	---	0.01	0.00	0.30	0.00	0.00	0.00	0.00	0.00	0.00	0.07
2	---	---	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.02	0.00	0.00
3	---	---	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	---	---	0.00	0.00	0.22	0.00	0.00	0.24	0.04	0.00	0.00	0.00
5	---	---	0.09	0.04	0.03	0.00	0.00	0.05	0.00	0.00	0.00	0.00
6	---	---	0.05	0.00	0.00	0.06	0.08	0.00	0.02	0.00	0.04	0.00
7	---	---	0.01	---	0.00	0.49	0.00	0.00	0.18	0.20	0.00	0.07
8	---	---	0.08	---	0.42	0.00	0.00	0.00	0.00	0.00	0.04	0.00
9	---	---	0.09	---	0.00	0.17	0.00	0.00	0.00	0.11	0.04	0.00
10	---	---	0.00	---	0.00	0.00	0.00	0.00	0.20	0.00	0.00	0.11
11	---	---	0.08	0.00	0.00	0.00	0.00	0.09	0.00	0.00	0.00	0.00
12	---	---	0.18	0.00	0.35	0.00	0.00	0.52	0.00	0.00	0.00	0.00
13	---	---	0.43	0.00	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	---	---	0.18	0.00	0.00	0.00	0.08	0.00	0.02	0.07	0.00	0.07
15	---	0.00	0.17	0.00	0.09	0.19	0.00	0.00	0.00	0.00	0.00	0.00
16	---	0.00	0.06	0.00	0.00	0.13	0.05	0.00	0.07	0.00	0.00	0.00
17	---	0.00	0.13	0.20	0.00	0.18	0.00	0.00	0.00	0.04	0.00	0.00
18	---	0.00	0.12	1.16	0.00	0.00	0.06	0.18	0.02	0.00	0.04	0.00
19	---	0.00	0.18	0.49	0.00	0.00	0.00	0.04	0.02	0.00	0.00	0.00
20	---	0.00	0.01	0.20	0.00	0.00	1.02	0.00	0.00	0.00	0.00	0.04
21	---	0.00	0.00	0.01	0.00	0.00	0.00	0.15	0.00	0.00	0.00	0.00
22	---	0.00	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00
23	---	0.00	0.23	0.00	0.00	0.00	0.02	0.00	0.04	0.00	0.04	0.00
24	---	0.00	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.07	0.00	0.00
25	---	0.00	0.00	0.00	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26	---	0.00	0.00	0.90	0.09	0.00	0.18	0.00	0.00	0.00	0.04	0.00
27	---	2.68	0.00	0.58	0.00	0.00	0.03	0.00	0.00	0.00	0.11	0.00
28	---	0.00	0.06	0.18	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.00
29	---	0.00	0.00	1.68	---	0.56	0.10	0.00	0.00	0.04	0.00	0.04
30	---	0.00	0.22	0.14	---	0.00	0.00	0.00	0.04	0.00	0.00	0.00
31	---	---	0.00	0.25	---	0.00	---	0.00	---	0.00	0.00	---
TOTAL	---	---	2.38	---	1.89	1.81	1.62	1.27	0.65	0.55	0.46	0.40

No record Oct. 1 (0015 hrs) to Nov. 14 (0930 hrs).
Partial daily record on Jan. 7 from 0015 hrs to 1800 hrs is 0 inches.
No daily record from Jan. 7 (1815) to Jan. 10 (1800), accumulated total is 0.05 inches.
Partial daily record on Jan. 10 from 1815 hrs to 2400 hrs is 0 inches.

HAWAII, ISLAND OF OAHU

212428157511201. State Key Number 771.11 North Halawa Valley rain gage at tunnel portal near Kaneohe, Oahu.

LOCATION.--Lat 21°24'28", long 157°51'12", Hydrologic Unit 20060000, on roof of Halawa portal control center, 3.2 mi west of Kaneohe Post Office, and 2.4 mi southwest of Ahuimanu School.

PERIOD OF RECORD.--Continuous-record station, July 1998 to current year.

GAGE.--Standard 8-in. National Weather Service collector attached to a 7 5/16-in. rain can with float-type recorder system. Elevation of the gage is 1,100 ft above mean sea level (from topographic map).

REMARKS.--Records fair. Rainfall read in tenths of an inch.

PRECIPITATION, TOTAL, INCHES, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY SUM VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.5	0.3	0.4	0.0	0.2	0.0	0.0	0.0	0.0	1.1	---	0.1
2	0.0	0.6	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.4	---	0.2
3	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.2	0.2	---	---	0.3
4	1.0	0.5	0.2	0.0	3.9	0.2	0.4	1.2	0.1	---	---	0.0
5	1.7	0.6	0.3	0.1	0.1	1.3	0.0	2.9	0.2	---	---	0.1
6	0.1	1.2	0.5	0.1	0.2	2.4	0.0	10.1	0.0	---	---	0.0
7	0.8	2.7	0.0	0.0	0.0	3.4	0.0	2.1	0.1	---	---	0.4
8	0.0	0.4	0.2	---	2.3	0.1	0.0	0.5	0.0	---	---	0.0
9	0.0	0.1	0.0	---	0.0	2.5	0.0	0.4	0.0	---	---	0.0
10	0.6	0.1	0.0	---	0.0	0.0	0.0	0.4	0.7	---	0.1	0.4
11	0.5	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.2	---	1.2	0.3
12	0.0	0.1	0.3	0.0	1.0	0.0	0.0	0.9	0.0	---	0.4	0.1
13	1.3	0.7	1.1	0.0	0.6	0.2	0.0	0.3	0.0	---	0.0	0.0
14	0.0	0.0	0.9	0.1	0.0	0.3	0.0	0.0	0.0	---	0.2	0.3
15	0.2	0.0	0.2	0.0	0.9	0.4	0.0	0.0	0.1	---	0.0	0.3
16	0.2	0.0	0.0	0.0	0.1	1.0	0.2	0.0	0.1	---	0.1	0.4
17	0.0	0.0	0.2	0.0	0.0	3.2	0.7	0.0	0.1	---	0.0	0.1
18	0.0	0.0	0.1	0.8	0.0	0.0	0.4	0.4	1.0	---	0.1	1.6
19	0.1	0.0	0.6	0.2	0.0	0.0	0.0	0.3	0.6	---	0.2	0.2
20	0.1	0.0	0.5	0.8	0.0	0.0	1.6	0.5	0.4	---	0.1	0.6
21	0.3	0.0	0.1	1.6	0.0	0.0	0.0	0.5	0.6	---	0.0	0.0
22	0.3	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.5	---	0.3	0.0
23	0.1	0.0	2.4	0.0	0.0	0.0	0.0	0.0	0.4	---	0.7	0.0
24	0.0	0.0	0.6	0.0	0.2	0.0	0.4	0.0	0.2	---	0.2	0.0
25	0.8	0.0	0.0	0.5	0.4	0.0	1.0	0.0	0.0	---	0.6	0.0
26	0.0	1.0	0.0	6.8	0.1	0.0	1.0	0.0	0.0	---	0.4	0.0
27	2.1	3.4	0.0	1.0	0.0	0.2	0.4	0.0	0.0	---	0.3	0.0
28	1.8	0.1	0.1	4.2	0.0	0.0	0.1	0.0	0.0	---	0.5	0.0
29	0.0	0.1	0.5	4.4	---	0.3	0.8	0.0	0.0	---	0.2	0.1
30	0.1	0.1	0.2	1.0	---	0.0	0.0	0.0	0.8	---	2.0	0.1
31	0.5	---	0.0	2.4	---	0.0	---	0.0	---	---	0.1	---
TOTAL	15.1	12.5	9.8	---	10.0	15.9	7.0	20.7	6.3	---	---	5.6

CAL YR 2001 TOTAL 117.4 (estimated)
WTR YR 2002 TOTAL 144.9

Partial daily record on Jan. 8 from 0100 hrs to 0600 hrs is 0 inches.
Total accumulated rainfall from Jan. 8 (0600 hrs) to Jan. 10 (0700 hrs) is 0.1 inches.
Partial daily record on Jan. 10 from 0700 hrs to 2400 hrs is 0 inches.
Partial daily record on July 3 from 0100 hrs to 1100 hrs is 0.1 inches.
Total accumulated rainfall from July 3 (1100 hrs) to Aug. 9 (1000 hrs) is 8.4 inches.
Partial daily record on Aug. 9 from 1000 hrs to 2400 hrs is 0 inches.

HAWAII, ISLAND OF OAHU

212304157542201. State Key Number 771.9 North Halawa rain gage near Honolulu, Oahu.

LOCATION.--Lat 21°23'04", long 157°54'22", (Waipahu quadrangle, 1983, 1:24000) Hydrologic Unit 20060000, in USGS stream-gaging station 16226200, 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.--Continuous-record station, May 1983 to current year. Prior to October 1992, unpublished records are in the files of the U.S. Geological Survey.

GAGE.--Standard 8-in. National Weather Service rain gage receiver and 7 5/16-in. rain can with float-type system attached to an electronic data logger. Elevation of gage is 160 ft above mean sea level (from topographic map).

REMARKS.--Records poor. Rainfall read in tenths of an inch.

PRECIPITATION, TOTAL, INCHES, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY SUM VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.2	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
4	0.1	0.2	0.0	0.0	0.7	0.0	0.0	0.1	0.0	0.0	0.0	0.0
5	0.1	0.0	0.2	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0
6	0.0	0.1	0.3	0.0	0.0	0.1	0.0	1.2	0.1	0.0	0.3	0.0
7	0.3	0.3	0.0	0.0	0.0	0.3	0.0	1.8	0.1	0.1	0.3	0.1
8	0.0	0.1	0.1	0.0	0.9	0.1	0.0	0.0	0.0	0.2	0.0	0.0
9	0.2	0.0	0.1	0.0	0.1	0.4	0.0	0.0	0.0	0.1	0.0	0.0
10	0.2	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
12	0.0	0.1	0.2	0.0	0.2	0.0	0.0	0.5	0.0	0.0	0.0	0.0
13	0.3	0.0	1.0	0.0	0.2	0.1	0.0	0.3	0.0	0.0	0.0	0.0
14	0.0	0.0	0.2	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.0
15	0.0	0.0	0.1	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.1
16	0.0	0.1	0.0	0.0	0.0	1.4	0.1	0.0	0.0	0.0	0.0	0.1
17	0.0	0.0	0.1	0.3	0.0	0.2	0.1	0.0	0.0	0.0	0.0	0.0
18	0.0	0.0	0.0	0.6	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.2
19	0.0	0.0	0.1	0.4	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0
20	0.1	0.0	0.1	0.7	0.0	0.0	0.2	0.1	0.0	0.0	0.0	0.0
21	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.2	0.1	0.0	0.0
22	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.2	0.0	0.0
23	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
24	0.0	0.0	0.2	0.0	0.1	0.0	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	0.2	0.0	0.0	0.0	0.0	0.0
26	0.0	0.7	0.0	4.5	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
27	2.2	3.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
28	0.7	0.0	0.2	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
29	0.0	0.0	0.3	2.0	---	0.4	0.1	0.0	0.0	0.3	0.0	0.0
30	0.0	0.0	0.1	0.1	---	0.0	0.0	0.1	0.1	0.0	0.1	0.1
31	0.1	---	0.1	0.2	---	0.0	---	0.0	---	0.0	0.0	---
TOTAL	4.6	4.8	3.9	10.0	2.5	3.2	0.8	4.7	0.8	1.2	1.0	0.7

CAL YR 2001 TOTAL 30.2
WTR YR 2002 TOTAL 38.2

HAWAII, ISLAND OF OAHU

212346157533701. State Key Number 772.1 North Halawa rain gage 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.--Continuous-record station, August 1929 to June 1933, June 1953 to current year. Prior to October 1992, unpublished records are in the files of the U.S. Geological Survey.

GAGE.--A 12-in. collector and 10-in. storage tank with float-type recorder system. Elevation of gage is 320 ft above mean sea level (from topographic map).

REMARKS.--Records fair, except period of no data which is poor. Rainfall recorded in 0.083-inch increments.

PRECIPITATION, TOTAL, INCHES, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY SUM VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.33	0.17	0.00	0.00	---	---	0.00	0.00	0.00	0.00	0.00	0.17
2	0.00	0.17	0.00	0.00	---	---	0.00	0.00	0.00	0.08	0.00	0.00
3	0.00	0.17	0.00	0.00	---	---	0.00	0.00	0.00	0.08	0.00	0.17
4	0.00	0.33	0.00	0.00	---	---	0.00	0.00	0.08	0.00	0.08	0.00
5	0.25	0.17	0.00	0.00	---	---	0.00	0.83	0.00	0.00	0.08	0.00
6	0.08	0.17	0.00	0.00	---	---	0.00	2.00	0.17	0.00	0.33	0.00
7	0.58	0.58	0.00	0.00	---	---	0.00	1.33	0.08	0.25	0.33	0.08
8	0.00	0.08	0.00	0.00	---	---	0.00	0.00	0.00	0.17	0.00	0.00
9	0.00	0.00	0.08	0.00	---	---	0.00	0.00	0.00	0.08	0.00	0.00
10	0.42	0.00	0.00	0.00	---	---	0.00	0.00	0.25	0.08	0.17	0.17
11	0.08	0.00	0.00	---	---	---	0.00	0.00	0.42	0.00	0.00	0.00
12	0.00	0.00	0.08	---	---	---	0.00	0.42	0.00	0.00	0.08	0.00
13	0.08	0.00	0.17	---	---	---	0.00	0.25	0.00	0.00	0.00	0.00
14	0.00	0.00	0.08	---	---	---	0.00	0.00	0.00	0.00	0.08	0.00
15	0.00	0.00	0.00	---	---	---	0.00	0.00	0.00	0.00	0.00	0.17
16	0.00	0.00	0.00	---	---	---	0.00	0.00	0.00	0.00	0.00	0.25
17	0.00	0.00	0.00	---	---	---	0.17	0.00	0.00	0.00	0.00	0.00
18	0.00	0.00	0.00	---	---	---	0.25	0.17	0.17	0.17	0.00	0.67
19	0.00	0.00	0.00	---	---	---	0.08	0.00	0.17	0.17	0.08	0.00
20	0.00	0.00	0.08	---	---	---	0.42	0.00	0.00	0.00	0.00	0.00
21	0.08	0.00	0.00	---	---	---	0.00	0.00	0.25	0.17	0.00	0.00
22	0.00	0.00	0.00	---	---	---	0.08	0.00	0.17	0.17	0.08	0.00
23	0.00	0.00	0.00	---	---	---	0.00	0.00	0.00	0.00	0.08	0.00
24	0.00	0.00	0.00	---	---	---	0.00	0.00	0.08	0.00	0.00	0.00
25	0.00	0.00	0.00	---	---	---	0.33	0.17	0.00	0.00	0.00	0.00
26	0.00	0.00	0.00	---	---	0.00	0.08	0.00	0.00	0.00	0.00	0.00
27	0.92	0.50	0.00	---	---	0.00	0.08	0.00	0.00	0.00	0.42	0.00
28	0.08	0.00	0.00	---	---	0.00	0.00	0.00	0.00	0.00	0.08	0.00
29	0.00	0.00	0.00	---	---	0.17	0.17	0.00	0.00	0.08	0.08	0.08
30	0.00	0.00	0.00	---	---	0.00	0.00	0.00	0.17	0.00	0.17	0.00
31	0.00	---	0.00	---	---	0.00	---	0.00	---	0.00	0.00	---
TOTAL	2.90	2.34	0.49	---	---	---	1.66	5.17	2.01	1.50	2.14	1.76

CAL YR 2001 TOTAL 30.11

Partial daily record on Jan. 11 from 0015 hrs to 1430 hrs was 0 inches.
Accumulated totals from Jan. 11 (1445 hrs) to Mar. 25 (1030 hrs) was greater than 1.24 inches.
Partial daily record on Mar. 25 from 1045 hrs to 2400 hrs was 0 inches.

HAWAII, ISLAND OF OAHU

212359157502601. State Key Number 772.3 Moanalua rain gage no. 1 at altitude 1,000 ft 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.--Continuous-record station, June 25, 1968 to current year. Prior to October 1992, unpublished records are in the files of the U.S. Geological Survey.

GAGE.--Standard 8-in. National Weather Service collector and 7 5/16-in. rain can with recorder. An electronic data logger was installed on February 5, 1997 replacing the digital recorder. Elevation of gage is 1,000 ft above mean sea level (from topographic map).

REMARKS.--Records good. Rainfall recorded in tenths of an inch.

PRECIPITATION, TOTAL, INCHES, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY SUM VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.3	0.3	0.4	0.0	0.2	0.0	0.0	0.1	0.0	1.0	0.0	0.2
2	0.0	0.3	0.1	0.0	0.0	0.4	0.0	0.0	0.1	0.4	0.1	0.3
3	0.1	0.7	0.0	0.0	0.0	0.0	0.0	0.4	0.2	0.2	0.1	0.4
4	1.2	0.6	0.1	0.0	3.8	0.2	0.5	1.4	0.0	0.0	0.0	0.0
5	1.9	0.5	0.2	0.0	0.0	1.1	0.0	3.1	0.0	0.1	0.5	0.1
6	0.1	1.1	0.3	0.1	0.0	0.7	0.0	10.8	0.1	0.1	0.2	0.1
7	0.8	3.2	0.0	0.0	0.0	0.0	0.0	2.5	0.0	0.2	0.1	0.5
8	0.0	0.3	0.3	0.0	2.6	0.0	0.0	0.3	0.1	0.2	0.0	0.0
9	0.2	0.0	0.0	0.2	0.0	0.0	0.0	0.5	0.0	0.3	0.1	0.0
10	0.4	0.1	0.1	0.1	0.0	0.0	0.0	0.4	0.5	0.4	0.1	0.1
11	0.5	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.9	0.2
12	0.1	0.1	0.2	0.0	0.7	0.0	0.0	1.0	0.1	0.0	0.4	0.2
13	1.0	0.5	1.3	0.0	0.6	0.1	0.0	0.4	0.0	0.0	0.0	0.0
14	0.0	0.0	0.9	0.1	0.0	0.0	0.1	0.0	0.1	0.0	0.2	0.4
15	0.1	0.0	0.2	0.0	1.0	0.0	0.0	0.1	0.1	0.1	0.0	0.4
16	0.1	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.1	0.0	0.2
17	0.0	0.0	0.2	0.1	0.0	0.0	0.7	0.0	0.2	0.4	0.0	0.0
18	0.1	0.0	0.2	0.3	0.0	0.0	0.5	0.5	0.7	0.4	0.1	1.9
19	0.0	0.0	0.3	0.5	0.0	0.0	0.0	0.3	0.4	1.0	0.2	0.1
20	0.1	0.0	0.8	0.9	0.0	0.0	1.9	0.4	0.3	0.0	0.0	0.7
21	0.1	0.0	0.0	1.4	0.0	0.0	0.0	0.7	0.6	1.1	0.0	0.0
22	0.1	0.0	0.0	0.3	0.0	0.0	0.1	0.0	0.7	0.1	0.1	0.0
23	0.1	0.0	2.5	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.7	0.0
24	0.1	0.0	0.6	0.0	0.0	0.0	0.1	0.0	0.3	0.1	0.4	0.0
25	0.1	0.0	0.0	0.7	0.2	0.0	0.8	0.0	0.0	0.0	0.7	0.0
26	0.1	0.4	0.0	7.3	0.1	0.0	1.1	0.0	0.0	0.1	0.1	0.0
27	1.6	3.6	0.0	1.5	0.0	0.4	0.4	0.2	0.0	0.2	0.6	0.0
28	1.5	0.0	0.0	4.2	0.0	0.0	0.0	0.0	0.0	0.6	0.3	0.0
29	0.0	0.1	0.4	4.8	---	0.2	0.6	0.0	0.0	0.3	0.5	0.0
30	0.1	0.1	0.1	0.9	---	0.0	0.0	0.0	0.8	0.2	1.3	0.1
31	0.5	---	0.0	2.8	---	0.0	---	0.0	---	0.0	0.1	---
TOTAL	13.3	11.9	9.5	26.2	9.2	3.1	7.0	23.1	5.8	7.7	7.8	5.9

CAL YR 2001 TOTAL 111.9
WTR YR 2002 TOTAL 130.5

HAWAII, ISLAND OF OAHU

212029157523601. State Key Number 773.3 Kalihi rain gage at Kalihi, Oahu.

LOCATION.--Lat 21°20'29", long 157°52'36", Hydrologic Unit 20060000, in USGS stream-gaging station 16229300 on left bank, 0.4 mi northwest of Bishop Museum, and 2.4 mi northwest of Honolulu Post Office.

PERIOD OF RECORD.--Continuous-record station, July 1962 to current year. Prior to October 1992, unpublished records are in the files of the U.S. Geological Survey.

GAGE.--Standard 8-in. National Weather Service rain gage with tipping-bucket attachment. An electronic data logger records rainfall at 15-minute intervals. Elevation of gage is 70 ft above mean sea level (from topographic map).

REMARKS.--Records poor. Rainfall recorded in hundredths of an inch.

PRECIPITATION, TOTAL, INCHES, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY SUM VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.09	0.00	0.00	0.00	0.02	0.00	---	---	0.00	0.00	0.00	0.13
2	0.00	0.00	0.01	0.00	0.00	0.00	---	---	0.00	0.02	0.00	0.01
3	0.00	0.00	0.00	0.00	0.00	0.00	---	---	0.00	0.02	0.00	0.09
4	0.03	0.00	0.03	0.00	0.17	0.00	---	---	0.00	0.00	0.01	0.07
5	0.03	0.00	0.35	0.01	0.05	0.00	---	---	0.02	0.00	0.01	0.00
6	0.00	0.00	0.22	0.02	0.00	0.17	---	---	0.00	0.02	0.15	0.01
7	0.01	0.00	0.03	0.01	0.00	0.02	---	---	0.02	0.17	0.17	0.03
8	0.00	0.00	0.14	0.00	0.00	0.00	---	---	0.02	0.06	0.00	0.00
9	0.00	0.00	0.07	0.00	0.00	0.33	---	0.02	0.00	0.11	0.00	0.01
10	0.03	0.01	0.01	0.00	0.00	0.02	---	0.00	0.02	0.02	0.00	0.00
11	0.00	0.00	0.01	0.00	0.02	0.00	---	0.03	0.02	0.02	0.00	0.00
12	0.00	0.05	0.19	0.00	0.02	0.00	---	0.11	0.02	0.00	0.00	0.01
13	0.00	0.01	0.78	0.00	0.05	0.00	---	0.00	0.02	0.00	0.00	0.00
14	0.00	0.00	0.11	0.00	0.00	0.00	---	0.00	0.00	0.00	0.00	0.00
15	0.00	0.00	0.04	0.00	0.00	0.00	---	0.00	0.00	0.00	0.00	0.00
16	0.00	0.00	0.01	0.00	0.00	0.26	---	0.02	0.05	0.00	0.00	0.06
17	0.00	0.00	0.05	0.17	0.00	0.00	---	0.00	0.02	0.01	0.00	0.01
18	0.00	0.00	0.05	1.02	0.00	---	---	0.05	0.00	0.05	0.00	0.00
19	0.00	0.00	0.08	0.70	0.02	---	---	0.00	0.05	0.04	0.00	0.00
20	0.00	0.00	0.01	0.90	0.00	---	---	0.00	0.00	0.00	0.00	0.03
21	0.00	0.00	0.00	0.44	0.00	---	---	0.22	0.00	0.06	0.00	0.00
22	0.00	0.00	0.00	0.10	0.00	---	---	0.12	0.00	0.09	0.00	0.00
23	0.00	0.01	0.13	0.00	0.00	---	---	0.00	0.00	0.00	0.00	0.00
24	0.00	0.00	0.02	0.00	0.00	---	---	0.00	0.00	0.01	0.00	0.00
25	0.00	0.00	0.05	0.01	0.02	---	---	0.02	0.00	0.00	0.00	0.00
26	0.00	0.50	0.00	1.29	0.05	---	---	0.00	0.00	0.00	0.00	0.00
27	0.00	3.21	0.00	0.15	0.00	---	---	0.02	0.00	0.00	0.01	0.00
28	0.00	0.00	0.01	0.28	0.00	---	---	0.00	0.02	0.00	0.04	0.00
29	0.00	0.00	0.12	2.48	---	---	---	0.00	0.00	0.09	0.01	0.00
30	0.00	0.00	0.04	0.11	---	---	---	0.00	0.05	0.04	0.22	0.00
31	0.00	---	0.01	0.05	---	---	---	0.00	---	0.00	0.00	---
TOTAL	0.19	3.79	2.57	7.74	0.42	---	---	---	0.33	0.83	0.62	0.46

No record from Mar. 18 (1300 hrs) to May 9 (1145 hrs).

HAWAII, ISLAND OF OAHU

212114157435001. State Key Number 794.3 Waimanalo rain gage at Waimanalo, Oahu.

LOCATION.--Lat 21°21'14", long 157°43'50", Hydrologic Unit 20060000, in USGS stream-gaging station 16249000, 260 ft downstream from Kalanianaole Highway, and 2.3 mi northwest of Waimanalo Post Office.

PERIOD OF RECORD.--Continuous-record station, January 1967 to current year. Prior to October 1992, unpublished records are in the files of the U.S. Geological Survey.

GAGE.--Standard 8-in. National Weather Service rain gage collector and 7 5/16-in. diameter rain can, 4 ft tall, with a float system attached to a data logger. Elevation of gage is 20 ft above mean sea level (from topographic map).

REMARKS.--Records good. Rainfall recorded in tenths of an inch.

PRECIPITATION, TOTAL, INCHES, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY SUM VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.40	0.00	0.00	0.00	0.00	0.00	0.10
3	0.00	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.00	0.00
4	0.20	0.00	0.00	0.00	0.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.50	0.00	0.00	0.00	0.10	0.00	0.10	0.00	0.00	0.00	0.00	0.00
6	0.00	0.30	0.10	0.00	0.00	0.10	0.00	1.50	0.00	0.00	0.00	0.00
7	0.20	0.40	0.00	0.00	0.00	1.10	0.10	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	4.10	0.10	0.00	0.00	0.00	0.00	0.00	0.00
9	0.10	0.00	0.00	0.10	0.00	0.30	0.00	0.10	0.00	0.00	0.00	0.00
10	0.00	0.10	0.00	0.00	0.00	0.00	0.00	0.10	0.00	0.10	0.00	0.00
11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	0.00	0.00	0.00	0.00	0.10	0.00	0.00	0.50	0.00	0.00	0.00	0.10
13	0.00	0.10	0.40	0.00	0.50	0.00	0.00	1.00	0.00	0.00	0.00	0.00
14	0.00	0.00	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.00
15	0.00	0.00	0.40	0.00	0.30	0.00	0.00	0.00	0.10	0.00	0.00	0.00
16	0.00	0.00	0.10	0.00	0.00	1.60	0.00	0.00	0.00	0.00	0.00	0.00
17	0.00	0.00	0.00	0.00	0.00	0.40	0.00	0.00	0.00	0.00	0.00	0.00
18	0.00	0.00	0.00	0.40	0.00	0.00	0.20	0.00	0.00	0.00	0.00	0.00
19	0.00	0.00	0.10	0.00	0.00	0.00	0.10	0.00	0.00	0.10	0.00	0.00
20	0.00	0.00	0.00	0.20	0.00	0.00	1.20	0.00	0.00	0.00	0.00	0.10
21	0.00	0.00	0.00	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.00	0.00	0.00
23	0.00	0.00	0.20	0.00	0.00	0.00	0.00	0.00	0.10	0.00	0.00	0.00
24	0.00	0.00	1.20	0.00	0.10	0.00	0.00	0.00	0.10	0.10	0.10	0.00
25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.00
26	0.00	1.10	0.10	0.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
27	0.00	6.10	0.00	0.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28	0.20	0.10	0.00	0.60	0.00	0.00	0.00	0.00	0.00	0.20	0.20	0.00
29	0.00	0.00	1.70	4.40	---	0.90	0.70	0.00	0.00	0.40	0.00	0.00
30	0.00	0.00	0.10	0.20	---	0.00	0.00	0.00	0.00	0.00	0.40	0.00
31	0.10	---	0.00	0.30	---	0.00	---	0.00	---	0.00	0.00	---
TOTAL	1.40	8.30	4.50	7.80	5.60	4.90	2.40	3.20	0.40	1.00	0.90	0.30

CAL YR 2001 TOTAL 22.70
WTR YR 2002 TOTAL 40.70

HAWAII, ISLAND OF OAHU

212813157574001. State Key Number 832.2 Kipapa rain gage near Wahiawa, Oahu.

LOCATION.--Lat 21°28'13", long 157°57'40", Hydrologic Unit 20060000, on left bank of stream 1,700 ft below Forest Reserve Boundary, 4.9 mi southeast of Wahiawa Post Office, and 6.3 mi northeast of Waipahu. The rain gage is housed in the same shelter with USGS stream-gaging station 16212800.

PERIOD OF RECORD.--Continuous-record station, January 2, 1957 to current year. Prior to October 1992, unpublished records are in the files of the U.S. Geological Survey.

GAGE.--Standard 8-in. National Weather Service collector and 7 5/16-in. storage can with a float-type recorder system. Elevation of gage is 690 ft above mean sea level (from topographic map).

REMARKS.--Records good. Rainfall recorded in tenths of an inch.

PRECIPITATION, TOTAL, INCHES, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY SUM VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.1	0.5	0.2	0.0	0.2	0.0	0.0	0.0	0.0	0.1	0.0	0.1
2	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0
3	0.0	0.2	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.0
4	0.1	0.1	0.3	0.0	0.5	0.0	0.1	0.5	0.1	0.0	0.1	0.0
5	0.2	0.0	0.5	0.0	0.0	0.0	0.0	1.2	0.1	0.0	0.1	0.1
6	0.0	0.2	0.4	0.1	0.1	1.6	0.0	3.6	0.2	0.0	0.9	0.1
7	1.1	0.6	0.0	0.0	0.0	1.6	0.0	0.7	0.0	0.3	0.7	0.1
8	0.0	0.1	0.4	0.0	0.9	0.0	0.0	0.0	0.0	0.6	0.0	0.1
9	0.2	0.0	0.3	0.1	0.0	1.3	0.0	0.0	0.0	0.1	0.0	0.0
10	0.5	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.2
11	0.0	0.1	0.3	0.1	0.1	0.0	0.0	0.0	0.2	0.1	0.1	0.0
12	0.0	0.3	0.3	0.1	0.3	0.0	0.1	0.1	0.1	0.1	0.1	0.0
13	0.3	0.0	2.1	0.0	0.4	0.5	0.1	0.4	0.0	0.0	0.1	0.0
14	0.0	0.0	0.5	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.1	0.0
15	0.0	0.0	0.1	0.1	0.1	0.6	0.0	0.1	0.0	0.1	0.0	0.2
16	0.1	0.0	0.0	0.1	0.0	1.5	0.2	0.0	0.0	0.0	0.0	0.4
17	0.0	0.0	0.0	0.2	0.0	0.3	0.3	0.0	0.1	0.2	0.1	0.0
18	0.0	0.0	0.2	1.0	0.1	0.0	0.2	0.1	0.2	0.4	0.0	1.0
19	0.0	0.0	0.2	1.1	0.0	0.0	0.4	0.0	0.3	0.1	0.1	0.1
20	0.1	0.0	0.2	1.5	0.0	0.0	1.4	0.1	0.1	0.0	0.0	0.0
21	0.2	0.0	0.1	0.6	0.0	0.0	0.1	0.0	0.6	0.5	0.0	0.1
22	0.4	0.1	0.0	0.1	0.0	0.0	0.1	0.3	0.4	0.3	0.1	0.1
23	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
24	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
25	0.2	0.0	0.0	0.1	0.1	0.0	0.2	0.0	0.1	0.0	0.0	0.0
26	0.0	1.0	0.1	3.6	0.0	0.0	0.3	0.0	0.0	0.0	0.1	0.0
27	2.4	2.4	0.0	0.9	0.1	0.0	0.1	0.0	0.0	0.0	0.2	0.0
28	0.7	0.0	0.1	1.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
29	0.1	0.0	0.4	2.2	---	0.1	0.0	0.0	0.0	0.1	0.0	0.1
30	0.1	0.1	0.1	0.2	---	0.0	0.0	0.0	0.2	0.0	0.1	0.1
31	0.2	---	0.0	0.4	---	0.0	---	0.0	---	0.0	0.0	---
TOTAL	7.1	6.0	7.3	14.4	3.0	7.5	3.7	7.2	3.0	3.3	3.0	2.8

CAL YR 2001 TOTAL 64.57
WTR YR 2002 TOTAL 68.3

HAWAII, ISLAND OF OAHU

213016158105901. State Key Number 842.1 Makaha rain gage near Makaha, Oahu.

LOCATION.--Lat 21°30'16", long 158°10'59", Hydrologic Unit 20060000, in USGS stream-gaging station 16211600, on right bank, 1.5 mi northeast of Kaneaki Heiau, and 3.4 mi northeast of Makaha.

PERIOD OF RECORD.--Continuous-record station, July 1959 to current year. Prior to October 1992, unpublished records in files of the U.S. Geological Survey.

GAGE.--Standard 8-in. National Weather Service collector and 7 5/16-in., 4-ft tall rain can with a float-type system attached to an electronic data logger. Readings are taken at 15-minute intervals. Elevation of gage is 957 ft above mean sea level (from topographic map).

REMARKS.--Records good, except for period of estimated record, which are poor. Rainfall recorded in tenths of an inch.

PRECIPITATION, TOTAL, INCHES, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
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	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	---	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.7
3	---	---	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.9
4	---	---	0.0	0.0	1.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	---	---	0.1	0.1	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0
6	---	---	0.1	0.2	0.0	0.3	0.0	1.4	0.0	0.1	0.1	0.0
7	---	---	0.0	0.0	0.0	1.7	0.0	0.1	0.0	0.0	0.1	0.0
8	---	---	0.1	0.0	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9	---	---	0.0	0.1	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0
10	---	---	0.0	0.0	0.0	0.2	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	0.0	0.0	0.1	0.0
12	---	---	0.1	0.0	0.1	0.1	0.0	0.3	0.0	0.0	0.0	0.0
13	---	---	1.0	0.0	0.0	0.1	0.0	0.2	0.0	0.0	0.0	0.0
14	---	---	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15	---	---	0.1	0.1	0.0	3.7	0.0	0.0	0.0	0.0	0.0	0.0
16	---	---	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0
17	---	---	0.0	0.1	0.0	2.6	0.0	0.0	0.0	0.0	0.0	0.0
18	---	---	0.0	0.2	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0
19	---	---	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.1
20	---	---	0.0	0.3	0.0	0.0	0.9	0.0	0.0	0.0	0.0	0.0
21	---	---	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.3	0.0	0.0
22	---	---	0.0	0.2	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
23	---	---	1.1	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0
25	---	---	0.2	0.0	0.1	0.0	0.4	0.0	0.0	0.0	0.0	0.0
26	---	---	0.3	0.4	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
27	---	---	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
28	---	---	0.1	0.4	0.0	0.0	0.0	0.0	0.0	0.5	0.1	0.0
29	---	0.0	1.0	1.6	---	0.5	0.0	0.0	0.0	0.0	0.0	0.0
30	0.0	0.0	0.2	0.8	---	0.0	0.0	0.0	0.0	0.0	0.1	0.0
31	0.0	---	0.0	0.0	---	0.0	---	0.0	---	0.0	0.0	---
TOTAL	---	---	4.5	5.0	3.3	10.6	1.6	2.4	0.2	1.1	0.5	1.8

CAL YR 2001 TOTAL 27.9 (estimated)
WTR YR 2002 TOTAL 37.6 (estimated)

Estimated rainfall from Oct. 1 (0015 hrs) to Oct. 29 (0945 hrs) was 2.4 inches.
Partial daily record on Oct. 29 from 1000 hrs to 2400 hrs was 0.1 inches.
Accumulated total from Nov. 3 (1945 hrs) to Nov. 28 (1030 hrs) was 4.1 inches.
Partial daily record on Nov. 3 from 0015 hrs to 1930 hrs is 0 inches.
Partial daily record on Nov. 28 from 1045 hrs to 2400 hrs is 0 inches.

HAWAII, ISLAND OF OAHU

213211157562400. State Key Number 882.4 Poamoho rain gage 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 Wahiawa.

PERIOD OF RECORD.--Continuous-record station, June 8, 1967 to current year. Prior to October 1992, unpublished records are in the files of the U.S. Geological Survey.

GAGE.--Standard 8-in. National Weather Service collector on a 10-in. storage can with a float-type system attached to an electronic data logger. Elevation of gage is 1,960 ft above mean sea level (from topographic map).

REMARKS.--Records good. Rainfall recorded in 0.188-inch increments.

PRECIPITATION, TOTAL, INCHES, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY SUM VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.50	0.37	0.56	0.00	0.38	0.00	0.00	0.19	0.00	0.75	0.00	0.00
2	0.00	0.38	0.00	0.00	0.19	0.19	0.00	0.19	0.00	0.19	0.19	0.19
3	0.00	0.75	0.56	0.00	0.00	0.00	0.00	0.56	0.19	0.19	0.19	0.56
4	1.31	0.56	0.56	0.00	3.19	0.19	0.00	1.88	0.19	0.00	0.38	0.19
5	3.56	0.19	0.75	0.00	0.00	2.06	0.00	2.44	0.00	0.19	0.75	0.00
6	0.19	1.12	1.50	0.00	0.00	8.81	0.00	18.38	0.38	0.00	0.38	0.38
7	0.56	1.88	0.19	0.00	0.00	3.38	0.00	3.38	0.00	0.38	1.12	0.19
8	0.00	0.56	0.75	0.00	0.94	0.00	0.00	1.31	0.19	0.75	0.19	0.19
9	0.00	0.00	0.00	0.19	0.00	2.81	0.00	0.19	0.00	0.19	0.38	0.37
10	0.94	0.38	0.19	0.00	0.19	0.19	0.00	0.56	1.31	0.37	0.19	0.38
11	0.56	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.38	0.19	2.06	0.19
12	0.38	0.38	0.19	0.00	0.56	0.00	0.00	0.00	0.19	0.00	1.50	0.19
13	0.75	0.19	2.06	0.00	0.56	1.12	0.00	0.56	0.00	0.00	0.00	0.56
14	0.00	0.00	2.63	0.19	0.19	0.00	0.00	0.00	0.19	0.19	0.00	0.56
15	0.37	0.00	0.37	0.00	0.37	0.94	0.00	0.00	0.00	0.19	0.00	0.19
16	0.94	0.00	0.19	0.00	0.00	1.12	0.00	0.00	0.19	0.00	0.00	0.38
17	0.00	0.00	0.00	0.19	0.00	2.81	0.38	0.00	0.75	0.38	0.00	0.00
18	0.19	0.00	0.19	0.56	0.00	0.00	0.75	1.12	0.56	0.19	0.19	1.31
19	0.00	0.00	0.56	0.38	0.00	0.00	0.19	0.94	0.94	1.12	0.19	0.38
20	0.19	0.00	0.94	0.94	0.00	0.00	2.25	1.69	0.19	0.00	0.00	0.00
21	0.00	0.00	0.19	1.88	0.00	0.00	0.19	0.00	0.56	0.56	0.00	0.00
22	0.37	0.00	0.00	0.19	0.00	0.00	0.38	0.00	0.56	0.00	0.19	0.00
23	0.00	0.00	1.12	0.00	0.00	0.00	0.00	0.00	0.38	0.00	0.19	0.00
24	0.19	0.00	0.94	0.00	0.00	0.00	0.56	0.00	0.19	0.38	0.19	0.00
25	0.37	0.00	0.00	0.19	0.75	0.00	1.69	0.00	0.00	0.00	0.38	0.00
26	0.75	0.56	0.19	3.94	0.00	0.19	1.13	0.00	0.00	0.19	0.38	0.00
27	2.44	3.00	0.00	4.50	0.00	0.00	1.12	0.00	0.00	0.19	0.19	0.00
28	1.69	0.19	0.00	10.69	0.00	0.00	0.56	0.00	0.00	0.38	0.56	0.00
29	0.19	0.19	0.19	4.12	---	0.19	0.94	0.00	0.00	0.56	0.19	0.00
30	0.19	0.00	0.00	3.38	---	0.00	0.00	0.00	0.56	0.19	2.44	0.56
31	0.94	---	0.19	2.81	---	0.00	---	0.00	---	0.00	0.19	---
TOTAL	18.57	10.70	15.01	34.15	7.32	24.00	10.14	33.39	7.90	7.72	12.61	6.77

CAL YR 2001 TOTAL 163.91
WTR YR 2002 TOTAL 188.28

HAWAII, ISLAND OF OAHU

213215157552800. State Key Number 883.12 Poamoho rain gage 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.--Continuous-record station, June 1967 to current year. Prior to October 1992, unpublished records are in the files of the U.S. Geological Survey.

GAGE.--Standard 8-in. National Weather Service collector on a 10-in. storage can with a float-type system attached to an electronic data logger. Elevation is 2,480 ft above mean sea level (from topographic map).

REMARKS.--Records poor. Rainfall recorded in 0.188-inch increments.

PRECIPITATION, TOTAL, INCHES, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY SUM VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.69	---	---	---	---	---	---	---	---	---	---	---
2	0.00	---	---	---	---	---	---	---	---	---	---	---
3	0.19	---	---	---	---	---	---	---	---	---	---	---
4	1.50	---	---	---	---	---	---	---	---	---	---	---
5	3.19	---	---	---	---	---	---	---	---	---	---	---
6	0.00	---	---	---	---	---	---	---	---	---	---	---
7	0.19	---	---	---	---	---	---	---	---	---	---	---
8	0.00	---	---	---	---	---	---	---	---	---	---	---
9	0.00	---	---	---	---	---	---	---	---	---	---	---
10	0.94	---	---	---	---	---	---	---	---	---	---	---
11	---	---	---	---	---	---	---	---	---	---	---	---
12	---	---	---	---	---	---	---	---	---	---	---	---
13	---	---	---	---	---	---	---	---	---	---	---	---
14	---	---	---	---	---	---	---	---	---	---	---	---
15	---	---	---	---	---	---	---	---	---	---	---	---
16	---	---	---	---	---	---	---	---	---	---	---	---
17	---	---	---	---	---	---	---	---	---	---	---	---
18	---	---	---	---	---	---	---	---	---	---	---	---
19	---	---	---	---	---	---	---	---	---	---	---	---
20	---	---	---	---	---	---	---	---	---	---	---	---
21	---	---	---	---	---	---	---	---	---	---	---	---
22	---	---	---	---	---	---	---	---	---	---	---	---
23	---	---	---	---	---	---	---	---	---	---	---	---
24	---	---	---	---	---	---	---	---	---	---	---	---
25	---	---	---	---	---	---	---	---	---	---	---	---
26	---	---	---	---	---	---	---	---	---	---	---	---
27	---	---	---	---	---	---	---	---	---	---	---	---
28	---	---	---	---	---	---	---	---	---	---	---	---
29	---	---	---	---	---	---	---	---	---	---	---	---
30	---	---	---	---	---	---	---	---	---	---	---	---
31	---	---	---	---	---	---	---	---	---	---	---	---
TOTAL	---	---	---	---	---	---	---	---	---	---	---	---

CAL YR 2001 TOTAL 153.45 (estimated)
WTR YR 2002 TOTAL 197.21 (estimated)

Accumulated total from Oct. 11 (1200 hrs) to Dec. 17 (1230 hrs) was 25.52 inches.
Accumulated total from Dec. 17 (1245 hrs) to Mar. 4 (1115 hrs) was 46.94 inches.
Accumulated total from Mar. 4 (1130 hrs) to May 21 (1215 hrs) was 80.05 inches.
Accumulated total from May 21 (1315 hrs) to Oct. 15 (1230 hrs) was 44.61 inches.

HAWAII, ISLAND OF OAHU

213237157530701. State Key Number 886.4 Kahana rain gage at altitude 95 ft near Kahana, Oahu.

LOCATION.--Lat 21°32'37", long 157°53'07", Hydrologic Unit 20060000, on right bank, 600 ft upstream from Kawa Stream, about 40 ft bankward from USGS stream-gaging station 16296500, 1.1 mi southwest of Kahana, and 2.2 mi southwest of Swanzy Beach Park in Kaaawa.

PERIOD OF RECORD.--Accumulated-rainfall station, December 1958 to May 1961, February 1990 to June 1994. Continuous-record station, May 1961 to February 1990, June 1994 to current year. Prior to October 1992, unpublished records in files of the U.S. Geological Survey.

GAGE.--An electronic data logger with a float system using an 8-in. receiver and 7 5/16-in. diameter rain can, 4-ft tall. Readings are taken at 15-minute intervals. Elevation of gage is 95 ft above mean sea level (from topographic map).

REMARKS.--Records good, except for days of no daily rainfall, which are poor. Rainfall recorded in tenths of an inch.

PRECIPITATION, TOTAL, INCHES, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY SUM VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.6	0.1	0.3	0.0	0.4	0.0	0.0	---	---	---	0.0	0.0
2	0.0	0.1	0.1	0.0	0.0	0.3	0.0	---	---	---	0.0	0.1
3	0.1	0.2	0.0	0.0	0.2	0.0	0.0	---	---	---	0.1	0.8
4	0.4	0.1	0.2	0.0	1.4	1.6	0.5	---	---	---	0.0	0.0
5	1.7	0.0	0.1	0.0	0.1	0.6	0.0	---	---	---	0.5	0.0
6	0.0	0.7	0.1	0.0	0.1	1.3	0.0	---	---	---	0.1	0.3
7	0.1	1.1	0.0	0.0	0.0	2.5	0.0	---	---	---	0.3	0.0
8	0.1	0.1	0.4	0.0	2.6	0.0	0.0	---	---	---	0.1	0.1
9	0.0	0.0	0.0	0.3	0.0	1.1	0.0	---	---	---	0.1	0.0
10	0.2	0.1	0.0	0.1	0.0	0.1	0.0	---	---	---	0.0	0.1
11	0.3	0.0	0.1	0.0	0.0	0.0	0.0	---	---	---	0.5	0.0
12	0.1	0.2	0.1	0.0	0.3	0.2	0.0	---	---	---	0.0	0.0
13	0.4	0.0	1.0	0.1	0.2	0.9	0.0	---	---	---	1.1	0.4
14	0.0	0.2	0.8	0.5	0.0	0.0	0.2	---	---	0.0	0.2	0.2
15	0.2	0.0	0.3	0.0	0.4	0.5	0.0	---	---	0.0	0.0	0.0
16	0.1	0.0	0.1	0.0	0.0	2.1	0.0	---	---	0.0	0.0	0.1
17	0.0	0.0	0.2	0.0	0.0	0.1	0.1	---	---	0.0	0.0	0.0
18	0.0	0.0	0.0	0.4	0.0	0.1	0.4	---	---	0.1	0.0	0.3
19	0.0	0.0	0.2	0.1	0.0	0.0	0.1	---	---	0.7	0.1	0.7
20	0.1	0.0	0.5	0.7	0.0	0.0	1.2	---	---	0.0	0.0	0.0
21	0.0	0.0	0.0	0.1	0.0	0.0	0.0	---	---	0.4	0.0	0.0
22	0.0	0.0	0.0	0.3	0.1	0.0	0.1	---	---	0.0	0.0	0.0
23	0.1	0.0	0.8	0.0	0.0	0.0	0.0	---	---	0.0	0.1	0.0
24	0.0	0.0	1.5	0.0	0.0	0.0	0.2	---	---	0.1	0.1	0.0
25	0.2	0.0	0.0	0.2	0.4	0.2	0.2	---	---	0.0	0.3	0.0
26	0.5	0.4	0.0	1.5	0.0	0.0	---	---	---	0.3	0.1	0.0
27	0.8	3.9	0.0	1.8	0.0	0.3	---	---	---	0.0	0.2	0.0
28	0.3	0.0	0.0	2.9	0.0	0.1	---	---	---	0.3	0.2	0.0
29	0.1	0.0	0.2	3.9	---	0.2	---	---	---	0.7	0.0	0.2
30	0.1	0.1	0.0	2.9	---	0.0	---	---	---	0.9	1.3	0.0
31	0.6	---	0.0	1.4	---	0.0	---	---	---	0.1	0.3	---
TOTAL	7.1	7.3	7.0	17.2	6.2	12.2	---	---	---	---	5.7	3.3

CAL YR 2001 TOTAL 76.6
WTR YR 2002 TOTAL 103.7

Accumulated rainfall from Apr. 26 (1345 hrs) to July 13 (1115 hrs) was 31.1 inches.

HAWAII, ISLAND OF OAHU

213000157515401. State Key Number 886.6 Waikane rain gage at altitude 75 ft at Waikane, Oahu.

LOCATION.--Lat 21°30'00", long 157°51'54", Hydrologic Unit 20060000, in USGS stream-gaging 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.--Continuous-record station, February 1960 to October 1985, May 1994 to current year. Accumulated-rainfall station, October 1985 to May 1994. Prior to October 1992, unpublished records are in the files of the U.S. Geological Survey.

GAGE.--Standard 8-in. National Weather Service collector and 7 5/16-in., 4-ft tall rain can with a float-type system attached to an electronic data logger. Readings are taken at 15-minute intervals. Elevation of gage is 75 ft above mean sea level (from topographic map).

REMARKS.--Records good except periods of missing record, which are poor. Daily record read in nearest tenths of an inch.

PRECIPITATION, TOTAL, INCHES, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY SUM VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.7	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.2	---	0.0
2	0.0	0.1	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	---	0.0
3	0.1	0.1	0.0	0.0	0.1	0.0	0.0	0.2	0.0	0.0	---	0.1
4	0.1	0.1	0.0	0.0	1.3	0.2	0.3	0.9	0.0	0.0	---	0.0
5	0.7	0.1	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	---	0.0
6	0.0	0.2	0.0	0.0	0.0	0.3	0.0	9.8	0.0	0.0	---	0.1
7	0.0	0.9	0.0	0.0	0.0	3.5	0.0	0.2	0.0	0.0	---	0.0
8	0.1	0.1	0.0	0.0	2.2	0.0	0.0	0.2	0.0	0.0	---	0.0
9	0.1	0.0	0.0	0.3	0.0	1.2	0.0	0.1	0.0	0.0	---	0.0
10	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	---	0.0
11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	---	0.0
12	0.1	0.0	0.0	0.0	0.1	0.3	0.0	0.7	0.0	0.0	---	0.1
13	0.1	0.0	0.1	0.0	0.1	0.6	0.0	0.5	0.0	0.0	---	0.0
14	0.0	0.0	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.1	---	0.1
15	0.0	0.0	0.1	0.0	0.2	0.1	0.0	0.0	0.0	0.0	---	0.0
16	0.0	0.0	0.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0	---	0.0
17	0.0	0.0	0.0	0.0	0.0	0.9	0.1	0.0	0.1	0.0	---	0.0
18	0.0	0.0	0.0	0.1	0.0	0.0	0.2	0.0	0.1	0.0	---	0.0
19	0.0	0.0	0.0	0.1	0.0	0.0	0.5	0.1	0.2	0.2	---	0.4
20	0.0	0.0	0.1	0.2	0.0	0.0	1.8	0.0	0.0	0.0	---	0.0
21	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.1	0.3	---	0.0
22	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.0	---	0.0
23	0.1	0.0	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	---	0.0
24	0.1	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0
25	0.2	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	---	0.1	0.0
26	0.5	0.8	0.0	1.2	0.0	0.0	0.3	0.0	0.0	---	0.0	0.1
27	1.2	3.7	0.0	0.6	0.0	0.0	0.0	0.0	0.0	---	0.0	0.0
28	0.3	0.0	0.0	2.4	0.0	0.0	0.0	0.0	0.0	---	0.3	0.0
29	0.0	0.1	0.3	2.6	---	0.2	0.3	0.0	0.0	---	0.0	0.0
30	0.2	0.0	0.1	0.7	---	0.0	0.0	0.0	0.0	---	0.7	0.0
31	0.1	---	0.0	0.2	---	0.0	---	0.0	---	---	0.0	---
TOTAL	4.8	6.2	3.5	9.0	4.1	10.8	3.6	13.4	0.7	---	---	0.9

WTR YR 2002 TOTAL 63.5

Partial daily record on July 25 from 0015 hrs to 0445 hrs was 0 inches.
Total accumulated rainfall from July 25 (0500 hrs) to Aug. 23 (1945 hrs) was 4.3 inches.
Partial daily record on Aug. 23 from 2000 hrs to 2400 hrs was 0 inches.

HAWAII, ISLAND OF OAHU

213725158010401. State Key Number 897.1 Kamananui rain gage at Pupukea Military Road near Maunawai, Oahu.

LOCATION.--Lat 21°37'25", long 158°01'04", Hydrologic Unit 20060000, on left bank, at USGS stream-gaging station 16325000, 75.0 ft upstream from Pupukea Military Road, and 3.5 mi southeast of Maunawai.

PERIOD OF RECORD.--Continuous-record station, July 1, 1963 to current year. Prior to October 1992, unpublished records are in the files of the Geological Survey.

GAGE.--Standard 8-in. National Weather Service collector and 8-in. rain can attached to a Sutron tipping-bucket counter. An electronic data logger was installed on March 26, 1996 to record rainfall at 15-minute intervals. Elevation of gage is 590 ft above mean sea level (from topographic map).

REMARKS.--Records fair, except for peroids of missing daily values, which are poor. Rainfall recorded in hundrenths of an inch after Feb. 11, 2001, and nearest tenths of an inch previous to that.

PRECIPITATION, TOTAL, INCHES, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY SUM VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	---	---	---	---	0.01	0.00	0.01	0.00	0.17	0.01	0.12
2	---	---	---	---	---	0.37	0.00	0.02	0.00	0.06	0.01	0.12
3	---	---	---	---	---	0.00	0.00	0.26	0.00	0.00	0.08	0.05
4	---	---	---	---	---	0.09	0.02	0.50	0.16	0.00	0.14	0.00
5	---	---	---	---	---	0.41	0.01	0.31	0.01	0.00	0.02	0.00
6	---	---	---	---	---	1.44	0.00	7.82	0.17	0.00	0.53	0.31
7	---	---	---	---	---	0.44	0.00	0.85	0.03	0.22	0.51	0.00
8	---	---	---	---	---	0.00	0.00	0.22	0.00	0.31	0.06	0.00
9	---	---	---	---	---	0.37	0.00	0.10	0.00	0.06	0.10	0.18
10	---	---	---	---	---	0.01	0.00	0.07	0.17	0.05	0.03	0.02
11	---	---	---	---	---	0.00	0.00	0.02	0.15	0.02	0.21	0.18
12	---	---	---	---	0.76	0.00	0.00	0.15	0.02	0.00	0.01	0.01
13	---	---	---	---	0.66	0.47	0.00	0.08	0.01	0.00	0.00	0.26
14	---	---	---	---	0.00	0.01	0.00	0.04	0.01	0.06	0.07	0.20
15	---	---	---	---	0.26	0.02	0.00	0.00	0.02	0.05	0.00	0.10
16	---	---	---	---	0.00	0.63	0.07	0.00	0.09	0.06	0.00	0.08
17	---	---	---	---	0.00	0.84	0.31	0.01	0.01	0.10	0.00	0.02
18	---	---	---	---	0.00	0.00	0.02	0.43	0.10	0.14	0.02	0.01
19	---	---	---	---	0.00	0.00	0.12	0.02	0.42	0.29	0.06	0.03
20	---	---	---	---	0.00	0.00	0.26	0.02	0.06	0.00	0.00	0.01
21	---	---	---	---	0.00	0.00	0.02	0.00	0.54	0.10	0.00	0.00
22	---	---	---	---	0.00	0.00	0.14	0.00	0.24	0.05	0.00	0.00
23	---	---	---	---	0.00	0.00	0.00	0.00	0.07	0.00	0.09	0.00
24	---	---	---	---	0.00	0.00	0.14	0.00	0.06	0.06	0.29	0.00
25	---	---	---	---	0.18	0.06	0.12	0.00	0.00	0.00	0.00	0.00
26	---	---	---	---	0.00	0.01	0.44	0.00	0.00	0.01	0.02	0.00
27	---	---	---	---	0.00	0.00	0.17	0.06	0.00	0.00	0.23	0.00
28	---	---	---	---	0.00	0.00	0.01	0.00	0.00	0.11	0.29	0.00
29	---	---	---	---	---	0.66	1.87	0.00	0.00	0.01	0.00	0.06
30	---	---	---	---	---	0.20	0.00	0.00	0.56	0.01	0.68	0.09
31	---	---	---	---	---	0.00	---	0.00	---	0.00	0.01	---
TOTAL	---	---	---	---	---	6.04	3.72	10.99	2.90	1.94	3.47	1.85

CAL YR 2001 TOTAL 65.40 (estimated)
WTR YR 2002 TOTAL 76.87 (estimated)

Estimated accumulated total from Oct. 1-12 is 3.2 inches.
Accumulated total from Oct. 12 to Dec. 18 (0940 hrs) is 19.0 inches.
Accumulated total from Dec. 18 (0945 hrs) to Feb. 11 (1207 hrs) is 21.9 inches.
Partial daily total for Feb. 11 from 1338 hrs to 2400 hrs is 0 inches.

213626158044601. Local number and name, 3-3604-01 Kawailoa Deep Monitoring Well, Oahu.

LOCATION.--Lat 21°36'26", long 158°04'46", Hydrologic Unit 20060000, 12.6 miles northwest of Weed Circle and 1.0 miles north of Anahulu Gulch. Owner: Bishop Estate.

AQUIFER.--Koolau, Basalt, Pleistocene to Pliocene age

WELL CHARACTERISTICS.--Drilled well, depth 701 ft., surface casing diameter 8 5/8-in., cased to 69 ft., inner casing 4 ½-in., cased to 701 ft., bottom 400 ft. screened.

DATUM.--Elevation of land-surface datum is 308 ft. Measuring point is located on the top of the casing, 309.01 ft.above mean sea level.

REMARKS.-Prior to September 2000, unpublished records in files of the U.S. Geological Survey.

PERIOD OF RECORD.-- Water level: occasional measurements, January 1994 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 4.50 ft. above mean sea level, June 29, 1994; lowest 3.81 ft. above mean sea level, April 10, 1995.

WATER LEVEL, IN FEET RELATIVE TO MEAN SEA LEVEL, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 29	4.15	FEB 28	4.02	AUG 20	3.99

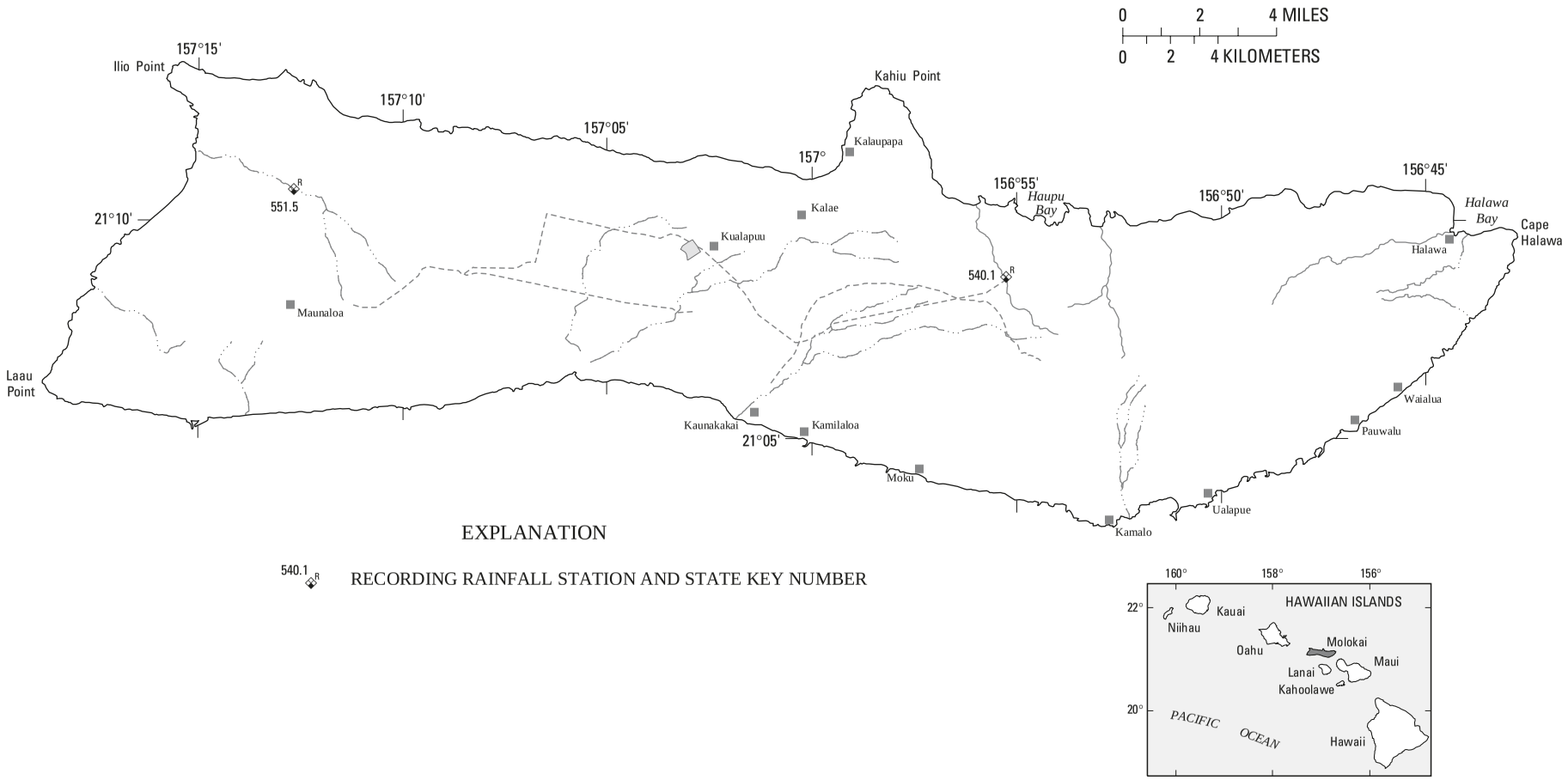


Figure 23. Locations of rainfall stations on Molokai.

HAWAII, ISLAND OF MOLOKAI

210843156551801. State Key Number 540.1 Waikolu rain gage at altitude 900 ft, near Kalaupapa, Molokai.

LOCATION.--Lat 21°08'43", long 156°55'18", Hydrologic Unit 20050000, on right bank near USGS stream-gaging station 16405500, 1.8 mi southwest of Haupu Bay, 2.3 mi upstream from mouth, and 5.2 mi southeast of Kalaupapa.

PERIOD OF RECORD.--1957 to current year. Prior to October 1992, unpublished records are in the files of the U.S. Geological Survey and at the National Weather Service.

GAGE.--Data logger with a .01-in. tipping bucket attachment and National Weather Service accumulation can as a backup. Elevation of gage is 900 ft (from topographic map).

REMARKS.--Records fair. Rainfall recorded in hundredths of an inch.

PRECIPITATION, TOTAL, INCHES, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY SUM VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.35	---	0.12	0.00	0.01	0.20	0.00	0.00	0.00	0.11	0.01	0.01
2	0.01	---	0.00	0.38	0.00	1.73	0.00	0.00	0.01	0.13	0.04	0.02
3	0.00	---	0.03	0.04	0.00	0.37	0.00	0.01	0.00	0.14	0.00	0.01
4	0.08	0.35	0.02	0.00	0.21	0.46	0.00	0.02	0.00	0.00	0.00	0.01
5	0.20	0.26	0.18	0.38	0.00	0.19	0.00	0.72	0.01	0.00	0.00	0.02
6	0.12	0.22	0.05	0.28	0.00	0.62	0.07	0.75	0.08	0.20	0.22	0.01
7	0.83	2.34	0.15	0.02	0.00	0.00	1.18	0.01	0.04	0.82	0.35	0.02
8	0.02	1.99	0.80	0.07	4.78	0.00	0.00	0.03	0.00	0.61	0.02	0.01
9	0.12	0.40	0.19	0.90	0.09	0.00	0.00	0.02	0.00	0.65	0.00	0.01
10	0.17	0.18	0.12	0.57	0.00	0.18	0.00	0.00	0.21	0.27	0.00	0.02
11	0.01	0.14	0.21	0.00	0.02	0.03	0.00	0.01	0.09	0.01	0.26	0.01
12	---	0.00	1.28	0.00	3.38	0.00	0.00	0.10	0.04	0.00	0.00	0.01
13	---	0.04	2.24	0.00	2.00	0.01	0.00	2.17	0.00	0.01	0.00	0.01
14	---	0.00	0.08	0.00	0.53	0.13	0.00	0.00	0.43	0.00	0.07	0.01
15	---	0.00	0.01	0.00	0.01	0.14	0.00	0.00	0.13	0.05	0.00	0.01
16	---	0.00	0.06	0.04	0.00	0.39	0.01	0.00	0.07	0.01	0.00	0.00
17	---	0.00	0.80	0.80	0.00	12.75	0.28	0.03	0.16	0.31	0.00	0.00
18	---	0.00	0.28	0.93	0.00	1.25	---	0.30	0.14	0.08	0.39	0.01
19	---	0.00	0.20	0.67	0.00	0.00	---	0.03	0.06	0.26	---	0.00
20	---	0.00	0.28	2.33	0.03	0.00	---	0.02	0.13	0.00	---	0.00
21	---	0.00	0.01	0.21	0.00	0.00	0.03	0.00	0.17	1.99	---	0.00
22	---	0.00	0.00	0.00	0.00	0.00	0.19	0.00	0.11	0.05	---	0.00
23	---	0.00	1.76	0.00	0.12	0.00	0.00	0.00	0.00	0.18	---	0.00
24	---	0.00	0.07	0.00	1.46	0.00	0.03	0.00	0.01	0.21	---	0.00
25	---	0.00	0.00	0.07	2.42	0.07	0.00	0.00	0.00	0.19	---	0.00
26	---	2.39	0.54	3.68	1.29	0.00	0.00	0.00	0.05	0.64	0.03	0.01
27	---	5.53	0.00	0.06	0.00	0.00	0.04	0.00	0.33	0.01	0.01	0.00
28	---	0.01	0.06	0.49	0.01	0.00	0.08	0.00	0.00	0.46	0.01	0.00
29	---	0.00	1.66	4.25	---	0.32	0.53	0.00	0.00	0.01	0.00	0.00
30	---	0.00	0.50	0.01	---	1.00	0.00	0.00	0.40	0.00	0.01	0.00
31	---	---	0.22	0.32	---	0.03	---	0.00	---	0.03	0.01	---
TOTAL	---	---	11.92	16.50	16.36	19.87	---	4.22	2.67	7.43	---	0.21

CAL YR 2001 TOTAL 89.30
WTR YR 2002 TOTAL 110.91

Total accumulated rainfall for Oct. 12 (0000) to Nov. 3 (2345) is 8.60 inches.
Total accumulated rainfall for Apr. 18 (0000) to Apr. 20 (2345) is 0.07 inches.
Total accumulated rainfall for Aug. 19 (0000) to Aug. 25 (2345) is 0.71 inches.

HAWAII, ISLAND OF MOLOKAI

211039157123101. State Key Number 551.5 Kakaako rain gage near Mauna Loa, Molokai.

LOCATION.--Lat 21°10'39", long 157°12'31", Hydrologic Unit 20050000, at discontinued USGS stream-gaging station 16411400 on left bank, 1.0 mi downstream of Kamakahi Gulch, and 3.0 mi north of Mauna Loa school.

PERIOD OF RECORD.--1964 to current year. Prior to October 1992, unpublished records are in the files of the U.S. Geological Survey and at the National Weather Service.

GAGE.--Data logger with a .01-in. tipping bucket attachment and an 8-in. National Weather Service rain gage used as a backup accumulation can. Elevation of gage is 380 ft (from topographic map).

REMARKS.--Records fair. Rainfall recorded in hundredths of an inch.

PRECIPITATION, TOTAL, INCHES, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY SUM VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.20	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.01	0.03	0.00	0.14
2	0.00	0.00	0.00	0.13	0.00	0.07	0.00	0.00	0.00	0.03	0.00	0.00
3	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.05	0.00	0.07
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00
5	0.01	0.25	0.00	0.09	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.10	0.00	0.00	0.03	0.00	0.00	0.04	0.01	0.00	0.01	0.00	0.00
7	0.18	0.05	0.16	0.00	0.00	0.00	0.67	0.28	0.00	0.00	0.00	0.00
8	0.00	0.03	0.01	0.00	1.61	0.00	0.00	0.00	0.00	0.03	0.00	0.00
9	0.11	0.00	0.00	0.22	0.00	0.00	0.00	0.00	0.01	0.21	0.00	0.00
10	0.03	0.01	0.00	0.05	0.00	0.17	0.00	0.00	0.01	0.06	0.00	0.00
11	0.00	0.03	0.01	0.00	0.00	0.31	0.00	0.00	0.00	0.00	0.08	0.00
12	0.00	0.00	0.20	0.00	0.37	0.00	0.00	0.47	0.00	0.00	0.00	0.00
13	0.00	0.00	0.69	0.00	0.53	0.00	0.00	1.46	0.00	0.00	0.00	0.00
14	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.06	0.00
15	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01
17	0.00	0.00	0.08	0.12	0.00	0.36	0.00	0.01	0.00	0.05	0.00	0.00
18	0.00	0.00	0.04	0.16	0.00	0.00	0.00	0.01	0.00	0.03	0.00	0.00
19	0.01	0.00	0.01	0.25	0.00	0.00	0.18	0.00	0.00	0.01	0.00	0.00
20	0.00	0.00	0.00	0.34	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00
21	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.03	0.21	0.00	0.00
22	0.00	0.00	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
23	0.00	0.00	0.61	0.02	0.00	0.00	0.00	0.00	0.00	0.04	0.06	0.00
24	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00
25	0.00	0.00	0.01	0.09	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.00
26	0.00	0.44	0.12	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
27	0.09	4.02	0.01	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28	0.23	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00
29	0.00	0.00	0.28	4.42	---	0.35	0.32	0.00	0.00	0.01	0.00	0.05
30	0.00	0.00	0.01	0.00	---	0.22	0.00	0.00	0.05	0.03	0.02	0.00
31	0.00	---	0.15	0.01	---	0.00	---	0.00	---	0.00	0.00	---
TOTAL	0.96	4.87	2.51	6.20	2.54	1.49	1.21	2.34	0.11	0.88	0.22	0.28

CAL YR 2001 TOTAL 16.64
WTR YR 2002 TOTAL 23.61

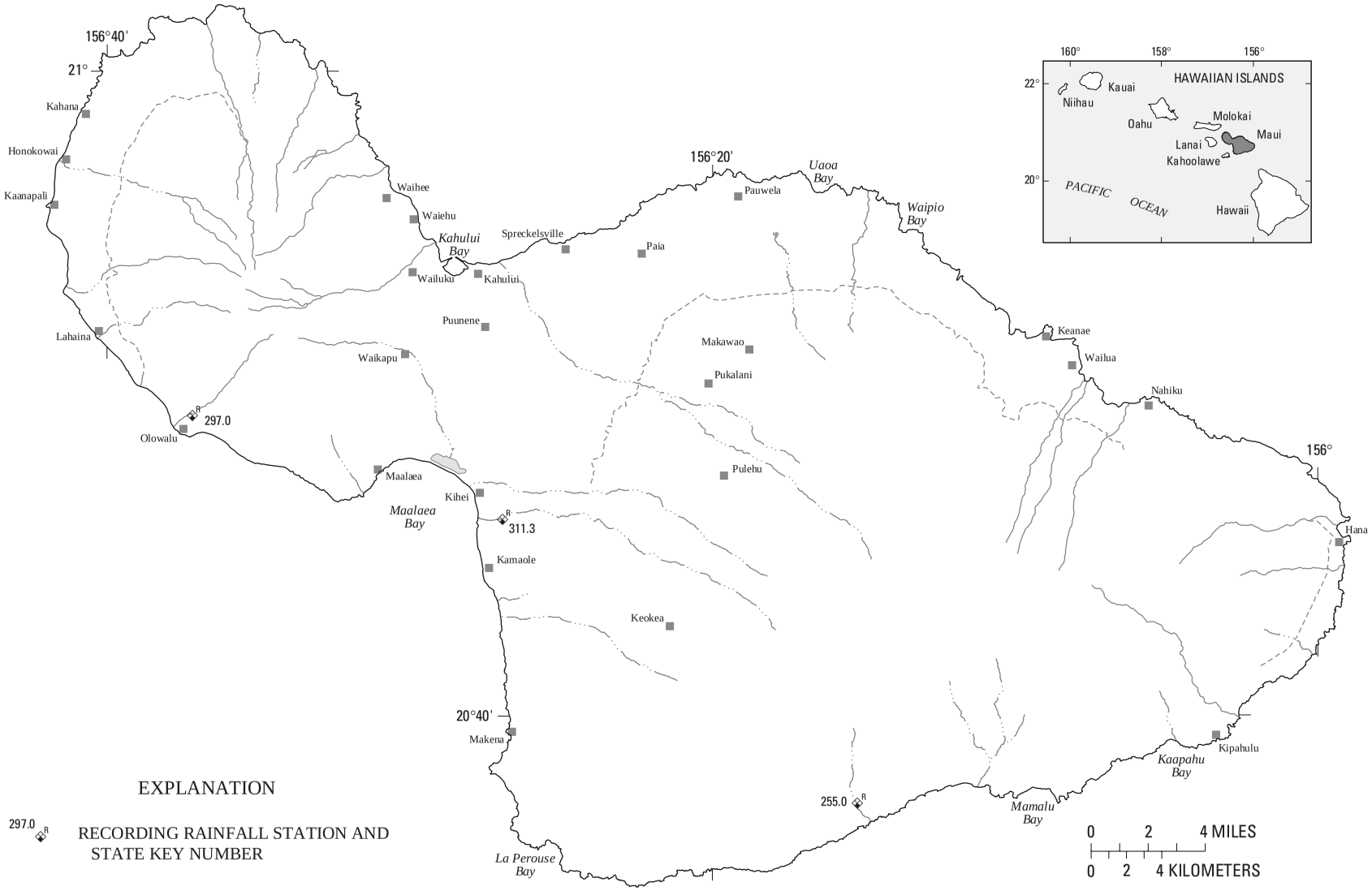


Figure 24. Locations of rainfall stations on Maui.

HAWAII, ISLAND OF MAUI

203721156151601. State Key Number 255.0 Kepuni Gulch rain gage near Kaupo, Maui.

LOCATION.--Lat 20°37'21", long 156°15'16", Hydrologic Unit 20020000, near USGS stream-gaging station 16500100 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.

PERIOD OF RECORD.--1964 to current year. Prior to October 1992, unpublished records are in the files of the U.S. Geological Survey and at the National Weather Service.

GAGE.--Data logger with a .01-in. tipping bucket attachment. The National Weather Service rain gage was converted to a backup accumulation can. Elevation of gage is 740 ft (from topographic map).

REMARKS.--Records good. Rainfall recorded in hundredths of an inch.

PRECIPITATION, TOTAL, INCHES, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY SUM VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	1.21	0.00	0.00	0.91	0.00	0.00	0.00	0.00
4	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.65	0.00	0.00	0.00	0.00
5	0.06	0.00	0.00	0.00	0.00	0.00	0.02	1.61	0.00	0.00	0.00	0.00
6	0.00	0.00	0.01	0.00	0.00	0.01	0.03	0.53	0.00	0.00	0.00	0.00
7	0.01	0.41	0.00	0.00	0.00	0.00	0.48	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.11	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.00	0.00
11	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00
12	0.00	0.00	0.50	0.00	0.00	0.12	0.00	0.00	0.00	0.00	0.00	0.00
13	0.00	0.00	1.04	0.00	0.00	0.94	0.75	1.61	0.00	0.00	0.24	0.00
14	0.00	0.00	0.08	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	0.00	0.01	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00
16	0.02	0.00	0.00	0.00	0.00	0.12	0.00	0.00	0.00	0.00	0.00	0.00
17	0.00	0.00	0.00	0.00	0.00	0.29	0.01	0.01	0.03	0.00	0.00	0.00
18	0.00	0.00	0.00	0.00	0.00	0.00	0.24	0.00	0.00	0.00	0.00	0.00
19	0.00	0.00	0.00	0.02	0.03	0.00	0.22	0.00	0.00	0.00	0.00	0.04
20	0.00	0.00	0.00	0.00	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00
21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24	1.12	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
25	0.01	0.01	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	1.27
26	0.02	0.46	0.02	0.05	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00
27	0.11	3.24	0.00	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28	0.02	0.47	0.20	0.00	0.00	0.00	1.33	0.00	0.00	0.00	0.00	0.02
29	0.00	0.00	1.94	3.39	---	0.13	3.22	0.00	0.00	0.00	0.00	0.00
30	0.00	0.00	0.03	0.06	---	0.03	0.00	0.00	0.00	0.00	0.13	0.00
31	0.00	---	0.28	0.31	---	0.00	---	0.00	---	0.00	0.00	---
TOTAL	1.75	4.66	4.21	5.12	1.35	1.66	6.35	5.32	0.11	0.00	0.37	1.33

CAL YR 2001 TOTAL 16.56
WTR YR 2002 TOTAL 32.23

HAWAII, ISLAND OF MAUI

204923156371501. State Key Number 297.0 Olowalu rain gage at Olowalu, Maui.

LOCATION.--Lat 20°49'23", long 156°37'15", Hydrologic Unit 20020000, at USGS stream-gaging station 16646200 on downstream side of center pier of plantation road bridge, 0.6 mi northeast of Olowalu, and 5.5 mi southeast of Lahaina.

PERIOD OF RECORD.--1964 to current year. Prior to October 1992, unpublished records are in the files of the U.S. Geological Survey and at the National Weather Service.

GAGE.--Data logger with a tipping basket attachment. A Standard 8-in. National Weather Service accumulation can also was installed as a backup. Elevation of gage is 130 ft (from topographic map).

REMARKS.--Records poor. Rainfall recorded in hundredths of an inch.

PRECIPITATION, TOTAL, INCHES, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY SUM VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.46	0.00	0.00	0.00	0.07	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.04	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.01	0.00	0.00	0.48	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.76	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	0.00	0.00	0.20	0.00	0.00	0.00	0.00	2.33	0.00	0.00	0.00	0.00
14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
15	0.00	0.00	0.00	0.00	0.01	0.25	0.00	0.00	0.00	0.00	0.00	0.00
16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17	0.00	0.00	0.02	0.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18	0.00	0.00	0.01	0.53	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19	0.00	0.00	0.00	0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.02	0.00	0.00
23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
25	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.10
26	0.00	0.07	0.00	0.30	0.00	0.00	0.00	0.00	0.95	0.00	0.00	0.00
27	0.00	e3.88	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28	0.03	e0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
29	0.00	0.00	0.26	4.19	---	0.35	0.13	0.00	0.00	0.00	0.00	0.00
30	0.00	0.00	0.00	0.00	---	0.03	0.00	0.00	0.00	0.00	0.00	0.00
31	0.00	---	0.41	0.00	---	0.00	---	0.00	---	0.00	0.00	---
TOTAL	0.03	3.95	0.94	6.10	0.03	0.63	1.38	2.54	0.95	0.02	0.00	0.14

CAL YR 2001 TOTAL 6.09
WTR YR 2002 TOTAL 16.71

e Estimated

HAWAII, ISLAND OF MAUI

204606156270301. State Key Number 311.3 Kulanihakoi rain gage near Kihei, Maui.

LOCATION.--Lat 20°46'06", long 156°27'03", Hydrologic Unit 20020000, at USGS stream-gaging station 16660000 on right bank, 0.5 mi northeast of Lihue Cemetery, 0.8 mi upstream from mouth, and 1.3 mi southeast of Kihei.

PERIOD OF RECORD.--1963 to current year. Prior to October 1992, unpublished records are in the files of the U.S. Geological Survey and at the National Weather Service.

GAGE.--Data logger with a .01-in. tipping bucket attachment. The National Weather Service rain gage was converted to a backup accumulation can. Elevation of gage is 35 ft (from topographic map).

REMARKS.--Records good. Rainfall recorded in hundredths of an inch.

PRECIPITATION, TOTAL, INCHES, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY SUM VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.30	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.41	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.22	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.13	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.57	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.16	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00
11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	0.00	0.00	0.14	0.00	0.00	0.01	0.00	1.79	0.00	0.00	0.00	0.00
14	0.00	0.00	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17	0.00	0.00	0.00	0.00	0.00	0.26	0.00	0.00	0.00	0.00	0.00	0.00
18	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00
19	0.00	0.00	0.00	0.00	0.00	0.00	0.58	0.00	0.00	0.00	0.00	0.00
20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
23	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09
25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26	0.00	0.17	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00
27	0.06	3.18	0.15	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28	0.06	0.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
29	0.00	0.00	0.35	2.20	---	0.18	0.67	0.00	0.00	0.00	0.00	0.00
30	0.00	0.00	0.01	0.00	---	0.02	0.00	0.00	0.00	0.00	0.00	0.00
31	0.00	---	0.35	0.00	---	0.00	---	0.00	---	0.00	0.00	---
TOTAL	0.12	3.58	1.14	2.77	0.09	0.51	1.83	2.62	0.02	0.03	0.00	0.09

CAL YR 2001 TOTAL 5.54
WTR YR 2002 TOTAL 12.80

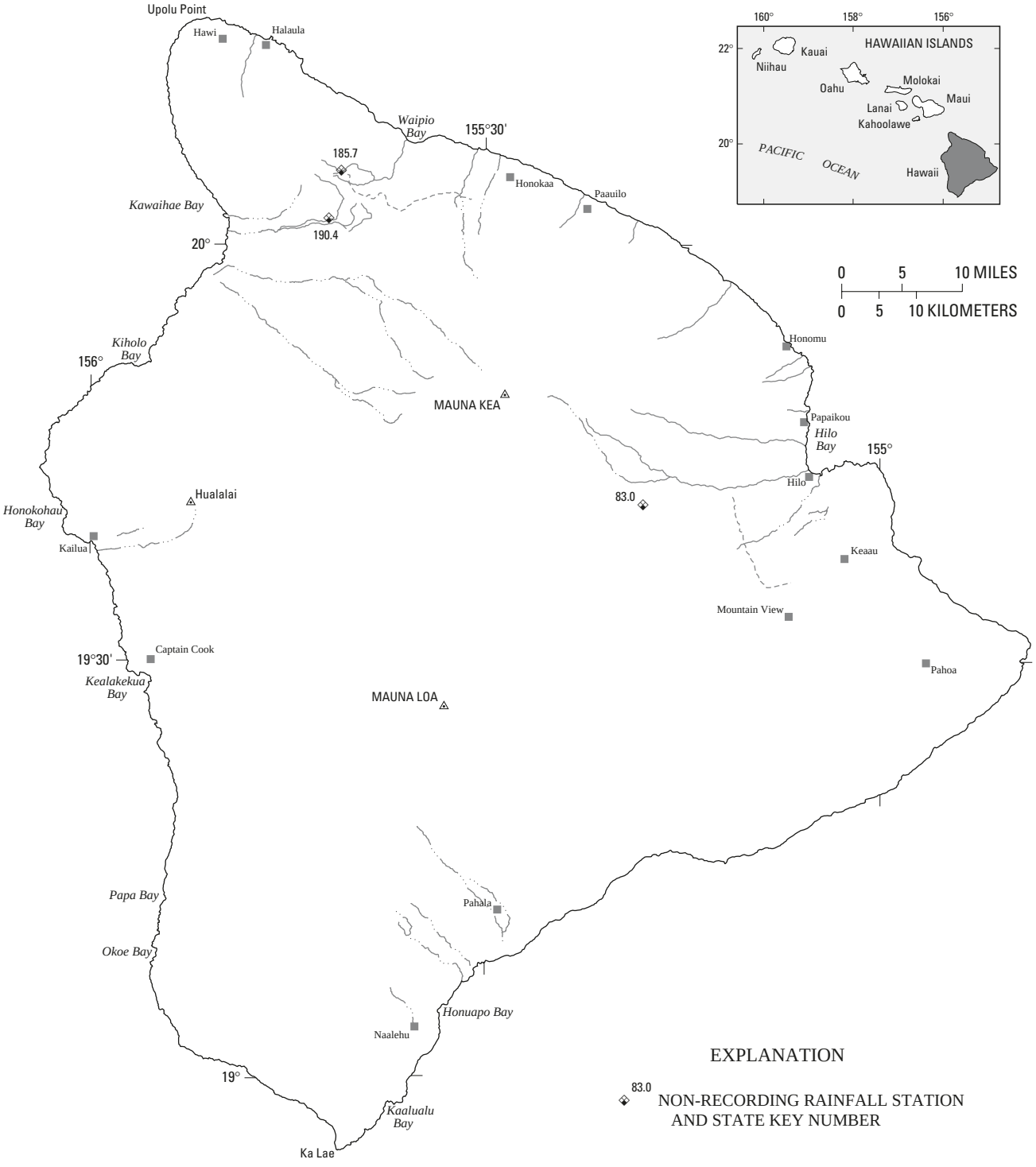


Figure 17. Locations of rainfall stations on Hawaii.

HAWAII, ISLAND OF HAWAII

194117155174801. State Key Number 83.0 Quarry at Saddle Road rain gage, 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 are in the files of the U.S. Geological Survey.

GAGE.--Standard 8-in. National Weather Service nonrecording rain gage. Elevation of gage is 4,140 ft (from topographic map).

REMARKS.--Records poor. Cumulative rainfall read in nearest tenths of an inch.

RAINFALL ACCUMULATED (INCHES), WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
INTERMITTENT READINGS

Period	Rainfall
Aug. 13 to Oct. 09	11.3
Oct. 09 to Oct. 25	5.3
Oct. 25 to Dec. 03	13.8
Dec. 03 to Jan. 28	>18.9
Jan. 28 to May 14	>18.6
May 14 to Jul. 15	13.0
Jul. 15 to Aug. 20	11.3
Aug. 20 to Sep. 23	12.4
Sep. 23 to Sep. 26	0.5
Sep. 26 to Oct. 04	3.9

> Actual value is known to be greater than value shown.

HAWAII, ISLAND OF HAWAII

200518155405801. State Key Number 185.7 Kawainui Rain Gage, Hawaii.

LOCATION.--Lat 20°05'18", long 155°40'58", Hydrologic Unit 20010000, on left bank 125 ft upstream from Upper Hamakua Ditch intake and 4.5 mi north of Kamuela.

PERIOD OF RECORD.--February to September 2002

GAGE.--Standard 8-in. National Weather Service rain gage connected to data logger and tipping bucket attachment. Elevation of gage is 4,060 ft (from topographic map).

REMARKS.--Records good. Rainfall recorded in hundredths of an inch.

RAINFALL ACCUMULATED (INCHES), WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY SUM VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	---	---	---	---	0.18	0.28	0.50	0.20	2.73	0.40	0.04
2	---	---	---	---	---	0.07	0.09	0.55	1.26	0.44	0.12	0.23
3	---	---	---	---	---	1.29	0.08	1.12	0.05	1.59	1.19	0.25
4	---	---	---	---	---	0.80	0.07	0.11	0.25	1.41	1.57	0.44
5	---	---	---	---	---	3.99	0.01	0.35	0.33	0.67	0.53	0.40
6	---	---	---	---	0.17	0.50	0.00	0.44	0.12	0.64	0.76	0.49
7	---	---	---	---	0.00	0.00	0.01	0.85	0.41	1.29	0.65	2.19
8	---	---	---	---	1.07	0.16	0.00	0.60	0.14	1.68	0.44	0.88
9	---	---	---	---	0.45	0.65	0.00	0.14	0.22	3.34	0.33	1.23
10	---	---	---	---	0.08	0.05	0.00	0.06	1.22	2.09	0.67	0.63
11	---	---	---	---	1.18	0.11	0.00	0.39	0.08	1.50	0.52	0.02
12	---	---	---	---	0.25	0.00	0.00	0.07	0.73	0.34	0.13	0.19
13	---	---	---	---	1.31	0.00	0.24	0.75	0.15	0.00	0.05	0.66
14	---	---	---	---	0.61	0.32	0.00	0.00	1.08	0.39	0.00	1.01
15	---	---	---	---	0.13	0.71	0.12	0.37	0.91	1.74	0.25	1.08
16	---	---	---	---	0.35	0.26	0.02	0.69	0.63	0.40	0.17	0.49
17	---	---	---	---	0.00	5.55	1.73	0.41	0.63	1.71	0.90	1.27
18	---	---	---	---	0.00	3.81	0.00	2.01	1.16	1.38	0.98	0.53
19	---	---	---	---	0.01	0.85	0.01	1.05	0.65	0.78	1.58	0.00
20	---	---	---	---	0.77	0.36	0.01	0.14	0.43	0.53	0.69	0.00
21	---	---	---	---	0.09	0.10	0.18	0.00	0.14	2.98	0.11	0.00
22	---	---	---	---	0.01	0.00	0.78	0.01	1.64	3.56	0.13	0.00
23	---	---	---	---	1.41	0.00	0.25	0.00	0.06	0.29	1.64	0.00
24	---	---	---	---	5.95	0.00	0.74	0.00	0.59	0.97	1.10	0.00
25	---	---	---	---	5.46	0.00	0.02	0.00	0.75	2.02	0.20	0.00
26	---	---	---	---	7.40	0.16	0.38	0.03	3.47	1.46	0.21	0.00
27	---	---	---	---	0.08	0.29	0.72	0.44	1.70	0.19	1.18	0.00
28	---	---	---	---	0.02	0.06	0.66	0.00	1.48	0.50	0.91	0.05
29	---	---	---	---	---	0.00	0.84	0.01	0.05	0.07	1.20	0.27
30	---	---	---	---	---	0.13	0.15	0.03	2.48	0.26	0.73	0.41
31	---	---	---	---	---	0.03	---	0.03	---	0.90	0.26	---
TOTAL	---	---	---	---	---	20.43	7.39	11.15	23.01	37.85	19.60	12.76

RAINFALL RECORDS

HAWAII, ISLAND OF HAWAII

200148155420501. State Key Number 190.4 Keanuiomano rain gage near Kamuela, Hawaii.

LOCATION.--Lat 20°01'48", long 155°42'05", Hydrologic Unit 20010000, in USGS stream-gaging station 16756500 on left bank, 150 ft upstream from junction of State Highways 19 and 250, and 2.0 mi west of junction of State Highways 19 and 190.

PERIOD OF RECORD.--1963 to current year. Prior to October 1992, unpublished records are in the files of the U.S. Geological Survey.

GAGE.--Standard 8-in. National Weather Service nonrecording rain gage. Elevation of gage is 2,410 ft (from topographic map).

REMARKS.--Records good. Cumulative rainfall read in nearest tenths of an inch.

RAINFALL ACCUMULATED (INCHES), WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
INTERMITTENT READINGS

Period	Rainfall
Oct. 01 to Oct. 04	0.0 a
Oct. 04 to Dec. 07	5.6
Dec. 07 to Feb. 06	11.5
Feb. 06 to May 10	12.0
May 10 to Jul. 11	3.3
Jul. 11 to Sep. 30	0.2 b

CAL YR 2001 TOTAL 20.0
WTR YR 2002 TOTAL 32.6

a Estimated value based on accumulated reading of 0.1 inches from Aug. 16 to Oct. 04, 2001.
b Estimated value based on accumulated reading of 0.2 inches from Jul. 11 to Oct. 11, 2002.

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