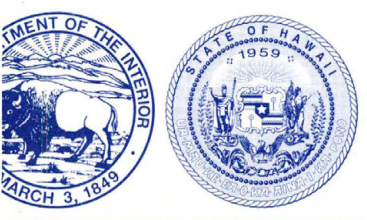
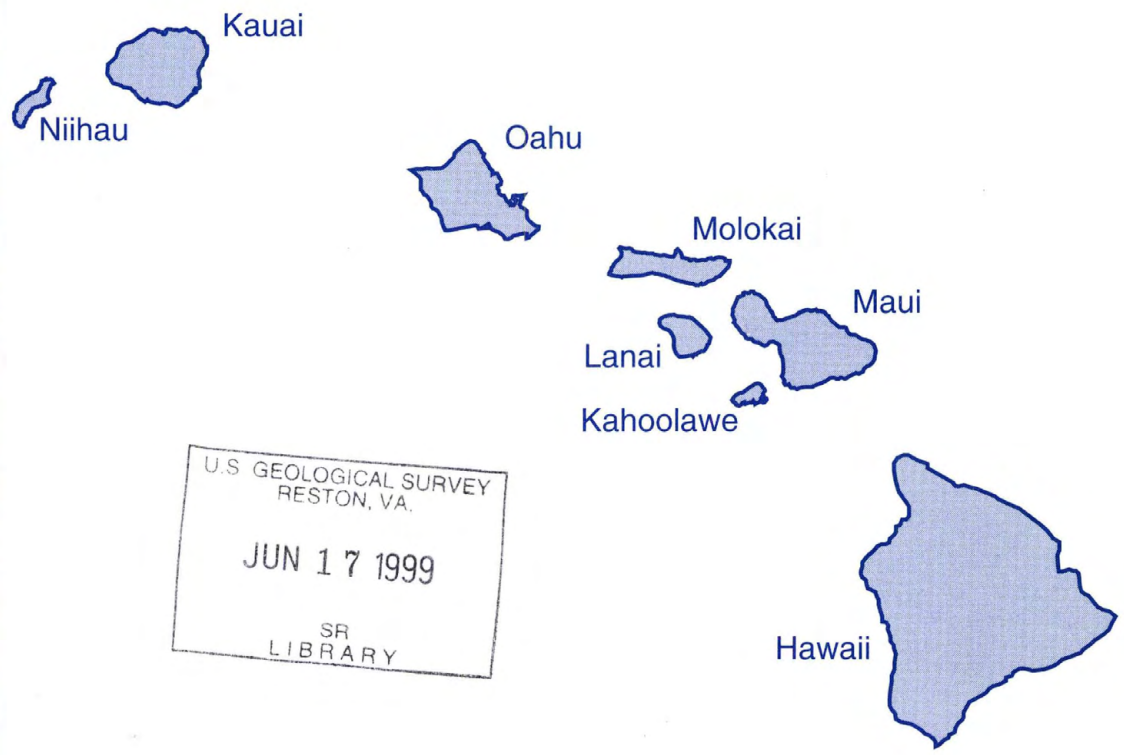


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Water Resources Data Hawaii Water Year 1996



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U.S. GEOLOGICAL SURVEY WATER-DATA REPORT HI-96-1
Prepared in cooperation with the State of Hawaii
Department of Land and Natural Resources,
Commission on Water Resource Management
and with other agencies

CALENDAR FOR WATER YEAR 1996

1995

| OCTOBER | | | | | | | NOVEMBER | | | | | | | DECEMBER | | | | | | |
|---------|----|----|----|----|----|----|----------|----|----|----|----|----|----|----------|----|----|----|----|----|----|
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| 15 | 16 | 17 | 18 | 19 | 20 | 21 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| 22 | 23 | 24 | 25 | 26 | 27 | 28 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| 29 | 30 | 31 | | | | | 26 | 27 | 28 | 29 | 30 | | | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
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1996

| JANUARY | | | | | | | FEBRUARY | | | | | | | MARCH | | | | | | |
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| 28 | 29 | 30 | 31 | | | | 25 | 26 | 27 | 28 | 29 | | | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
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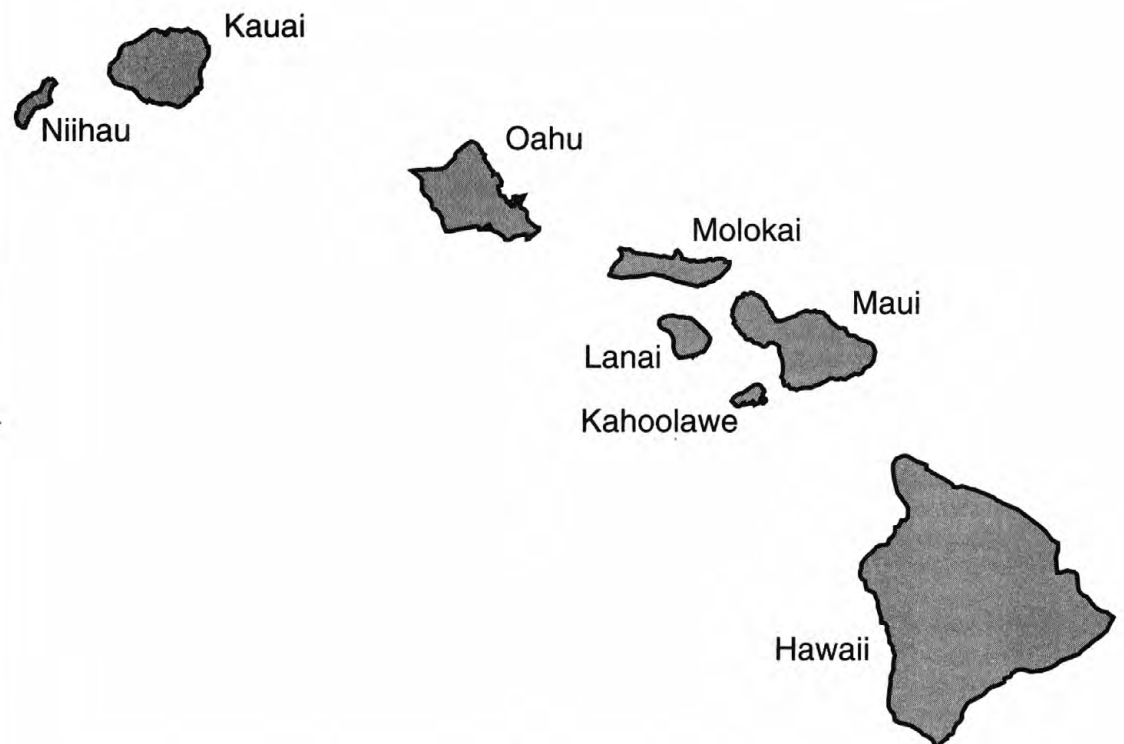
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| 7 | 8 | 9 | 10 | 11 | 12 | 13 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 14 | 15 | 16 | 17 | 18 | 19 | 20 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 21 | 22 | 23 | 24 | 25 | 26 | 27 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 16 | 17 | 18 | 19 | 20 | 21 | 22 |
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| | | | | | | | | | | | | | | 30 | | | | | | |

| JULY | | | | | | | AUGUST | | | | | | | SEPTEMBER | | | | | | |
|------|----|----|----|----|----|----|--------|----|----|----|----|----|----|-----------|----|----|----|----|----|----|
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| 7 | 8 | 9 | 10 | 11 | 12 | 13 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| 14 | 15 | 16 | 17 | 18 | 19 | 20 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 15 | 16 | 17 | 18 | 19 | 20 | 21 |
| | 22 | 23 | 24 | 25 | 26 | 27 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 22 | 23 | 24 | 25 | 26 | 27 | 28 |
| 28 | 29 | 30 | 31 | | | | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 29 | 30 | | | | | |



Water Resources Data Hawaii Water Year 1996

by Richard A. Fontaine, Stephen S. Anthony, Roy I. Taogoshi,
Vaughn E. Kunishige, and Wayne S. Shibata



U.S. GEOLOGICAL SURVEY WATER-DATA REPORT HI-96-1
Prepared in cooperation with the State of Hawaii
Department of Land and Natural Resources,
Commission on Water Resource Management
and with other agencies

UNITED STATES DEPARTMENT OF THE INTERIOR

BRUCE BABBITT, Secretary

U. S. GEOLOGICAL SURVEY

Gordon Eaton, Director

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State of Hawaii
and with other agencies as listed
under cooperation

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677 Ala Moana Boulevard, Suite 415
Honolulu, Hawaii 96813

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 following individuals contributed significantly to the collection, processing, and tabulation of the data:

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This report was prepared in cooperation with the State of Hawaii, and with other local and Federal agencies under the general supervision of William Meyer, District Chief, Hawaii.

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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

ISLAND OF KAUAI

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|---|----------|
| (2-0021-01) 220057159210301 (w) | 293 |
| (2-0023-01) 220051159231801 (ct) | 341 |
| (2-0044-13) 220018159444702 (ct) | 341 |
| (2-0044-14) 220019159444801 (w) | 294 |
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| (2-0320-03) 220354159205602 (ctw) | 296, 341 |
| (2-0345-04) 220341159453901 (ct) | 341 |
| (2-0545-01) 220530159450401 (ct) | 341 |
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| (2-0818-01) 220827159185401 (ct) | 341 |
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| (3-2006-12) 212038158061501 (w) | 311 |
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| (3-2358-22) | 212342157584301 (ct) | 346 |
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| (3-2448-01) | 212422157485601 (ct) | 346 |
| (3-2508-02) | 212501158080701 (w) | 317 |
| (3-2550-01) | 212556157500301 (ct) | 346 |
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| (6-4600-01) | 204601156001501 (ct) | 352 |
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| (6-4824-01) | 204827156242201 (w) | 328 |
| (6-4825-01) | 204845156255001 (ct) | 352 |
| (6-4831-01) | 204818156310301 (w) | 328 |
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| (6-4937-01) | 204931156371201 (ct) | 352 |
| (6-5021-01) | 205014156212701 (ct) | 352 |
| (6-5128-02) | 205102156282501 (ct) | 352 |
| (6-5130-01) | 205140156304501 (w) | 329 |
| (6-5130-02) | 205154156303801 (w) | 330 |
| (6-5224-02) | 205243156243201 (ct) | 352 |
| (6-5330-09) | 205329156305502 (ct) | 352 |
| (6-5330-10) | 205329156305501 (ct) | 352 |
| (6-5330-11) | 205330156305401 (ct) | 352 |
| (6-5332-04) | 205312156321402 (w) | 330 |
| (6-5339-01) | 205322156394501 (ct) | 352 |
| (6-5339-02) | 205320156394501 (ct) | 353 |
| (6-5340-01) | 205343156401101 (ct) | 353 |
| (6-5419-01) | 205412156193801 (ctw) | 331, 353 |
| (6-5424-01) | 205416156244301 (ct) | 353 |
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| (6-5430-05) | 205405156305401 (ctw) | 332, 354 |
| (6-5431-01) | 205437156310501 (w) | 333 |
| (6-5522-01) | 205511156222101 (ct) | 355 |
| (6-5631-01) | 205617156311101 (w) | 334 |
| (6-5631-02) | 205651156313201 (w) | 335 |
| (6-5640-01) | 205651156401001 (ct) | 355 |
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| (6-5838-02) | 205838156383101 (ct) | 355 |
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| (8-0831-01) | 190832155310801 (ct) | 356 |
| (8-0831-02) | 190832155310901 (ct) | 356 |
| (8-1128-02) | 191108155281701 (ct) | 356 |
| (8-1129-01) | 191114155294801 (ct) | 356 |
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| (8-2487-01) | 192456154571901 (ct) | 356 |
| (8-2653-01) | 192646155532001 (ct) | 356 |
| (8-2753-01) | 192738155534201 (ct) | 356 |
| (8-2753-02) | 192731155534101 (ct) | 357 |
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| (8-3389-01) | 193339154594801 (ctw) | 339, 357 |
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| (8-3557-02) | 193505155570801 (ct) | 357 |
| (8-3557-03) | 193508155570701 (ct) | 357 |
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| (8-3557-05) | 193502155572301 (ct) | 358 |
| (8-4003-01) | 194037155035301 (ct) | 358 |
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Letters after station number designate type of station: (r) recording, and (n) non-recording

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| (1047.0) 220427159300201 (r) | 363 |
| (1051.0) 220356159281401 (n) | 364 |
| (1068.0) 220443159235601 (r) | 365 |
| (1080.0) 220817159374401 (n) | 366 |
| (1082.0) 220739159373001 (n) | 366 |
| (1083.0) 220713159361201 (r) | 367 |
| (1084.0) 220927159355001 (r) | 368 |
| (1085.0) 220703159351201 (n) | 369 |
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| (772.0) 212253157522201 (r) | 372 |
| (772.1) 212346157533701 (r) | 373 |
| (772.3) 212359157502601 (r) | 374 |
| (772.6) 212329157510501 (r) | 375 |
| (773.3) 212029157523601 (r) | 376 |
| (781.11) 212342157484401 (r) | 377 |
| (781.9) 212322157474401 (r) | 378 |
| (794.3) 212114157435001 (n) | 379 |
| (832.2) 212813157574001 (r) | 380 |
| (839.11) 212650157521001 (n) | 381 |
| (839.3) 212434157495601 (r) | 382 |
| (839.9) 212647157521201 (n) | 383 |
| (842.1) 213016158105901 (r) | 384 |
| (882.3) 213205157571001 (n) | 385 |
| (882.4) 213211157562400 (r) | 386 |
| (883.12) 213215157552800 (r) | 387 |
| (884.3) 213221157541501 (n) | 388 |
| (886.4) 213237157530701 (r) | 389 |
| (886.6) 213000157515401 (r) | 390 |
| (897.1) 213725158010401 (r) | 391 |
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| (543.1) 210807156524601 (n) | 394 |
| (551.5) 211039157123101 (r) | 395 |
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| (255.0) 203721156151601 (r) | 397 |
| (297.0) 204923156371501 (r) | 398 |
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| (12.13) 191027155355801 (n) | 401 |
| (70.7) 193812155554501 (n) | 401 |
| (83.0) 194117155174801 (n) | 402 |
| (185.4) 200517155404201 (n) | 402 |
| (190.4) 200148155420501 (n) | 403 |

DISCONTINUED GAGING STATIONS

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

| Station number | Station name | Drainage area (mi ²) | Period of record |
|-----------------|--|----------------------------------|---------------------------------|
| ISLAND OF KAUAI | | | |
| 16011000 | Waikoali Str nr Waimea | 1.58 | 1909-13, 1919-25 |
| 16012000 | Kauaikinana Str nr Waimea | 0.84 | 1919-25 |
| 16013000 | Mohihi Str at alt 3,420 ft nr Waimea | 1.68 | 1920-26, 1936-71 |
| 16014000 | Kokee Ditch nr Waimea | -- | 1926-82 |
| 16015000 | Mohihi Str nr Waimea | 2.20 | 1909-17 |
| 16016000 | Waimea River at alt 840 ft nr Waimea | 20.0 | 1916-18, 1925-68 |
| 16017000 | Koaie Str at alt 3,770 ft nr Waimea | 1.68 | 1919-32, 1954-68 |
| 16018000 | Koaie Str nr Waimea | 9.97 | 1916-18 |
| 16020000 | Waialae Str nr Waimea | 2.81 | 1910-16 |
| 16021000 | Waialae Str at alt 800 ft nr Waimea | 7.87 | 1917-21 |
| 16022000 | Kekaha Ditch at Camp 1 nr Waimea | -- | 1908-68 |
| 16024000 | Kekaha Ditch at siphon nr Waimea | -- | 1910-12 |
| 16025000 | Kekaha Ditch at flume 2 nr Waimea | -- | 1910-12 |
| 16027000 | Kekaha Ditch below tunnel 12 nr Waimea | -- | 1908-34 |
| 16028000 | Waimea 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 |
| 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 |

WATER RESOURCES DATA FOR HAWAII, 1996
DISCONTINUED GAGING STATIONS--Continued

| Station number | Station name | Drainage area (mi ²) | Period of record |
|----------------------------|--|-------------------------------------|---------------------------|
| ISLAND OF KAUAI--Continued | | | |
| 16073000 | Konohiki Str at Makakuaelele mki weir nr Kapaa | 0.89 | 1912 |
| 16074000 | N F Kaehulua Str at Kainahola weir nr Kapaa | 1.39 | 1911-13 |
| 16075000 | S F Kaehulua Str at Wainamuamu weir nr Kapaa | 0.04 | 1911-13 |
| 16076000 | Kaehulua Str at Kuhinoa weir nr Kapaa | 1.90 | 1911-13 |
| 16078000 | Kapaa Str nr Kealia | 3.05 | 1910-20 |
| 16079200 | Tunnel Ditch at Kapahi nr Kapaa | -- | 1909-11 |
| 16079400 | Pipe Ditch at Kapahi nr Kapaa | -- | 1909-11 |
| 16079600 | Kapaa Ditch at Kapahi nr Kapaa | -- | 1909-11 |
| 16082000 | Kaneha Ditch nr Kealia | -- | 1909-13 |
| 16086000 | Anahola Ditch above wasteway nr Kealia | -- | 1915-21 |
| 16087000 | Anahola Ditch wasteway nr Kealia | -- | 1936-85 |
| 16089000 | Anahola Str nr Kealia | 4.27 | 1910, 1913-85 |
| 16090000 | Lower Anahola Ditch at Kiokala nr Kealia | -- | 1909-14 |
| 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 | Hanakoia 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 Luualualei nr Waianae | 1.16 | 1930-44 |
| 16212400 | Awanui Gulch nr Barbers Point NAS | 13.80 | 1957-58 |
| 16212900 | Kipapa Str nr Waipahu | -- | 1966-68 |
| 16217000 | Pearl Harbor Spr at Puukapu nr Pearl City | -- | 1931-35 |

WATER RESOURCES DATA FOR HAWAII, 1996
DISCONTINUED GAGING STATIONS--Continued

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| Station number | Station name | Drainage area (mi ²) | Period of record |
|---------------------------|--|----------------------------------|------------------------------------|
| ISLAND OF OAHU--Continued | | | |
| 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 Waiiau nr Pearl City | -- | 1939-42 |
| 16220000 | Hawn Elec. Co. wasteway at Waiiau nr Pearl City | -- | 1953-59 |
| 16222000 | Pearl Harbor Sprngs at Waiiau | -- | 1913-39, 1942-47 |
| 16224000 | Pearl Harbor Springs at Kalauoa | -- | 1931-62, 1964-65, 1966-68, 1970-88 |
| 16224500 | Kalauao Str at Moanalua Road at Aiea | 2.59 | 1957-82 |
| 16225000 | Kalauao Str at Aiea | 2.61 | 1953-57 |
| 16227500 | Moanalua Str nr Kaneohe | 0.94 | 1968-78 |
| 16227700 | Moanalua Str tributary nr Kaneohe | 0.62 | 1968-78 |
| 16227900 | Moanalua Str tributary nr Aiea | 0.03 | 1972-78 |
| 16228900 | Kalihi Str nr Kaneohe | 0.60 | 1966-71 |
| 16230000 | Lulumahu Dit at upper Nuuanu Res nr Honolulu | -- | 1911-13 |
| 16231000 | Luakaha weir in upper Nuuanu Valley nr Hon | -- | 1910-13 |
| 16231500 | Moole Ditch mauka station nr Honolulu | -- | 1917-20 |
| 16231700 | Moole Ditch makai station nr Honolulu | -- | 1918-23 |
| 16235000 | Nuuanu Str at Kuakini Street nr Honolulu | 4.39 | 1911-12 |
| 16236000 | Kahuawai Spring nr Honolulu | -- | 1912-14 |
| 16237000 | Pauoa Str at upper Pauoa Valley nr Honolulu | 0.79 | 1911-13 |
| 16238500 | Waihi Str at Honolulu | 1.14 | 1913-21, 1925-83 |
| 16239500 | East Manoa Ditch nr Honolulu | -- | 1915-16, 1918-20, 1926-39 |
| 16241000 | Manoa Str at upper Manoa Valley nr Honolulu | 2.62 | 1910-13 |
| 16242000 | Manoa Str at College of Hawaii nr Honolulu | 4.99 | 1909-10, 1912-18 |
| 16243000 | Manoa Str at Waialae Road nr Honolulu | 5.38 | 1910-12 |
| 16244000 | Pukele Str nr Honolulu | 1.18 | 1926-82 |
| 16245000 | Waiomao Str at upper Palolo Valley nr Hon | 0.35 | 1911-13 |
| 16246000 | Waiomao Str nr Honolulu | 1.04 | 1911, 1912, 1926-71 |
| 16247000 | Palolo Str nr Honolulu | 3.63 | 1952-79 |
| 16248900 | Waimanalo Ditch below main res nr Waimanalo | -- | 1912-13 |
| 16249000 | Waimanalo Str at Waimanalo | 2.16 | 1967-70 |
| 16249200 | Maunawili Str nr Waimanalo | 1.28 | 1912-16 |
| 16249400 | Main Spring nr Kailua | -- | 1914-16 |
| 16249600 | Makawao Spring nr Kailua | -- | 1914-16 |
| 16249800 | Makawao Ditch nr Kailua | -- | 1912-15 |
| 16250000 | Maunawili Ditch nr Waimanalo | -- | 1954-68 |
| 16256000 | Kamakalepo Str nr Kailua | 0.82 | 1912, 1913-16 |
| 16257000 | Pohakea Str nr Kailua | 0.21 | 1912-14 |
| 16258000 | Maunawili Str ab Wong Leongs Ditch nr Kailua | 4.60 | 1922-23 |
| 16260000 | Maunawili Str nr Kailua | 4.60 | 1912, 1913-16 |
| 16260500 | Maunawili Str at highway 61 nr Kailua | 5.34 | 1967-71 |
| 16261000 | North Branch Kahanaiki Str nr Kailua | 0.34 | 1913-14 |
| 16262000 | South Branch Kahanaiki Str nr Kailua | 0.21 | 1913-14 |
| 16263000 | Kahanaiki Str nr Kailua | 0.58 | 1912, 1914-16 |
| 16264400 | Kawainui Swamp drain canl at Kailua Rd at Kailua | -- | 1961-65 |
| 16264500 | Kawainui Swamp canal at Wanaao Rd at Kailua | -- | 1961-64 |
| 16266000 | Kamooalii Str nr Kaneohe | 1.48 | 1914-16 |
| 16267000 | Hooleinaiwa Str nr Kaneohe | 0.61 | 1914-16 |
| 16268000 | Piho Str nr Kaneohe | 0.43 | 1914-16 |
| 16269000 | Kuou Ditch nr Kaneohe | -- | 1914-16 |
| 16270000 | Kuou Str nr Kaneohe | 0.37 | 1914-16 |
| 16270500 | Kamooalii Str below Kuou Str nr Kaneohe | 3.21 | 1967-70, 1971, 1972-76 |
| 16271000 | North Luluku Ditch nr Kaneohe | -- | 1914-16 |
| 16272000 | Luluku Str nr Kaneohe | 0.46 | 1914-16 |
| 16273000 | Young Mau Ditch nr Kaneohe | -- | 1914-16 |
| 16273900 | Kamooalii Str at Kaneohe | 4.38 | 1959-63, 1965-80 |
| 16274000 | Ahlo Ditch nr Kaneohe | -- | 1914-16 |

WATER RESOURCES DATA FOR HAWAII, 1996
DISCONTINUED GAGING STATIONS--Continued

| Station number | Station name | Drainage area (mi ²) | Period of record |
|---------------------------|---|-------------------------------------|------------------------------------|
| ISLAND OF OAHU--Continued | | | |
| 16276000 | Reservoir Ditch nr Heeia | -- | 1914-16 |
| 16277000 | Waipio Ditch nr Heeia | -- | 1914-16 |
| 16278000 | Iolekaa Str mauka nr Heeia | 0.29 | 1940-70 |
| 16279000 | Iolekaa Str nr Heeia | 0.52 | 1914-16 |
| 16280000 | Wing Wo Tai Ditch nr Heeia | -- | 1914-16 |
| 16281000 | Hop Tuck Ditch nr Heeia | -- | 1914-16 |
| 16282000 | Lee Ditch nr Heeia | -- | 1914-16 |
| 16283000 | Kahaluu Str nr Heeia | 0.28 | 1935-71 |
| 16283800 | Waihee Str at alt. 260 ft nr Heeia | 0.31 | 1961-66 |
| 16284000 | Waihee Str nr Heeia | 0.93 | 1935-82 |
| 16284500 | Waihee Str at Kahaluu | 2.26 | 1966-71 |
| 16285000 | Waiahole tunnel at Waianu nr Waiahole | -- | 1950-69 |
| 16286000 | Waiahole tunl wasteway at intk 31 nr Waiahole | -- | 1951-69 |
| 16287000 | Waiahole tunnel at north portal nr Waiahole | -- | 1951-69 |
| 16287200 | Waiahole tunnel at adit 8 nr Waipahu | -- | 1956-69 |
| 16288000 | Halona Str nr Waikane | 0.08 | 1911 |
| 16289000 | Waihi Str nr Waikane | 0.11 | 1911 |
| 16290000 | Waiahole Str below powerhouse nr Waiahole | 0.46 | 1915 |
| 16291000 | Waiahole Str at alt. 250 ft. nr Waiahole | 0.99 | 1955-68 |
| 16292000 | Waiahole Str nr Waiahole | 1.22 | 1911-16 |
| 16293000 | Waianu Str nr Waikane | 1.28 | 1911 |
| 16294000 | Waiahole Str at Waiahole nr Waikane | 3.60 | 1911-12 |
| 16295000 | Waikane Str nr Waikane | 2.35 | 1912 |
| 16296000 | Kahana Str nr Kahana | 3.20 | 1914-17 |
| 16297000 | Kawa Str nr Kahana | 2.09 | 1914-17 |
| 16299000 | Punaluu Str at alt. 539 ft. nr Punaluu | 0.98 | 1915-18 |
| 16300000 | Waihoi Str nr Punaluu | 0.50 | 1915-17 |
| 16301000 | Punaluu Str at alt. 250 ft. nr Punaluu | 2.78 | 1914-18 |
| 16304000 | Kaluanui Str nr Hauula | 0.50 | 1915-17 |
| 16305000 | Kaipapau Str nr Hauula | 0.21 | 1906-07 |
| 16306000 | Koloa Gulch nr Laie | 0.90 | 1914-18 |
| 16307000 | Wailele Gulch nr Laie | 0.50 | 1914-15, 1916-18 |
| 16308000 | East Branch Kahawainui Str nr Laie | 0.53 | 1914-18 |
| 16308990 | Malaekahana Str nr Laie | 0.64 | 1963-71 |
| 16309000 | Malaekahana Str nr Kahuku | 1.66 | 1914-18 |
| 16310000 | Middle Branch Malaekahana Str nr Kahuku | 0.69 | 1914-18 |
| 16329000 | Kaiwikoele Str tributary nr Maunawai | 0.97 | 1967-71 |
| 16340500 | Anahulu River tributary nr Haleiwa | 0.83 | 1967-71 |
| 16343000 | Helemano Str at Haleiwa | 14.20 | 1967-82 |
| ISLAND OF MOLOKAI | | | |
| 16401000 | Papalaua Str nr Pukoo | 2.00 | 1919-29 |
| 16402000 | Pulena Str nr Wailau | 4.38 | 1919-28, 1937-57 |
| 16403000 | Waiakeakua Str nr Wailau | 1.41 | 1919-29, 1937-57 |
| 16404000 | Pelekunu Str nr Pelekunu | 2.59 | 1919-29, 1937-47, 1948-57, 1971-82 |
| 16405000 | Lanipuni Str nr Pelekunu | 1.09 | 1919-29, 1937-57 |
| 16406000 | Waikolu Str at alt. 650 ft nr Kalaupapa | 2.99 | 1920-23 |
| 16409000 | Waihanau Str nr Kalaupapa | 1.18 | 1930-32 |
| 16410000 | Keolewa Str nr Kalae | 0.18 | 1940-44 |
| 16411000 | Waialala Spring nr Kalae | -- | 1940-60 |
| 16412000 | Mokomoko Gulch nr Kalae | 0.23 | 1940-45 |
| 16411300 | Kakaako Gulch at Hwy 46 nr Mauna Loa | 0.18 | 1964-85 |
| 16415000 | EF Kawela Gulch | 0.45 | 1946-71 |
| 16416000 | Punaula Gulch nr Pukoo | 0.24 | 1947-72 |

WATER RESOURCES DATA FOR HAWAII, 1996
DISCONTINUED GAGING STATIONS--Continued

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| Station number | Station name | Drainage area (mi ²) | Period of record |
|-------------------|---|-------------------------------------|------------------------------------|
| ISLAND OF MAUI | | | |
| 16501000 | Palikea Str bl diversion dam nr Kipahulu | 6.29 | 1927-29, 1931-35, 1935-38, 1939-83 |
| 16502000 | Hahalawe Gulch nr Kipahulu | 0.43 | 1927-37, 1938-69 |
| 16503000 | Kaeluku flume nr Kaeleku | -- | 1940-45 |
| 16504000 | Hana flume nr Hana | -- | 1940-45 |
| 16506000 | Makapipi Ditch nr Nahiku | -- | 1948-66 |
| 16506500 | West Makapipi Spring nr Nahiku | -- | 1932-45 |
| 16507000 | Makapipi Str nr Nahiku | 1.93 | 1932-45 |
| 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 |
| 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 |

WATER RESOURCES DATA FOR HAWAII, 1996
DISCONTINUED GAGING STATIONS--Continued

| Station number | Station name | Drainage area (mi ²) | Period of record |
|---------------------------|--|----------------------------------|-----------------------------------|
| ISLAND OF MAUI--Continued | | | |
| 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 Naililiihaele Str at Haiku-uka | 0.20 | 1932-33 |
| 16570000 | Nailiihaele Str nr Huelo | 3.49 | 1910-11, 1913-18,1919-24, 1925-75 |
| 16571000 | Naililiihaele Str bl new Hamakua Dt nr Huelo | 3.60 | 1912 |
| 16572000 | New Hamakua Ditch at Naililiihaele weir nr Huelo | -- | 1910-12 |
| 16573000 | New Hamakua Ditch at station 1 nr Kailiili | -- | 1912-13 |
| 16574000 | Kailua Str at Haiku-uka boundary nr Kailiili | 0.80 | 1918-28, 1932-34 |
| 16574500 | Kailua Str nr Kailiili | 1.10 | 1963-71 |
| 16575000 | Tenth Br Kailua Str at Haiku-uka nr Kailiili | 0.10 | 1932-33 |
| 16576000 | Ninth Br Kailua Str at Haiku-uka nr Kailiili | 0.20 | 1932-33 |
| 16577000 | Kailua Str nr Huelo | 2.41 | 1910-11, 1912-18,1919-58 |
| 16578000 | New Hamakua Ditch at station 2 nr Huelo | -- | 1912-13 |
| 16579000 | New Hamakua Ditch at station 3 nr Huelo | -- | 1912-13 |
| 16579500 | New Hamakua Ditch at station 4 nr Huelo | -- | 1912-13 |
| 16580000 | Oanui Str nr Huelo | 0.90 | 1910-11, 1913-16 |
| 16582000 | New Hamakua Ditch at station 5 nr Huelo | -- | 1912-13 |
| 16583000 | Old Hamakua Ditch at Kailua nr Huelo | -- | 1919-22 |
| 16584000 | Kailua Str nr Huelo | 3.69 | 1912-13 |
| 16585000 | Hoolawanui Str nr Huelo | 1.34 | 1910-71 |
| 16586000 | Hoolawaliilii Str nr Huelo | 0.55 | 1911-57 |
| 16588000 | Wailoa Ditch at Honopou nr Huelo | -- | 1922-87 |
| 16589000 | New Hamakua Ditch at Honopou nr Huelo | -- | 1918-85 |
| 16590000 | Old Hamakua Ditch at Honopou nr Huelo | -- | 1918-22, 1936-65 |
| 16591000 | Honopou Str at Lowrie Ditch siphon nr Huelo | 2.00 | 1932-47 |
| 16592000 | Lowrie Ditch at Honopou Gulch nr Huelo | -- | 1910-27 |
| 16593000 | Honopou Str above Haiku Ditch nr Huelo | 2.20 | 1930-85 |
| 16594000 | Haiku Ditch at Honopou Gulch nr Kailua | -- | 1910-28, 1930-85 |
| 16595000 | Honopou Str below Haiku Ditch nr Huelo | 2.30 | 1932-47 |
| 16596000 | New Hamakua Ditch at Halehaku weir nr Huelo | -- | 1910-14, 1915-23 |
| 16596200 | Halehaku Gulch nr Kailiili | 0.13 | 1965-71 |
| 16597000 | Halehaku Gulch weir at New Hamakua Dt nr Huelo | -- | 1910-12 |
| 16598000 | Halehaku Gulch nr Huelo | 1.40 | 1910-12 |
| 16599000 | E Br Opana Gulch at Haiku-uka bdry nr Kailiili | 0.60 | 1932-33 |
| 16600000 | Opana Ditch nr Huelo | -- | 1910-12 |
| 16601000 | Opana Str nr Huelo | 3.30 | 1910-12 |
| 16602000 | Kauhikoa Ditch at Opana weir nr Huelo | -- | 1910-13, 1913-15,1916-28 |
| 16602400 | Awalau Gulch nr Kailiili | 0.23 | 1965-71 |
| 16603000 | Kaluanui Ditch at Puuomalei nr Hamakuapoko | -- | 1910-12 |
| 16604000 | Iao Str nr Wailuku | -- | 1910-15 |
| 16605000 | Maniania Ditch nr Wailuku | -- | 1910-13 |
| 16608000 | North Waiehu Str nr Wailuku | 0.90 | 1912-15 |
| 16609000 | North Waiehu Ditch nr Wailuku | -- | 1910-11, 1916-17 |
| 16609500 | North Waiehu Str bl N Waiehu Ditch nr Wailuku | 0.90 | 1910-11 |
| 16610000 | South Waiehu Str nr Wailuku | 0.70 | 1910-17 |
| 16611000 | South Waiehu Ditch nr Wailuku | -- | 1913 |
| 16612000 | Waihee River nr Waihee | 3.90 | 1913-17 |

WATER RESOURCES DATA FOR HAWAII, 1996
DISCONTINUED GAGING STATIONS--Continued

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| Station number | Station name | Drainage area (mi ²) | Period of record |
|---------------------------|--|-------------------------------------|------------------------------------|
| ISLAND OF MAUI--Continued | | | |
| 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 |
| 16620000 | Honokohau Str nr Honokohau | 4.11 | 1911, 1913-20, 1922-88 |
| 16621000 | Honokohau Ditch intake nr Honokohau | -- | 1907-13 |
| 16622000 | Honokohau Ditch above Honolua Str nr Honolohau | -- | 1910-11 |
| 16623000 | Honolua Str nr Honokohau | 2.90 | 1913-17 |
| 16624000 | Honokohau Ditch at Honokowai weir nr Lahaina | -- | 1910-12 |
| 16625000 | Honolua Ditch nr Honokohau | -- | 1911-12 |
| 16626000 | Honolua Str at Honolua Ranch nr Honokahau | 3.96 | 1911 |
| 16627000 | Kapalooa Str at weir 1 nr Lahaina | 1.00 | 1901 |
| 16628000 | Kapalooa 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 | | | |
| 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 |
| 16717500 | Kawainui Str nr Pepekeo | 9.20 | 1912 |
| 16717820 | Manowaiopae Str nr Laupahoe | 1.04 | 1965-71 |
| 16718000 | Upper Hamakua Ditch at Puualala nr Kukuihaele | -- | 1913-20 |

WATER RESOURCES DATA FOR HAWAII, 1996
DISCONTINUED GAGING STATIONS--Continued

| Station number | Station name | Drainage area (mi ²) | Period of record |
|-----------------------------|---|-------------------------------------|---|
| ISLAND OF HAWAII--Continued | | | |
| 16721000 | Kawainui Str at alt. 2,120 ft nr Waipio | 3.48 | 1901-02 |
| 16721500 | Br 3 Kawainui Str at alt. 1,700 ft nr Waipio | 3.90 | 1901-02 |
| 16722000 | Kawainui Str at alt. 1,435 ft nr Waipio | 4.43 | 1901-02 |
| 16722300 | Br 3 Kawainui Str at alt. 1,405 ft nr Waipio | 0.47 | 1901-02 |
| 16722600 | Br 1 Kawainui Str at alt. 1,380 ft nr Waipio | 5.19 | 1901-02 |
| 16723000 | Kawainui Str nr Waipio | 5.55 | 1901-02 |
| 16724000 | Kawainui Str at alt. 775 ft nr Waipio | 6.00 | 1901-02 |
| 16728000 | Alakahi Str at alt. 1,200 ft nr Waipio | 1.49 | 1901-02 |
| 16729000 | Alakahi Str at alt. 730 ft. nr Waipio | 3.14 | 1901-02 |
| 16730000 | Koiawe Str at alt. 1,120 ft. nr Waipio | 1.65 | 1901-02 |
| 16731000 | Koiawe Str at alt. 610 ft. nr Waipio | 2.23 | 1901-02 |
| 16732000 | Waipio Str below Koiawe Str nr Waipio | 11.70 | 1901-02 |
| 16732100 | Waima Str at alt. 790 ft. nr Waipio | 0.51 | 1901-02 |
| 16732150 | Waima Str at alt. 385 ft nr Waipio | 0.77 | 1901-02 |
| 16732200 | Wailoa Str nr Waipio | 14.30 | 1901-02, 1911-12, 1964-69 |
| 16732300 | Upper Hamakua Ditch at Puualala and Res No. 3 | -- | 1913-20 |
| 16732600 | Lower Hamakua Ditch at Waima flume nr Kukuihaele | -- | 1910-13 |
| 16732900 | Lower Hamakua Ditch at main weir nr Kukuihaele | -- | 1910-20 |
| 16733000 | Lower Hamakua Ditch wasteway nr Kukuihaele | -- | 1964-73 |
| 16733100 | Lower Hamakua Ditch bl main weir nr Kukuihaele | -- | 1964-73 |
| 16733200 | Honokaa diversion at Honokaa | -- | 1964-73 |
| 16733300 | Lower Hamakua Ditch bl Honokaa div at Honokaa | -- | 1964-73 |
| 16737000 | Waiilikahi Str nr Waimanu | 0.76 | 1939-60 |
| 16738000 | Kaimu Str nr Waimanu | 0.90 | 1939-47, 1950-52 |
| 16739000 | Punalulu Str nr Waimanu | 0.66 | 1939-52 |
| 16740000 | Waiaalala Str nr Waimanu | 0.12 | 1939-52 |
| 16741000 | Paopao Str nr Waimanu | 0.32 | 1939-52 |
| 16742000 | Kukui Str nr Waimanu | 0.22 | 1939-52, 1959-66 |
| 16743000 | Awini Ditch at E Honokane iki Gulch nr Niulii | -- | 1927-38, 1938-49, 1950-72 |
| 16744000 | E Honokane iki intake to Awini Ditch nr Niulii | -- | 1927-36, 1937-38, 1939-40, 1940-49, 1951-72 |
| 16745000 | Awini Ditch above Honokane Gulch nr Kohala | -- | 1918 |
| 16745500 | Awini Ditch at Awini Weir nr Kohala | -- | 1907-17 |
| 16747000 | E Br Honokane nui Str at alt 1,300 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 |
| 16765000 | Hilea Gulch tributary 2 nr Honuapo | 1.86 | 1966-82 |
| 16767000 | Ninole Gulch nr Punaluu | 15.5 | 1966-82 |
| 16770500 | Paauau Gulch at Pahala | 1.74 | 1962-79 |

WATER RESOURCES DATA FOR HAWAII, 1996
DISCONTINUED WATER-QUALITY STATIONS

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

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

| Station number | Station name | Drainage area (mi ²) | Type of record | Period of record |
|-------------------------|---------------------------------------|-------------------------------------|----------------|------------------|
| ISLAND OF OAHU | | | | |
| 16212800 | Kipapa Str nr Wahiawa | 4.29 | S | 1973-82 |
| 16213000 | Waikele Str nr Waipahu | 45.70 | C,T | 1973-81 |
| | | | S | 1972-93 |
| 16227500 | Moanalua Str nr Kaneohe, | 0.94 | S | 1971-78 |
| 16270500 | Kamooalii Str blw Kuou Str nr Kaneohe | 3.21 | S | 1972-76 |
| ISLAND OF HAWAII | | | | |
| 16704000 | Wailuku River at Piihonua, Hawaii, HI | 125.00 | C | 1975-78 |
| | | | T | 1975-79 |
| 16713000 | Wailuku River at Hilo, Hawaii, HI | 256.00 | S | 1977-79, 1980-83 |
| | | | C,T | 1982-84, 1984-85 |

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WATER RESOURCES DATA - HAWAII, 1996

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

This report includes records on both surface and ground water in the State. Specifically, it contains: (1) Discharge records for 87 stream-gaging stations, 4 miscellaneous streamflow stations, and 107 crest-stage partial-record streamflow stations; (2) water-quality records for 11 streamflow-gaging stations, and 19 partial-record streamflow stations; (3) water-level records for 66 observation wells; (4) water-quality records for 155 observation wells; and (5) accumulated rainfall records for 43 rainfall stations.

This series of annual reports for Hawaii and other Pacific areas 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 other Pacific areas) and for several water years concurrent with it, water-resources data for Hawaii and other Pacific areas were published in U.S. Geological Survey Water-Supply Papers. Data on stream discharge and stage and on lake or reservoir contents and stage, through September 1960, were published annually under the title "Surface-Water Supply of the United States." The records in Hawaii were contained in the series as "Surface Water Supply of Hawaii." Records for other Pacific areas were contained in one volume entitled, "Surface Water Supply of Mariana, Caroline, and Samoa Islands." For the 1961 through 1970 water years, the data were published in two 5-year reports. Data on chemical quality, temperature, and suspended sediment for the 1941 through 1970 water years were published annually under the title "Quality of Surface Waters of the United States," and water levels for the 1935 through 1974 water years were published under the title "Ground-Water Levels in the United States." These Water-Supply Papers may be consulted in the libraries of the principal cities in the United States, or if 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-96-1." 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 Chief at the address given on the back of the title page or by telephone (808) 522-8290.

COOPERATION

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

Hawaii Department of Land and Natural Resources, Commission of Water Resource Management,
Rae Loui, Deputy Director.

Hawaii Department of Transportation, Kazu Hayashida, Director.

Hawaii Department of Agriculture, Paul Matsuo, Administrator.

City and County of Honolulu, Board of Water Supply, Raymond Sato, Manager and Chief Engineer.

City and County of Honolulu, Department of Public Works, Johathan K. Shimada, Ph.D., Director and Chief Engineer.

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

The following organizations aided in collecting records:

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

SUMMARY OF HYDROLOGIC CONDITIONS

Surface Water

Runoff during the 1996 water year was normal at the index stations on the islands of Oahu and Maui, excessive (upper 25 percent of record) at the index station on the island of Kauai, and deficient (lower 25 percent of record) at the index station on the island of Hawaii. The monthly mean flow for all index stations was normal for the month of January and deficient for the month of May.

The annual mean discharge at East Branch of North Fork Wailua River near Lihue, Kauai was 121 percent of the 1961-90 median, 81 percent at Kalihi Stream near Honolulu, Oahu, and 116 percent at Honopou Stream near Huelo, Maui. The annual mean discharge at Honolii Stream near Papaikou, Hawaii was 71 percent of the 1967-90 median.

Monthly and yearly mean discharges of the four index stations are compared with their medians in figure 1. Comparisons of 1996 peak discharge to peaks for period of record at the index stations are shown in Table 1.

Table 1.--Comparison of peak discharge for 1996 water year with the peak discharge for the period of record at four representative stations

| Station Number | Station name | Water year 1996 | | 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 | Nov. 3 | 7,650 | Nov. 12, 1955 | 18,400 |
| 16229000 | Kalihi Stream near Honolulu, Oahu | Jan. 25 | 1,060 | Nov. 18, 1930 | 12,400 |
| 16587000 | Honopou Stream near Huelo, Maui | Jan. 18 | 1,350 | Nov. 18, 1930 | 5,710 |
| 16717000 | Honolii Stream near Papaikou, Hawaii | Mar. 3 | 11,500 | May 23, 1978 | 22,600 |

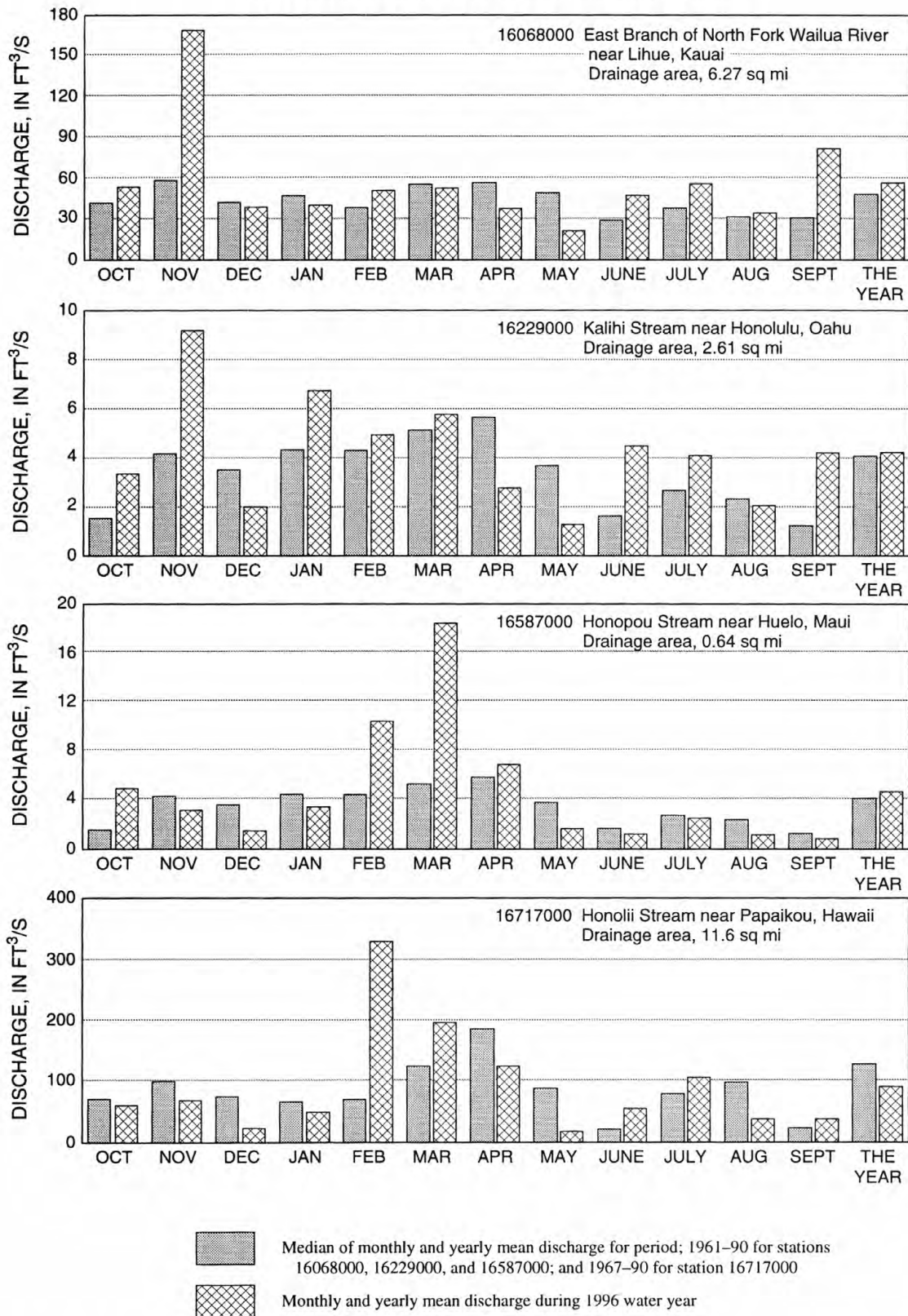


Figure 1. Discharge during 1996 water year compared with median discharge for four representative gaging stations.

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; and (3) provide the scientific basis and nationwide evaluation mechanism for implementation of the Phase II CAAA emission reductions for SO₂ and NO_x 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.nrel.colostate.edu/NADP>

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

EXPLANATION OF THE RECORDS

The surface-water and ground-water records published in this report are for the 1996 water year that began October 1, 1995, and ended September 30, 1996. 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 4-14 and 16-25. 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 indentation in the "List of Stations" in the front of this report. Each indentation represents one rank. This downstream order and system of indentation 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 to have a same 6-digit number for wells on different islands, another digit distinguishing each of the islands is added in front of the 6-digit number with a dash separator.

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.

| <u>Island</u> | <u>State Key Number</u> |
|---------------|-------------------------|
| 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 daily discharges may be computed for any time, or any period of time, during the period of record. Complete records of lake or reservoir content, similarly, are those for which stage or content may be computed or estimated with reasonable accuracy for any time, or 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 daily mean stages (gage heights) to the stage-discharge curves or tables. If the stage-discharge relation is subject to change because of frequent or continual change in the physical features that form the control, the daily mean discharge is determined by the shifting-control method, in which correction factors based on individual discharge measurements and notes of the personnel making the measurements are applied to the gage heights before the discharges are determined from the curves or tables. This shifting-control method also is used if the stage-discharge relation is changed temporarily because of aquatic growth or debris on the control.

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

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

For some gaging stations there are periods when no gage-height record is obtained, or the validity of the recorded gage height is so questionable that it cannot be used to compute daily discharge or contents. This happens when the recorder stops or otherwise fails to operate properly, intakes are plugged, or for various other reasons. For such periods, the daily discharges are estimated from the recorded range in stage, previous and following record, discharge measurements, weather records, and comparison with other 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.)

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

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

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

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

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

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

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

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

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

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

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 ft³/s; the nearest tenths between 1.0 and 10 ft³/s; to whole numbers between 10 and 1,000 ft³/s; and to 3 significant figures for more than 1,000 ft³/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 measurements 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 5-14.

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. To assure that measurements made in the laboratory also represent the in situ water, carefully prescribed procedures need to be followed in collecting the samples, treating the samples to prevent changes in quality pending analysis, and shipping the samples to the laboratory. Procedures for on site measurements and for collecting, treating, and shipping samples are detailed in the TWRI Book 1, Chapter D2; Book 3, Chapter C2; and Book 5, Chapters A1, A3, and A4. 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 taken at time of discharge measurements for water-discharge stations. For stations where water temperatures are taken manually once or twice daily, the water temperatures are taken at about the same time each day. Large streams have a small diurnal temperature change; shallow streams may have a daily range of several degrees and may follow closely the changes in air temperature. Some streams may be affected by waste-heat discharges.

At stations where recording instruments are used, maximum, minimum, and mean temperatures for each day are published. Water temperatures measured at the time of water-discharge measurements are on file in the 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 mean daily streamflow, mean daily 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. 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, WATSTORE, and subsequently by monthly transfer of update transactions to the U.S. Environmental Protection Agency's STORET system. Because the usual volume of updates makes it impractical to document individual changes in the State data-report series or elsewhere, potential users of U.S. Geological Survey water-quality data are encouraged to obtain all required data from the appropriate computer file.

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

Remark Codes

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

| <u>PRINTED OUTPUT</u> | <u>REMARK</u> |
|-----------------------|---|
| 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). |
| & | Biological organism estimated as dominant. |

Dissolved Trace-Element Concentrations

*NOTE.--Traditionally, dissolved trace-element concentrations have been reported at the microgram per liter ($\mu\text{g/L}$) 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 $\mu\text{g/L}$ 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/NTN Coordination Office, Colorado State University, Fort Collins, CO 80532 (Telephone: 303-491-5643).

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 6).

Water-level records are obtained from direct measurements with a steel or electrical tape or from the graph, digital record, or punched tape of a water-stage recorder. The water-level measurements in this report are given in feet with reference to either mean sea level (msl) or land-surface datum (lsd). Mean sea level is the datum plane on which the national network of precise levels is based; land-surface datum is a datum plane that is approximately at land surface at each well. If known, the altitude of the land-surface datum above mean sea level is given in the well description. The height of the measuring point (MP) above or below land-surface datum is given in each well description. Water levels in wells equipped with recording gages are reported every day. When complete water-level data for a day is not available, the day is noted with three dashes (---). To show the intraday variation in the ground-water levels caused by local pumping and tidal fluctuations, instantaneous maximum and minimum water levels for the year are given at the bottom of each daily tables.

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 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). The highest and lowest water levels of the water year and their dates of occurrence are shown on a line below the abbreviated table. Because all values are not published for wells with recorders, the extremes may be values that are not listed in the table. Missing records are indicated by dashes in place of the water level.

ACCESS TO WATSTORE DATA

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

- Station Header File - Contains descriptive information on more than 440,000 sites throughout the United States and its territories where the U.S. Geological Survey collects or has collected data.
- Daily Values File - Contains more than 220 million daily values of stream flows, stages, reservoir contents, water temperatures, specific conductances, sediment concentrations, sediment discharges, and ground-water levels.
- Peak Flow File - Contains approximately 500,000 maximum (peak) streamflow and gage-height values at surface-water sites.
- Water Quality File - Contains approximately 2 million analyses of water samples that describe the chemical, physical, biological, and radio-chemical characteristics of both surface and ground water.
- Ground-Water Site Inventory Data Base - Contains inventory data for more than 900,000 wells, springs, and other sources of ground water. The data includes site location, geohydrologic characteristics, well-construction history, and one-time field measurements such as water temperature.

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

U.S. Geological Survey
National Water Data Exchange
421 USGS National Center
Reston, Virginia 20192

In addition to providing direct access to WATSTORE, data can be provided in various machine-readable formats on magnetic tape or 5¹/₄ 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's District offices. (See address on the back of the title page).

DEFINITION OF TERMS

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Ash mass is the mass or amount of residue present after the residue from the dry mass determination has been ashed in a muffle furnace at a temperature of 500°C for 1 hour. The ash mass values of zooplankton and phytoplankton are expressed in g/m³ (grams per cubic meter), and periphyton and benthic organisms in g/m² (grams per square meter).

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

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

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

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

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

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

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

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

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

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

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

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

1. When chemical samples are collected daily or monthly for 10 or more months during the water year.
2. When water temperature records include observations taken one or more times daily.
3. When sediment discharge records include those periods for which sediment loads are computed and are considered to be representative of the runoff for the water year.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Hydrologic Bench-Mark Network is a network of 53 sites in small drainage basins around the country whose purpose is to provide consistent data on the hydrology, including water quality, and related factors in representative undeveloped watersheds nationwide, and to provide analyses on a continuing basis to compare and contrast conditions observed in basins more obviously affected by the human activities.

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

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

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

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

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

National Stream-Quality Accounting Network (NASQAN) is a nationwide data-collection network designed by the U.S. Geological Survey to meet many of the information needs of government agencies and other groups involved in national or regional water-quality planning and management. The 284 sites in NASQAN are generally located at the downstream ends of hydrologic accounting units designated by the U.S. Geological Survey Office of Water Data Coordination in consultation with the Water Resources Council. The objective of NASQAN is to obtain information on the quality and quantity of water moving within and from the United States through a systematic and uniform process of data collection, summarization, analysis, and reporting. The design of the network is intended to provide data for (1) description of the areal variability of water quality in the Nation's rivers through analysis of data from this and other programs, (2) detection of changes or trends with time in the pattern of occurrence of water-quality characteristics, and (3) a nationally consistent data base useful for water-quality assessment and hydrologic research.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Zooplankton is the animal part of the plankton. Zooplankton are capable of extensive movements within the water column and are often 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.

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.

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

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

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

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

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

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

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

Solute is any substance that is dissolved in water.

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

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

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. Streamflow includes water and all constituents transported by water in the stream.

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

Suspended recoverable is the amount of a given constituent that is in solution after the part of a representative water-suspended sediment sample that is retained on a 0.45 micrometer membrane filter has been digested by a method (usually using a dilute acid solution) that results in dissolution of only readily soluble substances. Complete dissolution of all the particulate matter is not achieved by the digestion treatment and thus the determination represents something less than the "total" amount (that is, less than 95 percent) of the constituent present in the sample. To achieve 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.

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

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

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

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

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

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

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

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

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

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

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

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

Water year in U.S. Geological Survey 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. Thus the year ending September 30, 1994, is called the "1994 water year".

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

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

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

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

PUBLICATIONS ON TECHNIQUES OF WATER-RESOURCES INVESTIGATIONS

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

The reports listed below are for sale by the U.S. Geological Survey, Branch of Information Services, Box 25286, Federal Center, Denver, Colorado 80225 (authorized agent of the Superintendent of Documents, Government Printing Office). Prepayment is required. Remittance should be sent by check or money order payable to the U.S. Geological Survey. Prices are not included because they are subject to change. Current prices can be obtained by writing to the above address. When ordering or inquiring about prices for any of these publications, please give the title, book number, chapter number, and "U.S. Geological Survey Techniques of Water-Resources Investigations."

- 1-D1. *Water temperature--influential factors, field measurement, and data presentation*, by H.H. Stevens, Jr., J.F. Ficke, and G.F. Smoot: USGS--TWRI Book 1, Chapter D1. 1975. 65 pages.
- 1-D2. *Guidelines for collection and field analysis of ground-water samples for selected unstable constituents*, by W.W. Wood: USGS--TWRI Book 1, Chapter D2. 1976. 24 pages.
- 2-D1. *Application of surface geophysics to ground-water investigations*, by A.A.R. Zohdy, G.P. Eaton, and D.R. Mabey: USGS--TWRI Book 2, Chapter D1. 1974. 116 pages.
- 2-D2. *Application of seismic-refraction techniques to hydrologic studies*, by F.P. Haeni: USGS--TWRI Book 2, Chapter D2. 1988. 86 pages.
- 2-E1. *Application of borehole geophysics to water-resources investigations*, by W.S. Keys and L.M. MacCary: USGS--TWRI Book 2, Chapter E1. 1971. 126 pages.
- 2-E2. *Borehole geophysics applied to ground-water investigations*, by W.S. Keys: USGS--TWRI Book 2, Chapter E2. 1990. 150 pages.
- 2-F1. *Application of drilling, coring, and sampling techniques to test holes and wells*, by Eugene Shuter and W.E. Teasdale: USGS--TWRI Book 2, Chapter F1. 1989. 97 pages.
- 3-A1. *General field and office procedures for indirect discharge measurements*, by M.A. Benson and Tate Dalrymple: USGS--TWRI Book 3, Chapter A1. 1967. 30 pages.
- 3-A2. *Measurement of peak discharge by the slope-area method*, by Tate Dalrymple and M.A. Benson: USGS--TWRI Book 3, Chapter A2. 1967. 12 pages.
- 3-A3. *Measurement of peak discharge at culverts by indirect methods*, by G.L. Bodhaine: USGS--TWRI Book 3, Chapter A3. 1968. 60 pages.
- 3-A4. *Measurement of peak discharge at width contractions by indirect methods*, by H.F. Matthai: USGS--TWRI Book 3, Chapter A4. 1967. 44 pages.
- 3-A5. *Measurement of peak discharge at dams by indirect methods*, by Harry Hulsing: USGS--TWRI Book 3, Chapter A5. 1967. 29 pages.
- 3-A6. *General procedure for gaging streams*, by R.W. Carter and Jacob Davidian: USGS--TWRI Book 3, Chapter A6. 1968. 13 pages.
- 3-A7. *Stage measurement at gaging stations*, by T.J. Buchanan and W.P. Somers: USGS--TWRI Book 3, Chapter A7. 1968. 28 pages.
- 3-A8. *Discharge measurements at gaging stations*, by T.J. Buchanan and W.P. Somers: USGS--TWRI Book 3, Chapter A8. 1969. 65 pages.
- 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, Chapter A9. 1989. 27 pages.

PUBLICATIONS ON TECHNIQUES OF WATER-RESOURCES INVESTIGATIONS--Continued

- 3-A10. *Discharge ratings at gaging stations*, by E.J. Kennedy: USGS--TWRI Book 3, Chapter A10. 1984. 59 pages.
- 3-A11. *Measurement of discharge by the moving-boat method*, by G.F. Smoot and C.E. Novak: USGS--TWRI Book 3, Chapter A11. 1969. 22 pages.
- 3-A12. *Fluorometric procedures for dye tracing*, Revised, by J.F. Wilson, Jr., E.D. Cobb, and F.A. Kilpatrick: USGS--TWRI Book 3, Chapter A12. 1986. 34 pages.
- 3-A13. *Computation of continuous records of streamflow*, by E. J. Kennedy: USGS--TWRI Book 3, Chapter A13. 1983. 53 pages.
- 3-A14. *Use of flumes in measuring discharge*, by F.A. Kilpatrick and V.R. Schneider: USGS--TWRI Book 3, Chapter A14. 1983. 46 pages.
- 3-A15. *Computation of water-surface profiles in open channels*, by Jacob Davidian: USGS--TWRI Book 3, Chapter A15. 1984. 48 pages.
- 3-A16. *Measurement of discharge using tracers*, by F.A. Kilpatrick and E.D. Cobb: USGS--TWRI Book 3, Chapter A16. 1985. 52 pages.
- 3-A17. *Acoustic velocity meter systems*, by Antonius Laenen: USGS--TWRI Book 3, Chapter A17. 1985. 38 pages.
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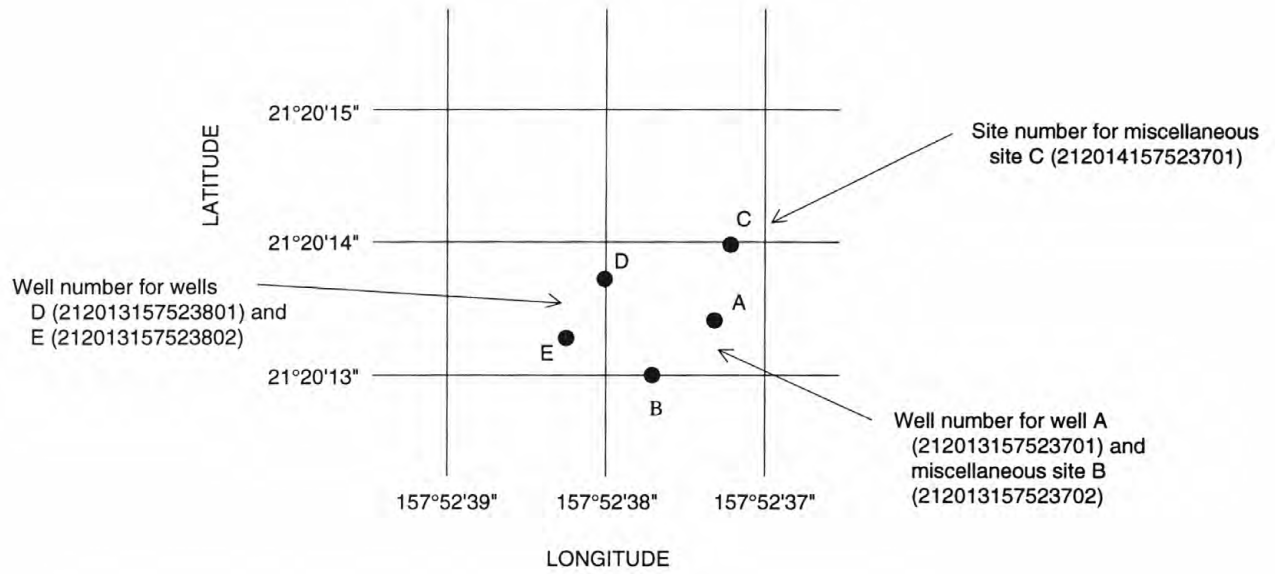


Figure 2. Sketch showing system for numbering wells and miscellaneous sites.

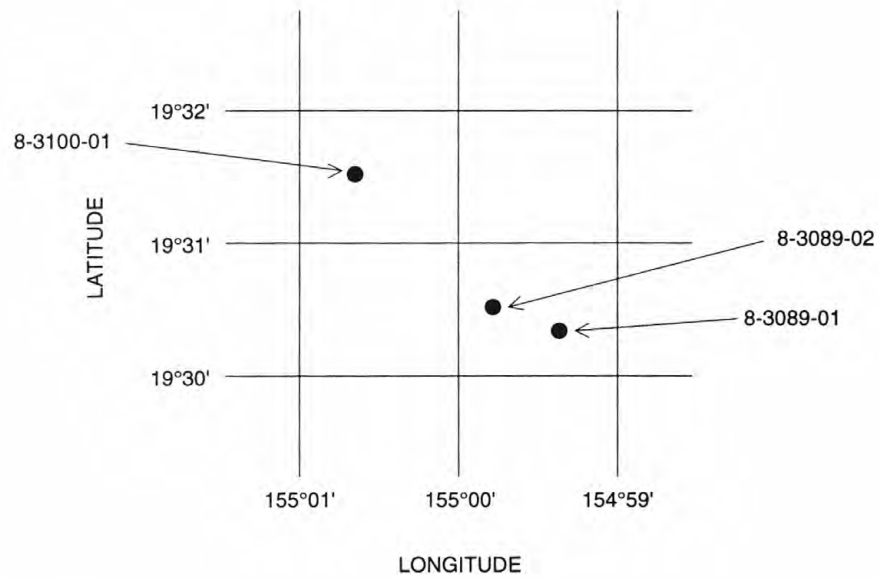


Figure 3. Sketch showing local well-numbering system.

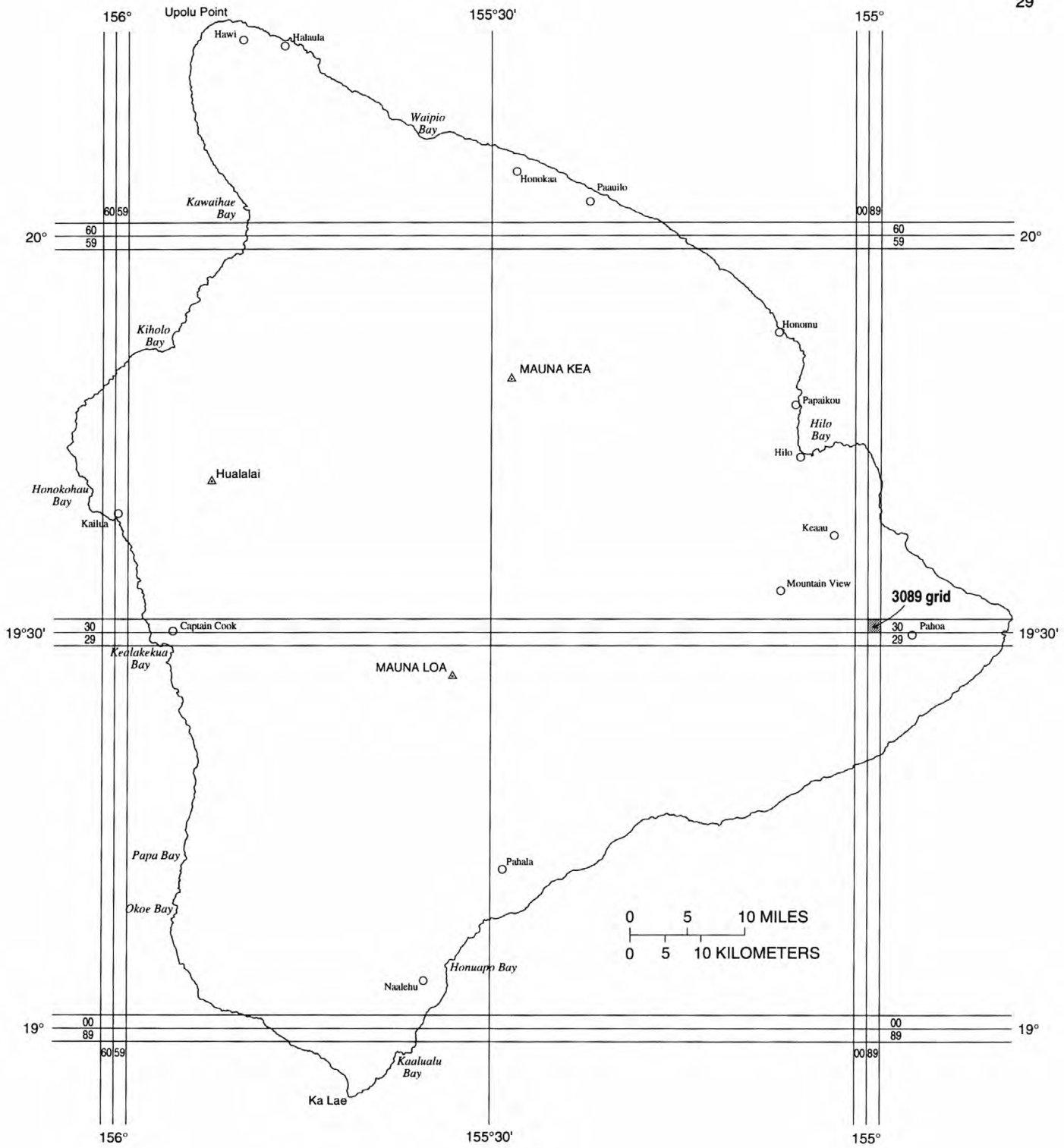


Figure 4. Map of island of Hawaii showing system for numbering local well numbers.

Surface-Water Station Records
for Kauai

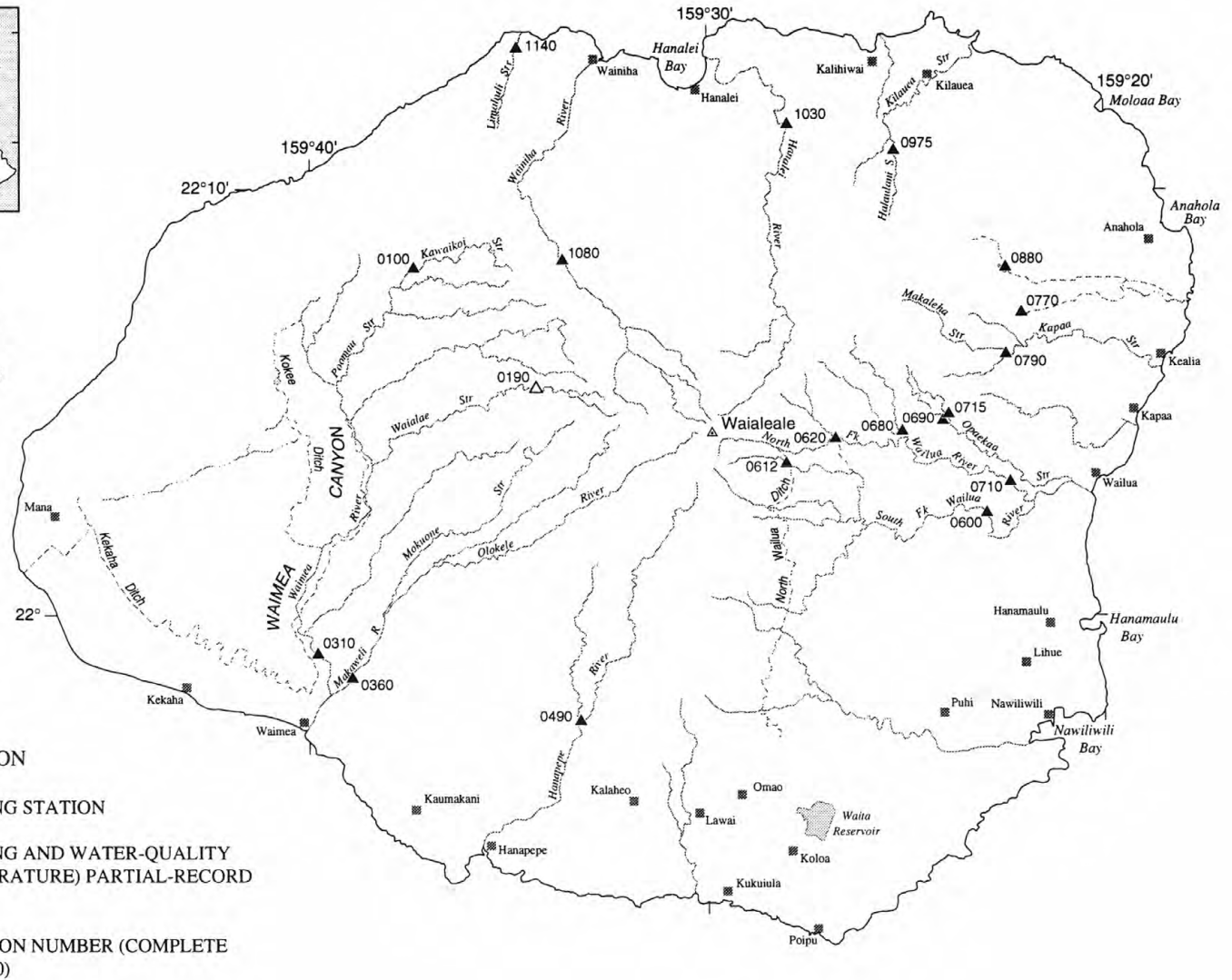
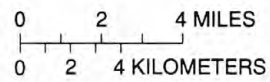
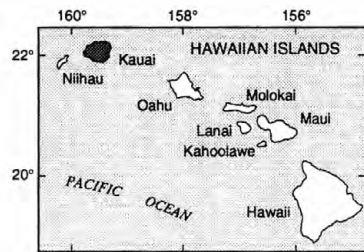


Figure 5. Locations of gaging, water-quality, and partial-record stations on Kauai.

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 mi².

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 good. No diversion upstream.

AVERAGE DISCHARGE.--79 years (water years 1912, 1914, 1920-96), 34.2 ft³/s (24,790 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 11,300 ft³/s, January 13, 1967, gage height, 15.33 ft, from rating curve extended above 470 ft³/s on basis of slope-area measurements at gage heights 12.12 ft and 13.43 ft; minimum, 1.14 ft³/s, September 21, 22, 1953.

EXTREMES FOR CURRENT YEAR.--Peak discharge greater than base discharge of 2,100 ft³/s and maximum (*):

| Date | Time | Discharge (ft ³ /s) | Gage height (ft) | Date | Time | Discharge (ft ³ /s) | Gage height (ft) |
|---------|------|-----------------------------------|---------------------|---------|------|-----------------------------------|---------------------|
| Nov. 03 | 1230 | *4,030 | *10.04 | Mar. 03 | 0500 | 2,260 | 7.97 |
| Jan. 18 | 0400 | 3,580 | 9.55 | Jun. 30 | 0800 | 2,940 | 8.81 |

Minimum discharge, 2.5 ft³/s, June 5, 6.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
 DAILY MEAN VALUES

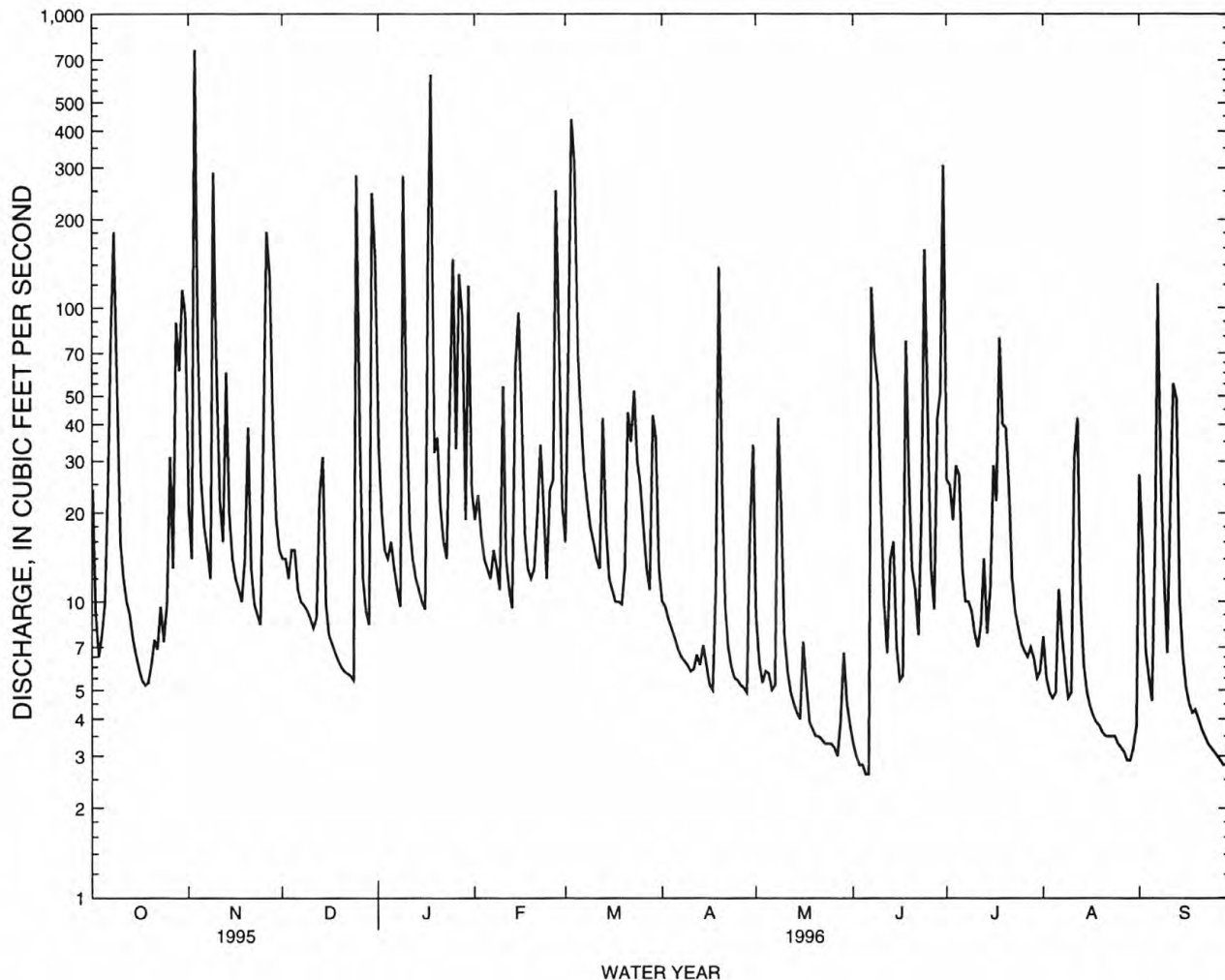
| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|-------|--------|--------|--------|-------|--------|-------|-------|--------|-------|-------|-------|
| 1 | 24 | 21 | 14 | 34 | 19 | 16 | 10 | 8.9 | 3.3 | 26 | 7.6 | 27 |
| 2 | 9.1 | 14 | 14 | 20 | 23 | 72 | 9.6 | 6.2 | 3.0 | 25 | 5.5 | 16 |
| 3 | 6.5 | 757 | 12 | 15 | 17 | 439 | 8.7 | 5.3 | 2.8 | 19 | 4.9 | 6.8 |
| 4 | 7.6 | 76 | 15 | 14 | 14 | 316 | 8.1 | 5.8 | 2.8 | 29 | 4.7 | 5.5 |
| 5 | 9.8 | 26 | 15 | 16 | 13 | 69 | 7.5 | 5.7 | 2.6 | 27 | 4.9 | 4.6 |
| 6 | 26 | 18 | 11 | 13 | 12 | 43 | 6.9 | 5.0 | 2.6 | 13 | 11 | 15 |
| 7 | 84 | 15 | 10 | 11 | 15 | 28 | 6.5 | 5.2 | 117 | 10 | 7.7 | 121 |
| 8 | 181 | 12 | 9.7 | 9.6 | 13 | 22 | 6.3 | 42 | 69 | 10 | 5.9 | 26 |
| 9 | 53 | 289 | 9.3 | 281 | 11 | 18 | 6.1 | 20 | 55 | 9.3 | 4.7 | 12 |
| 10 | 16 | 61 | 8.7 | 43 | 54 | 16 | 5.8 | 7.7 | 22 | 7.8 | 4.9 | 6.7 |
| 11 | 12 | 22 | 8.1 | 18 | 14 | 14 | 5.9 | 5.8 | 10 | 7.0 | 31 | 21 |
| 12 | 10 | 16 | 8.8 | 14 | 11 | 13 | 6.6 | 4.9 | 6.7 | 8.4 | 42 | 55 |
| 13 | 9.1 | 60 | 23 | 12 | 9.5 | 42 | 6.1 | 4.5 | 14 | 14 | 10 | 49 |
| 14 | 7.5 | 20 | 31 | 11 | 63 | 18 | 7.1 | 4.2 | 16 | 7.8 | 6.1 | 10 |
| 15 | 6.6 | 14 | 9.8 | 10 | 96 | 12 | 6.1 | 4.0 | 7.1 | 11 | 4.9 | 6.5 |
| 16 | 5.9 | 12 | 7.7 | 9.4 | 42 | 11 | 5.2 | 7.3 | 5.4 | 29 | 4.4 | 5.1 |
| 17 | 5.4 | 11 | 7.2 | 150 | 17 | 10 | 5.0 | 5.2 | 5.6 | 22 | 4.1 | 4.5 |
| 18 | 5.2 | 10 | 6.7 | 623 | 13 | 10 | 11 | 3.9 | 77 | 79 | 3.9 | 4.2 |
| 19 | 5.3 | 14 | 6.3 | 32 | 12 | 9.8 | 138 | 3.7 | 26 | 40 | 3.8 | 4.3 |
| 20 | 6.1 | 39 | 6.0 | 36 | 13 | 13 | 25 | 3.5 | 13 | 39 | 3.6 | 4.0 |
| 21 | 7.4 | 13 | 5.8 | 21 | 20 | 44 | 9.6 | 3.5 | 11 | 24 | 3.5 | 3.7 |
| 22 | 6.9 | 9.8 | 5.7 | 16 | 34 | 35 | 7.0 | 3.4 | 7.7 | 12 | 3.5 | 3.5 |
| 23 | 9.6 | 9.0 | 5.6 | 14 | 21 | 52 | 6.0 | 3.3 | 21 | 9.2 | 3.5 | 3.3 |
| 24 | 7.3 | 8.3 | 5.4 | 48 | 12 | 30 | 5.5 | 3.3 | 158 | 8.1 | 3.5 | 3.2 |
| 25 | 9.8 | 43 | 282 | 146 | 24 | 25 | 5.4 | 3.3 | 43 | 7.2 | 3.3 | 3.1 |
| 26 | 31 | 181 | 37 | 33 | 26 | 18 | 5.2 | 3.2 | 13 | 6.8 | 3.2 | 3.0 |
| 27 | 13 | 128 | 12 | 130 | 251 | 13 | 5.1 | 3.0 | 9.4 | 6.5 | 3.1 | 2.9 |
| 28 | 89 | 37 | 9.2 | 94 | 73 | 11 | 4.9 | 3.9 | 42 | 7.0 | 2.9 | 2.8 |
| 29 | 61 | 19 | 8.3 | 19 | 21 | 43 | 17 | 6.7 | 51 | 6.4 | 2.9 | 2.8 |
| 30 | 115 | 15 | 246 | 119 | --- | 36 | 34 | 4.5 | 306 | 5.5 | 3.2 | 3.3 |
| 31 | 95 | --- | 150 | 24 | --- | 13 | --- | 3.8 | --- | 5.8 | 3.8 | --- |
| TOTAL | 935.1 | 1970.1 | 1000.3 | 2036.0 | 963.5 | 1511.8 | 391.2 | 200.7 | 1123.0 | 531.8 | 212.0 | 435.8 |
| MEAN | 30.2 | 65.7 | 32.3 | 65.7 | 33.2 | 48.8 | 13.0 | 6.47 | 37.4 | 17.2 | 6.84 | 14.5 |
| MAX | 181 | 757 | 282 | 623 | 251 | 439 | 138 | 42 | 306 | 79 | 42 | 121 |
| MIN | 5.2 | 8.3 | 5.4 | 9.4 | 9.5 | 9.8 | 4.9 | 3.0 | 2.6 | 5.5 | 2.9 | 2.8 |
| AC-FT | 1850 | 3910 | 1980 | 4040 | 1910 | 3000 | 776 | 398 | 2230 | 1050 | 421 | 864 |

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1911 - 1996, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|------|------|------|------|------|------|------|------|------|------|------|------|------|
| MEAN | 21.9 | 43.7 | 53.4 | 53.4 | 42.0 | 49.1 | 44.9 | 26.8 | 16.9 | 23.5 | 21.8 | 14.6 |
| 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 |

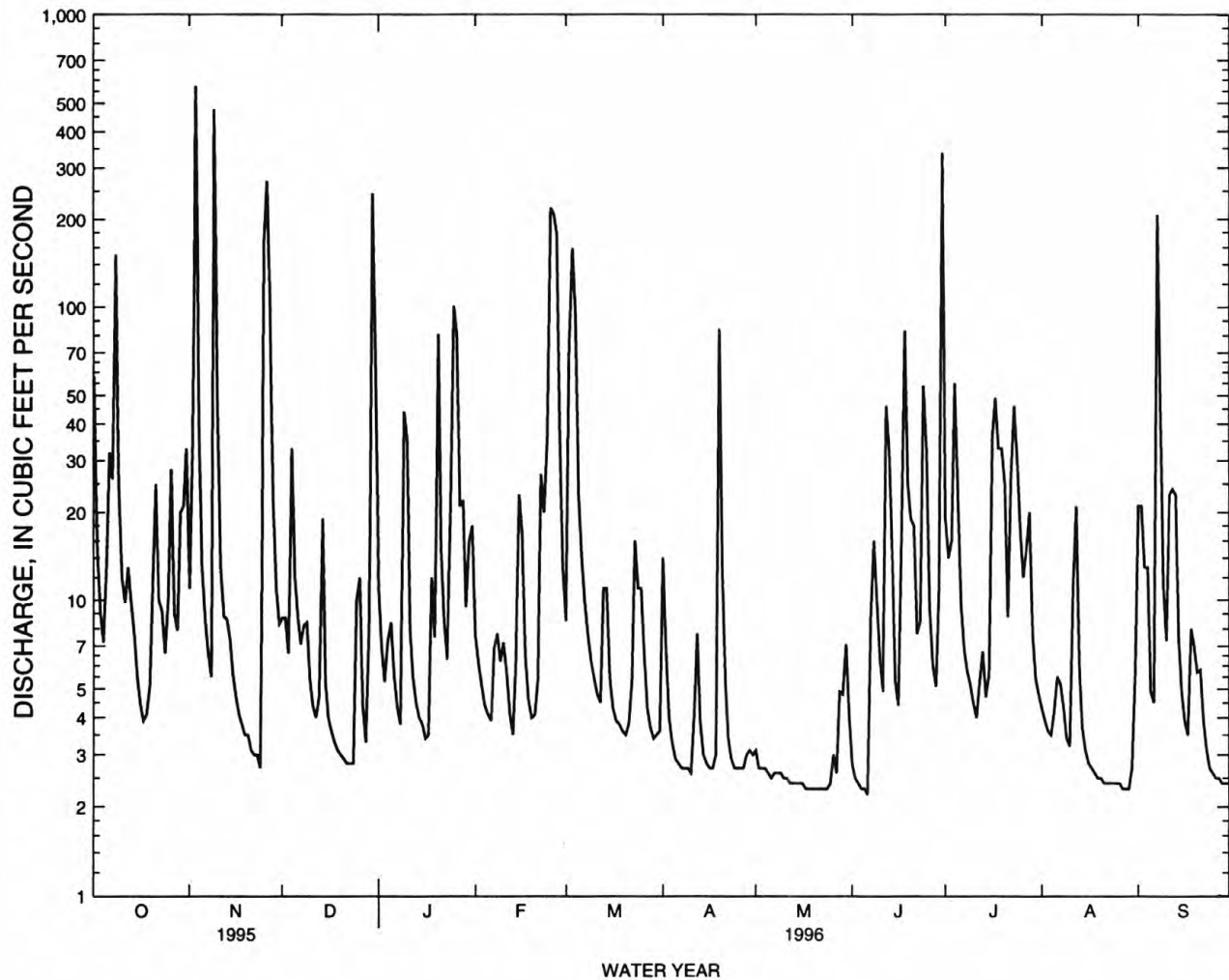
HAWAII, ISLAND OF KAUAI
 16010000 KAWAIKOI STREAM NEAR WAIMEA--Continued

| SUMMARY STATISTICS | FOR 1995 CALENDAR YEAR | FOR 1996 WATER YEAR | WATER YEARS 1911 - 1996 | |
|--------------------------|------------------------|---------------------|-------------------------|-------------|
| ANNUAL TOTAL | 9737.0 | 11311.3 | | |
| ANNUAL MEAN | 26.7 | 30.9 | 34.2 | |
| HIGHEST ANNUAL MEAN | | | 60.7 | 1982 |
| LOWEST ANNUAL MEAN | | | 15.3 | 1945 |
| HIGHEST DAILY MEAN | 757 Nov 3 | 757 Nov 3 | 2620 | Jan 15 1921 |
| LOWEST DAILY MEAN | 3.4 Jul 9 | 2.6 Jun 5 | 1.1 | Sep 21 1953 |
| ANNUAL SEVEN-DAY MINIMUM | 3.9 Jun 21 | 3.0 May 31 | 1.2 | Sep 17 1953 |
| ANNUAL RUNOFF (AC-FT) | 19310 | 22440 | 24790 | |
| 10 PERCENT EXCEEDS | 60 | 62 | 74 | |
| 50 PERCENT EXCEEDS | 10 | 11 | 13 | |
| 90 PERCENT EXCEEDS | 4.5 | 3.8 | 4.4 | |



HAWAII, ISLAND OF KAUAI
 16019000 WAIALAE STREAM AT ALTITUDE 3,820 FT, NEAR WAIMEA--Continued

| SUMMARY STATISTICS | FOR 1995 CALENDAR YEAR | | FOR 1996 WATER YEAR | | WATER YEARS 1920 - 1996 | |
|--------------------------|------------------------|--------|---------------------|--------|-------------------------|-------------|
| ANNUAL TOTAL | 7101.3 | | 7247.5 | | | |
| ANNUAL MEAN | 19.5 | | 19.8 | | 21.5 | |
| HIGHEST ANNUAL MEAN | | | | | 40.9 | 1982 |
| LOWEST ANNUAL MEAN | | | | | 8.94 | 1926 |
| HIGHEST DAILY MEAN | 572 | Nov 3 | 572 | Nov 3 | 1440 | Dec 1 1957 |
| LOWEST DAILY MEAN | 2.3 | Jul 2 | 2.2 | Jun 6 | .99 | May 17 1966 |
| ANNUAL SEVEN-DAY MINIMUM | 2.5 | Jun 26 | 2.3 | May 17 | 1.1 | May 26 1966 |
| ANNUAL RUNOFF (AC-FT) | 14090 | | 14380 | | 15570 | |
| 10 PERCENT EXCEEDS | 34 | | 33 | | 45 | |
| 50 PERCENT EXCEEDS | 6.6 | | 5.6 | | 6.6 | |
| 90 PERCENT EXCEEDS | 2.8 | | 2.5 | | 2.5 | |



HAWAII, ISLAND OF KAUAI
16019000 WAIALAE STREAM AT ALTITUDE 3,820 FT, NEAR WAIMEA--Continued

WATER-QUALITY RECORDS

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

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

WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

| DATE | TIME | DIS- CHARGE, INST. | SPE- CIFIC CON- DUCT- | PH WATER WHOLE FIELD | TEMPER- ATURE AIR | TEMPER- ATURE WATER | HARD- NESS TOTAL | CALCIUM DIS- | MAGNE- SIUM, DIS- | SODIUM, DIS- | SODIUM PERCENT |
|--------------|------|--------------------------------|----------------------------------|-------------------------------|-------------------------|---------------------------|------------------------|--------------------|-------------------------|--------------------|-------------------|
| | | CUBIC FEET PER SECOND | ANCE DUCT- ANCE (US/CM) | (STAND- ARD UNITS) | (DEG C) | (DEG C) | (MG/L AS CACO3) | (MG/L AS CA) | (MG/L AS MG) | (MG/L AS NA) | |
| NOV 30... | 1020 | 8.6 | 26 | 5.9 | 18.5 | 16.0 | 4 | 0.56 | 0.58 | 3.2 | 63 |
| MAR 26... | 1020 | 7.1 | 32 | 6.1 | 13.5 | 11.5 | 6 | 0.86 | 0.95 | 3.5 | 55 |
| JUL 09... | 1015 | 5.3 | 27 | 6.5 | 20.0 | 18.0 | 4 | 0.59 | 0.63 | 3.1 | 61 |

| DATE | SODIUM AD- SORP- TION RATIO | POTAS- SIUM, DIS- SOLVED (MG/L AS K) | ALKA- LINITY LAB (MG/L AS CACO3) | SULFATE DIS- SOLVED (MG/L AS SO4) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) | FLUO- RIDE, DIS- SOLVED (MG/L AS F) | SILICA, DIS- SOLVED (MG/L AS SIO2) | SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) | SOLIDS, DIS- SOLVED (TONS PER AC-FT) | IRON, DIS- SOLVED (UG/L AS FE) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) |
|--------------|---|---|---|---|---|--|---|---|---|--|--|
| | NOV 30... | 0.7 | 0.20 | 2.5 | 0.50 | 5.0 | <0.10 | 5.6 | 17 | 0.02 | 220 |
| MAR 26... | 0.6 | 0.20 | 3.4 | 0.50 | 7.0 | <0.10 | 3.9 | 19 | 0.03 | 290 | 2.0 |
| JUL 09... | 0.7 | 0.20 | 3.1 | 0.40 | 6.0 | <0.10 | 5.2 | 18 | 0.02 | 250 | 2.0 |

HAWAII, ISLAND OF KAUAI

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HAWAII, ISLAND OF KAUAI
16031000 WAIMEA RIVER NEAR WAIMEA
(National stream-quality accounting network station)

LOCATION.--Lat 21°59'02", long 159°34'47", Hydrologic Unit 20070000, on right bank 1.3 mi upstream from Makaweli River and 1.9 mi north of Waimea Post Office.

DRAINAGE AREA.--57.8 mi².

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

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

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

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

AVERAGE DISCHARGE.--55 years (water years 1911-17, 1945-68, 1970-72, 1976-96), 124 ft³/s (90,010 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 37,100 ft³/s, February 7, 1949, gage height, 19.3 ft, from rating curve extended above 5,200 ft³/s on basis of slope-area measurements at gage heights 10.28 ft and 18.7 ft; practically no flow occasionally owing to upstream diversions.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of April 19, 1974, which destroyed the station reached a stage of 19.05 ft, from floodmarks, discharge, 29,100 ft³/s, from rating curve extended above 2,200 ft³/s on basis of slope-area measurement at gage heights 19.05 ft.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 8,700 ft³/s and maximum (*):

| Date | Time | Discharge (ft ³ /s) | Gage height (ft) | Date | Time | Discharge (ft ³ /s) | Gage height (ft) |
|---------|------|-----------------------------------|---------------------|---------|------|-----------------------------------|---------------------|
| Nov. 03 | 1300 | *26,600 | *18.48 | Nov. 09 | 1345 | 16,000 | 15.36 |

Minimum discharge, 4.7 ft³/s, August 21, 26-30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY MEAN VALUES

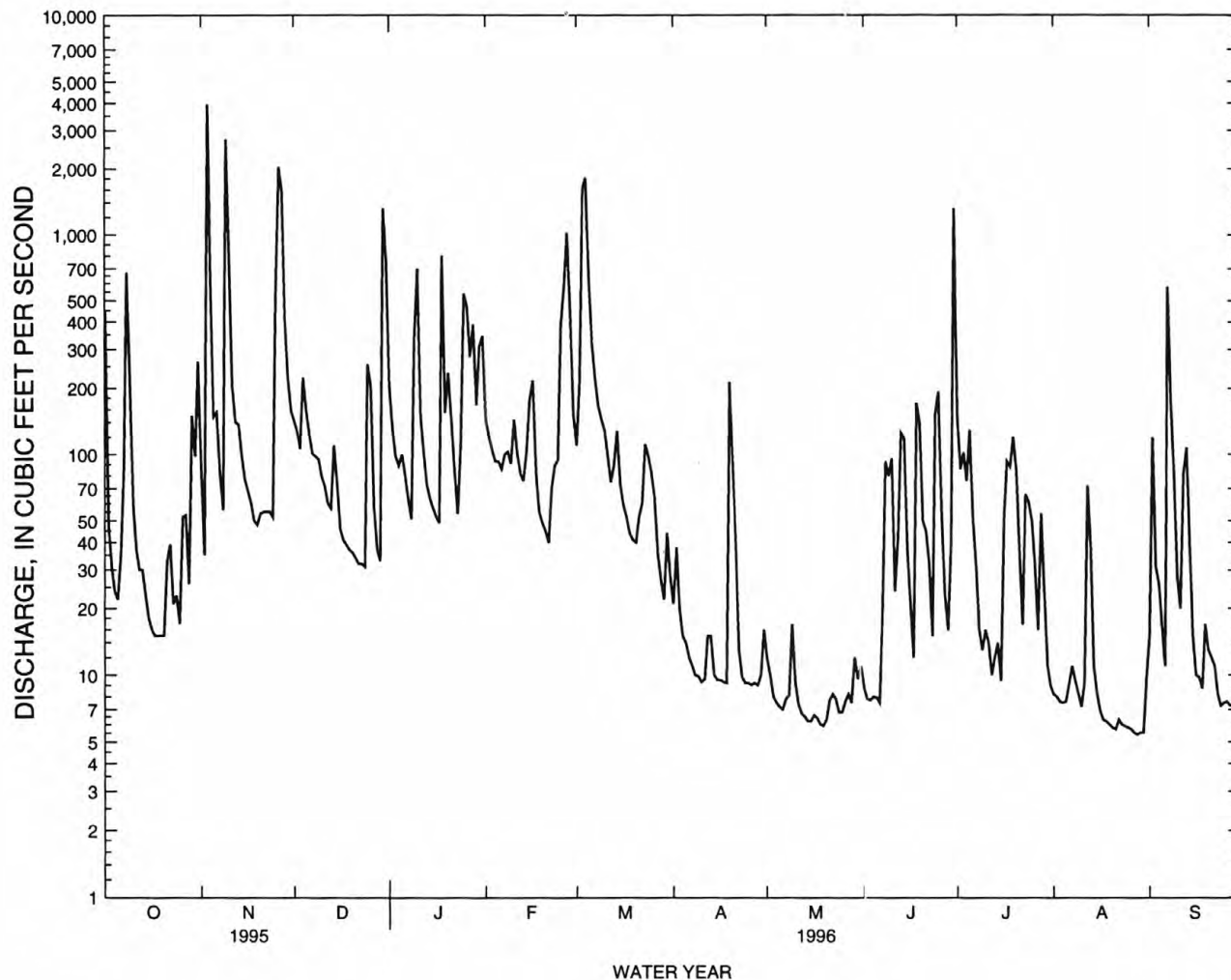
| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|------|-------|------|-------|------|-------|-------|-------|--------|--------|-------|--------|
| 1 | 453 | 84 | 141 | 204 | 143 | 110 | 21 | 12 | 8.7 | 149 | 8.2 | 15 |
| 2 | 48 | 35 | 127 | 131 | 120 | 214 | 38 | 10 | 7.8 | 86 | 8.0 | 119 |
| 3 | 31 | 3940 | 106 | 98 | 104 | 1630 | 20 | 8.0 | 7.7 | 102 | 7.6 | 31 |
| 4 | 24 | 616 | 223 | 89 | 93 | 1820 | 15 | 7.5 | 8.0 | 76 | 7.5 | 26 |
| 5 | 22 | 148 | 158 | 100 | 93 | 640 | 14 | 7.2 | 7.9 | 129 | 7.6 | 17 |
| 6 | 35 | 155 | 123 | 80 | 86 | 320 | 12 | 7.0 | 7.5 | 51 | 9.1 | 11 |
| 7 | 88 | 82 | 101 | 62 | 100 | 223 | 11 | 7.8 | 20 | 31 | 11 | 579 |
| 8 | 672 | 56 | 98 | 51 | 103 | 168 | 10 | 8.1 | 93 | 16 | 9.4 | 176 |
| 9 | 221 | 2730 | 95 | 341 | 91 | 145 | 9.9 | 17 | 80 | 13 | 8.3 | 78 |
| 10 | 59 | 775 | 79 | 703 | 144 | 129 | 9.3 | 9.4 | 96 | 16 | 7.2 | 28 |
| 11 | 37 | 203 | 72 | 150 | 101 | 100 | 9.6 | 7.4 | 24 | 14 | 9.2 | 20 |
| 12 | 30 | 140 | 60 | 103 | 82 | 75 | 15 | 6.7 | 42 | 10 | 7.2 | 82 |
| 13 | 30 | 137 | 57 | 73 | 76 | 89 | 15 | 6.5 | 125 | 12 | 38 | 107 |
| 14 | 23 | 99 | 110 | 63 | 103 | 128 | 10 | 6.2 | 118 | 14 | 11 | 38 |
| 15 | 18 | 77 | 73 | 57 | 178 | 73 | 9.5 | 6.2 | 38 | 9.4 | 8.3 | 15 |
| 16 | 16 | 68 | 46 | 52 | 217 | 59 | 9.5 | 6.6 | 21 | 52 | 6.9 | 10 |
| 17 | 15 | 60 | 41 | 49 | 82 | 52 | 9.3 | 6.4 | 12 | 93 | 6.3 | 9.8 |
| 18 | 15 | 50 | 39 | 804 | 55 | 44 | 9.2 | 6.0 | 171 | 88 | 6.2 | 8.7 |
| 19 | 15 | 48 | 37 | 155 | 49 | 41 | 213 | 5.9 | 139 | 120 | 6.0 | 17 |
| 20 | 15 | 54 | 36 | 235 | 45 | 40 | 92 | 6.3 | 50 | 85 | 5.8 | 13 |
| 21 | 33 | 55 | 34 | 146 | 40 | 52 | 36 | 7.7 | 45 | 35 | 5.7 | 12 |
| 22 | 39 | 55 | 32 | 85 | 70 | 60 | 13 | 8.2 | 32 | 17 | 6.3 | 11 |
| 23 | 21 | 55 | 32 | 54 | 89 | 111 | 9.8 | 7.8 | 15 | 66 | 6.0 | 8.2 |
| 24 | 23 | 52 | 31 | 113 | 94 | 98 | 9.2 | 6.8 | 153 | 61 | 5.9 | 7.3 |
| 25 | 17 | 533 | 257 | 539 | 389 | 83 | 9.2 | 6.8 | 193 | 50 | 5.8 | 7.5 |
| 26 | 52 | 2040 | 204 | 474 | 581 | 64 | 9.0 | 7.6 | 52 | 32 | 5.7 | 7.6 |
| 27 | 53 | 1580 | 57 | 279 | 1020 | 36 | 9.2 | 8.2 | 23 | 16 | 5.5 | 7.3 |
| 28 | 26 | 407 | 37 | 391 | 456 | 27 | 9.0 | 7.5 | 16 | 54 | 5.4 | 7.3 |
| 29 | 150 | 218 | 33 | 168 | 152 | 22 | 10 | 12 | 40 | 24 | 5.5 | 8.2 |
| 30 | 98 | 157 | 1320 | 310 | --- | 44 | 16 | 9.6 | 1320 | 11 | 5.5 | 9.9 |
| 31 | 264 | --- | 758 | 346 | --- | 28 | --- | 11 | --- | 9.0 | 9.9 | --- |
| TOTAL | 2643 | 14709 | 4617 | 6505 | 4956 | 6725 | 682.7 | 251.4 | 2965.6 | 1541.4 | 320.8 | 1486.8 |
| MEAN | 85.3 | 490 | 149 | 210 | 171 | 217 | 22.8 | 8.11 | 98.9 | 49.7 | 10.3 | 49.6 |
| MAX | 672 | 3940 | 1320 | 804 | 1020 | 1820 | 213 | 17 | 1320 | 149 | 72 | 579 |
| MIN | 15 | 35 | 31 | 49 | 40 | 22 | 9.0 | 5.9 | 7.5 | 9.0 | 5.4 | 7.3 |
| AC-FT | 5240 | 29180 | 9160 | 12900 | 9830 | 13340 | 1350 | 499 | 5880 | 3060 | 636 | 2950 |

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1910 - 1996, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|------|------|------|------|------|------|------|------|------|------|------|------|------|
| MEAN | 67.7 | 185 | 220 | 255 | 193 | 209 | 138 | 61.4 | 27.8 | 42.9 | 57.9 | 34.7 |
| MAX | 381 | 1632 | 1285 | 1639 | 996 | 1113 | 589 | 244 | 125 | 423 | 1453 | 294 |
| (WY) | 1995 | 1914 | 1968 | 1916 | 1956 | 1951 | 1918 | 1965 | 1978 | 1989 | 1950 | 1914 |
| MIN | 2.79 | 8.94 | 8.39 | 2.28 | 2.97 | 1.80 | 1.60 | .95 | 1.02 | 2.54 | .000 | 1.13 |
| (WY) | 1950 | 1945 | 1977 | 1945 | 1978 | 1915 | 1966 | 1966 | 1912 | 1953 | 1911 | 1949 |

HAWAII, ISLAND OF KAUAI
 16031000 WAIMEA RIVER NEAR WAIMEA--Continued

| SUMMARY STATISTICS | FOR 1995 CALENDAR YEAR | FOR 1996 WATER YEAR | WATER YEARS 1910 - 1996 | |
|--------------------------|------------------------|---------------------|-------------------------|-------------|
| ANNUAL TOTAL | 39977.4 | 47403.7 | 124 | |
| ANNUAL MEAN | 110 | 130 | 297 | 1982 |
| HIGHEST ANNUAL MEAN | | | 24.1 | 1984 |
| LOWEST ANNUAL MEAN | | | 17300 | Aug 16 1950 |
| HIGHEST DAILY MEAN | 3940 Nov 3 | 3940 Nov 3 | .00 | Jun 12 1911 |
| LOWEST DAILY MEAN | 8.3 Jan 22 | 5.4 Aug 28 | .00 | Jun 16 1911 |
| ANNUAL SEVEN-DAY MINIMUM | 8.7 Jan 19 | 5.6 Aug 24 | | |
| ANNUAL RUNOFF (AC-FT) | 79300 | 94030 | 90010 | |
| 10 PERCENT EXCEEDS | 201 | 222 | 249 | |
| 50 PERCENT EXCEEDS | 29 | 41 | 16 | |
| 90 PERCENT EXCEEDS | 12 | 7.5 | 2.2 | |



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 mi².

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

REVISED RECORDS.--WSP 2137: Drainage area.

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

REMARKS.--Records good, except for periods of estimated discharges which are poor. Olokele ditch diverts all low flow from the headwaters of the Olokele River 9 mi upstream for irrigation in vicinity of Makaweli. A 5 ft³/s capacity ditch diverts water 0.1 mi upstream of station for irrigation of taro in the vicinity of the station.

AVERAGE DISCHARGE.--53 years (water years 1944-96), 87.1 ft³/s (63,110 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 26,000 ft³/s, January 31, 1975, gage height, 15.51 ft, from rating curve extended above 3,200 ft³/s on basis of slope-area measurement at gage height 10.65 ft; minimum, 3.15 ft³/s, July 19, 1951.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 4,700 ft³/s: and maximum (*):

| Date | Time | Discharge (ft ³ /s) | Gage height (ft) | Date | Time | Discharge (ft ³ /s) | Gage height (ft) |
|---------|------|-----------------------------------|---------------------|---------|------|-----------------------------------|---------------------|
| Nov. 03 | 1300 | *21,500 | *13.80 | Feb. 27 | 1130 | 5,480 | 9.08 |
| Nov. 09 | 1200 | 13,700 | 11.98 | Jun. 30 | 0830 | 17,300 | 12.88 |

Minimum discharge, 9.3 ft³/s, August 24.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|------|-------|------|------|------|------|------|------|------|------|------|------|
| 1 | 441 | 24 | 94 | 92 | 62 | 118 | 167 | 13 | 12 | 198 | 17 | 40 |
| 2 | 198 | 28 | 71 | 69 | 53 | 319 | 30 | 13 | 11 | 85 | 17 | 57 |
| 3 | 115 | e2000 | 61 | 61 | 50 | 646 | 21 | 13 | 11 | 71 | 17 | 32 |
| 4 | 66 | e250 | 304 | 59 | 46 | 438 | 20 | 13 | 11 | 99 | 26 | 31 |
| 5 | 44 | e80 | 146 | 58 | 36 | 138 | 19 | 13 | 11 | 91 | 20 | 17 |
| 6 | 97 | e60 | 144 | 49 | 29 | 96 | 18 | 13 | 11 | 36 | 16 | 16 |
| 7 | 94 | e45 | 98 | 40 | 50 | 74 | 18 | 13 | 24 | 25 | 17 | 647 |
| 8 | 413 | e80 | 95 | 34 | 46 | 61 | 18 | 13 | 38 | 24 | 15 | 227 |
| 9 | 178 | e2500 | 80 | 89 | 48 | 54 | 17 | 13 | 23 | 21 | 15 | 86 |
| 10 | 120 | e300 | 61 | 224 | 55 | 50 | 17 | 13 | 18 | 20 | 17 | 27 |
| 11 | 102 | e120 | 58 | 64 | 41 | 46 | 57 | 13 | 16 | 19 | 36 | 60 |
| 12 | 69 | e80 | 59 | 43 | 31 | 43 | 35 | 13 | 68 | 28 | 89 | 60 |
| 13 | 46 | e64 | 77 | 38 | 29 | 78 | 19 | 13 | 87 | 26 | 19 | 71 |
| 14 | 34 | e52 | 83 | 35 | 29 | 63 | 17 | 12 | 50 | 18 | 15 | 24 |
| 15 | 29 | e44 | 41 | 33 | 40 | 46 | 17 | 12 | 21 | 27 | 14 | 19 |
| 16 | 27 | e39 | 37 | 30 | 39 | 36 | 16 | 12 | 29 | 59 | 13 | 17 |
| 17 | 30 | e35 | 35 | 19 | 27 | 33 | 16 | 12 | 42 | 79 | 12 | 21 |
| 18 | 27 | e50 | 35 | 25 | 25 | 32 | 40 | 12 | 158 | 59 | 12 | 46 |
| 19 | 22 | e32 | 32 | 40 | 24 | 31 | 218 | 13 | 76 | 70 | 12 | 23 |
| 20 | 52 | e28 | 30 | 334 | 24 | 29 | 50 | 12 | 57 | 53 | 12 | 23 |
| 21 | 52 | e26 | 29 | 137 | 24 | 27 | 18 | 12 | 58 | 25 | 12 | 24 |
| 22 | 28 | 27 | 29 | 116 | 66 | 27 | 15 | 12 | 25 | 53 | 14 | 15 |
| 23 | 34 | 27 | 30 | 39 | 67 | 28 | 14 | 12 | 19 | 82 | 13 | 14 |
| 24 | 19 | 26 | 28 | 92 | 162 | 27 | 13 | 13 | 71 | 69 | 12 | 14 |
| 25 | 28 | 549 | 32 | 384 | 939 | 27 | 13 | 42 | 104 | 41 | 11 | 13 |
| 26 | 103 | 1250 | 43 | 422 | 904 | 26 | 14 | 16 | 34 | 40 | 10 | 13 |
| 27 | 25 | 760 | 28 | 304 | 1110 | 24 | 19 | 15 | 19 | 83 | 10 | 13 |
| 28 | 20 | 221 | 29 | 178 | 286 | 23 | 14 | 35 | 23 | 88 | 10 | 13 |
| 29 | 30 | 122 | 37 | 95 | 149 | 22 | 16 | 22 | 38 | 45 | 10 | 14 |
| 30 | 26 | 100 | 483 | 79 | --- | 26 | 14 | 21 | 2000 | 21 | 10 | 15 |
| 31 | 47 | --- | 226 | 93 | --- | 21 | --- | 14 | --- | 18 | 25 | --- |
| TOTAL | 2616 | 9019 | 2635 | 3375 | 4491 | 2709 | 980 | 468 | 3165 | 1673 | 548 | 1692 |
| MEAN | 84.4 | 301 | 85.0 | 109 | 155 | 87.4 | 32.7 | 15.1 | 105 | 54.0 | 17.7 | 56.4 |
| MAX | 441 | 2500 | 483 | 422 | 1110 | 646 | 218 | 42 | 2000 | 198 | 89 | 647 |
| MIN | 19 | 24 | 28 | 19 | 24 | 21 | 13 | 12 | 11 | 18 | 10 | 13 |
| AC-FT | 5190 | 17890 | 5230 | 6690 | 8910 | 5370 | 1940 | 928 | 6280 | 3320 | 1090 | 3360 |

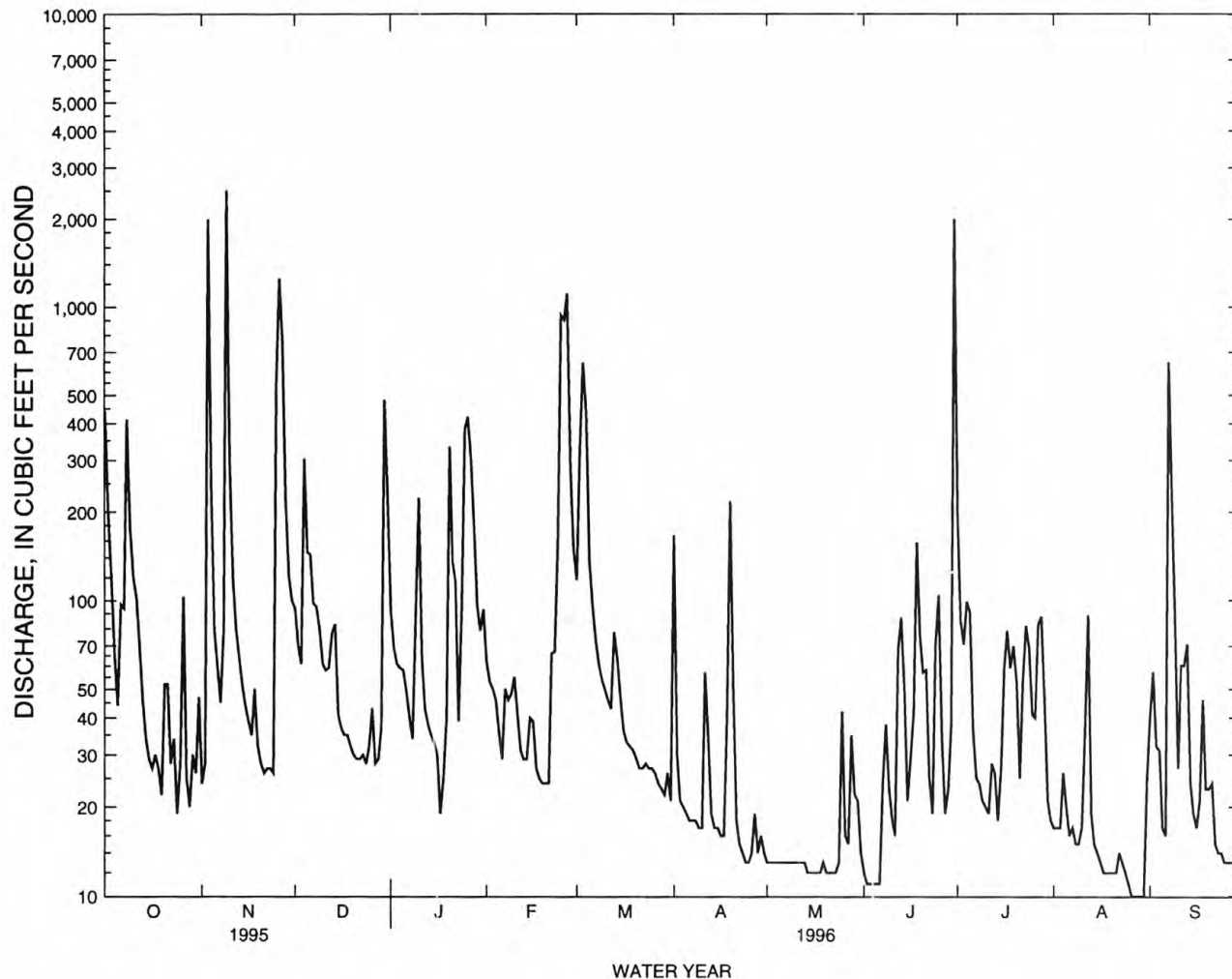
e Estimated

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1943 - 1996, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|------|------|------|------|------|------|------|------|------|------|------|------|------|
| MEAN | 60.6 | 127 | 143 | 132 | 118 | 131 | 95.9 | 57.2 | 38.3 | 53.2 | 52.5 | 37.6 |
| MAX | 311 | 491 | 577 | 441 | 774 | 609 | 419 | 283 | 105 | 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 | 15.1 | 9.56 | 10.0 | 14.2 | 9.54 |
| (WY) | 1960 | 1951 | 1977 | 1945 | 1978 | 1959 | 1992 | 1996 | 1951 | 1984 | 1944 | 1962 |

HAWAII, ISLAND OF KAUAI
 16036000 MAKAWELI RIVER NEAR WAIMEA--Continued

| SUMMARY STATISTICS | FOR 1995 CALENDAR YEAR | | FOR 1996 WATER YEAR | | WATER YEARS 1943 - 1996 | |
|--------------------------|------------------------|-------|---------------------|--------|-------------------------|-------------|
| ANNUAL TOTAL | 29653 | | 33371 | | 87.1 | |
| ANNUAL MEAN | 31.2 | | 91.2 | | 31.1 | |
| HIGHEST ANNUAL MEAN | | | | | 204 | |
| LOWEST ANNUAL MEAN | | | | | 31.1 | |
| HIGHEST DAILY MEAN | 2500 | Nov 9 | 2500 | Nov 9 | 5170 | Dec 1 1957 |
| LOWEST DAILY MEAN | 13 | Sep 9 | 10 | Aug 26 | 4.3 | Jul 19 1951 |
| ANNUAL SEVEN-DAY MINIMUM | 13 | Sep 9 | 10 | Aug 24 | 5.7 | Oct 21 1944 |
| ANNUAL RUNOFF (AC-FT) | 58820 | | 66190 | | 63110 | |
| 10 PERCENT EXCEEDS | 130 | | 152 | | 171 | |
| 50 PERCENT EXCEEDS | 29 | | 32 | | 27 | |
| 90 PERCENT EXCEEDS | 15 | | 13 | | 12 | |



HAWAII, ISLAND OF KAUAI
16049000 HANAPEPE RIVER BELOW MANUAHI STREAM, NEAR ELELEE

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 Elelee.

DRAINAGE AREA.--18.5 mi².

PERIOD OF RECORD.--July 1917 to January 1921, December 1926 to current year. Prior to July 1952, published as "at Koula, near Elelee." 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 good except for estimated discharges, which are fair. Koula ditch diverts water 3.0 mi upstream of station for irrigation in vicinity of Makaweli.

AVERAGE DISCHARGE.--72 years (water years 1918-20, 1928-96), 84.7 ft³/s (61,350 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 39,000 ft³/s, April 15, 1963, gage height, 14.87 ft, from rating curve extended above 7,600 ft³/s on basis of slope-area measurement of peak flow; minimum, 5.1 ft³/s, May 21, 1954.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 3,600 ft³/s and maximum (*):

| Date | Time | Discharge (ft ³ /s) | Gage height (ft) | Date | Time | Discharge (ft ³ /s) | Gage height (ft) |
|---------|------|-----------------------------------|---------------------|---------|------|-----------------------------------|---------------------|
| Nov. 03 | 1230 | 4,720 | 6.90 | Feb. 27 | 1130 | 7,080 | 8.11 |
| Nov. 09 | 1130 | 7,410 | 8.26 | Jun. 30 | 0800 | *8,310 | *8.61 |

Minimum discharge, 15 ft³/s, April 4-10, 14-18, May 1-7, 9-21, 26, 27, May 31 to June 6.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY MEAN VALUES

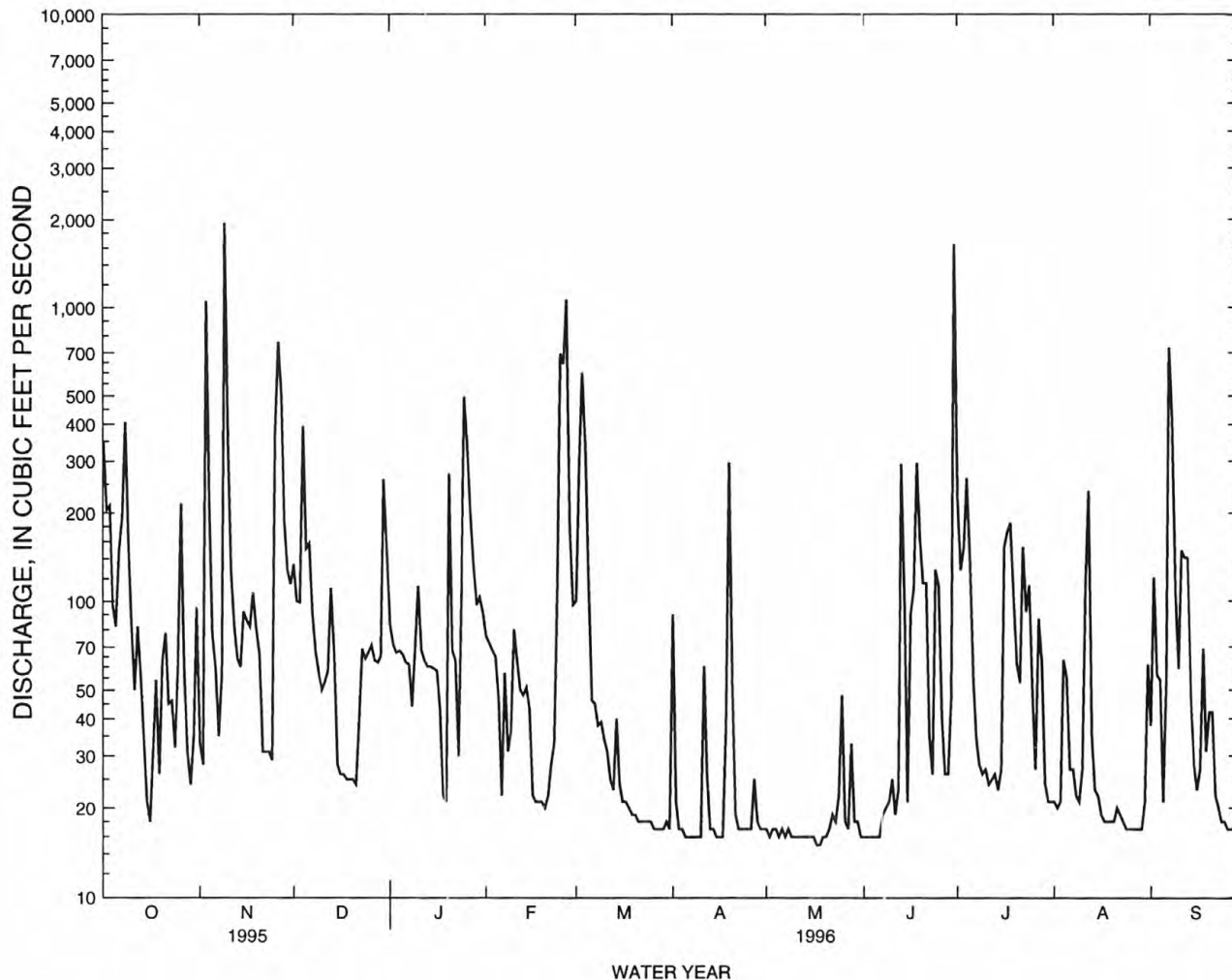
| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|------|-------|------|------|------|------|------|------|------|------|------|------|
| 1 | 350 | 33 | 134 | 83 | 76 | 100 | 90 | 17 | 16 | 224 | 21 | 38 |
| 2 | 205 | 28 | 100 | 71 | 72 | 273 | 21 | 16 | 16 | 128 | 20 | 120 |
| 3 | 212 | 1050 | 99 | 67 | 68 | 598 | 17 | 17 | 16 | 153 | 21 | 56 |
| 4 | 97 | 216 | 394 | 68 | 65 | 338 | 17 | 17 | 16 | 263 | 63 | 54 |
| 5 | 82 | 78 | 152 | 66 | 47 | 109 | 16 | 16 | 16 | 137 | 55 | 21 |
| 6 | 149 | 59 | 158 | 62 | 22 | 46 | 16 | 17 | 16 | 54 | 27 | 53 |
| 7 | 194 | 35 | 91 | 61 | 57 | 45 | 16 | 16 | 19 | 34 | 27 | 729 |
| 8 | 406 | 57 | 67 | 44 | 31 | 38 | 16 | 17 | 20 | 28 | 22 | 414 |
| 9 | 164 | 1950 | 57 | 69 | 36 | 39 | 16 | 16 | 21 | 26 | 21 | 105 |
| 10 | 84 | 349 | 50 | 113 | 80 | 34 | 16 | 16 | 25 | 27 | 27 | 59 |
| 11 | 50 | 128 | 53 | 68 | 63 | 31 | 60 | 16 | 19 | 24 | 112 | 149 |
| 12 | 82 | 82 | 58 | 63 | 50 | 25 | 26 | 16 | 23 | 25 | 237 | 141 |
| 13 | 57 | 64 | 111 | 60 | 48 | 23 | 17 | 16 | 293 | 26 | 35 | 141 |
| 14 | 34 | 60 | 67 | 60 | 51 | 40 | 17 | 16 | 102 | 23 | 23 | 46 |
| 15 | 21 | 92 | 28 | 59 | 43 | 24 | 16 | 16 | 21 | 27 | 22 | 28 |
| 16 | 18 | 86 | 26 | 58 | 22 | 21 | 16 | 16 | 90 | 154 | 19 | 23 |
| 17 | 31 | 82 | 26 | 43 | 21 | 21 | 16 | 15 | 110 | 172 | 18 | 27 |
| 18 | 54 | 107 | 25 | 22 | 21 | 20 | 37 | 15 | 295 | 185 | 18 | 69 |
| 19 | 26 | 81 | 25 | 21 | 21 | 19 | 296 | 16 | 162 | 103 | 18 | 31 |
| 20 | 63 | 66 | 25 | 272 | 20 | 19 | 52 | 16 | 115 | 61 | 18 | 42 |
| 21 | 78 | 31 | 24 | 68 | 22 | 18 | 19 | 17 | 115 | 53 | 20 | 42 |
| 22 | 45 | 31 | 40 | 63 | 28 | 18 | 17 | 19 | 35 | 153 | 19 | 22 |
| 23 | 46 | 31 | 69 | 30 | 33 | 18 | 17 | 18 | 26 | 92 | 18 | 20 |
| 24 | 32 | 29 | 64 | 106 | 110 | 18 | 17 | 22 | 128 | 113 | 17 | 18 |
| 25 | 59 | 370 | 67 | 497 | 695 | 18 | 17 | 48 | 113 | 48 | 17 | 18 |
| 26 | 215 | 763 | 71 | 346 | 641 | 17 | 17 | 18 | 41 | 27 | 17 | 17 |
| 27 | 60 | 507 | 63 | 199 | 1060 | 17 | 25 | 17 | 26 | 87 | 17 | 17 |
| 28 | 31 | 188 | 62 | 132 | 178 | 17 | 18 | 33 | 26 | 62 | 17 | 17 |
| 29 | 24 | 128 | 65 | 97 | 97 | 17 | 17 | 18 | 47 | 24 | 17 | 19 |
| 30 | 35 | 115 | 260 | 103 | --- | 18 | 17 | 18 | 1640 | 21 | 21 | 19 |
| 31 | 95 | --- | 150 | 91 | --- | 17 | --- | 16 | --- | 21 | 61 | --- |
| TOTAL | 3099 | 6896 | 2681 | 3162 | 3778 | 2056 | 975 | 567 | 3608 | 2575 | 1065 | 2555 |
| MEAN | 100 | 230 | 86.5 | 102 | 130 | 66.3 | 32.5 | 18.3 | 120 | 83.1 | 34.4 | 85.2 |
| MAX | 406 | 1950 | 394 | 497 | 1060 | 598 | 296 | 48 | 1640 | 263 | 237 | 729 |
| MIN | 18 | 28 | 24 | 21 | 20 | 17 | 16 | 15 | 16 | 21 | 17 | 17 |
| AC-FT | 6150 | 13680 | 5320 | 6270 | 7490 | 4080 | 1930 | 1120 | 7160 | 5110 | 2110 | 5070 |

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1917 - 1996, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|------|------|------|------|------|------|------|------|------|------|------|------|------|
| MEAN | 61.8 | 107 | 115 | 110 | 100 | 116 | 91.1 | 66.5 | 52.4 | 72.7 | 73.1 | 54.2 |
| MAX | 240 | 430 | 720 | 578 | 657 | 803 | 470 | 201 | 175 | 202 | 222 | 190 |
| (WY) | 1995 | 1991 | 1920 | 1920 | 1932 | 1918 | 1963 | 1965 | 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 FLEELE--Continued

| SUMMARY STATISTICS | FOR 1995 CALENDAR YEAR | | FOR 1996 WATER YEAR | | WATER YEARS 1917 - 1996 | |
|--------------------------|------------------------|--------|---------------------|--------|-------------------------|-------------|
| ANNUAL TOTAL | 27670 | | 33017 | | 84.7 | |
| ANNUAL MEAN | 75.8 | | 90.2 | | 30.6 | |
| HIGHEST ANNUAL MEAN | | | | | 182 | 1918 |
| LOWEST ANNUAL MEAN | | | | | 30.6 | 1953 |
| HIGHEST DAILY MEAN | 1950 | Nov 9 | 1950 | Nov 9 | 10900 | Dec 3 1919 |
| LOWEST DAILY MEAN | 16 | Apr 2 | 15 | May 17 | 5.3 | May 21 1954 |
| ANNUAL SEVEN-DAY MINIMUM | 17 | Jun 24 | 16 | May 12 | 6.4 | May 10 1954 |
| ANNUAL RUNOFF (AC-FT) | 54880 | | 65490 | | 61350 | |
| 10 PERCENT EXCEEDS | 151 | | 180 | | 173 | |
| 50 PERCENT EXCEEDS | 28 | | 36 | | 30 | |
| 90 PERCENT EXCEEDS | 18 | | 17 | | 15 | |



HAWAII, ISLAND OF KAUAI
160600000 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 mi².

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 good. Lihue and Hanamaulu ditches divert water upstream of station for irrigation of sugarcane in vicinity of Lihue.

AVERAGE DISCHARGE.--79 years (water years 1913-18, 1920, 1922-24, 1926-56, 1959-96), 117 ft³/s (84,420 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 87,300 ft³/s, April 15, 1963, gage height, 22.90 ft, from rating curve extended above 13,000 ft³/s on basis of slope-area measurement of peak flow; minimum, 1.5 ft³/s, August 21, 1984.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 5,800 ft³/s and maximum (*):

| Date | Time | Discharge (ft ³ /s) | Gage height (ft) | Date | Time | Discharge (ft ³ /s) | Gage height (ft) |
|---------|------|--------------------------------|------------------|---------|------|--------------------------------|------------------|
| Nov. 03 | 1400 | *29,400 | *19.02 | Feb. 27 | 1130 | 8,190 | 15.39 |
| Nov. 09 | 2200 | 11,850 | 16.37 | Jul. 22 | 0130 | 7,410 | 15.14 |

Minimum discharge, 3.3 ft³/s, June 3, 4, 6, 7.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY MEAN VALUES

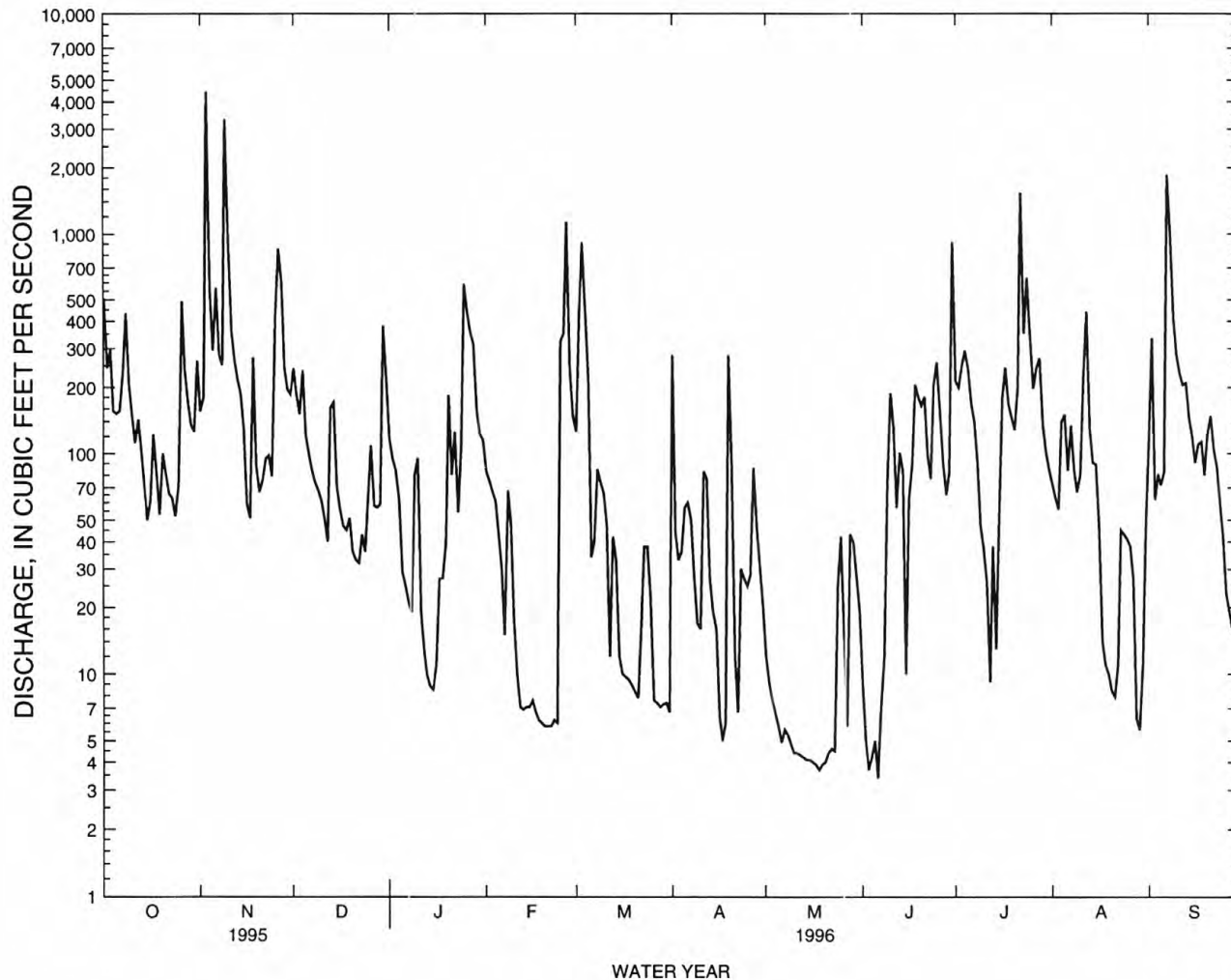
| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|-------|-------|------|--------|--------|--------|--------|-------|--------|--------|--------|-------|
| 1 | 507 | 156 | 243 | 116 | 83 | 126 | 280 | 12 | 8.8 | 213 | 73 | 112 |
| 2 | 245 | 179 | 186 | 94 | 75 | 421 | 44 | 9.1 | 5.1 | 199 | 63 | 334 |
| 3 | 295 | 4450 | 151 | 84 | 67 | 918 | 33 | 7.6 | 3.7 | 250 | 56 | 62 |
| 4 | 156 | 551 | 239 | 62 | 61 | 453 | 36 | 6.6 | 4.2 | 293 | 139 | 81 |
| 5 | 152 | 294 | 121 | 29 | 43 | 216 | 57 | 5.8 | 5.0 | 243 | 150 | 72 |
| 6 | 156 | 567 | 99 | 25 | 30 | 34 | 60 | 4.9 | 3.4 | 169 | 84 | 82 |
| 7 | 234 | 281 | 84 | 21 | 15 | 40 | 50 | 5.6 | 7.2 | 138 | 134 | 1850 |
| 8 | 435 | 252 | 74 | 19 | 68 | 85 | 28 | 5.3 | 12 | 92 | 84 | 999 |
| 9 | 207 | 3330 | 68 | 80 | 48 | 74 | 17 | 4.8 | 73 | 47 | 67 | 409 |
| 10 | 150 | 930 | 61 | 95 | 18 | 66 | 16 | 4.4 | 188 | 37 | 80 | 280 |
| 11 | 112 | 358 | 51 | 19 | 10 | 48 | 83 | 4.4 | 132 | 26 | 219 | 231 |
| 12 | 143 | 264 | 40 | 13 | 7.1 | 12 | 77 | 4.3 | 57 | 9.2 | 441 | 205 |
| 13 | 104 | 216 | 162 | 9.9 | 6.9 | 42 | 27 | 4.2 | 101 | 38 | 130 | 209 |
| 14 | 72 | 187 | 171 | 8.8 | 7.1 | 33 | 19 | 4.1 | 84 | 13 | 91 | 145 |
| 15 | 50 | 130 | 70 | 8.5 | 7.1 | 12 | 16 | 4.1 | 10 | 53 | 89 | 121 |
| 16 | 61 | 59 | 56 | 11 | 7.6 | 10 | 6.4 | 4.0 | 62 | 179 | 46 | 91 |
| 17 | 122 | 51 | 47 | 27 | 6.7 | 9.7 | 5.0 | 3.9 | 88 | 245 | 14 | 110 |
| 18 | 83 | 273 | 45 | 27 | 6.2 | 9.4 | 6.0 | 3.7 | 205 | 168 | 11 | 113 |
| 19 | 53 | 88 | 51 | 39 | 6.0 | 8.9 | 279 | 3.9 | 180 | 145 | 10 | 80 |
| 20 | 100 | 67 | 36 | 184 | 5.8 | 8.3 | 90 | 4.0 | 165 | 128 | 8.4 | 123 |
| 21 | 81 | 76 | 33 | 80 | 5.8 | 7.8 | 12 | 4.4 | 181 | 200 | 7.9 | 148 |
| 22 | 66 | 95 | 32 | 125 | 5.8 | 16 | 6.7 | 4.6 | 98 | 1530 | 11 | 105 |
| 23 | 63 | 98 | 43 | 54 | 6.2 | 38 | 30 | 4.5 | 77 | 351 | 45 | 87 |
| 24 | 52 | 79 | 36 | 108 | 6.0 | 38 | 27 | 25 | 203 | 630 | 43 | 60 |
| 25 | 72 | 423 | 62 | 591 | 325 | 23 | 25 | 42 | 259 | 336 | 41 | 42 |
| 26 | 491 | 856 | 109 | 444 | 349 | 7.6 | 28 | 15 | 156 | 197 | 38 | 23 |
| 27 | 241 | 603 | 58 | 358 | 1130 | 7.4 | 86 | 5.8 | 91 | 245 | 27 | 19 |
| 28 | 172 | 248 | 57 | 314 | 245 | 7.1 | 48 | 43 | 65 | 271 | 6.3 | 16 |
| 29 | 135 | 196 | 59 | 156 | 147 | 7.3 | 31 | 40 | 82 | 134 | 5.6 | 15 |
| 30 | 126 | 186 | 382 | 123 | --- | 7.4 | 20 | 28 | 919 | 101 | 11 | 16 |
| 31 | 264 | --- | 221 | 115 | --- | 6.7 | --- | 19 | --- | 85 | 48 | --- |
| TOTAL | 5200 | 15543 | 3147 | 3440.2 | 2798.3 | 2792.6 | 1543.1 | 338.0 | 3525.4 | 6765.2 | 2273.2 | 6240 |
| MEAN | 168 | 518 | 102 | 111 | 96.5 | 90.1 | 51.4 | 10.9 | 118 | 218 | 73.3 | 208 |
| MAX | 507 | 4450 | 382 | 591 | 1130 | 918 | 280 | 43 | 919 | 1530 | 441 | 1850 |
| MIN | 50 | 51 | 32 | 8.5 | 5.8 | 6.7 | 5.0 | 3.7 | 3.4 | 9.2 | 5.6 | 15 |
| AC-FT | 10310 | 30830 | 6240 | 6820 | 5550 | 5540 | 3060 | 670 | 6990 | 13420 | 4510 | 12380 |

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1912 - 1996, BY WATER YEAR (WY)

| | 1912 | 1913 | 1914 | 1915 | 1916 | 1917 | 1918 | 1919 | 1920 | 1921 | 1922 | 1923 | 1924 | 1925 | 1926 | 1927 | 1928 | 1929 | 1930 | 1931 | 1932 | 1933 | 1934 | 1935 | 1936 | 1937 | 1938 | 1939 | 1940 | 1941 | 1942 | 1943 | 1944 | 1945 | 1946 | 1947 | 1948 | 1949 | 1950 | 1951 | 1952 | 1953 | 1954 | 1955 | 1956 | 1957 | 1958 | 1959 | 1960 | 1961 | 1962 | 1963 | 1964 | 1965 | 1966 | 1967 | 1968 | 1969 | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| MEAN | 92.1 | 174 | 172 | 175 | 128 | 149 | 133 | 98.4 | 55.3 | 75.3 | 84.3 | 76.5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 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 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

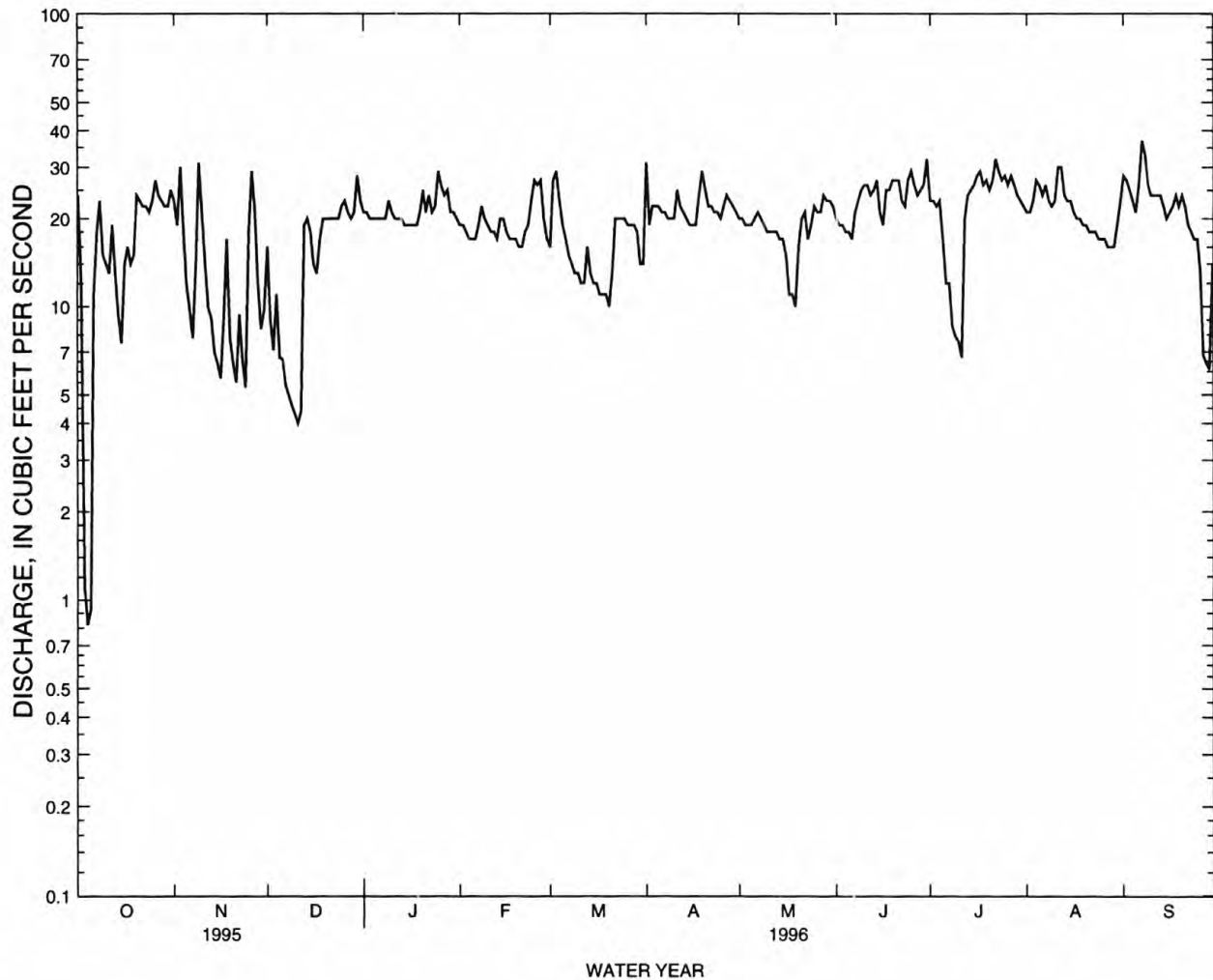
HAWAII, ISLAND OF KAUAI
 160600000 SOUTH FORK WAILUA RIVER NEAR LIHUE--Continued

| SUMMARY STATISTICS | FOR 1995 CALENDAR YEAR | FOR 1996 WATER YEAR | WATER YEARS 1912 - 1996 | |
|--------------------------|------------------------|---------------------|-------------------------|-------------|
| ANNUAL TOTAL | 41127.6 | 53606.0 | | |
| ANNUAL MEAN | 113 | 146 | 117 | |
| HIGHEST ANNUAL MEAN | | | 284 | 1982 |
| LOWEST ANNUAL MEAN | | | 17.3 | 1984 |
| HIGHEST DAILY MEAN | 4450 Nov 3 | 4450 Nov 3 | 13800 | Jan 16 1921 |
| LOWEST DAILY MEAN | 3.7 Sep 13 | 3.4 Jun 6 | 1.8 | Sep 17 1953 |
| ANNUAL SEVEN-DAY MINIMUM | 4.0 Sep 9 | 4.0 May 14 | 1.8 | Sep 16 1953 |
| ANNUAL RUNOFF (AC-FT) | 81580 | 106300 | 84420 | |
| 10 PERCENT EXCEEDS | 242 | 285 | 266 | |
| 50 PERCENT EXCEEDS | 44 | 66 | 38 | |
| 90 PERCENT EXCEEDS | 5.2 | 6.4 | 4.7 | |



HAWAII, ISLAND OF KAUAI
 16061200 NORTH WAILUA DITCH BELOW WAIKOKO STREAM, NEAR LIHUE--Continued

| SUMMARY STATISTICS | FOR 1995 CALENDAR YEAR | FOR 1996 WATER YEAR | WATER YEARS 1965 - 1996 | |
|--------------------------|------------------------|---------------------|-------------------------|-------------|
| ANNUAL TOTAL | 6676.85 | 7037.95 | | |
| ANNUAL MEAN | 18.3 | 19.2 | 21.8 | |
| HIGHEST ANNUAL MEAN | | | 30.3 | 1969 |
| LOWEST ANNUAL MEAN | | | 6.64 | 1991 |
| HIGHEST DAILY MEAN | 31 Jul 26 | 37 Sep 7 | 58 | Oct 11 1966 |
| LOWEST DAILY MEAN | .82 Oct 4 | .82 Oct 4 | .00 | Jan 1 1965 |
| ANNUAL SEVEN-DAY MINIMUM | 4.9 Dec 6 | 4.9 Dec 6 | .00 | Jan 1 1965 |
| ANNUAL RUNOFF (AC-FT) | 13240 | 13960 | 15800 | |
| 10 PERCENT EXCEEDS | 25 | 26 | 29 | |
| 50 PERCENT EXCEEDS | 20 | 20 | 22 | |
| 90 PERCENT EXCEEDS | 10 | 9.8 | 16 | |



HAWAII, ISLAND OF KAUAI
160620000 STABLE STORM DITCH NEAR LIHUE

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

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

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

REMARKS.--Records good. Ditch diverts water from North Fork Wailua River for irrigation of sugarcane in vicinity of Lihue.

AVERAGE DISCHARGE.--59 years (water years 1938-96), 9.75 ft³/s (7,070 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 71 ft³/s, April 3, 1948; no flow on many days.

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge, 18 ft³/s, May 25, no flow on many days.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY MEAN VALUES

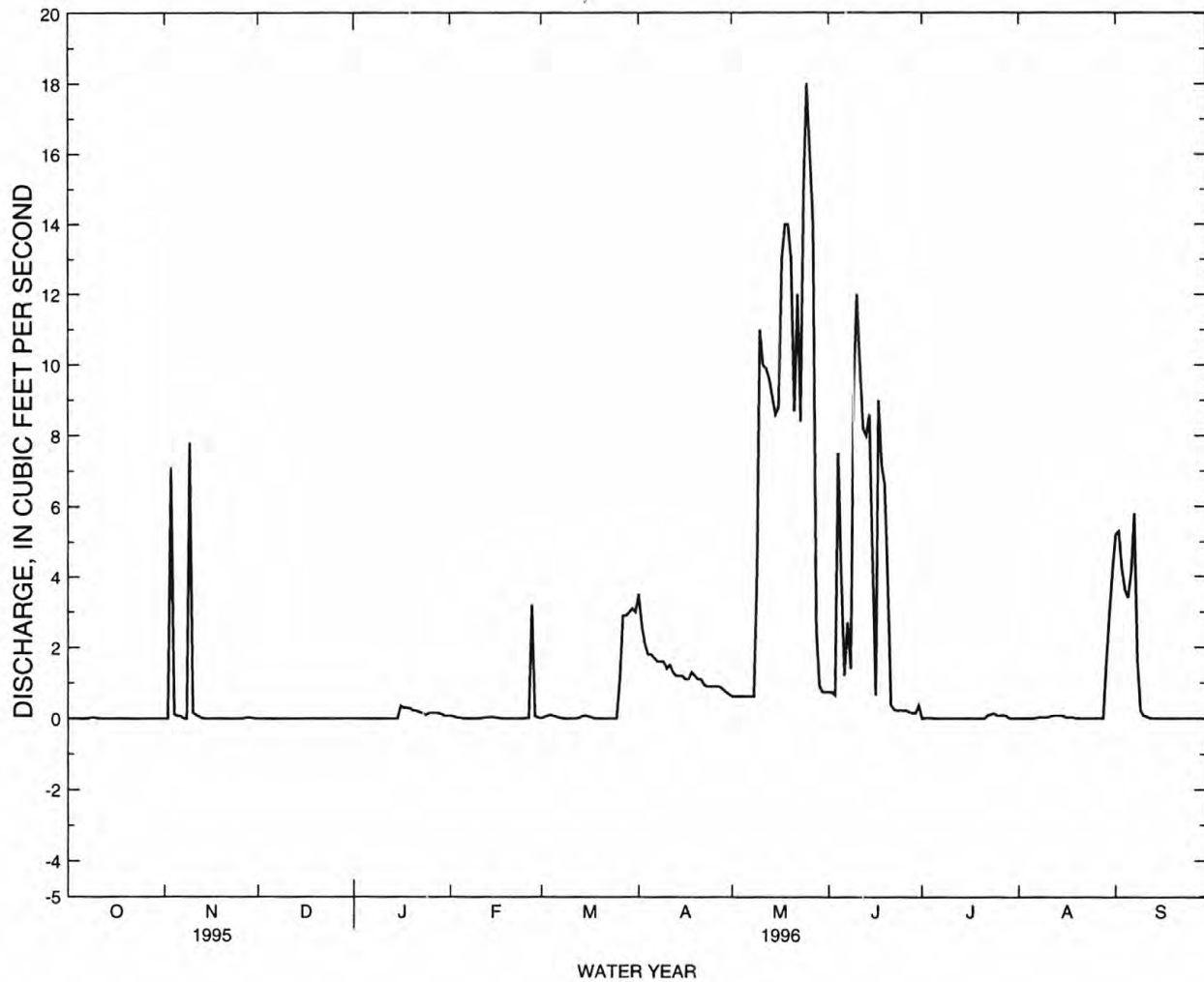
| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|------|-------|------|------|------|-------|-------|--------|--------|------|------|-------|
| 1 | .00 | .00 | .00 | .00 | .08 | .01 | 3.5 | .62 | .74 | .00 | .00 | 5.2 |
| 2 | .00 | .00 | .00 | .00 | .06 | .04 | 2.6 | .62 | .74 | .01 | .00 | 5.3 |
| 3 | .00 | 7.1 | .00 | .00 | .03 | .08 | 2.1 | .62 | .65 | .01 | .00 | 4.2 |
| 4 | .00 | .12 | .00 | .00 | .02 | .10 | 1.8 | .62 | 7.5 | .01 | .00 | 3.6 |
| 5 | .00 | .08 | .00 | .00 | .00 | .07 | 1.8 | .62 | 4.0 | .00 | .00 | 3.4 |
| 6 | .00 | .07 | .00 | .00 | .00 | .04 | 1.7 | .62 | 1.2 | .00 | .00 | 4.1 |
| 7 | .00 | .01 | .00 | .00 | .00 | .02 | 1.6 | .62 | 2.7 | .00 | .03 | 5.8 |
| 8 | .02 | .00 | .00 | .00 | .00 | .00 | 1.6 | .62 | 1.4 | .00 | .03 | 1.6 |
| 9 | .03 | 7.8 | .00 | .00 | .00 | .00 | 1.6 | 4.1 | 9.5 | .00 | .03 | .22 |
| 10 | .01 | .17 | .00 | .00 | .00 | .00 | 1.4 | 11 | 12 | .00 | .03 | .08 |
| 11 | .00 | .10 | .00 | .00 | .01 | .00 | 1.5 | 10 | 10 | .00 | .05 | .05 |
| 12 | .00 | .06 | .00 | .00 | .03 | .00 | 1.3 | 9.9 | 8.2 | .00 | .08 | .01 |
| 13 | .00 | .01 | .00 | .00 | .03 | .02 | 1.2 | 9.6 | 8.0 | .00 | .08 | .00 |
| 14 | .00 | .00 | .00 | .00 | .04 | .07 | 1.2 | 9.1 | 8.6 | .00 | .08 | .00 |
| 15 | .00 | .00 | .00 | .00 | .03 | .08 | 1.2 | 8.6 | 4.7 | .00 | .08 | .00 |
| 16 | .00 | .00 | .00 | .36 | .02 | .05 | 1.1 | 8.8 | .65 | .00 | .03 | .00 |
| 17 | .00 | .00 | .00 | .30 | .00 | .03 | 1.1 | 13 | 9.0 | .00 | .03 | .00 |
| 18 | .00 | .00 | .00 | .30 | .00 | .00 | 1.3 | 14 | 7.2 | .00 | .03 | .00 |
| 19 | .00 | .00 | .00 | .29 | .00 | .00 | 1.2 | 14 | 6.6 | .00 | .01 | .00 |
| 20 | .00 | .00 | .00 | .22 | .00 | .00 | 1.1 | 13 | 3.8 | .00 | .00 | .00 |
| 21 | .00 | .00 | .00 | .22 | .00 | .00 | 1.1 | 8.7 | .38 | .00 | .00 | .00 |
| 22 | .00 | .00 | .00 | .18 | .00 | .00 | .95 | 12 | .25 | .09 | .00 | .00 |
| 23 | .00 | .00 | .00 | .15 | .00 | .00 | .90 | 8.4 | .22 | .11 | .00 | .00 |
| 24 | .00 | .00 | .00 | .10 | .00 | .00 | .90 | 15 | .23 | .14 | .00 | .00 |
| 25 | .00 | .00 | .00 | .15 | .01 | .00 | .90 | 18 | .22 | .08 | .00 | .00 |
| 26 | .00 | .00 | .00 | .16 | .01 | 1.1 | .90 | 16 | .22 | .08 | .00 | .00 |
| 27 | .00 | .03 | .00 | .15 | 3.2 | 2.9 | .90 | 14 | .17 | .09 | .00 | .00 |
| 28 | .00 | .03 | .00 | .15 | .06 | 2.9 | .82 | 2.5 | .15 | .07 | .00 | .00 |
| 29 | .00 | .02 | .00 | .13 | .03 | 3.0 | .74 | .90 | .15 | .00 | 1.6 | .00 |
| 30 | .00 | .00 | .00 | .08 | --- | 3.1 | .68 | .74 | .37 | .00 | 3.0 | .00 |
| 31 | .00 | --- | .00 | .08 | --- | 3.0 | --- | .74 | --- | .00 | 4.2 | --- |
| TOTAL | 0.06 | 15.60 | 0.00 | 3.02 | 3.66 | 16.61 | 40.69 | 227.04 | 109.54 | 0.69 | 9.39 | 33.56 |
| MEAN | .002 | .52 | .000 | .097 | .13 | .54 | 1.36 | 7.32 | 3.65 | .022 | .30 | 1.12 |
| MAX | .03 | 7.8 | .00 | .36 | 3.2 | 3.1 | 3.5 | 18 | 12 | .14 | 4.2 | 5.8 |
| MIN | .00 | .00 | .00 | .00 | .00 | .00 | .68 | .62 | .15 | .00 | .00 | .00 |
| AC-FT | .1 | 31 | .00 | 6.0 | 7.3 | 33 | 81 | 450 | 217 | 1.4 | 19 | 67 |

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1938 - 1996, BY WATER YEAR (WY)

| | MEAN | MAX | (WY) | MIN | (WY) | MEAN | MAX | (WY) | MIN | (WY) | MEAN | MAX | (WY) | MIN | (WY) |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 1938 | 12.6 | 37.3 | 1951 | .002 | 1996 | 6.07 | 35.7 | 1951 | .000 | 1938 | 4.46 | 24.8 | 1984 | .000 | 1991 |
| 1939 | 6.33 | 31.4 | 1951 | .000 | 1939 | 8.71 | 32.3 | 1991 | .000 | 1938 | 3.02 | 31.4 | 1946 | .000 | 1939 |
| 1940 | 7.60 | 36.0 | 1951 | .000 | 1939 | 8.71 | 32.3 | 1991 | .000 | 1938 | 3.02 | 31.4 | 1946 | .000 | 1939 |
| 1941 | 7.60 | 36.0 | 1951 | .000 | 1939 | 8.71 | 32.3 | 1991 | .000 | 1938 | 3.02 | 31.4 | 1946 | .000 | 1939 |
| 1942 | 8.66 | 34.7 | 1954 | .000 | 1963 | 8.66 | 34.4 | 1954 | .000 | 1939 | 8.66 | 34.4 | 1954 | .000 | 1939 |
| 1943 | 9.67 | 34.4 | 1954 | .000 | 1963 | 9.67 | 34.4 | 1954 | .000 | 1939 | 9.67 | 34.4 | 1954 | .000 | 1939 |
| 1944 | 15.4 | 38.7 | 1953 | .000 | 1938 | 15.4 | 38.7 | 1953 | .000 | 1938 | 15.4 | 38.7 | 1953 | .000 | 1938 |
| 1945 | 11.5 | 36.8 | 1953 | .014 | 1980 | 11.5 | 36.8 | 1953 | .014 | 1980 | 11.5 | 36.8 | 1953 | .014 | 1980 |
| 1946 | 11.5 | 37.0 | 1970 | .000 | 1964 | 11.5 | 37.0 | 1970 | .000 | 1964 | 11.5 | 37.0 | 1970 | .000 | 1964 |
| 1947 | 14.6 | 36.1 | 1950 | .000 | 1989 | 14.6 | 36.1 | 1950 | .000 | 1989 | 14.6 | 36.1 | 1950 | .000 | 1989 |

HAWAII, ISLAND OF KAUAI
160620000 STABLE STORM DITCH NEAR LIHUE--Continued

| SUMMARY STATISTICS | FOR 1995 CALENDAR YEAR | FOR 1996 WATER YEAR | WATER YEARS 1938 - 1996 | |
|--------------------------|------------------------|---------------------|-------------------------|------------|
| ANNUAL TOTAL | 1016.18 | 459.86 | | |
| ANNUAL MEAN | 2.78 | 1.26 | 9.75 | |
| HIGHEST ANNUAL MEAN | | | 22.1 | 1984 |
| LOWEST ANNUAL MEAN | | | .15 | 1994 |
| HIGHEST DAILY MEAN | 25 Jun 7 | 18 May 25 | 71 | Apr 3 1948 |
| LOWEST DAILY MEAN | .00 Jan 1 | .00 Oct 1 | .00 | Oct 1 1937 |
| ANNUAL SEVEN-DAY MINIMUM | .00 Jan 1 | .00 Oct 1 | .00 | Oct 1 1937 |
| ANNUAL RUNOFF (AC-FT) | 2020 | 912 | 7070 | |
| 10 PERCENT EXCEEDS | 12 | 4.1 | 33 | |
| 50 PERCENT EXCEEDS | .10 | .01 | .29 | |
| 90 PERCENT EXCEEDS | .00 | .00 | .00 | |



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 mi².

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 fair. No diversion upstream.

AVERAGE DISCHARGE.--81 years (water years 1913-14, 1916-17, 1920-96), 48.5 ft³/s (35,100 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 18,400 ft³/s, November 12, 1955, gage height, 14.7 ft, from floodmarks, from rating curve extended above 2,700 ft³/s; minimum, 6.8 ft³/s, July 3, 13, 1926.

EXTREMES FOR CURRENT YEAR.--Peak discharge greater than base discharge of 1,900 ft³/s and maximum (*):

| Date | Time | Discharge (ft ³ /s) | Gage height (ft) | Date | Time | Discharge (ft ³ /s) | Gage height (ft) |
|---------|------|-----------------------------------|---------------------|---------|------|-----------------------------------|---------------------|
| Nov. 03 | 1300 | *7,650 | *9.53 | Feb. 27 | 1000 | 1,950 | 5.36 |
| Nov. 09 | 2030 | 5,380 | 8.20 | Sep. 07 | 1030 | 4,300 | 7.46 |

Minimum discharge, 15 ft³/s June 4-6.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|------|-------|------|------|------|------|------|------|------|------|------|------|
| 1 | 62 | 63 | 79 | 31 | 35 | 45 | 198 | 25 | 17 | 78 | 30 | 41 |
| 2 | 43 | 128 | 49 | 28 | 34 | 160 | 41 | 23 | 16 | 80 | 30 | 76 |
| 3 | 61 | 1220 | 43 | 27 | 32 | 321 | 66 | 22 | 16 | 76 | 32 | 30 |
| 4 | 43 | 204 | 41 | 26 | 31 | 110 | 35 | 21 | 16 | 72 | 43 | 26 |
| 5 | 60 | e103 | 38 | 26 | 29 | 73 | 29 | 21 | 15 | 60 | 48 | 23 |
| 6 | 66 | e81 | 36 | 26 | 29 | 57 | 27 | 23 | 15 | 51 | 36 | 53 |
| 7 | 79 | e69 | 34 | 25 | 28 | 49 | 26 | 27 | 17 | 46 | 44 | 945 |
| 8 | 138 | e63 | 33 | 24 | 57 | 43 | 25 | 35 | 29 | 44 | 32 | 271 |
| 9 | 61 | e1310 | 32 | 31 | 36 | 39 | 24 | 25 | 177 | 41 | 31 | 125 |
| 10 | 52 | 322 | 30 | 32 | 32 | 35 | 23 | 21 | 107 | 39 | 31 | 81 |
| 11 | 48 | e123 | 29 | 25 | 28 | 33 | 30 | 21 | 46 | 36 | 68 | 65 |
| 12 | 54 | e92 | 31 | 24 | 27 | 31 | 25 | 20 | 36 | 43 | 120 | 58 |
| 13 | 43 | 84 | 54 | 24 | 26 | 129 | 22 | 20 | 32 | 39 | 46 | 60 |
| 14 | 39 | 66 | 40 | 23 | 30 | 47 | 21 | 19 | 31 | 39 | 38 | 47 |
| 15 | 36 | e59 | 31 | 22 | 35 | 36 | 21 | 18 | 28 | 40 | 37 | 43 |
| 16 | 34 | e50 | 28 | 22 | 29 | 33 | 20 | 18 | 33 | 48 | 31 | 42 |
| 17 | 34 | e49 | 28 | 23 | 26 | 31 | 20 | 18 | 33 | 60 | 30 | 44 |
| 18 | 35 | e55 | 27 | 29 | 25 | 30 | 27 | 18 | 51 | 50 | 29 | 42 |
| 19 | 32 | e42 | 27 | 25 | 24 | 28 | 101 | 17 | 48 | 51 | 28 | 37 |
| 20 | 39 | e41 | 26 | 34 | 24 | 27 | 43 | 17 | 60 | 47 | 26 | 39 |
| 21 | 35 | e36 | 25 | 28 | 24 | 30 | 26 | 18 | 52 | 49 | 25 | 37 |
| 22 | 31 | e36 | 25 | 65 | 24 | 27 | 23 | 18 | 38 | 122 | 23 | 34 |
| 23 | 34 | e36 | 26 | 28 | 24 | 28 | 22 | 17 | 38 | 59 | 23 | 32 |
| 24 | 30 | e35 | 25 | 59 | 27 | 26 | 21 | 18 | 78 | 142 | 22 | 31 |
| 25 | 34 | 201 | 138 | 142 | 45 | 26 | 21 | 27 | 73 | 66 | 21 | 30 |
| 26 | 145 | 212 | 49 | 74 | 70 | 24 | 26 | 23 | 63 | 48 | 20 | 29 |
| 27 | 58 | 127 | 31 | 100 | 482 | 23 | 37 | 19 | e46 | 52 | 20 | 28 |
| 28 | 58 | e63 | 28 | 88 | e112 | 22 | 63 | 27 | e48 | e53 | 19 | 27 |
| 29 | 51 | 52 | 27 | 49 | e53 | 22 | 34 | 24 | 58 | e39 | 18 | 26 |
| 30 | 48 | 48 | 38 | 44 | --- | 27 | 34 | 19 | 109 | e34 | 23 | 29 |
| 31 | 81 | --- | 54 | 39 | --- | 22 | --- | 20 | --- | e32 | 47 | --- |
| TOTAL | 1664 | 5070 | 1202 | 1243 | 1478 | 1634 | 1131 | 659 | 1426 | 1736 | 1071 | 2451 |
| MEAN | 53.7 | 169 | 38.8 | 40.1 | 51.0 | 52.7 | 37.7 | 21.3 | 47.5 | 56.0 | 34.5 | 81.7 |
| MAX | 145 | 1310 | 138 | 142 | 482 | 321 | 198 | 35 | 177 | 142 | 120 | 945 |
| MIN | 30 | 35 | 25 | 22 | 24 | 22 | 20 | 17 | 15 | 32 | 18 | 23 |
| AC-FT | 3300 | 10060 | 2380 | 2470 | 2930 | 3240 | 2240 | 1310 | 2830 | 3440 | 2120 | 4860 |

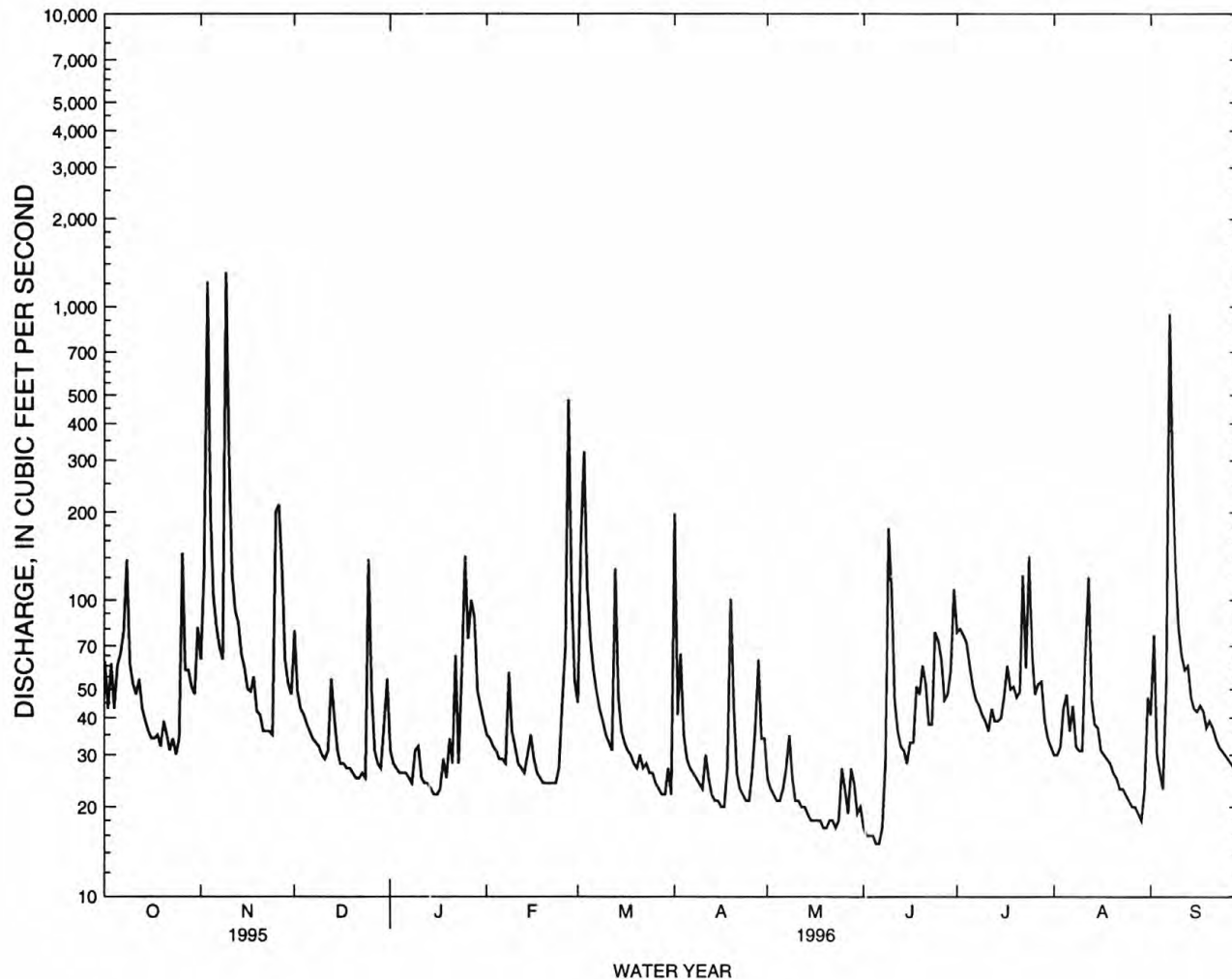
e Estimated

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1912 - 1996, BY WATER YEAR (WY)

| MEAN | 41.6 | 61.0 | 60.5 | 59.2 | 48.8 | 56.5 | 57.0 | 46.8 | 33.1 | 38.6 | 40.1 | 37.2 |
|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 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 | 8.87 | 11.0 | 10.6 | 9.81 | 13.0 | 12.3 | 11.5 | 11.8 |
| (WY) | 1954 | 1934 | 1964 | 1986 | 1986 | 1970 | 1926 | 1926 | 1969 | 1926 | 1984 | 1953 |

HAWAII, ISLAND OF KAUAI
 16068000 EAST BRANCH OF NORTH FORK WAILUA RIVER NEAR LIHUE--Continued

| SUMMARY STATISTICS | FOR 1995 CALENDAR YEAR | | FOR 1996 WATER YEAR | | WATER YEARS 1912 - 1996 | |
|--------------------------|------------------------|--------|---------------------|-------|-------------------------|-------------|
| ANNUAL TOTAL | 16327 | | 20765 | | 48.5 | |
| ANNUAL MEAN | 44.7 | | 56.7 | | 21.3 | |
| HIGHEST ANNUAL MEAN | | | | | 95.5 1982 | |
| LOWEST ANNUAL MEAN | | | | | 21.3 1984 | |
| HIGHEST DAILY MEAN | 1310 | Nov 9 | 1310 | Nov 9 | 2570 | Feb 13 1994 |
| LOWEST DAILY MEAN | 13 | Jun 19 | 15 | Jun 5 | 7.0 | Jul 8 1926 |
| ANNUAL SEVEN-DAY MINIMUM | 14 | Mar 15 | 16 | Jun 1 | 8.2 | Mar 5 1986 |
| ANNUAL RUNOFF (AC-FT) | 32380 | | 41190 | | 35100 | |
| 10 PERCENT EXCEEDS | 76 | | 81 | | 84 | |
| 50 PERCENT EXCEEDS | 25 | | 34 | | 31 | |
| 90 PERCENT EXCEEDS | 16 | | 21 | | 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 current year.

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

AVERAGE DISCHARGE.--59 years (water years 1938-96), 16.2 ft³/s (11,710 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 63 ft³/s, June 4, 1937; no flow on many days.

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge, 29 ft³/s, October 3, 4; minimum daily, 0.17 ft³/s, April 6-7.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY MEAN VALUES

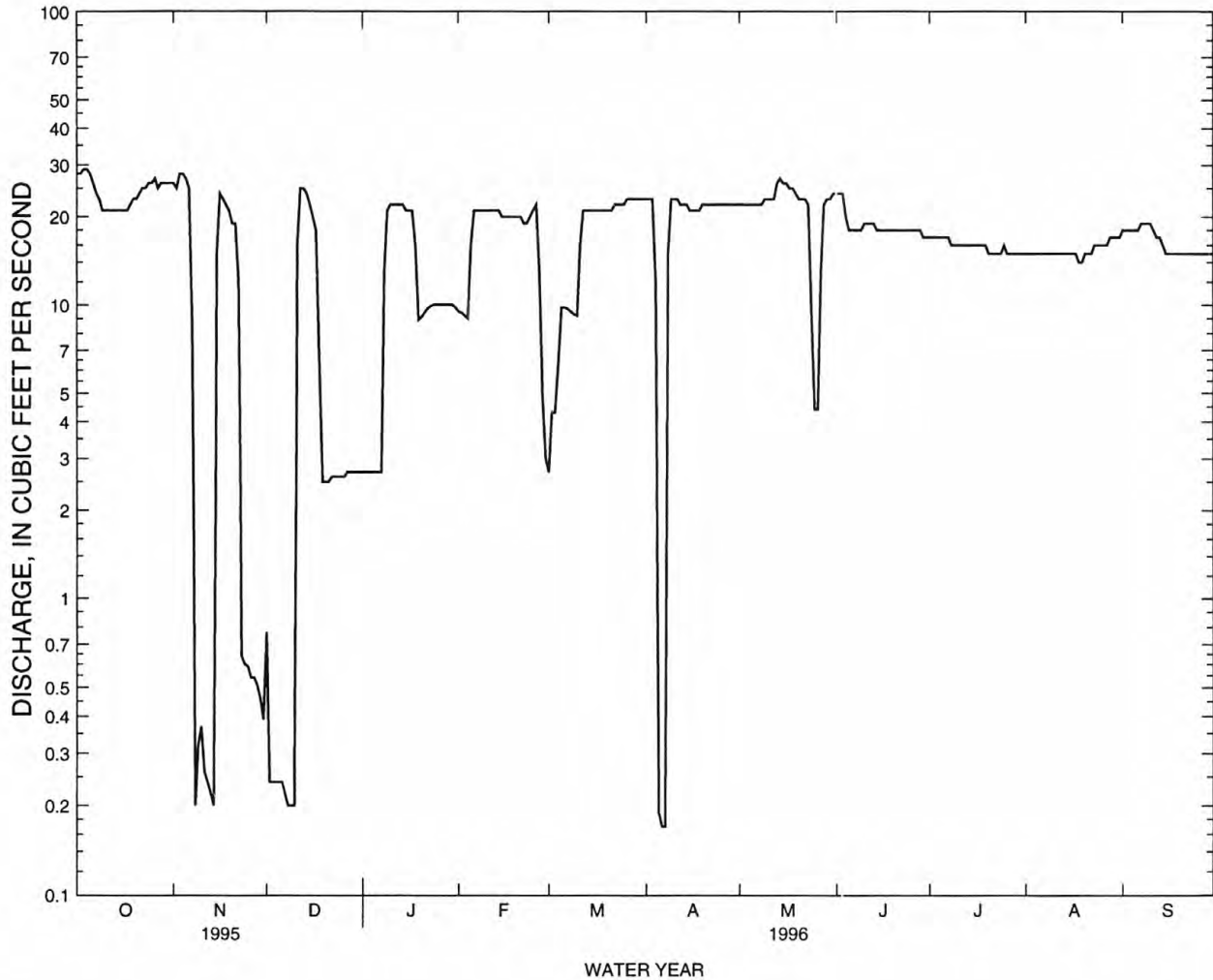
| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|------|--------|--------|-------|-------|-------|--------|-------|------|------|------|------|
| 1 | 28 | 26 | .77 | 2.7 | 9.5 | 2.7 | 23 | 22 | 24 | 17 | 15 | 18 |
| 2 | 28 | 25 | .24 | 2.7 | 9.4 | 4.3 | 23 | 22 | 24 | 17 | 15 | 18 |
| 3 | 29 | 28 | .24 | 2.7 | 9.2 | 4.3 | 23 | 22 | 24 | 17 | 15 | 18 |
| 4 | 29 | 28 | .24 | 2.7 | 9.0 | 6.3 | 12 | 22 | 20 | 17 | 15 | 18 |
| 5 | 28 | 27 | .24 | 2.7 | 16 | 9.8 | .19 | 22 | 18 | 17 | 15 | 18 |
| 6 | 26 | 25 | .24 | 2.7 | 21 | 9.8 | .17 | 22 | 18 | 17 | 15 | 18 |
| 7 | 24 | 8.6 | .22 | 2.7 | 21 | 9.7 | .17 | 22 | 18 | 17 | 15 | 19 |
| 8 | 23 | .20 | .20 | 13 | 21 | 9.5 | 15 | 22 | 18 | 16 | 15 | 19 |
| 9 | 21 | .32 | .20 | 21 | 21 | 9.3 | 23 | 23 | 18 | 16 | 15 | 19 |
| 10 | 21 | .37 | .20 | 22 | 21 | 9.2 | 23 | 23 | 19 | 16 | 15 | 19 |
| 11 | 21 | .26 | 16 | 22 | 21 | 16 | 23 | 23 | 19 | 16 | 15 | 18 |
| 12 | 21 | .24 | 25 | 22 | 21 | 21 | 22 | 23 | 19 | 16 | 15 | 17 |
| 13 | 21 | .22 | 25 | 22 | 21 | 21 | 22 | 26 | 19 | 16 | 15 | 17 |
| 14 | 21 | .20 | 24 | 22 | 21 | 21 | 22 | 27 | 18 | 16 | 15 | 16 |
| 15 | 21 | 15 | 22 | 21 | 20 | 21 | 21 | 26 | 18 | 16 | 15 | 15 |
| 16 | 21 | 24 | 20 | 21 | 20 | 21 | 21 | 26 | 18 | 16 | 15 | 15 |
| 17 | 21 | 23 | 18 | 21 | 20 | 21 | 21 | 25 | 18 | 16 | 15 | 15 |
| 18 | 22 | 22 | 6.1 | 16 | 20 | 21 | 21 | 25 | 18 | 16 | 14 | 15 |
| 19 | 23 | 21 | 2.5 | 8.9 | 20 | 21 | 22 | 24 | 18 | 16 | 14 | 15 |
| 20 | 23 | 19 | 2.5 | 9.1 | 20 | 21 | 22 | 23 | 18 | 15 | 15 | 15 |
| 21 | 24 | 19 | 2.5 | 9.4 | 20 | 21 | 22 | 23 | 18 | 15 | 15 | 15 |
| 22 | 25 | 12 | 2.6 | 9.7 | 19 | 22 | 22 | 23 | 18 | 15 | 15 | 15 |
| 23 | 25 | .64 | 2.6 | 9.9 | 19 | 22 | 22 | 22 | 18 | 15 | 16 | 15 |
| 24 | 26 | .60 | 2.6 | 10 | 20 | 22 | 22 | 9.3 | 18 | 15 | 16 | 15 |
| 25 | 26 | .59 | 2.6 | 10 | 21 | 22 | 22 | 4.4 | 18 | 16 | 16 | 15 |
| 26 | 27 | .54 | 2.6 | 10 | 22 | 23 | 22 | 4.4 | 18 | 15 | 16 | 15 |
| 27 | 25 | .54 | 2.7 | 10 | 13 | 23 | 22 | 13 | 18 | 15 | 16 | 15 |
| 28 | 26 | .51 | 2.7 | 10 | 4.9 | 23 | 22 | 22 | 18 | 15 | 17 | 15 |
| 29 | 26 | .46 | 2.7 | 10 | 3.0 | 23 | 22 | 23 | 17 | 15 | 17 | 15 |
| 30 | 26 | .39 | 2.7 | 10 | --- | 23 | 22 | 23 | 17 | 15 | 17 | 15 |
| 31 | 26 | --- | 2.7 | 9.8 | --- | 23 | --- | 24 | --- | 15 | 17 | --- |
| TOTAL | 754 | 328.68 | 192.89 | 368.7 | 504.0 | 526.9 | 579.53 | 661.1 | 562 | 492 | 476 | 492 |
| MEAN | 24.3 | 11.0 | 6.22 | 11.9 | 17.4 | 17.0 | 19.3 | 21.3 | 18.7 | 15.9 | 15.4 | 16.4 |
| MAX | 29 | 28 | 25 | 22 | 22 | 23 | 23 | 27 | 24 | 17 | 17 | 19 |
| MIN | 21 | .20 | .20 | 2.7 | 3.0 | 2.7 | .17 | 4.4 | 17 | 15 | 14 | 15 |
| AC-FT | 1500 | 652 | 383 | 731 | 1000 | 1050 | 1150 | 1310 | 1110 | 976 | 944 | 976 |

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1937 - 1996, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|------|------|------|------|------|------|------|------|------|------|------|------|------|
| MEAN | 19.0 | 12.3 | 9.24 | 10.7 | 12.0 | 12.7 | 13.7 | 16.8 | 21.5 | 22.2 | 22.1 | 22.6 |
| MAX | 35.2 | 28.5 | 33.3 | 35.3 | 37.8 | 27.3 | 28.8 | 40.5 | 40.0 | 46.5 | 48.6 | 53.5 |
| (WY) | 1958 | 1984 | 1938 | 1938 | 1940 | 1980 | 1938 | 1938 | 1937 | 1938 | 1939 | 1938 |
| MIN | 2.80 | .19 | .009 | .20 | .071 | .41 | .90 | 1.08 | 7.87 | 9.72 | 5.72 | 3.89 |
| (WY) | 1969 | 1965 | 1955 | 1968 | 1969 | 1956 | 1963 | 1965 | 1962 | 1954 | 1954 | 1946 |

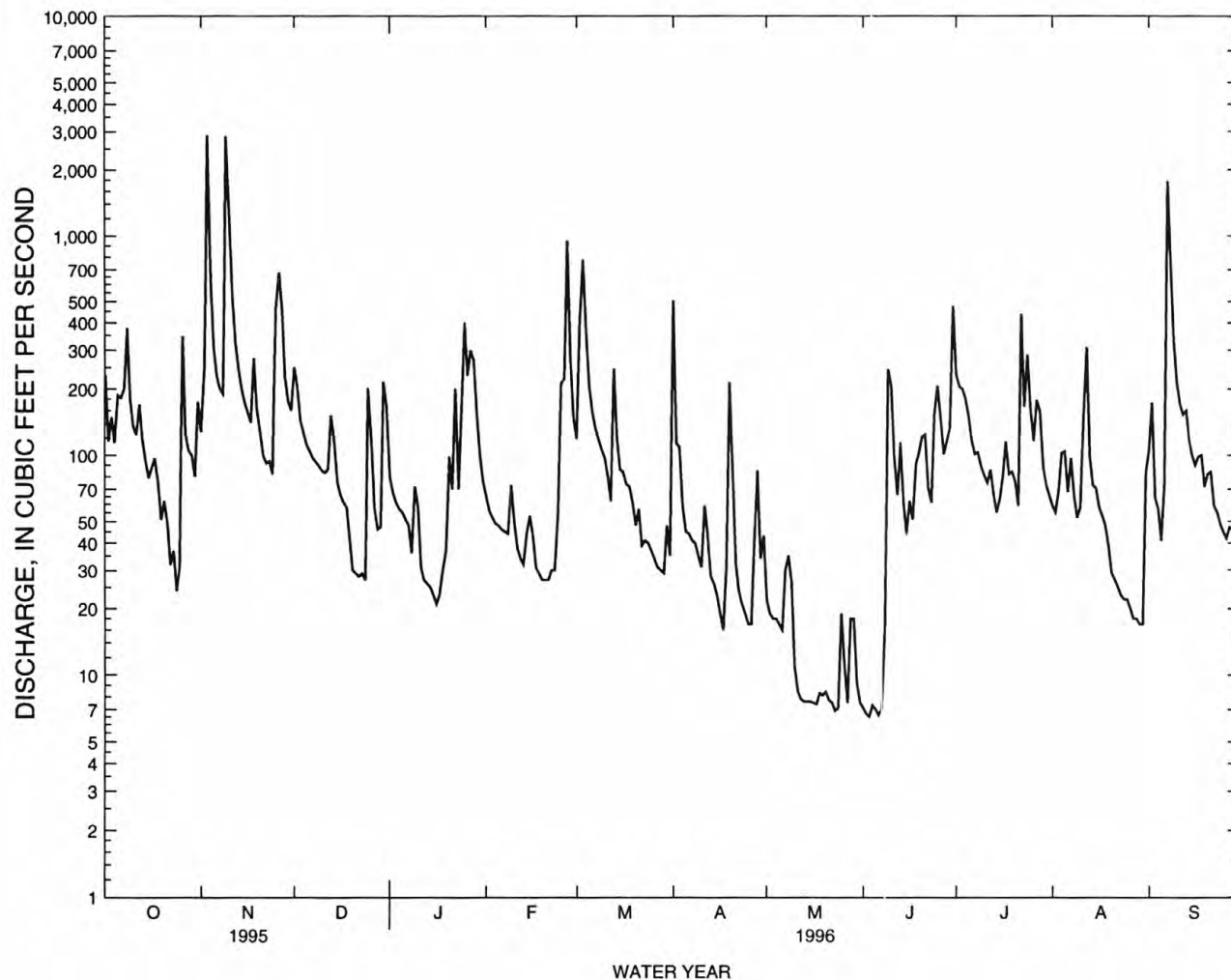
HAWAII, ISLAND OF KAUAI
 16069000 WAILUA DITCH NEAR KAPAA--Continued

| SUMMARY STATISTICS | FOR 1995 CALENDAR YEAR | FOR 1996 WATER YEAR | WATER YEARS 1937 - 1996 |
|--------------------------|------------------------|---------------------|-------------------------|
| ANNUAL TOTAL | 7921.97 | 5937.80 | |
| ANNUAL MEAN | 21.7 | 16.2 | 16.2 |
| HIGHEST ANNUAL MEAN | | | 32.9 1938 |
| LOWEST ANNUAL MEAN | | | 6.52 1962 |
| HIGHEST DAILY MEAN | 29 Jul 6 | 29 Oct 3 | 63 Jun 4 1937 |
| LOWEST DAILY MEAN | .20 Nov 8 | .17 Apr 6 | .00 May 15 1940 |
| ANNUAL SEVEN-DAY MINIMUM | .22 Dec 4 | .22 Dec 4 | .00 May 15 1940 |
| ANNUAL RUNOFF (AC-FT) | 15710 | 11780 | 11710 |
| 10 PERCENT EXCEEDS | 27 | 24 | 31 |
| 50 PERCENT EXCEEDS | 25 | 18 | 16 |
| 90 PERCENT EXCEEDS | 2.7 | 2.7 | .87 |



HAWAII, ISLAND OF KAUAI
16071000 NORTH FORK WAILUA RIVER NEAR KAPAA--Continued

| SUMMARY STATISTICS | FOR 1995 CALENDAR YEAR | FOR 1996 WATER YEAR | FOR 1995 WATER YEAR | FOR 1996 WATER YEAR | FOR 1997 WATER YEAR |
|--------------------------|------------------------|---------------------|---------------------|---------------------|---------------------|
| ANNUAL TOTAL | 38243.0 | 46845.4 | 122 | 262 | 1982 |
| ANNUAL MEAN | 105 | 128 | 25.7 | 25.7 | 1984 |
| HIGHEST ANNUAL MEAN | | | | | |
| LOWEST ANNUAL MEAN | | | | | |
| HIGHEST DAILY MEAN | 2880 | 2880 | 7350 | 7350 | 7350 |
| LOWEST DAILY MEAN | 5.6 | 6.5 | 2.2 | 2.2 | 2.2 |
| ANNUAL SEVEN-DAY MINIMUM | 9.0 | 6.9 | 2.4 | 2.4 | 2.4 |
| ANNUAL RUNOFF (AC-FT) | 75850 | 92920 | 88120 | 88120 | 88120 |
| 10 PERCENT EXCEEDS | 216 | 230 | 255 | 255 | 255 |
| 50 PERCENT EXCEEDS | 45 | 70 | 67 | 67 | 67 |
| 90 PERCENT EXCEEDS | 11 | 18 | 8.2 | 8.2 | 8.2 |



HAWAII, ISLAND OF KAUAI
16071500 LEFT BRANCH OPAEKA 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 mi².

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

REVISED RECORDS.--WSP 2137: Drainage area.

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

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

AVERAGE DISCHARGE.--36 years (water years 1961-95), 2.65 ft³/s (1,920 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,060 ft³/s, December 14, 1991, gage height, 6.60 ft, from rating curve extended above 415 ft³/s on basis of slope-area measurement at gage height 5.01 ft; minimum, 0.09 ft³/s, September 27-30, 1968.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 70 ft³/s and maximum (*):

| Date | Time | Discharge (ft ³ /s) | Gage height (ft) | Date | Time | Discharge (ft ³ /s) | Gage height (ft) |
|---------|------|-----------------------------------|---------------------|---------|------|-----------------------------------|---------------------|
| Nov. 03 | 1345 | *623 | 5.25 | Jun. 09 | 1330 | 112 | 2.70 |
| Nov. 09 | 1345 | 334 | 4.07 | Sep. 07 | 1200 | 80 | 2.40 |
| Feb. 27 | 1015 | 103 | 2.62 | | | | |

Minimum discharge, 0.60 ft³/s June 6-8.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY MEAN VALUES

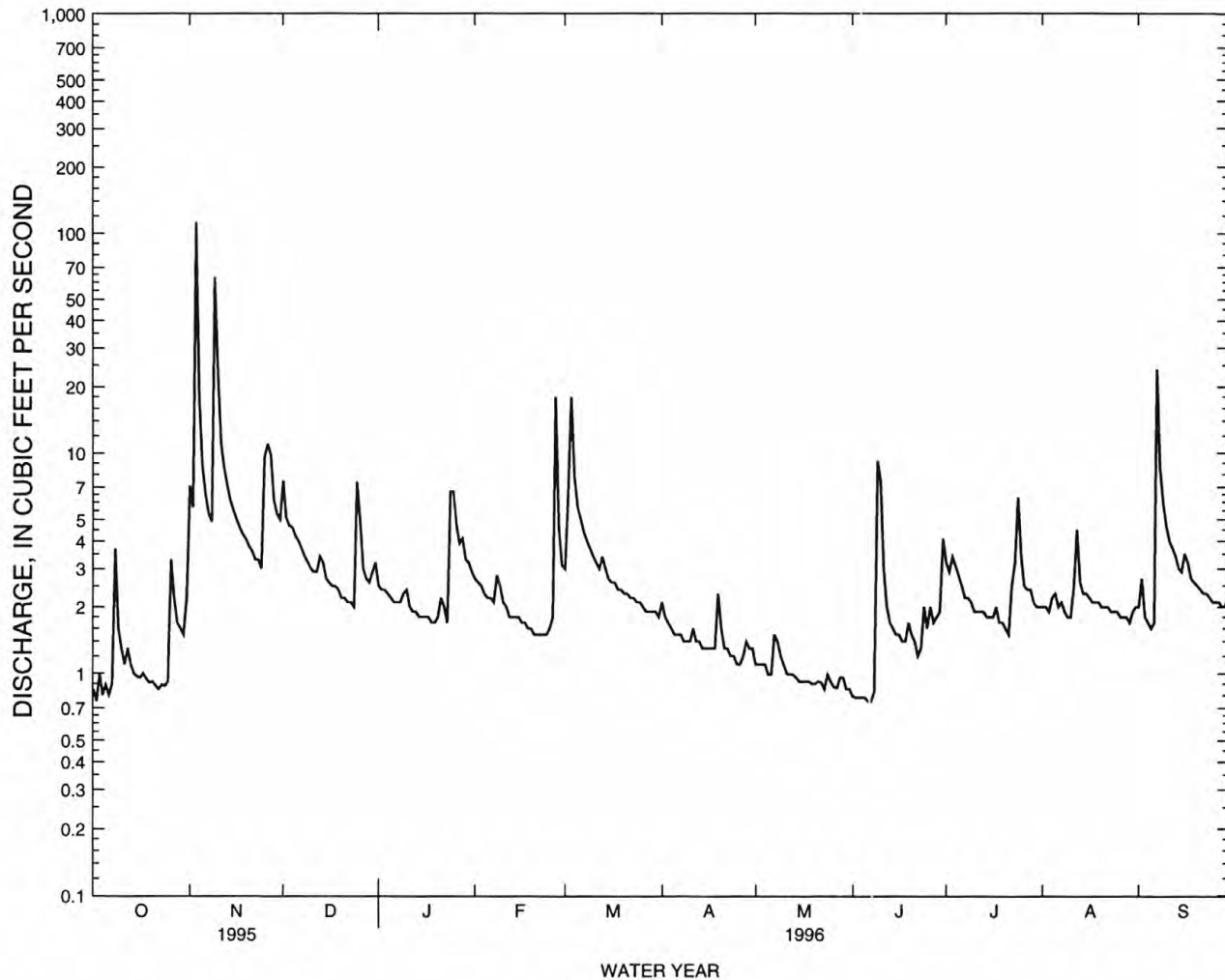
| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|-------|-------|-------|------|------|-------|------|-------|-------|------|------|-------|
| 1 | .85 | 7.1 | 7.5 | 2.5 | 2.7 | 3.0 | 2.1 | 1.1 | .79 | 3.2 | 2.0 | 2.0 |
| 2 | .75 | 5.7 | 5.1 | 2.4 | 2.6 | 6.3 | 1.8 | 1.1 | .78 | 2.9 | 2.0 | 2.7 |
| 3 | 1.0 | 112 | 4.7 | 2.4 | 2.5 | 18 | 1.7 | 1.1 | .78 | 3.4 | 1.9 | 1.8 |
| 4 | .80 | 17 | 4.6 | 2.3 | 2.3 | 7.8 | 1.6 | 1.1 | .78 | 3.1 | 2.2 | 1.7 |
| 5 | .89 | 8.8 | 4.2 | 2.2 | 2.2 | 5.7 | 1.5 | .99 | .78 | 2.8 | 2.3 | 1.6 |
| 6 | .80 | 6.5 | 4.0 | 2.1 | 2.2 | 5.0 | 1.5 | .99 | .75 | 2.5 | 2.0 | 1.7 |
| 7 | .90 | 5.3 | 3.7 | 2.1 | 2.1 | 4.4 | 1.5 | 1.5 | .75 | 2.2 | 2.1 | 24 |
| 8 | 3.7 | 4.9 | 3.4 | 2.1 | 2.8 | 4.0 | 1.4 | 1.4 | .83 | 2.2 | 1.9 | 8.5 |
| 9 | 1.6 | 63 | 3.2 | 2.3 | 2.5 | 3.7 | 1.4 | 1.2 | 9.2 | 2.1 | 1.8 | 5.9 |
| 10 | 1.3 | 23 | 3.0 | 2.4 | 2.1 | 3.4 | 1.4 | 1.1 | 7.4 | 1.9 | 1.8 | 4.7 |
| 11 | 1.1 | 11 | 2.9 | 2.0 | 2.0 | 3.2 | 1.6 | 1.0 | 3.0 | 1.9 | 2.5 | 4.0 |
| 12 | 1.3 | 8.5 | 2.9 | 1.9 | 1.8 | 3.0 | 1.4 | .99 | 2.0 | 1.9 | 4.5 | 3.7 |
| 13 | 1.1 | 7.1 | 3.4 | 1.9 | 1.8 | 3.4 | 1.4 | .99 | 1.7 | 1.9 | 2.6 | 3.4 |
| 14 | 1.0 | 6.1 | 3.2 | 1.8 | 1.8 | 3.0 | 1.3 | .96 | 1.6 | 1.8 | 2.3 | 3.0 |
| 15 | .97 | 5.5 | 2.7 | 1.8 | 1.8 | 2.7 | 1.3 | .92 | 1.5 | 1.8 | 2.3 | 2.9 |
| 16 | .96 | 5.0 | 2.6 | 1.8 | 1.7 | 2.6 | 1.3 | .92 | 1.5 | 1.8 | 2.2 | 3.5 |
| 17 | 1.0 | 4.6 | 2.5 | 1.8 | 1.7 | 2.6 | 1.3 | .92 | 1.4 | 2.0 | 2.1 | 3.2 |
| 18 | .95 | 4.3 | 2.5 | 1.7 | 1.6 | 2.4 | 1.3 | .92 | 1.4 | 1.7 | 2.1 | 2.7 |
| 19 | .91 | 4.1 | 2.4 | 1.7 | 1.6 | 2.4 | 2.3 | .90 | 1.7 | 1.7 | 2.1 | 2.6 |
| 20 | .92 | 3.8 | 2.2 | 1.8 | 1.5 | 2.3 | 1.6 | .90 | 1.5 | 1.6 | 2.0 | 2.5 |
| 21 | .88 | 3.6 | 2.2 | 2.2 | 1.5 | 2.3 | 1.3 | .92 | 1.4 | 1.5 | 2.0 | 2.4 |
| 22 | .85 | 3.3 | 2.1 | 2.0 | 1.5 | 2.2 | 1.3 | .91 | 1.2 | 2.5 | 2.0 | 2.3 |
| 23 | .89 | 3.3 | 2.1 | 1.7 | 1.5 | 2.2 | 1.2 | .85 | 1.3 | 3.2 | 1.9 | 2.3 |
| 24 | .88 | 3.0 | 2.0 | 6.7 | 1.5 | 2.1 | 1.2 | .99 | 2.0 | 6.3 | 1.9 | 2.2 |
| 25 | .92 | 9.6 | 7.4 | 6.7 | 1.6 | 2.1 | 1.1 | .92 | 1.6 | 3.4 | 1.9 | 2.1 |
| 26 | 3.3 | 11 | 5.0 | 4.8 | 1.8 | 2.0 | 1.1 | .87 | 2.0 | 2.5 | 1.8 | 2.1 |
| 27 | 2.2 | 9.8 | 3.0 | 3.9 | 18 | 1.9 | 1.2 | .86 | 1.7 | 2.4 | 1.8 | 2.1 |
| 28 | 1.7 | 6.2 | 2.7 | 4.1 | 4.6 | 1.9 | 1.4 | .96 | 1.8 | 2.4 | 1.8 | 2.0 |
| 29 | 1.6 | 5.3 | 2.6 | 3.3 | 3.1 | 1.9 | 1.3 | .96 | 1.9 | 2.1 | 1.7 | 2.0 |
| 30 | 1.5 | 5.0 | 2.9 | 3.2 | --- | 1.9 | 1.3 | .85 | 4.1 | 2.0 | 1.9 | 2.3 |
| 31 | 2.2 | --- | 3.2 | 2.9 | --- | 1.8 | --- | .85 | --- | 2.0 | 2.0 | --- |
| TOTAL | 39.72 | 373.4 | 105.9 | 82.5 | 76.4 | 111.2 | 43.1 | 30.94 | 59.14 | 74.7 | 65.4 | 107.9 |
| MEAN | 1.28 | 12.4 | 3.42 | 2.66 | 2.63 | 3.59 | 1.44 | 1.00 | 1.97 | 2.41 | 2.11 | 3.60 |
| MAX | 3.7 | 112 | 7.5 | 6.7 | 18 | 18 | 2.3 | 1.5 | 9.2 | 6.3 | 4.5 | 24 |
| MIN | .75 | 3.0 | 2.0 | 1.7 | 1.5 | 1.8 | 1.1 | .85 | .75 | 1.5 | 1.7 | 1.6 |
| AC-FT | 79 | 741 | 210 | 164 | 152 | 221 | 85 | 61 | 117 | 148 | 130 | 214 |

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1960 - 1996, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|------|------|------|------|------|------|------|------|------|------|------|------|------|
| MEAN | 2.28 | 4.00 | 3.94 | 3.19 | 2.64 | 2.88 | 3.24 | 2.79 | 1.85 | 1.70 | 1.67 | 1.60 |
| 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 | .42 | .59 | .56 | .58 | .50 | .50 | .81 | .62 | .29 | .59 | .36 | .38 |
| (WY) | 1985 | 1964 | 1963 | 1977 | 1986 | 1978 | 1993 | 1966 | 1968 | 1968 | 1984 | 1975 |

HAWAII, ISLAND OF KAUAI
 16071500 LEFT BRANCH OPAEKAA STREAM NEAR KAPAA--Continued

| SUMMARY STATISTICS | FOR 1995 CALENDAR YEAR | FOR 1996 WATER YEAR | WATER YEARS 1960 - 1996 | |
|--------------------------|------------------------|---------------------|-------------------------|-------------|
| ANNUAL TOTAL | 826.90 | 1170.30 | | |
| ANNUAL MEAN | 2.27 | 3.20 | 2.65 | |
| HIGHEST ANNUAL MEAN | | | 5.72 | 1982 |
| LOWEST ANNUAL MEAN | | | .92 | 1984 |
| HIGHEST DAILY MEAN | 112 Nov 3 | 112 Nov 3 | 218 | Dec 14 1991 |
| LOWEST DAILY MEAN | .55 Sep 6 | .75 Oct 2 | .09 | Sep 28 1968 |
| ANNUAL SEVEN-DAY MINIMUM | .55 Sep 6 | .77 Jun 1 | .10 | Jun 6 1968 |
| ANNUAL RUNOFF (AC-FT) | 1640 | 2320 | 1920 | |
| 10 PERCENT EXCEEDS | 3.8 | 5.0 | 4.5 | |
| 50 PERCENT EXCEEDS | .99 | 2.0 | 1.7 | |
| 90 PERCENT EXCEEDS | .66 | .96 | .67 | |



HAWAII, ISLAND OF KAUAI
16077000 MAKALEHA DITCH NEAR KEALIA

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

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

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

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

AVERAGE DISCHARGE.--59 years (water years 1938-96), 6.13 ft³/s (4,440 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 31 ft³/s, August 1, 1961, June 30, 1982; no flow at times.

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge, 12 ft³/s, November 03; minimum daily, no flow November 22, 24, December 11, 13, 17-20, September 16.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY MEAN VALUES

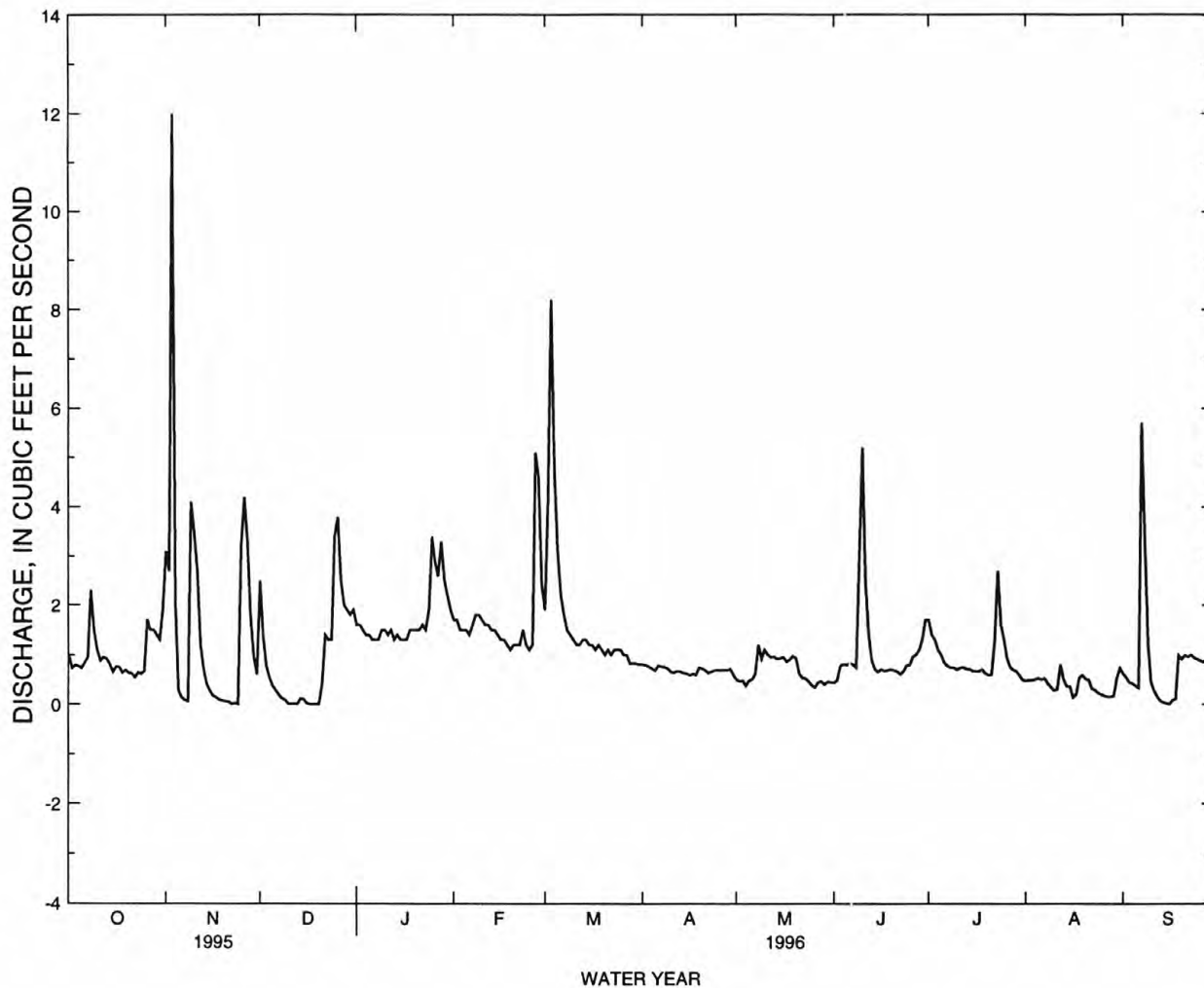
| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|-------|-------|-------|------|------|-------|-------|-------|-------|-------|-------|-------|
| 1 | .99 | 3.1 | 2.5 | 1.6 | 1.7 | 1.9 | .80 | .50 | .43 | 1.7 | .47 | .62 |
| 2 | .73 | 2.7 | 1.4 | 1.6 | 1.7 | 4.1 | .79 | .46 | .48 | 1.4 | .48 | .54 |
| 3 | .79 | 12 | .78 | 1.5 | 1.5 | 8.2 | .76 | .47 | .77 | 1.3 | .48 | .44 |
| 4 | .77 | 2.0 | .54 | 1.4 | 1.5 | 4.8 | .72 | .37 | .81 | 1.1 | .50 | .42 |
| 5 | .73 | .28 | .37 | 1.4 | 1.5 | 3.1 | .68 | .47 | .79 | 1.0 | .52 | .37 |
| 6 | .84 | .14 | .28 | 1.3 | 1.4 | 2.2 | .78 | .50 | .83 | .84 | .50 | .33 |
| 7 | .95 | .08 | .19 | 1.3 | 1.6 | 1.8 | .76 | .61 | .80 | .77 | .52 | 5.7 |
| 8 | 2.3 | .06 | .12 | 1.3 | 1.8 | 1.5 | .75 | 1.2 | .74 | .74 | .42 | 3.3 |
| 9 | 1.5 | 4.1 | .09 | 1.5 | 1.8 | 1.4 | .72 | .92 | 3.0 | .74 | .35 | 1.2 |
| 10 | 1.1 | 3.5 | .01 | 1.5 | 1.7 | 1.3 | .65 | 1.1 | 5.2 | .70 | .28 | .44 |
| 11 | .88 | 2.7 | .00 | 1.4 | 1.6 | 1.2 | .64 | 1.0 | 2.5 | .73 | .30 | .27 |
| 12 | .95 | 1.2 | .01 | 1.5 | 1.6 | 1.2 | .67 | .95 | 1.4 | .75 | .80 | .15 |
| 13 | .92 | .70 | .00 | 1.3 | 1.5 | 1.3 | .66 | .96 | .89 | .71 | .50 | .07 |
| 14 | .81 | .41 | .11 | 1.4 | 1.5 | 1.3 | .63 | .91 | .71 | .71 | .36 | .04 |
| 15 | .65 | .27 | .10 | 1.3 | 1.4 | 1.2 | .62 | .93 | .65 | .67 | .36 | .02 |
| 16 | .76 | .17 | .02 | 1.3 | 1.3 | 1.2 | .58 | .95 | .70 | .67 | .14 | .00 |
| 17 | .75 | .14 | .00 | 1.3 | 1.3 | 1.1 | .61 | .86 | .67 | .66 | .20 | .08 |
| 18 | .64 | .09 | .00 | 1.5 | 1.2 | 1.2 | .59 | .90 | .68 | .70 | .53 | .11 |
| 19 | .69 | .07 | .00 | 1.5 | 1.1 | 1.1 | .74 | .97 | .70 | .62 | .59 | .99 |
| 20 | .63 | .06 | .00 | 1.5 | 1.2 | 1.0 | .72 | .93 | .68 | .59 | .51 | .91 |
| 21 | .62 | .05 | .41 | 1.5 | 1.2 | 1.1 | .68 | .62 | .66 | .60 | .49 | .99 |
| 22 | .54 | .00 | 1.4 | 1.6 | 1.2 | 1.0 | .63 | .53 | .60 | 1.3 | .31 | .96 |
| 23 | .64 | .02 | 1.3 | 1.5 | 1.5 | 1.1 | .66 | .52 | .66 | 2.7 | .29 | 1.0 |
| 24 | .61 | .00 | 1.3 | 1.9 | 1.2 | 1.1 | .68 | .46 | .78 | 1.6 | .23 | .94 |
| 25 | .66 | 3.2 | 3.4 | 3.4 | 1.1 | 1.1 | .69 | .38 | .79 | 1.3 | .20 | .91 |
| 26 | 1.7 | 4.2 | 3.8 | 2.9 | 1.2 | 1.0 | .68 | .34 | .96 | .93 | .17 | .88 |
| 27 | 1.5 | 3.3 | 2.5 | 2.6 | 5.1 | .99 | .69 | .44 | 1.0 | .75 | .15 | .85 |
| 28 | 1.5 | 1.8 | 2.0 | 3.3 | 4.6 | .82 | .68 | .46 | 1.1 | .69 | .15 | .90 |
| 29 | 1.4 | .97 | 1.9 | 2.5 | 2.4 | .83 | .71 | .40 | 1.3 | .66 | .16 | .82 |
| 30 | 1.3 | .60 | 1.8 | 2.2 | --- | .82 | .59 | .45 | 1.7 | .58 | .52 | .89 |
| 31 | 1.9 | --- | 1.9 | 1.9 | --- | .80 | --- | .44 | --- | .49 | .73 | --- |
| TOTAL | 30.75 | 47.91 | 28.23 | 53.7 | 49.4 | 52.76 | 20.56 | 21.00 | 32.98 | 28.70 | 12.21 | 25.14 |
| MEAN | .99 | 1.60 | .91 | 1.73 | 1.70 | 1.70 | .69 | .68 | 1.10 | .93 | .39 | .84 |
| MAX | 2.3 | 12 | 3.8 | 3.4 | 5.1 | 8.2 | .80 | 1.2 | 5.2 | 2.7 | .80 | 5.7 |
| MIN | .54 | .00 | .00 | 1.3 | 1.1 | .80 | .58 | .34 | .43 | .49 | .14 | .00 |
| AC-FT | 61 | 95 | 56 | 107 | 98 | 105 | 41 | 42 | 65 | 57 | 24 | 50 |

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1937 - 1996, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|------|------|------|------|------|------|------|------|------|------|------|------|------|
| MEAN | 7.78 | 4.91 | 3.36 | 3.37 | 4.27 | 4.49 | 5.21 | 6.24 | 8.14 | 8.72 | 8.52 | 8.11 |
| MAX | 13.7 | 11.8 | 10.1 | 9.48 | 12.7 | 13.0 | 15.7 | 17.1 | 16.8 | 17.1 | 16.4 | 14.0 |
| (WY) | 1984 | 1954 | 1939 | 1983 | 1961 | 1961 | 1960 | 1956 | 1956 | 1958 | 1955 | 1969 |
| MIN | .031 | .003 | .000 | .000 | .013 | .028 | .027 | .030 | .009 | .005 | .000 | .007 |
| (WY) | 1995 | 1995 | 1995 | 1995 | 1993 | 1992 | 1992 | 1992 | 1993 | 1994 | 1994 | 1993 |

HAWAII, ISLAND OF KAUAI
 16077000 MAKALEHA DITCH NEAR KEALIA--Continued

| SUMMARY STATISTICS | FOR 1995 CALENDAR YEAR | FOR 1996 WATER YEAR | WATER YEARS 1937 - 1996 | |
|--------------------------|------------------------|---------------------|-------------------------|-------------|
| ANNUAL TOTAL | 221.60 | 403.34 | | |
| ANNUAL MEAN | .61 | 1.10 | 6.13 | |
| HIGHEST ANNUAL MEAN | | | 10.0 | 1961 |
| LOWEST ANNUAL MEAN | | | .042 | 1994 |
| HIGHEST DAILY MEAN | 12 Nov 3 | 12 Nov 3 | 31 | Aug 1 1961 |
| LOWEST DAILY MEAN | .00 Jan 1 | .00 Nov 22 | .00 | Jan 11 1958 |
| ANNUAL SEVEN-DAY MINIMUM | .00 Jan 3 | .03 Dec 13 | .00 | Dec 6 1959 |
| ANNUAL RUNOFF (AC-FT) | 440 | 800 | 4440 | |
| 10 PERCENT EXCEEDS | 1.3 | 1.9 | 13 | |
| 50 PERCENT EXCEEDS | .51 | .80 | 6.3 | |
| 90 PERCENT EXCEEDS | .00 | .17 | .11 | |



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 current year.
Published as "at Kapahi, near Kapaa" prior to January 1914 and as "at Kapahi, near Kealia" January to December 1913.

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

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

AVERAGE DISCHARGE.--78 years (water years 1918-20, 1922-96), 6.21 ft³/s (4,500 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 138 ft³/s, February 6, 1913; no flow at times.

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge, 18 ft³/s, December 13; minimum daily, 0.01 ft³/s, November 22, 23.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY MEAN VALUES

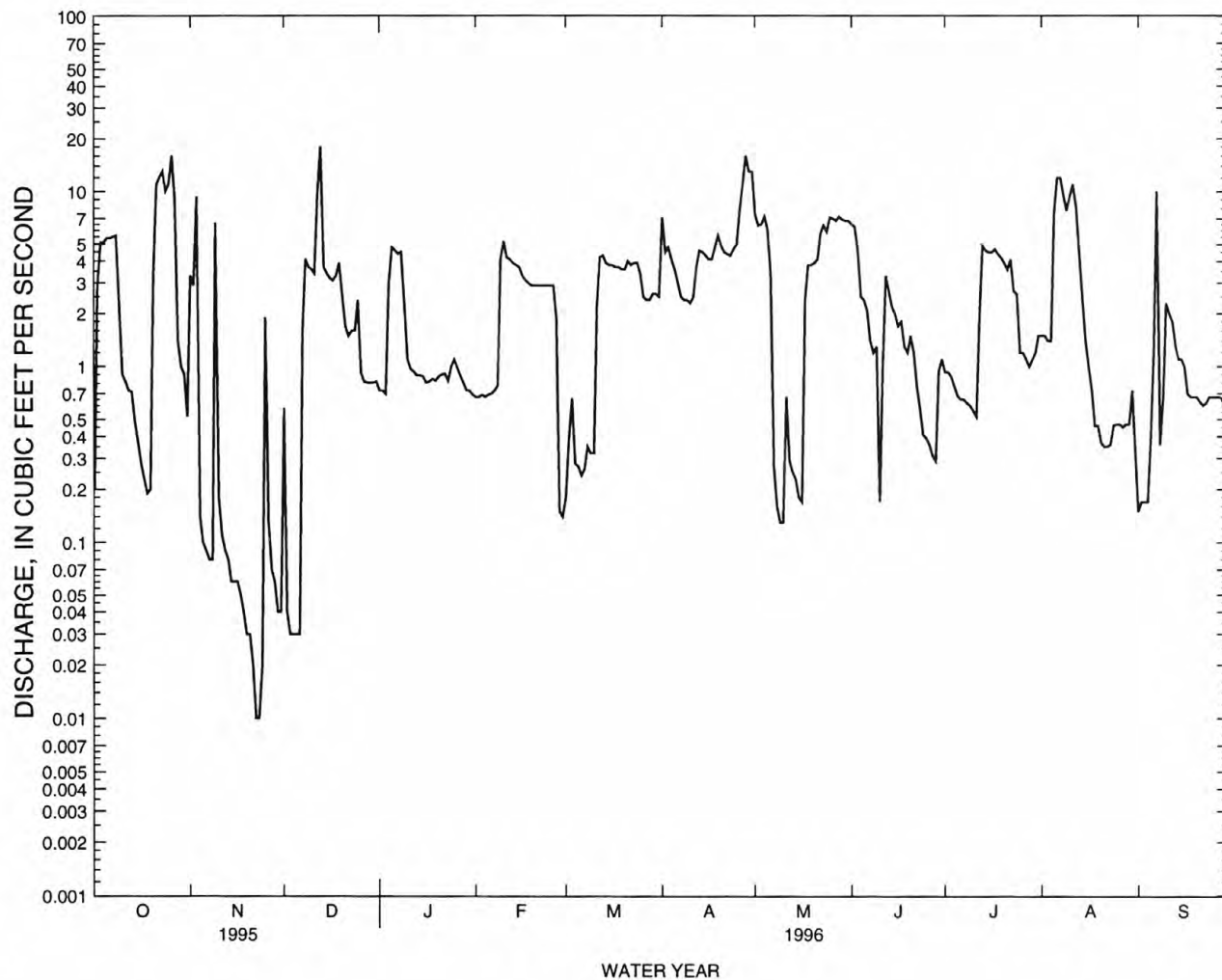
| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|--------|-------|-------|-------|-------|-------|-------|--------|-------|-------|-------|-------|
| 1 | .20 | 3.3 | .58 | .73 | .67 | .18 | 7.1 | 7.4 | 6.5 | .93 | 1.5 | .15 |
| 2 | 2.9 | 2.9 | .04 | .73 | .67 | .38 | 4.5 | 6.4 | 6.3 | .93 | 1.5 | .17 |
| 3 | 5.1 | 9.3 | .03 | .70 | .69 | .66 | 4.8 | 6.5 | 4.6 | .87 | 1.4 | .17 |
| 4 | 5.1 | .14 | .03 | 3.0 | .67 | .28 | 4.1 | 7.2 | 2.5 | .77 | 1.4 | .17 |
| 5 | 5.4 | .10 | .03 | 4.8 | .69 | .27 | 3.6 | 6.1 | 2.4 | .68 | 7.5 | .39 |
| 6 | 5.4 | .09 | .03 | 4.6 | .70 | .24 | 3.0 | 3.4 | 2.1 | .65 | 12 | 1.3 |
| 7 | 5.5 | .08 | 1.6 | 4.4 | .73 | .26 | 2.5 | .27 | 1.4 | .65 | 12 | 10 |
| 8 | 5.6 | .08 | 4.1 | 4.5 | .78 | .35 | 2.4 | .16 | 1.2 | .62 | 9.5 | .36 |
| 9 | 2.3 | 6.6 | 3.7 | 2.3 | 4.1 | .32 | 2.4 | .13 | 1.3 | .60 | 7.8 | .67 |
| 10 | .90 | .18 | 3.6 | 1.1 | 5.2 | .32 | 2.3 | .13 | .17 | .56 | 9.4 | 2.3 |
| 11 | .82 | .11 | 3.4 | .97 | 4.2 | 2.2 | 2.5 | .67 | 1.0 | .52 | 11 | 2.0 |
| 12 | .73 | .09 | 9.7 | .94 | 4.1 | 4.2 | 3.7 | .29 | 3.3 | 2.0 | 8.2 | 1.8 |
| 13 | .72 | .08 | 18 | .89 | 3.9 | 4.3 | 4.6 | .25 | 2.7 | 4.9 | 4.4 | 1.3 |
| 14 | .49 | .06 | 3.7 | .89 | 3.8 | 3.9 | 4.5 | .23 | 2.2 | 4.6 | 2.5 | 1.1 |
| 15 | .37 | .06 | 3.4 | .88 | 3.7 | 3.8 | 4.3 | .18 | 2.0 | 4.5 | 1.4 | 1.1 |
| 16 | .28 | .06 | 3.2 | .81 | 3.3 | 3.8 | 4.1 | .17 | 1.7 | 4.5 | .99 | 1.0 |
| 17 | .23 | .05 | 3.1 | .82 | 3.1 | 3.7 | 4.1 | 2.4 | 1.8 | 4.7 | .73 | .70 |
| 18 | .19 | .04 | 3.3 | .85 | 3.0 | 3.7 | 4.8 | 3.8 | 1.3 | 4.4 | .46 | .67 |
| 19 | .20 | .03 | 3.9 | .83 | 2.9 | 3.6 | 5.6 | 3.8 | 1.2 | 4.2 | .46 | .67 |
| 20 | 3.3 | .03 | 2.6 | .88 | 2.9 | 3.6 | 4.9 | 3.9 | 1.5 | 3.9 | .37 | .67 |
| 21 | 11 | .02 | 1.7 | .90 | 2.9 | 4.0 | 4.5 | 4.1 | 1.2 | 3.6 | .35 | .63 |
| 22 | 12 | .01 | 1.5 | .91 | 2.9 | 3.8 | 4.4 | 5.8 | .77 | 4.1 | .35 | .60 |
| 23 | 13 | .01 | 1.6 | .83 | 2.9 | 3.9 | 4.3 | 6.4 | .57 | 2.7 | .36 | .62 |
| 24 | 10 | .02 | 1.6 | 1.0 | 2.9 | 3.9 | 4.7 | 5.9 | .41 | 2.6 | .46 | .67 |
| 25 | 11 | 1.9 | 2.4 | 1.1 | 2.9 | 3.4 | 5.0 | 7.1 | .39 | 1.2 | .47 | .67 |
| 26 | 16 | .13 | .92 | .99 | 2.9 | 2.5 | 7.8 | 7.0 | .36 | 1.2 | .47 | .67 |
| 27 | 9.1 | .07 | .82 | .89 | 1.9 | 2.4 | 11 | 6.8 | .31 | 1.1 | .45 | .67 |
| 28 | 1.4 | .06 | .81 | .81 | .15 | 2.4 | 16 | 7.2 | .29 | 1.0 | .47 | .66 |
| 29 | 1.0 | .04 | .81 | .73 | .14 | 2.6 | 13 | 6.9 | .94 | 1.1 | .47 | .60 |
| 30 | .90 | .04 | .81 | .73 | --- | 2.6 | 13 | 6.8 | 1.1 | 1.2 | .73 | .65 |
| 31 | .52 | --- | .82 | .69 | --- | 2.5 | --- | 6.8 | --- | 1.5 | .32 | --- |
| TOTAL | 131.65 | 25.68 | 81.83 | 45.20 | 69.39 | 74.06 | 163.5 | 124.18 | 53.51 | 66.78 | 99.41 | 33.13 |
| MEAN | 4.25 | .86 | 2.64 | 1.46 | 2.39 | 2.39 | 5.45 | 4.01 | 1.78 | 2.15 | 3.21 | 1.10 |
| MAX | 16 | 9.3 | 18 | 4.8 | 5.2 | 4.3 | 16 | 7.4 | 6.5 | 4.9 | 12 | 10 |
| MIN | .19 | .01 | .03 | .69 | .14 | .18 | 2.3 | .13 | .17 | .52 | .32 | .15 |
| AC-FT | 261 | 51 | 162 | 90 | 138 | 147 | 324 | 246 | 106 | 132 | 197 | 66 |

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1918 - 1996, BY WATER YEAR (WY)

| | 1918 | 1919 | 1920 | 1921 | 1922 | 1923 | 1924 | 1925 | 1926 | 1927 | 1928 | 1929 | 1930 | 1931 | 1932 | 1933 | 1934 | 1935 | 1936 | 1937 | 1938 | 1939 | 1940 | 1941 | 1942 | 1943 | 1944 | 1945 | 1946 | 1947 | 1948 | 1949 | 1950 | 1951 | 1952 | 1953 | 1954 | 1955 | 1956 | 1957 | 1958 | 1959 | 1960 | 1961 | 1962 | 1963 | 1964 | 1965 | 1966 | 1967 | 1968 | 1969 | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| MEAN | 6.05 | 5.13 | 4.61 | 4.45 | 4.86 | 5.65 | 6.49 | 7.70 | 7.56 | 8.19 | 8.48 | 7.02 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| MAX | 26.0 | 21.8 | 27.5 | 22.9 | 19.4 | 22.6 | 21.2 | 28.0 | 26.1 | 33.6 | 30.0 | 25.8 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| (WY) | 1919 | 1919 | 1922 | 1918 | 1919 | 1919 | 1922 | 1918 | 1918 | 1918 | 1918 | 1920 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| MIN | .27 | .044 | .073 | .012 | .042 | .22 | .27 | .32 | 1.57 | 1.66 | 1.88 | .72 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| (WY) | 1961 | 1952 | 1949 | 1943 | 1956 | 1968 | 1945 | 1965 | 1962 | 1987 | 1995 | 1946 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

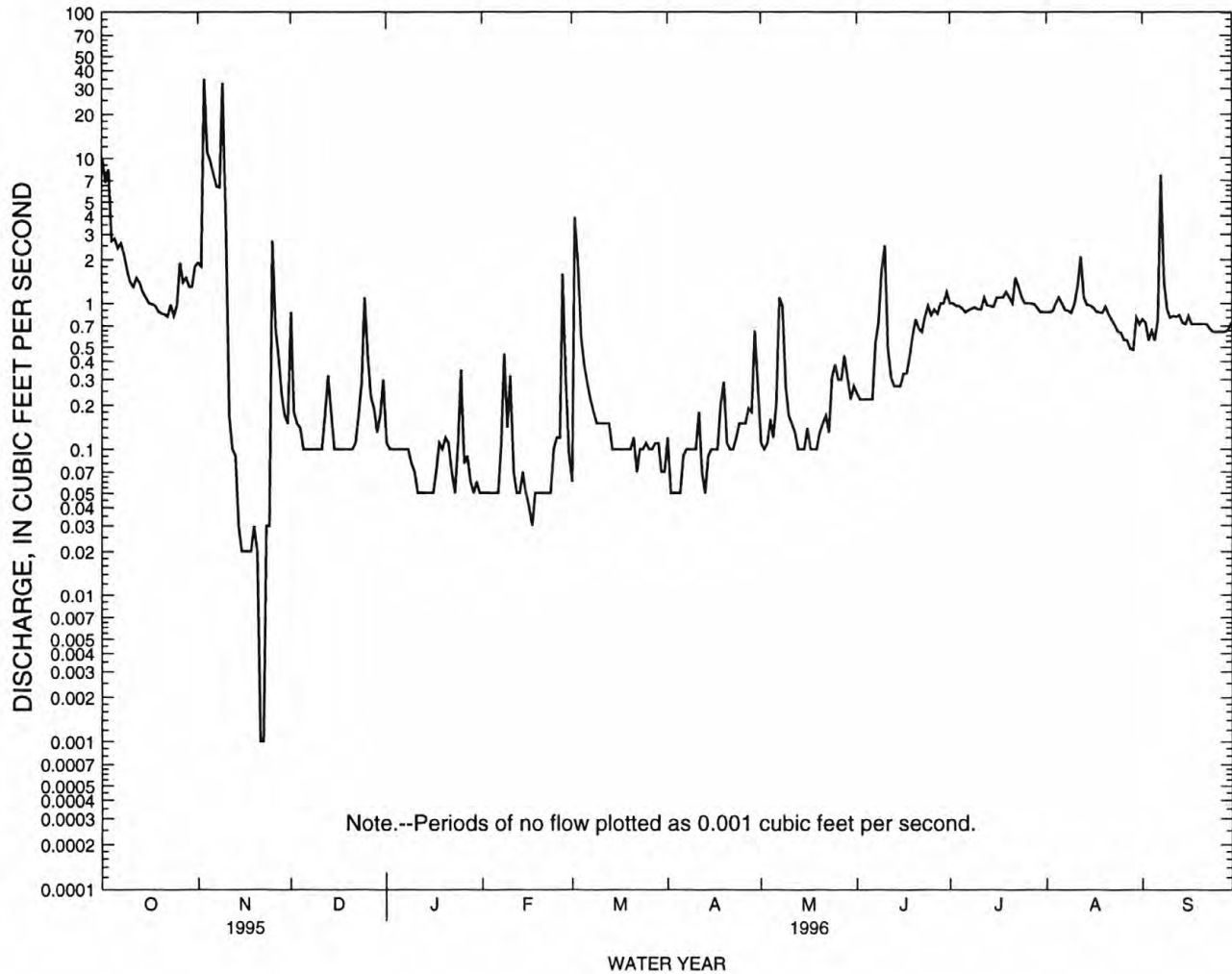
HAWAII, ISLAND OF KAUAI
16079000 KAPAHI DITCH NEAR KEALIA--Continued

| SUMMARY STATISTICS | FOR 1995 CALENDAR YEAR | FOR 1996 WATER YEAR | WATER YEARS 1918 - 1996 | |
|--------------------------|------------------------|---------------------|-------------------------|-------------|
| ANNUAL TOTAL | 2056.85 | 968.32 | | |
| ANNUAL MEAN | 5.64 | 2.65 | 6.21 | |
| HIGHEST ANNUAL MEAN | | | 21.0 | 1918 |
| LOWEST ANNUAL MEAN | | | 2.23 | 1965 |
| HIGHEST DAILY MEAN | 23 Feb 17 | 18 Dec 13 | 94 | Oct 25 1926 |
| LOWEST DAILY MEAN | .01 Nov 22 | .01 Nov 22 | .00 | Jun 4 1922 |
| ANNUAL SEVEN-DAY MINIMUM | .02 Nov 18 | .02 Nov 18 | .00 | Nov 13 1925 |
| ANNUAL RUNOFF (AC-FT) | 4080 | 1920 | 4500 | |
| 10 PERCENT EXCEEDS | 12 | 6.5 | 15 | |
| 50 PERCENT EXCEEDS | 5.1 | 1.4 | 4.5 | |
| 90 PERCENT EXCEEDS | .10 | .17 | .25 | |



HAWAII, ISLAND OF KAUAI
 16088000 ANAHOLA DITCH ABOVE KANEHA RESERVOIR, NEAR KEALIA--Continued

| SUMMARY STATISTICS | FOR 1995 CALENDAR YEAR | FOR 1996 WATER YEAR | WATER YEARS 1922 - 1996 | |
|--------------------------|------------------------|---------------------|-------------------------|-------------|
| ANNUAL TOTAL | 591.37 | 330.30 | | |
| ANNUAL MEAN | 1.62 | .90 | 4.21 | |
| HIGHEST ANNUAL MEAN | | | 8.00 | 1987 |
| LOWEST ANNUAL MEAN | | | .13 | 1992 |
| HIGHEST DAILY MEAN | 35 Nov 3 | 35 Nov 3 | 62 | Nov 12 1947 |
| LOWEST DAILY MEAN | .00 May 8 | .00 Nov 21 | .00 | Dec 11 1923 |
| ANNUAL SEVEN-DAY MINIMUM | .02 Nov 16 | .02 Nov 16 | .00 | Dec 15 1923 |
| ANNUAL RUNOFF (AC-FT) | 1170 | 655 | 3050 | |
| 10 PERCENT EXCEEDS | 4.5 | 1.3 | 10 | |
| 50 PERCENT EXCEEDS | .56 | .27 | 2.9 | |
| 90 PERCENT EXCEEDS | .04 | .05 | .03 | |



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 mi², revised. (Drainage area of 1.9 mi² published in the data report for water years 1977-94 was in error; the correct figure is 1.19 mi²).

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

REVISED RECORDS.--WSP 2137: Drainage area.

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

REMARKS.--Records good.

AVERAGE DISCHARGE.--38 years (water years 1959-96), 12.0 ft³/s (8,720 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 4,140 ft³/s, February 13, 1994, gage height, 9.76 ft; minimum, 1.8 ft³/s, September 6-8, 1968.

EXTREMES FOR CURRENT YEAR.--Peak discharge greater than base discharge of 580 ft³/s and maximum (*):

| Date | Time | Discharge (ft ³ /s) | Gage height (ft) | Date | Time | Discharge (ft ³ /s) | Gage height (ft) |
|---------|------|--------------------------------|------------------|---------|------|--------------------------------|------------------|
| Nov. 03 | 1230 | *4,000 | *9.64 | Sep. 07 | 1030 | 1,200 | 5.94 |
| Nov. 09 | 2100 | 3,760 | 9.40 | | | | |

Minimum discharge, 4.6 ft³/s, June 3-6, August 27-30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY MEAN VALUES

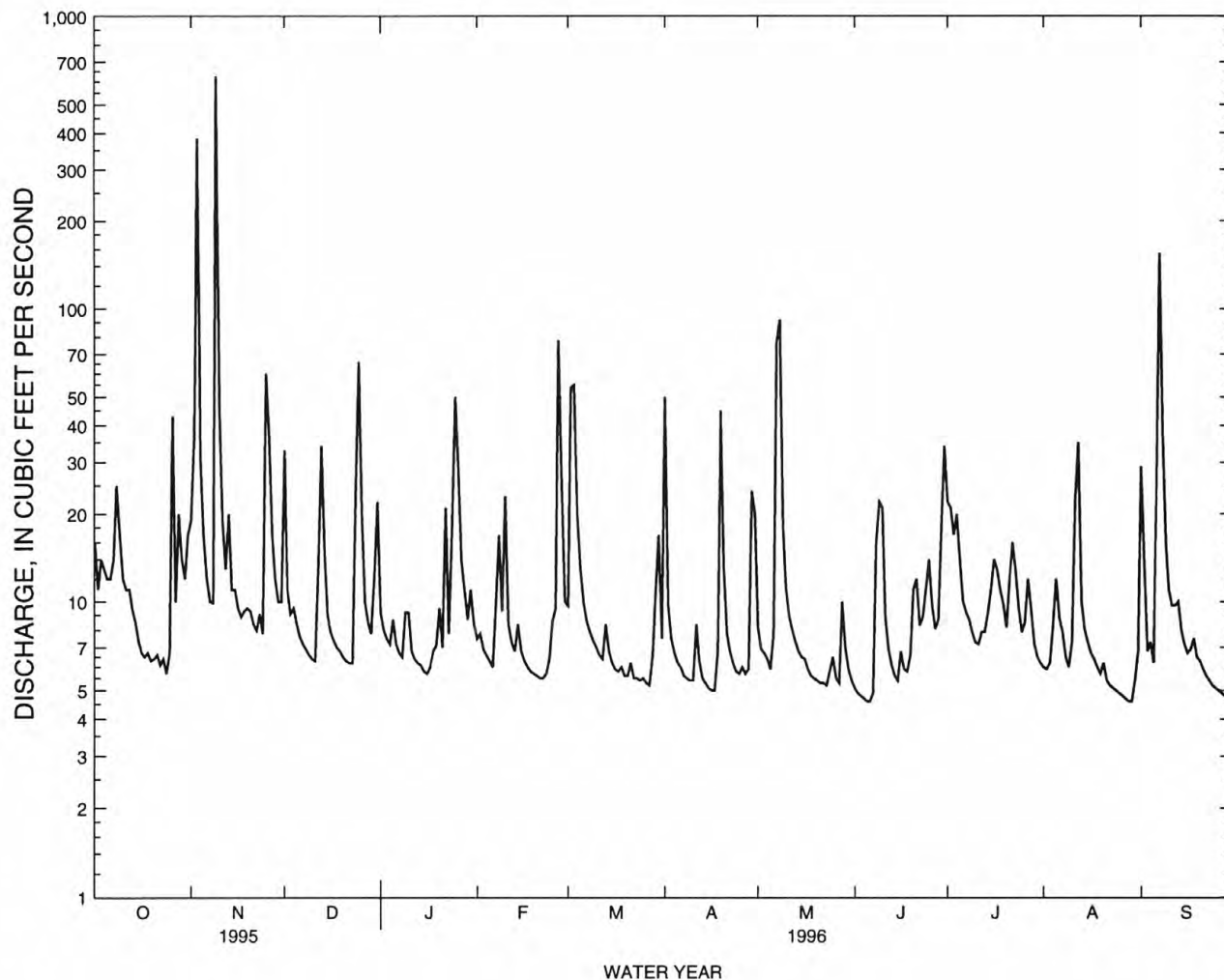
| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|-------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 16 | 19 | 33 | 9.2 | 7.5 | 9.7 | 50 | 8.2 | 5.1 | 22 | 6.0 | 29 |
| 2 | 11 | 36 | 11 | 8.0 | 7.8 | 54 | 9.7 | 6.9 | 4.9 | 21 | 5.9 | 14 |
| 3 | 14 | 384 | 9.1 | 7.5 | 6.9 | 55 | 7.5 | 6.7 | 4.8 | 17 | 6.2 | 6.8 |
| 4 | 13 | 31 | 9.5 | 7.2 | 6.6 | 20 | 6.7 | 6.4 | 4.7 | 20 | 8.3 | 7.3 |
| 5 | 12 | 17 | 8.4 | 8.7 | 6.3 | 13 | 6.2 | 5.9 | 4.6 | 14 | 12 | 6.2 |
| 6 | 12 | 12 | 7.6 | 7.2 | 6.0 | 9.9 | 6.0 | 7.8 | 4.6 | 10 | 8.8 | 25 |
| 7 | 14 | 10 | 7.2 | 6.7 | 9.7 | 8.6 | 5.6 | 77 | 4.9 | 9.2 | 7.9 | 155 |
| 8 | 25 | 9.9 | 6.9 | 6.5 | 17 | 7.9 | 5.5 | 92 | 16 | 8.7 | 6.5 | 38 |
| 9 | 17 | 625 | 6.6 | 9.2 | 9.3 | 7.4 | 5.4 | 18 | 22 | 7.9 | 6.0 | 16 |
| 10 | 12 | 48 | 6.4 | 9.2 | 23 | 7.0 | 5.4 | 11 | 21 | 7.3 | 7.3 | 11 |
| 11 | 11 | 19 | 6.3 | 6.8 | 8.4 | 6.6 | 8.4 | 8.9 | 8.9 | 7.2 | 22 | 9.7 |
| 12 | 11 | 13 | 13 | 6.4 | 7.3 | 6.4 | 6.3 | 8.0 | 6.9 | 7.9 | 35 | 9.7 |
| 13 | 9.4 | 20 | 34 | 6.2 | 6.8 | 8.4 | 5.5 | 7.3 | 6.1 | 7.9 | 10 | 10 |
| 14 | 8.5 | 11 | 15 | 6.1 | 8.4 | 6.8 | 5.3 | 6.8 | 5.6 | 9.1 | 8.1 | 8.0 |
| 15 | 7.3 | 11 | 9.0 | 5.8 | 6.8 | 6.2 | 5.1 | 6.5 | 5.4 | 11 | 7.3 | 7.2 |
| 16 | 6.7 | 9.5 | 7.9 | 5.7 | 6.3 | 5.9 | 5.0 | 6.4 | 6.8 | 14 | 6.7 | 6.7 |
| 17 | 6.5 | 8.9 | 7.4 | 6.0 | 6.0 | 5.8 | 5.0 | 5.9 | 5.9 | 13 | 6.4 | 6.9 |
| 18 | 6.7 | 9.3 | 7.0 | 6.8 | 5.8 | 6.0 | 6.8 | 5.6 | 5.8 | 11 | 6.0 | 7.5 |
| 19 | 6.3 | 9.5 | 6.8 | 7.1 | 5.7 | 5.6 | 45 | 5.5 | 6.6 | 9.8 | 5.7 | 6.5 |
| 20 | 6.4 | 9.3 | 6.5 | 9.5 | 5.6 | 5.6 | 13 | 5.4 | 11 | 8.2 | 6.2 | 6.3 |
| 21 | 6.6 | 8.4 | 6.3 | 7.0 | 5.5 | 6.2 | 7.8 | 5.3 | 12 | 12 | 5.4 | 5.9 |
| 22 | 6.1 | 8.0 | 6.2 | 21 | 5.5 | 5.5 | 6.8 | 5.3 | 8.3 | 16 | 5.2 | 5.6 |
| 23 | 6.4 | 9.1 | 6.2 | 7.8 | 5.7 | 5.5 | 6.2 | 5.2 | 8.9 | 13 | 5.1 | 5.4 |
| 24 | 5.7 | 7.8 | 24 | 18 | 6.4 | 5.4 | 5.8 | 5.8 | 11 | 9.5 | 5.0 | 5.2 |
| 25 | 6.7 | 60 | 66 | 50 | 8.6 | 5.5 | 5.7 | 6.5 | 14 | 7.9 | 4.9 | 5.1 |
| 26 | 43 | 37 | 20 | 29 | 9.5 | 5.3 | 6.0 | 5.5 | 9.7 | 8.5 | 4.8 | 5.0 |
| 27 | 10 | 17 | 10 | 14 | 78 | 5.2 | 5.7 | 5.3 | 8.1 | 12 | 4.7 | 4.9 |
| 28 | 20 | 12 | 8.5 | 11 | 26 | 6.6 | 5.9 | 10 | 8.7 | 9.4 | 4.6 | 4.8 |
| 29 | 14 | 10 | 7.8 | 8.7 | 10 | 11 | 24 | 7.0 | 18 | 7.2 | 4.6 | 4.8 |
| 30 | 12 | 10 | 12 | 11 | --- | 17 | 20 | 5.9 | 34 | 6.5 | 5.4 | 6.1 |
| 31 | 17 | --- | 22 | 8.5 | --- | 7.5 | --- | 5.4 | --- | 6.2 | 6.8 | --- |
| TOTAL | 373.3 | 1491.7 | 407.6 | 331.8 | 322.4 | 336.5 | 307.3 | 373.4 | 294.3 | 344.4 | 244.8 | 439.6 |
| MEAN | 12.0 | 49.7 | 13.1 | 10.7 | 11.1 | 10.9 | 10.2 | 12.0 | 9.81 | 11.1 | 7.90 | 14.7 |
| MAX | 43 | 625 | 66 | 50 | 78 | 55 | 50 | 92 | 34 | 22 | 35 | 155 |
| MIN | 5.7 | 7.8 | 6.2 | 5.7 | 5.5 | 5.2 | 5.0 | 5.2 | 4.6 | 6.2 | 4.6 | 4.8 |
| AC-FT | 740 | 2960 | 808 | 658 | 639 | 667 | 610 | 741 | 584 | 683 | 486 | 872 |

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1958 - 1996, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|------|------|------|------|------|------|------|------|------|------|------|------|------|
| MEAN | 10.5 | 17.0 | 14.2 | 11.4 | 11.7 | 13.8 | 15.0 | 12.0 | 8.57 | 11.5 | 10.4 | 8.47 |
| 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 | 5.62 | 4.27 | 5.05 | 3.95 | 3.93 |
| (WY) | 1985 | 1977 | 1986 | 1986 | 1986 | 1995 | 1992 | 1995 | 1959 | 1975 | 1973 | 1975 |

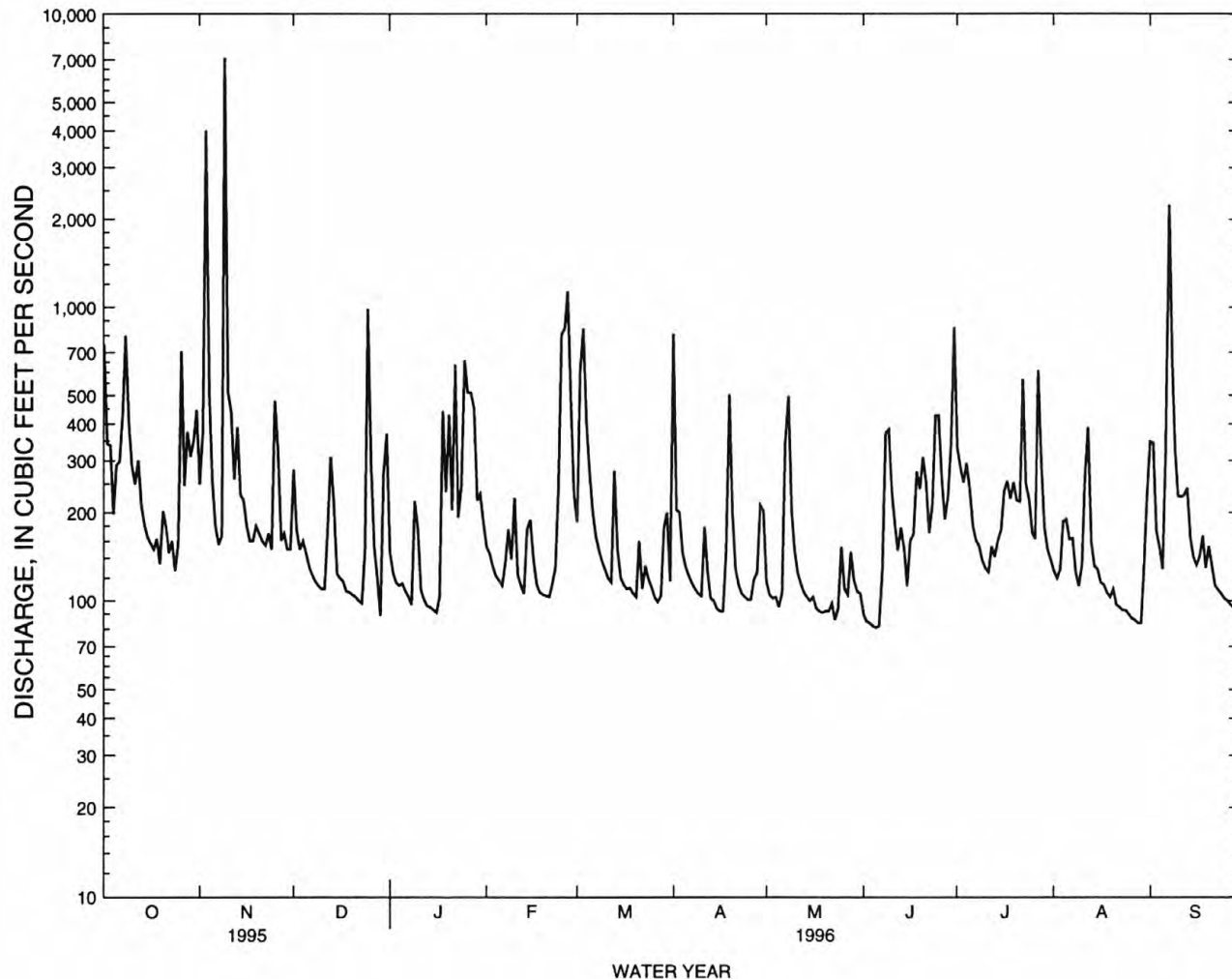
HAWAII, ISLAND OF KAUAI
16097500 HALAULANI STREAM AT ALTITUDE 400 FT, NEAR KILAUEA--Continued

| SUMMARY STATISTICS | FOR 1995 CALENDAR YEAR | FOR 1996 WATER YEAR | WATER YEARS 1958 - 1996 | |
|--------------------------|------------------------|---------------------|-------------------------|-------------|
| ANNUAL TOTAL | 4332.9 | 5267.1 | | |
| ANNUAL MEAN | 11.9 | 14.4 | 12.0 | |
| HIGHEST ANNUAL MEAN | | | 19.6 | 1982 |
| LOWEST ANNUAL MEAN | | | 7.01 | 1984 |
| HIGHEST DAILY MEAN | 625 Nov 9 | 625 Nov 9 | 879 | Feb 13 1994 |
| LOWEST DAILY MEAN | 3.8 Mar 25 | 4.6 Jun 5 | 1.9 | Sep 5 1968 |
| ANNUAL SEVEN-DAY MINIMUM | 3.9 Mar 14 | 4.8 Jun 1 | 2.4 | Sep 2 1968 |
| ANNUAL RUNOFF (AC-FT) | 8590 | 10450 | 8720 | |
| 10 PERCENT EXCEEDS | 16 | 21 | 21 | |
| 50 PERCENT EXCEEDS | 6.6 | 7.8 | 7.5 | |
| 90 PERCENT EXCEEDS | 4.3 | 5.4 | 4.6 | |



HAWAII, ISLAND OF KAUAI
 16103000 HANAIEI RIVER NEAR HANAIEI--Continued

| SUMMARY STATISTICS | FOR 1995 CALENDAR YEAR | | FOR 1996 WATER YEAR | | WATER YEARS 1962 - 1996 | |
|--------------------------|------------------------|--------|---------------------|--------|-------------------------|-------------|
| ANNUAL TOTAL | 75994 | | 87831 | | | |
| ANNUAL MEAN | 208 | | 240 | | 214 | |
| HIGHEST ANNUAL MEAN | | | | | 408 | |
| LOWEST ANNUAL MEAN | | | | | 92.7 | |
| HIGHEST DAILY MEAN | 7100 | Nov 9 | 7100 | Nov 9 | 8340 | May 22 1967 |
| LOWEST DAILY MEAN | 58 | Jun 30 | 81 | Jun 5 | 31 | Nov 3 1975 |
| ANNUAL SEVEN-DAY MINIMUM | 62 | Jun 26 | 87 | May 31 | 33 | Sep 19 1975 |
| ANNUAL RUNOFF (AC-FT) | 150700 | | 174200 | | 155300 | |
| 10 PERCENT EXCEEDS | 340 | | 403 | | 419 | |
| 50 PERCENT EXCEEDS | 119 | | 151 | | 119 | |
| 90 PERCENT EXCEEDS | 71 | | 98 | | 58 | |



HAWAII, ISLAND OF KAUAI
16108000 WAINIHA RIVER NEAR HANAIEI

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 mi².

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.

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

REMARKS.--Records fair, except for estimated discharges which are poor. No diversion upstream.

AVERAGE DISCHARGE.--41 years (water years 1953-55, 1959-96), 138 ft³/s (100,200 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 28,100 ft³/s, April 19, 1974, gage height, 9.47 ft, from rating curve extended above 1,100 ft³/s on basis of slope-area measurement at gage height 7.72 ft; minimum, 32 ft³/s, October 21-23, 1984.

EXTREMES FOR CURRENT YEAR.--Peak discharge greater than base discharge of 1,900 ft³/s and maximum (*):

| Date | Time | Discharge (ft ³ /s) | Gage height (ft) | Date | Time | Discharge (ft ³ /s) | Gage height (ft) |
|---------|------|-----------------------------------|---------------------|---------|------|-----------------------------------|---------------------|
| Nov. 03 | 1200 | *22,500 | *8.61 | Nov. 09 | 1030 | 3,900 | 5.34 |

Minimum discharge, 35 ft³/s June 4-6.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|------|-------|------|------|-------|------|------|------|------|------|------|------|
| 1 | 457 | 116 | 101 | e120 | e80 | e94 | 338 | 55 | 41 | 190 | 49 | 161 |
| 2 | 178 | 184 | 78 | e70 | e73 | e365 | 80 | 54 | 37 | 165 | 50 | 137 |
| 3 | 145 | 1640 | 77 | e62 | e70 | 446 | 59 | 53 | 36 | 136 | 84 | 105 |
| 4 | 99 | e196 | 104 | e60 | e68 | 283 | 56 | 53 | 36 | 207 | 106 | 73 |
| 5 | 149 | e150 | 65 | e64 | e65 | e110 | 55 | 53 | 35 | 156 | 90 | 54 |
| 6 | 185 | e100 | 59 | e60 | e61 | e98 | 54 | 52 | 38 | 100 | 71 | 127 |
| 7 | 213 | e82 | 54 | e54 | e77 | e88 | 54 | 52 | 128 | 79 | 88 | 969 |
| 8 | 574 | e100 | 56 | e50 | e74 | e78 | 54 | 72 | 144 | 76 | 55 | e290 |
| 9 | 190 | 1770 | 56 | e180 | e72 | e74 | 53 | 66 | 106 | 67 | 49 | e140 |
| 10 | 127 | e216 | 54 | e134 | e130 | e69 | 53 | 53 | 80 | 68 | 65 | e130 |
| 11 | 122 | e170 | 53 | e70 | e90 | e65 | 144 | 52 | 63 | 59 | 176 | e152 |
| 12 | 162 | e140 | 66 | e54 | e72 | e62 | 83 | 52 | 96 | 119 | 180 | 163 |
| 13 | 114 | e230 | 199 | e51 | e60 | e170 | 54 | 51 | 209 | 73 | 59 | e72 |
| 14 | 80 | e120 | 107 | e49 | e88 | e92 | 53 | 50 | e96 | 85 | e56 | e66 |
| 15 | 70 | e110 | 62 | e48 | 211 | e72 | 52 | 48 | e72 | 85 | e57 | e55 |
| 16 | 63 | e100 | 56 | e47 | e88 | e68 | 52 | 49 | e100 | 161 | e54 | e62 |
| 17 | 73 | e82 | 56 | e120 | e70 | e64 | 51 | 46 | 132 | 209 | e52 | 73 |
| 18 | 104 | e80 | 63 | e292 | e58 | e64 | 146 | 43 | 301 | 166 | e51 | 114 |
| 19 | 69 | e86 | 58 | e212 | e77 | e60 | 369 | 42 | 163 | 197 | e51 | 59 |
| 20 | 151 | e94 | 53 | 459 | e56 | e54 | 120 | 41 | 160 | 150 | e57 | 110 |
| 21 | 137 | e82 | 53 | e130 | e56 | e96 | e70 | 41 | 146 | 129 | e49 | e56 |
| 22 | 79 | e80 | 53 | e220 | e64 | e68 | e62 | 40 | 82 | 163 | e48 | e50 |
| 23 | 109 | e86 | 54 | e160 | e74 | e80 | e56 | 38 | 113 | 103 | e46 | e45 |
| 24 | 70 | e78 | 53 | e170 | e248 | e68 | e54 | 45 | 273 | 72 | e46 | e44 |
| 25 | 127 | e617 | 242 | 463 | 1240 | e65 | 56 | 121 | 276 | 60 | e45 | e44 |
| 26 | 237 | 446 | e130 | 318 | 1050 | e63 | 57 | 53 | e160 | 95 | e44 | e43 |
| 27 | 81 | e120 | e74 | e310 | e580 | 59 | 86 | 75 | e110 | 231 | e43 | e42 |
| 28 | 150 | e92 | e62 | e320 | e240 | 56 | 55 | 116 | e130 | 92 | e41 | e40 |
| 29 | 151 | e82 | e54 | e110 | e115 | 80 | 57 | 81 | 144 | 55 | e40 | e40 |
| 30 | 204 | e104 | 525 | e120 | --- | 113 | 72 | 100 | 924 | 50 | e55 | e48 |
| 31 | 240 | --- | e231 | e100 | --- | 73 | --- | 58 | --- | 51 | 93 | --- |
| TOTAL | 4910 | 7553 | 3008 | 4677 | 5287 | 3297 | 2605 | 1805 | 4431 | 3649 | 2050 | 3564 |
| MEAN | 158 | 252 | 97.0 | 151 | 182 | 106 | 86.8 | 58.2 | 148 | 118 | 66.1 | 119 |
| MAX | 574 | 1770 | 525 | 463 | 1240 | 446 | 369 | 121 | 924 | 231 | 180 | 969 |
| MIN | 63 | 78 | 53 | 47 | 56 | 54 | 51 | 38 | 35 | 50 | 40 | 40 |
| AC-FT | 9740 | 14980 | 5970 | 9280 | 10490 | 6540 | 5170 | 3580 | 8790 | 7240 | 4070 | 7070 |

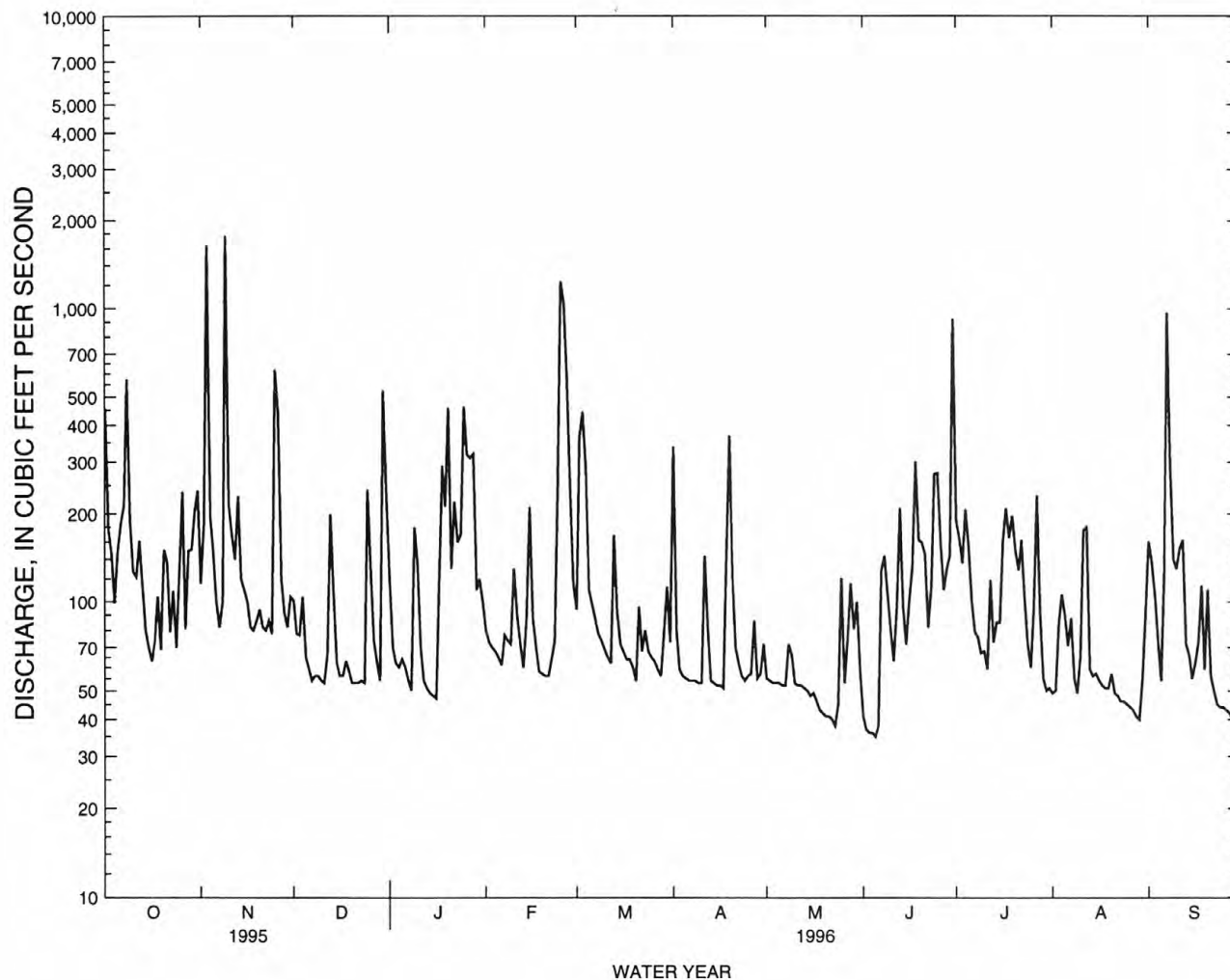
e Estimated

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1952 - 1996, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|------|------|------|------|------|------|------|------|------|------|------|------|------|
| MEAN | 114 | 189 | 167 | 143 | 144 | 170 | 173 | 122 | 100 | 132 | 115 | 95.4 |
| 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 | 54.6 | 42.3 |
| (WY) | 1985 | 1964 | 1984 | 1986 | 1978 | 1970 | 1992 | 1966 | 1993 | 1984 | 1965 | 1965 |

HAWAII, ISLAND OF KAUAI
16108000 WAINIHA RIVER NEAR HANALEI--Continued

| SUMMARY STATISTICS | FOR 1995 CALENDAR YEAR | | FOR 1996 WATER YEAR | | WATER YEARS 1952 - 1996 | |
|--------------------------|------------------------|--------|---------------------|--------|-------------------------|-------------|
| ANNUAL TOTAL | 46897 | | 46836 | | | |
| ANNUAL MEAN | 128 | | 128 | | 138 | |
| HIGHEST ANNUAL MEAN | | | | | 243 | |
| LOWEST ANNUAL MEAN | | | | | 84.7 | |
| HIGHEST DAILY MEAN | 1770 | Nov 9 | 1770 | Nov 9 | 3650 | Nov 21 1974 |
| LOWEST DAILY MEAN | 52 | Mar 18 | 35 | Jun 5 | 31 | Sep 29 1965 |
| ANNUAL SEVEN-DAY MINIMUM | 53 | Mar 14 | 40 | May 31 | 33 | Sep 24 1965 |
| ANNUAL RUNOFF (AC-FT) | 93020 | | 92900 | | 100200 | |
| 10 PERCENT EXCEEDS | 215 | | 217 | | 263 | |
| 50 PERCENT EXCEEDS | 80 | | 77 | | 78 | |
| 90 PERCENT EXCEEDS | 56 | | 49 | | 48 | |



HAWAII, ISLAND OF KAUAI
16114000 LIMAHUL 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 mi².

PERIOD OF RECORD.--October 1994 to September 1996.

GAGE.--Water-stage recorders and natural control. Elevation of gage is 160 ft above mean sea level, by altimeter.

REMARKS.--Records fair. No diversion upstream of station.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 458 ft³/s, June 30, 1996, gage height, 3.76 ft; minimum, 3.5 ft³/s, June 30, July 1, 2, 1995.

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

| Date | Time | Discharge (ft ³ /s) | Gage height (ft) | Date | Time | Discharge (ft ³ /s) | Gage height (ft) |
|---------|------|-----------------------------------|---------------------|---------|------|-----------------------------------|---------------------|
| Nov. 03 | 1200 | 430 | 4.32 | Jun. 08 | 1530 | 300 | 3.16 |
| Dec. 30 | 2300 | 373 | 4.10 | Jun. 30 | 0430 | *458 | *3.76 |

Minimum discharge, 4.1 ft³/s, February 5, 6.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 17 | 12 | 8.0 | 8.6 | 4.9 | 8.0 | 6.1 | 8.4 | 4.7 | 15 | 5.8 | 5.7 |
| 2 | 11 | 9.9 | 6.8 | 6.6 | 9.2 | 15 | 5.6 | 6.3 | 4.5 | 12 | 5.6 | 5.8 |
| 3 | 8.9 | 94 | 6.2 | 5.7 | 6.0 | 23 | 5.4 | 5.8 | 4.5 | 10 | 5.5 | 5.9 |
| 4 | 9.3 | 26 | 8.2 | 5.3 | 4.7 | 16 | 5.2 | 8.0 | 4.4 | 11 | 5.9 | 6.1 |
| 5 | 8.9 | 13 | 7.4 | 7.4 | 4.3 | 10 | 5.1 | 5.7 | 4.4 | 11 | 5.6 | 6.0 |
| 6 | 9.1 | 9.3 | 6.4 | 5.5 | 4.5 | 8.1 | 5.0 | 5.3 | 4.5 | 8.9 | 5.6 | 10 |
| 7 | 12 | 7.9 | 5.9 | 5.1 | 12 | 6.9 | 4.9 | 35 | 5.1 | 12 | 5.5 | 70 |
| 8 | 17 | 7.4 | 5.7 | 5.0 | 10 | 6.4 | 4.8 | 98 | 51 | 9.9 | 5.3 | 22 |
| 9 | 15 | 28 | 5.2 | 32 | 8.3 | 6.1 | 4.8 | 16 | 19 | 8.7 | 5.2 | 11 |
| 10 | 11 | 14 | 5.1 | 14 | 51 | 5.9 | 4.9 | 8.3 | 8.5 | 8.1 | 6.2 | 8.0 |
| 11 | 9.1 | 8.5 | 4.9 | 7.6 | 9.9 | 5.8 | 6.4 | 6.5 | 6.3 | 7.8 | 9.9 | 7.6 |
| 12 | 7.7 | 7.3 | 15 | 5.8 | 7.5 | 5.7 | 5.5 | 5.9 | 5.9 | 7.6 | 11 | 7.9 |
| 13 | 7.1 | 19 | 20 | 5.2 | 6.6 | 5.9 | 5.3 | 5.5 | 35 | 7.3 | 7.0 | 8.1 |
| 14 | 6.5 | 8.8 | 16 | 4.9 | 9.5 | 5.7 | 5.3 | 5.3 | 12 | 7.3 | 6.2 | 6.8 |
| 15 | 6.3 | 7.4 | 9.4 | 4.6 | 8.4 | 5.4 | 5.2 | 5.2 | 6.9 | 7.4 | 5.9 | 6.4 |
| 16 | 5.7 | 6.7 | 7.8 | 4.5 | 6.7 | 5.3 | 5.4 | 5.6 | 6.1 | 8.3 | 5.8 | 7.1 |
| 17 | 5.2 | 6.4 | 7.4 | 5.2 | 6.1 | 5.3 | 5.6 | 5.1 | 5.7 | 7.5 | 5.6 | 6.6 |
| 18 | 5.6 | 6.3 | 6.6 | 13 | 5.8 | 5.5 | 9.5 | 4.9 | 7.0 | 10 | 5.5 | 6.4 |
| 19 | 5.6 | 7.4 | 6.1 | 8.1 | 5.7 | 5.2 | 47 | 4.9 | 6.8 | 11 | 5.5 | 6.1 |
| 20 | 5.2 | 7.7 | 5.8 | 7.8 | 5.6 | 5.3 | 11 | 4.9 | 8.4 | 8.3 | 5.5 | 6.1 |
| 21 | 5.8 | 6.4 | 5.6 | 6.0 | 5.8 | 6.2 | 6.8 | 4.9 | 10 | 7.3 | 5.5 | 6.0 |
| 22 | 5.1 | 6.1 | 5.5 | 5.3 | 6.7 | 5.6 | 5.8 | 4.7 | 6.9 | e7.4 | 5.5 | 5.9 |
| 23 | 5.1 | 6.7 | 5.2 | 5.6 | 6.2 | 5.9 | 5.4 | 4.7 | 7.0 | e7.1 | 5.5 | 5.9 |
| 24 | 4.8 | 6.0 | 11 | 8.8 | 6.0 | 5.8 | 5.2 | 5.0 | 12 | e6.8 | 5.5 | e5.9 |
| 25 | 5.6 | 6.9 | 47 | 39 | 9.2 | 5.8 | 5.1 | 4.8 | 9.5 | 6.2 | 5.5 | e5.8 |
| 26 | 12 | 8.4 | 14 | 11 | 11 | 6.0 | 4.9 | 4.8 | 6.7 | 6.6 | 5.5 | e5.8 |
| 27 | 7.7 | 7.2 | 7.5 | 7.2 | 73 | 5.9 | 6.2 | 4.7 | 6.2 | 8.3 | 5.5 | e5.8 |
| 28 | 16 | 6.3 | 5.7 | 7.8 | 34 | 9.0 | 4.9 | 7.5 | 6.5 | 7.2 | 5.6 | e5.7 |
| 29 | 17 | 6.1 | 5.0 | 5.4 | 10 | 15 | 61 | 5.5 | 26 | 6.1 | 5.6 | e5.7 |
| 30 | 18 | 8.1 | 63 | 6.8 | --- | 16 | 24 | 5.0 | 65 | 5.8 | 5.5 | e7.4 |
| 31 | 18 | --- | 48 | 5.7 | --- | 7.3 | --- | 4.8 | --- | 5.9 | 5.6 | --- |
| TOTAL | 298.3 | 375.2 | 381.4 | 270.5 | 348.6 | 249.0 | 287.3 | 307.0 | 366.5 | 263.8 | 184.9 | 279.5 |
| MEAN | 9.62 | 12.5 | 12.3 | 8.73 | 12.0 | 8.03 | 9.58 | 9.90 | 12.2 | 8.51 | 5.96 | 9.32 |
| MAX | 18 | 94 | 63 | 39 | 73 | 23 | 61 | 98 | 65 | 15 | 11 | 70 |
| MIN | 4.8 | 6.0 | 4.9 | 4.5 | 4.3 | 5.2 | 4.8 | 4.7 | 4.4 | 5.8 | 5.2 | 5.7 |
| AC-FT | 592 | 744 | 757 | 537 | 691 | 494 | 570 | 609 | 727 | 523 | 367 | 554 |

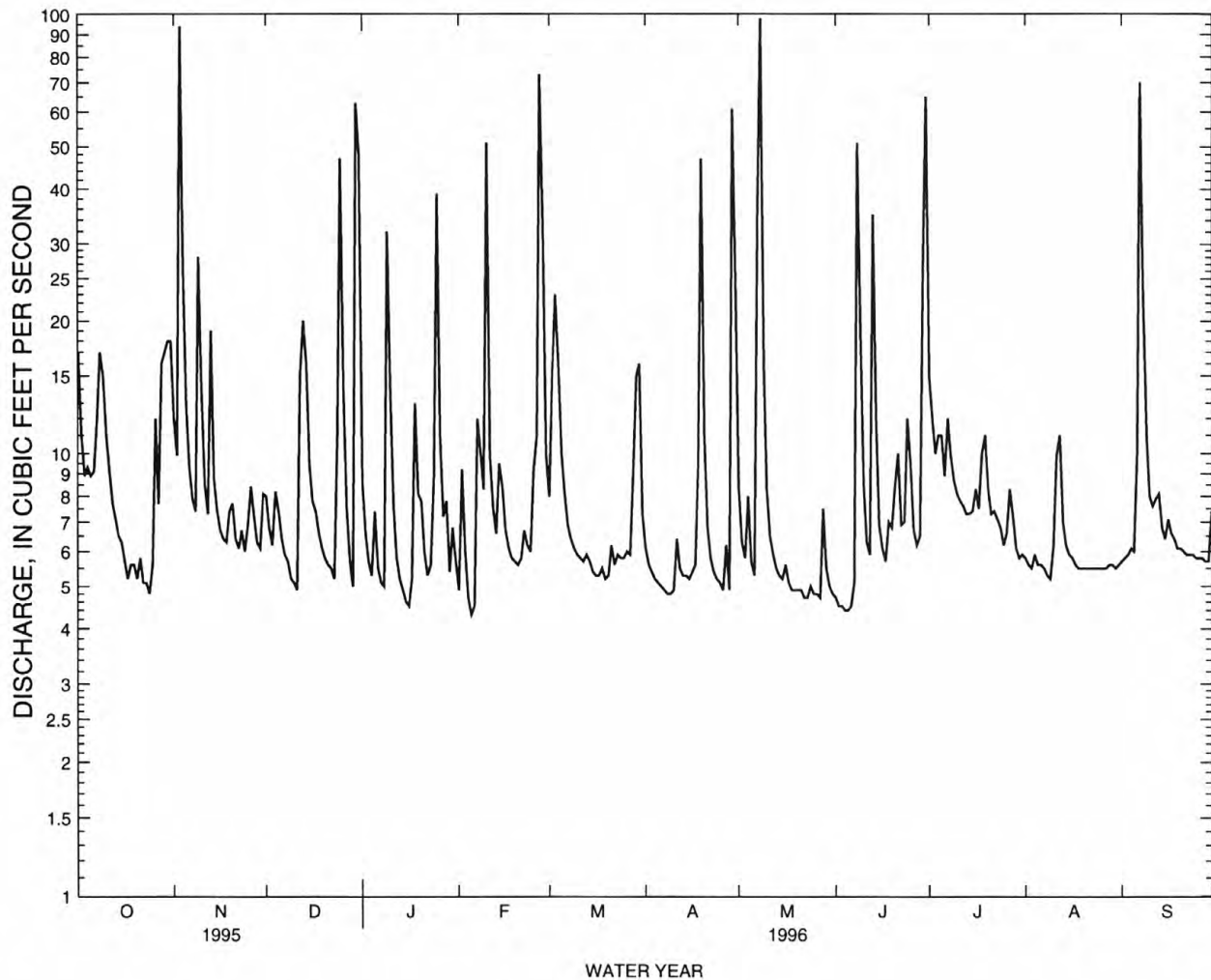
e Estimated

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1995 - 1996, BY WATER YEAR (WY)

| | 1995 | 1996 | 1995 | 1996 | 1995 | 1996 | 1995 | 1996 | 1995 | 1996 | 1995 | 1996 |
|------|------|------|------|------|------|------|------|------|------|------|------|------|
| MEAN | 9.04 | 10.1 | 9.87 | 7.38 | 9.19 | 6.83 | 10.7 | 8.82 | 8.71 | 8.62 | 7.90 | 8.53 |
| MAX | 9.62 | 12.5 | 12.3 | 8.73 | 12.0 | 8.03 | 11.9 | 9.90 | 12.2 | 8.74 | 9.84 | 9.32 |
| (WY) | 1996 | 1996 | 1996 | 1996 | 1996 | 1996 | 1995 | 1996 | 1996 | 1995 | 1995 | 1996 |
| MIN | 8.45 | 7.66 | 7.43 | 6.04 | 6.27 | 5.63 | 9.58 | 7.74 | 5.20 | 8.51 | 5.96 | 7.75 |
| (WY) | 1995 | 1995 | 1995 | 1995 | 1995 | 1995 | 1996 | 1995 | 1995 | 1996 | 1996 | 1995 |

HAWAII, ISLAND OF KAUAI
 16114000 LIMAHLI STREAM NEAR WAINIHA--Continued

| SUMMARY STATISTICS | FOR 1995 CALENDAR YEAR | FOR 1996 WATER YEAR | WATER YEARS 1995 - 1996 |
|--------------------------|------------------------|---------------------|-------------------------|
| ANNUAL TOTAL | 3152.2 | 3612.0 | |
| ANNUAL MEAN | 8.64 | 9.87 | 8.80 |
| HIGHEST ANNUAL MEAN | | | 9.87 1996 |
| LOWEST ANNUAL MEAN | | | 7.72 1995 |
| HIGHEST DAILY MEAN | 94 Nov 3 | 98 May 8 | 98 May 8 1996 |
| LOWEST DAILY MEAN | 3.7 Jul 1 | 4.3 Feb 5 | 3.7 Jul 1 1995 |
| ANNUAL SEVEN-DAY MINIMUM | 3.9 Jun 26 | 4.5 May 31 | 3.9 Jun 26 1995 |
| ANNUAL RUNOFF (AC-FT) | 6250 | 7160 | 6370 |
| 10 PERCENT EXCEEDS | 13 | 15 | 12 |
| 50 PERCENT EXCEEDS | 6.6 | 6.4 | 6.3 |
| 90 PERCENT EXCEEDS | 4.7 | 5.1 | 4.9 |



Surface-Water Station Records
for Oahu

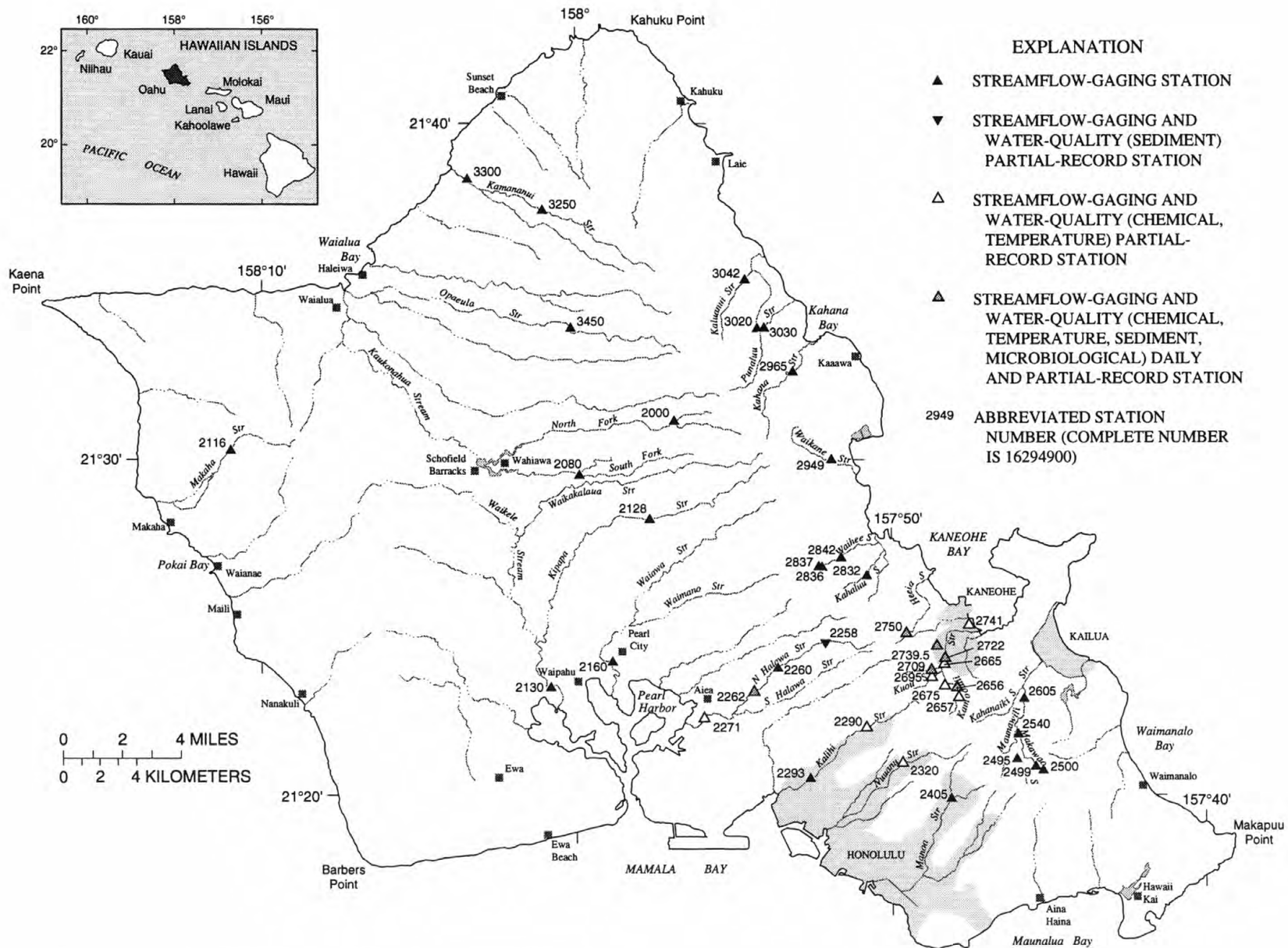


Figure 6. Locations of gaging, water-quality, and partial-record stations on Oahu.

HAWAII, ISLAND OF 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 mi².

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 fair.

AVERAGE DISCHARGE.--73 years (water years 1914-24, 1927-52, 1961-96), 16.4 ft³/s (11,870 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 5,640 ft³/s, October 28, 1981, gage height, 13.2 ft, from rating curve extended above 68 ft³/s on basis of slope-area measurement at gage height, 12.46 ft; minimum, 0.12 ft³/s, March 2, 13, 1941.

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

| Date | Time | Discharge (ft ³ /s) | Gage height (ft) | Date | Time | Discharge (ft ³ /s) | Gage height (ft) |
|---------|------|--------------------------------|------------------|---------|------|--------------------------------|------------------|
| Jan. 19 | 0730 | *2,880 | *8.95 | Jan. 25 | 0345 | 2,320 | 8.02 |

Minimum discharge, 0.75 ft³/s, March 29, 30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY MEAN VALUES

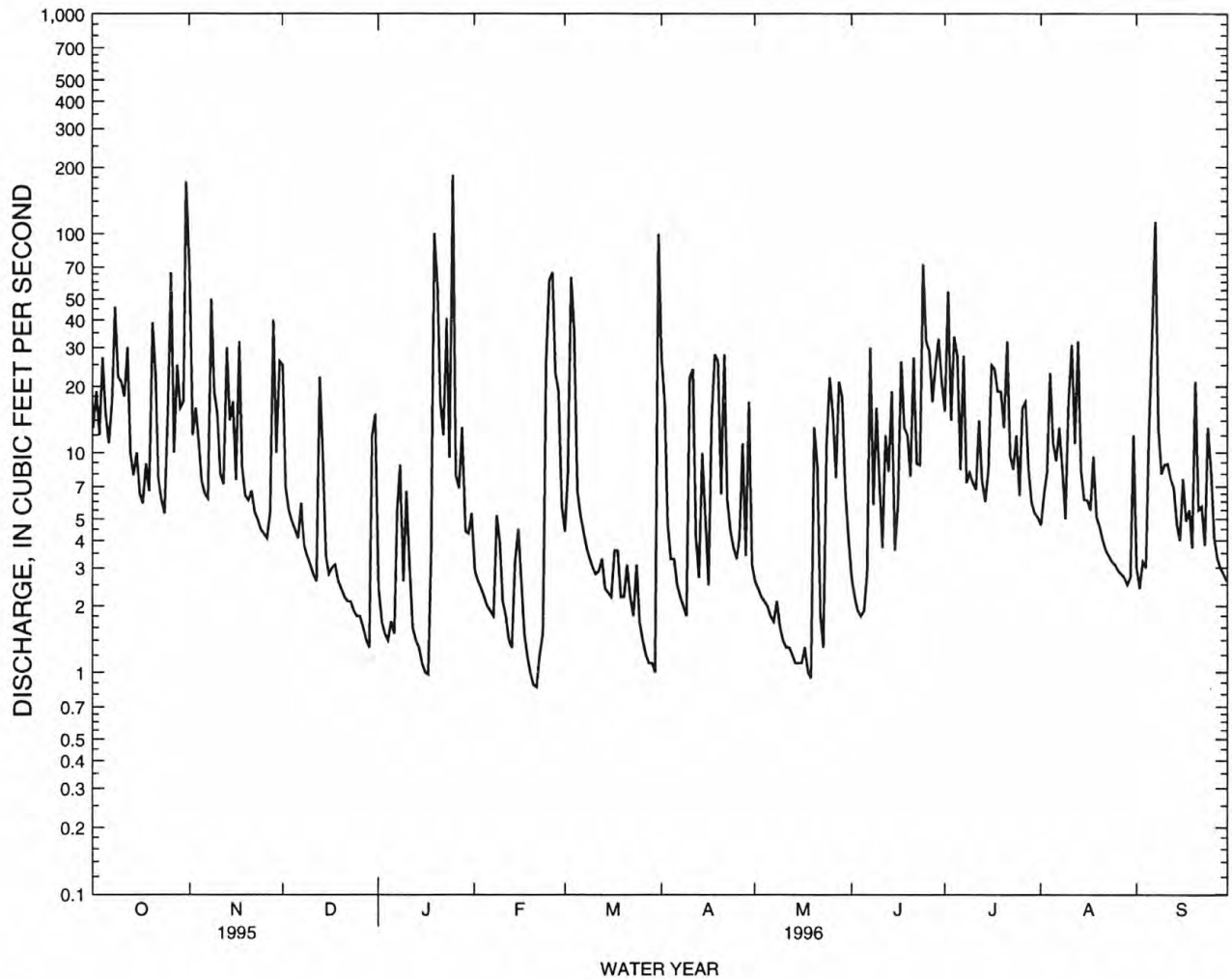
| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|-------|-------|-------|--------|--------|-------|-------|--------|-------|-------|-------|-------|
| 1 | 13 | 72 | 25 | 2.4 | 2.9 | 4.4 | 27 | 2.6 | 2.7 | 15 | 4.7 | 3.0 |
| 2 | 19 | 12 | 7.0 | 1.7 | 2.6 | 8.1 | 17 | 2.4 | 2.2 | 54 | 6.5 | 2.4 |
| 3 | 12 | 16 | 5.5 | 1.5 | 2.4 | 63 | 4.8 | 2.2 | 1.9 | 14 | 8.2 | 3.2 |
| 4 | 27 | 11 | 4.9 | 1.4 | 2.2 | 36 | 3.3 | 2.1 | 1.8 | 34 | 23 | 3.0 |
| 5 | 15 | 7.4 | 4.5 | 1.7 | 2.0 | 6.7 | 3.3 | 2.0 | 1.9 | 28 | 11 | 12 |
| 6 | 11 | 6.5 | 4.1 | 1.5 | 1.9 | 5.2 | 2.5 | 1.8 | 2.8 | 8.4 | 9.2 | 33 |
| 7 | 17 | 6.2 | 5.9 | 5.5 | 1.8 | 4.4 | 2.2 | 1.7 | 30 | 28 | 13 | 113 |
| 8 | 46 | 50 | 3.8 | 8.8 | 5.2 | 3.7 | 2.0 | 2.1 | 5.8 | 7.3 | 8.2 | 13 |
| 9 | 22 | 19 | 3.4 | 2.6 | 4.0 | 3.3 | 1.8 | 1.6 | 16 | 8.1 | 5.0 | 8.0 |
| 10 | 21 | 15 | 3.1 | 6.7 | 2.1 | 3.0 | 22 | 1.4 | 7.0 | 7.3 | 17 | 8.8 |
| 11 | 18 | 8.0 | 2.8 | 3.0 | 1.8 | 2.8 | 24 | 1.3 | 3.7 | 6.8 | 31 | 8.9 |
| 12 | 30 | 7.2 | 2.6 | 1.6 | 1.4 | 2.9 | 4.2 | 1.3 | 12 | 14 | 11 | 7.6 |
| 13 | 10 | 30 | 22 | 1.4 | 1.3 | 3.3 | 2.7 | 1.2 | 8.2 | 7.4 | 32 | 6.9 |
| 14 | 7.9 | 14 | 10 | 1.3 | 3.2 | 2.4 | 9.9 | 1.1 | 19 | 6.0 | 8.3 | 4.7 |
| 15 | 10 | 17 | 3.4 | 1.1 | 4.5 | 2.3 | 5.0 | 1.1 | 3.6 | 8.4 | 6.1 | 4.0 |
| 16 | 6.5 | 7.5 | 2.8 | 1.0 | 2.6 | 2.2 | 2.5 | 1.1 | 5.8 | 25 | 6.1 | 7.6 |
| 17 | 5.9 | 32 | 3.0 | .98 | 1.5 | 3.6 | 14 | 1.3 | 26 | 24 | 5.5 | 4.9 |
| 18 | 8.9 | 8.6 | 3.1 | 3.7 | 1.2 | 3.6 | 28 | 1.0 | 13 | 19 | 9.6 | 5.5 |
| 19 | 6.7 | 6.4 | 2.6 | 100 | 1.0 | 2.2 | 26 | .94 | 12 | 19 | 5.1 | 3.7 |
| 20 | 39 | 6.1 | 2.4 | 57 | .88 | 2.2 | 6.5 | 13 | 7.8 | 13 | 4.6 | 21 |
| 21 | 22 | 6.7 | 2.2 | 17 | .86 | 3.1 | 28 | 8.7 | 27 | 32 | 4.0 | 5.5 |
| 22 | 7.6 | 5.4 | 2.1 | 12 | 1.2 | 2.2 | 6.1 | 1.8 | 8.9 | 9.7 | 3.6 | 5.7 |
| 23 | 6.1 | 5.0 | 2.1 | 41 | 1.5 | 1.8 | 4.4 | 1.3 | 8.8 | 8.4 | 3.4 | 3.8 |
| 24 | 5.3 | 4.5 | 1.9 | 9.5 | 26 | 3.1 | 3.7 | 11 | 72 | 12 | 3.2 | 13 |
| 25 | 16 | 4.3 | 1.8 | 184 | 61 | 1.7 | 3.3 | 22 | 32 | 6.4 | 3.1 | 8.4 |
| 26 | 66 | 4.1 | 1.8 | 7.9 | 66 | 1.4 | 4.1 | 15 | 29 | 16 | 2.9 | 4.1 |
| 27 | 10 | 5.4 | 1.6 | 6.9 | 23 | 1.2 | 11 | 7.7 | 17 | 17 | 2.8 | 3.3 |
| 28 | 25 | 40 | 1.4 | 13 | 19 | 1.1 | 3.4 | 21 | 25 | 8.4 | 2.7 | 3.0 |
| 29 | 16 | 10 | 1.3 | 4.4 | 5.7 | 1.1 | 17 | 18 | 33 | 5.9 | 2.5 | 2.8 |
| 30 | 17 | 26 | 12 | 4.3 | --- | 1.0 | 3.1 | 6.8 | 21 | 5.3 | 2.7 | 2.6 |
| 31 | 172 | --- | 15 | 5.3 | --- | 99 | --- | 4.1 | --- | 5.1 | 12 | --- |
| TOTAL | 708.9 | 463.3 | 165.1 | 510.18 | 250.74 | 282.0 | 292.8 | 160.64 | 456.9 | 472.9 | 268.0 | 326.4 |
| MEAN | 22.9 | 15.4 | 5.33 | 16.5 | 8.65 | 9.10 | 9.76 | 5.18 | 15.2 | 15.3 | 8.65 | 10.9 |
| MAX | 172 | 72 | 25 | 184 | 66 | 99 | 28 | 22 | 72 | 54 | 32 | 113 |
| MIN | 5.3 | 4.1 | 1.3 | .98 | .86 | 1.0 | 1.8 | .94 | 1.8 | 5.1 | 2.5 | 2.4 |
| AC-FT | 1410 | 919 | 327 | 1010 | 497 | 559 | 581 | 319 | 906 | 938 | 532 | 647 |

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1913 - 1996, BY WATER YEAR (WY)

| | MEAN | MAX | (WY) | MIN | (WY) | MEAN | MAX | (WY) | MIN | (WY) | MEAN | MAX | (WY) | MIN | (WY) |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 1913 | 13.2 | 32.7 | 1942 | 2.21 | 1985 | 17.5 | 76.5 | 1966 | 1.31 | 1934 | 15.1 | 48.9 | 1988 | 1.57 | 1990 |
| 1914 | 14.6 | 126 | 1921 | .36 | 1986 | 12.8 | 117 | 1932 | .40 | 1986 | 19.1 | 74.4 | 1982 | .28 | 1983 |
| 1915 | 19.9 | 58.6 | 1963 | 1.38 | 1966 | 16.4 | 53.3 | 1927 | .67 | 1992 | 19.9 | 58.6 | 1963 | 1.38 | 1966 |
| 1916 | 13.2 | 31.3 | 1963 | 2.63 | 1951 | 18.6 | 48.0 | 1930 | 4.22 | 1951 | 18.4 | 50.1 | 1931 | 1.81 | 1971 |
| 1917 | 15.3 | 48.0 | 1930 | 4.22 | 1951 | 8.65 | 50.1 | 1931 | 1.81 | 1971 | 10.9 | 79.1 | 1914 | 1.95 | 1975 |

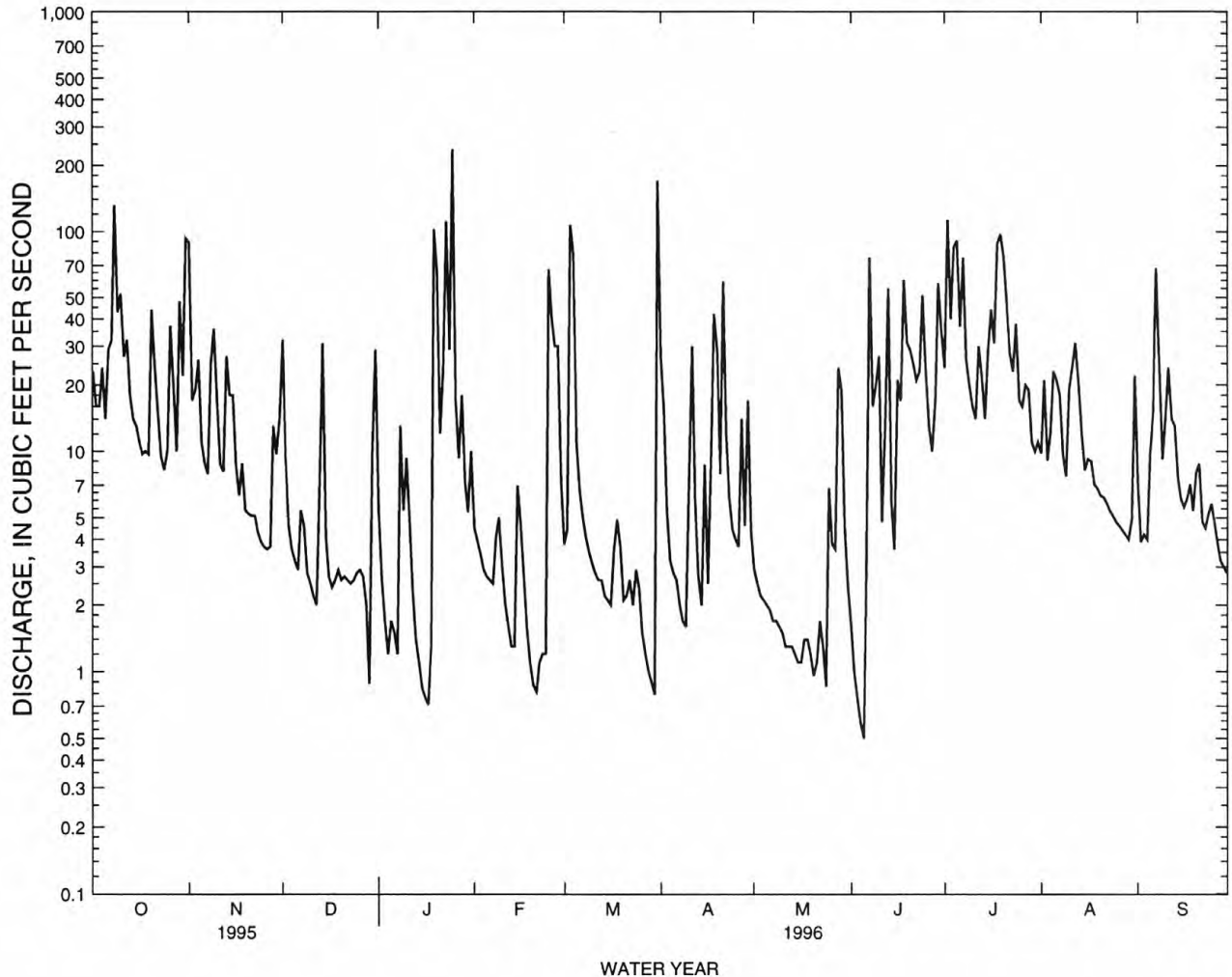
16200000 NORTH FORK KAUKONAHUA STREAM ABOVE RIGHT BRANCH, NEAR WAHIAWA--Continued

| SUMMARY STATISTICS | FOR 1995 CALENDAR YEAR | | FOR 1996 WATER YEAR | | WATER YEARS 1913 - 1996 | |
|--------------------------|------------------------|--------|---------------------|--------|-------------------------|-------------|
| ANNUAL TOTAL | 4482.94 | | 4357.86 | | | |
| ANNUAL MEAN | 12.3 | | 11.9 | | 16.4 | |
| HIGHEST ANNUAL MEAN | | | | | 29.5 | 1932 |
| LOWEST ANNUAL MEAN | | | | | 9.11 | 1984 |
| HIGHEST DAILY MEAN | 197 | Jan 14 | 184 | Jan 25 | 975 | Feb 27 1935 |
| LOWEST DAILY MEAN | .38 | Mar 18 | .86 | Feb 21 | .12 | Mar 13 1941 |
| ANNUAL SEVEN-DAY MINIMUM | .43 | Mar 14 | 1.1 | May 13 | .13 | Mar 5 1986 |
| ANNUAL RUNOFF (AC-FT) | 8890 | | 8640 | | 11870 | |
| 10 PERCENT EXCEEDS | 27 | | 27 | | 36 | |
| 50 PERCENT EXCEEDS | 5.3 | | 5.9 | | 7.1 | |
| 90 PERCENT EXCEEDS | 1.7 | | 1.6 | | 1.6 | |



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

| SUMMARY STATISTICS | FOR 1995 CALENDAR YEAR | FOR 1996 WATER YEAR | WATER YEARS 1961 - 1996 | |
|--------------------------|------------------------|---------------------|-------------------------|-------------|
| ANNUAL TOTAL | 5633.19 | 5851.29 | | |
| ANNUAL MEAN | 15.4 | 16.0 | 21.5 | |
| HIGHEST ANNUAL MEAN | | | 37.2 | 1982 |
| LOWEST ANNUAL MEAN | | | 11.1 | 1984 |
| HIGHEST DAILY MEAN | 154 Sep 30 | 237 Jan 25 | 1050 | Feb 1 1969 |
| LOWEST DAILY MEAN | .51 Mar 20 | .50 Jun 5 | .00 | Dec 24 1960 |
| ANNUAL SEVEN-DAY MINIMUM | .64 Mar 15 | 1.1 Feb 18 | .00 | Jan 19 1977 |
| ANNUAL RUNOFF (AC-FT) | 11170 | 11610 | 15550 | |
| 10 PERCENT EXCEEDS | 36 | 37 | 50 | |
| 50 PERCENT EXCEEDS | 6.1 | 6.7 | 8.9 | |
| 90 PERCENT EXCEEDS | 2.0 | 1.4 | 1.8 | |



HAWAII, ISLAND OF OAHU
16211600 MAKAHA STREAM NEAR MAKAHA

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

DRAINAGE AREA.--2.31 mi².

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 good, except for periods of no gage height record which is poor. Honolulu Board of Water Supply wells upstream of station may influence flows at gage. Recording rain gage located at station.

AVERAGE DISCHARGE.--37 years (water years 1960-96), 1.82 ft³/s (1,320 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,450 ft³/s, January 6, 1982, gage height, 7.40 ft, from floodmarks, from rating curve extended above 51 ft³/s on basis of slope-area measurements at gage heights 6.50 ft and 7.40 ft; no flow at times.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum stage known since at least 1953, about 7.8 ft, November 24, 1954, from information by local resident. Discharge, about 1,700 ft³/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 200 ft³/s and maximum (*):

| Date | Time | Discharge (ft ³ /s) | Gage height (ft) | Date | Time | Discharge (ft ³ /s) | Gage height (ft) |
|--|------|-----------------------------------|---------------------|--|------|-----------------------------------|---------------------|
| Jan. 24 | 1800 | *306 | *3.88 | No other peak greater than base discharge. | | | |
| Minimum discharge, no flow on many days. | | | | | | | |

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY MEAN VALUES

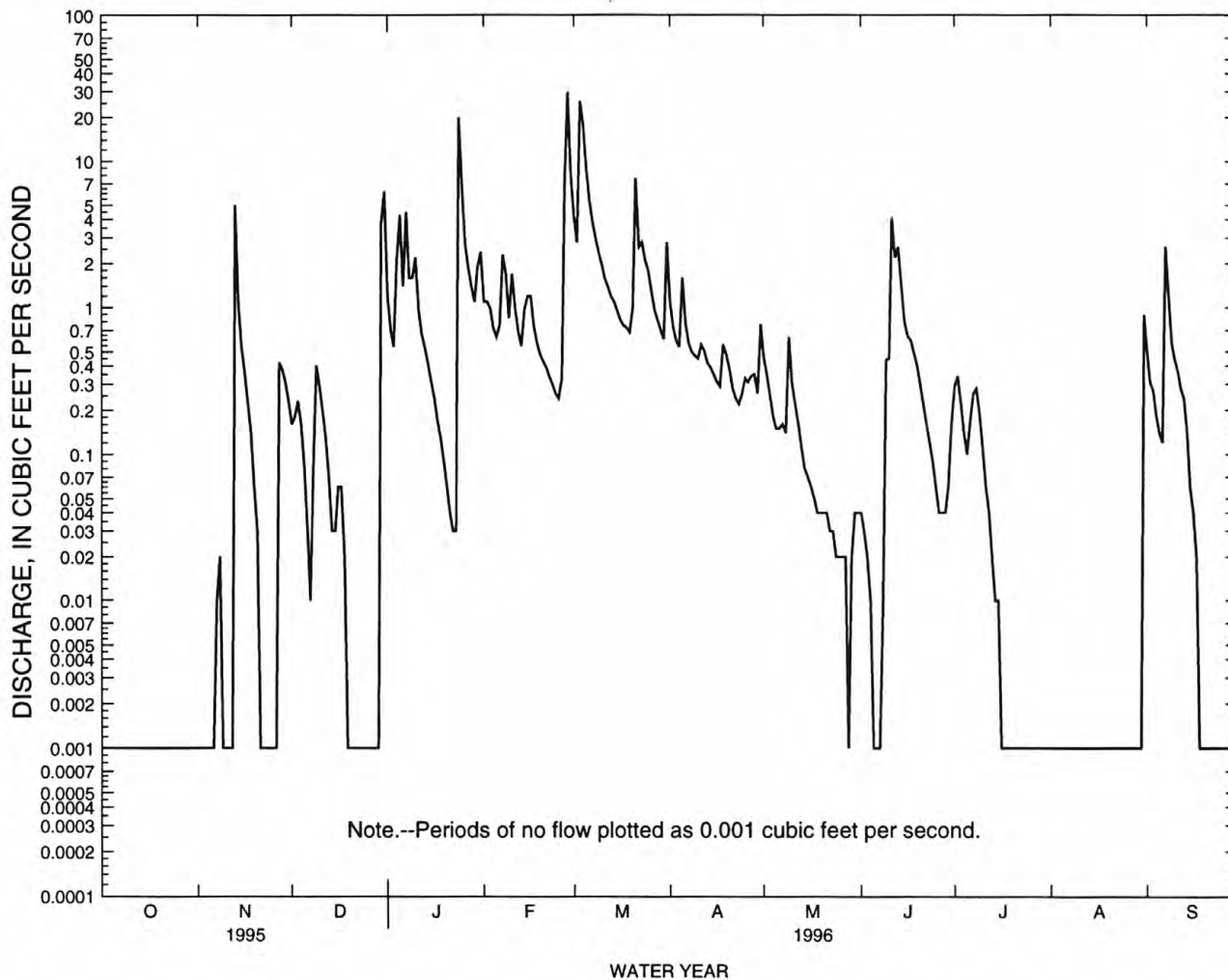
| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|------|------|-------|-------|-------|--------|-------|------|-------|------|------|------|
| 1 | .00 | .00 | .16 | 1.2 | 1.1 | 4.1 | 1.1 | .46 | .04 | .29 | .00 | .51 |
| 2 | .00 | .00 | .18 | .70 | 1.1 | 2.8 | .74 | .35 | .03 | .34 | .00 | .31 |
| 3 | .00 | .00 | .23 | .54 | .99 | 26 | .60 | .25 | .02 | .25 | .00 | .27 |
| 4 | .00 | .00 | .16 | 2.1 | .73 | 18 | .54 | .18 | .01 | .14 | .00 | .18 |
| 5 | .00 | .00 | .08 | 4.3 | .63 | 9.0 | 1.6 | .15 | .00 | .10 | .00 | .14 |
| 6 | .00 | .00 | .03 | 1.4 | .76 | 5.4 | .78 | .15 | .00 | .17 | .00 | .12 |
| 7 | .00 | .01 | .01 | 4.5 | 2.3 | 3.9 | .57 | .16 | .00 | .26 | .00 | 2.6 |
| 8 | .00 | .02 | .08 | 1.6 | 1.7 | 3.0 | .50 | .14 | .01 | .28 | .00 | 1.2 |
| 9 | .00 | .00 | .40 | 1.6 | .85 | 2.4 | .47 | .63 | .44 | .19 | .00 | .57 |
| 10 | .00 | .00 | .29 | 2.2 | 1.7 | 2.0 | .45 | .31 | .45 | .11 | .00 | .44 |
| 11 | .00 | .00 | .20 | .95 | .99 | 1.6 | .56 | .22 | 4.1 | .06 | .00 | .37 |
| 12 | .00 | .00 | .13 | .66 | .68 | 1.4 | .51 | .16 | 2.2 | .04 | .00 | .28 |
| 13 | .00 | 5.0 | .07 | .53 | .55 | 1.2 | .42 | .11 | 2.6 | .02 | .00 | .24 |
| 14 | .00 | 1.1 | .03 | .41 | .97 | 1.1 | .39 | .08 | 1.4 | .01 | .00 | .14 |
| 15 | .00 | .54 | .03 | .31 | 1.2 | .95 | .35 | .07 | .81 | .01 | .00 | .06 |
| 16 | .00 | .36 | .06 | .24 | 1.2 | .83 | .31 | .06 | .64 | .00 | .00 | .04 |
| 17 | .00 | .22 | .06 | .17 | .74 | .76 | .29 | .05 | .60 | .00 | .00 | .02 |
| 18 | .00 | .14 | .02 | .13 | .58 | .73 | .56 | .04 | .49 | .00 | .00 | .00 |
| 19 | .00 | .06 | .00 | .09 | .48 | .68 | .48 | .04 | .40 | .00 | .00 | .00 |
| 20 | .00 | .03 | .00 | .06 | .43 | 1.0 | .38 | .04 | .30 | .00 | .00 | .00 |
| 21 | .00 | .00 | .00 | .04 | .39 | 7.7 | .28 | .04 | .22 | .00 | .00 | .00 |
| 22 | .00 | .00 | .00 | .03 | .34 | 2.6 | .24 | .03 | .16 | .00 | .00 | .00 |
| 23 | .00 | .00 | .00 | .03 | .30 | 2.8 | .22 | .03 | .12 | .00 | .00 | .00 |
| 24 | .00 | .00 | .00 | 20 | .26 | 2.1 | .26 | .02 | .09 | .00 | .00 | .00 |
| 25 | .00 | .00 | .00 | 6.8 | .24 | 1.8 | .33 | .02 | .06 | .00 | .00 | .00 |
| 26 | .00 | .00 | .00 | 2.8 | .33 | 1.3 | .31 | .02 | .04 | .00 | .00 | .00 |
| 27 | .00 | .42 | .00 | 1.9 | 7.2 | .97 | .34 | .02 | .04 | .00 | .00 | .00 |
| 28 | .00 | .38 | .00 | 1.4 | 30 | .82 | .35 | .00 | .04 | .00 | .00 | .00 |
| 29 | .00 | .31 | .00 | 1.1 | 8.0 | .70 | .26 | .02 | .06 | .00 | .00 | .00 |
| 30 | .00 | .23 | 3.8 | 1.9 | --- | .61 | .77 | .04 | .16 | .00 | .00 | .00 |
| 31 | .00 | --- | 6.2 | 2.4 | --- | 2.8 | --- | .04 | --- | .00 | .89 | --- |
| TOTAL | 0.00 | 8.82 | 12.22 | 62.09 | 66.74 | 111.05 | 14.96 | 3.93 | 15.53 | 2.24 | 0.89 | 7.49 |
| MEAN | .000 | .29 | .39 | 2.00 | 2.30 | 3.58 | .50 | .13 | .52 | .072 | .029 | .25 |
| MAX | .00 | 5.0 | 6.2 | 20 | 30 | 26 | 1.6 | .63 | 4.1 | .34 | .89 | 2.6 |
| MIN | .00 | .00 | .00 | .03 | .24 | .61 | .22 | .00 | .00 | .00 | .00 | .00 |
| AC-FT | .00 | 17 | 24 | 123 | 132 | 220 | 30 | 7.8 | 31 | 4.4 | 1.8 | 15 |

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1959 - 1996, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|------|------|------|------|------|------|------|------|------|------|------|------|------|
| MEAN | .75 | 1.54 | 2.95 | 4.20 | 3.47 | 3.15 | 2.59 | 1.44 | .63 | .48 | .37 | .39 |
| MAX | 3.66 | 8.67 | 15.0 | 22.7 | 16.3 | 11.5 | 15.7 | 5.33 | 1.72 | 1.31 | 1.44 | 2.19 |
| (WY) | 1983 | 1966 | 1965 | 1982 | 1976 | 1963 | 1965 | 1978 | 1986 | 1983 | 1983 | 1974 |
| MIN | .000 | .000 | .038 | .22 | .25 | .18 | .13 | .13 | .013 | .005 | .000 | .000 |
| (WY) | 1976 | 1995 | 1995 | 1995 | 1995 | 1995 | 1993 | 1996 | 1995 | 1995 | 1995 | 1961 |

HAWAII, ISLAND OF OAHU
 16211600 MAKAHA STREAM NEAR MAKAHA--Continued

| SUMMARY STATISTICS | FOR 1995 CALENDAR YEAR | FOR 1996 WATER YEAR | WATER YEARS 1959 - 1996 | |
|--------------------------|------------------------|---------------------|-------------------------|-------------|
| ANNUAL TOTAL | 96.02 | 305.96 | | |
| ANNUAL MEAN | .26 | .84 | 1.82 | |
| HIGHEST ANNUAL MEAN | | | 3.80 | 1963 |
| LOWEST ANNUAL MEAN | | | .25 | 1995 |
| HIGHEST DAILY MEAN | 8.3 Apr 4 | 30 Feb 28 | 283 | Feb 7 1976 |
| LOWEST DAILY MEAN | .00 Jan 2 | .00 Oct 1 | .00 | Sep 25 1960 |
| ANNUAL SEVEN-DAY MINIMUM | .00 Jan 2 | .00 Oct 1 | .00 | Aug 28 1961 |
| ANNUAL RUNOFF (AC-FT) | 190 | 607 | 1320 | |
| 10 PERCENT EXCEEDS | .64 | 1.8 | 3.5 | |
| 50 PERCENT EXCEEDS | .00 | .13 | .57 | |
| 90 PERCENT EXCEEDS | .00 | .00 | .05 | |



HAWAII, ISLAND OF OAHU
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 mi².

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

AVERAGE DISCHARGE.--39 years (water years 1958-96), 11.0 ft³/s (7,940 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 6,370 ft³/s, March 21, 1991, gage height, 12.67 ft, from rating curve extended above 5,680 ft³/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 ft³/s and maximum (*):

| Date | Time | Discharge (ft ³ /s) | Gage height (ft) | Date | Time | Discharge (ft ³ /s) | Gage height (ft) |
|---------|------|-----------------------------------|---------------------|--|------|-----------------------------------|---------------------|
| Jan. 25 | 0400 | *1,880 | *8.74 | No other peak greater than base discharge. | | | |

Minimum discharge, 0.05 ft³/s, June 4.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY MEAN VALUES

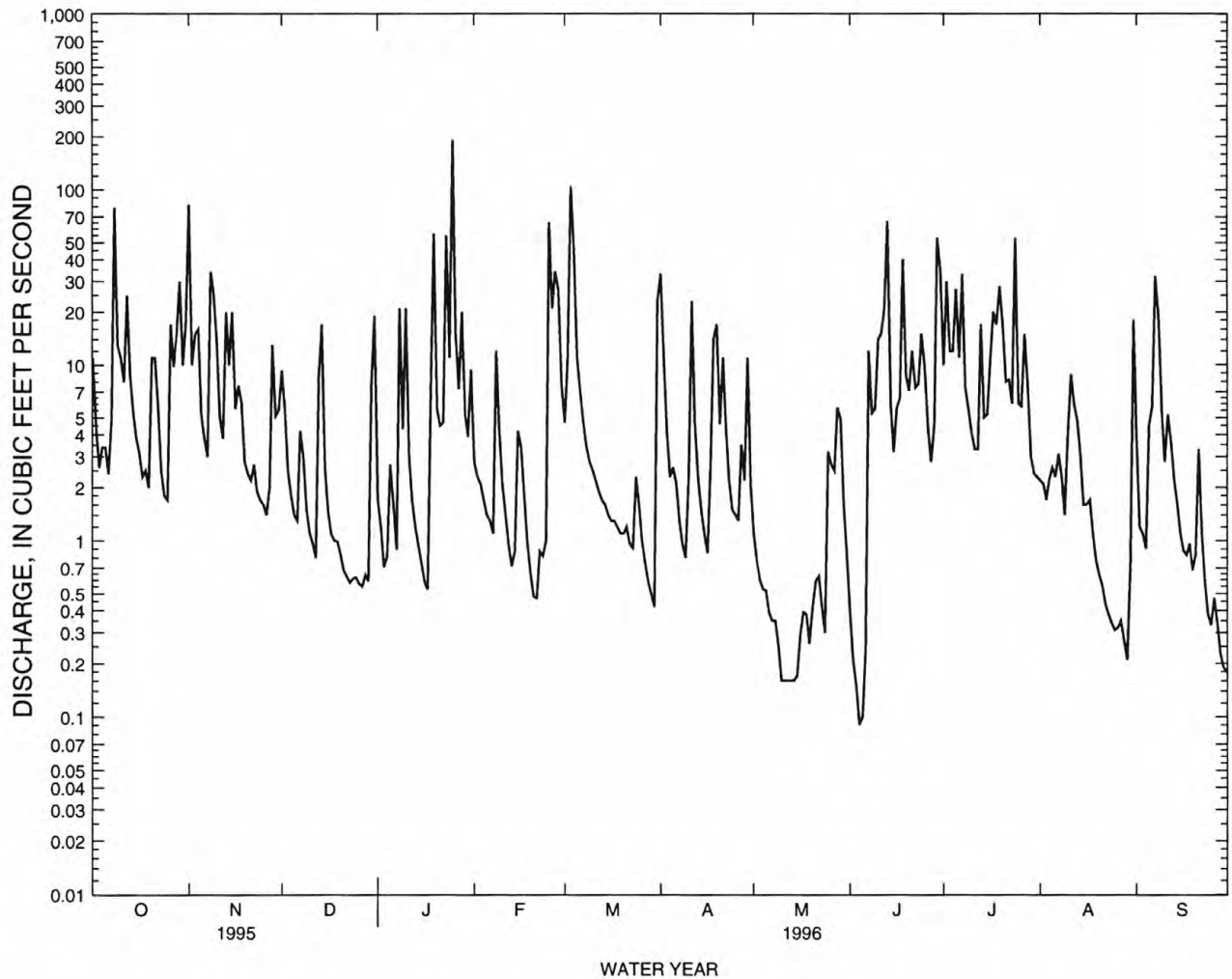
| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|-------|-------|-------|--------|--------|--------|--------|-------|--------|-------|-------|--------|
| 1 | 11 | 82 | 9.3 | 1.7 | 2.8 | 4.7 | 33 | 1.1 | .39 | 10 | 2.2 | 3.8 |
| 2 | 4.4 | 10 | 5.7 | 1.2 | 2.3 | 11 | 11 | .77 | .21 | 30 | 2.1 | 1.2 |
| 3 | 2.6 | 15 | 2.5 | .71 | 2.1 | 104 | 4.3 | .60 | .15 | 12 | 1.7 | 1.1 |
| 4 | 3.4 | 16 | 1.8 | .81 | 1.7 | 45 | 2.3 | .53 | .09 | 12 | 2.2 | .90 |
| 5 | 3.4 | 5.2 | 1.4 | 2.7 | 1.4 | 11 | 2.6 | .52 | .10 | 27 | 2.6 | 4.5 |
| 6 | 2.4 | 3.8 | 1.3 | 1.6 | 1.3 | 6.9 | 2.1 | .39 | .24 | 11 | 2.3 | 5.8 |
| 7 | 5.0 | 3.0 | 4.2 | .89 | 1.1 | 4.7 | 1.3 | .35 | 12 | 33 | 3.1 | 32 |
| 8 | 79 | 34 | 3.0 | 21 | 12 | 3.4 | .96 | .35 | 5.3 | 7.4 | 2.3 | 19 |
| 9 | 13 | 26 | 1.5 | 4.3 | 4.3 | 2.8 | .80 | .25 | 5.6 | 5.6 | 1.4 | 5.4 |
| 10 | 11 | 14 | 1.1 | 21 | 2.1 | 2.5 | 2.3 | .16 | 14 | 4.1 | 4.1 | 2.8 |
| 11 | 8.0 | 5.0 | .97 | 3.0 | 1.4 | 2.2 | 23 | .16 | 15 | 3.3 | 8.8 | 5.2 |
| 12 | 25 | 3.8 | .80 | 1.7 | .94 | 1.9 | 4.7 | .16 | 21 | 3.3 | 5.9 | 3.6 |
| 13 | 8.8 | 20 | 8.8 | 1.2 | .72 | 1.7 | 2.3 | .16 | 66 | 17 | 4.8 | 2.2 |
| 14 | 5.3 | 10 | 17 | .94 | .87 | 1.6 | 1.5 | .16 | 6.0 | 5.0 | 3.1 | 1.6 |
| 15 | 3.8 | 20 | 2.6 | .74 | 4.2 | 1.4 | 1.1 | .17 | 3.2 | 5.2 | 1.6 | 1.1 |
| 16 | 3.1 | 5.6 | 1.5 | .58 | 3.4 | 1.3 | .85 | .29 | 5.7 | 11 | 1.6 | .88 |
| 17 | 2.3 | 7.6 | 1.1 | .53 | 1.8 | 1.3 | 2.6 | .39 | 6.4 | 20 | 1.7 | .83 |
| 18 | 2.5 | 6.1 | 1.0 | 7.0 | .99 | 1.2 | 14 | .38 | 40 | 17 | 1.1 | .96 |
| 19 | 2.0 | 2.8 | .99 | 56 | .66 | 1.1 | 17 | .26 | 8.6 | 28 | .78 | .68 |
| 20 | 11 | 2.4 | .84 | 5.6 | .48 | 1.1 | 4.6 | .42 | 7.1 | 17 | .64 | .83 |
| 21 | 11 | 2.2 | .68 | 4.5 | .47 | 1.2 | 11 | .59 | 12 | 8.0 | .55 | 3.3 |
| 22 | 5.9 | 2.7 | .63 | 4.7 | .87 | .96 | 4.3 | .63 | 7.4 | 8.2 | .43 | 1.1 |
| 23 | 2.5 | 1.9 | .58 | 55 | .82 | .91 | 2.2 | .42 | 7.8 | 6.0 | .38 | .57 |
| 24 | 1.8 | 1.7 | .61 | 11 | 1.0 | 2.3 | 1.5 | .30 | 15 | 53 | .34 | .38 |
| 25 | 1.7 | 1.6 | .62 | 192 | 65 | 1.6 | 1.4 | 3.2 | 9.8 | 6.0 | .31 | .33 |
| 26 | 17 | 1.4 | .57 | 15 | 21 | .99 | 1.3 | 2.7 | 4.5 | 5.8 | .32 | .47 |
| 27 | 9.8 | 2.0 | .55 | 7.3 | 34 | .74 | 3.5 | 2.5 | 2.8 | 15 | .35 | .34 |
| 28 | 15 | 13 | .64 | 20 | 27 | .58 | 2.2 | 5.7 | 4.5 | 7.7 | .27 | .23 |
| 29 | 30 | 5.1 | .59 | 5.2 | 7.7 | .49 | 11 | 4.9 | 53 | 3.0 | .21 | .19 |
| 30 | 10 | 5.5 | 7.8 | 3.9 | --- | .42 | 2.0 | 1.6 | 35 | 2.4 | .75 | .18 |
| 31 | 17 | --- | 19 | 9.4 | --- | 23 | --- | .83 | --- | 2.3 | 18 | --- |
| TOTAL | 328.7 | 329.4 | 99.67 | 461.20 | 204.42 | 243.99 | 172.71 | 30.94 | 368.88 | 396.3 | 75.93 | 101.47 |
| MEAN | 10.6 | 11.0 | 3.22 | 14.9 | 7.05 | 7.87 | 5.76 | 1.00 | 12.3 | 12.8 | 2.45 | 3.38 |
| MAX | 79 | 82 | 19 | 192 | 65 | 104 | 33 | 5.7 | 66 | 53 | 18 | 32 |
| MIN | 1.7 | 1.4 | .55 | .53 | .47 | .42 | .80 | .16 | .09 | 2.3 | .21 | .18 |
| AC-FT | 652 | 653 | 198 | 915 | 405 | 484 | 343 | 61 | 732 | 786 | 151 | 201 |

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1957 - 1996, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|------|------|------|------|------|------|------|------|------|------|------|------|------|
| MEAN | 10.3 | 14.9 | 12.6 | 11.2 | 10.3 | 16.6 | 15.3 | 9.30 | 5.59 | 9.97 | 8.49 | 6.26 |
| MAX | 49.6 | 61.8 | 42.2 | 32.1 | 54.4 | 98.4 | 60.9 | 34.0 | 21.9 | 28.1 | 37.5 | 23.6 |
| (WY) | 1982 | 1966 | 1988 | 1989 | 1969 | 1991 | 1963 | 1965 | 1978 | 1989 | 1958 | 1994 |
| MIN | .84 | .23 | .83 | .17 | .19 | .021 | .33 | .39 | .16 | .47 | .30 | .54 |
| (WY) | 1958 | 1963 | 1990 | 1977 | 1978 | 1983 | 1966 | 1992 | 1959 | 1968 | 1971 | 1984 |

HAWAII, ISLAND OF OAHU
 16212800 KIPAPA STREAM NEAR WAHIAWA--Continued

| SUMMARY STATISTICS | FOR 1995 CALENDAR YEAR | FOR 1996 WATER YEAR | WATER YEARS 1957 - 1996 | |
|--------------------------|------------------------|---------------------|-------------------------|-------------|
| ANNUAL TOTAL | 2595.30 | 2813.61 | | |
| ANNUAL MEAN | 7.11 | 7.69 | 11.0 | |
| HIGHEST ANNUAL MEAN | | | 25.2 | 1982 |
| LOWEST ANNUAL MEAN | | | 4.50 | 1984 |
| HIGHEST DAILY MEAN | 132 Aug 23 | 192 Jan 25 | 852 | Apr 15 1963 |
| LOWEST DAILY MEAN | .06 Mar 20 | .09 Jun 4 | .00 | Jun 18 1959 |
| ANNUAL SEVEN-DAY MINIMUM | .11 Mar 15 | .17 May 9 | .00 | Jun 18 1959 |
| ANNUAL RUNOFF (AC-FT) | 5150 | 5580 | 7940 | |
| 10 PERCENT EXCEEDS | 19 | 19 | 25 | |
| 50 PERCENT EXCEEDS | 2.0 | 2.6 | 2.9 | |
| 90 PERCENT EXCEEDS | .46 | .42 | .34 | |



HAWAII, ISLAND OF OAHU
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 sugar refinery at Waipahu.

DRAINAGE AREA.--45.7 mi².

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 good.

AVERAGE DISCHARGE.--43 years (water years 1953-59, 1961-96), 40.7 ft³/s (29,460 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 13,600 ft³/s, November 28, 1954, gage height, 14.82 ft, site and datum then in use, from rating curve extended above 730 ft³/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 ft³/s and maximum (*):

| Date | Time | Discharge (ft ³ /s) | Gage height (ft) | Date | Time | Discharge (ft ³ /s) | Gage height (ft) |
|----------|------|-----------------------------------|---------------------|--|------|-----------------------------------|---------------------|
| Jan. 25 | 0630 | *1,940 | *5.44 | No other peak greater than base discharge. | | | |
| Sept. 07 | 1915 | 1,640 | 5.16 | | | | |

Minimum discharge, 14 ft³/s June 4-7.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY MEAN VALUES

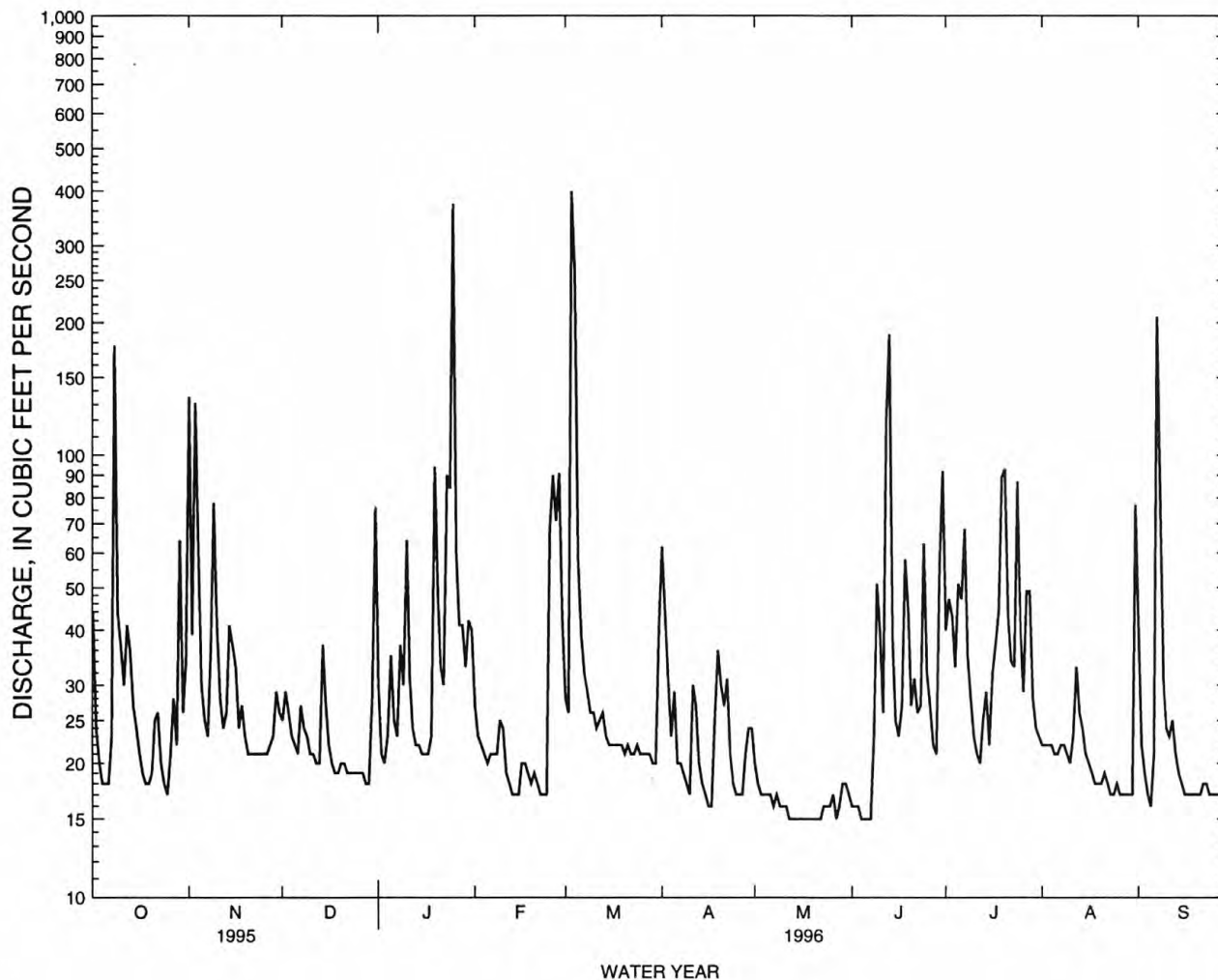
| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|------|------|------|------|------|------|------|------|------|------|------|------|
| 1 | 44 | 135 | 25 | 30 | 27 | 28 | 62 | 20 | 16 | 40 | 22 | 41 |
| 2 | 24 | 39 | 29 | 21 | 23 | 26 | 43 | 18 | 16 | 47 | 22 | 22 |
| 3 | 20 | 131 | 26 | 20 | 22 | 398 | 31 | 17 | 16 | 43 | 22 | 19 |
| 4 | 18 | 61 | 23 | 23 | 21 | 260 | 23 | 17 | 15 | 33 | 22 | 17 |
| 5 | 18 | 30 | 22 | 35 | 20 | 58 | 29 | 17 | 15 | 51 | 21 | 16 |
| 6 | 18 | 25 | 21 | 25 | 21 | 39 | 20 | 17 | 15 | 47 | 21 | 21 |
| 7 | 23 | 23 | 27 | 23 | 21 | 32 | 20 | 16 | 15 | 68 | 22 | 206 |
| 8 | 177 | 37 | 24 | 37 | 21 | 29 | 19 | 17 | 23 | 35 | 22 | 82 |
| 9 | 44 | 78 | 23 | 30 | 25 | 26 | 18 | 16 | 51 | 28 | 21 | 31 |
| 10 | 37 | 41 | 21 | 64 | 24 | 26 | 17 | 16 | 39 | 23 | 20 | 24 |
| 11 | 30 | 28 | 21 | 31 | 19 | 24 | 30 | 16 | 26 | 21 | 23 | 23 |
| 12 | 41 | 24 | 20 | 24 | 18 | 25 | 27 | 15 | 119 | 20 | 33 | 25 |
| 13 | 36 | 26 | 20 | 22 | 17 | 26 | 20 | 15 | 188 | 25 | 26 | 21 |
| 14 | 27 | 41 | 37 | 22 | 17 | 23 | 18 | 15 | 38 | 29 | 24 | 19 |
| 15 | 24 | 37 | 27 | 21 | 17 | 22 | 17 | 15 | 25 | 22 | 21 | 18 |
| 16 | 21 | 33 | 22 | 21 | 20 | 22 | 16 | 15 | 23 | 32 | 20 | 17 |
| 17 | 19 | 24 | 20 | 21 | 20 | 22 | 16 | 15 | 27 | 37 | 19 | 17 |
| 18 | 18 | 27 | 19 | 23 | 19 | 22 | 25 | 15 | 58 | 44 | 18 | 17 |
| 19 | 18 | 23 | 19 | 94 | 18 | 22 | 36 | 15 | 44 | 89 | 18 | 17 |
| 20 | 19 | 21 | 20 | 48 | 19 | 21 | 30 | 15 | 27 | 93 | 18 | 17 |
| 21 | 25 | 21 | 20 | 33 | 18 | 22 | 27 | 15 | 31 | 43 | 19 | 17 |
| 22 | 26 | 21 | 19 | 30 | 17 | 21 | 31 | 15 | 26 | 34 | 18 | 18 |
| 23 | 20 | 21 | 19 | 90 | 17 | 21 | 21 | 16 | 27 | 33 | 17 | 18 |
| 24 | 18 | 21 | 19 | 84 | 17 | 22 | 18 | 16 | 63 | 87 | 17 | 17 |
| 25 | 17 | 21 | 19 | 373 | 68 | 21 | 17 | 16 | 32 | 40 | 18 | 17 |
| 26 | 21 | 21 | 19 | 60 | 90 | 21 | 17 | 17 | 27 | 29 | 17 | 17 |
| 27 | 28 | 22 | 19 | 41 | 71 | 21 | 17 | 15 | 22 | 49 | 17 | 17 |
| 28 | 22 | 23 | 18 | 41 | 91 | 21 | 21 | 16 | 21 | 49 | 17 | 17 |
| 29 | 64 | 29 | 18 | 33 | 43 | 20 | 24 | 18 | 56 | 28 | 17 | 16 |
| 30 | 26 | 26 | 28 | 42 | --- | 20 | 24 | 18 | 92 | 24 | 17 | 16 |
| 31 | 34 | --- | 76 | 40 | --- | 40 | --- | 17 | --- | 23 | 77 | --- |
| TOTAL | 977 | 1110 | 740 | 1502 | 841 | 1401 | 734 | 501 | 1193 | 1266 | 686 | 840 |
| MEAN | 31.5 | 37.0 | 23.9 | 48.5 | 29.0 | 45.2 | 24.5 | 16.2 | 39.8 | 40.8 | 22.1 | 28.0 |
| MAX | 177 | 135 | 76 | 373 | 91 | 398 | 62 | 20 | 188 | 93 | 77 | 206 |
| MIN | 17 | 21 | 18 | 20 | 17 | 20 | 16 | 15 | 15 | 20 | 17 | 16 |
| AC-FT | 1940 | 2200 | 1470 | 2980 | 1670 | 2780 | 1460 | 994 | 2370 | 2510 | 1360 | 1670 |

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1953 - 1996, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|------|------|------|------|------|------|------|------|------|------|------|------|------|
| MEAN | 33.2 | 47.6 | 50.3 | 60.7 | 55.9 | 55.2 | 50.0 | 33.0 | 23.8 | 29.4 | 26.3 | 22.7 |
| MAX | 97.8 | 198 | 146 | 222 | 179 | 195 | 235 | 99.3 | 51.5 | 76.8 | 90.0 | 68.1 |
| (WY) | 1992 | 1966 | 1966 | 1969 | 1955 | 1991 | 1963 | 1965 | 1980 | 1989 | 1958 | 1994 |
| MIN | 7.22 | 12.2 | 13.3 | 14.7 | 7.72 | 6.13 | 18.4 | 14.9 | 10.6 | 9.08 | 7.50 | 6.28 |
| (WY) | 1978 | 1954 | 1954 | 1986 | 1978 | 1978 | 1961 | 1954 | 1981 | 1985 | 1984 | 1975 |

HAWAII, ISLAND OF OAHU
 16213000 WAIKELE STREAM AT WAIPAHO--Continued

| SUMMARY STATISTICS | FOR 1995 CALENDAR YEAR | | FOR 1996 WATER YEAR | | WATER YEARS 1953 - 1996 | |
|--------------------------|------------------------|--------|---------------------|--------|-------------------------|-------------|
| ANNUAL TOTAL | 10310 | | 11791 | | | |
| ANNUAL MEAN | 28.2 | | 32.2 | | 40.7 | |
| HIGHEST ANNUAL MEAN | | | | | 77.3 | 1969 |
| LOWEST ANNUAL MEAN | | | | | 18.5 | 1954 |
| HIGHEST DAILY MEAN | 208 | Aug 23 | 398 | Mar 3 | 2590 | Mar 21 1991 |
| LOWEST DAILY MEAN | 15 | Sep 16 | 15 | May 12 | .61 | Feb 25 1978 |
| ANNUAL SEVEN-DAY MINIMUM | 16 | Sep 13 | 15 | May 12 | 2.5 | Feb 24 1978 |
| ANNUAL RUNOFF (AC-FT) | 20450 | | 23390 | | 29460 | |
| 10 PERCENT EXCEEDS | 41 | | 50 | | 64 | |
| 50 PERCENT EXCEEDS | 22 | | 22 | | 24 | |
| 90 PERCENT EXCEEDS | 18 | | 17 | | 12 | |



HAWAII, ISLAND OF OAHU
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 mi².

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 poor. Occasional small irrigation diversion and return flow upstream.

AVERAGE DISCHARGE.--44 years (water years 1953-96), 34.2 ft³/s (24,740 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 27,900 ft³/s, October 28, 1981, gage height, 22.46 ft, from rating curve extended above 1,100 ft³/s on basis of slope-area measurements at gage heights 17.1 ft and 20.56 ft; minimum, 1.1 ft³/s on several days in 1984 and 1985.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,300 ft³/s and maximum (*):

| Date | Time | Discharge (ft ³ /s) | Gage height (ft) | Date | Time | Discharge (ft ³ /s) | Gage height (ft) |
|---------|------|--------------------------------|------------------|----------|------|--------------------------------|------------------|
| Nov. 01 | 0530 | 5,520 | 12.18 | June 29 | 1845 | 2,560 | 9.14 |
| Jan. 25 | 0530 | *14,000 | *17.17 | Sept. 07 | 1945 | 5,560 | 12.22 |

Minimum discharge, 1.3 ft³/s, June 4, 5.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|-------|--------|-------|--------|-------|-------|-------|------|-------|-------|-------|--------|
| 1 | e17 | 921 | 10 | e8.6 | e8.0 | 5.4 | 56 | 2.2 | 1.4 | e25 | 2.0 | 16 |
| 2 | e4.6 | 34 | 6.4 | e3.0 | e5.0 | 6.7 | 18 | 1.8 | 1.4 | e27 | 2.0 | e3.6 |
| 3 | e3.6 | 199 | 3.1 | e2.0 | e4.0 | 416 | 7.4 | 1.7 | 1.4 | e20 | 2.0 | e6.5 |
| 4 | e2.2 | 112 | 2.3 | e3.0 | e3.2 | 221 | 3.6 | 1.6 | 1.4 | e16 | 1.9 | e7.8 |
| 5 | e2.0 | 17 | 2.1 | 7.3 | e2.6 | 30 | 9.6 | 1.6 | 1.4 | e72 | 1.8 | e5.6 |
| 6 | e1.9 | 8.5 | 2.3 | 3.1 | e2.1 | 14 | 7.4 | 1.6 | 1.4 | e37 | 1.8 | 11 |
| 7 | e1.8 | 5.1 | 2.9 | 5.4 | 2.0 | 7.7 | 2.7 | 1.6 | 1.4 | e93 | 1.8 | 690 |
| 8 | e230 | 77 | 3.9 | 74 | 1.9 | 4.7 | 1.9 | 1.6 | 4.0 | e21 | 1.8 | 134 |
| 9 | e15 | 107 | 2.4 | 14 | 4.4 | 3.2 | 1.8 | 1.6 | 4.3 | e11 | 1.8 | 27 |
| 10 | e7.0 | 22 | 2.2 | 97 | 2.5 | 2.5 | 1.8 | 1.6 | 47 | e6.5 | 1.8 | 16 |
| 11 | e4.5 | 8.8 | e2.1 | 11 | 1.9 | 2.2 | 13 | 1.6 | 5.2 | e4.0 | e14 | 12 |
| 12 | e16 | 5.2 | e2.0 | 4.5 | 1.8 | 2.2 | 8.5 | 1.5 | 67 | e3.0 | e12 | 12 |
| 13 | e10 | 76 | e2.0 | 2.7 | 1.8 | 2.1 | 3.2 | 1.5 | 91 | e3.1 | e6.2 | 7.3 |
| 14 | e5.0 | 28 | e36 | 2.0 | 1.8 | 2.0 | 2.0 | 1.5 | 8.0 | e7.3 | e2.7 | 6.0 |
| 15 | e4.0 | 42 | e5.3 | 1.8 | 1.7 | 2.0 | 1.8 | 1.5 | 2.8 | e3.4 | 2.7 | 4.5 |
| 16 | e2.7 | 12 | e2.5 | 1.8 | 1.7 | 2.0 | 1.8 | 1.5 | 2.3 | e9.4 | 2.0 | 3.8 |
| 17 | e1.7 | 6.9 | e2.4 | 1.8 | 1.7 | 1.9 | 1.7 | 1.5 | 2.0 | e24 | e1.8 | e3.6 |
| 18 | 1.6 | 13 | e2.3 | 1.7 | 1.7 | 1.9 | 13 | 1.5 | e36 | e19 | e1.8 | e3.4 |
| 19 | 1.6 | 4.0 | e2.2 | 88 | 1.7 | 1.9 | 23 | 1.4 | e27 | e65 | 1.8 | e3.0 |
| 20 | 1.5 | 2.7 | e2.1 | 10 | 1.6 | 1.9 | 10 | 1.4 | e10 | e38 | e1.8 | e3.0 |
| 21 | 1.5 | 2.4 | e2.0 | 5.8 | 1.7 | 1.8 | 21 | 1.4 | e7.6 | e17 | 1.8 | e3.6 |
| 22 | 1.5 | 2.2 | e2.0 | 5.2 | 1.7 | 1.8 | 11 | 1.4 | e8.3 | e12 | 1.8 | e3.4 |
| 23 | 1.5 | 2.1 | e2.0 | 15 | 1.6 | 1.7 | 4.6 | 1.4 | e22 | e6.5 | 1.8 | e3.0 |
| 24 | 1.5 | 2.0 | e1.9 | 14 | 1.7 | 1.7 | 2.7 | 1.4 | e64 | e32 | 1.8 | e2.7 |
| 25 | 1.5 | 2.0 | e1.9 | 1380 | 5.0 | 1.7 | 2.0 | 1.4 | e17 | e9.1 | 1.6 | e2.7 |
| 26 | 1.5 | 2.0 | e1.8 | 48 | 29 | 1.7 | 1.9 | 1.4 | e8.3 | e4.2 | 1.6 | e2.7 |
| 27 | 14 | 2.1 | e1.8 | 70 | 39 | 1.7 | 2.9 | 1.4 | e4.3 | e26 | 1.6 | e2.6 |
| 28 | 3.4 | 1.9 | e1.7 | 92 | 47 | 1.6 | 24 | 1.4 | e3.4 | e14 | 1.6 | e2.4 |
| 29 | 106 | 1.9 | e1.7 | 18 | 14 | 1.6 | 22 | 2.1 | e171 | e4.8 | 1.6 | e2.4 |
| 30 | 7.1 | 2.8 | e6.0 | 18 | --- | 1.7 | 4.2 | 1.6 | e102 | e2.5 | 1.6 | e2.4 |
| 31 | 78 | --- | e73 | 26 | --- | 16 | --- | 1.5 | --- | 2.2 | e85 | --- |
| TOTAL | 551.2 | 1722.6 | 192.3 | 2034.7 | 193.8 | 764.3 | 284.5 | 48.2 | 724.3 | 635.0 | 167.3 | 1004.0 |
| MEAN | 17.8 | 57.4 | 6.20 | 65.6 | 6.68 | 24.7 | 9.48 | 1.55 | 24.1 | 20.5 | 5.40 | 33.5 |
| MAX | 230 | 921 | 73 | 1380 | 47 | 416 | 56 | 2.2 | 171 | 93 | 85 | 690 |
| MIN | 1.5 | 1.9 | 1.7 | 1.7 | 1.6 | 1.6 | 1.7 | 1.4 | 1.4 | 2.2 | 1.6 | 2.4 |
| AC-FT | 1090 | 3420 | 381 | 4040 | 384 | 1520 | 564 | 96 | 1440 | 1260 | 332 | 1990 |

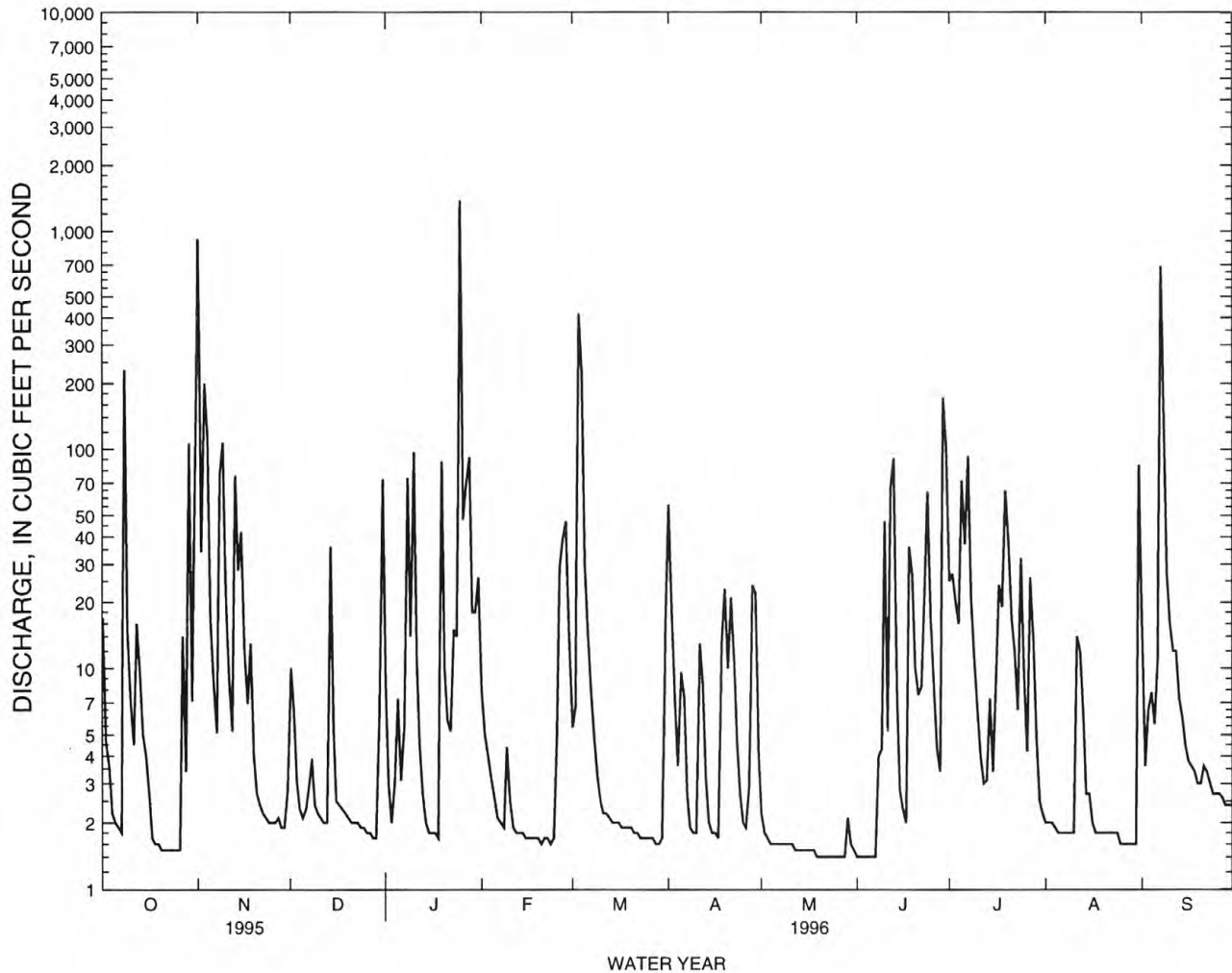
e Estimated

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1952 - 1996, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|------|------|------|------|------|------|------|------|------|------|------|------|------|
| MEAN | 29.9 | 50.3 | 45.5 | 45.1 | 39.5 | 54.4 | 41.6 | 24.3 | 14.5 | 27.2 | 21.9 | 14.9 |
| MAX | 131 | 209 | 351 | 199 | 208 | 336 | 241 | 131 | 72.9 | 149 | 128 | 104 |
| (WY) | 1967 | 1991 | 1988 | 1969 | 1955 | 1980 | 1974 | 1965 | 1987 | 1970 | 1982 | 1992 |
| MIN | 1.55 | 2.54 | 1.92 | 1.65 | 1.66 | 1.56 | 1.75 | 1.55 | 1.43 | 1.40 | 1.28 | 1.28 |
| (WY) | 1985 | 1990 | 1984 | 1986 | 1986 | 1993 | 1992 | 1996 | 1984 | 1984 | 1984 | 1984 |

HAWAII, ISLAND OF OAHU
 16216000 WAIAWA STREAM NEAR PEARL CITY--Continued

| SUMMARY STATISTICS | FOR 1995 CALENDAR YEAR | | FOR 1996 WATER YEAR | | WATER YEARS 1952 - 1996 | |
|--------------------------|------------------------|-------|---------------------|--------|-------------------------|-------------|
| ANNUAL TOTAL | 7199.7 | | 8322.2 | | | |
| ANNUAL MEAN | 19.7 | | 22.7 | | 34.2 | |
| HIGHEST ANNUAL MEAN | | | | | 80.8 | 1982 |
| LOWEST ANNUAL MEAN | | | | | 7.56 | 1984 |
| HIGHEST DAILY MEAN | 921 | Nov 1 | 1380 | Jan 25 | 5150 | Mar 24 1994 |
| LOWEST DAILY MEAN | 1.4 | Jan 3 | 1.4 | May 19 | 1.1 | May 18 1993 |
| ANNUAL SEVEN-DAY MINIMUM | 1.4 | Jan 3 | 1.4 | May 19 | 1.1 | May 25 1993 |
| ANNUAL RUNOFF (AC-FT) | 14280 | | 16510 | | 24740 | |
| 10 PERCENT EXCEEDS | 40 | | 37 | | 47 | |
| 50 PERCENT EXCEEDS | 2.6 | | 2.8 | | 6.6 | |
| 90 PERCENT EXCEEDS | 1.7 | | 1.6 | | 2.3 | |



HAWAII, ISLAND OF OAHU
16225800 NORTH HALAWA STREAM NEAR KANEOHE

LOCATION.--Lat 21°24'33", long 157°52'06", Hydrologic Unit 2006000 (Kaneohe quadrangle, 1968, 1:24,000), on right bank, 4.1 mi west of Kaneohe Post Office, and 4.4 mi east of Aiea High School.

DRAINAGE AREA.--1.64 mi².

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

GAGE.--Water-stage recorder. Gage datum is 646.52 ft above mean sea level (by stadia survey).

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

AVERAGE DISCHARGE- 5 years (water years 1992-96), 2.69 ft³/s (1,950 acre ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 470 ft³/s, revised, October 16, 1991, gage height, 6.94 ft, revised; no flow at times each year.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 250 ft³/s and maximum (*):

| Date | Time | Discharge (ft ³ /s) | Gage height (ft) | Date | Time | Discharge (ft ³ /s) | Gage height (ft) |
|---------|------|-----------------------------------|---------------------|---------|------|-----------------------------------|---------------------|
| Nov. 01 | 0330 | 307 | 5.51 | Jan. 25 | 0345 | *403 | *6.31 |
| Nov. 13 | 1000 | 334 | 5.72 | | | | |

Minimum discharge, no flow on many days.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY MEAN VALUES

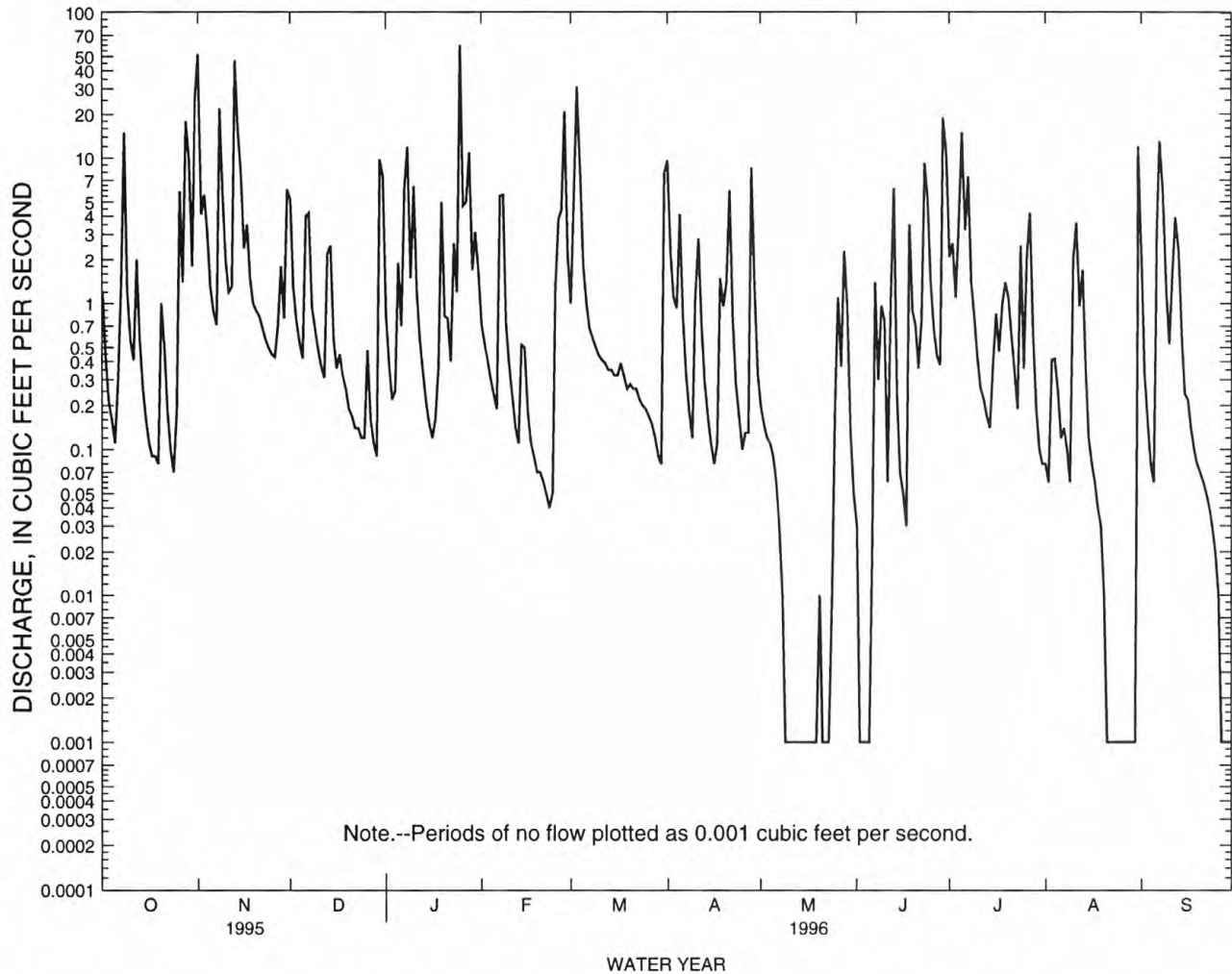
| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|-------|--------|-------|--------|-------|-------|-------|------|-------|-------|-------|-------|
| 1 | 1.2 | 52 | 5.2 | .84 | .73 | 1.0 | 9.6 | .20 | .03 | 2.1 | .08 | 2.2 |
| 2 | .42 | 4.1 | 1.3 | .38 | .53 | 5.2 | 2.2 | .15 | .00 | 2.6 | .06 | .33 |
| 3 | .21 | 5.6 | .76 | .22 | .41 | 31 | 1.1 | .12 | .00 | 1.1 | .41 | .16 |
| 4 | .16 | 3.0 | .54 | .25 | .31 | 8.3 | .93 | .11 | .00 | 3.6 | .42 | .08 |
| 5 | .11 | 1.3 | .42 | 1.9 | .24 | 1.8 | 4.1 | .09 | .00 | 15 | .25 | .06 |
| 6 | .31 | .88 | 4.0 | .70 | .19 | 1.0 | .79 | .06 | .02 | 3.2 | .12 | 2.9 |
| 7 | 1.4 | .71 | 4.2 | 6.3 | 5.5 | .68 | .32 | .03 | 1.4 | 7.5 | .14 | 13 |
| 8 | 15 | 22 | .95 | 12 | 5.6 | .58 | .18 | .01 | .30 | 1.4 | .10 | 6.0 |
| 9 | 1.2 | 5.8 | .67 | 1.5 | .74 | .50 | .12 | .00 | .97 | .80 | .06 | 1.2 |
| 10 | .56 | 2.0 | .48 | 6.4 | .38 | .44 | 1.1 | .00 | .76 | .42 | 2.0 | .53 |
| 11 | .41 | 1.2 | .37 | 1.2 | .23 | .41 | 2.8 | .00 | .06 | .26 | 3.6 | 1.6 |
| 12 | 2.0 | 1.3 | .31 | .57 | .14 | .39 | .75 | .00 | 1.0 | .22 | .96 | 3.9 |
| 13 | .58 | 47 | 2.2 | .34 | .11 | .35 | .29 | .00 | 6.2 | .17 | 1.7 | 2.3 |
| 14 | .26 | 16 | 2.5 | .21 | .52 | .35 | .17 | .00 | .23 | .14 | .37 | .58 |
| 15 | .16 | 7.8 | .56 | .15 | .50 | .32 | .11 | .00 | .07 | .38 | .12 | .24 |
| 16 | .11 | 2.4 | .36 | .12 | .18 | .32 | .08 | .00 | .05 | .85 | .08 | .22 |
| 17 | .09 | 3.5 | .45 | .16 | .11 | .39 | .11 | .00 | .03 | .47 | .06 | .14 |
| 18 | .09 | 1.5 | .32 | .36 | .09 | .32 | 1.5 | .00 | 3.5 | .97 | .04 | .10 |
| 19 | .08 | 1.0 | .26 | 5.0 | .07 | .26 | .95 | .00 | .89 | 1.4 | .03 | .08 |
| 20 | 1.0 | .89 | .19 | .82 | .07 | .28 | 1.4 | .01 | .71 | 1.1 | .01 | .07 |
| 21 | .51 | .82 | .17 | .79 | .06 | .26 | 6.0 | .00 | .36 | .60 | .00 | .06 |
| 22 | .19 | .68 | .14 | .40 | .05 | .26 | .82 | .00 | .75 | .35 | .00 | .05 |
| 23 | .10 | .57 | .14 | 2.6 | .04 | .22 | .28 | .00 | 9.2 | .19 | .00 | .04 |
| 24 | .07 | .50 | .12 | 1.2 | .05 | .20 | .17 | .01 | 5.3 | 2.5 | .00 | .03 |
| 25 | .18 | .45 | .12 | 60 | 1.3 | .19 | .10 | .19 | 1.4 | .36 | .00 | .02 |
| 26 | 5.9 | .43 | .48 | 4.7 | 3.8 | .17 | .13 | 1.1 | .67 | 2.1 | .00 | .01 |
| 27 | 1.4 | .71 | .16 | 5.0 | 4.4 | .15 | .13 | .37 | .44 | 4.2 | .00 | .00 |
| 28 | 18 | 1.8 | .11 | 11 | 21 | .12 | 8.6 | 2.3 | .38 | .62 | .00 | .00 |
| 29 | 9.8 | .79 | .09 | 1.7 | 2.1 | .09 | 1.3 | .94 | 19 | .19 | .00 | .00 |
| 30 | 1.8 | 6.1 | 9.8 | 3.1 | --- | .08 | .33 | .13 | 11 | .10 | .00 | .00 |
| 31 | 25 | --- | 7.5 | 1.7 | --- | 7.9 | --- | .05 | --- | .08 | 12 | --- |
| TOTAL | 88.30 | 192.83 | 44.87 | 131.61 | 49.45 | 63.53 | 46.46 | 5.87 | 64.72 | 54.97 | 22.61 | 35.90 |
| MEAN | 2.85 | 6.43 | 1.45 | 4.25 | 1.71 | 2.05 | 1.55 | .19 | 2.16 | 1.77 | .73 | 1.20 |
| MAX | 25 | 52 | 9.8 | 60 | 21 | 31 | 9.6 | 2.3 | 19 | 15 | 12 | 13 |
| MIN | .07 | .43 | .09 | .12 | .04 | .08 | .08 | .00 | .00 | .08 | .00 | .00 |
| AC-FT | 175 | 382 | 89 | 261 | 98 | 126 | 92 | 12 | 128 | 109 | 45 | 71 |

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1991 - 1996, BY WATER YEAR (WY)

| | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 |
|------|------|------|------|------|------|------|
| MEAN | 3.21 | 3.66 | 2.81 | 3.22 | 2.24 | 3.32 |
| MAX | 4.48 | 7.27 | 6.89 | 8.09 | 7.87 | 12.0 |
| (WY) | 1992 | 1993 | 1994 | 1995 | 1996 | 1994 |
| MIN | 1.85 | .56 | 1.28 | .81 | .25 | .20 |
| (WY) | 1995 | 1992 | 1994 | 1992 | 1993 | 1993 |

HAWAII, ISLAND OF OAHU
 16225800 NORTH HALAWA STREAM NEAR KANEOHE--Continued

| SUMMARY STATISTICS | FOR 1995 CALENDAR YEAR | FOR 1996 WATER YEAR | WATER YEARS 1991 - 1996 | |
|--------------------------|------------------------|---------------------|-------------------------|-------------|
| ANNUAL TOTAL | 859.87 | 801.12 | | |
| ANNUAL MEAN | 2.36 | 2.19 | 2.69 | |
| HIGHEST ANNUAL MEAN | | | 4.28 | 1994 |
| LOWEST ANNUAL MEAN | | | 1.94 | 1995 |
| HIGHEST DAILY MEAN | 52 Nov 1 | 60 Jan 25 | 213 | Mar 24 1994 |
| LOWEST DAILY MEAN | .00 Mar 14 | .00 May 9 | .00 | Nov 28 1991 |
| ANNUAL SEVEN-DAY MINIMUM | .00 Mar 14 | .00 May 9 | .00 | Jan 24 1992 |
| ANNUAL RUNOFF (AC-FT) | 1710 | 1590 | 1950 | |
| 10 PERCENT EXCEEDS | 6.1 | 5.6 | 6.1 | |
| 50 PERCENT EXCEEDS | .31 | .39 | .44 | |
| 90 PERCENT EXCEEDS | .04 | .01 | .01 | |



HAWAII, ISLAND OF OAHU
16225800 NORTH HALAWA STREAM NEAR KANEOHE--Continued

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

PERIOD OF DAILY RECORD.--

SUSPENDED SEDIMENT DISCHARGE: April 1991 to current year.

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

REMARKS.--Record of "Sediment discharge, suspended (tons/day)" for water years 1994, 1995, and 1996 was not completed at the time of this publication.

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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 mi².

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 good. Recording rain gage located at station.

AVERAGE DISCHARGE.--46 years (water years 1930-32, 1954-96), 5.42 ft³/s (3,930 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 6,650 ft³/s, February 28, 1932, gage height, 13.36 ft, from rating curve extended above 420 ft³/s; maximum gage height, 13.46 ft, May 14, 1963; no flow at times each year.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 570 ft³/s and maximum (*):

| Date | Time | Discharge (ft ³ /s) | Gage height (ft) | Date | Time | Discharge (ft ³ /s) | Gage height (ft) |
|---------|------|-----------------------------------|---------------------|--|------|-----------------------------------|---------------------|
| Jan. 25 | 0345 | *422 | *8.24 | No other peak greater than base discharge. | | | |

Minimum discharge, no flow on many days.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY MEAN VALUES

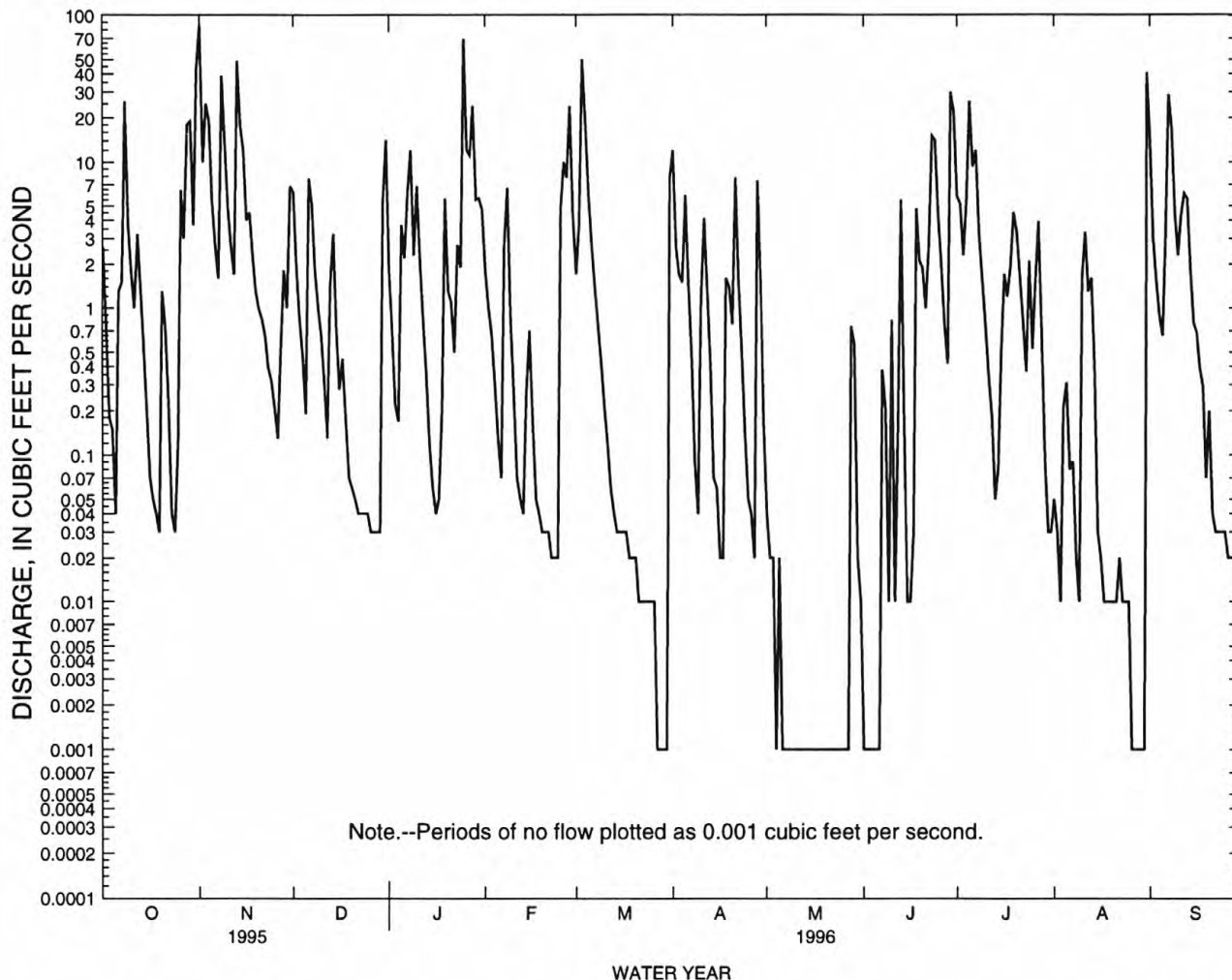
| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|--------|--------|-------|--------|-------|-------|-------|------|--------|-------|-------|-------|
| 1 | 2.6 | 85 | 6.2 | 1.8 | 1.8 | 1.7 | 12 | .04 | .00 | 5.8 | .05 | 15 |
| 2 | .77 | 10 | 2.0 | .68 | 1.0 | 3.7 | 2.6 | .02 | .00 | 5.2 | .03 | 3.0 |
| 3 | .18 | 25 | .87 | .22 | .65 | 50 | 1.7 | .02 | .00 | 2.3 | .01 | 1.5 |
| 4 | .15 | 19 | .48 | .17 | .31 | 19 | 1.5 | .00 | .00 | 5.4 | .21 | .86 |
| 5 | .04 | 5.3 | .19 | 3.7 | .13 | 5.8 | 5.9 | .02 | .00 | 26 | .31 | .65 |
| 6 | 1.3 | 2.7 | 7.7 | 2.2 | .07 | 2.6 | 1.4 | .00 | .00 | 9.3 | .08 | 3.1 |
| 7 | 1.5 | 1.6 | 5.2 | 6.3 | 2.7 | 1.4 | .45 | .00 | .38 | 12 | .09 | 29 |
| 8 | 26 | 39 | 1.8 | 12 | 6.6 | .75 | .09 | .00 | .21 | 3.3 | .02 | 17 |
| 9 | 3.8 | 14 | 1.0 | 2.3 | .87 | .42 | .04 | .00 | .01 | 1.6 | .01 | 4.4 |
| 10 | 1.8 | 5.0 | .64 | 6.8 | .26 | .21 | 1.1 | .00 | .83 | .77 | 1.6 | 2.3 |
| 11 | 1.0 | 2.7 | .31 | 2.1 | .07 | .12 | 4.1 | .00 | .01 | .34 | 3.3 | 4.3 |
| 12 | 3.2 | 1.7 | .13 | .84 | .05 | .06 | 1.4 | .00 | .16 | .18 | 1.3 | 6.1 |
| 13 | 1.4 | 49 | 1.4 | .36 | .04 | .04 | .43 | .00 | 5.5 | .05 | 1.6 | 5.6 |
| 14 | .56 | 18 | 3.2 | .12 | .26 | .03 | .07 | .00 | .14 | .08 | .41 | 1.8 |
| 15 | .20 | 12 | .69 | .06 | .70 | .03 | .06 | .00 | .01 | .51 | .03 | .79 |
| 16 | .07 | 4.0 | .28 | .04 | .17 | .03 | .02 | .00 | .01 | 1.7 | .02 | .68 |
| 17 | .05 | 4.5 | .45 | .05 | .05 | .03 | .02 | .00 | .03 | 1.2 | .01 | .39 |
| 18 | .04 | 2.3 | .17 | .20 | .04 | .02 | 1.6 | .00 | 4.8 | 1.9 | .01 | .29 |
| 19 | .03 | 1.3 | .07 | 5.6 | .03 | .02 | 1.4 | .00 | 2.1 | 4.5 | .01 | .07 |
| 20 | 1.3 | .98 | .06 | 1.3 | .03 | .02 | .78 | .00 | 1.9 | 3.3 | .01 | .20 |
| 21 | .74 | .84 | .05 | 1.1 | .03 | .01 | 7.8 | .00 | 1.0 | 1.6 | .01 | .04 |
| 22 | .24 | .64 | .04 | .50 | .02 | .01 | 1.6 | .00 | 2.7 | .83 | .02 | .03 |
| 23 | .04 | .39 | .04 | 2.7 | .02 | .01 | .51 | .00 | 15 | .37 | .01 | .03 |
| 24 | .03 | .32 | .04 | 1.9 | .02 | .01 | .14 | .00 | 14 | 2.1 | .01 | .03 |
| 25 | .12 | .21 | .04 | 69 | 4.7 | .01 | .05 | .00 | 4.4 | .53 | .01 | .03 |
| 26 | 6.4 | .13 | .03 | 12 | 9.9 | .01 | .04 | .00 | 2.0 | 1.5 | .00 | .02 |
| 27 | 3.0 | .55 | .03 | 11 | 7.8 | .00 | .02 | .00 | .79 | 3.9 | .00 | .02 |
| 28 | 18 | 1.8 | .03 | 24 | 24 | .00 | 7.4 | .75 | .42 | .66 | .00 | .02 |
| 29 | 19 | 1.0 | .03 | 5.5 | 4.2 | .00 | 1.7 | .57 | 30 | .09 | .00 | .01 |
| 30 | 3.7 | 6.8 | 5.3 | 5.6 | --- | .00 | .16 | .02 | 22 | .03 | .00 | .01 |
| 31 | 43 | --- | 14 | 4.7 | --- | 7.7 | --- | .01 | --- | .03 | 41 | --- |
| TOTAL | 140.26 | 315.76 | 52.47 | 184.84 | 66.52 | 93.74 | 56.08 | 1.45 | 108.40 | 97.07 | 50.17 | 97.27 |
| MEAN | 4.52 | 10.5 | 1.69 | 5.96 | 2.29 | 3.02 | 1.87 | .047 | 3.61 | 3.13 | 1.62 | 3.24 |
| MAX | 43 | 85 | 14 | 69 | 24 | 50 | 12 | .75 | 30 | 26 | 41 | 29 |
| MIN | .03 | .13 | .03 | .04 | .02 | .00 | .02 | .00 | .00 | .03 | .00 | .01 |
| AC-FT | 278 | 626 | 104 | 367 | 132 | 186 | 111 | 2.9 | 215 | 193 | 100 | 193 |

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1929 - 1996, BY WATER YEAR (WY)

| | 1929 | 1930 | 1931 | 1932 | 1933 | 1934 | 1935 | 1936 | 1937 | 1938 | 1939 | 1940 | 1941 | 1942 | 1943 | 1944 | 1945 | 1946 | 1947 | 1948 | 1949 | 1950 | 1951 | 1952 | 1953 | 1954 | 1955 | 1956 | 1957 | 1958 | 1959 | 1960 | 1961 | 1962 | 1963 | 1964 | 1965 | 1966 | 1967 | 1968 | 1969 | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| MEAN | 3.55 | 7.85 | 7.82 | 6.58 | 8.10 | 8.23 | 7.09 | 4.82 | 1.81 | 3.74 | 3.77 | 2.24 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| MAX | 16.3 | 50.6 | 35.0 | 26.0 | 76.3 | 37.8 | 33.2 | 30.1 | 7.86 | 23.0 | 21.6 | 17.1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| (WY) | 1959 | 1966 | 1930 | 1988 | 1932 | 1968 | 1932 | 1965 | 1932 | 1954 | 1982 | 1931 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| MIN | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| (WY) | 1933 | 1954 | 1990 | 1977 | 1931 | 1931 | 1931 | 1931 | 1931 | 1953 | 1962 | 1953 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

HAWAII, ISLAND OF OAHU
 16226000 NORTH HALAWA STREAM NEAR AIEA--Continued

| SUMMARY STATISTICS | FOR 1995 CALENDAR YEAR | FOR 1996 WATER YEAR | WATER YEARS 1929 - 1996 | |
|--------------------------|------------------------|---------------------|-------------------------|-------------|
| ANNUAL TOTAL | 1236.42 | 1264.03 | | |
| ANNUAL MEAN | 3.39 | 3.45 | 5.42 | |
| HIGHEST ANNUAL MEAN | | | 15.7 | 1932 |
| LOWEST ANNUAL MEAN | | | 1.41 | 1984 |
| HIGHEST DAILY MEAN | 85 Nov 1 | 85 Nov 1 | 956 | Nov 18 1930 |
| LOWEST DAILY MEAN | .00 Jan 13 | .00 Mar 27 | .00 | Sep 14 1929 |
| ANNUAL SEVEN-DAY MINIMUM | .00 Jun 15 | .00 May 6 | .00 | Sep 14 1929 |
| ANNUAL RUNOFF (AC-FT) | 2450 | 2510 | 3930 | |
| 10 PERCENT EXCEEDS | 9.8 | 7.8 | 11 | |
| 50 PERCENT EXCEEDS | .30 | .43 | .39 | |
| 90 PERCENT EXCEEDS | .01 | .00 | .00 | |



HAWAII, ISLAND OF OAHU
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 mi².

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 good, except for periods of estimated record which are poor.

AVERAGE DISCHARGE.--13 years (water years 1984-96), 5.31 ft³/s (3,850 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,780 ft³/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 750 ft³/s and maximum (*):

| Date | Time | Discharge (ft ³ /s) | Gage height (ft) | Date | Time | Discharge (ft ³ /s) | Gage height (ft) |
|---------|------|-----------------------------------|---------------------|--|------|-----------------------------------|---------------------|
| Jan. 25 | 0400 | *778 | *10.43 | No other peak greater than base discharge. | | | |

Minimum discharge, 0.01 ft³/s on several days.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|--------|--------|-------|--------|-------|--------|-------|------|--------|--------|-------|--------|
| 1 | 3.0 | 124 | 5.9 | e1.8 | 3.1 | 2.0 | 12 | .04 | .01 | 9.5 | e.07 | 22 |
| 2 | .71 | 11 | 2.1 | e.92 | 2.1 | 3.3 | 2.6 | .02 | .01 | 8.0 | e.07 | 5.5 |
| 3 | .19 | 33 | .87 | e.37 | 1.2 | 74 | 2.0 | .02 | .01 | 4.3 | e.05 | 3.8 |
| 4 | .05 | 21 | .39 | e.31 | .63 | 28 | 1.3 | .02 | .01 | 7.2 | e.21 | 2.0 |
| 5 | .05 | 5.5 | .12 | e3.6 | .22 | 7.4 | 6.5 | .02 | .01 | 39 | e.30 | 1.7 |
| 6 | 1.1 | 3.0 | 7.0 | e1.9 | .13 | 3.9 | 1.8 | .02 | .03 | 15 | e.09 | 4.7 |
| 7 | 1.2 | 1.8 | 4.8 | e6.9 | 2.2 | 2.1 | .62 | .02 | .08 | 19 | e.07 | 48 |
| 8 | 37 | 47 | 1.8 | e12 | 8.0 | 1.2 | .24 | .01 | .10 | 6.3 | e.05 | 27 |
| 9 | 5.0 | e16 | .89 | 2.8 | 1.3 | .58 | .08 | .01 | .04 | 3.5 | .02 | 8.5 |
| 10 | 2.5 | e7.2 | .50 | 7.2 | .22 | .30 | .56 | .01 | .60 | 1.8 | 1.4 | 4.4 |
| 11 | 1.2 | e5.2 | .41 | 2.7 | .12 | .16 | 4.2 | .01 | .04 | 1.0 | 3.4 | 6.8 |
| 12 | 3.5 | e3.1 | .07 | 1.1 | .15 | .09 | 1.6 | .01 | .95 | .53 | 1.6 | 7.7 |
| 13 | 1.8 | e45 | .94 | .49 | .02 | .06 | .57 | .01 | 6.1 | .32 | 1.6 | 8.0 |
| 14 | .63 | e19 | 2.9 | .15 | .02 | .05 | .19 | .01 | .37 | .18 | .57 | 2.4 |
| 15 | .21 | e12 | .59 | .11 | .55 | .02 | .07 | .01 | .11 | .88 | .07 | .97 |
| 16 | .12 | e6.4 | .20 | .11 | .17 | .02 | .05 | .01 | .12 | 3.5 | .03 | .74 |
| 17 | .05 | e5.4 | .14 | .06 | .03 | .02 | .02 | .01 | .12 | 2.3 | .02 | .41 |
| 18 | .04 | e3.8 | .16 | .04 | .02 | .02 | 1.2 | .01 | 5.2 | 3.0 | .02 | .33 |
| 19 | .02 | e2.6 | .05 | 5.7 | .05 | .02 | 1.4 | .01 | 3.0 | 7.0 | .02 | .10 |
| 20 | 1.1 | e1.2 | .02 | 1.3 | .02 | .02 | .50 | .01 | 2.8 | 4.7 | .01 | .09 |
| 21 | .52 | e.89 | .02 | .92 | .02 | .02 | 7.9 | .01 | 1.6 | 2.6 | .01 | .06 |
| 22 | .27 | e.47 | .01 | .41 | .02 | .01 | 1.8 | .01 | 3.0 | 1.6 | .01 | .03 |
| 23 | .07 | .10 | .02 | 2.1 | .02 | .01 | .51 | .01 | 20 | .88 | .01 | .02 |
| 24 | .03 | .05 | .01 | 1.8 | .02 | .01 | .12 | .01 | 18 | 3.7 | .01 | .02 |
| 25 | .04 | e.17 | .01 | 92 | 4.9 | .01 | .06 | .02 | 5.3 | 1.2 | .01 | .01 |
| 26 | 6.7 | e.40 | .01 | 12 | 9.9 | .01 | .03 | .02 | 2.5 | 1.6 | .01 | .01 |
| 27 | 4.0 | e.50 | .02 | 13 | 8.0 | .01 | .02 | .02 | 1.2 | 4.6 | .01 | .01 |
| 28 | 18 | e2.1 | e.01 | 32 | 28 | .01 | 7.0 | .08 | .63 | 1.2 | .01 | .01 |
| 29 | 31 | .83 | e.04 | 7.7 | 4.8 | .01 | 2.1 | .36 | 45 | .27 | .01 | .01 |
| 30 | 4.6 | 6.5 | e6.2 | 6.9 | --- | .01 | .26 | .02 | 32 | .11 | .01 | .01 |
| 31 | 65 | --- | e12 | 6.2 | --- | 7.5 | --- | .01 | --- | .09 | 58 | --- |
| TOTAL | 189.70 | 385.21 | 48.20 | 224.59 | 75.93 | 130.87 | 57.30 | 0.86 | 148.94 | 154.86 | 67.77 | 155.33 |
| MEAN | 6.12 | 12.8 | 1.55 | 7.24 | 2.62 | 4.22 | 1.91 | .028 | 4.96 | 5.00 | 2.19 | 5.18 |
| MAX | 65 | 124 | 12 | 92 | 28 | 74 | 12 | .36 | 45 | 39 | 58 | 48 |
| MIN | .02 | .05 | .01 | .04 | .02 | .01 | .02 | .01 | .01 | .09 | .01 | .01 |
| AC-FT | 376 | 764 | 96 | 445 | 151 | 260 | 114 | 1.7 | 295 | 307 | 134 | 308 |

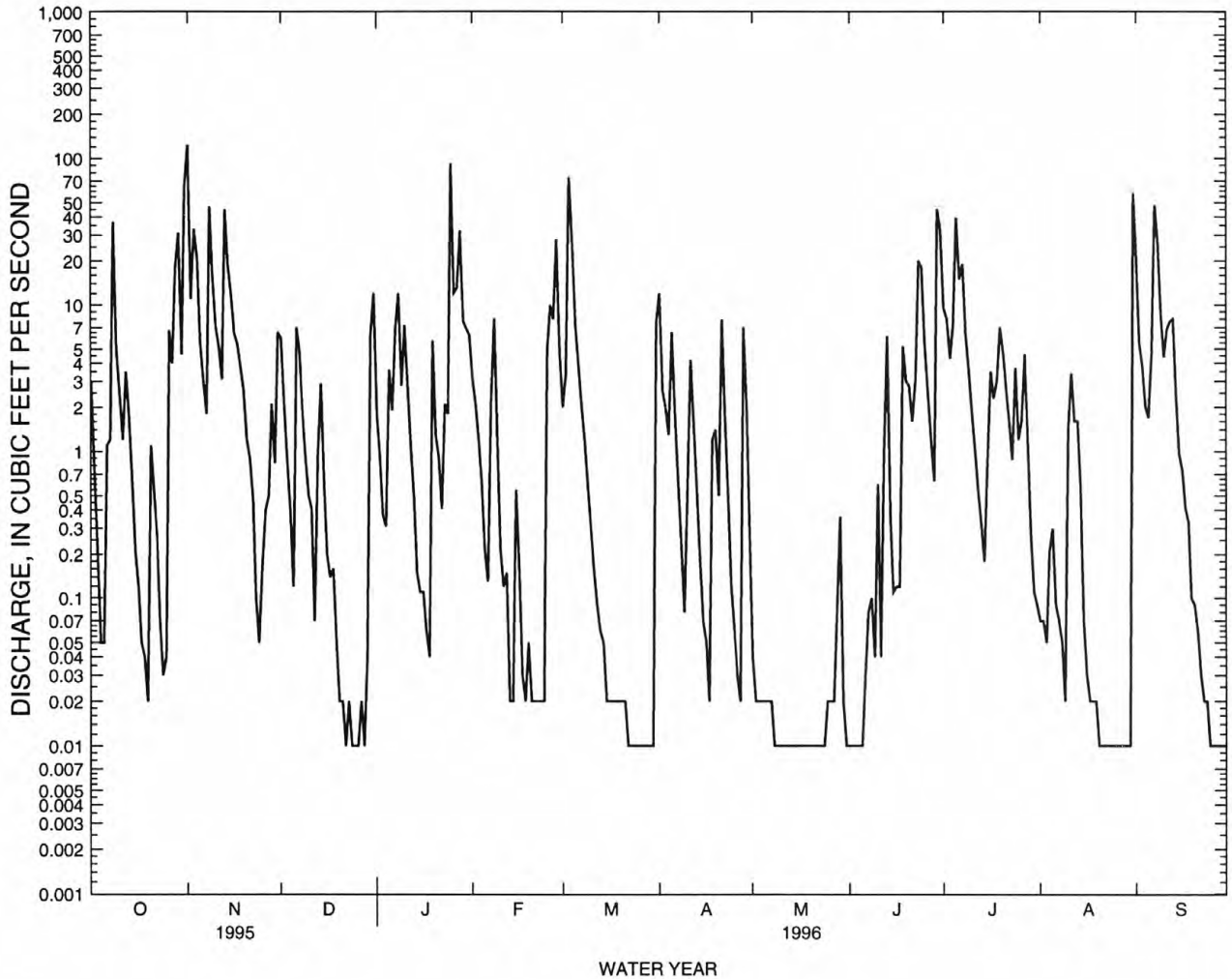
e Estimated

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1983 - 1996, BY WATER YEAR (WY)

| | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| MEAN | 4.01 | 6.92 | 8.72 | 6.83 | 4.71 | 8.41 | 6.18 | 2.79 | 1.86 | 4.54 | 3.13 | 3.41 | | |
| MAX | 9.71 | 25.9 | 40.6 | 29.6 | 17.4 | 31.0 | 35.3 | 15.5 | 7.84 | 15.0 | 10.0 | 12.6 | | |
| (WY) | 1992 | 1991 | 1988 | 1988 | 1991 | 1989 | 1989 | 1987 | 1989 | 1991 | 1992 | 1992 | | |
| MIN | .000 | .059 | .008 | .001 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | | |
| (WY) | 1985 | 1990 | 1990 | 1986 | 1983 | 1983 | 1983 | 1992 | 1984 | 1984 | 1984 | 1984 | | |

HAWAII, ISLAND OF OAHU
 16226200 NORTH HALAWA STREAM NEAR HONOLULU--Continued

| SUMMARY STATISTICS | FOR 1995 CALENDAR YEAR | FOR 1996 WATER YEAR | WATER YEARS 1983 - 1996 | |
|--------------------------|------------------------|---------------------|-------------------------|-------------|
| ANNUAL TOTAL | 1569.23 | 1639.56 | | |
| ANNUAL MEAN | 4.30 | 4.48 | 5.31 | |
| HIGHEST ANNUAL MEAN | | | 10.1 | 1988 |
| LOWEST ANNUAL MEAN | | | 1.43 | 1984 |
| HIGHEST DAILY MEAN | 124 Nov 1 | 124 Nov 1 | 476 | Mar 24 1994 |
| LOWEST DAILY MEAN | .00 Jun 20 | .01 Dec 22 | .00 | Feb 1 1983 |
| ANNUAL SEVEN-DAY MINIMUM | .00 Sep 22 | .01 Mar 22 | .00 | Feb 1 1983 |
| ANNUAL RUNOFF (AC-FT) | 3110 | 3250 | 3850 | |
| 10 PERCENT EXCEEDS | 11 | 8.8 | 11 | |
| 50 PERCENT EXCEEDS | .25 | .50 | .54 | |
| 90 PERCENT EXCEEDS | .02 | .01 | .00 | |



HAWAII, ISLAND OF OAHU
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 current year.

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

REMARKS.--Water-quality samples were also collected at this site. Table of "Sediment discharge, suspended (tons/day)" for water years 1994, 1995, and 1996 was not completed at the time of this publication.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

| DATE | TIME | DIS- CHARGE, INST. CUBIC FEET PER SECOND | SPE- CIFIC CON- DUCT- ANCE (US/CM) | PH WATER WHOLE FIELD (STAND- ARD UNITS) | TEMPER- ATURE AIR (DEG C) | TEMPER- ATURE WATER (DEG C) | TUR- BID- ITY (NTU) | BARO- METRIC PRES- SURE (MM OF HG) | OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) | OXYGEN, DIS- SOLVED (MG/L) | COLI- FORM, FECAL, (PER- 0.7 UM-MF 100 ML) |
|-------|------|--|---|--|---|---|---|---|---|---|--|
| OCT | | | | | | | | | | | |
| 11... | 1313 | 1.2 | 240 | 8.0 | 27.5 | 24.0 | 4.7 | 761 | 8.0 | 95 | -- |
| NOV | | | | | | | | | | | |
| 20... | 1435 | 0.96 | 250 | 8.2 | 25.0 | 23.5 | 340 | 759 | 8.1 | 96 | -- |
| JAN | | | | | | | | | | | |
| 16... | 1212 | 0.14 | 400 | 7.8 | 25.0 | 21.5 | 1.1 | 762 | 7.7 | 87 | -- |
| FEB | | | | | | | | | | | |
| 12... | 1030 | 0.39 | 420 | 7.9 | 18.0 | 17.5 | 3.9 | 760 | 8.9 | 93 | 2500 |
| MAR | | | | | | | | | | | |
| 05... | 1205 | 7.6 | 240 | 8.0 | 21.5 | 20.0 | 280 | 756 | 8.7 | 97 | -- |
| APR | | | | | | | | | | | |
| 24... | 1100 | 0.14 | 326 | 8.1 | 25.5 | 22.5 | 0.80 | 763 | 8.6 | 99 | -- |
| MAY | | | | | | | | | | | |
| 14... | 1030 | 0.01 | 428 | 7.7 | 28.0 | 23.0 | 1.0 | 763 | 6.8 | 79 | 8000 |
| | | | | | | | | | | | |
| DATE | TIME | HARD- NESS TOTAL (MG/L AS CACO3) | CALCIUM DIS- SOLVED (MG/L AS CA) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) | SODIUM, DIS- SOLVED (MG/L AS NA) | SODIUM PERCENT | SODIUM AD- SORP- TION RATIO | POTAS- SIUM, DIS- SOLVED (MG/L AS K) | ALKA- LINITY LAB (MG/L CACO3) | SULFATE DIS- SOLVED (MG/L AS SO4) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) |
| FEB | | | | | | | | | | | |
| 12... | 1030 | 140 | 28 | 16 | 23 | 27 | 0.9 | 1.5 | 124 | 8.5 | 43 |
| | | | | | | | | | | | |
| DATE | TIME | FLUO- RIDE, DIS- SOLVED (MG/L AS F) | SILICA, DIS- SOLVED (MG/L AS SIO2) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) | SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) | SOLIDS, DIS- SOLVED (TONS PER AC-FT) | RESIDUE TOTAL AT 105 DEG. C, SUS- PENDED (MG/L) | NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) | NITRO- GEN, AM- MONIA + ORGANIC TOTAL (MG/L AS N) | PHOS- PHORUS TOTAL (MG/L AS P) | |
| FEB | | | | | | | | | | | |
| 12... | 1030 | <0.10 | 22 | 219 | 217 | 0.30 | 3 | <0.050 | <0.20 | <0.010 | |
| MAY | | | | | | | | | | | |
| 14... | 1030 | -- | -- | -- | -- | -- | 1 | <0.050 | <0.20 | 0.030 | |

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

HAWAII, ISLAND OF OAHU
16226200 NORTH HALAWA STREAM NEAR HONOLULU--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

| DATE | TIME | ALUM- INUM, TOTAL RECOV- ERABLE (UG/L AS AL) | ALUM- INUM, DIS- SOLVED (UG/L AS AL) | ARSENIC TOTAL (UG/L AS AS) | BARIUM, TOTAL RECOV- ERABLE (UG/L AS BA) | BARIUM, DIS- SOLVED (UG/L AS BA) | BERYL- LIUM, TOTAL RECOV- ERABLE (UG/L AS BE) | CADMIUM WATER UNFLTRD TOTAL (UG/L AS CD) | CHRO- MIUM, TOTAL RECOV- ERABLE (UG/L AS CR) | COBALT, TOTAL RECOV- ERABLE (UG/L AS CO) | COBALT, DIS- SOLVED (UG/L AS CO) | |
|------|-------|--|--|--|--|--|---|---|--|--|--|---|
| FEB | 12... | 1030 | 230 | 30 | <1 | <100 | 4.0 | <10 | <1 | <1 | 1 | <3.0 |
| DATE | TIME | COPPER, TOTAL RECOV- ERABLE (UG/L AS CU) | IRON, TOTAL RECOV- ERABLE (UG/L AS FE) | IRON, DIS- SOLVED (UG/L AS FE) | LEAD, TOTAL RECOV- ERABLE (UG/L AS PB) | LITHIUM TOTAL RECOV- ERABLE (UG/L AS LI) | LITHIUM DIS- SOLVED (UG/L AS LI) | MANGA- NESE, TOTAL RECOV- ERABLE (UG/L AS MN) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) | MERCURY TOTAL RECOV- ERABLE (UG/L AS HG) | MOLYB- DENUM, TOTAL RECOV- ERABLE (UG/L AS MO) | MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) |
| FEB | 12... | 1 | 350 | 49 | <1 | <10 | <4 | 170 | 150 | <0.10 | <1 | <10 |
| DATE | TIME | NICKEL, TOTAL RECOV- ERABLE (UG/L AS NI) | NICKEL, DIS- SOLVED (UG/L AS NI) | SELE- NIUM, TOTAL RECOV- ERABLE (UG/L AS SE) | SELE- NIUM, DIS- SOLVED (UG/L AS SE) | SILVER, TOTAL RECOV- ERABLE (UG/L AS AG) | SILVER, DIS- SOLVED (UG/L AS AG) | STRON- TIUM, TOTAL RECOV- ERABLE (UG/L AS SR) | VANA- DIUM, DIS- SOLVED (UG/L AS V) | ZINC, TOTAL RECOV- ERABLE (UG/L AS ZN) | CARBON, TOTAL RECOV- ERABLE (MG/L AS C) | OIL AND GREASE, TOTAL RECOV- ERABLE (MG/L GRAVI- METRIC) |
| FEB | 12... | 1 | <1.0 | <1 | <1 | <1 | <1.0 | 150 | <6 | <10 | 1.2 | <1 |
| DATE | TIME | ALDRIN, TOTAL RECOV- ERABLE (UG/L) | CHLOR- DANE, TECH- NICAL TOTAL RECOV- ERABLE (UG/L) | CHLOR- PYRIFOS TOTAL RECOV- ERABLE (UG/L) | P,P'- DDD UNFILTRD TOTAL RECOV- ERABLE (UG/L) | DDE, TOTAL RECOV- ERABLE (UG/L) | P,P'- DDT UNFILTRD TOTAL RECOV- ERABLE (UG/L) | DEF TOTAL RECOV- ERABLE (UG/L) | DI- AZINON, TOTAL RECOV- ERABLE (UG/L) | DI- ELDRIN TOTAL RECOV- ERABLE (UG/L) | DISUL- FOTON UNFILTRD TOTAL RECOV- ERABLE (UG/L) | 2, 4-DP TOTAL RECOV- ERABLE (UG/L) |
| FEB | 12... | <0.010 | <0.100 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 |
| DATE | TIME | 2, 4-D, TOTAL RECOV- ERABLE (UG/L) | ENDO- SULFAN, I TOTAL RECOV- ERABLE (UG/L) | ENDRIN WATER UNFLTRD REC TOTAL RECOV- ERABLE (UG/L) | ETHION, TOTAL RECOV- ERABLE (UG/L) | FONOFOS (DY- FONATE) WATER TOTAL RECOV- ERABLE (UG/L) | HEPTA- CHLOR, TOTAL RECOV- ERABLE (UG/L) | HEPTA- CHLOR EPOXIDE TOTAL RECOV- ERABLE (UG/L) | LINDANE TOTAL RECOV- ERABLE (UG/L) | MALA- THION, TOTAL RECOV- ERABLE (UG/L) | METH- OXY- CHLOR, TOTAL RECOV- ERABLE (UG/L) | METHYL PARA- THION, TOTAL RECOV- ERABLE (UG/L) |
| FEB | 12... | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 |
| DATE | TIME | MIREX, TOTAL RECOV- ERABLE (UG/L) | PARA- THION, TOTAL RECOV- ERABLE (UG/L) | PCB, TOTAL RECOV- ERABLE (UG/L) | PCNS UNFILTRD WATER TOTAL RECOV- ERABLE (UG/L) | PER- THANE TOTAL RECOV- ERABLE (UG/L) | PHORATE TOTAL RECOV- ERABLE (UG/L) | SILVEX, TOTAL RECOV- ERABLE (UG/L) | TOX- APHENE, TOTAL RECOV- ERABLE (UG/L) | TOTAL TRI- THION, TOTAL RECOV- ERABLE (UG/L) | 2, 4, 5-T TOTAL RECOV- ERABLE (UG/L) | |
| FEB | 12... | <0.010 | <0.010 | <0.100 | <0.100 | <0.100 | <0.010 | <0.010 | <1.00 | <0.010 | <0.010 | |

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

HAWAII, ISLAND OF OAHU
 16229000 KALIHI STREAM NEAR HONOLULU

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

DRAINAGE AREA.--2.61 mi².

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, quarterly (discontinued).

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 fair. Miscellaneous chemical analyses published for the 1969, and 1973 water years.

AVERAGE DISCHARGE.--82 years (water years 1915-96), 6.51 ft³/s (4,720 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, about 12,400 ft³/s, November 18, 1930, gage height, 13.81 ft, from rating curve extended above 280 ft³/s on basis of indirect measurements at gage heights 8.9 ft, 10.96 ft, and 11.27 ft; minimum, 0.09 ft³/s, October 22, 1933, July 29, 1966.

EXTREMES FOR CURRENT YEAR.--Peak discharge greater than base discharge of 700 ft³/s and maximum (*):

| Date | Time | Discharge (ft ³ /s) | Gage height (ft) | Date | Time | Discharge (ft ³ /s) | Gage height (ft) |
|---------|------|--------------------------------|------------------|---------|------|--------------------------------|------------------|
| Nov. 01 | 0330 | 894 | 7.81 | June 29 | 1400 | 782 | 7.53 |
| Jan. 25 | 0200 | *1,060 | *8.17 | | | | |

Minimum discharge, 0.52 ft³/s, August 30-31.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
 DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|-------|-------|-------|-------|-------|-------|------|-------|--------|-------|-------|-------|
| 1 | 3.5 | 75 | 7.8 | 1.9 | 3.6 | 4.6 | 12 | 1.5 | 1.0 | 4.9 | 1.6 | 6.3 |
| 2 | 2.1 | 6.4 | 3.6 | 1.6 | 3.7 | 8.4 | 4.0 | 1.5 | .99 | 5.2 | 1.7 | 2.4 |
| 3 | 1.7 | 4.4 | 2.8 | 1.5 | 3.3 | 52 | 3.4 | 1.4 | .90 | 3.9 | 1.6 | 1.9 |
| 4 | 1.5 | 3.7 | 2.5 | 1.7 | 3.0 | 11 | 3.1 | 1.4 | .90 | 4.2 | 1.6 | 1.8 |
| 5 | 1.3 | 3.0 | 2.2 | 7.3 | 2.9 | 6.9 | 3.1 | 1.3 | 1.0 | 18 | 1.6 | 15 |
| 6 | 1.4 | 2.7 | 1.9 | 2.3 | 2.8 | 5.9 | 2.3 | 1.1 | 1.6 | 8.8 | 1.6 | 4.7 |
| 7 | 3.7 | 3.5 | 2.0 | 4.9 | 8.4 | 5.1 | 2.1 | 1.1 | 2.2 | 8.4 | 1.8 | 23 |
| 8 | 12 | 24 | 1.9 | 5.3 | 6.5 | 4.6 | 1.9 | 1.2 | 1.6 | 4.5 | 1.6 | 8.6 |
| 9 | 3.3 | 11 | 1.8 | 3.1 | 3.5 | 4.2 | 1.7 | 1.2 | 17 | 3.7 | 1.3 | 4.7 |
| 10 | 2.7 | 6.4 | 1.6 | 7.9 | 2.8 | 3.9 | 2.8 | 1.1 | 4.1 | 3.0 | 2.5 | 3.4 |
| 11 | 2.1 | 4.4 | 1.4 | 2.7 | 2.4 | 3.9 | 3.6 | 1.1 | 2.0 | 2.6 | 4.7 | 7.3 |
| 12 | 2.2 | 4.5 | 1.4 | 2.2 | 2.3 | 3.7 | 2.8 | .98 | 5.3 | 3.3 | 2.0 | 4.5 |
| 13 | 1.7 | 41 | 2.4 | 1.8 | 2.2 | 3.4 | 2.1 | 1.1 | 4.1 | 2.6 | 2.8 | 4.0 |
| 14 | 1.4 | 17 | 2.1 | 1.6 | 2.3 | 3.2 | 2.0 | 1.1 | 2.2 | 2.4 | 1.9 | 3.4 |
| 15 | 1.3 | 9.9 | 1.6 | 1.6 | 2.1 | 3.0 | 1.9 | 1.0 | 1.8 | 2.3 | 1.6 | 2.9 |
| 16 | 1.2 | 5.8 | 1.4 | 1.6 | 2.0 | 2.8 | 1.7 | 1.0 | 2.0 | 2.3 | 1.3 | 2.5 |
| 17 | 1.1 | 5.3 | 1.3 | 1.6 | 1.9 | 3.0 | 1.9 | 1.1 | 1.9 | 2.9 | 1.3 | 2.5 |
| 18 | 1.2 | 4.8 | 1.4 | 2.3 | 1.9 | 3.3 | 3.5 | .90 | 3.0 | 4.7 | 1.3 | 2.9 |
| 19 | 1.2 | 4.0 | 1.3 | 7.5 | 1.9 | e3.4 | 3.8 | .82 | 2.3 | 5.2 | 1.4 | 2.5 |
| 20 | 1.6 | 3.8 | 1.1 | 2.7 | 1.8 | e3.6 | 2.5 | 1.2 | 2.2 | 4.0 | 1.2 | 3.0 |
| 21 | 1.6 | 3.9 | 1.0 | 4.2 | 1.8 | e3.1 | 3.0 | 1.5 | 1.8 | 3.3 | 1.1 | 2.4 |
| 22 | 1.2 | 3.4 | 1.0 | 2.2 | 1.7 | e3.3 | 2.3 | 1.3 | 2.0 | 2.6 | 1.1 | 2.1 |
| 23 | 1.2 | 3.1 | 1.0 | 5.6 | 1.6 | e3.5 | 2.0 | .84 | 8.0 | 2.4 | 1.0 | 1.9 |
| 24 | 1.0 | 2.8 | 1.0 | 5.6 | 2.0 | e3.0 | 1.6 | 1.1 | 4.8 | 2.3 | .93 | 1.9 |
| 25 | 1.4 | 2.5 | .98 | 77 | 11 | e2.7 | 1.6 | 1.6 | 3.1 | 2.2 | .87 | 1.9 |
| 26 | 2.3 | 2.3 | 1.1 | 7.7 | 18 | e2.7 | 1.9 | 1.8 | 2.0 | 3.0 | 1.0 | 1.8 |
| 27 | 1.8 | 2.6 | .84 | 17 | 13 | e2.6 | 1.8 | 1.4 | 1.7 | 5.0 | .78 | 1.6 |
| 28 | 14 | 3.0 | .80 | 12 | 26 | e2.6 | 2.9 | 1.8 | 1.7 | 3.1 | .74 | 1.6 |
| 29 | 11 | 2.2 | 1.0 | 5.2 | 6.2 | e2.6 | 1.9 | 2.4 | 39 | 2.2 | .91 | 1.5 |
| 30 | 2.8 | 8.4 | 5.0 | 4.9 | --- | e3.0 | 1.7 | 1.3 | 12 | 1.8 | .56 | 1.4 |
| 31 | 17 | --- | 4.9 | 4.1 | --- | 9.5 | --- | 1.2 | --- | 1.8 | 18 | --- |
| TOTAL | 103.5 | 274.8 | 62.12 | 208.6 | 142.6 | 178.5 | 82.9 | 39.34 | 134.19 | 126.6 | 63.39 | 125.4 |
| MEAN | 3.34 | 9.16 | 2.00 | 6.73 | 4.92 | 5.76 | 2.76 | 1.27 | 4.47 | 4.08 | 2.04 | 4.18 |
| MAX | 17 | 75 | 7.8 | 77 | 26 | 52 | 12 | 2.4 | 39 | 18 | 18 | 23 |
| MIN | 1.0 | 2.2 | .80 | 1.5 | 1.6 | 2.6 | 1.6 | .82 | .90 | 1.8 | .56 | 1.4 |
| AC-FT | 205 | 545 | 123 | 414 | 283 | 354 | 164 | 78 | 266 | 251 | 126 | 249 |

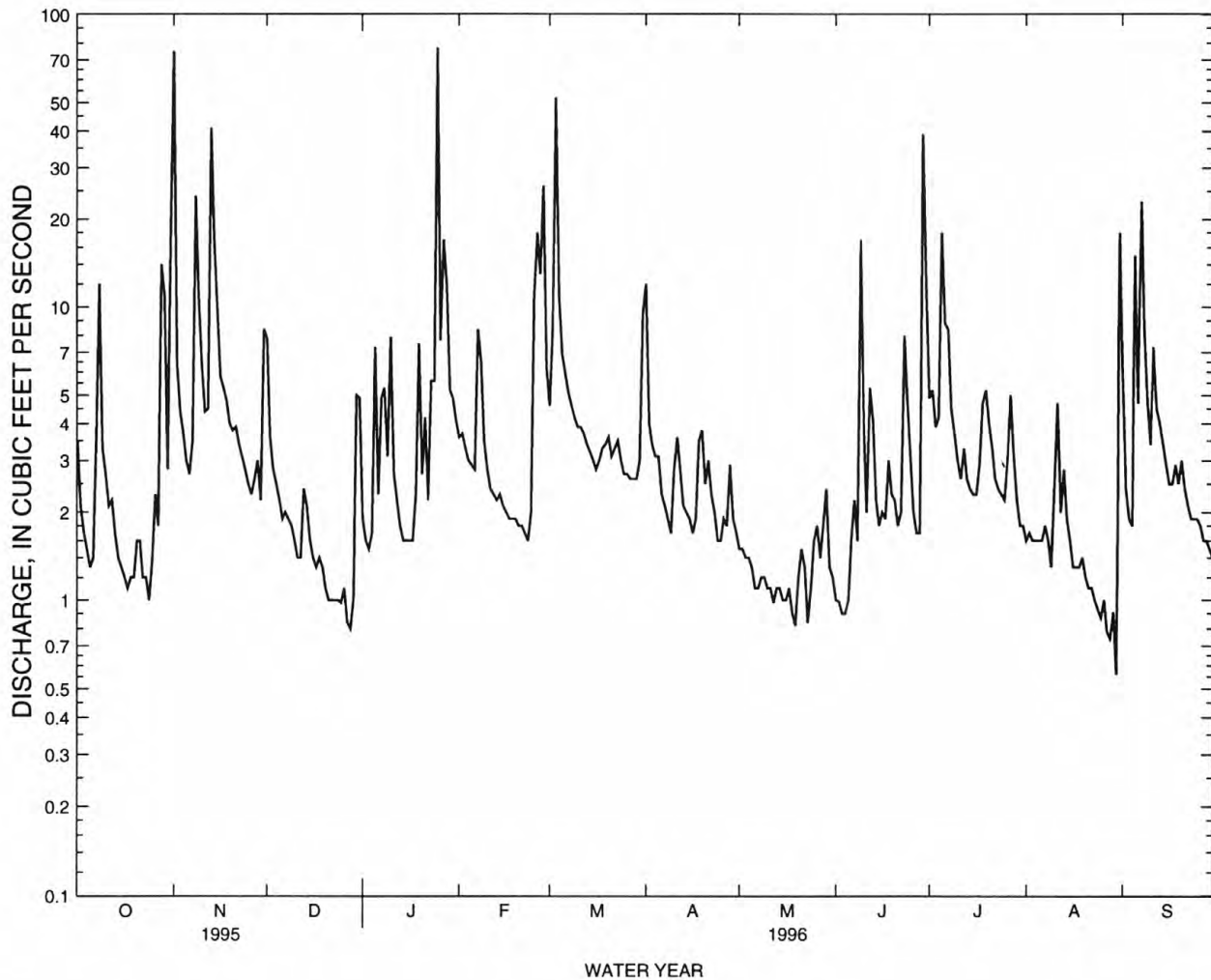
e Estimated

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1914 - 1996, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|------|------|------|------|------|------|------|------|------|------|------|------|------|
| MEAN | 4.66 | 7.29 | 8.51 | 9.08 | 7.28 | 8.64 | 8.41 | 6.52 | 3.72 | 4.56 | 5.14 | 4.59 |
| MAX | 18.9 | 35.0 | 35.0 | 65.7 | 48.6 | 40.6 | 36.0 | 37.5 | 12.9 | 16.6 | 26.7 | 31.3 |
| (WY) | 1937 | 1928 | 1930 | 1923 | 1932 | 1951 | 1989 | 1927 | 1934 | 1954 | 1958 | 1914 |
| MIN | .29 | .46 | .74 | .50 | .34 | .74 | .63 | .27 | .32 | .60 | .43 | .30 |
| (WY) | 1985 | 1954 | 1977 | 1977 | 1978 | 1926 | 1926 | 1926 | 1966 | 1984 | 1984 | 1984 |

HAWAII, ISLAND OF OAHU
 16229000 KALIHI STREAM NEAR HONOLULU--Continued

| SUMMARY STATISTICS | FOR 1995 CALENDAR YEAR | FOR 1996 WATER YEAR | WATER YEARS 1914 - 1996 | |
|--------------------------|------------------------|---------------------|-------------------------|-------------|
| ANNUAL TOTAL | 1470.08 | 1541.94 | 6.51 | |
| ANNUAL MEAN | 4.03 | 4.21 | 13.5 | 1923 |
| HIGHEST ANNUAL MEAN | | | 2.04 | 1984 |
| LOWEST ANNUAL MEAN | | | 951 | Jan 19 1923 |
| HIGHEST DAILY MEAN | 75 Nov 1 | 77 Jan 25 | .11 | Jul 29 1966 |
| LOWEST DAILY MEAN | .80 Dec 28 | .56 Aug 30 | .15 | May 15 1926 |
| ANNUAL SEVEN-DAY MINIMUM | .92 Sep 21 | .83 Aug 24 | | |
| ANNUAL RUNOFF (AC-FT) | 2920 | 3060 | 4720 | |
| 10 PERCENT EXCEEDS | 7.7 | 7.8 | 12 | |
| 50 PERCENT EXCEEDS | 2.1 | 2.3 | 2.9 | |
| 90 PERCENT EXCEEDS | 1.2 | 1.1 | 1.0 | |



HAWAII, ISLAND OF OAHU
16229000 KALIHI STREAM NEAR HONOLULU--Continued
WATER-QUALITY RECORDS

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

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

WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

| DATE | TIME | DIS- CHARGE, INST. CUBIC FEET PER SECOND | SPE- CIFIC CON- DUCT- ANCE (US/CM) | PH WATER WHOLE FIELD (STAND- ARD UNITS) | TEMPER- ATURE AIR (DEG C) | TEMPER- ATURE WATER (DEG C) | HARD- NESS TOTAL (MG/L AS CACO3) | CALCIUM DIS- SOLVED (MG/L AS CA) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) | SODIUM, DIS- SOLVED (MG/L AS NA) | SODIUM PERCENT |
|-------|------|--|---|---|------------------------------------|--------------------------------------|---|--|--|--|-------------------|
| MAR | | | | | | | | | | | |
| 01... | 1420 | 4.4 | 120 | 7.5 | 22.0 | 19.5 | 34 | 5.4 | 5.1 | 14 | 46 |
| JUN | | | | | | | | | | | |
| 03... | 1455 | 0.95 | 144 | 7.6 | 25.5 | 24.5 | 41 | 6.4 | 6.0 | 15 | 44 |

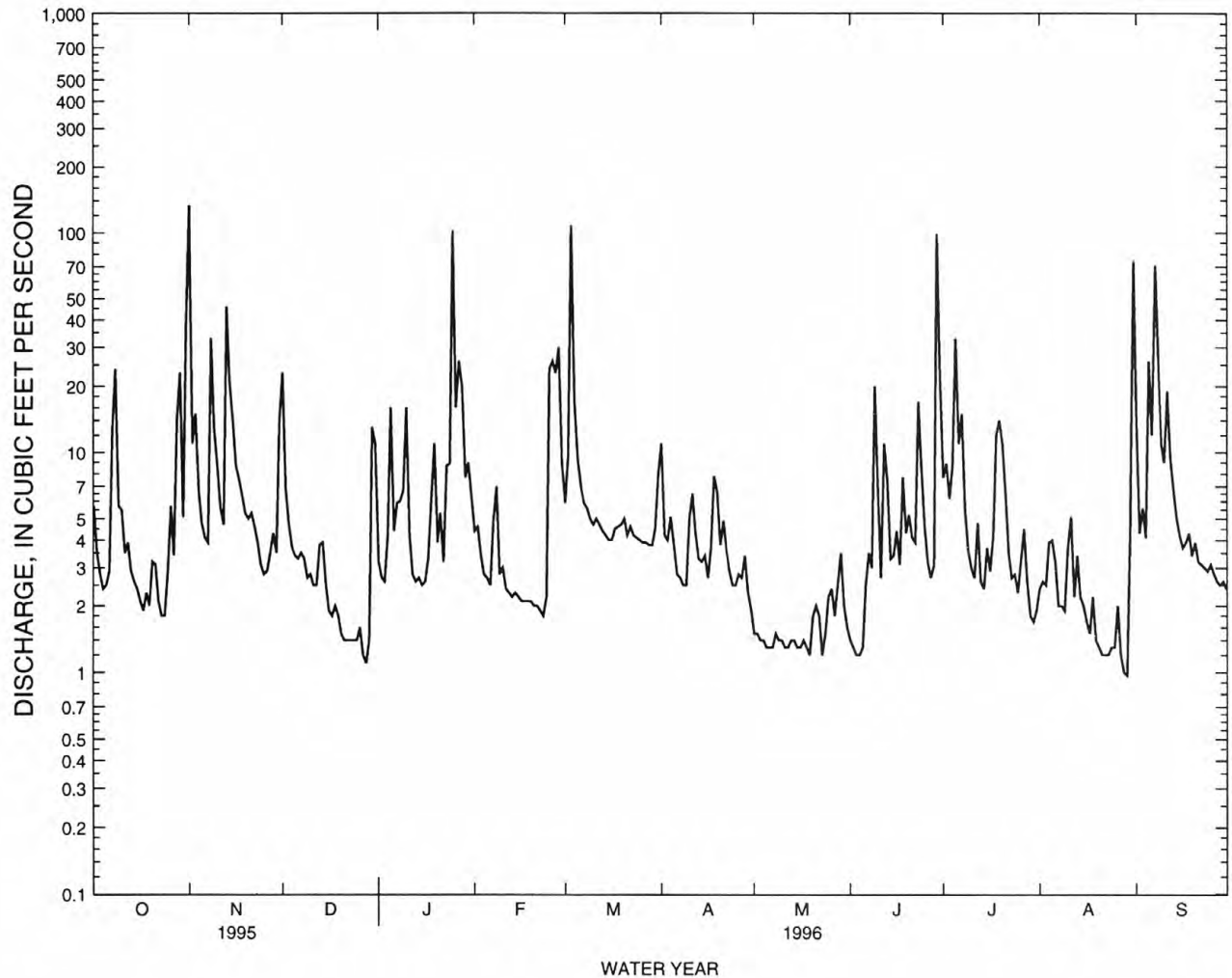
| DATE | RATIO | SODIUM AD- SORP- TION SOLVED (MG/L AS K) | POTAS- SIUM, DIS- SOLVED (MG/L AS K) | ALKA- LINITY LAB (MG/L AS CACO3) | SULFATE DIS- SOLVED (MG/L AS SO4) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) | FLUO- RIDE, DIS- SOLVED (MG/L AS F) | SILICA, DIS- SOLVED (MG/L AS SIO2) | SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) | SOLIDS, DIS- SOLVED (TONS PER AC-FT) | IRON, DIS- SOLVED (UG/L AS FE) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) |
|-------|-------|--|---|---|---|---|--|---|---|---|--|--|
| MAR | | | | | | | | | | | | |
| 01... | 1 | 0.80 | 29 | 3.7 | 25 | <0.10 | 13 | 85 | 0.11 | 150 | 14 | |
| JUN | | | | | | | | | | | | |
| 03... | 1 | 0.90 | 35 | 4.0 | 22 | <0.10 | 15 | 91 | 0.12 | 370 | 25 | |

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HAWAII, ISLAND OF OAHU
 16229300 KALIHI STREAM AT KALIHI--Continued

| SUMMARY STATISTICS | FOR 1995 CALENDAR YEAR | FOR 1996 WATER YEAR | WATER YEARS 1962 - 1996 | |
|--------------------------|------------------------|---------------------|-------------------------|-------------|
| ANNUAL TOTAL | 2412.99 | 2537.87 | | |
| ANNUAL MEAN | 6.61 | 6.93 | 10.3 | |
| HIGHEST ANNUAL MEAN | | | 21.3 | 1982 |
| LOWEST ANNUAL MEAN | | | 3.13 | 1984 |
| HIGHEST DAILY MEAN | 223 Feb 27 | 133 Nov 1 | 781 | Feb 1 1969 |
| LOWEST DAILY MEAN | .58 Mar 11 | .97 Aug 29 | .23 | Jun 28 1966 |
| ANNUAL SEVEN-DAY MINIMUM | 1.0 Mar 13 | 1.3 Aug 19 | .36 | Oct 14 1984 |
| ANNUAL RUNOFF (AC-FT) | 4790 | 5030 | 7470 | |
| 10 PERCENT EXCEEDS | 13 | 14 | 18 | |
| 50 PERCENT EXCEEDS | 3.3 | 3.5 | 3.8 | |
| 90 PERCENT EXCEEDS | 1.5 | 1.4 | 1.3 | |



HAWAII, ISLAND OF OAHU

16232000 NUUANU STREAM BELOW RESERVOIR 2 WASTEWAY, NEAR HONOLULU

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

DRAINAGE AREA.--3.35 mi².

PERIOD OF RECORD.--October 1913 to January 1921. September 1921 to January 1996 (discontinued).

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

GAGE.--Water-stage recorder and sharp-crested weirs. Datum of gage is 630.71 ft above mean sea level (by stadia survey). Prior to September 7, 1915, nonrecording gage at same site at datum 631.68 ft and September 7, 1915 to March 31, 1918, at 631.71 ft above mean sea level. Datum of gage lowered 1.00 ft on February 4, 1992.

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

AVERAGE DISCHARGE.--80 years (water years 1915-16, 1918-20, 1922-96), 7.00 ft³/s (5,070 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 6,990 ft³/s, January 16, 1921, gage height, 8.74 ft, from floodmarks, from rating curve extended above 420 ft³/s by test of physical model of station site; minimum, 0.09 ft³/s, September 10, 11, 1925.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 240 ft³/s and maximum (*):

| Date | Time | Discharge (ft ³ /s) | Gage height (ft) | Date | Time | Discharge (ft ³ /s) | Gage height (ft) |
|---------|------|--------------------------------|------------------|------|------|--------------------------------|------------------|
| Nov. 01 | 0100 | *302 | *4.86 | | | | |

Minimum discharge, 2.7 ft³/s, October 19, 24, 28, 31.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|-------|-------|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 1 | 4.4 | 57 | 12 | 4.2 | --- | --- | --- | --- | --- | --- | --- | --- |
| 2 | 3.4 | 6.3 | 9.0 | 4.1 | --- | --- | --- | --- | --- | --- | --- | --- |
| 3 | 3.2 | 5.2 | 6.8 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 4 | 3.0 | 4.9 | 6.2 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 5 | 2.9 | 4.6 | 5.8 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 6 | 3.0 | 4.4 | 5.9 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 7 | 3.5 | 4.3 | 6.2 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 5.7 | 13 | 5.8 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 9 | 3.8 | 6.4 | 5.7 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 10 | 3.8 | 5.2 | 5.5 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 11 | 3.4 | 4.8 | 5.4 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 12 | 4.5 | 4.8 | 5.4 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 13 | 3.5 | 21 | 5.5 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 14 | 3.2 | 12 | 5.5 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 15 | 3.1 | 9.3 | 5.2 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 16 | 2.9 | 6.6 | 5.1 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 17 | 2.9 | 7.3 | 5.1 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 18 | 3.0 | 6.5 | 4.9 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 19 | 2.8 | 6.1 | 4.8 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 20 | 4.6 | 5.9 | 4.8 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 21 | 3.8 | 5.9 | 4.7 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 22 | 3.1 | 5.7 | 4.7 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 23 | 2.9 | 5.6 | 4.6 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 24 | 2.8 | 5.6 | 4.5 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 25 | 3.1 | 5.5 | 4.4 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 26 | 3.7 | 5.4 | 4.4 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 27 | 3.2 | 5.6 | 4.3 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 28 | 7.2 | 6.9 | 4.2 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 29 | 12 | 5.9 | 4.1 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 30 | 3.8 | 12 | 4.9 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 31 | 26 | --- | 5.6 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| TOTAL | 142.2 | 259.7 | 171.0 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| MEAN | 4.59 | 8.66 | 5.52 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| MAX | 26 | 57 | 12 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| MIN | 2.8 | 4.3 | 4.1 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| AC-FT | 282 | 515 | 339 | --- | --- | --- | --- | --- | --- | --- | --- | --- |

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1914 - 1996, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|------|------|------|------|------|------|------|------|------|------|------|------|------|
| MEAN | 4.35 | 6.90 | 8.82 | 9.46 | 9.07 | 9.62 | 9.44 | 8.05 | 5.00 | 4.30 | 5.04 | 4.50 |
| MAX | 21.5 | 43.7 | 46.8 | 56.0 | 81.3 | 52.5 | 41.7 | 46.2 | 19.0 | 10.7 | 32.4 | 27.7 |
| (WY) | 1931 | 1966 | 1928 | 1988 | 1932 | 1968 | 1989 | 1927 | 1938 | 1954 | 1982 | 1931 |
| MIN | .23 | .38 | .38 | .51 | .39 | .39 | .32 | .28 | .35 | .22 | .43 | .38 |
| (WY) | 1918 | 1946 | 1920 | 1920 | 1920 | 1926 | 1926 | 1926 | 1920 | 1922 | 1920 | 1917 |

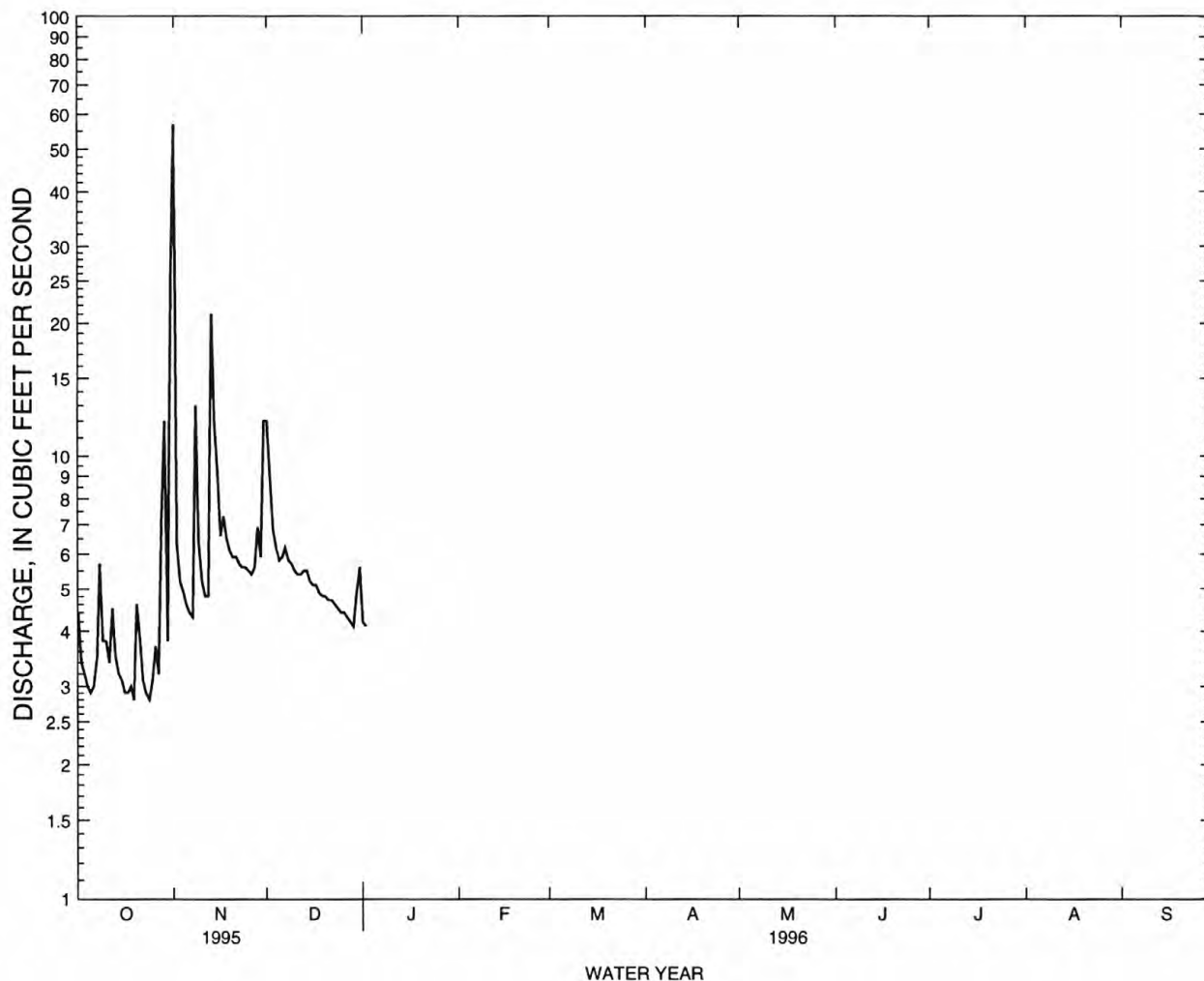
16232000 NUUANU STREAM BELOW RESERVOIR 2 WASTEWAY, NEAR HONOLULU--Continued

SUMMARY STATISTICS

FOR 1995 CALENDAR YEAR

WATER YEARS 1914 - 1996

| | | | |
|--------------------------|--------|--------|-----------------|
| ANNUAL TOTAL | 1923.8 | | |
| ANNUAL MEAN | 5.27 | | 7.00 |
| HIGHEST ANNUAL MEAN | | | 20.0 1932 |
| LOWEST ANNUAL MEAN | | | .88 1920 |
| HIGHEST DAILY MEAN | 57 | Nov 1 | 514 May 16 1927 |
| LOWEST DAILY MEAN | 2.3 | Feb 22 | .14 Jul 7 1922 |
| ANNUAL SEVEN-DAY MINIMUM | 2.6 | Feb 17 | .14 Jul 18 1922 |
| ANNUAL RUNOFF (AC-FT) | 3820 | | 5070 |
| 10 PERCENT EXCEEDS | 7.6 | | 13 |
| 50 PERCENT EXCEEDS | 4.0 | | 3.7 |
| 90 PERCENT EXCEEDS | 3.0 | | .93 |



HAWAII, ISLAND OF OAHU
16232000 NUUANU STREAM BELOW RESERVOIR 2 WASTEWAY, NEAR HONOLULU--Continued
WATER-QUALITY RECORDS

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

| WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996 | | | | | | | | | | | | |
|---|-------|--|---|---|---|---|--|---|---|--|--|--|
| DATE | TIME | DIS- CHARGE, INST. CUBIC FEET PER SECOND | SPE- CIFIC CON- DUCT- ANCE (US/CM) | PH WATER WHOLE FIELD (STAND- ARD UNITS) | TEMPER- ATURE AIR (DEG C) | TEMPER- ATURE WATER (DEG C) | HARD- NESS TOTAL (MG/L AS CACO3) | CALCIUM DIS- SOLVED (MG/L AS CA) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) | SODIUM, DIS- SOLVED (MG/L AS NA) | SODIUM PERCENT | |
| DEC 01... | 1025 | 9.3 | 130 | 8.0 | 23.5 | 21.5 | 35 | 4.7 | 5.6 | 10 | 38 | |
| DATE | RATIO | SODIUM AD- SORP- TION (MG/L AS K) | POTAS- SIUM, DIS- SOLVED (MG/L AS K) | ALKA- LINITY LAB (MG/L AS CACO3) | SULFATE DIS- SOLVED (MG/L AS SO4) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) | FLUO- RIDE, DIS- SOLVED (MG/L AS F) | SILICA, DIS- SOLVED (MG/L AS SIO2) | SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) | SOLIDS, DIS- SOLVED PER AC-FT) | IRON, DIS- SOLVED (UG/L AS FE) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) |
| DEC 01... | 0.7 | 0.70 | 31 | 3.6 | 16 | <0.10 | 13 | 72 | 0.10 | 180 | 21 | |

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HAWAII, ISLAND OF OAHU
16240500 WAIAKEAKUA STREAM AT HONOLULU

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

DRAINAGE AREA.--1.06 mi².

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 good. 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.--78 years (water years 1914-20, 1926-96), 4.92 ft³/s (3,560 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. Current peak discharges are derived from rating curve extended above 1,760 ft³/s on the basis of slope-area measurement at gage height 5.28 ft; minimum, 0.6 ft³/s, June 7, 8, 1926.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 310 ft³/s and maximum (*):

| Date | Time | Discharge (ft ³ /s) | Gage height (ft) | Date | Time | Discharge (ft ³ /s) | Gage height (ft) |
|---------|------|-----------------------------------|---------------------|---------|------|-----------------------------------|---------------------|
| Dec. 01 | 1200 | 389 | 3.35 | Aug. 31 | 2015 | 389 | 3.35 |
| Jan. 25 | 0130 | *580 | *3.78 | | | | |

Minimum discharge, 1.4 ft³/s, August 29.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY MEAN VALUES

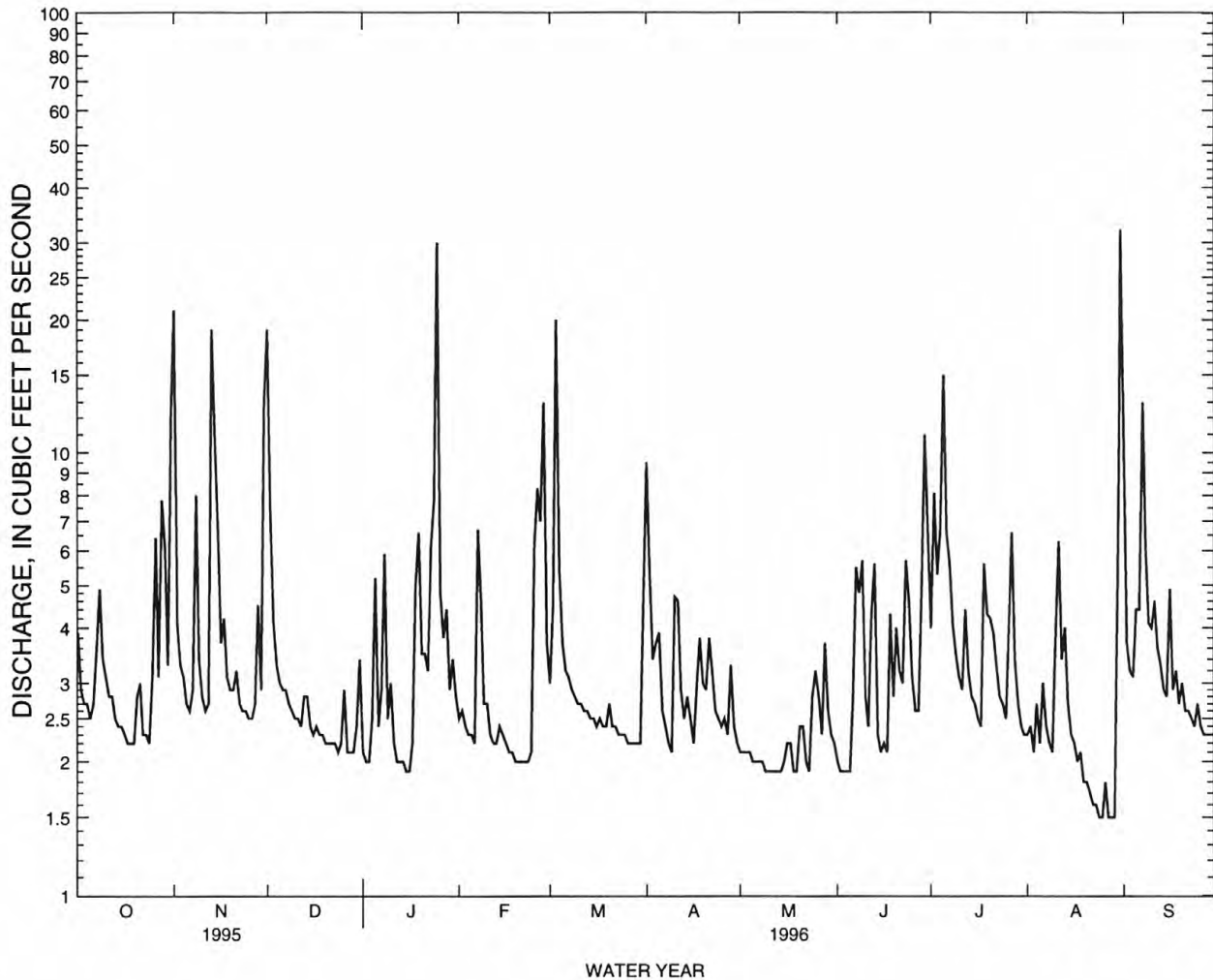
| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|-------|-------|-------|-------|------|-------|------|------|-------|-------|-------|-------|
| 1 | 3.9 | 21 | 19 | 2.1 | 2.5 | 3.0 | 9.5 | 2.1 | 2.0 | 4.0 | 2.3 | 9.7 |
| 2 | 2.9 | 4.1 | 7.4 | 2.0 | 2.6 | 4.5 | 5.2 | 2.1 | 1.9 | 8.1 | 2.4 | 3.7 |
| 3 | 2.7 | 3.3 | 4.1 | 2.0 | 2.4 | 20 | 3.4 | 2.1 | 1.9 | 5.3 | 2.1 | 3.2 |
| 4 | 2.7 | 3.1 | 3.3 | 2.5 | 2.3 | 5.4 | 3.7 | 2.1 | 1.9 | 6.6 | 2.7 | 3.1 |
| 5 | 2.5 | 2.7 | 3.0 | 5.2 | 2.3 | 3.7 | 3.9 | 2.0 | 1.9 | 15 | 2.2 | 4.4 |
| 6 | 2.7 | 2.6 | 2.9 | 2.4 | 2.2 | 3.2 | 2.6 | 2.0 | 2.8 | 6.6 | 3.0 | 4.4 |
| 7 | 3.6 | 2.9 | 2.9 | 2.9 | 6.7 | 3.1 | 2.4 | 2.0 | 5.5 | 5.6 | 2.4 | 13 |
| 8 | 4.9 | 8.0 | 2.7 | 5.9 | 4.6 | 2.9 | 2.2 | 2.0 | 4.8 | 4.1 | 2.2 | 6.1 |
| 9 | 3.4 | 3.4 | 2.6 | 2.5 | 2.7 | 2.8 | 2.1 | 1.9 | 5.7 | 3.5 | 2.1 | 4.1 |
| 10 | 3.1 | 2.8 | 2.5 | 3.0 | 2.7 | 2.7 | 4.7 | 1.9 | 2.8 | 3.1 | 3.7 | 4.0 |
| 11 | 2.8 | 2.6 | 2.5 | 2.2 | 2.3 | 2.7 | 4.6 | 1.9 | 2.4 | 2.9 | 6.3 | 4.6 |
| 12 | 2.8 | 2.7 | 2.4 | 2.0 | 2.2 | 2.6 | 2.9 | 1.9 | 4.3 | 4.4 | 3.4 | 3.6 |
| 13 | 2.5 | 19 | 2.8 | 2.0 | 2.2 | 2.6 | 2.5 | 1.9 | 5.6 | 3.2 | 4.0 | 3.3 |
| 14 | 2.4 | 11 | 2.8 | 2.0 | 2.4 | 2.5 | 2.8 | 1.9 | 2.3 | 2.8 | 2.7 | 2.9 |
| 15 | 2.4 | 6.7 | 2.4 | 1.9 | 2.3 | 2.5 | 2.5 | 2.0 | 2.1 | 2.7 | 2.3 | 2.8 |
| 16 | 2.3 | 3.7 | 2.3 | 1.9 | 2.2 | 2.4 | 2.2 | 2.2 | 2.2 | 2.5 | 2.2 | 4.9 |
| 17 | 2.2 | 4.2 | 2.4 | 2.2 | 2.1 | 2.5 | 2.9 | 2.2 | 2.1 | 2.4 | 2.0 | 2.9 |
| 18 | 2.2 | 3.1 | 2.3 | 5.0 | 2.1 | 2.4 | 3.8 | 1.9 | 4.3 | 5.6 | 2.1 | 3.2 |
| 19 | 2.2 | 2.9 | 2.3 | 6.6 | 2.0 | 2.4 | 3.0 | 1.9 | 2.8 | 4.3 | 1.8 | 2.7 |
| 20 | 2.8 | 2.9 | 2.2 | 3.5 | 2.0 | 2.7 | 2.9 | 2.4 | 4.0 | 4.2 | 1.8 | 3.0 |
| 21 | 3.0 | 3.2 | 2.2 | 3.5 | 2.0 | 2.4 | 3.8 | 2.4 | 3.2 | 3.9 | 1.7 | 2.6 |
| 22 | 2.3 | 2.7 | 2.2 | 3.2 | 2.0 | 2.4 | 3.2 | 2.0 | 3.0 | 3.3 | 1.6 | 2.6 |
| 23 | 2.3 | 2.6 | 2.2 | 6.1 | 2.0 | 2.3 | 2.6 | 1.9 | 5.7 | 2.8 | 1.6 | 2.5 |
| 24 | 2.2 | 2.6 | 2.1 | 7.8 | 2.1 | 2.3 | 2.5 | 2.8 | 4.6 | 2.7 | 1.5 | 2.4 |
| 25 | 3.1 | 2.5 | 2.2 | 30 | 6.2 | 2.3 | 2.4 | 3.2 | 3.1 | 2.5 | 1.5 | 2.7 |
| 26 | 6.4 | 2.5 | 2.9 | 4.8 | 8.3 | 2.2 | 2.5 | 2.8 | 2.6 | 3.9 | 1.8 | 2.4 |
| 27 | 3.1 | 2.7 | 2.1 | 3.8 | 7.0 | 2.2 | 2.3 | 2.3 | 2.6 | 6.6 | 1.5 | 2.3 |
| 28 | 7.8 | 4.5 | 2.1 | 4.4 | 13 | 2.2 | 3.3 | 3.7 | 4.9 | 3.4 | 1.5 | 2.3 |
| 29 | 6.1 | 2.9 | 2.1 | 2.9 | 3.7 | 2.2 | 2.4 | 2.6 | 11 | 2.7 | 1.5 | 2.3 |
| 30 | 3.3 | 13 | 2.4 | 3.4 | --- | 2.2 | 2.2 | 2.3 | 6.7 | 2.4 | 4.9 | 2.3 |
| 31 | 12 | --- | 3.4 | 2.8 | --- | 4.7 | --- | 2.2 | --- | 2.3 | 32 | --- |
| TOTAL | 108.6 | 151.9 | 100.7 | 132.5 | 99.1 | 104.0 | 97.0 | 68.6 | 110.7 | 133.4 | 104.8 | 114.0 |
| MEAN | 3.50 | 5.06 | 3.25 | 4.27 | 3.42 | 3.35 | 3.23 | 2.21 | 3.69 | 4.30 | 3.38 | 3.80 |
| MAX | 12 | 21 | 19 | 30 | 13 | 20 | 9.5 | 3.7 | 11 | 15 | 32 | 13 |
| MIN | 2.2 | 2.5 | 2.1 | 1.9 | 2.0 | 2.2 | 2.1 | 1.9 | 2.3 | 1.5 | 2.3 | 2.3 |
| AC-FT | 215 | 301 | 200 | 263 | 197 | 206 | 192 | 136 | 220 | 265 | 208 | 226 |

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1913 - 1996, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|------|------|------|------|------|------|------|------|------|------|------|------|------|
| MEAN | 4.21 | 5.24 | 5.37 | 4.90 | 4.53 | 5.47 | 5.70 | 5.20 | 4.17 | 4.95 | 4.89 | 4.21 |
| MAX | 10.7 | 18.1 | 15.5 | 14.8 | 15.6 | 19.5 | 17.5 | 13.3 | 10.3 | 12.3 | 13.6 | 13.3 |
| (WY) | 1915 | 1928 | 1988 | 1988 | 1955 | 1942 | 1989 | 1988 | 1938 | 1958 | 1958 | 1914 |
| MIN | 1.18 | 1.17 | 1.42 | 1.28 | 1.03 | 1.14 | 1.16 | .87 | 1.27 | .87 | 1.31 | 1.27 |
| (WY) | 1946 | 1934 | 1920 | 1977 | 1920 | 1926 | 1926 | 1926 | 1920 | 1926 | 1984 | 1984 |

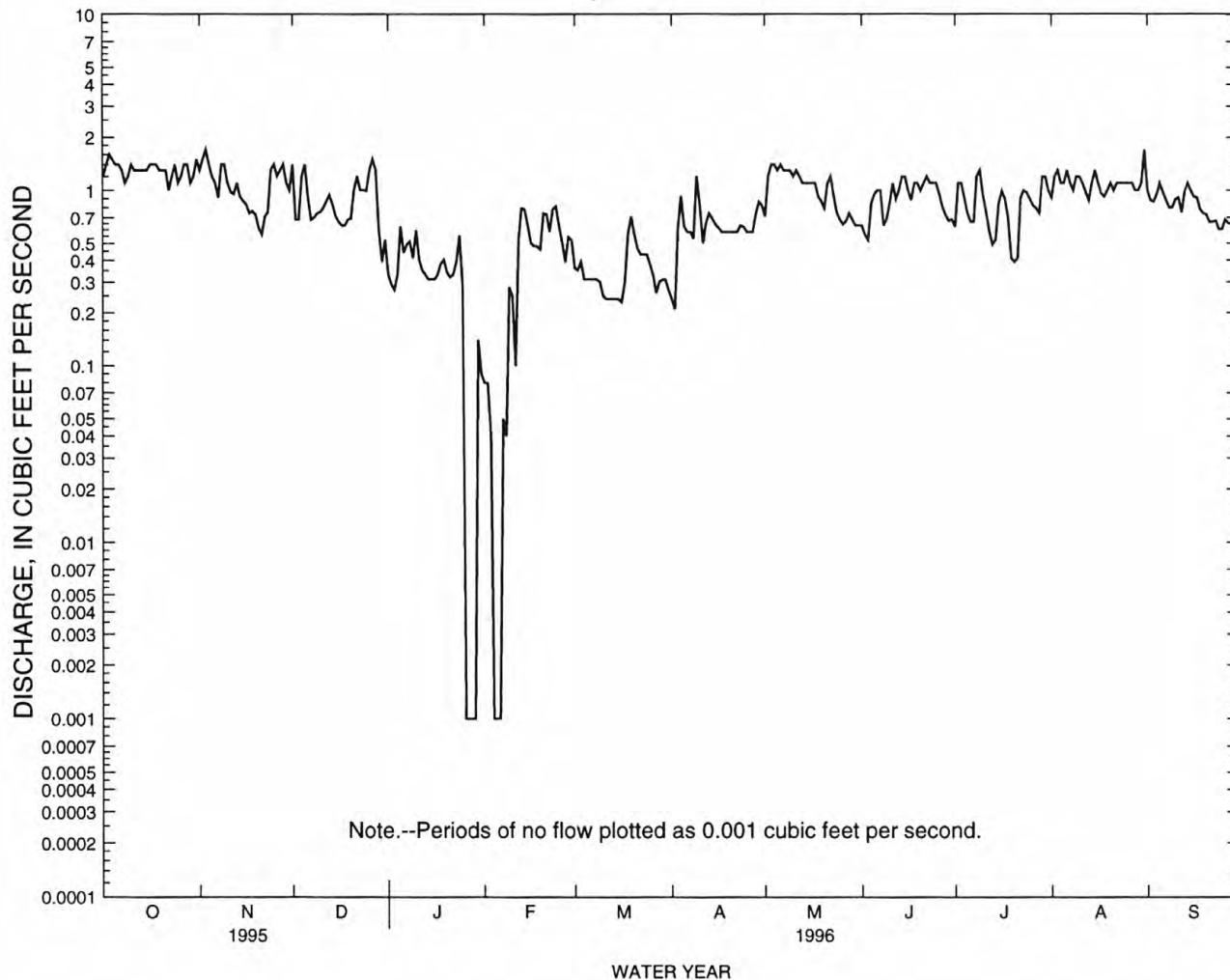
16240500 WAIAKEAKUA STREAM AT HONOLULU--Continued

| SUMMARY STATISTICS | FOR 1995 CALENDAR YEAR | | FOR 1996 WATER YEAR | | WATER YEARS 1913 - 1996 | |
|--------------------------|------------------------|--------|---------------------|--------|-------------------------|-------------|
| ANNUAL TOTAL | 1463.5 | | 1325.3 | | | |
| ANNUAL MEAN | 4.01 | | 3.62 | | 4.92 | |
| HIGHEST ANNUAL MEAN | | | | | 8.23 | 1988 |
| LOWEST ANNUAL MEAN | | | | | 1.94 | 1920 |
| HIGHEST DAILY MEAN | 39 | Feb 28 | 32 | Aug 31 | 183 | Mar 24 1994 |
| LOWEST DAILY MEAN | 2.1 | Dec 24 | 1.5 | Aug 24 | .62 | Feb 26 1920 |
| ANNUAL SEVEN-DAY MINIMUM | 2.2 | Dec 19 | 1.6 | Aug 23 | .75 | May 23 1926 |
| ANNUAL RUNOFF (AC-FT) | 2900 | | 2630 | | 3560 | |
| 10 PERCENT EXCEEDS | 6.6 | | 5.8 | | 8.1 | |
| 50 PERCENT EXCEEDS | 2.9 | | 2.7 | | 3.5 | |
| 90 PERCENT EXCEEDS | 2.3 | | 2.0 | | 1.7 | |



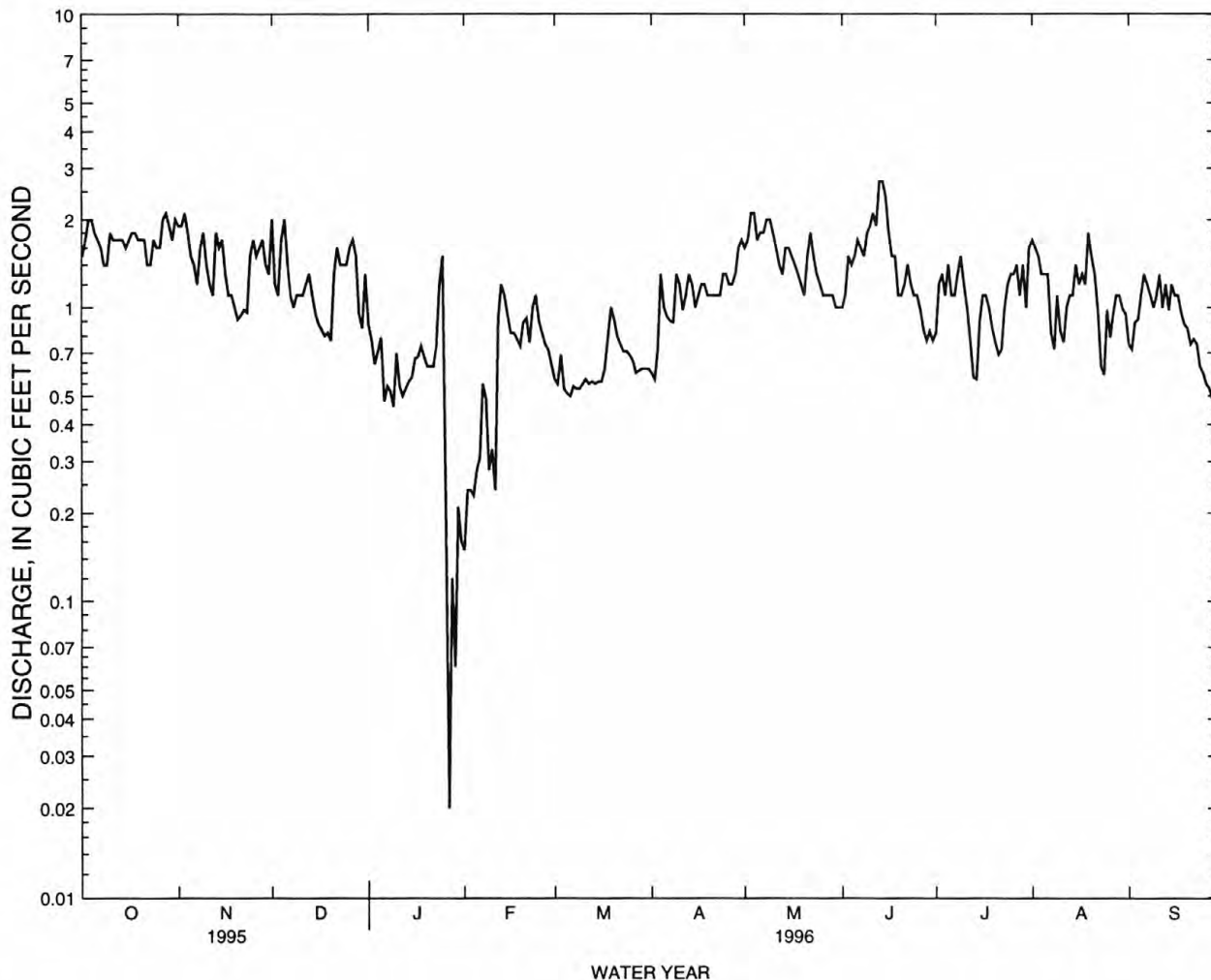
HAWAII, ISLAND OF OAHU
 16249500 MAUNAWILI DITCH AT AINONI SPRING--Continued

| SUMMARY STATISTICS | FOR 1995 CALENDAR YEAR | FOR 1996 WATER YEAR | WATER YEARS 1991 - 1996 | |
|--------------------------|------------------------|---------------------|-------------------------|-------------|
| ANNUAL TOTAL | 463.71 | 295.16 | | |
| ANNUAL MEAN | 1.27 | .81 | 1.29 | |
| HIGHEST ANNUAL MEAN | | | 1.75 | 1992 |
| LOWEST ANNUAL MEAN | | | .81 | 1996 |
| HIGHEST DAILY MEAN | 2.3 Feb 21 | 1.7 Nov 3 | 2.8 | Jun 25 1994 |
| LOWEST DAILY MEAN | .20 Mar 1 | .00 Jan 26 | .00 | Jan 1 1993 |
| ANNUAL SEVEN-DAY MINIMUM | .55 Feb 28 | .03 Feb 2 | .03 | Feb 2 1996 |
| ANNUAL RUNOFF (AC-FT) | 920 | 585 | 934 | |
| 10 PERCENT EXCEEDS | 1.7 | 1.3 | 2.0 | |
| 50 PERCENT EXCEEDS | 1.3 | .79 | 1.4 | |
| 90 PERCENT EXCEEDS | .75 | .31 | .57 | |



16249900 MAUNAWILI DITCH ABOVE ANIANINUI TUNNEL NR KAILUA--Continued

| SUMMARY STATISTICS | FOR 1995 CALENDAR YEAR | FOR 1996 WATER YEAR | WATER YEARS 1991 - 1996 | |
|--------------------------|------------------------|---------------------|-------------------------|-------------|
| ANNUAL TOTAL | 611.81 | 410.65 | | |
| ANNUAL MEAN | 1.68 | 1.12 | 1.83 | |
| HIGHEST ANNUAL MEAN | | | 2.48 | 1992 |
| LOWEST ANNUAL MEAN | | | 1.12 | 1996 |
| HIGHEST DAILY MEAN | 3.0 Aug 27 | 2.7 Jun 13 | 5.5 | Mar 24 1994 |
| LOWEST DAILY MEAN | .68 Mar 1 | .02 Jan 27 | .00 | Mar 22 1991 |
| ANNUAL SEVEN-DAY MINIMUM | .88 Dec 14 | .13 Jan 26 | .13 | Jan 26 1996 |
| ANNUAL RUNOFF (AC-FT) | 1210 | 815 | 1330 | |
| 10 PERCENT EXCEEDS | 2.3 | 1.7 | 2.8 | |
| 50 PERCENT EXCEEDS | 1.7 | 1.1 | 1.9 | |
| 90 PERCENT EXCEEDS | 1.1 | .55 | .98 | |



HAWAII, ISLAND OF OAHU
16250000 MAUNAWILI DITCH NEAR WAIMANALO

LOCATION.--Lat 21°20'45", long 157°45'10", Hydrologic Unit 20060000, on left bank 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 current year.

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 good. Ditch diverts from headwaters of Maunawili and Makawao streams for irrigation in vicinity of Waimanalo. Station was reestablished on October 1, 1993.

AVERAGE DISCHARGE.-- 17 years (water years 1955-68, 1994-96), 2.36 ft³/s (1,710 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 10.8 ft³/s, March 5, 1958; minimum, no flow at times.

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge, 3.6 ft³/s, January 25; minimum daily 0.01 ft³/s January 29.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY MEAN VALUES

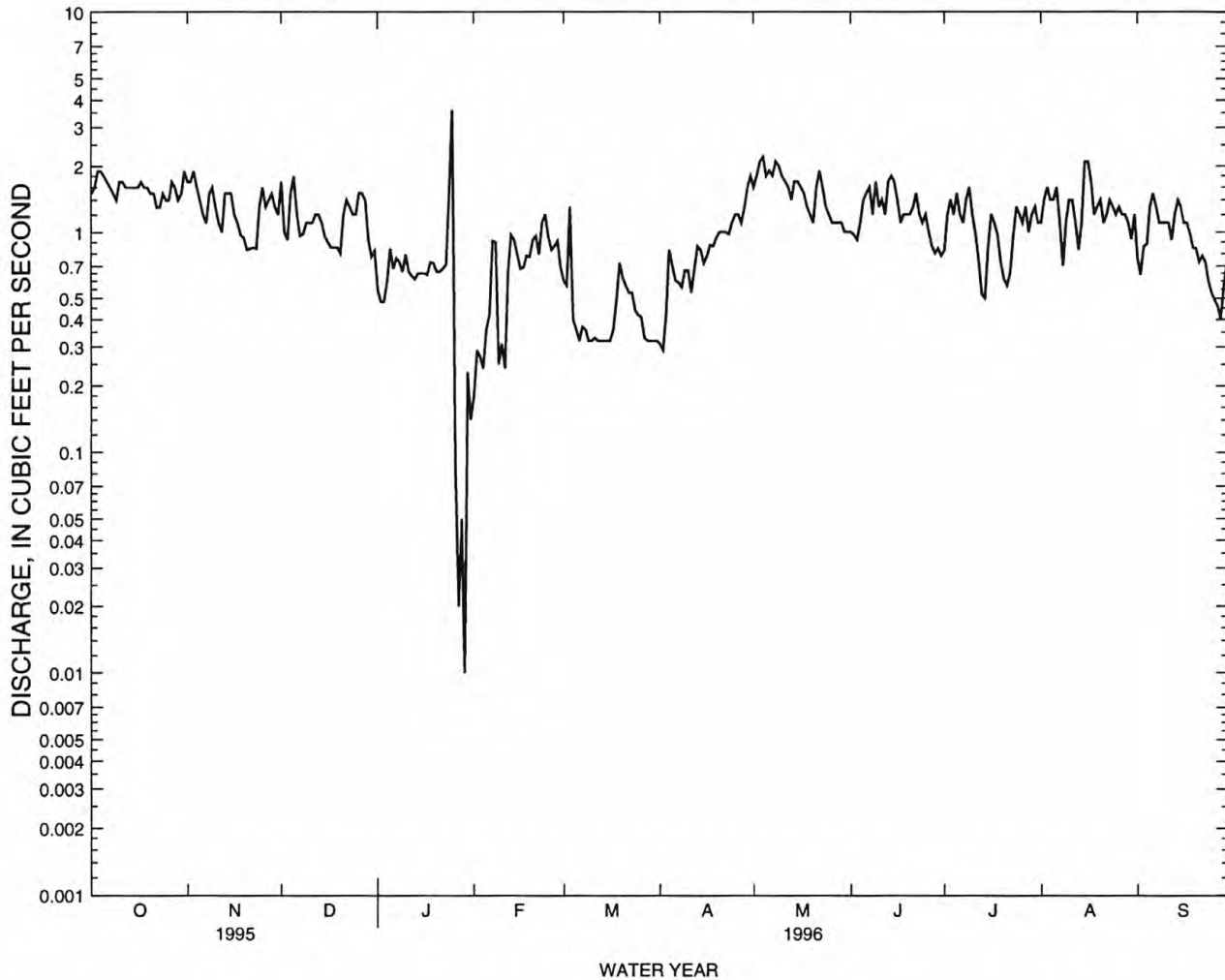
| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|
| 1 | 1.5 | 1.7 | 1.7 | .54 | .18 | .60 | .31 | 1.6 | 1.0 | .82 | 1.1 | .76 |
| 2 | 1.6 | 1.7 | 1.0 | .48 | .29 | .57 | .29 | 1.8 | .97 | 1.2 | 1.4 | .64 |
| 3 | 1.9 | 1.9 | .92 | .48 | .27 | 1.3 | .42 | 2.1 | .92 | 1.4 | 1.6 | .86 |
| 4 | 1.9 | 1.6 | 1.5 | .59 | .24 | .40 | .83 | 2.2 | 1.1 | 1.2 | 1.4 | .88 |
| 5 | 1.8 | 1.4 | 1.8 | .84 | .36 | .36 | .70 | 1.8 | 1.4 | 1.5 | 1.4 | 1.3 |
| 6 | 1.7 | 1.2 | 1.2 | .68 | .42 | .32 | .60 | 1.9 | 1.5 | 1.2 | 1.6 | 1.5 |
| 7 | 1.6 | 1.1 | .96 | .76 | .91 | .37 | .59 | 1.8 | 1.6 | 1.1 | 1.1 | 1.3 |
| 8 | 1.5 | 1.5 | .98 | .73 | .90 | .36 | .56 | 2.1 | 1.2 | 1.4 | .70 | 1.1 |
| 9 | 1.4 | 1.6 | 1.1 | .66 | .25 | .32 | .67 | 2.0 | 1.7 | 1.6 | 1.1 | 1.1 |
| 10 | 1.7 | 1.3 | 1.1 | .79 | .31 | .32 | .67 | 1.8 | 1.3 | 1.2 | 1.4 | 1.1 |
| 11 | 1.7 | 1.1 | 1.1 | .66 | .24 | .33 | .53 | 1.7 | 1.4 | .98 | 1.4 | 1.1 |
| 12 | 1.6 | 1.0 | 1.2 | .63 | .66 | .32 | .67 | 1.6 | 1.2 | .73 | 1.1 | .92 |
| 13 | 1.6 | 1.5 | 1.2 | .61 | .97 | .32 | .86 | 1.4 | 1.7 | .52 | .83 | 1.2 |
| 14 | 1.6 | 1.5 | 1.1 | .65 | .92 | .32 | .83 | 1.7 | 1.8 | .50 | 1.1 | 1.4 |
| 15 | 1.6 | 1.5 | .95 | .65 | .79 | .32 | .72 | 1.7 | 1.7 | .86 | 2.1 | 1.3 |
| 16 | 1.6 | 1.2 | .90 | .65 | .68 | .32 | .78 | 1.6 | 1.4 | 1.2 | 2.1 | 1.1 |
| 17 | 1.7 | 1.1 | .85 | .64 | .69 | .36 | .87 | 1.5 | 1.1 | 1.1 | 1.7 | 1.1 |
| 18 | 1.6 | .97 | .85 | .73 | .78 | .49 | .86 | 1.3 | 1.2 | .97 | 1.2 | .98 |
| 19 | 1.6 | .94 | .85 | .72 | .77 | .72 | .94 | 1.2 | 1.2 | .73 | 1.3 | .85 |
| 20 | 1.5 | .83 | .80 | .66 | .92 | .62 | 1.0 | 1.1 | 1.2 | .61 | 1.4 | .84 |
| 21 | 1.5 | .84 | 1.2 | .66 | .96 | .57 | 1.0 | 1.6 | 1.3 | .57 | 1.1 | .73 |
| 22 | 1.3 | .85 | 1.4 | .68 | .79 | .53 | 1.0 | 1.9 | 1.5 | .65 | 1.2 | .78 |
| 23 | 1.3 | .84 | 1.3 | .71 | 1.1 | .53 | .98 | 1.6 | 1.2 | .96 | 1.4 | .73 |
| 24 | 1.5 | 1.3 | 1.2 | 1.5 | 1.2 | .44 | 1.1 | 1.3 | 1.1 | 1.3 | 1.3 | .60 |
| 25 | 1.4 | 1.6 | 1.2 | 3.6 | .96 | .42 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | .53 |
| 26 | 1.4 | 1.3 | 1.5 | .08 | .83 | .41 | 1.2 | 1.1 | 1.0 | 1.1 | 1.3 | .49 |
| 27 | 1.7 | 1.4 | 1.5 | .02 | .86 | .33 | 1.1 | 1.1 | .86 | 1.3 | 1.2 | .46 |
| 28 | 1.6 | 1.5 | 1.4 | .05 | .91 | .32 | 1.3 | 1.1 | .80 | 1.0 | 1.2 | .40 |
| 29 | 1.4 | 1.3 | .93 | .01 | .69 | .32 | 1.6 | 1.1 | .84 | 1.2 | 1.1 | .57 |
| 30 | 1.5 | 1.2 | .77 | .23 | --- | .32 | 1.8 | 1.0 | .78 | 1.3 | .93 | .74 |
| 31 | 1.9 | --- | .82 | .14 | --- | .32 | --- | 1.0 | --- | 1.1 | 1.2 | --- |
| TOTAL | 49.2 | 38.77 | 35.28 | 20.83 | 19.85 | 13.55 | 25.98 | 47.9 | 37.17 | 32.50 | 40.16 | 27.36 |
| MEAN | 1.59 | 1.29 | 1.14 | .67 | .68 | .44 | .87 | 1.55 | 1.24 | 1.05 | 1.30 | .91 |
| MAX | 1.9 | 1.9 | 1.8 | 3.6 | 1.2 | 1.3 | 1.8 | 2.2 | 1.8 | 1.6 | 2.1 | 1.5 |
| MIN | 1.3 | .83 | .77 | .01 | .18 | .32 | .29 | 1.0 | .78 | .50 | .70 | .40 |
| AC-FT | 98 | 77 | 70 | 41 | 39 | 27 | 52 | 95 | 74 | 64 | 80 | 54 |

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1954 - 1996, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|------|------|------|------|------|------|------|------|------|------|------|------|------|
| MEAN | 2.82 | 2.44 | 1.62 | 1.63 | 1.46 | 1.76 | 2.45 | 3.00 | 3.08 | 2.87 | 5.15 | 5.17 |
| MAX | 4.36 | 3.87 | 3.24 | 3.22 | 2.67 | 3.89 | 4.07 | 4.90 | 4.52 | 4.02 | 46.8 | 47.9 |
| (WY) | 1955 | 1955 | 1961 | 1955 | 1957 | 1956 | 1966 | 1955 | 1955 | 1955 | 1993 | 1993 |
| MIN | 1.44 | .93 | .026 | .000 | .000 | .097 | .39 | 1.19 | 1.24 | 1.05 | 1.30 | .61 |
| (WY) | 1995 | 1965 | 1968 | 1968 | 1968 | 1968 | 1963 | 1965 | 1996 | 1996 | 1996 | 1968 |

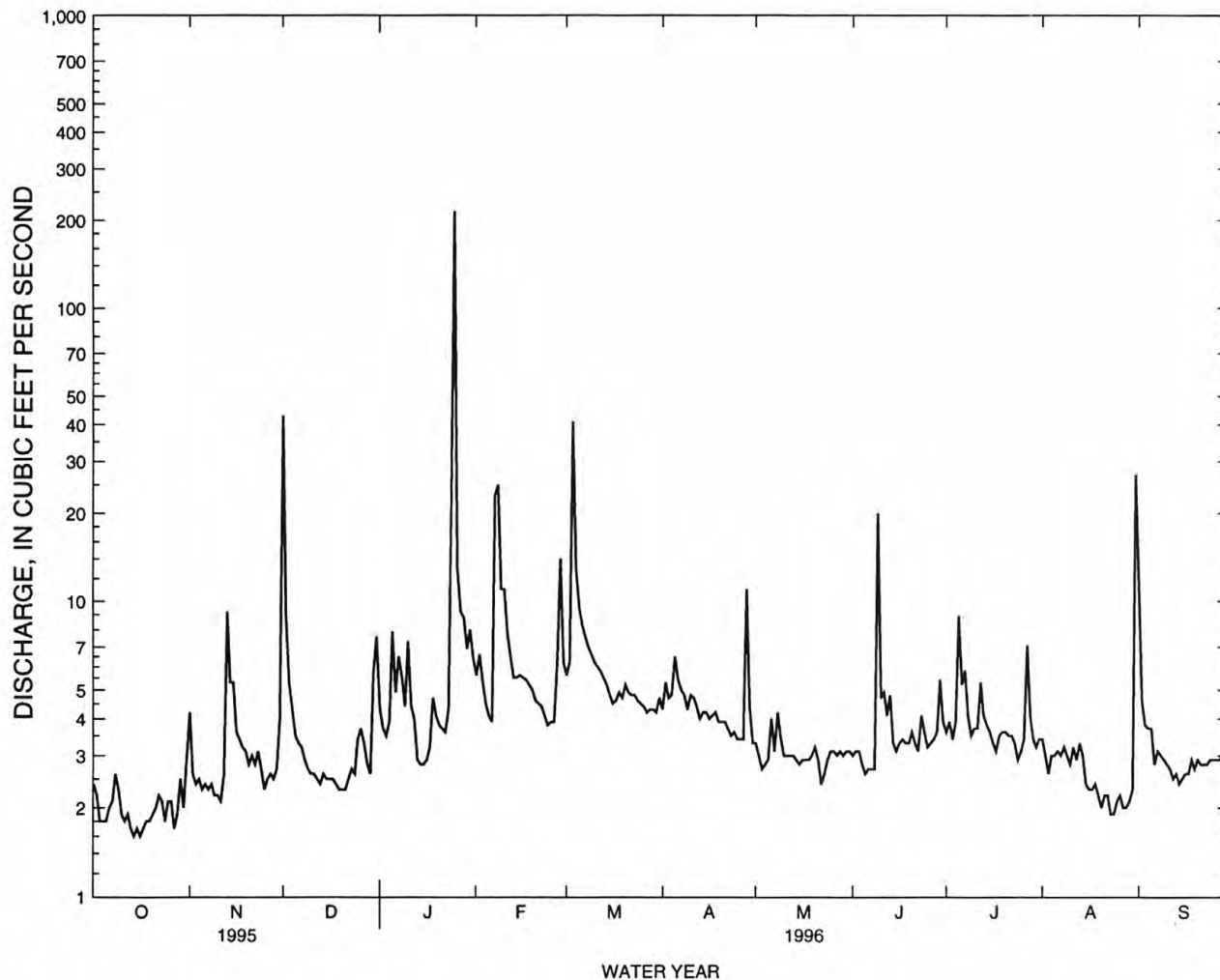
16250000 MAUNAWILI DITCH NEAR WAIMANALO--Continued

| SUMMARY STATISTICS | FOR 1995 CALENDAR YEAR | | FOR 1996 WATER YEAR | | WATER YEARS 1954 - 1996 | |
|--------------------------|------------------------|--------|---------------------|--------|-------------------------|-------------|
| ANNUAL TOTAL | 562.59 | | 388.55 | | | |
| ANNUAL MEAN | 1.54 | | 1.06 | | 2.36 | |
| HIGHEST ANNUAL MEAN | | | | | 3.43 | 1955 |
| LOWEST ANNUAL MEAN | | | | | 1.06 | 1996 |
| HIGHEST DAILY MEAN | 2.9 | Feb 27 | 3.6 | Jan 25 | 128 | Jul 28 1993 |
| LOWEST DAILY MEAN | .58 | Mar 1 | .01 | Jan 29 | .00 | Dec 27 1955 |
| ANNUAL SEVEN-DAY MINIMUM | .81 | Jul 14 | .10 | Jan 26 | .00 | Dec 27 1955 |
| ANNUAL RUNOFF (AC-FT) | 1120 | | 771 | | 1710 | |
| 10 PERCENT EXCEEDS | 2.1 | | 1.6 | | 4.0 | |
| 50 PERCENT EXCEEDS | 1.5 | | 1.1 | | 2.6 | |
| 90 PERCENT EXCEEDS | .96 | | .41 | | .57 | |



HAWAII, ISLAND OF OAHU
 16254000 MAKAWAO STREAM NEAR KAILUA--Continued

| SUMMARY STATISTICS | FOR 1995 CALENDAR YEAR | | FOR 1996 WATER YEAR | | WATER YEARS 1913 - 1996 | |
|--------------------------|------------------------|--------|---------------------|--------|-------------------------|-------------|
| ANNUAL TOTAL | 1218.4 | | 1783.1 | | | |
| ANNUAL MEAN | 3.34 | | 4.87 | | 5.11 | |
| HIGHEST ANNUAL MEAN | | | | | 11.1 | 1982 |
| LOWEST ANNUAL MEAN | | | | | 1.31 | 1973 |
| HIGHEST DAILY MEAN | 78 | Feb 28 | 215 | Jan 25 | 518 | Dec 31 1987 |
| LOWEST DAILY MEAN | 1.5 | Jan 21 | 1.6 | Oct 14 | .50 | Sep 8 1964 |
| ANNUAL SEVEN-DAY MINIMUM | 1.7 | Oct 13 | 1.7 | Oct 13 | .67 | Sep 8 1964 |
| ANNUAL RUNOFF (AC-FT) | 2420 | | 3540 | | 3700 | |
| 10 PERCENT EXCEEDS | 4.2 | | 6.4 | | 8.8 | |
| 50 PERCENT EXCEEDS | 2.7 | | 3.3 | | 2.8 | |
| 90 PERCENT EXCEEDS | 1.9 | | 2.2 | | 1.4 | |



HAWAII, ISLAND OF OAHU
 16260500 MAUNAWILI STREAM AT HIGHWAY 61, NEAR KAILUA

LOCATION.--Lat 21°22'51 " long 157°45'48", Hydrologic Unit 20060000, on right bank at downstream side of bridge on Highway 61, 0.6 mi west of Maunawili School, and 1.6 mi southwest of Kailua Post Office.

DRAINAGE AREA.--5.34 mi².

PERIOD OF RECORD.--Water years 1922, 1956-62, 1965-67 (low-flow measurements); water years 1958-67, 1971-91 (annual maximum); daily record January 1967 to October 1971, April 1991 to January 1996 (discontinued).

GAGE.--Water-stage recorder. Datum of gage is 9.79 ft above mean sea level (levels by Sunn, Low, Tom, and Hara, Inc.), October 16, 1957 to December 31, 1966, crest-stage gage at site 400 ft upstream at datum 3.46 ft higher.

REMARKS.--Records good. Maunawili ditch diverts from headwaters of Maunawili and Makawao Streams for irrigation in vicinity of Waimanalo. Records of chemical analyses and suspended sediment loads were published during the water years 1969-71, and 1967-71 respectively.

AVERAGE DISCHARGE.--9 years (water years 1968-71, 1992-96), 15.0 ft³/s (10,830 acre-ft/yr)

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 9,690 ft³/s, February 4, 1965, gage height, 15.62 ft (site and datum then in use), from rating curve extended above 700 ft³/s on basis of contracted-opening measurement of peak flow; minimum, 2.1 ft³/s, October 12, 13, 1991.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 700 ft³/s and maximum (*):

| Date | Time | Discharge (ft ³ /s) | Gage height (ft) | Date | Time | Discharge (ft ³ /s) | Gage height (ft) |
|---|------|--------------------------------|------------------|---------------------------------------|------|--------------------------------|------------------|
| Dec. 01 | 1300 | *1,070 | 7.77 | No peaks greater than base discharge. | | | |
| Minimum discharge, 3.0 ft ³ /s, November 10, 11, 12. | | | | | | | |

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
 DAILY MEAN VALUES

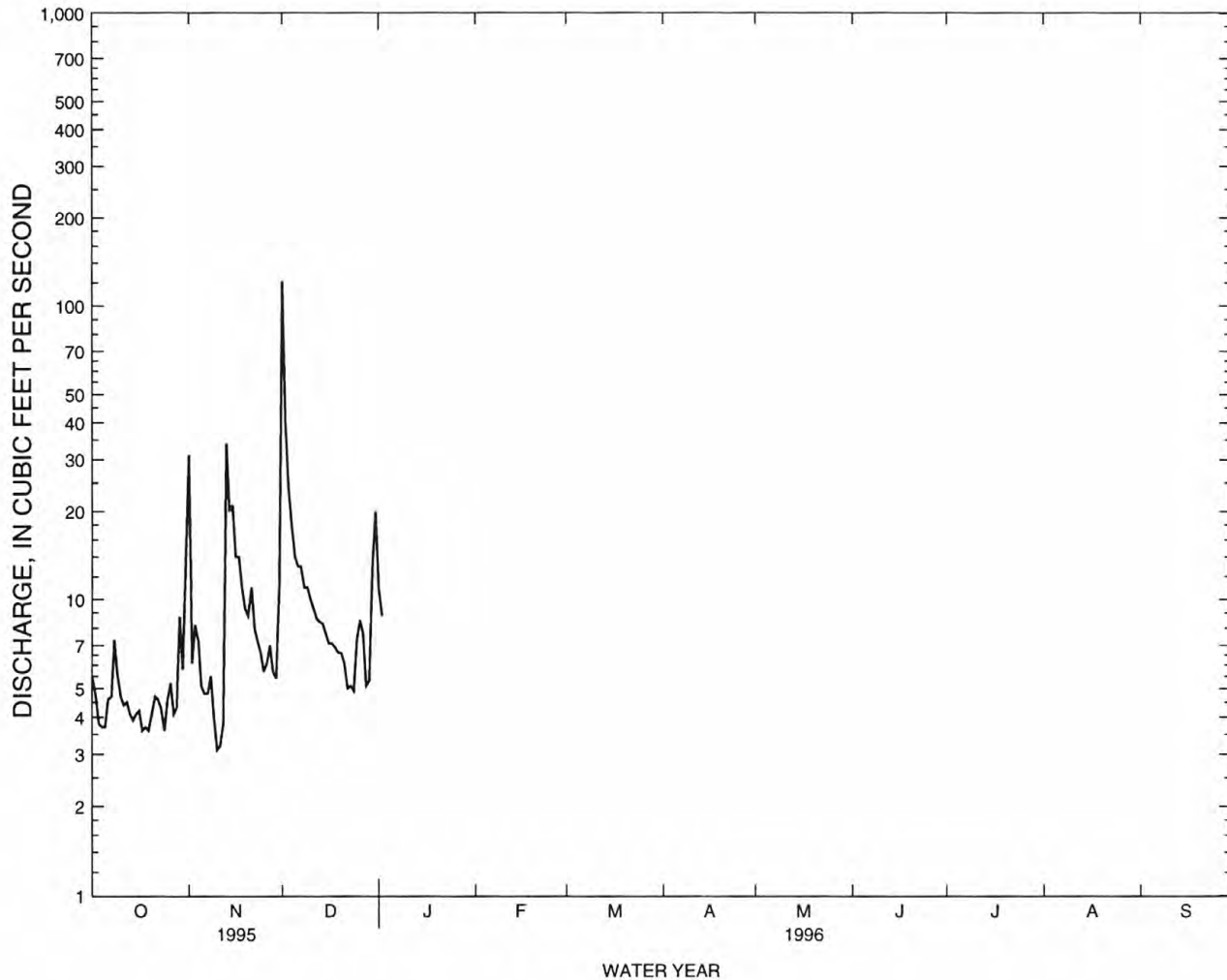
| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|-------|-------|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 1 | 5.4 | 31 | 121 | 11 | --- | --- | --- | --- | --- | --- | --- | --- |
| 2 | 4.7 | 6.1 | 40 | 8.8 | --- | --- | --- | --- | --- | --- | --- | --- |
| 3 | 3.8 | 8.2 | 24 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 4 | 3.7 | 7.2 | 18 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 5 | 3.7 | 5.1 | 14 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 6 | 4.6 | 4.8 | 13 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 7 | 4.7 | 4.8 | 13 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7.3 | 5.5 | 11 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 9 | 5.6 | 4.1 | 11 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 10 | 4.7 | 3.1 | 10 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 11 | 4.4 | 3.2 | 9.3 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 12 | 4.5 | 3.8 | 8.6 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 13 | 4.1 | 34 | 8.4 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 14 | 3.9 | 20 | 8.3 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 15 | 4.1 | 21 | 7.7 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 16 | 4.2 | 14 | 7.1 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 17 | 3.6 | 14 | 7.1 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 18 | 3.7 | 11 | 6.9 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 19 | 3.6 | 9.3 | 6.6 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 20 | 4.1 | 8.8 | 6.6 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 21 | 4.7 | 11 | 6.1 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 22 | 4.6 | 8.0 | 5.0 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 23 | 4.3 | 7.3 | 5.1 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 24 | 3.6 | 6.6 | 4.9 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 25 | 4.6 | 5.7 | 7.3 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 26 | 5.2 | 6.1 | 8.5 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 27 | 4.1 | 7.0 | 7.7 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 28 | 4.3 | 5.7 | 5.1 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 29 | 8.7 | 5.4 | 5.3 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 30 | 5.8 | 11 | 13 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 31 | 14 | --- | 20 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| TOTAL | 152.3 | 292.8 | 439.6 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| MEAN | 4.91 | 9.76 | 14.2 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| MAX | 14 | 34 | 121 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| MIN | 3.6 | 3.1 | 4.9 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| AC-FT | 302 | 581 | 872 | --- | --- | --- | --- | --- | --- | --- | --- | --- |

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1967 - 1996, BY WATER YEAR (WY)

| | 1967 | 1968 | 1969 | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| MEAN | 10.7 | 17.7 | 24.9 | 22.3 | 22.4 | 25.8 | 16.4 | 9.38 | 7.34 | 6.77 | 7.18 | 7.79 | 10.7 | 17.7 | 24.9 | 22.3 | 22.4 | 25.8 | 16.4 | 9.38 | 7.34 | 6.77 | 7.18 | 7.79 | 10.7 | 17.7 | 24.9 | 22.3 | 22.4 | 25.8 |
| MAX | 19.8 | 47.6 | 78.2 | 41.1 | 60.6 | 72.9 | 40.3 | 15.1 | 12.5 | 9.90 | 21.0 | 16.9 | 19.8 | 47.6 | 78.2 | 41.1 | 60.6 | 72.9 | 40.3 | 15.1 | 12.5 | 9.90 | 21.0 | 16.9 | 19.8 | 47.6 | 78.2 | 41.1 | 60.6 | 72.9 |
| (WY) | 1993 | 1971 | 1968 | 1969 | 1969 | 1968 | 1968 | 1968 | 1971 | 1967 | 1967 | 1967 | 1967 | 1993 | 1971 | 1968 | 1969 | 1969 | 1968 | 1968 | 1968 | 1971 | 1967 | 1967 | 1967 | 1993 | 1971 | 1968 | 1969 | 1969 |
| MIN | 4.91 | 5.59 | 5.45 | 5.61 | 9.79 | 5.84 | 4.45 | 3.85 | 3.04 | 5.55 | 4.63 | 4.38 | 4.91 | 5.59 | 5.45 | 5.61 | 9.79 | 5.84 | 4.45 | 3.85 | 3.04 | 5.55 | 4.63 | 4.38 | 4.91 | 5.59 | 5.45 | 5.61 | 9.79 | |
| (WY) | 1996 | 1995 | 1995 | 1995 | 1993 | 1993 | 1993 | 1993 | 1993 | 1970 | 1994 | 1995 | 1996 | 1996 | 1995 | 1995 | 1993 | 1993 | 1993 | 1993 | 1993 | 1970 | 1994 | 1995 | 1996 | 1996 | 1995 | 1995 | 1993 | 1993 |

16260500 MAUNAWILI STREAM AT HIGHWAY 61, NEAR KAILUA--Continued

| SUMMARY STATISTICS | FOR 1995 CALENDAR YEAR | | WATER YEARS 1967 - 1996 | |
|--------------------------|------------------------|--------|-------------------------|-------------|
| ANNUAL TOTAL | 3257.2 | | | |
| ANNUAL MEAN | 8.92 | | 15.0 | |
| HIGHEST ANNUAL MEAN | | | 26.0 | 1968 |
| LOWEST ANNUAL MEAN | | | 8.32 | 1995 |
| HIGHEST DAILY MEAN | 213 | Feb 28 | 875 | Dec 18 1967 |
| LOWEST DAILY MEAN | 3.1 | Nov 10 | 2.3 | Jun 24 1993 |
| ANNUAL SEVEN-DAY MINIMUM | 3.6 | Sep 21 | 2.5 | Jun 22 1993 |
| ANNUAL RUNOFF (AC-FT) | 6460 | | 10830 | |
| 10 PERCENT EXCEEDS | 14 | | 26 | |
| 50 PERCENT EXCEEDS | 6.3 | | 7.9 | |
| 90 PERCENT EXCEEDS | 4.1 | | 4.3 | |



HAWAII, ISLAND OF OAHU
16265600 RIGHT BRANCH KAMOOALII STREAM NEAR KANEOHE

LOCATION.--Lat 21°23'22", long 157°47'44", Hydrologic Unit 20060000, on left bank, 0.3 mi south of Hawaiian Memorial Park cemetery, 1.0 mi northwest of Pali Golf Course, and 1.3 mi south of Castle High School.

DRAINAGE AREA.--1.11 mi².

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

GAGE.--Water-stage recorder. Elevation of gage is 210 ft above mean sea level, from topographic map.

REMARKS.--Records fair except for estimated daily discharges, which are poor.

AVERAGE DISCHARGE.--13 years (water years 1984-96), 1.47 ft³/s (1,070 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 2,800 ft³/s, January 25, 1996, gage height, 11.64 ft from rating curve extended above 100 ft³/s on basis of slope-area computation; minimum, 0.03 ft³/s for several days in November, December 1984 and January 1985.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 600 ft³/s and maximum (*):

| Date | Time | Discharge (ft ³ /s) | Gage height (ft) | Date | Time | Discharge (ft ³ /s) | Gage height (ft) |
|---------|------|-----------------------------------|---------------------|---------|------|-----------------------------------|---------------------|
| Jan. 25 | 0145 | 2,800 | 11.64 | Jun. 09 | 1500 | 605 | 8.55 |

Minimum discharge, 0.10 ft³/s, October 13, 17-18.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|------|-------|-------|--------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1 | .17 | 7.6 | 12 | .42 | e.32 | .44 | .38 | .55 | .68 | .52 | .49 | 1.0 |
| 2 | .26 | .17 | .46 | .34 | e.40 | 9.0 | .46 | .56 | .65 | .59 | .48 | .40 |
| 3 | .26 | .29 | .24 | .25 | e.29 | 29 | .34 | .71 | .67 | .64 | .48 | .41 |
| 4 | .24 | .17 | .22 | .51 | e.27 | 1.2 | .36 | .56 | .72 | .62 | .48 | .47 |
| 5 | .34 | .16 | .25 | 4.7 | e.23 | .58 | .46 | .58 | .67 | 4.4 | .54 | 2.1 |
| 6 | .41 | .12 | .27 | .40 | e.23 | .48 | .39 | .63 | .83 | 2.2 | .61 | .47 |
| 7 | .79 | .11 | .33 | 2.0 | e5.7 | .50 | .37 | .79 | .74 | .92 | .55 | .42 |
| 8 | .85 | .29 | .26 | .58 | 6.4 | .43 | .40 | .74 | .65 | .53 | .55 | .44 |
| 9 | .27 | .33 | .29 | .32 | .56 | .44 | .41 | .66 | 21 | .54 | .48 | .42 |
| 10 | .36 | .33 | .26 | 1.8 | .53 | .44 | .48 | .54 | .94 | .50 | .55 | .43 |
| 11 | .29 | .42 | .23 | .33 | .42 | .47 | .50 | .55 | .73 | .58 | .53 | .53 |
| 12 | .14 | .44 | .21 | .26 | .41 | .44 | .52 | .55 | .52 | .72 | .33 | .43 |
| 13 | .10 | 3.0 | .19 | .19 | .40 | .44 | .51 | .54 | .56 | .53 | .36 | .46 |
| 14 | .12 | .83 | .18 | .24 | .38 | .38 | .48 | .54 | .53 | .51 | .32 | .46 |
| 15 | .11 | .44 | .16 | .22 | .35 | .38 | .52 | .48 | .56 | .54 | .34 | .44 |
| 16 | .11 | .25 | .18 | .18 | .35 | .46 | .47 | .54 | .60 | .51 | .34 | .41 |
| 17 | .10 | .22 | .19 | .19 | .36 | .40 | .46 | .46 | .71 | .42 | .35 | .43 |
| 18 | .10 | .39 | .20 | .65 | .35 | .40 | .55 | .48 | .69 | .43 | .35 | .46 |
| 19 | .12 | .25 | .22 | .47 | .32 | .38 | .45 | .48 | .51 | .51 | .38 | .42 |
| 20 | .12 | .43 | .17 | .26 | .31 | .44 | .44 | .71 | .52 | .58 | .35 | .45 |
| 21 | .14 | .33 | .17 | .26 | .36 | .42 | .46 | .51 | .56 | .49 | .36 | .48 |
| 22 | .11 | .22 | .14 | .26 | .43 | .44 | .40 | .51 | .61 | .96 | .37 | .53 |
| 23 | .11 | .18 | .16 | 1.3 | .44 | .46 | .38 | .58 | 1.3 | .49 | .39 | .49 |
| 24 | .12 | .19 | .17 | 14 | .45 | .45 | .35 | .60 | .49 | .48 | .40 | .93 |
| 25 | .16 | .27 | 1.5 | 162 | .44 | .45 | .37 | .65 | .57 | .52 | .45 | .43 |
| 26 | .16 | .27 | .53 | .94 | .56 | .44 | .38 | .62 | .57 | .58 | .42 | .44 |
| 27 | .11 | .63 | .42 | 6.9 | 5.3 | .45 | .42 | .61 | .61 | 6.8 | .45 | .42 |
| 28 | .57 | .27 | .43 | 2.8 | 6.7 | .42 | 7.7 | .72 | .65 | .45 | .43 | .48 |
| 29 | .16 | .19 | .52 | .30 | .38 | .52 | .65 | .75 | 2.5 | .42 | .46 | .49 |
| 30 | .14 | 1.0 | 6.0 | 2.6 | --- | .45 | .58 | .63 | .64 | .48 | .49 | .51 |
| 31 | 2.0 | --- | 5.4 | .59 | --- | 1.9 | --- | .62 | --- | .47 | 11 | --- |
| TOTAL | 9.04 | 19.79 | 31.95 | 206.26 | 33.64 | 53.10 | 20.64 | 18.45 | 41.98 | 28.93 | 24.08 | 16.25 |
| MEAN | .29 | .66 | 1.03 | 6.65 | 1.16 | 1.71 | .69 | .60 | 1.40 | .93 | .78 | .54 |
| MAX | 2.0 | 7.6 | 12 | 162 | 6.7 | 29 | 7.7 | .79 | 21 | 6.8 | 11 | 2.1 |
| MIN | .10 | .11 | .14 | .18 | .23 | .38 | .34 | .46 | .49 | .42 | .32 | .40 |
| AC-FT | 18 | 39 | 63 | 409 | 67 | 105 | 41 | 37 | 83 | 57 | 48 | 32 |

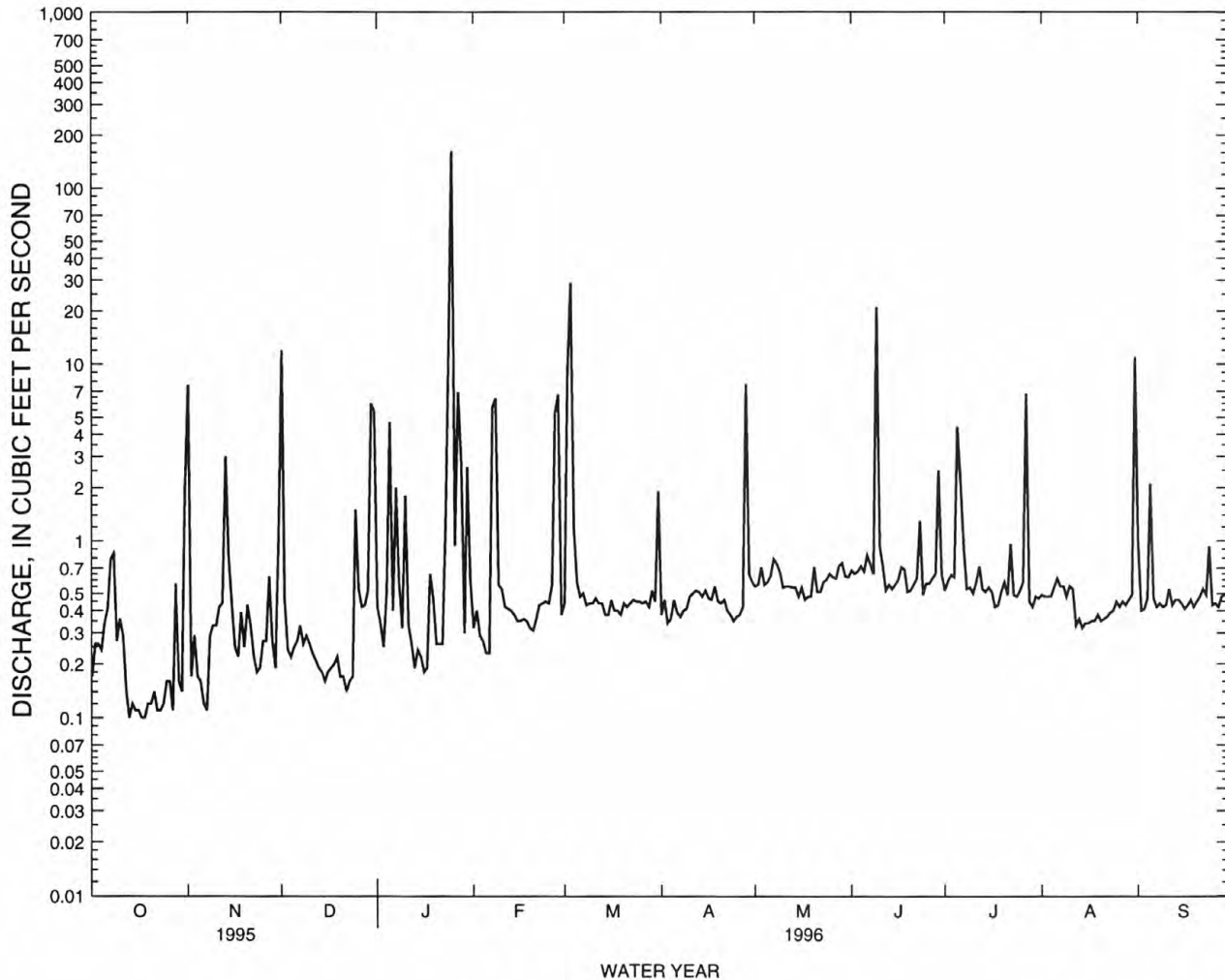
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1983 - 1996, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|------|------|------|------|------|------|------|------|------|------|------|------|------|
| MEAN | 1.06 | 2.26 | 2.43 | 1.73 | 2.25 | 2.15 | 1.72 | .90 | .82 | .75 | .57 | .98 |
| MAX | 2.21 | 9.43 | 15.0 | 6.65 | 5.56 | 8.83 | 11.9 | 1.95 | 2.17 | 1.92 | 1.10 | 4.36 |
| (WY) | 1990 | 1987 | 1988 | 1996 | 1994 | 1991 | 1989 | 1988 | 1989 | 1989 | 1989 | 1986 |
| MIN | .29 | .12 | .26 | .18 | .44 | .26 | .34 | .33 | .20 | .18 | .14 | .11 |
| (WY) | 1996 | 1985 | 1994 | 1985 | 1984 | 1995 | 1992 | 1984 | 1995 | 1984 | 1984 | 1984 |

16265600 RIGHT BRANCH KAMOOALII STREAM NEAR KANEOHE--Continued

| SUMMARY STATISTICS | FOR 1995 CALENDAR YEAR | | FOR 1996 WATER YEAR | | WATER YEARS 1983 - 1996 | |
|--------------------------|------------------------|--------|---------------------|--------|-------------------------|-------------|
| ANNUAL TOTAL | 224.28 | | 504.11 | | | |
| ANNUAL MEAN | .61 | | 1.38 | | 1.47 | |
| HIGHEST ANNUAL MEAN | | | | | 2.84 1989 | |
| LOWEST ANNUAL MEAN | | | | | .33 1984 | |
| HIGHEST DAILY MEAN | 34 | Feb 27 | 162 | Jan 25 | 177 | Dec 31 1987 |
| LOWEST DAILY MEAN | .10 | Sep 26 | .10 | Oct 13 | .03 | Nov 16 1984 |
| ANNUAL SEVEN-DAY MINIMUM | .11 | Oct 13 | .11 | Oct 13 | .04 | Nov 15 1984 |
| ANNUAL RUNOFF (AC-PT) | 445 | | 1000 | | 1070 | |
| 10 PERCENT EXCEEDS | .48 | | .95 | | 1.7 | |
| 50 PERCENT EXCEEDS | .22 | | .45 | | .54 | |
| 90 PERCENT EXCEEDS | .14 | | .19 | | .23 | |

e Estimated



HAWAII, ISLAND OF OAHU
16265600 RIGHT BRANCH KAMOOALII STREAM NEAR KANEOHE--Continued
WATER-QUALITY RECORDS

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

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

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

REMARKS.--Water-quality samples also were collected at this site. Record of "Sediment discharge, suspended (tons/day)" for water years 1994, 1995, and 1996 was not completed at the time of this publication.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

| DATE | TIME | DIS- CHARGE, INST. CUBIC FEET PER SECOND | SPE- CIFIC CON- DUCT- ANCE (US/CM) | PH WATER WHOLE FIELD (STAND- ARD UNITS) | TEMPER- ATURE AIR (DEG C) | TEMPER- ATURE WATER (DEG C) | TUR- BID- ITY (NTU) | BARO- METRIC PRES- SURE (MM OF HG) | OXYGEN, DIS- SOLVED CENT SATUR- ATION | COLI- FORM, FECAL, UM-MF (COLS./ 100 ML) | |
|-------|------|--|---|--|---|---|---|---|--|---|---|
| OCT | | | | | | | | | | | |
| 11... | 1610 | 0.15 | 194 | 6.6 | 25.0 | 23.5 | 1.2 | 759 | 4.1 | 49 | -- |
| NOV | | | | | | | | | | | |
| 21... | 1510 | 0.21 | 196 | 6.7 | 25.0 | 24.0 | 1.7 | 756 | 3.5 | 42 | -- |
| DEC | | | | | | | | | | | |
| 12... | 1220 | 0.27 | 250 | 6.7 | 24.0 | 23.0 | 1.8 | 763 | 4.2 | 49 | 2800 |
| JAN | | | | | | | | | | | |
| 18... | 0940 | 0.45 | 150 | 6.8 | 21.5 | 21.5 | 22 | 761 | 5.4 | 61 | -- |
| FEB | | | | | | | | | | | |
| 20... | 1030 | 0.33 | 250 | 6.7 | 20.5 | 21.0 | 1.7 | 761 | 5.3 | 60 | 1300 |
| MAR | | | | | | | | | | | |
| 06... | 1305 | 0.48 | 240 | 6.6 | 23.0 | 22.5 | 0.50 | 755 | 5.2 | 61 | -- |
| APR | | | | | | | | | | | |
| 24... | 1322 | 0.38 | 234 | 6.8 | 26.5 | 24.5 | 0.70 | 763 | 5.7 | 68 | -- |
| MAY | | | | | | | | | | | |
| 15... | 1240 | 0.43 | 202 | 6.7 | 25.5 | 23.5 | 1.4 | 762 | 5.5 | 65 | 4000 |
| | | | | | | | | | | | |
| DATE | TIME | HARD- NESS TOTAL (MG/L AS CACO3) | CALCIUM DIS- SOLVED (MG/L AS CA) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) | SODIUM, DIS- SOLVED (MG/L AS NA) | SODIUM PERCENT | SODIUM AD- SORP- TION RATIO | POTAS- SIUM, DIS- SOLVED (MG/L AS K) | ALKA- LINITY LAB (MG/L AS CACO3) | SULFATE DIS- SOLVED (MG/L AS SO4) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) |
| DEC | | | | | | | | | | | |
| 12... | 1220 | 76 | 15 | 9.3 | 18 | 34 | 0.9 | 1.4 | 74 | 12 | 21 |
| | | | | | | | | | | | |
| DATE | TIME | FLUO- RIDE, DIS- SOLVED (MG/L AS F) | SILICA, DIS- SOLVED (MG/L AS SIO2) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) | SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) | SOLIDS, DIS- SOLVED (TONS PER AC-PT) | RESIDUE TOTAL AT 105 DEG. C, SUS- PENDED (MG/L) | NITRO- GEN, NO2+NO3 TOTAL (MG/L AS N) | NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) | NITRO- GEN, AM- MONIA + ORGANIC TOTAL (MG/L AS N) | PHOS- PHORUS TOTAL (MG/L AS P) |
| DEC | | | | | | | | | | | |
| 12... | 1220 | <0.10 | 23 | 142 | 146 | 0.19 | <1 | 0.400 | 0.400 | <0.20 | <0.010 |
| FEB | | | | | | | | | | | |
| 20... | 1030 | -- | -- | -- | -- | -- | 4 | 0.510 | 0.510 | <0.20 | 0.010 |
| MAY | | | | | | | | | | | |
| 15... | 1240 | -- | -- | -- | -- | -- | 1 | 0.500 | 0.500 | <0.20 | 0.030 |
| | | | | | | | | | | | |
| DATE | TIME | ALUM- INUM, TOTAL RECOV- ERABLE (UG/L AS AL) | ALUM- INUM, DIS- SOLVED (UG/L AS AL) | ARSENIC TOTAL (UG/L AS AS) | BARIUM, TOTAL RECOV- ERABLE (UG/L AS BA) | BARIUM, DIS- SOLVED (UG/L AS BA) | BERYL- LIUM, TOTAL RECOV- ERABLE (UG/L AS BE) | CADMIUM WATER UNFLTRD TOTAL (UG/L AS CD) | CHRO- MIUM, TOTAL RECOV- ERABLE (UG/L AS CR) | COBALT, TOTAL RECOV- ERABLE (UG/L AS CO) | COBALT, DIS- SOLVED (UG/L AS CO) |
| DEC | | | | | | | | | | | |
| 12... | 1220 | 20 | <10 | <1 | <100 | 14 | <10 | <1 | <1 | <1 | <3.0 |

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

HAWAII, ISLAND OF OAHU
16265600 RIGHT BRANCH KAMOOALII STREAM NEAR KANEOHE--Continued
WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

| DATE | COPPER, TOTAL RECOV- ERABLE (UG/L AS CU) | IRON, TOTAL RECOV- ERABLE (UG/L AS FE) | IRON, DIS- SOLVED (UG/L AS FE) | LEAD, TOTAL RECOV- ERABLE (UG/L AS PB) | LITHIUM TOTAL RECOV- ERABLE (UG/L AS LI) | LITHIUM DIS- SOLVED (UG/L AS LI) | MANGA- NESE, TOTAL RECOV- ERABLE (UG/L AS MN) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) | MERCURY TOTAL RECOV- ERABLE (UG/L AS HG) | MOLYB- DENUM, TOTAL RECOV- ERABLE (UG/L AS MO) | MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) |
|--------------|---|---|--|---|---|--|---|--|---|--|---|
| DEC 12... | <1 | 510 | 110 | <1 | <10 | <4 | 240 | 220 | <0.10 | <1 | <10 |

| DATE | NICKEL, TOTAL RECOV- ERABLE (UG/L AS NI) | NICKEL, DIS- SOLVED (UG/L AS NI) | SELE- NIUM, TOTAL SOLVED (UG/L AS SE) | SELE- NIUM, DIS- SOLVED (UG/L AS SE) | SILVER, TOTAL RECOV- ERABLE (UG/L AS AG) | SILVER, DIS- SOLVED (UG/L AS AG) | STRON- TIUM, DIS- SOLVED (UG/L AS SR) | VANA- DIUM, DIS- SOLVED (UG/L AS V) | ZINC, TOTAL RECOV- ERABLE (UG/L AS ZN) | CARBON, ORGANIC TOTAL (MG/L AS C) | OIL AND GREASE, TOTAL RECOV. GRAVI- METRIC (MG/L) |
|--------------|---|--|--|---|---|--|--|--|---|---|---|
| DEC 12... | 2 | <1.0 | <1 | <1 | <1 | <1.0 | 110 | <6 | <10 | 1.6 | <1 |

| DATE | ALDRIN, TOTAL (UG/L) | CHLOR- DANE, TECH- NICAL TOTAL (UG/L) | CHLOR- PYRIFOS TOTAL RECOVER (UG/L) | P, P'- DDD UNFILT RECOVER (UG/L) | DDE, TOTAL (UG/L) | P, P'- DDT UNFILT RECOVER (UG/L) | DEF TOTAL (UG/L) | DI- AZINON, TOTAL (UG/L) | DI- ELDRIN TOTAL (UG/L) | 2, 4-DP TOTAL (UG/L) | 2, 4-D, TOTAL (UG/L) |
|--------------|----------------------------|--|---|--|-------------------------|--|------------------------|-----------------------------------|----------------------------------|----------------------------|----------------------------|
| DEC 12... | <0.010 | <0.100 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 |

| DATE | ENDO- SULFAN, I TOTAL (UG/L) | ENDRIN WATER UNFLTRD REC (UG/L) | ETHION, TOTAL (UG/L) | FONOPOS (DY- FONATE) WATER TOT.REC (UG/L) | HEPTA- CHLOR, TOTAL (UG/L) | HEPTA- CHLOR EPOXIDE TOTAL (UG/L) | LINDANE TOTAL (UG/L) | MALA- THION, TOTAL (UG/L) | METH- OXY- CHLOR, TOTAL (UG/L) | METHYL PARA- THION, TOTAL (UG/L) |
|--------------|--|---|----------------------------|--|-------------------------------------|---|----------------------------|------------------------------------|--|--|
| DEC 12... | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 |

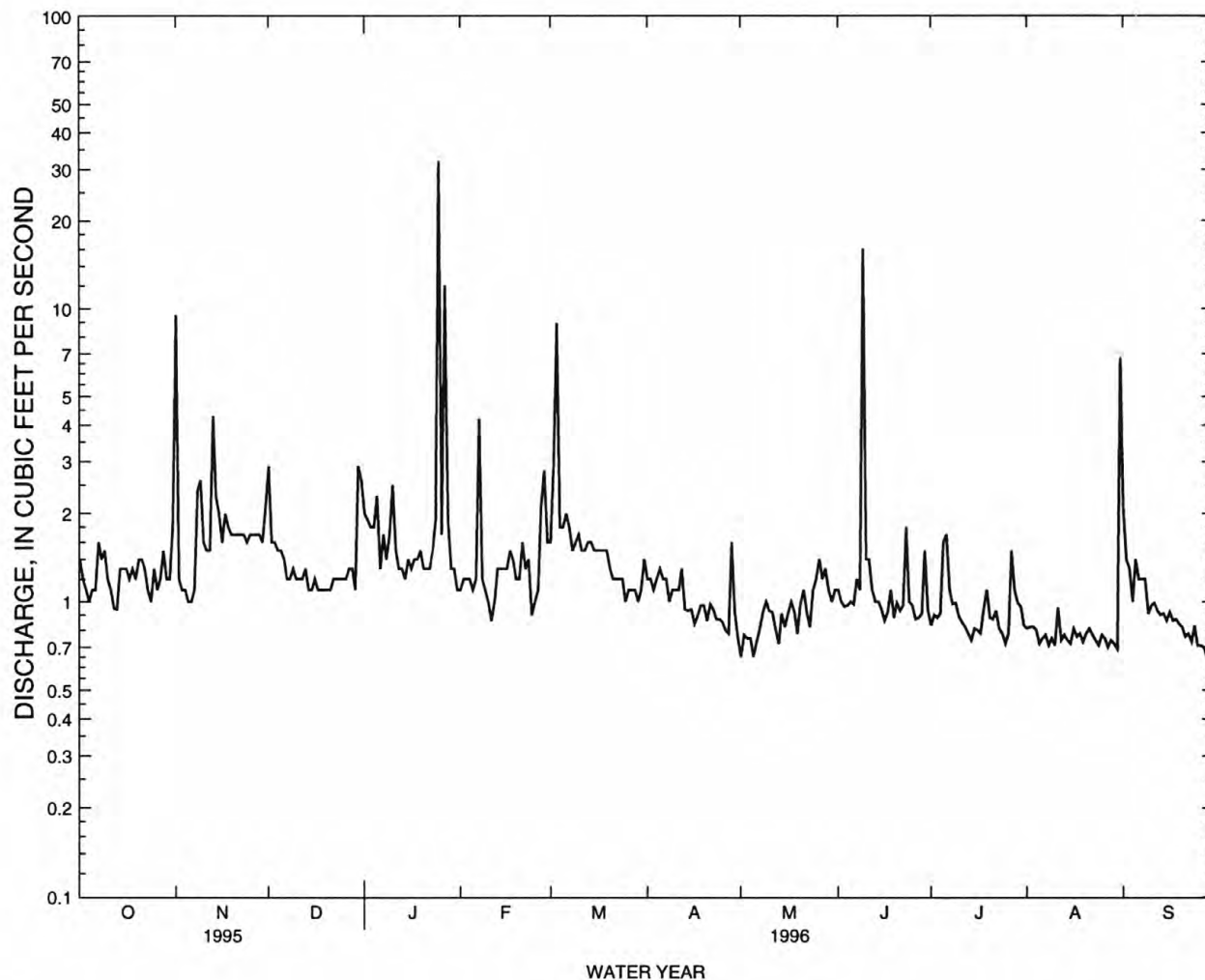
| DATE | MIREX, TOTAL (UG/L) | PARA- THION, TOTAL (UG/L) | PCB, TOTAL (UG/L) | PCNS UNFILT RECOVER (UG/L) | PER- THANE TOTAL (UG/L) | PHORATE TOTAL (UG/L) | SILVEX, TOTAL (UG/L) | TOX- APHENE, TOTAL (UG/L) | TOTAL TRI- THION (UG/L) | 2, 4, 5-T TOTAL (UG/L) |
|--------------|---------------------------|------------------------------------|-------------------------|-------------------------------------|----------------------------------|----------------------------|----------------------------|------------------------------------|----------------------------------|------------------------------|
| DEC 12... | <0.010 | <0.010 | <0.100 | <0.100 | <0.100 | <0.010 | <0.010 | <1.00 | <0.010 | <0.010 |

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

HAWAII, ISLAND OF OAHU

16270900 LULUKU STREAM AT ALTITUDE 220 FT, NEAR KANEOHE--Continued

| SUMMARY STATISTICS | FOR 1995 CALENDAR YEAR | FOR 1996 WATER YEAR | WATER YEARS 1967 - 1996 | |
|--------------------------|------------------------|---------------------|-------------------------|-------------|
| ANNUAL TOTAL | 564.03 | 519.64 | | |
| ANNUAL MEAN | 1.55 | 1.42 | 1.40 | |
| HIGHEST ANNUAL MEAN | | | 2.13 | 1969 |
| LOWEST ANNUAL MEAN | | | .41 | 1986 |
| HIGHEST DAILY MEAN | 9.5 Nov 1 | 32 Jan 25 | 67 | Feb 1 1969 |
| LOWEST DAILY MEAN | .54 Jul 13 | .65 May 1 | .03 | Oct 14 1988 |
| ANNUAL SEVEN-DAY MINIMUM | .80 Jul 11 | .72 Sep 24 | .07 | Nov 18 1984 |
| ANNUAL RUNOFF (AC-FT) | 1120 | 1030 | 1010 | |
| 10 PERCENT EXCEEDS | 2.1 | 1.7 | 2.1 | |
| 50 PERCENT EXCEEDS | 1.5 | 1.1 | 1.1 | |
| 90 PERCENT EXCEEDS | 1.0 | .77 | .32 | |



HAWAII, ISLAND OF OAHU
16270900 LULUKU STREAM AT ALTITUDE 220 FT, NEAR KANEOHE--Continued
WATER-QUALITY RECORDS

PERIOD OF RECORD.--April 1984 to current year.

PERIOD OF DAILY RECORD.--

SUSPENDED SEDIMENT DISCHARGE: April 1984 to current year.

INSTRUMENTATION.--Automatic pumping sediment sampler since April 1984.

REMARKS.--Water-quality samples also were collected at this site. Record of "Sediment discharge, suspended (tons/day)" for water years 1994, 1995, and 1996 was not completed at the time of this publication.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

| DATE | TIME | DIS-CHARGE, INST. CUBIC FEET PER SECOND | SPE-CIFIC CON-DUCTANCE (US/CM) | PH WATER WHOLE FIELD (STAND-ARD UNITS) | TEMPER-ATURE AIR (DEG C) | TEMPER-ATURE WATER (DEG C) | TUR-BID-ITY (NTU) | BARO-METRIC PRES-SURE (MM OF HG) | OXYGEN, DIS-SOLVED (MG/L) | OXYGEN, (PER-CENT SATUR-ATION) | COLI-FORM, FECAL, UM-MF (COLS./100 ML) |
|-------|------|---|-----------------------------------|---|---|-------------------------------------|--|--------------------------------------|---|---|--|
| | | | | | | | | | | | |
| OCT | | | | | | | | | | | |
| 11... | 1445 | 1.1 | 148 | 6.9 | 26.0 | 20.5 | 1.9 | 759 | 8.1 | 91 | -- |
| NOV | | | | | | | | | | | |
| 21... | 1150 | 1.6 | 145 | 7.5 | 29.0 | 20.5 | 0.90 | 757 | 9.3 | 104 | -- |
| DEC | | | | | | | | | | | |
| 11... | 1015 | 1.2 | 157 | 7.7 | 24.0 | 20.0 | 2.3 | 762 | 8.8 | 97 | 940 |
| JAN | | | | | | | | | | | |
| 17... | 1215 | 1.3 | 157 | 7.7 | 25.5 | 20.0 | 2.2 | 759 | 8.8 | 97 | -- |
| FEB | | | | | | | | | | | |
| 20... | 1235 | 1.0 | 180 | 7.7 | 20.0 | 18.5 | 0.30 | 760 | 9.2 | 98 | 550 |
| MAR | | | | | | | | | | | |
| 05... | 0930 | 1.9 | 187 | 7.0 | 22.5 | 19.5 | 0.40 | 759 | 8.5 | 93 | -- |
| APR | | | | | | | | | | | |
| 24... | 1040 | 0.89 | 155 | 7.4 | 27.0 | 21.0 | 0.10 | 762 | 8.6 | 97 | -- |
| MAY | | | | | | | | | | | |
| 14... | 1340 | 1.1 | 158 | 7.6 | 25.5 | 22.0 | 0.30 | 761 | 8.8 | 101 | 1000 |
| | | | | | | | | | | | |
| DATE | TIME | HARD-NESS TOTAL (MG/L AS CAC03) | CALCIUM DIS-SOLVED (MG/L AS CA) | MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) | SODIUM, DIS-SOLVED (MG/L AS NA) | SODIUM PERCENT | SODIUM AD-SORP-TION RATIO | POTAS-SIUM, DIS-SOLVED (MG/L AS K) | ALKA-LINITY LAB (MG/L AS CAC03) | SULFATE DIS-SOLVED (MG/L AS SO4) | CHLO-RIDE, DIS-SOLVED (MG/L AS CL) |
| DEC | | | | | | | | | | | |
| 11... | 1015 | 45 | 8.9 | 5.5 | 12 | 36 | 0.8 | 1.0 | 49 | 3.6 | 15 |
| | | | | | | | | | | | |
| DATE | TIME | FLUO-RIDE, DIS-SOLVED (MG/L AS F) | SILICA, DIS-SOLVED (MG/L AS SIO2) | SOLIDS, RESIDUE AT 180 DEG. C SOLVED (MG/L) | SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) | SOLIDS, DIS-SOLVED (TONS PER AC-FT) | RESIDUE TOTAL AT 105 DEG. C, SUS-PENDED (MG/L) | NITRO-GEN, NO2+NO3 TOTAL (MG/L AS N) | NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N) | NITRO-GEN, AM-MONIA + ORGANIC TOTAL (MG/L AS N) | PHOS-PHORUS TOTAL (MG/L AS P) |
| DEC | | | | | | | | | | | |
| 11... | 1015 | <0.10 | 29 | 103 | 105 | 0.14 | <1 | 0.170 | 0.170 | <0.20 | 0.040 |
| FEB | | | | | | | | | | | |
| 20... | 1235 | -- | -- | -- | -- | -- | 1 | 0.110 | 0.110 | <0.20 | 0.030 |
| MAY | | | | | | | | | | | |
| 14... | 1340 | -- | -- | -- | -- | -- | 2 | 0.080 | 0.080 | <0.20 | 0.020 |

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

HAWAII, ISLAND OF OAHU

16270900 LULUKU STREAM AT ALTITUDE 220 FT, NEAR KANEOHE--Continued
 WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

| DATE | TIME | ALUM- TOTAL RECOV- ERABLE (UG/L AS AL) | ALUM- INUM, DIS- SOLVED (UG/L AS AL) | ARSENIC TOTAL (UG/L AS AS) | BARIUM, TOTAL RECOV- ERABLE (UG/L AS BA) | BARIUM, DIS- SOLVED (UG/L AS BA) | BERYL- LIUM, TOTAL RECOV- ERABLE (UG/L AS BE) | CADMIUM WATER UNFLTRD TOTAL (UG/L AS CD) | CHRO- MIUM, TOTAL RECOV- ERABLE (UG/L AS CR) | COBALT, TOTAL RECOV- ERABLE (UG/L AS CO) | COBALT, DIS- SOLVED (UG/L AS CO) |
|--------------|---|---|--|--|---|---|---|---|--|--|---|
| DEC 11... | 1015 | 170 | 10 | <1 | <100 | <2.0 | <10 | <1 | 2 | <1 | <3.0 |
| DATE | COPPER, TOTAL RECOV- ERABLE (UG/L AS CU) | IRON, TOTAL RECOV- ERABLE (UG/L AS FE) | IRON, DIS- SOLVED (UG/L AS FE) | LEAD, TOTAL RECOV- ERABLE (UG/L AS PB) | LITHIUM TOTAL RECOV- ERABLE (UG/L AS LI) | LITHIUM DIS- SOLVED (UG/L AS LI) | MANGA- NESE, TOTAL RECOV- ERABLE (UG/L AS MN) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) | MERCURY TOTAL RECOV- ERABLE (UG/L AS HG) | MOLYB- DENUM, TOTAL RECOV- ERABLE (UG/L AS MO) | MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) |
| DEC 11... | <1 | 250 | 23 | <1 | <10 | <4 | 30 | 6.0 | <0.10 | <1 | <10 |
| DATE | NICKEL, TOTAL RECOV- ERABLE (UG/L AS NI) | NICKEL, DIS- SOLVED (UG/L AS NI) | SELE- NIUM, TOTAL SOLVED (UG/L AS SE) | SELE- NIUM, DIS- SOLVED (UG/L AS SE) | SILVER, TOTAL RECOV- ERABLE (UG/L AS AG) | SILVER, DIS- SOLVED (UG/L AS AG) | STRON- TIUM, DIS- SOLVED (UG/L AS SR) | VANA- DIUM, DIS- SOLVED (UG/L AS V) | ZINC, TOTAL RECOV- ERABLE (UG/L AS ZN) | CARBON, ORGANIC TOTAL (MG/L AS C) | OIL AND GREASE, TOTAL RECOV- GRAVI- METRIC (MG/L) |
| DEC 11... | <1 | <1.0 | <1 | <1 | <1 | <1.0 | 53 | 6 | <10 | 0.80 | <1 |
| DATE | ALDRIN, TOTAL (UG/L) | CHLOR- DANE, TECH- NICAL TOTAL (UG/L) | CHLOR- PYRIFOS TOTAL RECOVER (UG/L) | P, P'- DDD UNFILT RECOVER (UG/L) | DDE, TOTAL RECOVER (UG/L) | P, P'- DDT UNFILT RECOVER (UG/L) | DEF TOTAL (UG/L) | DI- AZINON, TOTAL (UG/L) | DI- ELDRIN, TOTAL (UG/L) | 2, 4-DP TOTAL (UG/L) | 2,4-D, TOTAL (UG/L) |
| DEC 11... | <0.010 | <0.100 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 |
| DATE | ENDO- SULFAN, I TOTAL (UG/L) | ENDRIN WATER UNFLTRD REC (UG/L) | ETHION, TOTAL (UG/L) | FONOFOS (DY- FONATE) WHOLE TOT.REC (UG/L) | HEPTA- CHLOR, EPOXIDE TOTAL (UG/L) | HEPTA- CHLOR EPOXIDE TOTAL (UG/L) | LINDANE TOTAL (UG/L) | MALA- THION, TOTAL (UG/L) | METH- OXY- CHLOR, TOTAL (UG/L) | METHYL PARA- THION, TOTAL (UG/L) | |
| DEC 11... | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | |
| DATE | MIREX, TOTAL (UG/L) | PARA- THION, TOTAL (UG/L) | PCB, TOTAL (UG/L) | PCNS UNFILT RECOVER (UG/L) | PER- THANE TOTAL (UG/L) | PHORATE TOTAL (UG/L) | SILVEX, TOTAL (UG/L) | TOX- APHENE, TOTAL (UG/L) | TOTAL TRI- THION (UG/L) | 2,4,5-T TOTAL (UG/L) | |
| DEC 11... | <0.010 | <0.010 | <0.100 | <0.100 | <0.100 | <0.010 | <0.010 | <1.00 | <0.010 | <0.010 | |

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

HAWAII, ISLAND OF OAHU

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 mi².

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 good. Flow regulated by a flood-control dam upstream.

AVERAGE DISCHARGE.--19 years (water years 1978-96), 11.0 ft³/s (7,990 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,650 ft³/s, December 31, 1987, gage height, 5.72 ft, from rating curve extended above 200 ft³/s; minimum, 0.25 ft³/s on several days in October 1984.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 700 ft³/s and maximum (*):

| Date | Time | Discharge (ft ³ /s) | Gage height (ft) | Date | Time | Discharge (ft ³ /s) | Gage height (ft) |
|---------|------|-----------------------------------|---------------------|------|------|-----------------------------------|---------------------|
| Jan. 25 | 0315 | *1,760 | *5.87 | | | | |

Minimum discharge, 1.0 ft³/s, December 18, 21.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY MEAN VALUES

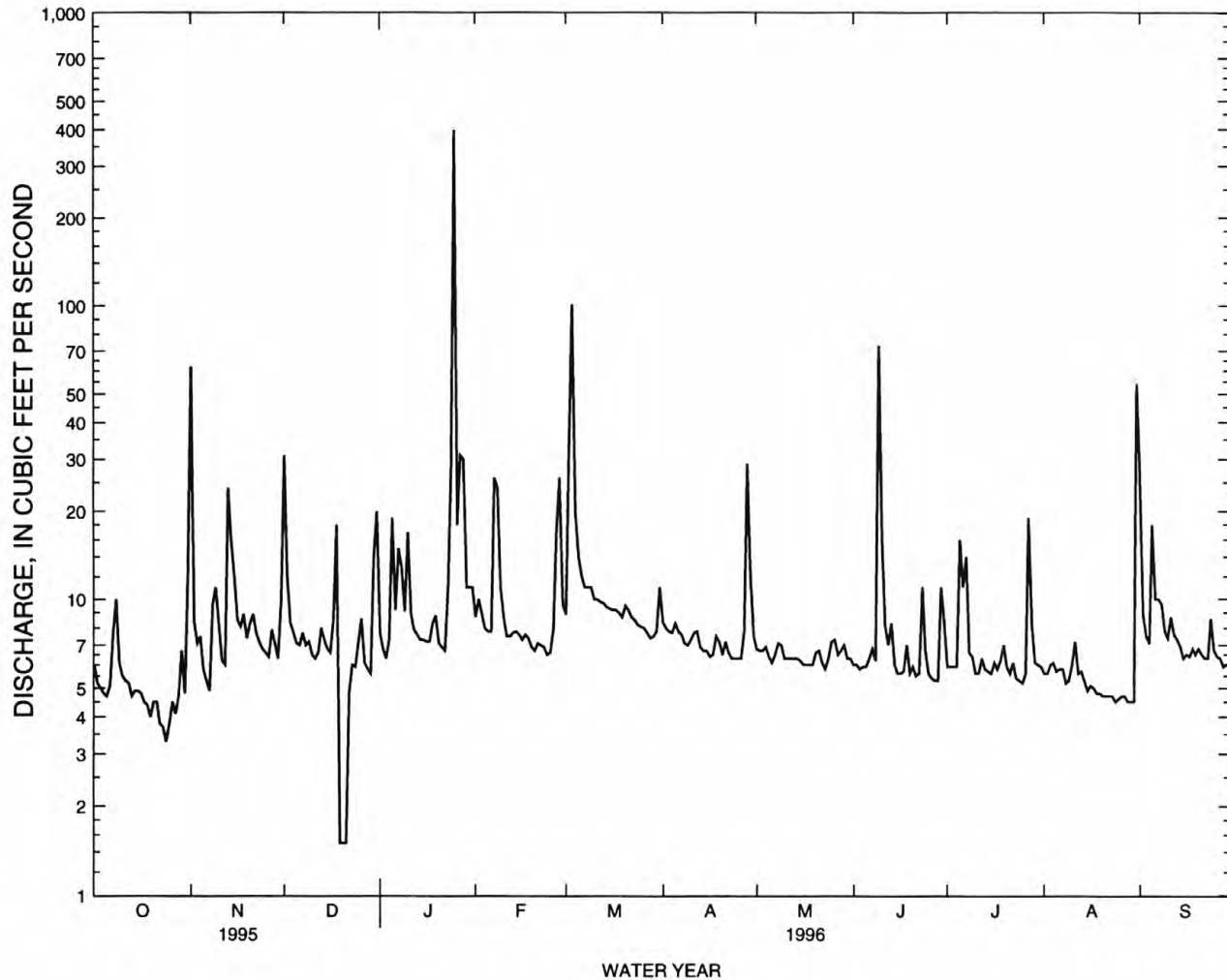
| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 6.0 | 62 | 31 | 7.7 | 8.7 | 8.9 | 8.4 | 6.8 | 6.0 | 5.9 | 5.6 | 28 |
| 2 | 5.2 | 8.4 | 12 | 6.8 | 10 | 31 | 8.0 | 6.7 | 6.0 | 5.9 | 5.6 | 8.9 |
| 3 | 5.0 | 7.1 | 8.3 | 6.3 | 8.9 | 101 | 7.8 | 6.7 | 5.8 | 5.9 | 6.0 | 7.5 |
| 4 | 4.8 | 7.5 | 7.7 | 7.3 | 8.0 | 20 | 7.7 | 6.9 | 5.9 | 5.9 | 6.1 | 7.1 |
| 5 | 4.7 | 5.8 | 7.1 | 19 | 7.8 | 14 | 8.3 | 6.4 | 5.9 | 16 | 5.7 | 18 |
| 6 | 5.1 | 5.3 | 7.0 | 9.2 | 7.8 | 12 | 7.8 | 6.1 | 6.3 | 11 | 5.8 | 10 |
| 7 | 7.7 | 4.9 | 7.7 | 15 | 26 | 11 | 7.6 | 6.5 | 6.8 | 14 | 5.8 | 10 |
| 8 | 10 | 9.6 | 7.0 | 13 | 24 | 11 | 7.1 | 7.1 | 6.2 | 6.6 | 5.2 | 9.6 |
| 9 | 6.1 | 11 | 7.2 | 9.1 | 11 | 11 | 7.0 | 7.0 | 73 | 6.4 | 5.3 | 7.8 |
| 10 | 5.5 | 8.3 | 6.5 | 17 | 8.7 | 10 | 7.3 | 6.3 | 16 | 5.6 | 6.0 | 7.4 |
| 11 | 5.3 | 6.2 | 6.3 | 8.9 | 7.5 | 10 | 7.7 | 6.3 | 8.2 | 5.6 | 7.2 | 8.7 |
| 12 | 5.2 | 6.0 | 6.6 | 7.9 | 7.5 | 9.8 | 7.8 | 6.3 | 7.0 | 6.3 | 5.6 | 7.6 |
| 13 | 4.7 | 24 | 8.0 | 7.6 | 7.7 | 9.7 | 6.9 | 6.3 | 8.3 | 5.8 | 5.7 | 7.3 |
| 14 | 4.9 | 16 | 7.3 | 7.3 | 7.8 | 9.4 | 6.7 | 6.3 | 6.0 | 5.7 | 5.3 | 6.9 |
| 15 | 4.9 | 12 | 6.8 | 7.3 | 7.6 | 9.3 | 6.7 | 6.2 | 5.6 | 5.6 | 4.9 | 6.3 |
| 16 | 4.8 | 8.5 | 6.6 | 7.2 | 7.3 | 9.2 | 6.4 | 6.0 | 5.6 | 6.1 | 5.1 | 6.5 |
| 17 | 4.5 | 8.1 | 8.6 | 7.2 | 7.6 | 9.2 | 6.5 | 6.0 | 5.7 | 5.8 | 5.0 | 6.4 |
| 18 | 4.4 | 8.9 | 18 | 8.3 | 7.4 | 9.0 | 7.5 | 6.0 | 7.0 | 6.2 | 4.8 | 6.8 |
| 19 | 4.0 | 7.4 | 1.5 | 8.8 | 6.9 | 8.7 | 7.2 | 6.0 | 5.6 | 7.0 | 4.8 | 6.5 |
| 20 | 4.5 | 8.3 | 1.5 | 7.1 | 6.7 | 9.5 | 6.5 | 6.6 | 5.9 | 5.9 | 4.7 | 6.8 |
| 21 | 4.5 | 8.9 | 1.5 | 6.9 | 7.1 | 9.2 | 7.2 | 6.7 | 5.5 | 5.6 | 4.7 | 6.5 |
| 22 | 3.8 | 7.7 | 4.8 | 6.7 | 7.0 | 8.7 | 6.6 | 6.1 | 5.6 | 6.1 | 4.7 | 6.3 |
| 23 | 3.7 | 7.2 | 6.0 | 11 | 6.9 | 8.5 | 6.3 | 5.8 | 11 | 5.4 | 4.7 | 6.3 |
| 24 | 3.3 | 6.8 | 5.9 | 28 | 6.5 | 8.2 | 6.3 | 6.3 | 6.7 | 5.3 | 4.5 | 8.6 |
| 25 | 3.8 | 6.6 | 7.1 | 399 | 6.6 | 8.1 | 6.3 | 7.2 | 5.6 | 5.2 | 4.6 | 6.7 |
| 26 | 4.5 | 6.4 | 8.6 | 18 | 8.0 | 8.0 | 6.3 | 7.3 | 5.4 | 5.6 | 4.7 | 6.4 |
| 27 | 4.1 | 7.9 | 6.1 | 31 | 17 | 7.7 | 7.8 | 6.5 | 5.3 | 19 | 4.7 | 6.3 |
| 28 | 4.7 | 7.1 | 5.8 | 30 | 26 | 7.4 | 29 | 6.7 | 5.3 | 8.2 | 4.5 | 5.9 |
| 29 | 6.7 | 6.3 | 5.6 | 11 | 9.6 | 7.5 | 12 | 7.0 | 11 | 6.1 | 4.5 | 6.0 |
| 30 | 4.8 | 9.9 | 14 | 11 | --- | 7.8 | 7.5 | 6.3 | 8.4 | 6.0 | 4.5 | 6.1 |
| 31 | 12 | --- | 20 | 11 | --- | 11 | --- | 6.3 | --- | 5.9 | 54 | --- |
| TOTAL | 163.2 | 310.1 | 258.1 | 751.6 | 289.6 | 415.8 | 242.2 | 200.7 | 272.6 | 221.6 | 210.3 | 249.2 |
| MEAN | 5.26 | 10.3 | 8.33 | 24.2 | 9.99 | 13.4 | 8.07 | 6.47 | 9.09 | 7.15 | 6.78 | 8.31 |
| MAX | 12 | 62 | 31 | 399 | 26 | 101 | 29 | 7.3 | 73 | 19 | 54 | 28 |
| MIN | 3.3 | 4.9 | 1.5 | 6.3 | 6.5 | 7.4 | 6.3 | 5.8 | 5.3 | 5.2 | 4.5 | 5.9 |
| AC-FT | 324 | 615 | 512 | 1490 | 574 | 825 | 480 | 398 | 541 | 440 | 417 | 494 |

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1977 - 1996, BY WATER YEAR (WY)

| | MEAN | MAX | (WY) | MIN | (WY) |
|------|------|------|------|------|------|
| MEAN | 8.37 | 11.0 | 12.7 | 15.4 | 12.9 |
| MAX | 16.8 | 29.6 | 37.2 | 53.4 | 35.9 |
| (WY) | 1983 | 1987 | 1988 | 1988 | 1979 |
| MIN | 2.91 | 3.90 | 4.56 | 4.05 | 3.83 |
| (WY) | 1985 | 1985 | 1978 | 1977 | 1978 |

16272200 KAMOOALII STREAM BELOW LULUKU STREAM NEAR KANEOHE--Continued

| SUMMARY STATISTICS | FOR 1995 CALENDAR YEAR | | FOR 1996 WATER YEAR | | WATER YEARS 1977 - 1996 | |
|--------------------------|------------------------|--------|---------------------|--------|-------------------------|-------------|
| ANNUAL TOTAL | 2654.1 | | 3585.0 | | 11.0 | |
| ANNUAL MEAN | 7.27 | | 9.80 | | 4.36 | |
| HIGHEST ANNUAL MEAN | | | | | 22.0 | 1982 |
| LOWEST ANNUAL MEAN | | | | | 4.36 | 1984 |
| HIGHEST DAILY MEAN | 64 | Feb 28 | 399 | Jan 25 | 723 | Jan 1 1988 |
| LOWEST DAILY MEAN | 1.5 | Dec 19 | 1.5 | Dec 19 | .29 | Oct 10 1984 |
| ANNUAL SEVEN-DAY MINIMUM | 3.8 | Aug 29 | 3.9 | Oct 19 | .30 | Oct 10 1984 |
| ANNUAL RUNOFF (AC-FT) | 5260 | | 7110 | | 7990 | |
| 10 PERCENT EXCEEDS | 9.2 | | 12 | | 17 | |
| 50 PERCENT EXCEEDS | 6.1 | | 6.9 | | 7.4 | |
| 90 PERCENT EXCEEDS | 4.7 | | 4.9 | | 4.5 | |



HAWAII, ISLAND OF OAHU
 16272200 KAMOOALII STREAM BELOW LULUKU STREAM NEAR KANEOHE--Continued
 WATER-QUALITY RECORDS

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

PERIOD OF DAILY RECORD.--

SUSPENDED SEDIMENT DISCHARGE: November 1976 to current year.

INSTRUMENTATION.--Automatic pumping sediment sampler since November 1976.

REMARKS.--Water-quality samples also were collected at this site. Table of "Sediment discharge, suspended (tons/day)" for water years 1995 and 1996 was not completed at the time of this publication.

EXTREMES FOR PERIOD OF RECORD.--

WATER YEAR 1994:

SEDIMENT CONCENTRATIONS: Maximum daily mean, 879 mg/L, March 18, 1980; minimum daily mean, 1 mg/L on several days in 1988, 1990, 1991, 1994.

SEDIMENT DISCHARGE: Maximum daily, 1,380 tons, March 18, 1980; minimum daily, 0.01 ton, October 9-11, 1981, Aug. 13, 1993.

EXTREMES FOR CURRENT YEAR.--

WATER YEAR 1994:

SEDIMENT CONCENTRATIONS: Maximum daily mean, 158 mg/L, March 24; minimum daily mean, 1 mg/L, April 25, May 2, 3, 7, 8.

SEDIMENT DISCHARGE: Maximum daily, 231 tons, March 24; minimum daily, 0.03 ton, May 3, 8.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

| DATE | TIME | DIS- CHARGE, INST. CUBIC FEET PER SECOND | SPE- CIFIC CON- DUCT- ANCE (US/CM) | PH WATER WHOLE FIELD (STAND- ARD UNITS) | TEMPER- ATURE AIR (DEG C) | TEMPER- ATURE WATER (DEG C) | TUR- BID- ITY (NTU) | BARO- METRIC PRES- SURE (MM OF HG) | OXYGEN, DIS- SOLVED (MG/L) | OXYGEN, DIS- SOLVED (MG/L) | OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) | COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) |
|-------|------|--|---|---|------------------------------------|--------------------------------------|------------------------------|--|-------------------------------------|-------------------------------------|--|--|
| OCT | | | | | | | | | | | | |
| 11... | 1020 | 5.4 | 180 | 8.0 | 27.5 | 24.5 | 1.6 | 761 | 9.0 | 108 | | -- |
| NOV | | | | | | | | | | | | |
| 21... | 1040 | 9.0 | 175 | 8.0 | 25.5 | 24.0 | 3.4 | 759 | 9.0 | 107 | | -- |
| DEC | | | | | | | | | | | | |
| 12... | 1000 | 6.7 | 182 | 8.0 | 24.0 | 23.5 | 2.5 | 764 | 8.8 | 103 | | 250 |
| JAN | | | | | | | | | | | | |
| 17... | 1015 | 6.9 | 180 | 8.0 | 24.5 | 23.0 | 0.90 | 758 | 8.8 | 103 | | -- |
| FEB | | | | | | | | | | | | |
| 20... | 1040 | 7.2 | 180 | 7.9 | 21.0 | 19.5 | 2.1 | 765 | 8.3 | 90 | | 50 |
| MAR | | | | | | | | | | | | |
| 05... | 1330 | 14 | 174 | 6.5 | 25.5 | 22.5 | 6.0 | 755 | 8.6 | 100 | | -- |
| APR | | | | | | | | | | | | |
| 24... | 1520 | 6.4 | 215 | 7.2 | 27.5 | 27.0 | 0.70 | 763 | 7.9 | 99 | | -- |
| MAY | | | | | | | | | | | | |
| 14... | 1100 | 6.0 | 198 | 8.1 | 27.0 | 26.0 | 0.60 | 765 | 9.1 | 112 | | 100 |

| DATE | TIME | HARD- NESS TOTAL (MG/L AS CACO3) | CALCIUM DIS- SOLVED (MG/L AS CA) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) | SODIUM, DIS- SOLVED (MG/L AS NA) | SODIUM PERCENT | SODIUM AD- SORP- TION RATIO | POTAS- SIUM, DIS- SOLVED (MG/L AS K) | ALKA- LINITY LAB (MG/L AS CACO3) | SULFATE DIS- SOLVED (MG/L AS SO4) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) |
|-------|------|---|--|--|--|-------------------|---|---|---|---|---|
| DEC | | | | | | | | | | | |
| 12... | 1000 | 54 | 8.9 | 7.7 | 13 | 34 | 0.8 | 1.4 | 54 | 6.5 | 18 |

| DATE | TIME | FLUO- RIDE, DIS- SOLVED (MG/L AS F) | SILICA, DIS- SOLVED (MG/L AS SIO2) | SOLIDS, RESIDUE AT 180 DEG. C SOLVED (MG/L) | SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) | SOLIDS, DIS- SOLVED (TONS AC-FT) | RESIDUE TOTAL AT 105 DEG. C, SUS- PENDED (MG/L) | NITRO- GEN, NO2+NO3 TOTAL (MG/L AS N) | NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) | NITRO- GEN, AM- MONIA + ORGANIC TOTAL (MG/L AS N) | PHOS- PHORUS TOTAL (MG/L AS P) |
|-------|------|--|---|--|---|--|---|--|---|---|--|
| DEC | | | | | | | | | | | |
| 12... | 1000 | <0.10 | 22 | 106 | 111 | 0.14 | 4 | 0.280 | 0.280 | <0.20 | 0.010 |
| FEB | | | | | | | | | | | |
| 20... | 1040 | -- | -- | -- | -- | -- | 8 | 0.320 | 0.320 | <0.20 | 0.020 |
| MAY | | | | | | | | | | | |
| 14... | 1100 | -- | -- | -- | -- | -- | 1 | 0.320 | 0.320 | 0.20 | 0.030 |

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

HAWAII, ISLAND OF OAHU
 16272200 KAMOOALII STREAM BELOW LULUKU STREAM NEAR KANEOHE--Continued
 WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

| DATE | TIME | ALUM- INUM, TOTAL RECOV- ERABLE (UG/L AS AL) (01105) | ALUM- INUM, DIS- SOLVED (UG/L AS AL) (01106) | ARSENIC TOTAL (UG/L AS AS) (01002) | BARIUM, TOTAL RECOV- ERABLE (UG/L AS BA) (01007) | BARIUM, DIS- SOLVED (UG/L AS BA) (01005) | BERYL- LIUM, TOTAL RECOV- ERABLE (UG/L AS BE) (01012) | CADMIUM WATER UNFLTRD TOTAL (UG/L AS CD) (01027) | CHRO- MIUM, TOTAL RECOV- ERABLE (UG/L AS CR) (01034) | COBALT, TOTAL RECOV- ERABLE (UG/L AS CO) (01037) | COBALT, DIS- SOLVED (UG/L AS CO) (01035) |
|--------------|------|---|--|--|--|---|--|--|---|--|---|
| DEC 12... | 1000 | 160 | 10 | <1 | <100 | 5.0 | <10 | <1 | 1 | <1 | <3.0 |

| DATE | COPPER, TOTAL RECOV- ERABLE (UG/L AS CU) | IRON, TOTAL RECOV- ERABLE (UG/L AS FE) | IRON, DIS- SOLVED (UG/L AS FE) | LEAD, TOTAL RECOV- ERABLE (UG/L AS PB) | LITHIUM TOTAL RECOV- ERABLE (UG/L AS LI) | LITHIUM DIS- SOLVED (UG/L AS LI) | MANGA- NESE, TOTAL RECOV- ERABLE (UG/L AS MN) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) | MERCURY TOTAL ERABLE (UG/L AS HG) | MOLYB- DENUM, TOTAL RECOV- ERABLE (UG/L AS MO) | MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) |
|--------------|---|---|--|---|---|--|---|--|---|--|---|
| DEC 12... | 2 | 320 | 79 | <1 | <10 | <4 | 70 | 11 | <0.10 | <1 | <10 |

| DATE | NICKEL, TOTAL RECOV- ERABLE (UG/L AS NI) | NICKEL, DIS- SOLVED (UG/L AS NI) | SELE- NIUM, TOTAL RECOV- ERABLE (UG/L AS SE) | SELE- NIUM, DIS- SOLVED (UG/L AS SE) | SILVER, TOTAL RECOV- ERABLE (UG/L AS AG) | SILVER, DIS- SOLVED (UG/L AS AG) | STRON- TIUM, DIS- SOLVED (UG/L AS SR) | VANA- DIUM, DIS- SOLVED (UG/L AS V) | ZINC, TOTAL RECOV- ERABLE (UG/L AS ZN) | CARBON, ORGANIC TOTAL (MG/L AS C) | OIL AND GREASE, TOTAL RECOV- ERABLE (MG/L METRIC) |
|--------------|---|--|--|---|---|--|--|--|---|---|---|
| DEC 12... | 2 | <1.0 | <1 | <1 | <1 | <1.0 | 74 | <6 | <10 | 1.9 | <1 |

| DATE | ALDRIN, TOTAL (UG/L) | CHLOR- DANE, TECH- NICAL TOTAL (UG/L) | CHLOR- PYRIFOS TOTAL RECOVER (UG/L) | P,P'- DDD UNFILT RECOVER (UG/L) | DDE, TOTAL (UG/L) | P,P'- DDT UNFILT RECOVER (UG/L) | DEF TOTAL (UG/L) | DI- AZINON, TOTAL (UG/L) | DI- ELDRIN, TOTAL (UG/L) | 2,4-DP TOTAL (UG/L) | 2,4-D, TOTAL (UG/L) |
|--------------|----------------------------|--|---|---|-------------------------|---|------------------------|-----------------------------------|-----------------------------------|---------------------------|---------------------------|
| DEC 12... | <0.010 | <0.100 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 |

| DATE | ENDO- SULFAN, I TOTAL (UG/L) | ENDRIN WATER UNFLTRD REC (UG/L) | ETHION, TOTAL (UG/L) | FONOFOS (DY- FONATE) WATER WHOLE TOT.REC (UG/L) | HEPTA- CHLOR, EPOXIDE TOTAL (UG/L) | HEPTA- CHLOR EPOXIDE TOTAL (UG/L) | LINDANE TOTAL (UG/L) | MALA- THION, TOTAL (UG/L) | METH- OXY- CHLOR, TOTAL (UG/L) | METHYL PARA- THION, TOTAL (UG/L) |
|--------------|--|---|----------------------------|---|--|---|----------------------------|------------------------------------|--|--|
| DEC 12... | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 |

| DATE | MIREX, TOTAL (UG/L) | PARA- THION, TOTAL (UG/L) | PCB, TOTAL (UG/L) | PCNS UNFILT RECOVER (UG/L) | PER- THANE TOTAL (UG/L) | PHORATE TOTAL (UG/L) | SILVEX, TOTAL (UG/L) | TOX- APHENE, TOTAL (UG/L) | TOTAL TRI- THION (UG/L) | 2,4,5-T TOTAL (UG/L) |
|--------------|---------------------------|------------------------------------|-------------------------|-------------------------------------|----------------------------------|----------------------------|----------------------------|------------------------------------|----------------------------------|----------------------------|
| DEC 12... | <0.010 | <0.010 | <0.100 | <0.100 | <0.100 | <0.010 | <0.010 | <1.00 | <0.010 | <0.010 |

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

HAWAII, ISLAND OF OAHU
16272200 KAMOOALII STREAM BELOW LULUKU STREAM NEAR KANEOHE--Continued
WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

SEDIMENT DISCHARGE, SUSPENDED (TONS/DAY), WATER YEAR OCTOBER 1993 TO SEPTEMBER 1994

| DAY | OCTOBER | | | NOVEMBER | | | DECEMBER | | |
|-------|----------------------------|--------------------------------------|-------------------------------------|----------------------------|--------------------------------------|-------------------------------------|----------------------------|--------------------------------------|-------------------------------------|
| | MEAN DISCHARGE (CFS) | MEAN CONCEN- TRATION (MG/L) | SEDIMENT DISCHARGE (TONS/DAY) | MEAN DISCHARGE (CFS) | MEAN CONCEN- TRATION (MG/L) | SEDIMENT DISCHARGE (TONS/DAY) | MEAN DISCHARGE (CFS) | MEAN CONCEN- TRATION (MG/L) | SEDIMENT DISCHARGE (TONS/DAY) |
| 1 | 5.2 | e7 | .10 | 7.9 | 9 | .21 | 6.7 | e8 | .14 |
| 2 | 4.8 | e7 | .09 | 7.4 | 5 | .10 | 6.3 | e8 | .13 |
| 3 | 4.6 | e7 | .08 | 28 | 19 | 2.8 | 6.0 | e8 | .12 |
| 4 | 4.8 | e7 | .08 | 18 | 18 | .98 | 6.3 | e7 | .13 |
| 5 | 4.8 | e6 | .08 | 9.2 | 8 | .20 | 6.0 | e7 | .12 |
| 6 | 4.8 | e6 | .08 | 7.7 | 6 | .12 | 5.5 | e7 | .11 |
| 7 | 4.5 | e6 | .08 | 7.2 | 6 | .12 | 5.6 | 8 | .13 |
| 8 | 4.2 | e6 | .07 | 9.2 | 7 | .17 | 5.3 | 14 | .20 |
| 9 | 4.2 | e6 | .07 | 7.8 | 7 | .15 | 5.6 | 8 | .12 |
| 10 | 5.0 | e8 | .11 | 7.7 | 8 | .17 | 5.2 | e7 | .09 |
| 11 | 4.3 | e6 | .07 | 7.8 | 10 | .21 | 5.1 | e6 | .08 |
| 12 | 4.2 | e6 | .07 | 7.5 | 7 | .15 | 5.7 | e6 | .10 |
| 13 | 4.2 | e6 | .07 | 7.3 | 11 | .21 | 6.2 | e6 | .09 |
| 14 | 6.0 | e7 | .13 | 7.2 | 12 | .24 | 6.0 | e6 | .10 |
| 15 | 9.8 | e17 | .50 | 7.4 | 11 | .21 | 5.6 | 8 | .11 |
| 16 | 5.4 | 9 | .13 | 7.4 | 10 | .19 | 5.7 | e9 | .14 |
| 17 | 5.0 | e7 | .10 | 7.1 | 14 | .26 | 6.2 | 9 | .15 |
| 18 | 5.5 | e7 | .12 | 6.9 | 11 | .21 | 6.2 | 5 | .09 |
| 19 | 9.7 | e10 | .33 | 6.6 | 10 | .17 | 5.9 | 6 | .09 |
| 20 | 7.8 | e6 | .14 | 6.4 | 9 | .16 | 5.6 | e7 | .11 |
| 21 | 5.3 | e6 | .09 | 6.1 | 9 | .15 | 6.1 | e4 | .11 |
| 22 | 5.0 | e7 | .10 | 6.3 | 11 | .19 | 4.3 | e4 | .05 |
| 23 | 21 | e23 | 2.0 | 6.9 | 14 | .26 | 5.0 | e6 | .08 |
| 24 | 15 | e17 | .82 | 5.8 | e14 | .22 | 4.8 | e5 | .07 |
| 25 | 32 | 21 | 1.9 | 6.0 | e13 | .21 | 5.0 | e5 | .07 |
| 26 | 13 | 9 | .32 | 5.7 | e12 | .18 | 4.9 | e5 | .06 |
| 27 | 8.0 | 10 | .21 | 6.4 | e11 | .19 | 5.2 | e4 | .06 |
| 28 | 7.2 | 8 | .15 | 6.1 | e10 | .16 | 6.5 | e6 | .13 |
| 29 | 7.6 | 8 | .16 | 5.7 | e9 | .14 | 7.4 | 8 | .16 |
| 30 | 10 | e10 | .30 | 6.9 | e8 | .16 | 4.9 | e6 | .08 |
| 31 | 7.6 | e4 | .09 | --- | --- | --- | 4.7 | e5 | .07 |
| TOTAL | 240.5 | --- | 8.64 | 243.6 | --- | 8.89 | 175.5 | --- | 3.29 |

e Estimated

HAWAII, ISLAND OF OAHU
16272200 KAMOOALII STREAM BELOW LULUKU STREAM NEAR KANEOHE--Continued
WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

SEDIMENT DISCHARGE, SUSPENDED (TONS/DAY), WATER YEAR OCTOBER 1993 TO SEPTEMBER 1994

| DAY | JANUARY | | | FEBRUARY | | | MARCH | | |
|-------|----------------------------|--------------------------------------|-------------------------------------|----------------------------|--------------------------------------|-------------------------------------|----------------------------|--------------------------------------|-------------------------------------|
| | MEAN DISCHARGE (CFS) | MEAN CONCEN- TRATION (MG/L) | SEDIMENT DISCHARGE (TONS/DAY) | MEAN DISCHARGE (CFS) | MEAN CONCEN- TRATION (MG/L) | SEDIMENT DISCHARGE (TONS/DAY) | MEAN DISCHARGE (CFS) | MEAN CONCEN- TRATION (MG/L) | SEDIMENT DISCHARGE (TONS/DAY) |
| 1 | 5.1 | e5 | .07 | 7.6 | 4 | .09 | 12 | 6 | .19 |
| 2 | 4.8 | e5 | .06 | 7.8 | 5 | .09 | 12 | 7 | .20 |
| 3 | 5.0 | e4 | .06 | 9.2 | 7 | .18 | 11 | 13 | .38 |
| 4 | 6.6 | e5 | .09 | 9.1 | 7 | .18 | 10 | 7 | .19 |
| 5 | 5.3 | e4 | .06 | 7.6 | 5 | .10 | 13 | e10 | .37 |
| 6 | 4.7 | e4 | .05 | 7.4 | 16 | .32 | 11 | 5 | .16 |
| 7 | 8.0 | 8 | .18 | 7.3 | 88 | 1.7 | 11 | 8 | .23 |
| 8 | 6.8 | 6 | .11 | 7.5 | 53 | 1.1 | 11 | 13 | .38 |
| 9 | 5.1 | 4 | .06 | 9.4 | e11 | .32 | 9.9 | 12 | .33 |
| 10 | 5.1 | e5 | .06 | 10 | 19 | .53 | 9.7 | 6 | .15 |
| 11 | 5.7 | 5 | .08 | 8.6 | 8 | .19 | 11 | e6 | .17 |
| 12 | 5.6 | 5 | .08 | 32 | 76 | 8.7 | 9.6 | 6 | .17 |
| 13 | 6.9 | 30 | .59 | 30 | 39 | 3.5 | 9.5 | 4 | .10 |
| 14 | 6.4 | 18 | .32 | 154 | 102 | 70 | 9.8 | 3 | .08 |
| 15 | 5.4 | 8 | .11 | 74 | 148 | 109 | 9.6 | 3 | .08 |
| 16 | 5.5 | 7 | .11 | 104 | 81 | 35 | 9.0 | 3 | .08 |
| 17 | 13 | 14 | .88 | 34 | e34 | 3.4 | 9.0 | 5 | .11 |
| 18 | 31 | e24 | 2.3 | 18 | 18 | .87 | 9.0 | 5 | .13 |
| 19 | 13 | e14 | .50 | 16 | 16 | .69 | 8.7 | 4 | .08 |
| 20 | 11 | 18 | .55 | 15 | 10 | .41 | 11 | e6 | .19 |
| 21 | 8.2 | 13 | .28 | 14 | 8 | .31 | 8.9 | 3 | .06 |
| 22 | 6.7 | 9 | .16 | 13 | 9 | .30 | 9.5 | e7 | .18 |
| 23 | 6.8 | 9 | .16 | 12 | 9 | .31 | 49 | 37 | 8.2 |
| 24 | 40 | 31 | 5.7 | 12 | 19 | .65 | 333 | 158 | 231 |
| 25 | 61 | 37 | 8.5 | 21 | e20 | 1.2 | 69 | 103 | 19 |
| 26 | 15 | 10 | .40 | 19 | e12 | .77 | 27 | 76 | 5.6 |
| 27 | 11 | 8 | .23 | 13 | 7 | .23 | 22 | 48 | 2.9 |
| 28 | 9.3 | 6 | .16 | 12 | 6 | .20 | 21 | 36 | 2.0 |
| 29 | 8.7 | 8 | .20 | --- | --- | --- | 27 | e31 | 2.3 |
| 30 | 8.6 | 9 | .21 | --- | --- | --- | 19 | 22 | 1.1 |
| 31 | 8.4 | 7 | .17 | --- | --- | --- | 18 | 25 | 1.2 |
| TOTAL | 343.7 | --- | 22.49 | 684.5 | --- | 240.34 | 810.2 | --- | 277.31 |

e Estimated

HAWAII, ISLAND OF OAHU
 16272200 KAMOOALII STREAM BELOW LULUKU STREAM NEAR KANEOHE--Continued
 WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

SEDIMENT DISCHARGE, SUSPENDED (TONS/DAY), WATER YEAR OCTOBER 1993 TO SEPTEMBER 1994

| DAY | APRIL | | | MAY | | | JUNE | | |
|-------|----------------------------|--------------------------------------|-------------------------------------|----------------------------|--------------------------------------|-------------------------------------|----------------------------|--------------------------------------|-------------------------------------|
| | MEAN DISCHARGE (CFS) | MEAN CONCEN- TRATION (MG/L) | SEDIMENT DISCHARGE (TONS/DAY) | MEAN DISCHARGE (CFS) | MEAN CONCEN- TRATION (MG/L) | SEDIMENT DISCHARGE (TONS/DAY) | MEAN DISCHARGE (CFS) | MEAN CONCEN- TRATION (MG/L) | SEDIMENT DISCHARGE (TONS/DAY) |
| 1 | 17 | 22 | .97 | 12 | 2 | .07 | 8.6 | 2 | .05 |
| 2 | 16 | 25 | 1.1 | 12 | 1 | .05 | 8.6 | 2 | .05 |
| 3 | 15 | 12 | .52 | 12 | 1 | .03 | 8.5 | 2 | .05 |
| 4 | 15 | 6 | .24 | 14 | e6 | .23 | 8.3 | 2 | .05 |
| 5 | 15 | 4 | .17 | 12 | 2 | .06 | 8.0 | 2 | .04 |
| 6 | 14 | 4 | .16 | 12 | 2 | .06 | 7.8 | 5 | .10 |
| 7 | 14 | 7 | .27 | 11 | 1 | .04 | 7.3 | 11 | .21 |
| 8 | 15 | 8 | .33 | 11 | 1 | .03 | 7.2 | 12 | .23 |
| 9 | 30 | e21 | 3.3 | 11 | 3 | .10 | 7.2 | 8 | .15 |
| 10 | 20 | e20 | 1.2 | 11 | 5 | .14 | 7.2 | 9 | .17 |
| 11 | 14 | 10 | .40 | 10 | 3 | .08 | 7.1 | 13 | .25 |
| 12 | 14 | 6 | .20 | 10 | 2 | .06 | 6.9 | 10 | .20 |
| 13 | 13 | 5 | .17 | 11 | e5 | .16 | 6.9 | 8 | .16 |
| 14 | 13 | 4 | .14 | 9.7 | 2 | .05 | 7.0 | 9 | .16 |
| 15 | 13 | 3 | .12 | 9.8 | 2 | .05 | 7.7 | 9 | .18 |
| 16 | 12 | 3 | .10 | 9.5 | 2 | .05 | 7.1 | 7 | .14 |
| 17 | 15 | e8 | .41 | 9.2 | 3 | .07 | 7.2 | e8 | .16 |
| 18 | 19 | e9 | .52 | 9.4 | 3 | .08 | 8.8 | e10 | .24 |
| 19 | 13 | 4 | .14 | 11 | e6 | .18 | 9.3 | e9 | .24 |
| 20 | 14 | 3 | .12 | 9.7 | 3 | .08 | 7.2 | 7 | .13 |
| 21 | 14 | 6 | .21 | 9.2 | 3 | .08 | 7.1 | e6 | .11 |
| 22 | 13 | 3 | .11 | 9.1 | 3 | .07 | 9.6 | e9 | .22 |
| 23 | 13 | 2 | .07 | 10 | e5 | .14 | 8.5 | 7 | .15 |
| 24 | 13 | 2 | .07 | 10 | e5 | .15 | 8.1 | 12 | .27 |
| 25 | 13 | 1 | .04 | 9.2 | 4 | .09 | 17 | e22 | 1.2 |
| 26 | 12 | 2 | .05 | 10 | e6 | .17 | 10 | e11 | .31 |
| 27 | 12 | 4 | .13 | 10 | e4 | .12 | 8.8 | 8 | .20 |
| 28 | 34 | e24 | 3.2 | 9.6 | 2 | .05 | 8.9 | 8 | .19 |
| 29 | 15 | 4 | .16 | 9.2 | 2 | .05 | 9.3 | e9 | .24 |
| 30 | 13 | 2 | .08 | 8.7 | 2 | .05 | 8.2 | 12 | .27 |
| 31 | --- | --- | --- | 8.7 | 2 | .05 | --- | --- | --- |
| TOTAL | 463 | --- | 14.70 | 321.0 | --- | 2.69 | 249.4 | --- | 6.12 |

e Estimated

HAWAII, ISLAND OF OAHU
16272200 KAMOOALII STREAM BELOW LULUKU STREAM NEAR KANEOHE--Continued
WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

SEDIMENT DISCHARGE, SUSPENDED (TONS/DAY), WATER YEAR OCTOBER 1993 TO SEPTEMBER 1994

| DAY | MEAN | MEAN | SEDIMENT | MEAN | MEAN | SEDIMENT | MEAN | MEAN | SEDIMENT |
|-------|--------------------|------------------------------|-------------------------|--------------------|------------------------------|-------------------------|--------------------|------------------------------|-------------------------|
| | DISCHARGE (CFS) | CONCEN- TRATION (MG/L) | DISCHARGE (TONS/DAY) | DISCHARGE (CFS) | CONCEN- TRATION (MG/L) | DISCHARGE (TONS/DAY) | DISCHARGE (CFS) | CONCEN- TRATION (MG/L) | DISCHARGE (TONS/DAY) |
| | JULY | | | AUGUST | | | SEPTEMBER | | |
| 1 | 8.2 | 15 | .32 | 7.2 | 6 | .12 | 8.7 | 11 | .26 |
| 2 | 8.2 | 11 | .25 | 6.6 | 10 | .18 | 8.1 | 18 | .38 |
| 3 | 8.0 | 12 | .25 | 6.5 | 25 | .44 | 7.7 | 14 | .29 |
| 4 | 7.9 | 10 | .21 | 6.9 | 21 | .39 | 6.9 | 10 | .19 |
| 5 | 8.1 | 8 | .16 | 6.7 | 10 | .19 | 6.6 | 12 | .22 |
| 6 | 8.5 | 7 | .16 | 6.8 | 10 | .19 | 7.1 | 8 | .16 |
| 7 | 8.3 | 8 | .18 | 7.0 | 13 | .24 | 6.9 | 8 | .14 |
| 8 | 7.7 | 8 | .16 | 6.6 | 12 | .21 | 7.7 | 13 | .27 |
| 9 | 7.8 | 10 | .22 | 6.6 | 11 | .19 | 7.1 | 16 | .31 |
| 10 | 7.8 | 13 | .27 | 6.5 | 10 | .18 | 6.7 | 8 | .14 |
| 11 | 7.6 | 8 | .16 | 6.9 | 12 | .24 | 6.6 | 8 | .13 |
| 12 | 7.7 | 7 | .15 | 11 | e11 | .33 | 7.4 | 7 | .14 |
| 13 | 7.7 | 7 | .14 | 7.7 | 6 | .13 | 7.9 | 12 | .26 |
| 14 | 7.4 | 5 | .11 | 6.9 | 6 | .10 | 7.2 | 12 | .24 |
| 15 | 9.3 | 12 | .29 | 6.7 | 5 | .09 | 6.7 | 9 | .16 |
| 16 | 7.9 | 11 | .23 | 6.8 | 4 | .07 | 6.5 | 9 | .15 |
| 17 | 7.7 | 9 | .19 | 6.8 | 5 | .10 | 6.4 | 7 | .11 |
| 18 | 7.8 | 8 | .17 | 7.2 | 6 | .12 | 16 | e21 | 1.3 |
| 19 | 7.4 | 6 | .12 | 7.4 | e6 | .12 | 15 | e17 | .83 |
| 20 | 7.3 | 4 | .08 | 7.8 | e5 | .10 | 8.7 | 8 | .18 |
| 21 | 7.1 | 25 | .47 | 6.9 | 5 | .09 | 7.3 | 9 | .17 |
| 22 | 7.5 | 22 | .43 | 6.6 | e7 | .12 | 7.2 | 8 | .16 |
| 23 | 7.7 | 5 | .09 | 7.1 | e9 | .17 | 7.3 | 8 | .16 |
| 24 | 14 | e19 | .87 | 6.8 | 7 | .13 | 7.0 | 10 | .18 |
| 25 | 12 | 13 | .45 | 6.7 | 7 | .13 | 6.8 | 10 | .19 |
| 26 | 8.2 | 26 | .57 | 6.7 | 9 | .16 | 6.7 | 10 | .19 |
| 27 | 7.9 | 19 | .41 | 6.2 | 10 | .16 | 6.7 | 8 | .14 |
| 28 | 7.5 | 4 | .09 | 6.1 | 13 | .22 | 6.8 | 9 | .16 |
| 29 | 7.3 | 7 | .15 | 6.1 | 12 | .19 | 6.6 | 8 | .14 |
| 30 | 7.2 | 7 | .14 | 6.0 | 7 | .12 | 6.4 | 6 | .11 |
| 31 | 7.2 | 5 | .10 | 17 | e20 | 1.1 | --- | --- | --- |
| TOTAL | 251.9 | --- | 7.59 | 224.8 | --- | 6.32 | 230.7 | --- | 7.46 |
| YEAR | 4238.8 | | 605.84 | | | | | | |
| e | Estimated | | | | | | | | |

HAWAII, ISLAND OF OAHU

16273950 SOUTH FORK KAPUNAHALA STREAM AT KANEOHE

LOCATION.--Lat 21°24'21 " long 157°48'31 ", Hydrologic Unit 20060000, on right bank, 1.8 mi west of Castle High School, 1.2 mi northwest of Hawaiian Memorial Park Cemetary, and 2.4 mi northwest of Pali Golf Course.

DRAINAGE AREA.--0.40 mi².

PERIOD OF RECORD.--October 1987 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 115 ft above mean sea level, from topographic map.

REMARKS.--Records fair except estimated days which are poor.

AVERAGE DISCHARGE.--9 years (water years 1988-96), 2.38 ft³/s (1,720 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 207 ft³/s, December 31, 1987, gage height, 5.18 ft, from rating curve extended above 21 ft³/s; minimum, 1.4 ft³/s, January 22, 1996.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 100 ft³/s and maximum (*):

| Date | Time | Discharge (ft ³ /s) | Gage height (ft) | Date | Time | Discharge (ft ³ /s) | Gage height (ft) |
|---------|------|--------------------------------|------------------|---|------|--------------------------------|------------------|
| Jan. 25 | 0300 | *181 | *4.85 | No other peaks greater than base discharge. | | | |

Minimum discharge, 1.6 ft³/s for many days.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|------|------|------|------|------|------|------|------|------|------|------|------|
| 1 | 1.7 | 5.3 | 4.8 | 2.0 | 1.8 | 2.2 | 2.1 | 1.8 | 1.8 | 1.7 | 1.7 | e3.1 |
| 2 | 1.7 | 1.8 | 2.2 | 2.0 | 1.8 | e3.3 | 2.2 | 1.8 | 1.8 | 1.7 | 1.7 | e2.6 |
| 3 | 1.7 | 2.2 | 1.9 | 2.0 | 1.8 | e6.2 | 2.1 | 1.8 | 1.8 | 1.7 | 1.7 | e2.1 |
| 4 | 1.7 | 2.1 | 1.7 | 2.3 | 1.8 | e2.1 | e2.2 | 1.8 | 1.8 | 1.7 | 1.7 | e1.8 |
| 5 | 1.7 | 2.0 | 1.7 | 2.5 | e1.8 | e2.2 | 2.2 | 1.8 | 1.8 | 2.1 | 1.7 | e2.0 |
| 6 | 1.7 | 2.0 | 1.7 | 2.1 | e2.0 | 2.0 | 2.2 | 1.8 | 1.8 | 2.1 | 1.7 | e1.8 |
| 7 | 2.2 | 2.0 | 1.8 | 2.7 | e2.7 | 1.9 | 2.2 | 1.8 | 1.8 | 1.8 | 1.7 | e1.9 |
| 8 | 2.3 | 2.7 | 1.8 | 2.5 | e2.1 | 1.9 | 2.2 | 1.9 | 1.8 | 1.7 | 1.7 | e1.7 |
| 9 | 1.8 | 2.8 | 1.8 | 2.0 | 1.9 | 2.0 | 2.2 | 1.9 | e6.0 | 1.7 | 1.7 | e1.6 |
| 10 | 1.8 | 2.1 | 1.7 | 2.3 | 1.8 | 2.0 | 2.2 | 1.8 | 2.1 | 1.7 | 1.7 | e1.7 |
| 11 | 1.7 | 2.0 | 1.8 | 1.8 | 1.8 | 2.0 | 2.3 | 1.8 | 2.1 | 1.7 | 1.8 | e1.7 |
| 12 | 1.6 | 2.0 | 1.8 | 1.7 | 1.8 | 2.1 | 2.3 | 1.8 | 1.8 | 1.7 | 1.7 | e1.7 |
| 13 | 1.6 | 2.8 | 1.8 | 1.7 | 1.8 | 2.1 | 2.1 | 1.8 | 1.8 | 1.7 | 1.7 | e1.7 |
| 14 | 1.6 | 2.5 | 1.7 | 1.7 | 1.8 | 2.1 | 2.1 | 1.8 | 1.8 | 1.6 | 1.7 | e1.7 |
| 15 | 1.6 | 2.2 | 1.7 | 1.6 | 1.8 | 2.1 | 2.0 | 1.8 | 1.8 | 1.7 | 1.7 | e1.7 |
| 16 | 1.6 | 2.1 | 1.6 | 1.7 | 1.8 | 2.1 | 2.0 | 1.8 | 1.8 | 1.6 | 1.7 | e1.7 |
| 17 | 1.6 | 2.0 | 1.7 | 1.7 | 1.8 | 2.1 | 2.0 | 1.8 | 1.8 | 1.6 | 1.7 | e1.7 |
| 18 | 1.6 | 1.9 | 1.7 | 1.8 | 1.8 | 2.2 | 2.0 | 1.8 | 2.0 | 1.7 | 1.7 | e1.7 |
| 19 | 1.6 | 1.9 | 1.7 | 1.8 | 1.8 | 2.1 | 1.9 | 1.8 | 1.8 | 1.7 | 1.7 | e1.7 |
| 20 | 1.7 | 1.9 | 1.7 | 1.7 | 1.8 | 2.1 | 1.9 | 1.9 | 1.8 | 1.7 | e1.6 | e1.6 |
| 21 | 1.7 | 1.8 | 1.6 | 1.7 | 1.8 | 2.1 | 1.9 | 1.9 | 1.7 | 1.7 | e1.6 | e1.6 |
| 22 | 1.6 | 1.8 | 1.7 | 1.7 | 1.8 | 2.0 | 1.8 | 1.8 | 1.8 | 1.7 | e1.6 | e1.6 |
| 23 | 1.6 | 1.7 | 1.6 | 1.9 | 1.8 | 2.0 | 1.8 | 1.8 | 2.6 | 1.6 | e1.6 | e1.6 |
| 24 | 1.6 | 1.8 | 1.7 | e2.7 | 1.9 | 2.0 | 1.8 | 1.9 | 1.8 | 1.6 | e1.6 | e1.6 |
| 25 | 1.7 | 1.7 | 2.1 | e15 | 1.8 | 1.9 | 1.8 | 1.9 | 1.7 | 1.6 | e1.6 | e1.6 |
| 26 | 1.6 | 1.8 | 1.8 | 2.8 | 1.8 | 2.0 | 1.8 | 2.0 | 1.7 | 1.7 | e1.6 | e1.6 |
| 27 | 1.6 | 1.9 | 1.8 | e2.9 | e2.9 | 2.0 | 1.8 | 1.9 | 1.7 | e2.0 | e1.6 | e1.6 |
| 28 | 1.8 | 1.8 | 1.8 | 2.6 | e2.7 | 2.0 | 3.4 | 1.9 | 1.7 | 1.7 | e1.6 | e1.6 |
| 29 | 1.7 | 1.8 | 1.8 | 2.2 | 2.2 | 2.0 | 1.9 | 1.9 | 2.0 | 1.7 | e1.6 | e1.6 |
| 30 | 1.7 | 2.1 | 3.3 | 2.0 | --- | 2.1 | 1.9 | 1.8 | 1.8 | 1.7 | e2.9 | e1.6 |
| 31 | 2.2 | --- | 2.9 | 1.8 | --- | 2.7 | --- | 1.8 | --- | 1.6 | e5.0 | --- |
| TOTAL | 53.3 | 64.5 | 60.4 | 76.9 | 56.2 | 69.6 | 62.3 | 56.9 | 59.5 | 53.2 | 56.3 | 53.2 |
| MEAN | 1.72 | 2.15 | 1.95 | 2.48 | 1.94 | 2.25 | 2.08 | 1.84 | 1.98 | 1.72 | 1.82 | 1.77 |
| MAX | 2.3 | 5.3 | 4.8 | 15 | 2.9 | 6.2 | 3.4 | 2.0 | 6.0 | 2.1 | 5.0 | 3.1 |
| MIN | 1.6 | 1.7 | 1.6 | 1.6 | 1.8 | 1.9 | 1.8 | 1.8 | 1.7 | 1.6 | 1.6 | 1.6 |
| AC-FT | 106 | 128 | 120 | 153 | 111 | 138 | 124 | 113 | 118 | 106 | 112 | 106 |

e Estimated

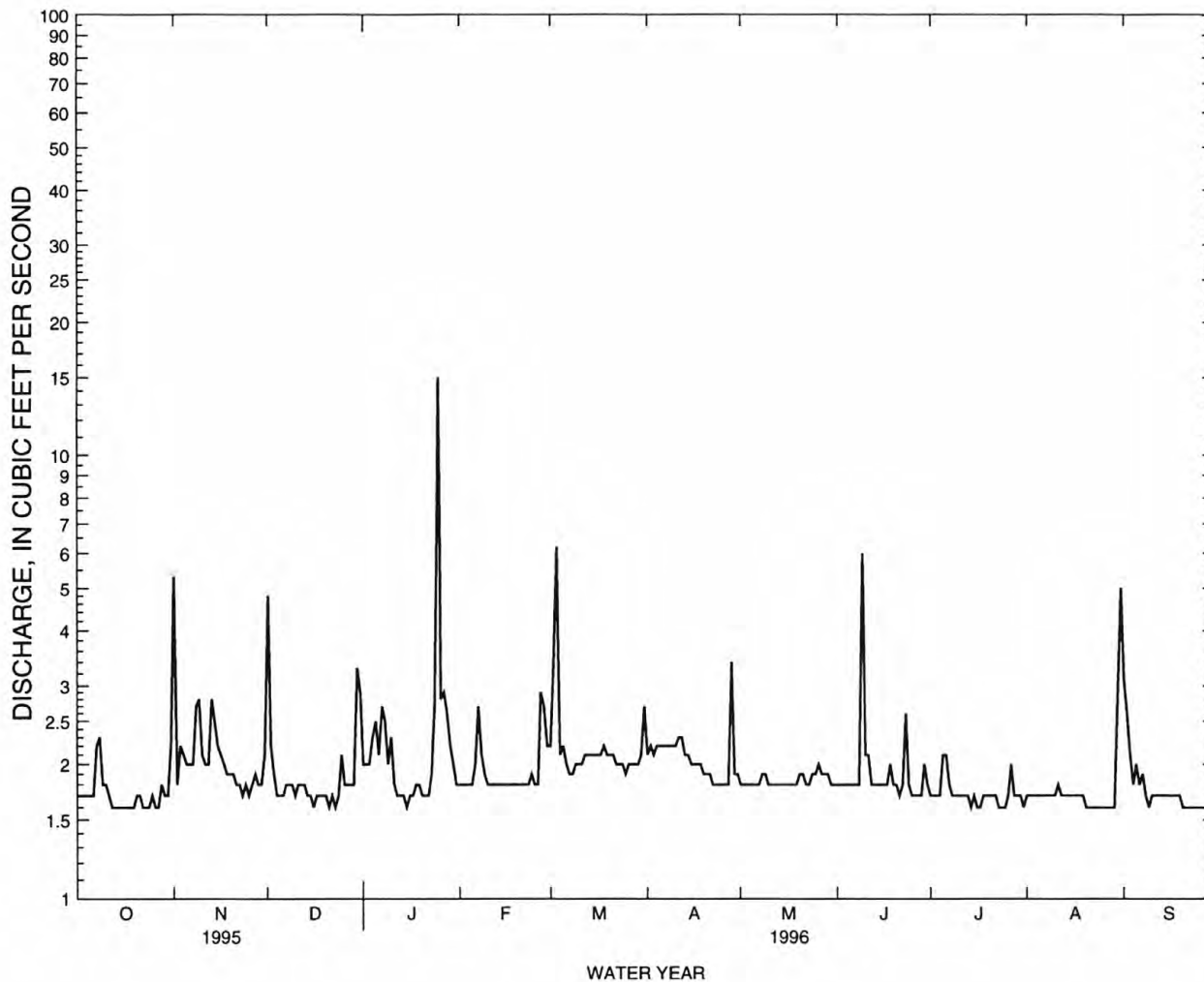
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1988 - 1996, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|------|------|------|------|------|------|------|------|------|------|------|------|------|
| MEAN | 2.30 | 2.43 | 2.71 | 2.61 | 2.69 | 2.63 | 2.59 | 2.12 | 2.07 | 2.14 | 2.10 | 2.13 |
| MAX | 3.07 | 3.45 | 4.99 | 4.31 | 3.57 | 3.78 | 5.44 | 2.46 | 2.31 | 2.64 | 2.50 | 2.85 |
| (WY) | 1992 | 1991 | 1988 | 1988 | 1994 | 1991 | 1989 | 1988 | 1988 | 1990 | 1989 | 1988 |
| MIN | 1.72 | 1.82 | 1.93 | 1.96 | 1.94 | 2.02 | 1.92 | 1.84 | 1.92 | 1.72 | 1.76 | 1.64 |
| (WY) | 1996 | 1995 | 1995 | 1995 | 1996 | 1995 | 1992 | 1996 | 1990 | 1996 | 1995 | 1995 |

HAWAII, ISLAND OF OAHU

16273950 SOUTH FORK KAPUNAHALA STREAM AT KANEOHE--Continued

| SUMMARY STATISTICS | FOR 1995 CALENDAR YEAR | FOR 1996 WATER YEAR | WATER YEARS 1988 - 1996 | |
|--------------------------|------------------------|---------------------|-------------------------|-------------|
| ANNUAL TOTAL | 704.6 | 722.3 | | |
| ANNUAL MEAN | 1.93 | 1.97 | 2.38 | |
| HIGHEST ANNUAL MEAN | | | 2.87 | 1989 |
| LOWEST ANNUAL MEAN | | | 1.93 | 1995 |
| HIGHEST DAILY MEAN | 5.3 Nov 1 | 15 Jan 25 | 30 | Apr 8 1989 |
| LOWEST DAILY MEAN | 1.6 Aug 22 | 1.6 Oct 12 | 1.5 | Jul 18 1989 |
| ANNUAL SEVEN-DAY MINIMUM | 1.6 Sep 11 | 1.6 Oct 12 | 1.6 | Sep 11 1995 |
| ANNUAL RUNOFF (AC-FT) | 1400 | 1430 | 1720 | |
| 10 PERCENT EXCEEDS | 2.2 | 2.2 | 2.8 | |
| 50 PERCENT EXCEEDS | 1.8 | 1.8 | 2.1 | |
| 90 PERCENT EXCEEDS | 1.6 | 1.6 | 1.8 | |



HAWAII, ISLAND OF OAHU
16273950 SOUTH FORK KAPUNAHALA STREAM AT KANEHOE--Continued
WATER-QUALITY RECORDS

PERIOD OF RECORD.--July 1988 to current year.

PERIOD OF DAILY RECORD.--

SUSPENDED SEDIMENT DISCHARGE: October 1990 to current year.

INSTRUMENTATION.--Automatic pumping sediment sampler since August 1984.

REMARKS.--Water-quality samples also were collected at this site. Record of "Sediment discharge, suspended (tons/day)" for water years 1994, 1995, and 1996 was not completed at the time of this publication.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

| DATE | TIME | DIS- CHARGE, INST. CUBIC FEET PER SECOND | SPE- CIFIC CON- DUCT- ANCE (US/CM) | PH WATER WHOLE FIELD (STAND- ARD UNITS) | TEMPER- ATURE AIR (DEG C) | TEMPER- ATURE WATER (DEG C) | TUR- BID- ITY (NTU) | BARO- METRIC PRES- SURE (MM HG) | OXYGEN, DIS- SOLVED OXYGEN, (PER- CENT OF SOLVED SATUR- ATION) | OXYGEN, DIS- SOLVED CENT SATUR- ATION) | COLI- FORM, FECAL, UM-MF (COLS./ 100 ML) |
|-------|------|--|---|---|------------------------------------|--------------------------------------|------------------------------|--|---|---|---|
| OCT | | | | | | | | | | | |
| 12... | 0950 | 1.7 | 200 | 7.8 | 21.5 | 25.5 | 2.3 | 762 | 8.4 | 103 | -- |
| NOV | | | | | | | | | | | |
| 20... | 1420 | 2.1 | 191 | 7.7 | 25.0 | 22.5 | 7.1 | 758 | 8.2 | 95 | -- |
| DEC | | | | | | | | | | | |
| 13... | 1225 | 1.7 | 205 | 7.8 | 24.5 | 22.5 | 4.8 | 764 | 8.6 | 99 | 2400 |
| JAN | | | | | | | | | | | |
| 16... | 1429 | 1.6 | 200 | 7.8 | 26.0 | 23.5 | 2.4 | 764 | 8.2 | 96 | -- |
| FEB | | | | | | | | | | | |
| 20... | 1345 | 1.8 | 170 | 7.9 | 21.5 | 20.0 | 1.8 | 764 | 8.8 | 97 | 780 |
| MAR | | | | | | | | | | | |
| 05... | 0920 | 2.2 | 239 | 7.7 | 19.5 | 20.0 | 2.4 | 757 | 8.6 | 95 | -- |
| APR | | | | | | | | | | | |
| 24... | 1530 | 1.7 | 195 | 8.0 | 25.5 | 23.0 | 1.5 | 764 | 8.2 | 95 | -- |
| MAY | | | | | | | | | | | |
| 15... | 1000 | 1.7 | 193 | 8.0 | 24.5 | 22.5 | 2.5 | 765 | 8.6 | 99 | 8000 |

| DATE | TIME | HARD- NESS TOTAL (MG/L AS CACO3) | CALCIUM DIS- SOLVED (MG/L AS CA) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) | SODIUM, DIS- SOLVED (MG/L AS NA) | SODIUM PERCENT | SODIUM AD- SORP- TION RATIO | POTAS- SIUM, DIS- SOLVED (MG/L AS K) | ALKA- LINITY LAB AS CACO3) | SULFATE DIS- SOLVED (MG/L AS SO4) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) |
|-------|------|---|--|--|--|-------------------|---|---|--|---|---|
| DEC | | | | | | | | | | | |
| 13... | 1225 | 58 | 12 | 6.7 | 16 | 37 | 0.9 | 1.5 | 65 | 5.6 | 19 |

| DATE | TIME | FLUO- RIDE, DIS- SOLVED (MG/L AS F) | SILICA, DIS- SOLVED (MG/L AS SIO2) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) | SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) | SOLIDS, DIS- SOLVED (TONS PER AC-FT) | RESIDUE TOTAL AT 105 DEG. C, SUS- PENDEED (MG/L) | NITRO- GEN, NO2+NO3 TOTAL (MG/L AS N) | NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) | NITRO- GEN, AM- MONIA + ORGANIC TOTAL (MG/L AS N) | PHOS- PHORUS TOTAL (MG/L AS P) |
|-------|------|--|---|--|---|---|--|--|---|---|--|
| DEC | | | | | | | | | | | |
| 13... | 1225 | <0.10 | 33 | 133 | 134 | 0.18 | 8 | 0.100 | 0.100 | <0.20 | 0.050 |
| FEB | | | | | | | | | | | |
| 20... | 1345 | -- | -- | -- | -- | -- | 5 | 0.090 | 0.090 | <0.20 | 0.020 |
| MAY | | | | | | | | | | | |
| 15... | 1000 | -- | -- | -- | -- | -- | 4 | 0.060 | 0.060 | <0.20 | 0.040 |

HAWAII, ISLAND OF OAHU
 16273950 SOUTH FORK KAPUNAHALA STREAM AT KANEOHE--Continued
 WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

| DATE | TIME | ALUM- INUM, TOTAL RECOV- ERABLE (UG/L AS AL) | ALUM- INUM, DIS- SOLVED (UG/L AS AL) | ARSENIC TOTAL (UG/L AS AS) | BARIUM, TOTAL RECOV- ERABLE (UG/L AS BA) | BARIUM, DIS- SOLVED (UG/L AS BA) | BERYL- LIUM, TOTAL RECOV- ERABLE (UG/L AS BE) | CADMIUM UNFLTRD TOTAL (UG/L AS CD) | CHRO- MIUM, TOTAL RECOV- ERABLE (UG/L AS CR) | COBALT, TOTAL RECOV- ERABLE (UG/L AS CO) | COBALT, DIS- SOLVED (UG/L AS CO) |
|--------------|------|--|---|-------------------------------------|---|--|---|--|--|---|--|
| DEC 13... | 1225 | 190 | 20 | <1 | <100 | 3.0 | <10 | <1 | 2 | <1 | <3.0 |

| DATE | COPPER, TOTAL RECOV- ERABLE (UG/L AS CU) | IRON, TOTAL RECOV- ERABLE (UG/L AS FE) | IRON, DIS- SOLVED (UG/L AS FE) | LEAD, TOTAL RECOV- ERABLE (UG/L AS PB) | LITHIUM TOTAL RECOV- ERABLE (UG/L AS LI) | LITHIUM DIS- SOLVED (UG/L AS LI) | MANGA- NESE, TOTAL RECOV- ERABLE (UG/L AS MN) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) | MERCURY TOTAL RECOV- ERABLE (UG/L AS HG) | MOLYB- DENUM, TOTAL RECOV- ERABLE (UG/L AS MO) | MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) |
|--------------|---|---|--|---|---|--|---|--|---|--|---|
| DEC 13... | 2 | 800 | 200 | <1 | <10 | <4 | 60 | 25 | <0.10 | <1 | <10 |

| DATE | NICKEL, TOTAL RECOV- ERABLE (UG/L AS NI) | NICKEL, DIS- SOLVED (UG/L AS NI) | SELE- NIUM, TOTAL RECOV- ERABLE (UG/L AS SE) | SELE- NIUM, DIS- SOLVED (UG/L AS SE) | SILVER, TOTAL RECOV- ERABLE (UG/L AS AG) | SILVER, DIS- SOLVED (UG/L AS AG) | STRON- TIUM, DIS- SOLVED (UG/L AS SR) | VANA- DIUM, DIS- SOLVED (UG/L AS V) | ZINC, TOTAL RECOV- ERABLE (UG/L AS ZN) | CARBON, TOTAL ORGANIC (MG/L AS C) | OIL AND GREASE, TOTAL RECOV- ERABLE (MG/L METRIC) |
|--------------|---|--|--|---|---|--|--|--|---|---|---|
| DEC 13... | <1 | <1.0 | <1 | <1 | <1 | <1.0 | 70 | 8 | <10 | 1.8 | <1 |

| DATE | ALDRIN, TOTAL (UG/L) | CHLOR- DANE, TECH- NICAL TOTAL (UG/L) | CHLOR- PYRIFOS TOTAL RECOVER (UG/L) | P, P'- DDD UNFILT RECOVER (UG/L) | DDE, TOTAL RECOVER (UG/L) | P, P'- DDT UNFILT RECOVER (UG/L) | DEF TOTAL (UG/L) | DI- AZINON, TOTAL (UG/L) | DI- ELDRIN, TOTAL (UG/L) | 2, 4-DP TOTAL (UG/L) | 2, 4-D, TOTAL (UG/L) |
|--------------|----------------------------|--|---|--|------------------------------------|--|------------------------|-----------------------------------|-----------------------------------|----------------------------|----------------------------|
| DEC 13... | <0.010 | <0.100 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 |

| DATE | ENDO- SULFAN, I TOTAL (UG/L) | ENDRIN WATER UNFLTRD REC (UG/L) | ETHION, TOTAL (UG/L) | FONOFOS (DY- FONATE) WATER WHOLE TOT.REC (UG/L) | HEPTA- CHLOR, EPOXIDE TOTAL (UG/L) | HEPTA- CHLOR TOTAL (UG/L) | LINDANE TOTAL (UG/L) | MALA- THION, TOTAL (UG/L) | METH- OXY- CHLOR, TOTAL (UG/L) | METHYL PARA- THION, TOTAL (UG/L) |
|--------------|--|---|----------------------------|---|--|------------------------------------|----------------------------|------------------------------------|--|--|
| DEC 13... | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 |

| DATE | MIREX, TOTAL (UG/L) | PARA- THION, TOTAL (UG/L) | PCB, TOTAL RECOVER (UG/L) | PCNS UNFILT RECOVER (UG/L) | PER- THANE TOTAL (UG/L) | PHORATE TOTAL (UG/L) | SILVEX, TOTAL (UG/L) | TOX- APHENE, TOTAL (UG/L) | TOTAL TRI- THION (UG/L) | 2, 4, 5-T TOTAL (UG/L) |
|--------------|---------------------------|------------------------------------|------------------------------------|-------------------------------------|----------------------------------|----------------------------|----------------------------|------------------------------------|----------------------------------|------------------------------|
| DEC 13... | <0.010 | <0.010 | <0.100 | <0.100 | <0.100 | <0.010 | <0.010 | <1.00 | <0.010 | <0.010 |

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

HAWAII, ISLAND OF OAHU
16275000 HAIKU STREAM NEAR HEEIA

LOCATION.--Lat 21°24'46 " long 157°49'33 " Hydrologic Unit 20060000, on left bank, 1.7 mi west of Kaneohe Post Office, and 1.8 mi southwest of Heeia.

DRAINAGE AREA.--0.97 mi².

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 fair. Honolulu Board of Water Supply has diverted ground water from tunnel in drainage area since 1943.

AVERAGE DISCHARGE (since diversion from tunnel began)--48 years (water years 1944-77, 1983-96), 2.22 ft³/s, (1,610 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 5,740 ft³/s, May 2, 1965, gage height, 7.94 ft, from rating curve extended above 57 ft³/s on basis of slope-area measurements at gage heights 3.87 ft, 3.88 ft, and 7.94 ft; minimum, 0.20 ft³/s, July 20, 1957, September 17, 1961.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 340 ft³/s and maximum (*):

| Date | Time | Discharge (ft ³ /s) | Gage height (ft) | Date | Time | Discharge (ft ³ /s) | Gage height (ft) |
|---------|------|-----------------------------------|---------------------|---|------|-----------------------------------|---------------------|
| Jan. 25 | 0400 | *640 | *3.43 | No other peaks greater than base discharge. | | | |

Minimum discharge, 1.2 ft³/s, many days.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY MEAN VALUES

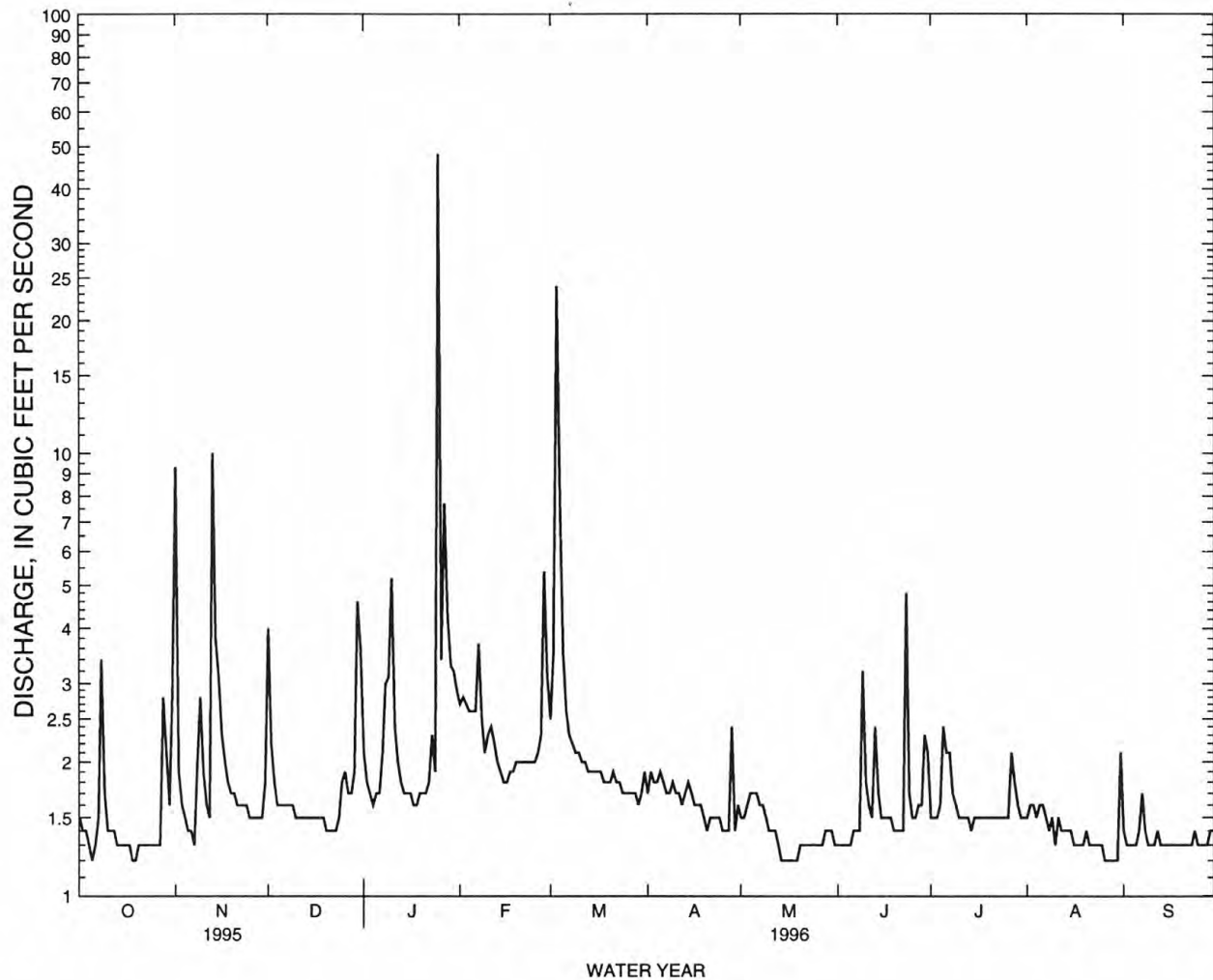
| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|------|------|------|-------|------|------|------|------|------|------|------|------|
| 1 | 1.5 | 9.3 | 4.0 | 2.1 | 2.7 | 2.5 | 1.7 | 1.5 | 1.3 | 1.5 | 1.5 | 1.4 |
| 2 | 1.4 | 1.9 | 2.2 | 1.8 | 2.8 | 3.5 | 1.9 | 1.5 | 1.3 | 1.5 | 1.6 | 1.3 |
| 3 | 1.4 | 1.6 | 1.8 | 1.7 | 2.7 | 24 | 1.8 | 1.6 | 1.3 | 1.5 | 1.6 | 1.3 |
| 4 | 1.3 | 1.5 | 1.6 | 1.6 | 2.6 | 7.8 | 1.8 | 1.7 | 1.3 | 1.6 | 1.5 | 1.3 |
| 5 | 1.2 | 1.4 | 1.6 | 1.7 | 2.6 | 3.5 | 1.9 | 1.7 | 1.3 | 2.4 | 1.6 | 1.3 |
| 6 | 1.3 | 1.4 | 1.6 | 1.7 | 2.6 | 2.6 | 1.8 | 1.7 | 1.4 | 2.1 | 1.6 | 1.4 |
| 7 | 1.5 | 1.3 | 1.6 | 2.1 | 3.7 | 2.3 | 1.7 | 1.6 | 1.4 | 2.1 | 1.5 | 1.7 |
| 8 | 3.4 | 2.0 | 1.6 | 3.0 | 2.5 | 2.2 | 1.7 | 1.6 | 1.4 | 1.7 | 1.4 | 1.4 |
| 9 | 1.7 | 2.8 | 1.6 | 3.1 | 2.1 | 2.1 | 1.8 | 1.5 | 3.2 | 1.6 | 1.5 | 1.3 |
| 10 | 1.4 | 1.9 | 1.5 | 5.2 | 2.3 | 2.1 | 1.7 | 1.4 | 1.8 | 1.5 | 1.3 | 1.3 |
| 11 | 1.4 | 1.6 | 1.5 | 2.4 | 2.4 | 2.0 | 1.7 | 1.4 | 1.6 | 1.5 | 1.5 | 1.3 |
| 12 | 1.4 | 1.5 | 1.5 | 2.0 | 2.2 | 2.0 | 1.6 | 1.4 | 1.5 | 1.5 | 1.4 | 1.4 |
| 13 | 1.3 | 10 | 1.5 | 1.8 | 2.0 | 1.9 | 1.7 | 1.3 | 2.4 | 1.5 | 1.4 | 1.3 |
| 14 | 1.3 | 3.8 | 1.5 | 1.7 | 1.9 | 1.9 | 1.8 | 1.2 | 1.7 | 1.4 | 1.4 | 1.3 |
| 15 | 1.3 | 3.1 | 1.5 | 1.7 | 1.8 | 1.9 | 1.7 | 1.2 | 1.5 | 1.5 | 1.4 | 1.3 |
| 16 | 1.3 | 2.3 | 1.5 | 1.7 | 1.8 | 1.9 | 1.6 | 1.2 | 1.5 | 1.5 | 1.3 | 1.3 |
| 17 | 1.3 | 2.0 | 1.5 | 1.6 | 1.9 | 1.9 | 1.6 | 1.2 | 1.5 | 1.5 | 1.3 | 1.3 |
| 18 | 1.2 | 1.8 | 1.5 | 1.6 | 1.9 | 1.8 | 1.6 | 1.2 | 1.5 | 1.5 | 1.3 | 1.3 |
| 19 | 1.2 | 1.7 | 1.5 | 1.7 | 2.0 | 1.8 | 1.5 | 1.2 | 1.4 | 1.5 | 1.3 | 1.3 |
| 20 | 1.3 | 1.7 | 1.4 | 1.7 | 2.0 | 1.8 | 1.4 | 1.3 | 1.4 | 1.5 | 1.4 | 1.3 |
| 21 | 1.3 | 1.6 | 1.4 | 1.7 | 2.0 | 1.9 | 1.5 | 1.3 | 1.4 | 1.5 | 1.3 | 1.3 |
| 22 | 1.3 | 1.6 | 1.4 | 1.8 | 2.0 | 1.8 | 1.5 | 1.3 | 1.4 | 1.5 | 1.3 | 1.3 |
| 23 | 1.3 | 1.6 | 1.4 | 2.3 | 2.0 | 1.8 | 1.5 | 1.3 | 4.8 | 1.5 | 1.3 | 1.3 |
| 24 | 1.3 | 1.6 | 1.5 | 1.9 | 2.0 | 1.7 | 1.5 | 1.3 | 1.7 | 1.5 | 1.3 | 1.4 |
| 25 | 1.3 | 1.5 | 1.8 | 48 | 2.0 | 1.7 | 1.4 | 1.3 | 1.5 | 1.5 | 1.3 | 1.3 |
| 26 | 1.3 | 1.5 | 1.9 | 3.4 | 2.1 | 1.7 | 1.4 | 1.3 | 1.5 | 1.5 | 1.2 | 1.3 |
| 27 | 1.3 | 1.5 | 1.7 | 7.7 | 2.3 | 1.7 | 1.4 | 1.3 | 1.6 | 2.1 | 1.2 | 1.3 |
| 28 | 2.8 | 1.5 | 1.7 | 4.3 | 5.4 | 1.7 | 2.4 | 1.4 | 1.6 | 1.8 | 1.2 | 1.3 |
| 29 | 2.1 | 1.5 | 1.9 | 3.3 | 3.1 | 1.6 | 1.4 | 1.4 | 2.3 | 1.6 | 1.2 | 1.4 |
| 30 | 1.6 | 1.8 | 4.6 | 3.2 | --- | 1.7 | 1.6 | 1.4 | 2.1 | 1.5 | 1.2 | 1.4 |
| 31 | 2.9 | --- | 3.6 | 2.9 | --- | 1.9 | --- | 1.3 | --- | 1.5 | 2.1 | --- |
| TOTAL | 47.6 | 70.3 | 56.9 | 122.4 | 69.4 | 90.7 | 49.6 | 43.0 | 51.6 | 49.9 | 43.4 | 40.1 |
| MEAN | 1.54 | 2.34 | 1.84 | 3.95 | 2.39 | 2.93 | 1.65 | 1.39 | 1.72 | 1.61 | 1.40 | 1.34 |
| MAX | 3.4 | 10 | 4.6 | 48 | 5.4 | 24 | 2.4 | 1.7 | 4.8 | 2.4 | 2.1 | 1.7 |
| MIN | 1.2 | 1.3 | 1.4 | 1.6 | 1.8 | 1.6 | 1.4 | 1.2 | 1.3 | 1.4 | 1.2 | 1.3 |
| AC-FT | 94 | 139 | 113 | 243 | 138 | 180 | 98 | 85 | 102 | 99 | 86 | 80 |

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1944 - 1996, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|------|------|------|------|------|------|------|------|------|------|------|------|------|
| MEAN | 1.94 | 2.74 | 2.70 | 2.63 | 2.54 | 3.30 | 2.54 | 2.34 | 1.38 | 1.56 | 1.59 | 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 | .32 | .33 | .64 | .94 | .86 | .60 | .50 | .51 | .38 | .41 | .56 | .36 |
| (WY) | 1946 | 1946 | 1960 | 1977 | 1963 | 1946 | 1946 | 1961 | 1946 | 1945 | 1961 | 1945 |

HAWAII, ISLAND OF OAHU
 16275000 HAIKU STREAM NEAR HEEIA--Continued

| SUMMARY STATISTICS | FOR 1995 CALENDAR YEAR | | FOR 1996 WATER YEAR | | WATER YEARS 1944 - 1996 | |
|--------------------------|------------------------|--------|---------------------|--------|-------------------------|-------------|
| ANNUAL TOTAL | 628.9 | | 734.9 | | | |
| ANNUAL MEAN | 1.72 | | 2.01 | | 2.22 | |
| HIGHEST ANNUAL MEAN | | | | | 4.82 | 1965 |
| LOWEST ANNUAL MEAN | | | | | .67 | 1946 |
| HIGHEST DAILY MEAN | 10 | Nov 13 | 48 | Jan 25 | 620 | May 2 1965 |
| LOWEST DAILY MEAN | 1.2 | Apr 22 | 1.2 | Oct 5 | .29 | Jul 13 1945 |
| ANNUAL SEVEN-DAY MINIMUM | 1.3 | Oct 13 | 1.2 | May 13 | .29 | Oct 19 1945 |
| ANNUAL RUNOFF (AC-FT) | 1250 | | 1460 | | 1610 | |
| 10 PERCENT EXCEEDS | 2.0 | | 2.6 | | 2.6 | |
| 50 PERCENT EXCEEDS | 1.5 | | 1.6 | | 1.5 | |
| 90 PERCENT EXCEEDS | 1.3 | | 1.3 | | .87 | |



HAWAII, ISLAND OF OAHU
16275000 HAIKU STREAM NEAR HEEIA--Continued
WATER-QUALITY RECORDS

PERIOD OF RECORD.--October 1982 to September 1985, October 1986 to current year.

PERIOD OF DAILY RECORD.--

SUSPENDED SEDIMENT DISCHARGE: December 1983 to September 1984, July 1987 to current year.

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

REMARKS.--Water-quality samples also were collected at this site. Record of "Sediment discharge, suspended (tons/day)" for water years 1994, 1995, and 1996 was not completed at the time of this publication.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

| DATE | TIME | DIS-CHARGE, INST. CUBIC FEET PER SECOND | SPE-CIFIC CON-DUCT-ANCE (US/CM) | PH WATER WHOLE FIELD (STAND-ARD UNITS) | TEMPER-ATURE AIR (DEG C) | TEMPER-ATURE WATER (DEG C) | TUR-BID-ITY (NTU) | BARO-METRIC PRES-SURE (MM OF HG) | OXYGEN, DIS-SOLVED (MG/L) | OXYGEN, SATUR-ATION | COLI-FORM, FECAL, UM-MF (COLS./100 ML) |
|-------|------|---|-----------------------------------|--|---|-------------------------------------|--|--------------------------------------|---|----------------------------------|--|
| OCT | | | | | | | | | | | |
| 12... | 1256 | 1.3 | 150 | 7.9 | 23.5 | 20.0 | 0.20 | 762 | 8.9 | 98 | -- |
| NOV | | | | | | | | | | | |
| 21... | 1421 | 1.8 | 155 | 7.8 | 23.5 | 20.5 | 0.30 | 759 | 8.8 | 98 | -- |
| JAN | | | | | | | | | | | |
| 17... | 1237 | 1.6 | 155 | 7.8 | 22.5 | 20.0 | 0.30 | 763 | 8.8 | 97 | -- |
| FEB | | | | | | | | | | | |
| 13... | 1120 | 2.0 | 165 | 7.6 | 20.5 | 19.0 | 0.30 | 757 | 9.1 | 99 | K36 |
| MAR | | | | | | | | | | | |
| 05... | 1500 | 3.0 | 161 | 7.7 | 23.0 | 20.0 | 0.40 | 750 | 8.7 | 97 | -- |
| APR | | | | | | | | | | | |
| 25... | 0929 | 1.4 | 154 | 7.9 | 23.5 | 20.0 | 0.20 | 758 | 8.8 | 97 | -- |
| MAY | | | | | | | | | | | |
| 15... | 1005 | 1.2 | 146 | 7.8 | 24.5 | 20.0 | 0.30 | 761 | 9.2 | 101 | 150 |
| | | | | | | | | | | | |
| DATE | TIME | HARD-NESS TOTAL (MG/L AS CaCO3) | CALCIUM DIS-SOLVED (MG/L AS Ca) | MAGNE-SIUM, DIS-SOLVED (MG/L AS Mg) | SODIUM, DIS-SOLVED (MG/L AS Na) | SODIUM PERCENT | SODIUM AD-SORP-TION RATIO | POTAS-SIUM, DIS-SOLVED (MG/L AS K) | ALKA-LINITY LAB (MG/L AS CaCO3) | SULFATE DIS-SOLVED (MG/L AS SO4) | CHLO-RIDE, DIS-SOLVED (MG/L AS Cl) |
| FEB | | | | | | | | | | | |
| 13... | 1120 | 45 | 9.2 | 5.4 | 12 | 36 | 0.8 | 0.90 | 49 | 3.5 | 15 |
| | | | | | | | | | | | |
| DATE | TIME | FLUO-RIDE, DIS-SOLVED (MG/L AS F) | SILICA, DIS-SOLVED (MG/L AS SiO2) | SOLIDS, RESIDUE AT 180 DEG. C (MG/L) | SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) | SOLIDS, DIS-SOLVED (TONS PER AC-FT) | RESIDUE TOTAL AT 105 DEG. C, SUS-PENDEDED (MG/L) | NITRO-GEN, NO2+NO3 TOTAL (MG/L AS N) | NITRO-GEN, AM-MONIA + ORGANIC (MG/L AS N) | PHOS-PHORUS TOTAL (MG/L AS P) | |
| FEB | | | | | | | | | | | |
| 13... | 1120 | <0.10 | 26 | 96 | 102 | 0.13 | 1 | 0.090 | 0.090 | <0.20 | |
| MAY | | | | | | | | | | | |
| 15... | 1005 | -- | -- | -- | -- | -- | 3 | 0.090 | 0.090 | 0.030 | |

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

K Results based on colony count outside acceptance range (non-ideal colony count)

HAWAII, ISLAND OF OAHU
16275000 HAIKU STREAM NEAR HEELA--Continued
WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

| DATE | TIME | ALUM- TOTAL RECOV- ERABLE (UG/L AS AL) | ALUM- INUM, DIS- SOLVED (UG/L AS AL) | ARSENIC TOTAL (UG/L AS AS) | BARIUM, TOTAL RECOV- ERABLE (UG/L AS BA) | BARIUM, DIS- SOLVED (UG/L AS BA) | BERYL- LIUM, TOTAL RECOV- ERABLE (UG/L AS BE) | CADMIUM WATER UNFLTRD TOTAL (UG/L AS CD) | CHRO- MIUM, TOTAL RECOV- ERABLE (UG/L AS CR) | COBALT, TOTAL RECOV- ERABLE (UG/L AS CO) | COBALT, DIS- SOLVED (UG/L AS CO) | |
|--------------|------|---|---|--|---|--|---|---|--|---|--|---|
| FEB 13... | 1120 | 40 | 20 | <1 | <100 | <2.0 | <10 | <1 | <1 | <1 | <3.0 | |
| DATE | TIME | COPPER, TOTAL RECOV- ERABLE (UG/L AS CU) | IRON, TOTAL RECOV- ERABLE (UG/L AS FE) | IRON, DIS- SOLVED (UG/L AS FE) | LEAD, TOTAL RECOV- ERABLE (UG/L AS PB) | LITHIUM TOTAL RECOV- ERABLE (UG/L AS LI) | LITHIUM DIS- SOLVED (UG/L AS LI) | MANGA- NESE, TOTAL RECOV- ERABLE (UG/L AS MN) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) | MERCURY TOTAL RECOV- ERABLE (UG/L AS HG) | MOLYB- DENUM, TOTAL RECOV- ERABLE (UG/L AS MO) | MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) |
| FEB 13... | | <1 | 50 | 32 | <1 | <10 | <4 | 20 | 4.0 | <0.10 | <1 | <10 |
| DATE | TIME | NICKEL, TOTAL RECOV- ERABLE (UG/L AS NI) | NICKEL, DIS- SOLVED (UG/L AS NI) | SELE- NIUM, TOTAL RECOV- ERABLE (UG/L AS SE) | SELE- NIUM, DIS- SOLVED (UG/L AS SE) | SILVER, TOTAL RECOV- ERABLE (UG/L AS AG) | SILVER, DIS- SOLVED (UG/L AS AG) | STRON- TIUM, DIS- SOLVED (UG/L AS SR) | VANA- DIUM, DIS- SOLVED (UG/L AS V) | ZINC, TOTAL RECOV- ERABLE (UG/L AS ZN) | CARBON, ORGANIC TOTAL (MG/L AS C) | OIL AND GREASE, TOTAL RECOV- GRAVI- METRIC (MG/L) |
| FEB 13... | | <1 | <1.0 | <1 | <1 | <1 | <1.0 | 53 | <6 | <10 | 0.80 | <1 |
| DATE | TIME | ALDRIN, TOTAL (UG/L) | CHLOR- DANE, TECH- NICAL TOTAL (UG/L) | CHLOR- PYRIFOS TOTAL RECOVER (UG/L) | P, P'- DDD UNFILT RECOVER (UG/L) | DDE, TOTAL RECOVER (UG/L) | P, P'- DDT UNFILT RECOVER (UG/L) | DEF TOTAL (UG/L) | DI- AZINON, TOTAL (UG/L) | DI- ELDRIN TOTAL (UG/L) | DISUL- FOTON UNFILT RECOVER (UG/L) | 2, 4-DP TOTAL (UG/L) |
| FEB 13... | | <0.010 | <0.100 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 |
| DATE | TIME | 2, 4-D, TOTAL (UG/L) | ENDO- SULFAN, I TOTAL (UG/L) | ENDRIN WATER UNFLTRD REC (UG/L) | ETHION, TOTAL RECOVER (UG/L) | FONOPOS (DY- FONATE) WATER WHOLE TOT. REC (UG/L) | HEPTA- CHLOR, TOTAL (UG/L) | HEPTA- CHLOR EPOXIDE TOTAL (UG/L) | LINDANE TOTAL (UG/L) | MALA- THION, TOTAL (UG/L) | METH- OXY- CHLOR, TOTAL (UG/L) | METHYL PARA- THION, TOTAL (UG/L) |
| FEB 13... | | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 |
| DATE | TIME | MIREX, TOTAL (UG/L) | PARA- THION, TOTAL (UG/L) | PCB, TOTAL (UG/L) | PCNS UNFILT RECOVER (UG/L) | PER- THANE TOTAL (UG/L) | PHORATE TOTAL (UG/L) | SILVEX, TOTAL (UG/L) | TOX- APHENE, TOTAL (UG/L) | TOTAL TRI- THION (UG/L) | 2, 4, 5-T TOTAL (UG/L) | |
| FEB 13... | | <0.010 | <0.010 | <0.100 | <0.100 | <0.100 | <0.010 | <0.010 | <1.00 | <0.010 | <0.010 | |

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

HAWAII, ISLAND OF OAHU
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.--0.99 mi².

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

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

REMARKS.--Records poor. 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 amount of water from the stream.

AVERAGE DISCHARGE.--13 years (water years 1984-96), 3.45 ft³/s (2,500 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 728 ft³/s, September 18, 1994, gage height, 6.05 ft; minimum, 0.58 ft³/s on several days in September, October, November 1984.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 180 ft³/s and maximum(*):

| Date | Time | Discharge (ft ³ /s) | Gage height (ft) | Date | Time | Discharge (ft ³ /s) | Gage height (ft) |
|---------|------|-----------------------------------|---------------------|--|------|-----------------------------------|---------------------|
| Jan. 25 | 0330 | *428 | *4.99 | No other peak greater than base discharge. | | | |

Minimum discharge, 1.1 ft³/s, several days in October.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|------|-------|------|-------|------|-------|------|------|------|------|------|------|
| 1 | 2.1 | 13 | 2.8 | 2.5 | 2.8 | 2.8 | 2.9 | 2.8 | 2.4 | 2.7 | 2.6 | 2.8 |
| 2 | 2.2 | 2.9 | 2.3 | 2.2 | 2.8 | 4.5 | 3.0 | 2.7 | 2.3 | 2.7 | 2.4 | 2.3 |
| 3 | 2.1 | 6.2 | 2.3 | 2.2 | 2.6 | 20 | 2.9 | 2.6 | 2.3 | 2.5 | 2.4 | 2.5 |
| 4 | 3.0 | 4.0 | 2.3 | 2.4 | 2.7 | 9.5 | 3.0 | 2.8 | 2.4 | 2.4 | 2.6 | 2.4 |
| 5 | 4.0 | 2.9 | 2.2 | 2.6 | 2.7 | 4.3 | 3.1 | 2.7 | 2.4 | 2.8 | 2.4 | 3.1 |
| 6 | 1.9 | 2.5 | 2.2 | 2.3 | 2.8 | 3.5 | 2.8 | 2.8 | 2.4 | 2.7 | 2.6 | 3.5 |
| 7 | 2.0 | 2.4 | 2.5 | 2.5 | 5.5 | 3.2 | 2.7 | 2.8 | 2.5 | 4.1 | 2.5 | 5.4 |
| 8 | 2.2 | 4.8 | 2.1 | 2.7 | 5.6 | 3.0 | 2.8 | 2.8 | 2.7 | 2.7 | 2.4 | 5.4 |
| 9 | 2.2 | 3.4 | 2.1 | 2.4 | 3.9 | 2.8 | 2.8 | 2.6 | 3.2 | 2.5 | 2.4 | 3.4 |
| 10 | 2.1 | 2.8 | 2.1 | 2.9 | 3.3 | 2.9 | 2.9 | 2.5 | 2.9 | 2.5 | 2.4 | 2.8 |
| 11 | 1.9 | 2.7 | 2.0 | 2.6 | 2.9 | 2.9 | 2.9 | 2.5 | 2.6 | 2.4 | 3.2 | 2.6 |
| 12 | 1.8 | 2.7 | 2.0 | 2.5 | 2.9 | 2.8 | 2.8 | 2.3 | 2.6 | 2.4 | 2.8 | 2.5 |
| 13 | e1.8 | 14 | 2.6 | 2.5 | 2.9 | 2.8 | 2.7 | 2.3 | 2.7 | 2.3 | 2.6 | 2.5 |
| 14 | e1.8 | 4.8 | 2.3 | 2.5 | 2.9 | 2.8 | 2.7 | 2.4 | 2.4 | 2.4 | 2.5 | 2.5 |
| 15 | e1.7 | 3.9 | 2.1 | 2.2 | 2.8 | 2.8 | 2.7 | 2.3 | 2.4 | 2.3 | 2.4 | 2.3 |
| 16 | e1.8 | 3.0 | 2.0 | 2.2 | 2.8 | 2.6 | 2.7 | 2.4 | 2.4 | 2.4 | 2.4 | 3.2 |
| 17 | 1.6 | 2.7 | 2.2 | 2.3 | 2.6 | 2.8 | 2.8 | 2.3 | 2.4 | 2.5 | 2.3 | 2.7 |
| 18 | 1.7 | 2.5 | 2.0 | 2.4 | 2.7 | 2.8 | 2.9 | 2.3 | 2.9 | 2.4 | 2.5 | 2.4 |
| 19 | 1.7 | 2.4 | 2.1 | 3.8 | 2.9 | 2.7 | 2.7 | 2.2 | 2.5 | 2.3 | 2.3 | 2.4 |
| 20 | 1.6 | 2.4 | 2.0 | 2.4 | 2.8 | 2.9 | 2.7 | 2.4 | 2.5 | 2.3 | 2.2 | 2.6 |
| 21 | 1.7 | 2.4 | 2.1 | 2.3 | 2.5 | 2.8 | 2.9 | 2.4 | 2.5 | 3.0 | 2.2 | 2.4 |
| 22 | 1.8 | 2.2 | 2.0 | 2.4 | 2.6 | 2.8 | 2.7 | 2.3 | 2.5 | 3.4 | 2.1 | 2.4 |
| 23 | 2.0 | 2.2 | 2.1 | 2.4 | 2.5 | 2.8 | 2.6 | 2.4 | 5.7 | 2.8 | 2.1 | 2.4 |
| 24 | 1.9 | 2.2 | 2.1 | 2.8 | 2.6 | 2.8 | 2.6 | 2.3 | 3.3 | 6.4 | 2.1 | 2.6 |
| 25 | 1.8 | 2.2 | 2.0 | 33 | 2.4 | 2.8 | 2.6 | 2.4 | 2.6 | 2.9 | 2.0 | 2.4 |
| 26 | 2.4 | 2.3 | 2.2 | 5.2 | 2.5 | 2.8 | 2.7 | 2.7 | 2.5 | 3.6 | 2.1 | 2.4 |
| 27 | 1.9 | 2.3 | 2.0 | 4.7 | 3.0 | 2.8 | 2.6 | 2.2 | 2.3 | 5.9 | 2.1 | 2.2 |
| 28 | 3.1 | 2.3 | 2.1 | 5.8 | 3.0 | 2.7 | 6.0 | 2.7 | 2.3 | 3.8 | 2.1 | 2.2 |
| 29 | 2.7 | 2.2 | 1.9 | 3.5 | 2.6 | 2.7 | 3.2 | 2.3 | 4.2 | 3.0 | 2.0 | 2.2 |
| 30 | 2.1 | 2.5 | 5.2 | 4.5 | --- | 2.7 | 2.9 | 2.4 | 3.8 | 2.8 | 2.1 | 2.2 |
| 31 | 5.8 | --- | 5.6 | 3.4 | --- | 3.7 | --- | 2.5 | --- | 2.6 | 7.3 | --- |
| TOTAL | 68.4 | 108.8 | 73.5 | 120.1 | 86.6 | 115.8 | 87.3 | 77.1 | 82.6 | 91.5 | 78.1 | 82.7 |
| MEAN | 2.21 | 3.63 | 2.37 | 3.87 | 2.99 | 3.74 | 2.91 | 2.49 | 2.75 | 2.95 | 2.52 | 2.76 |
| MAX | 5.8 | 14 | 5.6 | 33 | 5.6 | 20 | 6.0 | 2.8 | 5.7 | 6.4 | 7.3 | 5.4 |
| MIN | 1.6 | 2.2 | 1.9 | 2.2 | 2.4 | 2.6 | 2.6 | 2.2 | 2.3 | 2.3 | 2.0 | 2.2 |
| AC-FT | 136 | 216 | 146 | 238 | 172 | 230 | 173 | 153 | 164 | 181 | 155 | 164 |

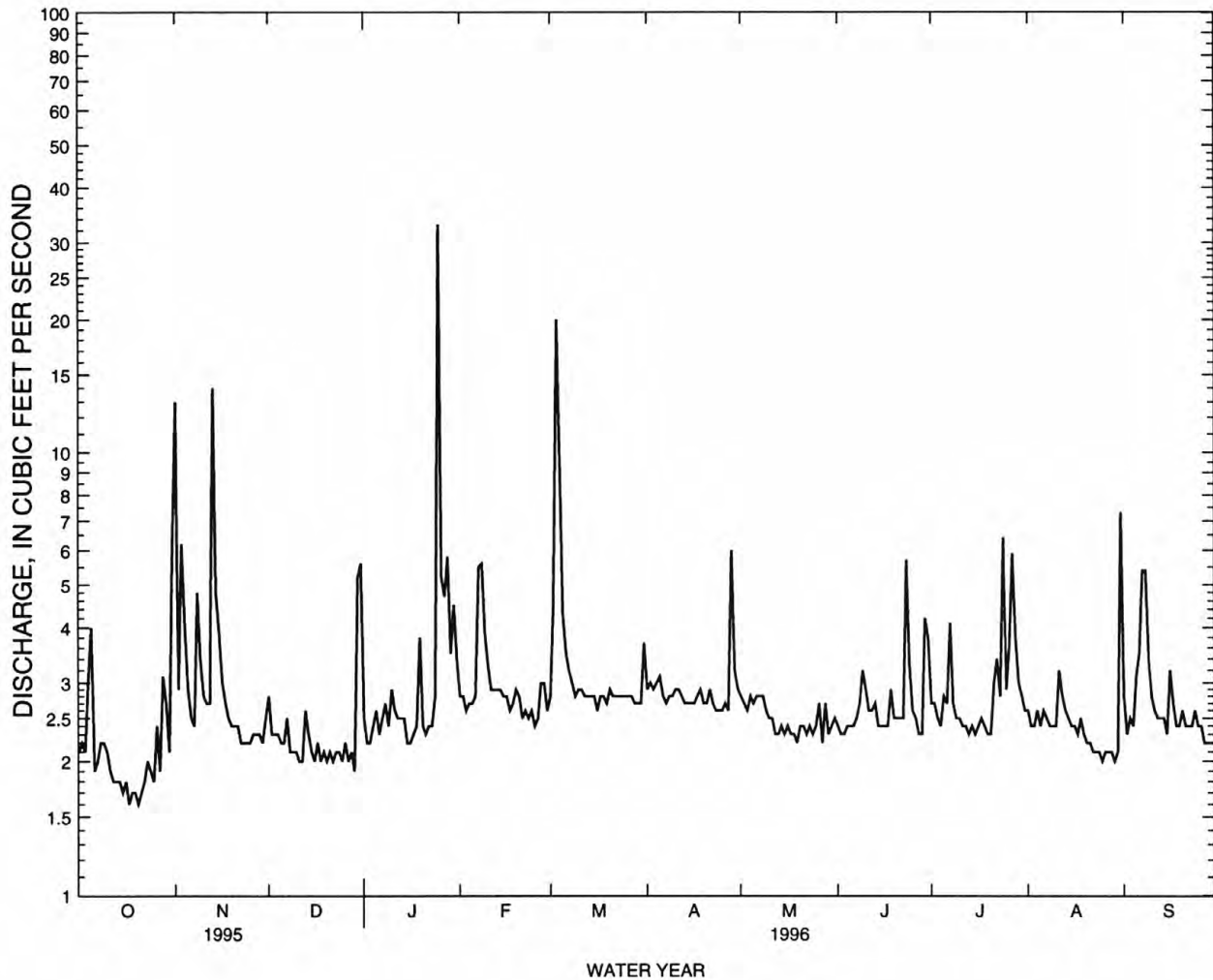
e Estimated

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1984 - 1996, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|------|------|------|------|------|------|------|------|------|------|------|------|------|
| MEAN | 3.26 | 3.82 | 3.88 | 3.70 | 3.88 | 4.40 | 3.59 | 3.11 | 2.76 | 3.09 | 2.80 | 3.15 |
| MAX | 6.69 | 10.5 | 9.56 | 8.65 | 7.55 | 11.8 | 10.6 | 5.52 | 4.78 | 5.89 | 5.78 | 5.81 |
| (WY) | 1992 | 1991 | 1988 | 1988 | 1989 | 1991 | 1989 | 1988 | 1991 | 1989 | 1991 | 1992 |
| MIN | .66 | 1.24 | 1.09 | .95 | 1.03 | .92 | .85 | .73 | .74 | .67 | .67 | .67 |
| (WY) | 1985 | 1986 | 1986 | 1986 | 1986 | 1984 | 1985 | 1984 | 1984 | 1984 | 1984 | 1984 |

HAWAII, ISLAND OF OAHU
 16283200 KAHALUU STREAM NEAR AHUIMANU--Continued

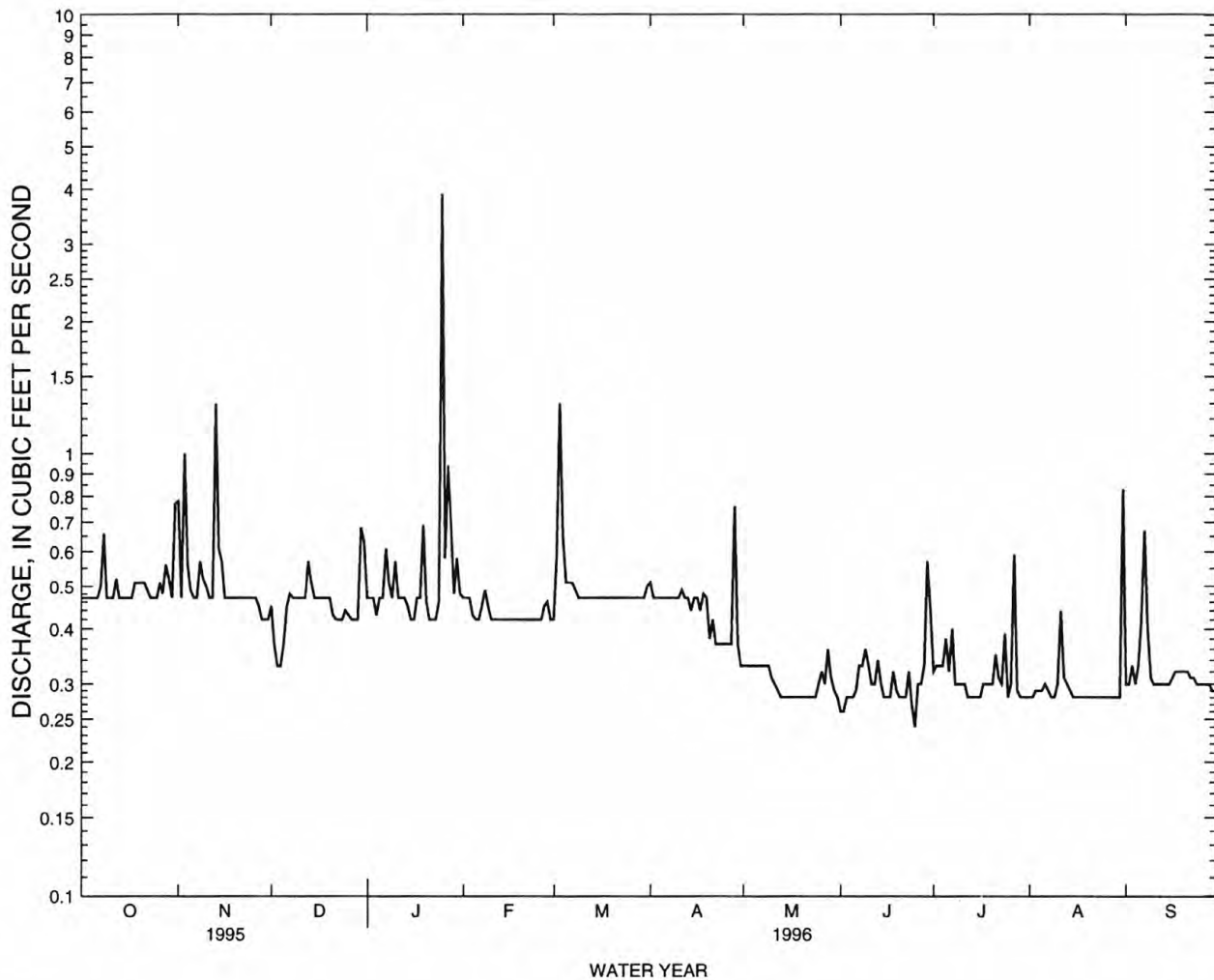
| SUMMARY STATISTICS | FOR 1995 CALENDAR YEAR | | FOR 1996 WATER YEAR | | WATER YEARS 1984 - 1996 | |
|--------------------------|------------------------|--------|---------------------|--------|-------------------------|-------------|
| ANNUAL TOTAL | 911.4 | | 1072.5 | | | |
| ANNUAL MEAN | 2.50 | | 2.93 | | 3.45 | |
| HIGHEST ANNUAL MEAN | | | | | 5.97 | 1991 |
| LOWEST ANNUAL MEAN | | | | | 1.07 | 1984 |
| HIGHEST DAILY MEAN | 14 | Aug 20 | 33 | Jan 25 | 97 | Mar 19 1991 |
| LOWEST DAILY MEAN | 1.2 | May 31 | 1.6 | Oct 17 | .58 | Sep 22 1984 |
| ANNUAL SEVEN-DAY MINIMUM | 1.5 | Mar 26 | 1.7 | Oct 15 | .59 | Nov 5 1984 |
| ANNUAL RUNOFF (AC-FT) | 1810 | | 2130 | | 2500 | |
| 10 PERCENT EXCEEDS | 3.1 | | 3.6 | | 5.0 | |
| 50 PERCENT EXCEEDS | 2.2 | | 2.5 | | 2.8 | |
| 90 PERCENT EXCEEDS | 1.8 | | 2.1 | | .91 | |



HAWAII, ISLAND OF OAHU
 16283600 SOUTH FORK WAIHEE STREAM NEAR HEEIA

| SUMMARY STATISTICS | FOR 1994 CALENDAR YEAR | FOR 1995 WATER YEAR | WATER YEARS 1962 - 1995 | |
|--------------------------|------------------------|---------------------|-------------------------|------------|
| ANNUAL TOTAL | 224.50 | 154.52 | | |
| ANNUAL MEAN | .62 | .42 | 1.27 | |
| HIGHEST ANNUAL MEAN | | | 2.52 | 1968 |
| LOWEST ANNUAL MEAN | | | .37 | 1990 |
| HIGHEST DAILY MEAN | 1.8 Aug 23 | 3.9 Jan 25 | 33 | May 2 1965 |
| LOWEST DAILY MEAN | .32 Apr 14 | .24 Jun 25 | .00 | Jul 8 1977 |
| ANNUAL SEVEN-DAY MINIMUM | .37 Apr 13 | .28 May 30 | .20 | Sep 2 1994 |
| ANNUAL RUNOFF (AC-FT) | 445 | 306 | 921 | |
| 10 PERCENT EXCEEDS | .80 | .51 | 2.2 | |
| 50 PERCENT EXCEEDS | .56 | .42 | 1.1 | |
| 90 PERCENT EXCEEDS | .47 | .28 | .42 | |

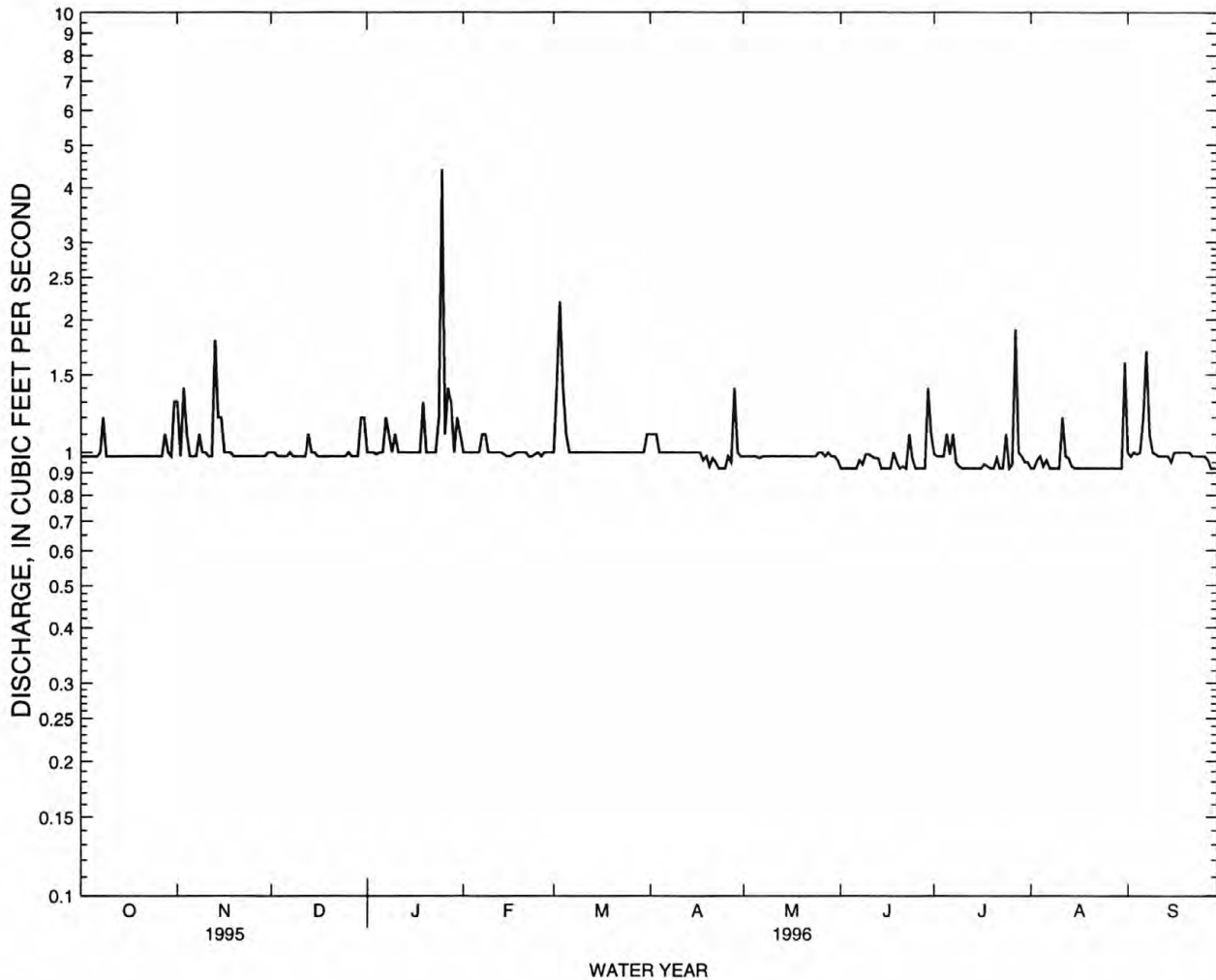
e Estimated



HAWAII, ISLAND OF OAHU

16283700 NORTH FORK WAIHEE STREAM NEAR HEEIA--Continued

| SUMMARY STATISTICS | FOR 1995 CALENDAR YEAR | FOR 1996 WATER YEAR | WATER YEARS 1962 - 1996 | |
|--------------------------|------------------------|---------------------|-------------------------|-------------|
| ANNUAL TOTAL | 418.63 | 373.00 | | |
| ANNUAL MEAN | 1.15 | 1.02 | 1.47 | |
| HIGHEST ANNUAL MEAN | | | 2.42 | 1965 |
| LOWEST ANNUAL MEAN | | | .76 | 1990 |
| HIGHEST DAILY MEAN | 2.1 Apr 3 | 4.4 Jan 25 | 32 | May 2 1965 |
| LOWEST DAILY MEAN | .98 Aug 27 | .92 Apr 23 | .00 | Jul 7 1977 |
| ANNUAL SEVEN-DAY MINIMUM | .98 Aug 27 | .92 Jul 10 | .35 | Apr 25 1983 |
| ANNUAL RUNOFF (AC-FT) | 830 | 740 | 1070 | |
| 10 PERCENT EXCEEDS | 1.3 | 1.1 | 2.2 | |
| 50 PERCENT EXCEEDS | 1.1 | .98 | 1.4 | |
| 90 PERCENT EXCEEDS | .98 | .92 | .83 | |



HAWAII, ISLAND OF OAHU
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 mi².

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 good except for estimated daily discharges, which are fair. Honolulu Board of Water Supply diverts water from tunnel and wells in drainage area.

AVERAGE DISCHARGE.--22 years (water years 1975-96), 6.26 ft³/s (4,540 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,530 ft³/s, March 21, 1991, gage height, 7.93 ft, from rating curve extended above 100 ft³/s on basis of slope area measurement at gage height 7.93 ft; minimum, 1.1 ft³/s, April 7, 1977.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 280 ft³/s and maximum (*):

| Date | Time | Discharge (ft ³ /s) | Gage height (ft) | Date | Time | Discharge (ft ³ /s) | Gage height (ft) |
|---------|------|-----------------------------------|---------------------|---------|------|-----------------------------------|---------------------|
| Jan. 25 | 0400 | *612 | 6.08(hwm) | July 27 | 1345 | 347 | 5.24 |

Minimum discharge, 4.1 ft³/s, October 21.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY MEAN VALUES

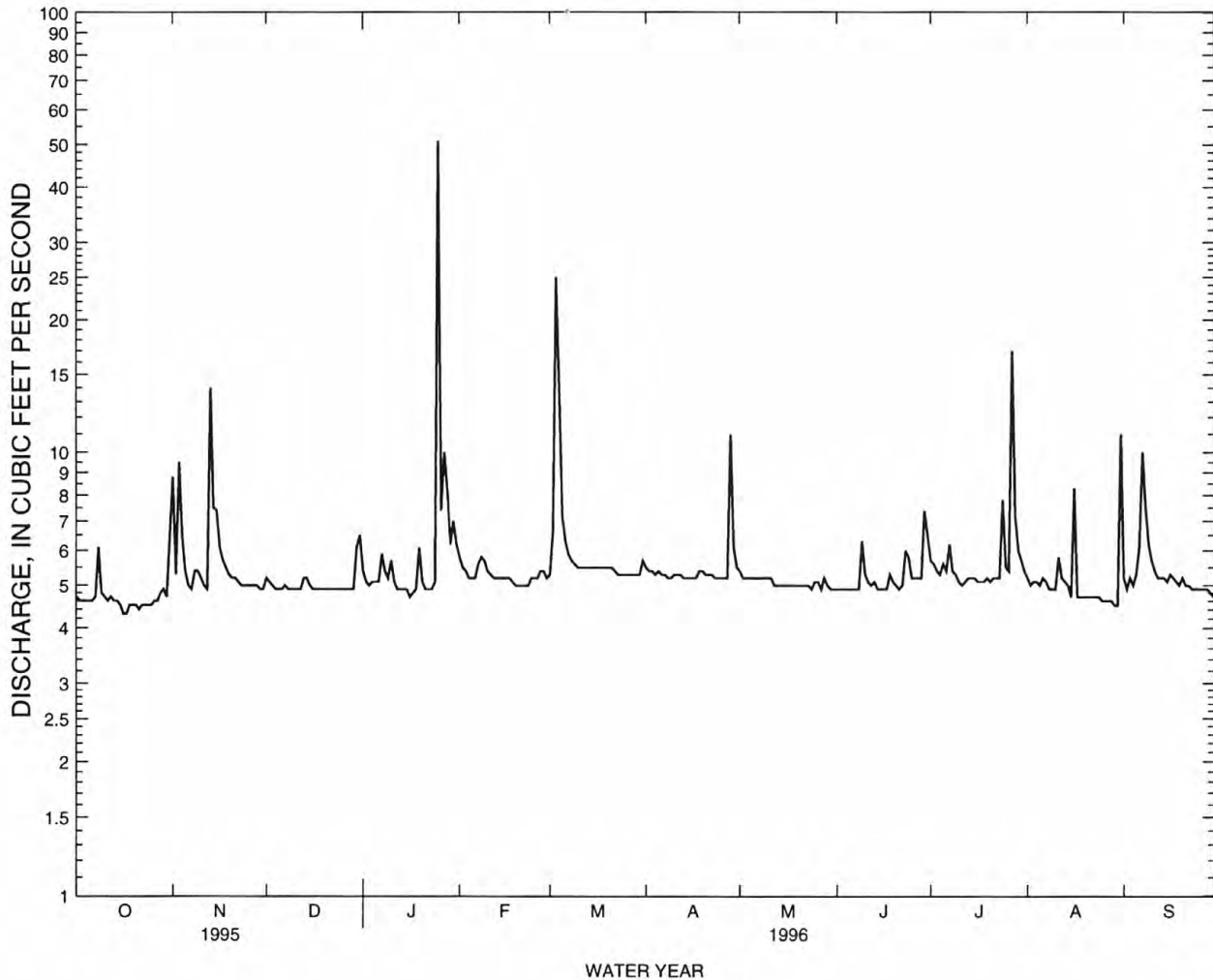
| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 4.7 | 8.8 | 5.2 | 5.4 | 5.8 | 5.3 | 5.5 | 5.4 | 4.9 | 5.7 | 5.2 | 5.2 |
| 2 | 4.6 | 5.3 | 5.1 | 5.1 | 5.5 | 6.6 | 5.4 | 5.2 | 4.9 | 5.6 | 5.0 | 4.9 |
| 3 | 4.6 | 9.5 | 5.0 | 5.0 | 5.4 | 25 | 5.4 | 5.2 | 4.9 | 5.4 | 5.1 | 5.2 |
| 4 | 4.6 | 6.4 | 4.9 | 5.1 | 5.2 | 14 | 5.3 | 5.2 | 4.9 | 5.3 | 5.1 | 5.0 |
| 5 | 4.6 | 5.4 | 4.9 | 5.1 | 5.2 | 7.2 | 5.4 | 5.2 | 4.9 | 5.6 | 5.0 | 5.3 |
| 6 | 4.6 | 5.0 | 4.9 | 5.1 | 5.2 | 6.3 | 5.3 | 5.2 | 4.9 | 5.4 | 5.2 | 6.1 |
| 7 | 4.7 | 4.9 | 5.0 | 5.9 | 5.6 | 5.9 | 5.3 | 5.2 | 4.9 | 6.2 | 5.1 | 10 |
| 8 | 6.1 | 5.4 | 4.9 | 5.4 | 5.8 | 5.7 | 5.2 | 5.2 | 4.9 | 5.4 | 4.9 | 7.5 |
| 9 | 4.8 | 5.4 | 4.9 | 5.2 | 5.7 | 5.6 | 5.2 | 5.2 | 6.3 | 5.3 | 4.9 | 6.2 |
| 10 | 4.7 | 5.2 | 4.9 | 5.7 | 5.4 | 5.5 | 5.3 | 5.2 | 5.3 | 5.1 | 4.9 | 5.7 |
| 11 | 4.6 | 5.0 | 4.9 | 5.1 | 5.3 | 5.5 | 5.3 | 5.2 | 5.1 | 5.0 | 5.8 | 5.4 |
| 12 | 4.7 | 4.9 | 4.9 | 4.9 | 5.2 | 5.5 | 5.3 | 5.0 | 5.0 | 5.1 | 5.2 | 5.2 |
| 13 | 4.6 | 14 | 5.2 | 4.9 | 5.2 | 5.5 | 5.2 | 5.0 | 5.1 | 5.2 | 5.1 | 5.2 |
| 14 | 4.6 | 7.5 | 5.2 | 4.9 | 5.2 | 5.5 | 5.2 | 5.0 | 4.9 | 5.2 | 5.0 | 5.2 |
| 15 | 4.5 | 7.4 | 5.0 | 4.9 | 5.2 | 5.5 | 5.2 | 5.0 | 4.9 | 5.2 | 4.7 | 5.1 |
| 16 | 4.3 | 6.1 | 4.9 | 4.7 | 5.2 | 5.5 | 5.2 | 5.0 | 4.9 | 5.1 | 8.3 | 5.3 |
| 17 | 4.3 | 5.7 | 4.9 | 4.8 | 5.2 | 5.5 | 5.2 | 5.0 | 4.9 | 5.1 | 4.7 | 5.2 |
| 18 | 4.5 | 5.5 | 4.9 | 4.9 | 5.1 | 5.5 | 5.4 | 5.0 | 5.3 | 5.1 | 4.7 | 5.1 |
| 19 | 4.5 | 5.3 | 4.9 | 6.1 | 5.0 | 5.5 | 5.4 | 5.0 | 5.1 | 5.2 | 4.7 | 5.0 |
| 20 | 4.5 | 5.2 | 4.9 | 5.1 | 5.0 | 5.5 | 5.3 | 5.0 | 5.0 | 5.1 | 4.7 | 5.2 |
| 21 | 4.4 | 5.2 | 4.9 | 4.9 | 5.0 | 5.5 | 5.3 | 5.0 | 4.9 | 5.2 | 4.7 | 5.0 |
| 22 | 4.5 | 5.1 | 4.9 | 4.9 | 5.0 | 5.4 | 5.3 | 5.0 | 5.0 | 5.2 | 4.7 | 5.0 |
| 23 | 4.5 | 5.0 | 4.9 | 4.9 | 5.0 | 5.3 | 5.2 | 5.0 | 6.0 | 5.2 | 4.7 | 4.9 |
| 24 | 4.5 | 5.0 | 4.9 | 5.1 | 5.2 | 5.3 | 5.2 | 4.9 | 5.8 | 7.8 | 4.7 | 4.9 |
| 25 | 4.5 | 5.0 | 4.9 | 5.1 | 5.2 | 5.3 | 5.2 | 5.1 | 5.2 | 5.5 | 4.6 | 4.9 |
| 26 | 4.6 | 5.0 | 4.9 | 7.4 | 5.2 | 5.3 | 5.2 | 5.1 | 5.2 | 5.4 | 4.6 | 4.9 |
| 27 | 4.6 | 5.0 | 4.9 | 10 | 5.4 | 5.3 | 5.2 | 4.9 | 5.2 | 17 | 4.6 | 4.9 |
| 28 | 4.8 | 5.0 | 4.9 | 8.2 | 5.4 | 5.3 | 11 | 5.2 | 5.2 | 7.2 | 4.6 | 4.9 |
| 29 | 4.9 | 4.9 | 4.9 | 6.2 | 5.2 | 5.3 | 6.1 | 5.0 | 7.4 | 6.0 | 4.5 | 4.8 |
| 30 | 4.7 | 4.9 | 6.1 | 7.0 | --- | 5.3 | 5.5 | 4.9 | 6.5 | 5.7 | 4.5 | 4.7 |
| 31 | 6.4 | --- | 6.5 | 6.2 | --- | 5.7 | --- | 4.9 | --- | 5.4 | 11 | --- |
| TOTAL | 145.5 | 178.0 | 156.1 | 219.1 | 153.0 | 201.1 | 165.2 | 157.4 | 157.4 | 181.9 | 160.5 | 161.9 |
| MEAN | 4.69 | 5.93 | 5.04 | 7.07 | 5.28 | 6.49 | 5.51 | 5.08 | 5.25 | 5.87 | 5.18 | 5.40 |
| MAX | 6.4 | 14 | 6.5 | 51 | 5.8 | 25 | 11 | 5.4 | 7.4 | 17 | 11 | 10 |
| MIN | 4.3 | 4.9 | 4.9 | 4.7 | 5.0 | 5.3 | 5.2 | 4.9 | 4.9 | 5.0 | 4.5 | 4.7 |
| AC-FT | 289 | 353 | 310 | 435 | 303 | 399 | 328 | 312 | 312 | 361 | 318 | 321 |

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1975 - 1996, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|------|------|------|------|------|------|------|------|------|------|------|------|------|
| MEAN | 5.90 | 6.51 | 6.58 | 6.81 | 6.67 | 7.53 | 6.36 | 5.92 | 5.69 | 5.81 | 5.72 | 5.69 |
| MAX | 9.81 | 14.3 | 15.5 | 12.1 | 13.2 | 17.7 | 15.1 | 8.46 | 8.88 | 9.95 | 10.6 | 9.43 |
| (WY) | 1983 | 1991 | 1988 | 1988 | 1979 | 1991 | 1989 | 1982 | 1982 | 1981 | 1982 | 1983 |
| MIN | 2.70 | 4.08 | 3.60 | 3.71 | 3.05 | 2.85 | 2.72 | 3.18 | 3.36 | 2.40 | 2.61 | 2.74 |
| (WY) | 1976 | 1978 | 1976 | 1977 | 1977 | 1977 | 1977 | 1977 | 1976 | 1977 | 1976 | 1976 |

16284200 WAIHEE STREAM NEAR KAHALUU--Continued

| SUMMARY STATISTICS | FOR 1995 CALENDAR YEAR | | FOR 1996 WATER YEAR | | WATER YEARS 1975 - 1996 | |
|--------------------------|------------------------|--------|---------------------|--------|-------------------------|-------------|
| ANNUAL TOTAL | 1995.1 | | 2037.1 | | 6.26 | |
| ANNUAL MEAN | 5.47 | | 5.57 | | 9.36 | |
| HIGHEST ANNUAL MEAN | | | | | 3.32 | |
| LOWEST ANNUAL MEAN | | | | | 1982 | |
| HIGHEST DAILY MEAN | 23 | Aug 23 | 51 | Jan 25 | 149 | Mar 19 1991 |
| LOWEST DAILY MEAN | 4.3 | Sep 21 | 4.3 | Oct 16 | 1.3 | Apr 15 1977 |
| ANNUAL SEVEN-DAY MINIMUM | 4.4 | Sep 20 | 4.4 | Oct 15 | 1.4 | Apr 12 1977 |
| ANNUAL RUNOFF (AC-FT) | 3960 | | 4040 | | 4540 | |
| 10 PERCENT EXCEEDS | 6.2 | | 6.1 | | 7.5 | |
| 50 PERCENT EXCEEDS | 5.1 | | 5.2 | | 5.6 | |
| 90 PERCENT EXCEEDS | 4.6 | | 4.7 | | 3.8 | |



HAWAII, ISLAND OF OAHU
16294900 WAIKANE STREAM AT ALTITUDE 75 FT, AT WAIKANE

LOCATION.--Lat 21°30'00", long 157°51'34", Hydrologic Unit 20060000, on right bank, 0.3 mi downstream from Waieekee Stream, 0.7 mi west of Waikane, and 1.2 mi northwest of Waiahole School.

DRAINAGE AREA.--2.22 mi².

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 fair.

AVERAGE DISCHARGE.--36 years (water years 1961-96), 8.88 ft³/s (6,430 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 8,800 ft³/s, February 4, 1965, gage height, 10.76 ft, from rating curve extended above 120 ft³/s on basis of slope-area measurements at gage heights 4.88 ft, 9.46 ft, and 10.76 ft; minimum, 0.76 ft³/s, October 27, 1975.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 700 ft³/s and maximum (*): (4.79 ft)

| Date | Time | Discharge (ft ³ /s) | Gage height (ft) | Date | Time | Discharge (ft ³ /s) | Gage height (ft) |
|---|------|-----------------------------------|---------------------|--|------|-----------------------------------|---------------------|
| Jan. 25 | 0430 | 2,120 | 7.13 | No other peak greater than base discharge. | | | |
| Minimum discharge, 2.06 ft ³ /s, October 24. | | | | | | | |

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY MEAN VALUES

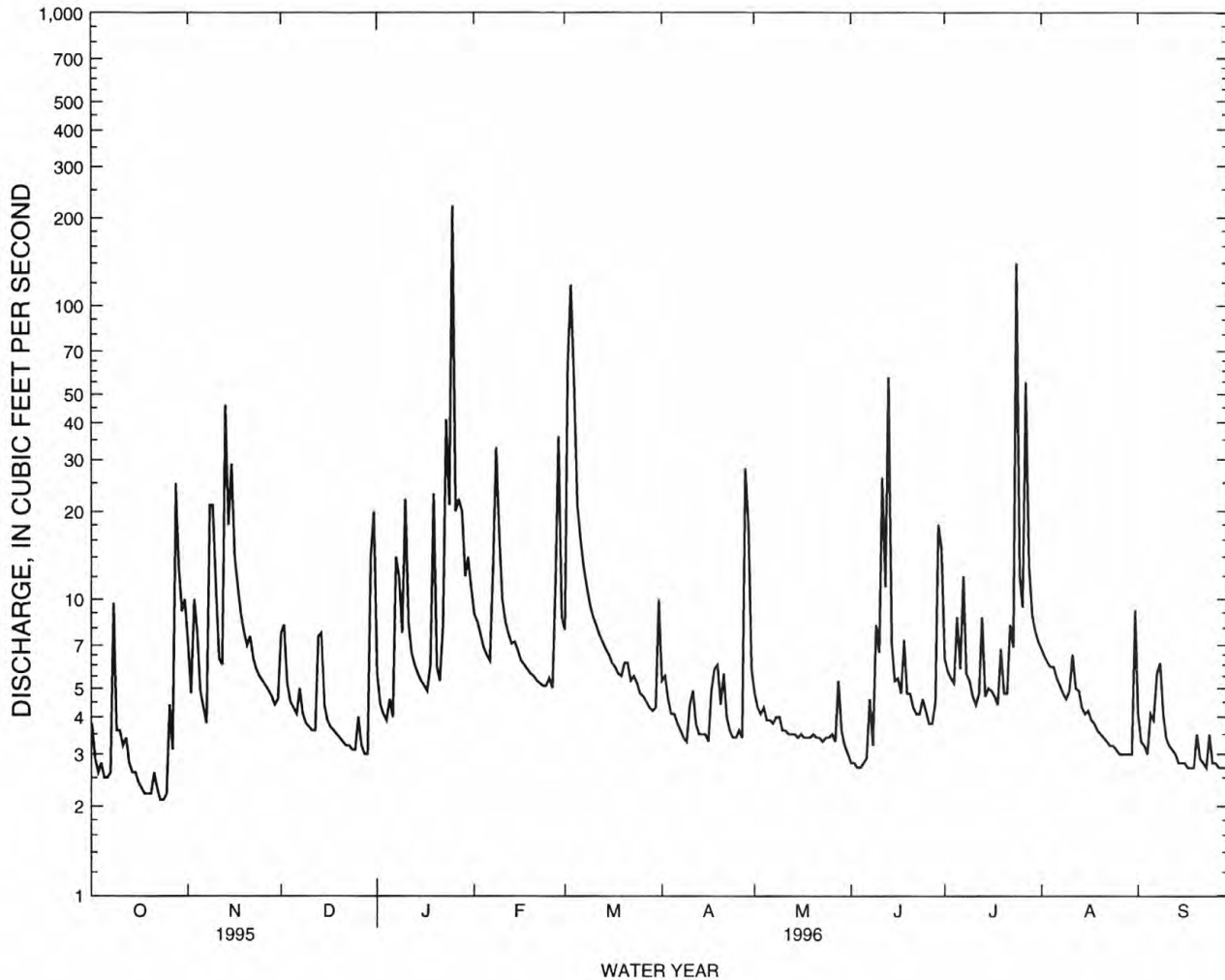
| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|
| 1 | 3.8 | 7.2 | 7.7 | 5.6 | 8.9 | 7.9 | 5.3 | 4.8 | 2.8 | 6.3 | 6.8 | 4.1 |
| 2 | 2.9 | 4.8 | 8.2 | 4.4 | 8.4 | 62 | 5.5 | 4.3 | 2.8 | 5.7 | 6.4 | 3.3 |
| 3 | 2.6 | 10 | 5.2 | 4.1 | 7.6 | 118 | 4.6 | 4.1 | 2.7 | 5.4 | 6.1 | 3.2 |
| 4 | 2.8 | 7.7 | 4.5 | 3.9 | 6.9 | 55 | 4.1 | 4.3 | 2.7 | 5.2 | 5.9 | 3.0 |
| 5 | 2.5 | 4.9 | 4.3 | 4.6 | 6.5 | 21 | 4.1 | 3.9 | 2.8 | 8.7 | 5.9 | 4.1 |
| 6 | 2.5 | 4.3 | 4.1 | 4.0 | 6.2 | 16 | 3.8 | 3.9 | 2.9 | 5.8 | 5.4 | 3.9 |
| 7 | 2.6 | 3.8 | 5.0 | 14 | 13 | 13 | 3.6 | 3.8 | 4.6 | 12 | 5.1 | 5.6 |
| 8 | 9.7 | 21 | 4.1 | 12 | 33 | 11 | 3.4 | 4.0 | 3.2 | 5.6 | 4.8 | 6.1 |
| 9 | 3.6 | 21 | 3.8 | 7.7 | 17 | 9.6 | 3.3 | 4.0 | 8.2 | 5.3 | 4.6 | 4.1 |
| 10 | 3.6 | 11 | 3.7 | 22 | 10 | 8.7 | 4.4 | 3.6 | 6.6 | 4.7 | 4.9 | 3.4 |
| 11 | 3.2 | 6.3 | 3.6 | 8.3 | 8.4 | 8.2 | 4.9 | 3.6 | 26 | 4.4 | 6.5 | 3.2 |
| 12 | 3.4 | 6.0 | 3.6 | 6.6 | 7.6 | 7.6 | 3.8 | 3.5 | 11 | 4.8 | 5.0 | 3.1 |
| 13 | 2.8 | 46 | 7.5 | 6.0 | 7.1 | 7.2 | 3.5 | 3.5 | 57 | 8.7 | 4.9 | 3.0 |
| 14 | 2.6 | 18 | 7.7 | 5.6 | 7.2 | 6.8 | 3.5 | 3.5 | 7.1 | 4.7 | 4.3 | 2.8 |
| 15 | 2.6 | 29 | 4.4 | 5.3 | 6.7 | 6.5 | 3.5 | 3.4 | 5.3 | 5.0 | 4.1 | 2.8 |
| 16 | 2.4 | 14 | 3.9 | 5.1 | 6.2 | 6.1 | 3.3 | 3.5 | 5.4 | 4.9 | 4.2 | 2.8 |
| 17 | 2.3 | 11 | 3.7 | 4.9 | 6.0 | 5.9 | 4.9 | 3.4 | 4.8 | 4.7 | 3.9 | 2.7 |
| 18 | 2.2 | 9.0 | 3.6 | 6.0 | 5.8 | 5.6 | 5.8 | 3.4 | 7.3 | 4.4 | 3.8 | 2.7 |
| 19 | 2.2 | 7.8 | 3.5 | 23 | 5.6 | 5.5 | 6.0 | 3.4 | 4.8 | 6.8 | 3.6 | 2.7 |
| 20 | 2.2 | 7.0 | 3.4 | 5.9 | 5.5 | 6.1 | 4.4 | 3.5 | 4.8 | 4.8 | 3.5 | 3.5 |
| 21 | 2.6 | 7.5 | 3.3 | 5.3 | 5.3 | 6.1 | 5.6 | 3.4 | 4.3 | 4.8 | 3.4 | 2.9 |
| 22 | 2.3 | 6.3 | 3.2 | 8.2 | 5.2 | 5.3 | 4.0 | 3.4 | 4.1 | 8.2 | 3.3 | 2.8 |
| 23 | 2.1 | 5.8 | 3.2 | 41 | 5.1 | 5.5 | 3.6 | 3.3 | 4.1 | 6.9 | 3.2 | 2.7 |
| 24 | 2.1 | 5.5 | 3.1 | 21 | 5.1 | 5.2 | 3.4 | 3.4 | 4.6 | 140 | 3.2 | 3.5 |
| 25 | 2.2 | 5.3 | 3.1 | 220 | 5.4 | 4.8 | 3.4 | 3.4 | 4.2 | 12 | 3.1 | 2.8 |
| 26 | 4.4 | 5.1 | 4.0 | 20 | 5.0 | 4.7 | 3.6 | 3.5 | 3.8 | 9.4 | 3.0 | 2.8 |
| 27 | 3.1 | 4.9 | 3.2 | 22 | 11 | 4.5 | 3.4 | 3.3 | 3.8 | 55 | 3.0 | 2.7 |
| 28 | 25 | 4.7 | 3.0 | 20 | 36 | 4.3 | 28 | 5.3 | 4.5 | 13 | 3.0 | 2.7 |
| 29 | 13 | 4.4 | 3.0 | 12 | 8.7 | 4.2 | 18 | 3.6 | 18 | 8.9 | 3.0 | 2.7 |
| 30 | 9.1 | 4.6 | 14 | 14 | --- | 4.3 | 5.8 | 3.2 | 15 | 7.8 | 3.0 | 2.7 |
| 31 | 10 | --- | 20 | 11 | --- | 10 | --- | 3.0 | --- | 7.2 | 9.2 | --- |
| TOTAL | 138.4 | 303.9 | 158.6 | 553.5 | 270.4 | 446.6 | 164.5 | 114.2 | 239.2 | 391.1 | 140.1 | 98.4 |
| MEAN | 4.46 | 10.1 | 5.12 | 17.9 | 9.32 | 14.4 | 5.48 | 3.68 | 7.97 | 12.6 | 4.52 | 3.28 |
| MAX | 25 | 46 | 20 | 220 | 36 | 118 | 28 | 5.3 | 57 | 140 | 9.2 | 6.1 |
| MIN | 2.1 | 3.8 | 3.0 | 3.9 | 5.0 | 4.2 | 3.3 | 3.0 | 2.7 | 4.4 | 3.0 | 2.7 |
| AC-FT | 275 | 603 | 315 | 1100 | 536 | 886 | 326 | 227 | 474 | 776 | 278 | 195 |

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1960 - 1996, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|------|------|------|------|------|------|------|------|------|------|------|------|------|
| MEAN | 6.92 | 11.5 | 9.71 | 11.2 | 12.4 | 13.2 | 10.4 | 8.58 | 5.49 | 6.48 | 5.44 | 5.42 |
| MAX | 31.0 | 55.7 | 44.1 | 45.6 | 65.5 | 53.1 | 49.3 | 29.3 | 16.2 | 30.2 | 25.0 | 22.1 |
| (WY) | 1992 | 1966 | 1988 | 1988 | 1994 | 1982 | 1963 | 1965 | 1977 | 1987 | 1967 | 1986 |
| MIN | 1.55 | 2.13 | 2.23 | 1.67 | 1.77 | 2.03 | 2.88 | 2.19 | 1.83 | 1.76 | 1.57 | 1.38 |
| (WY) | 1985 | 1963 | 1978 | 1977 | 1978 | 1978 | 1985 | 1991 | 1984 | 1984 | 1984 | 1984 |

16294900 WAIKANE STREAM AT ALTITUDE 75 FT, AT WAIKANE--Continued

| SUMMARY STATISTICS | FOR 1995 CALENDAR YEAR | | FOR 1996 WATER YEAR | | WATER YEARS 1960 - 1996 | |
|--------------------------|------------------------|--------|---------------------|--------|-------------------------|-------------|
| ANNUAL TOTAL | 1959.2 | | 3018.9 | | 8.88 | |
| ANNUAL MEAN | 5.37 | | 8.25 | | 3.33 | |
| HIGHEST ANNUAL MEAN | | | | | 16.7 | 1982 |
| LOWEST ANNUAL MEAN | | | | | 3.33 | 1984 |
| HIGHEST DAILY MEAN | 75 | Aug 23 | 220 | Jan 25 | 868 | Feb 4 1965 |
| LOWEST DAILY MEAN | 2.0 | Jun 19 | 2.1 | Oct 23 | 1.1 | Oct 17 1975 |
| ANNUAL SEVEN-DAY MINIMUM | 2.1 | Jun 15 | 2.2 | Oct 18 | 1.3 | Sep 19 1984 |
| ANNUAL RUNOFF (AC-FT) | 3890 | | 5990 | | 6430 | |
| 10 PERCENT EXCEEDS | 9.0 | | 13 | | 14 | |
| 50 PERCENT EXCEEDS | 3.4 | | 4.8 | | 4.2 | |
| 90 PERCENT EXCEEDS | 2.3 | | 2.8 | | 2.2 | |



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 mi².

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 fair. Waiahole tunnel diverts water from tributaries and tunnels upstream of station. Elevation of the Waihole tunnel is 800 ft, from topographic map. Recording rain gage located 50 ft from the streamgage at an elevation of 80 ft.

AVERAGE DISCHARGE.--37 years (water years 1960-96), 37.1 ft³/s (26,900 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 6,250 ft³/s, March 20, 1991, gage height, 8.60 ft, from rating curve extended above 530 ft³/s on basis of computation of peak flow over submerged weir; minimum, 10 ft³/s, September 17, 18, 20, 1961.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,600 ft³/s and maximum (*):

| Date | Time | Discharge (ft ³ /s) | Gage height (ft) | Date | Time | Discharge (ft ³ /s) | Gage height (ft) |
|--|------|--------------------------------|------------------|--|------|--------------------------------|------------------|
| Jan. 25 | 0430 | 3,290 | 6.50 | No other peak greater than base discharge. | | | |
| Minimum discharge, 11 ft ³ /s, September 4. | | | | | | | |

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY MEAN VALUES

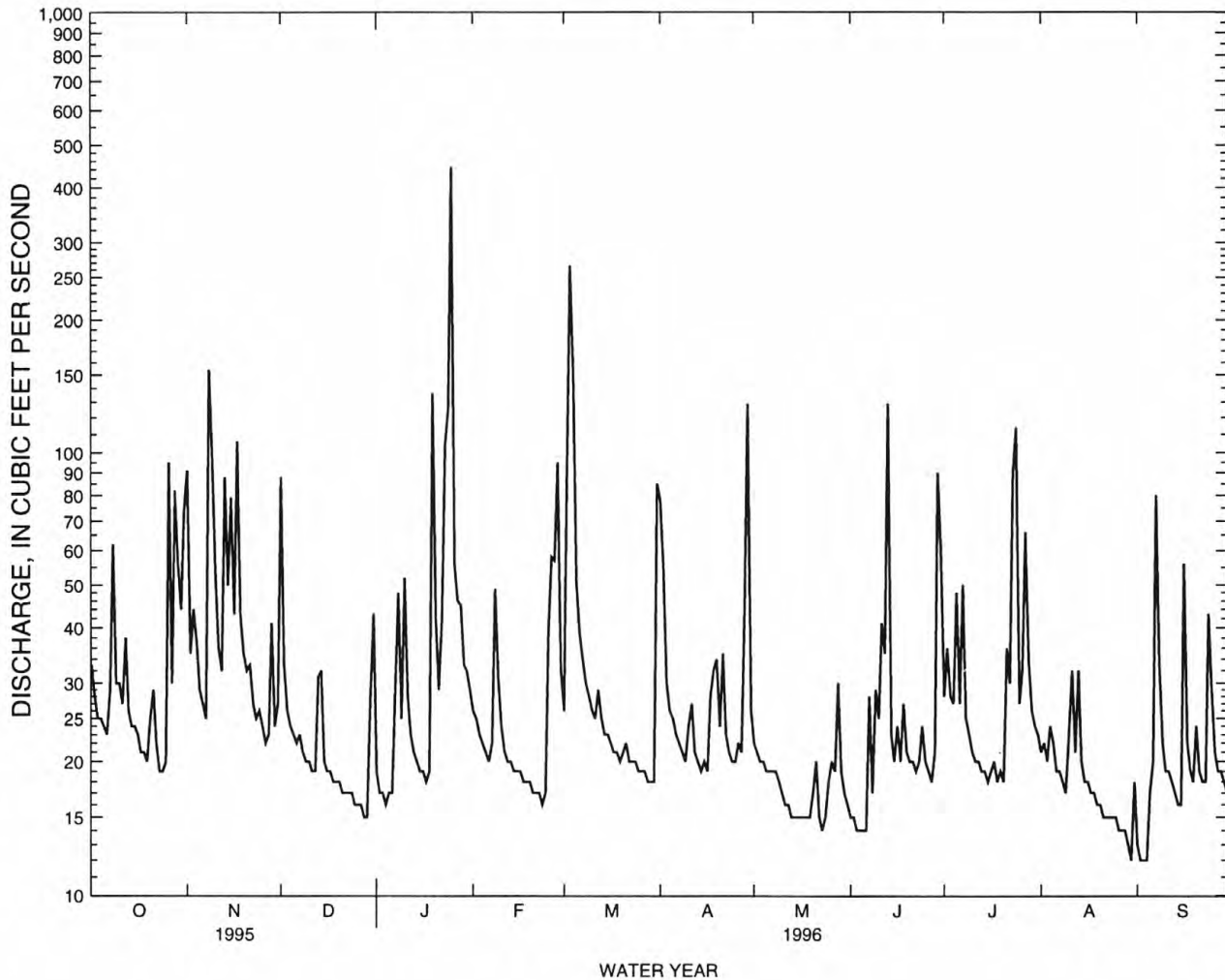
| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|------|------|------|------|------|------|------|------|------|------|------|------|
| 1 | 33 | 91 | 88 | 19 | 26 | 26 | 78 | 22 | 15 | 28 | 21 | 13 |
| 2 | 28 | 35 | 33 | 17 | 25 | 90 | 55 | 21 | 15 | 36 | 22 | 12 |
| 3 | 25 | 44 | 26 | 17 | 23 | 266 | 30 | 20 | 14 | 28 | 20 | 12 |
| 4 | 25 | 37 | 24 | 16 | 22 | 151 | 26 | 20 | 14 | 27 | 24 | 12 |
| 5 | 24 | 29 | 23 | 17 | 21 | 51 | 25 | 19 | 14 | 48 | 22 | 17 |
| 6 | 23 | 27 | 22 | 17 | 20 | 39 | 23 | 19 | 14 | 27 | 19 | 20 |
| 7 | 29 | 25 | 23 | 30 | 22 | 34 | 22 | 19 | 28 | 50 | 19 | 80 |
| 8 | 62 | 154 | 21 | 48 | 49 | 30 | 21 | 19 | 17 | 25 | 18 | 33 |
| 9 | 30 | 101 | 20 | 25 | 31 | 28 | 20 | 18 | 29 | 23 | 17 | 22 |
| 10 | 30 | 54 | 20 | 52 | 24 | 26 | 24 | 17 | 25 | 21 | 23 | 19 |
| 11 | 27 | 36 | 19 | 28 | 21 | 25 | 27 | 16 | 41 | 20 | 32 | 19 |
| 12 | 38 | 32 | 19 | 23 | 20 | 29 | 21 | 16 | 35 | 20 | 21 | 18 |
| 13 | 26 | 88 | 31 | 21 | 20 | 25 | 20 | 15 | 129 | 19 | 32 | 17 |
| 14 | 24 | 50 | 32 | 20 | 19 | 23 | 19 | 15 | 23 | 19 | 20 | 16 |
| 15 | 24 | 79 | 20 | 19 | 19 | 23 | 20 | 15 | 20 | 18 | 18 | 16 |
| 16 | 23 | 43 | 19 | 19 | 19 | 22 | 19 | 15 | 24 | 19 | 18 | 56 |
| 17 | 21 | 106 | 19 | 18 | 18 | 21 | 28 | 15 | 20 | 20 | 17 | 22 |
| 18 | 21 | 43 | 18 | 19 | 18 | 21 | 32 | 15 | 27 | 18 | 17 | 19 |
| 19 | 20 | 35 | 18 | 136 | 18 | 20 | 34 | 15 | 21 | 19 | 16 | 18 |
| 20 | 25 | 32 | 18 | 42 | 17 | 21 | 24 | 17 | 20 | 18 | 16 | 24 |
| 21 | 29 | 33 | 17 | 29 | 17 | 22 | 35 | 20 | 20 | 36 | 15 | 19 |
| 22 | 22 | 27 | 17 | 42 | 17 | 20 | 23 | 15 | 19 | 30 | 15 | 18 |
| 23 | 19 | 25 | 17 | 104 | 16 | 20 | 21 | 14 | 20 | 89 | 15 | 18 |
| 24 | 19 | 26 | 17 | 126 | 17 | 20 | 20 | 15 | 24 | 114 | 15 | 43 |
| 25 | 20 | 24 | 16 | 446 | 39 | 19 | 20 | 18 | 20 | 27 | 15 | 29 |
| 26 | 95 | 22 | 16 | 56 | 58 | 19 | 22 | 20 | 19 | 32 | 14 | 21 |
| 27 | 30 | 23 | 16 | 46 | 57 | 19 | 21 | 19 | 18 | 66 | 14 | 19 |
| 28 | 82 | 41 | 15 | 45 | 95 | 18 | 44 | 30 | 21 | 34 | 14 | 19 |
| 29 | 56 | 24 | 15 | 33 | 32 | 18 | 129 | 19 | 90 | 26 | 13 | 18 |
| 30 | 44 | 27 | 28 | 32 | --- | 18 | 26 | 17 | 60 | 24 | 12 | 17 |
| 31 | 74 | --- | 43 | 29 | --- | 85 | --- | 16 | --- | 23 | 18 | --- |
| TOTAL | 1048 | 1413 | 730 | 1591 | 800 | 1249 | 929 | 551 | 856 | 1004 | 572 | 686 |
| MEAN | 33.8 | 47.1 | 23.5 | 51.3 | 27.6 | 40.3 | 31.0 | 17.8 | 28.5 | 32.4 | 18.5 | 22.9 |
| MAX | 95 | 154 | 88 | 446 | 95 | 266 | 129 | 30 | 129 | 114 | 32 | 80 |
| MIN | 19 | 22 | 15 | 16 | 16 | 18 | 19 | 14 | 14 | 18 | 12 | 12 |
| AC-FT | 2080 | 2800 | 1450 | 3160 | 1590 | 2480 | 1840 | 1090 | 1700 | 1990 | 1130 | 1360 |

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1959 - 1996, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|------|------|------|------|------|------|------|------|------|------|------|------|------|
| MEAN | 32.8 | 45.0 | 38.2 | 37.1 | 37.3 | 45.8 | 46.1 | 39.5 | 27.4 | 32.8 | 30.6 | 30.2 |
| MAX | 55.1 | 170 | 101 | 94.9 | 141 | 176 | 137 | 102 | 56.5 | 90.5 | 73.7 | 84.7 |
| (WY) | 1992 | 1991 | 1988 | 1988 | 1969 | 1982 | 1963 | 1965 | 1978 | 1987 | 1978 | 1994 |
| MIN | 12.6 | 14.5 | 14.5 | 12.9 | 13.2 | 15.4 | 19.3 | 17.8 | 14.3 | 15.0 | 13.6 | 13.3 |
| (WY) | 1985 | 1963 | 1978 | 1977 | 1978 | 1984 | 1992 | 1996 | 1984 | 1984 | 1984 | 1975 |

16296500 KAHANA STREAM AT ALTITUDE 30 FT, NEAR KAHANA--Continued

| SUMMARY STATISTICS | FOR 1995 CALENDAR YEAR | | FOR 1996 WATER YEAR | | WATER YEARS 1959 - 1996 | |
|--------------------------|------------------------|--------|---------------------|--------|-------------------------|-------------|
| ANNUAL TOTAL | 10484 | | 11429 | | 37.1 | |
| ANNUAL MEAN | 28.7 | | 31.2 | | 67.2 | |
| HIGHEST ANNUAL MEAN | | | | | 20.1 | |
| LOWEST ANNUAL MEAN | | | | | 1982 | |
| HIGHEST DAILY MEAN | 306 | Jun 22 | 446 | Jan 25 | 1750 | Apr 15 1963 |
| LOWEST DAILY MEAN | 11 | Mar 18 | 12 | Aug 30 | 11 | Sep 16 1961 |
| ANNUAL SEVEN-DAY MINIMUM | 11 | Mar 15 | 13 | Aug 29 | 11 | Oct 16 1984 |
| ANNUAL RUNOFF (AC-FT) | 20800 | | 22670 | | 26900 | |
| 10 PERCENT EXCEEDS | 48 | | 53 | | 58 | |
| 50 PERCENT EXCEEDS | 20 | | 21 | | 23 | |
| 90 PERCENT EXCEEDS | 13 | | 16 | | 15 | |



HAWAII, ISLAND OF OAHU
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 good. Ditch diverts water from Punaluu Stream for irrigation in Punaluu Valley.

AVERAGE DISCHARGE.--43 years (water years 1954-96), 8.04 ft³/s (5,820 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 54 ft³/s, October 31, 1964; no flow at times.

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge, 18 ft³/s, March 5; minimum daily, 1.4 ft³/s, February 26.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY MEAN VALUES

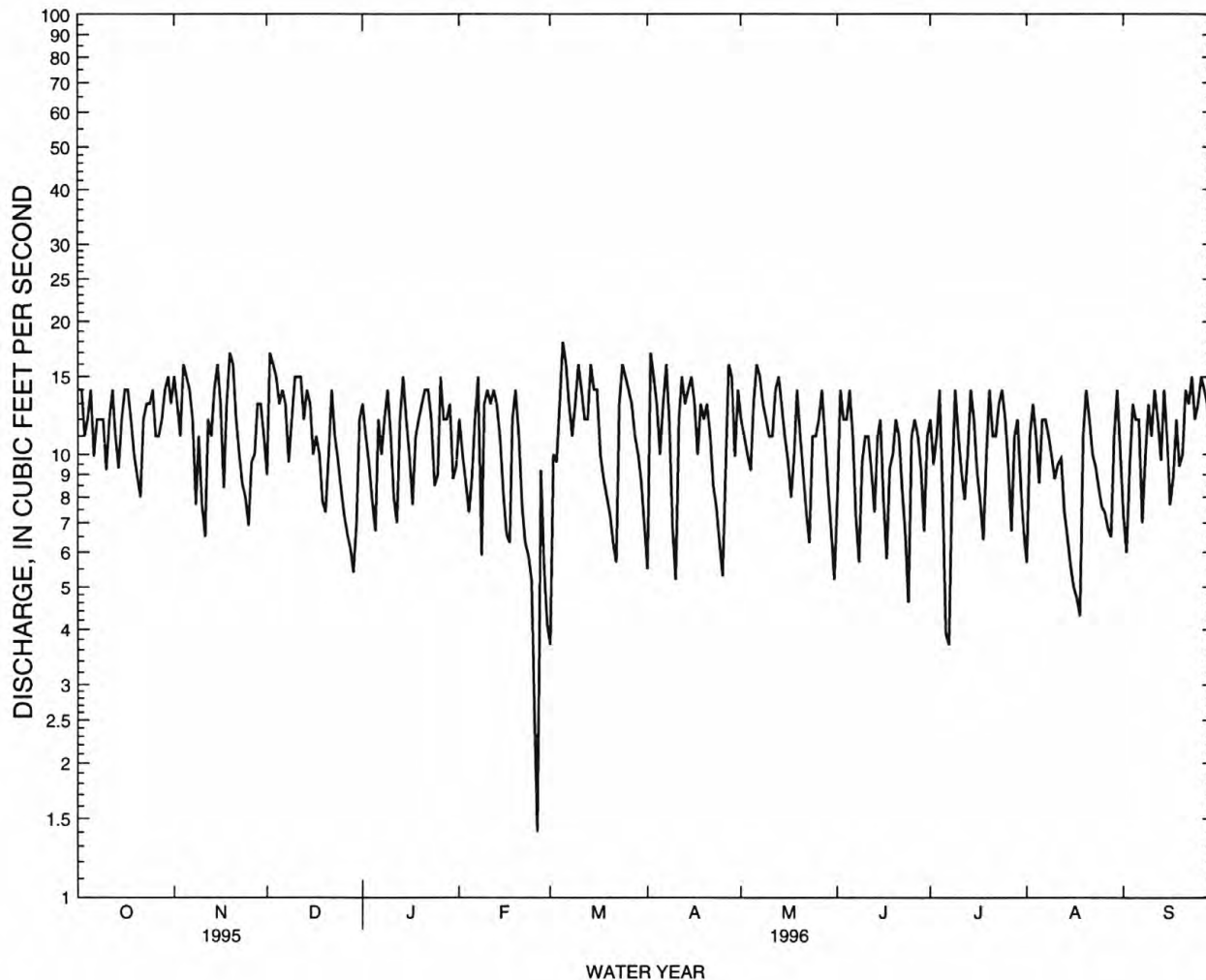
| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 14 | 15 | 9.0 | 13 | 12 | 3.7 | 5.5 | 12 | 8.2 | 12 | 5.7 | 7.3 |
| 2 | 14 | 13 | 17 | 11 | 10 | 10 | 17 | 11 | 14 | 9.5 | 11 | 6.0 |
| 3 | 11 | 11 | 16 | 9.6 | 8.6 | 9.6 | 15 | 10 | 12 | 11 | 13 | 9.4 |
| 4 | 12 | 16 | 15 | 7.9 | 7.4 | 13 | 13 | 9.2 | 12 | 14 | 11 | 13 |
| 5 | 14 | 15 | 13 | 6.7 | 8.9 | 18 | 10 | 13 | 14 | 7.7 | 8.6 | 12 |
| 6 | 9.9 | 14 | 14 | 12 | 12 | 16 | 13 | 16 | 11 | 3.9 | 12 | 12 |
| 7 | 12 | 12 | 13 | 10 | 15 | 13 | 16 | 15 | 7.2 | 3.7 | 12 | 7.0 |
| 8 | 12 | 7.7 | 9.6 | 12 | 5.9 | 11 | 12 | 13 | 5.7 | 8.6 | 11 | 9.9 |
| 9 | 12 | 11 | 12 | 14 | 13 | 13 | 6.8 | 12 | 9.6 | 14 | 9.9 | 13 |
| 10 | 9.2 | 7.7 | 15 | 11 | 14 | 16 | 5.2 | 11 | 11 | 11 | 8.8 | 11 |
| 11 | 12 | 6.5 | 15 | 7.9 | 13 | 14 | 12 | 11 | 11 | 9.1 | 9.5 | 14 |
| 12 | 14 | 12 | 15 | 7.0 | 14 | 12 | 15 | 14 | 9.2 | 7.9 | 9.8 | 12 |
| 13 | 11 | 11 | 12 | 12 | 13 | 12 | 13 | 15 | 7.4 | 10 | 7.4 | 9.7 |
| 14 | 9.3 | 14 | 14 | 15 | 11 | 16 | 14 | 13 | 11 | 14 | 6.5 | 14 |
| 15 | 12 | 16 | 13 | 12 | 8.2 | 14 | 15 | 11 | 12 | 12 | 5.6 | 11 |
| 16 | 14 | 13 | 10 | 9.9 | 6.6 | 14 | 13 | 9.7 | 7.9 | 9.1 | 5.0 | 7.7 |
| 17 | 14 | 8.4 | 11 | 7.7 | 6.3 | 10 | 10 | 8.0 | 5.8 | 7.9 | 4.7 | 8.9 |
| 18 | 12 | 13 | 10 | 11 | 12 | 8.8 | 13 | 10 | 9.3 | 6.4 | 4.3 | 12 |
| 19 | 10 | 17 | 7.8 | 12 | 14 | 8.0 | 12 | 14 | 10 | 10 | 11 | 9.4 |
| 20 | 8.9 | 16 | 7.4 | 13 | 11 | 7.3 | 13 | 11 | 12 | 14 | 14 | 10 |
| 21 | 8.0 | 12 | 10 | 14 | 7.6 | 6.3 | 11 | 9.0 | 11 | 11 | 12 | 14 |
| 22 | 12 | 10 | 14 | 14 | 6.3 | 5.7 | 8.5 | 7.3 | 8.3 | 11 | 10 | 13 |
| 23 | 13 | 8.6 | 11 | 12 | 5.9 | 13 | 7.6 | 6.3 | 6.5 | 13 | 9.4 | 15 |
| 24 | 13 | 8.0 | 9.7 | 8.5 | 5.2 | 16 | 6.3 | 11 | 4.6 | 14 | 8.4 | 12 |
| 25 | 14 | 6.9 | 8.4 | 9.0 | 2.6 | 15 | 5.3 | 11 | 11 | 12 | 7.6 | 13 |
| 26 | 11 | 9.6 | 7.3 | 15 | 1.4 | 14 | 9.3 | 12 | 12 | 9.5 | 7.4 | 15 |
| 27 | 11 | 10 | 6.6 | 12 | 9.2 | 13 | 16 | 14 | 11 | 6.7 | 6.8 | 14 |
| 28 | 12 | 13 | 6.1 | 12 | 5.6 | 11 | 15 | 11 | 9.2 | 11 | 6.5 | 13 |
| 29 | 14 | 13 | 5.4 | 13 | 4.1 | 10 | 9.9 | 8.4 | 6.7 | 12 | 11 | 11 |
| 30 | 15 | 11 | 7.0 | 8.8 | --- | 8.7 | 14 | 6.7 | 11 | 8.5 | 14 | 12 |
| 31 | 13 | --- | 12 | 9.4 | --- | 6.9 | --- | 5.2 | --- | 6.7 | 10 | --- |
| TOTAL | 373.3 | 351.4 | 346.3 | 342.4 | 263.8 | 359.0 | 346.4 | 340.8 | 291.6 | 311.2 | 283.9 | 341.3 |
| MEAN | 12.0 | 11.7 | 11.2 | 11.0 | 9.10 | 11.6 | 11.5 | 11.0 | 9.72 | 10.0 | 9.16 | 11.4 |
| MAX | 15 | 17 | 17 | 15 | 15 | 18 | 17 | 16 | 14 | 14 | 14 | 15 |
| MIN | 8.0 | 6.5 | 5.4 | 6.7 | 1.4 | 3.7 | 5.2 | 5.2 | 4.6 | 3.7 | 4.3 | 6.0 |
| AC-FT | 740 | 697 | 687 | 679 | 523 | 712 | 687 | 676 | 578 | 617 | 563 | 677 |

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1953 - 1996, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|------|------|------|------|------|------|------|------|------|------|------|------|------|
| MEAN | 9.03 | 7.36 | 5.84 | 5.67 | 5.63 | 6.63 | 8.22 | 8.63 | 9.56 | 9.96 | 10.2 | 10.0 |
| MAX | 26.4 | 15.3 | 16.0 | 17.6 | 21.7 | 16.1 | 19.0 | 21.2 | 22.6 | 22.0 | 23.9 | 21.3 |
| (WY) | 1965 | 1988 | 1988 | 1960 | 1964 | 1964 | 1961 | 1964 | 1963 | 1963 | 1958 | 1958 |
| MIN | .002 | .000 | .001 | .003 | .011 | .046 | .015 | .027 | .020 | .003 | .002 | .001 |
| (WY) | 1981 | 1981 | 1981 | 1981 | 1981 | 1979 | 1979 | 1981 | 1979 | 1980 | 1974 | 1980 |

HAWAII, ISLAND OF OAHU
 16302000 PUNALUU DITCH NEAR PUNALUU--Continued

| SUMMARY STATISTICS | FOR 1995 CALENDAR YEAR | FOR 1996 WATER YEAR | WATER YEARS 1953 - 1996 | |
|--------------------------|------------------------|---------------------|-------------------------|-------------|
| ANNUAL TOTAL | 4392.1 | 3951.4 | 8.04 | |
| ANNUAL MEAN | 12.0 | 10.8 | 15.2 | 1964 |
| HIGHEST ANNUAL MEAN | | | .23 | 1981 |
| LOWEST ANNUAL MEAN | | | 54 | Oct 31 1964 |
| HIGHEST DAILY MEAN | 19 Apr 26 | 18 Mar 5 | .00 | Dec 7 1963 |
| LOWEST DAILY MEAN | 5.4 Dec 29 | 1.4 Feb 26 | .00 | Jan 5 1969 |
| ANNUAL SEVEN-DAY MINIMUM | 7.2 Dec 24 | 4.5 Feb 24 | | |
| ANNUAL RUNOFF (AC-FT) | 8710 | 7840 | 5820 | |
| 10 PERCENT EXCEEDS | 15 | 14 | 17 | |
| 50 PERCENT EXCEEDS | 12 | 11 | 6.4 | |
| 90 PERCENT EXCEEDS | 9.2 | 6.6 | .19 | |



HAWAII, ISLAND OF OAHU
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 mi².

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 good up to 20 ft³/s and fair above that. Records do not include flow of Punaluu ditch (see station 16302000).

AVERAGE DISCHARGE.--43 years (water years 1954-96), 17.2 ft³/s (12,480 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 6,900 ft³/s, March 20, 1991, gage height, 10.02 ft, from rating curve extended above 170 ft³/s on basis of slope-area measurements at gage heights 7.77 ft and 9.60 ft; no flow at times. (Datum was lowered 2.0 ft after the flood of March 20, 1991).

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 930 ft³/s and maximum (*):

| Date | Time | Discharge (ft ³ /s) | Gage height (ft) | Date | Time | Discharge (ft ³ /s) | Gage height (ft) |
|---------|------|-----------------------------------|---------------------|---------|------|-----------------------------------|---------------------|
| Nov. 08 | 1600 | 1,340 | 6.03 | Jan. 25 | 0400 | *2,070 | *7.02 |
| Jan. 19 | 1030 | 1,040 | 5.55 | Mar. 03 | 2400 | 1,060 | 5.56 |
| Jan. 24 | 2000 | 1,080 | 5.61 | | | | |

Minimum discharge, 0.10 ft³/s, August 30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY MEAN VALUES

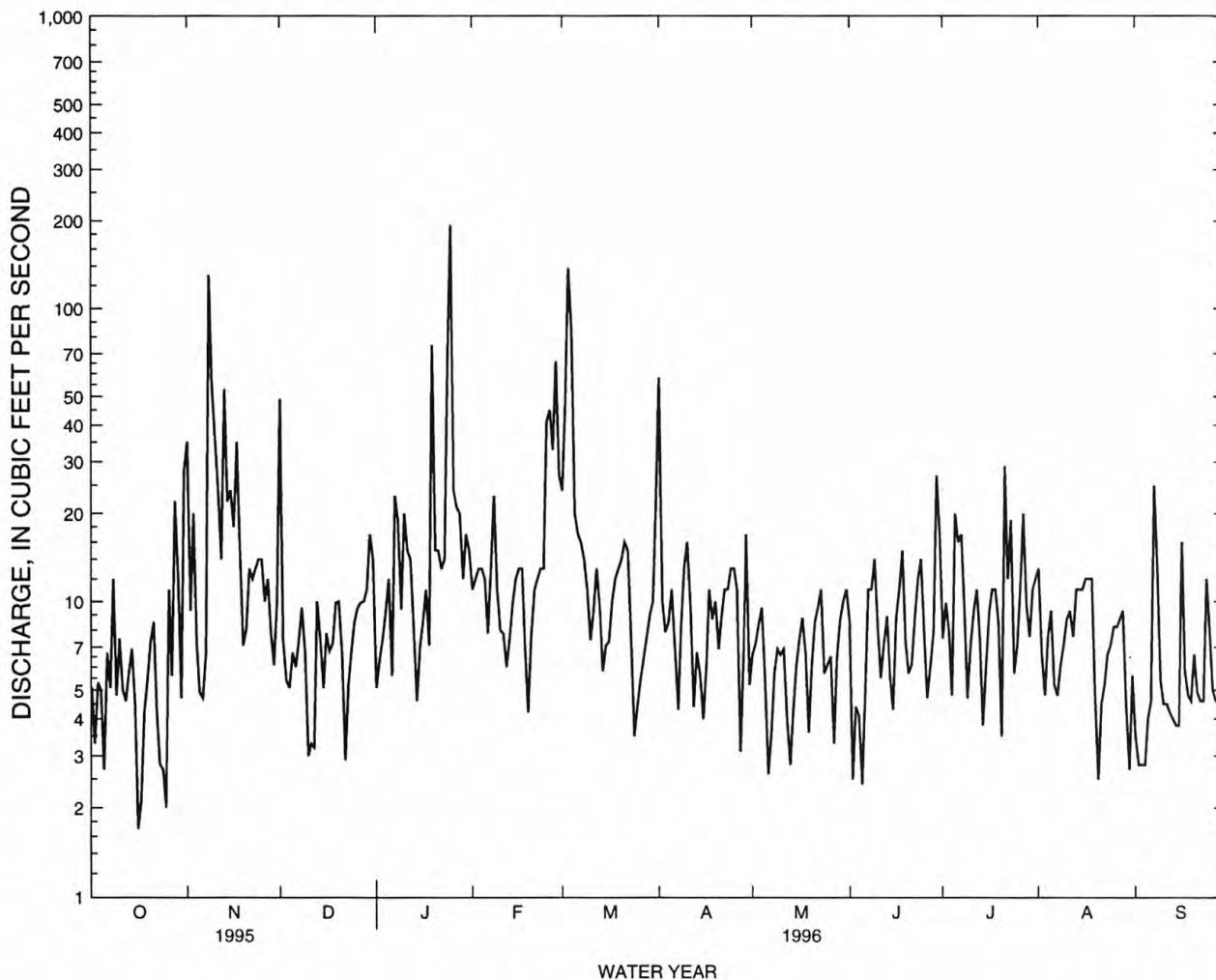
| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 5.1 | 35 | 49 | 5.1 | 11 | 24 | 58 | 6.6 | 8.5 | 7.5 | 13 | e3.5 |
| 2 | 3.3 | 9.3 | 7.4 | 6.3 | 12 | 47 | 10 | 7.2 | 2.5 | 9.9 | 6.6 | e2.8 |
| 3 | 5.3 | 20 | 5.4 | 7.4 | 13 | 138 | 7.9 | 8.4 | 4.4 | 7.9 | 4.8 | e2.8 |
| 4 | 5.0 | 7.2 | 5.1 | 9.2 | 13 | 85 | 8.5 | 9.5 | 4.1 | 4.8 | 7.6 | e2.8 |
| 5 | 2.7 | 4.9 | 6.7 | 12 | 12 | 20 | 11 | 5.5 | 2.4 | 20 | 9.3 | e4.0 |
| 6 | 6.7 | 4.7 | 6.0 | 5.6 | 7.8 | 17 | 6.9 | 2.6 | 4.8 | 16 | 5.2 | e4.6 |
| 7 | 5.1 | 6.7 | 7.3 | 23 | 13 | 16 | 4.3 | 3.6 | 11 | 17 | 4.8 | e25 |
| 8 | 12 | 130 | 9.5 | 19 | 23 | 14 | 8.2 | 5.7 | 11 | 9.5 | 6.1 | e13 |
| 9 | 4.8 | 55 | 6.8 | 9.4 | 11 | 11 | 13 | 6.9 | 14 | 4.7 | 7.1 | e5.4 |
| 10 | 7.5 | 36 | 3.0 | 20 | 8.0 | 7.4 | 16 | 6.6 | 8.2 | 7.1 | 8.7 | e4.5 |
| 11 | 5.0 | 24 | 3.3 | 15 | 7.8 | 9.2 | 9.5 | 6.9 | 5.5 | 9.3 | 9.3 | e4.5 |
| 12 | 4.6 | 14 | 3.2 | 14 | 6.0 | 13 | 4.4 | 4.0 | 7.2 | 11 | 7.6 | e4.2 |
| 13 | 5.7 | 53 | 10 | 8.2 | 7.4 | 9.7 | 6.7 | 2.8 | 8.9 | 7.5 | 11 | e4.0 |
| 14 | 6.9 | 22 | 7.5 | 4.6 | 9.8 | 5.8 | 5.7 | 4.2 | 5.5 | 3.8 | 11 | e3.8 |
| 15 | 4.5 | 24 | 5.1 | 7.0 | 12 | 7.1 | 4.0 | 6.0 | 4.3 | 6.1 | 11 | e3.8 |
| 16 | 1.7 | 18 | 7.8 | 8.6 | 13 | 7.3 | 6.0 | 7.4 | 8.8 | 9.3 | 12 | e16 |
| 17 | 2.1 | 35 | 6.8 | 11 | 13 | 10 | 11 | 8.8 | 11 | 11 | 12 | e5.8 |
| 18 | 4.2 | 15 | 7.2 | 7.1 | 7.0 | 12 | 8.7 | 6.6 | 15 | 11 | 12 | e4.8 |
| 19 | 5.4 | 7.1 | 9.9 | 75 | 4.2 | 13 | 10 | 3.6 | 7.3 | 8.4 | 4.8 | e4.6 |
| 20 | 7.3 | 8.1 | 10 | 15 | 7.7 | 14 | 6.9 | 6.1 | 5.7 | 3.5 | 2.5 | e6.6 |
| 21 | 8.5 | 13 | 6.7 | 15 | 11 | 16 | 9.0 | 8.5 | 6.1 | 29 | 4.5 | e4.9 |
| 22 | 4.3 | 12 | 2.9 | 13 | 12 | 15 | 11 | 9.6 | 8.8 | 12 | 5.2 | e4.6 |
| 23 | 2.8 | 13 | 5.2 | 14 | 13 | 7.5 | 11 | 11 | 12 | 19 | 6.6 | e4.6 |
| 24 | 2.7 | 14 | 6.8 | 68 | 13 | 3.5 | 13 | 5.7 | 14 | 5.7 | 7.1 | e12 |
| 25 | 2.0 | 14 | 8.5 | 193 | 41 | 4.4 | 13 | 6.1 | 7.9 | 7.1 | 8.2 | e8.0 |
| 26 | 11 | 10 | 9.5 | 24 | 45 | 5.4 | 11 | 6.5 | 4.7 | 11 | 8.2 | e5.0 |
| 27 | 5.6 | 12 | 9.9 | 21 | 33 | 6.4 | 3.1 | 3.3 | 6.0 | 20 | 8.7 | e4.6 |
| 28 | 22 | 7.9 | 10 | 20 | 66 | 7.6 | 6.4 | 6.4 | 7.9 | 9.7 | 9.3 | e4.6 |
| 29 | 12 | 6.1 | 11 | 12 | 27 | 9.0 | 17 | 8.6 | 27 | 7.6 | 4.4 | e4.3 |
| 30 | 4.7 | 10 | 17 | 17 | --- | 10 | 5.2 | 10 | 17 | 11 | e2.7 | e4.1 |
| 31 | 28 | --- | 14 | 15 | --- | 21 | --- | 11 | --- | 12 | e5.6 | --- |
| TOTAL | 208.5 | 641.0 | 278.5 | 694.5 | 472.7 | 586.3 | 316.4 | 205.7 | 261.5 | 329.4 | 236.9 | 183.2 |
| MEAN | 6.73 | 21.4 | 8.98 | 22.4 | 16.3 | 18.9 | 10.5 | 6.64 | 8.72 | 10.6 | 7.64 | 6.11 |
| MAX | 28 | 130 | 49 | 193 | 66 | 138 | 58 | 11 | 27 | 29 | 13 | 25 |
| MIN | 1.7 | 4.7 | 2.9 | 4.6 | 4.2 | 3.5 | 3.1 | 2.6 | 2.4 | 3.5 | 2.5 | 2.8 |
| AC-FT | 414 | 1270 | 552 | 1380 | 938 | 1160 | 628 | 408 | 519 | 653 | 470 | 363 |

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1953 - 1995, BY WATER YEAR (WY)

| | 1953 | 1954 | 1955 | 1956 | 1957 | 1958 | 1959 | 1960 | 1961 | 1962 | 1963 | 1964 | 1965 | 1966 | 1967 | 1968 | 1969 | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | | | | | | |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| MEAN | 14.1 | 20.4 | 21.2 | 21.1 | 22.0 | 22.6 | 22.3 | 17.6 | 11.5 | 12.3 | 11.6 | 10.6 | 10.6 | 10.6 | 10.6 | 10.6 | 10.6 | 10.6 | 10.6 | 10.6 | 10.6 | 10.6 | 10.6 | 10.6 | 10.6 | 10.6 | 10.6 | 10.6 | 10.6 | 10.6 | 10.6 | 10.6 | 10.6 | 10.6 | 10.6 | 10.6 | 10.6 | 10.6 | 10.6 | 10.6 | 10.6 | 10.6 | 10.6 | 10.6 | 10.6 | | | | |
| 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 | 29.9 | 29.9 | 29.9 | 29.9 | 29.9 | 29.9 | 29.9 | 29.9 | 29.9 | 29.9 | 29.9 | 29.9 | 29.9 | 29.9 | 29.9 | 29.9 | 29.9 | 29.9 | 29.9 | 29.9 | 29.9 | 29.9 | 29.9 | 29.9 | 29.9 | 29.9 | 29.9 | 29.9 | 29.9 | 29.9 | 29.9 | 29.9 | 29.9 | 29.9 | 29.9 | | |
| (WY) | 1959 | 1991 | 1965 | 1988 | 1969 | 1982 | 1963 | 1965 | 1982 | 1974 | 1982 | 1994 | 1994 | 1994 | 1994 | 1994 | 1994 | 1994 | 1994 | 1994 | 1994 | 1994 | 1994 | 1994 | 1994 | 1994 | 1994 | 1994 | 1994 | 1994 | 1994 | 1994 | 1994 | 1994 | 1994 | 1994 | 1994 | 1994 | 1994 | 1994 | 1994 | 1994 | 1994 | 1994 | 1994 | 1994 | 1994 | 1994 | 1994 |
| MIN | .28 | 4.58 | .23 | 3.32 | .58 | 3.19 | 2.37 | 1.00 | .000 | .000 | .31 | .49 | .49 | .49 | .49 | .49 | .49 | .49 | .49 | .49 | .49 | .49 | .49 | .49 | .49 | .49 | .49 | .49 | .49 | .49 | .49 | .49 | .49 | .49 | .49 | .49 | .49 | .49 | .49 | .49 | .49 | .49 | .49 | .49 | .49 | .49 | .49 | .49 | |
| (WY) | 1958 | 1960 | 1960 | 1960 | 1964 | 1993 | 1954 | 1961 | 1953 | 1953 | 1961 | 1961 | 1961 | 1961 | 1961 | 1961 | 1961 | 1961 | 1961 | 1961 | 1961 | 1961 | 1961 | 1961 | 1961 | 1961 | 1961 | 1961 | 1961 | 1961 | 1961 | 1961 | 1961 | 1961 | 1961 | 1961 | 1961 | 1961 | 1961 | 1961 | 1961 | 1961 | 1961 | 1961 | 1961 | 1961 | 1961 | 1961 | 1961 |

HAWAII, ISLAND OF OAHU
 16303000 PUNALUU STREAM NEAR PUNALUU--Continued

| SUMMARY STATISTICS | FOR 1994 CALENDAR YEAR | FOR 1995 WATER YEAR | WATER YEARS 1953 - 1995 | |
|--------------------------|------------------------|---------------------|-------------------------|-------------|
| ANNUAL TOTAL | 3247.0 | 4414.6 | | |
| ANNUAL MEAN | 8.90 | 12.1 | 17.3 | |
| HIGHEST ANNUAL MEAN | | | 35.4 | 1982 |
| LOWEST ANNUAL MEAN | | | 7.27 | 1961 |
| HIGHEST DAILY MEAN | 130 Nov 8 | 193 Jan 25 | 1010 | Apr 15 1963 |
| LOWEST DAILY MEAN | 1.4 Mar 6 | 1.7 Oct 16 | .00 | Jun 1 1953 |
| ANNUAL SEVEN-DAY MINIMUM | 2.3 Mar 14 | 3.5 Aug 30 | .00 | Jun 1 1953 |
| ANNUAL RUNOFF (AC-FT) | 6440 | 8760 | 12570 | |
| 10 PERCENT EXCEEDS | 15 | 20 | 30 | |
| 50 PERCENT EXCEEDS | 5.8 | 8.2 | 12 | |
| 90 PERCENT EXCEEDS | 2.9 | 4.2 | 2.3 | |



HAWAII, ISLAND OF OAHU
 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 mi².

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 good. No diversion upstream of station.

AVERAGE DISCHARGE.--29 years (water years 1968-96), 4.41 ft³/s (3,190 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 2,390 ft³/s, January 6, 1982, gage height, 11.90 ft, from rating curve extended above 14 ft³/s on basis of slope-area measurements at gage heights 8.85 ft and 10.0 ft; no flow at times.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 500 ft³/s and maximum(*):

| Date | Time | Discharge (ft ³ /s) | Gage height (ft) | Date | Time | Discharge (ft ³ /s) | Gage height (ft) |
|------|------|--------------------------------|------------------|--|------|--------------------------------|------------------|
| --* | -- | *1,530 | *10.65 | No other peak greater than base discharge. | | | |

Minimum discharge, 0.16 ft³/s on May 19, August 30.

--* sometime during January 19-25.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
 DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|-------|--------|-------|--------|-------|-------|--------|-------|--------|--------|-------|-------|
| 1 | 2.2 | e16 | 21 | e1.0 | 1.0 | e1.0 | e30 | .98 | .61 | 2.7 | 1.2 | 1.1 |
| 2 | 1.1 | e2.0 | 2.8 | e.50 | 1.1 | e1.5 | e9.0 | .68 | .45 | 6.9 | .99 | .41 |
| 3 | 2.1 | e2.3 | 1.2 | e.35 | 1.1 | e35 | e.90 | .55 | .38 | 2.7 | .88 | .56 |
| 4 | 1.5 | e21 | .89 | e.30 | .68 | e10 | e.55 | 1.2 | .34 | 8.0 | 2.7 | .44 |
| 5 | 1.2 | e1.7 | .75 | e.70 | .65 | e2.5 | e.47 | .77 | .34 | 16 | 2.2 | 7.4 |
| 6 | 3.2 | e1.2 | .63 | e1.5 | e.62 | e1.1 | e.41 | .45 | .45 | 3.6 | 2.1 | 5.6 |
| 7 | 2.4 | e.96 | .63 | e5.4 | e.60 | e.90 | e.36 | .41 | 12 | 6.5 | 1.7 | 26 |
| 8 | 12 | e29 | .53 | e1.7 | e9.0 | e.70 | e.35 | 1.4 | 2.0 | 2.1 | 1.2 | 3.1 |
| 9 | 1.6 | e34 | .46 | e15 | e1.5 | e.60 | e.35 | 2.8 | 12 | 2.4 | .77 | 1.4 |
| 10 | 2.1 | e20 | .40 | e3.0 | e.80 | e.55 | e1.0 | .43 | 5.9 | 1.5 | 2.8 | .96 |
| 11 | 2.6 | e2.7 | .34 | e.70 | e.60 | e.50 | e10 | .31 | 1.3 | 1.2 | 7.2 | 1.3 |
| 12 | 2.5 | e2.0 | 1.1 | e.40 | e.55 | e.48 | e2.0 | .25 | .89 | 3.6 | 3.0 | 1.2 |
| 13 | 1.1 | e34 | 17 | e.35 | e.52 | e.45 | e.50 | .22 | .99 | 1.2 | 5.2 | 1.3 |
| 14 | .85 | e14 | 2.6 | e.30 | e.60 | e.43 | e.45 | .22 | .61 | .95 | 1.5 | .78 |
| 15 | 1.0 | e21 | 1.0 | e.27 | e2.2 | e.41 | e2.0 | .18 | 1.2 | 2.0 | 1.0 | .54 |
| 16 | .74 | e4.8 | .72 | e.26 | e1.0 | e.40 | .58 | .47 | 1.9 | 5.9 | .94 | .50 |
| 17 | .62 | e9.3 | .61 | e.25 | e.60 | e.39 | 7.5 | .74 | 3.3 | 3.4 | 1.4 | .46 |
| 18 | 1.0 | e4.1 | .55 | e.30 | e.45 | e.38 | 9.1 | .28 | 17 | 2.6 | .88 | .38 |
| 19 | .61 | e2.1 | .50 | e70 | e.35 | e.37 | 11 | .73 | 1.8 | 2.3 | .71 | .38 |
| 20 | 2.1 | e2.7 | .44 | e4.5 | e.30 | e1.0 | 2.0 | 5.6 | 2.6 | 1.3 | .60 | 4.6 |
| 21 | 3.2 | e6.4 | .37 | e6.0 | e.25 | e2.5 | 4.7 | 3.6 | 4.1 | 2.7 | .51 | 1.1 |
| 22 | .86 | e1.9 | .31 | e2.2 | e.23 | e1.5 | 1.6 | .72 | 4.1 | 6.0 | .45 | .53 |
| 23 | .56 | e1.4 | .35 | e5.0 | e.22 | e.50 | 1.1 | .40 | 2.6 | 1.3 | .39 | .44 |
| 24 | .47 | e1.9 | .28 | e20 | e.25 | e2.5 | .91 | .33 | 5.4 | 7.1 | .35 | 3.3 |
| 25 | e.40 | e1.6 | .85 | e100 | e30 | e.90 | .80 | 5.3 | 8.7 | 1.2 | .31 | .60 |
| 26 | e5.3 | e1.0 | 1.7 | e5.0 | e10 | e.40 | 5.4 | 6.1 | 1.6 | 7.7 | .30 | .37 |
| 27 | e2.0 | e.87 | .42 | 2.9 | e6.0 | e.35 | 1.3 | 3.6 | 1.4 | 22 | .29 | .29 |
| 28 | e.75 | e.84 | .28 | 4.6 | e15 | e.33 | 9.3 | 4.3 | 2.0 | 3.0 | .23 | .22 |
| 29 | e18 | .96 | .22 | 1.6 | e5.0 | e.31 | 2.1 | 1.8 | 17 | 1.6 | .19 | .19 |
| 30 | e5.2 | 2.0 | e10 | 2.1 | --- | e.30 | 1.7 | 1.1 | 15 | 1.4 | .18 | .17 |
| 31 | e10 | --- | e5.0 | 2.6 | --- | e3.0 | --- | .82 | --- | 1.3 | 4.7 | --- |
| TOTAL | 89.26 | 243.73 | 73.93 | 258.78 | 91.17 | 71.25 | 117.43 | 46.74 | 127.96 | 132.15 | 46.87 | 65.62 |
| MEAN | 2.88 | 8.12 | 2.38 | 8.35 | 3.14 | 2.30 | 3.91 | 1.51 | 4.27 | 4.26 | 1.51 | 2.19 |
| MAX | .18 | .34 | .21 | 100 | .30 | .35 | .30 | 6.1 | .17 | .22 | 7.2 | .26 |
| MIN | .40 | .84 | .22 | .25 | .22 | .30 | .35 | .18 | .34 | .95 | .18 | .17 |
| AC-FT | 177 | 483 | 147 | 513 | 181 | 141 | 233 | 93 | 254 | 262 | 93 | 130 |

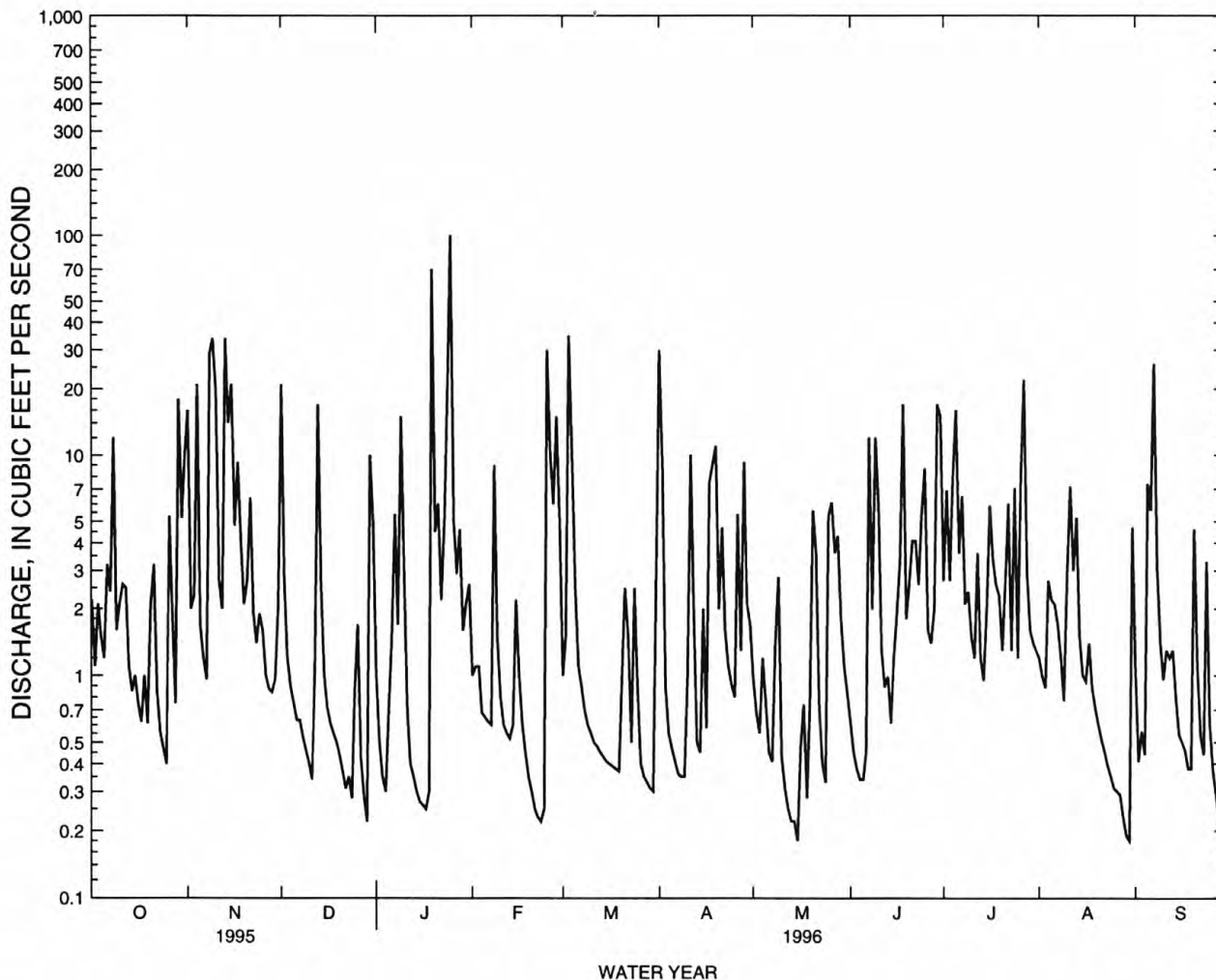
e Estimated

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1967 - 1996, BY WATER YEAR (WY)

| | 1967 | 1968 | 1969 | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | | | | | | |
|------|------|------|------|------|------|------|------|------|------|------|------|------|-----------|------|------|------|------|------|------|------|------|------|------|------|-----------|------|------|------|------|------|------|------|------|------|------|------|
| MEAN | 3.41 | 5.95 | 5.07 | 5.25 | 4.78 | 5.80 | 5.79 | 3.73 | 2.80 | 4.09 | 3.35 | 3.13 | 7.68 | 19.0 | 17.7 | 17.9 | 19.7 | 32.2 | 19.3 | 7.93 | 7.72 | 11.7 | 8.37 | 9.34 | (WY) 1992 | 1991 | 1988 | 1988 | 1979 | 1982 | 1988 | 1988 | 1987 | 1982 | 1991 | 1994 |
| MIN | .27 | 1.66 | .48 | .26 | .41 | .14 | .87 | .85 | .61 | .21 | .53 | .22 | (WY) 1985 | 1981 | 1977 | 1986 | 1983 | 1983 | 1979 | 1991 | 1981 | 1971 | 1984 | .22 | 1985 | 1981 | 1977 | 1986 | 1983 | 1979 | 1991 | 1981 | 1971 | 1984 | 1975 | |

HAWAII, ISLAND OF OAHU
 16304200 KALUANUI STREAM NEAR PUNALUU--Continued

| SUMMARY STATISTICS | FOR 1995 CALENDAR YEAR | FOR 1996 WATER YEAR | WATER YEARS 1967 - 1996 | |
|--------------------------|------------------------|---------------------|-------------------------|-------------|
| ANNUAL TOTAL | 1364.51 | 1364.89 | | |
| ANNUAL MEAN | 3.74 | 3.73 | 4.41 | |
| HIGHEST ANNUAL MEAN | | | 9.94 | 1982 |
| LOWEST ANNUAL MEAN | | | 2.04 | 1984 |
| HIGHEST DAILY MEAN | 51 Apr 25 | 100 Jan 25 | 230 | Feb 1 1969 |
| LOWEST DAILY MEAN | .00 Mar 20 | .17 Sep 30 | .00 | Jul 24 1971 |
| ANNUAL SEVEN-DAY MINIMUM | .05 Mar 15 | .26 Aug 24 | .00 | Sep 14 1975 |
| ANNUAL RUNOFF (AC-FT) | 2710 | 2710 | 3190 | |
| 10 PERCENT EXCEEDS | 10 | 9.2 | 9.6 | |
| 50 PERCENT EXCEEDS | 1.1 | 1.2 | 1.4 | |
| 90 PERCENT EXCEEDS | .22 | .34 | .25 | |



HAWAII, ISLAND OF OAHU

16325000 KAMANANUI STREAM AT PUPUKEA MILITARY ROAD, NEAR MAUNAWAI

LOCATION.--Lat 21°37'25", long 158°01'04", Hydrologic Unit 20060000, on left bank 75 ft upstream from Pupukea Military Road, and 3.5 mi southeast of Maunawai.

DRAINAGE AREA.--3.13 mi².

PERIOD OF RECORD.--June 1963 to current year. Occasional low-flow measurements, water years 1961 and 1963.

REVISED RECORDS.--WDR HI-94-1: 1992-93 (M).

GAGE.--Water-stage recorder and combination pipe culvers and paved road control. Elevation of gage is 590 ft above mean sea level, from topographic map.

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

AVERAGE DISCHARGE.--33 years (water years 1964-96), 10.3 ft³/s (7,490 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 4,810 ft³/s, revised, November 20, 1990, gage height, 11.34 ft, from rating curve extended above 42 ft³/s on basis of slope-area measurements at gage heights 10.06 ft, and 11.34 ft; no flow at times.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 950 ft³/s and maximum (*):

| Date | Time | Discharge (ft ³ /s) | Gage height (ft) | Date | Time | Discharge (ft ³ /s) | Gage height (ft) |
|---------|------|-----------------------------------|---------------------|---------|------|-----------------------------------|---------------------|
| Jan. 19 | 0900 | 1,460 | 8.14 | Jan. 25 | 0500 | 1,520 | 8.23 |
| Jan. 24 | 2100 | *2,270 | *9.16 | Jun. 29 | 1415 | 1,000 | 7.38 |

Minimum discharge, 0.84 ft³/s on June 4-6, August 29-31.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY MEAN VALUES

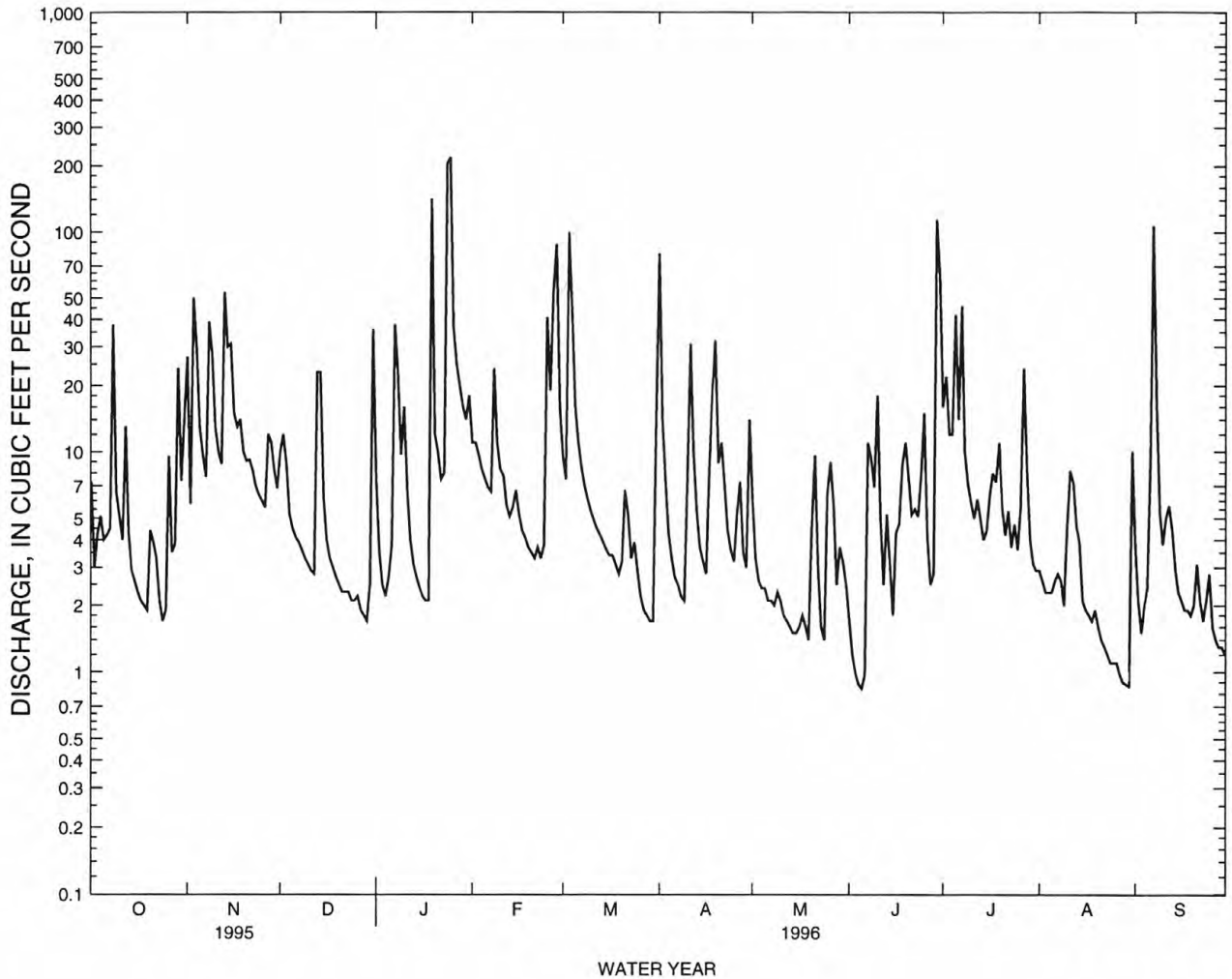
| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|-------|-------|-------|-------|-------|-------|-------|------|--------|-------|-------|-------|
| 1 | 7.3 | 27 | 10 | 7.5 | 11 | 9.5 | 80 | 6.2 | 1.7 | 16 | 2.9 | 3.9 |
| 2 | 3.0 | 5.8 | 12 | 3.5 | 11 | 7.5 | 14 | 3.3 | 1.2 | 22 | 2.6 | 2.1 |
| 3 | 4.3 | 50 | 8.9 | 2.5 | 9.7 | 100 | 7.6 | 2.6 | .99 | 12 | 2.3 | 1.5 |
| 4 | 5.1 | 29 | 5.2 | 2.2 | 8.4 | 44 | 4.3 | 2.4 | .88 | 12 | 2.3 | 2.0 |
| 5 | 4.0 | 13 | 4.5 | 2.7 | 7.6 | 16 | 3.3 | 2.4 | .84 | 42 | 2.3 | 2.4 |
| 6 | 4.2 | 9.6 | 4.1 | 3.8 | 6.9 | 11 | 2.7 | 2.1 | .97 | 14 | 2.6 | 8.6 |
| 7 | 4.5 | 7.7 | 3.9 | 38 | 6.6 | 8.6 | 2.5 | 2.1 | 11 | 46 | 2.8 | 107 |
| 8 | 38 | 39 | 3.6 | 23 | 24 | 7.0 | 2.2 | 2.0 | 9.3 | 10 | 2.6 | 16 |
| 9 | 6.6 | 28 | 3.3 | 9.7 | 11 | 6.1 | 2.1 | 2.3 | 6.9 | 7.1 | 2.0 | 5.3 |
| 10 | 5.1 | 13 | 3.1 | 16 | 8.3 | 5.4 | 7.4 | 2.1 | 18 | 5.9 | 4.6 | 3.8 |
| 11 | 4.0 | 10 | 2.9 | 6.6 | 7.8 | 4.9 | 31 | 1.8 | 5.1 | 5.0 | 8.2 | 5.0 |
| 12 | 13 | 8.8 | 2.8 | 4.0 | 5.7 | 4.5 | 10 | 1.7 | 2.5 | 6.1 | 7.2 | 5.7 |
| 13 | 4.3 | 53 | 23 | 3.1 | 5.1 | 4.2 | 5.4 | 1.6 | 5.2 | 5.0 | 4.6 | 4.4 |
| 14 | 2.9 | 30 | 23 | 2.7 | 5.6 | 3.9 | 3.7 | 1.5 | 3.1 | 4.0 | 3.9 | 2.9 |
| 15 | 2.6 | 31 | 6.2 | 2.4 | 6.7 | 3.6 | 3.2 | 1.5 | 1.8 | 4.4 | 2.1 | 2.3 |
| 16 | 2.3 | 15 | 4.0 | 2.2 | 5.2 | 3.4 | 2.8 | 1.6 | 4.3 | 6.4 | 1.9 | 2.1 |
| 17 | 2.1 | 13 | 3.3 | 2.1 | 4.4 | 3.4 | 8.1 | 1.8 | 4.7 | 8.0 | 1.8 | 1.9 |
| 18 | 2.0 | 14 | 3.0 | 2.1 | 4.1 | 3.1 | 19 | 1.6 | 8.7 | 7.3 | 1.7 | 1.9 |
| 19 | 1.9 | 10 | 2.7 | 142 | 3.7 | 2.8 | 32 | 1.4 | 11 | 11 | 1.9 | 1.8 |
| 20 | 4.4 | 9.1 | 2.5 | 12 | 3.5 | 3.2 | 8.9 | 4.5 | 7.7 | 5.6 | 1.6 | 2.0 |
| 21 | 3.9 | 9.2 | 2.3 | 10 | 3.3 | 6.7 | 11 | 9.6 | 5.2 | 4.2 | 1.4 | 3.1 |
| 22 | 3.3 | 8.2 | 2.3 | 7.5 | 3.7 | 5.2 | 7.1 | 3.0 | 5.5 | 5.4 | 1.3 | 2.1 |
| 23 | 2.1 | 7.0 | 2.3 | 8.0 | 3.3 | 3.3 | 4.4 | 1.6 | 5.1 | 3.7 | 1.2 | 1.7 |
| 24 | 1.7 | 6.4 | 2.1 | 205 | 3.8 | 3.9 | 3.6 | 1.4 | 7.7 | 4.7 | 1.1 | 2.1 |
| 25 | 1.9 | 6.0 | 2.1 | 219 | 41 | 2.9 | 3.2 | 6.5 | 15 | 3.6 | 1.1 | 2.8 |
| 26 | 9.5 | 5.6 | 2.2 | 37 | 19 | 2.2 | 5.2 | 9.0 | 4.1 | 5.6 | 1.1 | 1.6 |
| 27 | 3.5 | 12 | 1.9 | 25 | 53 | 1.9 | 7.3 | 5.7 | 2.5 | 24 | .98 | 1.4 |
| 28 | 3.8 | 11 | 1.8 | 20 | 88 | 1.8 | 3.5 | 2.5 | 2.8 | 8.3 | .90 | 1.3 |
| 29 | 24 | 8.2 | 1.7 | 16 | 16 | 1.7 | 3.0 | 3.7 | 114 | 4.0 | .88 | 1.3 |
| 30 | 7.4 | 6.8 | 2.5 | 14 | --- | 1.7 | 14 | 3.2 | 63 | 3.1 | .86 | 1.2 |
| 31 | 14 | --- | 36 | 18 | --- | 14 | --- | 2.5 | --- | 2.9 | 10 | --- |
| TOTAL | 196.7 | 496.4 | 189.2 | 867.6 | 387.4 | 297.4 | 312.5 | 95.2 | 330.78 | 319.3 | 82.72 | 201.2 |
| MEAN | 6.35 | 16.5 | 6.10 | 28.0 | 13.4 | 9.59 | 10.4 | 3.07 | 11.0 | 10.3 | 2.67 | 6.71 |
| MAX | 38 | 53 | 36 | 219 | 88 | 100 | 80 | 9.6 | 114 | 46 | 10 | 107 |
| MIN | 1.7 | 5.6 | 1.7 | 2.1 | 3.3 | 1.7 | 2.1 | 1.4 | .84 | 2.9 | .86 | 1.2 |
| AC-FT | 390 | 985 | 375 | 1720 | 768 | 590 | 620 | 189 | 656 | 633 | 164 | 399 |

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1963 - 1996, BY WATER YEAR (WY)

| | 6.83 | 15.9 | 12.8 | 15.0 | 12.8 | 15.9 | 14.1 | 8.11 | 4.92 | 8.02 | 5.56 | 4.14 |
|------|------|------|------|------|------|------|------|------|------|------|------|------|
| MEAN | 6.83 | 15.9 | 12.8 | 15.0 | 12.8 | 15.9 | 14.1 | 8.11 | 4.92 | 8.02 | 5.56 | 4.14 |
| MAX | 16.3 | 68.6 | 44.8 | 75.8 | 64.2 | 77.3 | 53.6 | 30.5 | 20.1 | 20.2 | 19.7 | 10.8 |
| (WY) | 1966 | 1966 | 1965 | 1988 | 1969 | 1968 | 1989 | 1965 | 1978 | 1982 | 1982 | 1994 |
| MIN | .000 | 2.27 | .91 | .45 | .073 | 1.07 | .79 | .95 | 1.00 | .76 | .57 | .000 |
| (WY) | 1985 | 1990 | 1977 | 1986 | 1978 | 1983 | 1992 | 1966 | 1992 | 1971 | 1984 | 1984 |

16325000 KAMANANUI STREAM AT PUPUKEA MILITARY ROAD, NEAR MAUNAWAI--Continued

| SUMMARY STATISTICS | FOR 1995 CALENDAR YEAR | | FOR 1996 WATER YEAR | | WATER YEARS 1963 - 1996 | |
|--------------------------|------------------------|--------|---------------------|--------|-------------------------|-------------|
| ANNUAL TOTAL | 2765.52 | | 3776.40 | | | |
| ANNUAL MEAN | 7.58 | | 10.3 | | 10.3 | |
| HIGHEST ANNUAL MEAN | | | | | 22.1 | 1982 |
| LOWEST ANNUAL MEAN | | | | | 4.09 | 1984 |
| HIGHEST DAILY MEAN | 160 | Aug 23 | 219 | Jan 25 | 620 | Nov 20 1990 |
| LOWEST DAILY MEAN | .13 | Mar 18 | .84 | Jun 5 | .00 | Aug 27 1971 |
| ANNUAL SEVEN-DAY MINIMUM | .18 | Mar 15 | .99 | Aug 24 | .00 | Oct 15 1971 |
| ANNUAL RUNOFF (AC-FT) | 5490 | | 7490 | | 7490 | |
| 10 PERCENT EXCEEDS | 18 | | 21 | | 19 | |
| 50 PERCENT EXCEEDS | 3.2 | | 4.3 | | 3.4 | |
| 90 PERCENT EXCEEDS | 1.2 | | 1.7 | | .66 | |



HAWAII, ISLAND OF OAHU
16330000 KAMANANUI STREAM AT MAUNAWAI

LOCATION.--Lat 21°38'20", long 158°03'27", Hydrologic Unit 20060000, on right bank, 0.5 mi upstream from Kamehameha Highway, 4.9 mi northeast of Waialua School, and 7.3 mi southwest of Kahuku School.

DRAINAGE AREA.--12.36 mi², 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 fair. Small diversion upstream of station.

AVERAGE DISCHARGE.--38 years (water years 1959-96), 18.5 ft³/s (13,430 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 16,800 ft³/s, November 20, 1990, gage height, 15.84 ft, from rating curve extended above 150 ft³/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 ft³/s and maximum (*):

| Date | Time | Discharge (ft ³ /s) | Gage height (ft) | Date | Time | Discharge (ft ³ /s) | Gage height (ft) |
|---------|------|-----------------------------------|---------------------|----------|------|-----------------------------------|---------------------|
| Nov. 03 | 2030 | 1,760 | 6.18 | Jan. 25 | 0545 | 3,890 | 8.35 |
| Jan. 19 | 0945 | 2,490 | 6.95 | June 29 | 1500 | 2,790 | 7.25 |
| Jan. 24 | 2100 | *4,540 | *8.86 | Sept. 07 | 1845 | 1,730 | 6.14 |

Minimum discharge, 0.20 ft³/s, June 5-8.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|-------|--------|--------|---------|-------|-------|-------|-------|--------|-------|-------|--------|
| 1 | 14 | 59 | 7.5 | 11 | 12 | 13 | 116 | 11 | 1.7 | 30 | 3.2 | 9.9 |
| 2 | 5.4 | 15 | 11 | 3.5 | 10 | 9.7 | 17 | 4.1 | .84 | 30 | 3.0 | 4.4 |
| 3 | 4.0 | 167 | 15 | 1.9 | 9.7 | 208 | 9.4 | 2.7 | .56 | 20 | 2.8 | 2.2 |
| 4 | 7.4 | 113 | 5.3 | 1.3 | 8.2 | 96 | 4.8 | 2.2 | .38 | 14 | 2.5 | 1.3 |
| 5 | 5.7 | 31 | 3.5 | 1.1 | 6.8 | 29 | 3.2 | 2.0 | .25 | 80 | 2.5 | 2.0 |
| 6 | 4.8 | 21 | 2.7 | 1.4 | 6.2 | 16 | 2.6 | 1.8 | .20 | 30 | 2.8 | 6.5 |
| 7 | 5.0 | 16 | 2.1 | 57 | 5.6 | 12 | 2.1 | 1.5 | 4.1 | 107 | 3.0 | 289 |
| 8 | 80 | 73 | 1.8 | 28 | 24 | 9.7 | 1.8 | 1.5 | 13 | 23 | 3.0 | 57 |
| 9 | 16 | 115 | 1.6 | 12 | 14 | 7.7 | 1.4 | 1.5 | 4.2 | 13 | 2.7 | 12 |
| 10 | 7.8 | 29 | 1.4 | 14 | 7.8 | 5.8 | 1.2 | 1.9 | 24 | 10 | 3.2 | 6.2 |
| 11 | 6.0 | 21 | 1.3 | 8.1 | 9.3 | 5.1 | 33 | 1.8 | 7.9 | 8.0 | 10 | 4.7 |
| 12 | 17 | 17 | 1.1 | 3.7 | 6.4 | 4.5 | 15 | 1.2 | 3.7 | 7.6 | 13 | 8.8 |
| 13 | 10 | 137 | 23 | 2.3 | 5.2 | 4.0 | 6.7 | .85 | 5.2 | 8.0 | 5.9 | 6.9 |
| 14 | 5.1 | 61 | 35 | 1.7 | 4.9 | 3.7 | 3.7 | .72 | 7.4 | 5.8 | 7.7 | 3.9 |
| 15 | 3.8 | 50 | 6.0 | 1.2 | 5.9 | 3.2 | 3.0 | .71 | 2.6 | 5.0 | 3.4 | 2.5 |
| 16 | 3.1 | 20 | 2.9 | 1.1 | 5.3 | 3.2 | 2.4 | .66 | 5.8 | 6.8 | 2.4 | 1.9 |
| 17 | 2.4 | 13 | 2.0 | .95 | 4.2 | 3.0 | 2.5 | .69 | 7.5 | 12 | 2.1 | 1.5 |
| 18 | 2.1 | 12 | 1.5 | .88 | 4.0 | 2.9 | 21 | .72 | 6.9 | 13 | 1.5 | 1.2 |
| 19 | 2.0 | 8.4 | 1.4 | 286 | 3.7 | 2.5 | 54 | .69 | 18 | 18 | 1.3 | 1.1 |
| 20 | 3.0 | 6.9 | 1.2 | 19 | 3.4 | 2.3 | 14 | .81 | 8.4 | 14 | 1.4 | 1.1 |
| 21 | 5.7 | 6.4 | 1.0 | 12 | 3.1 | 3.2 | 10 | 7.5 | 8.7 | 6.8 | 1.1 | 1.3 |
| 22 | 4.8 | 6.5 | .95 | 9.9 | 3.0 | 6.9 | 10 | 4.5 | 4.4 | 8.5 | .86 | 1.7 |
| 23 | 3.3 | 5.7 | .88 | 7.2 | 2.7 | 3.6 | 5.0 | 1.9 | 6.3 | 6.1 | .76 | 1.0 |
| 24 | 2.1 | 5.0 | .86 | 503 | 2.5 | 2.8 | 3.5 | .95 | 8.6 | 5.9 | .65 | .75 |
| 25 | 1.6 | 4.5 | .79 | 703 | 41 | 2.8 | 2.9 | 2.0 | 17 | 7.7 | .59 | 1.7 |
| 26 | 10 | 4.1 | .79 | 63 | 25 | 2.4 | 2.7 | 9.1 | 6.8 | 6.1 | .54 | 1.2 |
| 27 | 7.0 | 6.6 | .75 | 31 | 110 | 2.0 | 6.8 | 8.6 | 3.2 | 45 | .53 | .79 |
| 28 | 3.4 | 14 | .64 | 22 | 184 | 1.6 | 3.4 | 3.0 | 2.4 | 23 | .47 | .60 |
| 29 | 39 | 6.7 | .58 | 17 | 27 | 1.3 | 2.6 | 2.3 | 375 | 7.7 | .40 | .47 |
| 30 | 8.6 | 6.1 | 1.1 | 14 | --- | 1.2 | 9.2 | 2.7 | 178 | 5.2 | .40 | .39 |
| 31 | 17 | --- | 71 | 18 | --- | 9.9 | --- | 2.4 | --- | 4.1 | 10 | --- |
| TOTAL | 307.1 | 1050.9 | 206.64 | 1856.23 | 554.9 | 479.0 | 370.9 | 84.00 | 733.03 | 581.3 | 93.70 | 434.00 |
| MEAN | 9.91 | 35.0 | 6.67 | 59.9 | 19.1 | 15.5 | 12.4 | 2.71 | 24.4 | 18.8 | 3.02 | 14.5 |
| MAX | 80 | 167 | 71 | 703 | 184 | 208 | 116 | 11 | 375 | 107 | 13 | 289 |
| MIN | 1.6 | 4.1 | .58 | .88 | 2.5 | 1.2 | 1.2 | .66 | .20 | 4.1 | .40 | .39 |
| AC-FT | 609 | 2080 | 410 | 3680 | 1100 | 950 | 736 | 167 | 1450 | 1150 | 186 | 861 |

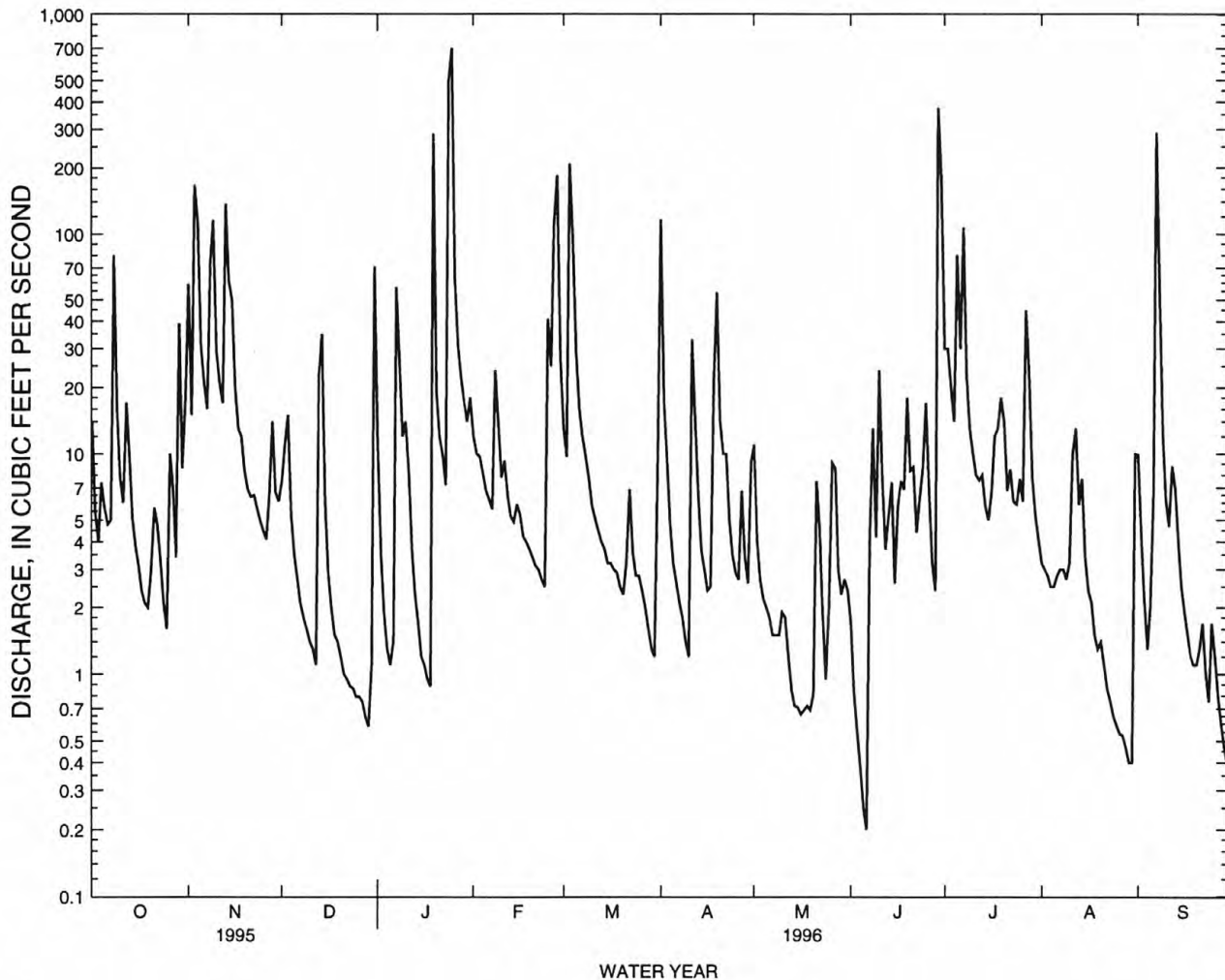
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1958 - 1996, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|------|------|------|------|------|------|------|------|------|------|------|------|------|
| MEAN | 12.3 | 28.2 | 21.6 | 27.2 | 23.0 | 32.4 | 28.5 | 14.9 | 7.35 | 12.9 | 9.95 | 6.03 |
| MAX | 56.7 | 168 | 107 | 143 | 106 | 155 | 168 | 62.8 | 52.9 | 52.7 | 68.0 | 19.9 |
| (WY) | 1959 | 1991 | 1988 | 1988 | 1969 | 1982 | 1989 | 1965 | 1978 | 1989 | 1958 | 1994 |
| MIN | .006 | .51 | .67 | .094 | .022 | 1.23 | .64 | .95 | .33 | .52 | .20 | .006 |
| (WY) | 1985 | 1963 | 1977 | 1986 | 1978 | 1983 | 1992 | 1984 | 1959 | 1971 | 1971 | 1984 |

HAWAII, ISLAND OF OAHU

16330000 KAMANANUI STREAM AT MAUNAWAI--Continued

| SUMMARY STATISTICS | FOR 1995 CALENDAR YEAR | FOR 1996 WATER YEAR | WATER YEARS 1958 - 1996 | |
|--------------------------|------------------------|---------------------|-------------------------|-------------|
| ANNUAL TOTAL | 5476.62 | 6751.70 | | |
| ANNUAL MEAN | 15.0 | 18.4 | 18.5 | |
| HIGHEST ANNUAL MEAN | | | 50.3 | 1982 |
| LOWEST ANNUAL MEAN | | | 4.81 | 1984 |
| HIGHEST DAILY MEAN | 545 Aug 23 | 703 Jan 25 | 1940 | Jan 1 1988 |
| LOWEST DAILY MEAN | .02 Mar 16 | .20 Jun 6 | .00 | Jun 21 1959 |
| ANNUAL SEVEN-DAY MINIMUM | .02 Mar 15 | .51 Aug 24 | .00 | Jul 23 1959 |
| ANNUAL RUNOFF (AC-FT) | 10860 | 13390 | 13430 | |
| 10 PERCENT EXCEEDS | 32 | 30 | 31 | |
| 50 PERCENT EXCEEDS | 3.8 | 5.0 | 3.9 | |
| 90 PERCENT EXCEEDS | .63 | .95 | .33 | |



HAWAII, ISLAND OF OAHU
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 Waiialua School.

DRAINAGE AREA.--2.98 mi².

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 good. No diversion upstream of station.

AVERAGE DISCHARGE.--37 years (water years 1960-96), 13.9 ft³/s (10,040 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 5,540 ft³/s, July 17, 1974, gage height, 11.94 ft from rating curve extended above 110 ft³/s on basis of slope-area measurements at gage heights 6.74 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 ft³/s and maximum (*):

| Date | Time | Discharge (ft ³ /s) | Gage height (ft) | Date | Time | Discharge (ft ³ /s) | Gage height (ft) |
|---------|------|-----------------------------------|---------------------|---------|------|-----------------------------------|---------------------|
| Jan. 18 | 1830 | *2,260 | *9.13 | Jan. 25 | 0530 | 2,160 | 8.91 |

Minimum discharge, 0.51 ft³/s, May 16, August 30-31.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|-------|-------|--------|--------|--------|--------|-------|-------|--------|-------|--------|-------|
| 1 | 12 | 75 | 18 | 3.4 | 4.5 | 5.9 | 122 | 3.2 | 1.7 | 9.3 | 2.5 | 5.6 |
| 2 | 5.4 | 9.1 | 4.7 | 2.0 | 3.3 | 6.8 | 14 | 2.2 | 1.2 | 14 | 2.6 | 2.1 |
| 3 | 3.7 | 35 | 2.8 | 1.3 | 3.1 | 143 | 9.4 | 1.6 | .88 | 8.2 | 2.2 | 1.3 |
| 4 | 3.9 | 26 | 2.2 | 1.2 | 2.7 | 80 | 4.2 | 1.4 | .69 | 10 | 1.7 | 1.1 |
| 5 | 5.7 | 6.4 | 1.9 | 5.8 | 2.3 | 12 | 3.3 | 1.3 | .59 | 46 | 3.1 | 1.9 |
| 6 | 4.4 | 4.3 | 1.8 | 12 | 2.0 | 7.5 | 2.9 | 1.3 | .60 | 14 | 4.8 | 16 |
| 7 | 8.0 | 25 | 1.7 | 33 | 1.9 | 5.5 | 2.3 | 1.2 | 20 | 17 | 5.3 | 109 |
| 8 | 40 | 108 | 1.7 | 14 | 14 | 4.3 | 1.9 | 1.1 | 11 | 7.4 | 6.3 | 21 |
| 9 | 7.3 | 27 | 1.5 | 72 | 5.0 | 3.7 | 1.6 | 1.0 | 5.1 | 5.1 | 3.1 | 5.7 |
| 10 | 6.4 | 9.3 | 1.3 | 9.6 | 3.6 | 3.2 | 2.0 | 1.2 | 25 | 4.4 | 2.1 | 3.6 |
| 11 | 6.6 | 5.6 | 1.2 | 4.2 | 3.8 | 2.8 | 29 | 1.2 | 4.3 | 3.5 | 11 | 4.2 |
| 12 | 9.5 | 27 | 4.9 | 2.8 | 2.1 | 2.6 | 8.5 | .85 | 4.0 | 3.8 | 10 | 5.0 |
| 13 | 6.0 | 65 | 30 | 2.1 | 1.5 | 2.4 | 3.4 | .69 | 3.0 | 4.6 | 7.9 | 4.4 |
| 14 | 3.7 | 32 | 6.7 | 1.8 | 3.0 | 2.2 | 2.4 | .61 | 1.4 | 3.1 | 6.7 | 3.6 |
| 15 | 2.9 | 16 | 2.9 | 1.5 | 11 | 1.8 | 9.1 | .56 | 1.1 | 3.4 | 3.1 | 2.2 |
| 16 | 2.9 | 7.6 | 1.9 | 1.4 | 6.5 | 1.8 | 3.4 | .52 | 1.2 | 14 | 2.5 | 1.7 |
| 17 | 2.3 | 22 | 1.6 | 1.3 | 3.3 | 2.1 | 8.1 | .57 | 6.4 | 13 | 2.7 | 1.3 |
| 18 | 2.1 | 6.4 | 1.5 | e300 | 1.9 | 2.7 | 29 | .74 | 46 | 7.6 | 3.7 | 1.3 |
| 19 | 3.9 | 4.9 | 1.4 | e350 | 1.4 | 2.6 | 24 | .96 | 8.9 | 11 | 2.1 | 1.2 |
| 20 | 6.0 | 4.8 | 1.3 | 15 | 1.1 | 5.9 | 7.4 | 3.4 | 4.8 | 7.4 | 1.9 | 4.5 |
| 21 | 6.0 | 7.5 | 1.1 | 19 | .98 | 10 | 12 | 11 | 8.4 | 14 | 1.4 | 8.9 |
| 22 | 9.6 | 4.0 | 1.0 | 11 | .94 | 6.4 | 7.0 | 4.0 | 9.2 | 11 | 1.2 | 2.8 |
| 23 | 3.1 | 3.3 | .91 | 35 | .91 | 4.1 | 3.8 | 1.7 | 7.3 | 4.4 | 1.1 | 1.6 |
| 24 | 2.2 | 3.0 | .88 | 26 | 1.0 | 10 | 2.8 | 1.0 | 10 | 3.0 | .94 | 1.3 |
| 25 | 2.0 | 2.8 | .83 | 278 | 117 | 3.9 | 2.4 | 3.8 | 43 | 3.2 | .83 | 2.1 |
| 26 | 8.2 | 2.8 | 1.9 | 13 | 50 | 2.2 | 2.2 | 10 | 6.2 | 2.7 | .74 | 4.7 |
| 27 | 7.9 | 4.6 | 1.8 | 7.4 | 35 | 1.6 | 7.2 | 15 | 3.8 | 23 | .74 | 6.5 |
| 28 | 10 | 3.3 | 1.1 | 10 | 87 | 1.3 | 3.2 | 4.4 | 3.4 | 11 | .70 | 5.7 |
| 29 | 57 | 3.9 | .84 | 6.7 | 11 | 1.1 | 10 | 8.1 | 42 | 3.9 | .59 | 5.2 |
| 30 | 21 | 9.9 | 46 | 4.8 | --- | .94 | 4.3 | e3.1 | 43 | 2.7 | .51 | 4.8 |
| 31 | 49 | --- | 12 | 7.7 | --- | 37 | --- | 2.3 | --- | 2.5 | 12 | --- |
| TOTAL | 318.7 | 561.5 | 159.36 | 1253.0 | 381.83 | 377.34 | 342.8 | 90.00 | 324.16 | 288.2 | 106.05 | 240.3 |
| MEAN | 10.3 | 18.7 | 5.14 | 40.4 | 13.2 | 12.2 | 11.4 | 2.90 | 10.8 | 9.30 | 3.42 | 8.01 |
| MAX | 57 | 108 | 46 | 350 | 117 | 143 | 122 | 15 | 46 | 46 | 12 | 109 |
| MIN | 2.0 | 2.8 | .83 | 1.2 | .91 | .94 | 1.6 | .52 | .59 | 2.5 | .51 | 1.1 |
| AC-FT | 632 | 1110 | 316 | 2490 | 757 | 748 | 680 | 179 | 643 | 572 | 210 | 477 |

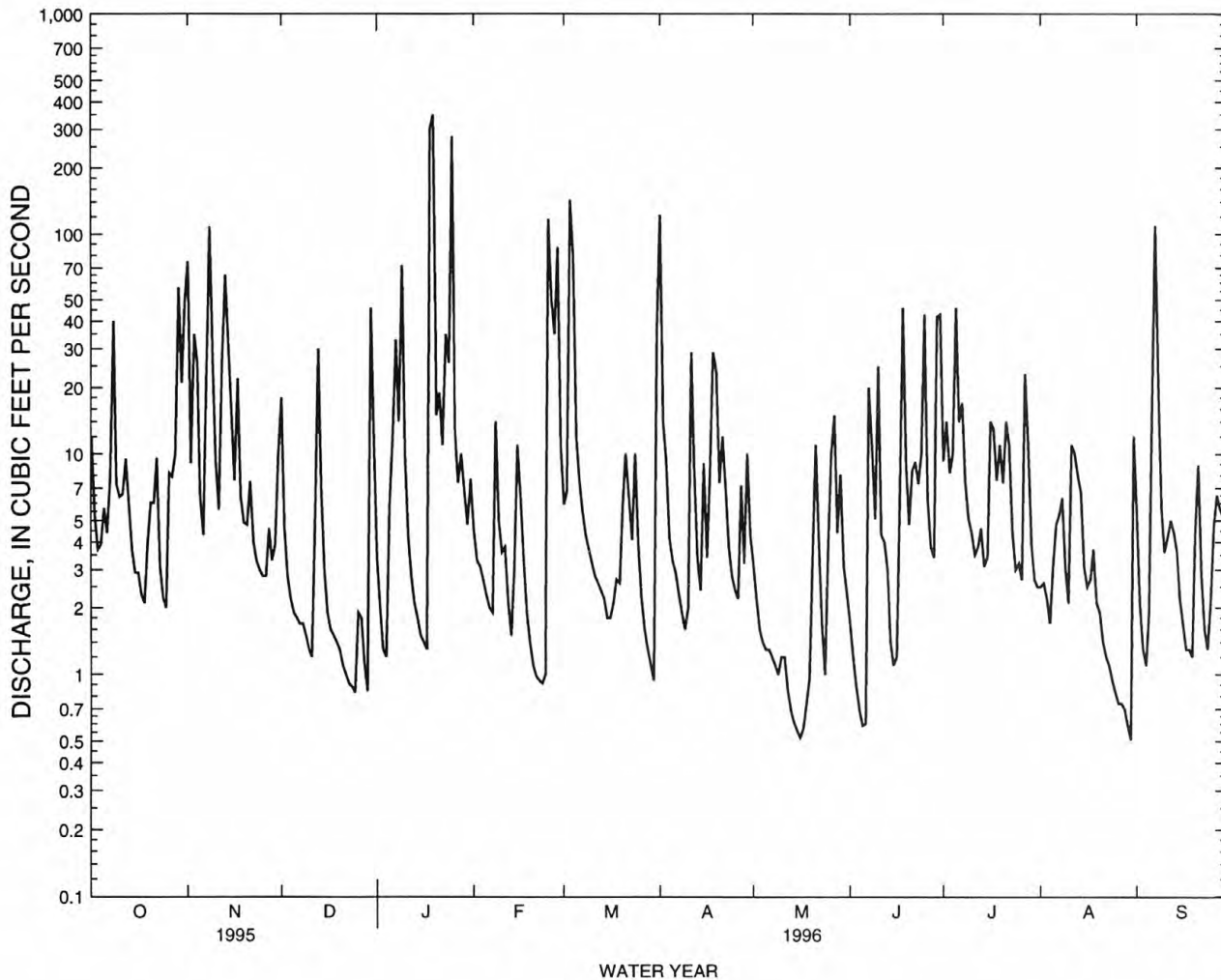
e Estimated

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1959 - 1996, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|------|------|------|------|------|------|------|------|------|------|------|------|------|
| MEAN | 11.1 | 18.5 | 15.9 | 16.3 | 14.2 | 21.2 | 21.1 | 12.4 | 7.36 | 11.8 | 8.74 | 7.78 |
| MAX | 30.7 | 71.9 | 52.6 | 54.1 | 66.9 | 90.0 | 75.7 | 43.7 | 24.9 | 29.3 | 31.0 | 24.9 |
| (WY) | 1982 | 1991 | 1988 | 1988 | 1969 | 1982 | 1989 | 1965 | 1978 | 1989 | 1982 | 1994 |
| MIN | .057 | 2.90 | 1.29 | .37 | .32 | .35 | 1.57 | 1.75 | 2.02 | .95 | 1.51 | .52 |
| (WY) | 1985 | 1963 | 1977 | 1977 | 1978 | 1983 | 1966 | 1966 | 1975 | 1971 | 1984 | 1975 |

HAWAII, ISLAND OF OAHU
 1634500 OPAEULA STREAM NEAR WAHIAWA--Continued

| SUMMARY STATISTICS | FOR 1995 CALENDAR YEAR | FOR 1996 WATER YEAR | WATER YEARS 1959 - 1996 | |
|--------------------------|------------------------|---------------------|-------------------------|-------------|
| ANNUAL TOTAL | 3579.35 | 4443.24 | | |
| ANNUAL MEAN | 9.81 | 12.1 | 13.9 | |
| HIGHEST ANNUAL MEAN | | | 29.7 | 1982 |
| LOWEST ANNUAL MEAN | | | 7.24 | 1984 |
| HIGHEST DAILY MEAN | 323 Aug 23 | 350 Jan 19 | 825 | Feb 1 1969 |
| LOWEST DAILY MEAN | .09 Mar 21 | .51 Aug 30 | .00 | Jan 24 1977 |
| ANNUAL SEVEN-DAY MINIMUM | .17 Mar 15 | .65 May 12 | .00 | Oct 24 1984 |
| ANNUAL RUNOFF (AC-FT) | 7100 | 8810 | 10040 | |
| 10 PERCENT EXCEEDS | 23 | 25 | 28 | |
| 50 PERCENT EXCEEDS | 3.3 | 3.9 | 4.5 | |
| 90 PERCENT EXCEEDS | .90 | 1.1 | .92 | |



Surface-Water Station Records
for Molokai

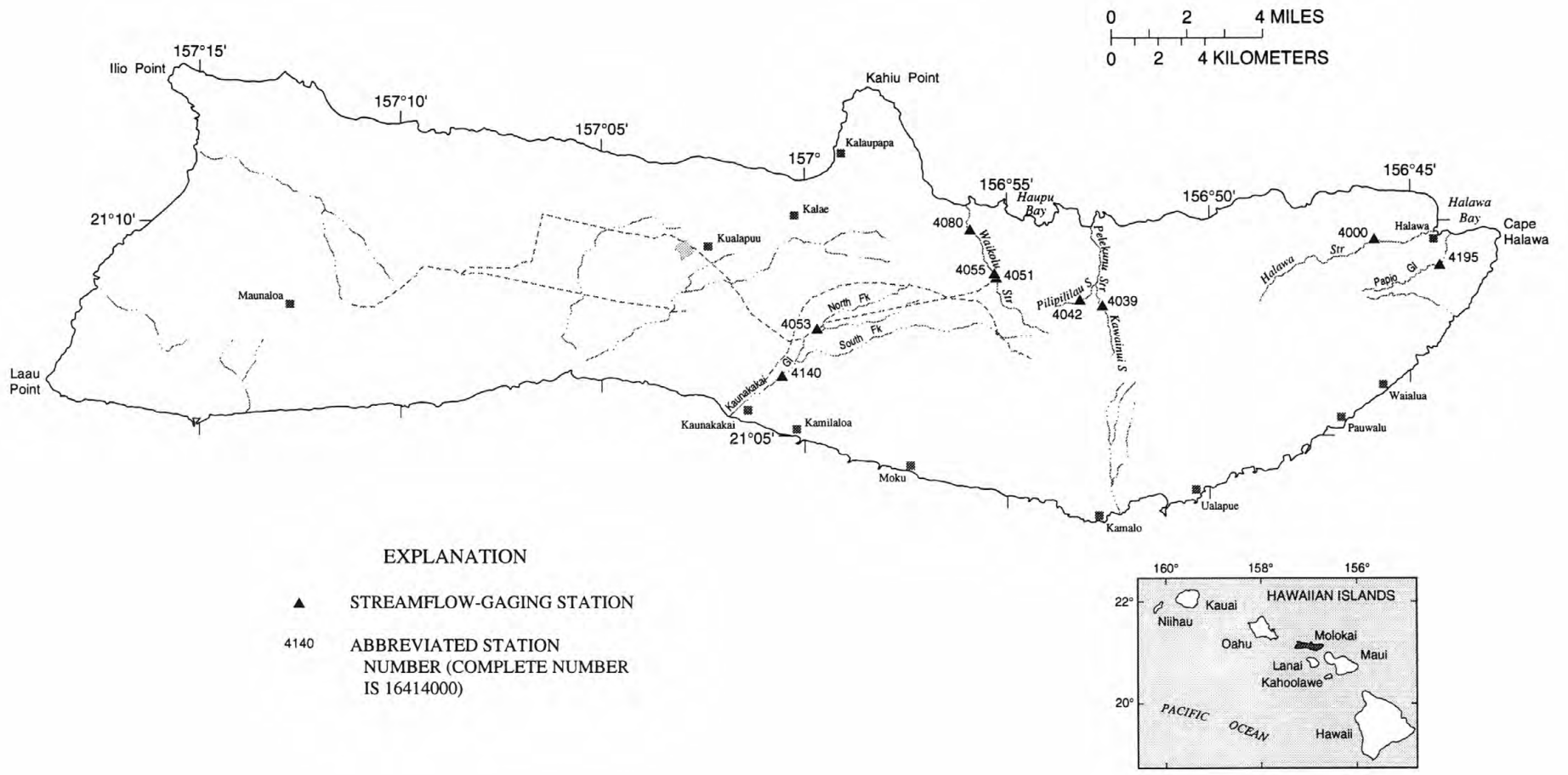


Figure 7. Locations of gaging, water-quality, and partial-record stations on Molokai.

HAWAII, ISLAND OF 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 mi².

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 fair. No diversion upstream.

AVERAGE DISCHARGE.--72 years (water years 1918-31, 1939-96), 29.8 ft³/s (21,580 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 26,900 ft³/s, February 4, 1965, gage height, 19.91 ft, from floodmarks, from rating curve extended above 163 ft³/s on basis of slope-area measurement of peak flow; minimum, 0.76 ft³/s, about November 23, 1962.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,900 ft³/s and maximum (*):

| Date | Time | Discharge (ft ³ /s) | Gage height (ft) | Date | Time | Discharge (ft ³ /s) | Gage height (ft) |
|--|------|-----------------------------------|---------------------|--------------------------------------|------|-----------------------------------|---------------------|
| Feb. 28 | 0600 | *1,370 | *7.48 | No peak greater than base discharge. | | | |
| Minimum discharge, 2.3 ft ³ /s, September 02. | | | | | | | |

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY MEAN VALUES

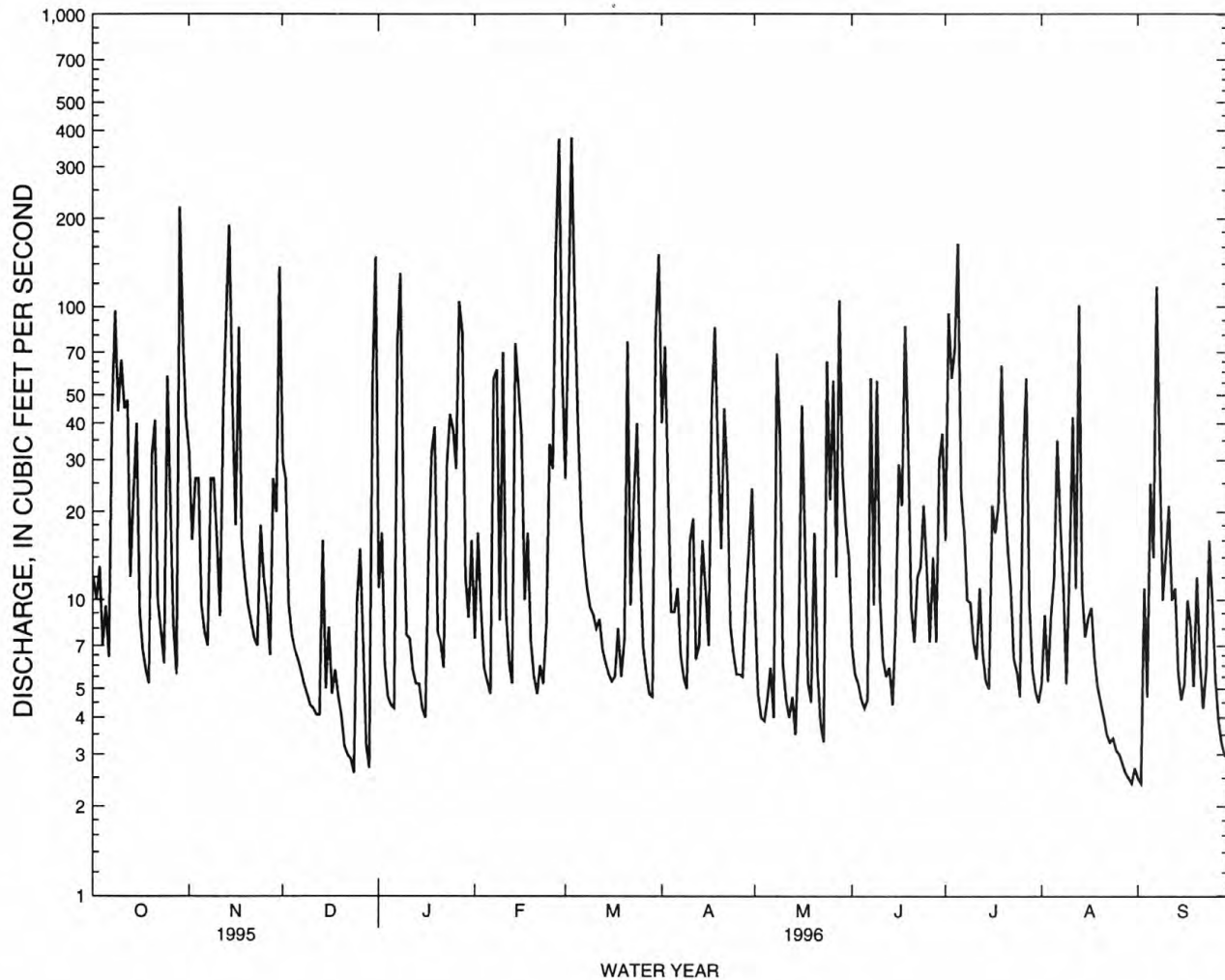
| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|--------|-------|-------|-------|--------|--------|-------|-------|-------|-------|-------|-------|
| 1 | 12 | 32 | 30 | 11 | 7.4 | 26 | 40 | 9.5 | 6.9 | 16 | 5.2 | 2.5 |
| 2 | 10 | 16 | 26 | 17 | 17 | 86 | 73 | 4.8 | 5.6 | 95 | 8.9 | 2.4 |
| 3 | 13 | 26 | 9.6 | 6.1 | 9.3 | 379 | 24 | 4.0 | 5.2 | 57 | 5.3 | 11 |
| 4 | 7.0 | 26 | 7.6 | 4.7 | 5.9 | 109 | 9.1 | 3.9 | 4.6 | 71 | 8.8 | 4.7 |
| 5 | 9.5 | 9.6 | 6.8 | 4.4 | 5.3 | 40 | 9.1 | 4.6 | 4.3 | 164 | 12 | 25 |
| 6 | 6.4 | 7.8 | 6.3 | 4.3 | 4.8 | 19 | 11 | 5.9 | 4.6 | 23 | 35 | 14 |
| 7 | 45 | 7.0 | 5.8 | 75 | 57 | 14 | 6.5 | 4.0 | 57 | 17 | 18 | 117 |
| 8 | 97 | 26 | 5.2 | 130 | 61 | 11 | 5.5 | 69 | 9.6 | 10 | 11 | 30 |
| 9 | 44 | 26 | 4.8 | 19 | 8.5 | 9.4 | 5.0 | 36 | 56 | 9.8 | 5.2 | 10 |
| 10 | 66 | 16 | 4.4 | 7.6 | 70 | 8.9 | 16 | 6.1 | 10 | 7.2 | 13 | 14 |
| 11 | 45 | 8.8 | 4.3 | 7.4 | 9.1 | 8.0 | 19 | 4.6 | 6.3 | 6.3 | 42 | 21 |
| 12 | 48 | 46 | 4.1 | 5.8 | 6.1 | 8.6 | 6.3 | 4.0 | 5.5 | 11 | 11 | 10 |
| 13 | 12 | 98 | 4.1 | 5.2 | 5.2 | 6.8 | 7.0 | 4.7 | 5.9 | 6.6 | 101 | 11 |
| 14 | 23 | 190 | 16 | 5.2 | 75 | 6.1 | 16 | 3.5 | 4.4 | 5.3 | 11 | 5.7 |
| 15 | 40 | 46 | 5.0 | 4.3 | 54 | 5.6 | 11 | 7.1 | 8.3 | 5.0 | 7.5 | 4.6 |
| 16 | 9.1 | 18 | 8.1 | 4.0 | 36 | 5.3 | 7.0 | 46 | 29 | 21 | 8.7 | 5.2 |
| 17 | 6.8 | 85 | 4.8 | 14 | 10 | 5.5 | 45 | 15 | 21 | 17 | 9.4 | 10 |
| 18 | 5.8 | 16 | 5.8 | 32 | 17 | 8.0 | 85 | 5.2 | 86 | 21 | 6.4 | 8.1 |
| 19 | 5.2 | 12 | 4.7 | 39 | 7.3 | 5.5 | 31 | 4.5 | 32 | 63 | 5.1 | 5.1 |
| 20 | 31 | 9.6 | 4.1 | 7.8 | 5.5 | 7.3 | 15 | 17 | 9.4 | 23 | 4.5 | 12 |
| 21 | 41 | 8.4 | 3.2 | 7.2 | 4.8 | 76 | 45 | 5.7 | 7.2 | 15 | 4.0 | 6.2 |
| 22 | 9.9 | 7.4 | 3.0 | 5.9 | 6.0 | 9.6 | 26 | 3.8 | 12 | 11 | 3.5 | 4.3 |
| 23 | 7.8 | 7.0 | 2.9 | 29 | 5.2 | 22 | 8.2 | 3.3 | 13 | 6.3 | 3.3 | 5.8 |
| 24 | 6.1 | 18 | 2.6 | 43 | 8.3 | 40 | 6.6 | 65 | 21 | 5.7 | 3.4 | 16 |
| 25 | 58 | 12 | 9.7 | 38 | 34 | 14 | 5.6 | 22 | 13 | 4.7 | 3.1 | 10 |
| 26 | 21 | 9.6 | 15 | 28 | 28 | 7.0 | 5.6 | 56 | 7.2 | 29 | 3.0 | 5.4 |
| 27 | 8.2 | 6.5 | 7.2 | 104 | 153 | 5.7 | 5.5 | 12 | 14 | 57 | 2.8 | 3.9 |
| 28 | 5.6 | 26 | 3.2 | 82 | 375 | 4.8 | 10 | 105 | 7.2 | 9.7 | 2.6 | 3.3 |
| 29 | 219 | 20 | 2.7 | 12 | 61 | 4.7 | 15 | 27 | 30 | 5.8 | 2.5 | 3.0 |
| 30 | 77 | 137 | 55 | 8.7 | --- | 82 | 24 | 18 | 37 | 4.9 | 2.4 | 2.9 |
| 31 | 42 | --- | 148 | 16 | --- | 151 | --- | 14 | --- | 4.5 | 2.7 | --- |
| TOTAL | 1031.4 | 973.7 | 420.0 | 777.6 | 1146.7 | 1185.8 | 593.0 | 591.2 | 533.2 | 802.8 | 362.3 | 384.1 |
| MEAN | 33.3 | 32.5 | 13.5 | 25.1 | 39.5 | 38.3 | 19.8 | 19.1 | 17.8 | 25.9 | 11.7 | 12.8 |
| MAX | 219 | 190 | 148 | 130 | 375 | 379 | 85 | 105 | 86 | 164 | 101 | 117 |
| MIN | 5.2 | 6.5 | 2.6 | 4.0 | 4.8 | 4.7 | 5.0 | 3.3 | 4.3 | 4.5 | 2.4 | 2.4 |
| AC-FT | 2050 | 1930 | 833 | 1540 | 2270 | 2350 | 1180 | 1170 | 1060 | 1590 | 719 | 762 |

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1917 - 1996, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|------|------|------|------|------|------|------|------|------|------|------|------|------|
| MEAN | 26.8 | 36.2 | 36.2 | 33.7 | 30.0 | 37.8 | 40.4 | 27.1 | 18.5 | 25.7 | 25.0 | 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 |

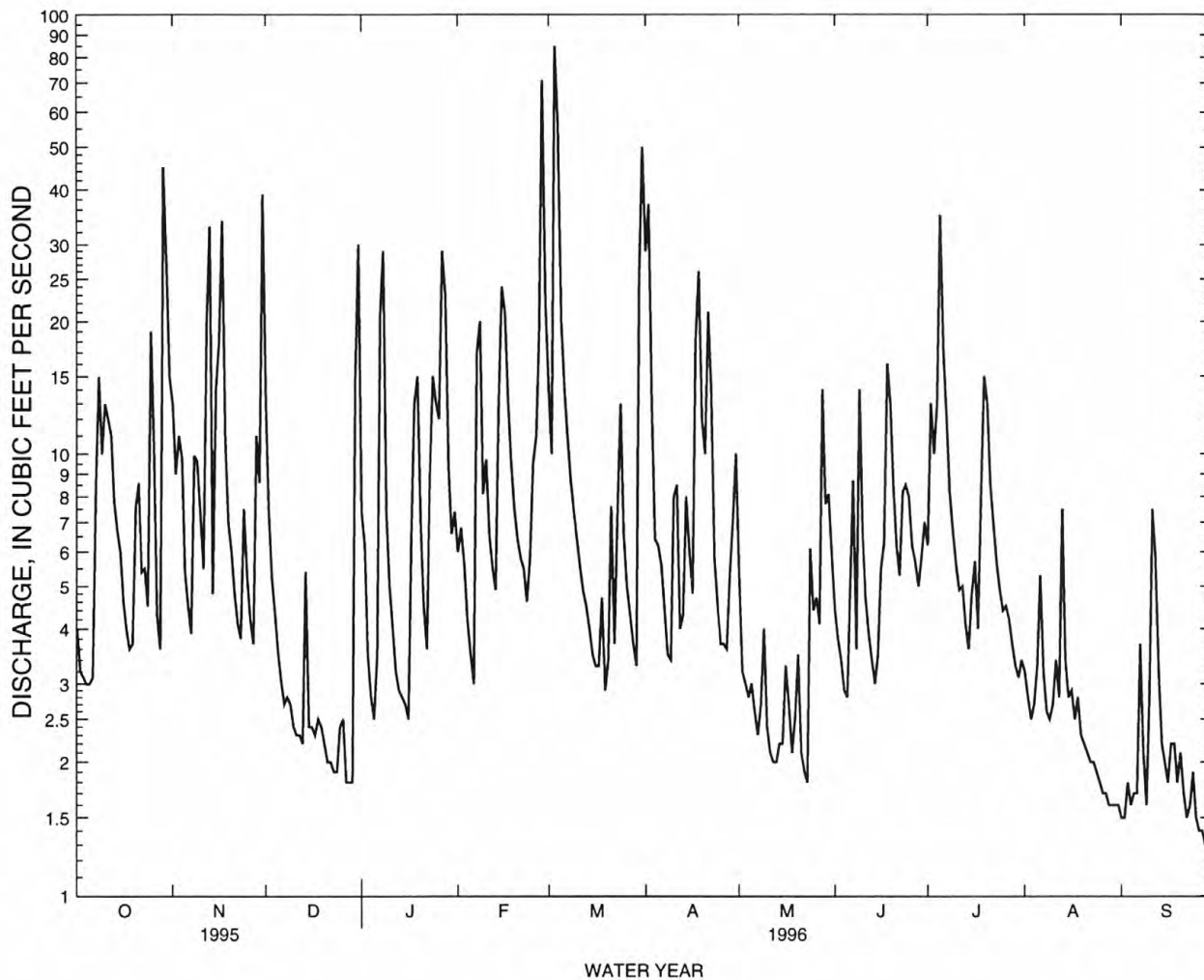
HAWAII, ISLAND OF MOLOKAI
 16400000 HALAWA STREAM NEAR HALAWA--Continued

| SUMMARY STATISTICS | FOR 1995 CALENDAR YEAR | | FOR 1996 WATER YEAR | | WATER YEARS 1917 - 1996 | |
|--------------------------|------------------------|--------|---------------------|--------|-------------------------|-------------|
| ANNUAL TOTAL | 8174.9 | | 8801.8 | | | |
| ANNUAL MEAN | 22.4 | | 24.0 | | 29.8 | |
| HIGHEST ANNUAL MEAN | | | | | 47.4 | 1965 |
| LOWEST ANNUAL MEAN | | | | | 17.4 | 1975 |
| HIGHEST DAILY MEAN | 223 | Jan 14 | 379 | Mar 3 | 1240 | Feb 4 1965 |
| LOWEST DAILY MEAN | 1.6 | Sep 15 | 2.4 | Aug 30 | .86 | Sep 1 1971 |
| ANNUAL SEVEN-DAY MINIMUM | 2.4 | Feb 18 | 2.6 | Aug 27 | .90 | Aug 26 1971 |
| ANNUAL RUNOFF (AC-FT) | 16210 | | 17460 | | 21580 | |
| 10 PERCENT EXCEEDS | 55 | | 61 | | 65 | |
| 50 PERCENT EXCEEDS | 8.8 | | 9.6 | | 13 | |
| 90 PERCENT EXCEEDS | 3.2 | | 4.3 | | 4.8 | |



HAWAII, ISLAND OF MOLOKAI
 16403900 KAWAINUI STREAM NEAR PELEKUNU--Continued

| SUMMARY STATISTICS | FOR 1995 CALENDAR YEAR | FOR 1996 WATER YEAR | WATER YEARS 1968 - 1996 | |
|--------------------------|------------------------|---------------------|-------------------------|-------------|
| ANNUAL TOTAL | 2320.3 | 2776.6 | | |
| ANNUAL MEAN | 6.36 | 7.59 | 8.05 | |
| HIGHEST ANNUAL MEAN | | | 11.8 | 1969 |
| LOWEST ANNUAL MEAN | | | 6.24 | 1978 |
| HIGHEST DAILY MEAN | 52 Jan 29 | 85 Mar 3 | 296 | Nov 29 1968 |
| LOWEST DAILY MEAN | 1.1 Jun 29 | 1.3 Sep 28 | .75 | Sep 22 1968 |
| ANNUAL SEVEN-DAY MINIMUM | 1.3 Sep 20 | 1.4 Sep 24 | .95 | Nov 17 1968 |
| ANNUAL RUNOFF (AC-FT) | 4600 | 5510 | 5830 | |
| 10 PERCENT EXCEEDS | 12 | 15 | 15 | |
| 50 PERCENT EXCEEDS | 4.5 | 4.7 | 4.8 | |
| 90 PERCENT EXCEEDS | 1.9 | 2.0 | 1.6 | |



HAWAII, ISLAND OF MOLOKAI
16404200 PILIPILILAU STREAM NEAR PELEKUNU

LOCATION.--Lat 21°08'08", long 156°53'09", Hydrologic Unit 20050000, on right bank 500 ft downstream from left-bank tributary, 1.9 mi south of former village of Pelekunu, and 5.8 mi north of Kamalo.

DRAINAGE AREA.--0.49 mi².

PERIOD OF RECORD.--August 1968 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 1,000 ft above mean sea level, from topographic map.

REMARKS.--Records good, except for estimated daily discharges which are fair. No diversions upstream of station.

AVERAGE DISCHARGE.--28 years (water years 1969-96), 1.58 ft³/s (1,140 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 835 ft³/s, January 25, 1982, gage height, 4.25 ft, from rating curve extended above 6.2 ft³/s on basis of slope-area measurement at gage height, 4.25 ft; minimum, 0.50 ft³/s, September 2-8, 21-29, 1975, November 26 to December 3, 1977.

EXTREMES FOR CURRENT YEAR.--Peak discharge greater than base discharge of 100 ft³/s and maximum (*):

| Date | Time | Discharge (ft ³ /s) | Gage height (ft) | Date | Time | Discharge (ft ³ /s) | Gage height (ft) |
|---|------|-----------------------------------|---------------------|--------------------------------------|------|-----------------------------------|---------------------|
| Mar. 30 | 2330 | *125 | *3.05 | No peak greater than base discharge. | | | |
| Minimum discharge, 0.52 ft ³ /s, August 25-27. | | | | | | | |

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY MEAN VALUES

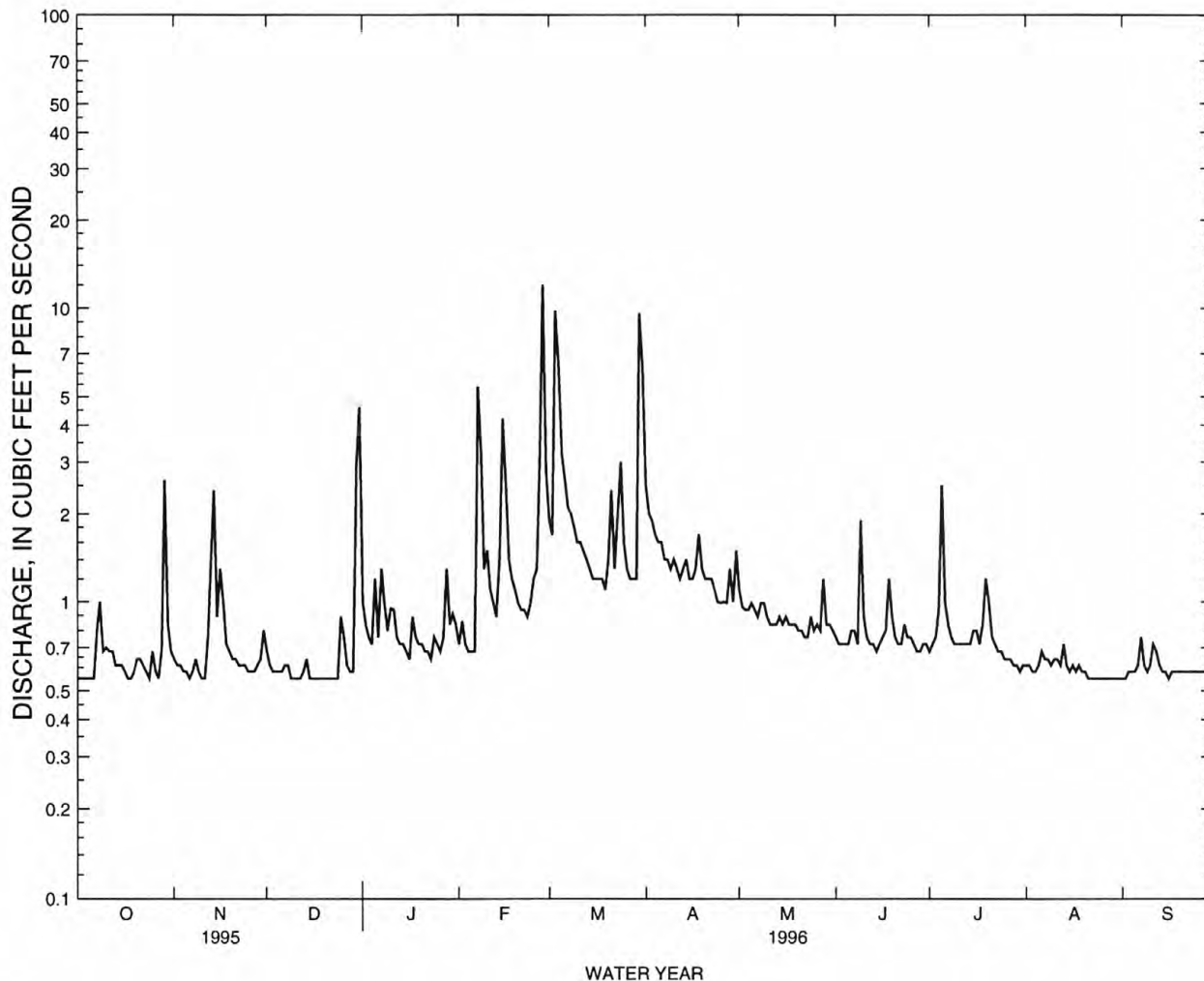
| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|-------|
| 1 | .55 | .64 | .68 | 1.0 | .72 | 1.9 | 2.5 | 1.1 | .76 | .68 | .61 | .55 |
| 2 | .55 | .61 | .61 | .84 | .86 | 1.7 | 2.0 | .96 | .72 | .72 | .61 | .55 |
| 3 | .55 | .61 | .58 | .76 | .72 | 9.8 | 1.9 | .94 | .72 | .76 | .58 | .58 |
| 4 | .55 | .58 | .58 | .72 | .68 | 6.5 | 1.7 | .94 | .72 | .94 | .58 | .58 |
| 5 | .55 | .58 | .58 | 1.2 | .68 | 3.2 | 1.6 | .99 | .72 | 2.5 | .61 | .58 |
| 6 | .55 | .55 | .58 | .76 | .68 | 2.6 | 1.6 | .94 | .80 | .99 | .68 | .61 |
| 7 | .80 | .58 | .61 | 1.3 | 5.4 | 2.1 | 1.4 | .89 | .80 | .84 | .64 | .76 |
| 8 | 1.0 | .64 | .61 | .99 | 3.2 | 2.0 | 1.4 | .99 | .72 | .76 | .64 | .61 |
| 9 | .68 | .58 | .55 | .80 | 1.3 | 1.8 | 1.3 | .99 | 1.9 | .72 | .61 | .58 |
| 10 | .70 | .55 | .55 | .95 | 1.5 | 1.6 | 1.4 | .89 | .89 | .72 | .64 | .61 |
| 11 | .68 | .55 | .55 | .94 | 1.1 | 1.6 | 1.3 | .84 | .76 | .72 | .64 | .72 |
| 12 | .68 | .76 | .55 | .76 | .99 | 1.5 | 1.2 | .84 | .72 | .72 | .61 | .68 |
| 13 | .61 | 1.4 | .58 | .72 | .89 | 1.4 | 1.3 | .84 | .72 | .72 | .72 | .61 |
| 14 | .61 | 2.4 | .64 | .72 | 1.4 | 1.3 | 1.4 | .89 | .68 | .72 | .61 | .58 |
| 15 | .61 | .89 | .55 | .68 | 4.2 | 1.2 | 1.2 | .84 | .72 | .80 | .58 | .58 |
| 16 | .58 | 1.3 | .55 | .64 | 2.5 | 1.2 | 1.2 | .89 | .76 | .80 | .61 | .55 |
| 17 | .55 | 1.0 | .55 | .89 | 1.4 | 1.2 | 1.3 | .84 | .80 | .72 | .58 | .58 |
| 18 | .55 | .72 | .55 | .76 | 1.2 | 1.2 | 1.7 | .84 | 1.2 | .84 | .61 | .58 |
| 19 | .58 | .68 | .55 | .72 | 1.1 | 1.1 | 1.3 | .84 | .89 | 1.2 | .58 | .58 |
| 20 | .64 | .64 | .55 | .72 | .99 | 1.4 | 1.2 | .80 | .76 | 1.0 | .58 | .58 |
| 21 | .64 | .64 | .55 | .68 | .94 | 2.4 | 1.2 | .80 | .72 | .76 | .55 | .58 |
| 22 | .61 | .61 | .55 | .68 | .94 | 1.3 | 1.2 | .76 | .72 | .72 | .55 | .58 |
| 23 | .58 | .61 | .55 | .64 | .89 | 2.0 | 1.1 | .76 | .84 | .68 | .55 | .58 |
| 24 | .55 | .61 | .55 | .76 | .99 | 3.0 | 1.0 | .89 | .76 | .68 | .55 | .58 |
| 25 | .68 | .58 | .89 | .72 | 1.2 | 1.6 | .99 | .80 | .76 | .64 | .55 | .58 |
| 26 | .58 | .58 | .76 | .68 | 1.3 | 1.3 | 1.0 | .84 | .72 | .64 | .55 | .58 |
| 27 | .55 | .58 | .61 | .76 | 3.1 | 1.2 | .99 | .80 | .68 | .64 | .55 | .58 |
| 28 | .69 | .61 | .58 | 1.3 | 12 | 1.2 | 1.3 | 1.2 | .68 | .61 | .55 | .58 |
| 29 | 2.6 | .64 | .58 | .84 | 2.8 | 1.2 | 1.0 | .84 | .72 | .61 | .55 | .58 |
| 30 | .84 | .80 | 2.9 | .91 | --- | 9.6 | 1.5 | .84 | .72 | .58 | .55 | .58 |
| 31 | .68 | --- | 4.6 | .84 | --- | 6.3 | --- | .80 | --- | .61 | .55 | --- |
| TOTAL | 21.57 | 22.52 | 24.67 | 25.68 | 55.67 | 77.4 | 41.18 | 27.42 | 24.08 | 25.04 | 18.37 | 17.85 |
| MEAN | .70 | .75 | .80 | .83 | 1.92 | 2.50 | 1.37 | .88 | .80 | .81 | .59 | .59 |
| MAX | 2.6 | 2.4 | 4.6 | 1.3 | 12 | 9.8 | 2.5 | 1.2 | 1.9 | 2.5 | .72 | .76 |
| MIN | .55 | .55 | .55 | .64 | .68 | 1.1 | .99 | .76 | .68 | .58 | .55 | .55 |
| AC-FT | 43 | 45 | 49 | 51 | 110 | 154 | 82 | 54 | 48 | 50 | 36 | 35 |

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1968 - 1996, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|------|------|------|------|------|------|------|------|------|------|------|------|------|
| MEAN | .90 | 1.54 | 1.76 | 2.51 | 2.07 | 2.29 | 2.36 | 1.67 | 1.12 | 1.02 | .89 | .80 |
| MAX | 1.68 | 4.85 | 3.92 | 6.55 | 5.56 | 4.41 | 12.1 | 5.92 | 2.22 | 1.90 | 1.56 | 1.38 |
| (WY) | 1994 | 1979 | 1969 | 1982 | 1979 | 1980 | 1989 | 1987 | 1987 | 1980 | 1980 | 1992 |
| MIN | .58 | .60 | .58 | .64 | .58 | 1.02 | .75 | .77 | .69 | .60 | .58 | .53 |
| (WY) | 1978 | 1978 | 1976 | 1977 | 1978 | 1975 | 1978 | 1975 | 1975 | 1975 | 1975 | 1975 |

HAWAII, ISLAND OF MOLOKAI
 16404200 PILIPILILAU STREAM NEAR PELEKUNU--Continued

| SUMMARY STATISTICS | FOR 1995 CALENDAR YEAR | FOR 1996 WATER YEAR | WATER YEARS 1968 - 1996 | |
|--------------------------|------------------------|---------------------|-------------------------|-------------|
| ANNUAL TOTAL | 345.06 | 381.45 | | |
| ANNUAL MEAN | .95 | 1.04 | 1.58 | |
| HIGHEST ANNUAL MEAN | | | 2.69 | 1982 |
| LOWEST ANNUAL MEAN | | | .77 | 1978 |
| HIGHEST DAILY MEAN | 6.3 Mar 1 | 12 Feb 28 | 152 | Apr 8 1989 |
| LOWEST DAILY MEAN | .52 Sep 7 | .55 Oct 1 | .50 | Sep 3 1975 |
| ANNUAL SEVEN-DAY MINIMUM | .52 Sep 11 | .55 Dec 15 | .50 | Sep 21 1975 |
| ANNUAL RUNOFF (AC-FT) | 684 | 757 | 1140 | |
| 10 PERCENT EXCEEDS | 1.4 | 1.6 | 2.7 | |
| 50 PERCENT EXCEEDS | .68 | .72 | 1.0 | |
| 90 PERCENT EXCEEDS | .55 | .55 | .64 | |



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 current year.

GAGE.--Water-stage recorder and concrete control. Elevation of gage is 989 ft above mean sea level, from tunnel plans.

REMARKS.--Records good except for period of estimated discharge, which are fair. 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.--30 years (water years 1967-96), 4.59 ft³/s (3,320 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 41 ft³/s, March 19, 1986; no flow at times.

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge, 23 ft³/s, February 28; minimum daily, 1.4 ft³/s, March 12, 13, 14, and May 12, 13.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 7.6 | 6.6 | 9.0 | 7.5 | 5.2 | 7.2 | 11 | 5.4 | e4.8 | e9.0 | e2.8 | e3.5 |
| 2 | 6.3 | 6.2 | 6.7 | 6.4 | 4.5 | 5.8 | 8.5 | 4.0 | e4.1 | e8.0 | e2.8 | e5.8 |
| 3 | 6.1 | 5.5 | 6.0 | 5.7 | 4.2 | 21 | 6.9 | 3.7 | e4.0 | e6.6 | e2.9 | e7.0 |
| 4 | 6.0 | 5.8 | 5.7 | 5.5 | 2.8 | 19 | 4.8 | 3.1 | e3.8 | e5.0 | e3.1 | e5.1 |
| 5 | 5.9 | 5.5 | 5.1 | 14 | 3.4 | 11 | 4.2 | 3.2 | e3.8 | e16 | e4.5 | e3.3 |
| 6 | 5.7 | 5.3 | 5.5 | 5.1 | 2.5 | 6.6 | 4.3 | 3.3 | e4.1 | e10 | e6.0 | e4.0 |
| 7 | 7.5 | 5.6 | 5.1 | 7.7 | 8.3 | 6.2 | 4.2 | 3.1 | e8.1 | e8.0 | e4.2 | e2.8 |
| 8 | 16 | 5.8 | 5.7 | 6.8 | 12 | 4.3 | 3.6 | 3.6 | e4.8 | e5.6 | e3.3 | e2.8 |
| 9 | 9.2 | 6.5 | 6.0 | 4.6 | 5.6 | 3.5 | 3.5 | 3.1 | e4.1 | e4.5 | e4.8 | e3.0 |
| 10 | 12 | 5.8 | 5.6 | 3.2 | 6.7 | 3.3 | 4.1 | 1.6 | e10 | e3.9 | e6.0 | e3.5 |
| 11 | 11 | 5.5 | 5.6 | 5.4 | 5.0 | 2.4 | 5.5 | 1.5 | e6.0 | e4.6 | e8.0 | e5.0 |
| 12 | 11 | 6.6 | 5.5 | 3.8 | 4.3 | 1.4 | 4.0 | 1.4 | e4.5 | e5.4 | e10 | e4.0 |
| 13 | 7.4 | 14 | 5.3 | 2.6 | 4.4 | 1.4 | 5.2 | 1.4 | e4.0 | e5.4 | e7.0 | e3.8 |
| 14 | 6.6 | 19 | 8.0 | 2.4 | 9.6 | 1.4 | 6.5 | e5.0 | e5.4 | e5.4 | e4.6 | e4.5 |
| 15 | 7.1 | 9.2 | 6.3 | 2.3 | 21 | 2.0 | 6.3 | e4.2 | e3.5 | e4.0 | e3.9 | e4.3 |
| 16 | 6.4 | 9.2 | 5.7 | 2.3 | 12 | 2.0 | 6.5 | e4.0 | e2.6 | e4.6 | e3.5 | e4.1 |
| 17 | 6.0 | 8.8 | 5.5 | 6.5 | 5.5 | 2.0 | 7.3 | e7.2 | e5.4 | e6.8 | e3.3 | e4.2 |
| 18 | 5.9 | 6.8 | 5.4 | 5.4 | 4.7 | 2.2 | 13 | e5.0 | e15 | e3.9 | e3.3 | e4.3 |
| 19 | 5.7 | 6.1 | 5.4 | 4.4 | 4.4 | 2.0 | 7.2 | e4.3 | e11 | e3.6 | e3.5 | 4.2 |
| 20 | 7.6 | 5.4 | 5.1 | 3.4 | 4.4 | 2.1 | 5.1 | e6.0 | e5.7 | e3.3 | e4.0 | 4.3 |
| 21 | 8.9 | 5.2 | 5.2 | 3.2 | 3.1 | 7.6 | 6.5 | e4.5 | e2.5 | e3.6 | e4.5 | 5.0 |
| 22 | 6.9 | 5.8 | 5.2 | 3.4 | 3.3 | 4.3 | 6.0 | e4.2 | e2.1 | e3.6 | e5.2 | 4.9 |
| 23 | 6.2 | 5.6 | 5.2 | 3.0 | 3.4 | 7.1 | 4.5 | e4.1 | e3.0 | e4.0 | e5.3 | 3.0 |
| 24 | 4.9 | 5.6 | 5.3 | 3.0 | 3.0 | 13 | 3.8 | e4.1 | e5.0 | e5.5 | e4.6 | 3.9 |
| 25 | 6.5 | 5.5 | 5.5 | 4.5 | 8.8 | 4.9 | 3.7 | e8.0 | e3.5 | e4.8 | e4.1 | 4.8 |
| 26 | 7.6 | 5.5 | 7.0 | 4.3 | 9.3 | 3.4 | 3.3 | e3.0 | e7.0 | e4.0 | e3.4 | 4.6 |
| 27 | 6.0 | 5.5 | 5.6 | 2.9 | 11 | 2.5 | 3.3 | e4.0 | e3.0 | e4.4 | e3.4 | 4.6 |
| 28 | 6.2 | 5.6 | 5.2 | 5.0 | 23 | 2.2 | 5.9 | e5.4 | e3.0 | e5.0 | e3.8 | 4.7 |
| 29 | 20 | 5.6 | 5.4 | 5.3 | 12 | 2.1 | 5.5 | e8.0 | e3.6 | e4.0 | e4.0 | 4.7 |
| 30 | 11 | 10 | 13 | 3.3 | --- | 6.6 | 6.5 | e5.0 | e6.9 | e3.0 | e3.8 | 4.6 |
| 31 | 8.5 | --- | 19 | 6.9 | --- | 12 | --- | e3.5 | --- | e2.9 | e3.2 | --- |
| TOTAL | 249.7 | 209.1 | 199.8 | 149.8 | 207.4 | 172.5 | 170.7 | 127.9 | 154.3 | 168.4 | 136.8 | 128.3 |
| MEAN | 8.05 | 6.97 | 6.45 | 4.83 | 7.15 | 5.56 | 5.69 | 4.13 | 5.14 | 5.43 | 4.41 | 4.28 |
| MAX | 20 | 19 | 19 | 14 | 23 | 21 | 13 | 8.0 | 15 | 16 | 10 | 7.0 |
| MIN | 4.9 | 5.2 | 5.1 | 2.3 | 2.5 | 1.4 | 3.3 | 1.4 | 2.1 | 2.9 | 2.8 | 2.8 |
| AC-FT | 495 | 415 | 396 | 297 | 411 | 342 | 339 | 254 | 306 | 334 | 271 | 254 |

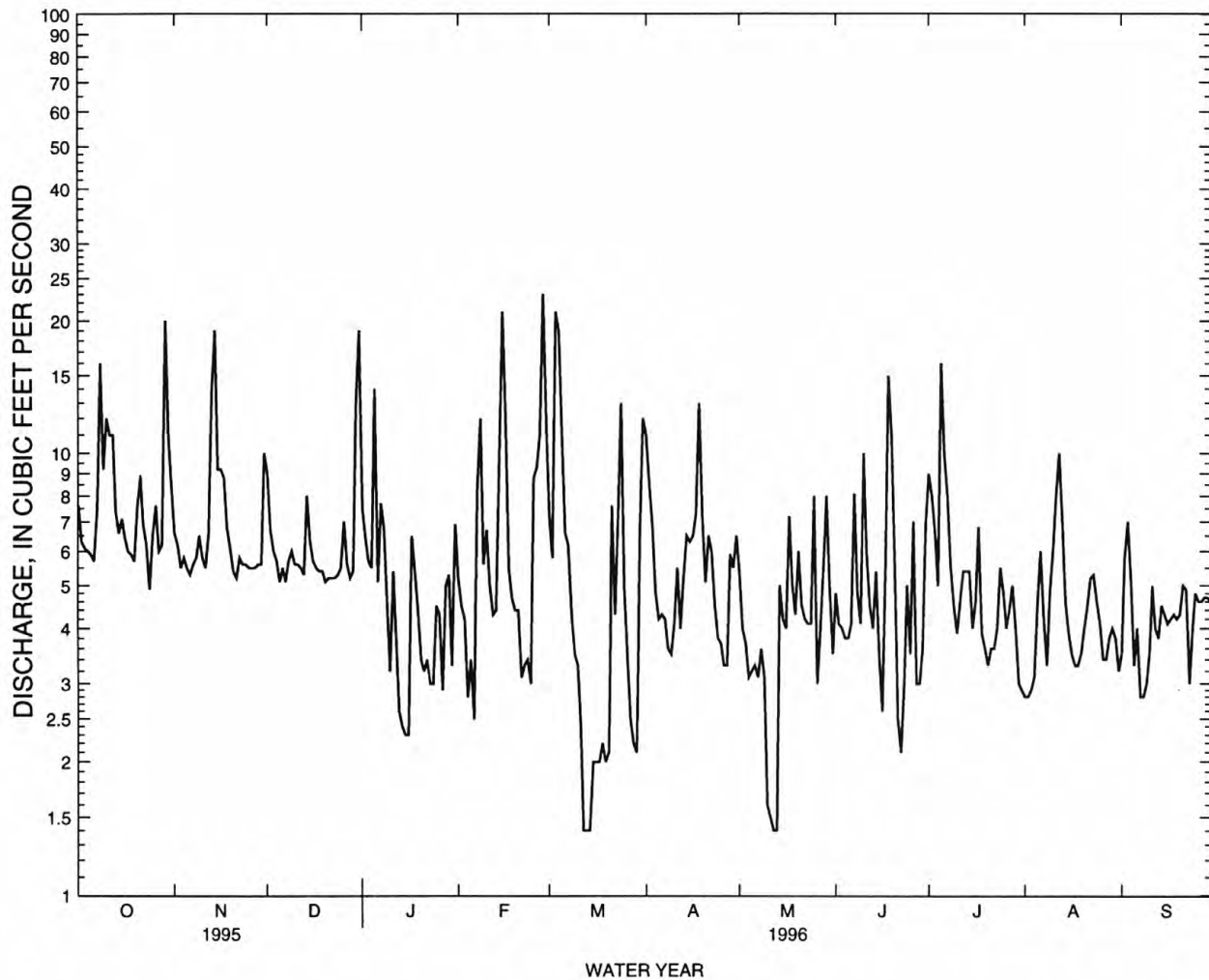
e Estimated

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1966 - 1996, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|------|------|------|------|------|------|------|------|------|------|------|------|------|
| MEAN | 3.95 | 5.38 | 5.22 | 4.95 | 4.81 | 5.45 | 5.46 | 4.43 | 3.96 | 4.32 | 3.73 | 3.25 |
| MAX | 8.05 | 10.2 | 10.6 | 12.5 | 12.5 | 13.8 | 12.8 | 12.3 | 8.37 | 9.89 | 7.22 | 5.81 |
| (WY) | 1996 | 1988 | 1991 | 1987 | 1990 | 1986 | 1986 | 1987 | 1986 | 1986 | 1985 | 1994 |
| MIN | 1.80 | 1.86 | .41 | .086 | .010 | .009 | .001 | .037 | .016 | .055 | .004 | .24 |
| (WY) | 1972 | 1992 | 1968 | 1968 | 1968 | 1968 | 1967 | 1967 | 1974 | 1974 | 1974 | 1974 |

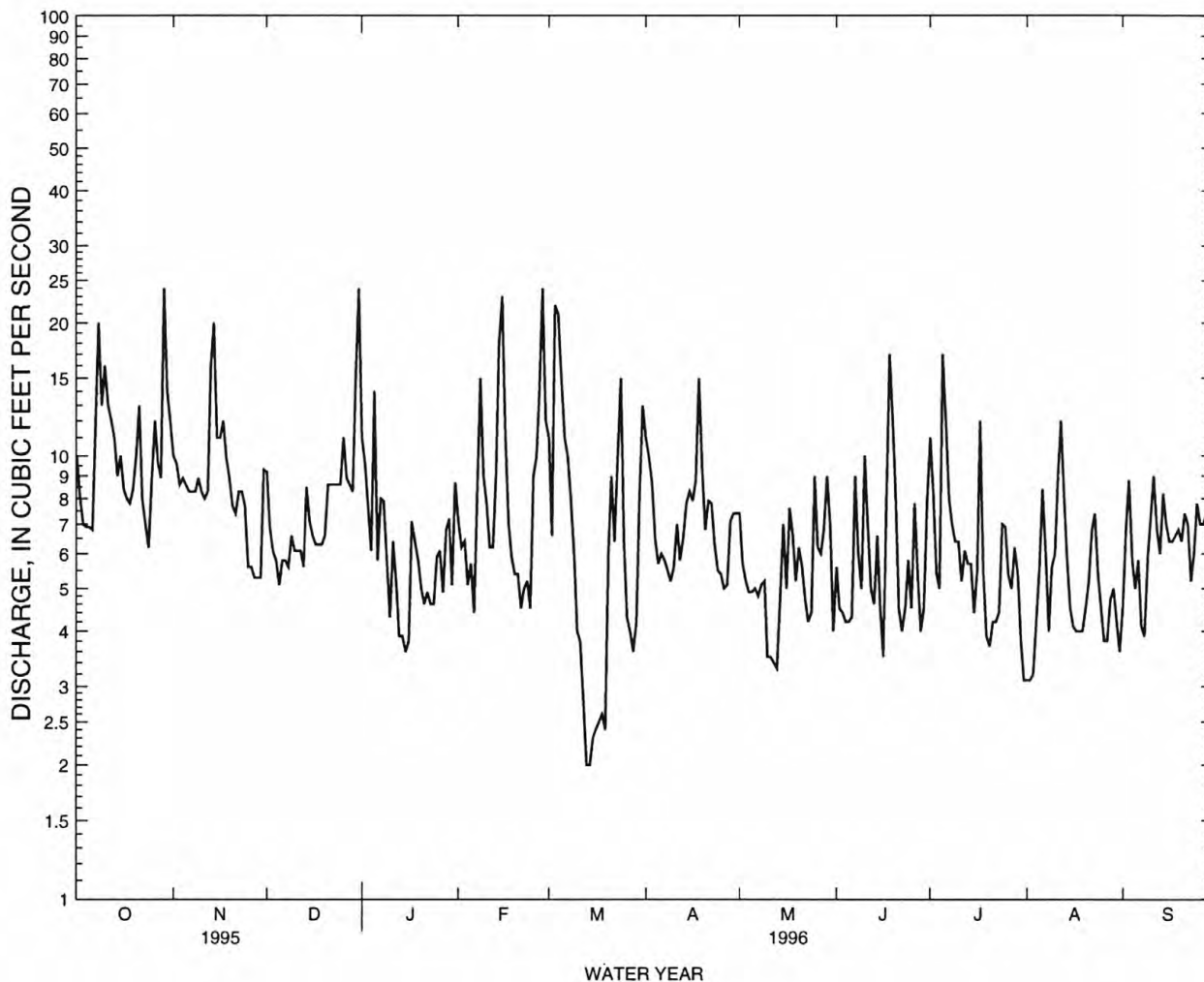
HAWAII, ISLAND OF MOLOKAI
 16405100 MOLOKAI TUNNEL AT EAST PORTAL--Continued

| SUMMARY STATISTICS | FOR 1995 CALENDAR YEAR | FOR 1996 WATER YEAR | WATER YEARS 1966 - 1996 | |
|--------------------------|------------------------|---------------------|-------------------------|-------------|
| ANNUAL TOTAL | 2051.0 | 2074.7 | | |
| ANNUAL MEAN | 5.62 | 5.67 | 4.59 | |
| HIGHEST ANNUAL MEAN | | | 8.19 | 1987 |
| LOWEST ANNUAL MEAN | | | 1.31 | 1974 |
| HIGHEST DAILY MEAN | 21 Apr 4 | 23 Feb 28 | 41 | Mar 19 1986 |
| LOWEST DAILY MEAN | 1.3 Aug 21 | 1.4 Mar 12 | .00 | Mar 30 1967 |
| ANNUAL SEVEN-DAY MINIMUM | 2.3 Aug 19 | 1.8 Mar 12 | .00 | Mar 30 1967 |
| ANNUAL RUNOFF (AC-FT) | 4070 | 4120 | 3320 | |
| 10 PERCENT EXCEEDS | 9.7 | 9.1 | 9.5 | |
| 50 PERCENT EXCEEDS | 5.1 | 5.1 | 3.3 | |
| 90 PERCENT EXCEEDS | 2.7 | 3.0 | .99 | |



HAWAII, ISLAND OF MOLOKAI
 16405300 MOLOKAI TUNNEL AT WEST PORTAL--Continued

| SUMMARY STATISTICS | FOR 1995 CALENDAR YEAR | FOR 1996 WATER YEAR | WATER YEARS 1965 - 1996 | |
|--------------------------|------------------------|---------------------|-------------------------|-------------|
| ANNUAL TOTAL | 3042.5 | 2661.4 | | |
| ANNUAL MEAN | 8.34 | 7.27 | 7.12 | |
| HIGHEST ANNUAL MEAN | | | 11.4 | 1987 |
| LOWEST ANNUAL MEAN | | | 3.46 | 1974 |
| HIGHEST DAILY MEAN | 33 Feb 14 | 24 Oct 29 | 39 | Apr 8 1986 |
| LOWEST DAILY MEAN | 2.2 Aug 21 | 2.0 Mar 13 | 1.8 | Oct 15 1967 |
| ANNUAL SEVEN-DAY MINIMUM | 3.8 Aug 19 | 2.3 Mar 13 | 1.9 | May 3 1976 |
| ANNUAL RUNOFF (AC-FT) | 6030 | 5280 | 5160 | |
| 10 PERCENT EXCEEDS | 13 | 11 | 12 | |
| 50 PERCENT EXCEEDS | 7.0 | 6.4 | 5.8 | |
| 90 PERCENT EXCEEDS | 4.8 | 4.0 | 3.1 | |



HAWAII, ISLAND OF MOLOKAI
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 mi².

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 good. Since November 16, 1960, water diverted upstream at times, either into or from Molokai tunnel.

AVERAGE DISCHARGE (since Molokai tunnel diversion began)--35 years (water years 1961, 1963-96), 6.24 ft³/s (4,520 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 3,570 ft³/s, January 25, 1982, gage height, 6.64 ft, from rating curve extended above 43 ft³/s on basis of slope-area measurement at gage height 5.25 ft; no flow at times since 1984.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of October 31, 1961, reached a stage of 13.62 ft, from floodmarks, former site and datum, discharge, 6,220 ft³/s, by slope-area measurement.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 590 ft³/s and maximum (*):

| Date | Time | Discharge (ft ³ /s) | Gage height (ft) | Date | Time | Discharge (ft ³ /s) | Gage height (ft) |
|---------|------|-----------------------------------|---------------------|---------|------|-----------------------------------|---------------------|
| Mar. 03 | 0745 | 877 | 4.21 | Mar. 30 | 2330 | *1,450 | *4.94 |

Minimum discharge, no flow on many days.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|-------|-------|-------|-------|--------|--------|-------|------|-------|-------|------|------|
| 1 | .00 | e.00 | e.00 | .11 | .00 | .18 | 3.4 | .05 | .00 | .00 | .00 | .00 |
| 2 | .00 | e.00 | e.00 | .00 | .00 | .00 | .28 | .00 | .00 | .24 | .00 | .00 |
| 3 | .00 | e.00 | e.00 | .00 | .00 | 77 | .00 | .00 | .00 | .00 | .00 | .00 |
| 4 | .00 | e.00 | e.00 | .00 | .00 | 31 | .00 | .00 | .00 | .99 | .00 | .00 |
| 5 | .00 | e.00 | e.00 | 3.5 | .00 | 3.4 | .00 | .00 | .00 | 15 | .00 | .00 |
| 6 | .00 | e.00 | e.00 | .04 | .00 | .04 | .00 | .00 | .00 | .26 | .00 | .00 |
| 7 | 1.2 | e.00 | e.00 | 9.1 | 53 | .00 | .00 | .00 | .00 | .00 | .00 | .00 |
| 8 | 6.8 | e.00 | e.00 | 3.4 | 14 | .00 | .00 | .00 | .00 | .00 | .00 | .00 |
| 9 | .00 | e.00 | e.00 | .00 | .00 | .00 | .00 | .00 | 11 | .00 | .00 | .00 |
| 10 | .27 | e.00 | e.00 | .00 | 2.0 | .00 | .00 | .00 | 1.8 | .00 | .00 | .00 |
| 11 | .08 | e18 | e.00 | .03 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 |
| 12 | .24 | e17 | e.00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 |
| 13 | .00 | e.00 | .00 | .00 | .00 | .00 | .26 | .00 | .00 | .00 | .30 | .00 |
| 14 | .00 | e27 | .00 | .00 | 13 | .00 | 2.9 | .00 | .00 | .00 | .01 | .00 |
| 15 | .00 | e.01 | .00 | .00 | 49 | .00 | .85 | .00 | .00 | .00 | .00 | .00 |
| 16 | .00 | e.00 | .00 | .00 | 11 | .00 | 2.0 | .00 | .00 | .00 | .00 | .00 |
| 17 | .00 | e.00 | .00 | 4.9 | .19 | .00 | .70 | .00 | .00 | .00 | .00 | .00 |
| 18 | .00 | e.00 | .00 | .00 | .00 | .00 | 7.9 | .00 | 5.3 | .00 | .00 | .00 |
| 19 | .00 | e.00 | .00 | .00 | .00 | .00 | .71 | .00 | .16 | 1.9 | .00 | .00 |
| 20 | .00 | e.00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .31 | .00 | .00 |
| 21 | .00 | e.00 | .00 | .00 | .00 | 9.8 | .07 | .00 | .00 | .00 | .00 | .00 |
| 22 | .00 | e.00 | .00 | .00 | .00 | .36 | .00 | .00 | .00 | .00 | .00 | .00 |
| 23 | .00 | e.00 | .00 | .00 | .00 | 7.4 | .00 | .00 | .15 | .00 | .00 | .00 |
| 24 | .00 | e.00 | .00 | .00 | .00 | 20 | .00 | .00 | .01 | .00 | .00 | .00 |
| 25 | .00 | e.00 | .00 | .00 | 3.3 | 1.6 | .00 | .00 | .00 | .00 | .00 | .00 |
| 26 | .00 | e.00 | .07 | .00 | 3.6 | .01 | .00 | .00 | .00 | .00 | .00 | .00 |
| 27 | .00 | e.00 | .00 | .00 | 22 | .00 | .00 | .00 | .00 | .00 | .00 | .00 |
| 28 | .00 | e.00 | .00 | 3.1 | 141 | .00 | 1.2 | 5.4 | .00 | .00 | .00 | .00 |
| 29 | 32 | e3.0 | .00 | .00 | 7.3 | .00 | .10 | .44 | .00 | .00 | .00 | .00 |
| 30 | .66 | e.01 | 25 | .00 | --- | 91 | .93 | .00 | .00 | .00 | .00 | .00 |
| 31 | .00 | --- | 42 | .14 | --- | 32 | --- | .00 | --- | .00 | .00 | --- |
| TOTAL | 41.25 | 65.02 | 67.07 | 24.32 | 319.39 | 273.79 | 21.30 | 5.89 | 18.42 | 18.70 | 0.31 | 0.00 |
| MEAN | 1.33 | 2.17 | 2.16 | .78 | 11.0 | 8.83 | .71 | .19 | .61 | .60 | .010 | .000 |
| MAX | 32 | 27 | 42 | 9.1 | 141 | 91 | 7.9 | 5.4 | 11 | 15 | .30 | .00 |
| MIN | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 |
| AC-FT | 82 | 129 | 133 | 48 | 634 | 543 | 42 | 12 | 37 | 37 | .6 | .00 |

e Estimated

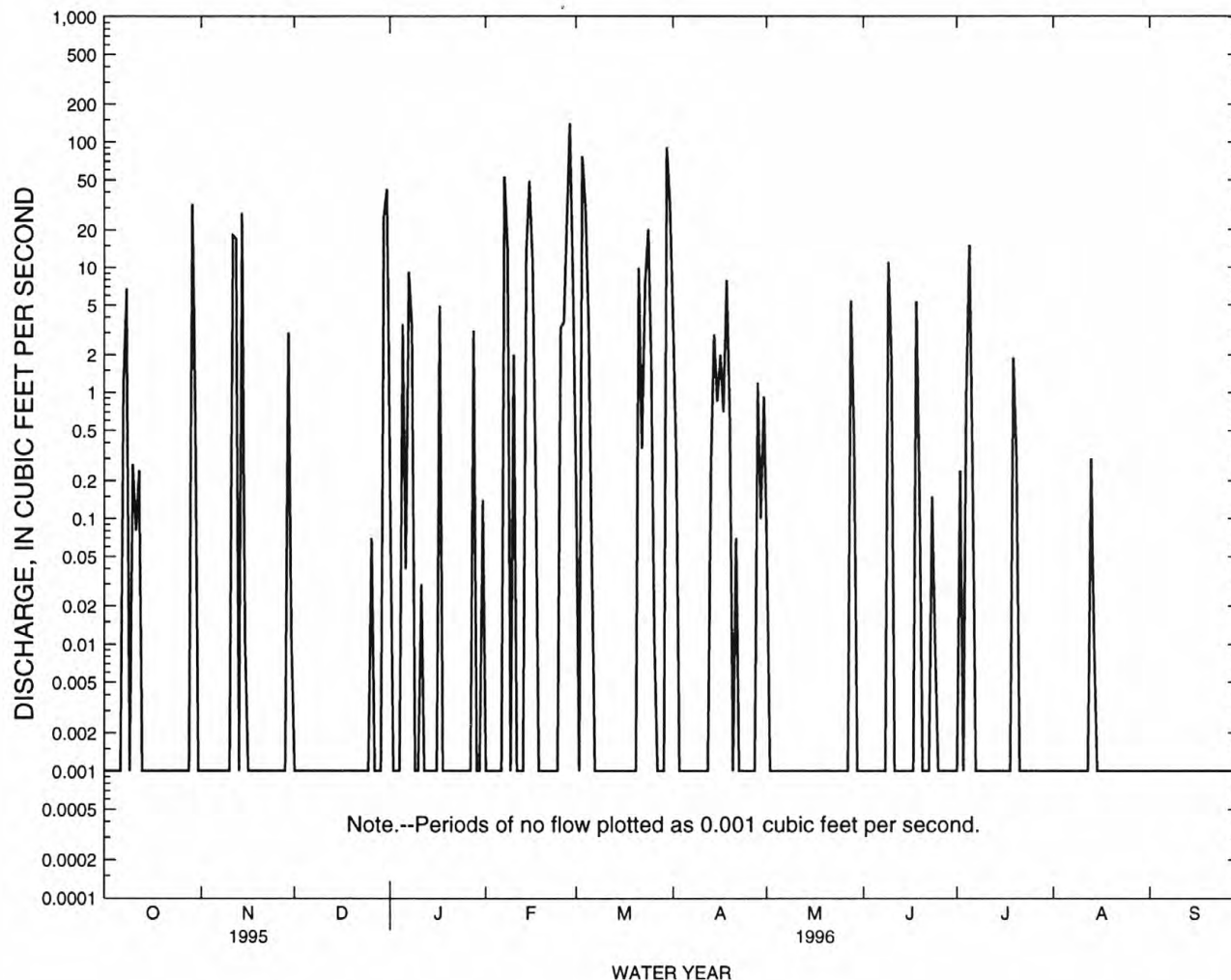
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1961 - 1996, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|------|------|------|------|------|------|------|------|------|------|------|------|------|
| MEAN | 3.38 | 8.78 | 9.32 | 11.4 | 9.36 | 9.27 | 9.78 | 4.85 | 2.46 | 2.95 | 2.11 | 1.48 |
| MAX | 16.7 | 30.5 | 31.0 | 40.5 | 30.6 | 22.6 | 64.8 | 23.6 | 10.5 | 11.0 | 7.52 | 6.81 |
| (WY) | 1966 | 1971 | 1966 | 1982 | 1979 | 1968 | 1989 | 1987 | 1961 | 1964 | 1961 | 1963 |
| MIN | .000 | .77 | .37 | .78 | .81 | 1.31 | .71 | .19 | .000 | .23 | .010 | .000 |
| (WY) | 1985 | 1985 | 1976 | 1996 | 1978 | 1983 | 1996 | 1996 | 1985 | 1984 | 1996 | 1996 |

HAWAII, ISLAND OF MOLOKAI

16405500 WAIKOLU STREAM AT ALTITUDE 900 FT, NEAR KALAUPAPA--Continued

| SUMMARY STATISTICS | FOR 1995 CALENDAR YEAR | FOR 1996 WATER YEAR | WATER YEARS 1961 - 1996 | |
|--------------------------|------------------------|---------------------|-------------------------|-------------|
| ANNUAL TOTAL | 635.49 | 855.46 | | |
| ANNUAL MEAN | 1.74 | 2.34 | 6.24 | |
| HIGHEST ANNUAL MEAN | | | 11.8 | 1965 |
| LOWEST ANNUAL MEAN | | | 1.26 | 1985 |
| HIGHEST DAILY MEAN | 90 Apr 4 | 141 Feb 28 | 847 | Apr 8 1989 |
| LOWEST DAILY MEAN | .00 Jun 17 | .00 Oct 1 | .00 | Sep 12 1984 |
| ANNUAL SEVEN-DAY MINIMUM | .00 Jun 17 | .00 Oct 13 | .00 | Sep 12 1984 |
| ANNUAL RUNOFF (AC-FT) | 1260 | 1700 | 4520 | |
| 10 PERCENT EXCEEDS | 3.0 | 3.0 | 11 | |
| 50 PERCENT EXCEEDS | .16 | .00 | 1.4 | |
| 90 PERCENT EXCEEDS | .00 | .00 | .21 | |



HAWAII, ISLAND OF MOLOKAI

16408000 WAIKOLU STREAM BELOW PIPELINE CROSSING, NEAR KALAUPAPA

LOCATION.--Lat 21°09'45", long 156°55'54"; Hydrologic Unit 20050000, on left bank 0.7 mi upstream from mouth, and 4.4 mi southeast of Molokai Lighthouse near Kalaupapa.

DRAINAGE AREA.--3.68 mi².

PERIOD OF RECORD.--July 1919 to November 1930, August 1931 to July 1932, September 1937 to January 1948, July 1948 to September 1996 (discontinued). Prior to August 1931, published as "at pipeline crossing, near Kalaupapa."

REVISED RECORDS.--WSP 1155: 1932(M), 1938-44(M), 1946-48(M). WSP 1319: 1923(M), 1930(M), 1932, 1938-40, 1945(M), 1974-81(M), drainage area.

GAGE.--Water-stage recorder. Datum of gage is 252 ft above mean sea level (hand levels by Bureau of Reclamation). Prior to November 19, 1930, at site 500 ft upstream of gage at different datums. August 14, 1931, to July 20, 1932, and September 20, 1937, to January 26, 1948, at present site at datum 1.49 ft higher, and July 30, 1948, to June 30, 1962, at present site at datum 1.00 ft higher.

REMARKS.--Records fair. Diversion upstream for domestic use in Kalaupapa, and since November 16, 1960, water has been diverted upstream to Molokai tunnel.

AVERAGE DISCHARGE (since Molokai tunnel diversion began).--36 years (water years 1961-96), 17.8 ft³/s (12,910 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 13,210 ft³/s, April 8, 1989, gage height, 8.50 ft, from rating curve extended above 26 ft³/s on basis of slope-area measurement at gage height 6.68 ft; minimum, 2.0 ft³/s, November 1, 2, 1926, June 5, 1926.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,200 ft³/s and maximum (*):

| Date | Time | Discharge (ft ³ /s) | Gage height (ft) | Date | Time | Discharge (ft ³ /s) | Gage height (ft) |
|---------|------|--------------------------------|------------------|---------|------|--------------------------------|------------------|
| Nov. 16 | 2115 | 1,420 | 4.77 | Mar. 31 | 2245 | *3,930 | *6.20 |
| Mar. 03 | 1600 | 1,870 | 5.13 | | | | |

Minimum discharge, 4.4 ft³/s November 8, 9, 10, 11, and 12.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 5.4 | 5.1 | 6.3 | 7.5 | 4.4 | 8.2 | e14 | e7.6 | 7.6 | 6.5 | 5.7 | 6.5 |
| 2 | 5.0 | 5.0 | 6.1 | 5.8 | 4.7 | 7.3 | e8.8 | e7.4 | 7.6 | 6.5 | 5.7 | 6.4 |
| 3 | 5.1 | 5.1 | 6.1 | 5.2 | 4.5 | 155 | e8.1 | e7.4 | 7.4 | 6.5 | 5.7 | 6.0 |
| 4 | 4.9 | 5.1 | 6.2 | 4.7 | 4.4 | 60 | e8.1 | e7.6 | 7.1 | 8.1 | 5.7 | 5.6 |
| 5 | 4.9 | 4.9 | 6.1 | 5.8 | 4.3 | 9.9 | e8.1 | e7.6 | 7.1 | 37 | 5.8 | 5.4 |
| 6 | 4.8 | 4.8 | 5.9 | 4.6 | 4.3 | 6.8 | e7.4 | e7.6 | 7.4 | 11 | 6.1 | 5.5 |
| 7 | 5.9 | 4.7 | 5.9 | 28 | 101 | 6.1 | e7.1 | e7.4 | 7.4 | 8.3 | 5.7 | 5.8 |
| 8 | 14 | 4.9 | 5.9 | 13 | 36 | 6.2 | e7.4 | e7.6 | 7.1 | 6.9 | 5.7 | 5.5 |
| 9 | 5.4 | 4.7 | 5.8 | 7.0 | 7.1 | 5.9 | e7.6 | e8.3 | 20 | 6.7 | 5.8 | 5.4 |
| 10 | 5.3 | 4.7 | 5.8 | 6.2 | 12 | 5.8 | e8.8 | e7.8 | 10 | 6.3 | 5.9 | 5.5 |
| 11 | 5.1 | 4.7 | 5.6 | 5.7 | 7.2 | 5.7 | e7.6 | e7.6 | 7.8 | 7.4 | 6.0 | 5.6 |
| 12 | 4.9 | 6.7 | 5.5 | 5.2 | 6.3 | 5.7 | e7.8 | e7.6 | 7.6 | 6.8 | 6.1 | 5.4 |
| 13 | 4.8 | 40 | 5.5 | 5.1 | 6.0 | 5.7 | e8.1 | e7.6 | 7.1 | 7.0 | 7.0 | 5.3 |
| 14 | 4.9 | 60 | 6.0 | 4.9 | 33 | 5.6 | e9.9 | e7.5 | 6.9 | 6.9 | 5.9 | 5.3 |
| 15 | 5.0 | 9.2 | 5.5 | 4.7 | 108 | 5.4 | e8.8 | 7.4 | 7.4 | 7.2 | 6.1 | 5.3 |
| 16 | 4.9 | 114 | 5.5 | 4.7 | 35 | 5.4 | e10 | 7.8 | 7.6 | 7.0 | 6.6 | 5.3 |
| 17 | 4.9 | 42 | 5.4 | 8.3 | 9.7 | 5.4 | e8.8 | 7.8 | 6.9 | 6.8 | 6.6 | 5.5 |
| 18 | 4.8 | 12 | 5.3 | 5.0 | 8.1 | 5.2 | e15 | 9.0 | 12 | 6.6 | 6.5 | 5.5 |
| 19 | 4.8 | 9.9 | 5.4 | 5.0 | 7.3 | 5.2 | e9.1 | 7.8 | 6.5 | 9.2 | 6.0 | 5.2 |
| 20 | 4.7 | 8.8 | 5.4 | 4.9 | 7.2 | 5.2 | e8.8 | 7.6 | 6.9 | 7.2 | 5.6 | 5.1 |
| 21 | 5.0 | 8.2 | 5.4 | 4.7 | 7.0 | 20 | e9.9 | 7.4 | 6.7 | 7.0 | 5.7 | 5.1 |
| 22 | 4.9 | 7.7 | 5.3 | 4.5 | 6.4 | 6.4 | e8.8 | 7.4 | 6.7 | 6.9 | 5.5 | 5.1 |
| 23 | 4.9 | 7.7 | 5.3 | 4.4 | 6.1 | 11 | e8.1 | 7.6 | 7.6 | 6.8 | 5.5 | 5.1 |
| 24 | 5.0 | 7.3 | 5.2 | 4.9 | 6.0 | 34 | e7.8 | 8.1 | 6.7 | 6.2 | 5.5 | 5.1 |
| 25 | 5.4 | 7.2 | 6.3 | 4.6 | 7.3 | 7.5 | e7.8 | 7.6 | 6.7 | 6.0 | 5.5 | 5.1 |
| 26 | 5.1 | 7.0 | 6.1 | 4.5 | 7.3 | 5.7 | e7.8 | 7.8 | 6.7 | 6.0 | 5.5 | 5.0 |
| 27 | 5.0 | 6.7 | 5.5 | 4.7 | 42 | 5.7 | e8.1 | 7.6 | 6.7 | 5.9 | 5.6 | 5.0 |
| 28 | 5.2 | 6.5 | 5.5 | 7.4 | 339 | 5.5 | e8.3 | 14 | 6.5 | 5.8 | 6.4 | 5.0 |
| 29 | 61 | 6.8 | 5.4 | 4.6 | 23 | 5.5 | e8.6 | 8.8 | 7.1 | 5.8 | 6.5 | 5.0 |
| 30 | 7.4 | 6.8 | 43 | 4.8 | --- | 189 | e7.8 | 8.3 | 6.7 | 5.8 | 6.5 | 5.0 |
| 31 | 5.6 | --- | 85 | 4.7 | --- | e123 | --- | 7.8 | --- | 5.8 | 6.5 | --- |
| TOTAL | 224.0 | 428.2 | 293.2 | 195.1 | 854.6 | 739.0 | 262.3 | 246.4 | 233.5 | 243.9 | 184.9 | 161.6 |
| MEAN | 7.23 | 14.3 | 9.46 | 6.29 | 29.5 | 23.8 | 8.74 | 7.95 | 7.78 | 7.87 | 5.96 | 5.39 |
| MAX | 61 | 114 | 85 | 28 | 339 | 189 | 15 | 14 | 20 | 37 | 7.0 | 6.5 |
| MIN | 4.7 | 4.7 | 5.2 | 4.4 | 4.3 | 5.2 | 7.1 | 7.4 | 6.5 | 5.8 | 5.5 | 5.0 |
| AC-FT | 444 | 849 | 582 | 387 | 1700 | 1470 | 520 | 489 | 463 | 484 | 367 | 321 |

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1919 - 1996, BY WATER YEAR (WY)

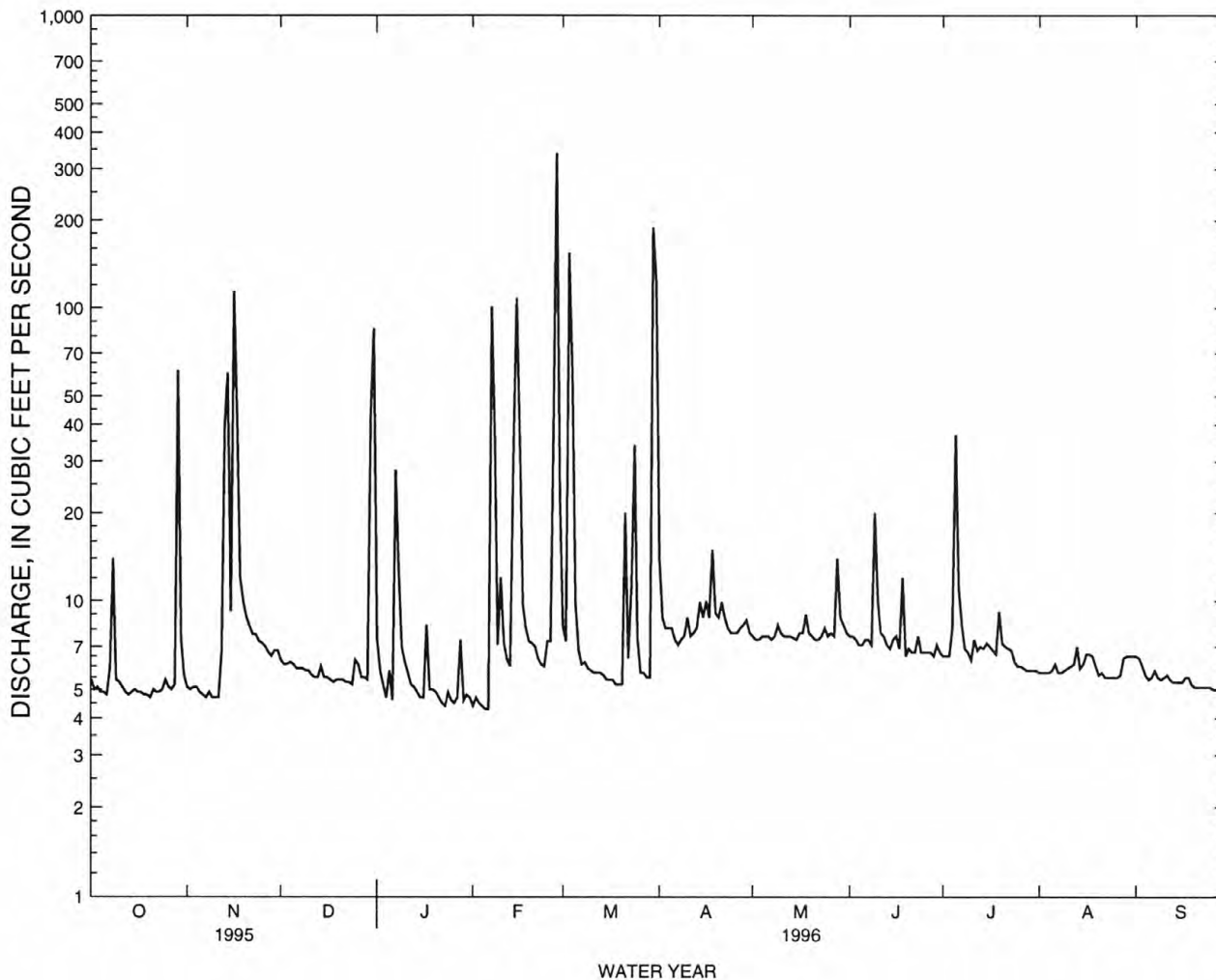
| | MEAN | 12.6 | 20.1 | 23.3 | 23.4 | 21.3 | 24.7 | 25.9 | 17.4 | 12.3 | 12.3 | 12.0 | 9.67 |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| MAX | 35.9 | 58.5 | 65.2 | 92.4 | 72.8 | 116 | 235 | 105 | 26.9 | 34.9 | 40.4 | 28.8 | |
| (WY) | 1962 | 1962 | 1955 | 1988 | 1955 | 1942 | 1989 | 1987 | 1938 | 1958 | 1958 | 1931 | |
| MIN | 3.20 | 5.07 | 2.93 | 5.91 | 5.59 | 7.69 | 7.13 | 4.77 | 3.15 | 3.43 | 2.91 | 3.60 | |
| (WY) | 1985 | 1976 | 1976 | 1977 | 1985 | 1983 | 1978 | 1984 | 1985 | 1984 | 1985 | 1984 | |

e Estimated

HAWAII, ISLAND OF MOLOKAI

16408000 WAIKOLU STREAM BELOW PIPELINE CROSSING, NEAR KALAUPAPA--Continued

| SUMMARY STATISTICS | FOR 1995 CALENDAR YEAR | FOR 1996 WATER YEAR | WATER YEARS 1919 - 1996 | |
|--------------------------|------------------------|---------------------|-------------------------|-------------|
| ANNUAL TOTAL | 3506.4 | 4066.7 | | |
| ANNUAL MEAN | 9.61 | 11.1 | 17.8 | |
| HIGHEST ANNUAL MEAN | | | 37.9 | 1989 |
| LOWEST ANNUAL MEAN | | | 6.12 | 1985 |
| HIGHEST DAILY MEAN | 193 | 339 | 3810 | Apr 8 1989 |
| LOWEST DAILY MEAN | 4.5 | 4.3 | 2.0 | Oct 6 1985 |
| ANNUAL SEVEN-DAY MINIMUM | 4.8 | 4.5 | 2.2 | Dec 27 1984 |
| ANNUAL RUNOFF (AC-FT) | 6950 | 8070 | 12910 | |
| 10 PERCENT EXCEEDS | 12 | 9.9 | 28 | |
| 50 PERCENT EXCEEDS | 6.0 | 6.4 | 11 | |
| 90 PERCENT EXCEEDS | 5.1 | 4.9 | 6.0 | |



HAWAII, ISLAND OF MOLOKAI
16414000 KAUNAKAKAI GULCH AT KAUNAKAKAI

LOCATION.--Lat 21°06'21", long 157°00'34", Hydrologic Unit 20050000, on left bank 0.6 mi upstream from Molokai Ranch pipeline crossing, 1.3 mi northeast of Kaunakakai Post Office, and 1.7 mi upstream from mouth.

DRAINAGE AREA.--6.57 mi².

PERIOD OF RECORD.--December 1949 to current year. Prior to July 1958, published as Kaunakakai Stream at Kaunakakai.

REVISED RECORDS.--WSP 1289: 1950-51. WSP 1569: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 240 ft above mean sea level, from topographic map.

REMARKS.--Records good. Flow has been augmented by occasional spillage from Molokai tunnel since May 1965.

AVERAGE DISCHARGE.--46 years (water years 1951-96), 1.84 ft³/s (1,330 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 3,060 ft³/s, October 31, 1961, gage height, 9.30 ft, from rating curve extended above 620 ft³/s on basis of slope-area measurements at gage heights 7.22 ft and 9.30 ft; no flow most of the time each year.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 280 ft³/s and maximum (*):

| Date | Time | Discharge (ft ³ /s) | Gage height (ft) | Date | Time | Discharge (ft ³ /s) | Gage height (ft) |
|---------|------|-----------------------------------|---------------------|---------|------|-----------------------------------|---------------------|
| Mar. 03 | 1030 | 405 | 5.00 | Mar. 31 | 0100 | *600 | *5.50 |

Minimum discharge, no flow for many days.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY MEAN VALUES

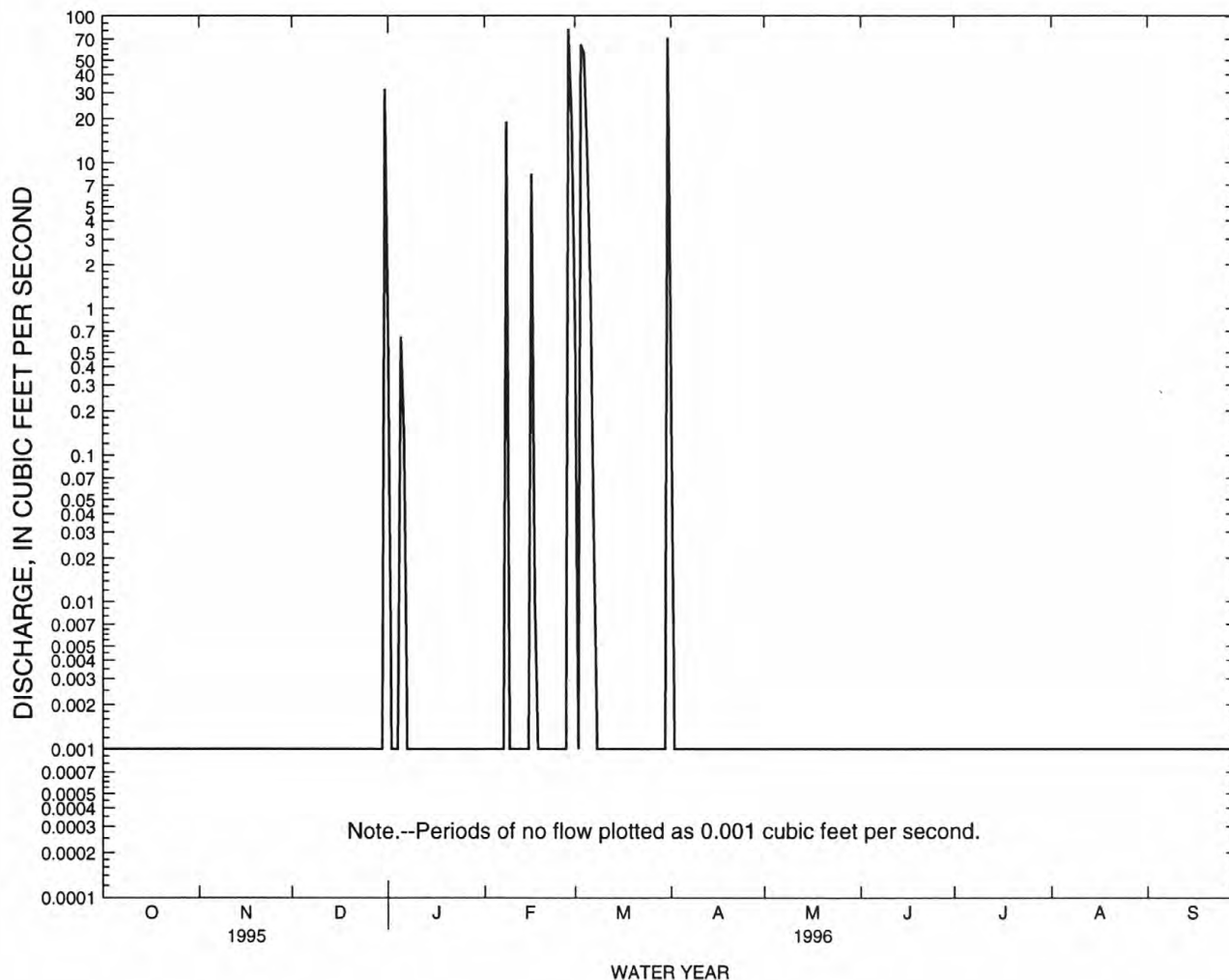
| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|------|------|-------|------|--------|--------|------|------|------|------|------|------|
| 1 | .00 | .00 | .00 | .46 | .00 | .68 | .30 | .00 | .00 | .00 | .00 | .00 |
| 2 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 |
| 3 | .00 | .00 | .00 | .00 | .00 | 64 | .00 | .00 | .00 | .00 | .00 | .00 |
| 4 | .00 | .00 | .00 | .00 | .00 | 56 | .00 | .00 | .00 | .00 | .00 | .00 |
| 5 | .00 | .00 | .00 | .64 | .00 | 11 | .00 | .00 | .00 | .00 | .00 | .00 |
| 6 | .00 | .00 | .00 | .14 | .00 | 1.2 | .00 | .00 | .00 | .00 | .00 | .00 |
| 7 | .00 | .00 | .00 | .00 | .00 | .03 | .00 | .00 | .00 | .00 | .00 | .00 |
| 8 | .00 | .00 | .00 | .00 | 19 | .00 | .00 | .00 | .00 | .00 | .00 | .00 |
| 9 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 |
| 10 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 |
| 11 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 |
| 12 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 |
| 13 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 |
| 14 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 |
| 15 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 |
| 16 | .00 | .00 | .00 | .00 | 8.4 | .00 | .00 | .00 | .00 | .00 | .00 | .00 |
| 17 | .00 | .00 | .00 | .00 | .01 | .00 | .00 | .00 | .00 | .00 | .00 | .00 |
| 18 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 |
| 19 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 |
| 20 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 |
| 21 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 |
| 22 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 |
| 23 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 |
| 24 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 |
| 25 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 |
| 26 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 |
| 27 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 |
| 28 | .00 | .00 | .00 | .00 | 82 | .00 | .00 | .00 | .00 | .00 | .00 | .00 |
| 29 | .00 | .00 | .00 | .00 | 20 | .00 | .00 | .00 | .00 | .00 | .00 | .00 |
| 30 | .00 | .00 | .00 | .00 | --- | .00 | .00 | .00 | .00 | .00 | .00 | .00 |
| 31 | .00 | --- | 32 | .00 | --- | 71 | --- | .00 | --- | .00 | .00 | --- |
| TOTAL | 0.00 | 0.00 | 32.00 | 1.24 | 129.41 | 203.91 | 0.30 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| MEAN | .000 | .000 | 1.03 | .040 | 4.46 | 6.58 | .010 | .000 | .000 | .000 | .000 | .000 |
| MAX | .00 | .00 | 32 | .64 | 82 | 71 | .30 | .00 | .00 | .00 | .00 | .00 |
| MIN | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 |
| AC-FT | .00 | .00 | 63 | 2.5 | 257 | 404 | .6 | .00 | .00 | .00 | .00 | .00 |

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1950 - 1996, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|------|------|------|------|------|------|------|------|------|------|------|------|------|
| MEAN | .57 | 3.26 | 3.81 | 5.12 | 2.62 | 3.19 | 2.44 | .65 | .030 | .070 | .29 | .057 |
| MAX | 7.09 | 25.4 | 16.5 | 29.7 | 15.5 | 26.8 | 46.2 | 17.5 | .74 | 1.39 | 6.56 | 1.02 |
| (WY) | 1962 | 1951 | 1956 | 1982 | 1979 | 1951 | 1989 | 1987 | 1966 | 1966 | 1950 | 1966 |
| MIN | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 |
| (WY) | 1951 | 1952 | 1953 | 1953 | 1953 | 1952 | 1950 | 1950 | 1950 | 1950 | 1951 | 1950 |

HAWAII, ISLAND OF MOLOKAI
 16414000 KAUNAKAKAI GULCH AT KAUNAKAKAI--Continued

| SUMMARY STATISTICS | FOR 1995 CALENDAR YEAR | FOR 1996 WATER YEAR | WATER YEARS 1950 - 1996 | |
|--------------------------|------------------------|---------------------|-------------------------|------------|
| ANNUAL TOTAL | 218.11 | 366.86 | | |
| ANNUAL MEAN | .60 | 1.00 | 1.84 | |
| HIGHEST ANNUAL MEAN | | | 6.01 | 1989 |
| LOWEST ANNUAL MEAN | | | .002 | 1953 |
| HIGHEST DAILY MEAN | 61 Apr 4 | 82 Feb 28 | 643 | Apr 8 1989 |
| LOWEST DAILY MEAN | .00 Jan 1 | .00 Oct 1 | .00 | Jan 1 1950 |
| ANNUAL SEVEN-DAY MINIMUM | .00 Jan 1 | .00 Oct 1 | .00 | Jan 1 1950 |
| ANNUAL RUNOFF (AC-FT) | 433 | 728 | 1330 | |
| 10 PERCENT EXCEEDS | .00 | .00 | .28 | |
| 50 PERCENT EXCEEDS | .00 | .00 | .00 | |
| 90 PERCENT EXCEEDS | .00 | .00 | .00 | |



HAWAII, ISLAND OF MOLOKAI
16419500 PAPIO GULCH AT HALAWA

LOCATION.--Lat 21°08'55", long 156°44'16", Hydrologic Unit 20050000, on left bank 200 ft downstream from wooden bridge on Highway 45, and 0.8 mi south of Halawa.

DRAINAGE AREA.--0.94 mi².

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 good except for estimated daily discharges which are fair. Diversion upstream of station for domestic use at Puu O Hoku Ranch.

AVERAGE DISCHARGE.--33 years (water years 1964-96), 0.86 ft³/s (622 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 2,720 ft³/s, April 13, 1965, gage height, 11.25 ft, from rating curve extended above 37 ft³/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 ft³/s and maximum (*):

| Date | Time | Discharge (ft ³ /s) | Gage height (ft) | Date | Time | Discharge (ft ³ /s) | Gage height (ft) |
|---------|------|--------------------------------|------------------|--------------------------------------|------|--------------------------------|------------------|
| Mar. 03 | 0830 | *84 | *2.98 | No peak greater than base discharge. | | | |

Minimum discharge, no flow for many days.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|-------|------|-------|------|-------|-------|------|------|------|------|------|------|
| 1 | e.40 | .30 | e1.4 | .53 | .12 | .38 | .29 | .08 | .09 | .01 | .00 | .00 |
| 2 | e.12 | .13 | e.78 | .36 | .22 | .30 | .21 | .07 | .07 | .78 | .00 | .00 |
| 3 | e.50 | .08 | e.11 | .15 | .36 | 24 | .25 | .07 | .05 | .48 | .00 | .00 |
| 4 | e.05 | .42 | e.02 | .06 | .10 | *6.4 | .19 | .07 | .03 | .51 | .00 | .00 |
| 5 | e.08 | .10 | e.00 | .03 | .05 | 1.6 | .18 | .08 | .03 | 2.8 | .00 | .00 |
| 6 | e.00 | .03 | .00 | .09 | .03 | .91 | .77 | .17 | .04 | .58 | .00 | .00 |
| 7 | e.30 | .01 | e.00 | .09 | .06 | .63 | .21 | .13 | .21 | .16 | .00 | .19 |
| 8 | e2.5 | .04 | e.00 | .62 | 1.0 | .50 | .16 | .36 | .22 | .08 | .00 | .29 |
| 9 | e.90 | .06 | e.00 | .21 | .17 | .41 | .13 | 1.0 | .14 | .05 | .00 | .14 |
| 10 | e2.0 | .01 | e.00 | .07 | .90 | .37 | .12 | .14 | .18 | .03 | .00 | .01 |
| 11 | e.96 | .01 | e.00 | .03 | .33 | .32 | .14 | .07 | .04 | .01 | .09 | .00 |
| 12 | e1.0 | .00 | e.00 | .02 | .11 | .43 | .15 | .05 | .04 | .02 | .17 | .00 |
| 13 | e.05 | .50 | e.00 | .01 | .08 | .48 | .12 | .06 | .03 | .04 | .67 | .00 |
| 14 | e.31 | 1.5 | .00 | .01 | .05 | .27 | .12 | .07 | .04 | .03 | .21 | .00 |
| 15 | e.60 | e1.4 | .00 | .01 | .42 | .25 | .12 | .04 | .03 | .02 | .02 | .00 |
| 16 | e.04 | e.56 | .00 | .01 | .13 | .24 | .11 | .03 | .11 | .01 | .01 | .00 |
| 17 | e.02 | e1.1 | .00 | .00 | .09 | .25 | .30 | .37 | .16 | .01 | .01 | .00 |
| 18 | e.00 | e.14 | .00 | .14 | .08 | .23 | .91 | .09 | .45 | .04 | .00 | .00 |
| 19 | e.00 | e.08 | .00 | .34 | .10 | .22 | .34 | .03 | .23 | .28 | .00 | .00 |
| 20 | e.45 | e.04 | .00 | .12 | .03 | .21 | .20 | .04 | .09 | .43 | .00 | .00 |
| 21 | e.20 | e.00 | .00 | .02 | .02 | .73 | .22 | .04 | .02 | .14 | .00 | .00 |
| 22 | e.02 | e.00 | .00 | .01 | .01 | .34 | .18 | .02 | .01 | .08 | .00 | .00 |
| 23 | e.00 | e.00 | .00 | .01 | .01 | .22 | .13 | .01 | .01 | .03 | .00 | .00 |
| 24 | e.02 | e.24 | .00 | .01 | .01 | .31 | .11 | .05 | .06 | .02 | .00 | .00 |
| 25 | e.00 | e.12 | .01 | .51 | .02 | .22 | .09 | .34 | .09 | .02 | .00 | .00 |
| 26 | .00 | e.00 | .00 | .55 | .02 | .16 | .09 | .65 | .04 | .01 | .00 | .00 |
| 27 | .00 | e.00 | .00 | 1.9 | .74 | .15 | .09 | .35 | .04 | .03 | .00 | .00 |
| 28 | .00 | e.32 | .00 | 2.0 | 11 | .12 | .09 | 1.1 | .06 | .09 | .00 | .00 |
| 29 | 5.5 | e.28 | .00 | .40 | 2.0 | .12 | .09 | .53 | .03 | .02 | .00 | .00 |
| 30 | 1.0 | e.20 | .75 | .19 | --- | .15 | .09 | .16 | .02 | .02 | .00 | .00 |
| 31 | 1.2 | --- | 7.7 | .27 | --- | 1.9 | --- | .11 | --- | .01 | .00 | --- |
| TOTAL | 18.22 | 7.67 | 10.77 | 8.77 | 18.26 | 42.82 | 6.20 | 6.38 | 2.66 | 6.84 | 1.18 | 0.63 |
| MEAN | .59 | .26 | .35 | .28 | .63 | 1.38 | .21 | .21 | .089 | .22 | .038 | .021 |
| MAX | 5.5 | 1.5 | 7.7 | 2.0 | 11 | 24 | .91 | 1.1 | .45 | 2.8 | .67 | .29 |
| MIN | .00 | .00 | .00 | .00 | .01 | .12 | .09 | .01 | .01 | .01 | .00 | .00 |
| AC-FT | 36 | 15 | 21 | 17 | 36 | 85 | 12 | 13 | 5.3 | 14 | 2.3 | 1.2 |

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1963 - 1996, BY WATER YEAR (WY)

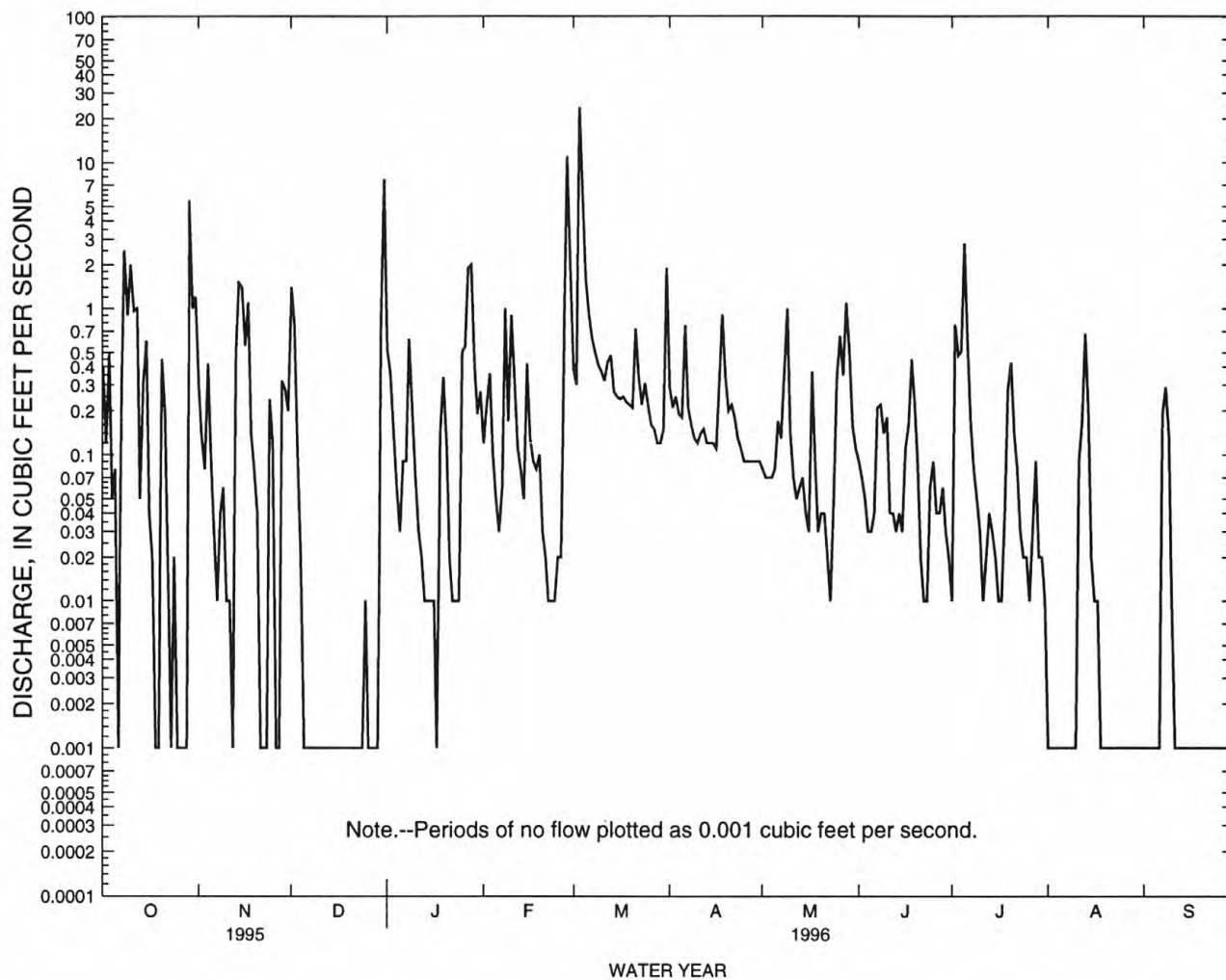
| | MEAN | MAX | MIN | (WY) | (WY) | (WY) | (WY) | (WY) | (WY) | (WY) | (WY) | (WY) |
|------|------|------|------|------|------|------|------|------|------|------|------|------|
| MEAN | .53 | 1.14 | 1.12 | 1.28 | 1.25 | 1.48 | 1.48 | .70 | .31 | .45 | .30 | .30 |
| MAX | 2.63 | 7.56 | 6.12 | 4.84 | 5.88 | 6.42 | 10.3 | 3.99 | 1.43 | 1.56 | 1.21 | 2.24 |
| (WY) | 1986 | 1971 | 1965 | 1988 | 1985 | 1968 | 1989 | 1987 | 1982 | 1993 | 1980 | 1992 |
| MIN | .000 | .000 | .000 | .000 | .000 | .007 | .003 | .000 | .000 | .000 | .000 | .000 |
| (WY) | 1972 | 1972 | 1972 | 1977 | 1973 | 1973 | 1975 | 1975 | 1964 | 1972 | 1964 | 1964 |

e Estimated

HAWAII, ISLAND OF MOLOKAI
 16419500 PAPIO GULCH AT HALAWA--Continued

| SUMMARY STATISTICS | FOR 1995 CALENDAR YEAR | FOR 1996 WATER YEAR | WATER YEARS 1963 - 1996 | |
|--------------------------|------------------------|---------------------|-------------------------|-------------|
| ANNUAL TOTAL | 116.76 | 130.40 | | |
| ANNUAL MEAN | .32 | .36 | .86 | |
| HIGHEST ANNUAL MEAN | | | 2.32 | 1989 |
| LOWEST ANNUAL MEAN | | | .063 | 1973 |
| HIGHEST DAILY MEAN | 10 | 24 | 164 | Apr 13 1965 |
| LOWEST DAILY MEAN | .00 | .00 | .00 | Jul 5 1963 |
| ANNUAL SEVEN-DAY MINIMUM | .00 | .00 | .00 | Aug 3 1963 |
| ANNUAL RUNOFF (AC-FT) | 232 | 259 | 622 | |
| 10 PERCENT EXCEEDS | .74 | .64 | 1.5 | |
| 50 PERCENT EXCEEDS | .08 | .07 | .23 | |
| 90 PERCENT EXCEEDS | .00 | .00 | .00 | |

e Estimated



Surface-Water Station Records
for Maui

HAWAII, ISLAND OF 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 mi².

PERIOD OF RECORD.--July 1, 1988 to current year. Forty-eight years of records are available for the right branch drainage, 1.3 mi upstream (Palikea Stream, 16501000) for periods prior to September 30, 1983.

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.--Records good except for estimated daily discharges which are fair. No diversion upstream of station.

AVERAGE DISCHARGE.--8 years (water years 1989-96), 58.2 ft³/s (42,140 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 14,700 ft³/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 PERIOD.--Peak discharges greater than base discharge of 2,680 ft³/s and maximum (*):

| Date | Time | Discharge (ft ³ /s) | Gage height (ft) | Date | Time | Discharge (ft ³ /s) | Gage height (ft) |
|---------|------|-----------------------------------|---------------------|----------|------|-----------------------------------|---------------------|
| Mar. 04 | 0430 | *2,960 | *6.49 | Sept. 07 | 2000 | 2,910 | 6.45 |

Minimum discharge, no flow, many days.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY MEAN VALUES

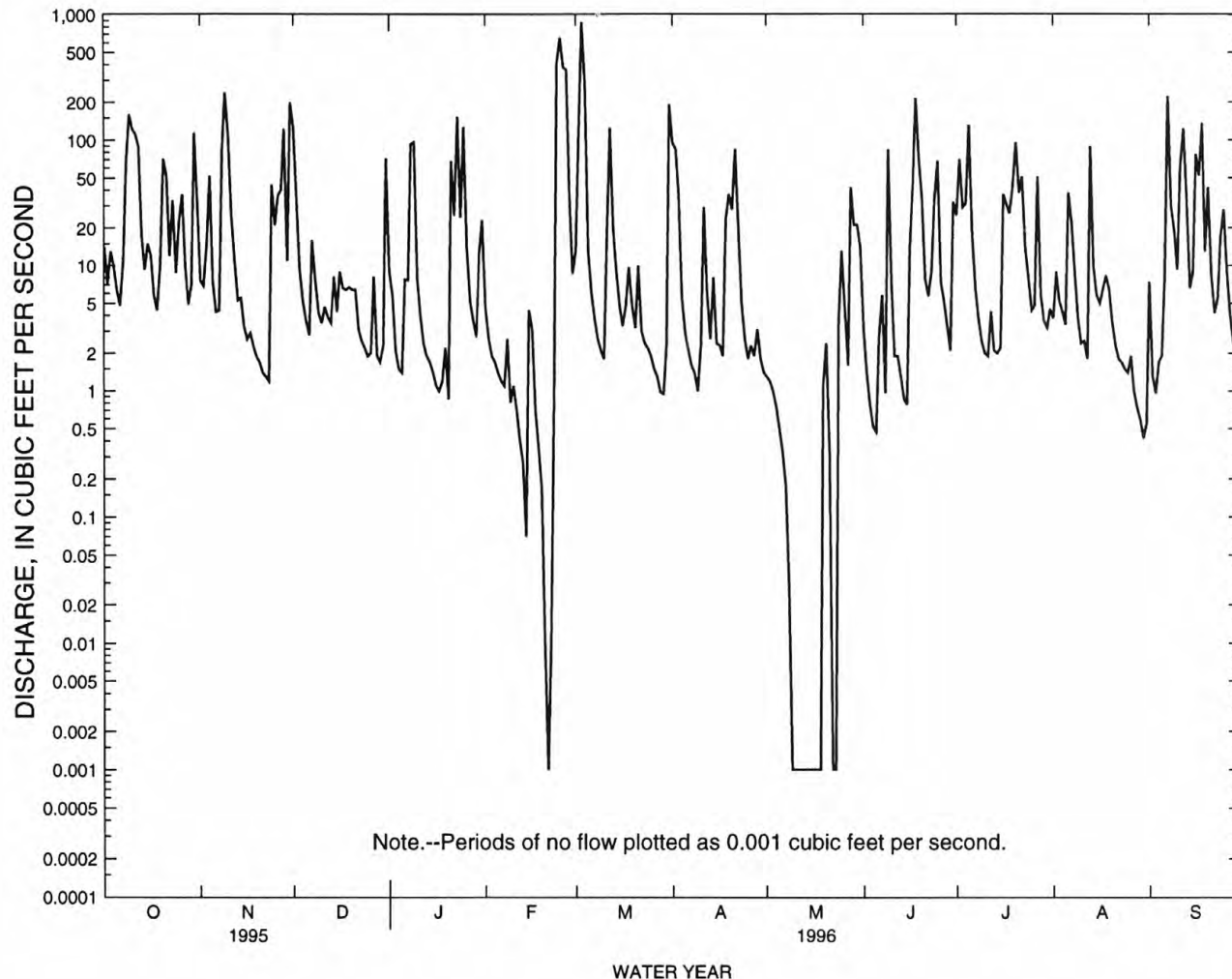
| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|--------|--------|-------|--------|---------|---------|-------|--------|--------|-------|--------|--------|
| 1 | 14 | 7.6 | 125 | 8.9 | 4.6 | 13 | 95 | 1.3 | 3.1 | 25 | 3.8 | 7.4 |
| 2 | 7.2 | 6.9 | 35 | 5.7 | 2.6 | 109 | 85 | 1.2 | 1.4 | 70 | 8.9 | 1.3 |
| 3 | 13 | 15 | 9.1 | 2.1 | 1.9 | 874 | 37 | 1.0 | .78 | 29 | 5.2 | .96 |
| 4 | 10 | 52 | 5.1 | 1.5 | 1.7 | 282 | 5.5 | .75 | .52 | 31 | 4.3 | 1.7 |
| 5 | 6.4 | 7.4 | 3.6 | 1.4 | 1.4 | 13 | 2.9 | .51 | .47 | 131 | 3.4 | 1.9 |
| 6 | 4.8 | 4.3 | 2.8 | 7.7 | 1.2 | 6.0 | 2.1 | .33 | 2.7 | 18 | 38 | 8.6 |
| 7 | 11 | 4.4 | 16 | 7.6 | 1.1 | 3.8 | 1.6 | .18 | 5.8 | 6.5 | 22 | 223 |
| 8 | 67 | 83 | 7.6 | 92 | 2.6 | 2.6 | 1.4 | .03 | .96 | 3.8 | 8.5 | 30 |
| 9 | 160 | 238 | 4.2 | 96 | .81 | 2.1 | 1.0 | .00 | 84 | 2.5 | 3.8 | 19 |
| 10 | 123 | 112 | 3.5 | 7.7 | 1.1 | 1.8 | 2.3 | .00 | 7.5 | 2.0 | 2.4 | 9.3 |
| 11 | 112 | 25 | 4.7 | 3.9 | .70 | 16 | 29 | .00 | 1.9 | 1.9 | 2.5 | 62 |
| 12 | 89 | 11 | 3.9 | 2.4 | .40 | 125 | 6.2 | .00 | 1.9 | 4.3 | 1.8 | 123 |
| 13 | 18 | 5.3 | 3.5 | 1.9 | .27 | 20 | 2.6 | .00 | 1.3 | 2.1 | 89 | 34 |
| 14 | 9.3 | 5.5 | 8.2 | 1.7 | .07 | 8.8 | 8.0 | .00 | .86 | 2.0 | 10 | 6.6 |
| 15 | 15 | 3.3 | 4.3 | 1.4 | 4.4 | 4.7 | 2.4 | .00 | .78 | 2.2 | 5.8 | 8.8 |
| 16 | 12 | 2.6 | 8.9 | 1.1 | 3.1 | 3.3 | 2.3 | .00 | 14 | 37 | 5.0 | 77 |
| 17 | 5.8 | 2.9 | 6.6 | 1.0 | .69 | 4.7 | 1.9 | .00 | 43 | 31 | 6.5 | 52 |
| 18 | 4.4 | 2.3 | 6.4 | 1.2 | .36 | 9.7 | 23 | .00 | 216 | 26 | 8.3 | 136 |
| 19 | 10 | 1.9 | 6.7 | 2.2 | .17 | 4.8 | 37 | 1.1 | 70 | 43 | 6.5 | 13 |
| 20 | 71 | 1.7 | 6.4 | .86 | .01 | 3.2 | 28 | 2.4 | 34 | 96 | 3.5 | 42 |
| 21 | 52 | 1.4 | 6.4 | 68 | .00 | 10 | 84 | .33 | 7.7 | 38 | 2.3 | 8.2 |
| 22 | 12 | 1.3 | 3.1 | 25 | .01 | 3.0 | 21 | .00 | 5.7 | 51 | 1.8 | 4.2 |
| 23 | 33 | 1.2 | 2.5 | 153 | 1.0 | 2.4 | 5.0 | .00 | 9.0 | 14 | 1.7 | 5.5 |
| 24 | 8.8 | 44 | 2.2 | 24 | 409 | 2.2 | 2.6 | 3.4 | 34 | 7.9 | 1.5 | 17 |
| 25 | 23 | 21 | 1.9 | 127 | 654 | 1.9 | 1.8 | 13 | 68 | 4.4 | 1.4 | 28 |
| 26 | 37 | 36 | 2.0 | 14 | 380 | 1.5 | 2.3 | 4.5 | 7.4 | 4.8 | 1.9 | 9.0 |
| 27 | 10 | 40 | 8.1 | 5.2 | 364 | 1.3 | 1.9 | 1.6 | 5.1 | 51 | 1.0 | 4.0 |
| 28 | 4.9 | 122 | 1.9 | 3.6 | 37 | .98 | 3.1 | 42 | 3.2 | 5.8 | .74 | 2.5 |
| 29 | 6.9 | 11 | 1.7 | 2.7 | 8.6 | .95 | 1.8 | 21 | 2.1 | 3.6 | .59 | 2.0 |
| 30 | 114 | 199 | 2.3 | 12 | --- | 2.3 | 1.4 | 21 | 32 | 3.2 | .42 | 1.7 |
| 31 | 33 | --- | 71 | 23 | --- | 193 | --- | 14 | --- | 4.5 | .55 | --- |
| TOTAL | 1097.5 | 1069.0 | 374.6 | 705.76 | 1882.79 | 1727.03 | 499.1 | 129.63 | 665.17 | 752.5 | 253.10 | 939.66 |
| MEAN | 35.4 | 35.6 | 12.1 | 22.8 | 64.9 | 55.7 | 16.6 | 4.18 | 22.2 | 24.3 | 8.16 | 31.3 |
| MAX | 160 | 238 | 125 | 153 | 654 | 874 | 95 | 42 | 216 | 131 | 89 | 223 |
| MIN | 4.4 | 1.2 | 1.7 | .86 | .00 | .95 | 1.0 | .00 | .47 | 1.9 | .42 | .96 |
| AC-FT | 2180 | 2120 | 743 | 1400 | 3730 | 3430 | 990 | 257 | 1320 | 1490 | 502 | 1860 |

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1988 - 1996, BY WATER YEAR (WY)

| | MEAN | MAX | MIN | AC-FT |
|------|------|------|------|-------|
| 1988 | 54.6 | 145 | 6.03 | 2180 |
| 1989 | 100 | 334 | 11.2 | 2120 |
| 1990 | 93.3 | 203 | 5.28 | 743 |
| 1991 | 62.2 | 218 | 11.1 | 1400 |
| 1992 | 56.6 | 163 | 2.90 | 3730 |
| 1993 | 90.6 | 320 | 10.2 | 3430 |
| 1994 | 40.5 | 116 | 6.56 | 990 |
| 1995 | 26.7 | 99.1 | 3.03 | 257 |
| 1996 | 29.4 | 66.5 | 9.11 | 1320 |
| 1997 | 49.0 | 114 | 15.2 | 1490 |
| 1998 | 34.9 | 82.4 | 8.16 | 502 |
| 1999 | 47.8 | 131 | 12.5 | 1860 |

HAWAII, ISLAND OF MAUI
 16501200 OHEO GULCH AT DAM NEAR KIPAHULU--Continued

| SUMMARY STATISTICS | FOR 1995 CALENDAR YEAR | FOR 1996 WATER YEAR | WATER YEARS 1988 - 1996 | |
|--------------------------|------------------------|---------------------|-------------------------|-------------|
| ANNUAL TOTAL | 8205.35 | 10095.84 | | |
| ANNUAL MEAN | 22.5 | 27.6 | 58.2 | |
| HIGHEST ANNUAL MEAN | | | 102 | 1991 |
| LOWEST ANNUAL MEAN | | | 22.3 | 1992 |
| HIGHEST DAILY MEAN | 857 Jan 29 | 874 Mar 3 | 2220 | Nov 19 1990 |
| LOWEST DAILY MEAN | .12 May 11 | .00 Feb 21 | .00 | Feb 25 1992 |
| ANNUAL SEVEN-DAY MINIMUM | .53 Jan 7 | .00 May 9 | .00 | Feb 25 1992 |
| ANNUAL RUNOFF (AC-FT) | 16280 | 20030 | 42140 | |
| 10 PERCENT EXCEEDS | 71 | 73 | 149 | |
| 50 PERCENT EXCEEDS | 3.9 | 4.8 | 6.6 | |
| 90 PERCENT EXCEEDS | .82 | .80 | 1.0 | |



HAWAII, ISLAND OF MAUI
 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 mi².

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 of gage at datum 0.12 ft lower.

REMARKS.--Records good. No diversion upstream of station.

AVERAGE DISCHARGE.--74 years (water years 1923-96), 24.0 ft³/s (17,360 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, about 5,570 ft³/s, January 18, 1916, gage height, 11.6 ft, present site and datum, from rating curve extended above 814 ft³/s by physical model of station site; minimum, 0.90 ft³/s, October 28 to November 1, 1984.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,700 ft³/s and maximum (*):

| Date | Time | Discharge (ft ³ /s) | Gage height (ft) | Date | Time | Discharge (ft ³ /s) | Gage height (ft) |
|---------|------|--------------------------------|------------------|---------|------|--------------------------------|------------------|
| Oct. 29 | 2400 | *1,890 | *6.78 | Feb. 27 | 0300 | 1,710 | 6.42 |
| Feb. 25 | 0230 | 1,710 | 6.42 | Mar. 03 | 0930 | 1,720 | 6.45 |

Minimum discharge, 2.3 ft³/s, January 06.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
 DAILY MEAN VALUES

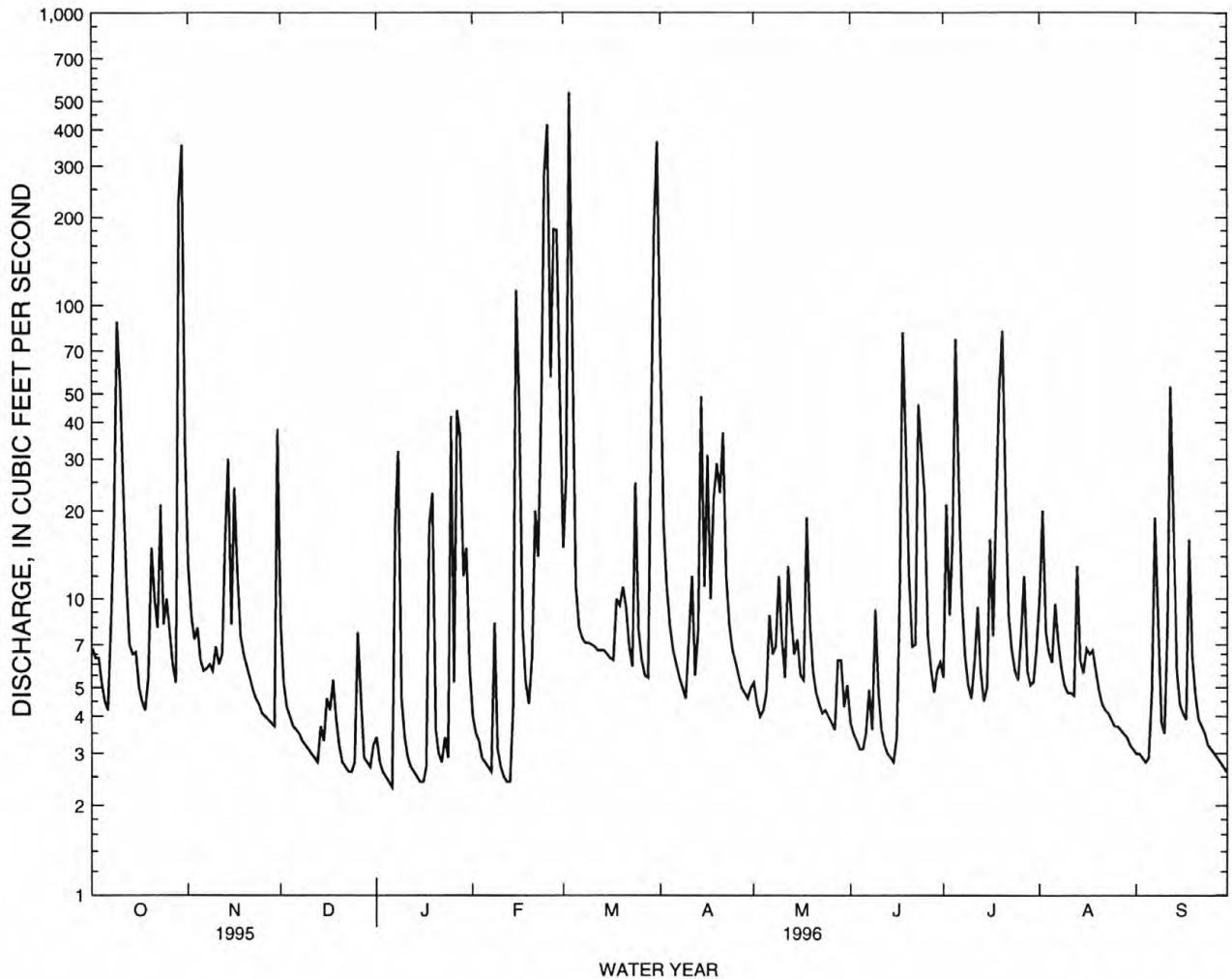
| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|-------|-------|-------|-------|--------|--------|-------|-------|-------|-------|-------|-------|
| 1 | 6.8 | 13 | 8.3 | 3.4 | 4.0 | 15 | 71 | 5.2 | 3.8 | 5.4 | 10 | 3.0 |
| 2 | 6.3 | 8.8 | 5.2 | 2.8 | 3.5 | 26 | 18 | 4.4 | 3.5 | 21 | 20 | 3.0 |
| 3 | 6.3 | 7.3 | 4.3 | 2.6 | 3.3 | 537 | 11 | 4.0 | 3.3 | 8.8 | 7.7 | 2.9 |
| 4 | 5.2 | 8.0 | 4.0 | 2.5 | 2.9 | 78 | 8.1 | 4.2 | 3.1 | 16 | 6.6 | 2.8 |
| 5 | 4.5 | 6.2 | 3.7 | 2.4 | 2.8 | 11 | 6.7 | 4.8 | 3.1 | 77 | 6.1 | 2.9 |
| 6 | 4.2 | 5.7 | 3.6 | 2.3 | 2.7 | 8.0 | 6.0 | 8.8 | 3.5 | 25 | 9.6 | 4.9 |
| 7 | 8.5 | 5.8 | 3.5 | 18 | 2.6 | 7.4 | 5.4 | 6.5 | 4.9 | 9.6 | 7.1 | 19 |
| 8 | 19 | 6.0 | 3.3 | 32 | 8.3 | 7.1 | 5.0 | 6.9 | 3.6 | 6.4 | 5.8 | 8.2 |
| 9 | 88 | 5.7 | 3.2 | 4.6 | 3.1 | 7.1 | 4.6 | 12 | 9.2 | 5.1 | 5.1 | 3.8 |
| 10 | 54 | 6.9 | 3.1 | 3.4 | 2.7 | 7.0 | 7.3 | 7.3 | 4.8 | 4.6 | 4.8 | 3.5 |
| 11 | 23 | 6.0 | 3.0 | 2.9 | 2.5 | 6.9 | 12 | 5.4 | 3.6 | 6.1 | 4.8 | 8.4 |
| 12 | 11 | 6.5 | 2.9 | 2.7 | 2.4 | 6.7 | 5.5 | 13 | 3.2 | 9.4 | 4.7 | 53 |
| 13 | 7.0 | 16 | 2.8 | 2.6 | 2.4 | 6.7 | 7.8 | 8.7 | 3.0 | 5.7 | 13 | 17 |
| 14 | 6.5 | 30 | 3.7 | 2.5 | 4.3 | 6.7 | 49 | 6.5 | 2.9 | 4.5 | 6.2 | 5.7 |
| 15 | 6.6 | 8.2 | 3.3 | 2.4 | 113 | 6.5 | 11 | 7.3 | 2.8 | 5.0 | 5.6 | 4.4 |
| 16 | 5.0 | 24 | 4.6 | 2.4 | 47 | 6.3 | 31 | 5.5 | 3.4 | 16 | 6.8 | 4.1 |
| 17 | 4.5 | 12 | 4.2 | 2.7 | 7.9 | 6.2 | 10 | 5.3 | 11 | 7.5 | 6.5 | 3.9 |
| 18 | 4.2 | 7.5 | 5.3 | 18 | 5.2 | 10 | 22 | 19 | 81 | 21 | 6.7 | 16 |
| 19 | 5.4 | 6.5 | 3.9 | 23 | 4.4 | 9.5 | 29 | 8.4 | 33 | 52 | 5.7 | 6.4 |
| 20 | 15 | 5.9 | 3.2 | 3.6 | 6.4 | 11 | 23 | 5.7 | 12 | 82 | 4.9 | 4.7 |
| 21 | 9.9 | 5.4 | 2.8 | 3.0 | 20 | 9.4 | 37 | 4.8 | 6.9 | 23 | 4.4 | 3.9 |
| 22 | 8.0 | 4.9 | 2.7 | 2.8 | 14 | 6.9 | 12 | 4.4 | 7.0 | 8.8 | 4.2 | 3.7 |
| 23 | 21 | 4.6 | 2.6 | 3.4 | 44 | 5.9 | 8.2 | 4.1 | 46 | 6.7 | 4.1 | 3.5 |
| 24 | 8.2 | 4.4 | 2.6 | 2.9 | 281 | 25 | 6.7 | 4.2 | 33 | 5.7 | 3.9 | 3.2 |
| 25 | 10 | 4.1 | 2.8 | 42 | 417 | 7.9 | 6.1 | 4.0 | 23 | 5.3 | 3.7 | 3.1 |
| 26 | 7.7 | 4.0 | 7.7 | 5.2 | 57 | 6.2 | 5.5 | 3.8 | 7.5 | 7.4 | 3.7 | 3.0 |
| 27 | 6.0 | 3.9 | 4.6 | 44 | 183 | 5.5 | 5.0 | 3.6 | 5.8 | 12 | 3.6 | 2.9 |
| 28 | 5.2 | 3.8 | 2.9 | 36 | 181 | 5.4 | 4.8 | 6.2 | 4.8 | 5.7 | 3.5 | 2.8 |
| 29 | 230 | 3.7 | 2.8 | 12 | 49 | 36 | 4.6 | 6.2 | 5.7 | 5.1 | 3.4 | 2.7 |
| 30 | 355 | 38 | 2.7 | 15 | --- | 179 | 5.0 | 4.3 | 6.1 | 5.2 | 3.2 | 2.6 |
| 31 | 34 | --- | 3.2 | 5.8 | --- | 364 | --- | 5.1 | --- | 6.7 | 3.1 | --- |
| TOTAL | 986.0 | 272.8 | 116.5 | 308.9 | 1477.4 | 1431.3 | 438.3 | 199.6 | 344.5 | 479.7 | 188.5 | 209.0 |
| MEAN | 31.8 | 9.09 | 3.76 | 9.96 | 50.9 | 46.2 | 14.6 | 6.44 | 11.5 | 15.5 | 6.08 | 6.97 |
| MAX | 355 | 38 | 8.3 | 44 | 417 | 537 | 71 | 19 | 81 | 82 | 20 | 53 |
| MIN | 4.2 | 3.7 | 2.6 | 2.3 | 2.4 | 5.4 | 4.6 | 3.6 | 2.8 | 4.5 | 3.1 | 2.6 |
| AC-FT | 1960 | 541 | 231 | 613 | 2930 | 2840 | 869 | 396 | 683 | 951 | 374 | 415 |

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1914 - 1996, BY WATER YEAR (WY)

| | 1914 | 1915 | 1916 | 1917 | 1918 | 1919 | 1920 | 1921 | 1922 | 1923 | 1924 | 1925 | 1926 | 1927 | 1928 | 1929 | 1930 | 1931 | 1932 | 1933 | 1934 | 1935 | 1936 | 1937 | 1938 | 1939 | 1940 | 1941 | 1942 | 1943 | 1944 | 1945 | 1946 | 1947 | 1948 | 1949 | 1950 | 1951 | 1952 | 1953 | 1954 | 1955 | 1956 | 1957 | 1958 | 1959 | 1960 | 1961 | 1962 | 1963 | 1964 | 1965 | 1966 | 1967 | 1968 | 1969 | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| MEAN | 15.0 | 29.6 | 32.1 | 30.6 | 31.1 | 41.6 | 36.5 | 20.3 | 10.7 | 15.8 | 17.1 | 11.8 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| MAX | 101 | 110 | 129 | 123 | 182 | 235 | 161 | 68.2 | 33.5 | 53.1 | 66.2 | 52.3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| (WY) | 1942 | 1991 | 1947 | 1979 | 1969 | 1980 | 1989 | 1987 | 1987 | 1914 | 1957 | 1914 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| MIN | 1.15 | 2.99 | 2.71 | 1.87 | 2.25 | 2.10 | 2.75 | 2.82 | 2.16 | 2.42 | 2.40 | 1.88 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| (WY) | 1985 | 1990 | 1981 | 1977 | 1983 | 1983 | 1992 | 1945 | 1981 | 1926 | 1973 | 1974 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

HAWAII, ISLAND OF MAUI
 16508000 HANAWI STREAM NEAR NAHIKU--Continued

| SUMMARY STATISTICS | FOR 1995 CALENDAR YEAR | | FOR 1996 WATER YEAR | | WATER YEARS 1914 - 1996 | |
|--------------------------|------------------------|--------|---------------------|--------|-------------------------|-------------|
| ANNUAL TOTAL | 4681.1 | | 6452.5 | | 24.0 | |
| ANNUAL MEAN | 12.8 | | 17.6 | | 52.6 | |
| HIGHEST ANNUAL MEAN | | | | | 1969 | |
| LOWEST ANNUAL MEAN | | | | | 1926 | |
| HIGHEST DAILY MEAN | 355 | Oct 30 | 537 | Mar 3 | 1610 | Jan 25 1948 |
| LOWEST DAILY MEAN | 1.8 | Mar 17 | 2.3 | Jan 6 | .90 | Oct 31 1984 |
| ANNUAL SEVEN-DAY MINIMUM | 1.9 | Mar 12 | 2.6 | Jan 11 | .96 | Oct 25 1984 |
| ANNUAL RUNOFF (AC-FT) | 9280 | | 12800 | | 17360 | |
| 10 PERCENT EXCEEDS | 29 | | 30 | | 51 | |
| 50 PERCENT EXCEEDS | 5.2 | | 5.8 | | 7.2 | |
| 90 PERCENT EXCEEDS | 2.6 | | 2.9 | | 2.8 | |



HAWAII, ISLAND OF MAUI

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 mi².

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 good. 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.--76 years (water years 1915, 1917, 1923-96), 35.2 ft³/s (25,510 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 9,900 ft³/s, January 14, 1923, gage height, 13.5 ft, from floodmarks, from rating curve extended above 660 ft³/s by logarithmic plotting; minimum, 0.5 ft³/s, July 26, 1922.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,900 ft³/s and maximum (*):

| Date | Time | Discharge (ft ³ /s) | Gage height (ft) | Date | Time | Discharge (ft ³ /s) | Gage height (ft) |
|---------|------|--------------------------------|------------------|---------|------|--------------------------------|------------------|
| Oct. 30 | 0100 | *3,430 | *9.45 | Feb. 25 | 0200 | 2,580 | 8.52 |

Minimum discharge, 1.9 ft³/s, December 25, January 7.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY MEAN VALUES

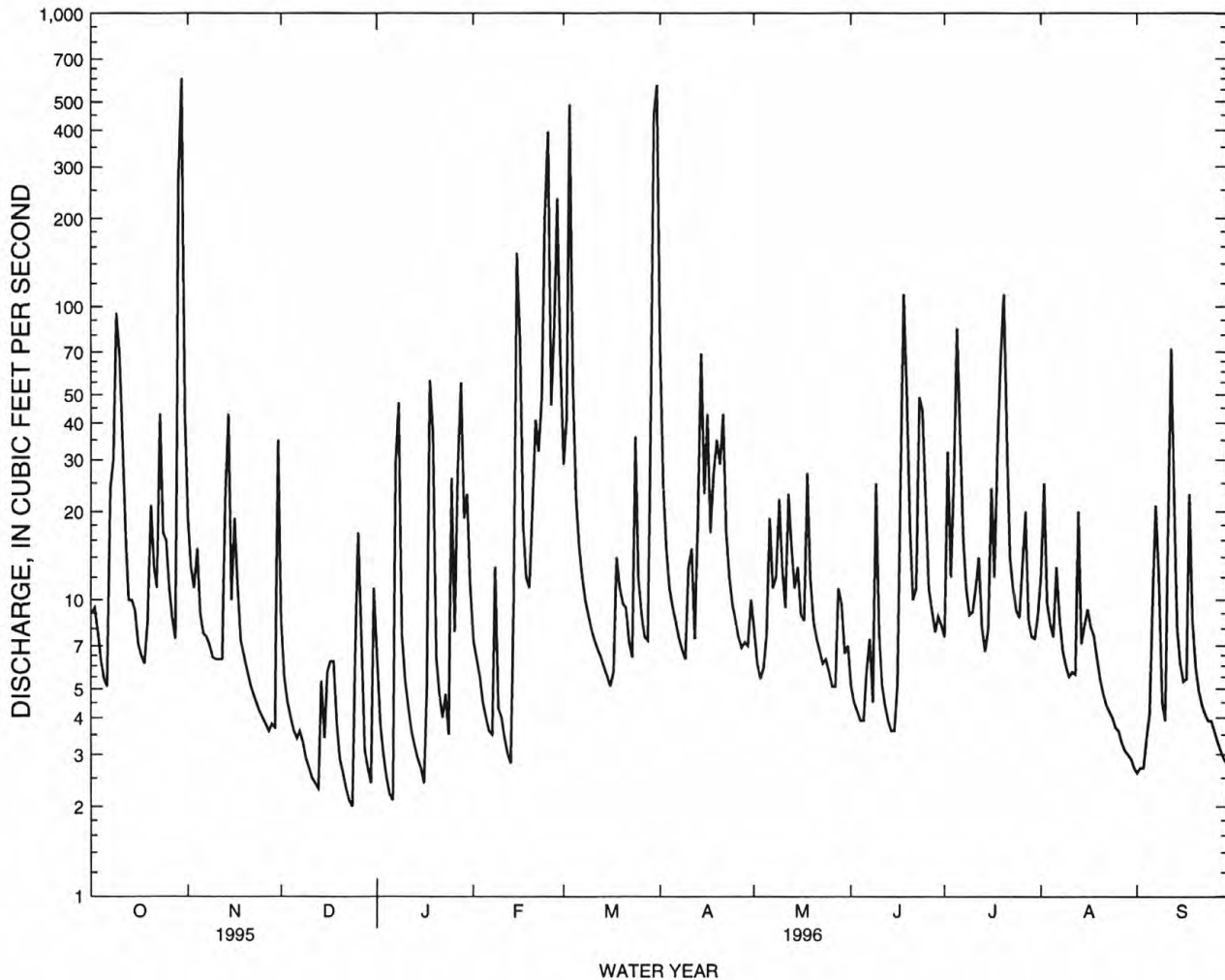
| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|--------|-------|-------|-------|--------|--------|-------|-------|-------|-------|-------|-------|
| 1 | 9.0 | 19 | 8.5 | 6.4 | 7.2 | 29 | 7.2 | 8.0 | 5.1 | 7.5 | 12 | 2.6 |
| 2 | 9.4 | 13 | 5.5 | 3.8 | 6.3 | 41 | 24 | 6.1 | 4.5 | 32 | 25 | 2.7 |
| 3 | 7.8 | 11 | 4.5 | 3.0 | 5.5 | 488 | 15 | 5.4 | 4.2 | 12 | 9.7 | 2.7 |
| 4 | 6.3 | 15 | 4.0 | 2.5 | 4.5 | 55 | 11 | 5.9 | 3.9 | 26 | 8.3 | 3.4 |
| 5 | 5.4 | 9.0 | 3.6 | 2.2 | 4.0 | 22 | 9.4 | 7.6 | 3.9 | 84 | 7.5 | 4.1 |
| 6 | 5.1 | 7.7 | 3.4 | 2.1 | 3.6 | 15 | 8.4 | 19 | 5.7 | 36 | 13 | 9.7 |
| 7 | 24 | 7.5 | 3.6 | 3.0 | 3.5 | 12 | 7.4 | 11 | 7.4 | 16 | 8.6 | 21 |
| 8 | 30 | 7.0 | 3.3 | 4.7 | 13 | 9.9 | 6.8 | 12 | 4.5 | 11 | 6.7 | 12 |
| 9 | 95 | 6.4 | 2.9 | 7.6 | 4.3 | 8.8 | 6.3 | 22 | 25 | 8.9 | 6.0 | 4.5 |
| 10 | 69 | 6.3 | 2.7 | 5.3 | 4.0 | 7.9 | 13 | 13 | 7.8 | 9.1 | 5.5 | 3.9 |
| 11 | 33 | 6.3 | 2.5 | 4.3 | 3.4 | 7.3 | 15 | 9.4 | 5.2 | 11 | 5.7 | 18 |
| 12 | 16 | 6.3 | 2.4 | 3.6 | 3.0 | 6.8 | 7.4 | 23 | 4.4 | 14 | 5.6 | 72 |
| 13 | 10 | 23 | 2.3 | 3.2 | 2.8 | 6.4 | 19 | 15 | 3.9 | 8.1 | 20 | 24 |
| 14 | 10 | 43 | 5.3 | 2.9 | 10 | 5.9 | 69 | 11 | 3.6 | 6.7 | 7.1 | 8.0 |
| 15 | 9.2 | 10 | 3.4 | 2.7 | 152 | 5.5 | 23 | 13 | 3.6 | 8.0 | 8.2 | 6.1 |
| 16 | 7.1 | 19 | 5.7 | 2.4 | 77 | 5.1 | 43 | 8.9 | 5.2 | 24 | 9.3 | 5.3 |
| 17 | 6.5 | 11 | 6.2 | 5.1 | 18 | 5.7 | 17 | 8.5 | 27 | 12 | 8.1 | 5.4 |
| 18 | 6.1 | 7.3 | 6.2 | 5.6 | 12 | 14 | 27 | 27 | 110 | 34 | 7.6 | 23 |
| 19 | 8.5 | 6.5 | 3.8 | 3.7 | 11 | 11 | 35 | 12 | 49 | 67 | 6.4 | 8.5 |
| 20 | 21 | 5.8 | 2.9 | 6.4 | 21 | 9.7 | 29 | 8.5 | 18 | 110 | 5.4 | 5.9 |
| 21 | 13 | 5.2 | 2.6 | 4.8 | 41 | 9.4 | 43 | 7.4 | 10 | 33 | 4.8 | 4.9 |
| 22 | 11 | 4.8 | 2.3 | 4.0 | 32 | 7.2 | 17 | 6.7 | 11 | 14 | 4.4 | 4.4 |
| 23 | 43 | 4.5 | 2.1 | 4.8 | 49 | 6.4 | 12 | 6.1 | 49 | 11 | 4.2 | 4.1 |
| 24 | 17 | 4.2 | 2.0 | 3.5 | 204 | 36 | 9.6 | 6.3 | 44 | 9.2 | 4.0 | 3.9 |
| 25 | 16 | 4.0 | 6.4 | 26 | 395 | 12 | 8.5 | 5.7 | 22 | 8.7 | 3.7 | 3.9 |
| 26 | 11 | 3.8 | 1.7 | 7.8 | 46 | 9.0 | 7.5 | 5.1 | 11 | 13 | 3.6 | 3.6 |
| 27 | 8.7 | 3.6 | 7.5 | 28 | 83 | 7.5 | 6.9 | 5.1 | 9.2 | 20 | 3.3 | 3.3 |
| 28 | 7.4 | 3.8 | 3.1 | 55 | 234 | 7.3 | 7.2 | 11 | 7.8 | 8.6 | 3.1 | 3.1 |
| 29 | 273 | 3.7 | 2.7 | 1.9 | 65 | 45 | 7.0 | 9.7 | 8.8 | 7.5 | 3.0 | 2.9 |
| 30 | 602 | 35 | 2.4 | 23 | --- | 446 | 10 | 6.6 | 8.2 | 7.4 | 2.9 | 2.8 |
| 31 | 43 | --- | 11 | 11 | --- | 570 | --- | 7.0 | --- | 8.8 | 2.7 | --- |
| TOTAL | 1433.5 | 312.7 | 141.8 | 420.4 | 1515.1 | 1921.8 | 586.4 | 323.0 | 482.9 | 678.5 | 225.4 | 279.7 |
| MEAN | 46.2 | 10.4 | 4.57 | 13.6 | 52.2 | 62.0 | 19.5 | 10.4 | 16.1 | 21.9 | 7.27 | 9.32 |
| MAX | 602 | 43 | 17 | 56 | 395 | 570 | 72 | 27 | 110 | 110 | 25 | 72 |
| MIN | 5.1 | 3.6 | 2.0 | 2.1 | 2.8 | 5.1 | 6.3 | 5.1 | 3.6 | 6.7 | 2.7 | 2.6 |
| AC-FT | 2840 | 620 | 281 | 834 | 3010 | 3810 | 1160 | 641 | 958 | 1350 | 447 | 555 |

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1914 - 1996, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|------|------|------|------|------|------|------|------|------|------|------|------|------|
| MEAN | 24.0 | 46.0 | 48.8 | 42.2 | 46.6 | 57.0 | 55.0 | 29.9 | 16.5 | 25.2 | 26.2 | 18.5 |
| MAX | 133 | 198 | 200 | 192 | 222 | 303 | 221 | 88.4 | 58.1 | 99.4 | 111 | 101 |
| (WY) | 1942 | 1922 | 1937 | 1979 | 1932 | 1942 | 1989 | 1914 | 1941 | 1914 | 1914 | 1914 |
| MIN | .88 | 4.06 | 2.82 | 2.01 | 2.65 | 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 1995 CALENDAR YEAR | | FOR 1996 WATER YEAR | | WATER YEARS 1914 - 1996 | |
|--------------------------|------------------------|--------|---------------------|--------|-------------------------|-------------|
| ANNUAL TOTAL | 6447.06 | | 8321.2 | | | |
| ANNUAL MEAN | 17.7 | | 22.7 | | 35.2 | |
| HIGHEST ANNUAL MEAN | | | | | 67.3 | 1980 |
| LOWEST ANNUAL MEAN | | | | | 14.5 | 1981 |
| HIGHEST DAILY MEAN | 602 | Oct 30 | 602 | Oct 30 | 2260 | Jan 26 1948 |
| LOWEST DAILY MEAN | .96 | Mar 17 | 2.0 | Dec 24 | .62 | Jul 23 1922 |
| ANNUAL SEVEN-DAY MINIMUM | 1.1 | Mar 12 | 2.8 | Aug 28 | .71 | Oct 25 1984 |
| ANNUAL RUNOFF (AC-FT) | 12790 | | 16510 | | 25510 | |
| 10 PERCENT EXCEEDS | 38 | | 42 | | 77 | |
| 50 PERCENT EXCEEDS | 7.5 | | 7.9 | | 10 | |
| 90 PERCENT EXCEEDS | 2.4 | | 3.4 | | 3.3 | |



HAWAII, ISLAND OF MAUI
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 mi².

PERIOD OF RECORD.--December 1910 to current year. Monthly discharge only for some periods, published in WSP 1319.

REVISED RECORDS.--WSP 1219: 1914(M), 1916-50(M). WSP 1249: 1948-50(P). WSP 1569: Drainage area.

GAGE.--Water-stage recorders and concrete control. Datum of gage is 1,208 ft above mean sea level (by vertical angles). Prior to June 19, 1914, nonrecording gage at same site and datum.

REMARKS.--Records good. No diversion upstream of station.

AVERAGE DISCHARGE.--85 years (water years 1912-96), 4.83 ft³/s (3,500 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 5,710 ft³/s, November 18, 1930, gage height, 7.28 ft from rating curve extended above 110 ft³/s by test of physical model of station site; minimum, 0.02 ft³/s, several days in 1933, 1934.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 270 ft³/s and maximum (*):

| Date | Time | Discharge (ft ³ /s) | Gage height (ft) | Date | Time | Discharge (ft ³ /s) | Gage height (ft) |
|---------|------|--------------------------------|------------------|---------|------|--------------------------------|------------------|
| Oct. 30 | 0230 | 311 | 3.15 | Mar. 03 | 2000 | 420 | 3.33 |
| Jan. 18 | 2400 | *1,350 | *4.38 | Mar. 31 | 0400 | 1,240 | 4.27 |
| Feb. 25 | 1900 | 1,269 | 4.30 | | | | |

Minimum discharge, 0.43 ft³/s September 26-30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY MEAN VALUES

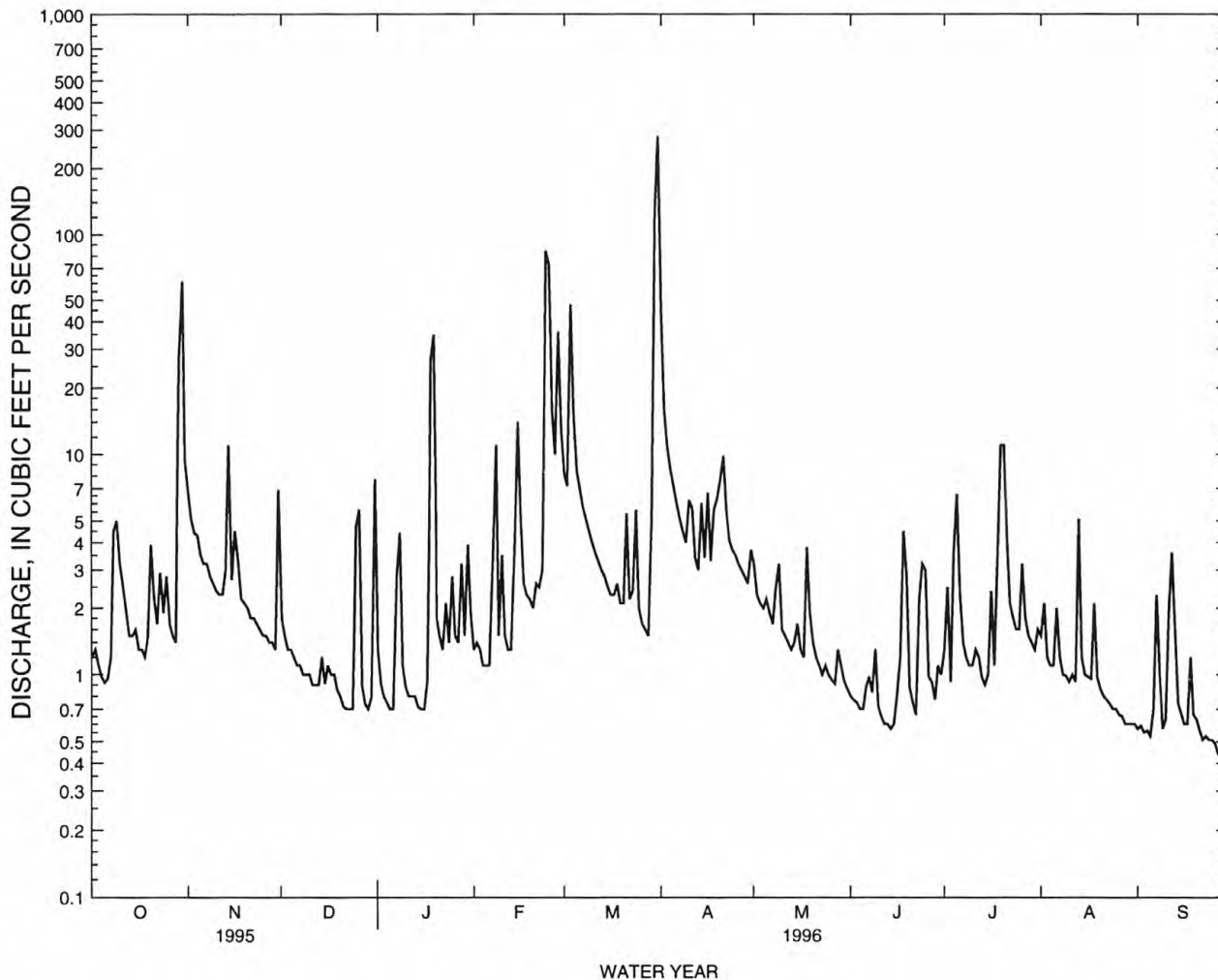
| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|--------|------|-------|--------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 1.2 | 6.8 | 1.8 | 1.3 | 1.3 | 8.1 | 45 | 3.2 | .80 | 1.3 | 1.5 | .57 |
| 2 | 1.3 | 5.1 | 1.5 | .91 | 1.4 | 7.2 | 16 | 2.3 | .77 | 2.5 | 2.1 | .59 |
| 3 | 1.1 | 4.4 | 1.3 | .80 | 1.3 | 48 | 11 | 2.1 | .75 | .93 | 1.2 | .55 |
| 4 | .98 | 4.3 | 1.3 | .75 | 1.1 | 15 | 8.6 | 2.0 | .70 | 3.6 | 1.1 | .56 |
| 5 | .92 | 3.5 | 1.2 | .70 | 1.1 | 8.4 | 7.2 | 2.2 | .70 | 6.6 | 1.1 | .53 |
| 6 | .96 | 3.2 | 1.1 | .70 | 1.1 | 6.9 | 6.0 | 1.9 | .88 | 2.3 | 2.0 | .70 |
| 7 | 1.2 | 3.2 | 1.1 | 2.8 | 3.3 | 5.8 | 5.1 | 1.7 | .98 | 1.4 | 1.2 | 2.3 |
| 8 | 4.5 | 2.8 | 1.0 | 4.4 | 11 | 5.1 | 4.5 | 2.5 | .83 | 1.2 | 1.0 | 1.0 |
| 9 | 5.0 | 2.6 | 1.0 | 1.1 | 1.5 | 4.5 | 4.0 | 3.2 | 1.3 | 1.1 | .99 | .57 |
| 10 | 3.2 | 2.4 | 1.0 | .88 | 3.5 | 4.0 | 6.2 | 1.6 | .72 | 1.1 | .93 | .63 |
| 11 | 2.5 | 2.3 | .90 | .80 | 1.5 | 3.6 | 5.7 | 1.5 | .65 | 1.3 | 1.0 | 1.9 |
| 12 | 1.9 | 2.3 | .90 | .80 | 1.3 | 3.3 | 3.4 | 1.4 | .60 | 1.2 | .93 | 3.6 |
| 13 | 1.5 | 3.0 | .90 | .80 | 1.3 | 3.0 | 3.0 | 1.3 | .60 | .98 | 5.1 | 1.6 |
| 14 | 1.5 | 11 | 1.2 | .72 | 3.5 | 2.8 | 6.0 | 1.4 | .57 | .90 | 1.2 | .74 |
| 15 | 1.6 | 2.7 | .91 | .70 | 14 | 2.5 | 3.4 | 1.7 | .60 | 1.0 | 1.0 | .67 |
| 16 | 1.3 | 4.5 | 1.1 | .70 | 5.0 | 2.3 | 6.7 | 1.3 | .81 | 2.4 | .98 | .60 |
| 17 | 1.3 | 3.3 | 1.0 | .93 | 2.6 | 2.3 | 3.3 | 1.2 | 1.2 | 1.1 | .96 | .60 |
| 18 | 1.2 | 2.2 | 1.0 | 27 | 2.3 | 2.6 | 5.6 | 3.8 | 4.5 | 3.4 | 2.1 | 1.2 |
| 19 | 1.5 | 2.1 | .85 | 35 | 2.2 | 2.1 | 6.3 | 1.9 | 2.8 | 11 | .97 | .66 |
| 20 | 3.9 | 2.0 | .80 | 1.8 | 2.0 | 2.1 | 7.7 | 1.4 | .88 | 11 | .86 | .63 |
| 21 | 2.2 | 1.8 | .72 | 1.5 | 2.6 | 5.4 | 9.8 | 1.2 | .75 | 4.1 | .80 | .56 |
| 22 | 1.7 | 1.8 | .70 | 1.3 | 2.5 | 2.2 | 5.6 | 1.1 | .66 | 2.1 | .77 | .51 |
| 23 | 2.9 | 1.7 | .70 | 2.1 | 3.0 | 2.4 | 4.1 | 1.0 | 2.2 | 1.8 | .74 | .53 |
| 24 | 1.9 | 1.6 | .70 | 1.4 | 84 | 5.6 | 3.7 | 1.1 | 3.2 | 1.6 | .70 | .51 |
| 25 | 2.8 | 1.5 | 4.7 | 2.8 | 73 | 2.0 | 3.5 | 1.0 | 3.0 | 1.6 | .70 | .51 |
| 26 | 1.7 | 1.5 | 5.6 | 1.5 | 16 | 1.7 | 3.2 | .95 | .98 | 3.2 | .66 | .49 |
| 27 | 1.5 | 1.4 | .89 | 1.4 | 10 | 1.6 | 3.0 | .91 | .93 | 1.8 | .65 | .44 |
| 28 | 1.4 | 1.4 | .74 | 3.2 | 36 | 1.5 | 2.8 | 1.3 | .77 | 1.5 | .60 | .43 |
| 29 | 28 | 1.3 | .70 | 1.5 | 13 | 4.9 | 2.6 | 1.1 | 1.1 | 1.4 | .60 | .43 |
| 30 | 61 | 6.9 | .79 | 3.9 | --- | 125 | 3.7 | .93 | 1.0 | 1.3 | .60 | .43 |
| 31 | 9.4 | --- | 7.7 | 1.9 | --- | 279 | --- | .86 | --- | 1.6 | .60 | --- |
| TOTAL | 153.06 | 94.6 | 45.80 | 106.09 | 302.4 | 570.9 | 206.7 | 51.05 | 36.23 | 78.31 | 35.64 | 25.04 |
| MEAN | 4.94 | 3.15 | 1.48 | 3.42 | 10.4 | 18.4 | 6.89 | 1.65 | 1.21 | 2.53 | 1.15 | .83 |
| MAX | 61 | 11 | 7.7 | 35 | 84 | 279 | 45 | 3.8 | 4.5 | 11 | 5.1 | 3.6 |
| MIN | .92 | 1.3 | .70 | .70 | 1.1 | 1.5 | 2.6 | .86 | .57 | .90 | .60 | .43 |
| AC-FT | 304 | 188 | 91 | 210 | 600 | 1130 | 410 | 101 | 72 | 155 | 71 | 50 |

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1912 - 1996, BY WATER YEAR (WY)

| | 1912 | 1913 | 1914 | 1915 | 1916 | 1917 | 1918 | 1919 | 1920 | 1921 | 1922 | 1923 | 1924 | 1925 | 1926 | 1927 | 1928 | 1929 | 1930 | 1931 | 1932 | 1933 | 1934 | 1935 | 1936 | 1937 | 1938 | 1939 | 1940 | 1941 | 1942 | 1943 | 1944 | 1945 | 1946 | 1947 | 1948 | 1949 | 1950 | 1951 | 1952 | 1953 | 1954 | 1955 | 1956 | 1957 | 1958 | 1959 | 1960 | 1961 | 1962 | 1963 | 1964 | 1965 | 1966 | 1967 | 1968 | 1969 | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| MEAN | 2.75 | 5.48 | 6.08 | 5.48 | 5.26 | 7.31 | 7.64 | 5.08 | 2.72 | 3.52 | 4.00 | 2.61 | 15.9 | 21.4 | 20.0 | 20.9 | 24.5 | 33.0 | 43.4 | 24.3 | 9.97 | 12.6 | 18.1 | 14.6 | 1942 | 1991 | 1947 | 1921 | 1969 | 1942 | 1989 | 1916 | 1914 | 1914 | 1914 | 1982 | 1992 | .15 | .25 | 1.04 | .61 | .62 | .79 | .58 | .84 | .52 | .41 | .40 | .25 | 1985 | 1963 | 1981 | 1977 | 1983 | 1992 | 1992 | 1933 | 1962 | 1981 | 1973 | 1984 | | | | | | | | | | | | | | | | | | | | | | | | |

HAWAII, ISLAND OF MAUI
 16587000 HONOPOU STREAM NEAR HUELO--Continued

| SUMMARY STATISTICS | FOR 1995 CALENDAR YEAR | | FOR 1996 WATER YEAR | | WATER YEARS 1912 - 1996 | |
|--------------------------|------------------------|--------|---------------------|--------|-------------------------|-------------|
| ANNUAL TOTAL | 1125.21 | | 1705.82 | | | |
| ANNUAL MEAN | 3.08 | | 4.66 | | 4.83 | |
| HIGHEST ANNUAL MEAN | | | | | 9.88 | 1914 |
| LOWEST ANNUAL MEAN | | | | | 1.73 | 1981 |
| HIGHEST DAILY MEAN | 61 | Oct 30 | 279 | Mar 31 | 305 | Apr 7 1989 |
| LOWEST DAILY MEAN | .35 | Mar 12 | .43 | Sep 28 | .11 | Oct 27 1984 |
| ANNUAL SEVEN-DAY MINIMUM | .47 | Mar 6 | .46 | Sep 24 | .11 | Oct 26 1984 |
| ANNUAL RUNOFF (AC-FT) | 2230 | | 3380 | | 3500 | |
| 10 PERCENT EXCEEDS | 6.3 | | 6.4 | | 10 | |
| 50 PERCENT EXCEEDS | 1.8 | | 1.5 | | 2.4 | |
| 90 PERCENT EXCEEDS | .75 | | .70 | | .74 | |



HAWAII, ISLAND OF MAUI
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 good. Tunnel diverts water from Opana Gulch for agricultural and domestic use in the Kokomo, Makawao, and Pukalani areas.

AVERAGE DISCHARGE.--31 years (water years 1966-96), 3.18 ft³/s (2,300 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 18 ft³/s, March 31, 1982, April 12, 1986, March 23, 1994; minimum daily, 0.11 ft³/s, November 5-10, 1973, October 5, 6, 25, 26, 1974.

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge, 12 ft³/s, February 25; minimum daily, 0.19 ft³/s, September 29, 30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY MEAN VALUES

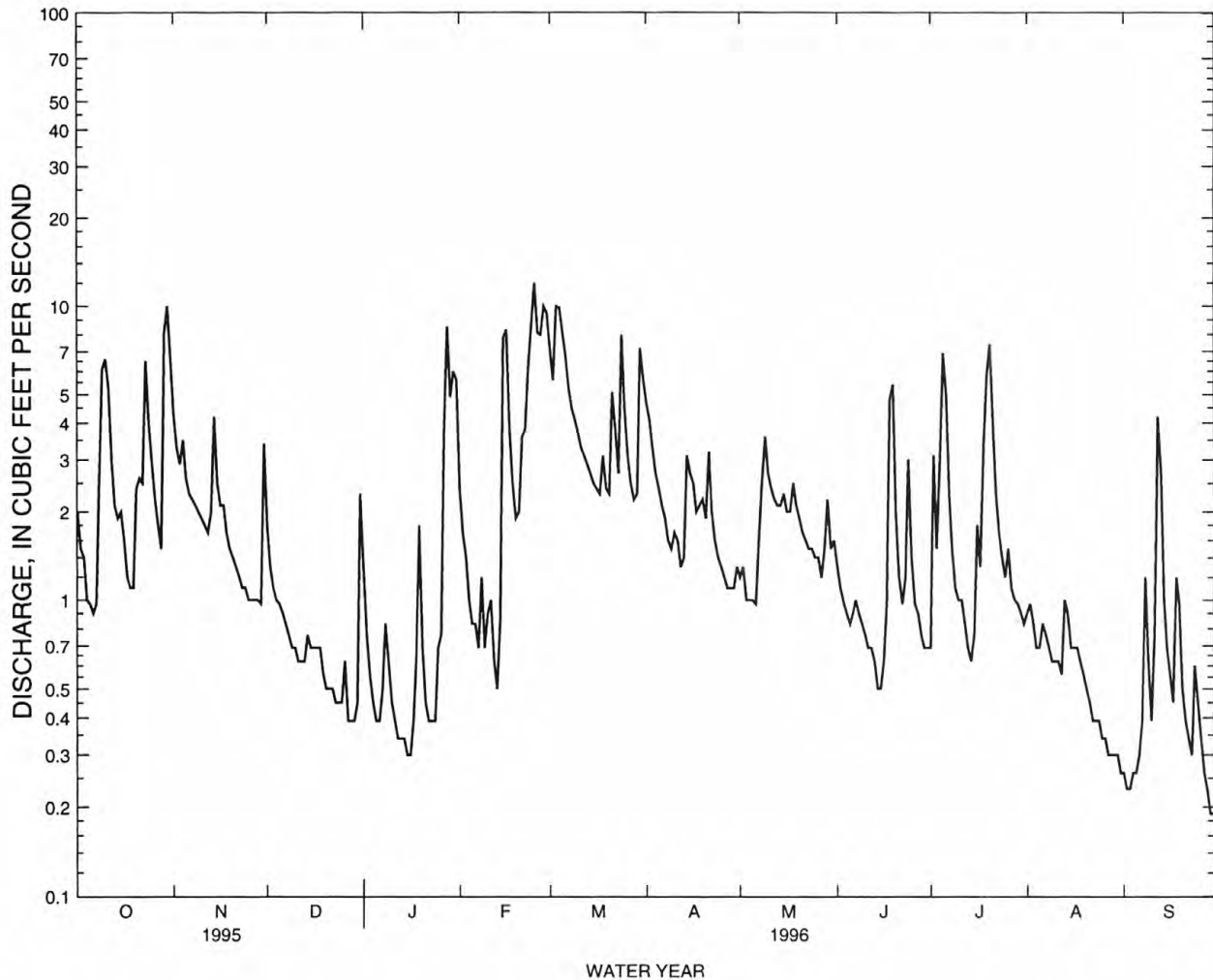
| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|-------|-------|-------|-------|--------|-------|------|-------|-------|-------|-------|-------|
| 1 | 2.0 | 4.3 | 1.8 | 1.3 | 2.4 | 7.1 | 4.7 | 1.2 | 1.3 | .69 | .90 | .26 |
| 2 | 1.5 | 3.3 | 1.3 | .76 | 1.7 | 5.6 | 4.1 | 1.3 | 1.1 | 3.1 | .97 | .23 |
| 3 | 1.4 | 2.9 | 1.1 | .56 | 1.4 | 10 | 3.3 | 1.0 | .98 | 1.5 | .83 | .23 |
| 4 | 1.0 | 3.5 | 1.0 | .45 | 1.0 | 9.9 | 2.7 | 1.0 | .90 | 2.9 | .69 | .26 |
| 5 | .97 | 2.6 | .97 | .39 | .83 | 8.1 | 2.4 | 1.0 | .83 | 6.9 | .69 | .26 |
| 6 | .90 | 2.3 | .90 | .39 | .83 | 6.7 | 2.1 | .97 | .90 | 5.0 | .83 | .30 |
| 7 | .97 | 2.2 | .83 | .50 | .69 | 5.3 | 1.9 | 1.6 | 1.0 | 2.3 | .76 | .39 |
| 8 | 2.5 | 2.1 | .76 | .83 | 1.2 | 4.5 | 1.6 | 2.5 | .90 | 1.5 | .69 | 1.2 |
| 9 | 6.1 | 2.0 | .69 | .62 | .69 | 4.1 | 1.5 | 3.6 | .83 | 1.1 | .62 | .62 |
| 10 | 6.6 | 1.9 | .69 | .45 | .90 | 3.7 | 1.7 | 2.7 | .76 | 1.0 | .62 | .39 |
| 11 | 5.3 | 1.8 | .62 | .39 | 1.0 | 3.3 | 1.6 | 2.4 | .69 | 1.0 | .62 | .76 |
| 12 | 3.0 | 1.7 | .62 | .34 | .62 | 3.1 | 1.3 | 2.2 | .69 | .83 | .56 | 4.2 |
| 13 | 2.1 | 2.0 | .62 | .34 | .50 | 2.9 | 1.4 | 2.1 | .62 | .69 | 1.0 | 2.7 |
| 14 | 1.9 | 4.2 | .76 | .34 | .86 | 2.7 | 3.1 | 2.1 | .50 | .62 | .90 | 1.0 |
| 15 | 2.0 | 2.5 | .69 | .30 | 7.8 | 2.5 | 2.7 | 2.3 | .50 | .76 | .69 | .69 |
| 16 | 1.6 | 2.1 | .69 | .30 | 8.3 | 2.4 | 2.5 | 2.0 | .62 | 1.8 | .69 | .56 |
| 17 | 1.2 | 2.1 | .69 | .39 | 3.8 | 2.3 | 2.0 | 2.0 | .97 | 1.3 | .69 | .45 |
| 18 | 1.1 | 1.7 | .69 | .65 | 2.5 | 3.1 | 2.1 | 2.5 | 4.8 | 3.4 | .62 | 1.2 |
| 19 | 1.1 | 1.5 | .56 | 1.8 | 1.9 | 2.4 | 2.2 | 2.1 | 5.4 | 5.8 | .56 | .97 |
| 20 | 2.4 | 1.4 | .50 | .69 | 2.0 | 2.3 | 1.9 | 1.9 | 2.0 | 7.4 | .50 | .50 |
| 21 | 2.6 | 1.3 | .50 | .45 | 3.6 | 5.1 | 3.2 | 1.7 | 1.2 | 3.8 | .45 | .39 |
| 22 | 2.5 | 1.2 | .50 | .39 | 3.8 | 3.8 | 2.0 | 1.6 | .97 | 2.3 | .39 | .34 |
| 23 | 6.5 | 1.1 | .45 | .39 | 6.2 | 2.7 | 1.6 | 1.5 | 1.2 | 1.7 | .39 | .30 |
| 24 | 4.0 | 1.1 | .45 | .39 | 8.6 | 8.0 | 1.4 | 1.5 | 3.0 | 1.4 | .39 | .60 |
| 25 | 2.9 | 1.0 | .45 | .69 | 12 | 4.5 | 1.3 | 1.4 | 1.4 | 1.2 | .34 | .45 |
| 26 | 2.2 | 1.0 | .62 | .76 | 8.1 | 3.1 | 1.2 | 1.4 | .97 | 1.5 | .34 | .34 |
| 27 | 1.8 | 1.0 | .39 | 3.8 | 8.0 | 2.5 | 1.1 | 1.2 | .90 | 1.1 | .30 | .26 |
| 28 | 1.5 | 1.0 | .39 | 8.5 | 10 | 2.2 | 1.1 | 1.5 | .76 | 1.0 | .30 | .23 |
| 29 | 8.1 | .97 | .39 | 4.9 | 9.5 | 2.3 | 1.1 | 2.2 | .69 | .97 | .30 | .19 |
| 30 | 10 | 3.4 | .45 | 6.0 | --- | 7.2 | 1.3 | 1.5 | .69 | .90 | .30 | .19 |
| 31 | 6.7 | --- | 2.3 | 5.6 | --- | 5.7 | --- | 1.6 | --- | .83 | .26 | --- |
| TOTAL | 94.44 | 61.17 | 23.37 | 43.66 | 110.72 | 139.1 | 62.1 | 55.57 | 38.07 | 66.29 | 18.19 | 20.46 |
| MEAN | 3.05 | 2.04 | .75 | 1.41 | 3.82 | 4.49 | 2.07 | 1.79 | 1.27 | 2.14 | .59 | .68 |
| MAX | 10 | 4.3 | 2.3 | 8.5 | 12 | 10 | 4.7 | 3.6 | 5.4 | 7.4 | 1.0 | 4.2 |
| MIN | .90 | .97 | .39 | .30 | .50 | 2.2 | 1.1 | .97 | .50 | .62 | .26 | .19 |
| AC-FT | 187 | 121 | 46 | 87 | 220 | 276 | 123 | 110 | 76 | 131 | 36 | 41 |

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1965 - 1996, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|------|------|------|------|------|------|------|------|------|------|------|------|------|
| MEAN | 1.89 | 3.29 | 3.87 | 3.71 | 3.70 | 4.74 | 5.13 | 3.52 | 2.07 | 2.59 | 2.14 | 1.55 |
| MAX | 5.40 | 7.97 | 9.19 | 7.55 | 9.04 | 11.1 | 9.35 | 7.42 | 5.99 | 6.40 | 4.98 | 5.69 |
| (WY) | 1984 | 1968 | 1971 | 1989 | 1969 | 1982 | 1968 | 1987 | 1986 | 1982 | 1969 | 1992 |
| MIN | .14 | .25 | .65 | .22 | .36 | .51 | .27 | 1.28 | .54 | .40 | .19 | .15 |
| (WY) | 1985 | 1992 | 1977 | 1977 | 1978 | 1983 | 1992 | 1992 | 1981 | 1981 | 1974 | 1984 |

HAWAII, ISLAND OF MAUI
 16599500 OPANA TUNNEL AT KAILILI--Continued

| SUMMARY STATISTICS | FOR 1995 CALENDAR YEAR | FOR 1996 WATER YEAR | WATER YEARS 1965 - 1996 | |
|--------------------------|------------------------|---------------------|-------------------------|-------------|
| ANNUAL TOTAL | 769.81 | 733.14 | | |
| ANNUAL MEAN | 2.11 | 2.00 | 3.18 | |
| HIGHEST ANNUAL MEAN | | | 5.34 | 1969 |
| LOWEST ANNUAL MEAN | | | 1.45 | 1981 |
| HIGHEST DAILY MEAN | 10 Oct 30 | 12 Feb 25 | 18 | Mar 31 1982 |
| LOWEST DAILY MEAN | .26 Mar 19 | .19 Sep 29 | .11 | Nov 5 1973 |
| ANNUAL SEVEN-DAY MINIMUM | .34 Mar 14 | .26 Aug 30 | .11 | Nov 4 1973 |
| ANNUAL RUNOFF (AC-FT) | 1530 | 1450 | 2300 | |
| 10 PERCENT EXCEEDS | 4.5 | 4.8 | 7.7 | |
| 50 PERCENT EXCEEDS | 1.6 | 1.2 | 2.2 | |
| 90 PERCENT EXCEEDS | .62 | .39 | .39 | |



HAWAII, ISLAND OF MAUI

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 mi².

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 fair. No appreciable diversion upstream of station.

AVERAGE DISCHARGE.--13 years (water years 1984-96), 66.9 ft³/s (48,440 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge 6,260 ft³/s, January 28, 1988, gage height, 9.0 ft, from rating curve extended above 181 ft³/s on basis of slope-area measurements at gage heights 6.48 ft and 9.0 ft; minimum, 11 ft³/s for several days in October and November 1984, May 1996.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum discharge known, 7,540 ft³/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 ft³/s and maximum (*):

| Date | Time | Discharge (ft ³ /s) | Gage height (ft) | Date | Time | Discharge (ft ³ /s) | Gage height (ft) |
|---------|------|-----------------------------------|---------------------|---|------|-----------------------------------|---------------------|
| Mar. 31 | 0300 | *2,730 | *6.03 | No other peak greater than base discharge | | | |

Minimum discharge, 12 ft³/s, many days.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|------|------|------|------|------|------|------|------|------|------|------|------|
| 1 | 36 | 52 | 28 | 62 | 36 | 38 | 354 | 53 | 40 | 76 | 43 | 20 |
| 2 | 41 | 39 | 23 | 36 | 34 | 44 | 242 | 51 | 41 | 126 | 56 | 20 |
| 3 | 36 | 37 | 22 | 28 | 30 | 248 | 107 | 47 | e30 | 48 | 49 | 21 |
| 4 | 29 | 68 | 21 | 24 | 25 | 294 | 74 | 45 | e45 | 109 | 46 | 23 |
| 5 | 25 | 32 | 20 | 41 | 22 | 130 | 62 | 45 | e48 | 108 | 42 | 22 |
| 6 | 23 | 29 | 19 | 32 | 19 | 71 | 55 | 45 | e66 | 54 | 62 | 26 |
| 7 | 27 | 50 | 47 | 84 | 20 | 45 | 45 | 45 | 81 | 40 | 46 | 71 |
| 8 | 32 | 36 | 34 | 207 | 84 | 36 | 40 | 50 | 43 | 34 | 36 | 27 |
| 9 | 66 | 29 | 26 | 64 | 26 | 30 | 37 | 44 | 42 | 31 | 32 | 17 |
| 10 | 66 | 29 | 23 | 43 | 26 | 28 | 109 | 42 | 39 | 30 | 31 | 24 |
| 11 | 33 | 46 | 23 | 35 | 19 | 26 | 53 | 41 | 39 | 28 | 35 | 46 |
| 12 | 32 | 43 | 22 | 29 | 17 | 26 | 39 | 42 | 37 | 28 | 40 | 109 |
| 13 | 28 | 103 | 22 | 26 | 16 | 20 | 39 | 44 | 36 | 26 | 150 | 45 |
| 14 | 28 | 234 | 55 | 25 | 129 | 17 | 126 | 62 | 55 | 25 | 47 | 24 |
| 15 | 34 | 95 | 25 | 21 | 285 | 16 | 54 | 61 | 40 | 25 | 43 | 19 |
| 16 | 25 | 56 | 23 | 20 | 195 | 17 | 81 | 60 | 39 | 33 | 35 | 18 |
| 17 | 23 | 46 | 22 | 32 | 68 | 22 | 68 | 54 | 48 | 27 | 30 | 18 |
| 18 | 22 | 38 | 26 | 54 | 41 | 54 | 103 | 85 | 66 | 36 | 31 | 20 |
| 19 | 56 | 35 | 22 | 96 | 29 | 17 | 129 | 67 | 63 | 60 | 27 | 19 |
| 20 | 107 | 33 | 20 | 30 | 25 | 15 | 160 | 65 | 39 | 109 | 25 | 17 |
| 21 | 40 | 30 | 19 | 25 | 24 | 15 | 260 | 48 | 35 | 72 | 24 | 13 |
| 22 | 30 | 28 | 18 | 22 | 21 | 13 | 124 | 45 | 31 | 42 | 24 | 14 |
| 23 | 27 | 27 | 18 | 19 | e26 | 29 | 82 | 42 | 55 | 34 | 23 | 24 |
| 24 | 27 | 26 | 17 | 36 | 82 | 58 | 67 | 43 | 120 | 29 | 23 | 15 |
| 25 | 46 | 25 | 18 | 32 | 68 | 17 | 66 | 42 | 89 | 29 | 22 | 13 |
| 26 | 30 | 24 | 27 | 26 | 97 | 14 | 64 | 42 | 59 | 62 | 21 | 13 |
| 27 | 26 | 26 | 27 | 22 | 70 | 13 | 89 | 42 | 70 | 29 | 21 | 12 |
| 28 | 24 | 25 | 18 | 54 | 166 | 13 | 74 | 120 | 66 | 27 | 22 | 14 |
| 29 | 260 | 23 | 17 | 26 | 96 | 62 | 63 | 69 | 132 | 27 | 22 | 13 |
| 30 | 188 | 65 | 112 | 42 | --- | 187 | 57 | 55 | 46 | 29 | 20 | 12 |
| 31 | 72 | --- | 211 | 92 | --- | 393 | --- | 46 | --- | 40 | 20 | --- |
| TOTAL | 1539 | 1429 | 1025 | 1385 | 1796 | 2008 | 2923 | 1642 | 1640 | 1473 | 1148 | 749 |
| MEAN | 49.6 | 47.6 | 33.1 | 44.7 | 61.9 | 64.8 | 97.4 | 53.0 | 54.7 | 47.5 | 37.0 | 25.0 |
| MAX | 260 | 234 | 211 | 207 | 285 | 393 | 354 | 120 | 132 | 126 | 150 | 109 |
| MIN | 22 | 23 | 17 | 19 | 16 | 13 | 37 | 41 | 30 | 25 | 20 | 12 |
| AC-FT | 3050 | 2830 | 2030 | 2750 | 3560 | 3980 | 5800 | 3260 | 3250 | 2920 | 2280 | 1490 |

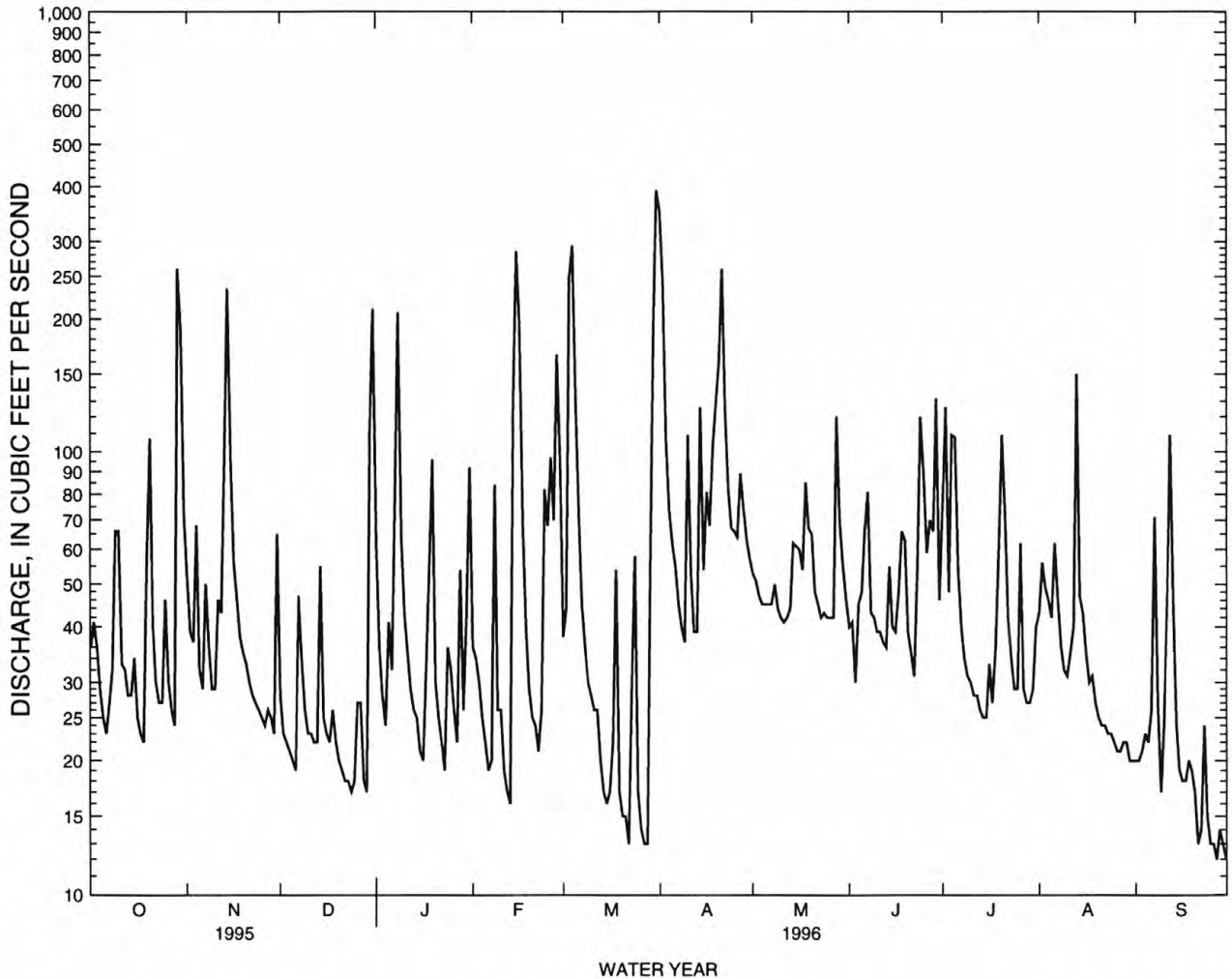
e Estimated

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1983 - 1996, BY WATER YEAR (WY)

| | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| MEAN | 56.0 | 65.2 | 62.7 | 69.1 | 60.3 | 84.6 | 90.0 | 67.4 | 57.1 | 73.0 | 62.2 | 48.2 | | |
| MAX | 103 | 132 | 97.5 | 149 | 108 | 176 | 230 | 136 | 99.7 | 137 | 97.0 | 133 | | |
| (WY) | 1984 | 1988 | 1988 | 1988 | 1994 | 1994 | 1989 | 1987 | 1987 | 1987 | 1994 | 1993 | 1992 | |
| MIN | 11.9 | 20.5 | 18.3 | 25.4 | 32.1 | 30.4 | 20.8 | 27.9 | 24.4 | 25.2 | 26.0 | 15.8 | | |
| (WY) | 1985 | 1985 | 1985 | 1985 | 1993 | 1987 | 1992 | 1984 | 1985 | 1984 | 1984 | 1984 | 1984 | |

16604500 IAO STREAM AT KEPANIWAI PARK, NEAR WAILUKU--Continued

| SUMMARY STATISTICS | FOR 1995 CALENDAR YEAR | | FOR 1996 WATER YEAR | | WATER YEARS 1983 - 1996 | |
|--------------------------|------------------------|--------|---------------------|--------|-------------------------|-------------|
| ANNUAL TOTAL | 20041 | | 18757 | | 66.9 | |
| ANNUAL MEAN | 54.9 | | 51.2 | | 93.4 | |
| HIGHEST ANNUAL MEAN | | | | | 41.4 | |
| LOWEST ANNUAL MEAN | | | | | 1994 | |
| HIGHEST DAILY MEAN | 404 | Jan 29 | 393 | Mar 31 | 913 | Apr 10 1986 |
| LOWEST DAILY MEAN | 17 | Jun 28 | 12 | Sep 27 | 11 | Oct 7 1984 |
| ANNUAL SEVEN-DAY MINIMUM | 19 | Dec 19 | 13 | Sep 24 | 11 | Oct 16 1984 |
| ANNUAL RUNOFF (AC-FT) | 39750 | | 37200 | | 48440 | |
| 10 PERCENT EXCEEDS | 116 | | 99 | | 134 | |
| 50 PERCENT EXCEEDS | 31 | | 36 | | 42 | |
| 90 PERCENT EXCEEDS | 20 | | 19 | | 21 | |



HAWAII, ISLAND OF MAUI
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 mi².

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 good, except for the period of no gage height record, which are poor. No diversion upstream of station.

AVERAGE DISCHARGE.--12 years (water years 1985-96), 82.1 ft³/s (59,460 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 9,660 ft³/s, January 28, 1988, gage height, 8.95 ft, from rating curve extended above 280 ft³/s on basis of slope-area measurements at gage heights 6.70 ft and 8.95 ft; minimum, 14 ft³/s, July 13, 1995.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,000 ft³/s and maximum (*):

| Date | Time | Discharge (ft ³ /s) | Gage height (ft) | Date | Time | Discharge (ft ³ /s) | Gage height (ft) |
|---------|------|-----------------------------------|---------------------|---------|------|-----------------------------------|---------------------|
| Mar. 03 | 0735 | 2,060 | 4.37 | Mar. 31 | ---- | *e3,950 | |

Minimum discharge, 29 ft³/s, May 26.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|------|------|------|------|------|------|------|------|------|------|------|------|
| 1 | 44 | 69 | 51 | 41 | 38 | 113 | e410 | 36 | e34 | 89 | 49 | 34 |
| 2 | 48 | 49 | 44 | 38 | 39 | 68 | e240 | 35 | e35 | 87 | 100 | 34 |
| 3 | 45 | 47 | 42 | 37 | 37 | 402 | e130 | 34 | e33 | 47 | 60 | 34 |
| 4 | 41 | 73 | 42 | 36 | 36 | 125 | e80 | 34 | e44 | 139 | 66 | 37 |
| 5 | 40 | 45 | 41 | 36 | 36 | 40 | e56 | 34 | 42 | 86 | 48 | 36 |
| 6 | 39 | 43 | 40 | 35 | 35 | e100 | 56 | 33 | 54 | 49 | 76 | 44 |
| 7 | 49 | 81 | 42 | 128 | 64 | e80 | 54 | 33 | 70 | 42 | 55 | 133 |
| 8 | 55 | 57 | 40 | 226 | 120 | e66 | 53 | 34 | 47 | 40 | 41 | 47 |
| 9 | 111 | 45 | 40 | 46 | 39 | e56 | 52 | 33 | 50 | 39 | 40 | 39 |
| 10 | 64 | 49 | 39 | 40 | 41 | e54 | 114 | 32 | 42 | 38 | 44 | 47 |
| 11 | 44 | 61 | 39 | 38 | 36 | e49 | 57 | 31 | 41 | 40 | 54 | 64 |
| 12 | 57 | 62 | 39 | 37 | 36 | e49 | 51 | 31 | 40 | 40 | 45 | 129 |
| 13 | 44 | 203 | 39 | 40 | 35 | e40 | 52 | 31 | 40 | 38 | 193 | 53 |
| 14 | 47 | 281 | 88 | 37 | 170 | e35 | 134 | 52 | 43 | 37 | 43 | 40 |
| 15 | 55 | 78 | 48 | 36 | 285 | e34 | 49 | 43 | 42 | 38 | 42 | 40 |
| 16 | 43 | 54 | 43 | 37 | 133 | e37 | 97 | 52 | 42 | 49 | 41 | 38 |
| 17 | 46 | 59 | 42 | 57 | 53 | e45 | 62 | 40 | 51 | 39 | 39 | 37 |
| 18 | 42 | 54 | 43 | 126 | 46 | e90 | 90 | 68 | 61 | 47 | 41 | 49 |
| 19 | 92 | 52 | 40 | 117 | 41 | e35 | 77 | 56 | 57 | 66 | 38 | 38 |
| 20 | 96 | 49 | 38 | 45 | 42 | e35 | 122 | 42 | 41 | 139 | 37 | 42 |
| 21 | 52 | 46 | 38 | 40 | 44 | e31 | 125 | 32 | 40 | 121 | 37 | 37 |
| 22 | 44 | 44 | 38 | 38 | 46 | e32 | 48 | 31 | 39 | 44 | 36 | 47 |
| 23 | 42 | 50 | 37 | 38 | 49 | e66 | 40 | 30 | 59 | 39 | 36 | 90 |
| 24 | 41 | 57 | 37 | 52 | 79 | e100 | 39 | 35 | 71 | 38 | 36 | 43 |
| 25 | 60 | 56 | 44 | 48 | 84 | e35 | 40 | 35 | 62 | 43 | 35 | 38 |
| 26 | 42 | 56 | 65 | 41 | 80 | e30 | 43 | 42 | 45 | 93 | 35 | 37 |
| 27 | 39 | 59 | 69 | 52 | 96 | e30 | 69 | e50 | 49 | 41 | 35 | 36 |
| 28 | 38 | 61 | 39 | 82 | 227 | e30 | 49 | e90 | 42 | 38 | 34 | 36 |
| 29 | 301 | 56 | 38 | 42 | 107 | e130 | 39 | e62 | 113 | 37 | 34 | 36 |
| 30 | 213 | 121 | 140 | 56 | --- | e370 | 37 | e50 | 43 | 39 | 34 | 35 |
| 31 | 62 | --- | 142 | 60 | --- | e510 | --- | e44 | --- | 45 | 35 | --- |
| TOTAL | 2036 | 2117 | 1567 | 1782 | 2174 | 2917 | 2565 | 1285 | 1472 | 1767 | 1539 | 1450 |
| MEAN | 65.7 | 70.6 | 50.5 | 57.5 | 75.0 | 94.1 | 85.5 | 41.5 | 49.1 | 57.0 | 49.6 | 48.3 |
| MAX | 301 | 281 | 142 | 226 | 285 | 510 | 410 | 90 | 113 | 139 | 193 | 133 |
| MIN | 38 | 43 | 37 | 35 | 35 | 30 | 37 | 30 | 33 | 37 | 34 | 34 |
| AC-FT | 4040 | 4200 | 3110 | 3530 | 4310 | 5790 | 5090 | 2550 | 2920 | 3500 | 3050 | 2880 |

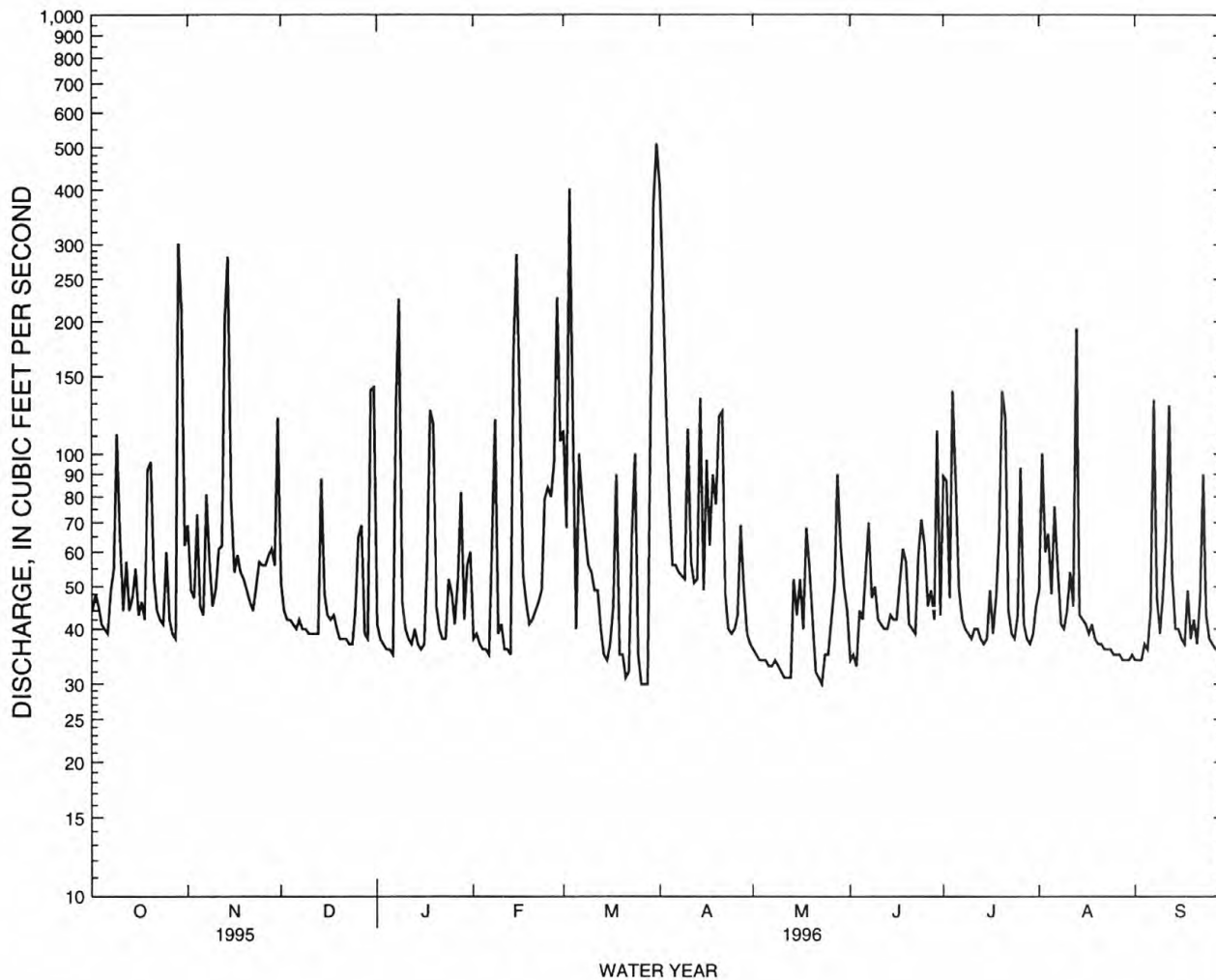
e Estimated

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1984 - 1996, BY WATER YEAR (WY)

| | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| MEAN | 72.2 | 83.8 | 72.0 | 77.4 | 68.5 | 95.4 | 97.3 | 81.6 | 72.5 | 91.1 | 78.3 | 73.4 | |
| 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 | 54.8 | 46.1 | 32.9 | |
| (WY) | 1985 | 1985 | 1985 | 1985 | 1993 | 1992 | 1992 | 1996 | 1984 | 1984 | 1984 | 1984 | |

HAWAII, ISLAND OF MAUI
 16614000 WAIHEE RIVER AT DAM NEAR WAIHEE--Continued

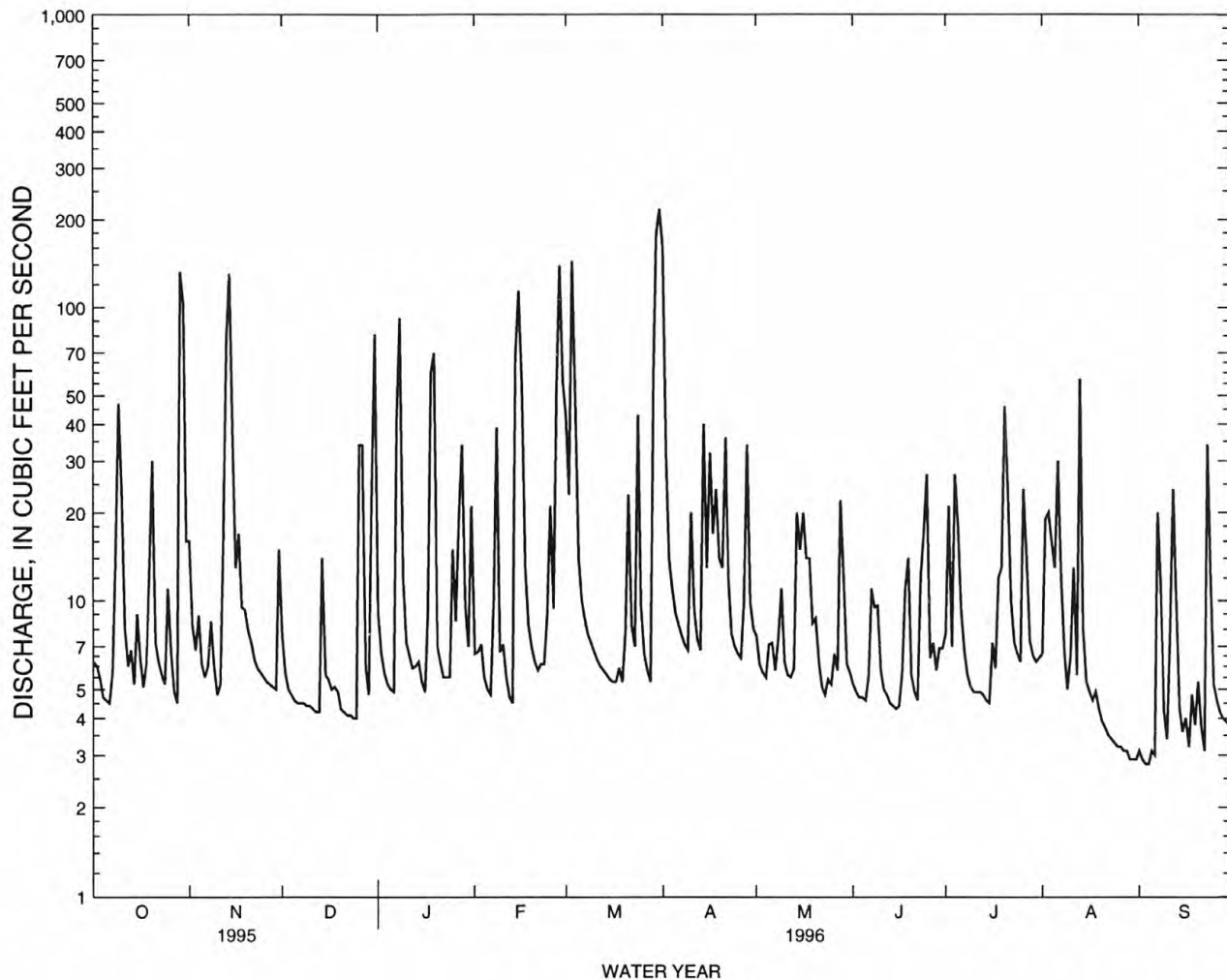
| SUMMARY STATISTICS | FOR 1995 CALENDAR YEAR | | FOR 1996 WATER YEAR | | WATER YEARS 1984 - 1996 | |
|--------------------------|------------------------|--------|---------------------|--------|-------------------------|-------------|
| ANNUAL TOTAL | 22935 | | 22671 | | | |
| ANNUAL MEAN | 62.8 | | 61.9 | | 82.1 | |
| HIGHEST ANNUAL MEAN | | | | | 106 | 1994 |
| LOWEST ANNUAL MEAN | | | | | 57.5 | 1985 |
| HIGHEST DAILY MEAN | 519 | Jan 14 | 510 | Mar 31 | 1160 | Jan 28 1988 |
| LOWEST DAILY MEAN | 32 | Jun 20 | 30 | Mar 26 | 22 | Jan 18 1985 |
| ANNUAL SEVEN-DAY MINIMUM | 39 | Sep 19 | 32 | May 7 | 23 | Jan 18 1985 |
| ANNUAL RUNOFF (AC-FT) | 45490 | | 44970 | | 59460 | |
| 10 PERCENT EXCEEDS | 100 | | 112 | | 137 | |
| 50 PERCENT EXCEEDS | 45 | | 44 | | 56 | |
| 90 PERCENT EXCEEDS | 39 | | 35 | | 38 | |



HAWAII, ISLAND OF MAUI

16618000 KAHAKULOA STREAM NEAR HONOKOHAU--Continued

| SUMMARY STATISTICS | FOR 1995 CALENDAR YEAR | | FOR 1996 WATER YEAR | | WATER YEARS 1939 - 1996 | |
|--------------------------|------------------------|--------|---------------------|--------|-------------------------|-------------|
| ANNUAL TOTAL | 5324.0 | | 5338.3 | | 17.9 | |
| ANNUAL MEAN | 14.6 | | 14.6 | | 30.8 | |
| HIGHEST ANNUAL MEAN | | | | | 1942 | |
| LOWEST ANNUAL MEAN | | | | | 11.0 | |
| HIGHEST DAILY MEAN | 242 | Jan 14 | 217 | Mar 31 | 696 | Mar 10 1942 |
| LOWEST DAILY MEAN | 3.6 | Sep 26 | 2.8 | Sep 3 | 2.7 | Jan 28 1985 |
| ANNUAL SEVEN-DAY MINIMUM | 3.8 | Sep 20 | 2.9 | Aug 29 | 2.8 | Feb 6 1985 |
| ANNUAL RUNOFF (AC-FT) | 10560 | | 10590 | | 12990 | |
| 10 PERCENT EXCEEDS | 33 | | 31 | | 35 | |
| 50 PERCENT EXCEEDS | 6.6 | | 6.6 | | 9.0 | |
| 90 PERCENT EXCEEDS | 4.6 | | 4.2 | | 5.2 | |



HAWAII, ISLAND OF MAUI
 16618000 KAHAKULOA STREAM NEAR HONOKOHAU--Continued
 WATER-QUALITY RECORDS

PERIOD OF RECORD.--December 1974 to current year.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

| DATE | TIME | DIS-CHARGE, INST. CUBIC FEET PER SECOND | SPE-CIFIC CON-DUCT-ANCE (US/CM) | PH WATER WHOLE FIELD (STAND-ARD UNITS) | TEMPER-ATURE AIR (DEG C) | TEMPER-ATURE WATER (DEG C) | TUR-BID-ITY (NTU) | BARO-METRIC PRES-SURE (MM OF HG) | OXYGEN, DIS-SOLVED (MG/L) | OXYGEN, SATUR-ATION (%) | COLI-FORM, FECAL, UM-MF (COLS./100 ML) | STREP-TOCOCCI, FECAL, KF AGAR (COLS./100 ML) |
|------|------|---|---------------------------------|--|--------------------------|----------------------------|-------------------|----------------------------------|---------------------------|-------------------------|--|--|
|------|------|---|---------------------------------|--|--------------------------|----------------------------|-------------------|----------------------------------|---------------------------|-------------------------|--|--|

| | | | | | | | | | | | | | |
|-----|-------|------|-----|----|-----|------|------|------|-----|-----|----|-----|------|
| NOV | 07... | 0940 | 5.0 | 81 | 8.1 | 24.5 | 20.5 | 0.30 | 755 | 8.4 | 94 | K9 | 1400 |
| FEB | 27... | 1130 | 7.3 | 80 | 7.7 | 22.5 | 19.0 | 0.20 | 752 | 8.7 | 95 | K11 | 600 |

| DATE | HARD-NESS (MG/L AS CACO3) | CALCIUM DIS-SOLVED (MG/L AS CA) | MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) | SODIUM, DIS-SOLVED (MG/L AS NA) | SODIUM AD-SORP-TION RATIO | POTAS-SIUM, DIS-SOLVED (MG/L AS K) | ALKA-LINITY LAB (MG/L AS CACO3) | SULFATE DIS-SOLVED (MG/L AS SO4) | CHLO-RIDE, DIS-SOLVED (MG/L AS CL) | FLUO-RIDE, DIS-SOLVED (MG/L AS F) | SILICA, DIS-SOLVED (MG/L AS SIO2) |
|------|---------------------------|---------------------------------|-------------------------------------|---------------------------------|---------------------------|------------------------------------|---------------------------------|----------------------------------|------------------------------------|-----------------------------------|-----------------------------------|
|------|---------------------------|---------------------------------|-------------------------------------|---------------------------------|---------------------------|------------------------------------|---------------------------------|----------------------------------|------------------------------------|-----------------------------------|-----------------------------------|

| | | | | | | | | | | | | | |
|-----|-------|----|-----|-----|-----|----|-----|------|----|------|----|-------|----|
| NOV | 07... | 19 | 3.5 | 2.4 | 7.0 | 44 | 0.7 | 0.80 | 23 | 0.80 | 10 | <0.10 | 19 |
| FEB | 27... | 18 | 3.3 | 2.4 | 7.9 | 47 | 0.8 | 0.80 | 18 | 1.5 | 12 | <0.10 | 16 |

| DATE | SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L) | SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) | SOLIDS, DIS-SOLVED (TONS PER AC-FT) | NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N) | NITRO-GEN, DIS-SOLVED (MG/L AS N) | NITRO-GEN, AM-MONIA + ORG-ANIC DIS-SOLVED (MG/L AS N) | PHOS-PHORUS DIS-SOLVED (MG/L AS P) | PHOS-PHORUS DIS-SOLVED (MG/L AS P) | PHOS-PHORUS ORTHO, DIS-SOLVED (MG/L AS P) | ALUM-INUM, DIS-SOLVED (UG/L AS AL) |
|------|---|---|-------------------------------------|---|-----------------------------------|---|------------------------------------|------------------------------------|---|------------------------------------|
|------|---|---|-------------------------------------|---|-----------------------------------|---|------------------------------------|------------------------------------|---|------------------------------------|

| | | | | | | | | | | | | |
|-----|-------|----|----|------|-------|-------|--------|-------|--------|-------|-------|-----|
| NOV | 07... | 52 | 58 | 0.07 | 0.090 | 0.090 | <0.015 | <0.20 | <0.010 | 0.010 | 0.010 | <10 |
| FEB | 27... | 58 | 55 | 0.08 | 0.090 | 0.090 | <0.015 | <0.20 | 0.020 | 0.010 | 0.020 | 30 |

| DATE | BARIUM, DIS-SOLVED (UG/L AS BA) | COBALT, DIS-SOLVED (UG/L AS CO) | IRON, DIS-SOLVED (UG/L AS FE) | LITHIUM, DIS-SOLVED (UG/L AS LI) | MANGA-NESE, DIS-SOLVED (UG/L AS MN) | MOLYB-DENUM, DIS-SOLVED (UG/L AS MO) | NICKEL, DIS-SOLVED (UG/L AS NI) | SELE-NIUM, DIS-SOLVED (UG/L AS SE) | SILVER, DIS-SOLVED (UG/L AS AG) | STRON-TIUM, DIS-SOLVED (UG/L AS SR) | VANA-DIUM, DIS-SOLVED (UG/L AS V) |
|------|---------------------------------|---------------------------------|-------------------------------|----------------------------------|-------------------------------------|--------------------------------------|---------------------------------|------------------------------------|---------------------------------|-------------------------------------|-----------------------------------|
|------|---------------------------------|---------------------------------|-------------------------------|----------------------------------|-------------------------------------|--------------------------------------|---------------------------------|------------------------------------|---------------------------------|-------------------------------------|-----------------------------------|

| | | | | | | | | | | | | |
|-----|-------|------|------|------|----|------|-----|------|----|------|----|----|
| NOV | 07... | <2.0 | <3.0 | <3.0 | <4 | <1.0 | <10 | <1.0 | <1 | <1.0 | 26 | <6 |
| FEB | 27... | <2.0 | 3.0 | 13 | <4 | <1.0 | 20 | <1.0 | <1 | <1.0 | 24 | 6 |

HAWAII, ISLAND OF MAUI
16618000 KAHAKULOA STREAM NEAR HONOKOHAU--Continued
WATER-QUALITY RECORDS--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

| DATE | TIME | RADIUM 226, DIS- SOLVED, RADON METHOD (PCI/L) (09511) | | RA-226 2 SIGMA WATER, DISS, (PCI/L) (76001) | URANIUM NATURAL DIS- SOLVED (UG/L) AS U (22703) | URANIUM NATURAL 2 SIGMA WATER, DISS, (UG/L) (75990) |
|--------------|------|--|-------|--|---|---|
| | | | | | | |
| FEB 27... | 1130 | <0.02 | <0.00 | <0.01 | 0 | |

PARTICLE-SIZE DISTRIBUTION OF SUSPENDED SEDIMENT, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

| DATE | TIME | SEDI- MENT, DIS- CHARGE, SUS- PENDEDED (MG/L) (80154) | | SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331) |
|--------------|------|--|------|--|
| | | | | |
| NOV 07... | 0940 | 2 | 0.03 | -- |

HAWAII, ISLAND OF MAUI
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 mi².

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).

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 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.--78 years (water years 1914-19, 1923-88, 1991-96), 39.3 ft³/s (28,490 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Prior to October 1990. Maximum discharge, 7,260 ft³/s, January 28, 1988 (gage-height, 8.38 ft for datum and site then in use, from rating curve extended above 3,200 ft³/s, on basis of slope-area measurement at gage height 8.38 ft; minimum, 8.4 ft³/s, May 1, 1945, January 5, 1946.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,000 ft³/s and maximum (*):

| Date | Time | Discharge (ft ³ /s) | Gage height (ft) | Date | Time | Discharge (ft ³ /s) | Gage height (ft) |
|---------|------|-----------------------------------|---------------------|--|------|-----------------------------------|---------------------|
| Mar. 31 | 0330 | *1,500 | *4.60 | No other peak greater than base discharge. | | | |

Minimum discharge, 10.0 ft³/s on September 27-30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|------|------|------|------|------|------|------|------|------|------|------|------|
| 1 | 20 | 28 | 21 | 16 | 15 | 27 | 226 | 18 | 15 | 51 | 27 | 11 |
| 2 | 24 | 18 | 16 | 14 | 15 | 25 | 44 | 17 | 15 | 70 | 44 | 11 |
| 3 | 22 | 16 | 15 | 13 | 15 | 157 | 24 | 16 | 14 | 21 | 33 | 11 |
| 4 | 18 | 37 | 15 | 13 | 14 | 72 | 22 | 16 | 14 | 76 | 31 | 12 |
| 5 | 16 | 16 | 14 | 13 | 13 | 23 | 20 | 16 | 14 | 58 | 25 | 14 |
| 6 | 16 | 16 | 14 | 13 | 13 | 18 | 19 | 16 | 22 | 24 | 43 | 17 |
| 7 | 21 | 40 | 16 | 23 | 14 | 17 | 19 | 16 | 43 | 17 | 28 | 71 |
| 8 | 33 | 26 | 15 | 71 | 53 | 16 | 18 | 16 | 20 | 14 | 17 | 20 |
| 9 | 86 | 17 | 14 | 16 | 15 | 16 | 18 | 17 | 19 | 13 | 13 | 13 |
| 10 | 47 | 16 | 14 | 13 | 15 | 16 | 61 | 16 | 15 | 13 | 17 | 14 |
| 11 | 21 | 23 | 14 | 13 | 14 | 16 | 31 | 15 | 14 | 13 | 25 | 37 |
| 12 | 24 | 26 | 14 | 12 | 13 | 15 | 22 | 15 | 14 | 15 | 18 | 78 |
| 13 | 22 | 71 | 14 | 13 | 13 | 15 | 19 | 15 | 14 | 13 | 101 | 24 |
| 14 | 21 | 103 | 39 | 12 | 62 | 15 | 64 | 20 | 19 | 13 | 17 | 13 |
| 15 | 29 | 28 | 17 | 12 | 141 | 15 | 25 | 24 | 17 | 13 | 14 | 12 |
| 16 | 18 | 18 | 17 | 12 | 76 | 16 | 34 | 22 | 18 | 28 | 16 | 11 |
| 17 | 19 | 18 | 16 | 25 | 22 | 23 | 31 | 22 | 23 | 15 | 13 | 11 |
| 18 | 18 | 17 | 19 | 53 | 17 | 45 | 59 | 37 | 35 | 23 | 17 | 23 |
| 19 | 38 | 17 | 15 | 65 | 16 | 18 | 52 | 26 | 31 | 35 | 13 | 13 |
| 20 | 69 | 16 | 14 | 16 | 15 | 18 | 86 | 24 | 15 | 92 | 13 | 19 |
| 21 | 28 | 15 | 14 | 14 | 22 | 28 | 91 | 16 | 14 | 44 | 12 | 12 |
| 22 | 19 | 15 | 14 | 14 | 26 | 17 | 28 | 15 | 14 | 18 | 12 | 12 |
| 23 | 19 | 15 | 13 | 14 | 27 | 19 | 19 | 15 | 25 | 13 | 12 | 23 |
| 24 | 17 | 15 | 13 | 24 | 92 | 51 | 18 | 19 | 44 | 13 | 12 | 16 |
| 25 | 35 | 15 | 15 | 24 | 70 | 19 | 20 | 19 | 49 | 12 | 12 | 11 |
| 26 | 19 | 15 | 24 | 17 | 61 | 16 | 22 | 24 | 17 | 34 | 12 | 11 |
| 27 | 16 | 15 | 36 | 18 | 60 | 15 | 31 | 17 | 22 | 13 | 12 | 11 |
| 28 | 15 | 19 | 15 | 34 | 120 | 14 | 30 | 69 | 15 | 12 | 12 | 11 |
| 29 | 138 | 15 | 14 | 18 | 52 | 41 | 21 | 30 | 112 | 12 | 12 | 10 |
| 30 | 105 | 69 | 74 | 19 | --- | 222 | 18 | 22 | 20 | 13 | 12 | 10 |
| 31 | 25 | --- | 82 | 37 | --- | 580 | --- | 19 | --- | 20 | 12 | --- |
| TOTAL | 1018 | 775 | 647 | 671 | 1101 | 1605 | 1192 | 649 | 723 | 821 | 657 | 562 |
| MEAN | 32.8 | 25.8 | 20.9 | 21.6 | 38.0 | 51.8 | 39.7 | 20.9 | 24.1 | 26.5 | 21.2 | 18.7 |
| MAX | 138 | 103 | 82 | 71 | 141 | 580 | 226 | 69 | 112 | 92 | 101 | 78 |
| MIN | 15 | 15 | 13 | 12 | 13 | 14 | 18 | 15 | 14 | 12 | 12 | 10 |
| AC-FT | 2020 | 1540 | 1280 | 1330 | 2180 | 3180 | 2360 | 1290 | 1430 | 1630 | 1300 | 1110 |

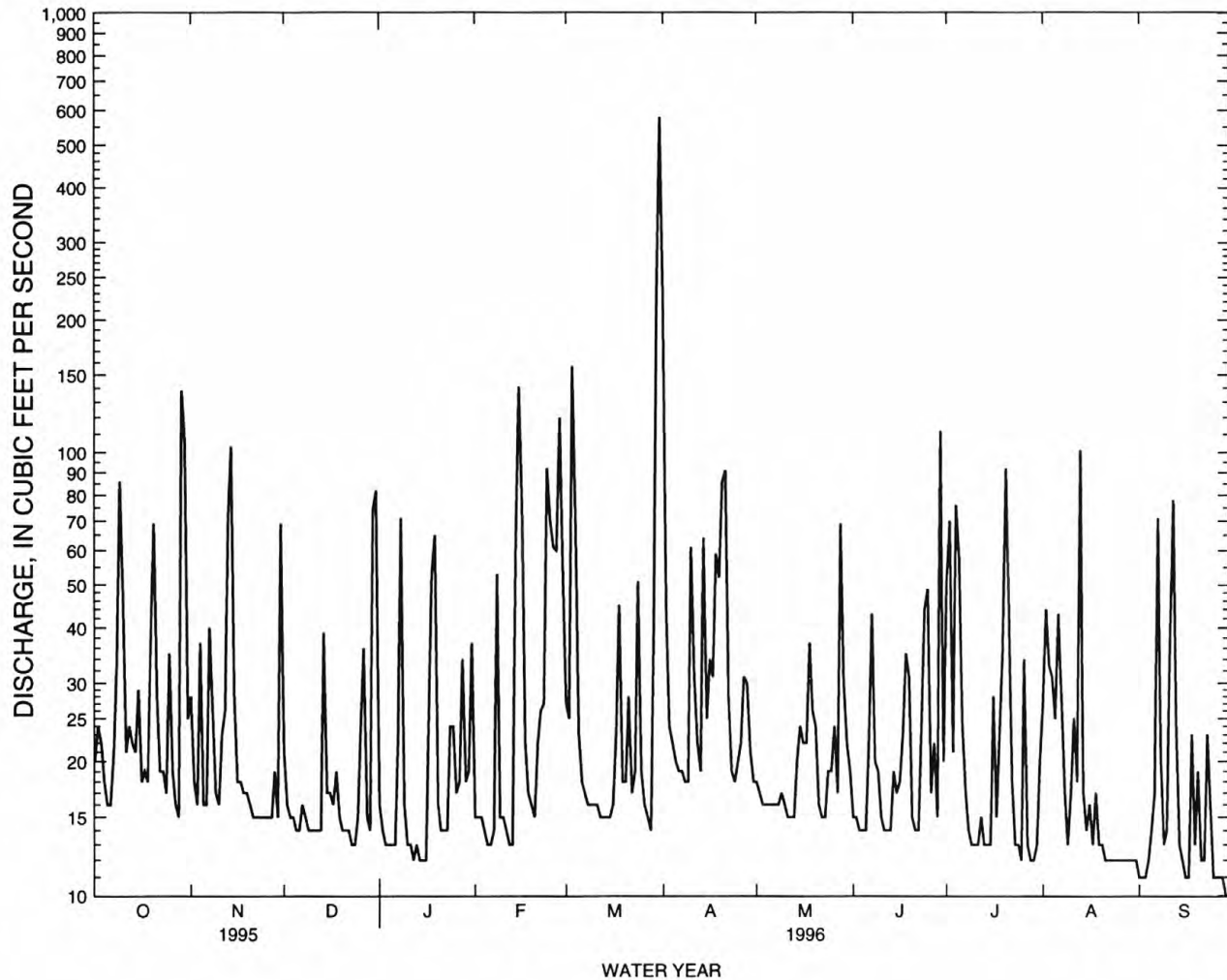
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1913 - 1996, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|------|------|------|------|------|------|------|------|------|------|------|------|------|
| MEAN | 31.7 | 41.1 | 41.0 | 35.8 | 37.1 | 44.4 | 49.1 | 41.5 | 34.4 | 40.2 | 41.3 | 30.5 |
| MAX | 94.8 | 110 | 97.5 | 98.6 | 132 | 144 | 120 | 130 | 81.1 | 116 | 103 | 122 |
| (WY) | 1915 | 1915 | 1955 | 1916 | 1932 | 1942 | 1980 | 1916 | 1916 | 1914 | 1914 | 1914 |
| MIN | 10.8 | 11.8 | 13.0 | 12.3 | 13.5 | 13.4 | 12.9 | 12.2 | 14.2 | 16.2 | 14.5 | 12.1 |
| (WY) | 1985 | 1963 | 1936 | 1944 | 1963 | 1926 | 1992 | 1945 | 1962 | 1926 | 1971 | 1984 |

HAWAII, ISLAND OF MAUI

1662000 HONOKOHAU STREAM NEAR HONOKOHAU--Continued

| SUMMARY STATISTICS | FOR 1995 CALENDAR YEAR | | FOR 1996 WATER YEAR | | WATER YEARS 1913 - 1996 | |
|--------------------------|------------------------|--------|---------------------|--------|-------------------------|-------------|
| ANNUAL TOTAL | 10348 | | 10421 | | 39.3 | |
| ANNUAL MEAN | 28.4 | | 28.5 | | 68.3 | |
| HIGHEST ANNUAL MEAN | | | | | 24.1 | 1914 |
| LOWEST ANNUAL MEAN | | | | | 781 | 1926 |
| HIGHEST DAILY MEAN | 262 | Jan 14 | 580 | Mar 31 | 8.0 | Apr 7 1938 |
| LOWEST DAILY MEAN | 11 | Mar 12 | 10 | Sep 29 | 8.5 | Aug 10 1920 |
| ANNUAL SEVEN-DAY MINIMUM | 12 | Mar 12 | 11 | Sep 24 | | Feb 6 1985 |
| ANNUAL RUNOFF (AC-FT) | 20530 | | 20670 | | 28490 | |
| 10 PERCENT EXCEEDS | 64 | | 59 | | 79 | |
| 50 PERCENT EXCEEDS | 17 | | 17 | | 24 | |
| 90 PERCENT EXCEEDS | 13 | | 13 | | 13 | |



Surface-Water Station Records
for Hawaii

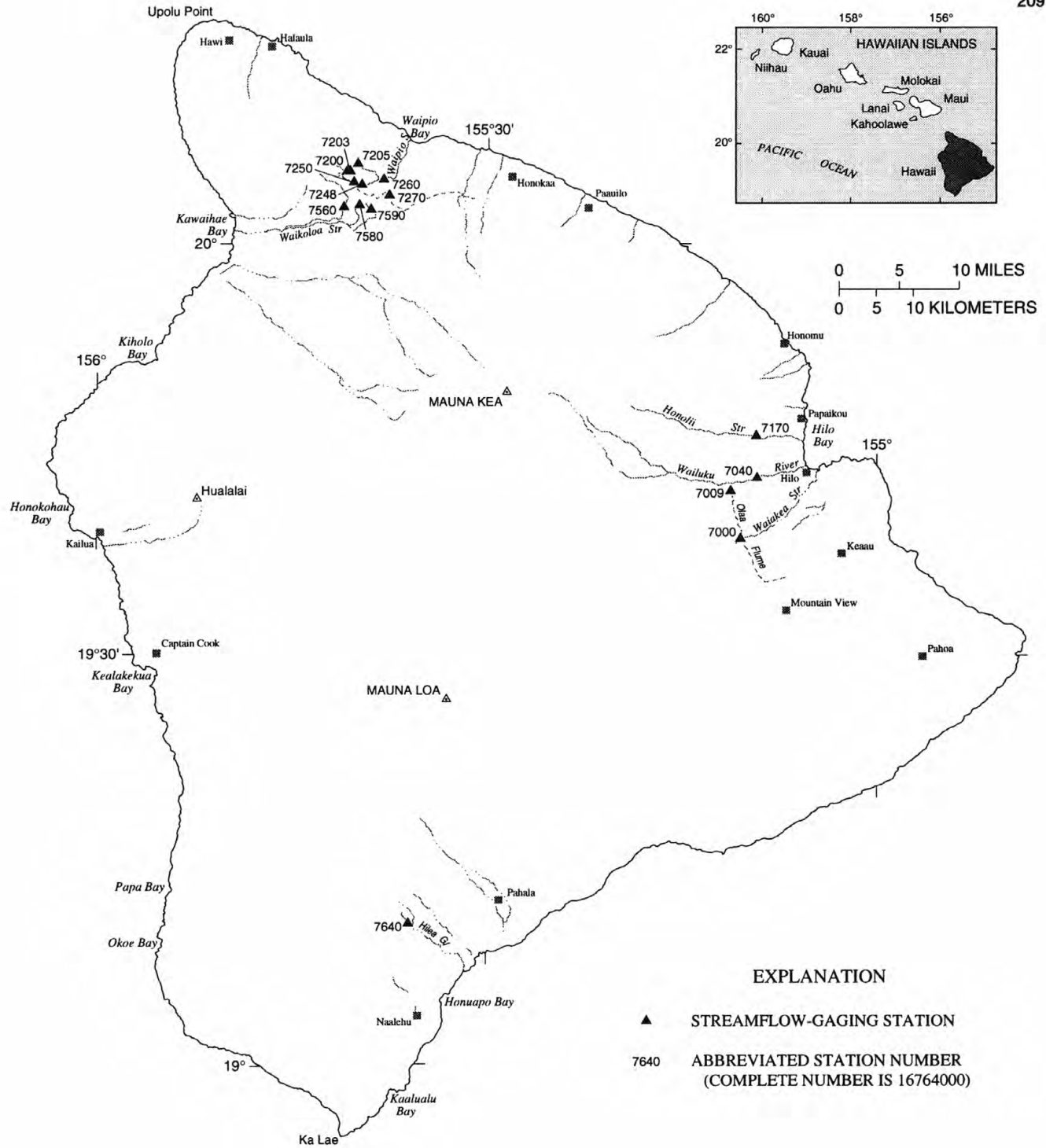


Figure 9. Locations of gaging, water-quality, and partial-record stations on Hawaii.

HAWAII, ISLAND OF HAWAII
16700000 WAIAKEA STREAM NEAR MOUNTAIN VIEW

RECORDS BEING REVIEWED

HAWAII, ISLAND OF HAWAII

16700900 OLAA FLUME SPRING NEAR KAUMANA

LOCATION.--Lat 19°41'59 ", long 155°11'13 ", Hydrologic Unit 20010000, on left bank 58 ft downstream from tunnel entrance, 3.3 mi northwest of Kaumana School, and 6.5 mi southwest of Hilo Post Office.

PERIOD OF RECORD.--October 1974 to current year.

GAGE.--Water-stage recorder and concrete control. Elevation of gage is 1,970 ft, from topographic map.

REMARKS.--Records good. County of Hawaii, Department of Water Supply, diverts by 16-in. pipeline 50 ft upstream for domestic use in the Kaumana and Piihonua areas since October 2, 1978.

AVERAGE DISCHARGE.--Water year 1991: 17 years (water years 1975-91), 6.20 ft³/s (4,500 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 43 ft³/s, January 8, 1975; no flow on August 13-18, 1980 (revised).

EXTREMES FOR CURRENT YEAR.--Water year 1991: Maximum daily discharge, 11 ft³/s, November 15; minimum daily, 0.03 ft³/s, February 6-13, March 2-6.

REVISIONS.--The annual minimum daily discharge for water years 1975 to 1982 have been revised. Daily discharges, in cubic feet per second, for all daily discharges less than 4 ft³/s for the period December 5, 1974 to September 30, 1982 have also been revised. These figures supersede those published in the annual reports for water years 1975 to 1982.

Water year 1976: Minimum daily discharge, 3.7 ft³/s, October 4, 5, 1975.

Water year 1977: Minimum daily discharge, 1.7 ft³/s, February 23, 1977.

Water year 1978: Minimum daily discharge, 0.12 ft³/s, February 12, 1978, September 8, 9, 1978.

Water year 1979: Minimum daily discharge, 2.1 ft³/s, September 24, 1979.

Water year 1980: No flow on August 13-18, 1980.

Water year 1981: Minimum daily discharge, 0.01 ft³/s, December 24-26, 1980.

Water year 1982: Minimum daily discharge, 0.41 ft³/s, March 5-8, 1982.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1974 TO SEPTEMBER 1975
DAILY MEAN VALUES

| | | | | | | | |
|-------------------|-----|-------------------|-----|-------------------|-----|-------------------|-----|
| June 28 | 3.7 | July 9 | 3.7 | July 11 | 3.2 | July 12 | 3.7 |
| June 29 | 3.5 | July 10 | 3.5 | | | | |

| MONTH | TOTAL | MEAN | MAX | MIN | AC-FT |
|-------------|---------|------|-----|-----|--------|
| June 1975 | 162.6 | 5.42 | 8.4 | 3.5 | 323 |
| July 1975 | 195.0 | 6.29 | 9.4 | 3.2 | 387 |
| WTR YR 1975 | 5,232.9 | 14.3 | 43 | 1.2 | 10,380 |

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1974 TO SEPTEMBER 1976
DAILY MEAN VALUES

| | | | |
|------------------|-----|------------------|-----|
| Oct. 4 | 3.7 | Oct. 5 | 3.7 |
|------------------|-----|------------------|-----|

| MONTH | TOTAL | MEAN | MAX | MIN | AC-FT |
|-------------|---------|------|-----|-----|--------|
| Oct. 1975 | 425.8 | 13.7 | 28 | 3.7 | 845 |
| CAL YR 1975 | 5,572.4 | 15.3 | 43 | 3.2 | 11,050 |
| WTR YR 1976 | 6,129.9 | 16.7 | 36 | 3.7 | 12,160 |

HAWAII, ISLAND OF HAWAII
16700900 OLAA FLUME SPRING NEAR KAUMANA--Continued

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1974 TO SEPTEMBER 1976
DAILY MEAN VALUES

| | | | | | | | |
|--------------|-----|--------------|-----|--------------|-----|--------------|-----|
| Jan. 20..... | 3.7 | Jan. 31..... | 2.1 | Feb. 13..... | 2.7 | Feb. 23..... | 1.7 |
| Jan. 21..... | 3.4 | Feb. 1..... | 2.1 | Feb. 14..... | 2.3 | Feb. 24..... | 1.8 |
| Jan. 22..... | 3.2 | Feb. 2..... | 2.0 | Feb. 15..... | 2.5 | June 27..... | 3.7 |
| Jan. 23..... | 3.0 | Feb. 3..... | 2.1 | Feb. 16..... | 2.8 | June 28..... | 3.4 |
| Jan. 24..... | 2.8 | Feb. 4..... | 2.3 | Feb. 17..... | 2.5 | June 29..... | 3.2 |
| Jan. 25..... | 2.7 | Feb. 5..... | 2.7 | Feb. 18..... | 2.3 | June 30..... | 3.2 |
| Jan. 26..... | 2.3 | Feb. 6..... | 2.8 | Feb. 19..... | 2.2 | July 1..... | 3.0 |
| Jan. 27..... | 2.2 | Feb. 10..... | 3.4 | Feb. 20..... | 2.1 | July 2..... | 2.8 |
| Jan. 28..... | 2.1 | Feb. 11..... | 3.0 | Feb. 21..... | 2.0 | July 3..... | 2.8 |
| Jan. 29..... | 2.1 | Feb. 12..... | 2.8 | Feb. 22..... | 1.8 | July 4..... | 3.4 |
| Jan. 30..... | 2.1 | | | | | | |

| MONTH | TOTAL | MEAN | MAX | MIN | AC-FT |
|-------------|---------|------|-----|-----|--------|
| Jan. 1977 | 168.6 | 5.44 | 10 | 2.1 | 334 |
| Feb. 1977 | 115.2 | 4.11 | 26 | 1.7 | 228 |
| June 1977 | 204.5 | 6.82 | 12 | 3.2 | 406 |
| July 1977 | 484.9 | 15.6 | 24 | 2.8 | 962 |
| CAL YR 1976 | 5,918.5 | 16.2 | 36 | 4.6 | 11,740 |
| WTR YR 1977 | 5,200.8 | 14.2 | 31 | 1.7 | 10,320 |

HAWAII, ISLAND OF HAWAII
16700900 OLAA FLUME SPRING NEAR KAUMANA--Continued

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1977 TO SEPTEMBER 1978
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------------|-------|---------|-------|-------|-------|-------|------|------|-------|-------|-------|--------|
| 1 | 9.0 | 14 | 6.2 | 2.3 | 7.4 | 2.3 | 10 | 12 | 14 | 14 | 13 | 12 |
| 2 | 8.6 | 15 | 6.0 | 2.3 | 4.0 | 2.3 | 10 | 13 | 14 | 14 | 13 | 12 |
| 3 | 8.2 | 17 | 5.7 | 2.5 | 1.1 | 2.2 | 11 | 16 | 14 | 13 | 12 | 12 |
| 4 | 8.4 | 19 | 5.4 | 2.7 | 1.1 | 2.1 | 12 | 16 | 14 | 14 | 12 | 12 |
| 5 | 8.6 | 18 | 5.1 | 2.8 | 1.1 | 2.0 | 11 | 16 | 13 | 14 | 12 | 11 |
| 6 | 8.8 | 16 | 4.9 | 2.5 | .96 | 1.7 | 12 | 15 | 13 | 18 | 12 | 11 |
| 7 | 8.4 | 14 | 4.6 | 2.3 | .96 | 1.7 | 15 | 14 | 12 | 24 | 6.8 | 6.7 |
| 8 | 8.4 | 12 | 4.1 | 2.2 | .75 | 1.8 | 18 | 13 | 12 | 21 | 5.9 | .12 |
| 9 | 8.6 | 11 | 3.7 | 2.1 | .50 | 3.2 | 17 | 12 | 11 | 18 | 10 | .12 |
| 10 | 8.6 | 10 | 3.4 | 2.1 | .35 | 4.6 | 15 | 12 | 11 | 17 | 8.6 | .25 |
| 11 | 9.2 | 9.8 | 3.2 | 1.8 | .16 | 4.6 | 14 | 11 | 11 | 16 | 9.5 | .30 |
| 12 | 9.2 | 9.4 | 3.0 | 1.7 | .12 | 5.4 | 12 | 11 | 11 | 17 | 7.1 | 5.0 |
| 13 | 10 | 9.0 | 2.7 | 1.7 | .35 | 8.0 | 12 | 10 | 11 | 18 | 6.7 | 8.4 |
| 14 | 10 | 9.0 | 2.5 | 1.6 | .85 | 10 | 13 | 10 | 11 | 18 | 8.1 | 8.4 |
| 15 | 9.4 | 9.6 | 2.3 | 1.6 | 1.5 | 12 | 14 | 10 | 11 | 16 | 6.6 | 8.4 |
| 16 | 9.4 | 14 | 2.3 | 1.6 | 3.5 | 12 | 14 | 11 | 11 | 15 | 5.7 | 8.4 |
| 17 | 16 | 16 | 3.2 | 1.6 | 3.0 | 13 | 18 | 14 | 12 | 14 | 12 | 8.2 |
| 18 | 18 | 14 | 4.6 | 1.5 | 2.8 | 12 | 20 | 14 | 13 | 14 | 12 | 8.2 |
| 19 | 15 | 12 | 5.5 | 1.5 | 2.8 | 13 | 18 | 14 | 17 | 14 | 10 | 8.2 |
| 20 | 13 | 11 | 5.9 | 1.5 | 2.7 | 14 | 15 | 13 | 18 | 14 | 6.6 | 7.4 |
| 21 | 12 | 10 | 5.7 | 4.1 | 2.7 | 14 | 13 | 14 | 17 | 18 | 7.4 | 6.9 |
| 22 | 14 | 9.6 | 5.4 | 8.4 | 2.3 | 15 | 12 | 16 | 16 | 20 | 11 | 7.1 |
| 23 | 16 | 9.2 | 4.9 | 10 | 2.5 | 14 | 12 | 16 | 20 | 18 | 11 | 7.1 |
| 24 | 15 | 9.0 | 4.6 | 9.0 | 3.4 | 14 | 11 | 18 | 21 | 16 | 8.4 | 6.9 |
| 25 | 15 | 8.4 | 4.0 | 8.2 | 3.2 | 12 | 11 | 18 | 19 | 15 | 6.6 | 6.6 |
| 26 | 15 | 8.0 | 3.7 | 8.2 | 2.8 | 12 | 11 | 18 | 17 | 8.1 | 6.0 | 6.4 |
| 27 | 18 | 7.4 | 3.4 | 8.8 | 2.7 | 12 | 11 | 17 | 16 | 2.7 | 5.4 | 6.4 |
| 28 | 18 | 7.1 | 3.0 | 9.4 | 2.3 | 11 | 12 | 16 | 15 | 7.3 | 3.7 | 6.2 |
| 29 | 17 | 6.7 | 2.8 | 9.0 | --- | 11 | 12 | 16 | 15 | 10 | 2.5 | 6.2 |
| 30 | 16 | 6.4 | 2.7 | 8.6 | --- | 10 | 12 | 16 | 14 | 12 | 4.0 | 6.2 |
| 31 | 15 | --- | 2.3 | 8.0 | --- | 10 | --- | 15 | --- | 11 | 7.4 | --- |
| TOTAL | 375.8 | 341.6 | 126.8 | 131.6 | 57.90 | 262.9 | 398 | 437 | 424 | 461.1 | 263.0 | 214.09 |
| MEAN | 12.1 | 11.4 | 4.09 | 4.25 | 2.07 | 8.48 | 13.3 | 14.1 | 14.1 | 14.9 | 8.48 | 7.14 |
| MAX | 18 | 19 | 6.2 | 10 | 7.4 | 15 | 20 | 18 | 21 | 24 | 13 | 12 |
| MIN | 8.2 | 6.4 | 2.3 | 1.5 | .12 | 1.7 | 10 | 10 | 11 | 2.7 | 2.5 | .12 |
| AC-FT | 745 | 678 | 252 | 261 | 115 | 521 | 789 | 867 | 841 | 915 | 522 | 425 |
| CAL YR 1977 | TOTAL | 5003.4 | MEAN | 13.7 | MAX | 31 | MIN | 1.7 | AC-FT | 9920 | | |
| WTR YR 1978 | TOTAL | 3493.79 | MEAN | 9.57 | MAX | 24 | MIN | .12 | AC-FT | 6930 | | |

HAWAII, ISLAND OF HAWAII
16700900 OLAA FLUME SPRING NEAR KAUMANA--Continued

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1978 TO SEPTEMBER 1979
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|
| 1 | 5.2 | 3.9 | 4.5 | 4.5 | 13 | 13 | 4.6 | 4.0 | 4.0 | 8.5 | 4.2 | 3.2 |
| 2 | 4.2 | 4.0 | 4.5 | 4.4 | 12 | 12 | 4.7 | 4.2 | 4.5 | 8.0 | 4.2 | 3.1 |
| 3 | 3.2 | 4.2 | 4.5 | 4.4 | 11 | 11 | 5.0 | 4.2 | 4.5 | 7.5 | 3.9 | 3.1 |
| 4 | 3.2 | 4.2 | 4.5 | 4.3 | 10 | 10 | 6.2 | 4.2 | 4.0 | 8.0 | 3.6 | 3.1 |
| 5 | 3.7 | 4.0 | 4.4 | 4.3 | 11 | 9.3 | 9.5 | 4.0 | 4.0 | 8.0 | 3.5 | 3.0 |
| 6 | 3.9 | 5.4 | 4.4 | 4.3 | 14 | 7.9 | 8.5 | 4.0 | 4.0 | 8.0 | 3.5 | 3.0 |
| 7 | 3.5 | 10 | 5.0 | 4.2 | 12 | 6.6 | 8.3 | 4.0 | 4.0 | 10 | 3.5 | 2.8 |
| 8 | 3.5 | 9.1 | 4.8 | 4.2 | 10 | 5.6 | 8.3 | 4.0 | 4.0 | 9.5 | 3.5 | 2.8 |
| 9 | 3.7 | 6.2 | 5.4 | 4.2 | 9.3 | 5.4 | 7.7 | 4.0 | 3.4 | 9.0 | 3.5 | 2.7 |
| 10 | 3.7 | 4.5 | 9.5 | 4.2 | 8.5 | 8.9 | 5.8 | 4.0 | 3.4 | 7.2 | 3.5 | 3.0 |
| 11 | 3.6 | 4.3 | 9.3 | 4.2 | 7.2 | 9.9 | 4.7 | 4.0 | 4.5 | 5.3 | 3.2 | 3.1 |
| 12 | 3.5 | 4.3 | 8.9 | 4.2 | 6.0 | 8.5 | 4.6 | 4.0 | 7.0 | 4.7 | 3.2 | 3.0 |
| 13 | 3.5 | 4.3 | 9.1 | 4.3 | 5.3 | 6.6 | 4.4 | 4.0 | 8.5 | 4.6 | 3.2 | 3.0 |
| 14 | 3.5 | 4.3 | 9.9 | 9.3 | 5.0 | 5.6 | 4.2 | 4.2 | 8.0 | 4.5 | 3.5 | 2.7 |
| 15 | 3.5 | 4.2 | 11 | 14 | 6.4 | 5.3 | 4.2 | 4.2 | 7.0 | 4.5 | 3.7 | 2.7 |
| 16 | 3.5 | 4.0 | 11 | 17 | 9.1 | 5.2 | 4.2 | 4.3 | 7.0 | 4.4 | 4.3 | 2.5 |
| 17 | 3.5 | 4.0 | 9.9 | 17 | 9.3 | 5.2 | 4.0 | 4.4 | 7.0 | 4.4 | 4.4 | 2.5 |
| 18 | 3.5 | 4.0 | 10 | 16 | 11 | 5.0 | 4.2 | 4.4 | 7.0 | 4.3 | 4.2 | 2.5 |
| 19 | 3.6 | 4.0 | 11 | 13 | 13 | 5.0 | 4.2 | 4.3 | 6.5 | 4.3 | 4.0 | 2.5 |
| 20 | 3.7 | 4.4 | 11 | 10 | 17 | 5.2 | 4.5 | 4.2 | 6.5 | 4.3 | 3.7 | 2.5 |
| 21 | 3.6 | 9.5 | 10 | 9.7 | 17 | 5.6 | 4.3 | 4.2 | 6.0 | 4.3 | 3.6 | 2.5 |
| 22 | 3.5 | 11 | 9.5 | 11 | 15 | 5.8 | 4.2 | 4.2 | 6.0 | 4.3 | 3.6 | 2.3 |
| 23 | 3.5 | 9.7 | 8.5 | 16 | 12 | 5.6 | 3.9 | 4.2 | 8.0 | 4.3 | 3.6 | 2.2 |
| 24 | 3.5 | 9.1 | 6.6 | 17 | 12 | 5.3 | 3.8 | 4.2 | 9.0 | 4.3 | 3.5 | 2.1 |
| 25 | 3.5 | 8.3 | 5.4 | 16 | 14 | 5.0 | 3.8 | 4.0 | 9.0 | 4.3 | 3.5 | 2.3 |
| 26 | 3.5 | 6.6 | 5.0 | 13 | 16 | 5.0 | 3.8 | 4.0 | 10 | 4.3 | 3.5 | 2.5 |
| 27 | 3.5 | 5.9 | 4.7 | 11 | 15 | 5.0 | 3.8 | 4.0 | 10 | 4.3 | 3.5 | 2.7 |
| 28 | 3.5 | 5.2 | 4.7 | 10 | 14 | 4.8 | 3.8 | 4.0 | 9.5 | 4.2 | 3.2 | 2.7 |
| 29 | 3.5 | 4.7 | 4.6 | 10 | --- | 4.7 | 3.9 | 4.0 | 9.5 | 4.2 | 3.2 | 2.7 |
| 30 | 3.7 | 4.5 | 4.5 | 11 | --- | 4.7 | 4.0 | 3.4 | 9.0 | 4.2 | 3.2 | 2.7 |
| 31 | 3.9 | --- | 4.5 | 12 | --- | 4.6 | --- | 4.0 | --- | 4.2 | 3.2 | --- |
| TOTAL | 112.4 | 171.8 | 220.6 | 288.7 | 315.1 | 207.3 | 151.1 | 126.8 | 194.8 | 175.9 | 111.9 | 81.5 |
| MEAN | 3.63 | 5.73 | 7.12 | 9.31 | 11.3 | 6.69 | 5.04 | 4.09 | 6.49 | 5.67 | 3.61 | 2.72 |
| MAX | 5.2 | 11 | 11 | 17 | 17 | 13 | 9.5 | 4.4 | 10 | 10 | 4.4 | 3.2 |
| MIN | 3.2 | 3.9 | 4.4 | 4.2 | 5.0 | 4.6 | 3.8 | 3.4 | 3.4 | 4.2 | 3.2 | 2.1 |
| AC-FT | 223 | 341 | 438 | 573 | 625 | 411 | 300 | 252 | 386 | 349 | 222 | 162 |

CAL YR 1978 TOTAL 3154.39 MEAN 8.64 MAX 24 MIN .12 AC-FT 6260
WTR YR 1979 TOTAL 2157.9 MEAN 5.91 MAX 17 MIN 2.1 AC-FT 4280

HAWAII, ISLAND OF HAWAII
16700900 OLAA FLUME SPRING NEAR KAUMANA--Continued

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1979 TO SEPTEMBER 1980
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|-------|-------|-------|-------|------|-------|------|------|------|------|-------|-------|
| 1 | 2.4 | 3.5 | 5.0 | 3.9 | .14 | .22 | .22 | .07 | .16 | .16 | .02 | 5.8 |
| 2 | 2.4 | 3.5 | 4.7 | 3.9 | .14 | .22 | .22 | .04 | .16 | .16 | .02 | 5.4 |
| 3 | 2.5 | 3.5 | 4.6 | 3.9 | .14 | .22 | .22 | .04 | .16 | .16 | .02 | 4.7 |
| 4 | 3.0 | 3.5 | 4.5 | 3.7 | .14 | .25 | .22 | .11 | .21 | .16 | .02 | 4.6 |
| 5 | 3.0 | 3.5 | 4.5 | 3.7 | .14 | .25 | .18 | .11 | .21 | .16 | .02 | 7.2 |
| 6 | 3.0 | 3.4 | 4.4 | 3.7 | .14 | 5.0 | .18 | .14 | .16 | .16 | .03 | 7.7 |
| 7 | 5.2 | 3.4 | 4.4 | 3.7 | .11 | 11 | .18 | .14 | .16 | .16 | .03 | 6.8 |
| 8 | 5.0 | 3.4 | 4.6 | 3.7 | .07 | 11 | .18 | .14 | .16 | .16 | .03 | 5.9 |
| 9 | 4.4 | 3.4 | 4.8 | 3.7 | .04 | 10 | .18 | .14 | .16 | .16 | .03 | 5.6 |
| 10 | 7.2 | 3.4 | 4.6 | 3.7 | .04 | 9.0 | .18 | .14 | .16 | .16 | .03 | 5.2 |
| 11 | 5.8 | 3.4 | 4.5 | 3.7 | .07 | 6.2 | .14 | .07 | .21 | .21 | .02 | 4.8 |
| 12 | 4.2 | 3.4 | 4.4 | 3.7 | .07 | .85 | .18 | .11 | .21 | .21 | .02 | 4.7 |
| 13 | 3.6 | 3.4 | 4.4 | 3.6 | .07 | .07 | .18 | .14 | .21 | .21 | .00 | 4.6 |
| 14 | 3.5 | 2.9 | 4.4 | 3.5 | .04 | .07 | .18 | .14 | .21 | .21 | .00 | 4.7 |
| 15 | 3.4 | 3.2 | 4.3 | 3.5 | .04 | .04 | .18 | .14 | .21 | .21 | .00 | 4.6 |
| 16 | 3.4 | 4.7 | 4.3 | 3.2 | .04 | .07 | .25 | .11 | .21 | .21 | .00 | 4.7 |
| 17 | 3.5 | 12 | 4.3 | 2.8 | .04 | .18 | .07 | .11 | .21 | .21 | .00 | 4.7 |
| 18 | 3.9 | 15 | 4.3 | 2.7 | .04 | .75 | .07 | .11 | .21 | .21 | .00 | 4.8 |
| 19 | 3.9 | 15 | 4.2 | 2.5 | .03 | .18 | .07 | .11 | .21 | .21 | 1.8 | 4.8 |
| 20 | 4.0 | 13 | 4.2 | 2.4 | .02 | .18 | .07 | .07 | .21 | .21 | 4.5 | 4.8 |
| 21 | 4.0 | 11 | 4.0 | 2.3 | .02 | .18 | .07 | .04 | .21 | .16 | 4.3 | 9.3 |
| 22 | 4.0 | 9.3 | 4.0 | 2.2 | .02 | .18 | .04 | .11 | .16 | .07 | 4.4 | 12 |
| 23 | 3.9 | 9.1 | 3.9 | 2.1 | .02 | .22 | .04 | .07 | .16 | .04 | 4.4 | 11 |
| 24 | 4.0 | 8.5 | 3.9 | 2.0 | .02 | .41 | .11 | .07 | .16 | .04 | 4.2 | 10 |
| 25 | 3.9 | 8.7 | 3.9 | 2.0 | .02 | .33 | .11 | .07 | .16 | .04 | 4.0 | 9.9 |
| 26 | 3.9 | 9.5 | 3.9 | 1.8 | .02 | .25 | .11 | .07 | .16 | .03 | 3.9 | 9.3 |
| 27 | 3.6 | 7.7 | 3.9 | 1.7 | .02 | .33 | .11 | .07 | .16 | .03 | 3.7 | 8.9 |
| 28 | 3.6 | 6.4 | 3.9 | 1.6 | .02 | .33 | .11 | .11 | .16 | .03 | 3.5 | 8.5 |
| 29 | 3.6 | 5.6 | 3.9 | .65 | .11 | .25 | .11 | .11 | .16 | .03 | 3.7 | 7.7 |
| 30 | 3.6 | 5.2 | 3.9 | .14 | --- | .25 | .07 | .11 | .16 | .03 | 4.5 | 7.5 |
| 31 | 3.5 | --- | 3.9 | .14 | --- | .22 | --- | .11 | --- | .03 | 5.8 | --- |
| TOTAL | 118.9 | 191.5 | 132.5 | 85.83 | 1.83 | 58.70 | 4.23 | 3.12 | 5.45 | 4.23 | 52.99 | 200.2 |
| MEAN | 3.84 | 6.38 | 4.27 | 2.77 | .063 | 1.89 | .14 | .10 | .18 | .14 | 1.71 | 6.67 |
| MAX | 7.2 | 15 | 5.0 | 3.9 | .14 | 11 | .25 | .14 | .21 | .21 | 5.8 | 12 |
| MIN | 2.4 | 2.9 | 3.9 | .14 | .02 | .04 | .04 | .04 | .16 | .03 | .00 | 4.6 |
| AC-FT | 236 | 380 | 263 | 170 | 3.6 | 116 | 8.4 | 6.2 | 11 | 8.4 | 105 | 397 |

CAL YR 1979 TOTAL 2096.0 MEAN 5.74 MAX 17 MIN 2.1 AC-FT 4160
WTR YR 1980 TOTAL 859.48 MEAN 2.35 MAX 15 MIN .00 AC-FT 1700

HAWAII, ISLAND OF HAWAII
16700900 OLA FLUME SPRING NEAR KAUMANA--Continued

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1980 TO SEPTEMBER 1981
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 7.2 | 6.8 | 6.0 | .33 | .25 | 6.2 | 4.0 | 3.5 | 2.7 | .41 | .14 | .18 |
| 2 | 7.2 | 6.4 | 5.9 | .25 | .25 | 5.8 | 8.0 | 3.5 | 2.7 | .41 | .14 | .18 |
| 3 | 7.0 | 6.2 | 5.8 | .33 | .25 | 5.4 | 7.0 | 3.5 | 2.5 | .41 | .85 | .14 |
| 4 | 7.0 | 6.2 | 5.4 | .41 | .25 | 5.6 | 6.5 | 3.5 | 2.5 | .41 | 3.5 | .14 |
| 5 | 7.0 | 6.0 | 5.3 | .48 | .14 | 5.6 | 6.0 | 3.5 | .85 | .41 | 9.1 | .14 |
| 6 | 7.0 | 5.8 | 5.0 | .41 | .07 | 5.4 | 6.0 | 3.5 | .22 | .33 | 7.5 | .14 |
| 7 | 6.4 | 5.3 | 4.8 | .41 | .07 | 5.4 | 5.0 | 3.5 | .22 | .33 | 4.5 | .14 |
| 8 | 6.6 | 4.8 | 4.6 | .33 | .07 | 5.3 | 5.0 | 3.5 | .18 | .25 | 3.9 | .11 |
| 9 | 7.0 | 4.8 | 4.4 | .33 | .22 | 5.3 | 4.5 | 3.5 | .18 | .33 | 2.5 | .11 |
| 10 | 7.0 | 5.8 | 4.2 | .33 | .22 | 5.2 | 4.5 | 3.5 | .18 | .33 | 1.6 | .14 |
| 11 | 7.2 | 7.2 | 2.3 | .33 | .14 | 5.2 | 4.0 | 3.5 | .18 | .33 | 1.5 | .14 |
| 12 | 8.1 | 8.9 | .96 | .33 | .14 | 7.2 | 4.0 | 3.5 | .18 | .48 | 5.6 | .14 |
| 13 | 9.3 | 8.9 | .85 | .65 | .14 | 7.0 | 3.4 | 3.4 | .14 | .48 | 8.9 | .18 |
| 14 | 8.7 | 7.5 | .85 | .41 | .11 | 6.8 | 3.5 | 3.4 | .14 | .48 | 7.7 | .22 |
| 15 | 7.9 | 7.2 | .96 | .25 | .01 | 6.2 | 3.5 | 3.4 | .14 | .48 | 5.2 | .22 |
| 16 | 7.5 | 6.6 | .96 | .22 | .01 | 5.9 | 3.5 | 3.4 | .14 | .48 | 3.4 | .25 |
| 17 | 8.3 | 7.2 | .96 | .18 | .01 | 5.8 | 3.4 | 3.4 | .11 | .54 | 2.0 | .41 |
| 18 | 9.3 | 8.9 | .85 | .14 | .01 | 4.7 | 3.2 | 3.4 | .11 | .54 | 1.4 | .41 |
| 19 | 9.1 | 9.7 | .85 | .11 | .01 | 4.5 | 3.4 | 3.4 | .07 | .54 | 1.4 | .48 |
| 20 | 8.7 | 9.3 | .75 | .07 | .01 | 4.2 | 3.4 | 3.4 | .07 | .54 | 2.5 | .48 |
| 21 | 8.7 | 8.3 | .75 | .04 | .04 | 3.5 | 3.4 | 3.4 | .07 | .25 | 1.4 | .54 |
| 22 | 8.1 | 7.7 | .38 | .04 | .14 | 3.1 | 3.4 | 3.4 | .14 | .41 | .48 | .65 |
| 23 | 7.7 | 7.3 | .04 | .04 | .41 | 2.7 | 3.4 | 3.2 | .33 | .33 | .25 | .75 |
| 24 | 7.5 | 7.2 | .01 | .04 | 2.2 | 2.5 | 3.4 | 3.2 | .33 | .22 | .65 | .85 |
| 25 | 7.2 | 7.0 | .01 | .04 | 5.2 | 2.5 | 3.4 | 3.2 | .41 | .18 | .25 | .85 |
| 26 | 7.0 | 6.8 | .01 | .04 | 5.9 | 2.5 | 3.4 | 3.2 | .33 | .18 | .25 | .85 |
| 27 | 6.8 | 6.8 | .14 | .04 | 5.9 | 2.8 | 3.4 | 3.2 | .33 | .14 | .22 | 5.8 |
| 28 | 6.8 | 6.6 | .14 | .04 | 5.9 | 3.4 | 3.5 | 3.1 | .33 | .14 | .25 | 14 |
| 29 | 7.0 | 6.4 | .14 | .14 | --- | 2.8 | 3.5 | 3.0 | .41 | .22 | .25 | 13 |
| 30 | 7.0 | 6.2 | .22 | .22 | --- | 3.4 | 3.5 | 3.0 | .33 | .18 | .22 | 10 |
| 31 | 6.8 | --- | .33 | .25 | --- | 3.4 | --- | 2.8 | --- | .18 | 1.7 | --- |
| TOTAL | 234.1 | 209.8 | 63.86 | 7.23 | 28.07 | 145.3 | 126.1 | 103.9 | 16.52 | 10.94 | 79.25 | 51.64 |
| MEAN | 7.55 | 6.99 | 2.06 | .23 | 1.00 | 4.69 | 4.20 | 3.35 | .55 | .35 | 2.56 | 1.72 |
| MAX | 9.3 | 9.7 | 6.0 | .65 | 5.9 | 7.2 | 8.0 | 3.5 | 2.7 | .54 | 9.1 | 14 |
| MIN | 6.4 | 4.8 | .01 | .04 | .01 | 2.5 | 3.2 | 2.8 | .07 | .14 | .14 | .11 |
| AC-FT | 464 | 416 | 127 | 14 | 56 | 288 | 250 | 206 | 33 | 22 | 157 | 102 |

CAL YR 1980 TOTAL 924.34 MEAN 2.53 MAX 12 MIN .00 AC-FT 1830
WTR YR 1981 TOTAL 1076.71 MEAN 2.95 MAX 14 MIN .01 AC-FT 2140

HAWAII, ISLAND OF HAWAII
16700900 OLAA FLUME SPRING NEAR KAUMANA--Continued

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1981 TO SEPTEMBER 1982
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------------|---------------|-----------|--------|---------|------------|--------|-------|-------|-------|--------|-------|-------|
| 1 | 9.7 | .85 | 14 | 13 | 7.9 | .54 | 14 | 14 | 2.2 | .48 | 9.9 | 18 |
| 2 | 9.3 | .85 | 16 | 12 | 7.0 | .54 | 14 | 14 | 1.5 | 2.7 | 13 | 18 |
| 3 | 10 | .96 | 15 | 11 | 6.0 | .54 | 13 | 14 | 1.1 | 9.5 | 13 | 16 |
| 4 | 9.5 | 9.1 | 14 | 10 | 5.8 | .48 | 12 | 12 | 1.1 | 10 | 11 | 15 |
| 5 | 8.9 | 8.3 | 12 | 9.5 | 4.6 | .41 | 10 | 10 | .96 | 10 | 8.9 | 14 |
| 6 | 8.1 | 5.8 | 11 | 9.0 | 4.8 | .41 | 9.9 | 8.5 | .96 | 11 | 8.3 | 13 |
| 7 | 7.5 | 4.4 | 10 | 8.0 | 4.6 | .41 | 9.1 | 7.2 | 1.2 | 11 | 7.7 | 12 |
| 8 | 6.8 | 5.6 | 9.7 | 7.0 | 4.0 | .41 | 8.5 | 7.2 | 1.1 | 9.7 | 7.0 | 11 |
| 9 | 5.9 | 6.6 | 9.7 | 6.5 | 3.4 | .48 | 7.7 | 10 | .96 | 8.7 | 6.4 | 9.7 |
| 10 | 5.0 | 5.3 | 8.9 | 6.0 | 2.8 | .48 | 6.8 | 13 | 1.2 | 8.5 | 9.7 | 9.7 |
| 11 | 4.2 | 4.0 | 8.1 | 5.0 | 2.2 | .48 | 6.0 | 13 | 2.1 | 8.9 | 15 | 12 |
| 12 | 3.9 | 2.8 | 7.2 | 4.5 | 1.4 | .54 | 5.3 | 14 | 1.6 | 7.7 | 14 | 11 |
| 13 | 4.5 | 1.8 | 6.4 | 4.0 | .85 | 7.7 | 4.8 | 13 | .85 | 7.0 | 12 | 10 |
| 14 | 4.4 | 1.1 | 5.6 | 3.4 | .54 | 13 | 4.7 | 12 | .65 | 6.8 | 9.7 | 8.1 |
| 15 | 3.4 | .85 | 5.0 | 2.8 | .48 | 12 | 4.5 | 11 | .65 | 7.2 | 8.7 | 10 |
| 16 | 2.4 | .85 | 4.5 | 2.8 | .48 | 9.9 | 4.6 | 9.5 | .54 | 7.5 | 8.3 | 12 |
| 17 | 1.7 | .75 | 3.9 | 2.2 | .48 | 11 | 7.2 | 8.3 | 1.1 | 8.3 | 7.9 | 12 |
| 18 | 1.1 | .75 | 3.2 | 1.6 | .48 | 14 | 8.7 | 11 | 5.9 | 7.5 | 7.7 | 12 |
| 19 | .85 | .85 | 2.2 | 1.1 | .48 | 14 | 8.9 | 10 | 5.9 | 5.9 | 7.5 | 10 |
| 20 | .85 | .75 | 1.5 | 1.1 | .48 | 12 | 8.5 | 9.5 | 5.2 | 4.5 | 7.7 | 7.2 |
| 21 | .85 | .75 | 1.2 | .96 | .54 | 11 | 7.7 | 8.7 | 5.8 | 4.2 | 7.7 | 5.4 |
| 22 | .85 | .75 | .85 | 7.7 | .54 | 12 | 7.5 | 8.7 | 5.6 | 4.3 | 7.5 | 3.5 |
| 23 | .85 | .85 | .85 | 8.9 | .54 | 12 | 6.6 | 7.9 | 4.5 | 4.4 | 7.7 | 3.4 |
| 24 | .85 | 5.8 | 1.1 | 7.3 | .54 | 14 | 5.8 | 7.7 | 3.9 | 4.0 | 8.7 | 3.2 |
| 25 | .85 | 12 | 9.7 | 7.7 | .54 | 16 | 5.0 | 5.4 | 3.0 | 3.9 | 8.7 | 2.0 |
| 26 | .85 | 11 | 18 | 13 | .54 | 14 | 4.5 | 4.7 | 2.0 | 3.9 | 10 | 3.6 |
| 27 | .85 | 10 | 17 | 16 | .54 | 12 | 4.5 | 4.5 | .96 | 5.3 | 13 | 4.7 |
| 28 | .85 | 11 | 16 | 16 | .48 | 11 | 6.4 | 4.2 | .48 | 7.0 | 15 | 5.0 |
| 29 | 2.2 | 12 | 15 | 12 | --- | 11 | 12 | 3.6 | .65 | 6.4 | 16 | 4.8 |
| 30 | 2.5 | 12 | 14 | 9.7 | --- | 12 | 14 | 2.8 | .65 | 6.2 | 16 | 4.7 |
| 31 | 1.4 | --- | 14 | 8.7 | --- | 13 | --- | 2.7 | --- | 6.2 | 17 | --- |
| TOTAL | 120.90 | 138.41 | 275.60 | 228.46 | 63.03 | 237.32 | 242.2 | 282.1 | 64.31 | 208.68 | 320.7 | 281.0 |
| MEAN | 3.90 | 4.61 | 8.89 | 7.37 | 2.25 | 7.66 | 8.07 | 9.10 | 2.14 | 6.73 | 10.3 | 9.37 |
| MAX | 10 | 12 | 18 | 16 | 7.9 | 16 | 14 | 14 | 5.9 | 11 | 17 | 18 |
| MIN | .85 | .75 | .85 | .96 | .48 | .41 | 4.5 | 2.7 | .48 | .48 | 6.4 | 2.0 |
| AC-FT | 240 | 275 | 547 | 453 | 125 | 471 | 480 | 560 | 128 | 414 | 636 | 557 |
| CAL YR 1981 | TOTAL 1103.86 | MEAN 3.02 | MAX 18 | MIN .01 | AC-FT 2190 | | | | | | | |
| WTR YR 1982 | TOTAL 2462.71 | MEAN 6.75 | MAX 18 | MIN .41 | AC-FT 4880 | | | | | | | |

HAWAII, ISLAND OF HAWAII
16700900 OLA FLUME SPRING NEAR KAUMANA--Continued

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | |
|-------------|---------------|-----------|--------|---------|------------|--------|--------|-------|-------|-------|-------|-------|--|
| 1 | 4.0 | 8.6 | 4.9 | 3.0 | .04 | .04 | 3.5 | 5.8 | 4.6 | .84 | .15 | 1.0 | |
| 2 | 4.2 | 8.6 | 4.6 | 2.5 | .04 | .03 | 3.5 | 5.6 | 4.2 | .44 | 1.0 | .15 | |
| 3 | 4.6 | 7.9 | 4.1 | 2.0 | .04 | .03 | 5.8 | 4.9 | 3.8 | .36 | .52 | .15 | |
| 4 | 4.9 | 6.5 | 3.8 | 1.3 | .04 | .03 | 7.0 | 4.2 | 3.5 | .15 | 2.4 | 3.4 | |
| 5 | 6.1 | 5.2 | 3.4 | .68 | .04 | .03 | 6.7 | 3.5 | 3.4 | .10 | 4.0 | 5.1 | |
| 6 | 7.2 | 4.6 | 3.0 | .44 | .03 | .03 | 8.3 | 3.0 | 3.1 | .10 | 3.0 | 4.4 | |
| 7 | 6.3 | 5.4 | 2.1 | .92 | .03 | .04 | 8.3 | 2.2 | 3.0 | .10 | 2.5 | 2.7 | |
| 8 | 5.6 | 7.2 | 1.7 | .52 | .03 | .05 | 7.6 | 1.3 | 5.1 | .10 | 6.3 | 1.7 | |
| 9 | 4.4 | 5.6 | 4.7 | .07 | .03 | 3.8 | 8.1 | .60 | 4.6 | .10 | 7.4 | .84 | |
| 10 | 3.8 | 4.2 | 7.4 | .15 | .03 | 7.2 | 7.2 | 1.1 | 3.8 | .10 | 6.3 | 1.5 | |
| 11 | 4.4 | 3.8 | 7.2 | .07 | .03 | 7.4 | 6.1 | .84 | 3.0 | .10 | 5.2 | 2.7 | |
| 12 | 8.1 | 3.4 | 6.0 | .04 | .03 | 7.2 | 5.8 | .44 | 2.0 | .92 | 4.2 | 1.6 | |
| 13 | 8.1 | 3.8 | 6.5 | .04 | .03 | 8.8 | 5.4 | .20 | 1.3 | .36 | 3.1 | 1.0 | |
| 14 | 7.2 | 6.5 | 8.6 | .15 | .05 | 8.1 | 4.7 | .92 | 1.5 | 1.5 | 2.6 | .44 | |
| 15 | 6.7 | 11 | 8.3 | .20 | .04 | 9.7 | 4.1 | 3.5 | 3.8 | 1.7 | 1.6 | .36 | |
| 16 | 7.2 | 10 | 6.7 | .20 | .04 | 9.1 | 3.6 | 3.4 | 4.2 | 2.1 | .92 | .20 | |
| 17 | 7.4 | 8.3 | 6.1 | .20 | .04 | 8.6 | 3.4 | 2.8 | 3.1 | 1.0 | .60 | .15 | |
| 18 | 8.1 | 10 | 5.8 | .28 | .04 | 8.3 | 3.2 | 1.8 | 1.7 | .52 | 2.0 | .10 | |
| 19 | 9.4 | 10 | 6.0 | .07 | .04 | 8.1 | 3.2 | .84 | .60 | .44 | 2.7 | .07 | |
| 20 | 9.7 | 7.9 | 6.1 | .05 | .07 | 7.4 | 3.1 | .10 | .44 | .52 | 1.5 | .15 | |
| 21 | 8.3 | 8.3 | 6.0 | .05 | 2.5 | 6.1 | 3.1 | .04 | .36 | .28 | .84 | .20 | |
| 22 | 7.4 | 9.1 | 7.2 | .05 | 3.1 | 4.7 | 1.7 | .05 | .20 | .10 | .52 | 1.1 | |
| 23 | 6.1 | 7.6 | 7.6 | .04 | 2.4 | 4.4 | .36 | .07 | .10 | .07 | .28 | 5.2 | |
| 24 | 5.4 | 6.7 | 6.1 | .04 | 1.0 | 4.2 | 2.0 | .05 | .10 | .05 | .20 | 3.6 | |
| 25 | 5.2 | 6.0 | 5.4 | .04 | .60 | 3.8 | 3.4 | .07 | .28 | .04 | .36 | 1.6 | |
| 26 | 5.2 | 7.0 | 4.9 | .04 | .36 | 3.4 | 4.6 | .05 | 4.6 | .07 | .36 | .68 | |
| 27 | 4.4 | 7.4 | 4.6 | .04 | .15 | 3.2 | 5.2 | 1.6 | 5.1 | .07 | 1.0 | .20 | |
| 28 | 3.6 | 6.7 | 4.2 | .04 | .05 | 3.6 | 5.1 | 3.1 | 3.8 | .07 | 3.5 | .07 | |
| 29 | 3.5 | 6.1 | 3.8 | .04 | --- | 4.0 | 5.1 | 4.0 | 3.0 | .07 | 4.4 | .07 | |
| 30 | 5.2 | 5.4 | 3.5 | .04 | --- | 4.0 | 5.8 | 5.1 | 1.8 | .10 | 4.0 | .20 | |
| 31 | 8.3 | --- | 3.1 | .04 | --- | 3.6 | --- | 4.9 | --- | .05 | 2.7 | --- | |
| TOTAL | 190.0 | 208.8 | 163.4 | 13.34 | 10.92 | 138.98 | 144.96 | 66.07 | 80.08 | 12.52 | 76.15 | 40.63 | |
| MEAN | 6.13 | 6.96 | 5.27 | .43 | .39 | 4.48 | 4.83 | 2.13 | 2.67 | .40 | 2.46 | 1.35 | |
| MAX | 9.7 | 11 | 8.6 | 3.0 | 3.1 | 9.7 | 8.3 | 5.8 | 5.1 | 2.1 | 7.4 | 5.2 | |
| MIN | 3.5 | 3.4 | 1.7 | .04 | .03 | .03 | .36 | .04 | .10 | .04 | .15 | .07 | |
| AC-FT | 377 | 414 | 324 | 26 | 22 | 276 | 288 | 131 | 159 | 25 | 151 | 81 | |
| CAL YR 1990 | TOTAL 1239.52 | MEAN 3.40 | MAX 11 | MIN .04 | AC-FT 2460 | | | | | | | | |
| WTR YR 1991 | TOTAL 1145.85 | MEAN 3.14 | MAX 11 | MIN .03 | AC-FT 2270 | | | | | | | | |

HAWAII, ISLAND OF 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 opposite site on left bank.

DRAINAGE AREA.--230 mi², of which 81 mi² 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, from topographic map. Prior to November 16, 1977, at opposite site on left bank at same datum.

REMARKS.--Water year 1991: Records poor. Kapehu ditch diverted water from Kapehu Stream into Wailuku River upstream 1938-63. Department of Water Supply diverted about 6 ft³/s of water upstream of gage till 1967.

AVERAGE DISCHARGE.--Water year 1991: 60 years (water years 1929-39, 1942-47, 1949-91), 291 ft³/s (210,500 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 80,200 ft³/s, August 11, 1940, gage height, 28.6 ft, from floodmarks, from rating curve extended above 13,000 ft³/s; minimum, 0.15 ft³/s, January 20, 1981.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 18,800 ft³/s, November 20, gage height, 18.32 ft; minimum discharge, 10 ft³/s, February 9, 10.

REVISIONS.--The maximum annual discharge for water years 1982 and 1987 have been revised. Maximum annual gage-height for water years 1983 and 1984, and all secondary peaks for water years 1980-90 have been deleted. Revised daily discharges, in cubic feet per second, for water years 1982 and 1990, and for periods in water years 1978-81 and 1985-89, are given below. These figures supersede those published in the annual reports for water years 1978-90. All daily discharges have been downgraded to fair for water years 1968-79 and to poor for water years 1980-90. All annual minimums have also been downgraded to poor.

Maximum for Water Years 1982, 1983, 1984, 1987:

| Water year | Date | Discharge (ft ³ /s) | Gage height (ft) | Water year | Date | Discharge (ft ³ /s) | Gage height (ft) |
|------------|---------------|-----------------------------------|---------------------|------------|---------------|-----------------------------------|---------------------|
| 1982 | July 16, 1982 | 35,000 | 22.12 | 1984 | Jan. 24, 1984 | 1,200 | Unknown |
| 1983 | Aug. 12, 1983 | 1,900 | Unknown | 1987 | Nov. 13, 1986 | 12,000 | Unknown |

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1977 TO SEPTEMBER 1978
DAILY MEAN VALUES

| | | | | | | | | | | | | |
|--------------|-------|--------------|-------|--------------|-------|--------------|-------|-------|-------|--------|-------|------|
| Jan. 26..... | 45 | Feb. 5..... | 5.8 | Apr. 18..... | e500 | Aug. 30..... | e400 | | | | | |
| Jan. 27..... | 49 | Feb. 6..... | 6.0 | May 21..... | e200 | Aug. 31..... | e150 | | | | | |
| Jan. 28..... | 29 | Feb. 7..... | 5.8 | May 22..... | e150 | Sep. 1..... | e175 | | | | | |
| Jan. 29..... | 24 | Feb. 8..... | 5.4 | May 23..... | e1200 | Sep. 2..... | e150 | | | | | |
| Jan. 30..... | 20 | Feb. 9..... | 5.1 | June 23..... | e1910 | Sep. 3..... | e125 | | | | | |
| Jan. 31..... | 14 | Apr. 7..... | 1410 | July 6..... | e4100 | Sep. 4..... | e120 | | | | | |
| Feb. 1..... | 8.9 | Apr. 14..... | e500 | Aug. 26..... | e250 | Sep. 5..... | e110 | | | | | |
| Feb. 2..... | 8.2 | Apr. 15..... | e150 | Aug. 27..... | e225 | Sep. 6..... | e90 | | | | | |
| Feb. 3..... | 7.2 | Apr. 16..... | e300 | Aug. 28..... | e200 | Sep. 7..... | e80 | | | | | |
| Feb. 4..... | 6.0 | Apr. 17..... | e820 | Aug. 29..... | e200 | Sep. 8..... | e100 | | | | | |
| | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
| TOTAL | 4843 | 3225 | 328.3 | 555.5 | 244.5 | 3679.9 | 7309 | 5993 | 7804 | 14810 | 10045 | 2863 |
| MEAN | 156 | 107 | 10.6 | 17.9 | 8.73 | 119 | 244 | 193 | 260 | 478 | 324 | 95.4 |
| MAX | 619 | 351 | 42 | 140 | 27 | 632 | 1410 | 1200 | 1910 | 4100 | 1040 | 264 |
| MIN | 25 | 16 | 3.9 | 1.8 | 3.6 | 2.2 | 57 | 20 | 37 | 115 | 119 | 20 |
| AC-FT | 9610 | 6400 | 651 | 1100 | 485 | 7300 | 14500 | 11890 | 15480 | 29380 | 19920 | 5680 |
| CAL YR 1977 | TOTAL | 106988.4 | MEAN | 293 | MAX | 5400 | MIN | 2.0 | AC-FT | 212200 | | |
| WTR YR 1978 | TOTAL | 61700.2 | MEAN | 169 | MAX | 4100 | MIN | 1.8 | AC-FT | 122400 | | |

HAWAII, ISLAND OF HAWAII
 16704000 WAILUKU RIVER AT PIIHONUA--Continued

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1978 TO SEPTEMBER 1979
 DAILY MEAN VALUES

| | | | | | | | |
|-------------|-----|--------------|------|--------------|-----|--------------|----|
| May 21..... | 67 | June 9..... | 23 | June 27..... | 526 | July 15..... | 86 |
| May 22..... | 58 | June 10..... | 21 | June 28..... | 332 | July 16..... | 72 |
| May 23..... | 55 | June 11..... | 95 | June 29..... | 273 | July 17..... | 64 |
| May 24..... | 55 | June 12..... | 411 | June 30..... | 194 | July 18..... | 56 |
| May 25..... | 48 | June 13..... | 549 | July 1..... | 145 | July 19..... | 53 |
| May 26..... | 50 | June 14..... | 264 | July 2..... | 115 | July 20..... | 45 |
| May 27..... | 46 | June 15..... | 157 | July 3..... | 167 | July 21..... | 38 |
| May 28..... | 42 | June 16..... | 181 | July 4..... | 187 | July 22..... | 38 |
| May 29..... | 31 | June 17..... | 222 | July 5..... | 256 | July 23..... | 75 |
| May 30..... | 27 | June 18..... | 140 | July 6..... | 214 | July 24..... | 57 |
| May 31..... | 107 | June 19..... | 200 | July 7..... | 586 | July 25..... | 44 |
| June 1..... | 234 | June 20..... | 132 | July 8..... | 505 | July 26..... | 52 |
| June 2..... | 182 | June 21..... | 137 | July 9..... | 327 | July 27..... | 56 |
| June 3..... | 64 | June 22..... | 440 | July 10..... | 200 | July 28..... | 41 |
| June 4..... | 47 | June 23..... | 832 | July 11..... | 151 | July 29..... | 36 |
| June 5..... | 37 | June 24..... | 642 | July 12..... | 118 | July 30..... | 33 |
| June 6..... | 31 | June 25..... | 405 | July 13..... | 97 | July 31..... | 35 |
| June 7..... | 27 | June 26..... | 1200 | July 14..... | 86 | Aug. 1..... | 32 |
| June 8..... | 24 | | | | | | |

| MONTH | TOTAL | MEAN | MAX | MIN | AC-FT |
|-------------|----------|------|------|-----|--------|
| May 1979 | 2514 | 81.1 | 212 | 27 | 4990 |
| June 1979 | 8022 | 267 | 1200 | 21 | 15910 |
| July 1979 | 4035 | 130 | 586 | 33 | 8000 |
| Aug. 1979 | 1434 | 46.3 | 230 | 13 | 2840 |
| CAL YR 1978 | 81512.9 | 223 | 4100 | 1.8 | 161700 |
| WTR YR 1979 | 125550.4 | 344 | 7210 | 5.8 | 249000 |

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1979 TO SEPTEMBER 1980
 DAILY MEAN VALUES

| | | | | | | | |
|--------------|-------|--------------|-----|--------------|-----|--------------|------|
| Oct. 6..... | 1090 | Dec. 2..... | e45 | July 24..... | 80 | Aug. 12..... | 36 |
| Oct. 7..... | 290 | Dec. 3..... | e50 | July 25..... | 68 | Aug. 13..... | 32 |
| Oct. 8..... | 134 | Dec. 4..... | e45 | July 26..... | 61 | Aug. 14..... | 28 |
| Oct. 9..... | 441 | Dec. 5..... | e40 | July 27..... | 69 | Aug. 15..... | 26 |
| Oct. 10..... | 242 | Dec. 6..... | e32 | July 28..... | 80 | Aug. 16..... | 24 |
| Oct. 11..... | 128 | Dec. 7..... | e45 | July 29..... | 62 | Aug. 17..... | 29 |
| Nov. 18..... | e8000 | July 10..... | 158 | July 30..... | 90 | Aug. 18..... | 26 |
| Nov. 19..... | e1300 | July 11..... | 172 | July 31..... | 69 | Aug. 19..... | 27 |
| Nov. 20..... | e500 | July 12..... | 205 | Aug. 1..... | 58 | Aug. 20..... | 20 |
| Nov. 21..... | e600 | July 13..... | 147 | Aug. 2..... | 74 | Aug. 21..... | 37 |
| Nov. 22..... | e550 | July 14..... | 137 | Aug. 3..... | 58 | Sep. 11..... | e106 |
| Nov. 23..... | e320 | July 15..... | 146 | Aug. 4..... | 70 | Sep. 12..... | e97 |
| Nov. 24..... | e200 | July 16..... | 111 | Aug. 5..... | 83 | Sep. 13..... | e130 |
| Nov. 25..... | e100 | July 17..... | 118 | Aug. 6..... | 168 | Sep. 14..... | e150 |
| Nov. 26..... | e84 | July 18..... | 339 | Aug. 7..... | 84 | Sep. 15..... | e160 |
| Nov. 27..... | e70 | July 19..... | 150 | Aug. 8..... | 67 | Sep. 16..... | e170 |
| Nov. 28..... | e58 | July 20..... | 111 | Aug. 9..... | 59 | Sep. 17..... | e120 |
| Nov. 29..... | e49 | July 21..... | 108 | Aug. 10..... | 54 | Sep. 18..... | e110 |
| Nov. 30..... | e48 | July 22..... | 113 | Aug. 11..... | 42 | Sep. 19..... | e106 |
| Dec. 1..... | e47 | July 23..... | 109 | | | | |

| | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------------|--------|-----------|------|-------|-------|--------|-------|-------|-------|--------|------|-------|
| TOTAL | 4207.7 | 27238 | 1462 | 252.8 | 48.78 | 61143 | 15152 | 6871 | 8536 | 4472 | 2213 | 8095 |
| MEAN | 136 | 908 | 47.2 | 8.15 | 1.68 | 1972 | 505 | 222 | 285 | 144 | 71.4 | 270 |
| MAX | 1090 | 10600 | 264 | 23 | 4.5 | 8500 | 2500 | 555 | 963 | 713 | 470 | 1920 |
| MIN | 8.7 | 11 | 20 | 2.2 | .35 | 12 | 100 | 111 | 60 | 61 | 15 | 64 |
| AC-FT | 8350 | 54030 | 2900 | 501 | 97 | 121300 | 30050 | 13630 | 16930 | 8870 | 4390 | 16060 |
| CAL YR 1979 | TOTAL | 130249.1 | MEAN | 357 | MAX | 10600 | MIN | 5.8 | AC-FT | 258300 | | |
| WTR YR 1980 | TOTAL | 139691.28 | MEAN | 382 | MAX | 10600 | MIN | .35 | AC-FT | 277100 | | |

e Estimated

HAWAII, ISLAND OF HAWAII
16704000 WAILUKU RIVER AT PIIHONUA--Continued

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1980 TO SEPTEMBER 1981
DAILY MEAN VALUES

| | | | | | | | |
|--------------|------|--------------|-------|--------------|------|--------------|-------|
| June 23..... | e3.0 | July 15..... | e.47 | Aug. 6..... | e340 | Sep. 10..... | e10 |
| June 24..... | e2.7 | July 16..... | e.43 | Aug. 7..... | e230 | Sep. 11..... | e10 |
| June 25..... | e2.4 | July 17..... | e.42 | Aug. 8..... | e170 | Sep. 12..... | e15 |
| June 26..... | e2.4 | July 18..... | e1.6 | Aug. 9..... | e148 | Sep. 13..... | e14 |
| June 27..... | e2.6 | July 19..... | e4.7 | Aug. 10..... | e125 | Sep. 14..... | e12 |
| June 28..... | e3.5 | July 20..... | e9.0 | Aug. 11..... | e320 | Sep. 15..... | e10 |
| June 29..... | e3.2 | July 21..... | e8.8 | Aug. 12..... | e462 | Sep. 16..... | e9.0 |
| June 30..... | e3.0 | July 22..... | e4.0 | Aug. 13..... | e252 | Sep. 17..... | e9.0 |
| July 1..... | e2.4 | July 23..... | e1.5 | Aug. 14..... | e187 | Sep. 18..... | e110 |
| July 2..... | e2.5 | July 24..... | e8.3 | Aug. 15..... | e146 | Sep. 19..... | e50 |
| July 3..... | e2.8 | July 25..... | e4.5 | Aug. 16..... | e109 | Sep. 20..... | e13 |
| July 4..... | e2.6 | July 26..... | e3.0 | Aug. 17..... | e92 | Sep. 21..... | e15 |
| July 5..... | e2.3 | July 27..... | e1.6 | Aug. 18..... | e95 | Sep. 22..... | e12 |
| July 6..... | e2.0 | July 28..... | e2.7 | Aug. 19..... | e97 | Sep. 23..... | e9.0 |
| July 7..... | e1.7 | July 29..... | e4.0 | Aug. 20..... | e92 | Sep. 24..... | e8.0 |
| July 8..... | e1.5 | July 30..... | e1.7 | Sep. 3..... | e66 | Sep. 25..... | e7.0 |
| July 9..... | e1.0 | July 31..... | e3.0 | Sep. 4..... | e60 | Sep. 26..... | e45 |
| July 10..... | e1.1 | Aug. 1..... | e1.7 | Sep. 5..... | e20 | Sep. 27..... | e2500 |
| July 11..... | e1.0 | Aug. 2..... | e1.6 | Sep. 6..... | e15 | Sep. 28..... | e1800 |
| July 12..... | e2.7 | Aug. 3..... | e1.6 | Sep. 7..... | e12 | Sep. 29..... | e500 |
| July 13..... | e2.0 | Aug. 4..... | e8000 | Sep. 8..... | e12 | Sep. 30..... | e250 |
| July 14..... | e1.2 | Aug. 5..... | e900 | Sep. 9..... | e10 | | |

| MONTH | TOTAL | MEAN | MAX | MIN | AC-FT |
|-------------|-----------|------|------|-----|--------|
| June 1981 | 164.4 | 5.48 | 30 | 2.4 | 326 |
| July 1981 | 86.52 | 2.79 | 9.0 | .42 | 172 |
| Aug. 1981 | 12168.9 | 393 | 8000 | 1.6 | 24140 |
| Sep. 1981 | 5632.0 | 188 | 2500 | 7.0 | 11170 |
| CAL YR 1980 | 117424.18 | 321 | 8500 | .35 | 232900 |
| WTR YR 1981 | 37420.65 | 103 | 8000 | .24 | 74220 |

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1981 TO SEPTEMBER 1982
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------------|-------|----------|--------|-------|------|---------|-------|-------|-------|--------|-------|-------|
| 1 | 205 | 54 | e1600 | e100 | e200 | e30 | e2310 | e350 | 68 | 54 | e7050 | 1560 |
| 2 | 392 | 41 | e2100 | e90 | e150 | e15 | e1180 | e325 | 69 | 908 | e1720 | 1080 |
| 3 | 273 | 459 | e1000 | e80 | e100 | e10 | e700 | e300 | 79 | 731 | e950 | 671 |
| 4 | 221 | 468 | e700 | e70 | e90 | e8.0 | e450 | e200 | 95 | 1060 | e600 | 458 |
| 5 | 217 | 253 | e400 | e60 | e80 | e5.0 | 311 | e150 | 64 | 743 | e450 | 339 |
| 6 | 147 | 104 | e300 | e45 | e70 | 5.4 | 234 | e125 | 99 | 641 | e300 | 269 |
| 7 | 157 | 142 | e200 | e40 | e65 | 4.7 | 189 | e100 | 70 | 396 | e200 | 221 |
| 8 | 114 | 196 | e450 | e35 | e50 | 4.3 | 156 | 202 | 67 | 290 | e150 | 191 |
| 9 | 102 | 155 | e250 | e30 | e35 | 4.9 | 126 | 323 | 79 | 361 | e200 | 155 |
| 10 | 79 | 104 | e150 | e30 | e30 | 25 | 104 | 334 | 111 | 927 | e8470 | 468 |
| 11 | 71 | 78 | e125 | e25 | e30 | 90 | 87 | 338 | 94 | 613 | e1790 | 221 |
| 12 | 83 | 65 | e100 | e25 | e25 | 69 | 76 | 455 | 65 | 453 | e1180 | 189 |
| 13 | 98 | 60 | e80 | 24 | e20 | e2710 | 68 | 264 | 67 | 426 | e700 | 164 |
| 14 | 66 | 47 | e70 | 21 | e25 | e1070 | 64 | 229 | 69 | 962 | e500 | 417 |
| 15 | 60 | 40 | e60 | 19 | e20 | e1130 | 61 | 171 | 55 | 551 | e400 | 739 |
| 16 | 50 | 35 | e50 | 18 | e25 | e1340 | e59 | 140 | 46 | e5140 | e300 | 314 |
| 17 | 41 | 31 | e40 | 18 | e20 | e2710 | e880 | 244 | 737 | e5920 | 327 | 233 |
| 18 | 35 | 30 | e30 | 62 | e18 | e1770 | e500 | 303 | 540 | e1200 | 412 | 207 |
| 19 | 31 | 28 | e25 | 55 | e16 | 506 | e250 | 383 | 339 | 823 | 265 | 177 |
| 20 | 28 | 24 | e20 | 26 | e15 | 371 | e150 | 241 | 213 | 508 | 237 | 148 |
| 21 | 25 | 21 | e20 | e950 | e15 | 439 | e200 | 240 | 148 | e700 | 329 | 128 |
| 22 | 24 | 20 | e30 | e1060 | e12 | 536 | e150 | 230 | 111 | e1070 | 317 | 106 |
| 23 | 21 | 100 | e35 | e282 | e10 | e4420 | e100 | 193 | 86 | e600 | 1330 | 135 |
| 24 | 20 | e2300 | e90 | e221 | e10 | e2310 | e80 | 144 | 71 | e500 | 1610 | 107 |
| 25 | 20 | e1000 | e11700 | e338 | e12 | e1080 | e75 | 117 | 61 | e400 | 1520 | e150 |
| 26 | 19 | e400 | e3900 | e6610 | e12 | 525 | e90 | 118 | 53 | e250 | 1490 | e450 |
| 27 | 15 | e1050 | e1000 | e5040 | e20 | e450 | e80 | 116 | 46 | e200 | 924 | e350 |
| 28 | 124 | e1500 | e500 | e1580 | e25 | e870 | e300 | 101 | 63 | e175 | 1390 | e325 |
| 29 | 235 | e700 | e300 | e800 | --- | e960 | e600 | 83 | 77 | e150 | 1040 | e250 |
| 30 | 85 | e2000 | e200 | e400 | --- | e1320 | e450 | 79 | 59 | e125 | 1080 | e225 |
| 31 | 79 | --- | e150 | e300 | --- | e4670 | --- | 75 | --- | e250 | 1840 | --- |
| TOTAL | 3137 | 11505 | 25675 | 18454 | 1200 | 29458.3 | 10080 | 6673 | 3801 | 27127 | 39071 | 10447 |
| MEAN | 101 | 383 | 828 | 595 | 42.9 | 950 | 336 | 215 | 127 | 875 | 1260 | 348 |
| MAX | 392 | 2300 | 11700 | 6610 | 200 | 4670 | 2310 | 455 | 737 | 5920 | 8470 | 1560 |
| MIN | 15 | 20 | 20 | 18 | 10 | 4.3 | 59 | 75 | 46 | 54 | 150 | 106 |
| AC-FT | 6220 | 22820 | 50930 | 36600 | 2380 | 58430 | 19990 | 13240 | 7540 | 53810 | 77500 | 20720 |
| CAL YR 1981 | TOTAL | 67097.05 | MEAN | 184 | MAX | 11700 | MIN | .24 | AC-FT | 133100 | | |
| WTR YR 1982 | TOTAL | 186628.3 | MEAN | 511 | MAX | 11700 | MIN | 4.3 | AC-FT | 370200 | | |

e Estimated

HAWAII, ISLAND OF HAWAII
16704000 WAILUKU RIVER AT PIIHONUA--Continued

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1984 TO SEPTEMBER 1985
DAILY MEAN VALUES

| | | | | | | | |
|--------------|-------|--------------|--------|--------------|-------|--------------|-------|
| Nov. 19..... | e3040 | Feb. 28..... | e6000 | Mar. 7..... | e2500 | Mar. 23..... | e3100 |
| Nov. 20..... | e3520 | Mar. 1..... | e12500 | Mar. 8..... | e1900 | Aug. 8..... | e4500 |
| Dec. 9..... | e5340 | Mar. 6..... | e6500 | Mar. 22..... | e1800 | | |

| MONTH | TOTAL | MEAN | MAX | MIN | AC-FT |
|-------------|-----------|------|-------|-----|--------|
| Nov. 1984 | 13990.86 | 466 | 3520 | .86 | 27750 |
| Dec. 1984 | 16414 | 529 | 5340 | 62 | 32560 |
| Feb. 1985 | 8973.24 | 320 | 6000 | .97 | 17800 |
| Mar. 1985 | 48191 | 1555 | 12500 | 257 | 95590 |
| Aug. 1985 | 10144 | 327 | 4500 | 45 | 20120 |
| CAL YR 1984 | 57158.14 | 156 | 5340 | .85 | 113400 |
| WTR YR 1985 | 129080.28 | 354 | 12500 | .86 | 256000 |

e Estimated

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1985 TO SEPTEMBER 1986
DAILY MEAN VALUES

| | | | | | | | |
|--------------|--------|--------------|------|--------------|-----|--------------|-------|
| Apr. 3..... | e4260 | Aug. 25..... | e60 | Sep. 8..... | e90 | Sep. 20..... | e150 |
| Apr. 4..... | e2740 | Aug. 26..... | e50 | Sep. 9..... | e60 | Sep. 21..... | e110 |
| Apr. 5..... | e1710 | Aug. 27..... | e40 | Sep. 10..... | e30 | Sep. 22..... | e75 |
| Apr. 6..... | e2160 | Aug. 28..... | e35 | Sep. 11..... | e19 | Sep. 23..... | e40 |
| Apr. 7..... | e1250 | Aug. 29..... | e100 | Sep. 12..... | e17 | Sep. 24..... | e35 |
| Apr. 8..... | e3710 | Aug. 30..... | e175 | Sep. 13..... | e18 | Sep. 25..... | e70 |
| Apr. 9..... | e6570 | Aug. 31..... | e90 | Sep. 14..... | e35 | Sep. 26..... | e200 |
| Apr. 10..... | e20300 | Sep. 3..... | e28 | Sep. 15..... | e25 | Sep. 27..... | e1300 |
| Apr. 11..... | e11800 | Sep. 4..... | e22 | Sep. 16..... | e20 | Sep. 28..... | e400 |
| Apr. 12..... | e2460 | Sep. 5..... | e18 | Sep. 17..... | e17 | Sep. 29..... | e600 |
| Aug. 23..... | e90 | Sep. 6..... | e20 | Sep. 18..... | e14 | Sep. 30..... | e350 |
| Aug. 24..... | e75 | Sep. 7..... | e23 | Sep. 19..... | e15 | | |

| MONTH | TOTAL | MEAN | MAX | MIN | AC-FT |
|-------------|-----------|------|-------|-----|--------|
| Apr. 1986 | 67864 | 2262 | 20300 | 131 | 134600 |
| Aug. 1986 | 5312 | 171 | 887 | 35 | 10540 |
| Sep. 1986 | 3926 | 131 | 1300 | 14 | 7790 |
| CAL YR 1985 | 106974.84 | 293 | 12500 | .97 | 212200 |
| WTR YR 1986 | 117524.06 | 322 | 20300 | .53 | 233100 |

e Estimated

HAWAII, ISLAND OF HAWAII
16704000 WAILUKU RIVER AT PIHONUA--Continued

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
DAILY MEAN VALUES

| | | | | | | | |
|--------------|-------|--------------|------|--------------|------|--------------|-------|
| Nov. 9..... | e600 | Nov. 25..... | e400 | Dec. 11..... | e40 | Dec. 26..... | e35 |
| Nov. 10..... | e1660 | Nov. 26..... | e350 | Dec. 12..... | e100 | Dec. 27..... | e25 |
| Nov. 11..... | e1810 | Nov. 27..... | e200 | Dec. 13..... | e70 | Dec. 28..... | e10 |
| Nov. 12..... | e4450 | Nov. 28..... | e180 | Dec. 14..... | e40 | Dec. 29..... | e20 |
| Nov. 13..... | e5880 | Nov. 29..... | e350 | Dec. 15..... | e25 | Dec. 30..... | e25 |
| Nov. 14..... | e2200 | Nov. 30..... | e200 | Dec. 16..... | e15 | Dec. 31..... | e30 |
| Nov. 15..... | e1090 | Dec. 1..... | e175 | Dec. 17..... | e25 | Jan. 1..... | e70 |
| Nov. 16..... | e800 | Dec. 2..... | e150 | Dec. 18..... | e20 | Jan. 2..... | e60 |
| Nov. 17..... | e700 | Dec. 3..... | e160 | Dec. 19..... | e15 | Jan. 3..... | e50 |
| Nov. 18..... | e450 | Dec. 4..... | e130 | Dec. 20..... | e20 | Jan. 4..... | e30 |
| Nov. 19..... | e840 | Dec. 5..... | e119 | Dec. 21..... | e25 | Jan. 5..... | e35 |
| Nov. 20..... | e3980 | Dec. 6..... | e105 | Dec. 22..... | e25 | Jan. 6..... | e30 |
| Nov. 21..... | e1090 | Dec. 7..... | e96 | Dec. 23..... | e50 | Jan. 12..... | e3150 |
| Nov. 22..... | e1710 | Dec. 8..... | e80 | Dec. 24..... | e40 | July 20..... | e1450 |
| Nov. 23..... | e820 | Dec. 9..... | e69 | Dec. 25..... | e20 | July 21..... | e1340 |
| Nov. 24..... | e600 | Dec. 10..... | e50 | | | | |

| MONTH | TOTAL | MEAN | MAX | MIN | AC-FT |
|-------------|-----------|------|-------|-----|--------|
| Nov. 1986 | 32958 | 1099 | 5880 | 105 | 65370 |
| Dec. 1986 | 1809 | 58.4 | 175 | 10 | 3590 |
| Jan. 1987 | 6535 | 211 | 3150 | 20 | 12960 |
| July 1987 | 7746 | 250 | 1450 | 60 | 15360 |
| CAL YR 1986 | 147991.96 | 405 | 20300 | .53 | 293500 |
| WTR YR 1987 | 75518.7 | 207 | 5880 | 2.2 | 149800 |

e Estimated

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988
DAILY MEAN VALUES

| | | | | | | | |
|--------------|-------|--------------|-------|--------------|------|--------------|-------|
| Oct. 1..... | e2560 | Oct. 14..... | e35 | Dec. 19..... | e700 | Jan. 1..... | e60 |
| Oct. 2..... | e1810 | Nov. 20..... | e3000 | Dec. 20..... | e300 | Jan. 2..... | e100 |
| Oct. 3..... | e880 | Nov. 21..... | e9000 | Dec. 21..... | e250 | Jan. 3..... | e100 |
| Oct. 4..... | e400 | Nov. 22..... | e1960 | Dec. 22..... | e200 | Jan. 4..... | e70 |
| Oct. 5..... | e200 | Nov. 23..... | e900 | Dec. 23..... | e150 | Jan. 5..... | e60 |
| Oct. 6..... | e150 | Nov. 24..... | e650 | Dec. 24..... | e140 | Jan. 6..... | e55 |
| Oct. 7..... | e120 | Dec. 12..... | e1500 | Dec. 25..... | e110 | Jan. 7..... | e50 |
| Oct. 8..... | e110 | Dec. 13..... | e9000 | Dec. 26..... | e100 | Jan. 8..... | e45 |
| Oct. 9..... | e100 | Dec. 14..... | e700 | Dec. 27..... | e200 | Jan. 9..... | e40 |
| Oct. 10..... | e80 | Dec. 15..... | e400 | Dec. 28..... | e150 | Jan. 10..... | e45 |
| Oct. 11..... | e70 | Dec. 16..... | e300 | Dec. 29..... | e100 | Jan. 11..... | e50 |
| Oct. 12..... | e50 | Dec. 17..... | e250 | Dec. 30..... | e90 | Jan. 12..... | e45 |
| Oct. 13..... | e30 | Dec. 18..... | e3000 | Dec. 31..... | e80 | Mar. 31..... | e1660 |

| MONTH | TOTAL | MEAN | MAX | MIN | AC-FT |
|-------------|---------|------|------|-----|--------|
| Oct. 1987 | 8525 | 275 | 2560 | 21 | 16910 |
| Nov. 1987 | 18878 | 629 | 9000 | 25 | 37440 |
| Dec. 1987 | 19207 | 620 | 9000 | 76 | 38100 |
| Jan. 1988 | 1729 | 55.8 | 139 | 36 | 3430 |
| Mar. 1988 | 8196 | 264 | 1660 | 43 | 16260 |
| CAL YR 1987 | 83269.7 | 228 | 9000 | 2.2 | 165200 |
| WTR YR 1988 | 85660 | 234 | 9000 | 15 | 169900 |

e Estimated

HAWAII, ISLAND OF HAWAII
16704000 WAILUKU RIVER AT PIIHONUA--Continued

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
DAILY MEAN VALUES

| | | | | | | | | | | | | |
|--------------|-------|--------------|-------|--------------|-------|--------------|-------|-------|-------|-------|-------|------|
| Oct. 14..... | e95 | Jan. 8..... | e2000 | Apr. 29..... | e2280 | June 7..... | e1600 | | | | | |
| Nov. 4..... | e1100 | Jan. 9..... | e1800 | Apr. 30..... | e2980 | July 6..... | e3000 | | | | | |
| Nov. 5..... | e900 | Jan. 10..... | e8540 | May 13..... | e3400 | July 13..... | e1900 | | | | | |
| Nov. 11..... | e1500 | Jan. 11..... | e1950 | May 14..... | e2300 | July 14..... | e2200 | | | | | |
| Nov. 23..... | e1550 | Jan. 13..... | e5000 | May 15..... | e1700 | July 19..... | e1640 | | | | | |
| Dec. 26..... | e2000 | Jan. 14..... | e4500 | May 25..... | e3500 | July 20..... | e4080 | | | | | |
| Dec. 30..... | e3100 | Jan. 15..... | e4600 | May 26..... | e1500 | July 21..... | e1400 | | | | | |
| Dec. 31..... | e3400 | Jan. 16..... | e2700 | May 29..... | e1900 | July 22..... | e9640 | | | | | |
| Jan. 1..... | e1600 | Apr. 23..... | e1800 | June 6..... | e2300 | July 23..... | e1700 | | | | | |
| Jan. 7..... | e1480 | | | | | | | | | | | |
| TOTAL | 2025 | 12114 | 11926 | 45647 | 6360 | 3033 | 13257 | 26501 | 11108 | 35352 | 5249 | 3872 |
| MEAN | 65.3 | 404 | 385 | 1472 | 227 | 97.8 | 442 | 855 | 370 | 1140 | 169 | 129 |
| MAX | 400 | 1550 | 3400 | 8540 | 1060 | 518 | 2980 | 3500 | 2300 | 9640 | 809 | 340 |
| MIN | 21 | 46 | 30 | 157 | 42 | 24 | 62 | 143 | 64 | 53 | 56 | 53 |
| AC-FT | 4020 | 24030 | 23660 | 90540 | 12620 | 6020 | 26300 | 52560 | 22030 | 70120 | 10410 | 7680 |

CAL YR 1988 TOTAL 65115 MEAN 178 MAX 3400 MIN 15 AC-FT 129200
WTR YR 1989 TOTAL 176444 MEAN 483 MAX 9640 MIN 21 AC-FT 350000

e Estimated

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|-------|------|-------|--------|-------|-------|------|-------|-------|-------|------|-------|
| 1 | 763 | e130 | 12 | 328 | e3410 | 667 | 27 | 19 | e110 | 122 | e200 | 245 |
| 2 | 600 | e90 | 9.6 | 357 | e6120 | 289 | 23 | 26 | e95 | 150 | e150 | 160 |
| 3 | e700 | e75 | 11 | 301 | e5620 | 259 | 33 | 30 | e80 | 115 | e120 | 99 |
| 4 | e825 | e135 | 9.3 | 167 | e2000 | 231 | 47 | 24 | e75 | 91 | e90 | 115 |
| 5 | e725 | e530 | 9.0 | 129 | e1210 | 188 | 32 | 21 | e90 | 77 | e67 | 1140 |
| 6 | e375 | e250 | 9.2 | 86 | e1450 | 533 | 30 | 24 | e120 | 68 | e59 | 970 |
| 7 | e280 | e175 | 15 | 61 | e2160 | e1870 | 33 | 23 | e75 | 61 | e59 | 350 |
| 8 | e200 | e120 | 41 | 48 | 682 | e4400 | 38 | 105 | e70 | 70 | e80 | 244 |
| 9 | e150 | e110 | 34 | 65 | 458 | e1360 | 27 | 61 | e45 | 91 | e55 | 278 |
| 10 | e230 | e260 | 22 | 61 | 344 | e1250 | 24 | 43 | 50 | 125 | e39 | 268 |
| 11 | e140 | e90 | 15 | 47 | 274 | e1440 | 21 | 94 | 47 | 90 | e35 | 251 |
| 12 | e90 | e60 | 10 | 121 | 226 | 654 | 36 | 54 | 41 | 177 | e49 | 257 |
| 13 | e70 | e50 | 7.9 | 120 | 187 | 421 | 25 | 39 | 40 | 101 | e336 | 355 |
| 14 | e75 | e35 | 6.8 | 122 | 154 | 303 | 23 | 51 | 46 | 110 | 111 | 306 |
| 15 | e135 | e25 | 5.6 | 92 | 132 | 238 | 28 | 98 | 111 | 109 | 164 | 230 |
| 16 | e85 | e20 | 5.3 | 98 | 110 | 194 | 25 | 50 | 219 | 91 | 140 | 204 |
| 17 | e50 | e25 | 5.1 | 70 | 98 | 159 | 21 | 42 | 880 | 77 | 173 | 766 |
| 18 | e60 | e20 | 4.8 | 65 | 86 | 131 | 16 | 66 | 467 | 265 | 117 | e1760 |
| 19 | e45 | e20 | 4.6 | e10600 | 76 | 111 | 14 | 192 | 302 | 562 | 152 | e2850 |
| 20 | e40 | e25 | 4.5 | e4500 | 65 | 93 | 17 | e450 | 349 | 400 | 176 | e3760 |
| 21 | e85 | e25 | 4.2 | 843 | 56 | 77 | 17 | e1300 | 385 | 274 | 112 | 880 |
| 22 | e50 | e20 | 3.8 | 542 | 47 | 67 | 34 | e850 | 274 | 212 | 94 | 515 |
| 23 | e850 | 20 | 3.6 | 595 | 43 | 58 | 27 | e500 | 210 | e174 | 117 | 359 |
| 24 | e350 | 18 | 3.5 | 442 | 124 | 51 | 84 | e750 | 438 | e219 | 345 | 341 |
| 25 | e500 | 16 | 3.4 | 518 | 304 | 47 | 57 | e900 | 448 | e195 | 387 | 244 |
| 26 | e350 | 14 | 3.2 | 432 | 167 | 41 | 41 | e480 | 308 | e146 | 191 | 204 |
| 27 | e240 | 13 | 3.5 | 352 | 108 | 35 | 34 | e450 | 412 | e137 | 204 | 224 |
| 28 | e230 | 12 | 43 | 378 | 224 | 32 | 30 | e325 | 259 | e142 | 194 | 179 |
| 29 | e415 | 11 | 56 | 311 | --- | 43 | 26 | e230 | 191 | e450 | 124 | 222 |
| 30 | e245 | 13 | 17 | 421 | --- | 34 | 22 | e210 | 147 | e340 | 100 | 335 |
| 31 | e160 | --- | 13 | 580 | --- | 30 | --- | e170 | --- | e260 | 83 | --- |
| TOTAL | 9113 | 2407 | 395.9 | 22852 | 25935 | 15306 | 912 | 7677 | 6384 | 5501 | 4323 | 18111 |
| MEAN | 294 | 80.2 | 12.8 | 737 | 926 | 494 | 30.4 | 248 | 213 | 177 | 139 | 604 |
| MAX | 850 | 530 | 56 | 10600 | 6120 | 4400 | 84 | 1300 | 880 | 562 | 387 | 3760 |
| MIN | 40 | 11 | 3.2 | 47 | 43 | 30 | 14 | 19 | 40 | 61 | 35 | 99 |
| AC-FT | 18080 | 4770 | 785 | 45330 | 51440 | 30360 | 1810 | 15230 | 12660 | 10910 | 8570 | 35920 |

CAL YR 1989 TOTAL 162294.9 MEAN 445 MAX 9640 MIN 3.2 AC-FT 321900
WTR YR 1990 TOTAL 118916.9 MEAN 326 MAX 10600 MIN 3.2 AC-FT 235900

e Estimated

HAWAII, ISLAND OF HAWAII
16704000 WAILUKU RIVER AT PIIHONUA--Continued

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------------|--------------|----------|-----------|--------|--------------|--------|-------|-------|-------|------|-------|-------|
| 1 | 298 | 602 | 198 | e125 | 22 | e35 | e311 | 448 | 448 | 104 | 226 | 138 |
| 2 | 347 | 455 | 192 | 111 | 21 | e32 | e225 | 306 | 338 | 88 | 158 | 110 |
| 3 | 360 | 313 | 161 | 96 | 21 | e29 | e306 | 230 | 264 | 76 | 147 | 222 |
| 4 | 486 | 239 | 143 | 82 | 18 | e26 | 236 | 185 | 210 | 67 | 511 | 1610 |
| 5 | 356 | 231 | 124 | 74 | 16 | e24 | 508 | 156 | 186 | 59 | 267 | 305 |
| 6 | 308 | 236 | 114 | 67 | 16 | e28 | 489 | 127 | 146 | 62 | 168 | 207 |
| 7 | 244 | 866 | 105 | 74 | 14 | e28 | 315 | 113 | 431 | 108 | 489 | 159 |
| 8 | 191 | 334 | 122 | 71 | 12 | e31 | 327 | 96 | 328 | 66 | 2140 | 152 |
| 9 | 157 | 237 | e1970 | 63 | 11 | e3960 | 399 | 110 | 230 | 55 | 1060 | 122 |
| 10 | 132 | 186 | e1080 | 57 | 11 | e1760 | 298 | 161 | 170 | 65 | 450 | 204 |
| 11 | 813 | 152 | 489 | 53 | 11 | e1490 | 290 | 106 | 165 | 294 | 286 | 158 |
| 12 | 437 | 224 | 602 | 51 | 11 | e6650 | 249 | 88 | 154 | 155 | 210 | 127 |
| 13 | 437 | 395 | e2180 | 136 | 12 | e11500 | 252 | 70 | 117 | 167 | 202 | 101 |
| 14 | 280 | e2940 | e1730 | 159 | 76 | e9270 | 342 | 259 | 165 | 283 | 146 | 83 |
| 15 | 350 | e2300 | 941 | 112 | 75 | e6560 | 280 | 230 | 439 | 192 | 121 | 77 |
| 16 | 525 | e1440 | 753 | 76 | 41 | e4560 | 224 | 150 | 217 | 182 | 111 | 70 |
| 17 | 513 | e2470 | 650 | 62 | 25 | e4470 | 191 | 150 | 157 | 132 | 163 | 60 |
| 18 | 910 | e17000 | 1170 | 55 | 26 | e1880 | 165 | 116 | 134 | 112 | 364 | 54 |
| 19 | e2310 | e9490 | 900 | 52 | 24 | e2900 | 175 | 115 | 112 | 103 | 170 | 61 |
| 20 | 650 | e18000 | e646 | 43 | 447 | e1890 | 153 | 89 | 87 | 95 | 131 | 103 |
| 21 | 378 | e3400 | e839 | 40 | 356 | e1210 | 130 | 77 | 76 | 78 | 107 | 72 |
| 22 | 288 | e1720 | e5490 | 36 | 151 | e842 | 115 | 78 | 77 | 69 | 127 | 633 |
| 23 | 255 | 956 | e799 | e37 | 129 | e690 | 111 | 76 | 65 | 61 | 142 | 345 |
| 24 | 262 | 639 | e941 | e35 | 82 | e488 | 333 | 68 | 68 | 56 | 139 | 165 |
| 25 | 272 | 478 | e486 | e32 | 60 | e360 | 310 | 73 | 228 | 50 | 163 | 112 |
| 26 | 197 | 564 | e360 | e28 | e49 | e291 | 906 | 120 | 472 | 53 | 169 | 85 |
| 27 | 172 | 448 | e286 | e26 | e42 | e445 | 744 | 229 | 241 | 46 | 315 | 70 |
| 28 | 140 | 332 | e240 | e34 | e38 | e422 | 527 | 209 | 178 | 41 | 613 | 60 |
| 29 | 149 | 274 | e201 | e37 | --- | e430 | 703 | 467 | 157 | 43 | 411 | 53 |
| 30 | e1960 | 230 | e164 | e28 | --- | e271 | 848 | 624 | 121 | 263 | 266 | 49 |
| 31 | 457 | --- | e142 | e24 | --- | e221 | --- | 645 | --- | 110 | 177 | --- |
| TOTAL | 14634 | 67151 | 24218 | 1976 | 1817 | 62793 | 10462 | 5971 | 6181 | 3335 | 10149 | 5767 |
| MEAN | 472 | 2238 | 781 | 63.7 | 64.9 | 2026 | 349 | 193 | 206 | 108 | 327 | 192 |
| MAX | 2310 | 18000 | 5490 | 159 | 447 | 11500 | 906 | 645 | 472 | 294 | 2140 | 1610 |
| MIN | 132 | 152 | 105 | 24 | 11 | 24 | 111 | 68 | 65 | 41 | 107 | 49 |
| AC-FT | 29030 | 133200 | 48040 | 3920 | 3600 | 124500 | 20750 | 11840 | 12260 | 6610 | 20130 | 11440 |
| CAL YR 1990 | TOTAL 213004 | MEAN 584 | MAX 18000 | MIN 14 | AC-FT 422500 | | | | | | | |
| WTR YR 1991 | TOTAL 214454 | MEAN 588 | MAX 18000 | MIN 11 | AC-FT 425400 | | | | | | | |

e Estimated

HAWAII, ISLAND OF HAWAII
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 mi².

PERIOD OF RECORD.--June 1911 to March 1913 (published as "at Kaiwika, 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.--Record good. No diversion upstream. During period 1911-13, Honolii ditch diverted an average of about 3.2 ft³/s upstream for fluming cane and domestic use.

AVERAGE DISCHARGE.--30 years (water years 1912, 1968-96), 130 ft³/s (94,420 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 22,600 ft³/s, May 23, 1978, gage height, 20.00 ft, from floodmarks and from rating curve extended above 4,610 ft³/s on basis of slope-area measurement at gage height 20.00 ft; minimum, 0.8 ft³/s January 31, 1912.

EXTREMES FOR CURRENT YEAR.-- Peak discharges greater than base discharge of 4,600 ft³/s and maximum (*):

| Date | Time | Discharge (ft ³ /s) | Gage height (ft) | Date | Time | Discharge (ft ³ /s) | Gage height (ft) |
|---------|------|-----------------------------------|---------------------|---------|------|-----------------------------------|---------------------|
| Feb. 25 | 0930 | 11,200 | 16.14 | Mar. 31 | 2130 | 5,780 | 12.81 |
| Mar. 03 | 0100 | *11,500 | *16.28 | | | | |

Minimum discharge, 7.0 ft³/s, January 15-17.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY MEAN VALUES

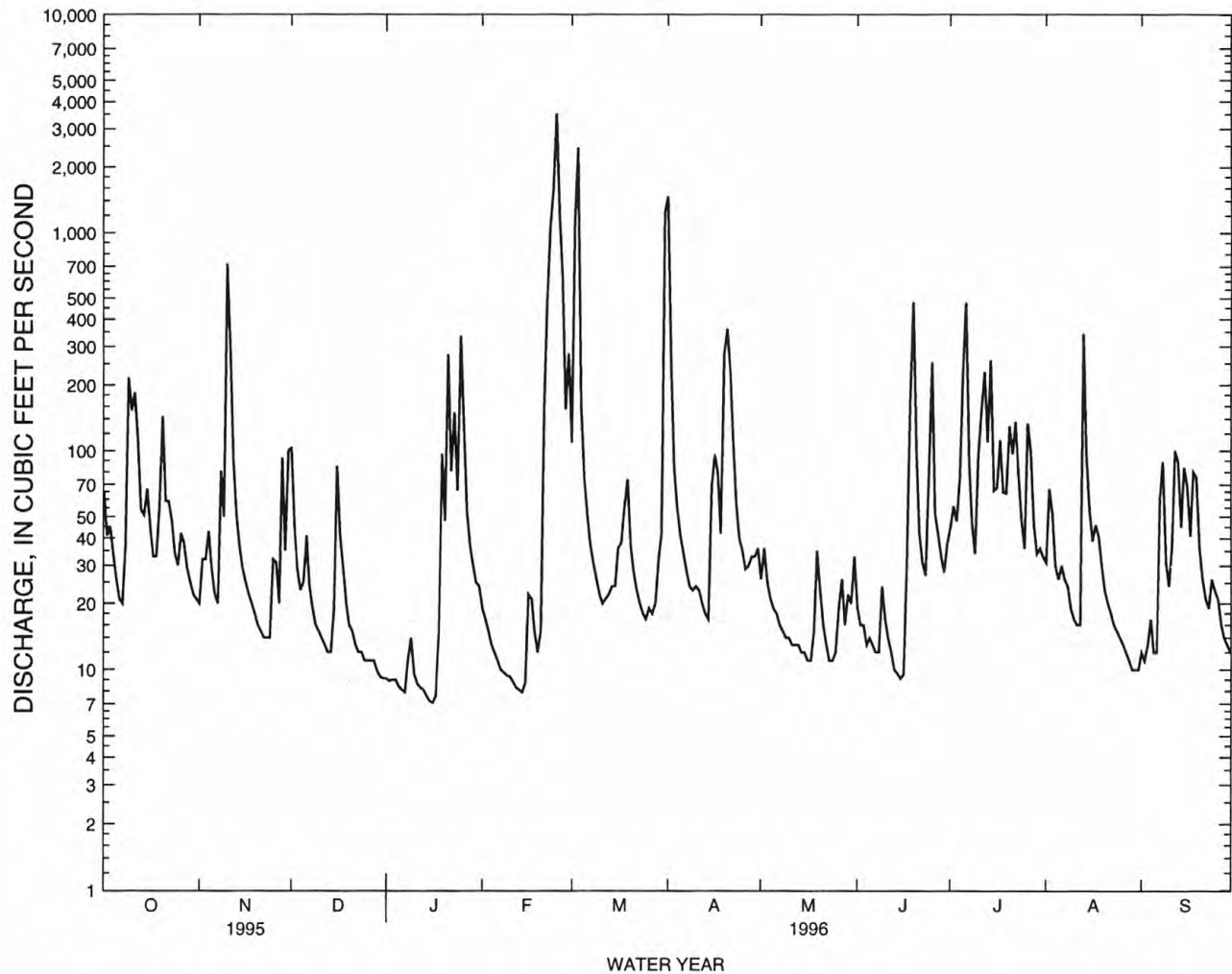
| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|------|------|-------|--------|--------|-------|------|------|--------|------|------|------|
| 1 | 65 | 20 | 103 | 9.1 | 19 | 109 | 1470 | 26 | 19 | 45 | 31 | 12 |
| 2 | 41 | 32 | 46 | 8.9 | 17 | 1120 | 241 | 36 | 16 | 56 | 67 | 11 |
| 3 | 45 | 32 | 29 | 9.0 | 15 | 2450 | 83 | 25 | 16 | 48 | 52 | 13 |
| 4 | 34 | 43 | 23 | 9.0 | 13 | 160 | 55 | 21 | 13 | 74 | 30 | 17 |
| 5 | 26 | 29 | 25 | 8.4 | 12 | 76 | 41 | 19 | 14 | 225 | 26 | 12 |
| 6 | 21 | 22 | 41 | 8.1 | 11 | 52 | 34 | 18 | 13 | 478 | 30 | 12 |
| 7 | 20 | 20 | 24 | 7.9 | 10 | 38 | 28 | 16 | 12 | 88 | 26 | 61 |
| 8 | 37 | 81 | 19 | 11 | 9.7 | 31 | 24 | 15 | 12 | 47 | 24 | 89 |
| 9 | 216 | 50 | 16 | 14 | 9.4 | 26 | 23 | 14 | 24 | 34 | 19 | 31 |
| 10 | 153 | 719 | 15 | 9.5 | 9.3 | 22 | 24 | 14 | 17 | 96 | 17 | 24 |
| 11 | 185 | 301 | 14 | 8.6 | 8.8 | 20 | 23 | 13 | 14 | 154 | 16 | 37 |
| 12 | 110 | 91 | 13 | 8.3 | 8.3 | 21 | 20 | 13 | 12 | 230 | 16 | 100 |
| 13 | 54 | 51 | 12 | 8.1 | 8.1 | 22 | 18 | 13 | 10 | 110 | 343 | 89 |
| 14 | 51 | 37 | 12 | 7.6 | 7.9 | 24 | 17 | 12 | 9.6 | 260 | 96 | 45 |
| 15 | 67 | 29 | 19 | 7.2 | 8.7 | 24 | 69 | 12 | 9.1 | 66 | 54 | 84 |
| 16 | 44 | 25 | 85 | 7.1 | 22 | 36 | 96 | 11 | 9.5 | 68 | 39 | 69 |
| 17 | 33 | 22 | 41 | 7.6 | 21 | 38 | 80 | 11 | 32 | 112 | 46 | 41 |
| 18 | 33 | 20 | 29 | 15 | 15 | 55 | 42 | 15 | 173 | 65 | 41 | 80 |
| 19 | 55 | 18 | 20 | 97 | 12 | 74 | 277 | 35 | 482 | 64 | 30 | 76 |
| 20 | 144 | 16 | 16 | 48 | 15 | 37 | 362 | 23 | 101 | 130 | 23 | 36 |
| 21 | 59 | 15 | 15 | 275 | 164 | 28 | 230 | 16 | 42 | 97 | 20 | 26 |
| 22 | 59 | 14 | 13 | 81 | 483 | 23 | 111 | 13 | 31 | 136 | 18 | 21 |
| 23 | 48 | 14 | 12 | 150 | 1060 | 20 | 58 | 11 | 27 | 78 | 16 | 19 |
| 24 | 34 | 14 | 12 | 66 | 1580 | 18 | 40 | 11 | 76 | 48 | 15 | 26 |
| 25 | 30 | 32 | 11 | 335 | 3530 | 17 | 35 | 12 | 254 | 36 | 14 | 23 |
| 26 | 42 | 31 | 11 | 135 | 1170 | 19 | 29 | 19 | 52 | 134 | 13 | 21 |
| 27 | 38 | 20 | 11 | 53 | 618 | 18 | 30 | 26 | 42 | 99 | 12 | 16 |
| 28 | 29 | 93 | 11 | 37 | 155 | 20 | 33 | 16 | 33 | 46 | 11 | 14 |
| 29 | 25 | 35 | 9.9 | 30 | 279 | 32 | 33 | 22 | 28 | 34 | 10 | 13 |
| 30 | 22 | 101 | 9.3 | 25 | --- | 42 | 36 | 20 | 38 | 36 | 10 | 12 |
| 31 | 21 | --- | 9.1 | 24 | --- | 1240 | --- | 33 | --- | 33 | 10 | --- |
| TOTAL | 1841 | 2027 | 726.3 | 1520.4 | 9291.2 | 5912 | 3662 | 561 | 1631.2 | 3227 | 1175 | 1130 |
| MEAN | 59.4 | 67.6 | 23.4 | 49.0 | 320 | 191 | 122 | 18.1 | 54.4 | 104 | 37.9 | 37.7 |
| MAX | 216 | 719 | 103 | 335 | 3530 | 2450 | 1470 | 36 | 482 | 478 | 343 | 100 |
| MIN | 20 | 14 | 9.1 | 7.1 | 7.9 | 17 | 17 | 11 | 9.1 | 33 | 10 | 11 |
| AC-FT | 3650 | 4020 | 1440 | 3020 | 18430 | 11730 | 7260 | 1110 | 3240 | 6400 | 2330 | 2240 |

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1911 - 1996, BY WATER YEAR (WY)

| | 1911 | 1918 | 1956 | 1964 | 1975 | 1984 | 1994 | 1996 | 1998 | 2000 | 2002 | 2004 |
|------|------|------|------|------|------|------|------|------|------|------|------|------|
| MEAN | 80.3 | 198 | 156 | 134 | 115 | 214 | 194 | 94.6 | 69.2 | 118 | 120 | 84.0 |
| MAX | 222 | 783 | 625 | 648 | 752 | 1349 | 772 | 319 | 184 | 384 | 420 | 276 |
| (WY) | 1991 | 1995 | 1971 | 1975 | 1969 | 1980 | 1986 | 1989 | 1994 | 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 |

HAWAII, ISLAND OF HAWAII
 16717000 HONOLII STREAM NEAR PAPAIKOU--Continued

| SUMMARY STATISTICS | FOR 1995 CALENDAR YEAR | | FOR 1996 WATER YEAR | | WATER YEARS 1911 - 1996 | |
|--------------------------|------------------------|--------|---------------------|--------|-------------------------|-------------|
| ANNUAL TOTAL | 30679.1 | | 32704.1 | | 130 | |
| ANNUAL MEAN | 84.1 | | 89.4 | | 220 | |
| HIGHEST ANNUAL MEAN | | | | | 1991 | |
| LOWEST ANNUAL MEAN | | | | | 53.1 | |
| HIGHEST DAILY MEAN | 2410 | Jan 16 | 3530 | Feb 25 | 5780 | Jan 8 1975 |
| LOWEST DAILY MEAN | 7.3 | Mar 19 | 7.1 | Jan 16 | .80 | Jan 31 1912 |
| ANNUAL SEVEN-DAY MINIMUM | 7.4 | Mar 15 | 7.8 | Jan 11 | 1.0 | Feb 22 1980 |
| ANNUAL RUNOFF (AC-FT) | 60850 | | 64870 | | 94420 | |
| 10 PERCENT EXCEEDS | 181 | | 138 | | 267 | |
| 50 PERCENT EXCEEDS | 30 | | 26 | | 42 | |
| 90 PERCENT EXCEEDS | 10 | | 11 | | 11 | |



HAWAII, ISLAND OF HAWAII
16720000 KAWAINUI STREAM NEAR KAMUELA

LOCATION.--Lat 20°05'18 " long 155°40'58 " , Hydrologic Unit 20010000, on left bank 250 ft upstream from Upper Hamakua ditch intake, and 4.5 mi north of Kamuela.

DRAINAGE AREA.--1.58 mi².

PERIOD OF RECORD.--January 1964 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 4,060 ft above mean sea level, from topographic map.

REMARKS.--

Water year 1992: Records fair except for periods of estimated record which are poor. No diversions upstream.
Water year 1993: Records fair except for periods of estimated record which are poor. No diversions upstream.
Water year 1994: Records fair. No diversions upstream.
Water year 1995: Records fair. No diversions upstream.
Water year 1996: Records fair. No diversions upstream.

AVERAGE DISCHARGE.--

Water year 1992: 28 years (water years 1965-92), 14.8 ft³/s (10,710 acre-ft/yr).
Water year 1993: 29 years (water years 1965-93), 14.8 ft³/s (10,720 acre-ft/yr).
Water year 1994: 30 years (water years 1965-94), 15.0 ft³/s (10,890 acre-ft/yr).
Water year 1995: 31 years (water years 1965-95), 15.0 ft³/s (10,880 acre-ft/yr).
Water year 1996: 32 years (water years 1965-96), 14.9 ft³/s (10,760 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 3,160 ft³/s, November 18, 1979, gage height, 10.03 ft, from rating curve extended above 53 ft³/s on basis of computations of peak flow over dam and slope-area measurement at gage height 10.03 ft; minimum, 0.01 ft³/s, January 23-28, February 20-21, 1977, December 16-19, February 23, 24, 1980 (revised).

EXTREMES FOR CURRENT YEAR.--Water year 1992: Peak discharges greater than base discharge of 440 ft³/s and maximum (*):

| Date | Time | Discharge (ft ³ /s) | Gage height (ft) | Date | Time | Discharge (ft ³ /s) | Gage height (ft) |
|---------|------|-----------------------------------|---------------------|--|------|-----------------------------------|---------------------|
| Sep. 14 | 0600 | *815 | *6.24 | No other peak greater than base discharge. | | | |

Minimum discharge, 0.12 ft³/s, June 4.

Water year 1993: Peak discharges greater than base discharge of 440 ft³/s and maximum (*):

| Date | Time | Discharge (ft ³ /s) | Gage height (ft) | Date | Time | Discharge (ft ³ /s) | Gage height (ft) |
|---------|------|-----------------------------------|---------------------|---------|------|-----------------------------------|---------------------|
| Jan. 06 | 2130 | *649 | *5.75 | Sep. 23 | 2030 | 479 | 5.16 |

Minimum discharge, 0.22 ft³/s, February 17-18.

Water year 1994: Peak discharges greater than base discharge of 440 ft³/s and maximum (*):

| Date | Time | Discharge (ft ³ /s) | Gage height (ft) | Date | Time | Discharge (ft ³ /s) | Gage height (ft) |
|---------|------|-----------------------------------|---------------------|---------|------|-----------------------------------|---------------------|
| Oct. 26 | 0400 | *782 | *6.15 | Mar. 25 | 0800 | 606 | 5.61 |
| Feb. 10 | 1700 | 485 | 5.18 | | | | |

Minimum discharge, 0.25 ft³/s, March 10-11.

Water year 1995: Peak discharges greater than base discharge of 440 ft³/s and maximum (*):

| Date | Time | Discharge (ft ³ /s) | Gage height (ft) | Date | Time | Discharge (ft ³ /s) | Gage height (ft) |
|---------|------|-----------------------------------|---------------------|--|------|-----------------------------------|---------------------|
| Jan. 15 | 2030 | *707 | *5.93 | No other peak greater than base discharge. | | | |

Minimum discharge, 0.08 ft³/s, February 28 to March 03.

Water year 1996: Peak discharges greater than base discharge of 440 ft³/s and maximum (*):

| Date | Time | Discharge (ft ³ /s) | Gage height (ft) | Date | Time | Discharge (ft ³ /s) | Gage height (ft) |
|---------|------|-----------------------------------|---------------------|--|------|-----------------------------------|---------------------|
| Feb. 24 | 2300 | *789 | *6.17 | No other peak greater than base discharge. | | | |

Minimum discharge, 0.11 ft³/s, February 14, September 1-2.

HAWAII, ISLAND OF HAWAII
16720000 KAWAINUI STREAM NEAR KAMUELA--Continued

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1991 TO SEPTEMBER 1992
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|-------|--------|--------|--------|--------|--------|-------|--------|--------|-------|-------|-------|
| 1 | .65 | .80 | .60 | e30 | e7.0 | e4.0 | 1.6 | .85 | e.16 | e6.0 | e4.5 | e5.5 |
| 2 | .56 | .60 | .58 | e35 | e2.0 | e1.5 | 9.9 | .58 | e.15 | e5.0 | e10 | 74 |
| 3 | .50 | 1.9 | 2.1 | e8.0 | e10 | e1.0 | 8.6 | .42 | e.13 | e5.0 | e4.5 | 48 |
| 4 | .44 | 1.5 | 16 | e3.0 | e20 | e.85 | 3.9 | .52 | e.12 | e35 | e9.0 | 40 |
| 5 | .42 | 2.3 | 4.6 | e2.0 | e50 | e.70 | 2.0 | 46 | .22 | e15 | e5.0 | 105 |
| 6 | .40 | 1.5 | 18 | e1.5 | e52 | e.60 | 1.3 | e60 | .36 | e10 | e5.0 | 41 |
| 7 | 3.1 | 1.9 | 7.0 | e1.2 | e15 | e.50 | 1.1 | e20 | e.90 | e6.0 | e15 | 9.0 |
| 8 | 4.4 | 2.5 | 2.9 | e1.0 | e6.0 | e.40 | .80 | e6.0 | e6.0 | e2.5 | e5.0 | 4.8 |
| 9 | 1.6 | 3.7 | 1.8 | e.90 | e2.5 | e.40 | .62 | e3.5 | e35 | e11 | e3.5 | 3.8 |
| 10 | .99 | 1.7 | 1.3 | e.80 | e1.5 | e.30 | 1.1 | e1.5 | e25 | e13 | e2.5 | 2.4 |
| 11 | .70 | 1.1 | 1.0 | e.70 | e1.3 | e.25 | 3.6 | e1.2 | e8.0 | e4.0 | e20 | 1.7 |
| 12 | .53 | .85 | .81 | e.60 | e2.5 | e.25 | 4.3 | e.80 | e6.5 | e4.5 | e6.0 | 1.3 |
| 13 | .43 | .65 | .65 | e.60 | e8.0 | e.25 | 2.1 | e.55 | e6.0 | e7.0 | e4.0 | 31 |
| 14 | .37 | .54 | .54 | e.60 | e3.0 | e.40 | 1.2 | e.45 | e4.0 | e9.0 | e2.5 | 178 |
| 15 | 2.5 | .45 | .70 | e70 | e3.5 | e4.5 | .88 | e.40 | e11 | e8.0 | e20 | 7.3 |
| 16 | 2.0 | .41 | .64 | e10 | e2.0 | e5.0 | .68 | e.30 | e6.0 | e30 | e35 | 4.7 |
| 17 | 1.1 | .61 | 2.8 | e3.0 | e1.0 | e4.0 | .55 | e.25 | e4.0 | e35 | e10 | 11 |
| 18 | .81 | .68 | 1.7 | e1.5 | e.60 | e6.0 | .50 | e.20 | e3.0 | e10 | e3.5 | 8.6 |
| 19 | .63 | 20 | 2.5 | e15 | e.55 | e15 | .51 | e.20 | e8.0 | e9.0 | e10 | 6.3 |
| 20 | .53 | 5.8 | 6.7 | e8.0 | e.50 | e25 | .77 | e.18 | e7.5 | e70 | e25 | 2.8 |
| 21 | .49 | 2.6 | 8.2 | e2.5 | e.50 | e8.0 | .60 | e.15 | e3.5 | e30 | e50 | 1.8 |
| 22 | 1.0 | 25 | 3.5 | e1.5 | e.40 | e2.5 | .50 | e.13 | e3.5 | e35 | e10 | 1.3 |
| 23 | .80 | 20 | 38 | e.90 | e.40 | e1.5 | .42 | e.13 | e9.0 | e10 | e35 | 15 |
| 24 | .69 | 5.9 | 6.0 | e.60 | e.40 | e2.5 | .35 | e.13 | e20 | e3.5 | e33 | 7.9 |
| 25 | 1.8 | 5.9 | e25 | e.60 | e.35 | 34 | .30 | e.16 | e35 | e20 | e30 | 50 |
| 26 | 1.5 | 3.1 | e130 | e.50 | e.30 | 19 | .27 | e.15 | e50 | e100 | e30 | 110 |
| 27 | 1.0 | 1.8 | e20 | e.45 | e.30 | 4.7 | .27 | e.14 | e40 | e80 | e10 | 41 |
| 28 | .78 | 1.2 | e23 | e.45 | e.30 | 2.6 | .38 | e.25 | e40 | e10 | e15 | 5.8 |
| 29 | .59 | .91 | e25 | e.40 | e.50 | 5.5 | .87 | e.35 | e10 | e4.0 | e30 | 2.7 |
| 30 | .49 | .71 | e10 | e4.0 | --- | 5.7 | 1.2 | e.25 | e4.5 | e5.0 | e10 | 2.2 |
| 31 | .53 | --- | e45 | e35 | --- | 2.4 | --- | e.20 | --- | e6.0 | e7.0 | --- |
| TOTAL | 32.33 | 116.61 | 406.62 | 240.30 | 192.40 | 159.30 | 51.17 | 145.94 | 347.54 | 598.5 | 460.0 | 823.9 |
| MEAN | 1.04 | 3.89 | 13.1 | 7.75 | 6.63 | 5.14 | 1.71 | 4.71 | 11.6 | 19.3 | 14.8 | 27.5 |
| MAX | 4.4 | 25 | 130 | 70 | 52 | 34 | 9.9 | 60 | 50 | 100 | 50 | 178 |
| MIN | .37 | .41 | .54 | .40 | .30 | .25 | .27 | .13 | .12 | 2.5 | 2.5 | 1.3 |
| AC-FT | 64 | 231 | 807 | 477 | 382 | 316 | 101 | 289 | 689 | 1190 | 912 | 1630 |

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1964 - 1992, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|------|------|------|------|------|------|------|------|------|------|------|------|------|
| MEAN | 9.46 | 16.1 | 14.7 | 15.7 | 12.1 | 21.1 | 23.2 | 12.6 | 12.6 | 18.1 | 14.4 | 8.23 |
| MAX | 27.3 | 55.8 | 41.4 | 62.5 | 40.6 | 98.0 | 67.5 | 34.8 | 25.5 | 37.0 | 31.8 | 27.5 |
| (WY) | 1984 | 1980 | 1971 | 1979 | 1969 | 1980 | 1986 | 1964 | 1986 | 1982 | 1982 | 1992 |
| MIN | .17 | 1.77 | .51 | .34 | .82 | 3.33 | 1.71 | 3.59 | 3.18 | 4.56 | 2.70 | .26 |
| (WY) | 1985 | 1990 | 1981 | 1981 | 1983 | 1983 | 1992 | 1972 | 1985 | 1981 | 1971 | 1965 |

SUMMARY STATISTICS FOR 1991 CALENDAR YEAR FOR 1992 WATER YEAR WATER YEARS 1964 - 1992

| | | | | | | | | | | | | |
|--------------------------|--|---------|-------|---------|--|------|--------|--|-------|------|--------|------|
| ANNUAL TOTAL | | 5435.59 | | 3574.61 | | | | | | | | |
| ANNUAL MEAN | | 14.9 | | 9.77 | | | | | | 14.8 | | |
| HIGHEST ANNUAL MEAN | | | | | | | | | | 26.3 | | 1980 |
| LOWEST ANNUAL MEAN | | | | | | | | | | 7.33 | | 1981 |
| HIGHEST DAILY MEAN | | | 257 | Aug 7 | | 178 | Sep 14 | | 612 | | Nov 18 | 1979 |
| LOWEST DAILY MEAN | | | .14 | Feb 12 | | .12 | Jun 4 | | .01 | | Jan 23 | 1977 |
| ANNUAL SEVEN-DAY MINIMUM | | | .19 | Feb 6 | | .14 | May 21 | | .01 | | Jan 22 | 1977 |
| ANNUAL RUNOFF (AC-FT) | | | 10780 | | | 7090 | | | 10710 | | | |
| 10 PERCENT EXCEEDS | | | 36 | | | 30 | | | 40 | | | |
| 50 PERCENT EXCEEDS | | | 4.3 | | | 2.5 | | | 4.5 | | | |
| 90 PERCENT EXCEEDS | | | .54 | | | .39 | | | .54 | | | |

e Estimated

HAWAII, ISLAND OF HAWAII
16720000 KAWAINUI STREAM NEAR KAMUELA--Continued

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

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|-------|--------|--------|--------|-------|--------|-------|-------|-------|--------|-------|-------|
| 1 | 1.8 | 1.2 | 6.6 | 74 | 1.1 | .67 | 1.7 | 52 | 43 | 5.4 | 4.0 | 1.5 |
| 2 | 1.2 | .83 | 17 | 8.9 | .69 | 75 | 1.4 | 33 | 47 | 29 | 21 | 1.1 |
| 3 | .97 | 2.4 | 6.1 | 2.5 | .52 | 68 | 4.3 | 52 | 8.0 | 17 | 47 | .87 |
| 4 | .79 | 1.4 | 11 | 48 | .41 | 22 | 4.6 | 12 | 27 | 43 | 5.6 | .74 |
| 5 | .65 | 1.5 | 51 | 129 | .36 | 12 | 11 | 36 | 35 | 4.5 | 3.7 | .65 |
| 6 | .55 | 5.7 | 12 | 136 | .36 | 63 | 24 | 10 | 22 | 2.5 | 4.5 | .61 |
| 7 | .49 | 4.5 | 11 | 50 | .31 | 32 | 73 | 22 | e15 | 3.3 | 7.5 | .57 |
| 8 | .56 | 2.1 | 5.9 | 13 | .32 | 12 | 24 | 54 | e50 | 1.9 | 14 | .52 |
| 9 | .45 | 52 | 138 | 3.4 | .35 | 30 | 7.6 | 37 | e20 | 1.6 | 35 | 1.2 |
| 10 | .37 | 14 | 98 | 2.2 | .30 | 34 | 14 | 58 | e30 | 1.2 | 59 | 1.2 |
| 11 | .34 | 2.8 | 51 | 1.4 | .43 | 27 | 3.5 | 7.7 | e30 | .99 | 64 | 3.7 |
| 12 | 1.3 | 1.7 | 15 | 1.1 | .42 | 4.3 | 2.8 | 4.5 | e25 | .81 | 31 | 7.3 |
| 13 | .64 | 15 | 3.7 | .94 | .37 | 2.9 | 3.0 | 4.1 | e10 | .65 | 63 | 5.5 |
| 14 | .46 | 63 | 1.9 | 1.1 | .38 | 7.0 | 1.8 | 1.9 | e4.0 | .55 | 59 | 1.9 |
| 15 | .38 | 84 | 1.3 | 14 | .30 | 22 | 8.8 | 2.6 | e2.0 | 7.9 | 25 | 1.2 |
| 16 | .33 | 6.9 | 3.4 | 32 | .26 | 3.8 | 3.6 | 2.9 | e6.0 | 5.6 | 80 | .92 |
| 17 | .36 | 2.9 | 1.7 | 27 | .24 | 9.4 | 2.3 | 3.4 | e15 | 13 | 6.9 | .81 |
| 18 | .39 | 1.7 | 1.2 | 4.7 | .23 | 4.1 | 1.3 | 3.6 | e40 | 21 | 3.1 | 1.4 |
| 19 | .34 | 1.2 | .99 | 4.8 | .26 | 2.1 | 10 | 6.5 | e15 | 79 | 33 | 2.1 |
| 20 | .30 | .88 | .99 | 4.6 | .38 | 7.2 | 133 | 4.1 | e6.0 | 28 | 12 | 6.0 |
| 21 | .26 | .72 | 2.9 | 2.2 | 1.8 | 6.4 | 116 | 2.3 | e3.5 | 105 | 3.8 | 3.1 |
| 22 | .26 | 4.8 | 32 | 1.5 | 2.2 | 2.7 | 105 | 1.4 | e6.0 | 80 | 7.4 | 1.3 |
| 23 | 1.3 | 24 | 5.1 | 1.1 | 1.6 | 17 | 14 | 1.0 | 7.1 | 64 | 31 | 28 |
| 24 | 1.9 | 9.3 | 2.2 | .82 | 3.3 | 4.8 | 9.1 | 2.8 | 3.4 | 101 | 27 | 11 |
| 25 | 3.1 | 5.0 | 1.3 | .66 | 6.2 | 2.1 | 7.8 | 4.4 | 44 | 47 | 12 | 2.2 |
| 26 | 18 | 20 | 1.0 | .55 | 4.2 | 1.3 | 8.4 | 2.5 | 42 | 26 | 3.5 | 1.2 |
| 27 | 15 | 3.2 | 1.5 | .47 | 1.7 | 8.2 | 3.5 | 5.3 | 43 | 125 | 3.0 | .80 |
| 28 | 16 | 1.9 | 1.2 | .40 | .97 | 7.1 | 3.3 | 7.2 | 36 | 19 | 3.2 | .63 |
| 29 | 6.7 | 13 | 1.2 | 13 | --- | 2.4 | 3.8 | 3.1 | 17 | 15 | 1.7 | .55 |
| 30 | 2.7 | 14 | .93 | 7.4 | --- | 12 | 64 | 1.5 | 9.0 | 32 | 1.3 | 4.8 |
| 31 | 1.5 | --- | 1.1 | 2.0 | --- | 3.4 | --- | 2.5 | --- | 8.3 | 1.0 | --- |
| TOTAL | 79.39 | 361.63 | 488.21 | 588.74 | 29.96 | 505.87 | 670.6 | 441.3 | 661.0 | 889.20 | 673.2 | 93.37 |
| MEAN | 2.56 | 12.1 | 15.7 | 19.0 | 1.07 | 16.3 | 22.4 | 14.2 | 22.0 | 28.7 | 21.7 | 3.11 |
| MAX | 18 | 84 | 138 | 136 | 6.2 | 75 | 133 | 58 | 50 | 125 | 80 | 28 |
| MIN | .26 | .72 | .93 | .40 | .23 | .67 | 1.3 | 1.0 | 2.0 | .55 | 1.0 | .52 |
| AC-FT | 157 | 717 | 968 | 1170 | 59 | 1000 | 1330 | 875 | 1310 | 1760 | 1340 | 185 |

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1964 - 1993, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|------|------|------|------|------|------|------|------|------|------|------|------|------|
| MEAN | 9.22 | 16.0 | 14.7 | 15.8 | 11.7 | 20.9 | 23.2 | 12.6 | 12.9 | 18.5 | 14.6 | 8.06 |
| MAX | 27.3 | 55.8 | 41.4 | 62.5 | 40.6 | 98.0 | 67.5 | 34.8 | 25.5 | 37.0 | 31.8 | 27.5 |
| (WY) | 1984 | 1980 | 1971 | 1979 | 1969 | 1980 | 1986 | 1964 | 1986 | 1982 | 1982 | 1992 |
| MIN | .17 | 1.77 | .51 | .34 | .82 | 3.33 | 1.71 | 3.59 | 3.18 | 4.56 | 2.70 | .26 |
| (WY) | 1985 | 1990 | 1981 | 1981 | 1983 | 1983 | 1992 | 1972 | 1985 | 1981 | 1971 | 1965 |

SUMMARY STATISTICS FOR 1992 CALENDAR YEAR FOR 1993 WATER YEAR WATER YEARS 1964 - 1993

| | | | |
|--------------------------|---------|---------|-------|
| ANNUAL TOTAL | 3948.28 | 5482.47 | |
| ANNUAL MEAN | 10.8 | 15.0 | 14.8 |
| HIGHEST ANNUAL MEAN | | | 26.3 |
| LOWEST ANNUAL MEAN | | | 7.33 |
| HIGHEST DAILY MEAN | 178 | Sep 14 | 612 |
| LOWEST DAILY MEAN | .12 | Jun 4 | .23 |
| ANNUAL SEVEN-DAY MINIMUM | .14 | May 21 | .29 |
| ANNUAL RUNOFF (AC-FT) | 7830 | 10870 | 10720 |
| 10 PERCENT EXCEEDS | 35 | 47 | 40 |
| 50 PERCENT EXCEEDS | 3.0 | 4.1 | 4.4 |
| 90 PERCENT EXCEEDS | .35 | .55 | .54 |

e Estimated

HAWAII, ISLAND OF HAWAII
 16720000 KAWAINUI STREAM NEAR KAMUELA--Continued

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1993 TO SEPTEMBER 1994
 DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|--------|--------|--------|--------|--------|---------|-------|--------|-------|-------|-------|--------|
| 1 | 1.5 | 4.9 | 18 | .54 | .55 | 1.3 | 1.7 | 32 | 4.4 | 19 | 12 | 38 |
| 2 | .85 | 2.0 | 8.2 | .48 | .49 | .92 | 1.5 | 47 | 4.1 | 18 | 13 | 15 |
| 3 | .64 | 1.3 | 52 | 3.1 | 8.4 | .72 | 13 | 10 | 4.1 | 31 | 40 | 13 |
| 4 | .51 | .98 | 62 | 2.9 | 56 | .60 | 37 | 23 | 29 | 17 | 11 | 17 |
| 5 | .43 | 4.3 | 88 | 1.4 | 119 | .50 | 14 | 23 | 61 | 52 | 7.1 | 13 |
| 6 | .37 | 27 | 121 | 21 | 52 | .44 | 14 | 7.9 | 74 | 31 | 11 | 13 |
| 7 | .32 | 20 | 34 | 17 | 36 | .37 | 32 | 3.6 | 21 | 29 | 8.1 | 11 |
| 8 | .29 | 17 | 58 | 2.8 | 17 | .33 | 24 | 2.5 | 5.3 | 21 | 5.7 | 3.8 |
| 9 | .30 | 61 | 14 | 1.4 | 9.4 | .30 | 8.9 | 1.5 | 6.4 | 6.6 | 5.0 | 11 |
| 10 | .36 | 6.2 | 17 | .99 | 37 | .28 | 5.1 | 1.1 | 7.6 | 4.0 | 5.3 | 39 |
| 11 | 1.6 | 2.3 | 29 | .75 | 38 | 3.4 | 31 | .90 | 3.2 | 13 | 30 | 38 |
| 12 | 13 | 1.5 | 69 | .60 | 24 | 122 | 135 | .83 | 3.1 | 7.5 | 63 | 61 |
| 13 | 13 | 4.9 | 44 | .51 | 5.1 | 102 | 34 | 5.6 | 3.7 | 3.7 | 20 | 13 |
| 14 | 4.2 | 8.9 | 13 | .43 | 20 | 110 | 7.6 | 5.1 | 34 | 17 | 5.2 | 6.1 |
| 15 | 1.7 | 13 | 35 | .36 | 10 | 108 | 7.6 | 30 | 21 | 62 | 7.3 | 5.1 |
| 16 | 1.7 | 9.2 | 41 | .39 | 12 | 42 | 4.3 | 15 | 12 | 11 | 13 | 5.1 |
| 17 | 9.0 | 43 | 26 | 1.4 | 6.1 | 50 | 3.7 | 9.5 | 53 | 59 | 6.4 | 55 |
| 18 | 5.7 | 73 | 11 | 6.0 | 13 | 40 | 29 | 9.1 | 106 | 42 | 33 | 22 |
| 19 | 2.2 | 30 | 114 | 39 | 3.5 | 51 | 85 | 16 | 77 | 18 | 16 | 7.7 |
| 20 | 1.1 | 4.9 | 48 | 95 | 2.3 | 61 | 113 | 8.4 | 18 | 17 | 10 | 3.4 |
| 21 | 1.3 | 5.4 | 11 | 87 | 1.5 | 92 | 102 | 14 | 19 | 74 | 4.5 | 2.3 |
| 22 | 5.1 | 8.7 | 3.8 | 52 | 1.0 | 33 | 46 | 13 | 17 | 36 | 15 | 2.1 |
| 23 | 13 | 43 | 11 | 26 | .79 | 72 | 37 | 4.6 | 17 | 30 | 88 | 4.0 |
| 24 | 5.4 | 51 | 10 | 36 | .70 | 69 | 29 | 4.8 | 35 | 20 | 42 | 2.0 |
| 25 | 2.8 | 9.1 | 7.3 | 35 | 6.1 | 173 | 12 | 18 | 59 | 26 | 5.3 | 1.3 |
| 26 | 72 | 35 | 2.7 | 20 | 19 | 42 | 58 | 8.9 | 43 | 33 | 4.1 | 1.0 |
| 27 | 4.5 | 51 | 1.6 | 4.3 | 4.6 | 8.8 | 20 | 8.9 | 49 | 8.2 | 22 | .99 |
| 28 | 4.0 | 38 | 1.2 | 1.9 | 2.0 | 6.6 | 17 | 7.9 | 35 | 5.0 | 5.0 | .91 |
| 29 | 5.4 | 32 | .94 | 1.2 | --- | 9.3 | 4.9 | 10 | 64 | 9.1 | 2.7 | .74 |
| 30 | 33 | 41 | .75 | .88 | --- | 3.5 | 9.5 | 25 | 49 | 4.1 | 2.0 | .61 |
| 31 | 14 | --- | .63 | .68 | --- | 2.3 | --- | 18 | --- | 4.6 | 30 | --- |
| TOTAL | 219.27 | 649.58 | 953.12 | 461.01 | 505.53 | 1206.66 | 936.8 | 385.13 | 934.9 | 728.8 | 542.7 | 406.15 |
| MEAN | 7.07 | 21.7 | 30.7 | 14.9 | 18.1 | 38.9 | 31.2 | 12.4 | 31.2 | 23.5 | 17.5 | 13.5 |
| MAX | 72 | 73 | 121 | 95 | 119 | 173 | 135 | 47 | 106 | 74 | 88 | 61 |
| MIN | .29 | .98 | .63 | .36 | .49 | .28 | 1.5 | .83 | 3.1 | 3.7 | 2.0 | .61 |
| AC-FT | 435 | 1290 | 1890 | 914 | 1000 | 2390 | 1860 | 764 | 1850 | 1450 | 1080 | 806 |

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1964 - 1994, BY WATER YEAR (WY)

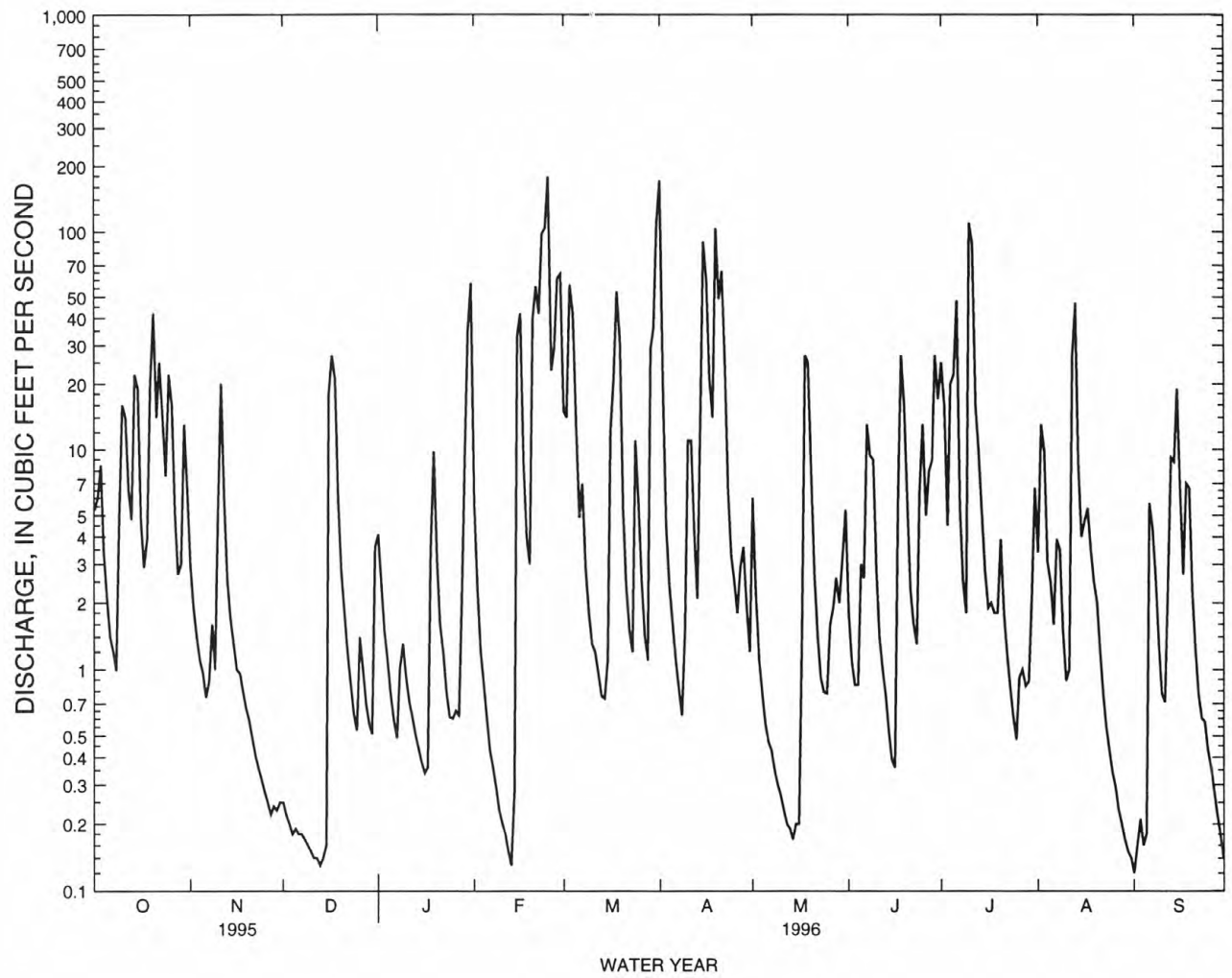
| | 1964 | 1965 | 1966 | 1967 | 1968 | 1969 | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | | |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|--|--|
| MEAN | 9.15 | 16.2 | 15.3 | 15.8 | 11.9 | 21.5 | 23.4 | 12.6 | 13.5 | 18.6 | 14.7 | 8.24 | | | | | | | | | | | | | | | | | | | | | |
| MAX | 27.3 | 55.8 | 41.4 | 62.5 | 40.6 | 98.0 | 67.5 | 34.8 | 31.2 | 37.0 | 31.8 | 27.5 | | | | | | | | | | | | | | | | | | | | | |
| (WY) | 1984 | 1980 | 1971 | 1979 | 1969 | 1980 | 1986 | 1964 | 1994 | 1982 | 1982 | 1992 | | | | | | | | | | | | | | | | | | | | | |
| MIN | .17 | 1.77 | .51 | .34 | .82 | 3.33 | 1.71 | 3.59 | 3.18 | 4.56 | 2.70 | .26 | | | | | | | | | | | | | | | | | | | | | |
| (WY) | 1985 | 1990 | 1981 | 1981 | 1983 | 1983 | 1992 | 1972 | 1985 | 1981 | 1971 | 1965 | | | | | | | | | | | | | | | | | | | | | |

SUMMARY STATISTICS

| | FOR 1993 CALENDAR YEAR | FOR 1994 WATER YEAR | WATER YEARS 1964 - 1994 |
|--------------------------|------------------------|---------------------|-------------------------|
| ANNUAL TOTAL | 6375.21 | 7929.65 | |
| ANNUAL MEAN | 17.5 | 21.7 | 15.0 |
| HIGHEST ANNUAL MEAN | | | 26.3 |
| LOWEST ANNUAL MEAN | | | 7.33 |
| HIGHEST DAILY MEAN | 136 Jan 6 | 173 Mar 25 | 612 Nov 18 1979 |
| LOWEST DAILY MEAN | .23 Feb 18 | .28 Mar 10 | .01 Jan 23 1977 |
| ANNUAL SEVEN-DAY MINIMUM | .29 Feb 13 | .37 Oct 4 | .01 Jan 22 1977 |
| ANNUAL RUNOFF (AC-FT) | 12650 | 15730 | 10890 |
| 10 PERCENT EXCEEDS | 51 | 58 | 41 |
| 50 PERCENT EXCEEDS | 5.6 | 11 | 4.6 |
| 90 PERCENT EXCEEDS | .65 | .89 | .54 |

HAWAII, ISLAND OF HAWAII

16720000 KAWAINUI STREAM NEAR KAMUELA--Continued



HAWAII, ISLAND OF HAWAII
16720300 KAWAIKI STREAM NEAR KAMUELA

THE RECORDS FOR WATER YEARS 1992-96 WERE NOT COMPUTED
AT THE TIME OF PUBLICATION

HAWAII, ISLAND OF HAWAII

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 Kawaiiki Stream intake and 4.4 mi north of Kamuela.

PERIOD OF RECORD.--January 1964 to current year.

GAGE.--Water-stage recorder and concrete control. Elevation of gage is 4,020 ft, from topographic map.

REMARKS.--Ditch diverts from Kawaiiki and Kawaiiki Streams for irrigation in vicinity of Kamuela. Rain gage located at station monitoring total rainfall between service dates.

Water year 1992: Records fair except for estimated daily discharges which are poor.

Water year 1993: Records fair except for estimated daily discharges which are poor.

Water year 1994: Records fair because of variable backwater at this gage.

Water year 1995: Records fair except for estimated daily discharges which are poor.

Water year 1996: Records good except for estimated daily discharges which are poor.

AVERAGE DISCHARGE.--

Water year 1992: 28 years, 7.63 ft³/s (5,530 acre-ft/yr).

Water year 1993: 29 years, 7.60 ft³/s (5,510 acre-ft/yr).

Water year 1994: 30 years, 7.61 ft³/s (5,510 acre-ft/yr).

Water year 1995: 31 years, 7.58 ft³/s (5,490 acre-ft/yr).

Water year 1996: 32 years, 7.49 ft³/s (5,420 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 49 ft³/s, November 2, 1967; no flow, July 8-9, 14-16, 1992, August 4-6, 1992.

EXTREMES FOR CURRENT YEAR.--

Water year 1992: Maximum daily discharge, 16 ft³/s, December 26, May 6, June 26; minimum daily, no flow, July 8-9, 14-16, August 4-6.

Water year 1993: Maximum daily discharge, 18 ft³/s, April 20; minimum daily, 0.47 ft³/s, February 18.

Water year 1994: Maximum daily discharge, 16 ft³/s, July 17, 21, August 3, 12, 23, September 12; minimum daily, 0.49 ft³/s, March 10.

Water year 1995: Maximum daily discharge, 17 ft³/s, January 15; minimum daily, 0.17 ft³/s, March 2.

Water year 1996: Maximum daily discharge, 16 ft³/s, February 21, 23, 25, April 1, 15-16, 21, July 11, August 13; minimum daily, 0.13 ft³/s, December 13.

HAWAII, ISLAND OF HAWAII

16720500 UPPER HAMAKUA DITCH BELOW KAWAIKI STREAM, NEAR KAMUELA--Continued

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1991 TO SEPTEMBER 1992
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|-------|-------|--------|--------|--------|--------|-------|-------|--------|--------|--------|--------|
| 1 | .97 | 1.4 | .79 | 13 | 6.6 | e5.0 | 2.4 | 1.5 | .22 | 7.8 | 2.2 | e3.3 |
| 2 | .84 | 1.0 | .78 | 14 | 3.2 | e2.0 | 6.2 | .97 | .18 | 6.2 | 4.8 | e14 |
| 3 | .78 | 2.7 | 2.5 | 9.8 | 12 | e1.3 | 9.9 | .66 | .16 | 6.2 | 1.4 | e13 |
| 4 | .68 | 2.2 | 12 | 5.0 | 14 | e1.1 | 5.6 | .64 | .16 | 15 | .00 | e12 |
| 5 | .65 | 3.3 | 5.7 | 3.2 | 15 | e.95 | 3.0 | 15 | .19 | 14 | .00 | e15 |
| 6 | .63 | 2.2 | 12 | 2.4 | 15 | e.80 | 2.1 | 16 | .50 | 7.9 | .00 | e11 |
| 7 | 3.9 | 2.6 | 7.8 | 1.9 | 13 | e.70 | 1.6 | 12 | 1.7 | 1.1 | 5.1 | e6.3 |
| 8 | 5.9 | 3.1 | 3.8 | 1.5 | 7.0 | e.55 | 1.3 | 6.8 | 7.9 | .00 | 3.6 | e3.3 |
| 9 | 2.3 | 4.4 | 2.4 | 1.3 | 4.0 | e.55 | 1.0 | 3.8 | 15 | .00 | 1.8 | e1.8 |
| 10 | 1.4 | 2.1 | 1.8 | 1.1 | 2.7 | e.40 | 1.6 | 2.0 | 15 | 1.1 | 1.6 | .85 |
| 11 | 1.0 | 1.4 | 1.4 | .99 | 2.6 | e.40 | 5.8 | 1.3 | 11 | 1.9 | 8.8 | 1.3 |
| 12 | .81 | 1.0 | 1.1 | .89 | 4.7 | e.40 | 6.6 | .98 | 8.1 | 2.0 | 4.6 | 1.6 |
| 13 | .69 | .82 | .92 | .80 | 8.1 | e.40 | 3.3 | .71 | 8.0 | 1.5 | 2.2 | 2.1 |
| 14 | .61 | .69 | .80 | .94 | 3.9 | e.70 | 1.9 | .58 | 5.1 | .00 | 1.4 | 15 |
| 15 | 3.3 | .59 | 1.0 | 14 | e5.0 | e5.5 | 1.4 | .47 | 9.8 | .00 | 4.9 | 5.1 |
| 16 | 2.9 | .54 | .98 | 7.0 | e2.5 | e6.0 | 1.0 | .41 | 7.6 | .00 | 12 | 4.2 |
| 17 | 1.7 | .76 | 3.9 | 3.6 | e1.3 | e4.5 | .83 | .36 | 5.1 | 6.7 | 6.9 | 6.6 |
| 18 | 1.2 | .79 | 2.3 | 2.4 | e.84 | e7.0 | .73 | .31 | 3.6 | 7.5 | 2.2 | 6.0 |
| 19 | 1.0 | 11 | 3.2 | 12 | e.75 | e10 | .76 | .28 | 6.7 | 5.1 | 3.0 | 5.7 |
| 20 | .86 | 7.1 | 7.6 | 7.3 | e.70 | e12 | 1.1 | .25 | 9.2 | 13 | e7.3 | 2.9 |
| 21 | .80 | 3.3 | 8.4 | 3.5 | e.70 | e8.5 | .90 | .23 | 4.2 | 11 | e14 | 2.2 |
| 22 | 2.0 | 9.5 | 4.7 | 2.4 | e.55 | e3.0 | .76 | .18 | 3.4 | 9.9 | e6.3 | 1.8 |
| 23 | 1.4 | 12 | 14 | 1.8 | e.55 | e2.0 | .66 | .17 | 11 | 8.4 | e12 | 5.4 |
| 24 | 1.1 | 6.9 | 6.9 | 1.5 | e.55 | e3.0 | .56 | .18 | 13 | 1.4 | e11 | 6.4 |
| 25 | 2.5 | 7.2 | 7.6 | 1.2 | e.50 | 15 | .46 | .22 | 15 | 12 | e10 | 6.8 |
| 26 | 2.1 | 3.9 | 16 | 1.0 | e.45 | 12 | .43 | .19 | 16 | 15 | e10 | 14 |
| 27 | 1.4 | 2.3 | 13 | .91 | e.45 | 6.4 | .44 | .16 | 15 | 15 | e6.0 | 11 |
| 28 | 1.1 | 1.6 | 14 | .81 | e.45 | 3.8 | .59 | .29 | 15 | 8.9 | e8.5 | 4.0 |
| 29 | .91 | 1.2 | 14 | .74 | e.75 | 5.3 | 1.7 | .43 | 8.6 | 2.2 | e13 | 2.8 |
| 30 | .76 | .94 | 9.9 | 3.7 | --- | 7.7 | 2.4 | .35 | 5.4 | 2.4 | e7.2 | 2.6 |
| 31 | .81 | --- | 15 | 14 | --- | 3.4 | --- | .25 | --- | 3.2 | e4.5 | --- |
| TOTAL | 47.00 | 98.53 | 196.27 | 134.68 | 127.84 | 130.35 | 67.02 | 67.67 | 221.81 | 186.40 | 176.30 | 188.05 |
| MEAN | 1.52 | 3.28 | 6.33 | 4.34 | 4.41 | 4.20 | 2.23 | 2.18 | 7.39 | 6.01 | 5.69 | 6.27 |
| MAX | 5.9 | 12 | 16 | 14 | 15 | 15 | 9.9 | 16 | 16 | 15 | 14 | 15 |
| MIN | .61 | .54 | .78 | .74 | .45 | .40 | .43 | .16 | .16 | .00 | .00 | .85 |
| AC-FT | 93 | 195 | 389 | 267 | 254 | 259 | 133 | 134 | 440 | 370 | 350 | 373 |

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1919 - 1992, BY WATER YEAR (WY)

| | 1919 | 1920 | 1921 | 1922 | 1923 | 1924 | 1925 | 1926 | 1927 | 1928 | 1929 | 1930 | 1931 | 1932 | 1933 | 1934 | 1935 | 1936 | 1937 | 1938 | 1939 | 1940 | 1941 | 1942 | 1943 | 1944 | 1945 | 1946 | 1947 | 1948 | 1949 | 1950 | 1951 | 1952 | 1953 | 1954 | 1955 | 1956 | 1957 | 1958 | 1959 | 1960 | 1961 | 1962 | 1963 | 1964 | 1965 | 1966 | 1967 | 1968 | 1969 | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| MEAN | 5.85 | 7.85 | 6.89 | 6.27 | 5.78 | 8.31 | 9.50 | 7.44 | 8.45 | 10.7 | 8.51 | 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 | 1966 | 1964 | 1967 | 1966 | 1964 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| MIN | .14 | 2.43 | .77 | .53 | .93 | 1.69 | 2.23 | 2.18 | 3.30 | 2.67 | 2.66 | .19 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| (WY) | 1985 | 1969 | 1981 | 1981 | 1983 | 1974 | 1992 | 1992 | 1984 | 1984 | 1973 | 1965 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

SUMMARY STATISTICS

| | FOR 1991 CALENDAR YEAR | | FOR 1992 WATER YEAR | | WATER YEARS 1919 - 1992 | |
|--------------------------|------------------------|--------|---------------------|--------|-------------------------|-------------|
| ANNUAL TOTAL | 3011.33 | | 1641.92 | | | |
| ANNUAL MEAN | 8.25 | | 4.49 | | 7.63 | |
| HIGHEST ANNUAL MEAN | | | | | 11.3 | |
| LOWEST ANNUAL MEAN | | | | | 3.78 | |
| HIGHEST DAILY MEAN | 23 | Mar 13 | 16 | Dec 26 | 49 | Nov 2 1967 |
| LOWEST DAILY MEAN | .45 | Feb 7 | .00 | Jul 8 | .00 | Jul 8 1992 |
| ANNUAL SEVEN-DAY MINIMUM | .46 | Feb 6 | .19 | May 21 | .04 | Dec 29 1980 |
| ANNUAL RUNOFF (AC-FT) | 5970 | | 3260 | | 5530 | |
| 10 PERCENT EXCEEDS | 19 | | 12 | | 17 | |
| 50 PERCENT EXCEEDS | 6.0 | | 2.4 | | 5.0 | |
| 90 PERCENT EXCEEDS | .90 | | .45 | | .72 | |

e Estimated

HAWAII, ISLAND OF HAWAII

16720500 UPPER HAMAKUA DITCH BELOW KAWAIKI STREAM, NEAR KAMUELA--Continued

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

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|-------|-------|-------|--------|-------|--------|-------|-------|-------|--------|-------|-------|
| 1 | 2.4 | 2.0 | 5.9 | 13 | 1.4 | e.70 | 2.4 | 16 | 16 | 7.3 | 5.9 | 2.4 |
| 2 | 1.9 | 1.3 | 12 | 7.4 | .90 | e16 | 2.1 | 14 | 16 | 13 | 11 | 1.6 |
| 3 | 1.5 | 3.4 | 8.9 | 3.2 | .74 | e15 | 6.7 | 16 | 9.2 | 11 | 14 | 1.2 |
| 4 | 1.3 | 2.2 | 5.9 | 7.7 | .62 | e13 | 4.5 | 11 | 11 | 14 | 7.8 | 1.0 |
| 5 | 1.0 | 2.7 | 14 | 13 | .58 | 11 | 9.8 | 15 | 15 | 6.0 | 5.6 | .92 |
| 6 | .92 | 9.1 | 12 | 13 | .59 | 16 | 8.0 | 11 | 13 | 3.3 | 6.3 | .87 |
| 7 | .81 | 6.0 | 11 | 10 | .54 | 14 | 17 | 11 | 12 | 4.5 | 9.5 | .81 |
| 8 | .96 | 3.3 | 8.1 | 5.3 | .50 | 11 | 14 | 16 | 14 | 2.7 | 12 | .75 |
| 9 | .81 | 13 | 15 | 2.7 | .52 | 13 | 8.6 | 16 | 13 | 2.2 | 13 | 2.2 |
| 10 | .70 | 8.5 | 14 | 2.0 | .50 | 14 | 12 | 16 | 15 | 1.8 | 16 | 1.9 |
| 11 | .64 | 3.4 | 14 | 1.5 | .72 | 13 | 5.2 | 9.4 | 15 | 1.4 | 16 | 4.9 |
| 12 | 1.7 | 5.1 | 10 | 1.3 | .73 | 5.9 | 4.4 | 6.5 | 14 | 1.2 | 14 | 8.4 |
| 13 | 1.1 | 12 | 4.6 | 1.2 | .60 | 4.5 | 4.7 | 5.8 | 9.1 | .95 | 16 | 7.2 |
| 14 | .83 | 15 | 2.7 | 1.3 | .63 | 5.0 | 2.9 | 3.0 | 4.3 | .81 | 16 | 2.7 |
| 15 | .75 | 14 | 2.0 | 9.5 | .58 | 12 | 9.7 | 4.1 | 2.9 | 4.9 | 13 | 1.6 |
| 16 | .67 | 7.7 | 5.9 | 11 | .52 | 5.6 | 5.5 | 4.4 | 7.5 | 7.0 | 15 | 1.1 |
| 17 | .70 | 4.0 | 2.7 | 5.8 | .48 | 9.6 | 3.6 | 5.1 | 9.5 | 11 | 8.4 | 1.1 |
| 18 | .77 | 2.5 | 1.8 | 3.8 | .47 | 6.0 | 2.2 | 5.4 | 15 | 13 | 4.3 | 2.5 |
| 19 | .68 | 1.8 | 1.4 | 5.0 | .58 | 3.2 | 3.9 | 9.3 | 14 | 14 | 8.5 | 3.8 |
| 20 | .62 | 1.3 | 1.4 | 3.0 | .86 | 8.8 | 18 | 6.4 | 9.2 | 14 | 10 | 9.1 |
| 21 | .55 | 1.0 | 2.4 | 2.0 | 3.1 | 8.2 | 17 | 3.5 | 5.2 | 16 | 5.4 | 4.8 |
| 22 | .52 | 1.7 | 12 | 1.5 | 3.7 | 4.1 | 17 | 2.2 | 8.4 | 15 | 8.0 | 2.1 |
| 23 | 1.9 | 14 | 7.4 | 1.2 | 2.6 | 9.5 | 12 | 1.6 | 8.4 | 15 | 13 | 3.8 |
| 24 | 3.5 | 11 | 3.4 | 1.0 | 5.1 | 6.7 | 10 | 4.9 | 5.0 | 16 | 13 | 9.2 |
| 25 | 1.9 | 6.4 | 2.0 | .93 | 8.0 | 3.0 | 9.9 | 6.6 | 14 | 15 | 11 | 3.7 |
| 26 | 12 | 12 | 1.4 | 1.1 | e6.0 | 1.9 | 9.7 | 4.2 | 16 | 14 | 4.9 | 2.3 |
| 27 | 12 | 5.1 | 2.0 | .79 | e2.7 | 4.7 | 5.6 | 8.5 | 16 | 16 | 4.1 | 1.5 |
| 28 | 12 | 3.1 | 1.5 | 1.6 | e1.4 | 7.9 | 5.4 | 10 | 15 | 13 | 4.7 | 1.2 |
| 29 | 9.3 | 3.9 | 1.5 | 11 | --- | 3.3 | 5.3 | 4.6 | 13 | 12 | 2.6 | 1.1 |
| 30 | 4.2 | 12 | 1.1 | 5.0 | --- | 9.0 | 14 | 2.3 | 10 | 15 | 1.8 | 6.7 |
| 31 | 2.5 | --- | 2.1 | 2.3 | --- | 4.5 | --- | 3.7 | --- | 9.5 | 1.4 | --- |
| TOTAL | 81.13 | 188.5 | 190.1 | 149.12 | 45.66 | 260.10 | 251.1 | 253.5 | 345.7 | 290.56 | 292.2 | 92.45 |
| MEAN | 2.62 | 6.28 | 6.13 | 4.81 | 1.63 | 8.39 | 8.37 | 8.18 | 11.5 | 9.37 | 9.43 | 3.08 |
| MAX | 12 | 15 | 15 | 13 | 8.0 | 16 | 18 | 16 | 16 | 16 | 16 | 9.2 |
| MIN | .52 | 1.0 | 1.1 | .79 | .47 | .70 | 2.1 | 1.6 | 2.9 | .81 | 1.4 | .75 |
| AC-FT | 161 | 374 | 377 | 296 | 91 | 516 | 498 | 503 | 686 | 576 | 580 | 183 |

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1919 - 1993, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|------|------|------|------|------|------|------|------|------|------|------|------|------|
| MEAN | 5.74 | 7.79 | 6.87 | 6.22 | 5.64 | 8.31 | 9.46 | 7.47 | 8.56 | 10.7 | 8.54 | 5.68 |
| 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 | .14 | 2.43 | .77 | .53 | .93 | 1.69 | 2.23 | 2.18 | 3.30 | 2.67 | 2.66 | .19 |
| (WY) | 1985 | 1969 | 1981 | 1981 | 1983 | 1974 | 1992 | 1992 | 1984 | 1984 | 1973 | 1965 |

SUMMARY STATISTICS

FOR 1992 CALENDAR YEAR

FOR 1993 WATER YEAR

WATER YEARS 1919 - 1993

| | | | |
|--------------------------|---------|---------|------|
| ANNUAL TOTAL | 1759.85 | 2440.12 | |
| ANNUAL MEAN | 4.81 | 6.69 | 7.60 |
| HIGHEST ANNUAL MEAN | | | 11.3 |
| LOWEST ANNUAL MEAN | | | 3.78 |
| HIGHEST DAILY MEAN | 16 | May 6 | 49 |
| LOWEST DAILY MEAN | .00 | Jul 8 | .47 |
| ANNUAL SEVEN-DAY MINIMUM | .19 | May 21 | .55 |
| ANNUAL RUNOFF (AC-FT) | 3490 | 4840 | 5510 |
| 10 PERCENT EXCEEDS | 13 | 14 | 17 |
| 50 PERCENT EXCEEDS | 2.7 | 5.2 | 5.0 |
| 90 PERCENT EXCEEDS | .45 | .87 | .72 |

e Estimated

HAWAII, ISLAND OF HAWAII

16720500 UPPER HAMAKUA DITCH BELOW KAWAIKI STREAM, NEAR KAMUELA--Continued

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1993 TO SEPTEMBER 1994
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|--------|-------|-------|--------|--------|--------|-------|-------|-------|-------|-------|--------|
| 1 | 2.8 | 6.4 | 8.7 | .90 | .84 | 1.4 | 1.9 | 12 | 5.3 | 11 | 11 | 15 |
| 2 | 1.5 | 2.9 | 7.0 | .84 | .80 | 1.0 | 1.7 | 14 | 5.3 | 11 | 12 | 13 |
| 3 | 1.1 | 1.8 | 12 | 3.2 | 4.0 | .78 | 4.9 | 9.0 | 5.5 | 12 | 16 | 12 |
| 4 | .88 | 1.3 | 12 | 3.2 | 9.9 | .65 | 13 | 11 | 11 | 11 | 11 | 13 |
| 5 | .75 | 3.4 | 13 | 2.0 | 12 | .56 | 10 | 11 | 14 | 13 | 8.2 | 12 |
| 6 | .67 | 11 | 13 | 5.6 | 11 | .54 | 11 | 7.8 | 15 | 12 | 11 | 11 |
| 7 | .62 | 11 | 10 | 6.3 | 8.7 | .54 | 13 | 4.3 | 11 | 12 | 10 | 11 |
| 8 | .57 | 8.6 | 12 | 2.7 | 5.6 | .52 | 12 | 3.2 | 6.5 | 12 | 8.0 | 5.5 |
| 9 | .61 | 12 | 9.0 | 1.9 | 4.5 | .51 | 9.4 | 2.2 | 6.6 | 8.2 | 7.5 | 9.4 |
| 10 | .79 | 6.8 | 9.4 | 1.5 | 5.8 | .49 | 6.6 | 1.6 | 8.3 | 5.7 | 6.8 | 15 |
| 11 | 3.8 | 3.2 | 9.1 | 1.2 | 8.8 | 2.9 | 12 | 1.3 | 4.2 | 8.2 | 14 | 14 |
| 12 | 10 | 2.1 | 13 | .99 | 5.9 | 14 | 15 | 1.3 | 4.0 | 8.7 | 16 | 16 |
| 13 | 11 | 6.0 | 11 | .87 | 2.2 | 14 | 13 | 8.1 | 4.9 | 5.6 | 13 | 12 |
| 14 | 6.0 | 9.0 | 8.1 | .76 | 5.0 | 14 | 8.0 | 7.0 | 12 | 11 | 7.5 | 8.4 |
| 15 | 3.0 | 9.6 | 11 | .69 | 4.0 | 14 | 8.5 | 12 | 11 | 15 | 8.0 | 8.1 |
| 16 | 3.0 | 5.6 | 11 | .75 | 4.4 | 14 | 5.2 | 10 | 10 | 11 | 11 | 6.6 |
| 17 | 9.9 | 12 | 9.5 | 2.6 | 2.4 | 13 | 4.3 | 9.0 | 13 | 16 | 8.2 | 14 |
| 18 | 7.9 | 13 | 7.7 | 5.9 | 3.8 | 13 | 12 | 7.7 | 15 | 15 | 15 | 13 |
| 19 | 3.7 | 10 | 12 | 10 | 1.7 | 14 | 14 | 11 | 15 | 13 | 13 | 9.3 |
| 20 | 2.0 | 5.6 | 10 | 12 | 1.2 | 14 | 15 | 8.9 | 10 | 12 | 10 | 5.0 |
| 21 | 2.3 | 6.1 | 5.4 | 12 | .91 | 14 | 14 | 10 | 11 | 16 | 7.0 | 3.3 |
| 22 | 7.3 | 7.3 | 3.2 | 11 | .79 | 12 | 13 | 9.7 | 11 | 15 | 12 | 3.2 |
| 23 | 11 | 11 | 5.1 | 8.0 | .72 | 14 | 13 | 5.9 | 11 | 15 | 16 | 6.0 |
| 24 | 6.8 | 11 | 5.8 | 9.4 | .70 | 14 | 12 | 6.1 | 11 | 13 | 13 | 3.0 |
| 25 | 4.0 | 7.8 | 4.9 | 9.2 | 3.7 | 15 | 10 | 8.9 | 12 | 14 | 7.1 | 2.1 |
| 26 | 12 | 11 | 2.8 | 7.8 | 7.2 | 13 | 14 | 8.2 | 11 | 15 | 6.3 | 1.6 |
| 27 | 5.9 | 12 | 2.1 | 3.5 | 2.5 | 9.1 | 11 | 8.3 | 13 | 9.7 | 13 | 1.5 |
| 28 | 4.9 | 11 | 1.8 | 2.2 | 1.7 | 7.5 | 10 | 8.0 | 12 | 7.2 | 6.1 | 1.4 |
| 29 | 7.7 | 10 | 1.5 | 1.7 | --- | 9.5 | 6.1 | 7.5 | 14 | 10 | 3.2 | 1.1 |
| 30 | 11 | 11 | 1.2 | 1.3 | --- | 4.3 | 9.2 | 11 | 14 | 6.1 | 2.5 | .95 |
| 31 | 11 | --- | 1.0 | .97 | --- | 2.7 | --- | 10 | --- | 5.8 | 7.9 | --- |
| TOTAL | 154.49 | 239.5 | 243.3 | 130.97 | 120.76 | 248.99 | 302.8 | 246.0 | 307.6 | 350.2 | 311.3 | 247.45 |
| MEAN | 4.98 | 7.98 | 7.85 | 4.22 | 4.31 | 8.03 | 10.1 | 7.94 | 10.3 | 11.3 | 10.0 | 8.25 |
| MAX | 12 | 13 | 13 | 12 | 12 | 15 | 15 | 14 | 15 | 16 | 16 | 16 |
| MIN | .57 | 1.3 | 1.0 | .69 | .70 | .49 | 1.7 | 1.3 | 4.0 | 5.6 | 2.5 | .95 |
| AC-FT | 306 | 475 | 483 | 260 | 240 | 494 | 601 | 488 | 610 | 695 | 617 | 491 |

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1919 - 1994, BY WATER YEAR (WY)

| | MEAN | 7.80 | 6.90 | 6.16 | 5.59 | 8.30 | 9.48 | 7.48 | 8.61 | 10.7 | 8.59 | 5.76 |
|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 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 | .14 | 2.43 | .77 | .53 | .93 | 1.69 | 2.23 | 2.18 | 3.30 | 2.67 | 2.66 | .19 |
| (WY) | 1985 | 1969 | 1981 | 1981 | 1983 | 1974 | 1992 | 1992 | 1984 | 1984 | 1973 | 1965 |

SUMMARY STATISTICS

| | FOR 1993 CALENDAR YEAR | | FOR 1994 WATER YEAR | | WATER YEARS 1919 - 1994 | |
|--------------------------|------------------------|--|---------------------|--|-------------------------|--|
| ANNUAL TOTAL | 2617.68 | | 2903.36 | | | |
| ANNUAL MEAN | 7.17 | | 7.95 | | 7.61 | |
| HIGHEST ANNUAL MEAN | | | | | 11.3 | |
| LOWEST ANNUAL MEAN | | | | | 3.78 | |
| HIGHEST DAILY MEAN | 18 | | Apr 20 | | 16 | |
| LOWEST DAILY MEAN | .47 | | Feb 18 | | .49 | |
| ANNUAL SEVEN-DAY MINIMUM | .55 | | Feb 4 | | .54 | |
| ANNUAL RUNOFF (AC-FT) | 5190 | | | | 5760 | |
| 10 PERCENT EXCEEDS | 14 | | | | 14 | |
| 50 PERCENT EXCEEDS | 6.4 | | | | 8.4 | |
| 90 PERCENT EXCEEDS | 1.0 | | | | 1.2 | |

HAWAII, ISLAND OF HAWAII

16720500 UPPER HAMAKUA DITCH BELOW KAWAIKI STREAM, NEAR KAMUELA--Continued

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|--------|-------|-------|--------|-------|--------|--------|--------|-------|-------|-------|--------|
| 1 | .77 | 1.2 | 14 | 2.8 | 1.8 | .22 | 9.2 | e1.0 | 15 | 9.8 | 11 | 14 |
| 2 | .67 | 2.0 | 12 | 1.8 | 2.3 | .17 | 4.9 | e.90 | 12 | 9.3 | 16 | 13 |
| 3 | .63 | 11 | 13 | 1.4 | 1.1 | 3.5 | 4.6 | 1.3 | 7.1 | 12 | 14 | 6.6 |
| 4 | .63 | 16 | 11 | 1.1 | .95 | 8.9 | 10 | 1.9 | 15 | 13 | 9.4 | 8.2 |
| 5 | .62 | 14 | 15 | 1.2 | 1.7 | 2.9 | 11 | 1.3 | 13 | 10 | 11 | 7.8 |
| 6 | .61 | 15 | 13 | 4.6 | 3.0 | 2.3 | 8.1 | 1.9 | 11 | 13 | 9.7 | 3.7 |
| 7 | .53 | 14 | 13 | 2.0 | 1.7 | 1.4 | 4.3 | 13 | 15 | 11 | 16 | 2.6 |
| 8 | .48 | 15 | 15 | 1.3 | 1.0 | .84 | 2.6 | 7.4 | 11 | 9.6 | 13 | 2.0 |
| 9 | .42 | 13 | 12 | .97 | .78 | .61 | 1.6 | 5.3 | 12 | 6.5 | 15 | 3.2 |
| 10 | .43 | 16 | 14 | .80 | .74 | .56 | 1.2 | 11 | 14 | 6.3 | 9.5 | 2.1 |
| 11 | .48 | 16 | 12 | .68 | .87 | .47 | .90 | 15 | 16 | 8.8 | 6.7 | 1.5 |
| 12 | .94 | 15 | 9.9 | 1.7 | .66 | .39 | 1.1 | 16 | 13 | 15 | 13 | 1.1 |
| 13 | 5.0 | 12 | 6.4 | 16 | .61 | .31 | 1.3 | 16 | 8.6 | 12 | 13 | .97 |
| 14 | 9.3 | 12 | 4.0 | 16 | .47 | .31 | 1.1 | 13 | 6.0 | 8.6 | 7.3 | .78 |
| 15 | 7.0 | 13 | 11 | 17 | .47 | .28 | 10 | 16 | 12 | 8.6 | 4.6 | .72 |
| 16 | 2.7 | 13 | 12 | 15 | .42 | .25 | 15 | 15 | 9.2 | 11 | 3.6 | .61 |
| 17 | 1.6 | 11 | 10 | 11 | .35 | .22 | 11 | 13 | 5.1 | 13 | 3.2 | .56 |
| 18 | 1.6 | 8.9 | 6.5 | 7.6 | .31 | .24 | 7.3 | 6.9 | 7.7 | 6.5 | 2.4 | .51 |
| 19 | 4.8 | 6.8 | 5.1 | 4.9 | .28 | .48 | 9.8 | 3.8 | 12 | 12 | 1.8 | .47 |
| 20 | 4.6 | 5.9 | 6.7 | 3.0 | .28 | 1.1 | 10 | 2.6 | 14 | 14 | 1.5 | .42 |
| 21 | 4.7 | 9.5 | 3.4 | 2.1 | .28 | 5.0 | 8.9 | 1.9 | 12 | 15 | 1.4 | .42 |
| 22 | 14 | 14 | 2.3 | 1.6 | .25 | 16 | 15 | 1.5 | 9.9 | 10 | 1.4 | .47 |
| 23 | 13 | 12 | 1.8 | 1.3 | .25 | 13 | 15 | 1.2 | 8.1 | 12 | 1.4 | .51 |
| 24 | 7.5 | 14 | 1.4 | 1.0 | .25 | 6.7 | 14 | 1.1 | 4.4 | 6.6 | 7.7 | .76 |
| 25 | 12 | 14 | 1.1 | .87 | .22 | 3.2 | 14 | 6.6 | 3.0 | 5.9 | 14 | 1.0 |
| 26 | 6.9 | 14 | 1.9 | .74 | .22 | 1.9 | 10 | 6.3 | 2.2 | 11 | 13 | 1.2 |
| 27 | 15 | 9.6 | 1.9 | .63 | .22 | 1.3 | e4.5 | 8.4 | 1.7 | 16 | 16 | 9.3 |
| 28 | 9.9 | 7.1 | 1.4 | .53 | .22 | 13 | e2.5 | 11 | 1.4 | 14 | 16 | 15 |
| 29 | 4.7 | 16 | 7.9 | .49 | --- | 15 | e1.5 | 11 | 1.2 | 8.0 | 10 | 13 |
| 30 | 2.6 | 15 | 13 | .87 | --- | 15 | e1.2 | 12 | 9.8 | 7.8 | 12 | 11 |
| 31 | 1.7 | --- | 5.7 | .80 | --- | 14 | --- | 14 | --- | 4.4 | 11 | --- |
| TOTAL | 135.81 | 356.0 | 257.4 | 121.78 | 21.70 | 129.55 | 211.60 | 237.30 | 282.4 | 320.7 | 285.6 | 123.50 |
| MEAN | 4.38 | 11.9 | 8.30 | 3.93 | .77 | 4.18 | 7.05 | 7.65 | 9.41 | 10.3 | 9.21 | 4.12 |
| MAX | 15 | 16 | 15 | 17 | 3.0 | 16 | 15 | 16 | 16 | 16 | 16 | 15 |
| MIN | .42 | 1.2 | 1.1 | .49 | .22 | .17 | .90 | .90 | 1.2 | 4.4 | 1.4 | .42 |
| AC-FT | 269 | 706 | 511 | 242 | 43 | 257 | 420 | 471 | 560 | 636 | 566 | 245 |

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1919 - 1995, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|------|------|------|------|------|------|------|------|------|------|------|------|------|
| MEAN | 5.66 | 7.93 | 6.95 | 6.09 | 5.44 | 8.17 | 9.41 | 7.49 | 8.64 | 10.7 | 8.61 | 5.71 |
| 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 | .14 | 2.43 | .77 | .53 | .77 | 1.69 | 2.23 | 2.18 | 3.30 | 2.67 | 2.66 | .19 |
| (WY) | 1985 | 1969 | 1981 | 1981 | 1995 | 1974 | 1992 | 1992 | 1984 | 1984 | 1973 | 1965 |

| SUMMARY STATISTICS | FOR 1994 CALENDAR YEAR | | FOR 1995 WATER YEAR | | WATER YEARS 1919 - 1995 | |
|--------------------------|------------------------|--------|---------------------|--------|-------------------------|-------------|
| ANNUAL TOTAL | 3015.28 | | 2483.34 | | | |
| ANNUAL MEAN | 8.26 | | 6.80 | | 7.58 | |
| HIGHEST ANNUAL MEAN | | | | | 11.3 | |
| LOWEST ANNUAL MEAN | | | | | 3.78 | |
| HIGHEST DAILY MEAN | 16 | Jul 17 | 17 | Jan 15 | 49 | Nov 2 1967 |
| LOWEST DAILY MEAN | .42 | Oct 9 | .17 | Mar 2 | .00 | Jul 8 1992 |
| ANNUAL SEVEN-DAY MINIMUM | .51 | Oct 5 | .22 | Feb 24 | .04 | Dec 29 1980 |
| ANNUAL RUNOFF (AC-FT) | 5980 | | 4930 | | 5490 | |
| 10 PERCENT EXCEEDS | 14 | | 15 | | 17 | |
| 50 PERCENT EXCEEDS | 8.9 | | 6.5 | | 5.2 | |
| 90 PERCENT EXCEEDS | 1.1 | | .51 | | .72 | |

e Estimated

HAWAII, ISLAND OF HAWAII

16720500 UPPER HAMAKUA DITCH BELOW KAWAIKI STREAM, NEAR KAMUELA--Continued

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|-------|-------|-------|-------|--------|--------|--------|-------|--------|--------|--------|-------|
| 1 | 6.7 | 3.9 | e.30 | 4.1 | 6.8 | 12 | 16 | 7.9 | 2.6 | 14 | 4.9 | .25 |
| 2 | 7.4 | 2.4 | e.27 | 2.2 | 2.8 | 12 | e13 | 3.2 | 1.5 | 12 | 11 | .31 |
| 3 | 9.4 | 1.6 | e.25 | 1.3 | 1.6 | e14 | e5.0 | 1.7 | 1.3 | 6.2 | 9.5 | .39 |
| 4 | 4.5 | 1.3 | e.22 | .90 | 1.1 | e13 | e2.5 | 1.2 | 1.4 | 8.8 | 4.0 | .33 |
| 5 | 2.6 | 1.0 | e.22 | .61 | .72 | e10 | e1.7 | .97 | 4.9 | 13 | 3.6 | .39 |
| 6 | 1.8 | .84 | .22 | .47 | .56 | 5.3 | e1.2 | .84 | 3.9 | 14 | 2.3 | 4.3 |
| 7 | 1.4 | .92 | .20 | .39 | .47 | 7.4 | e.95 | .78 | 11 | 7.1 | 5.2 | 6.2 |
| 8 | 1.1 | 2.0 | .20 | 1.5 | .39 | 3.1 | e.80 | .66 | 8.4 | 3.5 | 4.8 | 3.6 |
| 9 | 4.9 | 1.3 | .17 | 1.4 | .31 | 1.8 | e1.5 | .56 | 9.3 | 2.7 | 2.0 | 2.0 |
| 10 | 12 | 4.2 | .17 | .84 | .28 | 1.2 | 9.9 | .51 | 4.0 | 15 | 1.2 | 1.2 |
| 11 | 12 | 14 | .15 | .66 | .25 | 1.2 | 11 | .42 | 2.3 | 16 | 1.5 | 1.0 |
| 12 | 7.5 | 7.3 | .15 | .51 | .22 | .84 | 6.2 | .39 | 1.3 | 12 | 14 | 3.1 |
| 13 | 5.5 | 3.2 | .13 | .39 | .21 | .56 | 3.1 | .35 | .90 | 10 | 16 | 9.4 |
| 14 | 8.3 | 2.0 | .15 | .31 | .40 | .58 | 6.4 | .35 | .66 | 6.7 | 8.8 | 6.4 |
| 15 | 12 | 1.5 | .17 | .28 | 14 | 1.2 | 16 | .39 | .56 | 3.7 | 5.1 | 13 |
| 16 | 5.9 | 1.1 | 6.8 | .28 | 15 | 9.0 | 16 | .39 | .56 | 2.7 | 6.3 | 7.6 |
| 17 | 3.6 | 1.0 | 12 | .41 | 9.1 | 11 | 12 | 3.1 | 2.7 | 3.4 | 6.9 | 3.4 |
| 18 | 5.4 | .84 | 13 | 3.1 | 5.2 | 13 | 12 | 12 | 13 | 3.1 | 4.4 | 6.5 |
| 19 | 11 | .72 | 6.2 | 9.0 | 4.1 | 12 | 15 | 14 | 12 | 2.6 | 3.0 | 7.6 |
| 20 | 14 | .61 | 2.8 | 3.2 | 14 | 6.3 | 15 | 8.8 | 7.4 | 5.0 | 2.4 | 3.0 |
| 21 | 9.2 | .56 | 1.7 | 1.6 | 16 | 2.6 | 16 | 3.9 | 3.5 | 2.6 | 1.4 | 1.6 |
| 22 | 14 | .51 | 1.0 | .90 | 15 | 1.5 | 14 | 1.9 | 2.4 | 1.8 | .97 | 1.0 |
| 23 | 11 | e.47 | .78 | .61 | 16 | 1.2 | 8.5 | 1.3 | 1.9 | 1.2 | .78 | .92 |
| 24 | 8.2 | e.42 | .61 | .51 | 15 | 8.1 | 4.9 | 1.1 | 7.9 | .90 | .61 | .90 |
| 25 | 11 | e.38 | .47 | .61 | 16 | 6.9 | 3.9 | 1.2 | 11 | .72 | .56 | .72 |
| 26 | 12 | e.33 | 1.3 | .61 | 13 | 2.7 | 2.8 | 2.9 | 7.0 | 1.7 | .47 | .61 |
| 27 | 6.4 | e.28 | .84 | .51 | 11 | 1.5 | 4.5 | 3.2 | 9.8 | 1.8 | .42 | .51 |
| 28 | 3.3 | e.30 | .61 | 2.1 | 15 | 1.2 | 6.0 | 4.4 | 9.7 | 1.6 | .39 | .42 |
| 29 | 3.3 | e.28 | .47 | 7.9 | 15 | 7.6 | 3.1 | 3.2 | 9.1 | 1.6 | .31 | .35 |
| 30 | 11 | e.30 | .39 | 9.2 | --- | 12 | 2.1 | 4.6 | 12 | 3.6 | .31 | .31 |
| 31 | 8.2 | --- | 3.4 | 14 | --- | 14 | --- | 7.4 | --- | 7.6 | .28 | --- |
| TOTAL | 234.6 | 55.56 | 55.34 | 70.40 | 209.51 | 194.78 | 231.05 | 93.61 | 163.98 | 186.62 | 123.40 | 87.31 |
| MEAN | 7.57 | 1.85 | 1.79 | 2.27 | 7.22 | 6.28 | 7.70 | 3.02 | 5.47 | 6.02 | 3.98 | 2.91 |
| MAX | 14 | 14 | 13 | 14 | 16 | 14 | 16 | 14 | 13 | 16 | 16 | 13 |
| MIN | 1.1 | .28 | .13 | .28 | .21 | .56 | .80 | .35 | .56 | .72 | .28 | .25 |
| AC-FT | 465 | 110 | 110 | 140 | 416 | 386 | 458 | 186 | 325 | 370 | 245 | 173 |

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1919 - 1996, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|------|------|------|------|------|------|------|------|------|------|------|------|------|
| MEAN | 5.73 | 7.74 | 6.78 | 5.97 | 5.50 | 8.11 | 9.35 | 7.35 | 8.54 | 10.5 | 8.47 | 5.62 |
| 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 | .14 | 1.85 | .77 | .53 | .77 | 1.69 | 2.23 | 2.18 | 3.30 | 2.67 | 2.66 | .19 |
| (WY) | 1985 | 1996 | 1981 | 1981 | 1995 | 1974 | 1992 | 1992 | 1984 | 1984 | 1973 | 1965 |

SUMMARY STATISTICS

FOR 1995 CALENDAR YEAR

FOR 1996 WATER YEAR

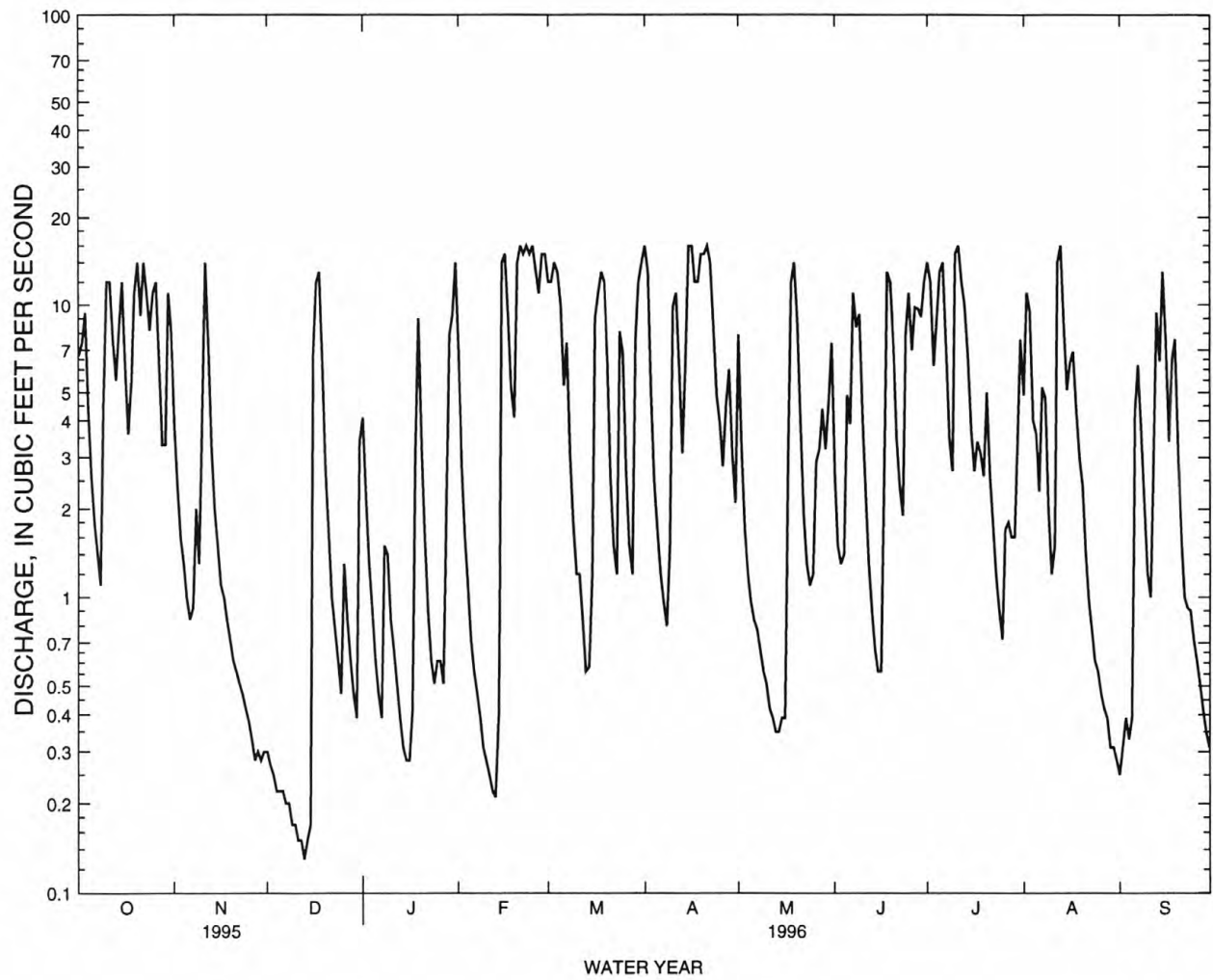
WATER YEARS 1919 - 1996

| | | | |
|--------------------------|---------|---------|------|
| ANNUAL TOTAL | 2079.63 | 1706.16 | |
| ANNUAL MEAN | 5.70 | 4.66 | 7.49 |
| HIGHEST ANNUAL MEAN | | | 11.3 |
| LOWEST ANNUAL MEAN | | | 3.78 |
| HIGHEST DAILY MEAN | 17 | Jan 15 | 16 |
| LOWEST DAILY MEAN | .13 | Dec 13 | .13 |
| ANNUAL SEVEN-DAY MINIMUM | .16 | Dec 9 | .16 |
| ANNUAL RUNOFF (AC-FT) | 4120 | 3380 | 5420 |
| 10 PERCENT EXCEEDS | 14 | 13 | 17 |
| 50 PERCENT EXCEEDS | 3.3 | 2.6 | 5.0 |
| 90 PERCENT EXCEEDS | .31 | .35 | .70 |

e Estimated

HAWAII, ISLAND OF HAWAII

16720500 UPPER HAMAKU DITCH BELOW KAWAIKI STREAM, NEAR KAMUELA--Continued

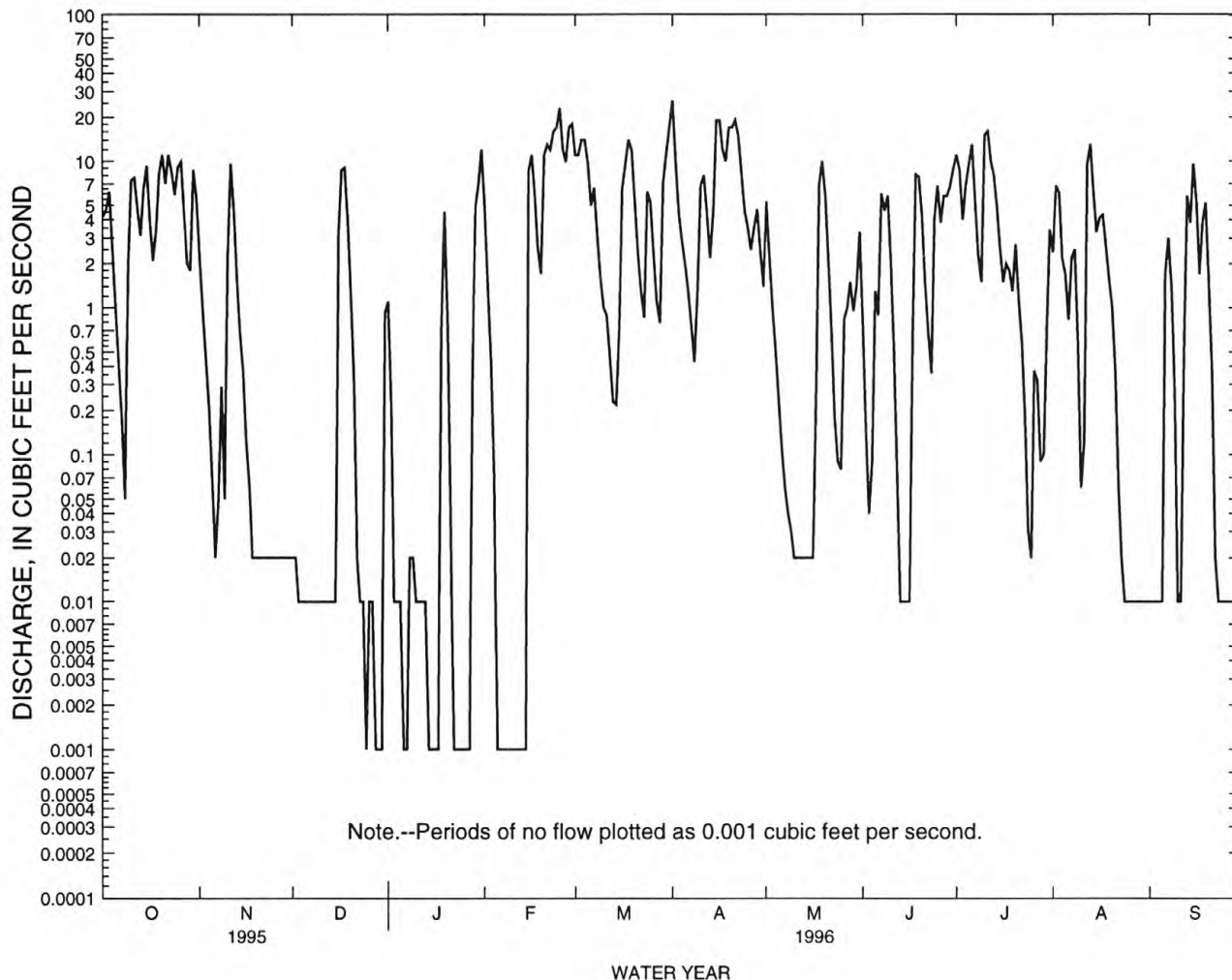


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HAWAII, ISLAND OF HAWAII

16724800 UPPER HAMAKUA DITCH ABOVE ALAKAHI STREAM, NEAR KAMUELA--Continued

| SUMMARY STATISTICS | FOR 1995 CALENDAR YEAR | | FOR 1996 WATER YEAR | | WATER YEARS 1968 - 1996 | |
|--------------------------|------------------------|--------|---------------------|--------|-------------------------|-------------|
| ANNUAL TOTAL | 1745.96 | | 1229.37 | | | |
| ANNUAL MEAN | 4.78 | | 3.36 | | 5.22 | |
| HIGHEST ANNUAL MEAN | | | | | 9.22 1994 | |
| LOWEST ANNUAL MEAN | | | | | 1.85 1980 | |
| HIGHEST DAILY MEAN | 25 | Jan 15 | 26 | Apr 1 | 41 | Aug 18 1972 |
| LOWEST DAILY MEAN | .00 | Mar 15 | .00 | Dec 25 | .00 | Oct 11 1968 |
| ANNUAL SEVEN-DAY MINIMUM | .00 | Mar 12 | .00 | Feb 5 | .00 | Oct 11 1968 |
| ANNUAL RUNOFF (AC-FT) | 3460 | | 2440 | | 3780 | |
| 10 PERCENT EXCEEDS | 13 | | 10 | | 13 | |
| 50 PERCENT EXCEEDS | 2.0 | | 1.0 | | 3.0 | |
| 90 PERCENT EXCEEDS | .01 | | .01 | | .01 | |



HAWAII, ISLAND OF HAWAII
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 mi².

PERIOD OF RECORD.--January 1964 to current year.

REVISED RECORDS.--WDR HI-94-1: 1964-90.

GAGE.--Stevens digital and graphic water-stage recorders. Elevation of gage is 3,900 ft above mean sea level, from topographic map.

REMARKS.--Records fair. Parker Ranch pipeline diverts from tributary 0.4 mi upstream for ranch use in Kamuela area.

AVERAGE DISCHARGE.--32 years (water years 1965-96), 7.67 ft³/s (5,560 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,330 ft³/s, November 18, 1979, gage height, 12.80 ft, from rating curve extended above 28 ft³/s on basis of computations of peak flow over dam and slope-area measurement at gage height 12.80 ft; minimum, 0.03 ft³/s on several days in 1965.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 180 ft³/s and maximum (*):

| Date | Time | Discharge (ft ³ /s) | Gage height (ft) | Date | Time | Discharge (ft ³ /s) | Gage height (ft) |
|---------|------|-----------------------------------|---------------------|---|------|-----------------------------------|---------------------|
| Feb. 25 | 0230 | *280 | *5.44 | No other peaks greater than base discharge. | | | |

Minimum discharge, 0.22 ft³/s, February 13-14.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY MEAN VALUES

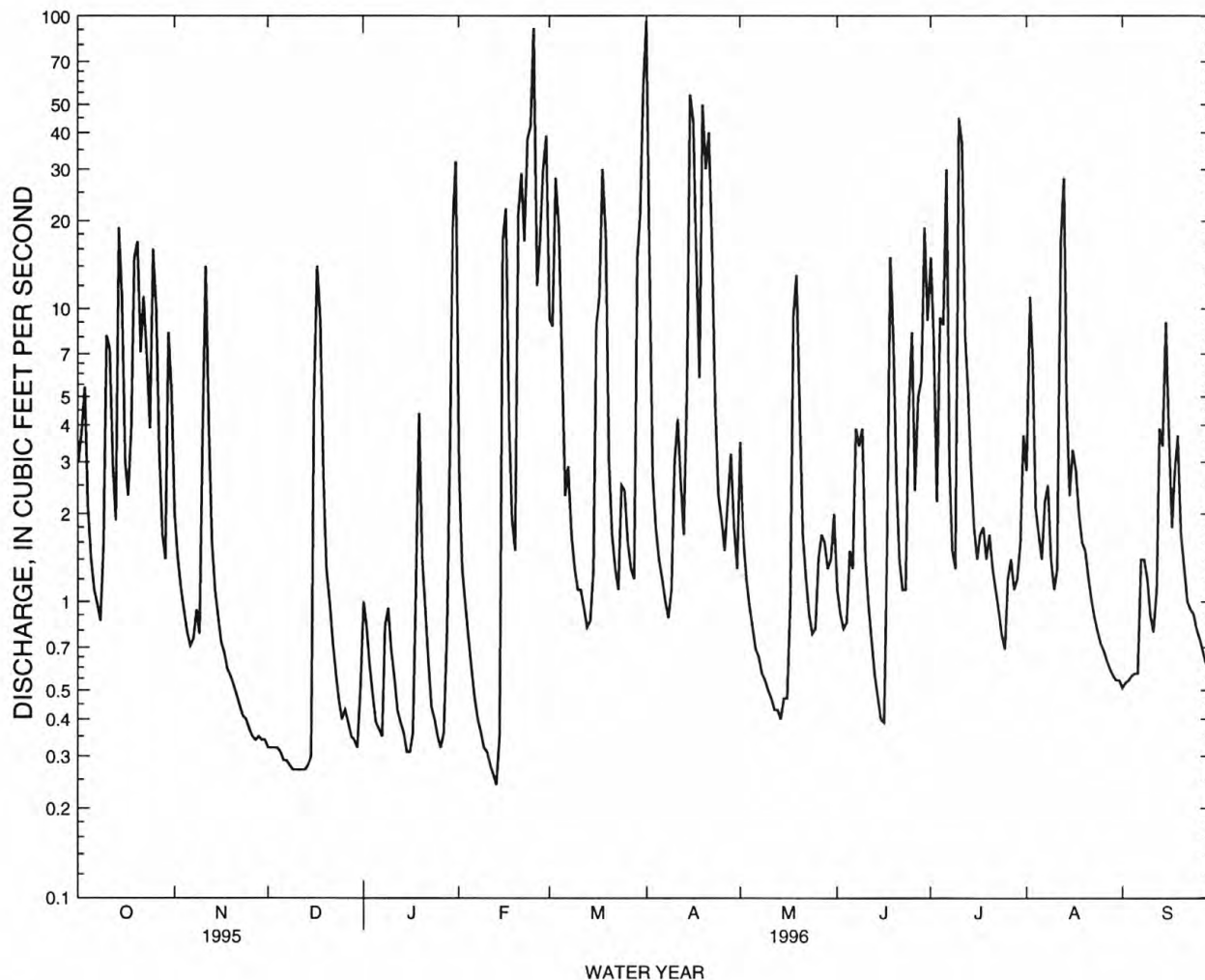
| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|--------|-------|-------|-------|--------|--------|--------|-------|--------|--------|--------|-------|
| 1 | 3.0 | 2.0 | .32 | 1.0 | 2.9 | 9.2 | 96 | 3.5 | 1.1 | 15 | 2.8 | .51 |
| 2 | 3.8 | 1.4 | .32 | .82 | 1.3 | 8.7 | 13 | 1.7 | .91 | 7.5 | 11 | .53 |
| 3 | 5.4 | 1.1 | .32 | .61 | .97 | 28 | 2.7 | 1.2 | .81 | 2.2 | 6.6 | .54 |
| 4 | 2.1 | .92 | .32 | .48 | .76 | 19 | 1.8 | .96 | .85 | 9.3 | 2.1 | .56 |
| 5 | 1.4 | .79 | .31 | .39 | .59 | 6.5 | 1.4 | .82 | 1.5 | 8.8 | 1.7 | .57 |
| 6 | 1.1 | .71 | .29 | .37 | .47 | 2.3 | 1.2 | .69 | 1.3 | 30 | 1.4 | .57 |
| 7 | .98 | .75 | .29 | .35 | .40 | 2.9 | 1.0 | .65 | 3.9 | 3.0 | 2.2 | 1.4 |
| 8 | .86 | .94 | .28 | .83 | .36 | 1.7 | .88 | .57 | 3.4 | 1.5 | 2.5 | 1.4 |
| 9 | 1.6 | .78 | .27 | .95 | .32 | 1.3 | 1.1 | .54 | 3.9 | 1.3 | 1.4 | 1.2 |
| 10 | 8.1 | 3.7 | .27 | .68 | .31 | 1.1 | 3.0 | .50 | 1.4 | 45 | 1.1 | .90 |
| 11 | 7.3 | 14 | .27 | .55 | .28 | 1.1 | 4.2 | .47 | .97 | 37 | 1.3 | .79 |
| 12 | 2.9 | 4.0 | .27 | .43 | .26 | .95 | 2.6 | .43 | .73 | 8.1 | 17 | 1.1 |
| 13 | 1.9 | 1.6 | .27 | .39 | .24 | .82 | 1.7 | .43 | .56 | 5.4 | 28 | 3.9 |
| 14 | 19 | 1.1 | .28 | .36 | .35 | .86 | 5.5 | .40 | .47 | 2.9 | 5.0 | 3.4 |
| 15 | 11 | .89 | .30 | .31 | 17 | 1.3 | 54 | .47 | .40 | 1.8 | 2.3 | 9.0 |
| 16 | 3.0 | .73 | 4.9 | .31 | 22 | 8.8 | 44 | .47 | .39 | 1.4 | 3.3 | 3.9 |
| 17 | 2.3 | .67 | 14 | .36 | 4.2 | 11 | 15 | 1.0 | 1.6 | 1.7 | 2.8 | 1.8 |
| 18 | 3.9 | .59 | 9.2 | 1.2 | 1.9 | 30 | 5.8 | 9.5 | 15 | 1.8 | 2.0 | 2.9 |
| 19 | 15 | .56 | 2.7 | 4.4 | 1.5 | 18 | 50 | 13 | 7.6 | 1.4 | 1.6 | 3.7 |
| 20 | 17 | .52 | 1.3 | 1.4 | 21 | 3.0 | 30 | 4.6 | 2.7 | 1.7 | 1.5 | 1.7 |
| 21 | 7.1 | .48 | 1.0 | .95 | 29 | 1.7 | 40 | 1.7 | 1.4 | 1.3 | 1.2 | 1.3 |
| 22 | 11 | .44 | .73 | .63 | 17 | 1.3 | 16 | 1.2 | 1.1 | 1.1 | 1.0 | 1.0 |
| 23 | 6.9 | .41 | .57 | .44 | 38 | 1.1 | 4.6 | .91 | 1.1 | .93 | .88 | .94 |
| 24 | 3.9 | .40 | .46 | .40 | 42 | 2.5 | 2.3 | .78 | 4.5 | .77 | .79 | .91 |
| 25 | 16 | .37 | .40 | .35 | 91 | 2.4 | 1.9 | .81 | 8.3 | .69 | .72 | .81 |
| 26 | 10 | .35 | .43 | .32 | 12 | 1.6 | 1.5 | 1.4 | 2.4 | 1.2 | .68 | .75 |
| 27 | 3.3 | .34 | .39 | .36 | 17 | 1.3 | 2.2 | 1.7 | 5.0 | 1.4 | .63 | .68 |
| 28 | 1.7 | .35 | .35 | .79 | 30 | 1.2 | 3.2 | 1.6 | 5.7 | 1.1 | .59 | .62 |
| 29 | 1.4 | .34 | .34 | 3.5 | 39 | 15 | 1.8 | 1.3 | 19 | 1.2 | .56 | .61 |
| 30 | 8.3 | .34 | .32 | 19 | --- | 21 | 1.3 | 1.4 | 9.1 | 1.6 | .54 | .57 |
| 31 | 5.3 | --- | .51 | 32 | --- | 57 | --- | 2.0 | --- | 3.7 | .54 | --- |
| TOTAL | 186.54 | 41.57 | 41.98 | 74.93 | 392.11 | 262.63 | 409.68 | 56.70 | 107.09 | 201.79 | 105.73 | 48.56 |
| MEAN | 6.02 | 1.39 | 1.35 | 2.42 | 13.5 | 8.47 | 13.7 | 1.83 | 3.57 | 6.51 | 3.41 | 1.62 |
| MAX | 19 | 14 | 14 | 32 | 91 | 57 | 96 | 13 | 19 | 45 | 28 | 9.0 |
| MIN | .86 | .34 | .27 | .31 | .24 | .82 | .88 | .40 | .39 | .69 | .54 | .51 |
| AC-FT | 370 | 82 | 83 | 149 | 778 | 521 | 813 | 112 | 212 | 400 | 210 | 96 |

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1964 - 1996, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|------|------|------|------|------|------|------|------|------|------|------|------|------|
| MEAN | 4.82 | 7.86 | 7.08 | 7.73 | 5.73 | 10.1 | 11.6 | 6.88 | 7.53 | 10.0 | 8.11 | 4.77 |
| MAX | 13.5 | 26.5 | 16.7 | 26.4 | 18.6 | 37.9 | 31.6 | 16.8 | 21.7 | 18.7 | 15.9 | 17.8 |
| (WY) | 1984 | 1980 | 1971 | 1979 | 1969 | 1980 | 1986 | 1990 | 1994 | 1978 | 1970 | 1992 |
| MIN | .31 | 1.07 | .54 | .46 | .40 | 1.27 | .82 | 1.83 | 2.04 | 2.38 | 1.72 | .087 |
| (WY) | 1985 | 1969 | 1981 | 1981 | 1993 | 1983 | 1992 | 1996 | 1985 | 1981 | 1971 | 1965 |

HAWAII, ISLAND OF HAWAII
 16725000 ALAKAHI STREAM NEAR KAMUELA--Continued

| SUMMARY STATISTICS | FOR 1995 CALENDAR YEAR | FOR 1996 WATER YEAR | WATER YEARS 1964 - 1996 |
|--------------------------|------------------------|---------------------|-------------------------|
| ANNUAL TOTAL | 2467.29 | 1929.31 | |
| ANNUAL MEAN | 6.76 | 5.27 | 7.67 |
| HIGHEST ANNUAL MEAN | | | 13.4 1994 |
| LOWEST ANNUAL MEAN | | | 3.39 1981 |
| HIGHEST DAILY MEAN | 83 Jan 15 | 96 Apr 1 | 338 Nov 18 1979 |
| LOWEST DAILY MEAN | .21 Jun 29 | .24 Feb 13 | .03 May 22 1965 |
| ANNUAL SEVEN-DAY MINIMUM | .27 Dec 8 | .27 Dec 8 | .04 September 22 1965 |
| ANNUAL RUNOFF (AC-FT) | 4890 | 3830 | 5560 |
| 10 PERCENT EXCEEDS | 20 | 15 | 19 |
| 50 PERCENT EXCEEDS | 1.7 | 1.3 | 3.1 |
| 90 PERCENT EXCEEDS | .34 | .36 | .56 |



HAWAII, ISLAND OF HAWAII

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.

GAGE.--Water-stage recorder and concrete control. Elevation of gage is 3,020 ft above mean sea level, from topographic map.

REMARKS.--Records for 1975-1983 poor. Records for 1984-1990, published in WDR: HI-84-1 to HI-90-1 are unreliable and should not be used. Ditch diverts from Kawainui, Kawaiki, and Alakahi Streams for use in vicinity of Kamuela. Records for current year good, except for periods of no gage height record which is poor.

AVERAGE DISCHARGE.--11 years (water years 1975-83, 1995-96), 9.36 ft³/s (6,780 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 48 ft³/s, April 6, 1977; no flow at times.

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge, 28 ft³/s, April 1 and April 15 1996; minimum daily discharge, 0.05 ft³/s, December 30, 1995.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|-------|-------|-------|-------|--------|-------|-------|-------|--------|-------|--------|-------|
| 1 | 10 | 7.3 | .52 | 1.4 | 11 | 17 | 28 | 5.4 | 2.9 | 6.9 | 5.1 | .39 |
| 2 | 9.3 | 4.0 | .48 | 1.1 | 4.4 | 16 | 16 | 4.8 | 1.9 | 5.6 | 7.2 | .39 |
| 3 | 12 | 2.7 | .44 | .88 | 2.5 | 19 | 13 | 3.5 | 1.8 | 5.0 | 5.4 | .42 |
| 4 | 7.1 | 2.1 | .43 | .62 | 1.7 | 26 | 8.2 | 2.5 | 2.5 | 7.7 | 4.7 | .46 |
| 5 | 3.6 | 1.7 | .39 | .47 | 1.2 | 12 | 5.6 | 2.0 | 5.4 | 6.0 | 4.1 | .57 |
| 6 | 2.5 | 1.4 | .39 | .39 | .96 | 5.4 | 4.2 | 1.7 | 3.5 | 8.0 | 3.0 | 1.1 |
| 7 | 2.0 | 1.5 | .39 | .35 | .84 | 13 | 3.2 | 1.5 | 5.5 | 5.2 | 3.5 | 4.5 |
| 8 | 1.6 | 2.1 | .39 | 1.4 | .74 | 7.6 | 2.6 | 1.4 | 5.7 | 4.9 | 4.4 | 2.7 |
| 9 | 2.9 | 1.6 | .35 | 1.6 | .66 | 4.6 | 3.7 | 1.3 | 7.6 | 4.2 | 2.7 | 1.6 |
| 10 | 11 | 7.0 | .34 | .96 | .61 | 3.5 | 12 | 1.2 | 4.9 | 7.5 | 1.7 | .91 |
| 11 | 12 | 17 | .31 | .65 | .54 | 3.3 | 14 | 1.1 | 3.0 | 7.8 | 2.0 | .71 |
| 12 | 9.7 | 12 | .31 | .46 | .48 | 2.6 | 11 | .97 | 1.9 | 5.9 | 10 | .81 |
| 13 | 6.7 | 5.1 | .29 | .35 | .46 | 2.1 | 5.6 | .93 | 1.4 | 5.6 | 7.6 | 10 |
| 14 | 13 | 3.0 | .29 | .29 | 1.5 | 2.3 | 11 | .88 | 1.1 | 5.4 | 4.9 | 6.9 |
| 15 | 16 | 2.3 | .32 | .23 | 20 | 4.3 | 28 | 1.4 | .98 | 5.1 | 4.4 | 16 |
| 16 | 12 | 1.7 | 4.2 | .23 | 19 | 14 | 20 | 1.3 | .90 | 4.1 | 4.6 | 12 |
| 17 | 6.8 | 1.4 | 11 | .31 | 14 | 15 | 13 | 3.9 | .96 | 4.3 | 4.6 | 4.3 |
| 18 | 10 | 1.3 | 12 | 3.9 | 7.1 | 18 | 12 | 8.4 | 5.2 | 4.7 | 4.2 | 6.9 |
| 19 | 17 | 1.2 | 8.2 | 13 | 6.4 | 16 | 18 | 6.8 | 4.6 | 3.5 | 3.5 | 12 |
| 20 | 17 | 1.2 | 3.3 | 3.1 | 21 | 13 | 10 | 5.2 | 4.3 | 4.4 | 2.9 | 3.9 |
| 21 | 13 | 1.0 | 1.8 | 1.0 | 19 | 6.7 | 13 | 4.5 | 3.8 | 3.4 | 2.0 | 2.0 |
| 22 | 16 | .90 | 1.1 | .42 | 17 | 4.3 | 7.4 | 2.9 | 2.7 | 2.6 | 1.4 | 1.2 |
| 23 | 13 | .77 | .80 | .26 | 19 | 3.5 | 6.0 | 1.9 | 2.1 | 1.8 | 1.1 | .96 |
| 24 | 11 | .72 | .66 | .21 | 20 | 16 | 5.3 | 1.6 | 4.0 | 1.4 | .90 | .93 |
| 25 | 14 | .66 | .56 | .59 | 11 | 13 | 5.2 | 2.2 | 5.1 | 1.2 | .79 | .77 |
| 26 | 16 | .62 | .62 | .42 | .71 | 7.2 | 5.0 | 4.8 | 5.2 | 2.1 | .71 | .66 |
| 27 | 11 | .57 | .52 | .41 | 6.6 | 4.2 | 5.4 | 4.5 | 5.9 | 3.3 | .64 | .56 |
| 28 | 5.7 | .57 | .24 | 6.8 | 24 | 7.0 | 5.5 | 4.0 | 5.6 | 1.9 | .57 | .48 |
| 29 | 5.3 | .56 | .06 | 14 | 23 | 20 | 5.0 | 3.3 | 7.2 | 1.8 | .51 | .42 |
| 30 | 19 | .52 | .05 | 12 | --- | 19 | 4.5 | 2.9 | 5.5 | 2.7 | .48 | .37 |
| 31 | 15 | --- | .32 | 18 | --- | 23 | --- | 4.5 | --- | 3.7 | .43 | --- |
| TOTAL | 321.2 | 84.49 | 51.07 | 85.80 | 255.40 | 338.6 | 301.4 | 93.28 | 113.14 | 137.7 | 100.03 | 94.91 |
| MEAN | 10.4 | 2.82 | 1.65 | 2.77 | 8.81 | 10.9 | 10.0 | 3.01 | 3.77 | 4.44 | 3.23 | 3.16 |
| MAX | 19 | 17 | 12 | 18 | 24 | 26 | 28 | 8.4 | 7.6 | 8.0 | 10 | 16 |
| MIN | 1.6 | .52 | .05 | .21 | .46 | 2.1 | 2.6 | .88 | .90 | 1.2 | .43 | .37 |
| AC-FT | 637 | 168 | 101 | 170 | 507 | 672 | 598 | 185 | 224 | 273 | 198 | 188 |

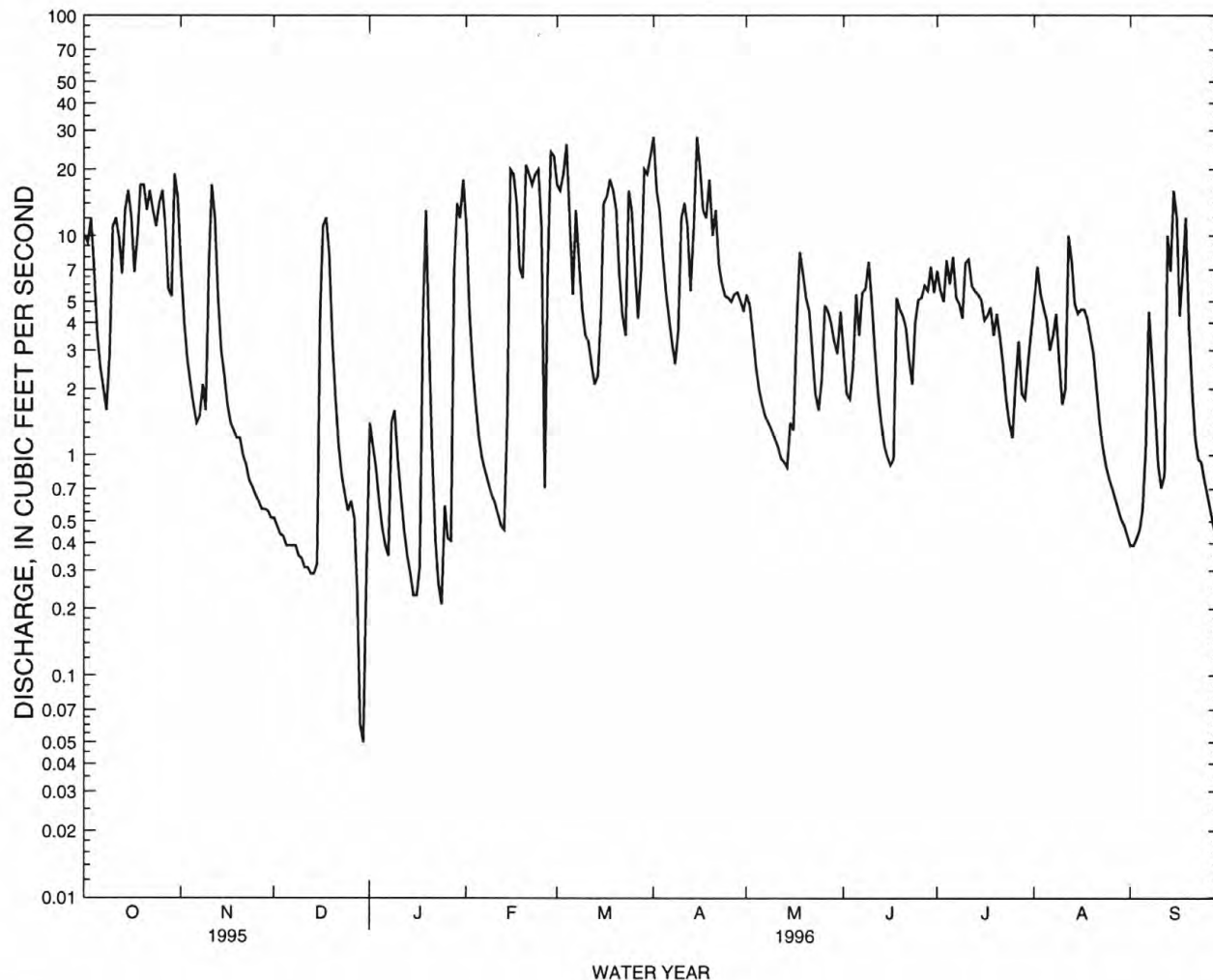
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1975 - 1996, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|------|------|------|------|------|------|------|------|------|------|------|------|------|
| MEAN | 7.42 | 9.56 | 7.21 | 5.39 | 5.35 | 12.2 | 13.0 | 10.4 | 8.65 | 13.7 | 11.4 | 7.71 |
| MAX | 12.9 | 17.4 | 12.6 | 9.93 | 11.4 | 19.7 | 21.7 | 20.2 | 15.6 | 26.0 | 19.6 | 16.9 |
| (WY) | 1976 | 1977 | 1979 | 1978 | 1975 | 1982 | 1977 | 1983 | 1983 | 1978 | 1978 | 1982 |
| MIN | 1.18 | 2.82 | .79 | .31 | .63 | 3.61 | 2.76 | 2.65 | 3.03 | 2.84 | 2.23 | 2.95 |
| (WY) | 1975 | 1996 | 1981 | 1981 | 1995 | 1995 | 1981 | 1981 | 1981 | 1981 | 1979 | 1981 |

HAWAII, ISLAND OF HAWAII

16726000 UPPER HAMAKUA DITCH ABOVE WAIMEA RESERVOIR DIVERSION, NEAR KAMUELA--Continued

| SUMMARY STATISTICS | FOR 1995 CALENDAR YEAR | FOR 1996 WATER YEAR | WATER YEARS 1975 - 1996 | |
|--------------------------|------------------------|---------------------|-------------------------|------------|
| ANNUAL TOTAL | 2549.63 | 1977.02 | | |
| ANNUAL MEAN | 6.99 | 5.40 | 9.36 | |
| HIGHEST ANNUAL MEAN | | | 14.1 | 1982 |
| LOWEST ANNUAL MEAN | | | 3.80 | 1981 |
| HIGHEST DAILY MEAN | 27 Apr 23 | 28 Apr 1 | 48 | Apr 6 1977 |
| LOWEST DAILY MEAN | .05 Dec 30 | .05 Dec 30 | .00 | Oct 1 1974 |
| ANNUAL SEVEN-DAY MINIMUM | .15 Feb 20 | .32 Dec 9 | .00 | Oct 1 1974 |
| ANNUAL RUNOFF (AC-FT) | 5060 | 3920 | 6780 | |
| 10 PERCENT EXCEEDS | 17 | 14 | 24 | |
| 50 PERCENT EXCEEDS | 5.1 | 3.5 | 5.8 | |
| 90 PERCENT EXCEEDS | .35 | .46 | .49 | |



HAWAII, ISLAND OF HAWAII

16727000 UPPER HAMAKUA DITCH ABOVE PUUKAPU RESERVOIR, NEAR KAMUELA

LOCATION.--Lat 20°02'53", long 155°37'17", Hydrologic Unit 20010000, on right bank 25 ft downstream from pipe railed bridge, and 4.0 mi northeast of Kamuela Post Office.

PERIOD OF RECORD.--October 1977 to current year.

GAGE.--Water-stage recorder and concrete control. Elevation of gage is 2,890 ft above mean sea level, from topographic map.

REMARKS.--Records rated good. Ditch diverts water from above into Waimea Reservoir for use in vicinity of Kamuela. Although the shift curve for 1995 was found slightly askew, no revisions were made and there was no downgrade in accuracy. It was felt that the daily discharges would not change by much and that 95 percent of daily discharges are within 5 percent of the true discharges.

AVERAGE DISCHARGE.--19 years (water years 1978-96), 1.66 ft³/s (1,200 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 42 ft³/s, April 16, 1985; no flow at times.

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge, 17 ft³/s, February 20; no flow for many days.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|-------|------|------|-------|-------|------|------|------|------|------|------|-------|
| 1 | 5.2 | .00 | .00 | .00 | 8.0 | .00 | .35 | .00 | .00 | .00 | .00 | .00 |
| 2 | 1.4 | .00 | .00 | .00 | 2.8 | .00 | .04 | .00 | .00 | .00 | .00 | .00 |
| 3 | 2.9 | .00 | .00 | .00 | 1.4 | .01 | .03 | .00 | .00 | .00 | .00 | .00 |
| 4 | 2.3 | .00 | .00 | .00 | .67 | .00 | .02 | .00 | .00 | .00 | .00 | .00 |
| 5 | 1.1 | .00 | .00 | .00 | .13 | .00 | .02 | .00 | .00 | .00 | .00 | .00 |
| 6 | .00 | .00 | .00 | .00 | .00 | .00 | .01 | .00 | .00 | .00 | .00 | .00 |
| 7 | .00 | .00 | .00 | .00 | .00 | .00 | .02 | .00 | .00 | .00 | .00 | .22 |
| 8 | .00 | .00 | .00 | .00 | .00 | .00 | .02 | .00 | .00 | .00 | .00 | .00 |
| 9 | .06 | .00 | .00 | .00 | .00 | .00 | .01 | .00 | .01 | .00 | .00 | .00 |
| 10 | 1.4 | .00 | .00 | .00 | .00 | .00 | .03 | .00 | .00 | .00 | .00 | .00 |
| 11 | 2.5 | .00 | .00 | .00 | .00 | .00 | .01 | .00 | .00 | .00 | .00 | .00 |
| 12 | 3.7 | .00 | .00 | .00 | .00 | .00 | .01 | .00 | .00 | .00 | .00 | .00 |
| 13 | 1.9 | .00 | .00 | .00 | .00 | .00 | .01 | .00 | .00 | .00 | .00 | .18 |
| 14 | .00 | .00 | .00 | .00 | .11 | .00 | .03 | .00 | .00 | .00 | .22 | .00 |
| 15 | .00 | .00 | .00 | .00 | 7.2 | .00 | .06 | .00 | .00 | .00 | .00 | .59 |
| 16 | .18 | .00 | .17 | .00 | 9.7 | .00 | .03 | .00 | .00 | .00 | .00 | 5.4 |
| 17 | .38 | .00 | .00 | .00 | 10 | .00 | .03 | .00 | .00 | .13 | .00 | 1.3 |
| 18 | .00 | .00 | 1.7 | .81 | 5.3 | .00 | .02 | .00 | .00 | .00 | .00 | .97 |
| 19 | .00 | .00 | 2.4 | 3.2 | 4.5 | .00 | .04 | .00 | .00 | .00 | .00 | 5.5 |
| 20 | .00 | .00 | .55 | .00 | 17 | .00 | .01 | .00 | .00 | .00 | .00 | 1.1 |
| 21 | .00 | .00 | .00 | .00 | 7.2 | .00 | .01 | .00 | .00 | .00 | .00 | .03 |
| 22 | .00 | .00 | .00 | .00 | .00 | .00 | .01 | .00 | .00 | .00 | .00 | .00 |
| 23 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 |
| 24 | .00 | .00 | .00 | .00 | .02 | .00 | .00 | .00 | .00 | .00 | .00 | .00 |
| 25 | .00 | .00 | .00 | .00 | .03 | .00 | .00 | .00 | .00 | .00 | .00 | .00 |
| 26 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 |
| 27 | .00 | .00 | .00 | .00 | 1.0 | .00 | .00 | .00 | .00 | .00 | .00 | .00 |
| 28 | .00 | .00 | .00 | .96 | 4.8 | .00 | .00 | .00 | .00 | .00 | .00 | .00 |
| 29 | .00 | .00 | .00 | 1.5 | 1.2 | .00 | .00 | .00 | .00 | .00 | .00 | .00 |
| 30 | .00 | .00 | .00 | 6.3 | --- | .00 | .00 | .00 | .00 | .00 | .00 | .00 |
| 31 | .00 | --- | .00 | 13 | --- | .00 | --- | .00 | --- | .00 | .00 | --- |
| TOTAL | 23.02 | 0.00 | 4.82 | 25.77 | 81.06 | 0.01 | 0.82 | 0.00 | 0.01 | 0.13 | 0.22 | 15.29 |
| MEAN | .74 | .000 | .16 | .83 | 2.80 | .000 | .027 | .000 | .000 | .004 | .007 | .51 |
| MAX | 5.2 | .00 | 2.4 | 13 | 17 | .01 | .35 | .00 | .01 | .13 | .22 | 5.5 |
| MIN | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 |
| AC-FT | 46 | .00 | 9.6 | 51 | 161 | .02 | 1.6 | .00 | .02 | .3 | .4 | 30 |

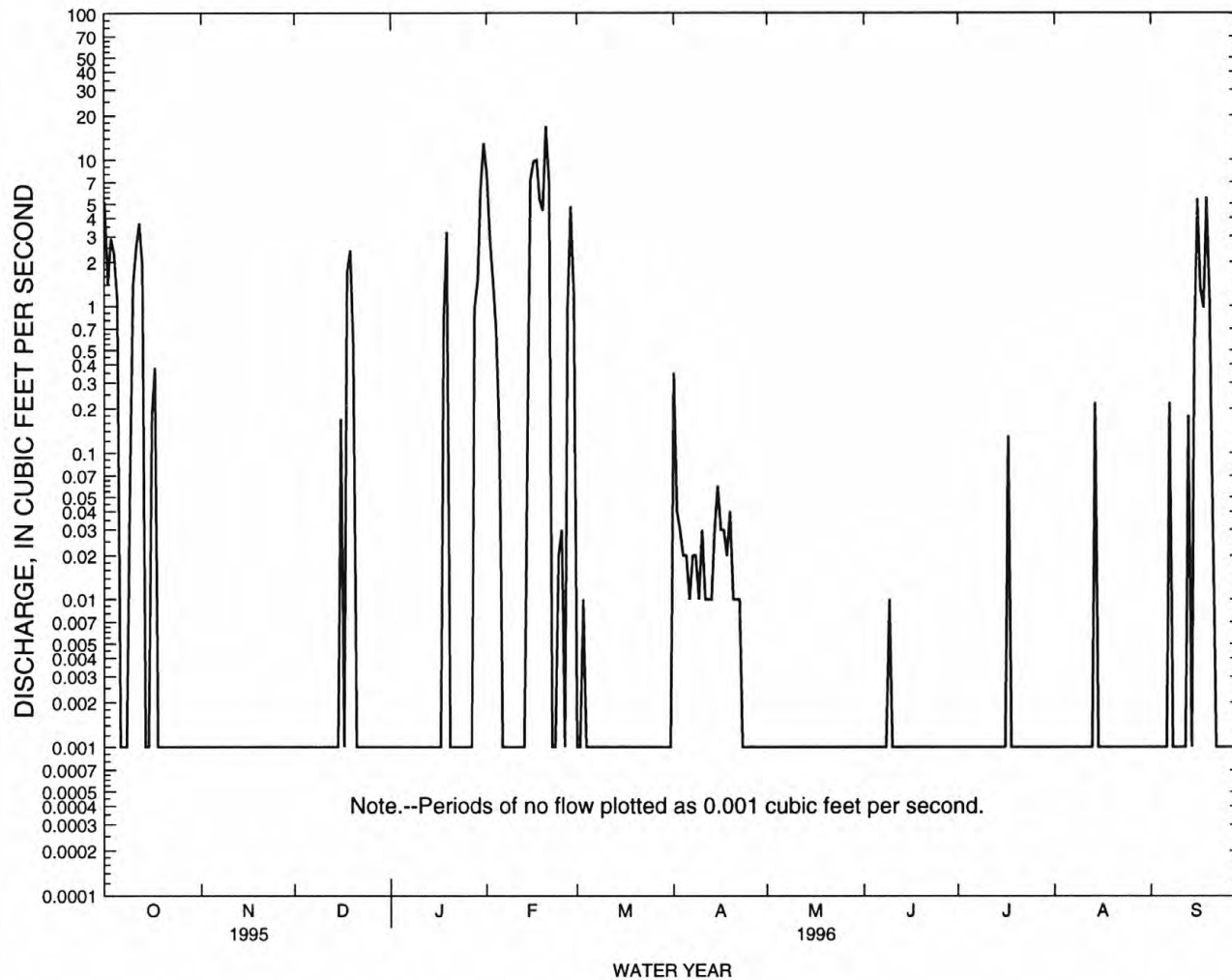
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1978 - 1996, BY WATER YEAR (WY)

| | | | | | | | | | | | | |
|------|------|------|------|------|------|------|------|------|------|------|------|------|
| MEAN | 1.38 | 2.27 | 1.55 | 1.52 | 1.08 | 2.37 | 2.51 | 1.63 | 1.76 | 1.70 | 1.48 | .64 |
| MAX | 6.36 | 10.1 | 5.46 | 8.23 | 4.56 | 15.2 | 13.9 | 9.55 | 11.6 | 9.04 | 10.8 | 4.44 |
| (WY) | 1986 | 1988 | 1988 | 1987 | 1988 | 1985 | 1986 | 1986 | 1986 | 1978 | 1985 | 1985 |
| MIN | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 |
| (WY) | 1985 | 1990 | 1989 | 1989 | 1993 | 1989 | 1993 | 1983 | 1983 | 1980 | 1984 | 1984 |

HAWAII, ISLAND OF HAWAII

16727000 UPPER HAMAKUA DITCH ABOVE PUUKAPU RESERVOIR, NEAR KAMUELA--Continued

| SUMMARY STATISTICS | FOR 1995 CALENDAR YEAR | FOR 1996 WATER YEAR | WATER YEARS 1978 - 1996 | |
|--------------------------|------------------------|---------------------|-------------------------|-------------|
| ANNUAL TOTAL | 83.22 | 151.15 | | |
| ANNUAL MEAN | .23 | .41 | 1.66 | |
| HIGHEST ANNUAL MEAN | | | 6.79 | 1986 |
| LOWEST ANNUAL MEAN | | | .007 | 1990 |
| HIGHEST DAILY MEAN | 8.1 Mar 29 | 17 Feb 20 | 42 | Apr 16 1985 |
| LOWEST DAILY MEAN | .00 Jan 1 | .00 Oct 6 | .00 | Oct 1 1977 |
| ANNUAL SEVEN-DAY MINIMUM | .00 Jan 1 | .00 Oct 18 | .00 | Oct 1 1977 |
| ANNUAL RUNOFF (AC-FT) | 165 | 300 | 1200 | |
| 10 PERCENT EXCEEDS | .00 | .61 | 5.6 | |
| 50 PERCENT EXCEEDS | .00 | .00 | .00 | |
| 90 PERCENT EXCEEDS | .00 | .00 | .00 | |



HAWAII, ISLAND OF HAWAII
16756000 KOHAKOHAU STREAM NEAR KAMUELA

RECORDS BEING REVIEWED

HAWAII, ISLAND OF HAWAII
16758000 WAIKOLOA STREAM AT MARINE DAM, NEAR KAMUELA

THE RECORDS FOR WATER YEARS 1992-96 WERE NOT COMPUTED
AT THE TIME OF PUBLICATION

HAWAII, ISLAND OF HAWAII
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 mi².

PERIOD OF RECORD.--March 1956 to current year. Prior to July 1960, published as Hauani Stream near Kamuela.

GAGE.--Water-stage recorder. Concrete control since February 27, 1963. Datum of gage is 3,117.42 ft above mean sea level (Hawaii County Department of Water Supply benchmark).

REMARKS.--Records good except for discharges less than 2.0 ft³/s, which are poor. Diversion upstream for livestock and domestic use.

AVERAGE DISCHARGE.--35 years (water years 1957-91), 1.67 ft³/s (1,210 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 822 ft³/s, November 18, 1979, gage height, 4.56 ft, from rating curve extended above 11 ft³/s on basis of slope-conveyance study; maximum gage height, 4.65 ft, October 23, 1957; no flow at times.

EXTREMES FOR CURRENT YEAR (Water year 1991).--Peak discharges greater than base discharge of 78 ft³/s and maximum (*):

| Date | Time | Discharge (ft ³ /s) | Gage height (ft) | Date | Time | Discharge (ft ³ /s) | Gage height (ft) |
|---------|------|-----------------------------------|---------------------|---------|------|-----------------------------------|---------------------|
| Dec. 09 | 0400 | 114 | 2.82 | Mar. 12 | 2200 | 136 | 2.93 |
| Dec. 24 | 2230 | 94 | 2.69 | Aug. 07 | 1730 | 190 | 3.18 |
| Jan. 27 | 2400 | *368 | *3.72 | | | | |

Minimum daily discharge, 0.31 ft³/s, March 2, 3.

REVISIONS.--Revised daily discharges, in cubic feet per second, for periods in water years 1969, 1977, 1979, and 1987, are given below. These figures supersede those published in the annual report for water years 1969, 1977, 1979, and 1987. All daily discharges less than 2.0 ft³/s, for the period of record, have been downgraded to poor. All annual minimum daily discharge for water years 1967-90 are subject to considerable error and should not be used for regional hydrologic studies of low-flow.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1968 TO SEPTEMBER 1969
DAILY MEAN VALUES

| | | | | | | | |
|-------------|--------|---------|------|---------|-------|---------|------|
| Nov. 25 | e.10 | Dec. 5 | e4.0 | Dec. 13 | e23 | Dec. 21 | e.35 |
| Nov. 26 | e.15 | Dec. 6 | e1.3 | Dec. 14 | e5.0 | Dec. 22 | e.33 |
| Nov. 27 | e.10 | Dec. 7 | e.70 | Dec. 15 | e1.8 | Dec. 23 | e.30 |
| Nov. 28 | e.50 | Dec. 8 | e.40 | Dec. 16 | e4.0 | Dec. 24 | e.27 |
| Nov. 29 | e2.0 | Dec. 9 | e.22 | Dec. 17 | e7.0 | Dec. 25 | e.25 |
| Nov. 30 | e.70 | Dec. 10 | e.15 | Dec. 18 | e1.5 | Dec. 26 | e.27 |
| Dec. 1 | e.15 | Dec. 11 | e.11 | Dec. 19 | e.80 | Dec. 28 | e.30 |
| Dec. 2 | e.30 | Dec. 12 | e.50 | Dec. 20 | e.40 | Dec. 29 | e.23 |
| Dec. 4 | e7.2 | | | | | | |
| MONTH | TOTAL | MEAN | MAX | MIN | AC-FT | | |
| Nov. 1968 | 4.51 | .15 | 2.0 | .00 | 8.9 | | |
| Dec. 1968 | 63.58 | 2.05 | 23 | .11 | 126 | | |
| CAL YR 1968 | 511.83 | 1.40 | 32 | .00 | 1,020 | | |
| WTR YR 1969 | 738.80 | 2.02 | 31 | .00 | 1,470 | | |

e Estimated

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1976 TO SEPTEMBER 1977
DAILY MEAN VALUES

| | | | | | | | |
|-------------|--------|---------|-----|---------|-------|---------|-----|
| Mar. 25 | .92 | Mar. 29 | 1.9 | Apr. 2 | .22 | Apr. 18 | .55 |
| Mar. 26 | .55 | Mar. 30 | .50 | Apr. 3 | 2.3 | Apr. 19 | .45 |
| Mar. 27 | .37 | Mar. 31 | .41 | Apr. 16 | .83 | Apr. 20 | 5.7 |
| Mar. 28 | 2.4 | Apr. 1 | .28 | Apr. 17 | .67 | | |
| MONTH | TOTAL | MEAN | MAX | MIN | AC-FT | | |
| Mar. 1977 | 46.42 | 1.50 | 7.6 | .08 | 92 | | |
| Apr. 1977 | 187.71 | 6.26 | 42 | .22 | 372 | | |
| CAL YR 1976 | 459.67 | 1.26 | 26 | .06 | 912 | | |
| WTR YR 1977 | 629.80 | 1.73 | 42 | .02 | 1,250 | | |

HAWAII, ISLAND OF HAWAII
16759000 HAUANI GULCH NEAR KAMUELA--Continued

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1978 TO SEPTEMBER 1979
DAILY MEAN VALUES

| | | | | | | | |
|-------------|----------|---------|------|---------|-------|---------|------|
| Jan. 9 | e2.2 | Jan. 18 | e8.1 | Jan. 27 | e.96 | Feb. 5 | e.60 |
| Jan. 10 | e29 | Jan. 19 | e4.9 | Jan. 28 | e.79 | Feb. 6 | e.70 |
| Jan. 11 | e61 | Jan. 20 | e69 | Jan. 29 | e2.4 | Feb. 7 | e11 |
| Jan. 12 | e53 | Jan. 21 | e23 | Jan. 30 | e.86 | Feb. 8 | e7.0 |
| Jan. 13 | e53 | Jan. 22 | e4.8 | Jan. 31 | e.67 | Feb. 9 | e4.0 |
| Jan. 14 | e35 | Jan. 23 | e2.1 | Feb. 1 | e.5 | Feb. 10 | e7.1 |
| Jan. 15 | e8.0 | Jan. 24 | e1.8 | Feb. 2 | e1.6 | Feb. 11 | e4.6 |
| Jan. 16 | e2.2 | Jan. 25 | e1.4 | Feb. 3 | e2.5 | Feb. 12 | e3.5 |
| Jan. 17 | e1.3 | Jan. 26 | e1.1 | Feb. 4 | e.71 | Mar. 27 | .50 |
| MONTH | TOTAL | MEAN | MAX | MIN | AC-FT | | |
| Jan. 1979 | 368.49 | 11.9 | 69 | .20 | 731 | | |
| Feb. 1979 | 128.41 | 4.59 | 29 | .54 | 255 | | |
| Mar. 1979 | 74.29 | 2.40 | 35 | .50 | 147 | | |
| CAL YR 1978 | 601.58 | 1.65 | 73 | .08 | 1,190 | | |
| WTR YR 1979 | 1,025.50 | 2.81 | 73 | .07 | 2,030 | | |

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987
DAILY MEAN VALUES

| | | | | | | | |
|-------------|----------|---------|-----|---------|-------|---------|-----|
| Feb. 3 | .55 | Feb. 12 | .34 | Feb. 21 | .72 | Mar. 2 | .50 |
| Feb. 4 | .50 | Feb. 13 | .50 | Feb. 22 | .55 | Mar. 3 | .88 |
| Feb. 5 | .45 | Feb. 14 | .55 | Feb. 23 | .50 | Mar. 4 | .50 |
| Feb. 6 | .45 | Feb. 15 | .45 | Feb. 24 | .45 | Mar. 5 | .41 |
| Feb. 7 | .45 | Feb. 16 | .61 | Feb. 25 | .88 | Mar. 6 | .37 |
| Feb. 8 | .41 | Feb. 17 | 4.0 | Feb. 26 | .67 | Mar. 7 | .41 |
| Feb. 9 | .37 | Feb. 18 | 3.9 | Feb. 27 | .45 | Mar. 8 | 1.2 |
| Feb. 10 | .37 | Feb. 19 | 1.9 | Feb. 28 | .41 | Mar. 9 | .82 |
| Feb. 11 | .34 | Feb. 20 | 1.7 | Mar. 1 | .37 | Mar. 10 | .50 |
| MONTH | TOTAL | MEAN | MAX | MIN | AC-FT | | |
| Feb. 1987 | 23.92 | .85 | 4.0 | .34 | 47 | | |
| Mar. 1987 | 16.28 | .53 | 1.2 | .36 | 32 | | |
| CAL YR 1986 | 1,020.04 | 2.79 | 104 | .12 | 2,020 | | |
| WTR YR 1987 | 879.45 | 2.41 | 37 | .28 | 1,740 | | |

e Estimated

HAWAII, ISLAND OF HAWAII
16759000 HAUANI GULCH NEAR KAMUELA--Continued

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | Nov. | JUN | JUL | AUG | SEP |
|-------------|-------|---------|--------|-------|-------|--------|-------|-------|-------|-------|--------|-------|
| 1 | 1.6 | .82 | .65 | .61 | .61 | .33 | 8.4 | 2.3 | 1.2 | 1.4 | 3.8 | .70 |
| 2 | 1.2 | .77 | .61 | .58 | .55 | .31 | 2.1 | 1.0 | 1.6 | 1.2 | 1.5 | .67 |
| 3 | 2.2 | .72 | .58 | .55 | .52 | .31 | 3.2 | .88 | 1.2 | .93 | 3.4 | 4.5 |
| 4 | 1.9 | .69 | .56 | .53 | .48 | .32 | 4.5 | 1.7 | 1.0 | .85 | 4.7 | 3.8 |
| 5 | 2.0 | .67 | .61 | .51 | .45 | .35 | 22 | 2.5 | .97 | .77 | 2.6 | 1.1 |
| 6 | 1.2 | .64 | .82 | .73 | .43 | .54 | 8.5 | 1.0 | .92 | .70 | 8.2 | .86 |
| 7 | 1.0 | .58 | .99 | .88 | .41 | 2.8 | 2.7 | 1.3 | 4.5 | .69 | 56 | .88 |
| 8 | .96 | .55 | 17 | .75 | .41 | 6.3 | 3.0 | 1.4 | 1.5 | .65 | 4.1 | 1.5 |
| 9 | .90 | .54 | 64 | .57 | .40 | 5.1 | 1.2 | .96 | 1.1 | .64 | 2.7 | .95 |
| 10 | .88 | .53 | 5.8 | 2.4 | .37 | 1.5 | .94 | .82 | .88 | 5.0 | 1.8 | 2.8 |
| 11 | 4.9 | .50 | 1.6 | 1.2 | .37 | 4.8 | .84 | .77 | .82 | 5.1 | 1.2 | 1.7 |
| 12 | 2.0 | .50 | 1.1 | .72 | .37 | 24 | .82 | .73 | .85 | 1.2 | 5.2 | 1.5 |
| 13 | 1.5 | .52 | 1.3 | .59 | 2.8 | 38 | 1.1 | 1.5 | .99 | 2.7 | 2.6 | 1.8 |
| 14 | 2.1 | 13 | 1.7 | .54 | 3.8 | 52 | .80 | 9.7 | 1.9 | 1.7 | 1.2 | .88 |
| 15 | 6.6 | 5.1 | .96 | .58 | .69 | 28 | .78 | 11 | 5.7 | 2.2 | .95 | .80 |
| 16 | 5.7 | 1.7 | .77 | 1.3 | .51 | 19 | .74 | 2.3 | 1.2 | 1.7 | .86 | .95 |
| 17 | 2.7 | 1.0 | .70 | 1.1 | .43 | 26 | .69 | 2.0 | 2.0 | 1.0 | .97 | .96 |
| 18 | 3.5 | 17 | 6.1 | .61 | .39 | 4.4 | .67 | 1.6 | 2.1 | 3.2 | 1.1 | .73 |
| 19 | 1.9 | 7.3 | 1.8 | .53 | .40 | 2.4 | .70 | 1.2 | 1.1 | 2.2 | .91 | .70 |
| 20 | 1.3 | 3.6 | 3.0 | .51 | .56 | 2.0 | .67 | .86 | .81 | 1.4 | 1.0 | .70 |
| 21 | 1.1 | 1.6 | 1.3 | .49 | .89 | 1.3 | .62 | .78 | .73 | .95 | .78 | .60 |
| 22 | 1.1 | 1.0 | 1.6 | .46 | .70 | .98 | .62 | .73 | .68 | .94 | .70 | .55 |
| 23 | 2.1 | 5.0 | 3.3 | 1.2 | .41 | .83 | .89 | .69 | .66 | .90 | .63 | .55 |
| 24 | 1.6 | 3.0 | 7.2 | .61 | .39 | .75 | 2.8 | .66 | .67 | 1.7 | .61 | .53 |
| 25 | 1.3 | 1.3 | 3.1 | .51 | .54 | .69 | 1.8 | .60 | 4.8 | 1.5 | .58 | .50 |
| 26 | 1.1 | .95 | 1.0 | .46 | .38 | .63 | 1.3 | 1.3 | 5.3 | 3.3 | .55 | .50 |
| 27 | 1.0 | .83 | .83 | 41 | .34 | 1.0 | 1.3 | 2.4 | 1.6 | .98 | 10 | .47 |
| 28 | .90 | .77 | .83 | 30 | .32 | 1.1 | 4.9 | 4.4 | 3.1 | .93 | 4.7 | .44 |
| 29 | 1.6 | .72 | .78 | 1.7 | --- | 1.2 | 3.4 | 7.2 | 1.9 | 13 | 1.8 | .45 |
| 30 | 4.5 | .70 | .69 | .82 | --- | 2.7 | 7.7 | 2.4 | 1.6 | 16 | .91 | .41 |
| 31 | .99 | --- | .64 | .69 | --- | 2.9 | --- | 1.5 | --- | 2.4 | .78 | --- |
| TOTAL | 63.33 | 72.60 | 131.92 | 93.73 | 18.92 | 232.54 | 89.68 | 68.18 | 53.38 | 77.83 | 126.83 | 33.48 |
| MEAN | 2.04 | 2.42 | 4.26 | 3.02 | .68 | 7.50 | 2.99 | 2.20 | 1.78 | 2.51 | 4.09 | 1.12 |
| MAX | 6.6 | 17 | 64 | 41 | 3.8 | 52 | 22 | 11 | 5.7 | 16 | 56 | 4.5 |
| MIN | .88 | .50 | .56 | .46 | .32 | .31 | .62 | .60 | .66 | .64 | .55 | .41 |
| AC-FT | 126 | 144 | 262 | 186 | 38 | 461 | 178 | 135 | 106 | 154 | 252 | 66 |
| CAL YR 1990 | TOTAL | 971.31 | MEAN | 2.66 | MAX | 64 | MIN | .09 | AC-FT | 1930 | | |
| WTR YR 1991 | TOTAL | 1062.42 | MEAN | 2.91 | MAX | 64 | MIN | .31 | AC-FT | 2110 | | |

HAWAII, ISLAND OF HAWAII
16764000 HILEA GULCH TRIBUTARY NEAR HONUAPO

RECORDS BEING REVIEWED

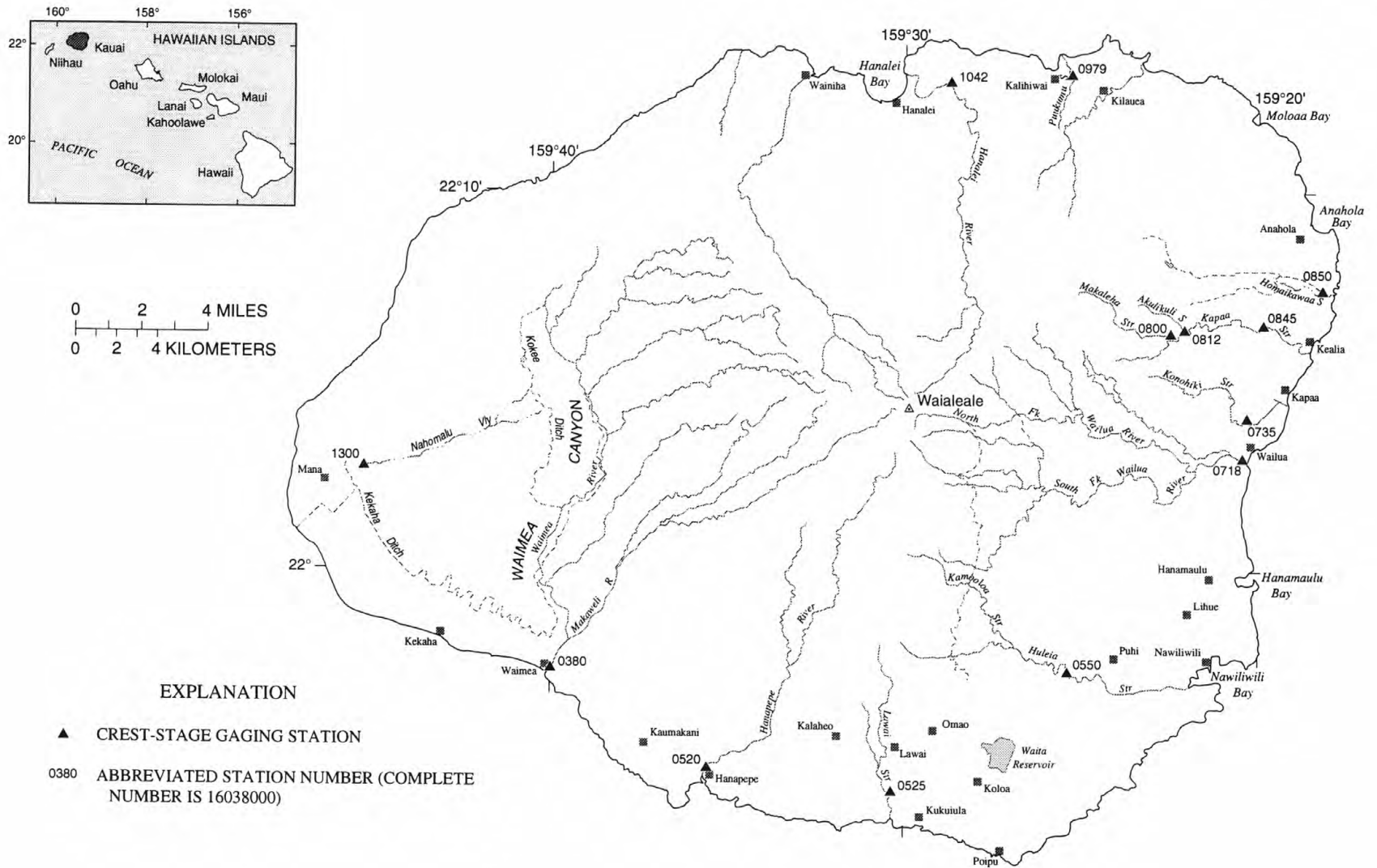


Figure 10. Locations of crest-stage gaging stations on Kauai.

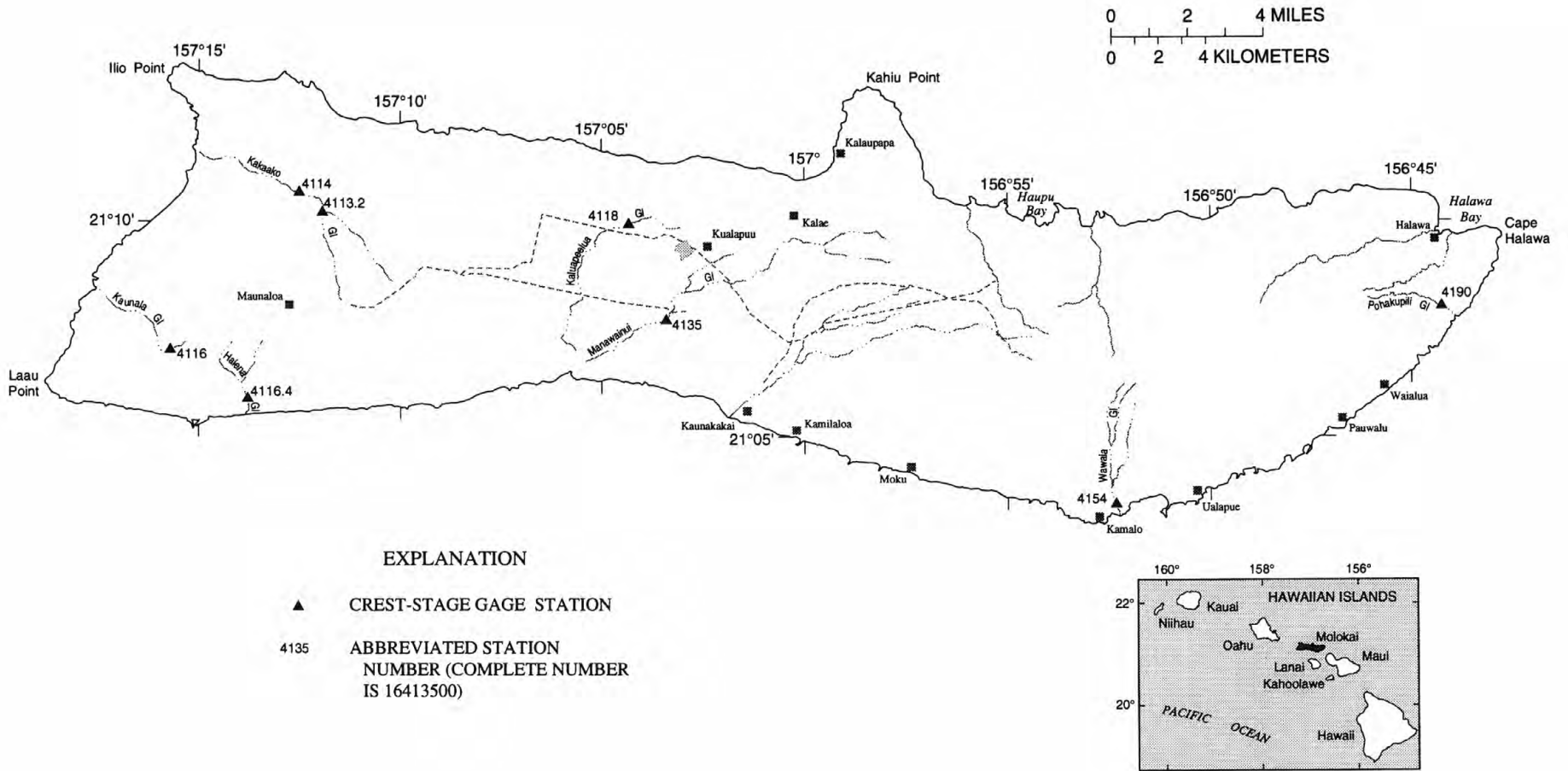


Figure 12. Locations of crest-stage gaging stations on Molokai.

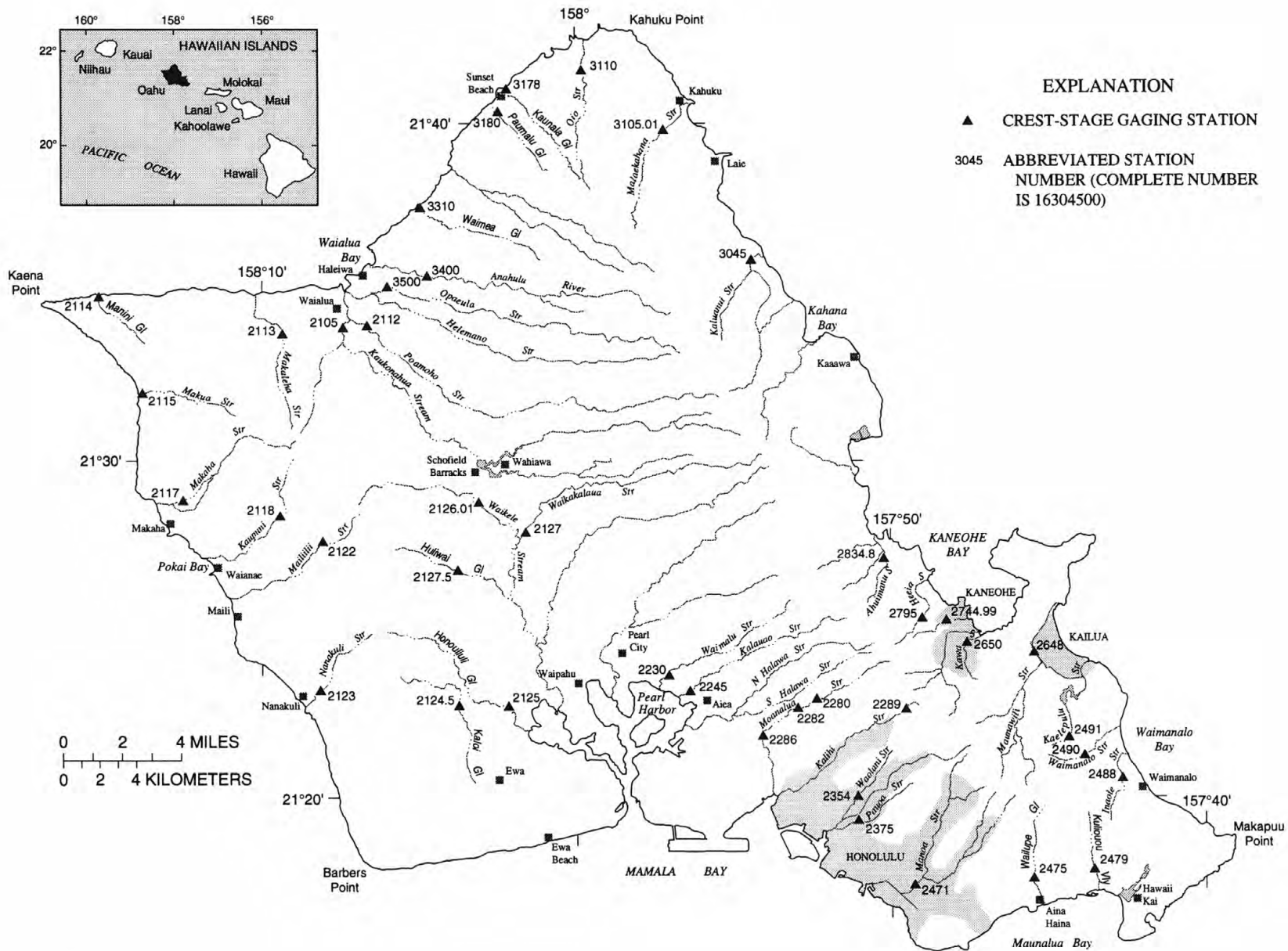


Figure 11. Locations of crest-stage gaging stations on Oahu.

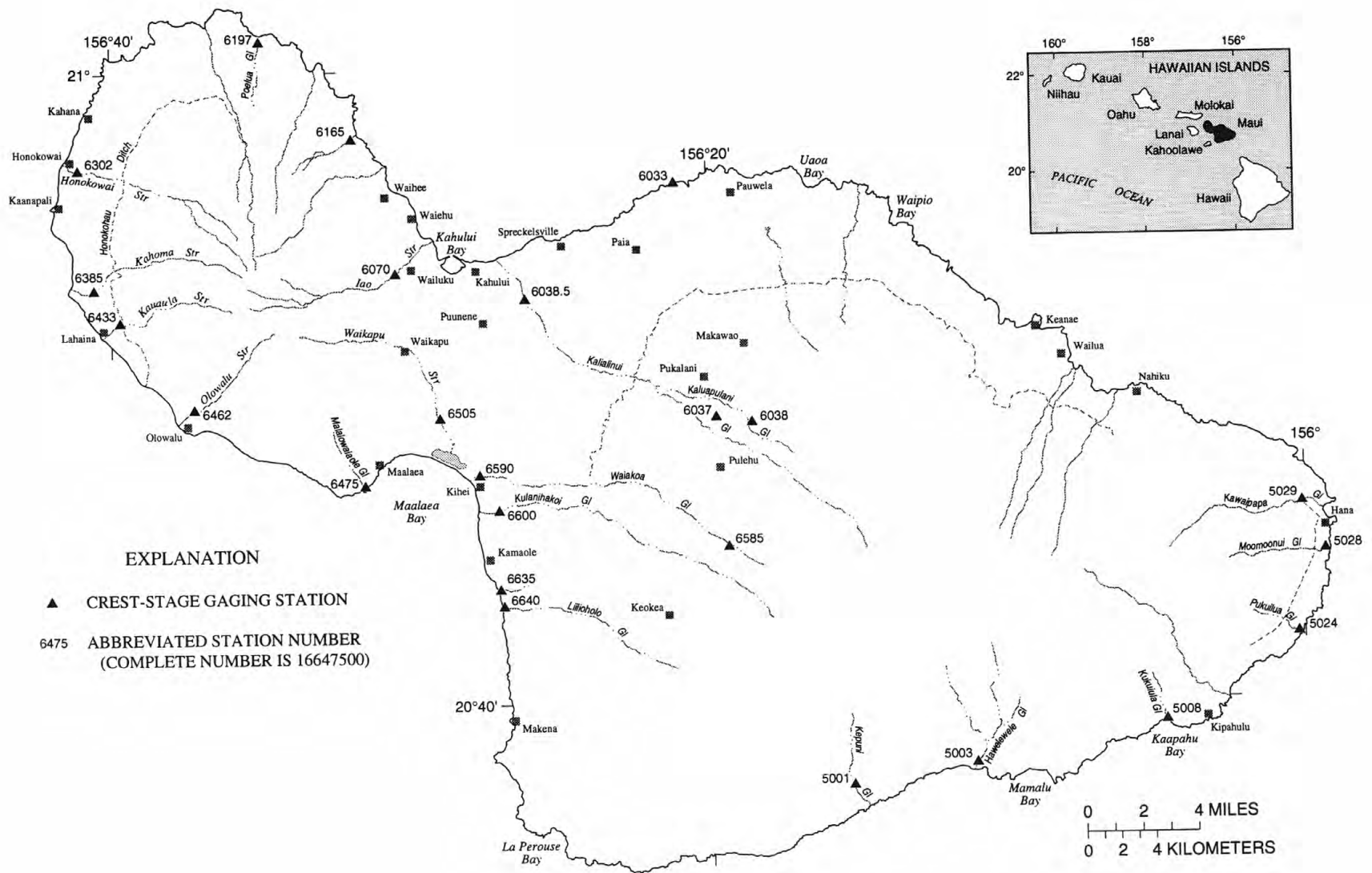


Figure 13. Locations of crest-stage gaging stations on Maui.

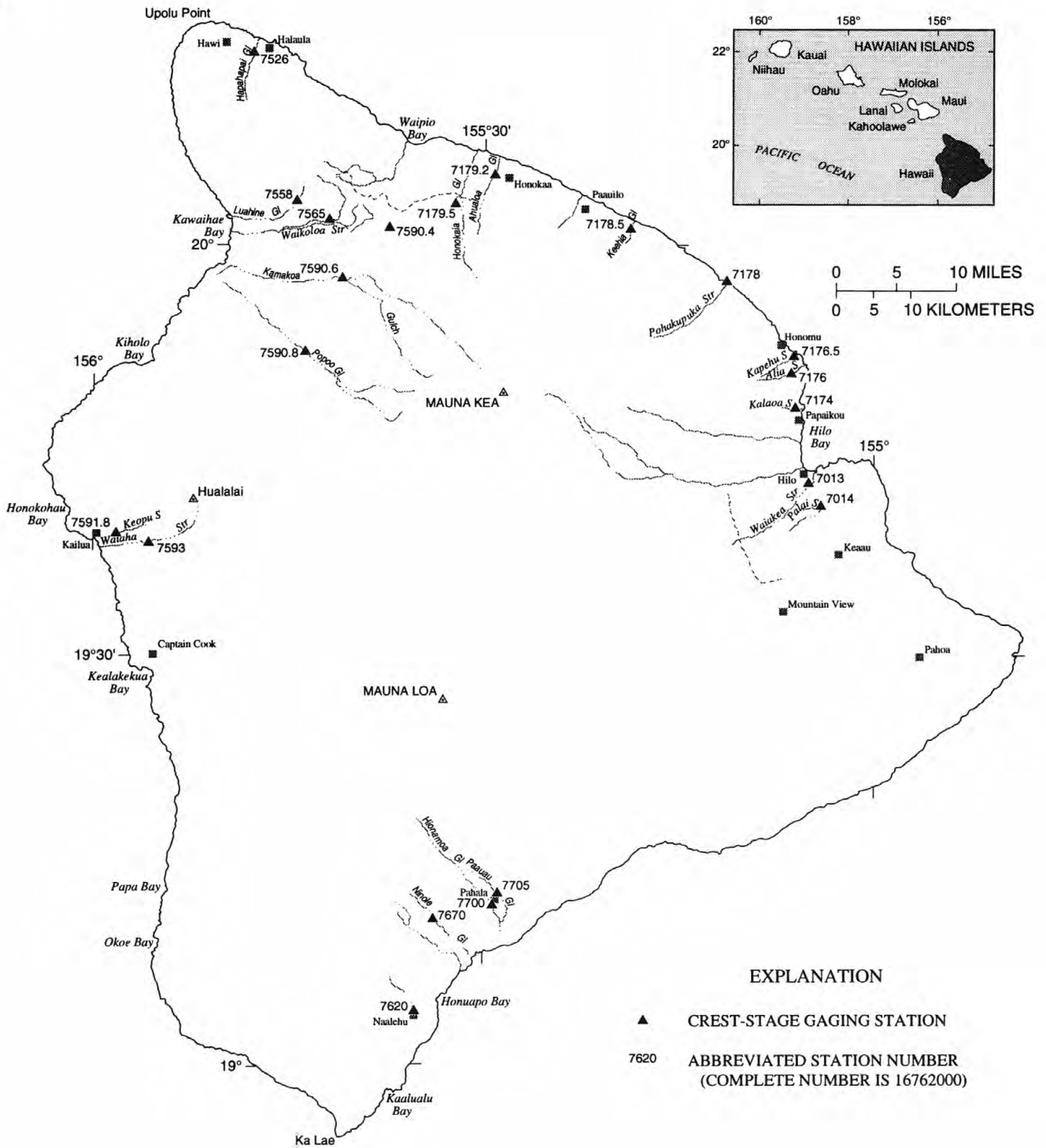


Figure 14. Locations of crest-stage gaging stations on Hawaii.

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 crest-stage partial-record stations are presented in the following table. Discharge measurements made at miscellaneous sites are given in a separate table.

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 1996

| Station name and number | Location | Drainage area (mi ²) | Period of record | Water year 1996 maximum | | | Period of record max | | |
|---|---|----------------------------------|--------------------------------------|-------------------------|------------------|--------------------------------|----------------------|------------------|--------------------------------|
| | | | | Date | Gage height (ft) | Discharge (ft ³ /s) | Date | Gage height (ft) | Discharge (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 | 1944-96b | 11-03-95 | 7.97 | - | 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 | 1950-96b | 06-30-96 | 5.03 | - | 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≠, 1973-96 | 11-09-95 | 4.98 | 1,540 | 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≠, 1971-96 | 11-03-95 | 16.97 | 12,000 | 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 | 1962-96b | 11-03-95 | 7.92 | - | 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, 1970-96 | 11-03-95 | 10.94 | 490 | 12-14-91 | 16.92 | 2,530 |
| 16080000 Kapaa Str at Kapahi ditch intake nr Kapaa | Lat 22°06'15", long 159°22'29", on right bank at Kapahi ditch intake, 3.8 mi northwest of Kapaa, and 4.3 mi northwest of Wailua. | 3.86 | 1936-85≠, 1986-96 | 11-03-95 | 4.37 | 4,830 | 12-14-91 | 5.66 | 9,660 |
| 16081200 Akulikuli Str nr Kapaa | Lat 22°06'25", long 159°22'07", at Kahuna road crossing, 800 ft upstream from mouth, and 3.5 mi northwest of Kapaa armory. | 0.40 | 1964-96 | 11-03-95 | 7.55 | 700 | 12-14-91 | 11.40 | 1,550 |

≠ Operated as a continuous-record gaging station

b Gage height only

Annual maximum discharge at crest-stage partial-record stations during water year 1996

| Station name and number | Location | Drainage area (mi ²) | Period of record | Water year 1996 maximum | | | Period of record max | | |
|---|---|----------------------------------|---|--------------------------------|------------------|---------------------------------|----------------------|------------------|---------------------------------|
| | | | | Date | Gage height (ft) | Dis-charge (ft ³ /s) | Date | Gage height (ft) | Dis-charge (ft ³ /s) |
| Island of Kauai--Continued | | | | | | | | | |
| 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 | 1962-96 | 11-03-95 | 17.21 | 15,900 | 12-14-91 | 23.11 | 30,330 |
| 16085000 Homaikawaa Str nr Kealia | Lat 22°07'23", long 159°18'12", at culvert on Highway 56, 1.6 mi south-east of Anahola School, and 1.6 mi north of Kealia. | 0.85 | 1964-96 | Destroyed by flood of 2-14-91. | | | 12-14-91 | - | e3,800 |
| 16097900 Puukumu Str nr Kilauea | Lat 22°13'01", long 159°25'18", at culvert on Highway 56, 0.8 mi north-west of Kilauea School, and 0.9 mi upstream from mouth. | 0.91 | 1964-68, 1971-96 | 11-03-95 | 14.77 | 1,240 | 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 | 1963-96b | 11-03-95 | 13.82 | - | 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 [≠] , 1972-96 | 11-03-95 | 6.01 | 684 | 04-15-72 | 7.15 | 2,120 |
| 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, 1968-96 | 01-25-96 | 19.50 | 2,050 | 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 | 1967-96 | 01-25-96 | 11.28 | 1,200 | 04-19-74 | 24.0 | 7,340 |
| 16211300 Makaleha Str nr Waialua | Lat 21°33'49", long 158°09'21", 1.0 mi southwest of Dillingham Ranch and 1.9 mi southwest of sugar mill at Waialua. | 4.15 | 1958-63, 1964-65 [≠] , 1966-96 | 01-25-96 | 4.92 | e500 | 11-13-65 | 7.41 | 3,640 |
| 16211400 Manini Gulch at Kaena | Lat 21°34'50", long 158°15'12", 180 ft upstream from Highway 99, 1.7 mi west of Camp Erdman, and 2.0 mi east of Kaena Point. | 1.08 | 1974-96 | 01-25-96 | 12.78 | 174 | 01-01-88 | 19.61 | 1,000 |
| 16211500 Makua Str at Makua | Lat 21°31'59", long 158°13'49", on left bank 20 ft upstream from old concrete highway ford, 140 ft down-stream from Farrington Highway box culvert, 0.1 mi north of Makua cemetery, and 4.5 mi southeast of Kaena Point lighthouse. | 4.24 | 1958-96 | 01-24-96 | 8.86 | e380 | 02-07-76 | a8.00 | 3,220 |
| 16211700 Makaha Str at Makaha | Lat 21°28'47", long 158°12'31", 0.9 mi upstream from Farrington Highway and 1.1 mi north of junction of Farrington Highway and Makaha Valley Road. | 5.25 | 1966-96 | 01-24-96 | 8.31 | e350 | 02-07-76 | 16.40 | 4,310 |

≠ Operated as a continuous-record gaging station

a At old gage datum

b Gage height only

e Estimated

Annual maximum discharge at crest-stage partial-record stations during water year 1996

| Station name and number | Location | Drainage area (mi ²) | Period of record | Water year 1996 maximum | | | Period of record max | | |
|--|--|----------------------------------|-------------------|-------------------------|------------------|---------------------------------|----------------------|------------------|---------------------------------|
| | | | | Date | Gage height (ft) | Dis-charge (ft ³ /s) | Date | Gage height (ft) | Dis-charge (ft ³ /s) |
| Island of Oahu--Continued | | | | | | | | | |
| 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≠, 1973-96 | 06-13-96 | 4.03 | e600 | 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 | 1958-96 | 06-13-96 | 2.68 | e100 | 01-06-82 | 7.20 | 2,460 |
| 16212300 Nanakuli Str at Nanakuli | Lat 21°23'08", long 158°08'11", 0.7 mi upstream from Highway 90 and 0.6 mi northeast of Nanakuli Post Office. | 3.98 | 1968-96 | 06-13-96 | 24.95 | e300 | 02-07-76 | 26.20 | 3,320 |
| 16212450 Kaloi Gulch tributary nr Honouliuli | Lat 21°22'41", long 158°03'45", at culvert on private road, 1.8 mi west of Honouliuli, and 2.8 mi northwest of Ewa Post Office. | 1.70 | 1968-96 | 06-13-96 | 3.18 | 115 | 01-08-80 | 7.45 | 724 |
| 16212500 Honouliuli Str nr Waipahu | Lat 21°22'40", long 158°02'10", at bridge on Farrington Highway and 1.8 mi west of Waipahu Post Office. | 11.0 | 1956-96 | 06-13-96 | 1.33 | 87 | 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, 1960-96 | 01-25-96 | 5.53 | 248 | 01-06-82 | 22.50 | 1,850 |
| 16212700 Waikakalaua Str nr Wahiawa | Lat 21°27'50", long 158°01'38", 0.2 mi downstream from Kamehameha Highway and 2.4 mi south of Wahiawa Post Office. | 7.49 | 1958-96 | 01-25-96 | 7.51 | 1,000 | 04-15-63 | 16.50 | 4,830 |
| 16212750 Huliwai Gulch nr Kunia Camp | Lat 21°26'43", long 158°03'47", 200 ft upstream from Highway 75 and 1.2 mi south of Kunia Camp. | 0.84 | 1974-96 | 01-25-96 | - | e103 | 02-10-79 | 8.36 | 600 |
| 16223000 Waimalu Str nr Aiea | Lat 21°23'48", long 157°56'56", 1,300 ft upstream from bridge on Moanalua Road and 1.2 mi northwest of Aiea High School. | 5.97 | 1952-70≠, 1973-96 | 01-25-96 | 3.12 | 1,550 | 01-05-68 | 6.82 | 8,020 |
| 16224500 Kalauao Str at Moanalua Road, at Aiea | Lat 21°23'07", long 157°56'22", on left bank at downstream side 1984-96 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≠, | 01-25-96 | - | e1,000 | 05-14-63 | 6.63 | 2,580 |
| 16228000 Moanalua Str nr Honolulu | Lat 21°22'53", long 157°52'22", on left bank 1.8 mi northeast of Tripler Hospital and 5.0 mi north of Honolulu Post Office. | 2.73 | 1927-78≠, 1979-96 | 01-25-96 | 6.97 | 1,030 | 11-18-30 | 11.58 | 4,580 |
| 16228200 Moanalua Str nr Aiea | Lat 21°22'37", long 157°53'03", on right bank 1.1 mi northeast of Tripler Hospital and 2.9 mi east of Aiea sugar refinery. | 3.34 | 1969-96 | 01-25-96 | 4.97 | 1,280 | 03-18-80 | 9.97 | 4,860 |

≠ Operated as a continuous-record gaging station

e Estimated

Annual maximum discharge at crest-stage partial-record stations during water year 1996

| Station name and number | Location | Drainage area (mi ²) | Period of record | Water year 1996 maximum | | | Period of record max | | |
|---|---|----------------------------------|-----------------------------------|-------------------------|------------------|---------------------------------|----------------------|------------------|---------------------------------|
| | | | | Date | Gage height (ft) | Dis-charge (ft ³ /s) | Date | Gage height (ft) | Dis-charge (ft ³ /s) |
| Island of Oahu--Continued | | | | | | | | | |
| 16228600 Moanalua Str at Tripler Hospital | Lat 21°21'52", long 157°54'05", on right bank 0.5 mi west of Tripler Hospital and 1.6 mi northeast of Aliamanu School. | 4.44 | 1971-96 | 01-25-96 | 14.94 | e1,500 | 03-08-80 | 21.0 | 6,200 |
| 16228900 Kalihi Str nr Kaneohe | Lat 21°22'35", long 157°49'32", on right bank 800 ft down- stream from Likelike Highway and 2.8 mi south- west of Castle High School in Kaneohe. | 0.60 | 1967-71 [≠] , 1972-96 | 01-25-96 | 4.64 | 1,000 | 01-08-80 | 5.60 | 1,700 |
| 16235400 Waolani Str at Honolulu | Lat 21°20'00", long 157°51'04", at Wylie Street bridge and 1.8 mi northeast of Honolulu Post Office. | 1.28 | 1958-96 | 11-01-95 | 1.41 | 227 | 05-14-63 | 6.14 | 2,500 |
| 16237500 Pauoa Str at Hono- lulu | Lat 21°19'18", long 157°51'03", at Lusitana Street bridge and 1.1 mi northeast of Honolulu Post Office. | 1.43 | 1958-96 | 01-25-96 | 0.36 | 185 | 05-14-63 | 4.65 | 2,200 |
| 16247100 Manoa-Palolo Drainage Canal at Moiliili | Lat 21°17'24", long 157°49'17", on left bank at Kaimuki High School, 0.3 mi downstream from confluence of Manoa and Palolo Streams, and 0.6 mi upstream from point of dis- charge into Ala Wai Canal. | 10.6 | 1968-96 | 01-25-96 | 5.82 | 1,610 | 12-18-67 | 12.6 | 10,100 |
| 16247500 Wailupe Gulch at Aina Haina | Lat 21°17'46", long 157°45'29", at Ani Street bridge and 1.0 mi upstream from Kalaniana'ole High- way in Aina Haina. | 2.35 | 1958-96 | 12-01-95 | 1.09 | 308 | 12-18-67 | 5.72 | 3,600 |
| 16247900 Kuliouou Valley at Kuliouou | Lat 21°17'50", long 157°43'35", at Kuliouou, 300 ft downstream of sin- gle-lane wooden bridge, and 0.6 mi upstream from Highway 72. | 1.18 | 1958-59, 1970-96 | 01-25-96 | 29.83 | 1,420 | 12-31-87 | 36.55 | 4,700 |
| 16248800 Inoaole Str at Waimanalo | Lat 21°29'31", long 157°42'40", 30 ft upstream from culvert on Hihimanu Street and 0.8 mi northwest of Waimanalo Post Office. | 1.21 | 1958-96 | 01-25-96 | - | e375 | 05-07-81 | 7.55 | 1,600 |
| 16249000 Waimanalo Str at Waimanalo | Lat 21°21'12", long 157°43'52", on right bank 40 ft upstream from Highway 72 and 2.3 mi northeast of Waimanalo Post Office. | 2.16 | 1967-70 [≠] , 1971-96 | 01-25-96 | 7.85 | 1,500 | 11-26-70 | 10.0 | 4,560 |
| 16249100 Kaelepulu Str trib- utary at Kailua | Lat 21°21'44", long 157°44'22", 30 ft upstream from Kalaniana'ole High- way, 1.6 mi northwest of Waimanalo School, and 2.4 mi south of Kailua Post Office. | 0.16 | 1963-96 | 01-25-96 | 7.04 | 423 | 12-31-87 | 7.53 | 467 |
| 16264800 Kawainui Canal at Kailua | Lat 21°24'15", long 157°45'28", at head of canal and 1.2 mi northwest of Kailua Post Office. | 11.0 | 1957-60, 1963-64, 1967-96b | 01-25-96 | 2.62 | - | 01-12-75 | 5.82 | - |
| 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 north- east of Castle High School, and 0.6 mi upstream from mouth. | 1.19 | 1965, 1968-74, 1977-96 | 01-25-96 | 12.59 | 2,776 | 02-01-69 | 17.90 | 5,290 |

≠ Operated as a continuous-record gaging station

b Gage height only

e Estimated

Annual maximum discharge at crest-stage partial-record stations during water year 1996

| Station name and number | Location | Drainage area (mi ²) | Period of record | Water year 1996 maximum | | | Period of record max | | |
|---|---|----------------------------------|------------------|-------------------------|------------------|---------------------------------|----------------------|------------------|---------------------------------|
| | | | | Date | Gage height (ft) | Dis-charge (ft ³ /s) | Date | Gage height (ft) | Dis-charge (ft ³ /s) |
| Island of Oahu--Continued | | | | | | | | | |
| 16274499 Kealahala Str at Kamehameha Highway, at Kaneohe | Lat 21°25'12", long 157°48'15", 35 ft upstream from bridge on Kamehameha Highway in Kaneohe. | 0.62 | 1959-96 | 01-25-96 | 4.24 | 438 | 05-02-65 | 11.50 | 2,750 |
| 16279500 Heeia Str at Kaneohe | Lat 21°25'17", long 157°49'01", 60 ft downstream from culvert on Kahehili Highway, 0.7 mi west of Kaneohe Post Office, and 0.8 mi southwest of Heeia. | 1.80 | 1965-66, 1968-96 | 01-25-96 | - | e800 | 05-02-65 | 9.50 | 5,600 |
| 16283480 Ahuimanu Str nr Kahaluu | Lat 21°27'04", long 157°50'13", at bridge on Ahuimanu Road and 0.8 mi south of Kahaluu. | 2.31 | 1963-96 | 01-25-96 | 5.68 | e500 | 02-01-69 | 11.8 | 7,300 |
| 16304500 Kaluanui Stream, at Hauula, Oahu | Lat 21°35'57", long 157°54'24", Kaluanui on left downstream wing-wall of Str at concrete bridge, 1.2 mi southeast Hauula of cemetery in Hauula, and 1.4 mi northeast of Sacred Falls. | 2.12 | 1958-96 | 01-25-96 | 4.51 | e2,000 | 01-06-82 | 6.95 | 4,920 |
| 16310501 Malaekahana Str at altitude 30 ft, nr Kahuku | Lat 21°39'47", long 157°57'11", at abandoned plantation railroad bridge, 1.1 mi southwest of junction of plantation road and Highway 83, and 1.2 mi south of Kahuku Hospital. | 4.05 | 1958-96 | 01-25-96 | 7.31 | e800 | 04-15-63 | 12.10 | 4,640 |
| 16311000 Oio Str nr Kahuku | Lat 21°41'32", long 157°59'48", 0.6 mi southwest of junction of plantation road and Highway 83 and 2.7 mi west of Kahuku Hospital. | 2.13 | 1958-96 | 01-25-96 | 4.32 | e100 | 05-02-65 | 8.13 | 1,390 |
| 16317800 Kaunala Gulch nr Sunset Beach | Lat 21°40'59", long 158°02'12", on downstream left bank wingwall of road bridge on Highway 83 nr Sunset Beach and 2.9 mi northeast of Waimea. | 1.98 | 1973-96 | 01-24-96 | 4.11 | e130 | 11-20-90 | 6.01 | 450 |
| 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 | 1968-96 | 01-24-96 | 4.35 | e250 | 04-19-74 | 4.97 | 982 |
| 16331000 Waimea Gulch nr Kawailoa Camp | Lat 21°37'29", long 158°04'58", at culvert on Ashley Road, 0.1 mi upstream from Highway 83, and 1.1 mi north of Kawailoa Camp. | 2.23 | 1968-96 | 01-24-96 | 3.16 | 136 | 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 | 1958-96 | 01-25-96 | 8.25 | 3,400 | 04-19-74 | 15.8 | 15,900 |
| 16350000 Opaepa 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 | 1956-96 | 01-18-96 | 13.79 | 1,870 | 04-19-74 | 20.7 | 7,600 |

≠ Operated as a continuous-record gaging station
e Estimated

Annual maximum discharge at crest-stage partial-record stations during water year 1996

| Station name and number | Location | Drainage area (mi ²) | Period of record | Water year 1996 maximum | | | Period of record max | | |
|---|---|----------------------------------|----------------------|-------------------------|------------------|---------------------------------|----------------------|------------------|---------------------------------|
| | | | | Date | Gage height (ft) | Dis-charge (ft ³ /s) | Date | Gage height (ft) | Dis-charge (ft ³ /s) |
| Island of Molokai | | | | | | | | | |
| 16411320 Kakaako Gulch abv Kamakahi Gulch, nr Mauna Loa | Lat 21°10'11", long 157°11'56", 0.1 mi upstream from Kamakahi Gulch, 1.7 mi downstream from Highway 46, and 2.5 mi northeast of Mauna Loa. | 1.40 | 1964-96 | 08-31-96 | - | e2 | 11-12-65 | 4.80 | 670 |
| 16411400 Kakaako Gulch nr Mauna Loa | Lat 21°10'39", long 157°12'31", on left bank 1.0 mi downstream from Kamakahi Gulch, and 3.0 mi north of Mauna Loa School. | 5.34 | 1963-72≠, 1973-96 | 08-31-96 | - | e30 | 02-11-89 | 8.47 | 2,860 |
| 16411600 Kaunala Gulch nr Mauna Loa | Lat 21°07'01", long 157°15'43", at Sand Haul Road, 3.2 mi east east of Laau Point lighthouse, and 3.3 mi southwest of Mauna Loa. | 0.28 | 1964-96 | 08-31-96 | - | e2 | 12-25-84 | 3.87 | 151 |
| 16411640 Halena Gulch nr Mauna Loa | Lat 21°05'53", long 157°13'47", 2.7 mi southwest of Mauna Loa and 5.5 mi east of Laau Point. | 2.07 | 1965-96 | 08-31-96 | 2.55 | 308 | 01-11-74 | 8.20 | 2,920 |
| 16411800 Kaluapeelua Gulch at Hoole- hua | Lat 21°09'55", long 157°04'22", 0.4 mi south of Hoolehua and 2.1 mi west of Kualapuu. | 1.46 | 1964-96 | No flow. | | | 12-08-73 | 3.30 | 86 |
| 16413500 Manawainui Gulch nr Kual- apuu | 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 | 1965-96 | 03-31-96 | - | e170 | 04-04-89 | - | 3,620 |
| 16415400 Wawaia Gulch at Kamalo | Lat 21°03'25", long 156°52'20", at Highway 45, 0.3 mi upstream from mouth, and 0.5 mi northeast of Kamalo. | 2.12 | 1964-96 | 12-31-95 | 1.34 | 429 | 04-13-65 | 2.61 | 1,250 |
| 16419000 Pohakupili Gulch nr Halawa | Lat 21°07'59", long 156°44'15", at Highway 45, 0.5 mi upstream from mouth, and 1.9 mi south of Halawa. | 0.48 | 1964-96 | 02-28-96 | 5.14 | 51 | 11-04-66 | 8.93 | 989 |
| 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≠, 1973-96 | 03-04-96 | 3.98 | 74 | 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 | 1967-96 | 03-04-96 | 7.96 | 2,070 | 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≠, 1969-96 | 09-07-96 | 5.05 | 338 | 03-31-82 | 13.76 | 5,950 |

≠ Operated as a continuous-record gaging station

e Estimated

Annual maximum discharge at crest-stage partial-record stations during water year 1996

| Station name and number | Location | Drainage area (mi ²) | Period of record | Water year 1996 maximum | | | Period of record max | | | |
|---|--|----------------------------------|--------------------|-------------------------|------------------|---------------------------------|----------------------|------------------|---------------------------------|--|
| | | | | Date | Gage height (ft) | Dis-charge (ft ³ /s) | Date | Gage height (ft) | Dis-charge (ft ³ /s) | |
| Island of Maui--Continued | | | | | | | | | | |
| 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 | 1963-96 | 09-07-96 | 2.38 | 81 | 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 | 1963-96 | 09-07-96 | 12.35 | 820 | 11-26-92 | 14.71 | 2,480 | |
| 16502900 Kawaipapa Gulch at Hana | Lat 20°46'08", long 156°00'04", 1,000 ft upstream from Highway 36 and 0.3 mi northwest of Hana Hospital. | 5.83 | 1965-96 | 09-07-96 | 7.93 | 5,470 | 08-01-82 | 11.03 | 16,880 | |
| 16603300 Unnamed gulch at Maliko Bay | Lat 20°56'26", long 156°21'04", at Hana Highway, 0.5 mi west of Maliko Bay, and 1.3 mi north of Hamakuapoko. | 0.43 | 1963-96 | 01-18-96 | 1.58 | 8.7 | 03-27-79 | 17.28 | 171 | |
| 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 | 1967-96 | 03-03-96 | 3.61 | 94 | 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 | 1963-96 | 03-31-96 | 1.69 | 33 | 07-23-64 | 9.90 | 306 | |
| 16603850 Kalialinui Gulch nr Kahului | Lat 20°52'47", long 156°26'06", 600 ft upstream from Hansen Road, 0.5 mi northeast of Puunene Hospital, and 2.5 mi southeast of Kahului Post Office. | 17.9 | 1967-96 | 03-31-96 | 5.52 | 366 | 01-28-71 | 8.33 | 1,330 | |
| 16607000 Iao Str at Wailuku | Lat 20°53'38", long 156°30'27", 560 ft upstream from Market Street bridge at Wailuku and 1.9 mi upstream from mouth. | 8.24 | 1951≠, 1952-96 | 03-31-96 | 5.38 | 3,960 | 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 | 1964-96 | 03-31-96 | - | e1 | 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 | 1965-96 | 12-31-95 | 5.40 | 99 | 03-16-68 | 15.22 | 1,760 | |
| 16630200 Honokowai Str at Honokowai | Lat 20°56'58", long 156°41'07", 0.5 mi southeast of Honokowai, and 1.1 mi northwest of Puukolii. | 5.59 | 1962-63, 1965-96 | 03-31-96 | - | e370 | 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 Kelaweia, 0.6 mi northeast of Lahaina, 0.6 mi downstream from Kanaha Str, and 0.9 mi upstream from mouth. | 5.22 | 1963-89≠, 1990-96a | 03-31-96 | - | e714 | 07-11-65 | 11.03 | 2,490 | |

≠ Operated as a continuous-record gaging station

e Estimated

Annual maximum discharge at crest-stage partial-record stations during water year 1996

| Station name and number | Location | Drainage area (mi ²) | Period of record | Water year 1996 maximum | | | Period of record max | | |
|--|--|----------------------------------|--------------------------------|-------------------------|------------------|---------------------------------|----------------------|------------------|---------------------------------|
| | | | | Date | Gage height (ft) | Dis-charge (ft ³ /s) | Date | Gage height (ft) | Dis-charge (ft ³ /s) |
| Island of Maui--Continued | | | | | | | | | |
| 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, 1964-96 | 03-31-96 | 3.37 | 224 | 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 ^a , 1973-96 | 12-30-95 | 3.18 | 220 | 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 | 1964-96 | 12-30-95 | 4.04 | 24 | 01-10-80 | 12.95 | 350 |
| 16650500 Waikapu Str nr Kihei | Lat 20°49'02", long 156°29'00", at railroad bridge beside Lower Maalaea Road, 2.5 mi northeast of Maalaea, and 2.5 mi northwest of Kihei. | 6.97 | 1963-96 | 03-31-96 | - | e200 | 11-04-88 | 8.69 | 1,170 |
| 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 | 0.98 | 1964-96 | 03-31-96 | 2.39 | 55 | 01-28-71 | 8.23 | 409 |
| 16659000 Waiakoa Gulch at Kihei | Lat 20°47'14", long 156°27'41", 0.3 mi northeast of Kihei and 0.4 mi upstream from mouth. | 10.1 | 1963-96 | 03-03-96 | 6.05 | 152 | 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 ^a , 1971-96 | 03-03-96 | - | e18 | 01-28-71 | 9.40 | 4,460 |
| 16663500 Kamaole Gulch at Kamaole | Lat 20°43'36", long 156°27'02", at Kihei Road, 350 ft upstream from mouth, and 0.2 mi south of Kamaole. | 4.28 | 1972-96 | No flow. | - | | 03-17-82 | 9.01 | 291 |
| 16664000 Liilihoholo Gulch at Kamaole | Lat 20°43'04", long 156°26'55", on upstream side of Kihei Road, 300 ft upstream from mouth, and 0.8 mi south of Kamaole. | 4.12 | 1972-96 | No flow. | - | | 02-11-82 | 13.73 | 526 |
| Island of Hawaii | | | | | | | | | |
| 16701300 Waiakea Str at Hilo | Lat 19°42'38", long 155°05'02", 0.3 mi upstream from Kinoole Street bridge and 1.3 mi southeast of Hilo Post Office. | 35.8 | 1968-91, 1993-96 | 02-25-96 | 4.32 | 374 | 08-12-94 | 10.90 | 3,670 |
| 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 | 1965-90, 1994-96 | | | | | | Records being reviewed. |
| 16717400 Kalaoa Mauka Str nr Hilo | Lat 19°48'07", long 155°06'03", at culvert on Highway 19, 1.0 mi north of Papaikou, and 5.1 mi north of Hilo Post Office. | 0.24 | 1963-96 | | | | | | Records being reviewed. |

≠ Operated as a continuous-record gaging station

a At a different datum

e Estimated

Annual maximum discharge at crest-stage partial-record stations during water year 1996

| Station name and number | Location | Drainage area (mi ²) | Period of record | Water year 1996 maximum | | | Period of record max | | |
|---|--|----------------------------------|---|---|------------------|--------------------------------|----------------------|------------------|--------------------------------|
| | | | | Date | Gage height (ft) | Discharge (ft ³ /s) | Date | Gage height (ft) | Discharge (ft ³ /s) |
| Island of Hawaii--Continued | | | | | | | | | |
| 16717600 Alia Str nr Hilo | Lat 19°50'38", long 155°06'21", on left bank 10 ft downstream from culvert on Highway 19 at Pepeekeo 2.0 mi south of Honomu, and 8.0 mi north of Hilo. | 0.58 | 1962-72 [≠] , 1973-90, 1994-96 | 02-25-96 | unknown | a- | 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 | 1963-90, 1994-96 | 02-25-96 | 9.85 | 1,055 | 02-20-79 | 29.93 | 3,320 |
| 16717800 Pohakupuka Str nr Papaaloo | Lat 19°57'20", long 155°11'20", right bank 200 ft downstream from Highway 19, 2.8 mi northwest of Honohina, and 3.0 mi southwest of Papaaloo. | 2.76 | 1963-80 [≠] , 1983-96 | Records being reviewed. | | | | | |
| 16717850 Keehia Gulch nr Ookala | Lat 20°01'08", long 155°18'45", at culvert on Highway 19, 1.7 mi west of Ookala, and 4.1 mi southeast of Paaui. | 0.62 | 1963-91, 1993-96 | 02-25-96 | 5.08 | 185 | 03-18-80 | 9.10 | 500 |
| 16717920 Ahualoo 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 1995-96 | 02-25-96 | 2.38 | a- | 11-18-79 | 17.68 | 3,160 |
| 16717950 Honokaia Gulch tributary nr Honokaa | Lat 20°02'58", long 155°32'19", at culvert 4.8 mi southwest of Honokaa Hospital, and 5.5 mi southeast of Kukuihaele. | 2.42 | 1963-96 | No peak above base elevation of 1.03 ft or base discharge of 10.5 ft ³ /s. | | | 01-14-79 | 7.65 | 385 |
| 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, 1995-96 | No peak above base elevation of 4.63 ft or base discharge of 40.6 ft ³ /s. | | | 01-09-80 | 11.42 | 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 1994-96 | 01-31-96 | 2.99 | 104 | 04-07-89 | 5.33 | 277 |
| 16756500 Keanuimano 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 [≠] , 1973-90, 1995-96 | 02-25-96 | 5.46 | a- | 04-20-68 | 10.02 | 3,540 |
| 16759040 Paiaakuli 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 northeast of Waimea. | 0.27 | 1963-91, 1994-96 | 06-09-96 | 2.64 | 88 | 12-26-83 | 3.70 | 400 |
| 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, 1994-96 | No peak above base elevation of 2.43 ft or base discharge of 8.71 ft ³ /s. | | | 04-20-68 | 6.71 | 1,210 |
| 16759080 Popoo Gulch nr Waikii | Lat 19°52'11", long 155°43'51", at bridge on Highway 19, 2.0 mi north of Keamuku, and 5.2 mi west of Waikii. | 33.1 | 1963-90, 1995-96 | No peak above base elevation of 4.26 ft or base discharge of 644 ft ³ /s. | | | 11-28-73 | 9.20 | 3,720 |

[≠] Operated as a continuous-record gaging station

a Discharge not determined

e Estimated

Annual maximum discharge at crest-stage partial-record stations during water year 1996

| Station name and number | Location | Drainage area (mi ²) | Period of record | Water year 1996 maximum | | | Period of record max | | |
|--|---|----------------------------------|---|--|------------------|---------------------------------|----------------------|------------------|---------------------------------|
| | | | | Date | Gage height (ft) | Dis-charge (ft ³ /s) | Date | Gage height (ft) | Dis-charge (ft ³ /s) |
| Island of Hawaii--Continued | | | | | | | | | |
| 16759180 Keopu Str nr Kailua | Lat 19°38'54", long 155°58'15", at county road bridge, 1.9 mi east of Kailua, and 2.3 mi northwest of Holualoa Post Office. | 2.61 | 1962, 1965-90, 1995-96 | No peak above base elevation of 9.13 ft or base discharge of 532 ft ³ /s. | | | 02-11-82 | 11.82 | e800 |
| 16759300 Waiaha Str at Luawai, nr Holualoa | Lat 19°38'12", long 155°55'45", on right bank at Luawai, 1.8 mi north-east of Holualoa School and 4.2 mi southeast of Honokohau School. | 8.74 | 1961-71 ^a , 1972-90, 1995-96 | 09-01-96 | 2.75 | 56 | 02-11-82 | 9.06 | 3,550 |
| 16762000 Alapai Gulch at Naalehu | Lat 19°04'00", long 155°35'19", at debris catchment outlet of Naalehu Watershed Protection Project and 0.2 mi upstream from Highway 11 at Naalehu. | 2.87 | 1963-96 | Records being reviewed. | | | | | |
| 16767000 Ninole Gulch nr Punaluu | Lat 19°10'44", long 155°33'46", on right bank 300 ft downstream from forest-reserve boundary, 4.6 mi northwest of Punaluu, and 6.0 mi north of Honuapo. | 15.5 | 1966-82 ^a , 1983-96 | Records being reviewed. | | | | | |
| 16770000 Hionamoia Gulch at Pahala | Lat 19°11'45", long 155°29'11", at bridge, 0.6 mi southwest of Pahala and 4.1 mi north of Punaluu. | 9.41 | 1963-90, 1994-96 | Records being reviewed. | | | | | |
| 16770500 Paauau Gulch at Pahala | Lat 19°12'39", long 155°28'48", on right bank 100 ft downstream from bridge on Wood Valley Road and 0.7 mi north of Pahala. | 1.74 | 1962-79 ^a , 1980-96 | Records being reviewed. | | | | | |
| ^a Operated as a continuous-record gaging station ^a Discharge not determined ^c Estimated | | | | | | | | | |

Discharge measurements made at miscellaneous sites during water year 1996

| Station no. | Station name | Location | Measured previously (water years) | Date | Discharge (ft ³ /s) |
|----------------|---|--|---|----------|--------------------------------|
| 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≠, 1988-95 | 10-31-95 | 301 |
| | | | | 03-01-96 | 308 |
| | | | | 04-23-96 | 247 |
| | | | | 08-20-96 | 110 |
| 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≠, 1986-95 | 10-31-95 | 160 |
| | | | | 03-01-96 | 147 |
| | | | | 04-23-96 | 13.4 |
| | | | | 08-02-96 | 145 |
| 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≠, 1986-95 | 11-01-95 | 69 |
| | | | | 03-05-96 | 3.79 |
| | | | | 04-18-96 | 78 |
| | | | | 08-01-96 | 15.5 |
| 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≠, 1986-95 | 11-01-95 | 30.6 |
| | | | | 03-05-96 | 3.37 |
| | | | | 04-18-96 | 90.7 |
| | | | | 08-01-96 | 1.28 |

≠ Operated as a continuous-record gaging station

ANALYSES OF SAMPLES COLLECTED AT WATER-QUALITY PARTIAL-RECORD STATIONS

Water-quality partial-record stations are particular sites where chemical-quality, and/or sediment data are collected systematically over a period of years for use in hydrologic analyses. A schematic diagram showing water-quality stations in Kamooolii Stream basin, Kaneohe, Oahu is shown in figure 15 and the data are listed in downstream order.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

HAWAII, ISLAND OF OAHU

16227100 HALAWA STREAM BELOW H1 (LAT 21°23'46" LONG 157°55'57")

| DATE | TIME | DIS-CHARGE, INST. CUBIC FEET PER SECOND | SPE-CIFIC CON-DUCT-ANCE (US/CM) | PH WATER WHOLE FIELD (STAND-ARD UNITS) | TEMPER-ATURE AIR (DEG C) | TEMPER-ATURE WATER (DEG C) | TUR-BID-ITY (NTU) | BARO-METRIC PRES-SURE (MM HG) | OXYGEN, DIS-SOLVED (MG/L) | OXYGEN, SATUR-ATION (%) | COLI-FORM, FECAL, (PER-CENT UM-MP (COLS./100 ML) |
|-------|------|--|------------------------------------|--|---|-------------------------------------|---|--|--|---|--|
| OCT | | | | | | | | | | | |
| 11... | 1039 | 0.91 | 335 | 9.7 | 29.5 | 27.0 | 1.0 | 765 | 11.9 | 150 | -- |
| NOV | | | | | | | | | | | |
| 20... | 1141 | 1.3 | 410 | 9.3 | 28.5 | 31.5 | 0.60 | 764 | 9.4 | 128 | -- |
| JAN | | | | | | | | | | | |
| 16... | 1035 | 0.31 | 520 | 9.0 | 26.0 | 25.0 | 0.70 | 767 | 11.4 | 137 | -- |
| FEB | | | | | | | | | | | |
| 12... | 1400 | 0.22 | 716 | 9.5 | 24.0 | 28.0 | 1.0 | 762 | 10.0 | 128 | 600 |
| MAR | | | | | | | | | | | |
| 05... | 0955 | 21 | 300 | 8.7 | 21.0 | 20.0 | 4.5 | 760 | 11.2 | 124 | -- |
| APR | | | | | | | | | | | |
| 24... | 0935 | 0.20 | 500 | 9.2 | 26.5 | 29.5 | 2.0 | 766 | 11.0 | 144 | -- |
| MAY | | | | | | | | | | | |
| 14... | 0915 | 0.06 | 730 | 9.1 | 28.5 | 28.0 | 1.5 | 766 | 12.2 | 155 | K4000 |
| | | | | | | | | | | | |
| DATE | TIME | HARD-NESS TOTAL (MG/L AS CaCO3) | CALCIUM DIS-SOLVED (MG/L AS Ca) | MAGNE-SIUM, DIS-SOLVED (MG/L AS Mg) | SODIUM, DIS-SOLVED (MG/L AS Na) | SODIUM PERCENT | SODIUM AD-SORP-TION RATIO | POTAS-SIUM, DIS-SOLVED (MG/L AS K) | ALKA-LINITY LAB (MG/L CaCO3) | SULFATE DIS-SOLVED (MG/L AS SO4) | CHLO-RIDE, DIS-SOLVED (MG/L AS Cl) |
| FEB | | | | | | | | | | | |
| 12... | 1400 | 130 | 27 | 15 | 73 | 54 | 3 | 3.5 | 54 | 33 | 160 |
| | | | | | | | | | | | |
| DATE | TIME | FLUO-RIDE, DIS-SOLVED (MG/L AS F) | SILICA, DIS-SOLVED (MG/L AS SiO2) | SOLIDS, RESIDUE AT 180 DEG. C (MG/L) | SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) | SOLIDS, DIS-SOLVED (TONS PER AC-FT) | RESIDUE AT 105 DEG. C, SUS-PENDED (MG/L) | NITRO-GEN, NO2+NO3 TOTAL (MG/L AS N) | NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N) | NITRO-GEN, AM-MONIA + ORGANIC TOTAL (MG/L AS N) | PHOS-PHORUS TOTAL (MG/L AS P) |
| FEB | | | | | | | | | | | |
| 12... | 1400 | 0.20 | 22 | 369 | 366 | 0.50 | 18 | -- | <0.050 | 0.50 | 0.030 |
| MAY | | | | | | | | | | | |
| 14... | 0915 | -- | -- | -- | -- | -- | 8 | 0.130 | 0.130 | 0.50 | 0.060 |
| | | | | | | | | | | | |
| DATE | TIME | ALUM-INUM, TOTAL RECOV-ERABLE (UG/L AS AL) | ALUM-INUM, DIS-SOLVED (UG/L AS AL) | ARSENIC TOTAL (UG/L AS AS) | BARIUM, TOTAL RECOV-ERABLE (UG/L AS BA) | BARIUM, DIS-SOLVED (UG/L AS BA) | BERYL-LIUM, TOTAL RECOV-ERABLE (UG/L AS BE) | CADMIUM WATER UNFLTRD TOTAL (UG/L AS CD) | CHRO-MIUM, TOTAL RECOV-ERABLE (UG/L AS CR) | COBALT, TOTAL RECOV-ERABLE (UG/L AS CO) | COBALT, DIS-SOLVED (UG/L AS CO) |
| FEB | | | | | | | | | | | |
| 12... | 1400 | 110 | 20 | <1 | <100 | 6.0 | <10 | <1 | <1 | <1 | <3.0 |

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

K Results based on colony count outside acceptance range (non-ideal colony count)

ANALYSES OF SAMPLES COLLECTED AT WATER-QUALITY PARTIAL-RECORD STATIONS
 WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
 HAWAII, ISLAND OF OAHU--Continued
 16227100 HALAWA STREAM BELOW HI--Continued

| DATE | COPPER, TOTAL RECOV- ERABLE (UG/L AS CU) | IRON, TOTAL RECOV- ERABLE (UG/L AS FE) | IRON, DIS- SOLVED (UG/L AS FE) | LEAD, TOTAL RECOV- ERABLE (UG/L AS PB) | LITHIUM TOTAL RECOV- ERABLE (UG/L AS LI) | LITHIUM DIS- SOLVED (UG/L AS LI) | MANGA- NESE, TOTAL RECOV- ERABLE (UG/L AS MN) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) | MERCURY TOTAL RECOV- ERABLE (UG/L AS HG) | MOLYB- DENUM, TOTAL RECOV- ERABLE (UG/L AS MO) | MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) |
|--------------|---|---|--|---|---|--|---|--|---|--|---|
| FEB 12... | 6 | 150 | 27 | <1 | <10 | <4 | 20 | <1.0 | <0.10 | <1 | <10 |
| DATE | NICKEL, TOTAL RECOV- ERABLE (UG/L AS NI) | NICKEL, DIS- SOLVED (UG/L AS NI) | SELE- NIUM, TOTAL SOLVED (UG/L AS SE) | SELE- NIUM, DIS- SOLVED (UG/L AS SE) | SILVER, TOTAL RECOV- ERABLE (UG/L AS AG) | SILVER, DIS- SOLVED (UG/L AS AG) | STRON- TIUM, DIS- SOLVED (UG/L AS SR) | VANA- DIUM, DIS- SOLVED (UG/L AS V) | ZINC, TOTAL RECOV- ERABLE (UG/L AS ZN) | CARBON, ORGANIC TOTAL (MG/L AS C) | OIL AND GREASE, TOTAL RECOV- GRAVI- METRIC (MG/L) |
| FEB 12... | 1 | 1.0 | <1 | <1 | <1 | <1.0 | 230 | 14 | <10 | 6.3 | <1 |
| DATE | ALDRIN, TOTAL (UG/L) | CHLOR- DANE, TECH- NICAL TOTAL (UG/L) | CHLOR- PYRIFOS TOTAL RECOVER (UG/L) | P, P'- DDD UNFILT RECOVER (UG/L) | DDE, TOTAL (UG/L) | P, P'- DDT UNFILT RECOVER (UG/L) | DEF TOTAL (UG/L) | DI- AZINON, TOTAL (UG/L) | DI- ELDRIN TOTAL (UG/L) | DISUL- FOTON UNFILT RECOVER (UG/L) | 2, 4-D TOTAL (UG/L) |
| FEB 12... | <0.010 | <0.100 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | 0.020 | <0.010 | <0.010 | <0.010 |
| DATE | 2, 4-D, TOTAL (UG/L) | ENDO- SULFAN, I TOTAL (UG/L) | ENDRIN WATER UNFLTRD REC (UG/L) | ETHION, TOTAL (UG/L) | FONOPOS (DY- FONATE) WATER WHOLE TOT.REC (UG/L) | HEPTA- CHLOR, EPOXIDE TOTAL (UG/L) | HEPTA- CHLOR EPOXIDE TOTAL (UG/L) | LINDANE TOTAL (UG/L) | MALA- THON, TOTAL (UG/L) | METH- OXY- CHLOR, TOTAL (UG/L) | METHYL PARA- THON, TOTAL (UG/L) |
| FEB 12... | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 |
| DATE | MIREX, TOTAL (UG/L) | PARA- THON, TOTAL (UG/L) | PCB, TOTAL (UG/L) | PCNS UNFILT RECOVER (UG/L) | PER- THANE TOTAL (UG/L) | PHORATE TOTAL (UG/L) | SILVEX, TOTAL (UG/L) | APHENE, TOTAL (UG/L) | TOTAL TRI- THON (UG/L) | 2, 4, 5-T TOTAL (UG/L) | |
| FEB 12... | <0.010 | <0.010 | <0.100 | <0.100 | <0.100 | <0.010 | <0.010 | <1.00 | <0.010 | <0.010 | |

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

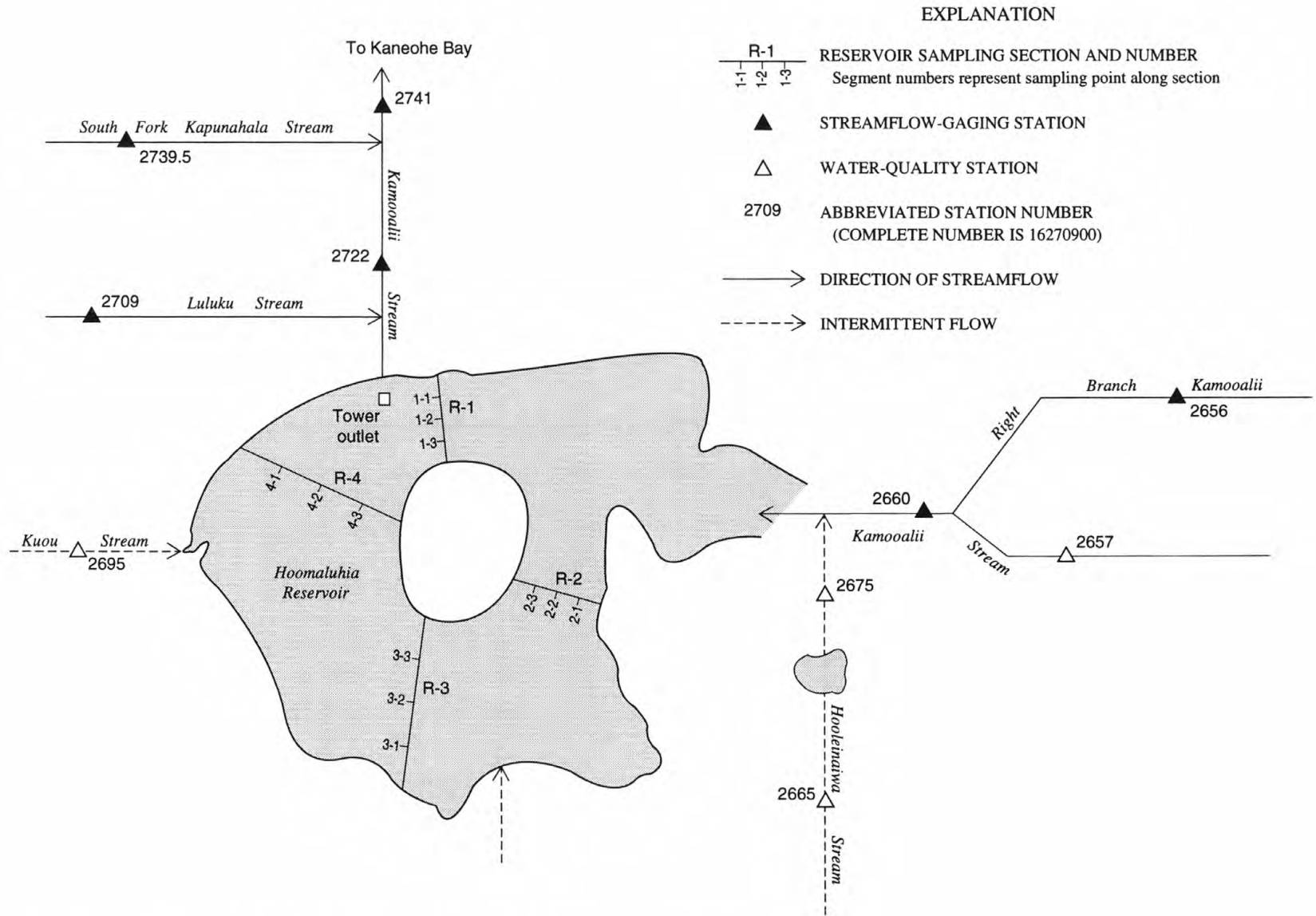


Figure 15. Diagram showing water-quality stations in Kamooalii Stream basin, Kaneohe, Oahu.

ANALYSES OF SAMPLES COLLECTED AT WATER-QUALITY PARTIAL-RECORD STATIONS

WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

HAWAII, ISLAND OF OAHU--Continued

16265700 KAMOOALII STREAM AT ALTITUDE 200 FT, NEAR KANEOHE (LAT 21°23'12" LONG 157°47'56")

| DATE | TIME | DIS- CHARGE, INST. CUBIC FEET PER SECOND | SPE- CIFIC CON- DUCT- ANCE (US/CM) | PH WATER WHOLE FIELD (STAND- ARD UNITS) | TEMPER- ATURE AIR (DEG C) | TEMPER- ATURE WATER (DEG C) | TUR- BID- ITY (NTU) | BARO- METRIC PRES- SURE (MM HG) | OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) | |
|-------|------|--|---|---|------------------------------------|--------------------------------------|------------------------------|--|--|----|
| OCT | | | | | | | | | | |
| 11... | 1100 | 0.17 | 219 | 6.6 | 26.0 | 22.5 | 0.30 | 759 | 4.3 | 50 |
| NOV | | | | | | | | | | |
| 20... | 1205 | 1.3 | 200 | 4.5 | -- | 23.0 | 2.2 | 759 | 7.4 | 87 |
| DEC | | | | | | | | | | |
| 13... | 0930 | 0.93 | 214 | 7.3 | 25.0 | 22.0 | 1.5 | 763 | 7.4 | 85 |
| JAN | | | | | | | | | | |
| 16... | 1400 | 0.71 | 221 | 7.0 | 23.5 | 21.0 | 0.40 | 758 | 7.0 | 79 |
| FEB | | | | | | | | | | |
| 13... | 1320 | 1.1 | 261 | 7.4 | 22.5 | 20.5 | 0.20 | 758 | 8.8 | 98 |
| MAR | | | | | | | | | | |
| 06... | 1445 | 2.1 | 250 | 7.2 | 24.0 | 21.0 | 0.40 | 754 | 8.1 | 92 |
| APR | | | | | | | | | | |
| 24... | 1500 | 0.67 | 265 | 7.1 | 25.0 | 22.5 | 0.20 | 759 | 7.8 | 91 |
| MAY | | | | | | | | | | |
| 15... | 1300 | 0.57 | 267 | 6.9 | 25.0 | 22.5 | 0.30 | 763 | 7.6 | 88 |

| DATE | TIME | COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) | RESIDUE TOTAL AT 105 DEG. C, SUS- PENDED (MG/L) | NITRO- GEN, NO2+NO3 TOTAL (MG/L AS N) | NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) | NITRO- GEN, AM- MONIA + ORGANIC TOTAL (MG/L AS N) | PHOS- PHORUS TOTAL (MG/L AS P) |
|-------|------|--|---|--|---|---|--|
| DEC | | | | | | | |
| 13... | 0930 | 1600 | 1 | 0.160 | 0.160 | <0.20 | 0.020 |
| FEB | | | | | | | |
| 13... | 1320 | K29 | 1 | 0.220 | 0.220 | <0.20 | <0.010 |
| MAY | | | | | | | |
| 15... | 1300 | 580 | 1 | 0.590 | 0.590 | <0.20 | 0.030 |

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

K Results based on colony count outside acceptance range (non-ideal colony count)

ANALYSES OF SAMPLES COLLECTED AT WATER-QUALITY PARTIAL-RECORD STATIONS

WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

HAWAII, ISLAND OF OAHU--Continued

16266500 HOOLEINAIWA STREAM AT ALTITUDE 220 FT, NEAR KANEOHE, OAHU (LAT 21°23'06" LONG 157°48'16")

| DATE | TIME | DIS- CHARGE, INST. CUBIC FEET PER SECOND | SPE- CIFIC CON- DUCT- ANCE (US/CM) | PH WATER WHOLE FIELD (STAND- ARD UNITS) | TEMPER- ATURE AIR (DEG C) | TEMPER- ATURE WATER (DEG C) | TUR- BID- ITY (NTU) | BARO- METRIC PRES- SURE (MM OF HG) | OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) |
|-------|------|--|---|---|------------------------------------|--------------------------------------|------------------------------|--|--|
| OCT | | | | | | | | | |
| 11... | 1300 | 0.08 | 154 | 6.2 | 25.5 | 23.5 | 0.40 | 759 | 5.2 |
| NOV | | | | | | | | | |
| 21... | 1350 | 0.24 | 166 | 6.7 | 25.0 | -- | 0.40 | 755 | 7.2 |
| DEC | | | | | | | | | |
| 12... | 1320 | 0.12 | 160 | 6.8 | 25.0 | 22.5 | 0.40 | 760 | 6.2 |
| JAN | | | | | | | | | |
| 16... | 1140 | 0.21 | 165 | 6.8 | 24.5 | 22.0 | 0.30 | 759 | 7.4 |
| FEB | | | | | | | | | |
| 13... | 1125 | 0.38 | 181 | 6.9 | 21.5 | 21.0 | 0.20 | 758 | 7.6 |
| MAR | | | | | | | | | |
| 05... | 1410 | 0.82 | 187 | 6.8 | 22.0 | 21.5 | 0.30 | 753 | 7.3 |
| APR | | | | | | | | | |
| 24... | 1400 | 0.22 | 167 | 6.9 | 25.0 | 23.0 | 0.20 | 760 | 7.5 |
| MAY | | | | | | | | | |
| 14... | 1415 | 0.11 | 156 | 6.7 | 26.5 | 23.0 | 0.20 | 761 | 6.9 |

| DATE | TIME | COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) | RESIDUE TOTAL AT 105 DEG. C, SUS- PENDED (MG/L) | NITRO- GEN, NO2+NO3 TOTAL (MG/L AS N) | NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) | NITRO- GEN, AM- MONIA + ORGANIC TOTAL (MG/L AS N) | PHOS- PHORUS TOTAL (MG/L AS P) |
|-------|------|--|---|--|---|---|--|
| DEC | | | | | | | |
| 12... | 1320 | K20 | <1 | 0.110 | 0.110 | <0.20 | <0.010 |
| FEB | | | | | | | |
| 13... | 1125 | K17 | <1 | 0.150 | 0.150 | <0.20 | <0.010 |
| MAY | | | | | | | |
| 14... | 1415 | K37 | 1 | 0.120 | 0.120 | <0.20 | 0.020 |

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

K Results based on colony count outside acceptance range (non-ideal colony count)

ANALYSES OF SAMPLES COLLECTED AT WATER-QUALITY PARTIAL-RECORD STATIONS
 WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

HAWAII, ISLAND OF OAHU--Continued

16267500 HOOLEINAIWA STREAM ABOVE CONFLUENCE WITH KAMOOALII STREAM, NEAR KANEOHE, OAHU
 (LAT 21°23'18" LONG 157°48'18")

| DATE | TIME | DIS-CHARGE, INST. CUBIC FEET PER SECOND | SPE-CIFIC CON-DUCT-ANCE (US/CM) | PH WATER WHOLE FIELD (STAND-ARD UNITS) | TEMPER-ATURE AIR (DEG C) | TEMPER-ATURE WATER (DEG C) | TUR-BID-ITY (NTU) | BARO-METRIC PRES-SURE (MM OF HG) | OXYGEN, DIS-SOLVED (MG/L) | OXYGEN, (PER-CENT SATUR-ATION) |
|-------|------|---|---------------------------------|--|--------------------------|----------------------------|-------------------|----------------------------------|---------------------------|--------------------------------|
| OCT | | | | | | | | | | |
| 11... | 1415 | 0.45 | 198 | 7.2 | 26.0 | 24.0 | 1.8 | 758 | 6.7 | 80 |
| NOV | | | | | | | | | | |
| 21... | 1215 | 1.0 | 192 | 7.2 | 25.5 | -- | 3.1 | 757 | 7.3 | -- |
| DEC | | | | | | | | | | |
| 12... | 1215 | 0.66 | 195 | 7.3 | 26.0 | 23.0 | 3.4 | 761 | 7.2 | 84 |
| JAN | | | | | | | | | | |
| 16... | 1020 | 0.67 | 193 | 7.2 | 24.5 | 21.5 | 2.3 | 761 | 7.2 | 82 |
| FEB | | | | | | | | | | |
| 13... | 1005 | 0.86 | 198 | 7.4 | 21.0 | 20.5 | 3.4 | 760 | 7.4 | 82 |
| MAR | | | | | | | | | | |
| 05... | 1215 | 1.9 | 186 | 7.4 | 22.5 | 22.0 | 3.8 | 755 | 8.0 | 92 |
| APR | | | | | | | | | | |
| 24... | 1200 | 0.65 | 192 | 7.5 | 24.5 | 25.0 | 1.7 | 762 | 8.8 | 107 |
| MAY | | | | | | | | | | |
| 14... | 1125 | 0.63 | 191 | 7.2 | 26.0 | 24.0 | 2.4 | 763 | 7.3 | 87 |

| DATE | TIME | COLI-FORM, FECAL, 0.7 UM-MF (COLS./100 ML) | RESIDUE TOTAL AT 105 DEG. C, SUS-PENDED (MG/L) | NITRO-GEN, NO2+NO3 TOTAL (MG/L AS N) | NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N) | NITRO-GEN, AM-MONIA + ORGANIC TOTAL (MG/L AS N) | PHOS-PHORUS TOTAL (MG/L AS P) |
|-------|------|--|--|--------------------------------------|---|---|-------------------------------|
| DEC | | | | | | | |
| 12... | 1215 | K62 | <1 | -- | <0.050 | <0.20 | <0.010 |
| FEB | | | | | | | |
| 13... | 1005 | K19 | 2 | -- | <0.050 | <0.20 | <0.010 |
| MAY | | | | | | | |
| 14... | 1125 | 140 | 1 | 0.070 | 0.070 | <0.20 | 0.020 |

< Actual value is known to be less than the value shown
 K Results based on colony count outside acceptance range (non-ideal colony count)

ANALYSES OF SAMPLES COLLECTED AT WATER-QUALITY PARTIAL-RECORD STATIONS
 WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
 HAWAII, ISLAND OF OAHU--Continued
 16269500 KUOU STREAM AT ALTITUDE 220 FT NEAR KANEOHE, OAHU
 (LAT 21°23'30" LONG 157°48'44")

| DATE | TIME | DIS- CHARGE, INST. CUBIC FEET PER SECOND | SPE- CIFIC CON- DUCT- ANCE (US/CM) | PH WATER WHOLE FIELD (STAND- ARD UNITS) | TEMPER- ATURE AIR (DEG C) | TEMPER- ATURE WATER (DEG C) | TUR- BID- ITY (NTU) | BARO- METRIC PRES- SURE (MM OF HG) | OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) |
|-------|------|--|---|---|------------------------------------|--------------------------------------|------------------------------|--|--|
| OCT | | | | | | | | | |
| 11... | 1215 | 0.01 | 312 | 7.4 | 25.0 | 23.0 | 0.90 | 758 | 85 |
| NOV | | | | | | | | | |
| 20... | 1430 | 0.10 | 359 | 6.7 | -- | 23.0 | 33 | 757 | 87 |
| DEC | | | | | | | | | |
| 13... | 1020 | 0.08 | 277 | 7.2 | 24.5 | 23.0 | 21 | 761 | 90 |
| JAN | | | | | | | | | |
| 17... | 1400 | 0.05 | 391 | 7.2 | 24.0 | 22.0 | 0.40 | 757 | 95 |
| FEB | | | | | | | | | |
| 20... | 1350 | E0.05 | 385 | 6.8 | 21.5 | 21.0 | 0.20 | 759 | 67 |
| MAR | | | | | | | | | |
| 05... | 1215 | 0.07 | 277 | 6.8 | 25.0 | 21.5 | 0.20 | 754 | 94 |
| APR | | | | | | | | | |
| 24... | 1220 | E0.00 | 361 | 7.2 | 30.0 | 27.0 | 0.20 | 762 | 133 |
| MAY | | | | | | | | | |
| 15... | 1115 | E0.02 | 358 | 6.6 | 26.0 | 22.5 | 0.20 | 761 | 37 |

| DATE | TIME | COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) | RESIDUE TOTAL AT 105 DEG. C, SUS- PENDED (MG/L) | NITRO- GEN, NO2+NO3 TOTAL (MG/L AS N) | NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) | NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) | PHOS- PHORUS TOTAL (MG/L AS P) |
|-------|------|--|---|--|---|--|--|
| DEC | | | | | | | |
| 13... | 1020 | 5100 | 15 | 0.130 | 0.130 | 0.40 | 0.070 |
| FEB | | | | | | | |
| 20... | 1350 | 300 | <1 | 0.270 | 0.270 | <0.20 | <0.010 |
| MAY | | | | | | | |
| 15... | 1115 | 1600 | 1 | 0.430 | 0.430 | <0.20 | 0.020 |

< Actual value is known to be less than the value shown
 E Estimated
 K Results based on colony count outside acceptance range (non-ideal colony count)

ANALYSES OF SAMPLES COLLECTED AT WATER-QUALITY PARTIAL-RECORD STATIONS

WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

HAWAII, ISLAND OF OAHU--Continued

16274100 KANEHOE STREAM BELOW KAMEHAMEHA HWY, OAHU (LAT 21°24'54" LONG 157°48'03")

| DATE | TIME | DIS- CHARGE, INST. CUBIC FEET PER SECOND | SPE- CIFIC CON- DUCT- ANCE (US/CM) | PH WATER WHOLE FIELD (STAND- ARD UNITS) | TEMPER- ATURE AIR (DEG C) | TEMPER- ATURE WATER (DEG C) | TUR- BID- ITY (NTU) | BARO- METRIC PRES- SURE (MM OF HG) | OXYGEN, DIS- SOLVED OXYGEN, DIS- SOLVED (MG/L) | OXYGEN, DIS- SOLVED SATUR- ATION | COLI- FORM, DIS- SOLVED FECAL, (PER- CENT UM-MF (COLS./ 100 ML) |
|-------|------|--|---|--|---|---|---|---|--|---|--|
| OCT | | | | | | | | | | | |
| 12... | 1017 | 8.2 | 190 | 8.8 | 25.5 | 24.0 | 4.0 | 764 | 9.7 | 115 | -- |
| NOV | | | | | | | | | | | |
| 21... | 1007 | 14 | 190 | 8.5 | 25.0 | 23.5 | 5.4 | 761 | 9.6 | 113 | -- |
| JAN | | | | | | | | | | | |
| 17... | 1013 | 11 | 205 | 8.4 | 25.0 | 22.0 | 1.2 | 766 | 9.9 | 113 | -- |
| FEB | | | | | | | | | | | |
| 12... | 1135 | 11 | 200 | 8.8 | 22.5 | 21.5 | 3.0 | 766 | 9.5 | 107 | 880 |
| MAR | | | | | | | | | | | |
| 06... | 0950 | 18 | 200 | 8.2 | 25.0 | 21.0 | 3.0 | 759 | 9.2 | 104 | -- |
| APR | | | | | | | | | | | |
| 24... | 1030 | 9.8 | 211 | 9.1 | 26.5 | 27.5 | 1.9 | 766 | 10.8 | 136 | -- |
| MAY | | | | | | | | | | | |
| 15... | 1045 | 10 | 207 | 9.3 | 26.5 | 26.5 | 2.1 | 768 | 10.3 | 127 | K1700 |
| | | | | | | | | | | | |
| DATE | TIME | HARD- NESS TOTAL (MG/L AS CACO3) | CALCIUM DIS- SOLVED (MG/L AS CA) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) | SODIUM, DIS- SOLVED (MG/L AS NA) | SODIUM PERCENT | SODIUM AD- SORP- TION RATIO | POTAS- SIUM, DIS- SOLVED (MG/L AS K) | ALKA- LINITY LAB (MG/L AS CACO3) | SULFATE SOLVED (MG/L AS SO4) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) |
| FEB | | | | | | | | | | | |
| 12... | 1135 | 66 | 14 | 7.5 | 15 | 32 | 0.8 | 1.7 | 65 | 9.6 | 18 |
| | | | | | | | | | | | |
| DATE | TIME | FLUO- RIDE, DIS- SOLVED (MG/L AS F) | SILICA, DIS- SOLVED (MG/L AS SIO2) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) | SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) | SOLIDS, DIS- SOLVED (TONS PER AC-FT) | RESIDUE TOTAL AT 105 DEG. C, SUS- PENDED (MG/L) | NITRO- GEN, NO2+NO3 TOTAL (MG/L AS N) | NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) | NITRO- GEN, AM- MONIA + DIS- ORGANIC TOTAL (MG/L AS N) | PHOS- PHORUS TOTAL (MG/L AS P) |
| FEB | | | | | | | | | | | |
| 12... | 1135 | <0.10 | 21 | 127 | 127 | 0.17 | 20 | 0.270 | 0.270 | <0.20 | <0.010 |
| MAY | | | | | | | | | | | |
| 15... | 1045 | -- | -- | -- | -- | -- | 6 | 0.190 | 0.190 | 0.30 | 0.030 |
| | | | | | | | | | | | |
| DATE | TIME | ALUM- INUM, TOTAL RECOV- ERABLE (UG/L AS AL) | ALUM- INUM, DIS- SOLVED (UG/L AS AL) | ARSENIC TOTAL (UG/L AS AS) | BARIUM, TOTAL RECOV- ERABLE (UG/L AS BA) | BARIUM, DIS- SOLVED (UG/L AS BA) | BERYL- LIUM, TOTAL RECOV- ERABLE (UG/L AS BE) | CADMIUM WATER UNFLTRD TOTAL (UG/L AS CD) | CHRO- MIUM, TOTAL RECOV- ERABLE (UG/L AS CR) | COBALT, TOTAL RECOV- ERABLE (UG/L AS CO) | COBALT, DIS- SOLVED (UG/L AS CO) |
| FEB | | | | | | | | | | | |
| 12... | 1135 | 170 | 130 | <1 | <100 | 4.0 | <10 | <1 | <1 | <1 | <3.0 |

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

K Results based on colony count outside acceptance range (non-ideal colony count)

ANALYSES OF SAMPLES COLLECTED AT WATER-QUALITY PARTIAL-RECORD STATIONS
 WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
 HAWAII, ISLAND OF OAHU--Continued
 16274100 KANEOHE STREAM BELOW KAMEHAMEHA HWY, OAHU--Continued

| DATE | COPPER, TOTAL RECOV- ERABLE (UG/L AS CU) | IRON, TOTAL RECOV- ERABLE (UG/L AS FE) | IRON, DIS- SOLVED (UG/L AS FE) | LEAD, TOTAL RECOV- ERABLE (UG/L AS PB) | LITHIUM TOTAL RECOV- ERABLE (UG/L AS LI) | LITHIUM DIS- SOLVED (UG/L AS LI) | MANGA- NESE, TOTAL RECOV- ERABLE (UG/L AS MN) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) | MERCURY TOTAL RECOV- ERABLE (UG/L AS HG) | MOLYB- DENUM, TOTAL RECOV- ERABLE (UG/L AS MO) | MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) |
|--------------|---|---|--|---|--|---|---|--|---|--|---|
| FEB 12... | 1 | 400 | 250 | <1 | <10 | <4 | 30 | 13 | <0.10 | <1 | <10 |
| DATE | NICKEL, TOTAL RECOV- ERABLE (UG/L AS NI) | NICKEL, DIS- SOLVED (UG/L AS NI) | SELE- NIUM, TOTAL SOLVED (UG/L AS SE) | SELE- NIUM, DIS- SOLVED (UG/L AS SE) | SILVER, TOTAL RECOV- ERABLE (UG/L AS AG) | SILVER, DIS- SOLVED (UG/L AS AG) | STRON- TIUM, DIS- SOLVED (UG/L AS SR) | VANA- DIUM, DIS- SOLVED (UG/L AS V) | ZINC, TOTAL RECOV- ERABLE (UG/L AS ZN) | CARBON, ORGANIC TOTAL (MG/L AS C) | OIL AND GREASE, TOTAL RECOV. GRAVI- METRIC (MG/L) |
| FEB 12... | 1 | <1.0 | <1 | <1 | <1 | <1.0 | 91 | <6 | <10 | 1.5 | <1 |
| DATE | ALDRIN, TOTAL (UG/L) | CHLOR- DANE, TECH- NICAL TOTAL (UG/L) | CHLOR- PYRIFOS TOTAL RECOVER (UG/L) | P, P'- DDD UNFILTR RECOVER (UG/L) | DDE, TOTAL (UG/L) | P, P'- DDT UNFILTR RECOVER (UG/L) | DEF TOTAL (UG/L) | DI- AZINON, TOTAL (UG/L) | DI- ELDRIN TOTAL (UG/L) | DISUL- FOTON UNFILTR RECOVER (UG/L) | 2, 4-DP TOTAL (UG/L) |
| FEB 12... | <0.010 | <0.100 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | 0.040 | <0.010 | <0.010 |
| DATE | 2, 4-D, TOTAL (UG/L) | ENDO- SULFAN, I TOTAL (UG/L) | ENDRIN WATER UNFLTRD REC (UG/L) | ETHION, TOTAL (UG/L) | FONOFOS (DY- FONATE) WATER WHOLE TOT. REC (UG/L) | HEPTA- CHLOR, TOTAL (UG/L) | HEPTA- CHLOR EPOXIDE TOTAL (UG/L) | LINDANE TOTAL (UG/L) | MALA- THON, TOTAL (UG/L) | METH- OXY- CHLOR, TOTAL (UG/L) | METHYL PARA- THON, TOTAL (UG/L) |
| FEB 12... | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | 0.010 | <0.010 | <0.010 | <0.010 | <0.010 |
| DATE | MIREX, TOTAL (UG/L) | PARA- THON, TOTAL (UG/L) | PCB, TOTAL (UG/L) | PCNS UNFILTR RECOVER (UG/L) | PER- THANE TOTAL (UG/L) | PHORATE TOTAL (UG/L) | SILVEX, TOTAL (UG/L) | TOX- APHENE, TOTAL (UG/L) | TOTAL TRI- THON (UG/L) | 2, 4, 5-T TOTAL (UG/L) | |
| FEB 12... | <0.010 | <0.010 | <0.100 | <0.100 | <0.100 | <0.010 | <0.010 | <1.00 | <0.010 | <0.010 | |

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

ANALYSES OF SAMPLES COLLECTED AT WATER-QUALITY PARTIAL-RECORD STATIONS

WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

HAWAII, ISLAND OF OAHU--Continued

212335157482601 HOOMALUHIA RES SEC 1-1 NR KANEOHE, OAHU (LAT 21°23'35" LONG 157°48'26")

| DATE | TIME | SAM- PLING DEPTH (FEET) | SPE- CIFIC CON- DUCT- ANCE (US/CM) | PH WATER WHOLE FIELD (STAND- ARD UNITS) | TEMPER- ATURE WATER (DEG C) | BARO- METRIC PRES- SURE (MM OF HG) | OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) | OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) |
|-------|------|----------------------------------|---|---|--------------------------------------|--|--|--|
| FEB | | | | | | | | |
| 14... | 1048 | 1.00 | 188 | 7.4 | 21.5 | 760 | 6.6 | 75 |
| 14... | 1049 | 3.00 | 190 | 7.4 | 21.5 | 760 | 6.6 | 75 |
| 14... | 1050 | 5.00 | 190 | 7.4 | 21.5 | 760 | 6.6 | 75 |
| 14... | 1052 | 7.00 | 190 | 7.4 | 21.5 | 760 | 6.6 | 75 |
| 14... | 1054 | 8.00 | 190 | 7.4 | 21.5 | 760 | 6.5 | 74 |
| MAR | | | | | | | | |
| 06... | 1006 | 1.00 | 154 | 7.2 | 21.0 | 755 | 6.3 | 71 |
| 06... | 1008 | 3.00 | 154 | 7.2 | 21.0 | 755 | 6.2 | 70 |
| 06... | 1009 | 5.00 | 156 | 7.2 | 21.0 | 755 | 6.0 | 68 |
| 06... | 1010 | 7.00 | 156 | 7.2 | 20.5 | 755 | 5.8 | 65 |
| 06... | 1011 | 8.00 | 156 | 7.2 | 20.5 | 755 | 5.6 | 63 |

212335157482602 HOOMALUHIA RES SEC 1-2 NR KANEOHE, OAHU (LAT 21°23'35" LONG 157°48'26")

| DATE | TIME | SAM- PLING DEPTH (FEET) | SPE- CIFIC CON- DUCT- ANCE (US/CM) | PH WATER WHOLE FIELD (STAND- ARD UNITS) | TEMPER- ATURE WATER (DEG C) | BARO- METRIC PRES- SURE (MM OF HG) | OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) | OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) |
|-------|------|----------------------------------|---|---|--------------------------------------|--|--|--|
| FEB | | | | | | | | |
| 14... | 1037 | 1.00 | 188 | 7.4 | 21.5 | 760 | 6.6 | 75 |
| 14... | 1039 | 3.00 | 190 | 7.4 | 21.5 | 760 | 6.6 | 75 |
| 14... | 1040 | 5.00 | 190 | 7.4 | 21.5 | 760 | 6.5 | 74 |
| 14... | 1041 | 7.00 | 188 | 7.4 | 21.5 | 760 | 6.5 | 74 |
| 14... | 1043 | 9.00 | 192 | 7.4 | 21.5 | 760 | 5.9 | 67 |
| MAR | | | | | | | | |
| 06... | 1014 | 1.00 | 154 | 7.3 | 21.0 | 755 | 6.4 | 73 |
| 06... | 1015 | 3.00 | 154 | 7.3 | 21.0 | 755 | 6.4 | 73 |
| 06... | 1016 | 5.00 | 154 | 7.3 | 21.0 | 755 | 6.4 | 73 |
| 06... | 1017 | 7.00 | 154 | 7.3 | 21.0 | 755 | 6.2 | 70 |
| 06... | 1025 | 9.00 | 158 | 7.3 | 20.5 | 755 | 5.8 | 65 |

ANALYSES OF SAMPLES COLLECTED AT WATER-QUALITY PARTIAL-RECORD STATIONS

WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

HAWAII, ISLAND OF OAHU--Continued

212335157482603 - HOOMALUHIA RES SEC 1-3 NR KANEOHE, OAHU (LAT 21°23'35" LONG 157°48'26")

| DATE | TIME | SAM- PLING DEPTH (FEET) | SPE- CIFIC CON- DUCT- ANCE (US/CM) | PH WATER FIELD (STAND- ARD UNITS) | TEMPER- ATURE WATER (DEG C) | TUR- BID- ITY (NTU) | BARO- METRIC PRES- SURE (MM OF HG) | OXYGEN, DIS- SOLVED (MG/L) | OXYGEN, DIS- SOLVED (MG/L) | OXYGEN, DIS- SOLVED (MG/L) | COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) |
|-------|------|---|--|--|---|---|--|--|---|--|--|
| FEB | | | | | | | | | | | |
| 14... | 1022 | 1.00 | 188 | 7.4 | 21.5 | 5.0 | 760 | 6.6 | 75 | K720 | |
| 14... | 1027 | 3.00 | 188 | 7.4 | 21.5 | -- | 760 | 6.6 | 75 | -- | |
| 14... | 1029 | 5.00 | 188 | 7.4 | 21.5 | -- | 760 | 6.6 | 75 | -- | |
| 14... | 1030 | 7.00 | 188 | 7.4 | 21.5 | 4.9 | 760 | 6.6 | 75 | K620 | |
| 14... | 1032 | 9.00 | 190 | 7.4 | 21.5 | -- | 760 | 6.2 | 70 | -- | |
| 14... | 1033 | 11.00 | 214 | 7.3 | 21.5 | 5.1 | 760 | 5.2 | 59 | K690 | |
| 14... | 1035 | -- | 188 | 7.4 | 21.5 | 5.1 | 760 | 6.1 | 69 | -- | |
| MAR | | | | | | | | | | | |
| 06... | 1030 | 1.00 | 156 | 7.3 | 21.0 | 6.3 | 755 | 6.8 | 77 | -- | |
| 06... | 1031 | 3.00 | 156 | 7.4 | 21.0 | -- | 755 | 6.6 | 75 | -- | |
| 06... | 1032 | 5.00 | 158 | 7.4 | 21.0 | -- | 755 | 6.4 | 73 | -- | |
| 06... | 1033 | 7.00 | 156 | 7.3 | 21.0 | 9.4 | 755 | 5.9 | 67 | -- | |
| 06... | 1034 | 9.00 | 158 | 7.3 | 20.5 | -- | 755 | 5.7 | 64 | -- | |
| 06... | 1035 | 11.00 | 156 | 7.3 | 20.5 | 27 | 755 | 5.7 | 64 | -- | |
| DATE | TIME | HARD- NESS TOTAL (MG/L AS CACO3) | CALCIUM DIS- SOLVED (MG/L AS CA) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) | SODIUM, DIS- SOLVED (MG/L AS NA) | SODIUM SODIUM PERCENT | SODIUM AD- SORP- TION RATIO | POTAS- SIUM, DIS- SOLVED (MG/L AS K) | ALKA- LINITY LAB AS CACO3) | SULFATE DIS- SOLVED (MG/L AS SO4) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) |
| FEB | | | | | | | | | | | |
| 14... | 1035 | 58 | 11 | 7.3 | 12 | 30 | 0.7 | 1.9 | 60 | 7.2 | 15 |
| DATE | TIME | FLUO- RIDE, DIS- SOLVED (MG/L AS F) | SILICA, DIS- SOLVED (MG/L AS SIO2) | SOLIDS, RESIDUE AT 180 DEG. C SOLVED (MG/L) | SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) | SOLIDS, DIS- SOLVED (TONS AC-FT) | RESIDUE TOTAL AT 105 DEG. C, SUS- PENDED (MG/L) | NITRO- GEN, NO2+NO3 TOTAL (MG/L AS N) | NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) | NITRO- GEN, MONIA + ORGANIC TOTAL (MG/L AS N) | PHOS- PHORUS TOTAL (MG/L AS P) |
| FEB | | | | | | | | | | | |
| 14... | 1022 | -- | -- | -- | -- | -- | 6 | 0.340 | 0.340 | <0.20 | <0.010 |
| 14... | 1030 | -- | -- | -- | -- | -- | 3 | 0.340 | 0.340 | <0.20 | <0.010 |
| 14... | 1033 | -- | -- | -- | -- | -- | 6 | 0.390 | 0.390 | <0.20 | 0.010 |
| 14... | 1035 | <0.10 | 16 | 108 | 107 | 0.15 | -- | -- | -- | -- | -- |
| DATE | TIME | ALUM- INUM, TOTAL RECOV- ERABLE (UG/L AS AL) | ALUM- INUM, DIS- SOLVED (UG/L AS AL) | ARSENIC TOTAL (UG/L AS AS) | BARIUM, TOTAL RECOV- ERABLE (UG/L AS BA) | BARIUM, DIS- SOLVED (UG/L AS BA) | BERYL- LIUM, TOTAL RECOV- ERABLE (UG/L AS BE) | CADMIUM WATER UNFLTRD TOTAL (UG/L AS CD) | CHRO- MIUM, TOTAL RECOV- ERABLE (UG/L AS CR) | COBALT, TOTAL RECOV- ERABLE (UG/L AS CO) | COBALT, DIS- SOLVED (UG/L AS CO) |
| FEB | | | | | | | | | | | |
| 14... | 1035 | 210 | 20 | <1 | <100 | 6.0 | <10 | <1 | <1 | <1 | <3.0 |

< 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)

ANALYSES OF SAMPLES COLLECTED AT WATER-QUALITY PARTIAL-RECORD STATIONS
 WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
 HAWAII, ISLAND OF OAHU--Continued
 212335157482603 - HOOMALUHIA RES SEC 1-3 NR KANEHOE, OAHU--Continued

| DATE | COPPER, TOTAL RECOV- ERABLE (UG/L AS CU) | IRON, TOTAL RECOV- ERABLE (UG/L AS FE) | IRON, DIS- SOLVED (UG/L AS FE) | LEAD, TOTAL RECOV- ERABLE (UG/L AS PB) | LITHIUM TOTAL RECOV- ERABLE (UG/L AS LI) | LITHIUM DIS- SOLVED (UG/L AS LI) | MANGA- NESE, TOTAL RECOV- ERABLE (UG/L AS MN) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) | MERCURY TOTAL RECOV- ERABLE (UG/L AS HG) | MOLYB- DENUM, TOTAL RECOV- ERABLE (UG/L AS MO) | MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) |
|--------------|---|---|---|---|---|--|---|--|---|--|---|
| FEB 14... | 3 | 430 | 74 | <1 | <10 | <4 | 100 | 67 | 0.10 | <1 | <10 |
| DATE | NICKEL, TOTAL RECOV- ERABLE (UG/L AS NI) | NICKEL, DIS- SOLVED (UG/L AS NI) | SELE- NIUM, TOTAL SOLVED (UG/L AS SE) | SELE- NIUM, DIS- SOLVED (UG/L AS SE) | SILVER, TOTAL RECOV- ERABLE (UG/L AS AG) | SILVER, DIS- SOLVED (UG/L AS AG) | STRON- TIUM, TOTAL SOLVED (UG/L AS SR) | VANA- DIUM, DIS- SOLVED (UG/L AS V) | ZINC, TOTAL RECOV- ERABLE (UG/L AS ZN) | ALDRIN, TOTAL (UG/L) | CHLOR- DANE, TECH- NICAL TOTAL (UG/L) |
| FEB 14... | 1 | <1.0 | <1 | <1 | <1 | <1.0 | 87 | <6 | <10 | <0.010 | <0.100 |
| DATE | CHLOR- PYRIFOS TOTAL RECOVER (UG/L) | P, P'- DDD UNFILTRD RECOVER (UG/L) | DDE, TOTAL (UG/L) | P, P'- DDT UNFILTRD RECOVER (UG/L) | DEF TOTAL (UG/L) | DI- AZINON, TOTAL (UG/L) | DI- ELDRIN TOTAL (UG/L) | DISUL- FOTON UNFILTRD RECOVER (UG/L) | 2, 4-DP TOTAL (UG/L) | 2, 4-D, TOTAL (UG/L) | ENDO- SULFAN, I TOTAL (UG/L) |
| FEB 14... | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 |
| DATE | ENDRIN WATER UNFLTRD REC (UG/L) | ETHION, TOTAL (UG/L) | FONOFOS (DY- FONATE) WATER WHOLE TOT.REC (UG/L) | HEPTA- CHLOR, TOTAL (UG/L) | HEPTA- CHLOR EPOXIDE TOTAL (UG/L) | LINDANE TOTAL (UG/L) | MALA- THION, TOTAL (UG/L) | METH- OXY- CHLOR, TOTAL (UG/L) | METHYL PARA- THION, TOTAL (UG/L) | MIREX, TOTAL (UG/L) | |
| FEB 14... | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | |
| DATE | PCNS UNFILTRD RECOVER (UG/L) | PARA- THION, TOTAL (UG/L) | PCB, TOTAL (UG/L) | PER- THANE TOTAL (UG/L) | PHORATE TOTAL (UG/L) | SILVEX, TOTAL (UG/L) | TOX- APHENE, TOTAL (UG/L) | TOTAL TRI- THION (UG/L) | 2, 4, 5-T TOTAL (UG/L) | | |
| FEB 14... | <0.100 | <0.010 | <0.100 | <0.100 | <0.010 | <0.010 | <1.00 | <0.010 | <0.010 | | |

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

ANALYSES OF SAMPLES COLLECTED AT WATER-QUALITY PARTIAL-RECORD STATIONS
WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

HAWAII, ISLAND OF OAHU--Continued

212331157482501 HOOMALUHIA RES SEC 2-1 NR KANEOHE, OAHU (LAT 21°23'31" LONG 157°48'25")

| DATE | TIME | SAM- PLING DEPTH (FEET) | SPE- CIFIC CON- DUCT- ANCE (US/CM) | PH WATER WHOLE FIELD (STAND- ARD UNITS) | TEMPER- ATURE WATER (DEG C) | BARO- METRIC PRES- SURE (MM OF HG) | OXYGEN, DIS- SOLVED (MG/L) | OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) |
|-------|------|----------------------------------|---|---|--------------------------------------|--|-------------------------------------|--|
| FEB | | | | | | | | |
| 14... | 1410 | 1.00 | 188 | 7.5 | 21.5 | 760 | 6.8 | 77 |
| 14... | 1411 | 3.00 | 188 | 7.5 | 21.5 | 760 | 6.8 | 77 |
| 14... | 1412 | 5.00 | 188 | 7.5 | 21.5 | 760 | 6.8 | 77 |
| 14... | 1413 | 7.00 | 188 | 7.5 | 21.5 | 760 | 6.8 | 77 |
| 14... | 1414 | 8.00 | 190 | 7.5 | 21.5 | 760 | 6.8 | 77 |
| MAR | | | | | | | | |
| 06... | 1334 | 1.00 | 160 | 7.5 | 22.0 | 753 | 7.4 | 86 |
| 06... | 1335 | 3.00 | 164 | 7.5 | 22.0 | 753 | 7.3 | 85 |
| 06... | 1336 | 5.00 | 164 | 7.5 | 22.0 | 753 | 7.2 | 83 |
| 06... | 1338 | 7.00 | 164 | 7.4 | 21.5 | 753 | 7.0 | 80 |
| 06... | 1340 | 8.00 | 164 | 7.4 | 21.5 | 753 | 6.7 | 77 |

212331157482502 - HOOMALUHIA RES SEC 2-2 NR KANEOHE, OAHU (LAT 21°23'31" LONG 157°48'25")

| DATE | TIME | SAM- PLING DEPTH (FEET) | SPE- CIFIC CON- DUCT- ANCE (US/CM) | PH WATER WHOLE FIELD (STAND- ARD UNITS) | TEMPER- ATURE WATER (DEG C) | BARO- METRIC PRES- SURE (MM OF HG) | OXYGEN, DIS- SOLVED (MG/L) | OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) |
|-------|------|----------------------------------|---|---|--------------------------------------|--|-------------------------------------|--|
| FEB | | | | | | | | |
| 14... | 1416 | 1.00 | 190 | 7.5 | 21.5 | 760 | 6.8 | 77 |
| 14... | 1417 | 3.00 | 192 | 7.5 | 21.5 | 760 | 6.8 | 77 |
| 14... | 1418 | 5.00 | 190 | 7.5 | 21.5 | 760 | 6.8 | 77 |
| 14... | 1419 | 7.00 | 190 | 7.5 | 21.5 | 760 | 6.8 | 77 |
| 14... | 1420 | 9.00 | 188 | 7.5 | 21.5 | 760 | 6.8 | 77 |
| 14... | 1421 | 11.0 | 196 | 7.5 | 21.5 | 760 | 6.5 | 74 |
| MAR | | | | | | | | |
| 06... | 1325 | 1.00 | 160 | 7.5 | 22.0 | 753 | 7.3 | 85 |
| 06... | 1327 | 3.00 | 164 | 7.5 | 22.0 | 753 | 7.3 | 85 |
| 06... | 1328 | 5.00 | 164 | 7.5 | 22.0 | 753 | 7.3 | 85 |
| 06... | 1329 | 7.00 | 162 | 7.5 | 21.5 | 753 | 6.9 | 79 |
| 06... | 1330 | 9.00 | 162 | 7.4 | 21.5 | 753 | 6.6 | 76 |
| 06... | 1332 | 11.0 | 166 | 7.4 | 21.0 | 753 | 6.4 | 73 |

ANALYSES OF SAMPLES COLLECTED AT WATER-QUALITY PARTIAL-RECORD STATIONS

WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

HAWAII, ISLAND OF OAHU--Continued

212331157482503 HOOMALUHIA RES SEC 2-3 NR KANEOHE, OAHU (LAT 21°23'31" LONG 157°48'25")

| DATE | TIME | SAM- PLING DEPTH (FEET) | SPE- CIFIC CON- DUCT- ANCE (US/CM) | PH WATER WHOLE FIELD (STAND- ARD UNITS) | TEMPER- ATURE WATER (DEG C) | BARO- METRIC PRES- SURE (MM OF HG) | OXYGEN, DIS- SOLVED (MG/L) | OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) |
|-------|------|----------------------------------|---|---|--------------------------------------|--|-------------------------------------|--|
| FEB | | | | | | | | |
| 14... | 1422 | 1.00 | 190 | 7.5 | 21.5 | 760 | 6.7 | 76 |
| 14... | 1423 | 3.00 | 190 | 7.5 | 21.5 | 760 | 6.7 | 76 |
| 14... | 1424 | 5.00 | 190 | 7.5 | 21.5 | 760 | 6.7 | 76 |
| 14... | 1425 | 7.00 | 186 | 7.5 | 21.5 | 760 | 6.8 | 77 |
| 14... | 1426 | 9.00 | 186 | 7.5 | 21.5 | 760 | 6.8 | 77 |
| MAR | | | | | | | | |
| 06... | 1316 | 1.00 | 160 | 7.5 | 22.0 | 753 | 7.4 | 86 |
| 06... | 1319 | 3.00 | 164 | 7.5 | 22.0 | 753 | 7.4 | 86 |
| 06... | 1321 | 5.00 | 162 | 7.5 | 21.5 | 753 | 7.2 | 83 |
| 06... | 1322 | 7.00 | 162 | 7.5 | 21.5 | 753 | 7.0 | 80 |
| 06... | 1323 | 9.00 | 164 | 7.4 | 21.5 | 753 | 6.9 | 79 |

212329157483101 HOOMALUHIA RES SEC 3-1 NR KANEOHE, OAHU (LAT 21°23'29" LONG 157°48'31")

| DATE | TIME | SAM- PLING DEPTH (FEET) | SPE- CIFIC CON- DUCT- ANCE (US/CM) | PH WATER WHOLE FIELD (STAND- ARD UNITS) | TEMPER- ATURE WATER (DEG C) | BARO- METRIC PRES- SURE (MM OF HG) | OXYGEN, DIS- SOLVED (MG/L) | OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) |
|-------|------|----------------------------------|---|---|--------------------------------------|--|-------------------------------------|--|
| FEB | | | | | | | | |
| 14... | 1152 | 1.00 | 184 | 7.5 | 21.5 | 760 | 7.0 | 79 |
| 14... | 1154 | 3.00 | 184 | 7.5 | 21.5 | 760 | 6.9 | 79 |
| 14... | 1155 | 5.00 | 186 | 7.5 | 21.5 | 760 | 6.9 | 79 |
| 14... | 1156 | 7.00 | 186 | 7.5 | 21.5 | 760 | 6.9 | 78 |
| 14... | 1157 | 8.00 | 186 | 7.5 | 21.5 | 760 | 6.9 | 78 |
| MAR | | | | | | | | |
| 06... | 1110 | 1.00 | 160 | 7.5 | 21.5 | 755 | 7.5 | 86 |
| 06... | 1111 | 3.00 | 162 | 7.5 | 21.5 | 755 | 7.5 | 86 |
| 06... | 1112 | 5.00 | 162 | 7.5 | 21.5 | 755 | 7.4 | 85 |
| 06... | 1114 | 7.00 | 162 | 7.5 | 21.5 | 755 | 7.4 | 85 |
| 06... | 1115 | 8.00 | 162 | 7.5 | 21.5 | 755 | 7.4 | 85 |

ANALYSES OF SAMPLES COLLECTED AT WATER-QUALITY PARTIAL-RECORD STATIONS

WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

HAWAII, ISLAND OF OAHU--Continued

212329157483102 - HOOMALUHIA RES SEC 3-2 NR KANEOHE, OAHU (LAT 21°23'29" LONG 157°48'31")

| DATE | TIME | SAM- PLING DEPTH (FEET) | SPE- CIFIC CON- DUCT- ANCE (US/CM) | PH WATER WHOLE FIELD (STAND- ARD UNITS) | TEMPER- ATURE WATER (DEG C) | TUR- BID- ITY (NTU) | BARO- METRIC PRES- SURE (MM OF HG) | OXYGEN, DIS- SOLVED (MG/L) | OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) |
|-------|------|----------------------------------|---|---|--------------------------------------|------------------------------|--|-------------------------------------|--|
| FEB | | | | | | | | | |
| 14... | 1131 | 1.00 | 184 | 7.5 | 21.5 | 5.1 | 760 | 7.0 | 79 |
| 14... | 1135 | 3.00 | 184 | 7.5 | 21.5 | -- | 760 | 7.0 | 80 |
| 14... | 1141 | 5.00 | 186 | 7.5 | 21.5 | 5.4 | 760 | 7.0 | 79 |
| 14... | 1142 | 7.00 | 184 | 7.5 | 21.5 | -- | 760 | 7.0 | 79 |
| 14... | 1145 | 9.00 | 184 | 7.6 | 21.5 | -- | 760 | 7.0 | 79 |
| 14... | 1150 | 10.0 | 184 | 7.5 | 21.5 | 4.9 | 760 | 7.0 | 79 |
| MAR | | | | | | | | | |
| 06... | 1100 | 1.00 | 160 | 7.5 | 21.5 | 5.5 | 755 | 7.6 | 87 |
| 06... | 1101 | 3.00 | 160 | 7.5 | 21.5 | -- | 755 | 7.6 | 87 |
| 06... | 1103 | 5.00 | 160 | 7.5 | 21.5 | 7.0 | 755 | 7.5 | 86 |
| 06... | 1104 | 7.00 | 160 | 7.5 | 21.5 | -- | 755 | 7.4 | 85 |
| 06... | 1105 | 9.00 | 162 | 7.4 | 21.5 | -- | 755 | 7.2 | 82 |
| 06... | 1107 | 10.0 | 162 | 7.4 | 21.5 | 8.5 | 755 | 7.1 | 81 |

| DATE | TIME | COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) | RESIDUE TOTAL AT 105 DEG. C, SUS- PENDE (MG/L) | NITRO- GEN, NO2+NO3 TOTAL (MG/L AS N) | NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) | NITRO- GEN,AM- MONIA + DIS- ORGANIC TOTAL (MG/L AS N) | PHOS- PHORUS TOTAL (MG/L AS P) |
|-------|------|--|--|--|---|--|--|
| FEB | | | | | | | |
| 14... | 1131 | K1400 | 1 | 0.300 | 0.300 | <0.20 | <0.010 |
| 14... | 1141 | K890 | 5 | 0.300 | 0.300 | <0.20 | <0.010 |
| 14... | 1150 | K860 | 4 | 0.300 | 0.300 | <0.20 | <0.010 |

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

K Results based on colony count outside acceptance range (non-ideal colony count)

ANALYSES OF SAMPLES COLLECTED AT WATER-QUALITY PARTIAL-RECORD STATIONS

WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

HAWAII, ISLAND OF OAHU--Continued

212329157483103 HOOMALUHIA RES SEC 3-3 NR KANEOHE, OAHU (LAT 21°23'29" LONG 157°48'31")

| DATE | TIME | SAM- PLING DEPTH (FEET) | SPE- CIFIC CON- DUCT- ANCE (US/CM) | PH WATER WHOLE FIELD (STAND- ARD UNITS) | TEMPER- ATURE WATER (DEG C) | BARO- METRIC PRES- SURE (MM OF HG) | OXYGEN, DIS- SOLVED (MG/L) | OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) |
|-------|------|----------------------------------|---|---|--------------------------------------|--|-------------------------------------|--|
| FEB | | | | | | | | |
| 14... | 1106 | 1.00 | 182 | 7.5 | 21.5 | 760 | 7.1 | 80 |
| 14... | 1108 | 3.00 | 182 | 7.5 | 21.5 | 760 | 7.0 | 80 |
| 14... | 1117 | 5.00 | 184 | 7.5 | 21.5 | 760 | 7.0 | 79 |
| 14... | 1123 | 7.00 | 184 | 7.5 | 21.5 | 760 | 7.0 | 80 |
| 14... | 1127 | 9.00 | 184 | 7.5 | 21.5 | 760 | 7.0 | 80 |
| 14... | 1128 | 11.0 | 184 | 7.5 | 21.5 | 760 | 7.0 | 79 |
| MAR | | | | | | | | |
| 06... | 1049 | 1.00 | 160 | 7.5 | 21.5 | 755 | 7.6 | 87 |
| 06... | 1051 | 3.00 | 160 | 7.5 | 21.5 | 755 | 7.6 | 87 |
| 06... | 1052 | 5.00 | 160 | 7.5 | 21.5 | 755 | 7.6 | 87 |
| 06... | 1053 | 7.00 | 160 | 7.5 | 21.5 | 755 | 7.5 | 86 |
| 06... | 1055 | 9.00 | 162 | 7.5 | 21.5 | 755 | 7.3 | 84 |
| 06... | 1056 | 11.0 | 162 | 7.4 | 21.5 | 755 | 7.2 | 82 |

212335157483001 HOOMALUHIA RES SEC 4-1 NR KANEOHE, OAHU (LAT 21°23'35" LONG 157°48'30")

| DATE | TIME | SAM- PLING DEPTH (FEET) | SPE- CIFIC CON- DUCT- ANCE (US/CM) | PH WATER WHOLE FIELD (STAND- ARD UNITS) | TEMPER- ATURE WATER (DEG C) | BARO- METRIC PRES- SURE (MM OF HG) | OXYGEN, DIS- SOLVED (MG/L) | OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) |
|-------|------|----------------------------------|---|---|--------------------------------------|--|-------------------------------------|--|
| FEB | | | | | | | | |
| 14... | 1232 | 1.00 | 184 | 7.6 | 21.5 | 760 | 6.9 | 78 |
| 14... | 1233 | 3.00 | 184 | 7.6 | 21.5 | 760 | 6.9 | 78 |
| 14... | 1235 | 5.00 | 186 | 7.5 | 21.5 | 760 | 6.6 | 75 |
| 14... | 1236 | 7.00 | 186 | 7.5 | 21.5 | 760 | 6.5 | 74 |
| 14... | 1237 | 8.00 | 186 | 7.5 | 21.5 | 760 | 6.5 | 74 |
| MAR | | | | | | | | |
| 06... | 1301 | 1.00 | 160 | 7.5 | 21.5 | 755 | 7.3 | 84 |
| 06... | 1303 | 3.00 | 162 | 7.5 | 21.5 | 755 | 7.3 | 84 |
| 06... | 1304 | 5.00 | 162 | 7.5 | 21.5 | 755 | 7.2 | 82 |
| 06... | 1305 | 7.00 | 162 | 7.5 | 21.5 | 755 | 7.2 | 82 |
| 06... | 1306 | 8.00 | 160 | 7.4 | 21.5 | 755 | 6.9 | 79 |

ANALYSES OF SAMPLES COLLECTED AT WATER-QUALITY PARTIAL-RECORD STATIONS
WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

HAWAII, ISLAND OF OAHU--Continued

212335157483002 - HOOMALUHIA RES SEC 4-2 NR KANEOHE, OAHU (LAT 21°23'35" LONG 157°48'30")

| DATE | TIME | SAM- PLING DEPTH (FEET) | SPE- CIFIC CON- DUCT- ANCE (US/CM) | PH WATER WHOLE FIELD (STAND- ARD UNITS) | TEMPER- ATURE WATER (DEG C) | BARO- METRIC PRES- SURE (MM HG) | OXYGEN, DIS- SOLVED OF (MG/L) | OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) |
|-------|------|----------------------------------|---|---|--------------------------------------|--|---|--|
| FEB | | | | | | | | |
| 14... | 1239 | 1.00 | 184 | 7.6 | 21.5 | 760 | 6.8 | 77 |
| 14... | 1240 | 3.00 | 184 | 7.6 | 21.5 | 760 | 6.8 | 77 |
| 14... | 1241 | 5.00 | 186 | 7.6 | 21.5 | 760 | 6.8 | 77 |
| 14... | 1242 | 7.00 | 186 | 7.6 | 21.5 | 760 | 6.8 | 77 |
| 14... | 1243 | 9.00 | 186 | 7.5 | 21.5 | 760 | 6.8 | 77 |
| MAR | | | | | | | | |
| 06... | 1252 | 1.00 | 160 | 7.5 | 21.5 | 755 | 7.3 | 84 |
| 06... | 1253 | 3.00 | 160 | 7.5 | 21.5 | 755 | 7.3 | 84 |
| 06... | 1255 | 5.00 | 158 | 7.4 | 21.0 | 755 | 6.7 | 76 |
| 06... | 1257 | 7.00 | 160 | 7.4 | 21.0 | 755 | 6.2 | 70 |
| 06... | 1259 | 9.00 | 160 | 7.4 | 21.0 | 755 | 6.2 | 70 |

212335157483003 HOOMALUHIA RES SEC 4-3 NR KANEOHE, OAHU (LAT 21°23'35" LONG 157°48'30")

| DATE | TIME | SAM- PLING DEPTH (FEET) | SPE- CIFIC CON- DUCT- ANCE (US/CM) | PH WATER WHOLE FIELD (STAND- ARD UNITS) | TEMPER- ATURE WATER (DEG C) | BARO- METRIC PRES- SURE (MM HG) | OXYGEN, DIS- SOLVED OF (MG/L) | OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) |
|-------|------|----------------------------------|---|---|--------------------------------------|--|---|--|
| FEB | | | | | | | | |
| 14... | 1245 | 1.00 | 186 | 7.6 | 21.5 | 760 | 6.9 | 78 |
| 14... | 1246 | 3.00 | 186 | 7.5 | 21.5 | 760 | 6.9 | 78 |
| 14... | 1247 | 5.00 | 186 | 7.5 | 21.5 | 760 | 6.8 | 77 |
| 14... | 1248 | 7.00 | 186 | 7.5 | 21.5 | 760 | 6.9 | 78 |
| 14... | 1249 | 9.00 | 184 | 7.6 | 21.5 | 760 | 6.8 | 77 |
| 14... | 1250 | 11.00 | 186 | 7.5 | 21.5 | 760 | 6.8 | 77 |
| MAR | | | | | | | | |
| 06... | 1243 | 1.00 | 158 | 7.4 | 21.5 | 755 | 7.2 | 82 |
| 06... | 1244 | 3.00 | 158 | 7.4 | 21.5 | 755 | 7.1 | 81 |
| 06... | 1245 | 5.00 | 156 | 7.4 | 21.0 | 755 | 6.6 | 75 |
| 06... | 1246 | 7.00 | 156 | 7.4 | 21.0 | 755 | 6.4 | 73 |
| 06... | 1247 | 9.00 | 158 | 7.3 | 21.0 | 755 | 6.0 | 68 |
| 06... | 1249 | 11.00 | 158 | 7.3 | 21.0 | 755 | 5.7 | 65 |

ANALYSES OF SAMPLES COLLECTED AT WATER-QUALITY PARTIAL-RECORD STATIONS

WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

HAWAII, ISLAND OF OAHU--Continued

212336157482601 - HOOMALUHIA RESERVOIR AT OUTLET, NEAR KANEOHE (LAT 21°23'36" LONG 157°48'26")

| DATE | TIME | SPE- CIFIC CON- DUCT- ANCE (US/CM) | TEMPER- ATURE WATER (DEG C) | OXYGEN, DIS- SOLVED (MG/L) |
|-------|------|---|--------------------------------------|-------------------------------------|
| MAR | | | | |
| 06... | 1500 | 158 | 21.5 | 6.6 |
| 06... | 1600 | 160 | 21.5 | 6.9 |
| 06... | 1700 | 162 | 21.5 | 7.0 |
| 06... | 1800 | 162 | 21.5 | 6.7 |
| 06... | 1900 | 164 | 21.5 | 6.8 |
| 06... | 2000 | 162 | 21.5 | 7.5 |
| 06... | 2100 | 162 | 21.5 | 7.1 |
| 06... | 2200 | 162 | 21.5 | 7.1 |
| 06... | 2300 | 162 | 21.5 | 7.2 |
| 06... | 2400 | 162 | 21.5 | 7.2 |
| 07... | 0100 | 162 | 21.5 | 7.0 |
| 07... | 0200 | 160 | 21.0 | 7.0 |
| 07... | 0300 | 162 | 21.0 | 7.0 |
| 07... | 0400 | 160 | 21.0 | 6.9 |
| 07... | 0500 | 162 | 21.0 | 6.9 |
| 07... | 0600 | 162 | 21.0 | 6.8 |
| 07... | 0700 | 162 | 21.0 | 6.7 |
| 07... | 0800 | 164 | 21.0 | 6.8 |
| 07... | 0900 | 164 | 21.0 | 6.8 |
| 07... | 1000 | 164 | 21.0 | 6.9 |
| 07... | 1100 | 164 | 21.0 | 6.9 |
| 07... | 1200 | 164 | 21.0 | 6.9 |
| 07... | 1300 | 166 | 21.0 | 6.8 |
| 07... | 1400 | 168 | 21.0 | 6.9 |

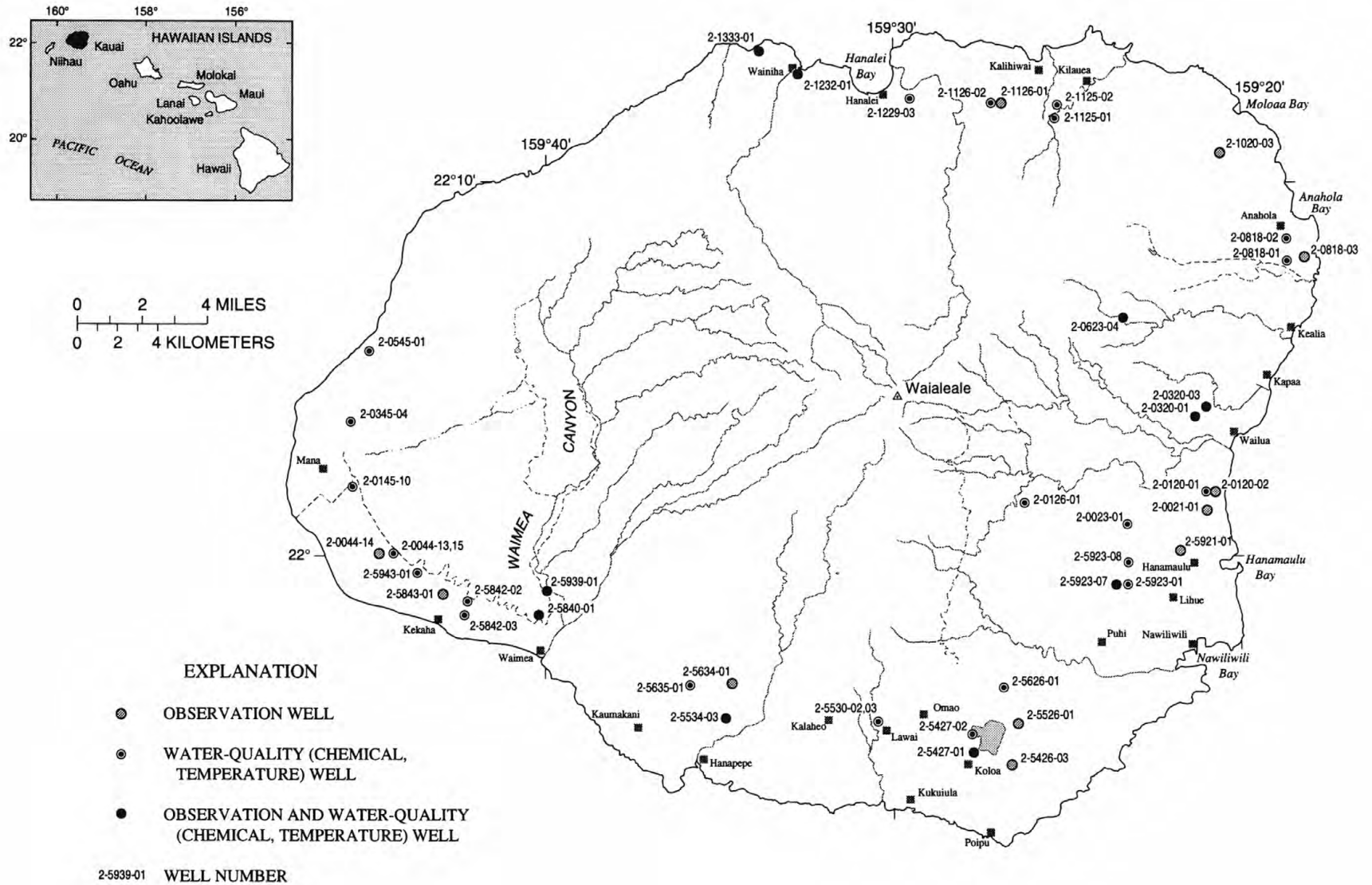


Figure 16. Locations of observation wells and ground-water quality sampling wells on Kauai.

GROUND-WATER LEVELS
HAWAII, ISLAND OF KAUAI

220057159210301, Local number 2-0021-01

LOCATION.--Lat 22°00'57" long 159°21'04" Hydrologic Unit 20070000, 1.0 mi southwest of Wailua County Golf Course, and 1.3 mi north of Hanamaulu Park. Owner: State of Hawaii, DOWALD.

AQUIFER.--Waimea Canyon Volcanic Series, Pliocene age.

WELL CHARACTERISTICS.--Drilled basal water table, depth 276 ft, casing diameter 8-in., cased to 196 ft.

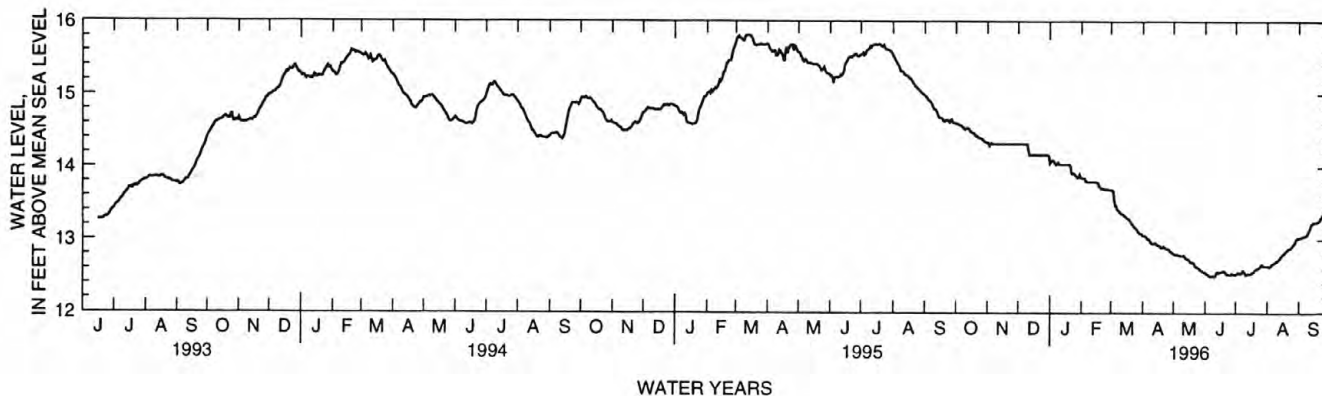
DATUM.--Elevation of land surface datum is 166 ft. Measuring point: Top of 4-in. galvanized coupling, 166.70 ft above mean sea level.

PERIOD OF RECORD.--Occasional measurements June 1980 to June 1993.
Water-level recorder, June 1993 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 15.86 ft above mean sea level, March 3, 1995; lowest measured, 12.65 ft above mean sea level, October 28, 1991.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 14.60 | 14.34 | 14.32 | 14.06 | 13.86 | 13.69 | 13.06 | 12.81 | 12.55 | 12.53 | 12.64 | 13.03 |
| 2 | 14.60 | 14.34 | 14.32 | 14.08 | 13.85 | 13.68 | 13.06 | 12.80 | 12.54 | 12.54 | 12.64 | 13.03 |
| 3 | 14.60 | 14.30 | 14.32 | 14.10 | 13.85 | 13.68 | 13.06 | 12.80 | 12.53 | 12.55 | 12.63 | 13.03 |
| 4 | 14.59 | 14.32 | 14.32 | 14.10 | 13.85 | 13.55 | 13.05 | 12.80 | 12.52 | 12.55 | 12.64 | 13.04 |
| 5 | 14.58 | 14.33 | 14.32 | 14.08 | 13.81 | 13.47 | 13.02 | 12.80 | 12.51 | 12.54 | 12.65 | 13.05 |
| 6 | 14.57 | 14.32 | 14.32 | 14.06 | 13.80 | 13.47 | 13.01 | 12.79 | 12.50 | 12.54 | 12.67 | 13.05 |
| 7 | 14.57 | 14.32 | 14.32 | 14.04 | 13.80 | 13.42 | 13.01 | 12.79 | 12.50 | 12.56 | 12.68 | 13.05 |
| 8 | 14.55 | 14.32 | 14.32 | 14.06 | 13.80 | 13.41 | 12.99 | 12.78 | 12.51 | 12.58 | 12.68 | 13.06 |
| 9 | 14.54 | 14.32 | 14.32 | 14.07 | 13.80 | 13.39 | 12.96 | 12.78 | 12.51 | 12.57 | 12.69 | 13.08 |
| 10 | 14.52 | 14.32 | 14.32 | 14.04 | 13.80 | 13.37 | 12.95 | 12.78 | 12.50 | 12.54 | 12.71 | 13.11 |
| 11 | 14.53 | 14.32 | 14.23 | 14.04 | 13.80 | 13.36 | 12.95 | 12.79 | 12.51 | 12.52 | 12.71 | 13.14 |
| 12 | 14.54 | 14.32 | 14.17 | 14.04 | 13.80 | 13.36 | 12.95 | 12.77 | 12.55 | 12.53 | 12.73 | 13.18 |
| 13 | 14.54 | 14.32 | 14.17 | 14.04 | 13.80 | 13.35 | 12.96 | 12.75 | 12.56 | 12.54 | 12.74 | 13.21 |
| 14 | 14.53 | 14.32 | 14.17 | 14.04 | 13.80 | 13.33 | 12.95 | 12.74 | 12.55 | 12.53 | 12.76 | 13.23 |
| 15 | 14.50 | 14.32 | 14.17 | 14.04 | 13.80 | 13.32 | 12.93 | 12.74 | 12.56 | 12.53 | 12.78 | 13.24 |
| 16 | 14.49 | 14.32 | 14.17 | 14.04 | 13.79 | 13.31 | 12.93 | 12.73 | 12.56 | 12.54 | 12.80 | 13.24 |
| 17 | 14.48 | 14.32 | 14.17 | 14.04 | 13.79 | 13.30 | 12.92 | 12.71 | 12.56 | 12.55 | 12.81 | 13.24 |
| 18 | 14.47 | 14.32 | 14.17 | 14.04 | 13.74 | 13.29 | 12.91 | 12.69 | 12.57 | 12.56 | 12.82 | 13.24 |
| 19 | 14.47 | 14.32 | 14.17 | 14.04 | 13.73 | 13.27 | 12.89 | 12.69 | 12.57 | 12.57 | 12.84 | 13.25 |
| 20 | 14.44 | 14.32 | 14.17 | 14.04 | 13.71 | 13.25 | 12.89 | 12.69 | 12.57 | 12.59 | 12.85 | 13.26 |
| 21 | 14.43 | 14.32 | 14.17 | 14.02 | 13.71 | 13.23 | 12.91 | 12.68 | 12.55 | 12.60 | 12.87 | 13.27 |
| 22 | 14.43 | 14.32 | 14.17 | 13.92 | 13.70 | 13.21 | 12.90 | 12.65 | 12.53 | 12.60 | 12.88 | 13.30 |
| 23 | 14.41 | 14.32 | 14.17 | 13.91 | 13.70 | 13.19 | 12.89 | 12.63 | 12.53 | 12.61 | 12.88 | 13.32 |
| 24 | 14.41 | 14.32 | 14.17 | 13.92 | 13.70 | 13.17 | 12.88 | 12.63 | 12.52 | 12.62 | 12.89 | 13.34 |
| 25 | 14.40 | 14.32 | 14.17 | 13.91 | 13.70 | 13.16 | 12.88 | 12.62 | 12.52 | 12.63 | 12.91 | 13.37 |
| 26 | 14.40 | 14.32 | 14.17 | 13.89 | 13.70 | 13.14 | 12.88 | 12.61 | 12.52 | 12.65 | 12.93 | 13.39 |
| 27 | 14.39 | 14.32 | 14.17 | 13.87 | 13.69 | 13.12 | 12.86 | 12.59 | 12.54 | 12.66 | 12.94 | 13.40 |
| 28 | 14.37 | 14.32 | 14.17 | 13.86 | 13.69 | 13.10 | 12.84 | 12.58 | 12.53 | 12.64 | 12.96 | 13.42 |
| 29 | 14.36 | 14.32 | 14.17 | 13.87 | 13.69 | 13.09 | 12.84 | 12.57 | 12.53 | 12.64 | 13.00 | 13.42 |
| 30 | 14.35 | 14.32 | 14.17 | 13.90 | --- | 13.09 | 12.82 | 12.56 | 12.52 | 12.64 | 13.02 | 13.44 |
| 31 | 14.34 | --- | 14.16 | 13.86 | --- | 13.08 | --- | 12.56 | --- | 12.64 | 13.02 | --- |
| MEAN | 14.48 | 14.32 | 14.22 | 14.00 | 13.77 | 13.32 | 12.94 | 12.71 | 12.53 | 12.58 | 12.80 | 13.21 |
| MAX | 14.60 | 14.34 | 14.32 | 14.10 | 13.86 | 13.69 | 13.06 | 12.81 | 12.57 | 12.66 | 13.02 | 13.44 |
| MIN | 14.34 | 14.30 | 14.16 | 13.86 | 13.69 | 13.08 | 12.82 | 12.56 | 12.50 | 12.52 | 12.63 | 13.03 |



GROUND-WATER LEVELS
HAWAII, ISLAND OF KAUAI--Continued

220019159444801. Local number 2-0044-14.

LOCATION.--Lat 22°00'19" N, long 159°44'48" W, Hydrologic Unit 20070000, 1.8 mi northeast of Kokole Point, and 2.8 mi northwest of Kekaha School. Owner: Kekaha Sugar Co.

AQUIFER.--Waimea Canyon Volcanic Series, Pliocene age.

WELL CHARACTERISTICS.--Drilled artesian well, depth 245 ft, casing diameter 12-in., cased to 164 ft.

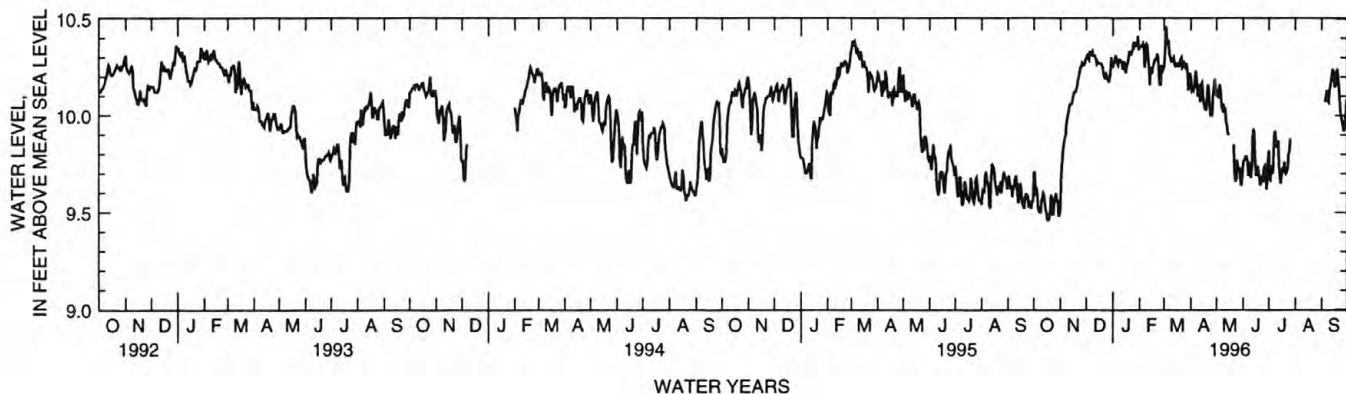
DATUM.--Elevation of land-surface datum is 8 ft. Measuring point: Top of standpipe, 11.49 ft above mean sea level. Prior to June 1979, nonrecording gage at datum 0.25 ft lower.

PERIOD OF RECORD.--Occasional measurements, 1937 to 1962 (measured by Kekaha Sugar Co.).
Water-level recorder, June 1979 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 11.07 ft above mean sea level, December 20, 1937; lowest measured, 7.52 ft above mean sea level, August 15, 1947.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|------|------|-------|-------|-------|-------|-------|-------|-------|------|------|-----|-------|
| 1 | 9.70 | 9.52 | 10.30 | 10.25 | 10.35 | 10.26 | 10.19 | 10.10 | 9.76 | 9.82 | --- | --- |
| 2 | 9.71 | 9.69 | 10.31 | 10.27 | 10.36 | 10.33 | 10.13 | 10.12 | 9.77 | 9.68 | --- | --- |
| 3 | 9.59 | 9.76 | 10.30 | 10.28 | 10.36 | 10.46 | 10.14 | 10.09 | 9.78 | 9.67 | --- | --- |
| 4 | 9.63 | 9.82 | 10.29 | 10.31 | 10.36 | 10.40 | 10.13 | 10.15 | 9.79 | 9.74 | --- | --- |
| 5 | 9.60 | 9.86 | 10.33 | 10.29 | 10.37 | 10.38 | 10.15 | 10.16 | 9.79 | 9.70 | --- | 10.07 |
| 6 | 9.52 | 9.88 | 10.33 | 10.27 | 10.34 | 10.39 | 10.21 | 10.11 | 9.77 | 9.73 | --- | 10.10 |
| 7 | 9.51 | 9.90 | 10.32 | 10.26 | 10.25 | 10.32 | 10.23 | 10.04 | 9.69 | 9.89 | --- | 10.13 |
| 8 | 9.50 | 9.96 | 10.33 | 10.29 | 10.36 | 10.30 | 10.17 | 10.03 | 9.72 | 9.92 | --- | 10.08 |
| 9 | 9.50 | 9.99 | 10.31 | 10.29 | 10.37 | 10.28 | 10.10 | 10.06 | 9.76 | 9.87 | --- | 10.07 |
| 10 | 9.56 | 10.01 | 10.31 | 10.28 | 10.36 | 10.28 | 10.16 | 10.02 | 9.68 | 9.84 | --- | 10.13 |
| 11 | 9.58 | 10.04 | 10.31 | 10.28 | 10.30 | 10.29 | 10.12 | 10.04 | 9.74 | 9.84 | --- | 10.15 |
| 12 | 9.60 | 10.06 | 10.29 | 10.24 | 10.24 | 10.30 | 10.07 | 9.97 | 9.89 | 9.87 | --- | 10.18 |
| 13 | 9.59 | 10.06 | 10.27 | 10.25 | 10.16 | 10.27 | 10.16 | 9.95 | 9.93 | 9.73 | --- | 10.21 |
| 14 | 9.54 | 10.06 | 10.28 | 10.28 | 10.25 | 10.25 | 10.17 | 9.91 | 9.91 | 9.67 | --- | 10.24 |
| 15 | 9.51 | 10.08 | 10.27 | 10.24 | 10.22 | 10.27 | 10.12 | 9.90 | 9.78 | 9.65 | --- | 10.22 |
| 16 | 9.49 | 10.11 | 10.27 | 10.22 | 10.22 | 10.27 | 10.06 | --- | 9.69 | 9.70 | --- | 10.15 |
| 17 | 9.46 | 10.12 | 10.27 | 10.26 | 10.26 | 10.27 | 10.04 | --- | 9.70 | 9.73 | --- | 10.15 |
| 18 | 9.46 | 10.12 | 10.27 | 10.27 | 10.27 | 10.25 | 10.03 | --- | 9.74 | 9.71 | --- | 10.22 |
| 19 | 9.47 | 10.13 | 10.26 | 10.30 | 10.29 | 10.28 | 10.03 | --- | 9.71 | 9.76 | --- | 10.24 |
| 20 | 9.51 | 10.15 | 10.25 | 10.33 | 10.29 | 10.29 | 10.11 | --- | 9.67 | 9.71 | --- | 10.21 |
| 21 | 9.59 | 10.18 | 10.21 | 10.33 | 10.30 | 10.30 | 10.16 | 9.85 | 9.64 | 9.70 | --- | 10.15 |
| 22 | 9.58 | 10.20 | 10.20 | 10.31 | 10.32 | 10.25 | 10.13 | 9.71 | 9.67 | 9.71 | --- | 10.10 |
| 23 | 9.49 | 10.22 | 10.22 | 10.33 | 10.29 | 10.26 | 10.05 | 9.66 | 9.68 | 9.73 | --- | 10.02 |
| 24 | 9.49 | 10.25 | 10.22 | 10.34 | 10.20 | 10.27 | 10.00 | 9.68 | 9.67 | 9.80 | --- | 9.99 |
| 25 | 9.55 | 10.25 | 10.19 | 10.38 | 10.16 | 10.25 | 10.00 | 9.77 | 9.73 | 9.82 | --- | 9.96 |
| 26 | 9.58 | 10.27 | 10.19 | 10.36 | 10.16 | 10.24 | 10.00 | 9.73 | 9.74 | 9.88 | --- | 9.94 |
| 27 | 9.60 | 10.26 | 10.17 | 10.37 | 10.26 | 10.27 | 10.10 | 9.71 | 9.71 | --- | --- | 9.92 |
| 28 | 9.56 | 10.26 | 10.19 | 10.36 | 10.23 | 10.22 | 10.15 | 9.73 | 9.62 | --- | --- | 9.95 |
| 29 | 9.56 | 10.27 | 10.22 | 10.36 | 10.24 | 10.13 | 10.19 | 9.66 | 9.66 | --- | --- | 10.02 |
| 30 | 9.48 | 10.29 | 10.30 | 10.41 | --- | 10.15 | 10.13 | 9.64 | 9.77 | --- | --- | 10.08 |
| 31 | 9.49 | --- | 10.25 | 10.34 | --- | 10.22 | --- | 9.68 | --- | --- | --- | --- |
| MEAN | 9.55 | 10.06 | 10.27 | 10.30 | 10.28 | 10.28 | 10.11 | --- | 9.74 | --- | --- | --- |
| MAX | 9.71 | 10.29 | 10.33 | 10.41 | 10.37 | 10.46 | 10.23 | --- | 9.93 | --- | --- | --- |
| MIN | 9.46 | 9.52 | 10.17 | 10.22 | 10.16 | 10.13 | 10.00 | --- | 9.62 | --- | --- | --- |



GROUND-WATER LEVELS
HAWAII, ISLAND OF KAUAI--Continued

220134159205401. Local number 2-0120-02.

LOCATION.--Lat 22°01'34 ", long 159°20'54 ", Hydrologic unit 20070000, 0.3 mi southwest of Wailua County Golf Course, and 1.6 mi south southwest of Wailua River Mouth. Owner: State of Hawaii, DOWALD.

AQUIFER.--Waimea Canyon Volcanic Series, Pliocene age.

WELL CHARACTERISTICS.--Drilled artesian well; depth 312 ft, casing diameter 6-in., cased to 60 ft.

DATUM.--Elevation of land-surface datum is 11 ft. Measuring point is the top of 10-in. plastic pipe, 11.36 ft above mean sea level. Prior to June 24, 1980 measuring point was the top of 6-in. steel casing, 11.93 ft above mean sea level.

PERIOD OF RECORD.--

Water level: Occasional measurements 1973 to 1980, 1987 to current year.

Water quality: Occasional measurements 1982 to 1987.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 11.79 ft above mean sea level, February 21, 1974; lowest measured, 8.08 ft above mean sea level, October 12, 1978.

REMARKS.--Well affected by pumping of nearby well.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

| DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL |
|--------|----------------|-------|----------------|--------|----------------|-------|----------------|--------|----------------|--------|----------------|--------|----------------|
| NOV 20 | 10.73 | JAN 4 | 11.36 | FEB 15 | 10.99 | APR 8 | 10.05 | JUN 12 | 8.71 | JUL 26 | 9.95 | AUG 30 | 10.30 |

220354159205601. Local number, 2-0320-01.

LOCATION.--Lat 22°03'54 ", long 159°20'56 ", Hydrologic unit 20070000, 0.6 mi east of Sleeping Giant Mountain, and 1.3 mi northwest of Wailua River bridge. Owner: Kauai County, Department of Water.

AQUIFER.--Koloa Volcanic Series, Pleistocene age.

WELL CHARACTERISTICS.--Drilled basal water-table well, depth 240 ft, casing diameter 8-in., cased to 193 ft.

DATUM.--Elevation of land-surface datum is 155 ft. Measuring point: Top edge of steel pump-base at 1" breather hole, 155.98 ft above mean sea level.

PERIOD OF RECORD.--

Water level: Occasional measurements, February 1960, June 1973 to current year.

Water quality: 1960, 1966, 1972-80, 1985-89, 1991, 1993.

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, 20.04 ft above mean sea level, February 17, 1960; lowest measured, 0.55 ft below mean sea level, August 11, 1995.

REMARKS.--Water used for public supply. Water level affected by pumping of nearby well.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

| DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL |
|--------|----------------|--------|----------------|--------|----------------|-------|----------------|-------|----------------|--------|----------------|
| OCT 20 | .52 | DEC 14 | .58 | FEB 14 | .50 | APR 9 | .48 | JUN 7 | 2.52 | JUL 23 | 1.65 |

GROUND-WATER LEVELS
HAWAII ISLAND OF KAUAI--Continued

220354159205602. Local number, 2-0320-03.

LOCATION.--Lat 22°03'54 " long 159°20'56 " Hydrologic unit 20070000, 0.6 mi east of Sleeping Giant Mountain, and 1.3 mi northwest of Wailua River bridge. Owner: Kauai County, Department of Water.

AQUIFER.--Koloa Volcanic Series, Pleistocene age.

WELL CHARACTERISTICS.--Drilled basal water-table well, depth 302 ft; casing diameter 14-in., cased to 168 ft.

DATUM.--Elevation of land-surface datum is 156 ft. Measuring point is the top edge of steel pump base at 1" breather hole, 156.94 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, 0.28 ft above mean sea level, August 11, 1995.

REMARKS.--Water is used for public supply. Water level affected by pumping of nearby well.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

| DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL |
|--------|-------------|--------|-------------|--------|-------------|-------|-------------|-------|-------------|--------|-------------|
| OCT 20 | .79 | DEC 14 | .85 | FEB 14 | .64 | APR 9 | .42 | JUN 6 | 2.79 | JUL 23 | 1.95 |

220621159232101. Local number 2-0623-04.

LOCATION.--Lat 22°06'11 " long 159°23'21 " Hydrologic Unit 20070000, 1.3 mi northeast of Kapahi Reservoir, and at the end of Kahuna Road. Owner: Kauai County, Dept. of Water.

AQUIFER.--Koloa Volcanic Series, Pliocene age.

WELL CHARACTERISTICS.--Drilled well; depth 1,023 ft, casing diameter 12-in., cased to 168 ft above mean sea level.

DATUM.--Elevation of land surface datum is 518 ft. Measuring point: Top of 3/4-in. pipe on concrete pump base, 516.35 ft above mean sea level.

PERIOD OF RECORD.--Occasional measurements April 1993 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 471.35 ft above mean sea level, July 23, 1996; lowest measured, 407.74 ft above mean sea level, October 20, 1995.

REMARKS.--Water is used for public supply.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

| DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL |
|--------|-------------|--------|-------------|--------|-------------|-------|-------------|-------|-------------|--------|-------------|
| OCT 20 | 407.74 | DEC 14 | 457.64 | FEB 14 | 469.08 | APR 9 | 458.24 | JUN 6 | 445.39 | JUL 23 | 471.35 |

GROUND-WATER LEVELS
HAWAII, ISLAND OF KAUAI--Continued

220825159185301. Local number 2-0818-03.

LOCATION.--Lat 22°08'25 ", long 159°18'53 ", Hydrologic Unit 20070000, 1.3 mi southwest of Kahala Point, and 0.2 mi south of Anahola School.
Owner: Kauai County, Dept. of Water.

AQUIFER.--Koloa Volcanic Series, Pliocene age.

WELL CHARACTERISTICS.--Drilled basal water table; depth 466 ft, casing diameter 12-in., cased to 290 ft above mean sea level.

DATUM.--Elevation of land surface datum is 267 ft. Measuring point: Top of west side of 4 1/2-in. pipe at 268.99 ft above mean sea level.

PERIOD OF RECORD.--Occasional measurements October 1991 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 12.03 ft above mean sea level, February 14, 1992; lowest measured, 9.26 ft above mean sea level, December 14, 1995.

REMARKS.--Water for future public supply. Water level affected by nearby wells.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

| DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL |
|--------|-------------|--------|-------------|--------|-------------|-------|-------------|-------|-------------|--------|-------------|
| OCT 20 | 10.67 | DEC 14 | 9.26 | FEB 14 | 10.99 | APR 9 | 11.00 | JUN 7 | 11.42 | JUL 23 | 11.64 |

221038159203801. Local number, 2-1020-03.

LOCATION.--Lat 22°10'38 ", long 159°20'38 ", Hydrologic Unit 20070000, 2.6 mi south of Kulikoa Point, and 2.6 mi northwest of Kuachu Point.
Owner: Amfac Properties Development Corp.

AQUIFER.--Waimea Canyon Volcanic Series, Pliocene age.

WELL CHARACTERISTICS.--Drilled basal water table well; depth 700 ft.

DATUM.--Elevation of land-surface datum 358 ft. Measuring point is the top of 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.

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 measured, 66.17 ft above mean sea level, November 6, 1973.

REMARKS.--Pump is in process of being replaced. Well unused at this time.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

| DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL |
|--------|-------------|-------|-------------|-------|-------------|--------|-------------|--------|-------------|--------|-------------|
| OCT 25 | 89.39 | DEC 8 | 92.47 | FEB 9 | 97.34 | APR 11 | 101.64 | JUN 10 | 105.60 | JUL 24 | 108.88 |

GROUND-WATER LEVELS
HAWAII, ISLAND OF KAUAI--Continued

221150159264501. Local number, 2-1126-01.

LOCATION.--Lat 22°11'50", long 159°26'45", Hydrologic Unit 20070000, 1.2 mi south of Princeville Airport terminal, and 4.0 mi east southeast of Puupoa Point. Owner: Princeville Hanalei.

AQUIFER.--Koloa Volcanic Series, Pliocene age.

WELL CHARACTERISTICS.--Drilled basal water-table well; depth 763 ft; casing diameter 14-in., cased to 435 ft.

DATUM.--Elevation of land-surface datum 348 ft. Measuring point is the top of 3/4-in. pipe, in 1-in. hole on southside of pump base, after removing airline connection, 349.64 ft above mean sea level.

PERIOD OF RECORD.--

Water level: Occasional measurements 1972 to current year.

Water quality: Occasional measurements 1977 to current year.

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.

REMARKS.--Water used for public supply and irrigation of golf course. Water level affected by nearby well.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

| DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL |
|--------|-------------|-------|-------------|-------|-------------|--------|-------------|--------|-------------|--------|-------------|
| OCT 25 | 5.49 | DEC 8 | 6.99 | FEB 9 | 7.98 | APR 11 | 8.72 | JUN 10 | 8.10 | JUL 24 | 7.35 |

221247159324801. Local number, 2-1232-01.

LOCATION.--Lat 22°12'47", long 159°32'48", Hydrologic Unit 20070000, 0.9 mi southwest of Kolokoko Point, and 1.5 mi southeast of Haena Point. Owner: Kauai County, Dept. of Water.

AQUIFER.--Koloa Volcanic Series, Pliocene age.

WELL CHARACTERISTICS.--Drilled basal water table well; depth 188 ft; casing diameter 6-in., cased to 140 ft.

DATUM.--Elevation of land-surface datum is 65 ft. Measuring point is the top of 1-in. pipe 0.06 ft above flange, 66.56 ft above mean sea level.

PERIOD OF RECORD.--

Water level: Occasional measurements 1972 to current year.

Water quality: Occasional measurements 1975 to current year.

REVISED RECORDS.--WDR HI-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 measured, 4.69 ft above mean sea level, August 6, 1993.

REMARKS.--Water used for public supply.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

| DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL |
|--------|-------------|--------|-------------|--------|-------------|-------|-------------|-------|-------------|--------|-------------|
| OCT 20 | 7.98 | DEC 14 | 9.73 | FEB 14 | 10.31 | APR 9 | 8.32 | JUN 7 | 7.09 | JUL 23 | 7.52 |

GROUND-WATER LEVELS
HAWAII, ISLAND OF KAUAI--Continued

221318159335901. Local number, 2-1333-01.

LOCATION.--Lat 22°13'18", long 159°33'59", Hydrologic Unit 20070000, 0.6 mi south southwest of Haena Point, and 1.2 mi east southeast of Kailiu Point. Owner: Kauai County, Dept. of Water.

AQUIFER.--Waimea Canyon Volcanic Series, Pliocene age.

WELL CHARACTERISTICS.--Drilled basal water-table well; depth 159 ft; casing diameter 8-in., cased to 104 ft.

DATUM.--Elevation of land-surface datum 83 ft. Measuring point is the top of pump base 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, 1.45 ft above mean sea level, August 26, 1986.

REMARKS.--Water used for public supply.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

| DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL |
|--------|-------------|--------|-------------|--------|-------------|-------|-------------|-------|-------------|--------|-------------|
| OCT 20 | 8.40 | DEC 12 | 8.95 | FEB 14 | 9.65 | APR 9 | 9.25 | JUN 7 | 9.16 | JUL 23 | 9.25 |

215434159263301. Local number, 2-5426-03.

LOCATION.--Lat 21°54'34", long 159°26'33", Hydrologic Unit 20070000, 0.6 mi northeast of Koloa Mill, and 2.6 mi north of Makahuena Point. Owner: Grove Farm Co. Inc.

AQUIFER.--Koloa Volcanic Series, Pliocene age.

WELL CHARACTERISTICS.--Drilled basal water-table well; depth 318 ft; casing diameter 12-in., cased to 176 ft.

DATUM.--Elevation of land-surface datum is 221 ft. Measuring point is the top of 1-in. hole on southwest side of flange, 222.30 ft above mean sea level.

PERIOD OF RECORD.--Occasional measurements of water level 1972 to current year.

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.

REMARKS.--Water used for irrigation.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

| DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL |
|--------|-------------|--------|-------------|--------|-------------|--------|-------------|--------|-------------|--------|-------------|
| OCT 23 | 23.92 | DEC 18 | 24.54 | FEB 26 | 24.86 | APR 10 | 24.99 | JUN 10 | 24.94 | JUL 22 | 24.90 |

GROUND-WATER LEVELS
HAWAII, ISLAND OF KAUAI--Continued

215454159274201. Local number, 2-5427-01.

LOCATION.--Lat 22°54'54", long 159°27'42", Hydrologic Unit 20070000, 0.1 mi west of the southwest corner of Waita Reservoir, and 2.7 mi northeast of Kaulala Point. Owner: Kauai County, Dept. of Water.

AQUIFER.--Koloa Volcanic Series, Pleistocene age.

WELL CHARACTERISTICS.--Drilled basal water-table well; depth 456 ft; casing diameter 12-in., cased to 263 ft.

DATUM.--Elevation of land surface datum is 245 ft. Measuring point is the bottom edge of the east side opening on pump base 246.77 ft above mean sea level.

PERIOD OF RECORD.--

Water level: Occasional measurements 1972 to current year.

Water quality: Occasional measurements 1972 to current year.

REVISED RECORDS.--WDR HI-94-1: 1988-94 (The minimum water level for the period of record.)

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 40.04 ft above mean sea level, July 15, 1974; lowest water level measured, 27.97 ft above mean sea level, October 6, 1988.

REMARKS.--Water used for public supply. Water level affected by nearby well.

REVISIONS.--All water level readings from March 29, 1990 to August 10, 1995 to be revised, with 0.28 ft being added to measurements. Error in measuring point elevation.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

| DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL |
|---------|----------------|--------|----------------|---------|----------------|---------|----------------|
| MAR. 29 | 34.94 | MAY 03 | 35.25 | JUL. 17 | 32.25 | AUG. 23 | 33.17 |

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

| DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL |
|---------|----------------|---------|----------------|---------|----------------|---------|----------------|---------|----------------|
| DEC. 13 | 35.41 | FEB. 07 | 35.54 | APR. 11 | 35.41 | JUN. 06 | 35.10 | AUG. 08 | 35.12 |

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1991 TO SEPTEMBER 1992
DAILY MEAN VALUES

| DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL |
|---------|----------------|---------|----------------|---------|----------------|---------|----------------|---------|----------------|---------|----------------|
| OCT. 24 | 35.43 | DEC. 12 | 35.65 | FEB. 13 | 36.10 | APR. 02 | 35.41 | JUN. 04 | 35.45 | AUG. 13 | 34.91 |

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

| DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL |
|---------|----------------|---------|----------------|---------|----------------|---------|----------------|---------|----------------|
| OCT. 08 | 34.91 | FEB. 11 | 35.37 | APR. 01 | 35.21 | JUN. 24 | 35.30 | AUG. 05 | 35.25 |

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1993 TO SEPTEMBER 1994

| DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL |
|---------|----------------|---------|----------------|---------|----------------|---------|----------------|---------|----------------|
| OCT. 14 | 34.65 | DEC. 09 | 34.86 | FEB. 07 | 34.89 | JUN. 09 | 34.89 | AUG. 04 | 34.70 |

GROUND-WATER LEVELS
HAWAII, ISLAND OF KAUAI--Continued

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995

| DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL |
|---------|-------------|---------|-------------|---------|-------------|---------|-------------|---------|-------------|---------|-------------|
| OCT. 11 | 34.36 | DEC. 07 | 34.79 | MAR. 02 | 35.28 | APR. 04 | 34.43 | JUN. 21 | 34.53 | AUG. 10 | 34.64 |

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

| DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL |
|--------|-------------|--------|-------------|--------|-------------|--------|-------------|-------|-------------|--------|-------------|
| OCT 19 | 35.02 | DEC 13 | 35.25 | FEB 13 | 35.16 | APR 10 | 34.97 | JUN 6 | 34.82 | JUL 22 | 34.82 |

215536159263501. Local number, 2-5526-01.

LOCATION.--Lat 21°55'36", long 159°26'35", Hydrologic Unit 20070000, 3.7 mi north of Makahuena Point, and 2.5 mi southeast of Knudsen Gap. Owner: McBryde Sugar Co.

AQUIFER.--Koloa Volcanic Series, Pleistocene age.

WELL CHARACTERISTICS.--Drilled basal water-table well; depth 1,010 ft; casing diameter 20-in., cased to 400 ft.

DATUM.--Elevation of land-surface is 355 ft. Measuring point is the top of 1-in. hole on top of pipe flange, southeast side of pump, 355.28 ft above mean sea level.

PERIOD OF RECORD.--

Water level: Occasional measurements 1977 to current year.
Water quality: Occasional measurements 1977 to current year.

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, 108.83 ft above mean sea level, June 4, 1992; lowest measured, 25.28 ft above mean sea level, April 5, 1984.

REMARKS.--Water used for sugar cane irrigation.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

| DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL |
|--------|-------------|--------|-------------|--------|-------------|--------|-------------|-------|-------------|--------|-------------|
| OCT 23 | 104.00 | DEC 13 | 104.16 | FEB 26 | 105.29 | APR 10 | 102.08 | JUN 6 | 103.99 | JUL 22 | 105.32 |

GROUND-WATER LEVELS

HAWAII, ISLAND OF KAUAI--Continued

215522159342601. Local number, 2-5534-03.

LOCATION.--Lat 21°55'22", long 159°34'26", Hydrologic Unit 20070000, 1.9 mi north from Weli Point, and 2.9 mi northeast from Puolo Point.
 Owner: Kauai County, Dept. of Water.

AQUIFER.--Koloa Volcanic Series, Pliocene age.

WELL CHARACTERISTICS.--Drilled basal water-table well; depth 108 ft; casing diameter 9-in., cased to 108 ft.

DATUM.--Elevation of land surface datum 78 ft. Measuring point is the top of 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.

REMARKS.--Water used for public supply.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

| DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL |
|--------|-------------|--------|-------------|--------|-------------|-------|-------------|-------|-------------|--------|-------------|
| OCT 19 | 14.90 | DEC 13 | 17.53 | FEB 13 | 16.48 | MAY 2 | 17.58 | JUN 6 | 16.49 | JUL 22 | 16.69 |

GROUND-WATER LEVELS

HAWAII, ISLAND OF KAUAI--Continued

215607159344301. Local number 2-5634-01.

LOCATION.--Lat 21°56'07" long 159°34'43", Hydrologic Unit 20070000, 2.7 mi north of Weli Point, and 3.3 mi northeast of Puolo Point.
 Owner: State of Hawaii.

AQUIFER.--Koloa Volcanic Series, Pliocene age.

WELL CHARACTERISTICS.--Drilled basal water-table well, depth 508 ft, casing diameter 8-in., cased to 507 ft.

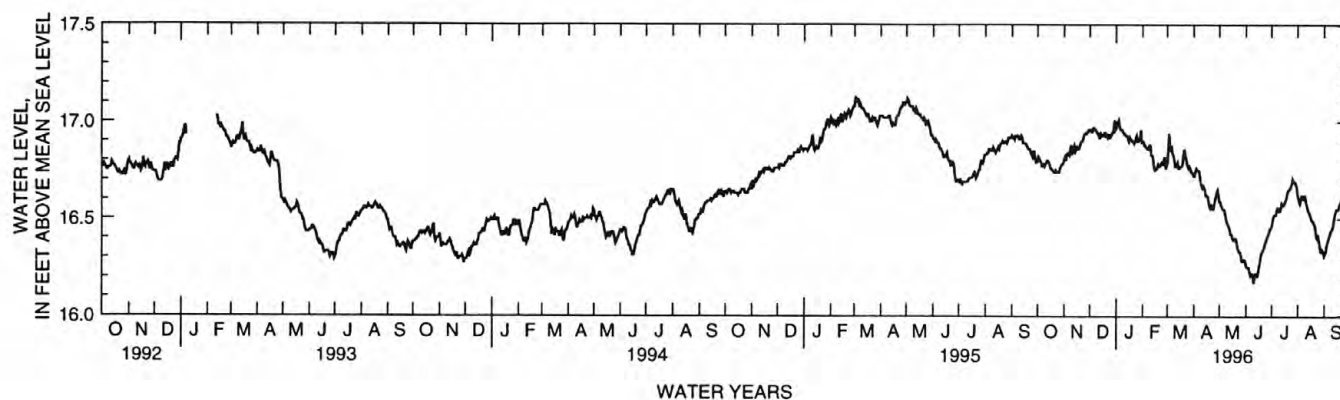
DATUM.--Elevation of land-surface datum is 439 ft. Measuring point: Top of casing 440.62 ft above mean sea level.

PERIOD OF RECORD.--Water level recorder, February 1986 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 17.83 ft above mean sea level, January 15, 16, 1992; lowest measured, 15.87 ft above mean sea level, November 1, 1989.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
 DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 16.80 | 16.81 | 16.96 | 16.97 | 16.90 | 16.79 | 16.72 | 16.59 | 16.26 | 16.46 | 16.63 | 16.31 |
| 2 | 16.82 | 16.82 | 16.96 | 17.00 | 16.90 | 16.85 | 16.72 | 16.59 | 16.25 | 16.48 | 16.61 | 16.32 |
| 3 | 16.81 | 16.80 | 16.95 | 17.00 | 16.88 | 16.94 | 16.75 | 16.57 | 16.25 | 16.51 | 16.59 | 16.33 |
| 4 | 16.80 | 16.83 | 16.95 | 17.01 | 16.88 | 16.87 | 16.76 | 16.56 | 16.25 | 16.52 | 16.58 | 16.36 |
| 5 | 16.79 | 16.84 | 16.97 | 16.98 | 16.87 | 16.85 | 16.75 | 16.55 | 16.23 | 16.52 | 16.60 | 16.38 |
| 6 | 16.77 | 16.84 | 16.97 | 16.96 | 16.87 | 16.88 | 16.75 | 16.55 | 16.21 | 16.52 | 16.62 | 16.39 |
| 7 | 16.77 | 16.83 | 16.96 | 16.96 | 16.86 | 16.84 | 16.75 | 16.54 | 16.22 | 16.54 | 16.62 | 16.41 |
| 8 | 16.78 | 16.86 | 16.96 | 16.96 | 16.86 | 16.83 | 16.72 | 16.52 | 16.22 | 16.56 | 16.61 | 16.42 |
| 9 | 16.77 | 16.88 | 16.95 | 16.95 | 16.88 | 16.81 | 16.69 | 16.49 | 16.21 | 16.56 | 16.62 | 16.44 |
| 10 | 16.78 | 16.83 | 16.94 | 16.94 | 16.88 | 16.77 | 16.67 | 16.48 | 16.17 | 16.54 | 16.62 | 16.44 |
| 11 | 16.79 | 16.85 | 16.94 | 16.94 | 16.83 | 16.77 | 16.66 | 16.47 | 16.20 | 16.54 | 16.59 | 16.45 |
| 12 | 16.80 | 16.87 | 16.92 | 16.93 | 16.83 | 16.78 | 16.67 | 16.46 | 16.22 | 16.56 | 16.57 | 16.47 |
| 13 | 16.80 | 16.88 | 16.92 | 16.93 | 16.82 | 16.79 | 16.66 | 16.44 | 16.22 | 16.58 | 16.55 | 16.50 |
| 14 | 16.79 | 16.85 | 16.94 | 16.93 | 16.78 | 16.76 | 16.65 | 16.42 | 16.20 | 16.57 | 16.54 | 16.53 |
| 15 | 16.78 | 16.86 | 16.93 | 16.91 | 16.75 | 16.76 | 16.62 | 16.42 | 16.22 | 16.57 | 16.53 | 16.54 |
| 16 | 16.76 | 16.87 | 16.93 | 16.90 | 16.75 | 16.77 | 16.62 | 16.40 | 16.25 | 16.58 | 16.52 | 16.55 |
| 17 | 16.76 | 16.86 | 16.93 | 16.92 | 16.76 | 16.77 | 16.62 | 16.39 | 16.27 | 16.59 | 16.50 | 16.55 |
| 18 | 16.75 | 16.86 | 16.94 | 16.91 | 16.76 | 16.77 | 16.60 | 16.39 | 16.30 | 16.60 | 16.49 | 16.55 |
| 19 | 16.75 | 16.87 | 16.93 | 16.91 | 16.78 | 16.79 | 16.57 | 16.40 | 16.32 | 16.62 | 16.49 | 16.57 |
| 20 | 16.74 | 16.89 | 16.94 | 16.90 | 16.77 | 16.84 | 16.56 | 16.40 | 16.33 | 16.64 | 16.48 | 16.58 |
| 21 | 16.74 | 16.90 | 16.93 | 16.90 | 16.77 | 16.86 | 16.58 | 16.38 | 16.34 | 16.65 | 16.47 | 16.59 |
| 22 | 16.75 | 16.90 | 16.92 | 16.89 | 16.78 | 16.83 | 16.56 | 16.35 | 16.35 | 16.65 | 16.45 | 16.61 |
| 23 | 16.74 | 16.91 | 16.94 | 16.90 | 16.79 | 16.81 | 16.55 | 16.34 | 16.37 | 16.66 | 16.41 | 16.62 |
| 24 | 16.74 | 16.93 | 16.92 | 16.92 | 16.78 | 16.78 | 16.55 | 16.33 | 16.38 | 16.67 | 16.40 | 16.64 |
| 25 | 16.74 | 16.94 | 16.92 | 16.93 | 16.78 | 16.77 | 16.58 | 16.33 | 16.39 | 16.68 | 16.41 | 16.64 |
| 26 | 16.74 | 16.94 | 16.93 | 16.90 | 16.81 | 16.76 | 16.60 | 16.31 | 16.41 | 16.71 | 16.39 | 16.62 |
| 27 | 16.76 | 16.94 | 16.94 | 16.90 | 16.82 | 16.77 | 16.62 | 16.28 | 16.42 | 16.70 | 16.36 | 16.59 |
| 28 | 16.77 | 16.95 | 16.95 | 16.91 | 16.76 | 16.76 | 16.64 | 16.28 | 16.43 | 16.69 | 16.33 | 16.57 |
| 29 | 16.78 | 16.95 | 16.96 | 16.92 | 16.77 | 16.74 | 16.65 | 16.29 | 16.45 | 16.69 | 16.33 | 16.53 |
| 30 | 16.78 | 16.96 | 17.01 | 16.96 | --- | 16.74 | 16.62 | 16.29 | 16.45 | 16.68 | 16.34 | 16.53 |
| 31 | 16.79 | --- | 16.96 | 16.89 | --- | 16.73 | --- | 16.28 | --- | 16.67 | 16.33 | --- |
| MEAN | 16.77 | 16.88 | 16.94 | 16.93 | 16.82 | 16.80 | 16.65 | 16.42 | 16.29 | 16.60 | 16.50 | 16.50 |
| MAX | 16.82 | 16.96 | 17.01 | 17.01 | 16.90 | 16.94 | 16.76 | 16.59 | 16.45 | 16.71 | 16.63 | 16.64 |
| MIN | 16.74 | 16.80 | 16.92 | 16.89 | 16.75 | 16.73 | 16.55 | 16.28 | 16.17 | 16.46 | 16.33 | 16.31 |



GROUND-WATER LEVELS
HAWAII, ISLAND OF KAUAI--Continued

215803159401201. Local number, 2-5840-01.

LOCATION.--Lat 21°58'03", long 159°40'12", Hydrologic Unit 20070000, 0.7 mi north of Waimea Recreational Pier State Park, and 2.4 mi east northeast of Oomano Point. Owner: Kauai County, Dept. of Water.

AQUIFER.--Waimea Canyon Volcanic Series, Pliocene age.

WELL CHARACTERISTICS.--Drilled basal water-table well, depth 190 ft, casing diameter 8-in., cased to 167 ft.

DATUM.--Elevation of land-surface datum is 167 ft. Measuring point is the top of 1-in. hole on pump base, 168.08 ft above mean sea level.

PERIOD OF RECORD.--

Water level: Occasional measurements 1973 to current year.

Water quality: Occasional measurements 1972-89, 94.

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 measured, 6.58 ft above mean sea level, July 19, 1990.

REMARKS.--Water used for public supply.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

| DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL |
|--------|-------------|--------|-------------|--------|-------------|--------|-------------|-------|-------------|--------|-------------|
| OCT 19 | 8.62 | DEC 13 | 8.98 | FEB 13 | 8.84 | APR 10 | 8.64 | JUN 6 | 8.55 | JUL 22 | 8.74 |

215857159430101. Local number, 2-5843-01.

LOCATION.--Lat 21°58'57", long 159°43'01", Hydrologic Unit 20070000, 2.7 mi east northeast from Kokole Point, and 1.4 mi north northwest of Oomano Point. Owner: Kauai County, Dept. of Water.

AQUIFER.--Waimea Canyon Volcanic Series, Pliocene age.

WELL CHARACTERISTICS.--Drilled artesian well; depth 53 ft, casing diameter 15 ft, cased to 10 ft.

DATUM.--Elevation of land surface is 57 ft. Measuring point is the top west side of concrete shaft 57.70 ft above mean sea level.

PERIOD OF RECORD.--

Water level: Occasional measurements 1972, 1985 to current year.

Water quality: One measurement in 1972.

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 measured, 7.82 ft above mean sea level, April 25, 1988.

REMARKS.--Well used for public supply.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

| DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL |
|--------|-------------|--------|-------------|--------|-------------|--------|-------------|-------|-------------|--------|-------------|
| OCT 19 | 8.33 | DEC 13 | 9.23 | FEB 13 | 9.23 | APR 10 | 8.65 | JUN 6 | 8.39 | JUL 22 | 8.59 |

GROUND-WATER LEVELS
HAWAII, ISLAND OF KAUAI--Continued

215958159214301. Local number 2-5921-01.

LOCATION.--Lat 21°59'58", long 159°21'43 ", Hydrologic Unit 20070000, 1.0 mi west of Hanamaulu Beach Park, and 3.3 mi south southwest of Lydgate State Park. Owner: Kauai County, Department of Water.

AQUIFER.--Waimea Canyon Volcanic Series, Pliocene age.

WELL CHARACTERISTICS.--Drilled basal water-table well, depth 540 ft, casing diameter 14-in., cased to 315 ft.

DATUM.--Elevation of land-surface datum is 302 ft. Measuring point: Top of 1-in. pipe, northeast side of flange after removing the plug, elevation 302.66 above mean sea level.

PERIOD OF RECORD.--Occasional measurements, July 1980 to September 1985. Water-level recorder, October 1985 to July 1992. Occasional measurements, October 1992 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 measured, 11.99 ft above mean sea level, July 23, 1996.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

| DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL |
|--------|-------------|--------|-------------|--------|-------------|-------|-------------|-------|-------------|--------|-------------|
| OCT 25 | 15.17 | DEC 14 | 14.28 | FEB 14 | 13.66 | APR 9 | 12.93 | JUN 7 | 12.33 | JUL 23 | 11.99 |

215901159235201. Local number, 2-5923-07.

LOCATION.--Lat 21°59'01", long 159°23'52", Hydrologic Unit 20070000, 4.2 mi northwest of Ninini Point, and 3.4 mi west from Lihue Airport terminal. Owner: Kauai County, Dept. of Water.

AQUIFER.--Koloa Volcanic Series, Pliocene age.

WELL CHARACTERISTICS.--Drilled perch water-table well; depth 200 ft, casing diameter 12-in., cased to 200 ft.

DATUM.--Elevation of land surface is 364 ft. Measuring point is the top of 1-in. pump base opening, after removing copper fittings, 365.48 ft above mean sea level.

PERIOD OF RECORD.--

Water level: Occasional measurements 1985 to current year.

Water quality: Occasional measurements 1985 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 226.86 ft above mean sea level, December 8, 1989; lowest water level measured, 213.17 ft above mean sea level, June 7, 1991.

REMARKS.--Water used for public supply. Water level affected by nearby well.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

| DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL |
|--------|-------------|--------|-------------|--------|-------------|-------|-------------|-------|-------------|--------|-------------|
| OCT 20 | 215.70 | DEC 14 | 216.78 | FEB 14 | 217.26 | APR 9 | 215.24 | JUN 7 | 217.13 | JUL 23 | 219.87 |

GROUND-WATER LEVELS
HAWAII, ISLAND OF KAUAI--Continued

215906159395601. Local number, 2-5939-01.

LOCATION.--Lat 21°59'06", long 159°39'56", Hydrologic Unit 20070000, 2.3 mi north northeast of Waimea Recreational Pier State Park, and 3.2 mi northeast from Oomano Point. Owner: Kauai County, Dept. of Water.

AQUIFER.--Waimea Canyon Volcanic Series, Pliocene age.

WELL CHARACTERISTICS.--Drilled basal water-table well; depth 40 ft, 6.5 ft diameter, uncased.

DATUM.--Elevation of land surface is 42 ft. Measuring point is the top west side of concrete base 41.61 ft above mean sea level.

PERIOD OF RECORD.--

Water level: Occasional measurements 1972 to current year.

Water quality: Occasional measurements 1972 to current year.

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, 10.43 ft above mean sea level, January 14, 1988; lowest water level measured, 8.71 ft below mean sea level, March 9, 1981.

REMARKS.--Water is presently unused.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

| DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL |
|--------|-------------|--------|-------------|--------|-------------|--------|-------------|-------|-------------|--------|-------------|
| OCT 19 | 9.19 | DEC 13 | 9.58 | FEB 15 | 9.44 | APR 10 | 9.31 | JUN 6 | 9.18 | JUL 22 | 10.08 |

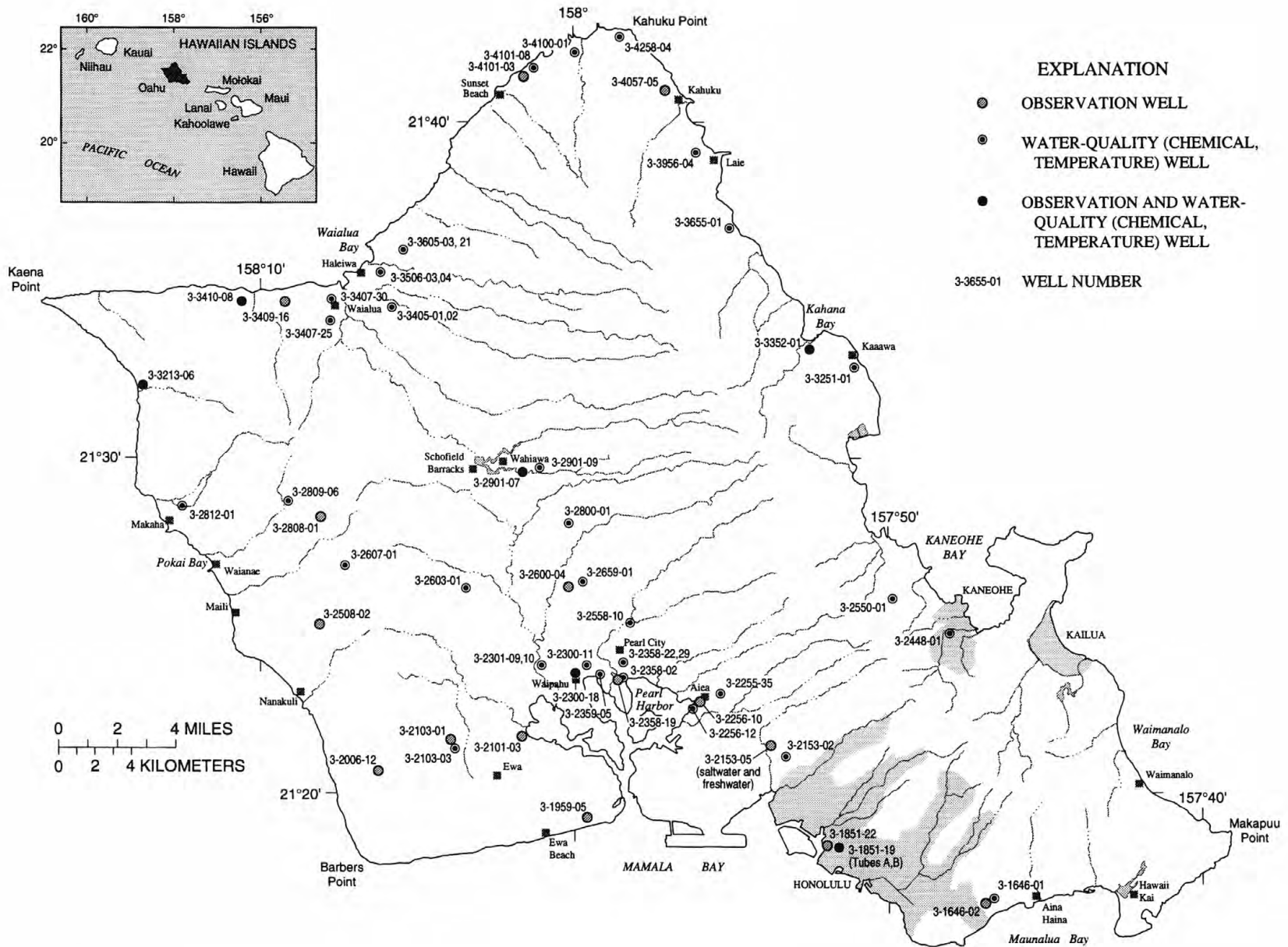


Figure 17. Locations of observation wells and ground-water quality sampling wells on Oahu.

GROUND-WATER LEVELS
HAWAII ISLAND OF OAHU

211646157465202. Local number, 3-1646-02.

LOCATION.--Lat 21°16'46", long 157°46'52", Hydrologic Unit 20060000, at Waialae Golf Course. Owner: Bishop Estate.

AQUIFER.--Basalt of Koolau Volcanic Series, Pliocene (?) age.

WELL CHARACTERISTICS.--Drilled well, depth 131 ft, casing diameter 4-in., cased to 100 ft.

DATUM.--Elevation of land-surface datum is 18 ft. Measuring point is top of casing, 13.84 ft above mean sea level.

REMARKS.--Prior to October 1993, unpublished records in files of the U.S. Geological Survey.

PERIOD OF RECORD.--Occasional measurements, September 1972 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 8.63 ft above mean sea level, January 27, 1983; lowest, 7.00 ft above mean sea level, June 10, 1986, July 23, 1986.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY MEAN VALUES

| DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL |
|--------|----------------|--------|----------------|--------|----------------|
| APR 04 | 7.58 | MAY 31 | 7.38 | AUG 27 | 7.45 |

211832157515501. Local number, 3-1851-19 Tube A.

LOCATION.--Lat 21° 18'32", long 157° 51'55", Hydrologic Unit 20060000, corner of Richards and Halekauwila Streets, adjacent to Ala Moana Boulevard. Owner: Hawaiian Electric Company.

AQUIFER.--Basalt of Koolau Volcanic Series, Pliocene age.

WELL CHARACTERISTICS.--Drilled artesian well, 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: 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 U.S. Geological Survey.

PERIOD OF RECORD.--

Water level: Occasional measurements, April 1969, March 1973 to current year.

Water quality: 1973 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 20.16 ft above mean sea level, August 13, 1974; lowest, 5.53 ft above mean sea level, September 25, 1990.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY MEAN VALUES

| DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL |
|-------|----------------|--------|----------------|--------|----------------|
| MAR 7 | 6.71 | MAY 31 | 6.74 | AUG 27 | a-- |

a-- unable to read water levels, no flow.

GROUND-WATER LEVELS
HAWAII ISLAND OF OAHU--Continued

211832157515501. Local number, 3-1851-19 Tube B.

LOCATION.--Lat 21°18'32", long 157°51'55", Hydrologic Unit 20060000, corner of Richards and Halekawila Streets, adjacent to Ala Moana Boulevard. Owner: Hawaiian Electric Company.

AQUIFER.--Basalt of Koolau Volcanic Series, Pliocene age.

WELL CHARACTERISTICS.--Drilled artesian well, 1/2-inch galvanized pipe at 988 feet depth. Tube B is the pipe furthest from Richards Street.

DATUM.--Elevation of land-surface datum is 6 ft. Measuring point: 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 U.S. Geological Survey.

PERIOD OF RECORD.--

Water level: Occasional measurements, April 1969, March 1973 to current year.

Water quality: 1973 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 26.16 ft above mean sea level, February 3, 1983; lowest, 13.54 ft above mean sea level, October 20, 1993.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY MEAN VALUES

| DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL |
|--------|----------------|--------|----------------|--------|----------------|
| MAR 07 | 17.64 | MAY 31 | 15.54 | AUG 27 | 14.63 |

211828157515801. Local number, 3-1851-22.

LOCATION.--Lat 21° 18'28", long 157° 51'58", Hydrologic Unit 20060000, northeast corner of the mini-park at the intersection of Richards Street and Ala Moana Boulevard. Owner: State of Hawaii.

AQUIFER.--Basalt of Koolau Volcanic Series, Pliocene age.

WELL CHARACTERISTICS.--Drilled artesian well, 3-in PVC pipe, depth 1,142 ft, bottom 60 ft slotted.

DATUM.--Elevation of land-surface datum is 7 ft. Measuring point: Edge of manhole cover, 7.30 ft above mean sea level.

REMARKS.--Prior to October 1993, unpublished records in files of the U.S. Geological Survey.

PERIOD OF RECORD.--

Water level: Water-level recorder, June 1983 to November 1986,

Occasional measurements, December 1982 to current year.

Water quality: 1982, 1987.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 22.74 ft above mean sea level, April 12, 1991; lowest, 15.97 ft, above mean sea level, September 11-13, 1985.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY MEAN VALUES

| DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL |
|-------|----------------|--------|----------------|--------|----------------|
| MAR 7 | 20.75 | MAY 31 | 19.76 | AUG 27 | 18.92 |

GROUND-WATER LEVELS
HAWAII ISLAND OF OAHU--Continued

211907157594701. Local number, 3-1959-05.

LOCATION.--Lat 21°19'06", long 157°59'46", Hydrologic Unit 20060000, 600 ft northwest of Ewa Beach Park, and 1.2 mi southeast of Campbell High School. Owner: Hawaii Institute of Geophysics.

AQUIFER.--Basalt of Koolau Volcanic Series, Tertiary age.

WELL CHARACTERISTICS.--Drilled basal water-table well, depth 1,110 ft, 5-in. PVC casing, bottom 12 ft perforated.

DATUM.--Elevation of land surface datum is 6 ft. Measuring point: Top of 5-in. PVC casing, 6.40 ft above mean sea level.

REMARKS.--October 2, 1990 to December 31, 1990, September 19, 1993 to October 21, 1993, February 16, 1994 to March 3, 1994, June 9, 1994 to July 26, 1994.

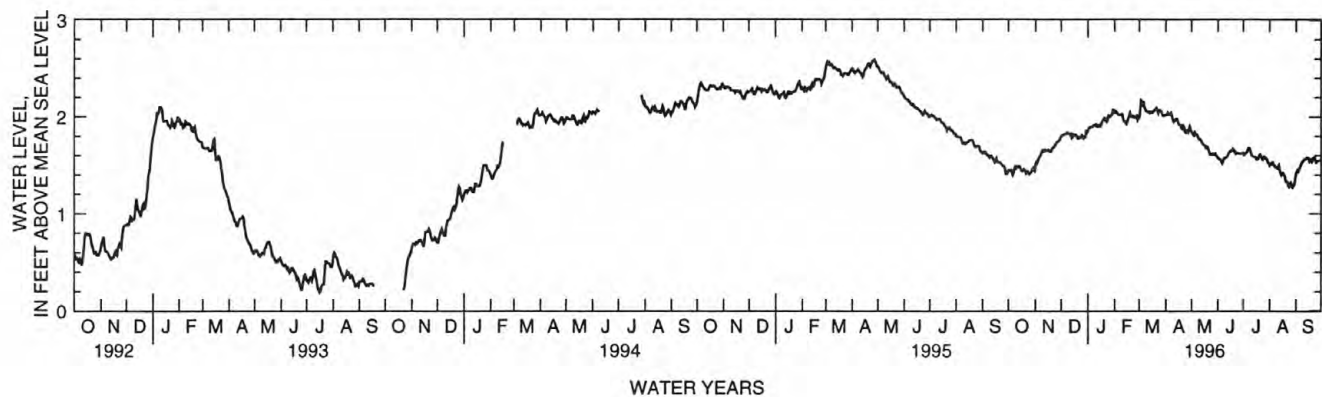
REMARKS.--Geophysical log and water-quality records are available in files of district office.

PERIOD OF RECORD.--Water-level recorder, December 1966 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 5.38 ft above mean sea level, January 17, 1969; lowest, 2.81 ft below mean sea level, August 25, 1977.

ELEVATION (FEET NGVD), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 1 | 1.45 | 1.51 | 1.80 | 1.86 | 2.04 | 1.99 | 2.02 | 1.85 | 1.58 | 1.63 | 1.50 | 1.41 |
| 2 | 1.45 | 1.53 | 1.81 | 1.88 | 2.06 | 2.05 | 2.02 | 1.83 | 1.57 | 1.61 | 1.51 | 1.44 |
| 3 | 1.45 | 1.52 | 1.81 | 1.89 | 2.05 | 2.17 | 2.04 | 1.82 | 1.56 | 1.62 | 1.51 | 1.45 |
| 4 | 1.45 | 1.55 | 1.82 | 1.90 | 2.04 | 2.16 | 2.02 | 1.81 | 1.56 | 1.63 | 1.53 | 1.44 |
| 5 | 1.42 | 1.58 | 1.82 | 1.90 | 2.03 | 2.13 | 2.02 | 1.84 | 1.54 | 1.63 | 1.53 | 1.47 |
| 6 | 1.40 | 1.59 | 1.82 | 1.90 | 2.02 | 2.16 | 2.03 | 1.82 | 1.52 | 1.65 | 1.50 | 1.48 |
| 7 | 1.43 | 1.60 | 1.83 | 1.90 | 2.02 | 2.10 | 2.04 | 1.82 | 1.54 | 1.68 | 1.50 | 1.51 |
| 8 | 1.48 | 1.63 | 1.84 | 1.92 | 2.02 | 2.08 | 2.01 | 1.81 | 1.56 | 1.68 | 1.48 | 1.53 |
| 9 | 1.49 | 1.65 | 1.83 | 1.92 | 2.03 | 2.06 | 1.97 | 1.78 | 1.58 | 1.66 | 1.48 | 1.54 |
| 10 | 1.47 | 1.64 | 1.83 | 1.91 | 2.03 | 2.06 | 1.95 | 1.77 | 1.58 | 1.63 | 1.47 | 1.55 |
| 11 | 1.48 | 1.64 | 1.83 | 1.92 | 1.98 | 2.05 | 1.96 | 1.77 | 1.58 | 1.60 | 1.48 | 1.56 |
| 12 | 1.49 | 1.66 | 1.81 | 1.90 | 1.96 | 2.05 | 1.97 | 1.76 | 1.59 | 1.59 | 1.50 | 1.56 |
| 13 | 1.49 | 1.65 | 1.79 | 1.90 | 1.95 | 2.04 | 1.98 | 1.74 | 1.61 | 1.59 | 1.45 | 1.57 |
| 14 | 1.49 | 1.65 | 1.82 | 1.91 | 1.94 | 2.05 | 1.98 | 1.72 | 1.63 | 1.59 | 1.42 | 1.58 |
| 15 | 1.46 | 1.65 | 1.80 | 1.92 | 1.93 | 2.04 | 1.95 | 1.71 | 1.64 | 1.59 | 1.40 | 1.58 |
| 16 | 1.45 | 1.66 | 1.82 | 1.91 | 1.95 | 2.04 | 1.92 | 1.71 | 1.65 | 1.58 | 1.41 | 1.57 |
| 17 | 1.44 | 1.65 | 1.82 | 1.94 | 1.98 | 2.05 | 1.92 | 1.70 | 1.65 | 1.56 | 1.42 | 1.54 |
| 18 | 1.45 | 1.64 | 1.82 | 1.96 | 2.01 | 2.06 | 1.92 | 1.68 | 1.65 | 1.56 | 1.40 | 1.55 |
| 19 | 1.46 | 1.64 | 1.80 | 1.97 | 2.04 | 2.07 | 1.89 | 1.69 | 1.67 | 1.57 | 1.39 | 1.56 |
| 20 | 1.44 | 1.66 | 1.78 | 1.99 | 2.01 | 2.08 | 1.88 | 1.69 | 1.66 | 1.60 | 1.34 | 1.54 |
| 21 | 1.42 | 1.68 | 1.79 | 1.99 | 2.00 | 2.09 | 1.91 | 1.66 | 1.64 | 1.61 | 1.33 | 1.56 |
| 22 | 1.44 | 1.68 | 1.78 | 1.96 | 2.01 | 2.07 | 1.90 | 1.63 | 1.62 | 1.60 | 1.33 | 1.58 |
| 23 | 1.44 | 1.69 | 1.79 | 1.95 | 2.01 | 2.04 | 1.85 | 1.61 | 1.63 | 1.57 | 1.29 | 1.58 |
| 24 | 1.42 | 1.71 | 1.79 | 1.97 | 1.99 | 2.07 | 1.84 | 1.61 | 1.63 | 1.56 | 1.28 | 1.55 |
| 25 | 1.41 | 1.72 | 1.81 | 2.01 | 1.99 | 2.07 | 1.86 | 1.61 | 1.62 | 1.58 | 1.31 | 1.53 |
| 26 | 1.42 | 1.74 | 1.80 | 2.00 | 2.00 | 2.06 | 1.85 | 1.62 | 1.62 | 1.59 | 1.32 | 1.54 |
| 27 | 1.43 | 1.75 | 1.78 | 2.00 | 2.01 | 2.05 | 1.84 | 1.61 | 1.62 | 1.58 | 1.28 | 1.55 |
| 28 | 1.45 | 1.75 | 1.79 | 2.02 | 1.97 | 2.02 | 1.88 | 1.61 | 1.62 | 1.57 | 1.27 | 1.55 |
| 29 | 1.47 | 1.76 | 1.79 | 2.02 | 1.99 | 2.01 | 1.90 | 1.62 | 1.62 | 1.56 | 1.29 | 1.55 |
| 30 | 1.45 | 1.78 | 1.85 | 2.08 | --- | 2.01 | 1.86 | 1.60 | 1.63 | 1.53 | 1.30 | 1.55 |
| 31 | 1.44 | --- | 1.84 | 2.04 | --- | 2.02 | --- | 1.59 | --- | 1.53 | 1.35 | --- |
| MEAN | 1.45 | 1.65 | 1.81 | 1.95 | 2.00 | 2.06 | 1.94 | 1.71 | 1.61 | 1.60 | 1.41 | 1.53 |
| MAX | 1.49 | 1.78 | 1.85 | 2.08 | 2.06 | 2.17 | 2.04 | 1.85 | 1.67 | 1.68 | 1.53 | 1.58 |
| MIN | 1.40 | 1.51 | 1.78 | 1.86 | 1.93 | 1.99 | 1.84 | 1.59 | 1.52 | 1.53 | 1.27 | 1.41 |



GROUND-WATER LEVELS
HAWAII ISLAND OF OAHU--Continued

212038158061501

-211907157594701. Local number, 3-1959-05. 3-2006-12

Record of water-level data for water year 1996 was not completed at the time of publication.

GROUND-WATER LEVELS
HAWAII ISLAND OF OAHU--Continued

212154158015201. Local number, 3-2101-03.

LOCATION.--Lat 21°21'54", long 158°01'52", Hydrologic Unit 20060000, 0.4 mi southeast of Honouliuli, and 0.5 mi north of Ewa Hospital.
Owner: State of Hawaii.

AQUIFER.--Basalt of Koolau Volcanic Series, Tertiary age.

WELL CHARACTERISTICS.--Drilled artesian well, depth 355 ft, 6-in. PVC casing, cased to 165 ft. Well was modified in January 1958 and May 1982.

DATUM.--Elevation of land-surface datum is 15 ft. Measuring point: Top of horizontal flange below petcock, 13.31 ft above mean sea level.

REMARKS.--Water-quality records for 1910-16, 1920-21, 1923-75, 1978-81, are available in files of district office.

PERIOD OF RECORD.--Occasional measurements, April 1910 to June 1921, September 1923 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 29.16 ft above mean sea level, April 1918; lowest observed, less than 11.2 ft, above mean sea level (below petcock then in use), September 2, and October 19, 1977.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY MEAN VALUES

| DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL |
|--------|----------------|--------|----------------|--------|----------------|
| APR 05 | 17.64 | MAY 20 | 17.08 | AUG 14 | 16.77 |

212132158035701. Local number, 3-2103-01.

LOCATION.--Lat 21°21'32", long 158°03'57", Hydrologic Unit 20060000, 1 mi east of Makakilo, and 2 mi north of Barbers Point Naval Air Station. owner: U.S. Navy.

AQUIFER.--Basalt of Waianae Volcanic Series, Pliocene age.

WELL CHARACTERISTICS.--Drilled well, depth 206 ft, casing diameter 6-in., cased to 17 ft.

DATUM.--Elevation of land-surface datum is 210 ft. Measuring point: Top of 6-in. pipe. Elevation: 211.70 ft above mean sea level.

REMARKS.--Prior to October 1993, unpublished records in files of the U.S. Geological Survey.

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: 1942, 1953-68.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 18.81 ft above mean sea level, February 20, 1957; lowest, 14.25 ft above mean sea level, July 5, 1978, September 20, 1978.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY MEAN VALUES

| DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL |
|--------|----------------|--------|----------------|--------|----------------|--------|----------------|
| APR 05 | 15.04 | APR 16 | 14.78 | MAY 21 | 14.62 | JUL 18 | 14.72 |

GROUND-WATER LEVELS
HAWAII ISLAND OF OAHU--Continued

212123157535501. Local number, 3-2153-05 Freshwater well.

LOCATION.--Lat 21°21'23", long 157°53'55", Hydrologic Unit 20060000, 0.4 mi northwest of Moanalua Elementary School, and 0.5 mi southwest of Tripler Hospital, in Moanalua. Owner: Honolulu Board of Water Supply.

AQUIFER.--Basalt of Koolau Volcanic Series, Tertiary age.

WELL CHARACTERISTICS.--Drilled basal water-table well, depth 1,246 ft, 6-in. PVC casing, cased to 24 ft, perforated from 24 to 1,246 ft. Well was modified and deepened August 1980. The well is a combination of a 3-in. PVC (salt water) and a 6-in. PVC (fresh water), encased in a 12-in. steel casing.

DATUM.--Elevation of land-surface datum is 35 ft. Measuring point: Top of 3-in. PVC casing, 37.90 ft above mean sea level.

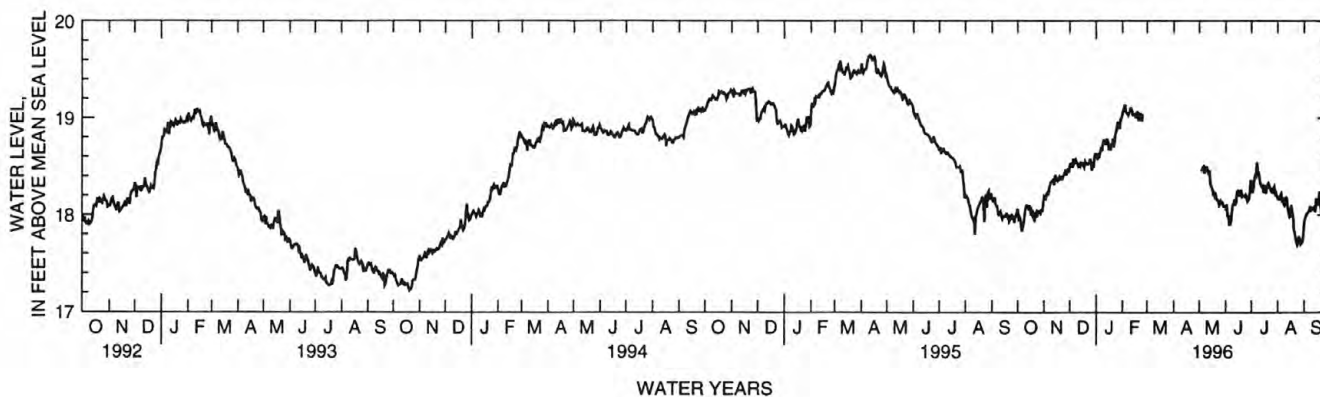
REMARKS.--Geophysical logs are available in files of district office. Prior to October 1993, unpublished records in files of the U.S. Geological Survey.

PERIOD OF RECORD.--Water-level recorder, March 1981 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 22.53 ft above mean sea level, January 9, 1983; lowest 16.56 ft above mean sea level, July 24, 1987.

ELEVATION (FEET NGVD), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|------|-------|-------|-------|-------|-------|-----|-----|-------|-------|-------|-------|-------|
| 1 | 18.06 | 18.19 | 18.52 | 18.63 | 19.04 | --- | --- | --- | 18.05 | 18.32 | 18.17 | 17.92 |
| 2 | 17.96 | 18.18 | 18.53 | 18.62 | 19.08 | --- | --- | --- | 18.11 | 18.23 | 18.16 | 17.96 |
| 3 | 17.98 | 18.17 | 18.53 | 18.57 | 19.11 | --- | --- | 18.45 | 17.99 | 18.27 | 18.16 | 17.99 |
| 4 | 17.96 | 18.22 | 18.49 | 18.62 | 19.14 | --- | --- | 18.46 | 17.99 | 18.36 | 18.20 | 18.01 |
| 5 | 17.88 | 18.23 | 18.58 | 18.61 | 19.07 | --- | --- | 18.49 | 17.90 | 18.41 | 18.22 | 18.02 |
| 6 | 17.83 | 18.22 | 18.53 | 18.66 | 19.05 | --- | --- | 18.50 | 17.90 | 18.40 | 18.15 | 18.03 |
| 7 | 17.88 | 18.28 | 18.55 | 18.70 | 19.05 | --- | --- | 18.43 | 17.93 | 18.54 | 18.16 | 18.05 |
| 8 | 17.91 | 18.31 | 18.57 | 18.66 | 19.03 | --- | --- | 18.45 | 18.02 | 18.45 | 18.11 | 18.09 |
| 9 | 18.00 | 18.34 | 18.54 | 18.74 | 19.06 | --- | --- | 18.49 | 18.10 | 18.44 | 18.10 | 18.05 |
| 10 | 18.06 | 18.35 | 18.53 | 18.78 | 19.07 | --- | --- | 18.49 | 18.11 | 18.38 | 18.14 | 18.06 |
| 11 | 18.10 | 18.35 | 18.50 | 18.75 | 19.11 | --- | --- | 18.45 | 18.16 | 18.33 | 18.19 | 18.07 |
| 12 | 18.10 | 18.37 | 18.51 | 18.73 | 19.08 | --- | --- | 18.43 | 18.10 | 18.30 | 18.15 | 18.06 |
| 13 | 18.08 | 18.31 | 18.50 | 18.73 | 19.03 | --- | --- | 18.44 | 18.13 | 18.29 | 18.06 | 18.09 |
| 14 | 18.05 | 18.41 | 18.55 | 18.79 | 19.03 | --- | --- | 18.31 | 18.24 | 18.30 | 18.02 | 18.03 |
| 15 | 18.10 | 18.39 | 18.52 | 18.76 | 19.04 | --- | --- | 18.29 | 18.25 | 18.23 | 17.98 | 18.17 |
| 16 | 18.03 | 18.36 | 18.53 | 18.67 | 19.04 | --- | --- | 18.28 | 18.24 | 18.31 | 17.99 | 18.13 |
| 17 | 18.05 | 18.35 | 18.51 | 18.72 | 19.00 | --- | --- | 18.22 | 18.19 | 18.26 | 18.10 | 18.10 |
| 18 | 18.00 | 18.37 | 18.49 | 18.67 | 19.06 | --- | --- | 18.23 | 18.22 | 18.22 | 18.03 | 18.18 |
| 19 | 18.02 | 18.39 | 18.55 | 18.73 | 19.06 | --- | --- | 18.19 | 18.26 | 18.27 | 17.98 | 18.24 |
| 20 | 17.95 | 18.36 | 18.53 | 18.73 | 18.98 | --- | --- | 18.21 | 18.19 | 18.31 | 17.85 | 18.11 |
| 21 | 17.93 | 18.40 | 18.52 | 18.79 | 18.98 | --- | --- | 18.17 | 18.20 | 18.33 | 17.82 | 18.02 |
| 22 | 18.01 | 18.36 | 18.52 | 18.70 | 19.05 | --- | --- | 18.15 | 18.20 | 18.31 | 17.76 | 18.04 |
| 23 | 18.03 | 18.39 | 18.53 | 18.79 | 19.00 | --- | --- | 18.15 | 18.19 | 18.27 | 17.72 | 18.04 |
| 24 | 17.98 | 18.41 | 18.55 | 18.84 | 18.97 | --- | --- | 18.10 | 18.21 | 18.25 | 17.69 | 18.04 |
| 25 | 18.04 | 18.43 | 18.58 | 18.87 | 19.04 | --- | --- | 18.11 | 18.19 | 18.26 | 17.72 | 17.94 |
| 26 | 18.04 | 18.47 | 18.54 | 18.94 | --- | --- | --- | 18.14 | 18.14 | 18.22 | 17.78 | 18.07 |
| 27 | 18.04 | 18.41 | 18.46 | 18.93 | --- | --- | --- | 18.12 | 18.15 | 18.27 | 17.74 | 18.06 |
| 28 | 18.02 | 18.45 | 18.52 | 18.96 | --- | --- | --- | 18.13 | 18.17 | 18.29 | 17.70 | 18.04 |
| 29 | 18.06 | 18.48 | 18.49 | 18.89 | --- | --- | --- | 18.10 | 18.25 | 18.22 | 17.71 | 18.01 |
| 30 | 18.03 | 18.44 | 18.61 | 18.99 | --- | --- | --- | 18.08 | 18.36 | 18.23 | 17.72 | 18.03 |
| 31 | 18.13 | --- | 18.63 | 19.00 | --- | --- | --- | --- | --- | 18.19 | 17.77 | --- |
| MEAN | 18.01 | 18.35 | 18.53 | 18.76 | --- | --- | --- | --- | 18.14 | 18.31 | 17.97 | 18.06 |
| MAX | 18.13 | 18.48 | 18.63 | 19.00 | --- | --- | --- | --- | 18.36 | 18.54 | 18.22 | 18.24 |
| MIN | 17.83 | 18.17 | 18.46 | 18.57 | --- | --- | --- | --- | 17.90 | 18.19 | 17.69 | 17.92 |



GROUND-WATER LEVELS
HAWAII ISLAND OF OAHU--Continued

212123157535503. Local number, 3-2153-05 Saltwater well.

LOCATION.--Lat 21°21'23", long 157°53'55", Hydrologic Unit 20060000, 0.4 mi northwest of Moanalua Elementary School, and 0.5 mi southwest of Tripler Hospital, in Moanalua. Owner: Honolulu Board of Water Supply.

AQUIFER.--Basalt of Koolau Volcanic Series, Tertiary age.

WELL CHARACTERISTICS.--Drilled basal water-table well, depth 1,246 ft, 3-in. PVC casing, cased to 46 ft, where it becomes 3/4-in. PVC pipe; two 5/8-in. holes at elevation 1,190 ft. Well was modified and deepened August 1980, and used to monitor water level (salt). The well is a combination of a 3-in. PVC (salt water) and a 6-in. PVC (fresh water), encased in a 12-in. steel casing.

DATUM.--Elevation of land-surface datum is 35 ft. Measuring point: Top of 6-in. PVC casing, 37.90 ft above mean sea level.

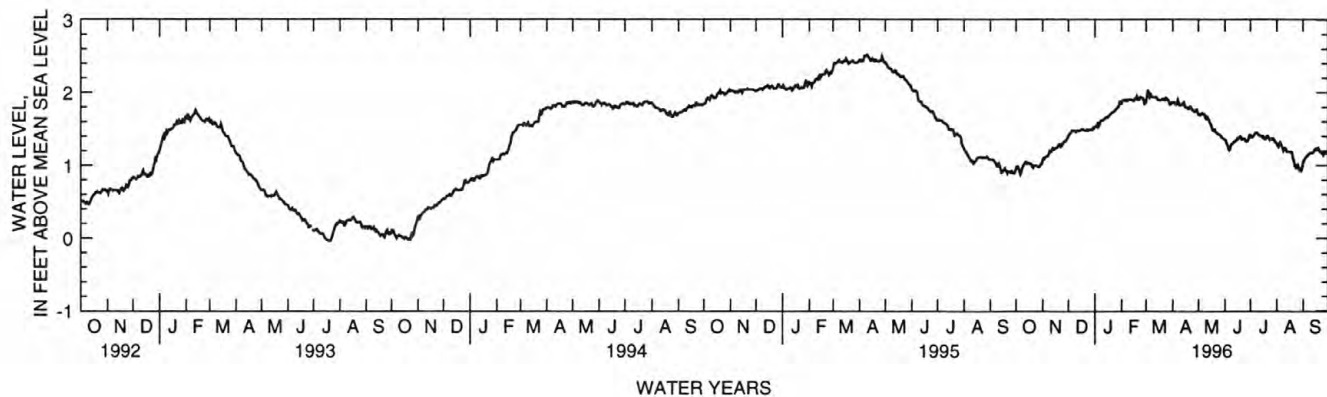
REMARKS.--Geophysical logs are available in files of district office. Prior to October 1993, unpublished records in files of the U.S. Geological Survey. No record March 5, 1991 to April 8, 1991.

PERIOD OF RECORD.--Water-level recorder, March 1981 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 4.45 ft above mean sea level, January 9, 1983; lowest, 1.45 ft below mean sea level, October 24, 1981.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 1 | .97 | 1.08 | 1.41 | 1.53 | 1.85 | 1.88 | 1.87 | 1.70 | 1.36 | 1.42 | 1.30 | 1.02 |
| 2 | .99 | 1.10 | 1.43 | 1.54 | 1.89 | 1.94 | 1.87 | 1.70 | 1.34 | 1.39 | 1.28 | 1.07 |
| 3 | .99 | 1.09 | 1.44 | 1.54 | 1.90 | 2.04 | 1.87 | 1.69 | 1.30 | 1.39 | 1.26 | 1.08 |
| 4 | .96 | 1.11 | 1.45 | 1.57 | 1.90 | 1.99 | 1.84 | 1.70 | 1.28 | 1.40 | 1.29 | 1.10 |
| 5 | .91 | 1.12 | 1.48 | 1.53 | 1.90 | 1.95 | 1.84 | 1.72 | 1.23 | 1.42 | 1.32 | 1.12 |
| 6 | .88 | 1.13 | 1.48 | 1.55 | 1.89 | 2.00 | 1.86 | 1.72 | 1.21 | 1.43 | 1.30 | 1.13 |
| 7 | .91 | 1.13 | 1.48 | 1.59 | 1.90 | 1.95 | 1.90 | 1.71 | 1.23 | 1.45 | 1.27 | 1.14 |
| 8 | .96 | 1.15 | 1.48 | 1.62 | 1.89 | 1.94 | 1.86 | 1.70 | 1.28 | 1.45 | 1.23 | 1.16 |
| 9 | .99 | 1.20 | 1.47 | 1.62 | 1.90 | 1.94 | 1.83 | 1.65 | 1.30 | 1.45 | 1.20 | 1.17 |
| 10 | 1.01 | 1.19 | 1.46 | 1.62 | 1.91 | 1.94 | 1.83 | 1.64 | 1.30 | 1.43 | 1.22 | 1.17 |
| 11 | 1.03 | 1.19 | 1.48 | 1.63 | 1.91 | 1.94 | 1.84 | 1.67 | 1.32 | 1.42 | 1.24 | 1.17 |
| 12 | 1.05 | 1.22 | 1.48 | 1.64 | 1.91 | 1.94 | 1.84 | 1.65 | 1.33 | 1.41 | 1.23 | 1.17 |
| 13 | 1.05 | 1.24 | 1.48 | 1.65 | 1.90 | 1.94 | 1.86 | 1.63 | 1.33 | 1.41 | 1.19 | 1.18 |
| 14 | 1.03 | 1.22 | 1.48 | 1.66 | 1.90 | 1.91 | 1.87 | 1.59 | 1.34 | 1.41 | 1.19 | 1.20 |
| 15 | 1.04 | 1.23 | 1.48 | 1.67 | 1.89 | 1.90 | 1.82 | 1.57 | 1.35 | 1.39 | 1.19 | 1.22 |
| 16 | 1.03 | 1.24 | 1.49 | 1.66 | 1.89 | 1.90 | 1.80 | 1.55 | 1.38 | 1.40 | 1.19 | 1.23 |
| 17 | 1.03 | 1.24 | 1.50 | 1.68 | 1.92 | 1.90 | 1.80 | 1.50 | 1.37 | 1.37 | 1.19 | 1.21 |
| 18 | 1.02 | 1.25 | 1.49 | 1.69 | 1.92 | 1.90 | 1.80 | 1.48 | 1.38 | 1.36 | 1.19 | 1.22 |
| 19 | 1.02 | 1.27 | 1.49 | 1.71 | 1.95 | 1.90 | 1.78 | 1.48 | 1.40 | 1.36 | 1.18 | 1.24 |
| 20 | .98 | 1.29 | 1.48 | 1.72 | 1.91 | 1.92 | 1.78 | 1.49 | 1.39 | 1.40 | 1.12 | 1.22 |
| 21 | .97 | 1.29 | 1.48 | 1.73 | 1.90 | 1.92 | 1.81 | 1.46 | 1.36 | 1.41 | 1.07 | 1.19 |
| 22 | 1.00 | 1.26 | 1.48 | 1.74 | 1.91 | 1.90 | 1.81 | 1.45 | 1.37 | 1.40 | 1.02 | 1.19 |
| 23 | 1.00 | 1.27 | 1.49 | 1.74 | 1.94 | 1.90 | 1.78 | 1.44 | 1.37 | 1.37 | .98 | 1.18 |
| 24 | 1.00 | 1.30 | 1.48 | 1.75 | 1.94 | 1.93 | 1.76 | 1.43 | 1.37 | 1.35 | .97 | 1.16 |
| 25 | 1.00 | 1.31 | 1.49 | 1.77 | 1.93 | 1.92 | 1.76 | 1.43 | 1.34 | 1.36 | 1.00 | 1.14 |
| 26 | .99 | 1.33 | 1.49 | 1.78 | 1.93 | 1.90 | 1.74 | 1.42 | 1.33 | 1.37 | 1.01 | 1.17 |
| 27 | .98 | 1.33 | 1.49 | 1.80 | 1.90 | 1.90 | 1.74 | 1.41 | 1.34 | 1.36 | .97 | 1.18 |
| 28 | .98 | 1.34 | 1.49 | 1.80 | 1.85 | 1.85 | 1.76 | 1.39 | 1.34 | 1.37 | .94 | 1.17 |
| 29 | 1.00 | 1.36 | 1.49 | 1.82 | 1.86 | 1.84 | 1.77 | 1.38 | 1.37 | 1.35 | .94 | 1.16 |
| 30 | 1.02 | 1.38 | 1.52 | 1.89 | --- | 1.85 | 1.73 | 1.37 | 1.42 | 1.32 | .93 | 1.16 |
| 31 | 1.02 | --- | 1.51 | 1.85 | --- | 1.87 | --- | 1.36 | --- | 1.32 | .96 | --- |
| MEAN | .99 | 1.23 | 1.48 | 1.68 | 1.90 | 1.92 | 1.81 | 1.55 | 1.33 | 1.39 | 1.14 | 1.16 |
| MAX | 1.05 | 1.38 | 1.52 | 1.89 | 1.95 | 2.04 | 1.90 | 1.72 | 1.42 | 1.45 | 1.32 | 1.24 |
| MIN | .88 | 1.08 | 1.41 | 1.53 | 1.85 | 1.84 | 1.73 | 1.36 | 1.21 | 1.32 | .93 | 1.02 |



GROUND-WATER LEVELS
HAWAII ISLAND OF OAHU--Continued

212238157561101. Local number, 3-2256-10.

LOCATION.--Lat 21°22'38", long 157°56'11", Hydrologic Unit 20060000, 0.4 mi southwest of Aiea School, and 0.5 mi east of McGrew Point.
Owner: U.S. Navy.

AQUIFER.--Basalt of Koolau Volcanic Series, Tertiary age.

WELL CHARACTERISTICS.--Drilled artesian well, depth 173 ft, casing diameter 12 in., cased to 143 ft.

DATUM.--Elevation of land-surface datum is 10 ft. Measuring point: Top of 10-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 district office.

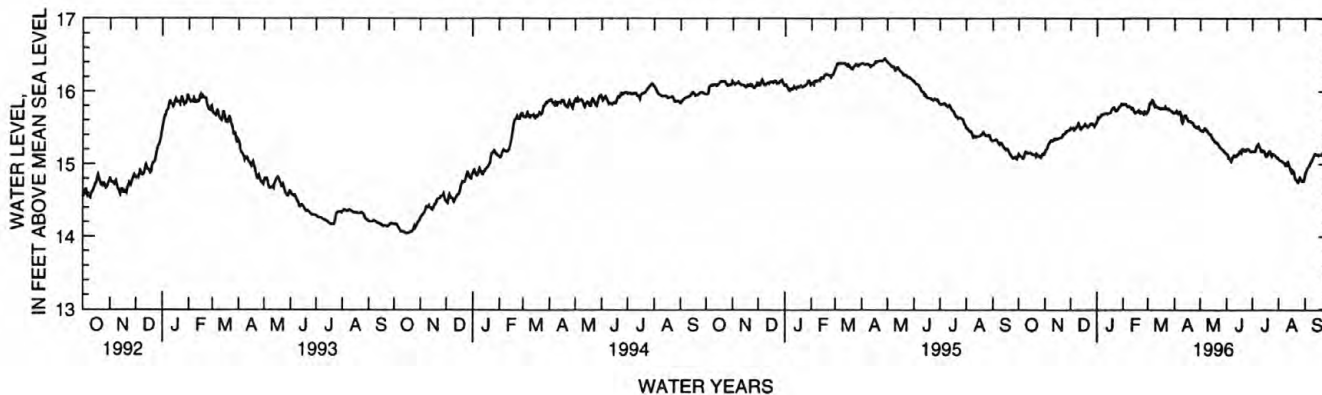
PERIOD OF RECORD.--

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, 12.97 ft above mean sea level, October 5, 1978.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 15.14 | 15.18 | 15.50 | 15.59 | 15.82 | 15.73 | 15.70 | 15.47 | 15.14 | 15.18 | 15.07 | 14.85 |
| 2 | 15.12 | 15.20 | 15.49 | 15.64 | 15.83 | 15.76 | 15.71 | 15.46 | 15.13 | 15.17 | 15.06 | 14.89 |
| 3 | 15.11 | 15.21 | 15.49 | 15.63 | 15.83 | 15.84 | 15.73 | 15.46 | 15.08 | 15.17 | 15.05 | 14.92 |
| 4 | 15.11 | 15.24 | 15.50 | 15.64 | 15.83 | 15.85 | 15.70 | 15.45 | 15.08 | 15.18 | 15.05 | 14.95 |
| 5 | 15.09 | 15.28 | 15.47 | 15.65 | 15.81 | 15.84 | 15.69 | 15.46 | 15.06 | 15.21 | 15.04 | 14.96 |
| 6 | 15.08 | 15.29 | 15.48 | 15.68 | 15.79 | 15.88 | 15.71 | 15.49 | 15.04 | 15.25 | 15.03 | 14.98 |
| 7 | 15.09 | 15.31 | 15.50 | 15.68 | 15.79 | 15.87 | 15.72 | 15.48 | 15.07 | 15.26 | 15.02 | 15.01 |
| 8 | 15.15 | 15.33 | 15.51 | 15.69 | 15.80 | 15.83 | 15.70 | 15.48 | 15.10 | 15.28 | 15.01 | 15.03 |
| 9 | 15.17 | 15.33 | 15.53 | 15.69 | 15.79 | 15.79 | 15.60 | 15.45 | 15.12 | 15.26 | 14.98 | 15.05 |
| 10 | 15.16 | 15.32 | 15.56 | 15.69 | 15.78 | 15.80 | 15.57 | 15.44 | 15.11 | 15.22 | 14.98 | 15.08 |
| 11 | 15.15 | 15.33 | 15.53 | 15.70 | 15.76 | 15.79 | 15.60 | 15.42 | 15.12 | 15.18 | 15.02 | 15.10 |
| 12 | 15.16 | 15.35 | 15.49 | 15.70 | 15.77 | 15.78 | 15.66 | 15.41 | 15.11 | 15.17 | 15.03 | 15.13 |
| 13 | 15.15 | 15.34 | 15.48 | 15.69 | 15.75 | 15.77 | 15.67 | 15.41 | 15.12 | 15.19 | 14.98 | 15.14 |
| 14 | 15.15 | 15.34 | 15.50 | 15.70 | 15.72 | 15.77 | 15.67 | 15.38 | 15.14 | 15.19 | 14.96 | 15.13 |
| 15 | 15.16 | 15.35 | 15.51 | 15.70 | 15.70 | 15.77 | 15.64 | 15.36 | 15.15 | 15.18 | 14.92 | 15.13 |
| 16 | 15.15 | 15.35 | 15.52 | 15.70 | 15.71 | 15.76 | 15.61 | 15.34 | 15.18 | 15.14 | 14.89 | 15.13 |
| 17 | 15.13 | 15.36 | 15.53 | 15.71 | 15.72 | 15.77 | 15.59 | 15.33 | 15.18 | 15.11 | 14.92 | 15.12 |
| 18 | 15.13 | 15.36 | 15.55 | 15.74 | 15.72 | 15.77 | 15.58 | 15.31 | 15.16 | 15.11 | 14.91 | 15.13 |
| 19 | 15.13 | 15.36 | 15.53 | 15.76 | 15.74 | 15.76 | 15.59 | 15.30 | 15.21 | 15.13 | 14.88 | 15.13 |
| 20 | 15.13 | 15.37 | 15.52 | 15.77 | 15.72 | 15.76 | 15.58 | 15.30 | 15.21 | 15.16 | 14.82 | 15.12 |
| 21 | 15.11 | 15.38 | 15.51 | 15.78 | 15.70 | 15.79 | 15.57 | 15.29 | 15.20 | 15.18 | 14.79 | 15.12 |
| 22 | 15.14 | 15.41 | 15.52 | 15.76 | 15.72 | 15.76 | 15.57 | 15.27 | 15.18 | 15.18 | 14.79 | 15.15 |
| 23 | 15.12 | 15.41 | 15.54 | 15.73 | 15.71 | 15.76 | 15.54 | 15.25 | 15.18 | 15.13 | 14.76 | 15.18 |
| 24 | 15.11 | 15.42 | 15.55 | 15.73 | 15.70 | 15.75 | 15.52 | 15.23 | 15.21 | 15.11 | 14.75 | 15.14 |
| 25 | 15.12 | 15.43 | 15.56 | 15.74 | 15.69 | 15.76 | 15.52 | 15.22 | 15.21 | 15.14 | 14.78 | 15.09 |
| 26 | 15.10 | 15.45 | 15.56 | 15.76 | 15.72 | 15.75 | 15.51 | 15.21 | 15.21 | 15.14 | 14.81 | 15.07 |
| 27 | 15.09 | 15.46 | 15.54 | 15.78 | 15.70 | 15.74 | 15.50 | 15.20 | 15.20 | 15.13 | 14.79 | 15.05 |
| 28 | 15.11 | 15.46 | 15.54 | 15.80 | 15.69 | 15.73 | 15.51 | 15.19 | 15.18 | 15.12 | 14.77 | 15.06 |
| 29 | 15.14 | 15.47 | 15.52 | 15.80 | 15.71 | 15.72 | 15.52 | 15.17 | 15.17 | 15.10 | 14.76 | 15.13 |
| 30 | 15.15 | 15.47 | 15.55 | 15.83 | --- | 15.71 | 15.48 | 15.16 | 15.18 | 15.09 | 14.76 | 15.17 |
| 31 | 15.14 | --- | 15.56 | 15.82 | --- | 15.70 | --- | 15.15 | --- | 15.09 | 14.78 | --- |
| MEAN | 15.13 | 15.35 | 15.52 | 15.72 | 15.75 | 15.78 | 15.61 | 15.34 | 15.15 | 15.17 | 14.91 | 15.07 |
| MAX | 15.17 | 15.47 | 15.56 | 15.83 | 15.83 | 15.88 | 15.73 | 15.49 | 15.21 | 15.28 | 15.07 | 15.18 |
| MIN | 15.08 | 15.18 | 15.47 | 15.59 | 15.69 | 15.70 | 15.48 | 15.15 | 15.04 | 15.09 | 14.75 | 14.85 |



GROUND-WATER LEVELS
HAWAII ISLAND OF OAHU--Continued

212318157583401. Local number, 3-2358-19.

Record of water-level data for water year 1996 was not completed at the time of publication.

212340158001901. Local number, 3-2300-18.

LOCATION.--Lat 21°23'40", long 158°00'19", Hydrologic Unit 20060000, 700 ft south of August Ahrens School, and 1,400 ft northeast of L'Orange Park, Waipahu. Owner: Honolulu Board of Water Supply.

AQUIFER.--Basalt of Koolau Volcanic Series, Tertiary age.

WELL CHARACTERISTICS.--Drilled basal water-table well, depth 1,090 ft, casing diameter 12-in., cased to 38 ft. Well was deepened May 1980 and modified February 1984. Prior to May 1980, well depth 205 ft.

DATUM.--Elevation of land-surface datum is 26 ft. Measuring point: Top of casing, 27.73 ft above mean sea level.

REMARKS.--Geophysical logs are available in files of district office.

PERIOD OF RECORD.--

Water level: Water-level recorder, August 1970 to January 1973. Occasional measurements, October 1987 to current year.

Water quality: 1930, 1942-45, 1947-49, 1951-54, 1968, 1983, 1985-86, 1991.

EXTREMES FOR PERIOD OF RECORD.--Highest water level 22.40 ft above mean sea level, January 4, 1983; lowest 14.01 ft above mean sea level, September 14, 1985.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY MEAN VALUES

| WATER | | WATER | | WATER | |
|--------|-------|--------|-------|--------|-------|
| DATE | LEVEL | DATE | LEVEL | DATE | LEVEL |
| APR 05 | 17.64 | MAY 20 | 17.18 | AUG 14 | 16.83 |

GROUND-WATER LEVELS
HAWAII ISLAND OF OAHU--Continued

212501158080701. Local number, 3-2508-02.

LOCATION.--Lat 21°25'01", long 158°08'07", Hydrologic Unit 20060000, 2.2 mi northeast from the intersection of Farrington Highway and Lualualei Naval Ammunition Depot, 0.4 mi southeast of entrance to Lualualei Naval Ammunition Depot, located inside the Depot. Owner: Honolulu Board of Water Supply.

AQUIFER.--Basalt of Waianae Volcanic Series, Pliocene age.

WELL CHARACTERISTICS.--Located at the bottom of a 30-degree inclined 6.8 ft by 7.8 ft shaft, 340 feet long.

DATUM.--Elevation of land-surface datum is 180 ft. Measuring point: Top of concrete above well, elevation; 13.16 feet above mean sea level.

REMARKS.--Prior to October 1993, unpublished records in files of the U.S. Geological Survey.

PERIOD OF RECORD.--

Water level: Occasional measurements, October 1972 to current year.

Water quality: 1971-84.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 12.40 ft above mean sea level, October 3, 1972; lowest, 10.15 ft above mean sea level, March 8, 1994.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY MEAN VALUES

| WATER | | WATER | | WATER | |
|--------|-------|--------|-------|--------|-------|
| DATE | LEVEL | DATE | LEVEL | DATE | LEVEL |
| APR 16 | 10.28 | MAY 21 | 10.30 | JUL 18 | 10.30 |

212659158004102. Local number, 3-2600-04.

LOCATION.--Lat 21°26'59", long 158°00'41", Hydrologic Unit 20060000, 30 ft south of Waiahole ditch, and 1.1 mi. east southeast of Kipapa School in Mililani. Owner: Honolulu Board of Water Supply.

AQUIFER.--Basalt of Koolau Volcanic Series, Tertiary age.

WELL CHARACTERISTICS.--Drilled basal water-table well, depth 815 ft, casing diameter 16 in., cased to 705 ft.

DATUM.--Elevation of land-surface datum is 665 ft. Measuring point: Top of 16-in. casing, 666.62 ft above mean sea level.

PERIOD OF RECORD.--

Water level: Water-level recorder, October 1983 to September 10, 1987.

Occasional measurements, October 1987 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 24.49 ft above mean sea level, April 5, 1989; lowest 16.74 ft above mean sea level, September 14, 1985.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY MEAN VALUES

| WATER | | WATER | |
|--------|-------|--------|-------|
| DATE | LEVEL | DATE | LEVEL |
| MAR 13 | a-- | MAY 17 | a-- |

a-- unable to make a measurement

GROUND-WATER LEVELS
HAWAII ISLAND OF OAHU--Continued

212813158080201. Local number, 3-2808-01.

LOCATION.--Lat 21°28'13", long 158°08'04", Hydrologic Unit 20060000, inside Lualualei Naval Ammunition Depot, 1000 ft west from the intersection of Kolekole Road and Radford Street, at Building 492, 3.3 miles north from the entrance of the depot. Owner: U.S. Navy.

AQUIFER.--Basalt of Waianae Volcanic Series, Pliocene age.

WELL CHARACTERISTICS.--Depth 535 ft, cased to 182 ft, diameter is 12-in to 185 ft, then 3-in to 535 ft.

DATUM.--Elevation of land-surface datum is 347 ft. Measuring point: 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 U.S. Geological Survey.

PERIOD OF RECORD.--

Water level: Occasional measurements, June 1973 to current year.
Water quality: 1972-88.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 441.81 ft above mean sea level, February 28, 1983; lowest, 420.78 ft above mean sea level, October 24, 1978.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY MEAN VALUES

| DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL |
|--------|----------------|--------|----------------|--------|----------------|
| APR 16 | 430.65 | MAY 21 | 430.15 | JUL 18 | 430.33 |

212927158014801. Local number, 3-2901-07.

LOCATION.--Lat 21°29'27", long 158°01'48", Hydrologic Unit 20060000, across the main gate of Wheeler AFB, and 1,200 ft south of Wahiawa bridge on Kaukonohua Stream. Owner: U.S. Army.

AQUIFER.--Basalt of Koolau Volcanic Series, Tertiary age.

WELL CHARACTERISTICS.--Dug high-level water-table well, size 8 ft x 8 ft, length of 30-degree inclined shaft 1,148 ft.

DATUM.--Elevation of land-surface datum is 51 ft. Measuring point: Top of 15-in. surface casing, 51.95 ft above mean sea level.

PERIOD OF RECORD.--

Water level: Water-level recorder, November 1938 to current year.
Water quality: 1966-72, 1975 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 284.40 ft above mean sea level, May 12, 1969; lowest, 269.52 ft above mean sea level, December 5, 1978.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-----|-----|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 5 | -- | -- | 273.35 | 272.90 | 273.35 | 273.07 | 273.04 | 272.66 | 272.33 | 272.84 | 272.49 | 272.70 |
| 10 | -- | -- | 273.37 | 273.34 | 273.48 | 273.34 | 273.35 | 272.86 | 272.97 | 272.72 | 272.62 | 272.90 |
| 15 | -- | -- | 273.38 | 273.35 | 272.99 | 273.43 | 273.34 | 272.57 | 272.87 | 272.78 | 272.50 | 272.87 |
| 20 | -- | a-- | 273.29 | 273.40 | 273.40 | 273.10 | 273.31 | 272.61 | 272.91 | 272.82 | 272.12 | 272.87 |
| 25 | -- | 273.31 | 273.35 | 273.38 | 273.36 | 272.50 | 272.47 | 273.08 | 272.80 | 272.72 | 272.66 | 272.71 |
| EOM | -- | 273.35 | 273.37 | 273.43 | 273.36 | 273.05 | 273.29 | 273.06 | 272.83 | 272.66 | 272.65 | 272.27 |

a-- No record October 01 to November 24, clock stopped.

NON-PUMPING VALUES

| DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL |
|--------|----------------|--------|----------------|--------|----------------|--------|----------------|--------|----------------|--------|----------------|
| OCT 20 | 273.54 | NOV 06 | 273.40 | DEC 04 | 273.49 | JAN 08 | 273.48 | FEB 06 | 273.47 | APR 03 | 273.57 |
| APR 06 | 273.56 | JUN 03 | 273.05 | JUL 01 | 272.93 | AUG 22 | 272.71 | SEP 10 | 272.90 | | |

GROUND-WATER LEVELS
HAWAII ISLAND OF OAHU--Continued

213224158135901. Local number, 3-3213-06.

LOCATION.--Lat 21°32'24", long 158°13'59", 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.--Basalt of Waianae Volcanic Series, Tertiary 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: Top of 6-in. casing, elevation: 26.47 ft above mean sea level.

REMARKS.--Prior to October 1993, unpublished records in files of the U.S. Geological Survey.

PERIOD OF RECORD.--

Water level: Occasional measurements, October 1972 to current year.

Water quality: 1967, 1972 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 7.92 ft above mean sea level, January 2, 1975; lowest, 6.49 ft above mean sea level, July 15, 1976.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY MEAN VALUES

| DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL |
|--------|----------------|--------|----------------|--------|----------------|
| APR 16 | 6.70 | MAY 21 | 6.66 | JUL 18 | 6.72 |

213327157524401. Local number, 3-3352-01.

LOCATION.--Lat 21°33'27", long 157°52'44", Hydrologic Unit 20060000, at mouth of Kahana Valley, and 700 ft southwest of Kamehameha Highway, Kahana. Owner: Mary E. Foster Estate.

AQUIFER.--Basalt of Koolau Volcanic Series, Tertiary age.

WELL CHARACTERISTICS.--Drilled artesian well, depth 441 ft, casing diameter 10-in., cased to 177 ft.

DATUM.--Elevation of land-surface datum is 6 ft. Measuring point: Top of "T", 7.31 ft above mean sea level.

PERIOD OF RECORD.--

Water level: Occasional measurements, April 1935 to 1990, 1992 to current year.

Water quality: 1935 to 1991.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 21.3 ft above mean sea level, March 29, 1966; lowest measured, 12.61 ft above mean sea level, July 5, 1984.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY MEAN VALUES

| DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL |
|--------|----------------|--------|----------------|--------|----------------|
| MAR 14 | 14.51 | MAY 28 | 14.36 | JUL 18 | 13.53 |

GROUND-WATER LEVELS
HAWAII ISLAND OF OAHU--Continued

213438158091101. Local number, 3-3409-16.

LOCATION.--Lat 21°34'36", long 158°09'12", 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.--Basalt of Waianae Volcanic Series, Pliocene age.

WELL CHARACTERISTICS.--Drilled artesian well, depth 518 ft, cased to 440 ft, diameter 10-in. to 8-in.

DATUM.--Elevation of land-surface datum is 8 ft. Measuring point: Chiseled 1 1/2-in. square on concrete, 3.7 ft in front of door of well shelter, elevation: 8.48 ft above mean sea level.

REMARKS.--Prior to October 1993, unpublished records in files of the U.S. Geological Survey.

PERIOD OF RECORD.--

Water level: Occasional measurements, December 1924 to current year.

Water quality: 1924-84.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 21.3 ft above mean sea level, January 16, 1969; lowest, 16.75 ft above mean sea level, August 6, 1929.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY MEAN VALUES

| DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL |
|--------|----------------|--------|----------------|--------|----------------|
| MAR 12 | 17.71 | MAY 17 | 17.70 | JUL 22 | 17.96 |

213446158104901. Local number, 3-3410-08.

LOCATION.--Lat 21°34'46", long 158°10'49", Hydrologic Unit 20060000, 0.5 mi east of Dillingham Airfield, and 1.1 mi southeast of Mokuleia Beach Park. Owner: Waialua Sugar Company, Inc.

AQUIFER.--Basalt of Waianae Volcanic Series, Tertiary age.

WELL CHARACTERISTICS.--Drilled artesian well, depth 447 ft, casing diameter 1 in., cased to 410 ft, perforated from 410 to 447 ft.

DATUM.--Elevation of land-surface datum is 12 ft. Measuring point: Top of 12-in. stilling well, 20.53 ft above mean sea level.

REMARKS.--Prior to October 1993, unpublished records in files of the U.S. Geological Survey.

PERIOD OF RECORD.--

Water level: Water-level recorder, January 1963 to February 1972.

Occasional measurements, January 1929 to December 1962, March 1972 to current year.

Water quality: 1929 to 1985, 1989 to 1991.

EXTREMES FOR PERIOD OF RECORD.--Highest water level 19.98 ft above mean sea level, January 5, 1969; lowest 16.08 ft above mean sea level, August 6, 1929.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY MEAN VALUES

| DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL |
|--------|----------------|--------|----------------|--------|----------------|
| MAR 12 | 18.29 | MAY 17 | 18.22 | JUL 19 | 18.15 |

GROUND-WATER LEVELS
HAWAII ISLAND OF OAHU--Continued

214053157570401. Local number, 3-4057-05.

LOCATION.--Lat 21°40'53", long 157°57'04", Hydrologic Unit 20060000, 0.4 mi northeast of Kahuku Hospital, and 500 ft north of Kahuku High School.

AQUIFER.--Basalt of Koolau Volcanic Series, Pliocene (?) age.

WELL CHARACTERISTICS.--Drilled artesian well, depth 397 ft, 12-in. metal casing, cased to 172 ft.

DATUM.--Elevation of land-surface datum is 9 ft. Measuring point: Top of 10-in. stand pipe, elevation; 16.01 ft above mean sea level.

REMARKS.--Prior to October 1993, unpublished records in files of the U.S. Geological Survey.

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: 1908, 1911-16, 1924-78.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 17.12 ft above mean sea level, January 1916; lowest, 8.00 ft above mean sea level, October 5, 1962.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY MEAN VALUES

| DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL |
|--------|----------------|--------|----------------|--------|----------------|--------|----------------|
| JAN 23 | 13.07 | MAR 14 | 13.15 | MAY 28 | 13.02 | JUL 17 | 13.03 |

214125158013401. Local number, 3-4101-03.

LOCATION.--Lat 21°41'25", long 158°01'34", Hydrologic Unit 20060000, 1,500 ft northeast of University of Hawaii agriculture experiment station in Waialeale, and 1.9 mi northeast of Sunset Beach. Owner: State of Hawaii.

AQUIFER.--Basalt of Koolau Volcanic Series, Tertiary age.

WELL CHARACTERISTICS.--Drilled artesian well, depth 61 ft, casing diameter 8 in., cased to 36 ft.

DATUM.--Elevation of land-surface datum is 22 ft. Measuring point: Top of 4-in. pipe, 21.89 ft above mean sea level.

REMARKS.--Water-quality records for 1929-74 are available in files of district office.

PERIOD OF RECORD.--Occasional measurements, February 1929 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 15.60 ft above mean sea level, November 14, 1932; lowest measured, 10.97 ft above mean sea level, July 1, 1977.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY MEAN VALUES

| DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL |
|--------|----------------|--------|----------------|--------|----------------|--------|----------------|
| JAN 23 | 13.33 | MAR 14 | 13.24 | MAY 28 | 13.20 | JUL 17 | 13.40 |

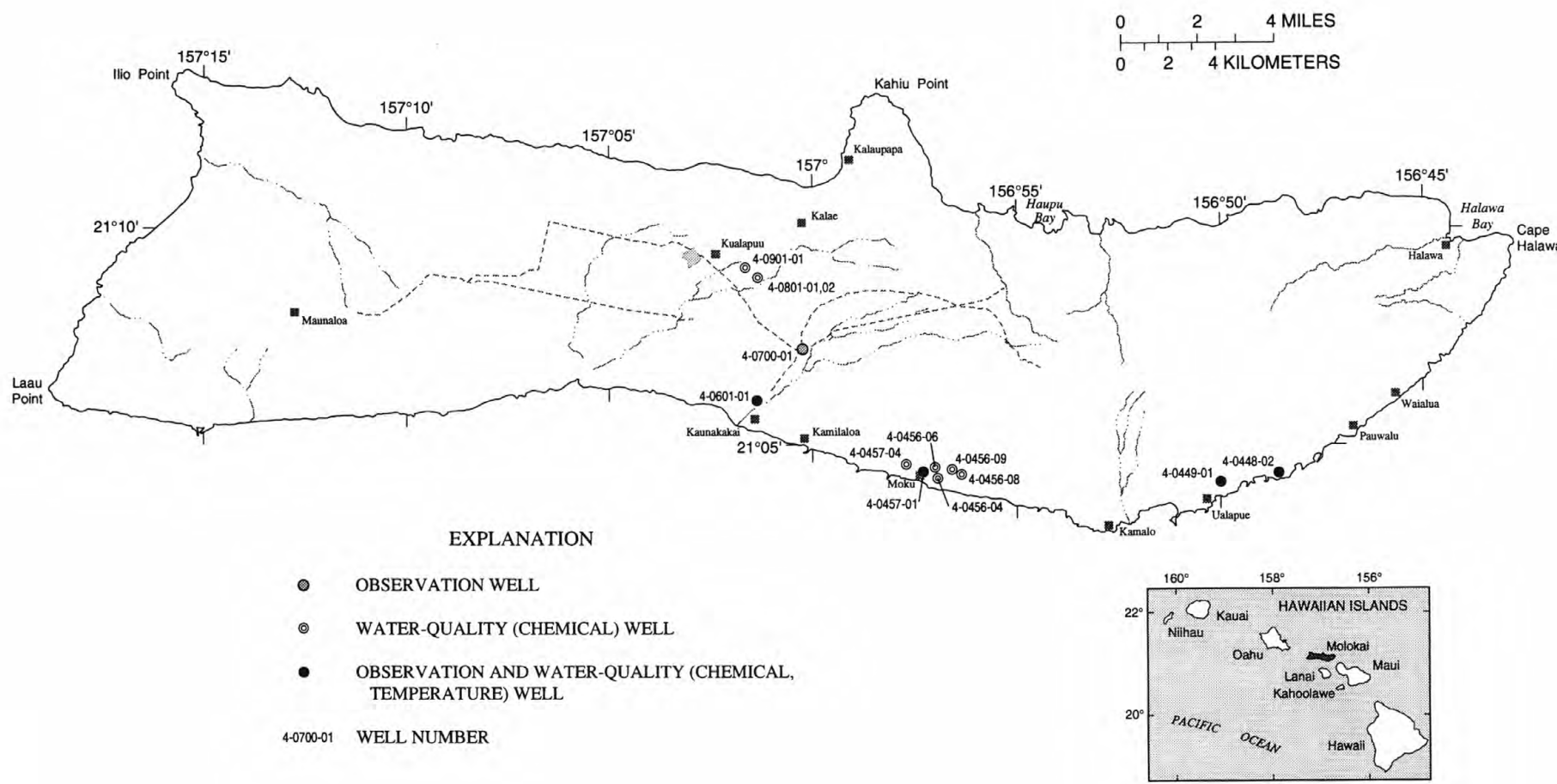


Figure 18. Locations of observation wells, ground-water quality sampling wells, and rainfall stations on Molokai.

GROUND-WATER LEVELS
HAWAII ISLAND OF MOLOKAI

210425156483001. Local number, 4-0448-02.

LOCATION.--Lat 21°04'25", long 156°48'30 ", Hydrologic Unit 20050000, 100 ft north of Highway 45, and 0.8 mi west of Pukoo. Owner: P. Friel.

AQUIFER.--East Molokai Volcanic Series, Pliocene age.

WELL CHARACTERISTICS.--Dug basal water-table well, size 4 ft x 6 ft, depth 22 ft.

DATUM.--Elevation of land surface datum is 19 ft. Measuring point: Top of 2" x 2" 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: 1970-73, 1993 to current year.

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 ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

| DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL |
|--------|-------------|--------|-------------|--------|-------------|--------|-------------|--------|-------------|--------|-------------|--------|-------------|
| OCT 26 | 4.22 | FEB 05 | 4.16 | MAR 25 | 4.13 | MAY 15 | 3.92 | JUL 11 | 4.09 | SEP 16 | 4.18 | DEC 13 | 4.36 |

210402156495801. Local number, 4-0449-01.

LOCATION.--Lat 21°04'02", long 156°49'58 ", Hydrologic Unit 20050000, 1,800 ft north of Ualapue Fishpond, and 0.5 mi northeast of Kilohana School. Owner: County of Maui.

AQUIFER.--East Molokai Volcanic Series, Pliocene age.

WELL CHARACTERISTICS.--Dug basal water-table well, size 4 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: Top of steel plate, 42.42 ft above mean sea level.

REMARKS.--Water from this well is used for public supply.

PERIOD OF RECORD.--

Water level: Occasional measurements, 1938-39, 1941-63, November 1972 to current year.

Water quality: 1948, 1952-56, 1970-91, 1993 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 ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

| DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL |
|--------|-------------|--------|-------------|--------|-------------|--------|-------------|--------|-------------|--------|-------------|--------|-------------|
| OCT 26 | 2.93 | FEB 05 | 3.19 | MAR 25 | 3.10 | MAY 15 | 2.77 | JUL 11 | 3.16 | SEP 16 | 3.17 | DEC 13 | 3.35 |

GROUND-WATER LEVELS
HAWAII ISLAND OF MOLOKAI--Continued

210419156570501. Local number, 4-0457-01.

LOCATION.--Lat 21°04'19", long 156°57'05", Hydrologic Unit 20050000, 0.5 mi northwest of Kakahaia Fishpond, and 0.5 mi northeast of Moku. Owner: County of Maui.

AQUIFER.--Basalt of East Molokai Volcanic Series, Pliocene age.

WELL CHARACTERISTICS.--Dug basal water-table well, size 4 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: Top of steel plate, 37.36 ft, above mean sea level.

REMARKS.--Water from this well is used for public supply. Water level taken after pump turned off for half hour.

PERIOD OF RECORD.--

Water level: Occasional measurements, June 1947 to November 1960, January 1962 to February 1963, November 1972 to current year.
Water quality: 1948, 1954-56, 1960, 1962, 1971, 1973-91, 1993 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 ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY MEAN VALUES

| DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL |
|--------|----------------|--------|----------------|--------|----------------|--------|----------------|--------|----------------|--------|----------------|--------|----------------|
| OCT 26 | 2.11 | FEB 05 | 1.96 | MAR 25 | 1.87 | MAY 15 | 1.87 | JUL 11 | 2.00 | SEP 16 | 2.11 | DEC 13 | 2.12 |

210605157012001. Local number, 4-0601-01.

LOCATION.--Lat 21°06'05", long 157°01'20", Hydrologic Unit 20050000, 0.6 mi north of Kaunakakai School, and 0.9 mi east of Kalaniana'ole Colony. Owner: Molokai Ranch.

AQUIFER.--Basalt of East Molokai Volcanic Series, Pliocene age.

WELL CHARACTERISTICS.--Drilled basal water-table well, depth 59 ft, casing diameter 12-in., cased to 20 ft.

DATUM.--Elevation of land-surface datum is 51 ft. Measuring point: 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: 1954 to current year.

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 ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY MEAN VALUES

| DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL |
|--------|----------------|--------|----------------|--------|----------------|--------|----------------|--------|----------------|--------|----------------|--------|----------------|
| OCT 26 | 2.85 | FEB 09 | 2.72 | MAR 29 | 2.64 | MAY 16 | 2.62 | JUL 11 | 2.65 | SEP 17 | 2.88 | DEC 13 | 2.86 |

GROUND-WATER LEVELS

HAWAII ISLAND OF MOLOKAI--Continued

210711157000501. Local number, 4-0700-01.

LOCATION.--Lat 21°07'11", long 157°00'05"; Hydrologic Unit 20050000, 2.3 mi northeast of Kakahaia Fishpond, and 0.5 mi northeast of Kaunakakai, and 2.4 mi north of Kamiloloa. Owner: Kaluakoi Corporation.

AQUIFER.--East Molokai Volcanic Series.

WELL CHARACTERISTICS.--Drilled basal water-table well, depth 1,080 ft, casing diameter 20-in., cased to 956 ft, perforated from 956 to 1,056 ft.

DATUM.--Measuring point: Top of casing, 979.00 ft, land-surface datum.

REMARKS.--Water-quality records for 1973-75 are available in files of district office.

PERIOD OF RECORD.--Occasional measurements, July 1976 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 975.25 ft below land-surface datum, April 27, 1988; lowest measured, 976.23 ft below land-surface datum, September 10, 1986.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY MEAN VALUES

| DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL |
|--------|----------------|--------|----------------|--------|----------------|--------|----------------|
| OCT 26 | 975.97 | FEB 07 | 975.94 | MAY 16 | 976.07 | JUL 11 | 976.20 |

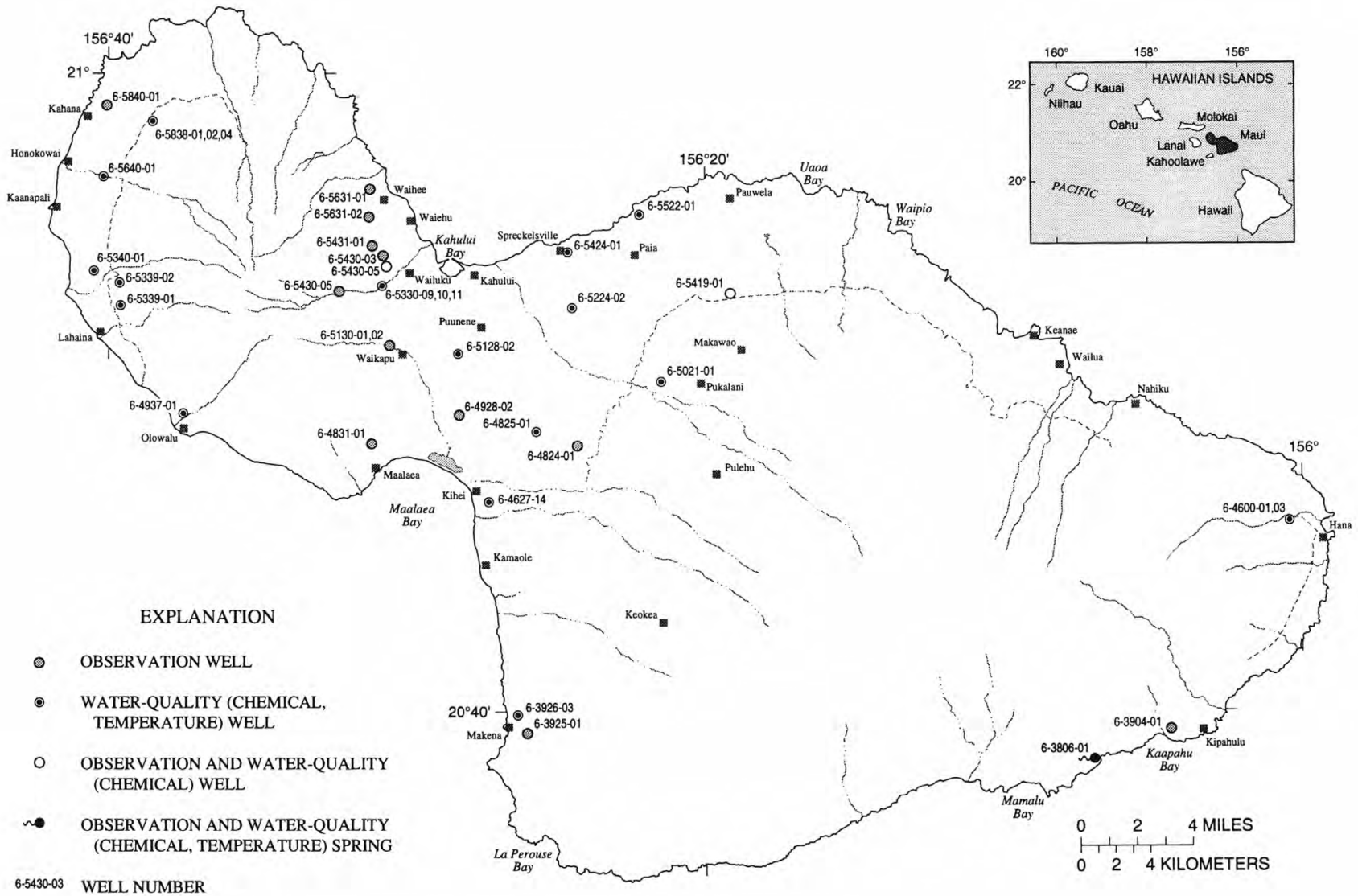


Figure 19. Locations of observation wells and ground-water quality sampling wells on Maui.

GROUND-WATER LEVELS
HAWAII ISLAND OF MAUI

203908156041201. Local number, 6-3904-01.

LOCATION.--Lat 20°39'08", long 156°04'12", Hydrologic Unit 20020000, 1,300 ft northwest of Kakanoni Point, and 0.7 mi west of Kipahulu School. Owner: Cordelia May.

AQUIFER.--Hana Volcanic Series, Pleistocene age.

WELL CHARACTERISTICS.--Drilled basal water-table well, depth 150 ft, casing diameter 4-in.

DATUM.--Elevation of land-surface datum is 133 ft. Measuring point: Top of 1-in. pipe nipple, 133.61 ft above mean sea level.

REMARKS.--Water-quality records for 1978 are available in files of district office.

PERIOD OF RECORD.--Occasional measurements, July 1978 to November 1995 (Discontinued).

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 2.97 ft above mean sea level, June 29, 1988; lowest measured, 0.70 ft above mean sea level, July 2, 1986.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY MEAN VALUES

| WATER | |
|--------|-------|
| DATE | LEVEL |
| OCT 03 | 2.55 |

203912156255901. Local number, 6-3925-01.

LOCATION.--Lat 20°39'12", long 156°25'59", Hydrologic Unit 20020000, 0.8 mi east of Keawalai Church, and 0.9 mi southeast of intersection of Kihei and Makena roads. Owner: State of Hawaii.

AQUIFER.--Hana Volcanic Series, Pleistocene age.

WELL CHARACTERISTICS.--Drilled basal water-table well, depth 382 ft, casing diameter 8-in., cased to 343 ft. perforated from 343 to 363 ft.

DATUM.--Elevation of land-surface datum is 352 ft. Measuring point: 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, 0.41 ft below mean sea level, May 4, 1977.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY MEAN VALUES

| WATER | | WATER | | WATER | | WATER | |
|--------|-------|--------|-------|--------|-------|--------|-------|
| DATE | LEVEL | DATE | LEVEL | DATE | LEVEL | DATE | LEVEL |
| OCT 16 | a-- | JAN 10 | 0.13 | APR 10 | -0.18 | AUG 13 | -0.01 |

a- no measurement made, gate locks changed

GROUND-WATER LEVELS
HAWAII, ISLAND OF MAUI--Continued

204827156242201. Local number, 6-4824-01.

LOCATION.--Lat 20°48'27", long 156°24'22", Hydrologic Unit 20020000, on Waiakoa Road 1,000 ft south of intersection with Kalalooa gulch, and 4 mi east of Kihei. Owner: State of Hawaii.

AQUIFER.--Kula volcanic series, Pleistocene age.

WELL CHARACTERISTICS.--Drilled basal water-table well, depth 647 ft, casing diameter 12-in., cased to 598 ft, screened from 598 to 638 ft.

DATUM.--Elevation of land-surface datum is 593 ft. Measuring point: Top of 3-in. pipe attached to the steel casing cover, 594.74 ft above mean sea level (levels of December 10, 1993).

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, 3.65 ft above mean sea level, January 27, 1977.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY MEAN VALUES

| DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL |
|--------|-------------|--------|-------------|--------|-------------|--------|-------------|--------|-------------|--------|-------------|
| NOV 02 | 4.29 | MAR 07 | 4.41 | APR 19 | 4.37 | JUN 21 | 3.99 | AUG 15 | 4.27 | JAN 17 | 4.39 |

204818156310301. Local number, 6-4831-01.

LOCATION.--Lat 20°48'18", long 156°31'03", Hydrologic Unit 20020000, on sugar plantation road 0.7 mi north of Maalaea, and 0.9 mi southwest of intersection of Honoapiilani Highway and Kihei Road. Owner: State of Hawaii.

AQUIFER.--Wailuku Volcanic Series, Pliocene age.

WELL CHARACTERISTICS.--Drilled basal water-table well, depth 219 ft, casing diameter 8-in., cased to 187 ft.

DATUM.--Elevation of land-surface datum is 166 ft. Measuring point: 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, 4.74 ft above mean sea level, March 16, 1977.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY MEAN VALUES

| DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL |
|--------|-------------|--------|-------------|--------|-------------|--------|-------------|--------|-------------|--------|-------------|
| OCT 19 | 5.23 | JAN 16 | 5.30 | MAR 07 | 5.28 | APR 08 | 5.21 | JUN 20 | 4.95 | AUG 09 | 5.21 |

GROUND-WATER LEVELS
HAWAII, ISLAND OF MAUI--Continued

204909156281401. Local number, 6-4928-02.

LOCATION.--Lat 20°48'27", long 156°28'14", Hydrologic Unit 20020000, at Puunene Airport on Mokulele Highway 2.3 mi north of intersection with Kihei Road, Kihei. Owner: Hawaiian Commercial and Sugar Co.

AQUIFER.--Honomanu Volcanic Series, Pliocene age.

WELL CHARACTERISTICS.--Dug basal water-table well, 6 ft x 9 ft vertical shaft, depth 53 ft.

DATUM.--Elevation of land-surface datum is 50 ft. Measuring point: Top of angle iron at well, 50.08 ft above mean sea level.

REMARKS.--Water-quality records for 1973 are available in files of district office.

PERIOD OF RECORD.--Water-level recorder, March 1972 to September 1984. Occasional measurements, October 1984 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 5.09 ft above mean sea level, January 12, 1980; lowest measured, 3.05 ft above mean sea level, March 5, 6, 1977.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY MEAN VALUES

| DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL |
|--------|-------------|--------|-------------|--------|-------------|--------|-------------|--------|-------------|--------|-------------|
| OCT 16 | 3.76 | JAN 10 | 3.99 | FEB 16 | 3.73 | APR 10 | 3.99 | JUN 19 | 3.53 | AUG 13 | 3.79 |

205140156304501. Local number, 6-5130-01.

LOCATION.--Lat 20°51'40", long 156°30'45", Hydrologic Unit 20020000, 0.5 mi northwest of Waikapu, and 1.0 mi southeast of Wailuku Heights. Owner: State of Hawaii.

AQUIFER.--Wailuku Volcanic Series, Pliocene age.

WELL CHARACTERISTICS.--Drilled basal water-table well, depth 757 ft, casing diameter 8-in., cased to 569 ft, perforated from 569 to 609 ft.

DATUM.--Elevation of land-surface datum is 551 ft. Measuring point: 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, 11.36 ft above mean sea level, January 27, 1976.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY MEAN VALUES

| DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL |
|--------|-------------|--------|-------------|--------|-------------|--------|-------------|--------|-------------|
| OCT 02 | 12.67 | MAR 07 | 11.66 | MAY 28 | 12.32 | JUL 01 | 12.59 | AUG 28 | 12.84 |

GROUND-WATER LEVELS
HAWAII, ISLAND OF MAUI--Continued

205154156303801. Local number, 6-5130-02.

LOCATION.--Lat 20°51'54", long 156°30'38", Hydrologic Unit 20020000, 0.6 mi northwest of Waikapu, and 1.0 mi southeast of Wailuku Heights.
Owner: State of Hawaii.

AQUIFER.--Wailuku Volcanic Series, Pliocene age.

WELL CHARACTERISTICS.--Drilled basal water-table well, depth 1,020 ft, casing diameter 20-in., cased to 520 ft, perforated from 520 to 570 ft.

DATUM.--Elevation of land-surface datum is 518 ft. Measuring point: Top of casing, 519.33 ft above mean sea level.

REMARKS.--Water-quality records for 1974 are available in files of district office.

PERIOD OF RECORD.--Water-level recorder, August 1983 to September 1984. Occasional measurements, October 1984 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 15.03 ft above mean sea level, July 15, 1987; lowest measured, 12.53 ft above mean sea level, July 12, and August 24, 1995.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY MEAN VALUES

| WATER | | WATER | | WATER | | WATER | | WATER | |
|--------|-------|--------|-------|--------|-------|--------|-------|--------|-------|
| DATE | LEVEL | DATE | LEVEL | DATE | LEVEL | DATE | LEVEL | DATE | LEVEL |
| OCT 02 | 12.41 | MAR 07 | 12.41 | MAY 28 | 12.20 | JUL 01 | 12.12 | AUG 26 | 12.13 |
| JAN 17 | 12.34 | APR 04 | 12.50 | | | | | | |

205312156321402. Local number, 6-5332-04.

Record of water-level data for water year 1996 was not completed at the time of publication.

GROUND-WATER LEVELS
HAWAII, ISLAND OF MAUI--Continued

205412156193801. Local number, 6-5419-01.

LOCATION.--Lat 20°54'12", long 156°19'38", Hydrologic Unit 20020000, 0.9 mi south of Haiku Cannery, and 2 mi north west of Kaupakulua between the Haiku-Kokomo road and Maliko Gulch. Owner: State of Hawaii

AQUIFER.--Honomanu Volcanic Series, Pliocene age.

WELL CHARACTERISTICS.--Drilled basal water-table well, depth 150 ft, casing diameter 4-in., cased to 829 ft, perforated from 829 to 859 ft.

DATUM.--Elevation of land-surface datum is 828 ft. Measuring point: Top of 6-in. pipe coupling, 828.44 ft above mean sea level.

REMARKS.--Water level readings are affected by oil floating on top of the water.

PERIOD OF RECORD.--Occasional measurements, October 1984 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 5.60 ft above mean sea level, May 2, 1989; lowest measured, 4.36 ft above mean sea level, July 9, 1985.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY MEAN VALUES

| DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL |
|--------|----------------|--------|----------------|--------|----------------|--------|----------------|--------|----------------|
| NOV 15 | a-- | JAN 18 | a-- | MAY 16 | a-- | JUL 12 | a-- | AUG 24 | a-- |

a-- Pump being installed. Unable to make a measurement.

205419156304401. Local number, 6-5430-03.

LOCATION.--Lat 20°54'19", long 156°30'44", Hydrologic Unit 20020000, 2,000 ft north of Puuhala Village, and 0.5 mi northwest of Wailuku Sugar Mill reservoir. Owner: Wailuku Sugar Co.

AQUIFER.--Wailuku Volcanic Series, Pliocene age.

WELL CHARACTERISTICS.--Drilled basal water-table well, depth 580 ft, 1.5-in. PVC casing, cased to 400 ft, perforated from 400 to 580 ft.

DATUM.--Elevation of land-surface datum is 415 ft. Measuring point: Top of 1-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, 11.50 ft above mean sea level, August 7, 1995.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY MEAN VALUES

| DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL |
|--------|----------------|--------|----------------|--------|----------------|--------|----------------|--------|----------------|
| OCT 04 | 11.04 | JAN 03 | 12.46 | APR 02 | 12.82 | JUL 01 | 10.80 | AUG 26 | 9.96 |
| NOV 21 | 11.54 | FEB 12 | 13.34 | MAY 29 | 11.70 | | | | |

GROUND-WATER LEVELS
HAWAII, ISLAND OF MAUI--Continued

205405156305401. Local number, 6-5430-05.

LOCATION.--Lat 20°45'59", long 156°30'56", Hydrologic Unit 20020000, 1.0 mi southwest of intersection of Malaihi Road and Highway 33, and 1.2 mi south of Waihee. Owner: State of Hawaii.

AQUIFER.--Wailuku Volcanic Series, Pliocene age.

WELL CHARACTERISTICS.--Drilled basal water-table well, depth 1,400 ft, casing diameter 10 in., cased to 400 ft.

DATUM.--Elevation of land-surface datum is 380 ft. Measuring point: Top of 10-in. casing, 380.84 ft, above mean sea level.

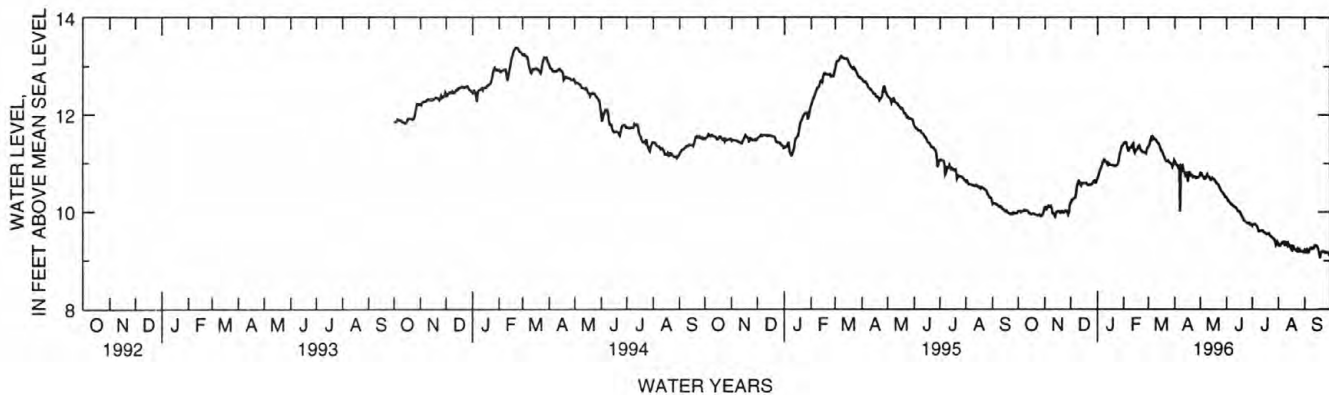
PERIOD OF RECORD.--

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, 9.00 ft above mean sea level, September 19, 1996.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|------|------|
| 1 | 10.02 | 10.10 | 10.19 | 10.70 | 11.42 | 11.35 | 11.03 | 10.81 | 10.30 | 9.71 | 9.34 | 9.22 |
| 2 | 10.02 | 10.09 | 10.24 | 10.75 | 11.43 | 11.38 | 10.99 | 10.80 | 10.26 | 9.75 | 9.30 | 9.18 |
| 3 | 10.02 | 10.06 | 10.25 | 10.80 | 11.44 | 11.48 | 10.96 | 10.76 | 10.22 | 9.75 | 9.30 | 9.17 |
| 4 | 9.99 | 10.11 | 10.27 | 10.87 | 11.43 | 11.53 | 10.96 | 10.74 | 10.21 | 9.75 | 9.33 | 9.22 |
| 5 | 10.01 | 10.13 | 10.28 | 10.90 | 11.33 | 11.50 | 10.88 | 10.69 | 10.19 | 9.75 | 9.36 | 9.17 |
| 6 | 10.01 | 10.10 | 10.29 | 10.96 | 11.27 | 11.55 | 10.96 | 10.68 | 10.16 | 9.71 | 9.37 | 9.17 |
| 7 | 10.02 | 10.10 | 10.35 | 11.01 | 11.27 | 11.53 | 10.01 | 10.69 | 10.16 | 9.70 | 9.39 | 9.25 |
| 8 | 10.04 | 10.12 | 10.51 | 11.07 | 11.32 | 11.50 | 10.94 | 10.74 | 10.13 | 9.65 | 9.38 | 9.25 |
| 9 | 10.02 | 10.06 | 10.59 | 11.08 | 11.34 | 11.49 | 10.91 | 10.78 | 10.13 | 9.60 | 9.30 | 9.27 |
| 10 | 10.03 | 9.97 | 10.64 | 11.05 | 11.33 | 11.48 | 10.95 | 10.74 | 10.11 | 9.60 | 9.37 | 9.24 |
| 11 | 10.03 | 9.96 | 10.62 | 11.03 | 11.39 | 11.44 | 10.85 | 10.73 | 10.10 | 9.61 | 9.36 | 9.24 |
| 12 | 10.01 | 9.93 | 10.56 | 10.99 | 11.41 | 11.43 | 10.82 | 10.70 | 10.09 | 9.61 | 9.31 | 9.26 |
| 13 | 9.99 | 9.90 | 10.54 | 10.97 | 11.26 | 11.40 | 10.76 | 10.66 | 10.05 | 9.62 | 9.35 | 9.32 |
| 14 | 9.96 | 9.99 | 10.59 | 11.01 | 11.22 | 11.35 | 10.80 | 10.66 | 10.02 | 9.61 | 9.31 | 9.32 |
| 15 | 9.97 | 10.00 | 10.60 | 10.99 | 11.28 | 11.30 | 10.81 | 10.70 | 10.01 | 9.58 | 9.29 | 9.31 |
| 16 | 9.95 | 10.01 | 10.60 | 10.97 | 11.28 | 11.26 | 10.63 | 10.68 | 10.01 | 9.58 | 9.25 | 9.28 |
| 17 | 9.96 | 10.02 | 10.59 | 10.97 | 11.31 | 11.25 | 10.77 | 10.68 | 9.98 | 9.56 | 9.32 | 9.23 |
| 18 | 9.97 | 10.00 | 10.59 | 10.97 | 11.35 | 11.19 | 10.84 | 10.65 | 9.94 | 9.54 | 9.24 | 9.15 |
| 19 | 9.96 | 9.98 | 10.60 | 10.96 | 11.37 | 11.15 | 10.77 | 10.63 | 9.91 | 9.55 | 9.28 | 9.05 |
| 20 | 9.95 | 10.01 | 10.57 | 10.96 | 11.31 | 11.11 | 10.75 | 10.59 | 9.88 | 9.55 | 9.25 | 9.15 |
| 21 | 9.95 | 10.02 | 10.55 | 10.95 | 11.27 | 11.07 | 10.76 | 10.59 | 9.83 | 9.56 | 9.23 | 9.18 |
| 22 | 9.94 | 9.98 | 10.56 | 10.95 | 11.27 | 11.04 | 10.72 | 10.56 | 9.82 | 9.52 | 9.21 | 9.20 |
| 23 | 9.93 | 9.98 | 10.57 | 10.96 | 11.23 | 11.04 | 10.74 | 10.53 | 9.80 | 9.49 | 9.19 | 9.20 |
| 24 | 9.93 | 10.01 | 10.56 | 10.96 | 11.23 | 11.06 | 10.74 | 10.48 | 9.78 | 9.49 | 9.24 | 9.17 |
| 25 | 9.94 | 10.03 | 10.56 | 10.98 | 11.23 | 11.02 | 10.72 | 10.46 | 9.77 | 9.47 | 9.20 | 9.16 |
| 26 | 9.95 | 10.02 | 10.59 | 11.05 | 11.23 | 11.02 | 10.70 | 10.42 | 9.77 | 9.46 | 9.23 | 9.18 |
| 27 | 9.91 | 10.00 | 10.62 | 11.17 | 11.21 | 10.99 | 10.71 | 10.41 | 9.78 | 9.44 | 9.19 | 9.17 |
| 28 | 9.92 | 9.95 | 10.64 | 11.25 | 11.30 | 10.98 | 10.71 | 10.37 | 9.74 | 9.41 | 9.20 | 9.17 |
| 29 | 9.94 | 10.01 | 10.60 | 11.32 | 11.33 | 10.93 | 10.72 | 10.36 | 9.73 | 9.32 | 9.19 | 9.16 |
| 30 | 9.97 | 10.15 | 10.60 | 11.37 | --- | 10.99 | 10.75 | 10.32 | 9.75 | 9.35 | 9.18 | 9.10 |
| 31 | 10.06 | --- | 10.66 | 11.37 | --- | 11.07 | --- | 10.31 | --- | 9.39 | 9.17 | --- |
| MEAN | 9.98 | 10.03 | 10.52 | 11.01 | 11.31 | 11.25 | 10.79 | 10.61 | 9.99 | 9.57 | 9.28 | 9.20 |
| MAX | 10.06 | 10.15 | 10.66 | 11.37 | 11.44 | 11.55 | 11.03 | 10.81 | 10.30 | 9.75 | 9.39 | 9.32 |
| MIN | 9.91 | 9.90 | 10.19 | 10.70 | 11.21 | 10.93 | 10.01 | 10.31 | 9.73 | 9.32 | 9.17 | 9.05 |



GROUND-WATER LEVELS
HAWAII ISLAND OF MAUI--Continued

205437156310501. Local number, 6-5431-01.

LOCATION.--Lat 20°54'37", long 156°31'05", Hydrologic Unit 20020000, 0.5 mi southwest of Waiehu Village, and 1.4 mi southwest of intersection of Malaihi Road and Kahekili Highway. Owner: Wailuku Sugar Co.

AQUIFER.--Wailuku Volcanic Series, Pliocene age.

WELL CHARACTERISTICS.--Drilled basal water-table well, depth 555 ft, 1.5-in. PVC casing, cased to 515 ft, perforated from 515 to 555 ft.

DATUM.--Elevation of land-surface datum is 493 ft. Measuring point: Top of 1.5-in. PVC casing, 492.51 ft above mean sea level.

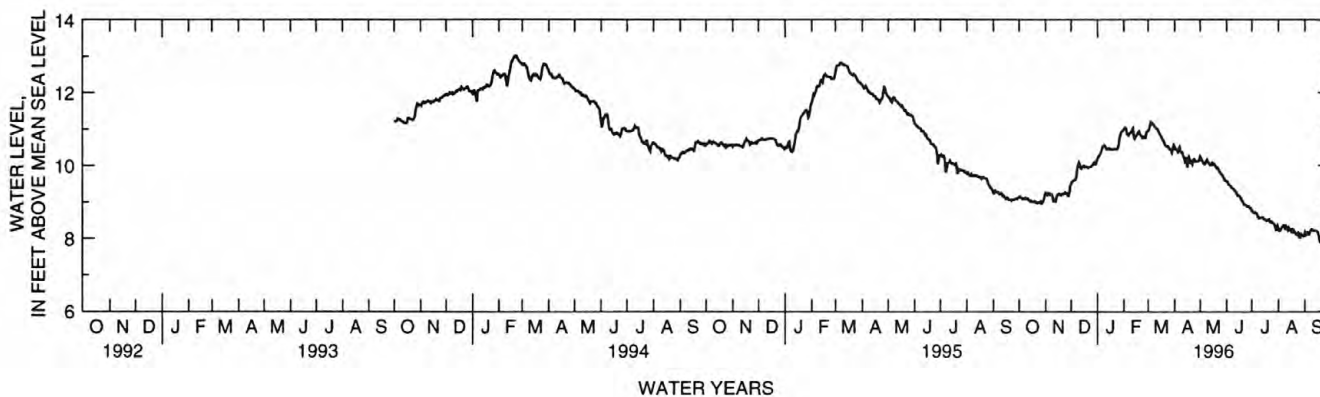
PERIOD OF RECORD.--Water-level recorder, August 1982 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 19.52 ft above mean sea level, January 2, 1983; lowest measured, 7.80 ft above mean sea level, August 19, 1996.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|------|------|------|-------|-------|-------|-------|-------|-------|------|------|------|------|
| 1 | 9.14 | 9.25 | 9.49 | 10.19 | 11.00 | 10.95 | 10.52 | 10.25 | 9.57 | 8.74 | 8.24 | 8.15 |
| 2 | 9.14 | 9.23 | 9.55 | 10.23 | 11.03 | 10.98 | 10.44 | 10.20 | 9.55 | 8.74 | 8.20 | 8.08 |
| 3 | 9.13 | 9.19 | 9.57 | 10.27 | 11.04 | 11.10 | 10.44 | 10.15 | 9.49 | 8.70 | 8.21 | 8.10 |
| 4 | 9.10 | 9.24 | 9.58 | 10.29 | 11.01 | 11.18 | 10.42 | 10.10 | 9.46 | 8.70 | 8.26 | 8.15 |
| 5 | 9.07 | 9.24 | 9.60 | 10.34 | 10.86 | 11.14 | 10.34 | 10.05 | 9.45 | 8.71 | 8.30 | 8.10 |
| 6 | 9.07 | 9.19 | 9.60 | 10.41 | 10.83 | 11.16 | 10.45 | 10.04 | 9.42 | 8.68 | 8.33 | 8.10 |
| 7 | 9.09 | 9.20 | 9.68 | 10.49 | 10.82 | 11.13 | 10.50 | 10.05 | 9.38 | 8.66 | 8.35 | 8.19 |
| 8 | 9.11 | 9.21 | 9.91 | 10.54 | 10.89 | 11.11 | 10.39 | 10.12 | 9.37 | 8.60 | 8.33 | 8.21 |
| 9 | 9.08 | 9.14 | 10.01 | 10.55 | 10.91 | 11.05 | 10.35 | 10.16 | 9.35 | 8.55 | 8.23 | 8.24 |
| 10 | 9.09 | 9.03 | 10.08 | 10.54 | 10.91 | 11.03 | 10.36 | 10.10 | 9.32 | 8.55 | 8.33 | 8.22 |
| 11 | 9.09 | 9.04 | 10.02 | 10.50 | 10.99 | 11.02 | 10.26 | 10.07 | 9.29 | 8.56 | 8.30 | 8.22 |
| 12 | 9.06 | 9.01 | 9.93 | 10.44 | 11.03 | 10.99 | 10.22 | 10.05 | 9.27 | 8.56 | 8.23 | 8.20 |
| 13 | 9.03 | 9.01 | 9.91 | 10.44 | 10.76 | 10.94 | 10.13 | 10.00 | 9.21 | 8.57 | 8.29 | 8.20 |
| 14 | 9.01 | 9.17 | 9.95 | 10.47 | 10.73 | 10.89 | 10.20 | 10.00 | 9.17 | 8.57 | 8.23 | 8.21 |
| 15 | 9.03 | 9.19 | 9.98 | 10.47 | 10.81 | 10.85 | 10.20 | 10.07 | 9.16 | 8.52 | 8.24 | 8.20 |
| 16 | 9.00 | 9.21 | 9.99 | 10.44 | 10.81 | 10.80 | 9.94 | 10.04 | 9.17 | 8.52 | 8.15 | 8.17 |
| 17 | 9.00 | 9.22 | 9.95 | 10.44 | 10.86 | 10.76 | 10.17 | 10.05 | 9.12 | 8.50 | 8.27 | 8.10 |
| 18 | 9.02 | 9.19 | 9.95 | 10.44 | 10.91 | 10.70 | 10.23 | 10.00 | 9.08 | 8.48 | 8.14 | 8.01 |
| 19 | 8.99 | 9.18 | 9.97 | 10.43 | 10.94 | 10.68 | 10.15 | 9.98 | 9.03 | 8.49 | 8.21 | 7.87 |
| 20 | 9.01 | 9.21 | 9.95 | 10.44 | 10.86 | 10.61 | 10.08 | 9.93 | 9.01 | 8.50 | 8.18 | 8.03 |
| 21 | 8.98 | 9.22 | 9.93 | 10.44 | 10.82 | 10.55 | 10.11 | 9.94 | 8.93 | 8.52 | 8.13 | 8.05 |
| 22 | 8.96 | 9.21 | 9.95 | 10.45 | 10.81 | 10.53 | 10.04 | 9.91 | 8.93 | 8.45 | 8.10 | 8.09 |
| 23 | 8.97 | 9.23 | 9.96 | 10.45 | 10.76 | 10.51 | 10.15 | 9.86 | 8.92 | 8.43 | 8.09 | 8.07 |
| 24 | 8.98 | 9.26 | 9.96 | 10.45 | 10.78 | 10.53 | 10.17 | 9.81 | 8.90 | 8.45 | 8.14 | 8.05 |
| 25 | 8.98 | 9.23 | 9.98 | 10.46 | 10.76 | 10.49 | 10.12 | 9.78 | 8.87 | 8.42 | 8.06 | 8.02 |
| 26 | 9.01 | 9.24 | 10.01 | 10.56 | 10.79 | 10.45 | 10.10 | e9.75 | 8.88 | 8.41 | 8.10 | 8.06 |
| 27 | 8.95 | 9.18 | 10.04 | 10.72 | 10.77 | 10.44 | 10.10 | e9.73 | 8.88 | 8.38 | 8.05 | 8.05 |
| 28 | 8.97 | 9.16 | 10.08 | 10.85 | 10.92 | 10.41 | 10.11 | e9.68 | 8.83 | 8.33 | 8.10 | 8.05 |
| 29 | 9.03 | 9.27 | 10.03 | 10.91 | 10.93 | 10.35 | 10.12 | e9.63 | 8.81 | 8.21 | 8.07 | 8.03 |
| 30 | 9.09 | 9.45 | 10.03 | 10.94 | --- | 10.49 | 10.15 | 9.59 | 8.82 | 8.29 | 8.06 | 7.96 |
| 31 | 9.21 | --- | 10.11 | 10.96 | --- | 10.56 | --- | 9.57 | --- | 8.34 | 8.06 | --- |
| MEAN | 9.04 | 9.19 | 9.90 | 10.50 | 10.87 | 10.79 | 10.23 | 9.96 | 9.15 | 8.52 | 8.19 | 8.11 |
| MAX | 9.21 | 9.45 | 10.11 | 10.96 | 11.04 | 11.18 | 10.52 | 10.25 | 9.57 | 8.74 | 8.35 | 8.24 |
| MIN | 8.95 | 9.01 | 9.49 | 10.19 | 10.73 | 10.35 | 9.94 | 9.57 | 8.81 | 8.21 | 8.05 | 7.87 |

e Estimated



GROUND-WATER LEVELS
HAWAII ISLAND OF MAUI--Continued

205617156311101. Local number, 6-5631-01.

LOCATION.--Lat 20°56'17", long 156°31'11", Hydrologic Unit 20020000, 2,000 ft southwest of Waihee Farm, and 1.3 mi northwest of Waiehu Golf Course. Owner: Wailuku Sugar Co.

AQUIFER.--Wailuku Volcanic Series, Pliocene age.

WELL CHARACTERISTICS.--Drilled basal water-table well, depth 300 ft, 1.5-in. PVC casing, cased to 260 ft, perforated from 260 to 300 ft.

DATUM.--Elevation of land-surface datum is 248 ft. Measuring point: Top of 1.5-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, 12.42 ft above mean sea level, August 20, 1996.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

| DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL |
|--------|----------------|--------|----------------|--------|----------------|--------|----------------|--------|----------------|
| OCT 04 | 12.99 | JAN 03 | 13.15 | APR 02 | 13.22 | JUL 01 | 12.68 | AUG 20 | 12.42 |
| NOV 21 | 12.85 | FEB 12 | 13.33 | MAY 28 | 12.92 | | | | |

GROUND-WATER LEVELS
HAWAII ISLAND OF MAUI--Continued

205651156313201. Local number, 6-5631-02.

LOCATION.--Lat 20°56'51", long 156°31'32", Hydrologic Unit 20020000, 0.9 mi northwest of Waihee School, and 0.9 mi upstream from mouth of Waihee river. Owner: Hawaiian Investments.

AQUIFER.--Wailuku Volcanic Series, Pliocene age.

WELL CHARACTERISTICS.--Drilled basal water-table well, depth 387 ft, casing diameter 16-in., cased to 290 ft, perforated from 290 to 310 ft.

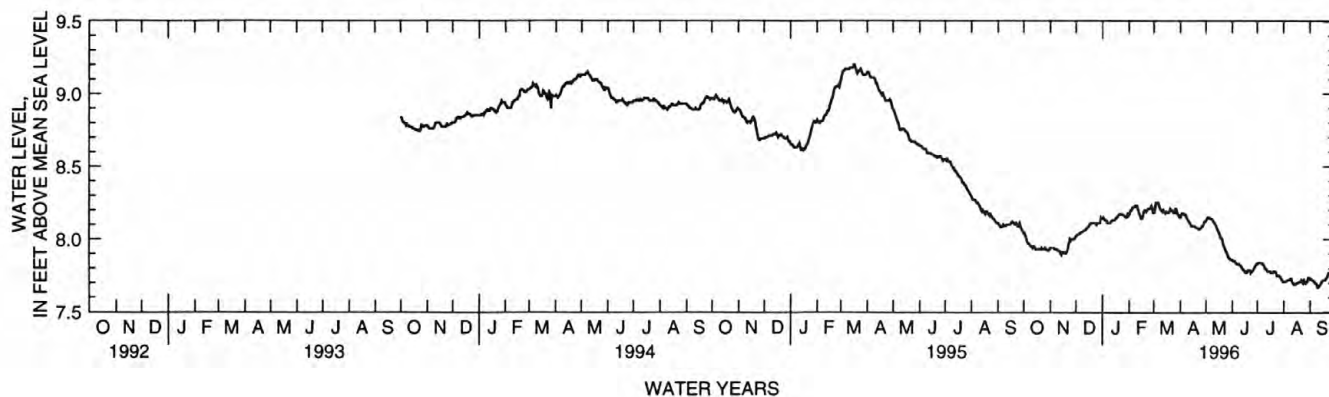
DATUM.--Elevation of land-surface datum is 281 ft. Measuring point: Top of 16-in. casing, 284.78 ft above mean sea level.

PERIOD OF RECORD.--Water-level recorder, April 1988 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 12.05 ft above mean sea level, October 22, November 2, 10, 11, 1989. Lowest water level measured, 7.61 ft above mean sea level, September 11, 1996.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 1 | 8.04 | 7.94 | 8.02 | 8.14 | 8.17 | 8.18 | 8.15 | 8.13 | 7.86 | 7.83 | 7.71 | 7.73 |
| 2 | 8.04 | 7.94 | 8.03 | 8.15 | 8.19 | 8.20 | 8.17 | 8.14 | 7.85 | 7.84 | 7.71 | 7.73 |
| 3 | 8.02 | 7.94 | 8.03 | 8.14 | 8.20 | 8.25 | 8.18 | 8.15 | 7.85 | 7.84 | 7.71 | 7.72 |
| 4 | 8.00 | 7.94 | 8.03 | 8.13 | 8.20 | 8.25 | 8.18 | 8.15 | 7.85 | 7.84 | 7.71 | 7.72 |
| 5 | 7.98 | 7.94 | 8.04 | 8.13 | 8.22 | 8.25 | 8.17 | 8.15 | 7.84 | 7.84 | 7.72 | 7.72 |
| 6 | 7.97 | 7.93 | 8.04 | 8.13 | 8.22 | 8.25 | 8.17 | 8.14 | 7.83 | 7.84 | 7.72 | 7.71 |
| 7 | 7.97 | 7.93 | 8.05 | 8.11 | 8.22 | 8.23 | 8.17 | 8.14 | 7.83 | 7.83 | 7.72 | 7.70 |
| 8 | 7.96 | 7.93 | 8.05 | 8.11 | 8.23 | 8.21 | 8.15 | 8.14 | 7.83 | 7.83 | 7.72 | 7.70 |
| 9 | 7.95 | 7.93 | 8.05 | 8.11 | 8.23 | 8.20 | 8.14 | 8.13 | 7.83 | 7.82 | 7.73 | 7.69 |
| 10 | 7.95 | 7.92 | 8.06 | 8.11 | 8.23 | 8.20 | 8.13 | 8.12 | 7.82 | 7.80 | 7.73 | 7.67 |
| 11 | 7.94 | 7.92 | 8.06 | 8.12 | 8.21 | 8.19 | 8.12 | 8.11 | 7.82 | 7.80 | 7.71 | 7.67 |
| 12 | 7.95 | 7.92 | 8.06 | 8.13 | 8.19 | 8.20 | 8.11 | 8.10 | 7.81 | 7.79 | 7.70 | 7.68 |
| 13 | 7.95 | 7.90 | 8.07 | 8.13 | 8.17 | 8.19 | 8.10 | 8.09 | 7.80 | 7.78 | 7.69 | 7.69 |
| 14 | 7.94 | 7.89 | 8.08 | 8.13 | 8.16 | 8.18 | 8.09 | 8.07 | 7.79 | 7.78 | 7.69 | 7.70 |
| 15 | 7.93 | 7.91 | 8.08 | 8.13 | 8.14 | 8.19 | 8.09 | 8.06 | 7.79 | 7.78 | 7.69 | 7.71 |
| 16 | 7.93 | 7.91 | 8.09 | 8.14 | 8.14 | 8.19 | 8.09 | 8.05 | 7.78 | 7.78 | 7.70 | 7.72 |
| 17 | 7.93 | 7.91 | 8.10 | 8.15 | 8.16 | 8.18 | 8.09 | 8.03 | 7.77 | 7.77 | 7.70 | 7.72 |
| 18 | 7.93 | 7.90 | 8.11 | 8.15 | 8.19 | 8.18 | 8.09 | 8.01 | 7.77 | 7.77 | 7.70 | 7.72 |
| 19 | 7.93 | 7.90 | 8.11 | 8.16 | 8.20 | 8.19 | 8.08 | 8.01 | 7.78 | 7.77 | 7.71 | 7.72 |
| 20 | 7.93 | 7.91 | 8.11 | 8.17 | 8.20 | 8.21 | 8.08 | 8.00 | 7.79 | 7.78 | 7.71 | 7.73 |
| 21 | 7.93 | 7.92 | 8.11 | 8.17 | 8.19 | 8.20 | 8.08 | 7.97 | 7.79 | 7.78 | 7.71 | 7.74 |
| 22 | 7.94 | 7.95 | 8.11 | 8.17 | 8.20 | 8.20 | 8.07 | 7.95 | 7.79 | 7.78 | 7.72 | 7.75 |
| 23 | 7.93 | 7.98 | 8.11 | 8.17 | 8.21 | 8.19 | 8.07 | 7.94 | 7.77 | 7.77 | 7.71 | 7.77 |
| 24 | 7.93 | 8.00 | 8.11 | 8.17 | 8.21 | 8.18 | 8.07 | 7.92 | 7.78 | 7.75 | 7.70 | 7.77 |
| 25 | 7.93 | 7.99 | 8.10 | 8.17 | 8.21 | 8.18 | 8.08 | 7.91 | 7.78 | 7.75 | 7.72 | 7.77 |
| 26 | 7.94 | 8.00 | 8.11 | 8.16 | 8.22 | 8.21 | 8.09 | 7.90 | 7.79 | 7.75 | 7.71 | 7.77 |
| 27 | 7.93 | 8.00 | 8.11 | 8.16 | 8.23 | 8.21 | 8.09 | 7.88 | 7.80 | 7.75 | 7.70 | 7.77 |
| 28 | 7.93 | 8.00 | 8.11 | 8.15 | 8.21 | 8.19 | 8.10 | 7.87 | 7.81 | 7.74 | 7.71 | 7.76 |
| 29 | 7.92 | 8.00 | 8.11 | 8.15 | 8.18 | 8.17 | 8.12 | 7.87 | 7.82 | 7.73 | 7.71 | 7.75 |
| 30 | 7.92 | 8.01 | 8.15 | 8.17 | --- | 8.16 | 8.12 | 7.86 | 7.83 | 7.72 | 7.74 | 7.75 |
| 31 | 7.93 | --- | 8.14 | 8.16 | --- | 8.15 | --- | 7.86 | --- | 7.71 | 7.74 | --- |
| MEAN | 7.95 | 7.94 | 8.08 | 8.14 | 8.20 | 8.20 | 8.11 | 8.03 | 7.81 | 7.79 | 7.71 | 7.72 |
| MAX | 8.04 | 8.01 | 8.15 | 8.17 | 8.23 | 8.25 | 8.18 | 8.15 | 7.86 | 7.84 | 7.74 | 7.77 |
| MIN | 7.92 | 7.89 | 8.02 | 8.11 | 8.14 | 8.15 | 8.07 | 7.86 | 7.77 | 7.71 | 7.69 | 7.67 |



GROUND-WATER LEVELS
HAWAII ISLAND OF MAUI--Continued

205856156400101. Local number, 6-5840-01.

LOCATION.--Lat 20°58'56", long 156°40'01", 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 Volcanic Series, Pliocene age.

WELL CHARACTERISTICS.--Drilled basal water-table well, depth 274 ft, casing diameter 8-in., cased to 264 ft, perforated from 264 to 274 ft. Hole was drilled to depth of 284 ft, but plugged back 10 ft with cement.

DATUM.--Elevation of land-surface datum is 257 ft. Measuring point: Top of 9-in. casing, 257.45 ft above mean sea level. Levels of August 11, 1993.

REMARKS.--Water-quality records for 1964, 1980 are available in files of district office.

PERIOD OF RECORD.--Occasional measurements, March 1972 to July 1975. Water-level recorder, August 1975 to June 25, 1993. Occasional measurements, July 1993 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.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

| DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL |
|--------|-------------|--------|-------------|--------|-------------|--------|-------------|--------|-------------|--------|-------------|
| OCT 16 | 3.23 | JAN 16 | 3.10 | FEB 20 | 2.96 | APR 16 | 2.90 | JUN 10 | 2.95 | AUG 13 | 3.07 |

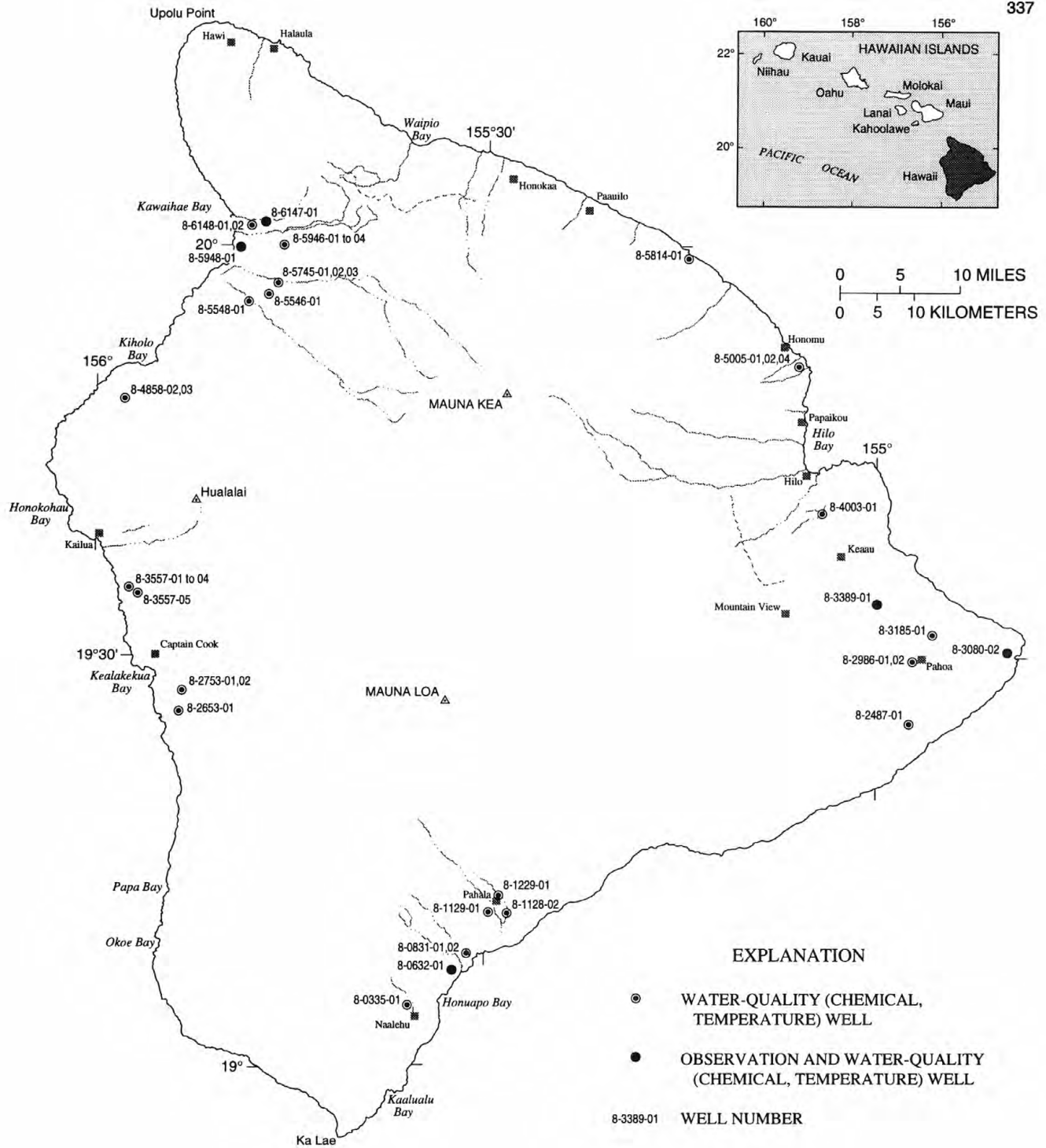


Figure 20. Locations of observation wells and ground-water quality sampling wells on Hawaii.

GROUND-WATER LEVELS
HAWAII, ISLAND OF HAWAII

190602155325901. Local number, 8-0632-01.

LOCATION.--Lat 19°06'02", long 155°32'59", Hydrologic Unit 20010000, 0.9 mi north of Whittington Park, and 3.3 mi northeast of Naalehu.
Owner: Kau Agribusiness (formerly Kau Sugar Company).

AQUIFER.--Ninole Volcanic Series, Pleistocene age.

WELL CHARACTERISTICS.--Drilled basal water-table, depth 140 ft, casing diameter 14-in., cased to 105 ft, perforated from 105 to 125 ft.

DATUM.--Elevation of land-surface datum is 102 ft. Measuring point: 0.38 ft above 1-in. hole in pump base, 103.64 ft above mean sea level.

REMARKS.--Water-quality records for 1972 and 1973 are available in files of the district office.

PERIOD OF RECORD.--Occasional measurements, April 1972 to current year.

REVISED RECORDS.--WDR HI-91-1: 1984-90 (The units of the minimum water level for the period of record.)

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 2.39 ft above mean sea level, October 19, 1978; lowest measured, 0.21 ft above mean sea level, June 19, 1989.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

| WATER | | WATER | | WATER | |
|--------|-------|---------|-------|--------|-------|
| DATE | LEVEL | DATE | LEVEL | DATE | LEVEL |
| OCT 02 | 1.86 | DEC 14 | 1.36 | FEB 23 | 0.77 |
| APR 19 | 0.29 | JUNE 18 | 0.41 | AUG 14 | 0.43 |

193017154502101. Local number, 8-3080-02.

LOCATION.--Lat 19°30'17", long 154°50'21", Hydrologic Unit 20010000, 0.5 mi south of intersection of Highway 132 and Highway 137 near Pahoehoe. Owner: County of Hawaii.

AQUIFER.--Puna Volcanic Series, Holocene age.

WELL CHARACTERISTICS.--Dug basal water-table well, depth 46 ft, casing diameter 66-in., with two horizontal infiltration tunnels 2 x 50 ft extending in opposite directions from 3 ft above bottom of well.

DATUM.--Elevation of land-surface datum is 39 ft. Measuring point: Top of steel manhole cover at 1-in. hole, 39.50 ft above mean sea level.

REMARKS.--Water from this well is used for public supply and at times, water level affected by pumping.

PERIOD OF RECORD.--

Water level: Occasional measurements, March 1972 to current year.

Water quality: 1972-81, 1983 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 4.77 ft above mean sea level, March 2, 1989; lowest measured, 1.18 ft above mean sea level, June 3, 1985.

WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

| DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL |
|--------|-------------|--------|-------------|--------|-------------|--------|-------------|--------|-------------|
| DEC 13 | 4.51 | FEB 21 | 4.58 | APR 18 | 4.30 | JUN 17 | 4.17 | AUG 13 | 4.59 |

GROUND-WATER LEVELS
HAWAII, ISLAND OF HAWAII--Continued

193339154594801. Local number, 8-3389-01.

LOCATION.--Lat 19°33'39", long 154°59'48", Hydrologic Unit 20010000, 3.5 mi northwest of Pahoia airstrip, and 5.5 mi southeast of Keaau.
Owner: County of Hawaii.

AQUIFER.--Puna Volcanic Series, Holocene age.

WELL CHARACTERISTICS.--Drilled basal water-table well, depth 475 ft, casing diameter 8-in., cased to 403 ft, perforated from 403 to 475 ft.

DATUM.--Elevation of land-surface datum is 427 ft. Measuring point: Top of casing, 428.14 ft above mean sea level.

REMARKS.--Water-quality records for 1961 are available in files of district office.

PERIOD OF RECORD.--Occasional measurements, September 1974 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 27.76 ft above mean sea level, revised, November 27, 1990; lowest measured, 9.92 ft above mean sea level, June 9, 1992.

| WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996 | | | | | | | | | |
|--|-------------|--------|-------------|--------|-------------|---------|-------------|--------|-------------|
| DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL |
| DEC 13 | 17.46 | FEB 21 | 17.46 | APR 18 | 18.20 | JUNE 17 | 17.25 | AUG 13 | 17.13 |

195947155485801. Local number, 8-5948-01.

LOCATION.--Lat 19°59'47", long 155°48'58", Hydrologic Unit 20010000, 0.7 mi east of Hapuna Beach Park, and 3.1 mi southeast of Kawaihae.
Owner: State of Hawaii.

AQUIFER.--Hamakua Volcanic Series, Pleistocene age.

WELL CHARACTERISTICS.--Drilled basal water-table well, depth 268 ft, casing diameter 10-in., cased to 246 ft, screened from 246 to 266 ft.

DATUM.--Elevation of land-surface datum is 244 ft. Measuring point: Hole in pumpbase, 246.47 ft above mean sea level.

REMARKS.--Water from this well is used for irrigation.

PERIOD OF RECORD.--

Water level: Occasional measurements, April 1970, March 1973 to current year.

Water quality: 1970, 1973 to current year.

REVISED RECORDS.--WDR HI-91-1: 1976-80 (Water-level data), 1976-90 (Maximum and minimum water levels for the period of record).

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 4.83 ft above mean sea level, August 29, 1994; lowest measured, 1.38 ft above mean sea level, September 28, 1979.

| WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996 | | | | | |
|--|-------------|---------|-------------|--------|-------------|
| DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL |
| OCT 06 | 4.63 | JAN 09 | a-- | FEB 28 | a-- |
| APR 23 | a-- | JUNE 21 | a-- | AUG 16 | a-- |

a-- No water level taken. Pump found running.

GROUND-WATER LEVELS
HAWAII, ISLAND OF HAWAII--Continued

200132155471101. Local number, 8-6147-01.

LOCATION.--Lat 20°01'32", long 155°47'10", Hydrologic Unit 20010000, on Highway 26, 3.1 mi east of Kawaihae, and 2.8 mi northeast of Hapuna Beach Park. Owner: State of Hawaii.

AQUIFER.--Pololu Volcanic Series, Pleistocene age.

WELL CHARACTERISTICS.--Drilled basal water-table well, depth 1,008 ft, casing diameter 8-in., cased to 997 ft, perforated from 997 to 1,008 ft. Hole was drilled to 1,040 ft, but was finally plugged back to 1,008 ft.

DATUM.--Elevation of land-surface datum is 982 ft. Measuring point: Top of pipe coupling on casing cover 983.08 ft, revised, November 18, 1986, above mean sea level.

REMARKS.--Water-quality records for 1963-64 are available in files of district office.

PERIOD OF RECORD.--Occasional measurements, June to July 1963, June 1973 to current year.

REVISED RECORDS.--WRD HI-91-1: 1975-90 (Station ID number.)

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 6.23 ft above mean sea level, May 1, 1987; lowest measured, 4.66 ft above mean sea level, May 3, 1994.

| WATER LEVEL, IN FEET ABOVE MEAN SEA LEVEL, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996 | | | | | | | | | |
|--|----------------|--------|----------------|--------|----------------|--------|----------------|--------|----------------|
| DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL |
| JAN 02 | 5.34 | FEB 28 | 4.90 | APR 23 | 5.16 | JUN 21 | 5.63 | AUG 16 | 5.80 |

QUALITY OF GROUND WATER
WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

| STATION NUMBER | LOCAL NUMBER | LOCAL IDENT- I- FIER | LAT- I- TUDE | LONG- I- TUDE | DATE | TIME | SPE- CIFIC CON- DUCT- ANCE (US/CM) | TEMPER- ATURE WATER (DEG C) | CHLO- RIDE, (MG/L AS CL) |
|-------------------------|-----------------|-------------------------------|--------------------|---------------------|-----------------|-----------|---|--------------------------------------|-----------------------------------|
| HAWAII, ISLAND OF KAUAI | | | | | | | | | |
| 220051159231801 | 2-0023-01 | PUKAKI RESERVO | 22 00 51 N | 159 23 18 W | 03-20-96 | 1050 | 308 | 25.5 | 24 |
| | | | | | 03-20-96 | 1150 | 318 | 25.0 | 24 |
| | | | | | 04-02-96 | 1140 | 313 | 25.5 | 24 |
| | | | | | 04-02-96 | 1700 | 344 | 25.0 | 24 |
| | | | | | 04-03-96 | 0800 | 434 | 25.0 | 23 |
| | | | | | 04-03-96 | 1700 | 496 | 26.0 | 24 |
| | | | | | 04-04-96 | 0800 | 658 | 26.0 | 23 |
| | | | | | 04-04-96 | 1700 | 800 | 26.5 | 27 |
| | | | | | 04-05-96 | 1100 | 908 | 27.0 | 25 |
| | | | | | 04-05-96 | 1700 | 955 | 27.0 | 27 |
| 04-06-96 | 0800 | 1000 | 26.5 | 24 | | | | | |
| 220018159444702 | 2-0044-13 | W34 KEKAHA | 22 00 18 N | 159 44 47 W | 10-24-95 | 1210 | 484 | 23.0 | 72 |
| | | | | | 01-04-96 | 0900 | 471 | 23.5 | 70 |
| 220016159442701 | 2-0044-15 | S14 KEKAHA | 22 00 16 N | 159 44 27 W | 10-24-95 | 0845 | 1290 | 22.5 | 305 |
| 220136159205501 | 2-0120-01 | W7 WAILUA | 22 01 36 N | 159 20 55 W | 10-25-95 | 1015 | 843 | 25.5 | 146 |
| | | | | | 01-12-96 | 1135 | 801 | 25.0 | 134 |
| | | | | | 02-15-96 | 1320 | 809 | 24.0 | 136 |
| | | | | | 04-08-96 | 1250 | 819 | 26.0 | 143 |
| | | | | | 06-12-96 | 1220 | 833 | 26.0 | 146 |
| 220126159261501 | 2-0126-01 | NW KILOHANA | 22 01 26 N | 159 26 15 W | 01-24-96 | 1615 | 913 | 30.0 | 16 |
| | | | | | 01-25-96 | 1700 | 693 | 29.0 | 15 |
| | | | | | 01-26-96 | 1700 | 626 | 28.5 | 16 |
| | | | | | 01-27-96 | 1700 | 593 | 28.5 | 15 |
| | | | | | 01-28-96 | 1600 | 583 | 28.5 | 15 |
| | | | | | 01-29-96 | 1700 | 576 | 28.5 | 18 |
| | | | | | 01-30-96 | 1600 | 570 | 28.0 | 16 |
| | | | | | 01-31-96 | 0800 | 566 | 27.0 | 17 |
| | | | | | 220148159453501 | 2-0145-10 | W45F MANA | 22 01 48 N | 159 45 35 W |
| 220354159205601 | 2-0320-01 | W9-1A WAIL | 22 03 54 N | 159 20 56 W | 10-20-95 | a0850 | -- | -- | -- |
| 220354159205602 | 2-0320-03 | W9-1B WAIL | 22 03 54 N | 159 20 56 W | 10-20-95 | 0850 | 400 | 24.0 | 46 |
| | | | | | 12-14-95 | 0840 | 403 | 24.0 | 46 |
| | | | | | 02-14-96 | 1025 | 422 | 23.5 | 56 |
| | | | | | 04-09-96 | 0915 | 419 | 24.0 | 55 |
| | | | | | 06-06-96 | 0955 | 393 | 24.0 | 47 |
| | | | | | 07-23-96 | 0900 | 418 | 24.0 | 54 |
| 220341159453901 | 2-0345-04 | S16 SAKIMA | 22 03 41 N | 159 45 39 W | 10-24-95 | 0930 | 225 | 23.5 | 569 |
| 220530159450401 | 2-0545-01 | W59 KAULAU | 22 05 30 N | 159 45 07 W | 01-12-96 | 0920 | 730 | 22.0 | 133 |
| | | | | | 02-13-96 | 1045 | 729 | 22.0 | 133 |
| | | | | | 04-05-96 | 0915 | 745 | 24.0 | 136 |
| | | | | | 06-06-96 | 1235 | 758 | 26.0 | 136 |
| | | | | | 07-22-96 | 1240 | 730 | 25.0 | 141 |
| | | | | | 220621159232101 | 2-0623-04 | KAPAA | 22 06 21 N | 159 23 21 W |
| 220827159185401 | 2-0818-01 | W90A ANAHO | 22 08 27 N | 159 18 54 W | 12-14-95 | 1400 | 113 | 25.5 | 13 |
| | | | | | 02-14-96 | 1515 | 107 | 25.5 | 12 |
| | | | | | 04-09-96 | 1430 | 103 | 25.0 | 13 |
| | | | | | 06-07-96 | 1050 | 117 | 24.0 | 14 |
| | | | | | 07-23-96 | 1500 | 111 | 26.0 | 12 |
| | | | | | 10-20-95 | 0940 | 222 | 24.5 | 21 |
| 02-14-96 | 1130 | 224 | 23.5 | 22 | | | | | |
| 06-06-96 | 1130 | 247 | 24.0 | 26 | | | | | |

a Pump being replaced, unable to collect sample

QUALITY OF GROUND WATER
WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

| STATION NUMBER | LOCAL NUMBER | LOCAL IDENT- I- FIER | LAT- I- TUDE | LONG- I- TUDE | DATE | TIME | SPE- CIFIC CON- DUCT- ANCE (US/CM) | TEMPER- ATURE WATER (DEG C) | CHLO- RIDE, (MG/L AS CL) |
|------------------------------------|-----------------|-------------------------------|--------------------|---------------------|----------|-------|---|--------------------------------------|-----------------------------------|
| HAWAII, ISLAND OF KAUAI--Continued | | | | | | | | | |
| 220826159185401 | 2-0818-02 | W90B ANAHO | 22 08 26 N | 159 18 54 W | 12-14-95 | 0940 | 285 | 24.0 | 23 |
| | | | | | 04-09-96 | 1010 | 245 | 24.0 | 23 |
| | | | | | 07-23-96 | 0950 | 280 | 24.0 | 23 |
| 221141159252501 | 2-1125-01 | N1 KILAUEA | 22 11 41 N | 159 25 25 W | 10-20-95 | 1015 | 180 | 24.0 | 19 |
| | | | | | 02-14-96 | 1245 | 162 | 22.5 | 16 |
| | | | | | 06-07-96 | 1205 | 177 | 25.0 | 18 |
| 221141159252502 | 2-1125-02 | N2 KILAUEA | 22 11 41 N | 159 25 25 W | 12-14-95 | 1020 | 158 | 24.5 | 16 |
| | | | | | 04-09-96 | 1115 | 159 | 24.5 | 15 |
| | | | | | 07-23-96 | 1040 | 160 | 25.0 | 15 |
| 221150159264501 | 2-1126-01 | KALIHIWAI | 22 11 50 N | 159 26 45 W | 12-08-95 | 0800 | 213 | 22.5 | 23 |
| | | | | | 04-11-96 | 0820 | 191 | 22.5 | 20 |
| | | | | | 06-10-96 | 0840 | 188 | 22.5 | 20 |
| | | | | | 07-24-96 | 0800 | 199 | 22.5 | 22 |
| 221151159265001 | 2-1126-02 | KALIHIWAI | 22 11 51 N | 159 26 50 W | 10-25-95 | 0840 | 197 | 22.5 | 22 |
| | | | | | 02-09-96 | 0800 | 210 | 22.5 | 22 |
| 221201159293401 | 2-1229-03 | W73 HANALE | 22 12 01 N | 159 29 34 W | 10-20-95 | 1240 | 256 | 23.5 | 35 |
| | | | | | 12-14-95 | 1245 | 258 | 25.0 | 36 |
| | | | | | 02-14-96 | 1415 | 257 | 23.5 | 36 |
| | | | | | 04-09-96 | 1330 | 228 | 23.5 | 27 |
| | | | | | 06-07-96 | 1430 | 229 | 25.0 | 36 |
| | | | | | 07-23-96 | 1115 | 257 | 24.0 | 36 |
| 221247159324801 | 2-1232-01 | W67 WAINIH | 22 12 47 N | 159 32 48 W | 10-20-95 | 1210 | 134 | 23.0 | 23 |
| | | | | | 12-14-95 | 1215 | 128 | 22.5 | 23 |
| | | | | | 02-14-96 | 1350 | 122 | 22.5 | 22 |
| | | | | | 04-09-96 | 1300 | 122 | 23.5 | 25 |
| | | | | | 06-07-96 | 1415 | 127 | 23.5 | 24 |
| | | | | | 07-23-96 | 1300 | 127 | 24.0 | 22 |
| 221318159335901 | 2-1333-01 | W66 HAENA | 22 13 18 N | 159 33 59 W | 10-20-95 | a1110 | -- | -- | -- |
| | | | | | 07-23-96 | 1205 | 215 | 22.0 | 21 |
| 215434159263301 | 2-5426-03 | T16 KOLOA | 21 54 34 N | 159 26 33 W | 05-02-96 | 0800 | 519 | 23.0 | 106 |
| | | | | | 06-06-96 | 0820 | 501 | 23.5 | 94 |
| 215454159274201 | 2-5427-01 | W16A KOLOA | 21 54 54 N | 159 27 42 W | 12-13-95 | 0800 | 236 | 22.5 | 26 |
| | | | | | 02-13-96 | 0755 | 237 | 22.0 | 28 |
| | | | | | 06-06-96 | 0850 | 233 | 22.5 | 27 |
| 215455159274201 | 2-5427-02 | W16B KOLOA | 21 54 55 N | 159 27 42 W | 10-19-95 | 1335 | 227 | 23.5 | 26 |
| | | | | | 04-10-96 | 0755 | 227 | 22.5 | 26 |
| | | | | | 07-22-96 | 0815 | 225 | 22.5 | 27 |
| 215536159263501 | 2-5526-01 | KOLOA | 21 55 36 N | 159 26 35 W | 10-23-95 | b0835 | -- | -- | -- |
| 215528159303001 | 2-5530-02 | W23 LAWAI | 21 55 28 N | 159 30 30 W | 10-23-95 | b1400 | -- | -- | -- |
| | | | | | 04-10-96 | 1240 | 283 | 24.0 | 32 |
| | | | | | 07-25-96 | 0820 | 283 | 23.0 | 34 |
| 215535159302601 | 2-5530-03 | W22 LAWAI | 21 55 35 N | 159 30 26 W | 10-24-95 | 1340 | 231 | 23.0 | 27 |
| | | | | | 12-13-95 | 1315 | 230 | 24.5 | 27 |
| | | | | | 02-15-96 | 1230 | 230 | 21.0 | 27 |
| | | | | | 04-08-96 | 0930 | 231 | 23.0 | 27 |
| | | | | | 06-11-96 | 1330 | 232 | 23.5 | 27 |
| | | | | | 07-25-96 | 0825 | 231 | 24.5 | 27 |

a Pump not working, unable to collect sample
b Well not being used for irrigation

QUALITY OF GROUND WATER
WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

| STATION NUMBER | LOCAL NUMBER | LOCAL IDENT- I- FIER | LAT- I- TUDE | LONG- I- TUDE | DATE | TIME | SPE- CIFIC CON- DUCT- ANCE (US/CM) | TEMPER- ATURE WATER (DEG C) | CHLO- RIDE, (MG/L AS CL) |
|------------------------------------|-----------------|-------------------------------|--------------------|---------------------|----------|------|---|--------------------------------------|-----------------------------------|
| HAWAII, ISLAND OF KAUAI--Continued | | | | | | | | | |
| 215522159342601 | 2-5534-03 | W25-1 HANA | 21 55 22 N | 159 34 26 W | 10-19-95 | 0850 | 449 | 23.5 | 39 |
| | | | | | 12-13-95 | 1000 | 436 | 23.5 | 39 |
| | | | | | 02-13-96 | 1300 | 439 | 24.0 | 37 |
| | | | | | 05-02-96 | 0945 | 430 | 24.0 | 36 |
| | | | | | 06-06-96 | 0950 | 428 | 24.0 | 40 |
| | | | | | 07-22-96 | 1045 | 429 | 23.5 | 35 |
| 215630159265101 | 2-5626-01 | PUAKUKUI | 21 56 30 N | 159 26 51 W | 12-02-95 | 1600 | 259 | 24.0 | 28 |
| | | | | | 12-04-95 | 1700 | 503 | 23.5 | 28 |
| | | | | | 12-11-95 | 0800 | 257 | 23.5 | 28 |
| 215635159355001 | 2-5635-01 | S7 HANAPEP | 21 56 35 N | 159 35 50 W | 10-23-95 | 1035 | 650 | 23.0 | 121 |
| 215803159401201 | 2-5840-01 | W26 WAIMEA | 21 58 03 N | 159 40 12 W | 10-19-95 | 1000 | 973 | 24.0 | 227 |
| | | | | | 12-13-95 | 1215 | 686 | 24.0 | 141 |
| | | | | | 02-13-96 | 1215 | 821 | 24.0 | 177 |
| | | | | | 04-10-96 | 1115 | 940 | 24.5 | 212 |
| | | | | | 06-06-96 | 1100 | 1040 | 24.5 | 240 |
| | | | | | 07-22-96 | 1130 | 967 | 25.5 | 206 |
| 215854159424601 | 2-5842-02 | S11 KEKAHA | 21 58 54 N | 159 42 46 W | 10-24-95 | 1245 | 683 | 25.0 | 101 |
| 215843159422901 | 2-5842-03 | S10 KEKAHA | 21 58 43 N | 159 42 29 W | 10-24-95 | 1305 | 1500 | 24.5 | 352 |
| 215901159235301 | 2-5923-01 | KILOHANA A | 21 59 01 N | 159 23 53 W | 10-20-95 | 0800 | 259 | 24.0 | 19 |
| | | | | | 12-14-95 | 0740 | 274 | 24.5 | 19 |
| | | | | | 02-14-96 | 0745 | 274 | 23.0 | 19 |
| | | | | | 04-09-96 | 0800 | 268 | 24.5 | 21 |
| | | | | | 06-07-96 | 0810 | 254 | 25.0 | 19 |
| | | | | | 07-23-96 | 0740 | 255 | 24.5 | 23 |
| 215901159235201 | 2-5923-07 | KILOHANA I | 21 59 01 N | 159 23 52 W | 10-20-95 | 0745 | 163 | 24.0 | 19 |
| | | | | | 12-14-95 | 0730 | 231 | 24.0 | 26 |
| | | | | | 02-14-96 | 0730 | 172 | 22.5 | 20 |
| | | | | | 04-09-96 | 0750 | 167 | 23.5 | 21 |
| | | | | | 06-07-96 | 0750 | 170 | 24.0 | 19 |
| | | | | | 07-23-96 | 0735 | 171 | 23.5 | 21 |
| 215950159231601 | 2-5923-08 | HANAMAULU TZ | 21 59 50 N | 159 23 16 W | 10-05-95 | 1550 | 311 | 25.5 | 35 |
| | | | | | 10-05-95 | 1800 | 311 | 25.5 | 35 |
| | | | | | 10-07-95 | 0900 | 501 | 25.0 | 35 |
| 215906159395601 | 2-5939-01 | S9 WAIMEA | 21 59 06 N | 159 39 56 W | 10-19-95 | 1035 | 175 | 23.5 | 15 |
| | | | | | 12-13-95 | 1040 | 384 | 24.0 | 45 |
| | | | | | 02-15-96 | 1015 | 322 | 23.5 | 28 |
| | | | | | 04-10-96 | 1015 | 243 | 23.0 | 23 |
| | | | | | 06-06-96 | 1400 | 269 | 24.0 | 26 |
| | | | | | 07-25-96 | 0855 | 270 | 23.5 | 26 |
| 215937159434201 | 2-5943-01 | S13 KEKAHA | 21 59 37 N | 159 43 42 W | 10-24-95 | 0820 | 941 | 24.0 | 178 |

QUALITY OF GROUND WATER
WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

| STATION NUMBER | LOCAL IDENTIFIER | LATITUDE | LONGITUDE | DATE | TIME | SPECIFIC CONDUCTANCE (US/CM) | TEMPERATURE WATER (DEG C) | CHLORIDE, (MG/L AS CL) |
|------------------------|----------------------|------------|-------------|----------|-------|------------------------------|---------------------------|------------------------|
| HAWAII, ISLAND OF OAHU | | | | | | | | |
| 211646157465201 | 3-1646-01 W1-B WAIAL | 21 16 46 N | 157 46 52 W | 04-04-96 | 1000 | 700 | 21.0 | -- |
| | | | | 05-31-96 | 1110 | 883 | 21.5 | -- |
| | | | | 08-27-96 | 0903 | 952 | 21.5 | -- |
| 211832157515501 | 3-1851-19 W102 TUBEA | 21 18 32 N | 157 51 55 W | 03-07-96 | 1140 | 23000 | 23.5 | 13100 |
| | | | | 05-31-96 | 1211 | 31600 | 25.5 | 12100 |
| 211832157515502 | 3-1851-19 W102 TUBEB | 21 18 32 N | 157 51 55 W | 03-07-96 | 1120 | 13500 | 24.0 | -- |
| | | | | 05-31-96 | 1230 | 16100 | 25.0 | -- |
| 212133158035501 | 3-2103-03 S14 MAKAKI | 21 21 33 N | 158 03 55 W | 04-16-96 | 0910 | 995 | 23.0 | 237 |
| | | | | 05-21-96 | 0936 | 1100 | 24.0 | 238 |
| | | | | 07-18-96 | 0845 | 1100 | 23.5 | 230 |
| 212106157533701 | 3-2153-02 W153 MOANA | 21 21 06 N | 157 53 37 W | 04-04-96 | 1035 | 455 | 22.0 | 102 |
| | | | | 05-21-96 | 1518 | 488 | 22.0 | 103 |
| | | | | 08-14-96 | 1518 | 489 | 22.0 | 100 |
| 212259157554201 | 3-2255-35 W189-3A | 21 22 59 N | 157 55 42 W | 04-04-96 | a1332 | -- | -- | -- |
| | | | | 05-20-96 | 1523 | 881 | 22.0 | -- |
| | | | | 08-27-96 | a1030 | -- | -- | -- |
| 212238157561102 | 3-2256-12 W187-C | 21 22 39 N | 157 56 09 W | 11-30-95 | 1125 | 886 | 23.5 | 230 |
| | | | | 04-19-96 | 1540 | 896 | 24.0 | 299 |
| | | | | 05-31-96 | 1425 | 892 | 25.5 | 235 |
| | | | | 08-01-96 | 1308 | 895 | 25.0 | 233 |
| 212343158001001 | 3-2300-11 W238 WAIPH | 21 23 43 N | 158 00 10 W | 03-19-96 | 1415 | 580 | 21.5 | -- |
| | | | | 05-20-96 | 1322 | 682 | 22.5 | -- |
| | | | | 08-14-96 | 1300 | 677 | 22.0 | -- |

a No sample collected, unable to get to the site

QUALITY OF GROUND WATER
WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

| STATION | NUMBER | LOCAL IDENT- I- FIER | LAT- I- TUDE | LONG- I- TUDE | DATE | TIME | SAMPLE DEPTH DIS- TANCE BELOW MSL FEET | CHLO- RIDE, (MG/L AS CL) |
|-----------------------------------|-----------|-------------------------------|--------------------|---------------------|----------|-------|--|-----------------------------------|
| HAWAII, ISLAND OF OAHU--Continued | | | | | | | | |
| 212340158001901 | 3-2300-18 | W241 | 21 23 40 N | 158 00 19 W | 12-28-95 | a1030 | 400 | 223 |
| | | | | | 12-28-95 | a1050 | 500 | 673 |
| | | | | | 12-28-95 | a1105 | 600 | 3710 |
| | | | | | 12-28-95 | a1130 | 650 | 6200 |
| | | | | | 12-28-95 | a1155 | 700 | 8010 |
| | | | | | 12-28-95 | a1215 | 750 | 9780 |
| | | | | | 12-28-95 | a1240 | 800 | 11100 |
| | | | | | 12-28-95 | a1305 | 850 | 13000 |
| | | | | | 12-28-95 | a1330 | 900 | 14300 |
| | | | | | 12-28-95 | a1400 | 950 | 16000 |
| | | | | | 12-28-95 | a1430 | 990 | 16300 |
| | | | | | 03-28-96 | a1025 | 400 | 222 |
| | | | | | 03-28-96 | a1045 | 500 | 664 |
| | | | | | 03-28-96 | a1105 | 550 | 1670 |
| | | | | | 03-28-96 | a1125 | 600 | 3690 |
| | | | | | 03-28-96 | a1145 | 650 | 6070 |
| | | | | | 06-20-96 | a1005 | 400 | 215 |
| | | | | | 06-20-96 | a1025 | 500 | 670 |
| | | | | | 06-20-96 | a1055 | 550 | 1660 |
| | | | | | 06-20-96 | a1120 | 600 | 3660 |
| | | | | | 06-20-96 | a1145 | 650 | 6020 |
| | | | | | 06-20-96 | a1210 | 700 | 8090 |
| | | | | | 06-20-96 | a1240 | 750 | 9840 |
| | | | | | 06-20-96 | a1315 | 800 | 11300 |
| | | | | | 06-20-96 | a1340 | 850 | 13100 |
| | | | | | 06-20-96 | a1410 | 900 | 14600 |
| | | | | | 06-20-96 | a1435 | 950 | 16100 |
| | | | | | 06-20-96 | a1505 | 990 | 16800 |
| | | | | | 09-27-96 | a0935 | 400 | 213 |
| | | | | | 09-27-96 | a1000 | 500 | 649 |
| | | | | | 09-27-96 | a1020 | 550 | 1640 |
| | | | | | 09-27-96 | a1040 | 600 | 3560 |
| | | | | | 09-27-96 | a1100 | 650 | 6000 |
| | | | | | 09-27-96 | a1125 | 700 | 7840 |
| | | | | | 09-27-96 | a1150 | 750 | 9730 |
| | | | | | 09-27-96 | a1220 | 800 | 11000 |
| | | | | | 09-27-96 | a1250 | 850 | 12900 |
| | | | | | 09-27-96 | a1315 | 900 | 14500 |
| | | | | | 09-27-96 | a1340 | 950 | 15900 |
| | | | | | 09-27-96 | a1410 | 990 | 16500 |

a Collected by non-USGS agency

QUALITY OF GROUND WATER
WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

| STATION NUMBER | LOCAL IDENTIFIER | LATITUDE | LONGITUDE | DATE | TIME | SPECIFIC CONDUCTANCE (US/CM) | TEMPERATURE WATER (DEG C) | CHLORIDE, (MG/L AS CL) |
|-----------------------------------|----------------------|------------|-------------|----------|-------|------------------------------|---------------------------|------------------------|
| HAWAII, ISLAND OF OAHU--Continued | | | | | | | | |
| 212358158010901 | 3-2301-09,10 W247-IJ | 21 23 58 N | 158 01 09 W | 04-19-96 | 1436 | 863 | 25.0 | -- |
| | | | | 05-21-96 | 1028 | 861 | 24.5 | -- |
| | | | | 07-30-96 | a1130 | -- | -- | -- |
| 212332157582201 | 3-2358-02 W201 | 21 23 32 N | 157 58 22 W | 04-04-96 | 1410 | 1160 | 20.5 | -- |
| | | | | 05-20-96 | 1448 | 1320 | 20.5 | -- |
| | | | | 08-14-96 | 1400 | 1400 | 21.0 | -- |
| 212342157584301 | 3-2358-22 W204-4 | 21 23 42 N | 157 58 43 W | 04-19-96 | 1240 | 1470 | 20.5 | -- |
| | | | | 05-20-96 | 1419 | 1440 | 20.5 | -- |
| | | | | 08-14-96 | 1330 | 1400 | 20.5 | -- |
| 212343157584701 | 3-2358-29 W204-9 | 21 23 43 N | 157 58 47 W | 04-19-96 | 1230 | 3630 | 21.0 | -- |
| | | | | 05-20-96 | 1414 | 3170 | 20.5 | -- |
| | | | | 08-14-96 | 1320 | 2180 | 20.5 | -- |
| 212336157591801 | 3-2359-05 W204-11 | 21 23 36 N | 157 59 18 W | 04-19-96 | 1250 | 2740 | 22.0 | -- |
| | | | | 05-20-96 | 1402 | 2670 | 22.0 | -- |
| | | | | 08-14-96 | 1310 | 2580 | 22.0 | -- |
| 212422157485601 | 3-2448-01 W416 | 21 24 22 N | 157 48 56 W | 04-09-96 | b1155 | -- | -- | -- |
| | | | | 05-28-96 | b1518 | -- | -- | -- |
| | | | | 07-18-96 | b1420 | -- | -- | -- |
| 212556157500301 | 3-2550-01 W407-16 | 21 25 56 N | 157 50 03 W | 04-09-96 | 1215 | 135 | 23.0 | 18 |
| | | | | 05-28-96 | 1506 | 134 | 23.5 | 18 |
| | | | | 07-18-96 | 1405 | 135 | 22.5 | 19 |
| 212506157582301 | 3-2558-10 S16 | 21 25 06 N | 157 58 23 W | 04-05-96 | 0806 | 240 | 20.5 | -- |
| | | | | 05-21-96 | 0905 | 242 | 21.0 | -- |
| | | | | 08-27-96 | 0955 | 243 | 21.0 | -- |
| 212617158033801 | 3-2603-01 W330-8 | 21 26 17 N | 158 03 38 W | 03-13-96 | 1225 | 340 | 22.0 | 47 |
| | | | | 05-20-96 | 1230 | 338 | 24.0 | 47 |
| | | | | 07-22-96 | 1220 | 337 | 23.0 | 47 |
| 212656158071801 | 3-2607-01 W277-97 | 21 26 56 N | 158 07 18 W | 04-16-96 | 1105 | 365 | 24.5 | -- |
| | | | | 05-21-96 | 1107 | 387 | 25.0 | -- |
| | | | | 07-18-96 | 0955 | 389 | 25.0 | -- |

a Pump being repaired, unable to collect a sample
b No flow, unable to collect sample

QUALITY OF GROUND WATER
WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

| STATION NUMBER | LOCAL IDENTIFIER | LATITUDE | LONGITUDE | DATE | TIME | SAMPLE DEPTH | CHLORIDE, (MG/L AS CL) | | |
|-----------------------------------|------------------|--------------|-----------|------------|-------------|----------------------|------------------------|------|-------|
| | | | | | | TANCE BELOW MSL FEET | | | |
| HAWAII, ISLAND OF OAHU--Continued | | | | | | | | | |
| 212614157594301 | 3-2659-01 | WAIPIO-MAUKA | MON | 21 26 14 N | 157 59 43 W | 12-27-95 | a1015 | 400 | 58 |
| | | | | | | 12-27-95 | a1040 | 500 | 57 |
| | | | | | | 12-27-95 | a1110 | 600 | 139 |
| | | | | | | 12-27-95 | a1140 | 700 | 680 |
| | | | | | | 12-27-95 | a1200 | 800 | 1700 |
| | | | | | | 12-27-95 | a1235 | 900 | 8370 |
| | | | | | | 12-27-95 | a1305 | 1000 | 13000 |
| | | | | | | 12-27-95 | a1340 | 1100 | 15200 |
| | | | | | | 12-27-95 | a1415 | 1200 | 16300 |
| | | | | | | 12-27-95 | a1450 | 1300 | 17000 |
| | | | | | | 03-27-96 | a0935 | 400 | 64 |
| | | | | | | 03-27-96 | a1010 | 500 | 57 |
| | | | | | | 03-27-96 | a1035 | 600 | 76 |
| | | | | | | 03-27-96 | a1100 | 700 | 618 |
| | | | | | | 03-27-96 | a1135 | 800 | 1660 |
| | | | | | | 03-27-96 | a1205 | 825 | 2590 |
| | | | | | | 03-27-96 | a1235 | 850 | 4470 |
| | | | | | | 03-27-96 | a1305 | 875 | 6810 |
| | | | | | | 03-27-96 | a1335 | 900 | 8430 |
| | | | | | | 03-27-96 | a1410 | 1000 | 13000 |
| | | | | | | 03-27-96 | a1445 | 1100 | 15300 |
| | | | | | | 03-27-96 | a1520 | 1200 | 16500 |
| | | | | | | 03-27-96 | a1550 | 1300 | 16900 |
| | | | | | | 06-19-96 | a0950 | 400 | 55 |
| | | | | | | 06-19-96 | a1025 | 500 | 54 |
| | | | | | | 06-19-96 | a1055 | 600 | 32 |
| | | | | | | 06-19-96 | a1130 | 700 | 395 |
| | | | | | | 06-19-96 | a1205 | 800 | 1280 |
| | | | | | | 06-19-96 | a1240 | 825 | 2700 |
| | | | | | | 06-19-96 | a1305 | 850 | 4590 |
| | | | | | | 06-19-96 | a1340 | 875 | 6780 |
| | | | | | | 06-19-96 | a1415 | 900 | 8500 |
| | | | | | | 06-19-96 | a1450 | 1000 | 12900 |
| | | | | | | 06-19-96 | a1530 | 1100 | 15100 |
| | | | | | | 09-25-96 | a1020 | 400 | 57 |
| | | | | | | 09-25-96 | a1050 | 500 | 57 |
| | | | | | | 09-25-96 | a1115 | 600 | 78 |
| | | | | | | 09-25-96 | a1145 | 700 | 636 |
| | | | | | | 09-25-96 | a1215 | 800 | 1290 |
| | | | | | | 09-25-96 | a1250 | 825 | 2840 |
| | | | | | | 09-25-96 | a1325 | 850 | 4660 |
| | | | | | | 09-25-96 | a1400 | 875 | 6990 |
| | | | | | | 09-26-96 | a0940 | 900 | 8450 |
| | | | | | | 09-26-96 | a1020 | 1000 | 12900 |
| | | | | | | 09-26-96 | a1100 | 1100 | 15100 |
| | | | | | | 09-26-96 | a1140 | 1200 | 16300 |
| | | | | | | 09-26-96 | a1225 | 1300 | 16900 |

a Collected by non-USGS agency

QUALITY OF GROUND WATER
WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

| STATION | NUMBER | LOCAL IDENT- I- FIER | LAT- I- TUDE | LONG- I- TUDE | DATE | TIME | SPE- CIFIC CON- DUCT- ANCE (US/CM) | TEMPER- ATURE WATER (DEG C) | CHLO- RIDE, (MG/L AS CL) |
|-----------------------------------|-----------|-------------------------------|--------------------|---------------------|----------|-------|---|--------------------------------------|-----------------------------------|
| HAWAII, ISLAND OF OAHU--Continued | | | | | | | | | |
| 212803158000701 | 3-2800-01 | W250-4A | 21 28 03 N | 158 00 06 W | 05-17-96 | 1358 | 143 | 22.0 | 17 |
| 212828158092001 | 3-2809-06 | TU WAIANAE | 21 28 27 N | 158 09 20 W | 04-16-96 | 1420 | 365 | 22.0 | -- |
| | | | | | 05-21-96 | 1425 | 389 | 22.0 | -- |
| | | | | | 08-14-96 | 1000 | 400 | 22.5 | -- |
| 212859158124301 | 3-2812-01 | S1 | 21 28 59 N | 158 12 43 W | 04-16-96 | 1248 | 444 | 26.0 | -- |
| | | | | | 04-29-96 | 1506 | 450 | 26.0 | -- |
| | | | | | 05-21-96 | 1400 | 456 | 28.0 | -- |
| | | | | | 07-18-96 | 1320 | 470 | 26.5 | -- |
| 212927158014801 | 3-2901-07 | S4 | 21 29 27 N | 158 01 48 W | 11-24-95 | 1145 | 166 | 21.0 | 20 |
| | | | | | 03-18-96 | 0830 | 175 | 22.0 | 19 |
| | | | | | 05-20-96 | 0336 | 171 | 22.5 | 20 |
| | | | | | 07-22-96 | 0906 | 169 | 21.0 | 19 |
| 212945158014301 | 3-2901-09 | W330-6 | 21 29 45 N | 158 01 43 W | 03-13-96 | a0810 | -- | -- | -- |
| | | | | | 05-17-96 | a1344 | -- | -- | -- |
| | | | | | 07-10-96 | a1345 | -- | -- | -- |
| | | | | | 07-22-96 | 1320 | 196 | 22.0 | 22 |
| 213224158135901 | 3-3213-06 | W277-101 | 21 32 24 N | 158 13 59 W | 04-16-96 | 1302 | 800 | 23.0 | 198 |
| | | | | | 05-21-96 | 1320 | 871 | 23.5 | 201 |
| | | | | | 07-18-96 | 1400 | 867 | 23.5 | 214 |
| 213243157510001 | 3-3251-01 | W406 | 21 32 43 N | 157 51 00 W | 01-23-96 | 1500 | 890 | 22.5 | 253 |
| | | | | | 03-14-96 | 1507 | 970 | 22.0 | 265 |
| 213327157524401 | 3-3352-01 | W405 | 21 33 27 N | 157 52 43 W | 01-23-96 | 1440 | 255 | 22.0 | 35 |
| | | | | | 03-14-96 | 1439 | 260 | 22.0 | 34 |
| | | | | | 05-28-96 | 1417 | 255 | 23.0 | 35 |
| | | | | | 07-18-96 | 1315 | 250 | 22.5 | 34 |
| 213429158055501 | 3-3405-01 | W323-1 | 21 34 29 N | 158 05 55 W | 03-12-96 | 1520 | 380 | 21.5 | -- |
| | | | | | 07-19-96 | 1500 | -- | -- | -- |
| 213427158055501 | 3-3405-02 | W323-2 | 21 34 27 N | 158 05 55 W | 05-17-96 | 1307 | 390 | 22.5 | -- |
| 213411158074501 | 3-3407-25 | W320 | 21 34 11 N | 158 07 45 W | 03-12-96 | 1025 | 1600 | 23.0 | -- |
| | | | | | 05-17-96 | 0945 | 1760 | 23.1 | -- |
| | | | | | 07-19-96 | 0900 | 1770 | 23.0 | -- |

a Pump off, unable to collect sample

QUALITY OF GROUND WATER
WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

| STATION NUMBER | LOCAL IDENTIFIER | LATITUDE | LONGITUDE | DATE | TIME | SPECIFIC CONDUCTANCE (US/CM) | TEMPERATURE WATER (DEG C) | CHLORIDE, (MG/L AS CL) |
|-----------------------------------|----------------------------|------------|-------------|----------|-------|------------------------------|---------------------------|------------------------|
| HAWAII, ISLAND OF OAHU--Continued | | | | | | | | |
| 213444158075501 | 3-3407-30 W318-2 | 21 34 44 N | 158 07 55 W | 03-11-96 | 1448 | 4800 | 24.0 | 1390 |
| | | | | 05-17-96 | 0920 | 6030 | 25.0 | 1820 |
| | | | | 07-22-96 | 1340 | 6930 | 25.0 | 1990 |
| 213446158104901 | 3-3410-08 W286 | 21 34 46 N | 158 10 49 W | 03-12-96 | 1147 | 690 | 21.5 | -- |
| | | | | 05-17-96 | 0957 | 712 | 22.5 | -- |
| | | | | 07-19-96 | 1325 | 728 | 22.0 | -- |
| 213512158061601 | 3-3506-03 TO 04 W329 A-B W | 21 35 12 N | 158 06 16 W | 03-12-96 | a1420 | -- | -- | -- |
| | | | | 05-17-96 | a1246 | -- | -- | -- |
| | | | | 07-19-96 | a1125 | -- | -- | -- |
| 213636158053701 | 3-3605-03 W334-C | 21 36 36 N | 158 05 37 W | 03-12-96 | 1310 | 1500 | 21.0 | -- |
| | | | | 05-17-96 | 1155 | 1540 | 21.0 | -- |
| | | | | 07-19-96 | 1000 | 1540 | 21.5 | -- |
| 213636158053702 | 3-3605-21 W334-U | 21 36 35 N | 158 05 40 W | 03-12-96 | 1330 | 1290 | 21.0 | -- |
| | | | | 05-17-96 | 1215 | 1360 | 21.5 | -- |
| | | | | 07-19-96 | 1022 | 1350 | 21.5 | -- |
| 213656157550401 | 3-3655-01 W394 | 21 36 56 N | 157 55 04 W | 03-14-96 | 1417 | 240 | 21.0 | 33 |
| | | | | 05-28-96 | 1350 | 241 | 33.0 | 33 |
| | | | | 07-17-96 | 1355 | 237 | 21.5 | 33 |
| 213902157561601 | 3-3956-04 W366 | 21 39 02 N | 157 56 16 W | 07-17-96 | 1335 | 312 | 21.5 | 50 |
| 214157158000101 | 3-4100-01 W338 | 21 41 57 N | 158 00 01 W | 01-23-96 | 1200 | 280 | 20.0 | 49 |
| | | | | 03-14-96 | 1130 | 310 | 20.0 | 50 |
| | | | | 05-28-96 | 1127 | 317 | 21.5 | 54 |
| | | | | 07-17-96 | 1025 | 317 | 20.5 | 55 |
| 214131158011601 | 3-4101-08 W337-6 | 21 41 31 N | 158 01 16 W | 03-14-96 | 1104 | 230 | 20.0 | 33 |
| | | | | 05-28-96 | a1107 | -- | -- | -- |
| | | | | 07-17-96 | a1140 | -- | -- | -- |
| 214233157583501 | 3-4258-04 W345 | 21 42 33 N | 157 58 35 W | 01-23-96 | 1305 | 1500 | 25.0 | 451 |
| | | | | 03-14-96 | 1248 | 1580 | 24.0 | 453 |
| | | | | 05-28-96 | 1226 | 1580 | 25.0 | 452 |
| | | | | 07-17-96 | 1000 | 1570 | 25.0 | 445 |

a Pump off, unable to collect sample

QUALITY OF GROUND WATER
WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

| STATION NUMBER | LOCAL NUMBER | LOCAL IDENT- I- FIER | LAT- I- TUDE | LONG- I- TUDE | DATE | TIME | SPE- CIFIC CON- DUCT- ANCE (US/CM) | TEMPER- ATURE WATER (DEG C) | CHLO- RIDE, (MG/L AS CL) |
|---------------------------|-----------------|-------------------------------|--------------------|---------------------|----------|-------|---|--------------------------------------|-----------------------------------|
| HAWAII, ISLAND OF MOLOKAI | | | | | | | | | |
| 210425156483001 | 4-0448-02 | S8 | 21 04 25 N | 156 48 30 W | 10-26-95 | 1410 | 346 | 24.5 | 20 |
| | | | | | 12-13-95 | 1210 | 344 | 24.0 | 20 |
| | | | | | 02-05-96 | 1415 | 347 | 24.5 | 20 |
| | | | | | 03-25-96 | 1255 | 350 | 24.0 | 20 |
| | | | | | 05-15-96 | 1050 | 342 | 24.0 | 20 |
| | | | | | 07-11-96 | 1130 | 334 | 24.5 | 19 |
| 210402156495801 | 4-0449-01 | S6 | 21 04 02 N | 156 49 58 W | 10-26-95 | 1430 | 324 | 22.0 | 62 |
| | | | | | 12-13-95 | 1230 | 331 | 20.5 | 64 |
| | | | | | 02-05-96 | 1440 | 325 | 20.5 | 63 |
| | | | | | 03-25-96 | 1310 | 330 | 20.5 | 64 |
| | | | | | 05-15-96 | 1115 | 335 | 21.0 | 65 |
| | | | | | 07-11-96 | 1200 | 336 | 20.5 | 65 |
| 210414156565601 | 4-0456-04 | KAWELA PLANTATION | 21 04 14 N | 156 56 56 W | 10-26-95 | a0735 | -- | -- | 22 |
| | | | | | 12-14-95 | a0800 | -- | -- | 18 |
| | | | | | 01-31-96 | a1325 | -- | -- | 30 |
| | | | | | 03-27-96 | a0810 | -- | -- | 42 |
| | | | | | 05-14-96 | a1035 | -- | -- | 25 |
| | | | | | 07-30-96 | a0825 | -- | -- | 33 |
| 210429156565106 | 4-0456-06 | KAWELA PLANTATION | 21 04 29 N | 156 56 51 W | 10-26-95 | a0755 | -- | -- | 67 |
| | | | | | 12-14-95 | a0810 | -- | -- | 65 |
| | | | | | 01-31-96 | a1315 | -- | -- | 61 |
| | | | | | 03-27-96 | a0805 | -- | -- | 75 |
| | | | | | 05-14-96 | a1050 | -- | -- | 71 |
| | | | | | 07-30-96 | a0810 | -- | -- | 70 |
| 210419156562108 | 4-0456-08 | KAWELA PLANTATION | 21 04 19 N | 156 56 21 W | 10-26-95 | a0815 | -- | -- | 105 |
| | | | | | 12-14-95 | a0830 | -- | -- | 90 |
| | | | | | 01-31-96 | a1255 | -- | -- | 79 |
| | | | | | 03-27-96 | a0740 | -- | -- | 105 |
| | | | | | 05-14-96 | a1105 | -- | -- | 425 |
| | | | | | 07-30-96 | a0745 | -- | -- | 468 |
| 210426156563509 | 4-0456-09 | KAWELA PLANTATION | 21 04 26 N | 156 56 35 W | 10-26-95 | a0805 | -- | -- | 147 |
| | | | | | 12-14-95 | a0820 | -- | -- | 132 |
| | | | | | 01-31-96 | a1305 | -- | -- | 74 |
| | | | | | 03-27-96 | a0755 | -- | -- | 137 |
| | | | | | 05-14-96 | a1055 | -- | -- | 151 |
| | | | | | 07-30-96 | a0755 | -- | -- | 152 |
| 210419156570501 | 4-0457-01 | S4 | 21 04 19 N | 156 57 05 W | 10-26-95 | 1500 | 486 | 23.0 | 111 |
| | | | | | 12-13-95 | 1320 | 507 | 23.0 | 119 |
| | | | | | 02-05-96 | 1600 | 570 | 23.5 | 136 |
| | | | | | 03-25-96 | 1405 | 620 | 23.0 | 149 |
| | | | | | 05-15-96 | 1245 | 647 | 23.5 | 150 |
| | | | | | 07-11-96 | 1230 | 613 | 23.5 | 144 |
| 210433156574201 | 4-0457-04 | KAWELA PLANTATION | 21 04 33 N | 156 57 42 W | 10-26-95 | a0830 | -- | -- | 326 |
| | | | | | 12-14-95 | a0845 | -- | -- | 327 |
| | | | | | 01-31-96 | a1335 | -- | -- | 327 |
| | | | | | 03-27-96 | a0830 | -- | -- | 325 |
| | | | | | 05-14-96 | a1005 | -- | -- | 330 |
| | | | | | 07-30-96 | a0840 | -- | -- | 331 |
| | | | | 09-16-96 | a1010 | -- | -- | 333 | |

a Collected by non-USGS agency

QUALITY OF GROUND WATER
WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

| STATION NUMBER | LOCAL NUMBER | LOCAL IDENT- I- FIER | LAT- I- TUDE | LONG- I- TUDE | DATE | TIME | SPE- CIFIC CON- DUCT- ANCE (US/CM) | TEMPER- ATURE WATER (DEG C) | CHLO- RIDE, (MG/L AS CL) |
|--------------------------------------|-----------------|-------------------------------|--------------------|---------------------|----------|-------|---|--------------------------------------|-----------------------------------|
| HAWAII, ISLAND OF MOLOKAI--Continued | | | | | | | | | |
| 210605157012001 | 4-0601-01 | W11 | 21 06 06 N | 157 01 11 W | 10-26-95 | 1100 | 330 | 24.0 | 31 |
| | | | | | 12-13-95 | 1420 | 334 | 24.0 | 33 |
| | | | | | 02-09-96 | 0840 | 325 | 24.0 | 34 |
| | | | | | 03-29-96 | 1030 | 229 | 23.5 | 15 |
| | | | | | 05-16-96 | 1800 | 278 | 23.5 | 18 |
| | | | | | 07-11-96 | 1020 | 295 | 24.5 | 25 |
| | | | | | 09-17-96 | 1440 | 343 | 24.5 | 34 |
| 210856157011201 | 4-0801-01 | W16 | 21 08 56 N | 157 01 12 W | 12-14-95 | 1300 | 473 | -- | 110 |
| | | | | | 02-01-96 | 0745 | 396 | -- | 86 |
| | | | | | 03-11-96 | a0950 | -- | -- | 83 |
| | | | | | 04-03-96 | a1045 | -- | -- | 83 |
| | | | | | 07-11-96 | a0655 | -- | -- | 90 |
| | | | | | 09-18-96 | a0950 | -- | -- | 105 |
| 210857156010701 | 4-0801-02 | | 21 08 57 N | 157 01 07 W | 10-27-95 | a0735 | -- | -- | 82 |
| | | | | | 11-01-95 | 0730 | 383 | -- | 83 |
| | | | | | 07-10-96 | 1045 | -- | -- | 66 |
| | | | | | 09-17-96 | 0950 | -- | -- | 71 |
| 210903157013001 | 4-0901-01 | W17 | 21 09 03 N | 157 01 30 W | 12-01-95 | a0900 | 315 | -- | 64 |
| | | | | | 01-07-96 | a0900 | 301 | -- | 58 |
| | | | | | 02-06-96 | a0930 | 316 | -- | 64 |
| | | | | | 03-01-96 | a0930 | -- | -- | 62 |
| | | | | | 04-01-96 | a0900 | -- | -- | 56 |
| | | | | | 05-01-96 | a0900 | -- | -- | 45 |
| | | | | | 06-01-96 | a0900 | -- | -- | 45 |
| | | | | | 07-01-96 | a1000 | -- | -- | 45 |
| | | | | | 08-01-96 | a1000 | -- | -- | 52 |
| | | | | | 09-14-96 | a1000 | -- | -- | 49 |

a Collected by non-USGS agency

QUALITY OF GROUND WATER
WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

| STATION NUMBER | LOCAL NUMBER | LOCAL IDENT- I- FIER | LAT- I- TUDE | LONG- I- TUDE | DATE | TIME | SPE- CIFIC CON- DUCT- ANCE (US/CM) | TEMPER- ATURE WATER (DEG C) | CHLO- RIDE, (MG/L AS CL) |
|------------------------|-----------------|-------------------------------|--------------------|---------------------|----------|-------|---|--------------------------------------|-----------------------------------|
| HAWAII, ISLAND OF MAUI | | | | | | | | | |
| 203835156065001 | 6-3806-01 | PUNAHOU SPRINGS | 20 38 35 N | 156 06 50 W | 10-03-95 | a1410 | -- | -- | -- |
| | | | | | 11-08-95 | 1115 | 726 | 20.5 | 148 |
| | | | | | 02-15-96 | 1430 | 769 | -- | 195 |
| | | | | | 04-11-96 | 1040 | 720 | 19.5 | -- |
| | | | | | 08-12-96 | 1045 | 716 | 19.5 | 181 |
| 203947156261201 | 6-3926-03 | WAILEA 8 | 20 39 47 N | 156 26 13 W | 10-16-95 | a1130 | -- | -- | -- |
| | | | | | 01-10-96 | 1120 | 2480 | 20.0 | 658 |
| | | | | | 04-10-96 | 1210 | 2650 | 19.0 | 703 |
| | | | | | 08-13-96 | 1230 | 3010 | 21.0 | 825 |
| 204601156001501 | 6-4600-01 | W55 | 20 46 01 N | 156 00 15 W | 10-18-95 | 1340 | 414 | 24.5 | 90 |
| 204633156003201 | 6-4600-03 | WAKIU B | 20 46 36 N | 156 00 30 W | 10-18-95 | 1420 | 679 | 19.0 | 171 |
| 204635156270101 | 6-4627-14 | W226 | 20 46 35 N | 156 27 01 W | 10-16-95 | 1050 | 1550 | 23.5 | 240 |
| | | | | | 01-10-96 | 1250 | 1520 | 24.0 | 234 |
| | | | | | 04-10-96 | 1055 | 1530 | 23.0 | 240 |
| | | | | | 08-13-96 | 1040 | 1510 | 24.0 | 233 |
| 204845156255001 | 6-4825-01 | S15 | 20 48 45 N | 156 25 50 W | 11-02-95 | 1235 | 1250 | 24.0 | 198 |
| | | | | | 01-17-96 | a1155 | -- | -- | -- |
| | | | | | 03-07-96 | a1040 | -- | -- | -- |
| | | | | | 04-19-96 | a1050 | -- | -- | -- |
| | | | | | 06-20-96 | a1115 | -- | -- | -- |
| | | | | | 08-15-96 | a1210 | -- | -- | -- |
| 204931156371201 | 6-4937-01 | S10 | 20 49 31 N | 156 37 12 W | 10-19-95 | 1200 | 932 | 24.0 | 178 |
| 205014156212701 | 6-5021-01 | PUKALANI | 20 50 14 N | 156 21 27 W | 10-11-95 | 1315 | 2050 | 21.0 | 571 |
| | | | | | 02-16-96 | b1215 | -- | -- | -- |
| | | | | | 04-23-96 | b1215 | 2050 | -- | 571 |
| | | | | | 08-15-96 | b1325 | -- | -- | 578 |
| 205102156282501 | 6-5128-02 | S16 | 20 51 02 N | 156 28 25 W | 11-02-95 | a1225 | -- | -- | -- |
| | | | | | 01-17-96 | a1135 | -- | -- | -- |
| | | | | | 04-19-96 | a1020 | -- | -- | -- |
| | | | | | 06-20-96 | 1100 | 1280 | 23.5 | -- |
| | | | | | 08-15-96 | a1155 | -- | -- | -- |
| 205243156243201 | 6-5224-02 | S22 | 20 52 43 N | 156 24 32 W | 11-02-95 | a1425 | -- | -- | -- |
| | | | | | 01-17-96 | a1240 | -- | -- | -- |
| | | | | | 03-07-96 | a0850 | -- | -- | -- |
| | | | | | 06-20-96 | a1120 | -- | -- | -- |
| | | | | | 08-15-96 | a1400 | -- | -- | -- |
| 205322156394501 | 6-5339-01 | W291 | 20 53 22 N | 156 39 45 W | 10-16-95 | a1115 | -- | -- | -- |
| | | | | | 01-16-96 | 0945 | 670 | 21.0 | 122 |
| | | | | | 02-20-96 | a0950 | -- | -- | -- |
| | | | | | 04-16-96 | a1105 | -- | -- | -- |
| | | | | | 06-10-96 | 1000 | 575 | 21.0 | 91 |
| | | | | | 08-13-96 | 1020 | 526 | 21.5 | 73 |

a Pump off, unable to collect sample
b Collected by non-USGS agency

QUALITY OF GROUND WATER
WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

| STATION NUMBER | LOCAL NUMBER | LOCAL IDENT- I- FIER | LAT- I- TUDE | LONG- I- TUDE | DATE | TIME | SPE- CIFIC CON- DUCT- ANCE (US/CM) | TEMPER- ATURE WATER (DEG C) | CHLO- RIDE, (MG/L AS CL) |
|-----------------------------------|-----------------|-------------------------------|--------------------|---------------------|----------|-------|---|--------------------------------------|-----------------------------------|
| HAWAII, ISLAND OF MAUI--Continued | | | | | | | | | |
| 205320156394501 | 6-5339-02 | W292 | 20 53 20 N | 156 39 45 W | 10-16-95 | 1105 | 696 | 21.5 | 133 |
| | | | | | 01-16-96 | 0950 | 634 | 21.0 | 110 |
| | | | | | 02-20-96 | 0955 | 687 | 20.5 | 123 |
| | | | | | 04-16-96 | a1100 | -- | -- | -- |
| | | | | | 06-10-96 | a1005 | -- | -- | -- |
| | | | | | 08-13-96 | 1025 | 566 | 21.0 | 89 |
| 205329156305502 | 6-5330-09 | W15A | | | 10-04-95 | a1030 | -- | -- | -- |
| | | | | | 11-22-95 | a0830 | -- | -- | -- |
| | | | | | 02-12-96 | a1015 | -- | -- | -- |
| | | | | | 04-19-96 | a0920 | -- | -- | -- |
| | | | | | 06-20-96 | a1120 | -- | -- | -- |
| | | | | | 08-15-96 | a1040 | -- | -- | -- |
| 205329156305501 | 6-5330-10 | W15B | 20 53 29 N | 156 30 55 W | 10-04-95 | a1025 | -- | -- | -- |
| | | | | | 11-22-95 | a0820 | -- | -- | -- |
| | | | | | 02-12-96 | a1020 | -- | -- | -- |
| | | | | | 04-19-96 | 0925 | 329 | 22.0 | 48 |
| | | | | | 06-20-96 | 1125 | 426 | 22.0 | 73 |
| | | | | | 08-15-96 | 1045 | 440 | 22.0 | 82 |
| 205330156305401 | 6-5330-11 | W15F | 20 53 30 N | 156 30 54 W | 10-04-95 | 1020 | 680 | 22.5 | 143 |
| | | | | | 11-22-95 | 0840 | 607 | 22.0 | 123 |
| | | | | | 02-12-96 | a1025 | -- | -- | -- |
| | | | | | 04-19-96 | 0930 | 556 | 22.5 | 111 |
| | | | | | 06-21-96 | 1130 | 639 | 21.5 | 130 |
| | | | | | 08-15-96 | 1050 | 675 | 22.5 | 142 |
| 205343156401101 | 6-5340-01 | S5 | 20 53 43 N | 156 40 11 W | 10-16-95 | 1215 | 1690 | 22.0 | 430 |
| | | | | | 01-16-96 | a1030 | -- | -- | -- |
| | | | | | 02-20-96 | a1020 | -- | -- | -- |
| | | | | | 04-16-96 | 1150 | 1120 | 22.0 | 264 |
| | | | | | 06-10-96 | a1100 | -- | -- | -- |
| | | | | | 08-13-96 | 1240 | 1460 | 21.5 | 365 |
| 205412156193801 | 6-5419-01 | HAIKU | 20 54 12 N | 156 19 38 W | 11-02-95 | b1340 | -- | -- | -- |
| | | | | | 01-17-96 | a1345 | -- | -- | -- |
| | | | | | 03-07-96 | a0940 | -- | -- | -- |
| | | | | | 06-21-96 | a1000 | -- | -- | -- |
| | | | | | 08-15-96 | a1300 | -- | -- | -- |
| | | | | | | | | | |
| 205416156244301 | 6-5424-01 | S24 | 20 54 16 N | 156 24 43 W | 11-02-95 | a1415 | -- | -- | -- |
| | | | | | 01-17-96 | a1250 | -- | -- | -- |
| | | | | | 03-07-96 | a0900 | -- | -- | -- |
| | | | | | 06-20-96 | a1130 | -- | -- | -- |
| | | | | | 08-15-96 | a1355 | -- | -- | -- |
| | | | | | | | | | |

a Pump off, unable to collect sample

b Pump under construction, unable to collect sample

QUALITY OF GROUND WATER
WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

| STATION NUMBER | LOCAL NUMBER | LOCAL IDENT- I- FIER | LAT- I- TUDE | LONG- I- TUDE | DATE | TIME | SAMPLE DEPTH DIS- TANCE BELOW MSL FEET | CHLO- RIDE, (MG/L AS CL) |
|-----------------------------------|-----------------|-------------------------------|--------------------|---------------------|----------|------|--|-----------------------------------|
| HAWAII, ISLAND OF MAUI--Continued | | | | | | | | |
| 205405156305401 | 6-5430-05 | WAIIEHU MONITOR W | 20 54 59 N | 156 30 54 W | 10-05-95 | 0940 | 400 | 12 |
| | | | | | 10-05-95 | 1005 | 200 | 12 |
| | | | | | 10-05-95 | 1020 | 500 | 104 |
| | | | | | 10-05-95 | 1040 | 600 | 138 |
| | | | | | 10-05-95 | 1100 | 675 | 718 |
| | | | | | 10-05-95 | 1125 | 750 | 13100 |
| | | | | | 10-05-95 | 1155 | 800 | 17600 |
| | | | | | 10-05-95 | 1220 | 825 | 18300 |
| | | | | | 10-05-95 | 1245 | 850 | 18500 |
| | | | | | 10-05-95 | 1310 | 900 | 18800 |
| | | | | | 01-03-96 | 1030 | 400 | 103 |
| | | | | | 01-03-96 | 1050 | 200 | 12 |
| | | | | | 01-03-96 | 1110 | 500 | 95 |
| | | | | | 01-03-96 | 1150 | 600 | 111 |
| | | | | | 01-03-96 | 1210 | 675 | 643 |
| | | | | | 01-03-96 | 1235 | 750 | 13400 |
| | | | | | 01-03-96 | 1300 | 800 | 17500 |
| | | | | | 01-03-96 | 1330 | 825 | 18400 |
| | | | | | 01-03-96 | 1400 | 850 | 18500 |
| | | | | | 01-03-96 | 1425 | 900 | 18800 |
| | | | | | 07-02-96 | 1025 | 200 | 13 |
| | | | | | 07-02-96 | 1040 | 400 | 13 |
| | | | | | 07-02-96 | 1100 | 500 | 102 |
| | | | | | 07-02-96 | 1120 | 600 | 136 |
| | | | | | 07-02-96 | 1145 | 675 | 730 |
| | | | | | 07-02-96 | 1210 | 750 | 14300 |
| | | | | | 07-02-96 | 1235 | 800 | 17600 |
| | | | | | 07-02-96 | 1300 | 825 | 18400 |
| | | | | | 07-02-96 | 1330 | 850 | 18500 |
| | | | | | 07-02-96 | 1400 | 900 | 18700 |

QUALITY OF GROUND WATER
WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

| STATION NUMBER | LOCAL NUMBER | LOCAL IDENT- I- FIER | LAT- I- TUDE | LONG- I- TUDE | DATE | TIME | SPE- CIFIC CON- DUCT- ANCE (US/CM) | TEMPER- ATURE WATER (DEG C) | CHLO- RIDE, (MG/L AS CL) |
|-----------------------------------|-----------------|-------------------------------|--------------------|---------------------|----------|-------|---|--------------------------------------|-----------------------------------|
| HAWAII, ISLAND OF MAUI--Continued | | | | | | | | | |
| 205511156222101 | 6-5522-01 | S31 | 20 55 11 N | 156 22 21 W | 11-02-95 | a1410 | -- | -- | -- |
| | | | | | 01-17-96 | a1310 | -- | -- | -- |
| | | | | | 03-07-96 | a0910 | -- | -- | -- |
| | | | | | 04-19-96 | a1200 | -- | -- | -- |
| | | | | | 06-20-96 | a1145 | -- | -- | -- |
| | | | | | 08-15-96 | a1340 | -- | -- | -- |
| 205651156401001 | 6-5640-01 | S36 | 20 56 51 N | 156 40 10 W | 10-16-95 | 1150 | 910 | 21.5 | 217 |
| | | | | | 01-16-96 | a1050 | -- | -- | -- |
| | | | | | 02-20-96 | a1035 | -- | -- | -- |
| | | | | | 04-16-96 | 1130 | 890 | 21.5 | 211 |
| | | | | | 06-10-96 | a1150 | -- | -- | -- |
| | | | | | 08-13-96 | a1220 | -- | -- | -- |
| 205837156384601 | 6-5838-01 | NAPILI A | 20 58 37 N | 156 38 46 W | 10-16-95 | b1500 | -- | -- | -- |
| | | | | | 01-16-96 | b1235 | -- | -- | -- |
| | | | | | 02-20-96 | a1200 | -- | -- | -- |
| | | | | | 04-16-96 | a1445 | -- | -- | -- |
| | | | | | 06-10-96 | a1240 | -- | -- | -- |
| | | | | | 08-13-96 | a1400 | -- | -- | -- |
| 205838156383101 | 6-5838-02 | NAPILI B | 20 58 38 N | 156 38 31 W | 10-16-95 | 1440 | 337 | 20.5 | 71 |
| | | | | | 01-16-96 | a1245 | -- | -- | -- |
| | | | | | 02-20-96 | 1215 | 323 | 20.0 | 66 |
| | | | | | 04-16-96 | 1455 | 355 | 21.0 | 74 |
| | | | | | 06-10-96 | 1250 | 386 | 20.0 | 83 |
| | | | | | 08-13-96 | 1400 | 405 | 20.0 | 90 |
| 205848156383601 | 6-5838-04 | NAPILI | 20 58 48 N | 156 38 36 W | 10-16-95 | a1450 | -- | -- | -- |
| | | | | | 01-16-96 | a1300 | -- | -- | -- |
| | | | | | 02-20-96 | 1230 | 490 | 20.0 | 111 |
| | | | | | 06-10-96 | a1300 | -- | -- | -- |
| | | | | | 08-13-96 | a1400 | -- | -- | -- |

a Pump off, unable to collect sample
b Pump being repaired, unable to collect sample

QUALITY OF GROUND WATER
WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

| STATION NUMBER | LOCAL IDENTIFIER | LATITUDE | LONGITUDE | DATE | TIME | SPECIFIC CONDUCTANCE (US/CM) | TEMPERATURE WATER (DEG C) | CHLORIDE (MG/L AS CL) |
|--------------------------|----------------------|------------|-------------|----------|-------|------------------------------|---------------------------|-----------------------|
| HAWAII, ISLAND OF HAWAII | | | | | | | | |
| 190347155354301 | 8-0335-01 NAALEHU W1 | 19 03 47 N | 155 35 43 W | 10-02-95 | a1245 | -- | -- | -- |
| | | | | 12-14-95 | a1045 | -- | -- | -- |
| | | | | 02-23-96 | a1105 | -- | -- | -- |
| | | | | 04-19-96 | a1225 | -- | -- | -- |
| | | | | 06-18-96 | a1230 | -- | -- | -- |
| | | | | 08-14-96 | a1210 | -- | -- | -- |
| 190602155325901 | 8-0632-01 W10-1 | 19 06 02 N | 155 32 59 W | 10-02-95 | a1210 | -- | -- | -- |
| | | | | 12-14-95 | a1120 | -- | -- | -- |
| | | | | 02-23-96 | a1240 | -- | -- | -- |
| | | | | 04-19-96 | a1140 | -- | -- | -- |
| | | | | 06-18-96 | a1200 | -- | -- | -- |
| | | | | 08-14-96 | a1135 | -- | -- | -- |
| 190832155310801 | 8-0831-01 NINOLE TH1 | 19 08 32 N | 155 31 08 W | 10-02-95 | a1140 | -- | -- | -- |
| 190832155310901 | 8-0831-02 NINOLE A | 19 08 32 N | 155 31 09 W | 10-02-95 | a1140 | -- | -- | -- |
| | | | | 12-14-95 | a1140 | -- | -- | -- |
| | | | | 02-23-96 | a1125 | -- | -- | -- |
| | | | | 04-19-96 | 1255 | 700 | 19.0 | 168 |
| | | | | 06-18-96 | a1250 | -- | -- | -- |
| | | | | 08-14-96 | a1225 | -- | -- | -- |
| 191108155281701 | 8-1128-02 PALIMA | 19 11 08 N | 155 28 17 W | 10-02-95 | 1120 | 130 | 19.0 | 13 |
| | | | | 12-14-95 | a1230 | -- | -- | -- |
| | | | | 02-23-96 | a1140 | -- | -- | -- |
| | | | | 04-19-96 | a1330 | -- | -- | -- |
| | | | | 06-18-96 | 1115 | 135 | 20.0 | 16 |
| | | | | 08-14-96 | a1250 | -- | -- | -- |
| 191114155294801 | 8-1129-01 | 19 11 14 N | 155 29 48 W | 10-02-95 | 1050 | 97 | 18.0 | 6 |
| | | | | 12-14-95 | a1200 | -- | -- | -- |
| | | | | 02-23-96 | 1155 | 92 | 18.5 | 5 |
| | | | | 04-19-96 | a1310 | -- | -- | -- |
| | | | | 06-18-96 | 1255 | 95 | 19.0 | 5 |
| | | | | 08-14-96 | a1235 | -- | -- | -- |
| 191219155291601 | 8-1229-01 PAHALA | 19 12 25 N | 155 29 22 W | 10-02-95 | 1030 | 97 | 17.5 | 5 |
| | | | | 12-14-95 | 1245 | 99 | 18.0 | -- |
| | | | | 02-23-96 | a1325 | -- | -- | -- |
| | | | | 04-19-96 | a1335 | -- | -- | -- |
| | | | | 06-18-96 | 1320 | 99 | 18.0 | 4 |
| | | | | 08-14-96 | a1300 | -- | -- | -- |
| 192456154571901 | 8-2487-01 W9-7 | 19 24 57 N | 154 57 18 W | 12-13-95 | a1115 | -- | -- | -- |
| | | | | 02-21-96 | a1250 | -- | -- | -- |
| | | | | 04-18-96 | a1240 | -- | -- | -- |
| | | | | 06-17-96 | a1310 | -- | -- | -- |
| | | | | 08-13-96 | a1325 | -- | -- | -- |
| | | | | | | | | |
| 192646155532001 | 8-2653-01 KEEI C | 19 26 46 N | 155 53 20 W | 10-11-95 | 1105 | 245 | 22.0 | -- |
| | | | | 01-08-96 | a1400 | -- | -- | -- |
| | | | | 02-26-96 | 1300 | 240 | 20.0 | 43 |
| | | | | 04-22-96 | a1540 | -- | -- | -- |
| | | | | 06-20-96 | 1600 | 230 | 20.0 | 39 |
| | | | | 08-15-96 | a1345 | -- | -- | -- |
| 192738155534201 | 8-2753-01 W12-4 | 19 27 31 N | 155 53 41 W | 10-11-95 | a1050 | -- | -- | -- |
| | | | | 01-08-96 | 1330 | 725 | 20.0 | 173 |
| | | | | 02-26-96 | 1235 | 655 | 20.0 | 159 |
| | | | | 04-22-96 | a1530 | -- | -- | -- |
| | | | | 08-15-96 | a1330 | -- | -- | -- |
| | | | | | | | | |

a Pump off, unable to collect sample

QUALITY OF GROUND WATER
WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

| STATION NUMBER | LOCAL IDENTIFIER | LATITUDE | LONGITUDE | DATE | TIME | SPECIFIC CONDUCTANCE (US/CM) | TEMPERATURE WATER (DEG C) | CHLORIDE, (MG/L AS CL) |
|-------------------------------------|----------------------------|------------|-------------|----------|-------|------------------------------|---------------------------|------------------------|
| HAWAII, ISLAND OF HAWAII--Continued | | | | | | | | |
| 192731155534101 | 8-2753-02 W12-8 | 19 27 22 N | 155 53 38 W | 10-11-95 | a1100 | -- | -- | -- |
| | | | | 01-08-96 | a1350 | -- | -- | -- |
| | | | | 02-26-96 | a1255 | -- | -- | -- |
| | | | | 04-22-96 | a1535 | -- | -- | -- |
| | | | | 06-21-96 | a1555 | -- | -- | -- |
| 08-15-96 | a1340 | -- | -- | -- | | | | |
| 192924154564701 | 8-2986-01 W9-5B | 19 29 24 N | 154 56 47 W | 12-13-95 | 1030 | 130 | 23.0 | 7 |
| | | | | 02-21-96 | a1230 | -- | -- | -- |
| | | | | 04-18-96 | a1230 | -- | -- | -- |
| | | | | 06-17-96 | a1255 | -- | -- | -- |
| | | | | 08-13-96 | a1305 | -- | -- | -- |
| 192923154564701 | 8-2986-02 W9-5A | 19 29 23 N | 154 56 47 W | 12-13-95 | 1035 | 130 | 23.0 | 7 |
| | | | | 02-21-96 | a1220 | -- | -- | -- |
| | | | | 04-18-96 | a1225 | -- | -- | -- |
| | | | | 06-17-96 | a1250 | -- | -- | -- |
| | | | | 08-13-96 | a1300 | -- | -- | -- |
| 193017154502101 | 8-3080-02 S9 | 19 30 17 N | 154 50 21 W | 12-13-95 | a1245 | -- | -- | -- |
| | | | | 02-21-96 | a1425 | -- | -- | -- |
| | | | | 04-18-96 | a1420 | -- | -- | -- |
| | | | | 06-17-96 | a1425 | -- | -- | -- |
| | | | | 08-13-96 | a1440 | -- | -- | -- |
| 193113154555801 | 8-3185-01 W9-11 HAWN SHORE | 19 31 13 N | 154 55 58 W | 12-13-95 | 1325 | 125 | 21.5 | 15 |
| | | | | 02-21-96 | 1445 | 125 | 21.5 | 15 |
| | | | | 04-18-96 | a1455 | -- | -- | -- |
| | | | | 06-17-96 | a1445 | -- | -- | -- |
| | | | | 08-13-96 | a1455 | -- | -- | -- |
| 193339154594801 | 8-3389-01 W9-4 | 19 33 39 N | 154 59 48 W | 12-13-95 | a1000 | -- | -- | -- |
| | | | | 02-21-96 | a1150 | -- | -- | -- |
| | | | | 04-18-96 | a1150 | -- | -- | -- |
| | | | | 06-17-96 | a1220 | -- | -- | -- |
| | | | | 08-13-96 | a1205 | -- | -- | -- |
| 193510155570801 | 8-3557-01 W12-5 | 19 35 10 N | 155 57 08 W | 10-11-95 | 1140 | 460 | 20.0 | 101 |
| | | | | 01-08-96 | 1450 | 490 | 20.5 | 104 |
| | | | | 02-26-96 | a1345 | -- | -- | -- |
| | | | | 04-22-96 | 1635 | 520 | 20.5 | 113 |
| | | | | 06-20-96 | a1650 | -- | -- | -- |
| 08-15-96 | 1445 | 350 | 20.5 | 70 | | | | |
| 193505155570801 | 8-3557-02 W12-6 | 19 35 05 N | 155 57 08 W | 10-11-95 | 1200 | 880 | 20.0 | 220 |
| | | | | 01-08-96 | 1510 | 825 | 20.5 | 215 |
| | | | | 02-26-96 | 1400 | 820 | 21.0 | 209 |
| | | | | 04-22-96 | 1655 | 850 | 20.5 | 212 |
| | | | | 06-20-96 | 1700 | 850 | 20.5 | 159 |
| 08-15-96 | 1440 | 800 | 21.0 | 183 | | | | |
| 193508155570701 | 8-3557-03 KAHALUU C | 19 35 08 N | 155 57 07 W | 10-11-95 | 1150 | 385 | 20.0 | 78 |
| | | | | 01-08-96 | 1500 | 390 | 20.5 | 82 |
| | | | | 02-26-96 | a1355 | -- | -- | -- |
| | | | | 04-22-96 | 1640 | 420 | 20.5 | 89 |
| | | | | 06-20-96 | a1655 | -- | -- | -- |
| 08-15-96 | 1455 | 255 | 20.5 | 41 | | | | |
| 193505155570701 | 8-3557-04 KAHALUU D | 19 35 05 N | 155 57 07 W | 10-11-95 | 1205 | 650 | 20.0 | 150 |
| | | | | 01-08-96 | 1520 | 645 | 20.5 | 150 |
| | | | | 02-26-96 | 1410 | 630 | 21.0 | 151 |
| | | | | 04-22-96 | 1710 | 650 | 20.5 | 152 |
| | | | | 06-20-96 | 1710 | 650 | 20.5 | 157 |
| 08-15-96 | 1425 | 625 | 21.0 | 160 | | | | |

a Pump off, unable to collect sample

QUALITY OF GROUND WATER
WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

| STATION NUMBER | LOCAL IDENTIFIER | LATITUDE | LONGITUDE | DATE | TIME | SPECIFIC CONDUCTANCE (US/CM) | TEMPERATURE WATER (DEG C) | CHLORIDE RIDE, (MG/L AS CL) |
|-------------------------------------|----------------------------|------------|-------------|----------|-------|------------------------------|---------------------------|-----------------------------|
| HAWAII, ISLAND OF HAWAII--Continued | | | | | | | | |
| 193502155572301 | 8-3557-05 KAH SHAPT | 19 35 02 N | 155 57 23 W | 10-11-95 | 1220 | 1110 | 20.0 | 285 |
| | | | | 01-09-96 | 1345 | 1060 | 20.5 | 268 |
| | | | | 02-28-96 | 1155 | 900 | 20.0 | 242 |
| | | | | 04-22-96 | 1735 | 1230 | 20.5 | 375 |
| | | | | 06-20-96 | 1455 | 1300 | 20.5 | 339 |
| | | | | 08-15-96 | 1515 | 1200 | 20.5 | 326 |
| 194037155035301 | 8-4003-01 W8-3 | 19 40 37 N | 155 03 53 W | 12-13-95 | 1405 | 85 | 21.0 | 5 |
| | | | | 02-21-96 | 1520 | 75 | 20.5 | 5 |
| | | | | 04-18-96 | 1525 | 85 | 21.0 | 5 |
| | | | | 06-17-96 | 1530 | 85 | 20.5 | 6 |
| | | | | 08-13-96 | 1530 | 75 | 21.0 | 5 |
| 194818155582301 | 8-4858-02 KONA VILLAGE | 19 48 18 N | 155 58 23 W | 10-06-95 | 1400 | 2400 | 21.0 | 499 |
| | | | | 01-09-96 | a1305 | -- | -- | -- |
| | | | | 02-27-96 | a0940 | -- | -- | -- |
| | | | | 04-23-96 | a0945 | -- | -- | -- |
| | | | | 06-21-96 | a1220 | -- | -- | -- |
| | | | | 08-16-96 | a1030 | -- | -- | -- |
| 194820155582401 | 8-4858-03 KONA VILLAGE 3 | 19 48 20 N | 155 58 24 W | 10-06-95 | a1355 | -- | -- | -- |
| 195035155054501 | 8-5005-01 W7-1 | 19 50 35 N | 155 05 45 W | 10-11-95 | 1555 | 200 | 21.0 | 13 |
| 195043155053801 | 8-5005-02 MAKAI | 19 50 43 N | 155 05 38 W | 10-11-95 | 1545 | 240 | 22.0 | 25 |
| 195049155051601 | 8-5005-04 SALT WTR 2 | 19 50 49 N | 155 05 16 W | 10-11-95 | 1605 | 20000 | 18.0 | 6310 |
| 195546155462001 | 8-5546-01 WAIKOLOA WATER W | 19 55 46 N | 155 46 20 W | 10-06-95 | 1200 | 620 | 28.5 | 99 |
| | | | | 01-09-96 | a1115 | -- | -- | -- |
| | | | | 02-27-96 | 1120 | 580 | 28.5 | 96 |
| | | | | 04-23-96 | 1140 | 585 | 28.5 | 101 |
| | | | | 06-21-96 | 1330 | 590 | 28.5 | 99 |
| | | | | 08-16-96 | 1205 | 590 | 28.5 | 103 |
| 195546155480301 | 8-5548-01 PARKER 1 | 19 55 46 N | 155 48 03 W | 10-06-95 | 1125 | 2500 | 28.5 | 647 |
| | | | | 01-09-96 | 1000 | 2400 | 28.5 | 639 |
| | | | | 02-27-96 | 1000 | 2400 | 28.5 | 639 |
| | | | | 04-23-96 | 1025 | 2350 | 28.5 | 633 |
| | | | | 06-21-96 | 1145 | 2400 | 28.5 | 639 |
| | | | | 08-16-96 | a1055 | -- | -- | -- |
| 195724155455301 | 8-5745-01 PARKER 5 | 19 57 24 N | 155 45 53 W | 10-06-95 | a1240 | -- | -- | -- |
| | | | | 01-09-96 | 1035 | 290 | 27.0 | 29 |
| | | | | 02-27-96 | 1040 | 282 | 27.0 | 28 |
| | | | | 04-23-96 | a1100 | -- | -- | -- |
| | | | | 06-21-96 | a1255 | -- | -- | -- |
| | | | | 08-16-96 | a1125 | -- | -- | -- |
| 195722155455201 | 8-5745-02 PARKER 4 | 19 57 22 N | 155 45 52 W | 10-06-95 | a1300 | -- | -- | -- |
| | | | | 01-09-96 | a1055 | -- | -- | -- |
| | | | | 02-27-96 | a1105 | -- | -- | -- |
| | | | | 04-23-96 | a1125 | -- | -- | -- |
| | | | | 06-21-96 | a1315 | -- | -- | -- |
| | | | | 08-16-96 | 1140 | 290 | 29.0 | 28 |

a Pump off, unable to collect sample

QUALITY OF GROUND WATER
WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

| STATION NUMBER | LOCAL IDENTIFIER | LATITUDE | LONGITUDE | DATE | TIME | SPECIFIC CONDUCTANCE (US/CM) | TEMPERATURE WATER (DEG C) | CHLORIDE (MG/L AS CL) |
|-------------------------------------|---------------------------|------------|-------------|----------|-------|------------------------------|---------------------------|-----------------------|
| HAWAII, ISLAND OF HAWAII--Continued | | | | | | | | |
| 195728155455401 | 8-5745-03 WAIKOLOA WELL 1 | 19 57 28 N | 155 45 54 W | 10-06-95 | 1245 | 290 | 27.0 | 26 |
| | | | | 01-09-96 | 1045 | 280 | 27.0 | 27 |
| | | | | 02-27-96 | 1050 | 280 | 27.0 | 27 |
| | | | | 04-23-96 | 1105 | 275 | 27.0 | 27 |
| | | | | 06-21-96 | 1305 | 280 | 27.0 | 29 |
| 08-16-96 | 1130 | 280 | 27.0 | 29 | | | | |
| 195857155142301 | 8-5814-01 LAUPAHOEHO | 19 58 57 N | 155 14 23 W | 10-11-95 | a1505 | -- | -- | -- |
| | | | | 01-09-96 | 1645 | 320 | 20.0 | 60 |
| | | | | 02-28-96 | a1530 | -- | -- | -- |
| | | | | 04-23-96 | a1555 | -- | -- | -- |
| | | | | 06-22-96 | a1510 | -- | -- | -- |
| 08-16-96 | a1450 | -- | -- | -- | | | | |
| 195929155462501 | 8-5946-01 LALAMILO A | 19 59 30 N | 155 46 30 W | 10-06-95 | 1505 | 540 | 26.5 | 95 |
| | | | | 01-09-96 | 0910 | 505 | 26.5 | 93 |
| | | | | 02-28-96 | 1025 | 510 | 26.0 | 95 |
| | | | | 04-23-96 | 1245 | 500 | 26.5 | 95 |
| | | | | 06-21-96 | 1430 | 520 | 26.5 | 102 |
| 08-16-96 | 1255 | 510 | 27.0 | 93 | | | | |
| 195912155464201 | 8-5946-02 LALAMILO B | 19 59 14 N | 155 46 39 W | 10-06-95 | a1455 | -- | -- | -- |
| | | | | 01-09-96 | a0900 | -- | -- | -- |
| | | | | 02-28-96 | a1050 | -- | -- | -- |
| | | | | 04-23-96 | 1300 | 340 | 26.0 | 45 |
| | | | | 06-21-96 | 1415 | 360 | 26.5 | 50 |
| 08-16-96 | 1310 | 370 | 26.5 | 55 | | | | |
| 195939155464201 | 8-5946-03 LALAMILO C | 19 59 34 N | 155 46 45 W | 10-06-95 | 1520 | 570 | 26.5 | 105 |
| | | | | 01-09-96 | 0850 | 540 | 26.5 | 102 |
| | | | | 02-28-96 | 1040 | 535 | 26.5 | 104 |
| | | | | 04-23-96 | 1230 | 535 | 26.5 | 103 |
| | | | | 06-21-96 | 1440 | 520 | 26.5 | -- |
| 08-16-96 | 1245 | 520 | 27.0 | 98 | | | | |
| 195953155464701 | 8-5946-04 LALAMILO D | 19 59 53 N | 155 46 47 W | 10-06-95 | 1535 | 550 | 26.0 | 100 |
| 195947155485801 | 8-5948-01 HAPUNA PRK | 19 59 47 N | 155 48 58 W | 10-06-95 | 1600 | 2000 | 26.0 | 504 |
| | | | | 01-09-96 | 1220 | 1950 | 26.0 | 509 |
| | | | | 02-28-96 | 1410 | 1820 | 26.0 | 503 |
| | | | | 04-23-96 | 1330 | 1900 | 26.0 | 511 |
| | | | | 06-21-96 | 1455 | 1920 | 26.0 | 505 |
| 08-16-96 | 1330 | 1950 | 26.0 | 519 | | | | |
| 200132155471101 | 8-6147-01 W16 | 20 01 32 N | 155 47 11 W | 01-02-96 | a1420 | -- | -- | -- |
| | | | | 02-28-96 | a1435 | -- | -- | -- |
| | | | | 04-23-96 | a1355 | -- | -- | -- |
| | | | | 06-21-96 | a1530 | -- | -- | -- |
| | | | | 08-16-96 | a1355 | -- | -- | -- |
| 200122155480901 | 8-6148-01 W14 | 20 01 22 N | 155 48 09 W | 01-02-96 | a1445 | -- | -- | -- |
| | | | | 01-17-96 | a1430 | -- | -- | -- |
| | | | | 02-28-96 | a1425 | -- | -- | -- |
| | | | | 04-23-96 | a1345 | -- | -- | -- |
| | | | | 06-21-96 | a1515 | -- | -- | -- |
| 08-16-96 | a1345 | -- | -- | -- | | | | |
| 200121155480801 | 8-6148-02 W14B | 20 01 21 N | 155 48 08 W | 01-02-96 | a1445 | -- | -- | -- |
| | | | | 02-28-96 | a1430 | -- | -- | -- |
| | | | | 04-23-96 | a1350 | -- | -- | -- |
| | | | | 06-21-96 | a1520 | -- | -- | -- |
| | | | | 08-16-96 | a1350 | -- | -- | -- |

a Pump off, unable to collect sample

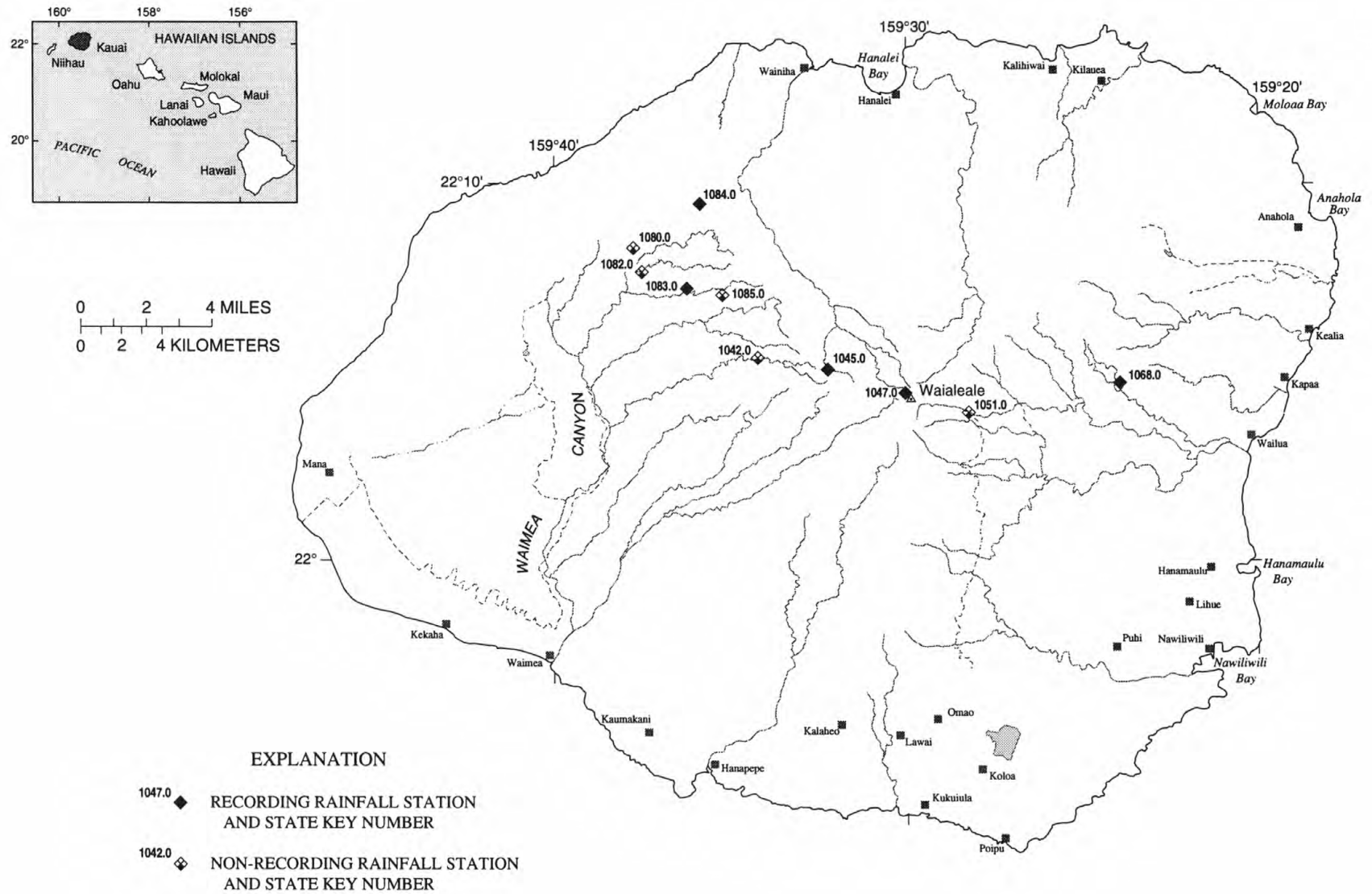


Figure 21. Locations of rainfall stations on Kauai.

RAINFALL RECORDS
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.--Standard 8-in. National Weather Service accumulation rain gage with a custom made reduced 1 to 2 ratio rain-gage catchment. Elevation of gage is 4,000 ft from topographic map.

REMARKS.--Records good. Cumulative rainfall read in nearest tenths of an inch.

RAINFALL ACCUMULATED (INCHES), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
INTERMITTENT READINGS

| Period | Rainfall |
|-------------------------|--------------------|
| Oct. 01 to Nov. 30 | 34.6 estimated (a) |
| Nov. 30 to Dec. 31 | 9.4 estimated (b) |
| Jan. 01 to Mar. 26 | 25.6 estimated (b) |
| Mar. 26 to Jul. 09 | 20.4 |
| Jul. 09 to Sep. 30 | 14.6 estimated (c) |
| WTR YR 1996 Total 104.6 | |

(a) Estimated values based on accumulation rain can reading of 38.0 in. from August 30, 1995 to November 30, 1995.

(b) Estimated values based on accumulation rain can reading of 35.0 in. from November 30, 1995 to March 26, 1996.

(c) Estimated values based on accumulation rain can reading of 14.6 in. from July 9, 1996 to October 1, 1996.

RAINFALL RECORDS
HAWAII, ISLAND OF KAUAI--Continued

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 (CR10) with a tipping bucket catchment (0.01 in. per tip). Elevation of gage is 4,560 ft from topographic map.

REMARKS.--Records good. Recording rainfall in hundredths of an inch.

RAINFALL ACCUMULATED (INCHES), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY SUM VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|-------|-------|-------|-------|-------|-------|------|------|-------|-------|------|-------|
| 1 | .43 | .01 | .40 | .00 | .00 | .00 | .64 | .00 | .00 | .21 | .03 | 1.48 |
| 2 | .20 | 1.38 | .00 | .00 | .10 | 2.70 | .00 | .02 | .00 | .45 | .03 | .15 |
| 3 | .32 | 7.90 | .10 | .00 | .00 | 2.70 | .00 | .07 | .00 | .96 | .10 | .99 |
| 4 | .31 | .00 | .80 | .40 | .00 | .70 | .00 | .08 | .00 | 1.39 | .36 | .14 |
| 5 | .75 | .00 | .10 | .10 | .00 | .00 | .04 | .00 | .00 | .14 | .32 | .27 |
| 6 | 1.36 | .00 | .20 | .00 | .00 | .20 | .01 | .15 | .53 | .04 | .28 | 1.95 |
| 7 | .97 | .00 | .00 | .00 | .80 | .00 | .00 | .06 | 1.09 | .26 | .06 | 3.45 |
| 8 | 3.09 | .60 | .40 | .00 | .30 | .00 | .01 | .19 | .47 | .06 | .01 | 1.10 |
| 9 | .32 | 10.00 | .00 | 2.00 | .00 | .00 | .08 | .00 | .21 | .10 | .03 | .10 |
| 10 | .32 | .00 | .00 | .10 | .50 | .00 | .33 | .04 | .30 | .18 | .65 | .45 |
| 11 | .31 | .00 | .00 | .00 | .00 | .00 | .73 | .00 | .00 | .42 | .84 | 1.05 |
| 12 | .43 | .00 | .10 | .00 | .00 | .00 | .01 | .00 | 2.16 | .30 | .31 | .91 |
| 13 | .24 | .40 | .90 | .00 | .00 | 1.20 | .01 | .00 | .86 | .02 | .00 | .12 |
| 14 | .05 | .00 | .10 | .00 | .80 | .00 | .04 | .00 | .04 | .40 | .01 | .07 |
| 15 | .04 | .00 | .00 | .00 | .80 | .00 | .00 | .14 | .11 | .68 | .12 | .03 |
| 16 | .01 | .10 | .10 | .00 | .10 | .00 | .01 | .00 | .62 | 1.35 | .05 | .14 |
| 17 | .09 | .00 | .00 | .50 | .10 | .10 | .08 | .00 | .80 | 1.17 | .11 | .40 |
| 18 | .47 | .00 | .10 | .70 | .00 | .10 | 1.52 | .00 | 2.00 | .91 | .02 | .46 |
| 19 | .26 | .20 | .00 | .20 | .20 | .00 | 2.02 | .00 | .65 | 1.25 | .00 | .27 |
| 20 | 1.00 | .00 | .00 | 2.80 | .00 | .20 | .01 | .02 | .59 | .15 | .03 | .26 |
| 21 | .69 | .00 | .00 | .00 | .60 | .40 | .00 | .02 | .43 | .47 | .00 | .00 |
| 22 | .10 | .30 | .10 | .20 | 1.10 | .60 | .00 | .00 | .23 | .58 | .00 | .00 |
| 23 | .29 | .00 | .00 | .00 | 1.10 | .50 | .00 | .00 | 1.09 | 1.57 | .02 | .04 |
| 24 | .22 | .00 | .10 | 1.00 | 1.70 | .30 | .01 | .49 | 1.30 | .38 | .05 | .00 |
| 25 | 1.03 | 5.20 | 1.00 | 2.30 | 7.10 | .20 | .13 | .55 | .56 | .37 | .01 | .02 |
| 26 | .38 | 4.50 | .00 | 1.80 | 2.90 | .00 | .18 | .07 | .04 | .38 | .00 | .00 |
| 27 | .01 | .80 | .00 | .10 | 3.70 | .03 | .11 | .25 | .15 | .88 | .00 | .00 |
| 28 | .79 | .00 | .00 | .60 | .10 | .03 | .41 | .74 | .37 | .04 | .00 | .01 |
| 29 | .11 | .00 | 1.10 | .00 | .00 | .26 | .25 | .37 | .69 | .00 | .00 | .15 |
| 30 | 1.20 | .30 | 3.90 | .70 | --- | .01 | .09 | .22 | 5.95 | .07 | 1.00 | .07 |
| 31 | .32 | --- | .50 | .00 | --- | .44 | --- | .02 | --- | .07 | .36 | --- |
| TOTAL | 16.11 | 31.69 | 10.00 | 13.50 | 22.00 | 10.67 | 6.72 | 3.50 | 21.24 | 15.25 | 4.80 | 14.08 |

RAINFALL RECORDS
HAWAII, ISLAND OF KAUAI--Continued

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, 9.2 mi south of Hanalei Bay and 11.6 mi west of Kapaa Beach Park.

PERIOD OF RECORD.--1910 to current year. Prior to October 1992, unpublished records are in files of the U.S. Geological Survey and at the National Weather Service.

GAGE.--Electronic data logger (CR10) with a tipping bucket catchment (0.01 in. per tip). Elevation of gage is 5,150 ft from topographic map.

REMARKS.--Records fair. No daily record July 21 to September 30. Recorded rainfall read in hundredths of an inch.

| DAY | PRECIPITATION, TOTAL, INCHES, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996 | | | | | | | | | | | |
|-------|---|-------|-------|-------|-------|-------|-------|------|-------|------|-----|-----|
| | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
| 1 | 2.44 | .41 | .50 | .10 | .00 | 1.80 | 7.24 | .00 | .00 | 1.30 | --- | --- |
| 2 | 1.26 | 3.13 | .00 | .00 | .00 | 5.10 | .00 | .00 | .00 | 2.30 | --- | --- |
| 3 | 2.06 | 10.93 | .30 | .00 | .00 | 4.30 | .02 | .11 | .04 | 1.60 | --- | --- |
| 4 | 1.20 | .00 | .70 | .60 | .00 | .20 | .01 | .02 | .01 | 1.40 | --- | --- |
| 5 | 1.74 | .20 | .10 | .00 | .00 | .00 | .07 | .01 | .06 | .70 | --- | --- |
| 6 | 2.29 | .00 | .20 | .00 | .10 | .10 | .00 | .19 | 1.08 | .10 | --- | --- |
| 7 | 1.20 | .10 | .00 | .40 | .60 | .00 | .00 | .06 | 1.92 | .80 | --- | --- |
| 8 | 2.81 | 1.90 | .40 | .40 | .40 | .00 | .00 | .12 | 2.19 | .30 | --- | --- |
| 9 | .96 | 19.00 | .00 | 2.90 | .00 | .00 | .47 | .00 | .31 | .40 | --- | --- |
| 10 | .78 | .30 | .00 | .10 | .20 | .00 | 1.03 | .15 | .86 | .40 | --- | --- |
| 11 | 1.07 | .40 | .00 | .00 | .00 | .10 | 2.22 | .00 | .02 | 1.00 | --- | --- |
| 12 | 2.43 | .00 | 1.70 | .00 | .00 | .00 | .03 | .00 | .91 | 1.70 | --- | --- |
| 13 | 1.00 | .20 | 3.70 | .00 | .00 | .50 | .04 | .00 | 4.89 | .10 | --- | --- |
| 14 | .35 | .10 | .00 | .20 | 1.60 | .00 | .14 | .00 | .54 | 1.40 | --- | --- |
| 15 | .19 | .00 | .60 | .00 | 1.90 | .20 | .00 | .18 | .40 | 1.00 | --- | --- |
| 16 | .36 | .10 | .20 | .00 | .10 | .40 | .10 | .00 | 1.86 | 1.20 | --- | --- |
| 17 | .96 | 1.90 | .30 | .70 | .10 | .40 | .29 | .02 | .81 | 1.60 | --- | --- |
| 18 | 1.49 | .40 | .60 | .80 | .00 | .60 | 3.52 | .07 | 2.15 | 1.10 | --- | --- |
| 19 | .98 | .50 | .00 | 1.50 | .30 | .20 | 3.92 | .12 | 1.48 | 1.30 | --- | --- |
| 20 | 1.71 | .00 | .00 | 3.90 | .10 | .00 | .10 | .47 | 1.46 | .80 | --- | --- |
| 21 | .78 | .00 | .00 | .20 | .60 | .20 | .02 | .54 | 1.09 | a--- | --- | --- |
| 22 | .34 | .30 | .60 | 1.00 | 1.40 | .20 | .00 | .01 | .59 | --- | --- | --- |
| 23 | .70 | .10 | .10 | .00 | 1.50 | .10 | .01 | .14 | 1.23 | --- | --- | --- |
| 24 | .52 | .00 | .20 | 1.20 | 2.20 | .20 | .23 | 1.04 | 1.81 | --- | --- | --- |
| 25 | 2.70 | 9.90 | 1.30 | 3.90 | 7.30 | .00 | .49 | 2.24 | 2.73 | b--- | --- | --- |
| 26 | 2.40 | 7.20 | .00 | 3.40 | 4.40 | .00 | .76 | .39 | .89 | --- | --- | --- |
| 27 | .04 | 1.00 | .00 | .80 | 4.00 | .04 | .65 | 1.17 | .35 | --- | --- | --- |
| 28 | 1.31 | .20 | .00 | 1.20 | .00 | .01 | .15 | 1.70 | 1.77 | --- | --- | --- |
| 29 | .24 | .20 | 1.50 | .00 | .10 | 1.39 | .15 | .61 | 2.47 | --- | --- | --- |
| 30 | 2.31 | 1.50 | 4.60 | .60 | --- | .47 | .01 | .55 | 7.14 | --- | --- | --- |
| 31 | 1.80 | --- | .10 | .00 | --- | 1.99 | --- | .05 | --- | --- | --- | --- |
| TOTAL | 40.42 | 59.97 | 17.70 | 23.90 | 26.90 | 18.50 | 21.67 | 9.96 | 41.06 | --- | --- | --- |

a. Total accumulated rainfall from July 21 (0001 hrs) to July 25 (0800 hrs) is 11.91 inches

b. Total accumulated rainfall from July 25 (0800 hrs) to September 30 (2400 hrs) is 65.00 inches

RAINFALL RECORDS
HAWAII, ISLAND OF KAUAI--Continued

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.--Standard 8-in. National Weather Service non-recording rain gage. Elevation of gage is 1,110 ft from topographic map.

REMARKS.--Records good. Cumulative rainfall read in nearest hundredths of an inch.

RAINFALL ACCUMULATED (INCHES), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
INTERMITTENT READINGS

| Period | Rainfall | Period | Rainfall |
|--------------------|--------------------|--------------------|----------|
| Oct. 01 to Oct. 02 | 2.53 estimated (a) | Apr. 01 to Apr. 08 | .84 |
| Oct. 02 to Oct. 09 | 7.20 | Apr. 08 to Apr. 15 | 1.36 |
| Oct. 09 to Oct. 16 | 2.15 | Apr. 15 to Apr. 22 | 3.15 |
| Oct. 16 to Oct. 23 | 3.14 | Apr. 22 to Apr. 29 | 2.10 |
| Oct. 23 to Oct. 30 | 4.27 | Apr. 29 to May 06 | .82 |
| Oct. 30 to Nov. 06 | 11.61 | May 06 to May 13 | 1.65 |
| Nov. 06 to Nov. 13 | 13.15 | May 13 to May 20 | .30 |
| Nov. 13 to Nov. 20 | 2.60 | May 20 to May 27 | 2.60 |
| Nov. 20 to Nov. 27 | 6.93 | May 27 to Jun. 03 | 1.10 |
| Nov. 27 to Dec. 04 | 2.30 | Jun. 03 to Jun. 10 | 3.48 |
| Dec. 04 to Dec. 11 | 4.40 | Jun. 10 to Jun. 17 | 3.75 |
| Dec. 11 to Dec. 18 | 2.20 | Jun. 17 to Jun. 24 | 5.65 |
| Dec. 18 to Dec. 26 | 2.45 | Jun. 24 to Jul. 01 | 8.60 |
| Dec. 26 to Dec. 31 | 2.90 estimated (b) | Jul. 01 to Jul. 08 | 3.48 |
| Jan. 01 to Jan. 08 | 3.10 estimated (b) | Jul. 08 to Jul. 15 | 2.32 |
| Jan. 08 to Jan. 15 | 1.50 | Jul. 15 to Jul. 22 | 6.95 |
| Jan. 15 to Jan. 22 | 4.00 | Jul. 22 to Jul. 29 | 5.25 |
| Jan. 22 to Jan. 29 | 8.55 | Jul. 29 to Aug. 05 | 2.80 |
| Jan. 29 to Feb. 05 | .50 | Aug. 05 to Aug. 12 | 5.65 |
| Feb. 05 to Feb. 11 | 1.53 | Aug. 12 to Aug. 19 | .52 |
| Feb. 11 to Feb. 20 | 1.14 | Aug. 19 to Aug. 26 | .20 |
| Feb. 20 to Feb. 26 | 5.04 | Aug. 26 to Sep. 03 | 6.10 |
| Feb. 26 to Mar. 04 | 11.65 | Sep. 03 to Sep. 09 | 14.00 |
| Mar. 04 to Mar. 11 | .35 | Sep. 09 to Sep. 16 | 2.00 |
| Mar. 11 to Mar. 18 | .52 | Sep. 16 to Sep. 23 | 2.42 |
| Mar. 18 to Mar. 25 | 1.10 | Sep. 23 to Sep. 30 | .72 |
| Mar. 25 to Apr. 01 | 4.30 | | |

(a) Estimated values based on accumulation rain can reading of 7.23 in. from September 25, 1995 to October 2, 1995.

(b) No record, station vandalized.

RAINFALL RECORDS
HAWAII, ISLAND OF KAUAI--Continued

220443159235601. State Key Number 1068.0 Left Branch Opaekaa rain gage near Kapaa, Kauai.

LOCATION.--Lat 22°04'43", long 159°23'56", Hydrologic Unit 20070000, in USGS streamgage station 16071500 on left bank, 5.0 mi west of Kapaa Beach Park and 0.7 mi northeast of Wailua Reservoir.

PERIOD OF RECORD.--1960 to current year. Prior to October 1992, unpublished records are in files of the U.S. Geological Survey and at the National Weather Service.

GAGE.--Electronic data logger (CR10) with a tipping bucket catchment (0.01 in. per tip). Elevation of gage is 470 ft from topographic map.

REMARKS.--Records good. Recorded rainfall read in hundredths of an inch.

RAINFALL ACCUMULATED (INCHES), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY SUM VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|------|-------|------|------|------|------|------|------|-------|------|------|------|
| 1 | .01 | 1.59 | .97 | .00 | .00 | .70 | .18 | .00 | .00 | .21 | .13 | 1.02 |
| 2 | .19 | 1.15 | .02 | .00 | .01 | 1.58 | .00 | .00 | .00 | .29 | .24 | .02 |
| 3 | .61 | 8.02 | .01 | .00 | .00 | 2.01 | .05 | .05 | .06 | .36 | .22 | .25 |
| 4 | .32 | .02 | .27 | .00 | .00 | .01 | .00 | .03 | .01 | .12 | .39 | .03 |
| 5 | .31 | .04 | .00 | .01 | .00 | .01 | .00 | .00 | .02 | .02 | .28 | .08 |
| 6 | .16 | .27 | .02 | .00 | .00 | .00 | .01 | .04 | .21 | .01 | .35 | .67 |
| 7 | .19 | .02 | .00 | .04 | .16 | .00 | .00 | 1.28 | .10 | .12 | .19 | 3.90 |
| 8 | 1.17 | .36 | .00 | .01 | 1.45 | .00 | .00 | .21 | .60 | .19 | .00 | .63 |
| 9 | .06 | 6.65 | .00 | 1.13 | .01 | .00 | .09 | .00 | 2.34 | .01 | .02 | .28 |
| 10 | .19 | .07 | .00 | .00 | .09 | .00 | .04 | .03 | 1.74 | .00 | .53 | .10 |
| 11 | .10 | .00 | .00 | .00 | .00 | .00 | .42 | .00 | .23 | .04 | 1.09 | .08 |
| 12 | .24 | .00 | .28 | .00 | .00 | .00 | .02 | .00 | .03 | .11 | .12 | .20 |
| 13 | .01 | .10 | .94 | .00 | .01 | .41 | .00 | .00 | .03 | .01 | .01 | .02 |
| 14 | .05 | .01 | .01 | .11 | .24 | .00 | .03 | .00 | .03 | .25 | .17 | .03 |
| 15 | .03 | .00 | .05 | .00 | .32 | .00 | .00 | .05 | .09 | .29 | .08 | .08 |
| 16 | .29 | .03 | .02 | .00 | .00 | .00 | .00 | .00 | .42 | .15 | .00 | 1.13 |
| 17 | .15 | .02 | .00 | .23 | .00 | .05 | .02 | .00 | .03 | .49 | .03 | .05 |
| 18 | .21 | .05 | .03 | .14 | .00 | .03 | .48 | .00 | .21 | .10 | .06 | .06 |
| 19 | .12 | .05 | .01 | .04 | .05 | .04 | 1.14 | .02 | .38 | .23 | .01 | .06 |
| 20 | .13 | .04 | .00 | .30 | .00 | .11 | .04 | .22 | .21 | .01 | .00 | .07 |
| 21 | .04 | .00 | .01 | .85 | .01 | .06 | .00 | .05 | .28 | .17 | .00 | .09 |
| 22 | .05 | .06 | .06 | .02 | .14 | .09 | .00 | .09 | .22 | 1.26 | .00 | .01 |
| 23 | .10 | .13 | .03 | .00 | .05 | .02 | .00 | .12 | .38 | .13 | .00 | .00 |
| 24 | .29 | .01 | .50 | 2.06 | .12 | .04 | .03 | .19 | .36 | .94 | .00 | .00 |
| 25 | .38 | 3.45 | 2.02 | 1.10 | .19 | .01 | .03 | .26 | .32 | .04 | .00 | .00 |
| 26 | .94 | 1.25 | .01 | .30 | .40 | .00 | .02 | .10 | .55 | .08 | .00 | .00 |
| 27 | .47 | .28 | .00 | .18 | 3.60 | .00 | .87 | .17 | .16 | .39 | .00 | .00 |
| 28 | .26 | .12 | .01 | .20 | .01 | .00 | .39 | .33 | .50 | .05 | .04 | .00 |
| 29 | .07 | .03 | .09 | .00 | .00 | .38 | .49 | .02 | .34 | .00 | .01 | .00 |
| 30 | .28 | .46 | .87 | .20 | --- | .01 | .00 | .01 | 1.06 | .00 | .28 | .92 |
| 31 | .34 | --- | .13 | .00 | --- | .04 | --- | .06 | --- | .15 | .88 | --- |
| TOTAL | 7.76 | 24.28 | 6.36 | 6.92 | 6.86 | 5.60 | 4.35 | 3.33 | 10.91 | 6.22 | 5.13 | 9.78 |

RAINFALL RECORDS
HAWAII, ISLAND OF KAUAI--Continued

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.--Standard 8-in. National Weather Service accumulation rain gage. Elevation of gage is 3,700 ft from topographic map.

REMARKS.--Records good. Cumulative rainfall read in nearest tenths of an inch.

RAINFALL ACCUMULATED (INCHES), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
INTERMITTENT READINGS

| Period | Rainfall |
|--------------------|-------------------|
| Oct. 01 to Oct. 24 | 1.4 estimated (a) |
| Oct. 24 to Jan. 08 | >24.0 (b) |
| Jan. 08 to Feb. 12 | 11.7 |
| Feb. 12 to Apr. 05 | 15.1 |
| Apr. 05 to Jun. 07 | 2.6 |
| Jun. 07 to Aug. 02 | 7.8 |
| Aug. 02 to Oct. 25 | -- (c) |

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.--Standard 8-in. National Weather Service accumulation rain gage with a custom made reduced 1 to 2 ratio rain-gage catchment. Elevation of gage is 3,420 ft from topographic map.

REMARKS.--Records good. Cumulative rainfall read in nearest tenths of an inch.

RAINFALL ACCUMULATED (INCHES), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
INTERMITTENT READINGS

| Period | Rainfall |
|--------------------|--------------------|
| Oct. 01 to Oct. 24 | 1.7 estimated (d) |
| Oct. 24 to Dec. 31 | 32.1 estimated (e) |
| Jan. 01 to Jan. 08 | 0.7 estimated (e) |
| Jan. 08 to Feb. 12 | 12.0 |
| Feb. 12 to Apr. 05 | 15.8 |
| Apr. 05 to Jun. 07 | 3.2 |
| Jun. 07 to Aug. 02 | 8.6 |
| Aug. 02 to Sep. 30 | 6.0 estimated (f) |

WTR YR 1996 Total 80.1

> Actual value is known to be greater than the value shown.

(a) Estimated values based on accumulation rain can reading of 5.5 in. from August 16, 1995 to October 24, 1995.

(b) Rain can overflowed.

(c) No record, station vandalized.

(d) Estimated values based on accumulation rain can reading of 6.6 in. from August 16, 1995 to October 24, 1995.

(e) Estimated values based on accumulation rain can reading of 32.8 in. from October 24, 1995 to January 8, 1996.

(f) Estimated values based on accumulation rain can reading of 9.4 in. from August 2, 1996 to October 25, 1996.

RAINFALL RECORDS
HAWAII, ISLAND OF KAUAI--Continued

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 (CR10) 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 in hundredths of an inch.

RAINFALL ACCUMULATED (INCHES), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY SUM VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|------|-------|------|------|------|------|------|------|------|------|------|------|
| 1 | .02 | .00 | .07 | .02 | .00 | .00 | .03 | .01 | .00 | .04 | .00 | .26 |
| 2 | .00 | 1.11 | .00 | .00 | .11 | 1.09 | .00 | .03 | .00 | .23 | .00 | .47 |
| 3 | .02 | 7.83 | .11 | .00 | .00 | 2.13 | .00 | .00 | .00 | .14 | .00 | .10 |
| 4 | .10 | .03 | .84 | .22 | .00 | 1.03 | .00 | .10 | .00 | .26 | .03 | .02 |
| 5 | .13 | .00 | .04 | .20 | .00 | .04 | .00 | .00 | .00 | .01 | .11 | .33 |
| 6 | .22 | .01 | .11 | .03 | .00 | .11 | .00 | .19 | .18 | .00 | .14 | .26 |
| 7 | .83 | .01 | .00 | .00 | .28 | .00 | .00 | .06 | .33 | .00 | .00 | 1.26 |
| 8 | 1.58 | .02 | .26 | .00 | .15 | .00 | .00 | .13 | .00 | .03 | .01 | .40 |
| 9 | .07 | 4.72 | .00 | 2.59 | .01 | .00 | .01 | .01 | 1.31 | .01 | .01 | .00 |
| 10 | .03 | .01 | .01 | .00 | .34 | .00 | .03 | .00 | .26 | .01 | .14 | .04 |
| 11 | .06 | .00 | .00 | .00 | .01 | .00 | .09 | .00 | .00 | .04 | .37 | .34 |
| 12 | .06 | .02 | .00 | .00 | .00 | .00 | .00 | .00 | .85 | .08 | .09 | .34 |
| 13 | .02 | .35 | .15 | .00 | .01 | .17 | .05 | .00 | 1.05 | .00 | .00 | .01 |
| 14 | .01 | .00 | .01 | .00 | .51 | .01 | .04 | .00 | .06 | .04 | .00 | .02 |
| 15 | .01 | .00 | .00 | .00 | .45 | .00 | .00 | .13 | .01 | .17 | .02 | .00 |
| 16 | .00 | .00 | .00 | .00 | .01 | .00 | .00 | .01 | .06 | .25 | .05 | .00 |
| 17 | .00 | .00 | .03 | .40 | .00 | .00 | .03 | .00 | .09 | .38 | .04 | .04 |
| 18 | .05 | .08 | .01 | .85 | .00 | .04 | .10 | .00 | .43 | .64 | .00 | .11 |
| 19 | .05 | .22 | .00 | .00 | .13 | .01 | .60 | .00 | .11 | .18 | .00 | .02 |
| 20 | .18 | .04 | .00 | .50 | .01 | .26 | .01 | .00 | .07 | .04 | .00 | .00 |
| 21 | .09 | .00 | .00 | .00 | .05 | .17 | .00 | .02 | .03 | .01 | .00 | .01 |
| 22 | .04 | .10 | .03 | .00 | .25 | .39 | .00 | .00 | .00 | .09 | .00 | .00 |
| 23 | .12 | .00 | .01 | .00 | .05 | .20 | .00 | .00 | .44 | .03 | .00 | .00 |
| 24 | .03 | .00 | .08 | 1.17 | .03 | .12 | .01 | .06 | .75 | .23 | .00 | .01 |
| 25 | .21 | 3.11 | 1.51 | 1.09 | .56 | .11 | .04 | .07 | .01 | .00 | .00 | .01 |
| 26 | .13 | 3.28 | .01 | .19 | .18 | .01 | .02 | .00 | .00 | .00 | .00 | .00 |
| 27 | .02 | 1.08 | .00 | .46 | 2.67 | .01 | .01 | .06 | .06 | .28 | .00 | .00 |
| 28 | .48 | .00 | .00 | .26 | .03 | .00 | .02 | .18 | .19 | .04 | .00 | .00 |
| 29 | .10 | .00 | .63 | .00 | .00 | .10 | .39 | .03 | .15 | .00 | .00 | .22 |
| 30 | .99 | .07 | 3.20 | 1.18 | --- | .01 | .03 | .05 | 3.18 | .02 | .91 | .38 |
| 31 | .33 | --- | .58 | .00 | --- | .00 | --- | .01 | --- | .06 | .27 | --- |
| TOTAL | 5.98 | 22.09 | 7.69 | 9.16 | 5.84 | 6.01 | 1.51 | 1.15 | 9.62 | 3.31 | 2.19 | 4.65 |

RAINFALL RECORDS
HAWAII, ISLAND OF KAUAI--Continued

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 (CR10) with a tipping bucket catchment (0.01 in. per tip). Elevation of gage is 4,000 ft from topographic map.

REMARKS.--Records good. Recording rainfall in hundredths of an inch.

RAINFALL ACCUMULATED (INCHES), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY SUM VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|-------|-------|-------|-------|------|-------|------|------|-------|------|------|------|
| 1 | .04 | .01 | .20 | .07 | .00 | .00 | .05 | .01 | .00 | .19 | .02 | 1.26 |
| 2 | .03 | .61 | .00 | .00 | .17 | 1.30 | .00 | .03 | .01 | .44 | .03 | .03 |
| 3 | .15 | 4.76 | .03 | .00 | .00 | 2.10 | .00 | .02 | .01 | .31 | .07 | .07 |
| 4 | .48 | .03 | .16 | .06 | .00 | 1.70 | .00 | .30 | .00 | .45 | .09 | .10 |
| 5 | .23 | .00 | .00 | .13 | .00 | .10 | .00 | .02 | .00 | .08 | .26 | .45 |
| 6 | .74 | .01 | .01 | .01 | .00 | .20 | .00 | .10 | .66 | .07 | .17 | .52 |
| 7 | 1.53 | .00 | .00 | .05 | .42 | .00 | .00 | .39 | 3.48 | .08 | .01 | 1.13 |
| 8 | 1.54 | .01 | .03 | .00 | .04 | .00 | .22 | 1.39 | 1.18 | .12 | .01 | .40 |
| 9 | .17 | 2.71 | .00 | 2.31 | .01 | .00 | .09 | .01 | .44 | .03 | .04 | .01 |
| 10 | .13 | .01 | .00 | .00 | .85 | .00 | .07 | .03 | .18 | .06 | .43 | .16 |
| 11 | .11 | .00 | .00 | .00 | .01 | .00 | .41 | .00 | .03 | .14 | 1.24 | .76 |
| 12 | .14 | .02 | .60 | .00 | .00 | .00 | .03 | .00 | .03 | .48 | .24 | .97 |
| 13 | .04 | .91 | .87 | .00 | .05 | 1.60 | .17 | .00 | .99 | .01 | .00 | .04 |
| 14 | .01 | .02 | .00 | .00 | 1.62 | .00 | .04 | .00 | .00 | .30 | .00 | .01 |
| 15 | .01 | .03 | .00 | .00 | .80 | .00 | .01 | .41 | .00 | .44 | .02 | .00 |
| 16 | .00 | .07 | .07 | .00 | .00 | .00 | .03 | .00 | .17 | .43 | .08 | .01 |
| 17 | .00 | .02 | .05 | 2.64 | .10 | .00 | .43 | .01 | .30 | .52 | .09 | .08 |
| 18 | .32 | .31 | .00 | 7.84 | .00 | .20 | .86 | .00 | 1.32 | .83 | .00 | .22 |
| 19 | .10 | .85 | .00 | .00 | .20 | .00 | 2.53 | .00 | .19 | .63 | .00 | .02 |
| 20 | .43 | .07 | .00 | .47 | .00 | .80 | .00 | .00 | .19 | .51 | .00 | .02 |
| 21 | .23 | .00 | .00 | .00 | .70 | .70 | .02 | .00 | .07 | .04 | .00 | .00 |
| 22 | .25 | .08 | .10 | .02 | 1.00 | .50 | .01 | .04 | .04 | .04 | .01 | .00 |
| 23 | .23 | .01 | .01 | .00 | .00 | .40 | .00 | .00 | 1.33 | .05 | .01 | .00 |
| 24 | .24 | .00 | .67 | 1.19 | .00 | .10 | .03 | .11 | 1.93 | .00 | .00 | .02 |
| 25 | .90 | 1.12 | 4.52 | 1.36 | .50 | .30 | .09 | .04 | .05 | .04 | .00 | .00 |
| 26 | .88 | .91 | .01 | .04 | .20 | .03 | .05 | .05 | .13 | .25 | .00 | .00 |
| 27 | .07 | .59 | .00 | 2.68 | 2.70 | .04 | .01 | .14 | .14 | .23 | .00 | .00 |
| 28 | 3.12 | .01 | .00 | .74 | .10 | .27 | .38 | .51 | 1.01 | .04 | .04 | .00 |
| 29 | .27 | .02 | .15 | .00 | .00 | 1.28 | 1.10 | .11 | 1.38 | .00 | .01 | .03 |
| 30 | 2.32 | .09 | 2.11 | 1.55 | --- | .03 | .12 | .06 | 2.37 | .14 | .21 | .58 |
| 31 | .65 | --- | .45 | .00 | --- | .05 | --- | .01 | --- | .26 | .36 | --- |
| TOTAL | 15.36 | 13.28 | 10.04 | 21.16 | 9.47 | 11.70 | 6.75 | 3.79 | 17.63 | 7.21 | 3.44 | 6.89 |

RAINFALL RECORDS
HAWAII, ISLAND OF KAUAI--Continued

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.--Standard 8-in. National Weather Service accumulation rain gage. Elevation of gage is 4,000 ft from topographic map.

REMARKS.--Records good. Cumulative rainfall read in nearest tenths of an inch.

RAINFALL ACCUMULATED (INCHES), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
INTERMITTENT READINGS

| Period | Rainfall |
|--------------------|--------------------|
| Oct. 01 to Dec. 07 | 20.7 estimated (a) |
| Dec. 07 to Dec. 31 | 5.5 estimated (b) |
| Jan. 01 to Mar. 26 | 17.6 estimated (b) |
| Mar. 26 to Jul. 25 | 19.8 |
| Jul. 25 to Sep. 30 | 9.8 estimated (c) |

WTR YR 1996 Total 73.4

(a) Estimated values based on accumulation rain can reading of 22.8 in. from August 30, 1995 to December 7, 1995.

(b) Estimated values based on accumulation rain can reading of 23.1 in. from December 7, 1995 to March 26, 1996.

(c) Estimated values based on accumulation rain can reading of 9.8 in. from July 25, 1996 to October 1, 1996.

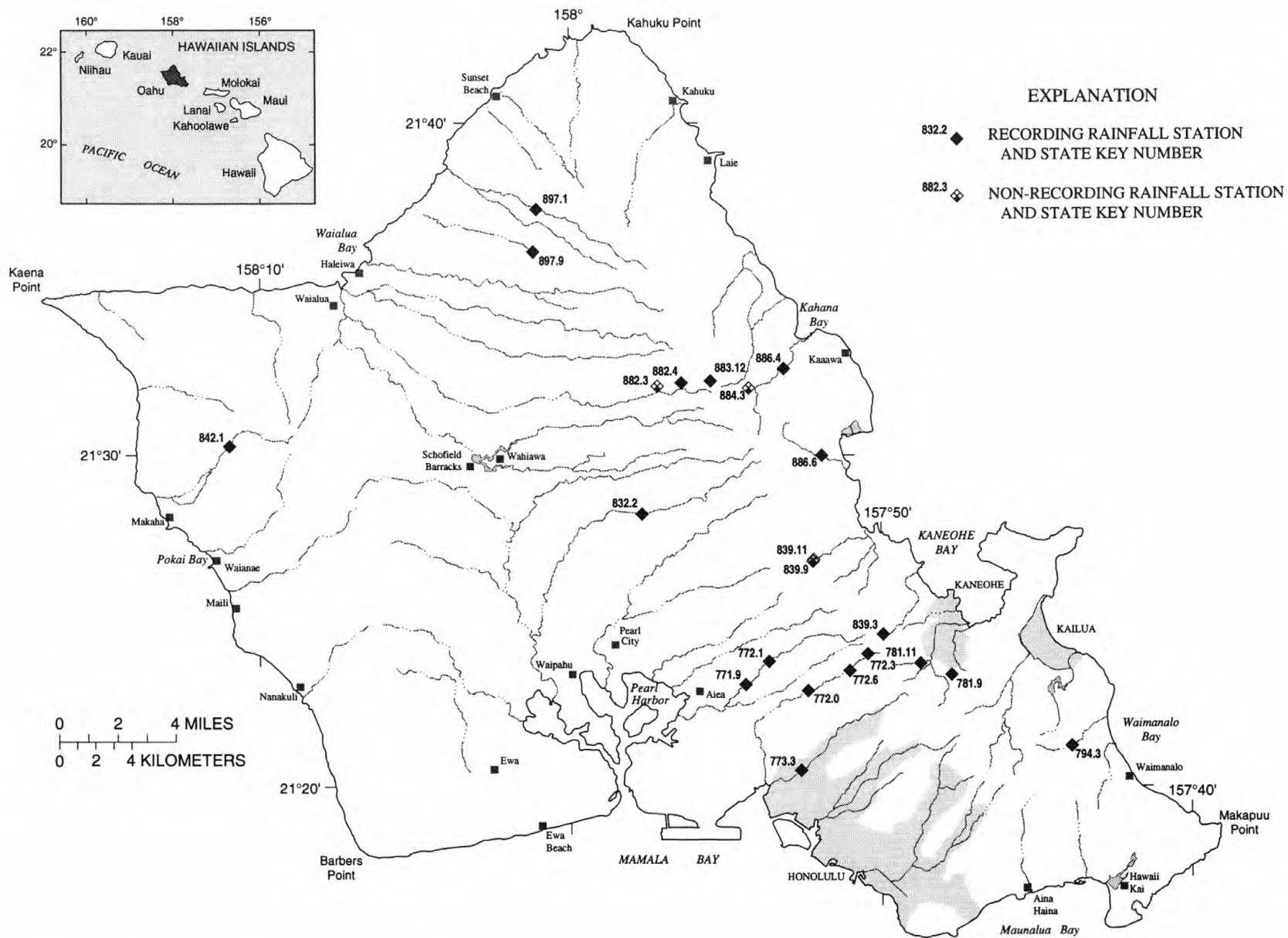


Figure 22. Locations of rainfall stations on Oahu.

RAINFALL RECORDS
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, 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, February 1, 1983 to September 1996 (discontinued). 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 recording tipping-bucket attachment, housed in the shelter for gaging station 16226200. Elevation of gage is 180 ft above mean sea level from topographic map.

REMARKS.--Records fair. Rainfall read in nearest tenths of an inch.

RAINFALL ACCUMULATED (INCHES), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY SUM VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 1 | .0 | .5 | --- | --- | .0 | .0 | .0 | .0 | .0 | .2 | .1 | .0 |
| 2 | .0 | .0 | --- | --- | .0 | .3 | .0 | .0 | .0 | .0 | .0 | .5 |
| 3 | .0 | 2.3 | --- | --- | .0 | 1.9 | .5 | .0 | .0 | .1 | .0 | .1 |
| 4 | .0 | .0 | --- | --- | .0 | .2 | .2 | .0 | .0 | .2 | .0 | .1 |
| 5 | .0 | .0 | --- | --- | .0 | .0 | .0 | .0 | .0 | .8 | .2 | .4 |
| 6 | .1 | .0 | --- | --- | .0 | .0 | .0 | .0 | .3 | .1 | .1 | .9 |
| 7 | .8 | .0 | --- | --- | .0 | .0 | .0 | .0 | .2 | .0 | .0 | 1.2 |
| 8 | .1 | .3 | --- | b.0 | .0 | .0 | .0 | .0 | .1 | .0 | .0 | .0 |
| 9 | .0 | .1 | --- | .0 | .0 | .0 | .0 | .0 | .1 | .0 | .0 | .0 |
| 10 | .0 | a.0 | --- | .5 | .0 | .0 | .1 | .0 | .0 | .0 | .1 | .3 |
| 11 | .0 | --- | --- | .0 | .0 | .0 | .2 | .0 | .0 | .0 | .1 | .2 |
| 12 | .0 | --- | --- | .0 | .0 | .0 | .1 | .0 | 2.2 | .0 | .0 | .1 |
| 13 | .0 | --- | --- | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| 14 | .0 | --- | --- | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| 15 | .0 | --- | --- | .0 | .0 | .0 | .0 | .0 | .1 | .6 | .0 | .0 |
| 16 | .0 | --- | --- | .0 | .0 | .0 | .0 | .0 | .1 | .2 | .1 | .0 |
| 17 | .0 | --- | --- | .0 | .0 | .1 | .0 | .0 | .3 | .2 | .0 | .1 |
| 18 | .0 | --- | --- | c.0 | .0 | .0 | .2 | .0 | .7 | .4 | .0 | .1 |
| 19 | .0 | --- | --- | d.0 | .0 | .0 | .1 | .0 | .0 | .3 | .0 | .0 |
| 20 | .1 | --- | --- | .0 | .0 | .1 | .1 | .1 | .6 | .1 | .0 | .0 |
| 21 | .0 | --- | --- | .0 | .0 | .0 | .2 | .0 | .0 | .0 | .0 | .0 |
| 22 | .0 | --- | --- | .0 | .0 | .0 | .1 | .0 | .2 | .0 | .0 | .0 |
| 23 | .0 | --- | --- | .0 | .0 | .0 | .0 | .0 | 1.4 | .0 | .0 | .0 |
| 24 | .0 | --- | --- | .9 | .0 | .0 | .0 | .1 | .0 | .8 | .0 | .0 |
| 25 | .1 | --- | --- | .7 | 1.6 | .0 | .0 | .2 | .0 | .0 | .0 | .0 |
| 26 | .1 | --- | --- | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| 27 | .0 | --- | --- | .4 | .2 | .0 | .0 | .0 | .0 | .1 | .0 | .0 |
| 28 | .1 | --- | --- | .0 | .0 | .0 | .7 | .2 | .1 | .0 | .0 | .0 |
| 29 | .0 | --- | --- | .0 | .0 | .0 | .0 | .2 | 2.1 | .0 | .0 | .0 |
| 30 | .0 | --- | --- | 1.0 | --- | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| 31 | .8 | --- | --- | .0 | --- | .6 | --- | .0 | --- | .0 | 4.6 | --- |
| TOTAL | 2.2 | --- | --- | --- | 1.8 | 3.2 | 2.5 | 0.8 | 8.5 | 4.1 | 5.3 | 4.0 |

a. Partial daily record from 0001 hrs to 1000 hrs.

b. Partial daily record from 1415 hrs to 2400 hrs. Total accumulated rainfall from Nov. 10 (1000 hrs) to Jan. 8 (1415 hrs) is 4.0 inches, clock stopped.

c. Partial daily record from 0001 hrs to 1100 hrs.

d. Partial daily record from 1245 hrs to 2400 hrs. Total accumulated rainfall from Jan. 18 (1100 hrs) to Jan. 19 (1245 hrs) is 0.3 inches, clock stopped.

RAINFALL RECORDS
HAWAII, ISLAND OF OAHU

212253157522201. State Key Number 772.0 Moanalua rain gage near Honolulu, Oahu.

LOCATION.--Lat 21°22'53", long 157°52'22", Hydrologic Unit 20060000, 1.8 mi northeast of Tripler Hospital, and 5.0 mi north of Honolulu Post Office.

PERIOD OF RECORD.--Accumulated-rainfall station, June 1926 (revised) to December 8, 1964. Continuous-record station, December 8, 1964 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 attached to a 7 5/16-in. rain can with float-type recorder system. Housed with recording crest-gage. Elevation of the gage is 340 ft above mean sea level from topographic map.

REMARKS.--Records good for periods when the recorder was in operation. Rainfall read in nearest tenths of an inch.

RAINFALL ACCUMULATED (INCHES), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY SUM VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|------|-----|-----|-----|
| 1 | .0 | 1.3 | .0 | .0 | --- | --- | --- | .0 | .0 | .1 | .2 | .0 |
| 2 | .0 | .0 | .0 | .0 | --- | --- | --- | .0 | .0 | .6 | .0 | .7 |
| 3 | .2 | 2.0 | .0 | .0 | --- | --- | --- | .0 | .0 | .2 | .0 | .4 |
| 4 | .0 | .0 | .0 | .5 | --- | --- | --- | .0 | .0 | .6 | .1 | .5 |
| 5 | .1 | .0 | .0 | .7 | --- | --- | --- | .0 | .0 | 1.4 | .0 | .9 |
| 6 | .4 | .0 | .2 | .0 | --- | --- | --- | .0 | .4 | .7 | .3 | 1.7 |
| 7 | 1.6 | .4 | .4 | .1 | --- | --- | --- | .0 | .6 | .1 | .2 | 2.6 |
| 8 | .7 | .9 | .0 | .1 | --- | --- | --- | .0 | .2 | .0 | .0 | .1 |
| 9 | .3 | .2 | .2 | .7 | --- | --- | --- | .0 | .2 | .1 | .1 | .0 |
| 10 | .2 | .0 | .1 | .2 | --- | --- | --- | .0 | .0 | .0 | .3 | .5 |
| 11 | .4 | .0 | .0 | .0 | --- | --- | --- | .0 | .0 | .0 | .6 | .6 |
| 12 | .3 | .0 | .0 | .0 | --- | --- | --- | .0 | .9 | .2 | .1 | .4 |
| 13 | .0 | .7 | .3 | .0 | --- | --- | --- | .0 | .0 | .0 | .1 | .0 |
| 14 | .1 | .2 | .0 | .0 | --- | --- | --- | .0 | .1 | .1 | .0 | .0 |
| 15 | .0 | .0 | .0 | .0 | --- | --- | --- | .0 | .4 | .6 | .0 | .0 |
| 16 | .0 | .0 | .0 | .2 | --- | --- | --- | .1 | .3 | .2 | .1 | .0 |
| 17 | .0 | .1 | .2 | .1 | --- | --- | --- | .0 | .4 | .6 | .0 | .0 |
| 18 | .1 | .0 | .1 | .4 | --- | --- | --- | .0 | 1.4 | 1.3 | .1 | .2 |
| 19 | .1 | .0 | .0 | .5 | --- | --- | --- | .1 | .2 | 1.0 | .0 | .1 |
| 20 | .7 | .0 | .0 | .3 | --- | --- | --- | .3 | 1.0 | .7 | .0 | .4 |
| 21 | .4 | .0 | .0 | .3 | --- | --- | --- | .1 | .3 | .1 | .0 | .0 |
| 22 | .0 | .0 | .0 | a.0 | --- | --- | --- | .0 | .3 | .0 | .0 | .0 |
| 23 | .1 | .0 | .0 | --- | --- | --- | --- | .0 | 1.7 | .0 | .0 | .0 |
| 24 | .0 | .1 | .0 | --- | --- | --- | --- | .7 | .2 | .1 | .0 | .0 |
| 25 | .5 | .0 | .0 | --- | --- | --- | --- | .5 | .1 | .0 | .0 | .0 |
| 26 | .8 | .1 | .0 | --- | --- | --- | --- | .2 | .0 | .1 | .0 | .0 |
| 27 | .0 | .2 | .0 | --- | --- | --- | --- | .1 | .0 | .0 | .1 | .0 |
| 28 | .9 | .3 | .0 | --- | --- | --- | --- | .7 | .3 | .0 | .0 | .0 |
| 29 | .0 | .4 | .0 | --- | --- | --- | --- | .2 | 3.4 | .0 | .0 | .0 |
| 30 | .2 | 1.0 | 1.5 | --- | --- | --- | b.0 | .1 | .3 | .0 | .2 | .0 |
| 31 | .8 | --- | .5 | --- | --- | --- | --- | .0 | --- | .0 | 4.9 | --- |
| TOTAL | 8.9 | 7.9 | 3.5 | --- | --- | --- | --- | 3.1 | 12.7 | 8.8 | 7.4 | 9.1 |

CAL YR 1995 TOTAL 72.9

a. Partial daily record from 0001 hrs to 1500 hrs.

b. Partial daily record from 1330 hrs to 2400 hrs. No record from January 22 (1500 hrs) to April 30 (1330 hrs), valve not closed.

RAINFALL RECORDS
HAWAII, ISLAND OF OAHU--Continued

212346157533701. State Key Number 772.1 North Halawa rain gage near Aiea, Oahu.

LOCATION.--Lat 21°23'46" (revised), 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 6, 1929 to June 30, 1933, June 3, 1953 (revised) 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 good except for cumulative totals which are fair. Rainfall recorded in tenths of an inch. From April 4, 1996, data logger records in 0.083 in. increments.

RAINFALL ACCUMULATED (INCHES), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY SUM VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|------|------|------|------|------|------|------|------|------|------|------|------|
| 1 | --- | --- | .10 | .00 | --- | .00 | .20 | .00 | .00 | .00 | .08 | .00 |
| 2 | --- | b--- | .00 | .00 | --- | .37 | .00 | .00 | .00 | .17 | .08 | .17 |
| 3 | --- | --- | .00 | .00 | --- | 1.68 | .00 | .00 | .00 | .00 | .00 | .08 |
| 4 | a.00 | --- | .00 | .50 | --- | .20 | .50 | .00 | .00 | .33 | .00 | .08 |
| 5 | .00 | --- | .00 | .60 | --- | .00 | .00 | .00 | .00 | .92 | .08 | .25 |
| 6 | .60 | --- | 1.00 | .00 | --- | .00 | .00 | .00 | .42 | .17 | .17 | .67 |
| 7 | .40 | --- | .10 | .00 | --- | .00 | .00 | .00 | .33 | .08 | .08 | 1.25 |
| 8 | 1.50 | c.00 | .00 | .10 | --- | .00 | .00 | .00 | .17 | .00 | .00 | .00 |
| 9 | .10 | .00 | .10 | d.00 | --- | .00 | .00 | .00 | .08 | .00 | .00 | .00 |
| 10 | .10 | .00 | .00 | --- | --- | .00 | .17 | .00 | .00 | .00 | .17 | .25 |
| 11 | .20 | .00 | .00 | --- | --- | .00 | .08 | .00 | .00 | .00 | .17 | .42 |
| 12 | .20 | .00 | .00 | --- | --- | .00 | .00 | .00 | .75 | .00 | .08 | .33 |
| 13 | .00 | .30 | .10 | --- | --- | .00 | .00 | .00 | .00 | .00 | .00 | .00 |
| 14 | .00 | .10 | .00 | --- | --- | .00 | .00 | .00 | .00 | .00 | .00 | .00 |
| 15 | .00 | .00 | .00 | --- | --- | .00 | .00 | .00 | .25 | .42 | .00 | .00 |
| 16 | .00 | .00 | .00 | --- | --- | .00 | .00 | .00 | .25 | .25 | .00 | .00 |
| 17 | .00 | .10 | .10 | --- | --- | .25 | .00 | .00 | .33 | .17 | .00 | .00 |
| 18 | .10 | .00 | .00 | --- | --- | .00 | .33 | .00 | 1.00 | .33 | .00 | .08 |
| 19 | .10 | .00 | .00 | --- | --- | .00 | .08 | .00 | .17 | .42 | .00 | .00 |
| 20 | .40 | .00 | .00 | --- | --- | .15 | .00 | .08 | .58 | .17 | .00 | .00 |
| 21 | .20 | .00 | .00 | --- | --- | .00 | .33 | .00 | .08 | .00 | .00 | .00 |
| 22 | .00 | .00 | .00 | --- | --- | .00 | .08 | .00 | .50 | .00 | .00 | .00 |
| 23 | .00 | .00 | .00 | --- | --- | .00 | .00 | .00 | 1.25 | .00 | .00 | .00 |
| 24 | .00 | .00 | .00 | --- | --- | .00 | .00 | .17 | .00 | .42 | .00 | .00 |
| 25 | .20 | .00 | .00 | --- | --- | .00 | .08 | .17 | .00 | .00 | .00 | .00 |
| 26 | .40 | .10 | .00 | --- | --- | .00 | .00 | .00 | .00 | .00 | .00 | .00 |
| 27 | --- | .00 | .00 | --- | --- | .00 | .00 | .00 | .00 | .00 | .00 | .00 |
| 28 | --- | .20 | .00 | --- | --- | .00 | .08 | .25 | .00 | .00 | .00 | .00 |
| 29 | --- | .20 | .00 | --- | e.00 | .00 | .00 | .17 | 1.67 | .00 | .00 | .00 |
| 30 | --- | .90 | 1.10 | --- | --- | .00 | .00 | .00 | .17 | .00 | .00 | .00 |
| 31 | --- | --- | .70 | --- | --- | 1.00 | --- | .00 | --- | .00 | 4.25 | --- |
| TOTAL | --- | --- | 3.30 | --- | --- | 3.65 | 1.93 | 0.84 | 8.00 | 3.85 | 5.16 | 3.58 |

- a. Partial daily record from 1251 hrs to 2400 hrs. Total accumulated rainfall from Aug. 24 (1052 hrs) to Oct. 4 (1251 hrs) is 3.0 inches, recorder stopped.
- b. Total accumulated rainfall from Oct. 27 (0001 hrs) to Nov. 2 (1304 hrs) is 3.5 inches, recorder stopped.
- c. Partial daily record from 1307 hrs to 2400 hrs. Total accumulated rainfall from Nov. 2 (1304 hrs) to Nov. 8 (1307 hrs) is 3.9 inches, recorder stopped.
- d. Partial daily record from 0001 hrs to 0915 hrs.
- e. Partial daily record from 0923 hrs to 2400 hrs. Total accumulated rainfall from Jan. 9 (0915 hrs) to Feb. 29 (0923 hrs) is 8.42 inches, recorder stopped.

RAINFALL RECORDS
HAWAII, ISLAND OF OAHU--Continued

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. can with recorder. Elevation of gage is 1,000 ft above mean sea level from topographic map.

REMARKS.--Records good except for the period of no record, which is poor. Rainfall recorded in tenths of an inch.

RAINFALL ACCUMULATED (INCHES), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY SUM VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|-----|-----|-----|------|-----|-----|-----|-----|------|------|-----|-----|
| 1 | .0 | --- | .1 | .0 | .0 | .1 | 1.6 | .0 | .0 | .0 | .3 | .0 |
| 2 | .0 | --- | .0 | .0 | .2 | .8 | .2 | .0 | .0 | .6 | .1 | .4 |
| 3 | .0 | --- | .0 | .0 | .0 | 2.8 | .0 | .0 | .0 | .2 | .0 | .2 |
| 4 | .3 | --- | .0 | .7 | .0 | .1 | .6 | .0 | .0 | .7 | .3 | .4 |
| 5 | .3 | --- | .1 | .7 | .0 | .0 | .2 | .0 | .0 | 1.9 | .1 | .8 |
| 6 | .8 | --- | .1 | .0 | .0 | .0 | .0 | .0 | .5 | 1.2 | .4 | 1.1 |
| 7 | 3.1 | --- | .4 | 1.1 | 1.3 | .0 | .0 | .0 | .8 | .1 | .4 | 1.8 |
| 8 | .9 | --- | .0 | 1.0 | .1 | .0 | .0 | .0 | .4 | .1 | .0 | .4 |
| 9 | .1 | --- | .3 | .8 | .0 | .0 | .0 | .0 | 1.5 | .2 | .2 | .0 |
| 10 | .4 | --- | .0 | .4 | .2 | .0 | 1.1 | .0 | .0 | .0 | .7 | .4 |
| 11 | .5 | --- | .0 | .0 | .0 | .0 | .5 | .0 | .0 | .0 | 1.1 | .3 |
| 12 | .3 | --- | .3 | .0 | .0 | .0 | .1 | .0 | .7 | .4 | .1 | .7 |
| 13 | .0 | --- | 1.0 | .0 | .0 | .0 | .0 | .0 | .8 | .5 | .3 | .0 |
| 14 | .1 | --- | .0 | .0 | .7 | .0 | .2 | .0 | .0 | .2 | .0 | .0 |
| 15 | .1 | --- | .0 | .0 | .0 | .0 | .0 | .0 | .3 | .1 | .0 | .0 |
| 16 | .0 | --- | .0 | .4 | .0 | .1 | .0 | .2 | .2 | .3 | .0 | .0 |
| 17 | .1 | --- | .2 | .0 | .0 | .2 | .3 | .0 | .4 | .7 | .0 | .0 |
| 18 | .0 | --- | .0 | .7 | .0 | .0 | .7 | .0 | 1.2 | .8 | .0 | .1 |
| 19 | .1 | --- | .1 | .8 | .0 | .0 | .3 | .2 | .2 | .7 | .1 | .0 |
| 20 | 1.3 | --- | .0 | .5 | .0 | .2 | .6 | 1.1 | .8 | .8 | .0 | .3 |
| 21 | .8 | --- | .0 | .4 | .0 | .0 | .6 | .3 | .2 | .6 | .0 | .0 |
| 22 | .0 | --- | .0 | .0 | .1 | .0 | .0 | .0 | .4 | .1 | .0 | .0 |
| 23 | .0 | --- | .0 | .3 | .0 | .1 | .0 | .2 | 2.0 | .0 | .0 | .1 |
| 24 | .0 | b.0 | .0 | 1.2 | .5 | .0 | .1 | .9 | .3 | .5 | .0 | .0 |
| 25 | .7 | .0 | .6 | 5.1 | 1.1 | .0 | .4 | .5 | .0 | .0 | .0 | .0 |
| 26 | a.2 | .1 | .1 | .1 | .8 | .0 | .3 | .8 | .0 | .8 | .0 | .0 |
| 27 | --- | .2 | .0 | 1.0 | 1.3 | .0 | .0 | .2 | .0 | .5 | .1 | .0 |
| 28 | --- | .4 | .0 | .3 | 1.8 | .0 | 1.8 | 1.2 | .4 | .0 | .0 | .0 |
| 29 | --- | .4 | .0 | .0 | .1 | .3 | .0 | .3 | 2.5 | .0 | .0 | .0 |
| 30 | --- | 1.2 | 1.9 | .3 | --- | .3 | .0 | .2 | .6 | .0 | .4 | .0 |
| 31 | --- | --- | 1.7 | .0 | --- | 1.8 | --- | .0 | --- | .0 | .0 | --- |
| TOTAL | --- | --- | 6.9 | 15.8 | 8.2 | 6.8 | 9.6 | 6.1 | 14.2 | 12.0 | 4.6 | 7.0 |

a. Partial daily record from 0001 hrs to 1630 hrs.

b. Partial daily record from 0930 hrs to 2400 hrs. Total accumulated rainfall from Oct 26 (1630 hrs) to Nov. 24 (0930 hrs) is greater than 36 inches, rain can overflowed.

RAINFALL RECORDS
HAWAII, ISLAND OF OAHU--Continued

212329157510501. State key Number 772.6 Moanalua rain gage near Kaneohe, Oahu.

LOCATION.--Lat 21°23'29", long 157°51'05", (Kaneohe quadrangle, 1959, 1:24000), Hydrologic Unit 20060000, in USGS streamgage station 16227500, on left bank 3.3 mi northeast of Tripler Hospital, and 3.6 mi southwest of Kaneohe Post Office.

PERIOD OF RECORD.--Continuous-record station, August 29, 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 attached to 7 5/16-in. rain can with a digital recorder. Elevation of gage is 660 ft above mean sea level from topographic map.

REMARKS.--Records fair. Rainfall recorded in tenths of an inch.

RAINFALL ACCUMULATED (INCHES), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY SUM VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|-----|-----|-----|------|-----|-----|-----|-----|------|------|-----|-----|
| 1 | .1 | --- | .1 | .0 | .0 | .0 | 1.5 | .0 | .0 | .1 | .3 | .0 |
| 2 | .0 | --- | .0 | .0 | .1 | .9 | .2 | .0 | .0 | .8 | .1 | .7 |
| 3 | .0 | --- | .1 | .0 | .0 | 2.9 | .0 | .0 | .0 | .2 | .1 | .2 |
| 4 | .2 | --- | .0 | .7 | .0 | .2 | .6 | .0 | .0 | .7 | .2 | .4 |
| 5 | .3 | --- | .0 | .9 | .0 | .0 | .2 | .0 | .0 | 2.0 | .1 | 1.5 |
| 6 | .0 | --- | .1 | .0 | .0 | .0 | .0 | .0 | .6 | 1.1 | .5 | 1.7 |
| 7 | 2.2 | --- | .5 | .6 | .7 | .0 | .0 | .0 | .9 | .1 | .4 | 2.3 |
| 8 | .8 | --- | .0 | .7 | .1 | .0 | .0 | .0 | .4 | .2 | .0 | .2 |
| 9 | .1 | --- | .3 | 1.1 | .0 | .0 | .0 | .0 | .6 | .1 | .2 | .0 |
| 10 | .5 | --- | .0 | .4 | .2 | .0 | 1.2 | .0 | .0 | .1 | .7 | .5 |
| 11 | .6 | --- | .0 | .0 | .0 | .0 | .6 | .0 | .0 | .0 | .9 | .4 |
| 12 | .4 | --- | .2 | .0 | .0 | .0 | .1 | .0 | .1 | .4 | .0 | .6 |
| 13 | .1 | --- | .7 | .0 | .0 | .0 | .0 | .0 | .4 | .1 | .3 | .0 |
| 14 | .0 | --- | .0 | .0 | 1.0 | .0 | .3 | .0 | .1 | .2 | .0 | .0 |
| 15 | .0 | --- | .0 | .0 | .2 | .0 | .0 | .0 | .2 | .4 | .0 | .0 |
| 16 | .0 | --- | .0 | .4 | .0 | .0 | .0 | .3 | .2 | .4 | .1 | .1 |
| 17 | .0 | --- | .3 | .0 | .0 | .2 | .3 | .0 | .5 | .7 | .0 | .0 |
| 18 | .1 | --- | .0 | .5 | .0 | .0 | .9 | .0 | 1.4 | 1.3 | .0 | .4 |
| 19 | .1 | --- | .1 | 1.3 | .0 | .0 | .3 | .2 | .2 | .9 | .0 | .0 |
| 20 | 1.4 | --- | .0 | .8 | .0 | .2 | .5 | .9 | 1.0 | .9 | .0 | .3 |
| 21 | .7 | --- | .0 | .5 | .0 | .0 | .6 | .1 | .3 | .5 | .0 | .0 |
| 22 | .0 | --- | .0 | .1 | .1 | .1 | .1 | .0 | .5 | .0 | .0 | .0 |
| 23 | .1 | --- | .0 | .2 | .1 | .1 | .0 | .1 | 1.9 | .0 | .0 | .1 |
| 24 | .0 | a.0 | .0 | .6 | .5 | .0 | .0 | .8 | .3 | .6 | .0 | .0 |
| 25 | .6 | .0 | .2 | 3.2 | 2.3 | .0 | .3 | .7 | .1 | .0 | .0 | .0 |
| 26 | --- | .1 | .2 | .2 | 1.2 | .0 | .3 | .7 | .0 | .6 | .0 | .1 |
| 27 | --- | .2 | .0 | 1.1 | 1.0 | .0 | .0 | .2 | .0 | .3 | .1 | .0 |
| 28 | --- | .4 | .0 | .5 | 1.0 | .0 | .7 | 1.2 | .3 | .0 | .0 | .0 |
| 29 | --- | .4 | .0 | .0 | .0 | .4 | .0 | .3 | 3.3 | .0 | .0 | .0 |
| 30 | --- | 1.7 | 1.8 | .4 | --- | .1 | .1 | .1 | .4 | .0 | .0 | .0 |
| 31 | --- | --- | .8 | .0 | --- | 1.7 | --- | .0 | --- | .0 | 2.6 | --- |
| TOTAL | --- | --- | 5.4 | 14.2 | 8.5 | 6.8 | 8.8 | 5.6 | 13.7 | 12.7 | 6.6 | 9.5 |

a. Partial daily record from 1100 hrs to 2400 hrs. Total accumulated rainfall from Oct 26 (0001 hrs) to Nov. 24 (1100 hrs) is greater than 36 inches, rain can overflowed.

RAINFALL RECORDS
HAWAII, ISLAND OF OAHU--Continued

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 streamgage station 16229300 on left bank, 0.4 mi northwest of Bishop Museum, and 2.4 mi northwest of Honolulu Post Office.

PERIOD OF RECORD.--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. A CR10 data logger records rainfall at 30 min. intervals. Elevation of gage is 70 ft above mean sea level from topographic map.

REMARKS.--Records fair. Rainfall recorded in tenths of an inch.

RAINFALL ACCUMULATED (INCHES), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY SUM VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|------|------|------|------|------|------|-----|-----|------|------|------|------|
| 1 | --- | .20 | .20 | .00 | .00 | .00 | .00 | --- | --- | .10 | .00 | .10 |
| 2 | --- | .00 | .10 | .00 | .10 | .30 | .00 | --- | --- | .10 | .00 | .10 |
| 3 | --- | .80 | .00 | .00 | .00 | 1.20 | .00 | --- | --- | .10 | .00 | .40 |
| 4 | --- | .00 | .00 | .30 | .00 | .00 | .30 | --- | --- | .20 | .00 | .20 |
| 5 | --- | .00 | .00 | .50 | .00 | .00 | .10 | --- | --- | .30 | .00 | .20 |
| 6 | --- | .00 | .10 | .00 | .00 | .00 | --- | --- | --- | .10 | .30 | .40 |
| 7 | --- | .10 | .00 | .00 | .00 | .00 | --- | --- | --- | .10 | .00 | .70 |
| 8 | --- | .10 | .10 | .00 | .00 | .00 | --- | --- | --- | .00 | .00 | .30 |
| 9 | --- | .00 | .00 | .30 | .00 | .00 | --- | --- | --- | .00 | .00 | .00 |
| 10 | --- | .00 | .00 | .70 | .30 | .00 | --- | --- | --- | .00 | .00 | .10 |
| 11 | --- | .00 | .00 | .00 | .00 | .00 | --- | --- | --- | .00 | .10 | .20 |
| 12 | --- | .00 | .00 | .00 | .00 | .00 | --- | --- | --- | .10 | .00 | .00 |
| 13 | a.00 | .10 | .10 | .00 | .00 | .00 | --- | --- | b.50 | .00 | .00 | .00 |
| 14 | .00 | .00 | .00 | .00 | .10 | .00 | --- | --- | .10 | .00 | .00 | .00 |
| 15 | .00 | .00 | .00 | .00 | .10 | .00 | --- | --- | .30 | .50 | .10 | .00 |
| 16 | .00 | .00 | .00 | .00 | .00 | .00 | --- | --- | .20 | .00 | .00 | .00 |
| 17 | .00 | .00 | .00 | .10 | .00 | .10 | --- | --- | .10 | .20 | .00 | .00 |
| 18 | .00 | .00 | .00 | .20 | .00 | .00 | --- | --- | .40 | .60 | .10 | .10 |
| 19 | .00 | .00 | .00 | .30 | .00 | .00 | --- | --- | .10 | .40 | .00 | .10 |
| 20 | .10 | .00 | .00 | .10 | .00 | .10 | --- | --- | .30 | .40 | .00 | .00 |
| 21 | .00 | .00 | .00 | .00 | .00 | .00 | --- | --- | .10 | .10 | .00 | .00 |
| 22 | .00 | .00 | .00 | .00 | .00 | .00 | --- | --- | .10 | .00 | .00 | .00 |
| 23 | .00 | .00 | .00 | .10 | .00 | .00 | --- | --- | .70 | .00 | .00 | .00 |
| 24 | .00 | .00 | .00 | .80 | .10 | .00 | --- | --- | .10 | .00 | .00 | .00 |
| 25 | .10 | .00 | .00 | .00 | .20 | .00 | --- | --- | .00 | .00 | .00 | .00 |
| 26 | .20 | .10 | .00 | .00 | .20 | .00 | --- | --- | .00 | .00 | .10 | .00 |
| 27 | .00 | .10 | .00 | .00 | .50 | .00 | --- | --- | .00 | .20 | .00 | .00 |
| 28 | .20 | .00 | .00 | .00 | .00 | .00 | --- | --- | .00 | .00 | .00 | .00 |
| 29 | .00 | .10 | .00 | .00 | .00 | .00 | --- | --- | .30 | .00 | .00 | .00 |
| 30 | .00 | .40 | .90 | .00 | --- | .00 | --- | --- | .00 | .00 | 1.10 | .00 |
| 31 | .70 | --- | .40 | .10 | --- | .10 | --- | --- | --- | .00 | 1.90 | --- |
| TOTAL | --- | 2.00 | 1.90 | 3.50 | 1.60 | 1.80 | --- | --- | --- | 3.50 | 3.70 | 2.90 |

a. Partial daily record from 1130 hrs to 2400 hrs. Total accumulated rainfall from Oct. 1 (0001 hrs) to Oct. 13 (1130 hrs) is 1.3 inches.

b. Partial daily record from 0915 hrs to 2400 hrs. No record from Apr. 6 (0001 hrs) to June 13 (0915 hrs), rain catchment hose was plugged.

RAINFALL RECORDS
HAWAII, ISLAND OF OAHU--Continued

212342157484401. State Key Number 781.11 Luluku rain gage at altitude 220 ft near Kaneohe, Oahu.

LOCATION.--Lat 21°23'42 " long 157°48'44 " Hydrologic Unit 20060000, in USGS streamgage station 16270900 on right bank, 0.5 mi upstream from mouth, 1.4 mi southwest of Castle High School, and 1.9 mi south of Kaneohe Post Office.

PERIOD OF RECORD.--Continuous-record station, April 1984 to current year. Station was relocated 400 ft downstream in 1984. Prior to October 1992, unpublished records are in the files of the U.S. Geological Survey.

GAGE.--Standard 8-in. National Weather Service tipping-bucket rain gage. Elevation of gage is 220 ft above mean sea level from topographic map (revised).

REMARKS.--Records good. Rainfall recorded in tenths of an inch.

RAINFALL ACCUMULATED (INCHES), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY SUM VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|-----|-----|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|
| 1 | .0 | 3.0 | 1.0 | .0 | .0 | .2 | .1 | .0 | .0 | .0 | .0 | .0 |
| 2 | .0 | .0 | .0 | .0 | .3 | 1.4 | .1 | .0 | .0 | .1 | .0 | .0 |
| 3 | .0 | .4 | .0 | .0 | .0 | 2.8 | .0 | .0 | .0 | .2 | .2 | .1 |
| 4 | .1 | .1 | .0 | .6 | .0 | .1 | .2 | .0 | .0 | .1 | .2 | .1 |
| 5 | .0 | .0 | .0 | .7 | .0 | .0 | .1 | .0 | .0 | .8 | .0 | .8 |
| 6 | .3 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .1 | .0 | .1 | .5 |
| 7 | 1.1 | .1 | .1 | .8 | 1.9 | .0 | .0 | .0 | .3 | .7 | .1 | .2 |
| 8 | .3 | 1.4 | .1 | .3 | .2 | .0 | .0 | .3 | .2 | .1 | .0 | .2 |
| 9 | .0 | .9 | .2 | .4 | .0 | .0 | .0 | .1 | 3.3 | .3 | .1 | .0 |
| 10 | .1 | .0 | .0 | .3 | .1 | .0 | .2 | .0 | .1 | .0 | .1 | .1 |
| 11 | .2 | .0 | .0 | .0 | .0 | .0 | .1 | .0 | .6 | .0 | .6 | .3 |
| 12 | .0 | .2 | .1 | .0 | .0 | .0 | .3 | .0 | .0 | .3 | .0 | .1 |
| 13 | .0 | 1.3 | .4 | .0 | .0 | .0 | .0 | .0 | .1 | .0 | .0 | .1 |
| 14 | .0 | .6 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| 15 | .0 | .1 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .1 | .0 | .0 |
| 16 | .0 | .0 | .0 | .1 | .0 | .0 | .0 | .0 | .1 | .1 | .0 | .0 |
| 17 | .0 | .0 | .1 | .1 | .0 | .0 | .0 | .0 | .2 | .1 | .0 | .0 |
| 18 | .0 | .2 | .0 | .2 | .0 | .0 | .3 | .0 | .4 | .3 | .0 | .1 |
| 19 | .0 | .0 | .0 | .2 | .0 | .0 | .1 | .0 | .0 | .5 | .0 | .0 |
| 20 | .2 | .2 | .0 | .1 | .0 | .2 | .1 | .4 | .3 | .0 | .0 | .1 |
| 21 | .2 | .1 | .0 | .0 | .0 | .2 | .1 | .0 | .0 | .0 | .0 | .0 |
| 22 | .0 | .0 | .0 | .0 | .0 | .1 | .0 | .0 | .2 | .1 | .0 | .0 |
| 23 | .0 | .0 | .0 | .4 | .0 | .0 | .0 | .0 | .9 | .0 | .0 | .0 |
| 24 | .0 | .0 | .0 | 1.1 | .2 | .0 | .0 | .2 | .0 | .0 | .0 | .2 |
| 25 | .2 | .0 | .3 | 7.9 | .1 | .0 | .0 | .3 | .0 | .0 | .0 | .0 |
| 26 | .0 | .0 | .1 | .0 | .3 | .0 | .0 | .4 | .0 | .3 | .0 | .0 |
| 27 | .0 | .4 | .0 | 1.4 | 1.6 | .0 | .0 | .1 | .0 | .7 | .2 | .0 |
| 28 | .7 | .0 | .0 | .2 | .6 | .0 | 1.5 | .3 | .1 | .0 | .0 | .0 |
| 29 | .0 | .1 | .0 | .0 | .0 | .0 | .1 | .0 | .9 | .0 | .0 | .0 |
| 30 | .4 | .8 | 1.2 | .2 | --- | .2 | .0 | .1 | .1 | .0 | .0 | .0 |
| 31 | .9 | --- | .6 | .1 | --- | .7 | --- | .0 | --- | .0 | 5.9 | --- |
| TOTAL | 4.7 | 9.9 | 4.2 | 15.1 | 5.3 | 5.9 | 3.3 | 2.2 | 7.9 | 4.8 | 7.5 | 2.9 |

WTR YR 1996 Total 73.7

RAINFALL RECORDS
HAWAII, ISLAND OF OAHU--Continued

212322157474401. State Key Number 781.9 Right Branch Kamoolii rain gage near Kaneohe, Oahu.

LOCATION.--Lat 21°23'22 " , long 157°47'44 " , Hydrologic Unit 20060000, in USGS streamgage station 16265600 on left bank, 0.3 mi south of Hawaiian Memorial Park Cemetery, 1.0 mi northwest of Pali Golf Course, and 1.3 mi south of Castle High School.

PERIOD OF RECORD.--Continuous-record station, February 1983 to current year. Prior to 1992, unpublished records are in the files of the U.S. Geological Survey.

GAGE.--Standard 8-in. National Weather Service rain gage attached to a tipping-bucket counter and recorder. Elevation of gage is 210 ft above mean sea level from topographic map.

REMARKS.--Records fair. Rainfall recorded in tenths of an inch.

RAINFALL ACCUMULATED (INCHES), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY SUM VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|-----|-----|-----|------|-----|-----|------|------|------|------|------|------|
| 1 | .0 | 1.2 | 1.9 | .0 | .0 | .0 | .0 | --- | --- | --- | --- | --- |
| 2 | .0 | .0 | .0 | .0 | .1 | .6 | a.0 | --- | --- | --- | --- | --- |
| 3 | .1 | .2 | .0 | .0 | .0 | 1.0 | --- | --- | --- | --- | --- | --- |
| 4 | .0 | .1 | .0 | .5 | .0 | .0 | --- | --- | --- | --- | --- | --- |
| 5 | .0 | .0 | .0 | .8 | .0 | .0 | --- | --- | --- | --- | --- | --- |
| 6 | .3 | .0 | .0 | .0 | .0 | .1 | --- | --- | --- | --- | --- | --- |
| 7 | .8 | .0 | .2 | .0 | .3 | .0 | --- | --- | --- | --- | --- | --- |
| 8 | .2 | .6 | .0 | .0 | .3 | .0 | --- | --- | --- | --- | --- | --- |
| 9 | .1 | .2 | .0 | .0 | .0 | .0 | --- | --- | --- | --- | --- | --- |
| 10 | .1 | .0 | .0 | .9 | .0 | .0 | --- | --- | --- | --- | --- | --- |
| 11 | .0 | .0 | .0 | .0 | .0 | .0 | --- | --- | f--- | --- | --- | --- |
| 12 | .1 | .1 | .0 | .0 | .0 | .0 | --- | --- | --- | --- | --- | --- |
| 13 | .0 | 1.0 | .2 | .0 | .0 | .0 | --- | --- | --- | --- | --- | --- |
| 14 | .0 | .3 | .2 | .0 | .0 | .0 | --- | --- | --- | --- | --- | --- |
| 15 | .0 | .0 | .0 | .0 | .0 | .0 | --- | c--- | --- | --- | --- | --- |
| 16 | .0 | .0 | .0 | .0 | .0 | .0 | --- | --- | --- | --- | --- | --- |
| 17 | .0 | .0 | .0 | .0 | .0 | .0 | --- | --- | --- | --- | --- | --- |
| 18 | .0 | .3 | .0 | .3 | .0 | .0 | --- | --- | --- | --- | --- | --- |
| 19 | .0 | .0 | .0 | .1 | .0 | .0 | --- | --- | g--- | h--- | --- | --- |
| 20 | .0 | .3 | .0 | .0 | .0 | .0 | --- | --- | --- | --- | i--- | --- |
| 21 | .1 | .3 | .0 | .0 | .0 | .0 | --- | d--- | --- | --- | --- | --- |
| 22 | .0 | .0 | .0 | .0 | .0 | .0 | --- | --- | --- | --- | --- | --- |
| 23 | .0 | .0 | .0 | .3 | .0 | .0 | --- | --- | --- | --- | --- | --- |
| 24 | .0 | .0 | .0 | 1.6 | .0 | .0 | b--- | --- | --- | --- | --- | --- |
| 25 | .1 | .0 | .8 | 11.9 | .0 | .0 | --- | --- | --- | --- | --- | --- |
| 26 | .2 | .0 | .0 | .0 | .1 | .0 | --- | --- | --- | --- | --- | --- |
| 27 | .0 | .4 | .0 | .8 | .7 | .0 | --- | --- | --- | --- | --- | --- |
| 28 | .5 | .2 | .0 | .2 | .0 | .0 | --- | e--- | --- | --- | --- | --- |
| 29 | .0 | .0 | .0 | .0 | .0 | .0 | --- | --- | --- | --- | --- | --- |
| 30 | .0 | .6 | 1.8 | .3 | --- | .0 | --- | --- | --- | --- | --- | j--- |
| 31 | 1.6 | --- | .3 | .0 | --- | .3 | --- | --- | --- | --- | --- | --- |
| TOTAL | 4.2 | 5.8 | 5.4 | 17.7 | 1.5 | 2.0 | --- | --- | --- | --- | --- | --- |

a. Partial daily record from 0001 hrs to 1351 hrs.

b. Total accumulated rainfall from Apr. 2 (1351 hrs) to Apr. 24 (1219 hrs) is 1.2 inches.

c. Total accumulated rainfall from Apr. 24 (1219 hrs) to May 15 (1312 hrs) is 2.5 inches.

d. Total accumulated rainfall from May 15 (1312 hrs) to May 21 (0837 hrs) is 0.2 inches.

e. Total accumulated rainfall from May 21 (0837 hrs) to May 28 (0919 hrs) is 0.5 inches.

f. Total accumulated rainfall from May 28 (0919 hrs) to June 11 (1509 hrs) is 4.1 inches.

g. Total accumulated rainfall from June 11 (1509 hrs) to June 19 (1414 hrs) is 0.3 inches.

h. Total accumulated rainfall from June 19 (1414 hrs) to July 19 (1509 hrs) is 4.8 inches.

i. Total accumulated rainfall from July 19 (1509 hrs) to Aug. 20 (0924 hrs) is 2.4 inches.

j. Total accumulated rainfall from Aug. 20 (0924 hrs) to Oct. 16 (0930 hrs) is 7.5 inches.

RAINFALL RECORDS
HAWAII, ISLAND OF OAHU--Continued

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 streamgage station 16249000, 260 ft downstream from Kalaniana'ole 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 attached to a tipping-bucket counter and recorder. Elevation of gage is 20 ft above mean sea level from topographic map.

REMARKS.--Records good. Rainfall recorded in tenths of an inch.

RAINFALL ACCUMULATED (INCHES), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
INTERMITTENT READINGS

| Period | Rainfall |
|--------------------|----------|
| Nov. 07 to Jan. 11 | 9.5 |
| Jan. 11 to Jan. 25 | 11.9 |
| Jan. 25 to Apr. 09 | 9.2 |
| Apr. 09 to Jun. 20 | 7.1 |
| Jun. 20 to Oct. 15 | 4.2 |

RAINFALL RECORDS
HAWAII, ISLAND OF OAHU--Continued

212813157574001. State Key Number 832.2 Kipapa rain gage near Wahiawa, Oahu.

LOCATION.--Lat 21°28'13", long 157°57'50", 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 was housed in the same shelter with USGS streamgage station 16212800, but was relocated to a new shelter 15 ft downstream on January 19, 1994.

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 for period when the recorder was in operation and poor for period of no record. Rainfall recorded in tenths of an inch.

RAINFALL ACCUMULATED (INCHES), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY SUM VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|------|-----|-----|-----|
| 1 | .0 | --- | --- | --- | --- | .0 | .0 | .0 | .0 | .3 | .0 | .0 |
| 2 | .0 | --- | --- | --- | --- | .4 | .2 | .0 | .0 | .7 | .1 | .5 |
| 3 | .0 | --- | --- | --- | --- | 3.7 | .0 | .0 | .0 | .1 | .0 | .6 |
| 4 | .0 | --- | --- | --- | --- | .3 | .2 | .2 | .0 | .4 | .0 | .1 |
| 5 | .1 | --- | --- | --- | --- | .0 | .1 | .0 | .1 | .7 | .1 | .6 |
| 6 | a.0 | --- | --- | --- | --- | .0 | .0 | .0 | .5 | .3 | .1 | .6 |
| 7 | --- | --- | --- | --- | --- | .0 | .0 | .0 | .9 | .1 | .1 | 2.3 |
| 8 | --- | --- | --- | --- | --- | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| 9 | --- | --- | --- | b | --- | .0 | .0 | .0 | .7 | .1 | .0 | .1 |
| 10 | --- | --- | --- | --- | --- | .0 | .3 | .0 | .0 | .0 | .3 | .3 |
| 11 | --- | --- | --- | --- | --- | .0 | .5 | .0 | .0 | .1 | .5 | .4 |
| 12 | --- | --- | --- | --- | --- | .2 | .0 | .0 | .7 | .0 | .0 | .1 |
| 13 | --- | --- | --- | --- | --- | .0 | .0 | .0 | .0 | .1 | .0 | .0 |
| 14 | --- | --- | --- | --- | --- | .0 | .1 | .1 | .0 | .0 | .0 | .0 |
| 15 | --- | --- | --- | --- | --- | .0 | .0 | .0 | .4 | .7 | .0 | .0 |
| 16 | --- | --- | --- | --- | --- | .1 | .0 | .2 | .4 | .7 | .1 | .0 |
| 17 | --- | --- | --- | --- | --- | .2 | .3 | .0 | .3 | .6 | .0 | .5 |
| 18 | --- | --- | --- | --- | --- | .0 | .8 | .0 | .8 | 1.3 | .1 | .0 |
| 19 | --- | --- | --- | --- | --- | .0 | .2 | .1 | .3 | 1.3 | .0 | .0 |
| 20 | --- | --- | --- | --- | --- | .1 | .1 | .2 | .9 | .0 | .0 | .1 |
| 21 | --- | --- | --- | --- | --- | .0 | .4 | .0 | .2 | .0 | .0 | .0 |
| 22 | --- | --- | --- | --- | --- | .0 | .1 | .1 | .1 | .0 | .0 | .0 |
| 23 | --- | --- | --- | --- | --- | .1 | .0 | .1 | 1.8 | .0 | .0 | .0 |
| 24 | --- | --- | --- | --- | --- | .0 | 1.0 | .4 | .1 | .0 | .0 | .0 |
| 25 | --- | --- | --- | --- | --- | .0 | .0 | .3 | .0 | .0 | .0 | .0 |
| 26 | --- | --- | --- | --- | --- | .0 | .0 | .1 | .0 | .0 | .0 | .0 |
| 27 | --- | --- | --- | --- | --- | .0 | .0 | .0 | .0 | .2 | .0 | .0 |
| 28 | --- | --- | --- | --- | --- | .0 | .0 | .1 | .2 | .0 | .0 | .0 |
| 29 | --- | --- | --- | --- | c.0 | .0 | .0 | .3 | 1.2 | .0 | .0 | .0 |
| 30 | --- | --- | --- | --- | --- | .0 | .0 | .0 | .5 | .0 | .8 | .0 |
| 31 | --- | --- | --- | --- | --- | .7 | --- | .0 | --- | .1 | 1.1 | --- |
| TOTAL | --- | --- | --- | --- | --- | 5.8 | 4.3 | 2.2 | 10.1 | 7.8 | 3.3 | 6.2 |

a. Partial daily record from 0001 hrs to 1200 hrs.

b. Total accumulated rainfall from Oct. 6 (1200 hrs) to Jan. 9 (1130 hrs) is 14.3 inches, recorder stopped.

c. Partial daily record from 1300 hrs to 2400 hrs. Total accumulated rainfall from Jan. 9 (1130 hrs) to Feb. 29 (1230 hrs) is 8.3 inches, recorder not in service.

RAINFALL RECORDS
HAWAII, ISLAND OF OAHU--Continued

212650157521001. State Key Number 839.11 Waihee rain gage at ridge crossing near Heeia, Oahu.

LOCATION.--Lat 21°26'50", long 157°52'10", Hydrologic Unit 20060000, approximately 1,000 ft downstream from USGS streamgage station 16283600.

PERIOD OF RECORD.--Accumulated-rainfall station, October 13, 1963 to September 1996 (discontinued). 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. Elevation of gage is 400 ft above mean sea level from topographic map.

REMARKS.--Records good. Cumulative rainfall read in nearest tenths of an inch.

RAINFALL ACCUMULATED (INCHES), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
INTERMITTENT READINGS

| Period | Rainfall |
|--------------------|----------|
| Nov. 06 to Jan. 10 | 17.6 |
| Jan. 10 to Apr. 17 | 22.5 |
| Apr. 17 to Jun. 27 | 17.5 |
| Jun. 27 to Oct. 08 | 22.1 |

RAINFALL RECORDS
HAWAII, ISLAND OF OAHU--Continued

212434157495601. State Key Number 839.3 Haiku rain gage near Heeiea, Oahu.

LOCATION.--Lat 21°24'34 " long 157°49'56", approximately 1,600 ft inside of security fence at Haiku, on the right side of roadway.

PERIOD OF RECORD.--Continuous-record station, December 2, 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 receiver and 7 5/16-in. storage can with a float-type system attached to a digital recorder. Elevation of gage is 195 ft above mean sea level from topographic map.

REMARKS.--Records good. Rainfall recorded in tenths of an inch.

RAINFALL ACCUMULATED (INCHES), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY SUM VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|-----|------|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|
| 1 | .0 | 1.7 | 1.2 | .1 | .0 | .1 | .2 | .0 | .0 | .0 | .1 | .0 |
| 2 | .0 | .0 | .0 | .0 | .4 | 1.0 | .4 | .0 | .0 | .3 | .1 | .1 |
| 3 | .0 | .7 | .0 | .0 | .0 | 2.9 | .0 | .0 | .0 | .0 | .1 | .1 |
| 4 | .1 | .1 | .0 | .9 | .0 | .3 | .5 | .0 | .0 | .4 | .3 | .3 |
| 5 | .1 | .0 | .0 | .5 | .0 | .1 | .6 | .0 | .0 | 1.1 | .0 | .4 |
| 6 | .2 | .1 | .3 | .0 | .1 | .0 | .0 | .4 | .2 | .4 | .2 | .9 |
| 7 | 1.9 | .3 | .4 | .5 | 2.0 | .0 | .0 | .0 | .3 | .1 | .0 | .8 |
| 8 | .3 | 1.0 | .0 | .7 | .2 | .0 | .0 | .4 | .2 | .0 | .0 | .2 |
| 9 | .1 | .9 | .1 | .6 | .0 | .0 | .0 | .0 | 2.0 | .1 | .1 | .0 |
| 10 | .0 | .0 | .0 | .9 | .2 | .0 | .3 | .0 | .0 | .0 | .3 | .1 |
| 11 | .2 | .1 | .0 | .0 | .0 | .0 | .2 | .0 | .4 | .0 | .4 | .2 |
| 12 | .3 | .5 | .2 | .0 | .0 | .0 | .1 | .0 | .2 | .0 | .1 | .2 |
| 13 | .0 | 2.4 | .5 | .0 | .0 | .0 | .0 | .0 | .5 | .0 | .1 | .0 |
| 14 | .0 | .9 | .1 | .0 | .2 | .0 | .0 | .0 | .0 | .2 | .0 | .0 |
| 15 | .0 | .1 | .0 | .0 | .0 | .0 | .0 | .0 | .2 | .3 | .0 | .0 |
| 16 | .0 | .0 | .0 | .2 | .0 | .0 | .0 | .0 | .1 | .1 | .0 | .0 |
| 17 | .0 | .3 | .2 | .0 | .0 | .1 | .0 | .0 | .2 | .3 | .0 | .2 |
| 18 | .0 | .0 | .0 | .2 | .0 | .1 | .2 | .0 | .6 | .1 | .0 | .1 |
| 19 | .0 | .0 | .1 | .5 | .0 | .0 | .1 | .0 | .1 | .3 | .0 | .0 |
| 20 | .3 | .1 | .0 | .1 | .0 | .1 | .2 | .4 | .3 | .1 | .0 | .2 |
| 21 | .2 | .1 | .0 | .0 | .0 | .1 | .3 | .1 | .1 | .1 | .0 | .0 |
| 22 | .0 | .1 | .0 | .1 | .0 | .1 | .0 | .0 | .3 | .4 | .0 | .0 |
| 23 | .0 | .0 | .0 | .3 | .0 | .0 | .0 | .0 | 1.5 | .0 | .0 | .0 |
| 24 | .0 | .0 | .0 | .7 | .0 | .0 | .1 | .3 | .2 | .1 | .0 | .1 |
| 25 | .4 | .0 | .9 | 7.8 | .1 | .0 | .0 | .3 | .0 | .0 | .0 | .0 |
| 26 | .0 | .3 | .1 | .1 | .3 | .0 | .0 | .3 | .0 | .6 | .0 | .0 |
| 27 | .0 | .3 | .0 | 1.1 | 1.1 | .0 | .0 | .1 | .0 | .5 | .0 | .0 |
| 28 | .9 | .3 | .0 | .2 | 1.3 | .0 | 1.1 | .4 | .2 | .0 | .0 | .0 |
| 29 | .1 | .2 | .0 | .0 | .0 | .0 | .0 | .1 | 1.3 | .0 | .0 | .0 |
| 30 | .1 | .8 | 2.5 | .4 | --- | .2 | .0 | .1 | .5 | .0 | .0 | .0 |
| 31 | 1.0 | --- | .5 | .0 | --- | 1.4 | --- | .0 | --- | .0 | 3.0 | --- |
| TOTAL | 6.2 | 11.3 | 7.1 | 15.9 | 5.9 | 6.5 | 4.3 | 2.9 | 9.4 | 5.5 | 4.8 | 3.9 |

CAL YR 1995 Total 73.7

WTR YR 1996 Total 83.7

RAINFALL RECORDS
HAWAII, ISLAND OF OAHU--Continued

212647157521201. State Key Number 839.9 South Fork Waihee rain gage near Heeia, Oahu.

LOCATION.--Lat 21°26'47", long 157°52'12", Hydrologic Unit 20060000, 50 ft north of streamgage station 16283600, on side of a hill about 40 ft above station.

PERIOD OF RECORD.--Accumulated-rainfall station, October 13, 1963 to September 1996 (discontinued). Prior to October 1992, unpublished records are in the files of the U.S. Geological Survey.

REVISED RECORDS.--WDR HI-94-1: 1993 (Station ID).

GAGE.--Standard 8-in. National Weather Service collector with standard 8-in. can, 24 in. tall. Elevation of gage is 640 ft above mean sea level from topographic map.

REMARKS.--Records good. Cumulative rainfall read in nearest tenths of an inch.

RAINFALL ACCUMULATED (INCHES), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
INTERMITTENT READINGS

| Period | Rainfall |
|--------------------|----------|
| Aug. 24 to Nov. 06 | 12.9 |
| Nov. 06 to Jan. 10 | 12.5 |
| Jan. 10 to Apr. 17 | 22.5 |
| Apr. 17 to Jun. 27 | 9.2 |
| Jun. 27 to Oct. 08 | 22.1 |

RAINFALL RECORDS
HAWAII, ISLAND OF OAHU--Continued

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 streamgage 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 a digital recorder. A CR10 data logger was installed on February 28, 1996, replacing the digital recorder. Readings are taken every 30 min. Elevation of gage is 957 ft above mean sea level from topographic map.

REMARKS.--Records good. Rainfall recorded in tenths of an inch.

RAINFALL ACCUMULATED (INCHES), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY SUM VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 1 | .0 | .0 | .1 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | 1.7 |
| 2 | .0 | .0 | .0 | .0 | .3 | .4 | .0 | .0 | .0 | .0 | .0 | .0 |
| 3 | .0 | .4 | .0 | .0 | .0 | 3.2 | .0 | .0 | .0 | .0 | .0 | .2 |
| 4 | .0 | .1 | .0 | 1.0 | .0 | .3 | .1 | .0 | .0 | .0 | .0 | .1 |
| 5 | .0 | .0 | .0 | .8 | .0 | .2 | .9 | .0 | .0 | .1 | .0 | .0 |
| 6 | .0 | .0 | .0 | .0 | .1 | .0 | .0 | .0 | .2 | .1 | .1 | .3 |
| 7 | .2 | .0 | .4 | .3 | .0 | .0 | .0 | .0 | .2 | .1 | .0 | 1.0 |
| 8 | .2 | .1 | .1 | .0 | .0 | .0 | .0 | .0 | .6 | .0 | .0 | .1 |
| 9 | .0 | .0 | .2 | .5 | .0 | .0 | .0 | .0 | .8 | .0 | .0 | .0 |
| 10 | .0 | .0 | .0 | .1 | .5 | .0 | .2 | .0 | .1 | .0 | .1 | .0 |
| 11 | .0 | .0 | .0 | .0 | .0 | .0 | .1 | .0 | 1.2 | .1 | .1 | .0 |
| 12 | .0 | .2 | .0 | .0 | .0 | .0 | .0 | .0 | .5 | .0 | .0 | .0 |
| 13 | .0 | 1.0 | .1 | .0 | .1 | .3 | .0 | .0 | .4 | .0 | .0 | .0 |
| 14 | .0 | .1 | .0 | .0 | .4 | .0 | .2 | .0 | .0 | .0 | .0 | .0 |
| 15 | .0 | .0 | .0 | .0 | .2 | .0 | .0 | .0 | .1 | .1 | .0 | .0 |
| 16 | .0 | .0 | .0 | .3 | .0 | .0 | .0 | .0 | .0 | .0 | .1 | .2 |
| 17 | .0 | .0 | .0 | .1 | .0 | .0 | .0 | .0 | .0 | .0 | .1 | .0 |
| 18 | .0 | .0 | .0 | .0 | .0 | .0 | .1 | .0 | .0 | .0 | .0 | .0 |
| 19 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| 20 | .0 | .2 | .0 | .0 | .0 | .5 | .0 | .0 | .0 | .0 | .0 | .0 |
| 21 | .1 | .0 | .0 | .0 | .0 | .7 | .0 | .1 | .0 | .0 | .0 | .0 |
| 22 | .0 | .0 | .0 | .0 | .0 | .3 | .0 | .0 | .0 | .0 | .0 | .0 |
| 23 | .1 | .0 | .0 | .0 | .1 | .3 | .0 | .0 | .0 | .6 | .0 | .0 |
| 24 | .0 | .0 | .0 | 1.9 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| 25 | .0 | .0 | .0 | .3 | .0 | .1 | .1 | .0 | .1 | .0 | .0 | .0 |
| 26 | .6 | .1 | .0 | .0 | 1.0 | .0 | .0 | .3 | .0 | .0 | .0 | .0 |
| 27 | .0 | 1.1 | .0 | .2 | 2.0 | .0 | .0 | .0 | .0 | .1 | .0 | .0 |
| 28 | .6 | .0 | .0 | .0 | .8 | .0 | .1 | .0 | .0 | .0 | .0 | .0 |
| 29 | .0 | .0 | .1 | .0 | .0 | .0 | .3 | .0 | .3 | .0 | .1 | .0 |
| 30 | .0 | .1 | .4 | .6 | --- | .0 | .2 | .0 | .0 | .0 | .2 | .0 |
| 31 | .2 | --- | .7 | .0 | --- | .8 | --- | .0 | --- | .0 | 3.2 | --- |
| TOTAL | 2.0 | 3.4 | 2.1 | 6.1 | 5.5 | 7.1 | 2.3 | 0.4 | 4.5 | 1.2 | 4.0 | 3.6 |

CAL YR 1995 Total 24.0

WTR YR 1996 Total 42.2

RAINFALL RECORDS
HAWAII, ISLAND OF OAHU--Continued

213205157571001. State Key Number 882.3 Poamoho rain gage no. 3 near Wahiawa, Oahu.

LOCATION.--Lat 21°32'05", long 157°57'10", Hydrologic Unit 20060000, on right side of Poamoho Trail, and 0.2 mi northeast from trail marker.

PERIOD OF RECORD.--Accumulated-rainfall station, July 12, 1967 to current year. Prior to October 1992, unpublished records are in the files of the U.S. Geological Survey.

GAGE.--A 3-in. diameter, 5-ft tall aluminum non-recording gage. Elevation of gage is 1,800 ft above mean sea level from topographic map.

REMARKS.--Record poor. Cumulative rainfall read in nearest tenths of an inch.

RAINFALL ACCUMULATED (INCHES), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
INTERMITTENT READINGS

| Period | Rainfall |
|--------------------|----------|
| Aug. 29 to Nov. 22 | 32.5 |
| Nov. 22 to Feb. 16 | 23.5 |
| Feb. 16 to May 08 | 29.4 |
| May 08 to July 05 | 21.3 |
| July 05 to Oct. 10 | 26.9 |

RAINFALL RECORDS
HAWAII, ISLAND OF OAHU--Continued

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 Waihawa.

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 rain gage with a float-type system attached to a graphic recorder. Elevation of gage is 1,960 ft above mean sea level from topographic map.

REMARKS.--Record good. Rainfall recorded in hundredths of an inch.

RAINFALL ACCUMULATED (INCHES), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY SUM VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|-------|-------|------|-------|-------|-------|------|------|-------|-------|------|-------|
| 1 | .25 | 2.45 | .36 | .00 | .00 | .09 | 1.59 | .00 | .00 | .57 | .17 | .05 |
| 2 | .40 | .00 | .00 | .00 | .20 | 2.27 | .22 | .00 | .00 | 1.05 | .01 | .13 |
| 3 | .35 | 1.15 | .00 | .00 | .00 | 3.46 | .00 | .00 | .00 | .35 | .11 | .32 |
| 4 | .32 | .00 | .00 | .32 | .02 | .20 | .18 | .00 | .00 | .60 | .31 | .76 |
| 5 | .53 | .05 | .00 | .20 | .00 | .08 | .05 | .00 | .24 | 1.55 | .44 | 1.42 |
| 6 | .33 | .00 | .00 | .00 | .00 | .10 | .01 | .00 | .27 | .43 | .51 | 1.12 |
| 7 | 1.17 | .40 | .35 | .57 | .56 | .00 | .00 | .28 | 1.49 | .46 | .87 | 6.13 |
| 8 | .67 | 3.80 | .02 | .40 | .12 | .00 | .00 | .12 | .13 | .04 | .00 | .14 |
| 9 | .53 | .80 | .00 | 1.33 | .04 | .00 | .14 | .00 | .81 | .44 | .10 | .08 |
| 10 | .32 | .25 | .00 | .28 | .15 | .00 | 1.02 | .02 | .06 | .16 | .45 | .33 |
| 11 | 1.28 | .03 | .00 | .01 | .00 | .06 | .67 | .05 | .00 | .20 | 1.09 | .54 |
| 12 | 1.20 | .04 | .43 | .00 | .00 | 1.02 | .05 | .01 | .21 | .29 | .11 | .39 |
| 13 | .50 | .88 | 1.12 | .00 | .00 | .04 | .06 | .01 | .00 | .00 | .47 | .09 |
| 14 | .27 | .72 | .00 | .00 | .90 | .00 | .26 | .01 | .11 | .32 | .12 | .01 |
| 15 | .28 | .25 | .00 | .00 | .38 | .09 | .07 | .01 | .22 | .66 | .02 | .07 |
| 16 | .02 | .03 | .06 | .01 | .05 | .16 | .06 | .27 | .89 | 1.08 | .38 | .07 |
| 17 | .33 | .67 | .13 | .10 | .00 | .47 | .81 | .02 | .47 | .34 | .04 | .05 |
| 18 | .40 | .08 | .11 | .70 | .00 | .21 | .82 | .00 | 1.10 | 1.11 | .38 | .35 |
| 19 | .43 | .00 | .20 | 5.94 | .03 | .00 | .60 | .31 | .11 | 1.21 | .02 | .09 |
| 20 | .57 | .00 | .02 | 2.16 | .02 | .44 | .37 | .89 | .83 | .07 | .16 | .94 |
| 21 | .70 | .32 | .02 | .97 | .05 | .22 | .38 | .10 | .47 | 1.62 | .02 | .02 |
| 22 | .00 | .05 | .00 | .19 | .10 | .11 | .05 | .00 | .26 | .04 | .01 | .29 |
| 23 | .05 | .10 | .04 | .54 | .38 | .60 | .00 | .20 | .84 | .00 | .00 | .11 |
| 24 | .05 | .00 | .00 | 1.40 | 2.37 | .01 | .02 | .69 | .58 | .02 | .00 | .58 |
| 25 | .75 | .00 | .10 | 4.09 | 8.43 | .00 | .18 | 1.21 | .18 | .02 | .01 | .06 |
| 26 | 1.00 | .03 | .00 | .05 | 3.22 | .00 | .70 | .88 | .13 | .82 | .00 | .03 |
| 27 | .05 | .27 | .00 | .45 | 1.30 | .00 | .51 | .02 | .13 | .40 | .00 | .00 |
| 28 | 1.30 | .33 | .01 | .41 | .40 | .00 | .01 | .75 | .88 | .00 | .00 | .00 |
| 29 | .10 | .46 | .07 | .00 | .00 | .17 | .10 | .13 | 2.72 | .09 | .00 | .00 |
| 30 | 1.00 | 1.00 | 1.62 | .39 | --- | .02 | .10 | .34 | 1.78 | .01 | .08 | .00 |
| 31 | 4.75 | --- | .58 | .01 | --- | 3.19 | --- | .00 | --- | .12 | 1.52 | --- |
| TOTAL | 19.90 | 14.16 | 5.24 | 20.52 | 18.72 | 13.01 | 9.03 | 6.32 | 14.91 | 14.07 | 7.40 | 14.17 |

CAL YR 1995 Total 151.57
WTR YR 1996 Total 157.45

RAINFALL RECORDS
HAWAII, ISLAND OF OAHU--Continued

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 rain gage with a float-type system attached to a graphic recorder. Elevation is 2,480 ft above mean sea level from topographic map.

REMARKS.--Records poor. Rainfall recorded in hundredths of an inch.

RAINFALL ACCUMULATED (INCHES), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY SUM VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|-----|------|------|-------|-------|-------|-------|------|------|------|-----|-----|
| 1 | --- | --- | 1.37 | .00 | .05 | .52 | 3.58 | .00 | .00 | --- | --- | --- |
| 2 | --- | --- | .00 | .00 | .20 | 3.08 | .50 | .00 | .02 | --- | --- | --- |
| 3 | --- | --- | .00 | .00 | .02 | 4.10 | .00 | .00 | 1.37 | --- | --- | --- |
| 4 | --- | --- | .00 | .30 | .00 | .29 | .30 | .17 | b.00 | --- | --- | --- |
| 5 | --- | --- | .00 | .40 | .01 | .06 | .09 | .00 | --- | c.03 | --- | --- |
| 6 | --- | --- | .00 | .15 | .04 | .15 | .00 | .03 | --- | .39 | --- | --- |
| 7 | --- | --- | .58 | 1.24 | 1.13 | .00 | .11 | .39 | --- | .20 | --- | --- |
| 8 | --- | --- | .00 | 1.11 | .72 | .00 | .01 | .02 | --- | d.00 | --- | --- |
| 9 | --- | --- | .00 | .80 | .00 | .00 | .00 | .00 | --- | --- | --- | --- |
| 10 | --- | --- | .00 | .71 | .15 | .00 | .79 | .00 | --- | --- | --- | --- |
| 11 | --- | --- | .00 | .01 | .03 | .31 | .56 | .00 | --- | --- | --- | --- |
| 12 | --- | --- | .40 | .00 | .01 | .93 | .00 | .00 | --- | --- | --- | --- |
| 13 | --- | --- | 1.00 | .00 | .00 | .00 | .02 | .00 | --- | --- | --- | --- |
| 14 | --- | --- | .00 | .00 | .46 | .00 | .60 | .06 | --- | --- | --- | --- |
| 15 | --- | --- | .01 | .00 | .15 | .10 | .00 | .00 | --- | --- | --- | --- |
| 16 | --- | --- | .09 | .00 | .01 | .07 | .00 | .29 | --- | --- | --- | --- |
| 17 | --- | --- | .12 | .09 | .00 | .19 | .72 | .00 | --- | --- | --- | --- |
| 18 | --- | --- | .15 | .39 | .00 | .16 | .47 | .00 | --- | --- | --- | --- |
| 19 | --- | --- | .08 | 5.05 | .00 | .04 | .23 | .40 | --- | --- | --- | --- |
| 20 | --- | --- | .05 | 2.05 | .00 | .99 | .59 | .83 | --- | --- | --- | --- |
| 21 | --- | --- | .00 | 1.50 | .00 | .40 | .20 | .01 | --- | --- | --- | --- |
| 22 | --- | --- | .09 | .55 | .00 | .12 | .02 | .00 | --- | --- | --- | --- |
| 23 | --- | a.00 | .01 | .65 | .27 | .44 | .00 | .19 | --- | --- | --- | --- |
| 24 | --- | .00 | .00 | 2.90 | .78 | .00 | .08 | .41 | --- | --- | --- | --- |
| 25 | --- | .00 | .19 | 4.35 | 4.22 | .04 | .12 | .89 | --- | --- | --- | --- |
| 26 | --- | .10 | .01 | .00 | 3.38 | .01 | .78 | .91 | --- | --- | --- | --- |
| 27 | --- | .75 | .00 | .96 | 1.70 | .00 | .44 | .09 | --- | --- | --- | --- |
| 28 | --- | .25 | .00 | .39 | .94 | .00 | .86 | .50 | --- | --- | --- | --- |
| 29 | --- | .41 | .00 | .00 | .00 | .30 | .14 | .16 | --- | --- | --- | --- |
| 30 | --- | .84 | 2.00 | .42 | --- | .31 | .02 | .04 | --- | --- | --- | --- |
| 31 | --- | --- | .60 | .01 | --- | 3.62 | --- | .00 | --- | --- | --- | --- |
| TOTAL | --- | --- | 6.75 | 24.03 | 14.27 | 16.23 | 11.23 | 5.39 | --- | --- | --- | --- |

a. Partial daily record from 1200 hrs to 2400 hrs. Total accumulated rainfall from Sept. 6 (1930 hrs) to Nov. 22 (1200 hrs) is 43.35 inches, recorder stopped.

b. Partial daily record from 0001 hrs to 0215 hrs.

c. Partial daily record from 1130 hrs to 2400 hrs. Total accumulated rainfall from June 4 (0215 hrs) to July 5 (1130 hrs) is 13.7 inches.

d. Partial daily record from 0001 hrs to 0345 hrs. Total accumulated rainfall from July 8 (0345 hrs) to Oct. 10 (1255 hrs) is 29.03 inches.

RAINFALL RECORDS
HAWAII, ISLAND OF OAHU--Continued

213221157541501. State Key Number 884.3 Punaluu rain gage near Punaluu, Oahu.

LOCATION.--Lat 21°32'21", long 157°54'15", Hydrologic Unit 20060000, 4.9 mi south of Hauula School, and 1.5 mi south of USGS streamgage station on Punaluu Ditch 16302000.

PERIOD OF RECORD.--Accumulated-rainfall station, July 14, 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 with standard 8-in. can, and an auxiliary 3-in. diameter, 5 ft high measuring can. Elevation of gage is 750 ft above mean sea level from topographic map.

REMARKS.--Records fair. Cumulative rainfall read in nearest tenths of an inch.

RAINFALL ACCUMULATED (INCHES), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
INTERMITTENT READINGS

| Period | Rainfall |
|--------------------|----------|
| Aug. 16 to Nov. 28 | 25.2 |
| Nov. 28 to Jan. 24 | 17.6 |
| Jan. 24 to Apr. 26 | 22.3 |
| Apr. 26 to Jun. 28 | 16.6 |
| Jun. 28 to Oct. 22 | 24.9 |

RAINFALL RECORDS
HAWAII, ISLAND OF OAHU--Continued

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, approximately 40 ft bankward from USGS streamgage station 16296500, 1.1 mi southwest of Kahana, and 2.2 mi southwest of Swanzy Beach Park in Kaawa.

PERIOD OF RECORD.--Accumulated-rainfall station, December 23, 1958 to May 11, 1961, February 19, 1990 to June 17, 1994. Continuous-record station, May 11, 1961 to February 19, 1990, June 17, 1994 to current year. Prior to October 1992, unpublished records in files of the U.S. Geological Survey.

GAGE.--A 3-in x 5 ft tall rain can from October 1, 1993 to June 17, 1994. Rain gage was relocated in new shelter on June 17, 1994. On June 6, 1996 a GS-93 data logger was installed with a float system using an 8-in. receiver and 7 5/16-in. diameter by 4-ft tall rain can takes readings at 30-min. intervals. Elevation of gage is 95 ft above mean sea level from topographic map.

REMARKS.--Records good except for the period of no daily record, October 29 to November 13 and September 28-30 which is poor.

RAINFALL ACCUMULATED (INCHES), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY SUM VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|-----|------|-----|------|-----|------|-----|-----|-----|------|-----|-----|
| 1 | .1 | --- | .8 | .0 | .0 | .9 | .4 | .0 | .0 | .1 | .2 | .0 |
| 2 | .1 | --- | .2 | .0 | .1 | 2.4 | .5 | .0 | .0 | .4 | .0 | .0 |
| 3 | .3 | --- | .0 | .0 | .0 | 4.6 | .0 | .0 | .0 | .1 | .1 | .0 |
| 4 | .3 | --- | .0 | .2 | .0 | .2 | .3 | .4 | .0 | .2 | .1 | .3 |
| 5 | .3 | --- | .0 | .5 | .0 | .1 | .3 | .0 | .0 | .8 | .1 | .8 |
| 6 | .1 | --- | .0 | .1 | .0 | .0 | .0 | .1 | .0 | .3 | .1 | .3 |
| 7 | .5 | --- | .2 | .9 | .9 | .0 | .0 | .2 | .7 | .1 | .2 | 1.2 |
| 8 | .6 | --- | .0 | .6 | 1.1 | .0 | .0 | .5 | .2 | .0 | .0 | .2 |
| 9 | .1 | --- | .0 | 1.2 | .1 | .0 | .0 | .0 | 1.5 | .2 | .0 | .0 |
| 10 | .0 | --- | .0 | 1.0 | .0 | .0 | .6 | .0 | .0 | .0 | .2 | .0 |
| 11 | .3 | --- | .0 | .0 | .0 | .1 | .3 | .0 | .7 | .1 | .6 | .2 |
| 12 | .1 | --- | .6 | .0 | .0 | .4 | .0 | .0 | .0 | .1 | .1 | .2 |
| 13 | .0 | b1.0 | .9 | .0 | .0 | .0 | .0 | .0 | .2 | .0 | .3 | .0 |
| 14 | .0 | .7 | .0 | .0 | .1 | .0 | .1 | .1 | .0 | .1 | .0 | .2 |
| 15 | .2 | .8 | .0 | .0 | .0 | .1 | .0 | .0 | .1 | .2 | .0 | .0 |
| 16 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .1 | .5 | .3 | .1 | .2 |
| 17 | .1 | .2 | .0 | .0 | .0 | .0 | .8 | .0 | .2 | .1 | .1 | .0 |
| 18 | .1 | .1 | .0 | .4 | .0 | .1 | .5 | .0 | .9 | .1 | .0 | .1 |
| 19 | .2 | .0 | .0 | 1.3 | .0 | .0 | .3 | .2 | .0 | .3 | .0 | .0 |
| 20 | .1 | .3 | .0 | .0 | .0 | .4 | .2 | .1 | .2 | .0 | .1 | .4 |
| 21 | .5 | .6 | .0 | .1 | .0 | .7 | .1 | .1 | .1 | .3 | .0 | .0 |
| 22 | .0 | .1 | .0 | .3 | .0 | .1 | .1 | .1 | .3 | 3.2 | .0 | .1 |
| 23 | .0 | .0 | .0 | .4 | .2 | .0 | .0 | .1 | .3 | 1.7 | .0 | .1 |
| 24 | .0 | .7 | .0 | 4.0 | .1 | .0 | .1 | .1 | .2 | 1.3 | .0 | 1.2 |
| 25 | .5 | .0 | .2 | 2.8 | .7 | .0 | .1 | .2 | .0 | .0 | .0 | .2 |
| 26 | .4 | .0 | .0 | .1 | .1 | .0 | .2 | .3 | .2 | .5 | .0 | c.0 |
| 27 | .0 | .2 | .0 | .3 | 1.8 | .0 | .0 | .1 | .0 | 1.5 | .0 | --- |
| 28 | a.6 | .0 | .0 | .4 | .7 | .0 | 1.7 | .4 | .3 | .0 | .0 | --- |
| 29 | --- | .2 | .0 | .0 | .0 | .1 | .3 | .1 | 1.3 | .1 | .0 | --- |
| 30 | --- | .7 | 1.7 | .3 | --- | .1 | .0 | .0 | .4 | .0 | .0 | --- |
| 31 | --- | --- | .6 | .0 | --- | 1.1 | --- | .0 | --- | .0 | 1.9 | --- |
| TOTAL | --- | --- | 5.2 | 14.9 | 5.9 | 11.4 | 6.9 | 3.2 | 8.3 | 12.1 | 4.2 | --- |

a. Partial daily record from 0001 hrs to 2300 hrs.

b. Partial daily record from 1030 hrs to 2400 hrs. Total accumulated rainfall from Oct. 28 (2300 hrs) to Nov. 13 (1030 hrs) is 10.0 inches, recorder stopped.

c. Partial daily record from 0001 hrs to 1230 hrs. Total accumulated rainfall from Sept. 26 (1230 hrs) to Jan. 16 (1100 hrs) is greater than 32.0 inches, can overflowed.

RAINFALL RECORDS
HAWAII, ISLAND OF OAHU--Continued

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 streamgage station 16294900, 0.3 mi downstream from Waikeeke Stream, 0.7 mi west of Waikane, and 1.2 mi northwest of Waiahole School.

PERIOD OF RECORD.--Continuous-record station, February 18, 1960 (revised) to October 2, 1985, May 17, 1994 to current year. Accumulated-rainfall station, October 2, 1985 to May 17, 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 a digital recorder. A CR10 data logger was installed on June 12, 1996, replacing the digital recorder. Readings are taken every 30 min. Elevation of gage is 75 ft above mean sea level from topographic map.

REMARKS.--Records good. Daily record read in nearest tenths of an inch, October 1-21, May 18 to September 30.

RAINFALL ACCUMULATED (INCHES), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY SUM VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|-----|-----|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|
| 1 | .2 | .2 | .7 | .1 | .0 | .6 | .1 | .0 | .0 | .0 | .1 | .0 |
| 2 | .0 | .0 | .6 | .0 | .1 | 2.5 | .3 | .0 | .0 | .3 | .0 | .0 |
| 3 | .0 | 1.5 | .0 | .0 | .0 | 3.2 | .0 | .0 | .0 | .1 | .0 | .0 |
| 4 | .3 | .0 | .0 | .3 | .0 | .8 | .3 | .3 | .0 | .1 | .0 | .0 |
| 5 | .1 | .0 | .0 | .4 | .0 | .0 | .2 | .0 | .0 | .3 | .0 | .5 |
| 6 | .1 | .0 | .0 | .0 | .0 | .0 | .0 | .4 | .1 | .4 | .1 | .1 |
| 7 | .4 | .0 | .3 | 1.0 | 1.7 | .0 | .0 | .0 | .3 | .1 | .0 | .2 |
| 8 | .5 | 2.7 | .0 | .2 | 1.9 | .0 | .0 | .6 | .0 | .0 | .0 | .3 |
| 9 | .2 | .4 | .0 | .6 | .1 | .0 | .0 | .0 | 1.8 | .1 | .0 | .0 |
| 10 | .2 | .0 | .0 | .7 | .1 | .0 | .6 | .0 | .1 | .0 | .0 | .1 |
| 11 | .2 | .0 | .0 | .0 | .0 | .0 | .1 | .0 | .2 | .0 | .2 | .1 |
| 12 | .0 | .4 | .3 | .0 | .0 | .0 | .0 | .0 | .6 | .2 | .0 | .0 |
| 13 | .1 | 2.1 | .6 | .0 | .0 | .0 | .0 | .0 | .1 | .6 | .1 | .0 |
| 14 | .0 | .2 | .0 | .0 | .1 | .0 | .0 | .0 | .0 | .1 | .0 | .0 |
| 15 | .1 | .8 | .0 | .0 | .1 | .0 | .0 | .0 | .3 | .0 | .0 | .0 |
| 16 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .4 | .2 | .0 | .0 |
| 17 | .0 | .2 | .1 | .0 | .0 | .0 | .3 | .0 | .0 | .1 | .0 | .0 |
| 18 | .0 | .0 | .0 | .4 | .0 | .0 | .3 | .0 | .5 | .1 | .0 | .0 |
| 19 | .1 | .0 | .0 | .7 | .0 | .0 | .1 | .0 | .0 | .3 | .0 | .0 |
| 20 | .0 | .0 | .0 | .0 | .0 | .3 | .0 | .0 | .2 | .0 | .0 | .3 |
| 21 | .2 | .4 | .0 | .1 | .0 | .5 | .1 | .0 | .1 | .1 | .0 | .0 |
| 22 | .0 | .0 | .1 | .0 | .0 | .1 | .0 | .0 | .3 | .8 | .0 | .0 |
| 23 | .0 | .0 | .0 | .2 | .0 | .1 | .0 | .0 | .3 | .1 | .0 | .0 |
| 24 | .0 | .0 | .0 | 1.1 | .0 | .0 | .0 | .0 | .1 | 1.5 | .0 | .2 |
| 25 | .5 | .0 | .0 | 2.8 | .1 | .0 | .0 | .1 | .1 | .0 | .0 | .0 |
| 26 | .1 | .0 | .1 | .2 | .1 | .0 | .1 | .1 | .0 | .2 | .0 | .0 |
| 27 | .0 | .1 | .0 | .7 | 1.2 | .0 | .0 | .0 | .1 | 1.3 | .0 | .0 |
| 28 | .7 | .0 | .0 | .3 | 1.7 | .0 | 2.0 | .4 | .1 | .0 | .0 | .1 |
| 29 | .0 | .1 | .0 | .0 | .0 | .0 | .0 | .0 | .8 | .1 | .0 | .0 |
| 30 | .4 | .2 | 2.0 | .6 | --- | .0 | .0 | .1 | .4 | .0 | .0 | .0 |
| 31 | .6 | --- | .6 | .0 | --- | .6 | --- | .0 | --- | .0 | 2.6 | --- |
| TOTAL | 5.0 | 9.3 | 5.4 | 10.4 | 7.2 | 8.7 | 4.5 | 2.0 | 6.9 | 7.1 | 3.1 | 1.9 |

WTR YR 1996 Total 71.5

RAINFALL RECORDS
HAWAII, ISLAND OF OAHU--Continued

213725158010401. State Key Number 897.1 Kamanui 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 streamgage 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 attached to a tipping-bucket counter and graphic recorder. A CR10 data logger was installed on March 26, 1996 to record rainfall at 30-min intervals. Elevation of gage is 590 ft above mean sea level from topographic map.

REMARKS.--Records fair. Rainfall recorded in tenths of an inch.

RAINFALL ACCUMULATED (INCHES), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY SUM VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|------|------|------|-------|------|------|------|------|-------|------|------|------|
| 1 | --- | .30 | .10 | .00 | .00 | .10 | .70 | .00 | .00 | .20 | .00 | .20 |
| 2 | --- | .00 | .00 | .00 | .20 | .60 | .00 | .00 | .00 | .70 | .30 | .00 |
| 3 | a.10 | 1.30 | .00 | .00 | .00 | 2.80 | .00 | .00 | .00 | .10 | .00 | .10 |
| 4 | .00 | .00 | .00 | .20 | .00 | .30 | .00 | .00 | .00 | .50 | .00 | .10 |
| 5 | .10 | .00 | .00 | .20 | .00 | .00 | .00 | .00 | .10 | .90 | .20 | .40 |
| 6 | .30 | .00 | .00 | .20 | .00 | .00 | .00 | .00 | .10 | .20 | .50 | .70 |
| 7 | .80 | .10 | .00 | .20 | .10 | .00 | .00 | .00 | 1.20 | .40 | .10 | 2.00 |
| 8 | 1.50 | 1.70 | .10 | .10 | .10 | .00 | .00 | .20 | .00 | .00 | .00 | .00 |
| 9 | .00 | .10 | .00 | .60 | .00 | .00 | .00 | .00 | 1.40 | .10 | .20 | .10 |
| 10 | .10 | .00 | .00 | .10 | .40 | .00 | .70 | .00 | .70 | .00 | .40 | .30 |
| 11 | .30 | .00 | .00 | .00 | .00 | .00 | .70 | .00 | .00 | .00 | .60 | .40 |
| 12 | .20 | .20 | .10 | .00 | .00 | .00 | .10 | .00 | .50 | .20 | .00 | .30 |
| 13 | .10 | 1.20 | .50 | .00 | .00 | .00 | .00 | .00 | .50 | .00 | .20 | .00 |
| 14 | .00 | .30 | .00 | .00 | .30 | .00 | .10 | .00 | .00 | .10 | .00 | .00 |
| 15 | .00 | .10 | .00 | .00 | .20 | .00 | .00 | .00 | .30 | .50 | .00 | .00 |
| 16 | .00 | .10 | .00 | .00 | .00 | .00 | .00 | .10 | 4.70 | .30 | .10 | .00 |
| 17 | .10 | .00 | .00 | .00 | .00 | .10 | .80 | .00 | 1.10 | .40 | .00 | .00 |
| 18 | .10 | .00 | .00 | .10 | .00 | .10 | .90 | .00 | 1.00 | .90 | .30 | .10 |
| 19 | .10 | .00 | .00 | 1.70 | .00 | .00 | .40 | .20 | .30 | .50 | .10 | .10 |
| 20 | .60 | .10 | .00 | .00 | .00 | .30 | .40 | .40 | .40 | .00 | .00 | .20 |
| 21 | .20 | .10 | .00 | .10 | .00 | b.10 | .20 | .00 | .20 | .10 | .00 | .00 |
| 22 | .00 | .00 | .10 | .00 | .20 | --- | .20 | .00 | .20 | .20 | .00 | .00 |
| 23 | .00 | .00 | .00 | .10 | .10 | --- | .00 | .10 | .60 | .00 | .00 | .00 |
| 24 | .00 | .00 | .00 | 4.30 | .20 | --- | .10 | .30 | .50 | .00 | .00 | .10 |
| 25 | .50 | .00 | .00 | 3.30 | 1.40 | --- | .10 | .50 | .00 | .00 | .00 | .00 |
| 26 | .10 | .00 | .00 | .00 | .50 | c.00 | .20 | .20 | .00 | .30 | .00 | .00 |
| 27 | .00 | .80 | .00 | .00 | 2.40 | .00 | .00 | .00 | .10 | .30 | .00 | .00 |
| 28 | .80 | .20 | .00 | .10 | .70 | .00 | .10 | .10 | .20 | .00 | .00 | .00 |
| 29 | .00 | .40 | .00 | .00 | .00 | .00 | .50 | .30 | 2.50 | .00 | .00 | .00 |
| 30 | .60 | .10 | 1.30 | .60 | --- | .00 | .80 | .10 | 1.10 | .10 | .00 | .00 |
| 31 | .30 | --- | 1.60 | .00 | --- | .40 | --- | .00 | --- | .00 | 1.00 | --- |
| TOTAL | --- | 7.10 | 3.80 | 11.90 | 6.80 | --- | 7.00 | 2.50 | 17.70 | 7.00 | 4.00 | 5.10 |

a. Partial daily record from 1230 hrs to 2400 hrs. Total accumulated rainfall from Sept. 9 (0400 hrs) to Oct. 3 (1230 hrs) is 4.6 inches, recorder stopped.

b. Partial daily record from 0001 hrs to 1000 hrs.

c. Partial daily record from 1445 hrs to 2400 hrs. Total accumulated rainfall from Mar. 21 (1000 hrs) to Mar. 26 (1445 hrs) is 0.2 inches.

RAINFALL RECORDS
HAWAII, ISLAND OF OAHU--Continued

213608158011101. State Key Number 897.9 Pupukea Road rain gage at altitude 1,160 ft near Haleiwa, Oahu (formerly published as Pupukea Road rain gage at altitude 1,600 ft near Haleiwa, Oahu).

LOCATION.--Lat 21°36'08", long 158°01'11", Hydrologic Unit 20060000, 4.3 mi southeast of Maunawai, 5.5 mi east of Haleiwa Beach Park, and 400 ft left of the road on the ridge.

PERIOD OF RECORD.--Continuous-record station, November 1, 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 collector attached to a 8-in. storage can with a recording float-type system. Elevation of gage is 1,160 ft above mean sea level from topographic map.

REMARKS.--Records good. Rainfall recorded in 0.12 of an inch.

RAINFALL ACCUMULATED (INCHES), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY SUM VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------------|-------------|------|------|------|------|------|------|------|-------|------|------|------|
| 1 | .00 | .24 | .12 | .00 | .00 | .12 | .36 | .00 | .00 | .36 | .12 | .48 |
| 2 | .00 | .00 | .36 | .00 | .36 | .60 | .12 | .00 | .00 | .48 | .00 | .12 |
| 3 | .36 | 1.68 | .00 | .00 | .00 | 2.04 | .00 | .00 | .00 | .24 | .00 | .24 |
| 4 | .12 | .00 | .00 | .12 | .00 | .24 | .00 | .24 | .00 | .72 | .00 | .00 |
| 5 | .12 | .00 | .00 | .48 | .00 | .24 | .00 | .00 | .12 | .96 | .12 | .00 |
| 6 | .36 | .00 | .00 | .12 | .00 | .12 | .00 | .00 | .12 | .36 | .24 | .00 |
| 7 | .96 | .12 | .00 | .48 | .12 | .00 | .00 | .00 | 1.08 | .96 | .00 | .00 |
| 8 | .96 | 1.32 | .00 | .12 | .12 | .00 | .00 | .12 | .00 | .00 | .00 | .00 |
| 9 | .12 | .00 | .00 | .60 | .00 | .00 | .00 | .00 | 1.20 | .00 | .36 | .12 |
| 10 | .12 | .00 | .00 | .12 | .24 | .00 | .48 | .00 | .24 | .12 | .12 | .00 |
| 11 | .36 | .00 | .00 | .00 | .00 | .12 | .72 | .00 | .24 | .00 | .24 | .00 |
| 12 | .24 | .12 | .24 | .00 | .00 | .00 | .12 | .00 | .72 | .36 | .12 | .00 |
| 13 | .00 | .84 | .48 | .00 | .00 | .00 | .00 | .00 | .84 | .00 | .00 | .00 |
| 14 | .00 | .36 | .00 | .00 | .48 | .00 | .36 | .00 | .00 | .12 | .00 | .00 |
| 15 | .00 | .00 | .00 | .00 | .12 | .00 | .00 | .00 | .36 | .36 | .12 | .00 |
| 16 | .00 | .00 | .00 | .00 | .00 | .12 | .00 | .36 | .48 | .72 | .12 | .00 |
| 17 | .12 | .00 | .12 | .12 | .00 | .24 | .48 | .00 | .00 | .24 | .12 | .00 |
| 18 | .00 | .00 | .00 | .12 | .00 | .12 | .84 | .00 | .60 | 1.08 | .00 | .00 |
| 19 | .24 | .00 | .00 | 1.20 | .00 | .00 | .36 | .00 | .12 | .72 | .00 | .00 |
| 20 | .36 | .12 | .00 | .00 | .00 | .36 | .12 | .36 | .72 | .00 | .00 | .00 |
| 21 | .12 | .00 | .00 | .12 | .00 | .24 | .48 | .00 | .36 | .00 | .00 | .00 |
| 22 | .00 | .00 | .00 | .00 | .24 | .12 | .12 | .00 | .36 | .48 | .00 | .00 |
| 23 | .00 | .00 | .00 | .00 | .12 | .36 | .00 | .00 | .72 | .12 | .00 | .00 |
| 24 | .00 | .00 | .00 | 2.40 | .24 | .00 | .12 | .12 | .36 | .00 | .00 | .00 |
| 25 | .24 | .00 | .00 | 3.00 | .96 | .00 | .12 | .36 | .12 | .00 | .00 | .00 |
| 26 | .00 | .00 | .00 | .00 | .48 | .00 | .12 | .00 | .00 | .24 | .00 | .00 |
| 27 | .00 | .60 | .00 | .00 | 1.68 | .00 | .00 | .00 | .00 | .48 | .00 | .00 |
| 28 | .84 | .00 | .00 | .00 | .48 | .00 | .00 | .12 | .36 | .00 | .00 | .00 |
| 29 | .00 | .24 | .00 | .00 | .12 | .00 | .48 | .36 | 3.24 | .00 | .00 | .00 |
| 30 | .36 | .24 | .84 | .36 | --- | .00 | .84 | .24 | .84 | .00 | 1.20 | .00 |
| 31 | 1.32 | --- | 1.32 | .00 | --- | .60 | --- | .00 | --- | .00 | .48 | --- |
| TOTAL | 7.32 | 5.88 | 3.48 | 9.36 | 5.76 | 5.64 | 6.24 | 2.28 | 13.20 | 9.12 | 3.36 | 0.96 |
| CAL YR 1995 | TOTAL 65.52 | | | | | | | | | | | |
| WTR YR 1996 | TOTAL 72.60 | | | | | | | | | | | |

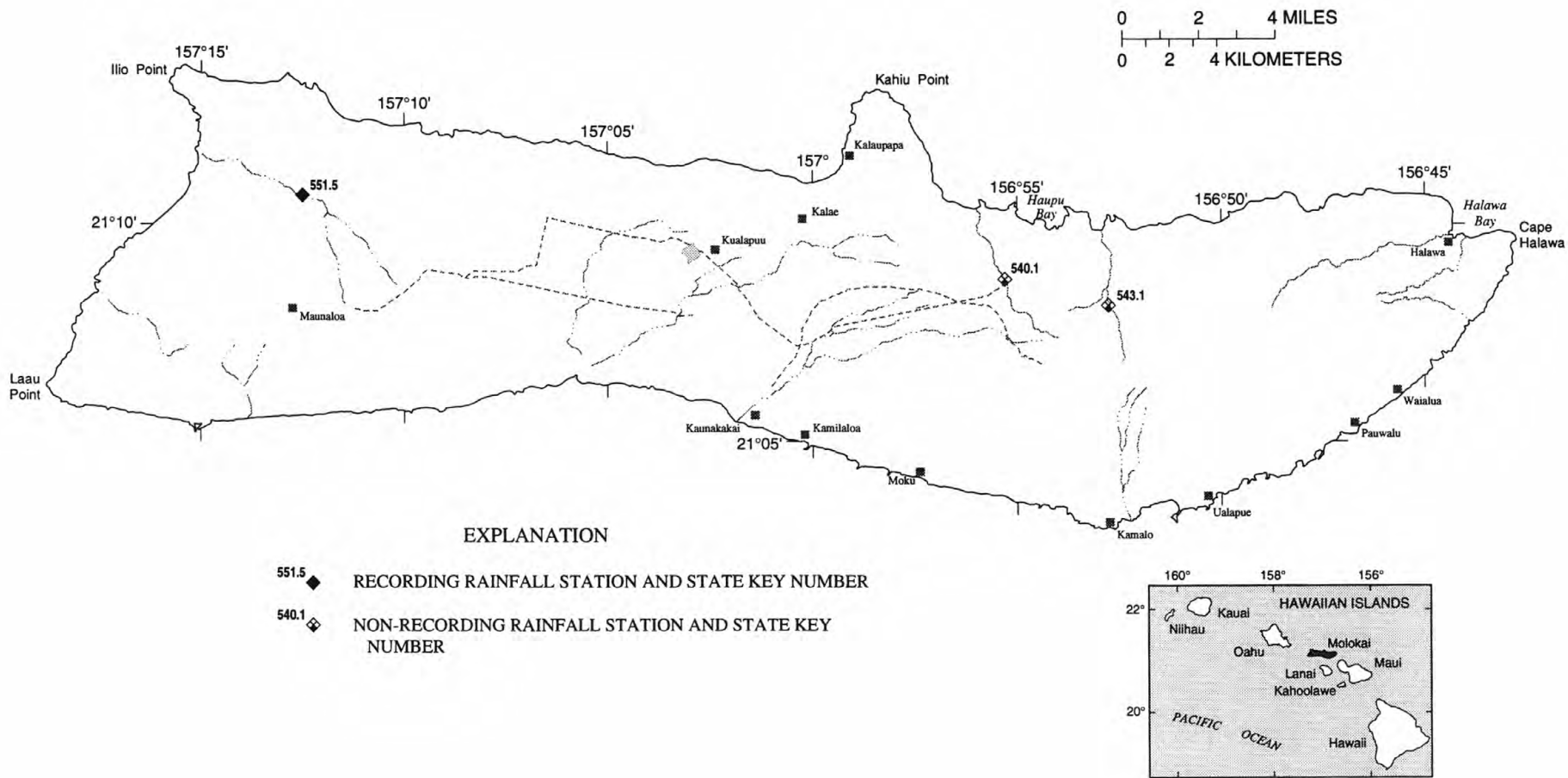


Figure 23. Locations of rainfall stations on Molokai.

RAINFALL RECORDS
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 left bank near USGS streamgage 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.--Standard rain gage with reduced 1:2 catchment. Elevation of gage is 900 ft from topographic map.

REMARKS.--Records good. Cumulative rainfall read in nearest tenths of an inch.

RAINFALL ACCUMULATED (INCHES), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
INTERMITTENT READINGS

| PERIOD | RAINFALL |
|--------------------|----------|
| Aug. 16 to Oct. 24 | 8.4 |
| Oct. 24 to Dec. 12 | 19.8 |
| Dec. 12 to Feb. 06 | 15.6 |
| Feb. 06 to Mar. 26 | 14.4 |
| Mar. 26 to May 14 | 15.0 |
| May 14 to Jul. 10 | 12.0 |
| Jul. 10 to Sep. 18 | 7.2 |
| Sep. 18 to Nov. 05 | 1.2 |

210807156524601. State Key Number 543.1 Pelekunu rain gage at altitude 700 ft near Kalaupapa, Molokai.

LOCATION.--Lat 21°08'07", long 156°52'46", Hydrologic Unit 20050000, on Puu Hoi Ridge, 2.0 mi south of former village of Pelekunu, and 5.7 mi north of Kamalo.

PERIOD OF RECORD.--1968 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.--Standard rain gage with reduced 1:2 catchment. Elevation of gage is 700 ft from topographic map.

REMARKS.--Records good. Cumulative rainfall read in nearest tenths of an inch.

RAINFALL ACCUMULATED (INCHES), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
INTERMITTENT READINGS

| Period | Rainfall |
|--------------------|----------|
| Aug. 22 to Dec. 06 | 20.8 |
| Dec. 06 to Feb. 08 | 17.0 |
| Feb. 08 to May 02 | 23.4 |
| May 02 to Jul. 19 | 18.0 |
| Jul. 19 to Oct. 25 | 6.2 |

RAINFALL RECORDS
HAWAII, ISLAND OF MOLOKAI--Continued

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, in the USGS streamgage 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.--Standard 8-in. National Weather Service rain gage with recording tipping bucket attachment. Elevation of gage is 380 ft from topographic map.

REMARKS.--Records poor. Rainfall recorded in tenths of an inch.

RAINFALL ACCUMULATED (INCHES), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY SUM VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 1 | .0 | --- | --- | .0 | .0 | .0 | .0 | .0 | .0 | .0 | --- | --- |
| 2 | .0 | --- | --- | .0 | .3 | .2 | .0 | .0 | .0 | .0 | --- | --- |
| 3 | .0 | --- | --- | .0 | .0 | 3.6 | .0 | .0 | .0 | .0 | --- | --- |
| 4 | .0 | --- | --- | .0 | .0 | .6 | .0 | .0 | .0 | .3 | --- | --- |
| 5 | .0 | --- | --- | .9 | .0 | .0 | .3 | .3 | .0 | .9 | --- | --- |
| 6 | .0 | --- | --- | .0 | .0 | .0 | .0 | .0 | .0 | .0 | --- | --- |
| 7 | .0 | --- | --- | .6 | .1 | .0 | .0 | .0 | .1 | .3 | --- | --- |
| 8 | .0 | --- | --- | .0 | .0 | .0 | .0 | .0 | .0 | c.0 | --- | --- |
| 9 | .0 | --- | --- | .0 | .0 | .0 | .0 | .0 | 1.5 | --- | --- | --- |
| 10 | .0 | --- | --- | .6 | .2 | .0 | .0 | .0 | .0 | --- | --- | --- |
| 11 | .0 | --- | b.0 | .0 | .0 | .0 | .0 | .0 | .2 | --- | --- | --- |
| 12 | .0 | --- | .0 | .0 | .0 | .0 | .3 | .0 | .0 | --- | --- | --- |
| 13 | .0 | --- | .0 | .0 | .0 | .0 | .0 | .0 | .0 | --- | --- | --- |
| 14 | .0 | --- | .0 | .0 | .2 | .0 | .0 | .0 | .0 | --- | --- | --- |
| 15 | .0 | --- | .0 | .0 | .0 | .0 | .0 | .0 | .1 | --- | --- | --- |
| 16 | .0 | --- | .0 | .0 | .0 | .0 | .0 | .0 | .2 | --- | --- | d.0 |
| 17 | .0 | --- | .0 | .0 | .0 | .0 | .0 | .0 | .0 | --- | --- | .0 |
| 18 | .0 | --- | .0 | .1 | .0 | .0 | .3 | .0 | .0 | --- | --- | .0 |
| 19 | .0 | --- | .0 | .0 | .0 | .0 | .0 | .0 | .0 | --- | --- | .0 |
| 20 | .0 | --- | .0 | .0 | .0 | .0 | .0 | .0 | .0 | --- | --- | .0 |
| 21 | .0 | --- | .0 | .0 | .0 | .3 | .0 | .0 | .0 | --- | --- | .0 |
| 22 | .0 | --- | .0 | .0 | .0 | .0 | .0 | .0 | .0 | --- | --- | .0 |
| 23 | a.2 | --- | .0 | .2 | .0 | .1 | .0 | .0 | .1 | --- | --- | .0 |
| 24 | --- | --- | .0 | .1 | .0 | .0 | .0 | .0 | .2 | --- | --- | .0 |
| 25 | --- | --- | 2.0 | 1.0 | .0 | .0 | .0 | .0 | .0 | --- | --- | .0 |
| 26 | --- | --- | .0 | .2 | .0 | .0 | .0 | .0 | .0 | --- | --- | .0 |
| 27 | --- | --- | .0 | .0 | 1.4 | .0 | .8 | .0 | .0 | --- | --- | .0 |
| 28 | --- | --- | .0 | .0 | .7 | .0 | .0 | .0 | .0 | --- | --- | .0 |
| 29 | --- | --- | .0 | .0 | .0 | .0 | .1 | .0 | .3 | --- | --- | .0 |
| 30 | --- | --- | .2 | .6 | --- | .0 | .9 | .0 | .1 | --- | --- | .0 |
| 31 | --- | --- | 2.3 | .0 | --- | .5 | --- | .0 | --- | --- | --- | --- |
| TOTAL | --- | --- | --- | 4.3 | 2.9 | 5.3 | 2.7 | 0.3 | 2.8 | --- | --- | --- |

a. Partial daily record from 0001 hrs to 1440 hrs.

b. Partial daily record from 1525 hrs to 2400 hrs. Total accumulated rainfall from Oct. 23 (1440 hrs) to Dec. 11 (1525 hrs) is 1.3 inches.

c. Partial daily record from 0001 hrs to 1330 hrs.

d. Partial daily record from 1240 hrs to 2400 hrs. Total accumulated rainfall from July 8 (1330 hrs) to Sept. 16 (1240 hrs) is 1.9 inches.

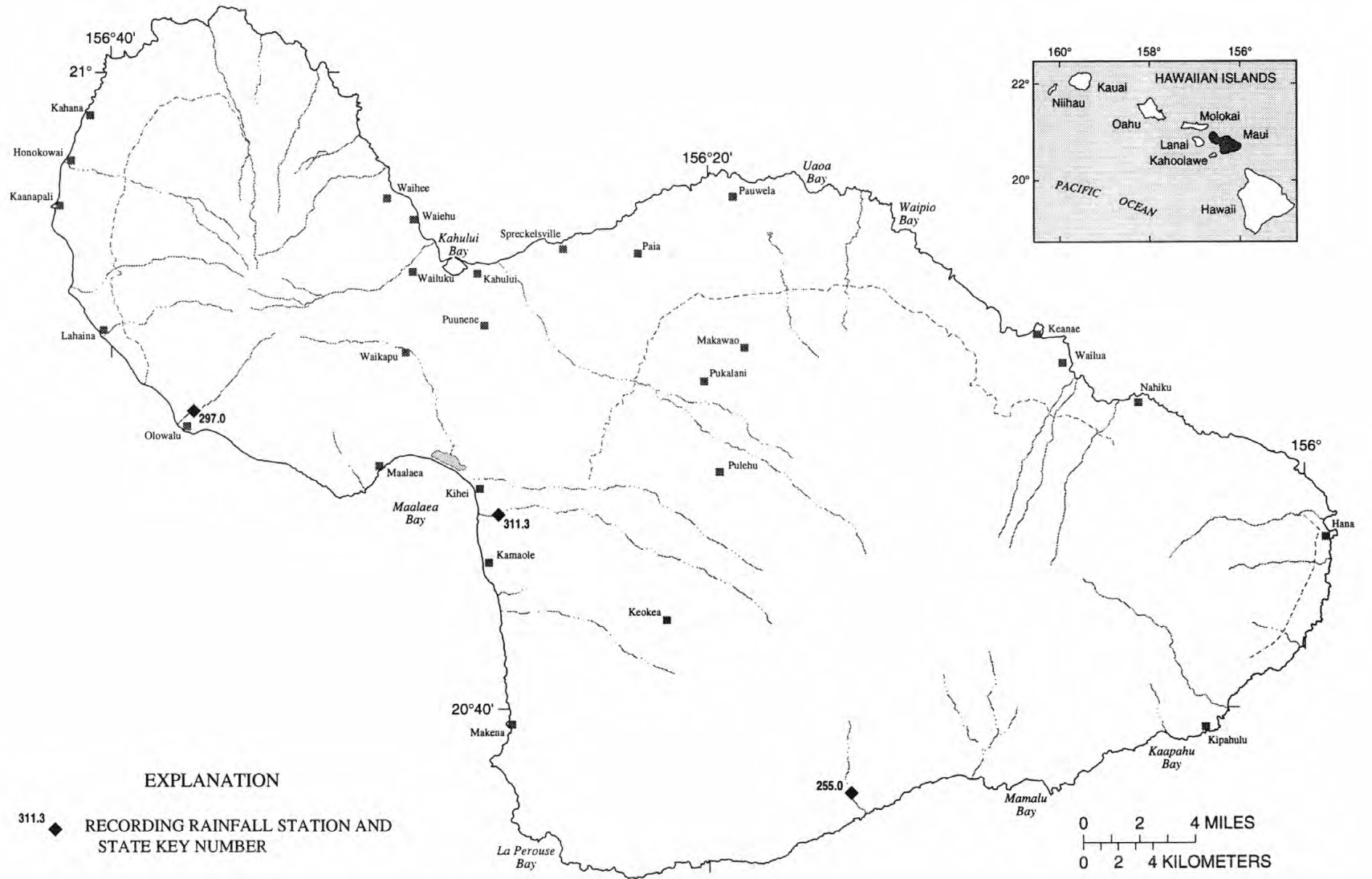


Figure 24. Locations of rainfall stations on Maui.

RAINFALL RECORDS
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, in USGS streamgage 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.--Standard 8-in. National Weather Service rain gage with recording tipping bucket attachment. Elevation of gage is 740 ft from topographic map.

REMARKS.--Records good. Rainfall recorded in tenths of an inch.

RAINFALL ACCUMULATED (INCHES), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY SUM VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 1 | .0 | .0 | .3 | .0 | .0 | .0 | .0 | .7 | .0 | .0 | .0 | .1 |
| 2 | .0 | .0 | .0 | .0 | .0 | .0 | .2 | .0 | .0 | .0 | .0 | .0 |
| 3 | .0 | .0 | .0 | .0 | .0 | 2.4 | .0 | .0 | .0 | .0 | .0 | .0 |
| 4 | .0 | .0 | .0 | .0 | .0 | 1.4 | .0 | .0 | .0 | .0 | .0 | .0 |
| 5 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| 6 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .5 |
| 7 | .0 | .3 | 3.0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| 8 | .0 | .0 | .1 | .1 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| 9 | .0 | .1 | .0 | 1.7 | .0 | .0 | .0 | .0 | 1.3 | .0 | .0 | .0 |
| 10 | .0 | .0 | .0 | .0 | .5 | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| 11 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| 12 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| 13 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| 14 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| 15 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .1 |
| 16 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .6 |
| 17 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| 18 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| 19 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| 20 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| 21 | .0 | .0 | .2 | .1 | .0 | .1 | .0 | .0 | .0 | .0 | .0 | .0 |
| 22 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .1 | .0 | .0 |
| 23 | .0 | .0 | .0 | .1 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| 24 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| 25 | .0 | .0 | .0 | 1.8 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .2 |
| 26 | .0 | .0 | .0 | .7 | .2 | .0 | .0 | .0 | .0 | .1 | .0 | .0 |
| 27 | .0 | .1 | .1 | .0 | 2.2 | .0 | .0 | .0 | .0 | .3 | .0 | .0 |
| 28 | .0 | .6 | .0 | .0 | .2 | .0 | .1 | .0 | .0 | .0 | .0 | .0 |
| 29 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| 30 | .0 | .1 | .8 | 1.6 | --- | .0 | .1 | .0 | .0 | .0 | .2 | .0 |
| 31 | .0 | --- | 1.2 | .4 | --- | .0 | --- | .0 | --- | .0 | .3 | --- |
| TOTAL | 0.0 | 1.2 | 5.7 | 6.5 | 3.1 | 3.9 | 0.4 | 0.7 | 1.3 | 0.5 | 0.5 | 1.5 |

CAL YR 1995 Total 22.8
WTR YR 1996 Total 25.3

RAINFALL RECORDS
HAWAII, ISLAND OF MAUI--Continued

204923156371501. State Key Number 297.0 Olowalu rain gage at Olowalu, Maui.

LOCATION.--Lat 20°49'23 " , long 156°37'15", Hydrologic Unit 20020000, in USGS streamgage station 16646200 on downstream side of center pier of plantation road bridge, 0.6 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.--Standard 8-in. National Weather Service rain gage with recording tipping bucket attachment. Elevation of gage is 130 ft from topographic map.

REMARKS.--Records good. Rainfall recorded in tenths of an inch.

RAINFALL ACCUMULATED (INCHES), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
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 |
| 2 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| 3 | .0 | .0 | .0 | .0 | .0 | .5 | .0 | .0 | .0 | .0 | .0 | .0 |
| 4 | .0 | .0 | .0 | .1 | .0 | .6 | .0 | .0 | .0 | .0 | .0 | .0 |
| 5 | .0 | .0 | .0 | .4 | .0 | .0 | .7 | .0 | .0 | .0 | .0 | .0 |
| 6 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| 7 | .0 | .0 | .5 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .6 |
| 8 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .4 | .0 | .0 | .0 | .0 |
| 9 | .0 | .0 | .1 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| 10 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| 11 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| 12 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| 13 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| 14 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| 15 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| 16 | .0 | .0 | .0 | .1 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| 17 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| 18 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| 19 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| 20 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| 21 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| 22 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| 23 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| 24 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| 25 | .0 | .0 | .0 | .3 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| 26 | .0 | .0 | .0 | .2 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| 27 | .0 | .0 | .0 | .0 | 1.2 | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| 28 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| 29 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| 30 | .0 | .0 | 1.3 | .2 | --- | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| 31 | .0 | --- | .6 | .2 | --- | .0 | --- | .0 | --- | .0 | .2 | --- |
| TOTAL | 0.0 | 0.0 | 2.5 | 1.5 | 1.2 | 1.1 | 0.7 | 0.4 | 0.0 | 0.0 | 0.2 | 0.6 |

WTR YR 1996 Total 8.2

RAINFALL RECORDS
HAWAII, ISLAND OF MAUI--Continued

204606156270301. State Key Number 311.3 Kulanihakoi rain gage near Kihei, Maui.

LOCATION.--Lat 20°46'06" N, long 156°27'03" W, Hydrologic Unit 20020000, in USGS streamgage 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.--Standard 8-in. National Weather Service rain gage with recording tipping bucket attachment. Elevation of gage is 35 ft from topographic map.

REMARKS.--Records good. Rainfall recorded in tenths of an inch.

RAINFALL ACCUMULATED (INCHES), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
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 |
| 2 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| 3 | .0 | .0 | .0 | .0 | .0 | .9 | .0 | .0 | .0 | .0 | .0 | .0 |
| 4 | .0 | .0 | .0 | .0 | .0 | .1 | .0 | .0 | .0 | .0 | .0 | .0 |
| 5 | .0 | .0 | .0 | .3 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| 6 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| 7 | .0 | .0 | 1.0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| 8 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| 9 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| 10 | .0 | .0 | .0 | .0 | .3 | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| 11 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| 12 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| 13 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| 14 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| 15 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| 16 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| 17 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| 18 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| 19 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| 20 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| 21 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| 22 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| 23 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| 24 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| 25 | .0 | .0 | .0 | .5 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| 26 | .0 | .0 | .1 | .3 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| 27 | .0 | .0 | .0 | .0 | .7 | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| 28 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| 29 | .2 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| 30 | .0 | .0 | 1.5 | .6 | --- | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| 31 | .0 | --- | 1.0 | .2 | --- | .0 | --- | .0 | --- | .0 | .0 | --- |
| TOTAL | 0.2 | 0.0 | 3.6 | 1.9 | 1.0 | 1.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

CAL YR 1995 Total 9.8
WTR YR 1996 Total 7.7

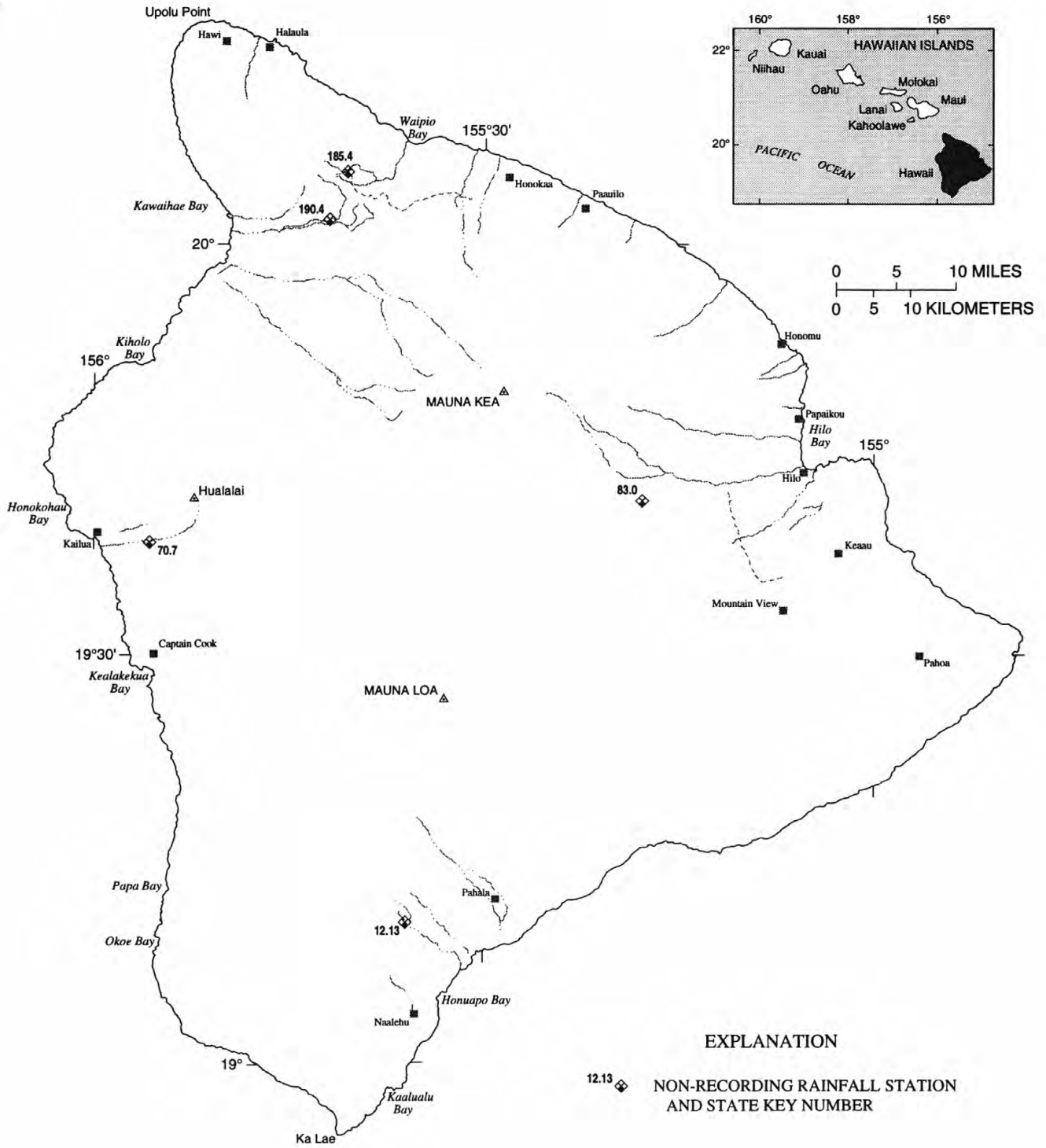


Figure 25. Locations of rainfall stations on Hawaii.

RAINFALL RECORDS
HAWAII, ISLAND OF HAWAII

191027155355801. State Key Number 12.13 Hilea Gulch Tributary rain gage near Honuapo, Hawaii.

LOCATION.--Lat 19°10'27", long 155°35'58", Hydrologic Unit 20010000, at USGS streamgage station 16764000, 6.6 mi northwest of Honuapo, and 6.7 mi west of Punaluu.

PERIOD OF RECORD.--1967 to current year. Prior to October 1992, unpublished records are in the files of the U.S. Geological Survey.

GAGE.--Standard 8-in. National Weather Service nonrecording rain gage. Elevation of gage is 2,940 ft from topographic map.

REMARKS.--Records good. Cumulative rainfall read in nearest tenths of an inch.

RAINFALL ACCUMULATED (INCHES), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
INTERMITTENT READINGS

| Period | Rainfall |
|--------------------|-------------------|
| Oct. 01 to Dec. 01 | 15.5 estimate (a) |
| Dec. 01 to Dec. 31 | 6.0 estimate (b) |
| Jan. 01 to Feb. 07 | 12.5 estimate (b) |
| Feb. 07 to Apr. 15 | 21.5 |
| Apr. 15 to Jun. 14 | 17.1 |
| Jun. 14 to Aug. 09 | 18.6 |
| Aug. 09 to Sep. 30 | 18.7 estimate (c) |

WTR YR 1996 Total 109.9 inches

193812155554501. State Key Number 70.7 Waiaha rain gage at Luawai, near Holualoa, Hawaii.

LOCATION.--Lat 19°38'12", long 155°55'45", Hydrologic Unit 20010000, 20 ft downstream of recording crest gage Waiaha Stream at Luawai, near Holualoa (16759300) on right bank, 1.8 mi northeast of Holualoa School, and 4.2 mi southeast of Honokohau School.

PERIOD OF RECORD.--1960 to current year. Prior to October 1992, unpublished records are in the files of the U.S. Geological Survey.

GAGE.--Standard 8-in. National Weather Service nonrecording rain gage. Elevation of gage is 2,580 ft from topographic map.

REMARKS.--Records fair. Cumulative rainfall read in nearest tenths of an inch.

RAINFALL ACCUMULATED (INCHES), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
INTERMITTENT READINGS

| Period | Rainfall |
|--------------------|-------------------|
| Oct. 01 to Dec. 08 | 2.3 estimate (d) |
| Dec. 08 to Dec. 31 | 1.0 estimate (e) |
| Jan. 01 to Feb. 27 | 5.8 estimate (e) |
| Feb. 27 to May 15 | 8.6 |
| May 15 to Jun. 22 | 5.7 |
| Jun. 22 to Aug. 20 | 17.2 |
| Aug. 20 to Sep. 30 | 10.4 estimate (f) |

WTR YR 1996 Total 51.0 inches

- a. Estimated value based on accumulation reading of 18.5 inches from Sept. 15 to Dec. 1, 1995.
- b. Estimated value based on accumulation reading of 18.5 inches from Dec. 1, 1995 to Feb. 7, 1996.
- c. Estimated value based on accumulation reading of 18.7 inches from Aug. 9 to Oct. 18, 1996.
- d. Estimated value based on accumulation reading of 3.3 inches from Sept. 18 to Dec. 8, 1995.
- e. Estimated value based on accumulation reading of 6.8 inches from Dec. 8, 1995 to Feb. 27, 1996.
- f. Estimated value based on accumulation reading of 11.4 inches from Aug. 20 to Oct. 11, 1996.

RAINFALL RECORDS
HAWAII, ISLAND OF HAWAII--Continued

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 good. Cumulative rainfall read in nearest tenths of an inch. Some rain fell between September 12-30, 1995 and some fell between October 1-31, 1996.

RAINFALL ACCUMULATED (INCHES), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
INTERMITTENT READINGS

| Period | Rainfall |
|---------------------|----------|
| Sept. 12 to Oct. 16 | 7.9 |
| Oct. 16 to Feb. 01 | 14.0 |
| Feb. 01 to Mar. 12 | 22.2 |
| Mar. 12 to May 15 | 2.5 |
| May 15 to July 05 | 2.4 |
| July 05 to Aug. 30 | 2.0 |
| Aug. 30 to Oct. 31 | 2.2 |

200517155404201. State Key Number 185.4 Upper Hamakua Ditch rain gage below Kawaiki Stream near Kamuela, Hawaii.

LOCATION.--Lat 20°05'17", long 155°40'42", Hydrologic Unit 20010000, 15 ft from USGS streamgage station 16720500 on right bank, and 800 ft downstream of Kawaiki Stream.

PERIOD OF RECORD.--1964 to current year. Prior to October 1992, unpublished records are in the files of the U.S. Geological Survey.

GAGE.--Standard 8-in. National Weather Service nonrecording rain gage. Elevation of gage is 4,020 ft from topographic map.

REMARKS.--Records fair. Cumulative rainfall read in nearest tenths of an inch.

RAINFALL ACCUMULATED (INCHES), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
INTERMITTENT READINGS

| Period | Rainfall |
|--------------------|-------------------|
| Oct. 01 to Dec. 05 | 37.6 estimate (a) |
| Dec. 05 to Dec. 31 | 6.0 estimate (b) |
| Jan. 01 to Feb. 13 | 6.9 estimate (b) |
| Feb. 13 to Apr. 09 | 44.9 |
| Apr. 09 to Jun. 11 | 33.4 |
| Jun. 11 to Aug. 06 | 27.4 |
| Aug. 06 to Sep. 30 | 15.2 estimate (c) |

WTR YR 1996 Total 171.4 inches

a. Actual reading Sep. 06 to Dec. 05 = 40.6 inches
b. Actual reading Dec. 05 to Feb. 13 = 12.9 inches
c. Actual reading Aug. 06 to Oct. 23 = 16.2 inches

RAINFALL RECORDS
HAWAII, ISLAND OF HAWAII--Continued

200148155420501. State Key Number 190.4 Keanuimano 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 Highway 19 and 25, and 2.0 mi west of Kamuela.

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 fair. Cumulative rainfall read in nearest tenths of an inch.

RAINFALL ACCUMULATED (INCHES), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
INTERMITTENT READINGS

| Period | Rainfall |
|--------------------|------------------|
| Oct. 01 to Oct. 13 | 0.0 |
| Oct. 13 to Dec. 04 | 0.0 |
| Dec. 04 to Dec. 31 | 0.0 estimate (a) |
| Jan. 01 to Feb. 15 | 5.4 estimate (a) |
| Feb. 15 to Apr. 10 | 7.4 |
| Apr. 10 to Jun. 12 | 3.0 |
| Jun. 12 to Aug. 08 | 0.2 |
| Aug. 08 to Sep. 30 | 0.0 |

WTR YR 1996 Total 16.0 inches

a. Estimated value based on accumulation reading of 5.4 inches from Dec. 4, 1995 to Feb. 15, 1996.

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CONVERSION FACTORS AND VERTICAL DATUM

| Multiply | By | To obtain |
|--|------------------------|----------------------------|
| <i>Length</i> | | |
| inch (in.) | 2.54×10^1 | millimeter |
| | 2.54×10^{-2} | meter |
| foot (ft) | 3.048×10^{-1} | meter |
| mile (mi) | 1.609×10^0 | kilometer |
| <i>Area</i> | | |
| acre | 4.047×10^3 | square meter |
| | 4.047×10^{-1} | square hectometer |
| | 4.047×10^{-3} | square kilometer |
| square mile (mi ²) | 2.590×10^0 | square kilometer |
| <i>Volume</i> | | |
| gallon (gal) | 3.785×10^0 | liter |
| | 3.785×10^0 | cubic decimeter |
| | 3.785×10^{-3} | cubic meter |
| million gallons (Mgal) | 3.785×10^3 | cubic meter |
| | 3.785×10^{-3} | cubic hectometer |
| cubic foot (ft ³) | 2.832×10^1 | cubic decimeter |
| | 2.832×10^{-2} | cubic meter |
| cubic-foot-per-second day [(ft ³ /s) d] | 2.447×10^3 | cubic meter |
| | 2.447×10^{-3} | cubic hectometer |
| acre-foot (acre-ft) | 1.233×10^3 | cubic meter |
| | 1.233×10^{-3} | cubic hectometer |
| | 1.233×10^{-6} | cubic kilometer |
| <i>Flow</i> | | |
| cubic foot per second (ft ³ /s) | 2.832×10^1 | liter per second |
| | 2.832×10^1 | cubic decimeter per second |
| | 2.832×10^{-2} | cubic meter per second |
| gallon per minute (gal/min) | 6.309×10^{-2} | liter per second |
| | 6.309×10^{-2} | cubic decimeter per second |
| | 6.309×10^{-5} | cubic meter per second |
| million gallons per day (Mgal/d) | 4.381×10^1 | cubic decimeter per second |
| | 4.381×10^{-2} | cubic meter per second |
| <i>Mass</i> | | |
| ton (short) | 9.072×10^{-1} | megagram or metric ton |

Sea level: In this report “sea level” refers to the National Geodetic Vertical Datum of 1929 (NGVD of 1929)—a geodetic datum derived from a general adjustment for the first-order level nets of both the United States and Canada, formerly called Sea Level Datum of 1929.

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