STATISTICAL SUMMARY OF HYDROLOGIC AND WATER-QUALITY DATA FROM THE NORTH HALAWA, HAIKU, AND KAMOOALII DRAINAGE BASINS, OAHU, HAWAII, WATER YEARS 1983-89

By Michael F. Wong and Barry R. Hill

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CONVERSION FACTORS, VERTICAL DATUM, AND ABBREVIATIONS

Multiply	By	To obtain
acre	4,047	square meter
acre-foot (acre-ft)	1,233	cubic meter
acre-foot per year (acre-ft/yr)	1,233	cubic meter per year
cubic foot per second (ft^3/s)	0.02832	cubic meter per second
cubic foot per second day $(ft^3/s)d$	0.02832	cubic meter per second day
cubic foot per second day per square mile $[(ft^3/s)d/mi^2]$	0.01093	cubic meter per second day per square kilometer
foot (ft)	0.3048	meter
inch (in.)	2.54	centimeter
inch per year (in/yr)	2.54	centimeter per year
mile (mi)	1.609	kilometer
square mile (mi^2)	2.590	square kilometer
ton	0.9072	megagram
ton per square mile (ton/mi^2)	0.3503	megagram per square kilometer

Air temperature is given in degrees Fahrenheit (°F), which can be converted to degrees Celsius (°C) by using the equation:

Temp. °C = (temp. °F-32)/1.8

Water temperature is given in degrees Celsius (°C), which can be converted to degrees Fahrenheit (°F) by using the equation:

Temp. °F = 1.8 temp. °C + 32

Abbreviations used: μS/cm @ 25°C, microsiemens per centimeter at 25°C
NTU, nephelometric turbidity units
0.7 μm-MF, 0.7-micron membrane-filter method
mg/L, milligrams per liter

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ABSTRACT

This report contains a statistical summary of rainfall, streamflow, sediment, and water-quality data collected from the North Halawa, Haiku, and Kamooalii drainage basins. These data were collected as part of a study to determine the effects of the construction of the H-3 highway. In addition to the data summary, the methods of data collection are described. Data collected between water years 1983 and 1989 at six stream-gaging stations, four stream water-quality stations, two water-quality stations located on a wildlife pond, and at Waimaluhia Reservoir are included. Physiographic data for all basins defined by the 10 stream stations as well as land-use and land-cover descriptions of the North Halawa, Haiku, and Kamooalii drainage basins are given. Areas for the 10 drainage basins ranged from 0.34 to 4.01 square miles. Monthly rainfall data from five of the stream-gaging stations, total annual streamflow data from six of the stream-gaging stations, and annual average suspended-sediment concentrations, loads, and yields from five of the stream-gaging stations are presented. Water-quality data are statistically summarized for the six stream-gaging stations and four water-quality stations as well as the two stations at the wildlife pond. Bed-altitude data and bathymetric contour maps are presented for Waimaluhia Reservoir. Calculated volumes from the bathymetric contour maps show the reservoir being depleted at 1.2 acre-feet per year. This value is less than the 2.0 acre-feet per year design depletion rate.

INTRODUCTION

Background

The construction of a new highway across the Koolau Range on the island of Oahu, Hawaii (fig. 1) has raised concerns over the potential effects of highway construction on streamflow, sediment transport, and water-quality of surface water in the drainage basins affected by construction. In 1983, the U.S. Geological Survey, in cooperation with the State of Hawaii Department of Transportation, began a study of the streamflow, sediment, and water-quality characteristics of these surface waters. The purpose of this study is to determine if construction activities are affecting streams along the right-of-way, and if so, what are the magnitude and extent of construction effects. If possible, the study will also identify specific construction activities responsible for observed changes in stream hydrology and water quality. This

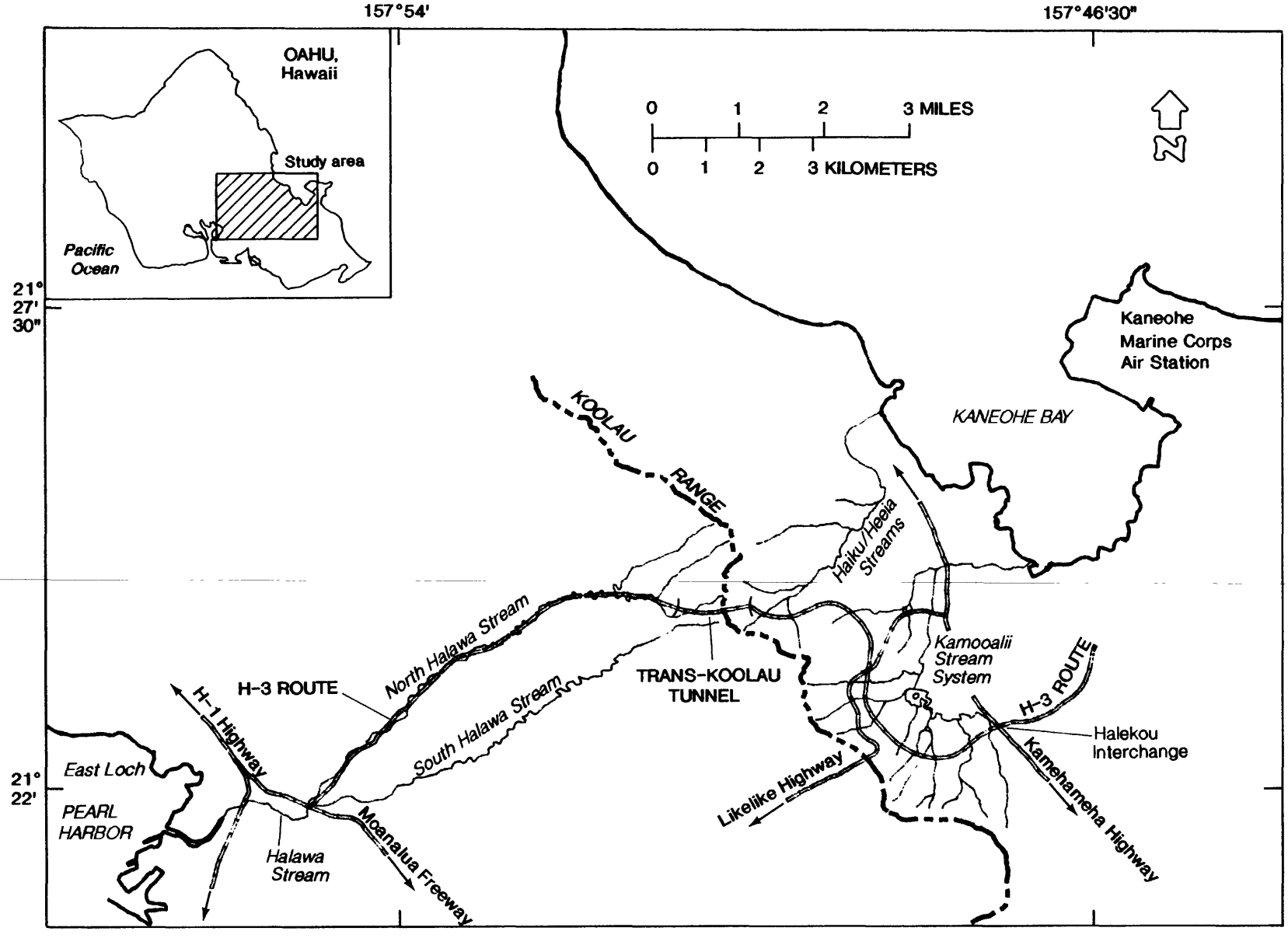

Figure 1. Location of study area.

study will extend over highway pre-construction, construction, and post-construction periods.

The proposed highway, designated as H-3, will extend from the existing H-1 highway near the East Loch of Pearl Harbor on the southwestern (leeward) side of the Koolau Range to the Halekou Interchange on the northeastern (windward) side, where the H-3 highway will connect with an existing section leading from the Kamehameha Highway to the Kaneohe Marine Corps Air Station (fig. 1). Construction of the H-3 highway, begun in the early part of 1983, is scheduled for completion in early 1995. The completed highway will consist of a cut-and-fill section in the lower North Halawa drainage basin, a viaduct through the upper North Halawa drainage basin, twin tunnels under the crest of the Koolau Range, and a viaduct and a cut-and-fill section on the windward side of the range. The highway will traverse the North Halawa, Haiku, Kapunahala, and Kamooalii drainage basins (figs. 2 and 3).

Purpose and Scope

This report describes the North Halawa, Haiku, and Kamooalii drainage basins and the methods used for hydrologic and water-quality data collection, and statistically summarizes the hydrologic and water-quality data collected during the first 7 water years of the study (1983-89). Data are presented from the North Halawa (stations 2260 and 2262), Haiku (station 2750), and Kamooalii (stations 2656, 2657, 2665, 2675, 2695, 2709, and 2722) drainage basins (figs. 2 and 3). Data for the Kapunahala drainage basin were not available for this report. In addition to the 10 stream-gaging and water-quality stations above, water-quality data from two wildlife-pond stations (figs. 3 and 4), and sedimentation data from cross-sections at Waimaluhia reservoir (figs. 5-7), both in the Kamooalii drainage basin, are presented.

Daily values of streamflow, suspended-sediment concentration and size, discharge, and instantaneous water-quality data have been published in the annual water-resources data reports of the U.S. Geological Survey (Chinn and others, 1984, 1985, 1986, 1988; Nakahara and others, 1988, 1989, 1990).

Four-digit gaging-station numbers used in this report are abbreviated numbers. The complete numbers are preceded by 16 and end in 00. For example, for station 2260 the complete number is 16226000.

Description of Study Area

The study area for this report consists of the North Halawa drainage basin (fig. 2) on the leeward side of the Koolau Range, and the Haiku and Kamooalii drainage basins (fig. 3) on the windward side.

Physiography and Lithology

The Koolau Range is the eroded remnant of the larger and younger of the two shield volcanoes that formed the island of Oahu (Wentworth, 1943; Visher and Mink, 1964). Much of the windward part of the original edifice has been eroded, leaving a steep windward slope indented with amphitheater-shaped

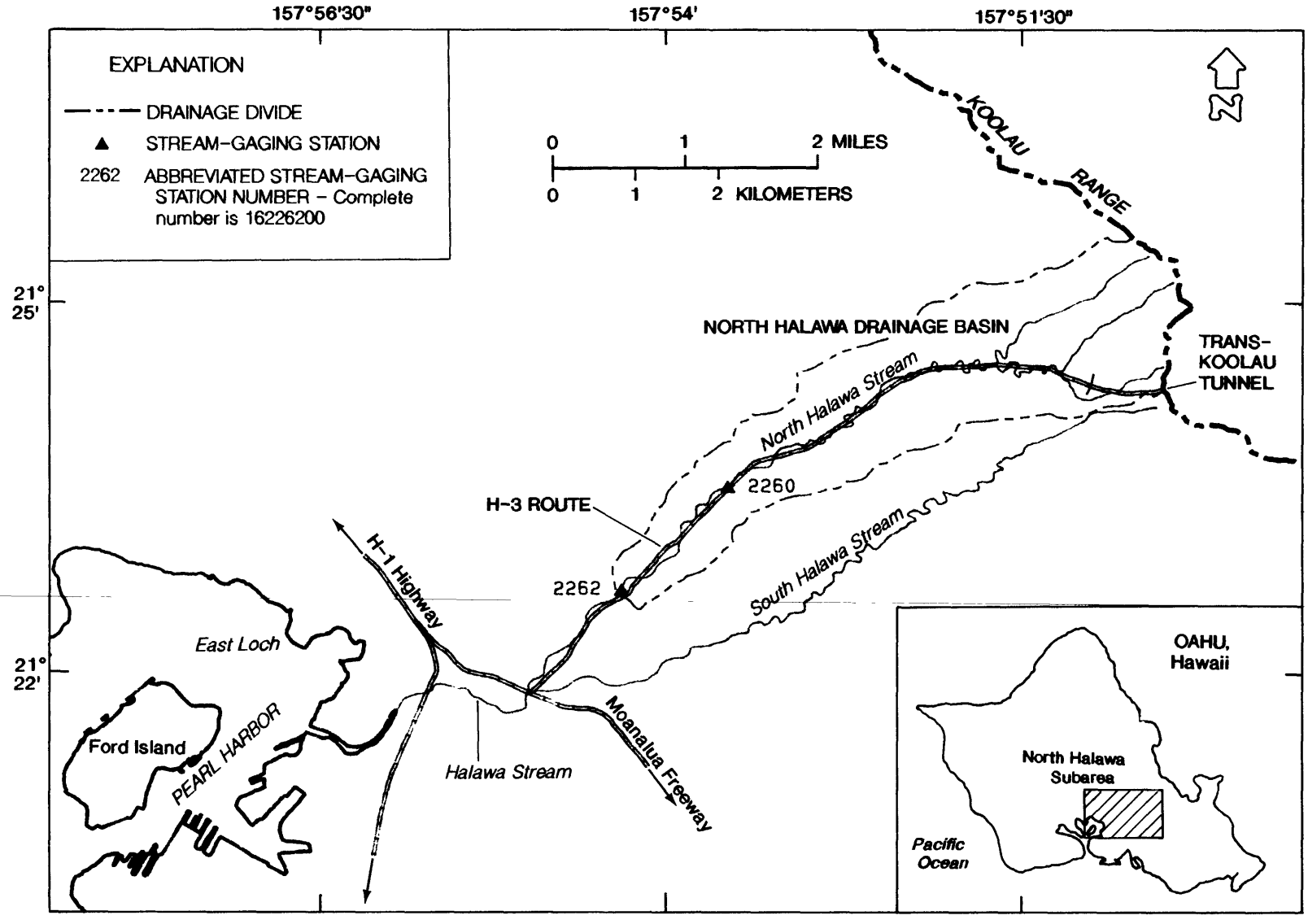

Figure 2. North Halawa subarea of the study area.

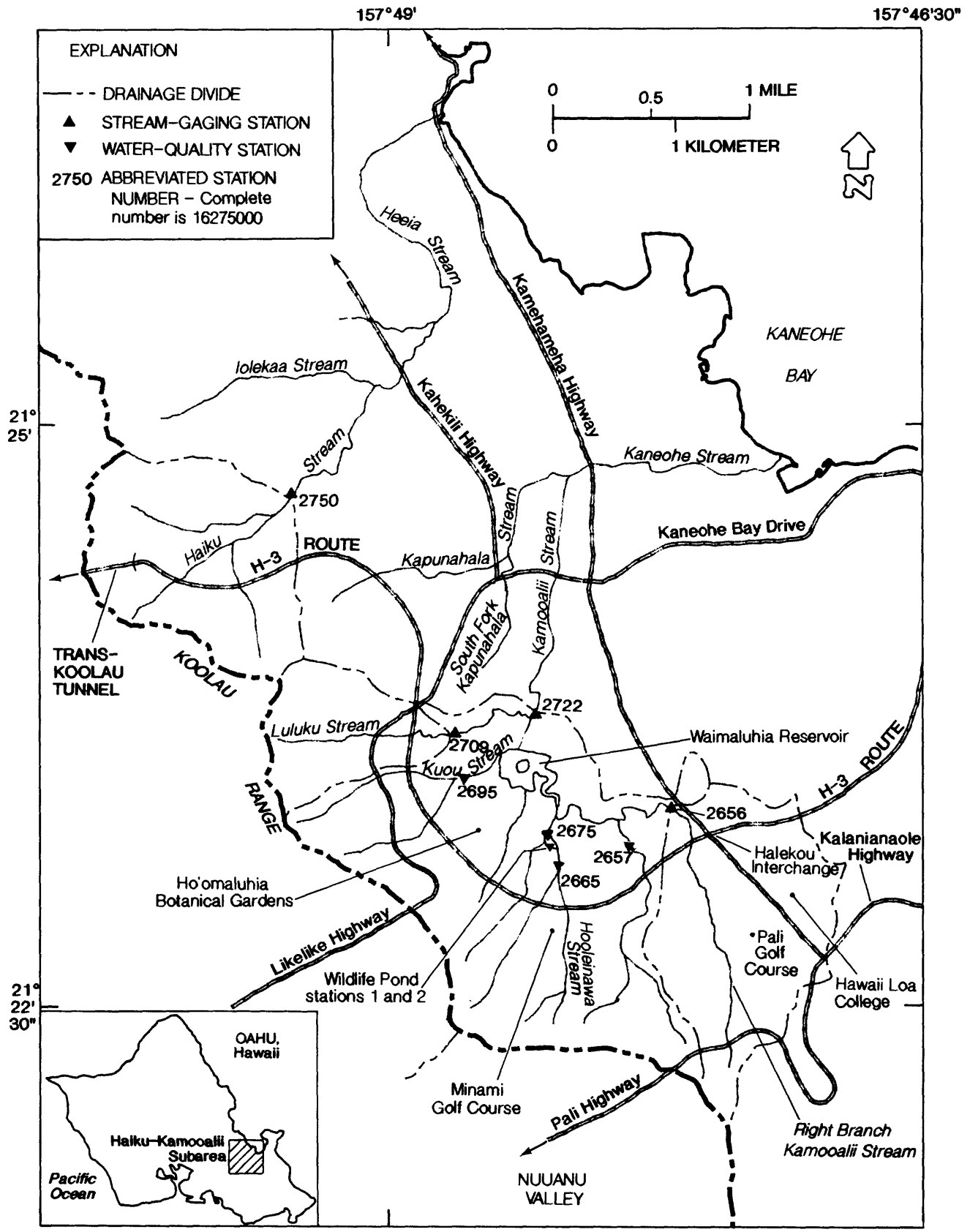

Figure 3. Haiku and Kamooalii subareas of the study area.

valleys (Hinds, 1925) and a more gentle leeward slope deeply dissected by linear valleys. Ridges on the leeward side approximate the original morphology of the Koolau volcanic dome (Wentworth, 1943). Selected physiographic data for the drainage basins upstream of all 12 stations and Waimaluhia reservoir are listed in table 1. Measurements were made from 1:24,000-scale topographic quadrangle maps.

Table 1.--Physiography of drainage basins upstream from selected gaging stations, Oahu

Basin relief is the maximum altitude in the basin minus the altitude at the gage. **Channel length** is the length of the longest stream in the basin determined from the blue lines on the topographic maps. **Channel gradient** is the difference between the altitude of the headwaters, as determined by the blue lines on the topographic maps and the altitude of the gage, divided by the channel length.

[ft, feet; mi^2, square mile; mi, mile; ft/ft, feet per foot; --, no data]

Station or location	Altitude of gaging station (ft)	Basin relief (ft)	Drainage area (mi^2)	Channel length (mi)	Channel gradient (ft/ft)
2260	320	2,510	3.45	5.55	0.076
2262	160	2,670	4.01	6.59	0.074
2656	210	2,190	1.11	1.75	0.132
2657	200	1,800	0.46	1.14	0.193
2665	220	2,540	0.41	0.91	0.412
2675	180	2,580	0.57	1.10	0.348
2695	220	2,500	0.34	0.91	0.437
2709	200	2,620	0.44	1.01	0.424
2722	115	2,700	3.81	5.44	0.095
2750	272	2,250	0.97	1.19	0.267
Waimaluhia reservoir	160	2,500	3.37	--	--
Wildlife pond	190	2,570	0.55	--	--

Lithology of the study area consists primarily of basalts of the Koolau Basalt that were extruded in numerous gently-dipping thin (less than 10 ft) flows of aa and pahoehoe lava (Visher and Mink, 1964). These flows are intruded by near-vertical dikes in the rift zone near the crest of the present Koolau Range (Visher and Mink, 1964). The more recent Honolulu Volcanics are exposed in small areas on the windward side of the study area (Takasaki and others, 1969). Most of the gently-sloping lower areas of the windward basins are underlain by alluvium derived from erosion of the Koolau Range (Takasaki and others, 1969).

Climate

The climate of Oahu is warm and humid. Temperature is uniform both spatially and temporally. Average annual temperature ranges from 74° to 76°F within the study area; temperatures above 95°F and below 50°F are rare

(Blumenstock and Price, 1961). Diurnal temperature fluctuates from 8° to 10°F on the windward side of the island and 15° to 20°F at leeward and inland locations (Blumenstock and Price, 1961). Potential-evaporation data collected for 6 years by the Honolulu Board of Water Supply in Nuuanu Valley on the leeward side of the Koolau Range (fig. 1) averaged 35.6 in/yr (State of Hawaii, 1973).

The distribution of rainfall is affected by the prevailing northeasterly trade winds and the topography of the island. Orographic lifting and cooling of marine air masses moving with the trade winds result in heavier and more frequent rainfall on the windward side and near the crest of the Koolau Range than on the leeward side. The largest amount of rainfall occurs about 1 mi leeward of the crest (C.K. Wentworth, written commun., 1942). Rainfall probably varies between ridge tops and valley bottoms on the leeward side, but data are insufficient to determine the magnitude of any such differences (C.K. Wentworth, written commun., 1942). Rainfall varies seasonally, with most precipitation occurring between November and April. Average annual precipitation ranges from 75 to 150 in. on the windward side of the study area, and from 40 to more than 150 in. on the leeward side (Blumenstock and Price, 1961).

Soil and Vegetation

Soils of the study area have been classified as low-humic latosols, humic ferruginous latosols, humic latosols, and hydrol-humic latosols (Cline, 1955). The distribution of soils is related to rainfall; low-humic latosols and humic ferruginous latosols are found at drier leeward areas, hydrol-humic latosols are found in areas of abundant rainfall, and humic latosols occupy intermediate areas (Tamura and others, 1953; Sherman and Ikawa, 1967). Soils on the windward side primarily are humic latosols (Foote and others, 1972). Most of the mountainous areas of the study basins are classified as "rough-mountainous land" or "rock outcrop" (Foote and others, 1972), and scarce information is available on the soils of these areas.

On the windward side of the study area, most native vegetation has been replaced by residential, agricultural, and commercial developments. Much of the Luluku sub-drainage basin (station 2709; fig. 3) has been converted to banana plantations. Remnants of the original vegetation, primarily hau trees, grow along stream channels. Vegetation in the North Halawa drainage basin includes both native and introduced species. In the drier, more leeward areas, mango, guava, and haole koa trees are common. In the higher and wetter areas the dominant species include koa, ohia lehua, kukui, ieie, and false staghorn fern.

Study Basins

The basins monitored by stations 2262, 2750, and 2722 represent the primary drainage basins for this study, the North Halawa, Haiku, and Kamooalii drainage basins, respectively. The remaining stations shown in figures 2 and

3 measure streamflow, sediment, and/or water-quality within the primary basins.

The North Halawa Stream, on the leeward side of the Koolau Range, flows into the East Loch of Pearl Harbor after joining South Halawa Stream downstream of station 2262 (fig. 2). The North Halawa drainage basin is roughly divided into lower and upper parts. The lower basin is deeply incised and roughly linear, with only a few small intermittent tributaries. The steep upper part of the basin is less deeply dissected, and has a dendritic drainage pattern with several intermittent tributaries. The stream channel is more than 100 ft above the basal water table throughout its length (C.K. Wentworth, written commun., 1942; Izuka, in press), and flow in the main channel is intermittent in most years.

The drainage area of stream-gaging station 2262, at an altitude of 160 ft, is 4.01 mi^2 (table 1). Streamflow, rainfall, suspended-sediment, and water-quality are measured at station 2262. Station 2260 (fig. 2) lies in the North Halawa drainage basin about 1.2 mi upstream of station 2262. Station 2260 is a long-term stream-gaging station measuring only streamflow and rainfall and where only a few water-quality measurements have been made. Before highway construction, which began in November 1987, the drainage basin upstream from station 2262 was undeveloped.

The Haiku drainage basin is adjacent to the North Halawa basin on the windward side of the Koolau Range. Haiku Stream joins Iolekaa Stream downstream of station 2750 to form Heeia Stream, which flows into Kaneohe Bay (fig. 3). The headwaters of Haiku Stream originate from the steep windward cliffs, called the Pali, of the Koolau Range. An alluviated valley floor occupies the lower parts of the basin. Water flows in channels on the Pali only during periods of rainfall; however, flow at stream-gaging station 2750 is perennial. The drainage area of stream-gaging station 2750, at an altitude of 272 ft, is 0.97 mi^2 (table 1). Streamflow, rainfall, suspended-sediment, and water-quality are measured at station 2750. Most of the drainage basin upstream of stream-gaging station 2750 is occupied by a U.S. Coast Guard navigational facility, which was built in the 1940's. Construction in the Haiku drainage basin began in September 1988.

Also on the windward side, to the south of the Haiku drainage basin, is the Kamooalii drainage basin (fig .3). Kamooalii Stream joins Kapunahala Stream downstream of station 2722 to form Kaneohe Stream, which flows into Kaneohe Bay (fig. 3). The Kamooalii drainage basin is similar to the Haiku drainage basin, with headwaters originating from the Pali of the Koolau Range and the lower part of the basin having an alluviated valley floor. The drainage area upstream of stream-gaging station 2722, at an altitude of 115 ft, is 3.81 mi^2 (table 1). This area includes 1.11 mi^2 upstream from stream-gaging station 2656 and 0.44 mi^2 upstream of stream-gaging station 2709. Streamflow is perennial at all three stream-gaging stations. The main tributaries of Kamooalii Stream, from north to south, are Luluku Stream, Kuou Stream, Hooleinawa Stream, and Right Branch Kamooalii Stream (fig. 3).

Streamflow, suspended-sediment, and water-quality data are collected at stations 2656, 2709, and 2722. Rainfall data are also collected at stations 2656 and 2709. Only water-quality data are collected at stations 2657, 2665, 2675, and 2695 (fig. 3). Figure 4 shows the schematic relation of all water-quality sites in the Kamooalii drainage basin. In addition to these stations, two stations located at the wildlife pond (fig. 3) are used for water-quality measurements. Data for the wildlife pond sites are given only until January 1984 when data collection ended at these sites. Monumented cross-sections for sedimentation monitoring are located along the shores of Waimaluhia Reservoir (figs. 3 and 5).

Waimaluhia Reservoir, a flood-control reservoir, was constructed in 1980 upstream of stream-gaging station 2722 (fig. 3). The water surface of the reservoir is normally kept at an altitude of 160 ft by a control outlet. This control maintains the reservoir area at 26 acres. The area to the west and south of the reservoir is occupied by the Ho'omaluhia Botanical Gardens, a 420-acre public park operated by the City and County of Honolulu (fig. 3). Downstream from the reservoir and station 2656, most of the drainage basin area has been developed for residential use. Upstream of the park most of the land use consists of banana plantations or undeveloped land. The wildlife pond is located upstream from water-quality station 2675 on Hooleinaiwa Stream (fig. 4). This 1.5-acre pond is part of the botanical gardens and provides a nesting place for waterfowl.

Other land use in the Kamooalii drainage basin includes the new Minami Golf Course, the existing Pali Golf Course, and the Hawaii Loa College campus. The Minami Golf Course is located to the south of the botanical gardens, upstream of stations 2657, 2665, and 2675 (fig. 3). Construction of the golf course began in the summer of 1989. The Pali Golf Course occupies 216 acres and is located to the south of the Halekou Interchange, upstream from station 2656. The Pali Golf Course was completed in 1957 and provides stormwater detention during periods of extreme rainfall. The Hawaii Loa College campus occupies about 24 acres out of 143 acres owned by the college and was constructed in the early 1960's. The campus is 1 mi south of the Halekou Interchange along Kamehameha Highway across from the Pali Golf Course.

Construction of the H-3 highway in the Kamooalii drainage basin (fig. 3) began in February 1983, with the construction of the Halekou Interchange (fig. 3), which was interrupted several times by court injunctions. Construction began in the Luluku sub-drainage basin of the Kamooalii drainage basin (fig. 3) in July 1989.

Acknowledgments

The authors gratefully acknowledge Harold Sexton, now retired U.S. Geological Survey employee, for his assistance with instrumentation.

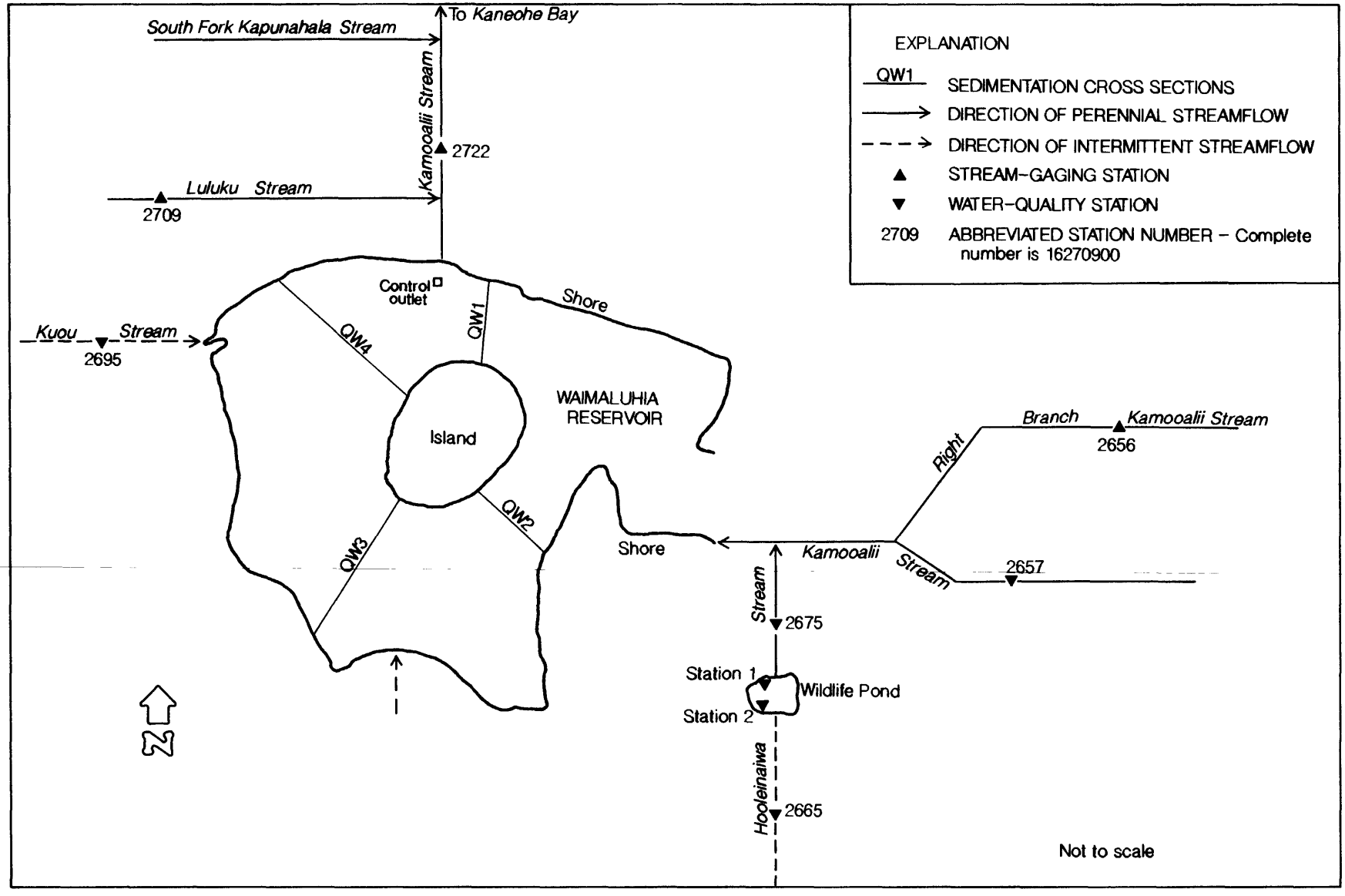

Figure 4. Diagram of Kamooalii drainage basin (modified from Nakahara and others, 1990).

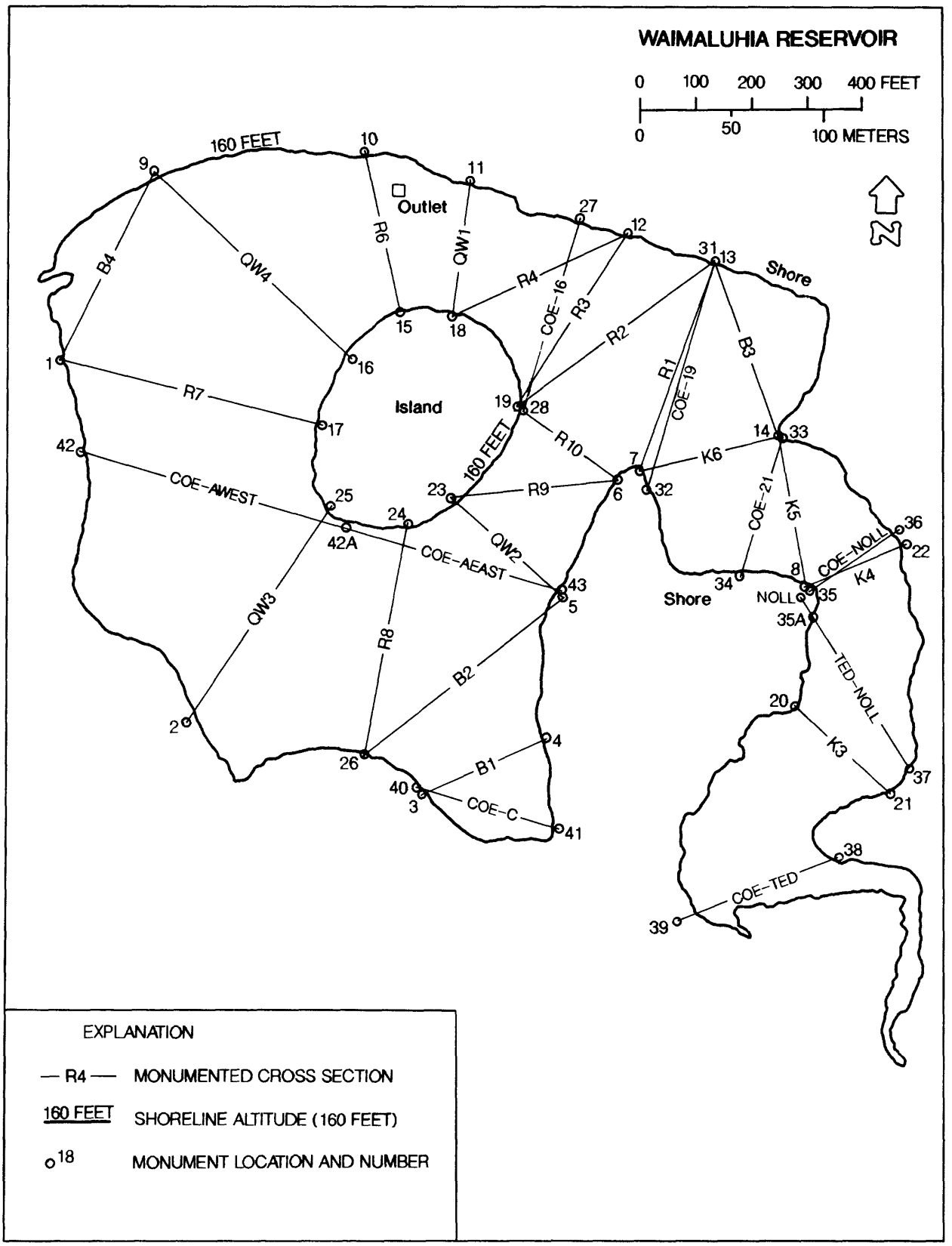

Figure 5. Waimaluhia Reservoir and locations of monumented cross-sections for bed-altitude measurements.

METHODS OF HYDROLOGIC AND WATER-QUALITY DATA COLLECTION

Rainfall, streamflow, sediment, and water-quality data are collected at the network of stream-gaging and water-quality stations described above (figs. 2, 3, and 4). Stream-gaging stations are equipped with stage recorders and automatic suspended-sediment samplers. In addition, stations 2262, 2656, 2709, and 2750 are equipped with recording rain gages. Data from an additional rain gage at station 2260 were also used. Water-quality stations have no recording equipment.

Rainfall

Rainfall was recorded at five stream-gaging stations using two types of rain gages. At stations 2260, 2262, 2656, and 2709, tipping-bucket (0.1 in. increments) rain gages were used. Tipping-bucket gages record the times at which increments of rainfall are collected. At station 2750, a float-type gage (8-in. diameter) was used. A float-type gage records continuous changes in storage due to rainfall.

Streamflow

Streamflow was measured periodically at all stations using standard practices for current-meter measurements (Rantz and others, 1982a). Indirect measurement techniques (slope-area method) (Dalrymple and Benson, 1967) were used to determine streamflow following extreme conditions when direct measurements were not possible. Streamflow records at the six stream-gaging stations (2260, 2262, 2656, 2709, 2722, and 2750) were determined from streamflow measurements and streamflow/gage-height relations as described by Rantz and others (1982b).

Suspended Sediment

Suspended-sediment samples were collected at stations 2262, 2656, 2709, 2722, and 2750 using PS-69 automatic sediment samplers (Edwards and Glysson, 1988). At station 2656, a Manning[1] automatic sampler (Edwards and Glysson, 1988) was used at times in place of the PS-69 because of sedimentation of the PS-69 intake. Samples were collected daily, except when streamflow was too low for sampler operation. Sampler orifices generally were located to take samples when stream depths exceeded 1 or 2 ft. During periods of high flows, samples were collected more frequently. Cross-sectional samples were collected periodically using the equal-width-increment method (Edwards and Glysson, 1988). The cross-sectional samples were used to calibrate the automatically collected samples; however, an insufficient number of cross-sectional samples were collected for adequate calibration at all stations. Suspended-sediment loads were computed using sediment-sample concentrations and streamflow records, as described by Porterfield (1972).

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[1] Use of the brand names in this report is for identification purposes only and does not constitute endorsement by the U.S. Geological Survey.

Reservoir Surveys

Sediment accumulation in Waimaluhia Reservoir (fig. 3) was monitored by surveys of monumented cross sections. A total of 30 cross sections were established (fig. 5). The end points of each cross section were monumented with pipes set in concrete. Horizontal angles, vertical angles, distances between each monument, and an arbitrary datum were measured and used to compute northings, eastings, and altitudes for all monuments. All altitudes are relative to sea level.

Cross-sectional surveys were made in September 1983 and November 1988. In 1983, all 30 cross sections were surveyed, whereas in 1988 only 20 were surveyed. Table 2 lists those cross sections surveyed in 1983 and 1988 that were converted to digital form. During each survey, a tagline was stretched between the two monuments defining each cross section. Because of wave action and wind deflection, positional coordinates determined from the tagline are considered accurate to the nearest foot. The water-surface altitude of the reservoir was read at a staff plate before and after each survey. The depths from the water surface to the bottom of the reservoir were determined to a precision of 0.01 ft with an electronic sounder in the 1983 survey. The 1988 survey used a surveying rod and manual sounding weight with a precision of 0.01 ft and an estimated accuracy of 0.1 ft.

Table 2.--Cross sections used in Waimaluhia Reservoir surveys

[Refer to figure 5 for cross-section locations]

Year of survey	
1983[1]	1988
B1	B1
B2	B2
B3	B4
B4	COE-AEAST
K3	COE-AWEST
K4	COE-C
K5	COE-TED
K6	COE-21
QW1	K4
QW2	K5
QW3	QW1[2]
QW4	QW2
R1	QW4
R3	R1
R4	R2
R7	R6
R8	R7[2]
R9	R8
R10	R9
	R10[2]

[1] All 30 cross-sections (fig. 5) used for creating bathymetric contour map, the 19 cross-sections listed are those that were available in digital form. The remaining 11 (COE-AEAST, COE-AWEST, COE-C, COE-NOLL, COE-TED, TED-NOLL, COE-16, COE-19, COE-21, R2, and R6) were in graphical form.

[2] Field notes did not record distance from monuments to edge of water, data were adjusted by setting edge of water to equivalent station in 1983 survey.

Northings, eastings, and altitudes for all points along the cross sections were computed with a computer program using the coordinates of the cross-sectional monuments, the altitude of the water surface, measurements of distance between monuments, and measured depths. The northings, eastings, and altitude data then were processed with a geographic information system (GIS) program to compute contours and reservoir volume. The design shoreline altitude of 160.0 ft was used for creating the bathymetric contour maps and as a datum in the reservoir volume calculations. The data points were plotted on a map of the reservoir and the bathymetric contour lines were drawn by hand for each year in which surveys were conducted. The contour lines were then digitized and entered into the GIS program. Reservoir volumes were computed from the digitized contours by the GIS program.

Water Quality

Water-quality samples were collected at the following stream-gaging and water-quality stations: 2260, 2262, 2656, 2657, 2665, 2675, 2695, 2709, 2722, and 2750, as well as at the wildlife pond located to the southwest of Waimaluhia Reservoir, (figs. 3 and 4). Measurements of instantaneous discharge, temperature, air pressure, specific conductance, pH, and dissolved oxygen were made and samples were analyzed for turbidity, solids, major ions, nutrients, trace metals, fecal coliform bacteria, organic constituents, and pesticides. All physical measurements and samples for chemical analyses were collected and processed according to Ward and Harr (1990): the equal-width increment method was used for stream-sample collection and a modified Van-Dorn sampler was used to collect pond samples. Samples at the wildlife pond were collected within 50 ft of the shore. Methods for the analyses of all the water-quality properties and constituents followed those in Britton and Greeson (1989), Wershaw and others (1987), and Fishman and Friedman (1989).

STATISTICAL SUMMARY OF HYDROLOGIC AND WATER-QUALITY DATA

The following sections briefly summarize the rainfall, streamflow, suspended sediment, reservoir surveys, and water-quality data in tables 3 through 21 (tables 10 through 21 at end of report).

Rainfall

Rainfall records (table 3) extend from 1983 to 1989 at stations 2260, 2262, and 2656. Rainfall-data collection began in 1984 at station 2709 and in 1986 at station 2750. Rainfall amounts were small in 1984, moderate in 1983, 1985, 1986, and 1987, and large in 1988 and 1989. The smallest and largest monthly rainfall amounts recorded were 0.2 in. in January 1986 at station 2262 and 29.8 in. in December 1988 at station 2656 (table 3). Annual rainfall was about equal at all windward precipitation stations (2656, 2709, and 2750) and at station 2260 (table 3). Rainfall at station 2262 ranged from about one-half to two-thirds of rainfall at station 2260 (table 3).

Table 3.--Monthly and annual rainfall at selected stream-gaging stations, Oahu, water years 1983-89

[All data are reported in inches; --, no data]

Water year	Month	Station 2260	2262	2656	2709	2750
1983	October	13.5	--	--	--	--
	November	5.8	--	--	--	--
	December	7.7	--	--	--	--
	January	1.8	--	--	--	--
	February	0.5	--	0.6	--	--
	March	0.9	--	1.1	--	--
	April	5.8	--	3.0	--	--
	May	4.1	1.7	3.2	--	--
	June	5.0	2.3	3.2	--	--
	July	6.7	3.1	3.7	--	--
	August	6.1	1.9	3.4	--	--
	September	7.5	3.6	6.6	--	--
	TOTAL:	65.4	--	--	--	--
1984	October	6.8	3.3	3.4	--	--
	November	3.0	0.8	3.1	--	--
	December	2.5	2.2	3.5	--	--
	January	4.7	1.4	4.7	--	--
	February	4.6	2.3	4.1	--	--
	March	3.6	2.4	2.0	--	--
	April	7.8	6.2	9.4	--	--
	May	3.7	1.6	2.7	10.5	--
	June	2.2	0.8	1.1	1.9	--
	July	2.3	1.2	1.6	2.1	--
	August	2.1	0.9	1.1	1.4	--
	September	0.8	0.4	2.2	2.4	--
	TOTAL:	44.1	23.5	38.9	--	--
1985	October	1.8	1.4	4.5	3.0	--
	November	8.1	5.2	7.1	6.1	--
	December	9.0	7.7	6.8	7.2	--
	January	2.9	1.7	6.4	5.3	--
	February	11.2	9.1	14.7	13.3	--
	March	8.2	5.6	2.7	3.4	--
	April	4.1	1.8	1.9	2.6	--
	May	7.0	2.2	6.1	11.7	--
	June	0.9	0.6	3.2	2.9	--
	July	3.9	2.3	3.4	3.5	--
	August	1.8	1.4	2.0	2.4	--
	September	2.7	1.7	5.1	5.4	--
	TOTAL:	61.6	40.7	63.9	66.8	--
1986	October	8.4	6.6	7.7	9.5	--
	November	4.7	3.5	8.2	7.9	--
	December	1.2	0.8	0.8	0.9	--
	January	1.1	0.2	1.2	1.2	--
	February	2.5	1.8	3.0	3.9	--
	March	6.3	2.8	10.0	13.0	--
	April	11.5	5.8	3.3	4.2	--
	May	3.5	1.2	2.4	3.1	--
	June	7.0	3.5	2.6	3.5	--
	July	5.9	2.4	5.7	4.9	7.9
	August	4.3	1.9	4.6	4.9	7.3
	September	4.5	2.4	9.7	9.2	9.5
	TOTAL:	60.9	32.9	59.2	66.2	--

Table 3.--Monthly and annual rainfall at selected stream-gaging stations, Oahu, water years 1983-89--Continued

[All data are reported in inches; --, no data]

Water year	Month	Station 2260	2262	2656	2709	2750
1987	October	7.0	3.9	4.4	4.3	5.3
	November	10.5	7.3	19.7	17.0	15.1
	December	3.6	1.5	5.2	4.6	5.7
	January	4.6	2.6	2.3	2.8	3.5
	February	4.8	2.8	6.0	4.6	4.7
	March	6.7	2.7	2.7	2.2	5.0
	April	6.0	2.4	6.6	5.4	7.5
	May	4.0	2.1	4.9	6.5	5.1
	June	8.5	4.9	4.5	5.3	7.5
	July	5.2	1.8	4.0	7.0	4.3[1]
	August	4.4	1.4	2.3	4.2	7.6
	September	3.0	0.4	4.6	2.8	4.1
	TOTAL:	68.3	33.8	67.2	66.7	75.4[1]
1988	October	3.2	0.6	2.6	3.2	7.4
	November	10.1	4.1	8.9	10.6	10.9
	December	26.2	21.7	29.8	27.1	26.5
	January	8.3	8.2	16.6	16.4	18.8
	February	3.7	2.1	3.5	2.7	4.3
	March	6.0	3.4	4.3	7.8	7.8
	April	7.9	4.4	3.5	3.7	6.2
	May	8.9	4.1	6.2	5.9	8.1
	June	3.1	1.3	1.5	1.5	1.6
	July	2.8	1.1	2.3	2.2	4.1
	August	4.5	2.8	1.6	5.3	7.2
	September	5.9	2.7	6.0	8.7	9.7
	TOTAL:	90.6	56.5	86.8	95.1	112.6
1989	October	2.1	1.1	5.0	4.6	9.0
	November	9.7	5.6	6.6	8.3	6.6
	December	13.0	9.5	9.6	9.5	11.6
	January	13.3	9.3	5.6	6.9	6.5[1]
	Febuary	12.7	10.9	12.2	12.0	9.8[1]
	March	4.7	3.6	6.0	5.0	7.1
	April	12.5	5.5	24.0	21.7	28.7
	May	2.8	1.0	1.9	1.8	2.4
	June	3.8	1.5	2.5	3.7	5.0
	July	3.3[1]	4.4	5.6[1]	7.4	10.8
	August	--	1.1	2.8[1]	4.3	4.5
	September	--	2.0	2.3	2.0	2.8
	TOTAL:	--	55.5	84.1[1]	87.2	104.8[1]

[1] several days of missing record

Streamflow

Streamflow-data collection began in 1983 at all stream-gaging stations except station 2709, where data collection began in 1985 and station 2260, where data collection has been continuous since 1953. Annual streamflow totals (tables 4 and 5) reflect the annual rainfall variations; streamflows were relatively low in 1984, moderate in 1983, 1985, 1986, and 1987, and high in 1988 and 1989. Annual streamflows were highest at stations 2262 and 2722, where the drainage-basin areas are larger. Annual streamflow per unit area of

drainage basin ranged from 110 [(ft³/s)d]/mi² at station 2656 in 1984 to 1,600 [(ft³/s)d]/mi² at station 2722 in 1988 (table 5). Annual streamflow per unit area of drainage basin was consistently highest at stations 2722 and 2750 because of discharge from dike-impounded ground water (Takasaki and others, 1969).

Table 4.--Total annual streamflow at selected stream-gaging stations, Oahu, water years 1983-89

[All data are reported in cubic feet per second-days (ft³/s)d; --, no data]

Station	Water year						
	1983	1984	1985	1986	1987	1988	1989
2260	964	517	827	1,590	1,440	3,140	3,040
2262	203[1]	525	969	1,580	1,540	3,700	3,640
2656	267[1]	122	284	406	612	986	1,040
2709	--	44.5[2]	152	150	327	508	532
2722	4,090	1,600	2,290	2,940	3,760	6,070	5,930
2750	877	520	604	674	789	1,270	1,420

[1] data from February to September
[2] data from April to September

Table 5.--Total annual streamflow per unit area of drainage basin at selected stream-gaging stations, Oahu, water years 1983-89

[All data are reported in cubic feet per second-days per square mile ([(ft³/s)d]/mi²) of drainage basin area; --, no data]

Station	Water year						
	1983	1984	1985	1986	1987	1988	1989
2260	280	150	240	461	417	910	881
2262	50.6[1]	131	242	394	384	923	908
2656	241[1]	110	256	366	551	888	935
2709	--	101[2]	345	341	741	1,150	1,210
2722	1,070	419	602	771	986	1,600	1,560
2750	904	536	623	695	813	1,308	1,460

[1] data from February to September
[2] data from April to September

Suspended Sediment

Suspended-sediment concentrations at stations 2262, 2656, 2709, 2722, and 2750, including both automatically and manually collected samples, ranged from less than 1 to 18,000 mg/L (table 6). Annual average suspended-sediment concentrations ranged from 7 mg/L at station 2750 in 1984 to 1,470 mg/L at station 2709 in 1987 (table 6). Annual suspended-sediment loads were variable from year to year and from station to station. Annual loads ranged from 23.7 tons at station 2656 in 1984 to 16,600 tons at station 2262 in 1989 (table 7), and were not consistently highest at any station. Annual suspended-sediment yields (suspended-sediment load per unit of drainage-basin area) were highest at station 2656 in all years except 1987 when the highest yield was at station 2709, and in 1989 when stations 2262 and 2750 had higher yields (table 8).

Table 6.--Summary of annual average suspended-sediment concentrations at selected stream-gaging stations, Oahu, water years 1983-89

[All concentrations are reported in milligrams per liter; <, less than]

Station number	Year	Number of samples	Average	Standard deviation	Minimum	First quartile	Median	Third quartile	Maximum
2262	1983	45	15	20	<1	3	6	17	79
	1984	90	19	27	1	4	7	23	144
	1985	83	186	443	2	6	13	101	2,800
	1986	153	114	338	1	3	5	18	1,880
	1987	198	127	530	1	3	7	30	4,740
	1988	420	304	628	<1	13	82	294	6,250
	1989	300	1,160	2,320	1	47	324	1,150	18,000
2656	1983	328	253	1,060	3	11	17	51	8,950
	1984	243	99	553	3	6	9	22	6,340
	1985	424	59	292	2	6	9	17	5,080
	1986	120	273	333	7	84	160	316	1,670
	1987	96	319	520	7	11	115	376	3,400
	1988	266	458	695	1	56	254	561	6,040
	1989	131	385	1,170	18	137	180	281	13,000
2709	1984	31	307	439	6	15	54	417	1,450
	1985	127	205	436	2	17	47	207	3,060
	1986	52	588	1,160	6	15	66	615	6,480
	1987	62	1,470	1,210	10	270	1,320	2,320	4,640
	1988	231	487	683	1	88	267	601	5,980
	1989	195	594	1,080	6	90	220	686	8,500
2722	1983	411	15	50	1	5	8	12	939
	1984	250	21	46	2	7	10	15	426
	1985	243	66	129	3	9	19	46	959
	1986	390	45	189	3	6	10	19	2,590
	1987	451	78	314	2	5	8	19	4,290
	1988	253	102	297	<1	5	18	55	2,390
	1989	287	95	268	3	10	22	49	2,670
2750	1984	113	7	9	1	3	5	7	81
	1988	237	185	548	1	4	7	16	3,430
	1989	370	636	1,670	1	5	13	36	14,000

Table 7.--Annual suspended-sediment loads at selected stream-gaging stations, Oahu, water years 1983-89

[All data are reported in tons; --, no data]

Station	Water year 1983	1984	1985	1986	1987	1988	1989
2262	5.45[1]	30.9	314	362	614	3,490	16,600
2656	12.7[1]	23.7	541	472	631	1,730	1,220
2709	--	--	1.37[3]	91.1	402	485	180
2722	173	76.6	336	322	1,190	2,240	1,290
2750	--	6.08[2]	--	--	114[4]	1,310	3,400

[1] data from February to September
[2] data from December to September
[3] data from April to September
[4] data from July to September

Table 8.--Annual suspended-sediment yields at selected stream-gaging stations, Oahu, water years 1983-89

[All data are reported in tons per square mile; only data for years with complete sediment records are listed; --, no data;]

Station	Water year 1983	1984	1985	1986	1987	1988	1989
2262	--	7.73	78.3	90.3	153	872	4,140
2656	--	21.4	487	425	568	1,560	1,100
2709	--	--	--	207	913	1,100	409
2722	45.4	20.1	88.2	84.5	312	587	338
2750	--	--	--	--	--	1,350	3,510

Reservoir Surveys

Survey data from Waimaluhia Reservoir indicate an average bed altitude at surveyed points of 151.5 ft in September 1983, and 151.9 ft in November 1988. The average increase in bed altitude in the 6 years between 1983 and 1988 was therefore 0.4 ft (table 9). Changes in bed altitude at selected cross sections are shown in figures 6 and 7. End-points for survey transects on figures 6 and 7 are edge of water points, and are not the same for all surveys. Discrepancy in end-points in figure 6 for cross-section QW2 is due to accuracy limits discussed above. Bathymetric contour maps for both 1983 and 1988 are shown in figures 8 and 9. Computed bed altitudes from the area and volume calculations indicate a bed altitude of 151.1 ft in 1983 and 151.2 ft in 1988 for only a 0.1 ft change. Between September 1983 and November 1988, the volume of the reservoir has decreased 5.9 acre-ft (table 9). This equates to an average depletion of 1.2 acre-ft/yr. This value is below the 2.0 acre-ft/yr design depletion rate (U.S. Army Corps of Engineers, 1981).

Table 9.--Summary of bed-altitude, area, and volume data, Waimaluhia Reservoir, Oahu, September 1983 and November 1988

a) Bed-altitude data for surveyed points in Waimaluhia Reservoir

[All bed-altitude data are in feet]

Year	Number of observations	Average	Median	Standard deviation
1983	1418	151.5	150.6	4.6
1988	1585	151.9	151.0	4.4

b) Computed area, volume, and average bed altitude for Waimaluhia Reservoir, based on bathymetric maps

[Area, volume, and calculated bed-altitude values are relative to 160.0 ft mean reservoir water-level altitude; bed altitude calculated by dividing volume by area, and subtracting that value from 160.0 feet.]

Year	Area (acres)	Volume (acre-feet)	Calculated bed altitude (feet)
1983	26.8	239.6	151.1
1988	26.7	233.7	151.2

Water Quality

Water-quality data for the 1983-89 period were collected at 10 stream-gaging and water-quality stations and two wildlife pond stations (tables 10 through 21). Data from the stream stations are given in tables 10 through 19, and data for the wildlife ponds are given in tables 20 and 21. The water-quality data listed in these tables represent selected physical properties and chemical and biological constituents. Properties or constituents had averages and percentages computed only when the number of samples collected exceeded five. Average values in the tables are arithmetic means. For censored data, average values were computed by log-probability regression (Helsel and Gilliom, 1986). Some constituents had different detection limits during the 6-year study period. Several commonly used measures of water quality are summarized below.

Turbidity is a measure of light penetration in water. Turbidity is normally increased by high concentrations of suspended sediment and large algae populations. Median turbidity values ranged from 0.7 NTU at station

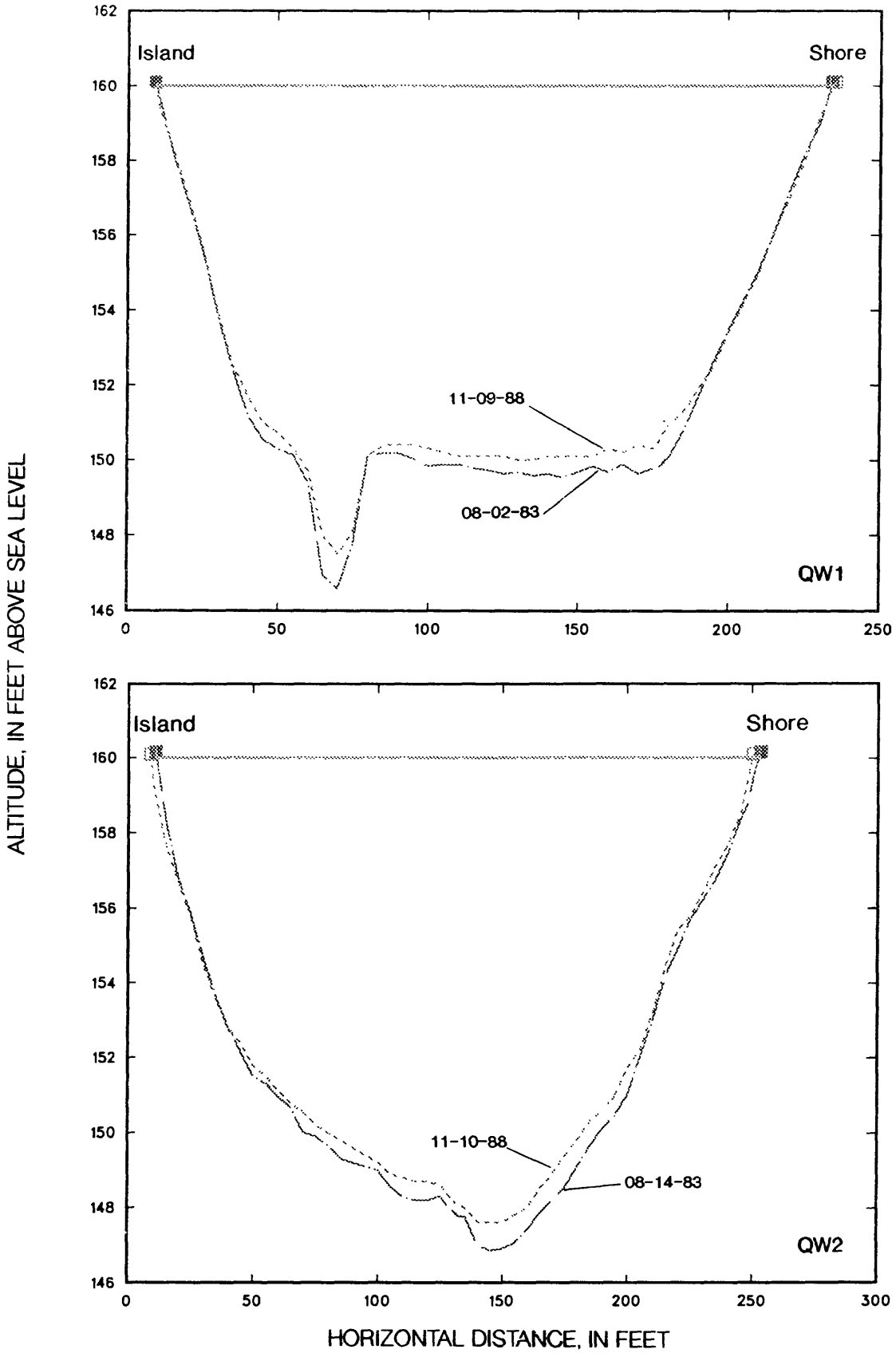

Figure 6. Changes in bed altitude at sedimentation cross-sections QW1, and QW2, Waimaluhia Reservoir.

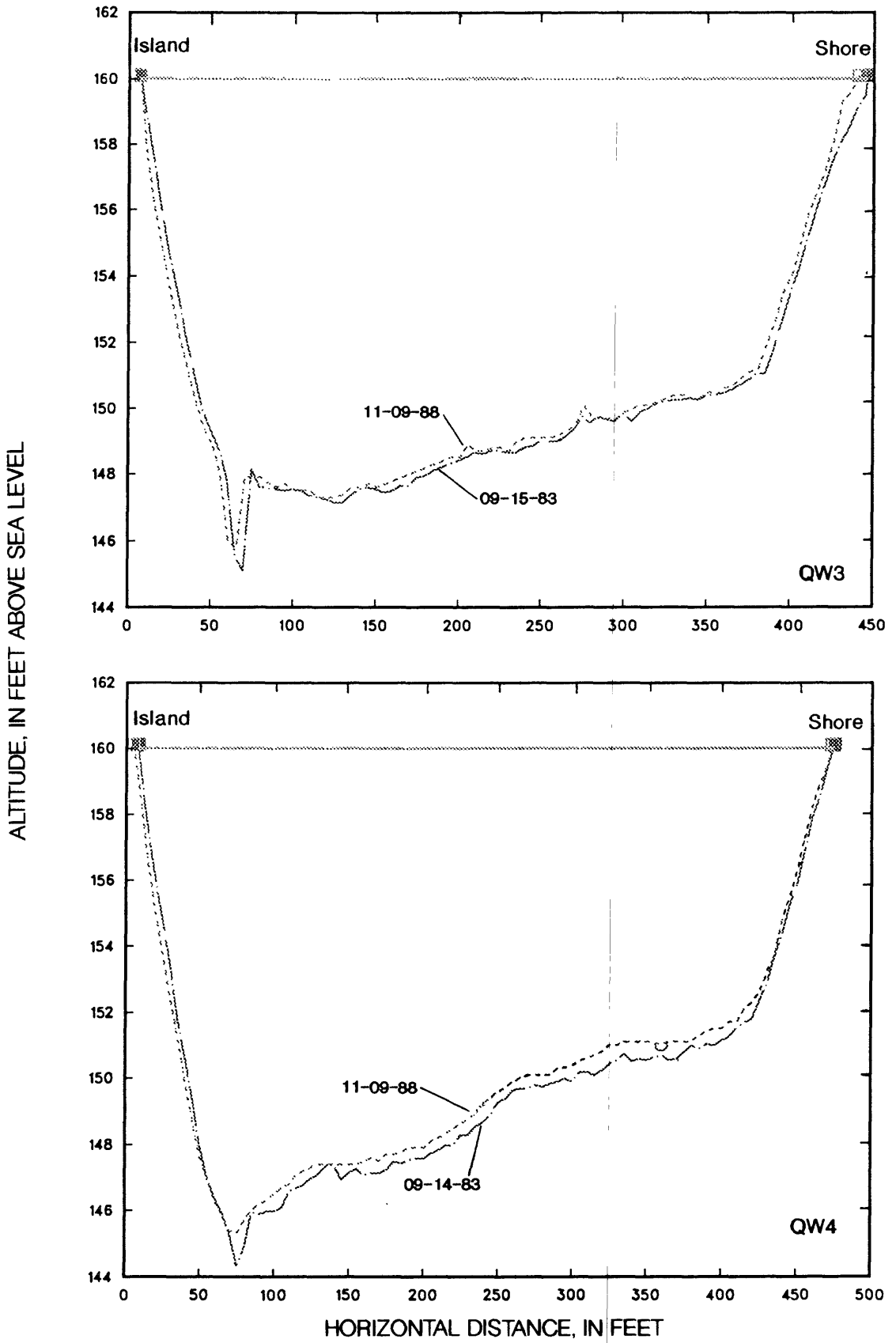

Figure 7. Changes in bed altitude at sedimentation cross-sections QW3, and QW4, Waimaluhia Reservoir.

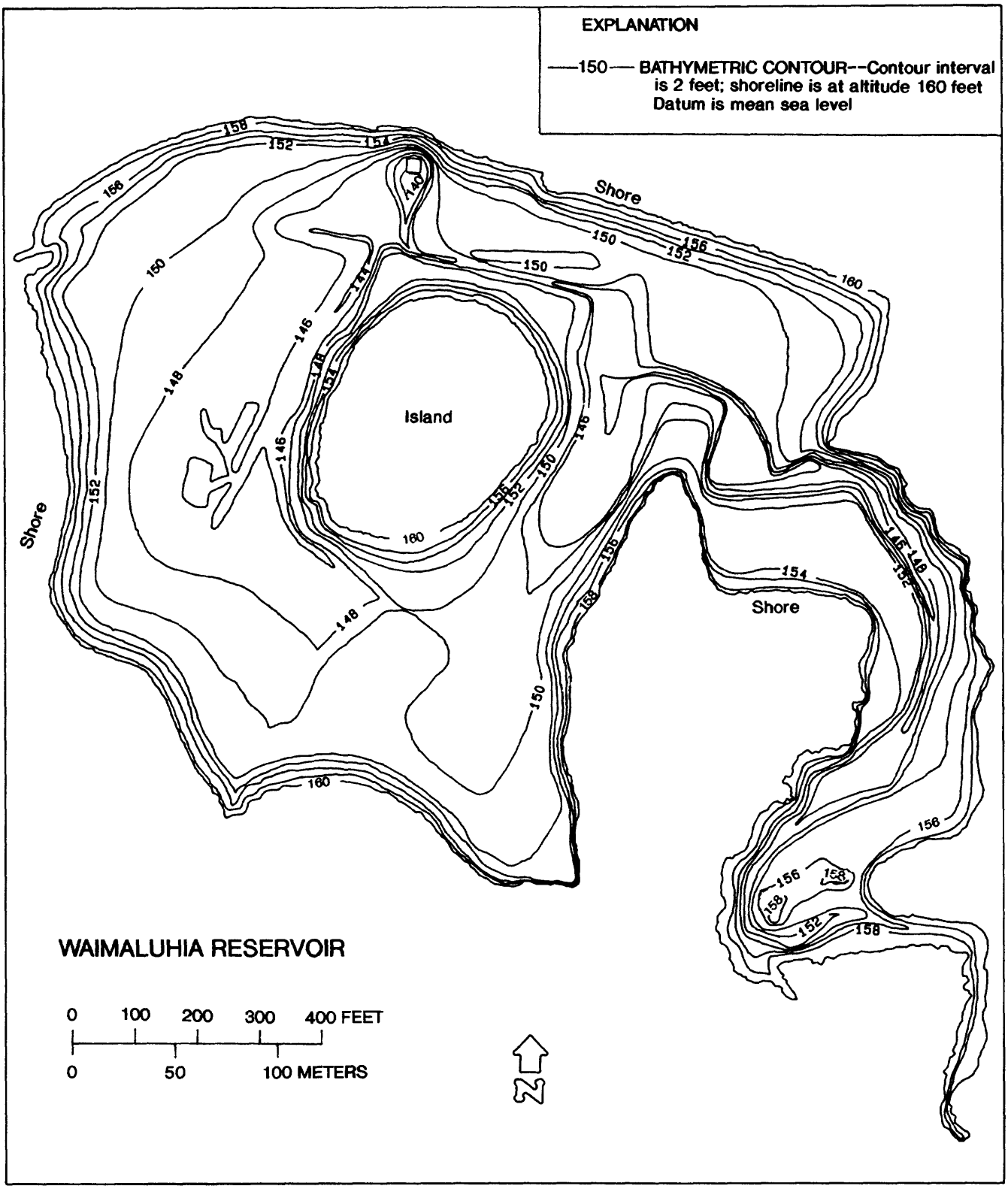

Figure 8. Waimaluhia Reservoir bathymetry, 1983.

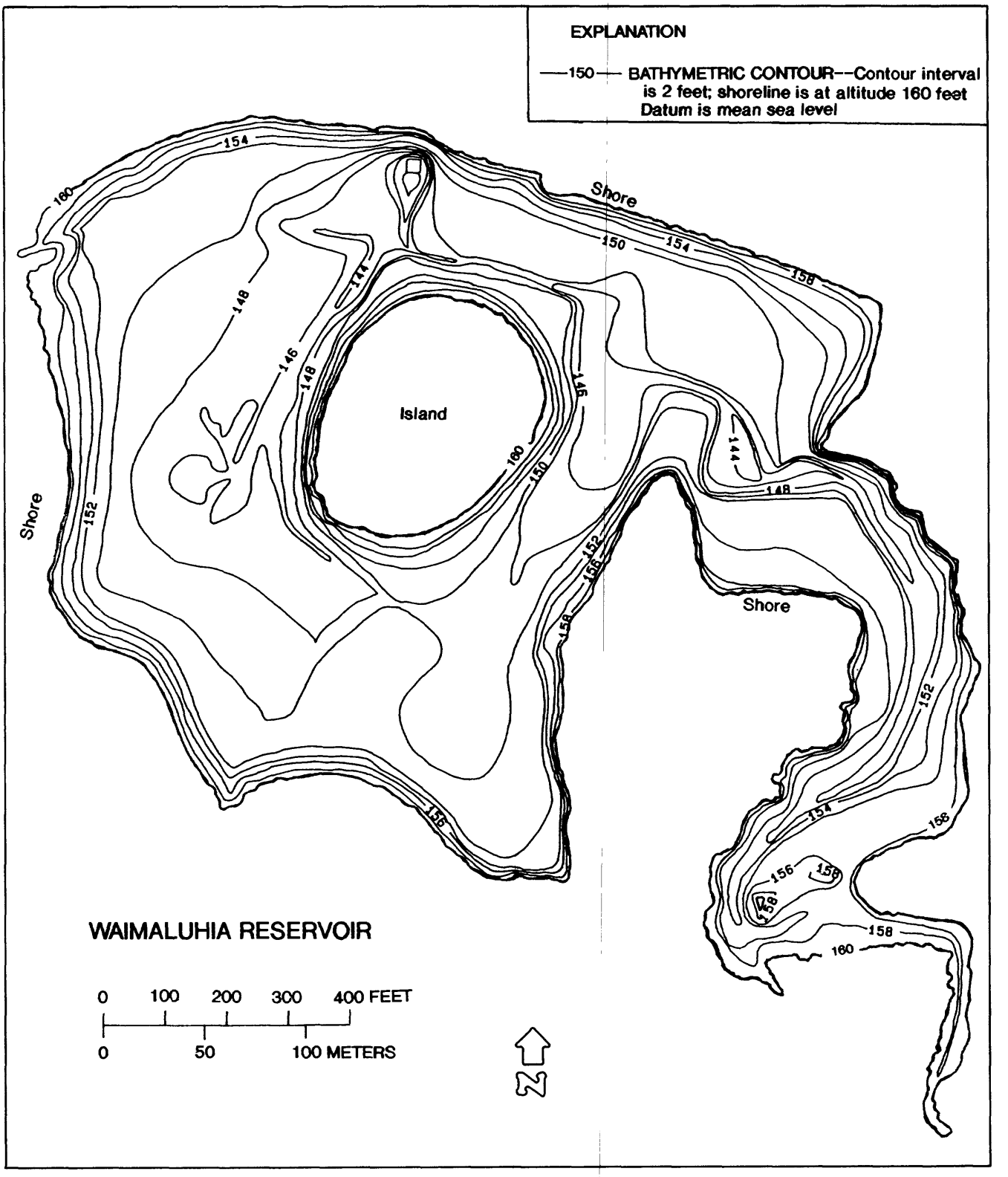

Figure 9. Waimaluhia Reservoir bathymetry, 1988.

2665 (table 14) to 67 NTU at 2722 (table 18). At the wildlife pond, turbidity values ranged from a minimum of 3.4 at station 2 (table 21) to a maximum of 5.5 at station 1 (table 20).

The hydrogen-ion activity of water is expressed as pH. Data collected from the stream-gaging stations (tables 11 through 21) during the study period show pH values ranging from 5.7 at station 2656 (table 12) to 8.6 at station 2657 (table 13). Wildlife pond values for pH ranged from 6.6 at station 1 (table 20) to 7.1 at station 2 (table 21).

Dissolved oxygen is critical for most forms of aquatic life. Median values for dissolved oxygen percent-saturation ranged from 78 percent at station 2656 (table 12) to 97 percent at station 2722 (table 18). For the wildlife pond, dissolved-oxygen saturation values ranged from a median of 64 percent at station 1 (table 20) to a maximum of 78 percent at station 2 (table 21).

Specific conductance is a measure of the ability of water to carry an electrical current, and is therefore a measure of ionic concentrations in water. The median values for specific conductance have a minimum of 120 μS/cm at station 2665 (table 14) and a maximum of 250 μS/cm at station 2695 (table 16). Specific conductance at the wildlife pond varied slightly, with a minimum and maximum of 167 μS/cm and 180 μS/cm, respectively, at both stations.

Both nitrogen and phosphorus are important nutrients for algae in freshwater. Ammonia and organic nitrogen ranged from a median value of less than 0.20 mg/L at station 2665 (table 14) to a median value of 0.70 mg/L at station 2722 (table 18). Nitrite and nitrate nitrogen median values had a minimum of less than 0.10 mg/L at stations 2262 (table 11), 2665 (table 14), 2675 (table 15), and 2750 (table 19) and a maximum value of 0.50 mg/L at station 2656 (table 12). Total phosphorus median values ranged from 0.010 mg/L at station 2665 (table 14) and station 2695 (table 16) to 0.050 at station 2722 (table 18). Nitrite and nitrate nitrogen values at the wildlife pond ranged from a minimum of less than 0.10 mg/L at both stations to a maximum of 0.10 mg/L at station 2 (table 21). The wildlife pond also had ammonia and organic nitrogen concentrations ranging from less than 0.20 mg/L at station 1 (table 20) to 0.80 mg/L at station 2 (table 21). Total phosphorus concentrations ranged from 0.010 mg/L to 0.030 mg/L at station 1 (table 20).

Fecal coliform bacteria is a microbiological indicator used to determine the sanitary quality of water. Median values for fecal coliform bacteria ranged from 96 colonies per 100 mL at station 2750 (table 19) to 640 colonies per 100 mL at station 2656 (table 12). The wildlife pond had fecal coliform values ranging from 16 colonies per 100 mL to 290 colonies per 100 mL.

SUMMARY

This report gives a statistical summary of rainfall, streamflow, sediment, and water-quality data collected from the North Halawa, Haiku, and Kamooalii drainage basins. Methods of data collection and basin descriptions are also included.

In brief, for water years 1983 through 1989, monthly rainfall ranged from 0.2 in. to 29.8 in. Annual streamflow per unit area of drainage basin ranged from 110 to 1,600 [$(ft^3/s)d/mi^2$]. The annual suspended-sediment yields ranged from 7.73 to 4,140 tons/mi^2. Bathymetric surveys showed that the volume of Waimaluhia Reservoir decreased 5.9 acre-ft between September 1983 and November 1988 indicating a rate of volume depletion of about 1.2 acre-ft/yr.

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TABLES 10-21.

Table 10.--Statistical summary of selected water-quality data collected at station 2260, North Halawa Stream near Aiea, from December 1982 to November 1987

[μS/cm @ 25°C, microsiemens per centimeter at 25 degrees Celsius; ft^3/s, cubic foot per second; °C, degrees Celsius; --, no data]

Property or constituent	Number of samples	Maximum	Minimum	Average	Percentage of samples that were less than or equal to those shown: 95	75	50 (Median)	25	5
INORGANIC									
Field measurements									
Specific conductance (μS/cm @ 25°C)	11	200	105	141	200	160	140	125	105
pH (units)	11	7.2	6.3	--	7.2	7.2	7.1	6.9	6.3
PHYSICAL PROPERTIES									
Discharge, instantaneous, stream (ft^3/s)	12	6.8	0.01	1.7	6.8	2.7	0.32	0.07	0.01
Temperature, water (°C)	12	23.0	18.5	21.0	23.0	22.0	21.0	20.0	18.5

Table 11.--Statistical summary of selected water-quality data collected at station 2262, North Halawa Stream near Honolulu, from May 1983 to September 1989

[µS/cm @ 25°C, microsiemens per centimeter at 25 degrees Celsius; mg/L, milligram per liter; µg/L, microgram per liter; <, less than; *, calculated value; e, estimated using log-probability regression; tot., total; 0.7 µm-MF, 0.7 micron membrane filter; cols./100 mL, colonies per 100 milliliters; ft^3/s, cubic foot per second; °C, degrees Celsius; NTU, nephelometric turbidity unit; --, no data]

Property or constituent	Number of samples	Maximum	Minimum	Average	Percentage of samples that were less than or equal to those shown: 95	75	50 (Median)	25	5
INORGANIC									
Field measurements									
Specific conductance (µS/cm @ 25°C)	36	220	48	133	216	162	138	110	49
pH (units)	36	8.2	6.2	--	8.0	7.4	7.2	6.9	6.5
Major ions (mg/L)									
Hardness, total (as $CaCO_3$)	9	49	5.0	27	49	40	30	15	5
Calcium, dissolved	9	8.8	0.8	4.6	8.8	6.6	4.9	2.5	0.8
Magnesium, dissolved	9	6.5	0.8	3.8	6.5	5.7	4.4	2.0	0.8
Sodium, dissolved	9	15	6.2	10	15	14	12	6.8	6.2
*Sodium, percent	9	69	40	47	69	48	45	42	40
*Sodium adsorption ratio	9	1.0	0.8	0.9	1.0	0.9	0.9	0.8	0.8
Potassium, dissolved	9	1.4	0.5	0.9	1.4	1.0	0.9	0.8	0.5
Alkalinity (as $CaCO_3$)	9	49	3	27	49	40	29	15	3
Sulfate, dissolved	9	8.0	3.5	5.7	8.0	7.4	5.0	4.8	3.5
Chloride, dissolved	9	18	8.4	14	18	18	17	11	8.4
Fluoride, dissolved	9	0.2	<0.1	--	0.2	0.1	<0.1	<0.1	<0.1
Silica, dissolved	9	21	6.2	15	21	21	20	7.9	6.2
Nutrients (mg/L)									
Nitrogen, nitrite plus nitrate, total (as N)	14	0.10	<0.10	--	0.10	<0.10	<0.10	<0.10	<0.10
Nitrogen, ammonia plus organic, total (as N)	15	2.8	<0.2	e0.8	2.8	0.8	0.5	<0.2	<0.2
Phosphorus, total (as P)	15	0.13	<0.010	e0.037	0.13	0.060	0.030	0.010	<0.010
Metals (µg/L)									
Aluminum, total recoverable	9	62,000	50	13,000	62,000	28,000	170	70	50
Aluminum, dissolved	9	240	30	100	240	170	70	40	30
Arsenic, total	8	1	<1	--	1	<1	<1	<1	<1
Arsenic, dissolved	9	1	<1	--	1	<1	<1	<1	<1
Barium, total recoverable	9	<100	<100	--	<100	<100	<100	<100	<100
Barium, dissolved	9	6	<2	e4	6	6	2	<2	<2
Beryllium, total recoverable	9	<10	<10	--	<10	<10	<10	<10	<10
Beryllium, dissolved	9	0.8	<0.5	--	0.8	<0.5	<0.5	<0.5	<0.5
Cadmium, total recoverable	9	1	<1	--	1	<1	<1	<1	<1
Cadmium, dissolved	9	2.0	<1.0	--	2.0	<1.0	<1.0	<1.0	<1.0
Chromium, total recoverable	9	250	<10	e50	250	10	1	<10	<10
Chromium, dissolved	9	4	<1	--	4	1	<1	<1	<1
Cobalt, total recoverable	9	20	<1	e6	20	10	1	<1	<1
Cobalt, dissolved	9	<3	<3	--	<3	<3	<3	<3	<3
Copper, total recoverable	9	65	1	16	65	33	5	3	1
Copper, dissolved	9	14	<1	e4	14	6	2	1	1
Iron, total recoverable	9	59,000	20	13,000	59,000	26,000	440	60	20
Iron, dissolved	9	190	24	82	190	150	40	40	20
Lead, total recoverable	9	11	<1	--	11	1	<5	<2	<1
Lead, dissolved	9	5	<1	--	5	<5	<5	<1	<1
Lithium, total recoverable	9	<10	<10	--	<10	<10	<10	<10	<10
Lithium, dissolved	9	6	<4	--	6	<4	<4	<4	<4
Manganese, total recoverable	9	1,300	<10	e230	1,300	40	20	20	<10
Manganese, dissolved	9	25	<1	e9	25	12	10	4	3
Mercury, total recoverable	9	0.2	<0.1	e0.1	0.2	0.1	0.1	<0.1	<0.1
Mercury, dissolved	9	0.2	<0.1	--	0.2	<0.1	<0.1	<0.1	<0.1
Molybdenum, tot. recoverable	9	5	<1	--	5	2	<1	<1	<1
Molybdenum, dissolved	9	<10	<10	--	<10	<10	<10	<10	<10

Table 11.--Statistical summary of selected water-quality data collected at station 2262, North Halawa Stream near Honolulu, from May 1983 to September 1989--Continued

Property or constituent	Number of samples	Maximum	Minimum	Average	Percentage of samples that were less than or equal to those shown: 95	75	50 (Median)	25	5
Metals (µg/L)--continued									
Nickel, total recoverable	9	100	<1	e25	100	13	4	3	<1
Nickel, dissolved	9	2	<1	e1	2	1	1	<1	<1
Selenium, total	8	<1	<1	--	<1	<1	<1	<1	<1
Selenium, dissolved	9	<1	<1	--	<1	<1	<1	<1	<1
Silver, total recoverable	9	<1	<1	--	<1	<1	<1	<1	<1
Silver, dissolved	9	<1.0	<1.0	--	<1.0	<1.0	<1.0	<1.0	<1.0
Strontium, dissolved	9	50	4	30	50	40	30	20	4
Vanadium, dissolved	9	<6	<6	--	<6	<6	<6	<6	<6
Zinc, total recoverable	9	270	<10	e70	270	80	50	20	<10
Zinc, dissolved	9	20	<3	e7	20	9	5	4	4
BIOLOGICAL									
Fecal coliform 0.7 µm-MF (cols./100 mL)	15	8,500	16	1,900	8,500	2,400	240	88	16
PHYSICAL PROPERTIES									
Discharge, instantaneous, stream (ft^3/s)	35	207	0.03	17	152	12	1.8	0.19	0.03
Pressure, air (mm of Hg)	23	761	751	758	761	760	758	757	751
Temperature, air (°C)	7	26.0	21.0	24.0	26.0	25.0	24.5	23.0	21.0
Temperature, water (°C)	36	25.5	19.0	22.0	24.7	23.0	22.0	21.1	19.4
Turbidity (NTU)	24	550	0.2	63	490	58	1.7	0.65	0.25
Oxygen dissolved (mg/L)	24	8.8	6.7	8.0	8.8	8.4	7.9	7.7	6.8
*Oxygen dissolved, percent	23	99	79	91	99	97	91	88	80
Solids, residue at 180°C, dissolved (mg/L)	9	101	31	68	101	87	75	45	31
Solids, residue at 105°C, suspended (mg/L)	16	684	<1	e113	684	25	5	<2	<1
*Solids, sum of constituents, dissolved (mg/L)	9	104	33	72	104	94	83	50	33
ORGANIC									
Carbon, organic, total (mg/L)	9	89	0.6	14	89	12	2.4	1.0	0.6
Oil and grease, total recoverable, gravimetric (mg/L)	9	5	<1	--	5	<1.0	<1	<1	<1
Pesticides and herbicides (total recoverable, µg/L)									
Malathion	9	0.01	<0.01	--	<0.01	<0.01	<0.01	<0.01	<0.01
Diazinon	9	0.01	<0.01	--	<0.01	<0.01	<0.01	<0.01	<0.01
Silvex	9	0.01	<0.01	--	<0.01	<0.01	<0.01	<0.01	<0.01

Other organic constituents analyzed but not detected

Organic (total recoverable)	Number of samples	Detection limit (µg/L)	Organic (total recoverable)	Number of samples	Detection limit (µg/L)
Aldrin	9	0.01	Methoxychlor	9	0.01
Chlordane	9	0.1	Methyl parathion	9	0.01
DDD	9	0.01	Methyl trithion	9	0.01
DDE	9	0.01	Mirex	9	0.01
DDT	9	0.01	Parathion	9	0.01
Dieldrin	9	0.01	Perthane	9	0.1
Endosulfan	9	0.01	Polychlorinated biphenyls	9	0.1
Endrin	9	0.01	Polychlorinated naphthalenes	9	0.1
Ethion	9	0.01	Toxaphene	9	1
Ethyl trithion	9	0.01	2,4-D	9	0.01
Heptachlor	9	0.01	2,4-DP	9	0.01
Heptachlor epoxide	9	0.01	2,4,5-T	9	0.01
Lindane	9	0.01			

Table 12.--Statistical summary of selected water-quality data collected at station 2656, Right Branch Kamooalii Stream near Kaneohe, from Febuary 1983 to September 1989

[µS/cm @ 25°C, microsiemens per centimeter at 25 degrees Celsius; mg/L, milligram per liter; µg/L, microgram per liter; <, less than; *, calculated value; e, estimated using log-probability regression; tot., total; 0.7 µm-MF, 0.7 micron membrane filter; cols./100 mL, colonies per 100 milliliters; ft^3/s, cubic foot per second; °C, degrees Celsius; NTU, nephelometric turbidity unit; --, no data]

Property or constituent	Number of samples	Maximum	Minimum	Average	Percentage of samples that were less than or equal to those shown: 95	75	50 (Median)	25	5
INORGANIC									
Field Measurements									
Specific conductance (µS/cm @ 25°C)	46	320	87	214	280	235	216	196	132
pH (units)	47	7.0	5.7	--	7.0	6.7	6.6	6.4	5.8
Major ions (mg/L)									
Hardness, total (as $CaCO_3$)	11	100	21	65	100	83	64	54	21
Calcium, dissolved	11	20	4.9	14	20	19	14	11	5
Magnesium, dissolved	11	13	2.2	7.5	13	8.5	7.2	6.5	2.2
Sodium, dissolved	11	24	5.3	17	24	19	18	16	5.3
*Sodium, percent	11	40	32	36	40	39	33	33	32
*Sodium adsorption ratio	11	1.0	0.5	0.9	1.0	1.0	0.9	0.9	0.5
Potassium, dissolved	11	2.7	0.9	1.3	2.7	1.4	1.1	0.9	0.9
Alkalinity (as $CaCO_3$)	11	94	17	58	94	68	55	52	17
Sulfate, dissolved	11	39	7.0	16	39	19	14	11	7.0
Chloride, dissolved	11	21	5.2	18	21	20	19	18	5.2
Fluoride, dissolved	11	0.3	<0.1	--	0.3	0.1	<0.1	<0.1	<0.1
Silica, dissolved	11	24	3.0	19	24	22	20	18	3.0
Nutrients (mg/L)									
Nitrogen, nitrite plus nitrate, total (as N)	26	0.70	0.30	0.49	0.67	0.60	0.50	0.40	0.30
Nitrogen, ammonia plus organic, total (as N)	26	1.7	<0.2	e0.46	0.90	0.60	0.30	0.30	<0.20
Phosphorus, total (as P)	26	0.58	<0.010	e0.079	0.43	0.060	0.030	0.020	<0.010
Metals (µg/L)									
Aluminum, total recoverable	11	1,100	90	350	1,100	520	190	140	90
Aluminum, dissolved	11	110	<10	15	110	10	<10	<10	<10
Arsenic, total	11	2	<1	--	2	<1	<1	<1	<1
Arsenic, dissolved	11	1	<1	--	1	<1	<1	<1	<1
Barium, total recoverable	11	100	<100	--	100	100	<100	<100.0	<100
Barium, dissolved	11	18	9	14	18	16	14	12	9
Beryllium, total recoverable	11	<10	<10	--	<10	<10	<10	<10	<10
Beryllium, dissolved	11	2.0	<0.5	--	2.0	<1.0	<0.5	<0.5	<0.5
Cadmium, total recoverable	11	3	<1	--	3	<1	<1	<1	<1
Cadmium, dissolved	11	<1.0	<1.0	--	<1.0	<1.0	<1.0	<1.0	<1.0
Chromium, total recoverable	11	80	<10	e11	80	10	1	<10	<10
Chromium, dissolved	11	10	<1	--	10	<1	<1	<1	<1
Cobalt, total recoverable	11	10	<1	e2	10	2	1	1	1
Cobalt, dissolved	11	<3	<3	--	<3	<3	<3	<3	<3
Copper, total recoverable	11	60	1	10	60	7	4	2	1
Copper, dissolved	11	8	1	3	8	5	2	2	1
Iron, total recoverable	11	39,000	420	4,400	39,000	1,700	720	520	420
Iron, dissolved	11	270	23	96	2700	110	80	35	23
Lead, total recoverable	11	31	<1	e5	31	3	2	<5	<1
Lead, dissolved	11	4	<1	e1	4	2	1	<5	<1
Lithium, total recoverable	11	10	<10	--	10	<10	<10	<10	<10
Lithium, dissolved	11	9	<4	e4	9	5	<4	<4	<4
Manganese, total recoverable	11	540	40	150	540	200	100	70	40
Manganese, dissolved	11	190	23	76	190	98	59	34	23
Mercury, total recoverable	11	0.8	<0.1	--	0.8	0.1	<0.1	<0.1	<0.1
Mercury, dissolved	11	0.1	<0.1	--	0.1	<0.1	<0.1	<0.1	<0.1
Molybdenum, tot. recoverable	11	4	<1	--	4	<1	<1	<1	<1
Molybdenum, dissolved	11	<10	<10	--	<10	<10	<10	<10	<10

Table 12.--Statistical summary of selected water-quality data collected at station 2656, Right Branch Kamooalii Stream near Kaneohe, from Febuary 1983 to September 1989--Continued

Property or constituent	Number of samples	Maximum	Minimum	Average	Percentage of samples that were less than or equal to those shown: 95	75	50 (Median)	25	5
Metals (µg/L)--continued									
Nickel, total recoverable	11	120	2	e21	120	17	11	7	2
Nickel, dissolved	11	8	<1	e4	8	5	3	2	<1
Selenium, total	11	<1	<1	--	<1	<1	<1	<1	<1
Selenium, dissolved	11	1	<1	--	1	<1	<1	<1	<1
Silver, total recoverable	11	<1	<1	--	<1	<1	<1	<1	<1
Silver, dissolved	11	<1.0	<1.0	--	<1.0	<1.0	<1.0	<1.0	<1.0
Strontium, dissolved	11	100	27	75	100	96	73	66	27
Vanadium, dissolved	11	<6	<6	--	<6	<6	<6	<6	<6
Zinc, total recoverable	11	170	40	90	170	160	60	40	40
Zinc, dissolved	11	160	7	54	160	74	42	16	7
BIOLOGICAL									
Fecal coliform 0.7 µm-MF (cols./100 mL)	22	9,000	37	1,600	8,300	2,800	640	280	42
PHYSICAL PROPERTIES									
Discharge, instantaneous, stream (ft^3/s)	49	1,130	0.07	24.7	14.5	1.4	0.8	0.4	0.2
Pressure, air (mm of Hg)	39	765	8.0	739	762	760	758	756	754
Temperature, air (°C)	16	29.0	23.0	25.7	29.0	26.9	25.5	24.6	23.0
Temperature, water (°C)	48	27.5	20.0	24.2	26.5	25.5	24.0	23.5	21.0
Turbidity (NTU)	36	360	0.9	28	280	11	3.1	1.8	0.90
Oxygen dissolved (mg/L)	38	8.2	4.0	6.4	8.2	7.2	6.4	5.8	4.2
*Oxygen dissolved, percent	37	101	0.0	75	95	87	78	69	43
Solids, residue at 180°C, dissolved (mg/L)	11	187	53	127	187	142	127	114	53
Solids, residue at 105°C, suspended (mg/L)	29	500	<1	e50	310	25	10	4	<1
*Solids, sum of constituents, dissolved (mg/L)	11	192	48	128	192	146	126	119	48
ORGANIC									
Carbon, organic, total (mg/L)	11	9.5	0.5	1.8	9.5	1.4	1.0	0.7	0.5
Oil and grease, total recoverable, gravimetric (mg/L)	11	3	<1	--	3	<1	<1	<1	<1
Pesticides and herbicides (total recoverable, µg/L)									
Diazinon	11	0.01	<0.01	--	<0.01	<0.01	<0.01	<0.01	<0.01
2,4-D	10	0.02	<0.01	--	0.02	<0.01	<0.01	<0.01	<0.01

Other organic constituents analyzed but not detected

Organic (total recoverable)	Number of samples	Detection limit (µg/L)	Organic (total recoverable)	Number of samples	Detection limit (µg/L)
Aldrin	11	0.01	Malathion	11	0.01
Chlordane	11	0.1	Methoxychlor	11	0.01
DDD	11	0.01	Methyl parathion	11	0.01
DDE	11	0.01	Methyl trithion	11	0.01
DDT	11	0.01	Mirex	11	0.01
Dieldrin	11	0.01	Parathion	11	0.01
Endosulfan	11	0.01	Perthane	11	0.1
Endrin	11	0.01	Polychlorinated biphenyls	11	0.1
Ethion	11	0.01	Polychlorinated naphthalenes	11	0.1
Ethyl trithion	11	0.01	Silvex	10	0.01
Heptachlor	11	0.01	Toxaphene	11	1
Heptachlor epoxide	11	0.01	2,4-DP	10	0.01
Lindane	11	0.01	2,4,5-T	10	0.01

Table 13.--Statistical summary of selected water-quality data collected at station 2657, Kamooalii Stream at altitude 200 feet near Kaneohe, from Febuary 1983 to September 1989

[µS/cm @ 25°C, microsiemens per centimeter at 25 degrees Celsius; mg/L, milligram per liter; µg/L, microgram per liter; <, less than; *, calculated value; e, estimated using log-probability regression; tot., total; 0.7 µm-MF, 0.7 micron membrane filter; cols./100 mL, colonies per 100 milliliters; ft^3/s, cubic foot per second; °C, degrees Celsius; NTU, nephelometric turbidity unit; --, no data]

Property or constituent	Number of samples	Maximum	Minimum	Average	Percentage of samples that were less than or equal to those shown: 95	75	50 (Median)	25	5
INORGANIC									
Field Measurements									
Specific conductance (µS/cm @ 25°C)	24	235	159	200	229	207	200	193	166
pH (units)	24	8.6	6.0	--	8.4	7.0	6.9	6.6	6.1
Major ions (mg/L)									
Hardness, total (as $CaCO_3$)	3	63	60	--	--	--	--	--	--
Calcium, dissolved	3	8.9	7.3	--	--	--	--	--	--
Magnesium, dissolved	3	10	9.9	--	--	--	--	--	--
Sodium, dissolved	3	15	14	--	--	--	--	--	--
*Sodium, percent	3	35	32	--	--	--	--	--	--
*Sodium adsorption ratio	3	0.8	0.8	--	--	--	--	--	--
Potassium, dissolved	3	1.5	0.9	--	--	--	--	--	--
Alkalinity (as $CaCO_3$)	3	65	59	--	--	--	--	--	--
Sulfate, dissolved	3	6.0	<5.0	--	--	--	--	--	--
Chloride, dissolved	3	22	21	--	--	--	--	--	--
Fluoride, dissolved	3	<0.1	<0.1	--	--	--	--	--	--
Silica, dissolved	3	23	20	--	--	--	--	--	--
Nutrients (mg/L)									
Nitrogen, nitrite plus nitrate, total (as N)	13	0.30	0.20	0.24	0.30	0.30	0.20	0.20	0.20
Nitrogen, ammonia plus organic, total (as N)	13	1.1	<0.20	e0.40	1.1	0.50	0.40	0.20	<0.20
Phosphorus, total (as P)	13	0.21	0.010	e0.050	0.21	0.060	0.030	0.020	0.010
Metals (µg/L)									
Aluminum, total recoverable	1	60	--	--	--	--	--	--	--
Aluminum, dissolved	3	10	<10	--	--	--	--	--	--
Arsenic, total	1	<1	--	--	--	--	--	--	--
Arsenic, dissolved	3	<1	<1	--	--	--	--	--	--
Barium, total recoverable	1	<100	--	--	--	--	--	--	--
Barium, dissolved	3	44	29	--	--	--	--	--	--
Beryllium, total recoverable	1	<10	--	--	--	--	--	--	--
Beryllium, dissolved	3	<0.5	<0.5	--	--	--	--	--	--
Cadmium, total recoverable	1	<1	--	--	--	--	--	--	--
Cadmium, dissolved	3	<1.0	<1.0	--	--	--	--	--	--
Chromium, total recoverable	1	10	--	--	--	--	--	--	--
Chromium, dissolved	3	<1	<1	--	--	--	--	--	--
Cobalt, total recoverable	1	<1	--	--	--	--	--	--	--
Cobalt, dissolved	3	<3	<3	--	--	--	--	--	--
Copper, total recoverable	1	1	--	--	--	--	--	--	--
Copper, dissolved	3	2	<1	--	--	--	--	--	--
Iron, total recoverable	1	120	--	--	--	--	--	--	--
Iron, dissolved	3	26	10	--	--	--	--	--	--
Lead, total recoverable	1	<1	--	--	--	--	--	--	--
Lead, dissolved	3	3	<1	--	--	--	--	--	--
Lithium, total recoverable	1	<10	--	--	--	--	--	--	--
Lithium, dissolved	3	9	<4	--	--	--	--	--	--
Manganese, total recoverable	1	10	--	--	--	--	--	--	--
Manganese, dissolved	3	6	2	--	--	--	--	--	--
Mercury, total recoverable	1	<0.1	--	--	--	--	--	--	--
Mercury, dissolved	3	<0.1	<0.1	--	--	--	--	--	--
Molybdenum, tot. recoverable	1	<1	--	--	--	--	--	--	--
Molybdenum, dissolved	3	<10	<10	--	--	--	--	--	--

Table 13.--Statistical summary of selected water-quality data collected at station 2657, Kamooalii Stream at altitude 200 feet near Kaneohe, from Febuary 1983 to September 1989--Continued

Property or constituent	Number of samples	Maximum	Minimum	Average	Percentage of samples that were less than or equal to those shown: 95	75	50 (Median)	25	5
Metals (µg/L)--continued									
Nickel, total recoverable	1	8	--	--	--	--	--	--	--
Nickel, dissolved	3	6	2	--	--	--	--	--	--
Selenium, total	1	<1	--	--	--	--	--	--	--
Selenium, dissolved	3	<1	<1	--	--	--	--	--	--
Silver, total recoverable	1	<1	--	--	--	--	--	--	--
Silver, dissolved	3	<1.0	<1.0	--	--	--	--	--	--
Strontium, dissolved	3	110	78	--	--	--	--	--	--
Vanadium, dissolved	3	<6	<6	--	--	--	--	--	--
Zinc, total recoverable	1	10	--	--	--	--	--	--	--
Zinc, dissolved	3	7	--	--	--	--	--	--	--
BIOLOGICAL									
Fecal coliform 0.7 µm-MF (cols./100 mL)	12	9,200	33	1,300	9,200	1,200	385	102	33
PHYSICAL PROPERTIES									
Discharge, instantaneous, stream (ft^3/s)	24	4.7	0.05	1.6	4.3	2.7	1.4	0.62	0.05
Pressure, air (mm of Hg)	23	765	754	758	764	759	758	757	754
Temperature, air (°C)	9	32.0	22.5	25.2	32.0	25.5	25.0	23.8	22.5
Temperature, water (°C)	24	26.0	20.0	22.2	25.4	22.5	22.5	21.6	20.2
Turbidity (NTU)	23	98	0.4	12	95	5.2	1.0	0.5	0.4
Oxygen dissolved (mg/L)	22	9.4	6.0	7.7	9.3	8.2	7.7	7.3	6.1
*Oxygen dissolved, percent	22	106	74	89	106	95	89	83	74
Solids, residue at 180°C, dissolved (mg/L)	3	113	109	--	--	--	--	--	--
Solids, residue at 105°C, suspended (mg/L)	16	156	<1	e15	156	10	5	2	1
*Solids, sum of constituents, dissolved (mg/L)	2	123	120	--	--	--	--	--	--
ORGANIC									
Carbon, organic, total (mg/L)	3	0.8	0.1	--	--	--	--	--	--
Oil and grease, total recoverable, gravimetric (mg/L)	2	3	<1	--	--	--	--	--	--
Pesticides and herbicides (total recoverable, µg/L)									
Diazinon	2	0.02	<0.01	--	--	--	--	--	--
Malathion	2	0.28	<0.01	--	--	--	--	--	--

Other organic constituents analyzed but not detected

Organic (total recoverable)	Number of samples	Detection limit (µg/L)	Organic (total recoverable)	Number of samples	Detection limit (µg/L)
Aldrin	2	0.01	Methoxychlor	2	0.01
Chlordane	2	0.1	Methyl parathion	2	0.01
DDD	2	0.01	Methyl trithion	2	0.01
DDE	2	0.01	Mirex	2	0.01
DDT	2	0.01	Parathion	2	0.01
Dieldrin	2	0.01	Perthane	2	0.1
Endosulfan	2	0.01	Polychlorinated biphenyls	2	0.1
Endrin	2	0.01	Polychlorinated naphthalenes	2	0.1
Ethion	2	0.01	Silvex	2	0.01
Ethyl trithion	2	0.01	Toxaphene	2	1
Heptachlor	2	0.01	2,4-D	2	0.01
Heptachlor epoxide	2	0.01	2,4-DP	2	0.01
Lindane	2	0.01	2,4,5-T	2	0.01

Table 14.--Statistical summary of selected water-quality data collected at station 2665, Hooleinaiwa Stream at altitude 220 feet near Kaneohe, from Febuary 1983 to September 1989

[µS/cm @ 25°C, microsiemens per centimeter at 25 degrees Celsius; mg/L, milligram per liter; µg/L, microgram per liter; <, less than; *, calculated value; e, estimated using log-probability regression; tot., total; 0.7 µm-MF, 0.7 micron membrane filter; cols./100 mL, colonies per 100 milliliters; ft^3/s, cubic foot per second; °C, degrees Celsius; NTU, nephelometric turbidity unit; --, no data]

Property or constituent	Number of samples	Maximum	Minimum	Average	Percentage of samples that were less than or equal to those shown: 95	75	50 (Median)	25	5
INORGANIC									
Field Measurements									
Specific conductance (µS/cm @ 25°C)	21	152	99	120	150	125	120	113	100
pH (units)	21	7.3	6.1	--	7.3	7.0	6.7	6.5	6.1
Major ions (mg/L)									
Hardness, total (as $CaCO_3$)	3	39	29	--	--	--	--	--	--
Calcium, dissolved	3	6.5	4.7	--	--	--	--	--	--
Magnesium, dissolved	3	5.6	4.3	--	--	--	--	--	--
Sodium, dissolved	3	11	9.5	--	--	--	--	--	--
*Sodium, percent	3	41	37	--	--	--	--	--	--
*Sodium adsorption ratio	3	0.8	0.8	--	--	--	--	--	--
Potassium, dissolved	3	0.7	0.4	--	--	--	--	--	--
Alkalinity (as $CaCO_3$)	3	41	34	--	--	--	--	--	--
Sulfate, dissolved	3	5.4	<5.0	--	--	--	--	--	--
Chloride, dissolved	3	15	12	--	--	--	--	--	--
Fluoride, dissolved	3	<0.1	<0.1	--	--	--	--	--	--
Silica, dissolved	3	22	18	--	--	--	--	--	--
Nutrients (mg/L)									
Nitrogen, nitrite plus nitrate, total (as N)	12	0.10	<0.10	--	0.10	<0.10	<0.10	<0.10	<0.10
Nitrogen, ammonia plus organic, total (as N)	12	0.60	<0.20	--	0.60	0.20	<0.20	<0.20	<0.20
Phosphorus, total (as P)	11	0.070	0.010	e0.014	0.070	0.010	0.010	<0.010	<0.010
Metals (µg/L)									
Aluminum, total recoverable	2	50	30	--	--	--	--	--	--
Aluminum, dissolved	3	10	<10	--	--	--	--	--	--
Arsenic, total	2	<1	<1	--	--	--	--	--	--
Arsenic, dissolved	3	<1	<1	--	--	--	--	--	--
Barium, total recoverable	2	<100	<100	--	--	--	--	--	--
Barium, dissolved	3	6	5	--	--	--	--	--	--
Beryllium, total recoverable	2	<10	<10	--	--	--	--	--	--
Beryllium, dissolved	3	<1.0	<0.5	--	--	--	--	--	--
Cadmium, total recoverable	2	1	<1	--	--	--	--	--	--
Cadmium, dissolved	3	<1.0	<1.0	--	--	--	--	--	--
Chromium, total recoverable	2	10	<10	--	--	--	--	--	--
Chromium, dissolved	3	1	<1	--	--	--	--	--	--
Cobalt, total recoverable	2	4	<1	--	--	--	--	--	--
Cobalt, dissolved	3	<3	<3	--	--	--	--	--	--
Copper, total recoverable	2	3	2	--	--	--	--	--	--
Copper, dissolved	3	2	<1	--	--	--	--	--	--
Iron, total recoverable	2	240	220	--	--	--	--	--	--
Iron, dissolved	3	94	32	--	--	--	--	--	--
Lead, total recoverable	2	<1	<1	--	--	--	--	--	--
Lead, dissolved	3	<1	<1	--	--	--	--	--	--
Lithium, total recoverable	2	<10	<10	--	--	--	--	--	--
Lithium, dissolved	3	9	<4	--	--	--	--	--	--
Manganese, total recoverable	2	70	50	--	--	--	--	--	--
Manganese, dissolved	3	51	17	--	--	--	--	--	--
Mercury, total recoverable	2	<0.1	<0.1	--	--	--	--	--	--
Mercury, dissolved	3	<0.1	<0.1	--	--	--	--	--	--
Molybdenum, tot. recoverable	2	<1	<1	--	--	--	--	--	--
Molybdenum, dissolved	3	<10	<10	--	--	--	--	--	--

Table 14.--Statistical summary of selected water-quality data collected at station 2665, Hooleinaiwa Stream at altitude 220 feet near Kaneohe, from Febuary 1983 to September 1989--Continued

Property or constituent	Number of samples	Maximum	Minimum	Average	Percentage of samples that were less than or equal to those shown: 95	75	50 (Median)	25	5
Metals (µg/L)--continued									
Nickel, total recoverable	2	9	9	--	--	--	--	--	--
Nickel, dissolved	3	4	<1	--	--	--	--	--	--
Selenium, total	2	<1	<1	--	--	--	--	--	--
Selenium, dissolved	3	<1	<1	--	--	--	--	--	--
Silver, total recoverable	2	<1	<1	--	--	--	--	--	--
Silver, dissolved	3	<1.0	<1.0	--	--	--	--	--	--
Strontium, dissolved	3	43	32	--	--	--	--	--	--
Vanadium, dissolved	3	<6	<6	--	--	--	--	--	--
Zinc, total recoverable	2	10	10	--	--	--	--	--	--
Zinc, dissolved	3	5	<3	--	--	--	--	--	--
BIOLOGICAL									
Fecal coliform 0.7 µm-MF (cols./100 mL)	12	1,100	50	233	1,100	258	125	91	50
PHYSICAL PROPERTIES									
Discharge, instantaneous, stream (ft^3/s)	21	2.8	0.07	0.6	2.7	0.87	0.37	0.16	0.08
Pressure, air (mm of Hg)	21	761	752	758	761	759	758	757	752
Temperature, air (°C)	7	28.0	24.0	25.5	28.0	26.0	25.5	24.0	24.0
Temperature, water (°C)	21	25.0	21.0	22.8	25.0	23.5	22.5	22.3	21.0
Turbidity (NTU)	20	32	0.3	2.4	31	1.2	0.7	0.4	0.3
Oxygen dissolved (mg/L)	20	9.3	6.6	7.8	9.3	8.5	8.0	7.0	6.6
*Oxygen dissolved, percent	20	107	78	91	107	98	94	83	78
Solids, residue at 180°C, dissolved (mg/L)	3	81	63	--	--	--	--	--	--
Solids, residue at 105°C, suspended (mg/L)	15	37	<1	e9	37	11	6	<2	<1
*Solids, sum of constituents, dissolved (mg/L)	2	89	85	--	--	--	--	--	--
ORGANIC									
Carbon, organic, total (mg/L)	2	0.6	0.3	--	--	--	--	--	--
Oil and grease, total recoverable, gravimetric (mg/L)	1	<1	--	--	--	--	--	--	--

Pesticides and herbicides (total recoverable, µg/L)

None detected

Other organic constituents analyzed but not detected

Organic (total recoverable)	Number of samples	Detection limit (µg/L)	Organic (total recoverable)	Number of samples	Detection limit (µg/L)
Aldrin	2	0.01	Malathion	2	0.01
Chlordane	2	0.1	Methoxychlor	2	0.01
DDD	2	0.01	Methyl parathion	2	0.01
DDE	2	0.01	Methyl trithion	2	0.01
DDT	2	0.01	Mirex	2	0.01
Diazinon	2	0.01	Parathion	2	0.01
Dieldrin	2	0.01	Perthane	2	0.1
Endosulfan	2	0.01	Polychlorinated biphenyls	2	0.1
Endrin	2	0.01	Polychlorinated naphthalenes	2	0.1
Ethion	2	0.01	Silvex	2	0.01
Ethyl trithion	2	0.01	Toxaphene	2	1
Heptachlor	2	0.01	2,4-D	2	0.01
Heptachlor epoxide	2	0.01	2,4-DP	2	0.01
Lindane	2	0.01	2,4,5-T	2	0.01

Table 15.--Statistical summary of selected water-quality data collected at station 2675, Hooleinaiwa Stream above confluence with Kamooalii Stream, from Febuary 1983 to September 1989

[µS/cm @ 25°C, microsiemens per centimeter at 25 degrees Celsius; mg/L, milligram per liter; µg/L, microgram per liter; <, less than; *, calculated value; e, estimated using log-probability regression; tot., total; 0.7 µm-MF, 0.7 micron membrane filter; cols./100 mL, colonies per 100 milliliters; ft^3/s, cubic foot per second; °C, degrees Celsius; NTU, nephelometric turbidity unit; --, no data]

Property or constituent	Number of samples	Maximum	Minimum	Average	Percentage of samples that were less than or equal to those shown: 95	75	50 (Median)	25	5
INORGANIC									
Field Measurements									
Specific conductance (µS/cm @ 25°C)	22	188	105	156	187	171	163	143	107
pH (units)	22	7.5	6.3	--	7.5	7.3	7.1	6.8	6.3
Major ions (mg/L)									
Hardness, total (as $CaCO_3$)	5	59	43	--	--	--	--	--	--
Calcium, dissolved	5	10	7.2	--	--	--	--	--	--
Magnesium, dissolved	5	8.3	6.0	--	--	--	--	--	--
Sodium, dissolved	5	15	11	--	--	--	--	--	--
*Sodium, percent	5	37	34	--	--	--	--	--	--
*Sodium adsorption ratio	5	0.9	0.7	--	--	--	--	--	--
Potassium, dissolved	5	0.9	0.6	--	--	--	--	--	--
Alkalinity (as $CaCO_3$)	5	62	46	--	--	--	--	--	--
Sulfate, dissolved	5	13	<5.0	--	--	--	--	--	--
Chloride, dissolved	5	18	14	--	--	--	--	--	--
Fluoride, dissolved	5	0.1	<0.1	--	--	--	--	--	--
Silica, dissolved	5	27	23	--	--	--	--	--	--
Nutrients (mg/L)									
Nitrogen, nitrite plus nitrate, total (as N)	13	0.10	<0.10	--	0.10	<0.10	<0.10	<0.10	<0.10
Nitrogen, ammonia plus organic, total (as N)	13	0.70	<0.20	e0.35	0.70	0.50	0.30	<0.20	<0.20
Phosphorus, total (as P)	11	0.040	<0.010	e0.019	0.040	0.030	0.020	0.010	<0.010
Metals (µg/L)									
Aluminum, total recoverable	3	60	30	--	--	--	--	--	--
Aluminum, dissolved	5	30	<10	--	--	--	--	--	--
Arsenic, total	3	<1	<1	--	--	--	--	--	--
Arsenic, dissolved	5	1	<1	--	--	--	--	--	--
Barium, total recoverable	3	<100	<100	--	--	--	--	--	--
Barium, dissolved	5	7	5	--	--	--	--	--	--
Beryllium, total recoverable	3	<10	<10	--	--	--	--	--	--
Beryllium, dissolved	5	<1.0	<0.5	--	--	--	--	--	--
Cadmium, total recoverable	3	1	<1	--	--	--	--	--	--
Cadmium, dissolved	5	<1.0	<1.0	--	--	--	--	--	--
Chromium, total recoverable	3	<10	<10	--	--	--	--	--	--
Chromium, dissolved	5	<1	<1	--	--	--	--	--	--
Cobalt, total recoverable	3	<1	<1	--	--	--	--	--	--
Cobalt, dissolved	5	<3	<3	--	--	--	--	--	--
Copper, total recoverable	3	4	2	--	--	--	--	--	--
Copper, dissolved	5	5	<1	--	--	--	--	--	--
Iron, total recoverable	3	910	750	--	--	--	--	--	--
Iron, dissolved	5	260	110	--	--	--	--	--	--
Lead, total recoverable	3	15	<1	--	--	--	--	--	--
Lead, dissolved	5	<1	<1	--	--	--	--	--	--
Lithium, total recoverable	3	<10	<10	--	--	--	--	--	--
Lithium, dissolved	5	10	<4	--	--	--	--	--	--
Manganese, total recoverable	3	130	90	--	--	--	--	--	--
Manganese, dissolved	5	100	44	--	--	--	--	--	--
Mercury, total recoverable	3	0.1	<0.1	--	--	--	--	--	--
Mercury, dissolved	5	<0.1	<0.1	--	--	--	--	--	--
Molybdenum, tot. recoverable	3	<1	<1	--	--	--	--	--	--
Molybdenum, dissolved	5	<10	<10	--	--	--	--	--	--

Table 15.--Statistical summary of selected water-quality data collected at station 2675, Hooleinaiwa Stream above confluence with Kamooalii Stream, from Febuary 1983 to September 1989--Continued

Property or constituent	Number of samples	Maximum	Minimum	Average	Percentage of samples that were less than or equal to those shown: 95	75	50 (Median)	25	5
Metals (µg/L)--continued									
Nickel, total recoverable	3	9	2	--	--	--	--	--	--
Nickel, dissolved	5	7	<1	--	--	--	--	--	--
Selenium, total	3	<1	<1	--	--	--	--	--	--
Selenium, dissolved	5	<1	<1	--	--	--	--	--	--
Silver, total recoverable	3	<1	<1	--	--	--	--	--	--
Silver, dissolved	5	<1.0	<1.0	--	--	--	--	--	--
Strontium, dissolved	5	62	42	--	--	--	--	--	--
Vanadium, dissolved	5	<6	<6	--	--	--	--	--	--
Zinc, total recoverable	3	360	<10	--	--	--	--	--	--
Zinc, dissolved	5	7	<3	--	--	--	--	--	--
BIOLOGICAL									
Fecal coliform 0.7 µm-MF (cols./100 mL)	12	3,300	10	417	3,300	435	97	36	10
PHYSICAL PROPERTIES									
Discharge, instantaneous, stream (ft^3/s)	22	8.5	0.42	1.4	7.8	1.2	0.84	0.66	0.42
Pressure, air (mm of Hg)	22	765	756	760	765	761	759	758	756
Temperature, air (°C)	6	30.0	26.0	28.0	30.0	30.0	28.0	26.8	26.0
Temperature, water (°C)	22	30.0	21.5	24.2	29.4	25.0	24.3	23.3	21.6
Turbidity (NTU)	22	26	0.5	4.6	24	4.2	2.9	2.5	0.7
Oxygen dissolved (mg/L)	22	8.4	5.6	7.3	8.4	8.0	7.0	6.6	5.7
*Oxygen dissolved, percent	22	99	74	87	99	96	84	80	74
Solids, residue at 180°C, dissolved (mg/L)	5	112	87	--	--	--	--	--	--
Solids, residue at 105°C, suspended (mg/L)	16	29	<1	e8	29	10	7	1	<1
*Solids, sum of constituents, dissolved (mg/L)	4	119	115	--	--	--	--	--	--
ORGANIC									
Carbon, organic, total (mg/L)	5	2.3	0.4	--	--	--	--	--	--
Oil and grease, total recoverable, gravimetric (mg/L)	4	5	<1	--	--	--	--	--	--
Pesticides and herbicides (total recoverable, µg/L)									
Diazinon	5	0.01	<0.01	--	--	--	--	--	--
2,4-D	4	0.02	<0.01	--	--	--	--	--	--

Other organic constituents analyzed but not detected

Organic (total recoverable)	Number of samples	Detection limit (µg/L)	Organic (total recoverable)	Number of samples	Detection limit (µg/L)
Aldrin	5	0.01	Malathion	5	0.01
Chlordane	5	0.1	Methoxychlor	5	0.01
DDD	5	0.01	Methyl parathion	5	0.01
DDE	5	0.01	Methyl trithion	5	0.01
DDT	5	0.01	Mirex	5	0.01
Dieldrin	5	0.01	Parathion	5	0.01
Endosulfan	5	0.01	Perthane	5	0.1
Endrin	5	0.01	Polychlorinated biphenyls	5	0.1
Ethion	5	0.01	Polychlorinated naphthalenes	5	0.1
Ethyl trithion	5	0.01	Silvex	4	0.01
Heptachlor	5	0.01	Toxaphene	5	1
Heptachlor epoxide	5	0.01	2,4-DP	4	0.01
Lindane	5	0.01	2,4,5-T	4	0.01

Table 16.--Statistical summary of selected water-quality data collected at station 2695, Kuou Stream at altitude 220 feet near Kaneohe, from Febuary 1983 to September 1989

[µS/cm @ 25°C, microsiemens per centimeter at 25 degrees Celsius; mg/L, milligram per liter; µg/L, microgram per liter; <, less than; *, calculated value; e, estimated using log-probability regression; tot., total; 0.7 µm-MF, 0.7 micron membrane filter; cols./100 mL, colonies per 100 milliliters; ft^3/s, cubic foot per second; °C, degrees Celsius; NTU, nephelometric turbidity unit; --, no data]

Property or constituent	Number of samples	Maximum	Minimum	Average	Percentage of samples that were less than or equal to those shown: 95	75	50 (Median)	25	5
INORGANIC									
Field Measurements									
Specific conductance (µS/cm @ 25°C)	21	320	200	252	320	281	250	221	201
pH (units)	22	7.4	6.0	--	7.3	7.0	6.9	6.8	6.0
Major ions (mg/L)									
Hardness, total (as $CaCO_3$)	3	83	66	--	--	--	--	--	--
Calcium, dissolved	3	17	13	--	--	--	--	--	--
Magnesium, dissolved	3	9.8	8.0	--	--	--	--	--	--
Sodium, dissolved	3	16	15	--	--	--	--	--	--
*Sodium, percent	3	33	29	--	--	--	--	--	--
*Sodium adsorption ratio	3	0.8	0.8	--	--	--	--	--	--
Potassium, dissolved	3	1.2	1.1	--	--	--	--	--	--
Alkalinity (as $CaCO_3$)	3	76	68	--	--	--	--	--	--
Sulfate, dissolved	3	17	8.0	--	--	--	--	--	--
Chloride, dissolved	3	22	18	--	--	--	--	--	--
Fluoride, dissolved	3	<0.1	<0.1	--	--	--	--	--	--
Silica, dissolved	3	36	32	--	--	--	--	--	--
Nutrients (mg/L)									
Nitrogen, nitrite plus nitrate, total (as N)	12	4.1	<0.10	e0.62	4.1	0.50	0.20	<0.10	<0.10
Nitrogen, ammonia plus organic, total (as N)	12	0.70	<0.20	e0.41	0.70	0.50	0.40	<0.20	<0.20
Phosphorus, total (as P)	12	0.20	<0.010	e0.029	0.20	0.020	0.010	<0.010	<0.010
Metals (µg/L)									
Aluminum, total recoverable	1	50	--	--	--	--	--	--	--
Aluminum, dissolved	3	10	<10	--	--	--	--	--	--
Arsenic, total	1	1	--	--	--	--	--	--	--
Arsenic, dissolved	3	1	<1	--	--	--	--	--	--
Barium, total recoverable	1	<100	--	--	--	--	--	--	--
Barium, dissolved	3	9	7	--	--	--	--	--	--
Beryllium, total recoverable	1	<10	--	--	--	--	--	--	--
Beryllium, dissolved	3	<0.5	<0.5	--	--	--	--	--	--
Cadmium, total recoverable	1	<1	--	--	--	--	--	--	--
Cadmium, dissolved	3	<1.0	<1.0	--	--	--	--	--	--
Chromium, total recoverable	1	10	--	--	--	--	--	--	--
Chromium, dissolved	3	<1	<1	--	--	--	--	--	--
Cobalt, total recoverable	1	<1	--	--	--	--	--	--	--
Cobalt, dissolved	3	<3	<3	--	--	--	--	--	--
Copper, total recoverable	1	4	--	--	--	--	--	--	--
Copper, dissolved	3	2	<1	--	--	--	--	--	--
Iron, total recoverable	1	680	--	--	--	--	--	--	--
Iron, dissolved	3	460	130	--	--	--	--	--	--
Lead, total recoverable	1	<1	--	--	--	--	--	--	--
Lead, dissolved	3	<1	<1	--	--	--	--	--	--
Lithium, total recoverable	1	<10	--	--	--	--	--	--	--
Lithium, dissolved	3	10	4	--	--	--	--	--	--
Manganese, total recoverable	1	80	--	--	--	--	--	--	--
Manganese, dissolved	3	91	62	--	--	--	--	--	--
Mercury, total recoverable	1	<0.1	--	--	--	--	--	--	--
Mercury, dissolved	3	<0.1	<0.1	--	--	--	--	--	--
Molybdenum, tot. recoverable	1	<1	--	--	--	--	--	--	--
Molybdenum, dissolved	3	<10	<10	--	--	--	--	--	--

Table 16.--Statistical summary of selected water-quality data collected at station 2695, Kuou Stream at altitude 220 feet near Kaneohe, from Febuary 1983 to September 1989--Continued

Property or constituent	Number of samples	Maximum	Minimum	Average	Percentage of samples that were less than or equal to those shown: 95	75	50 (Median)	25	5
Metals (µg/L)--continued									
Nickel, total recoverable	1	9	--	--	--	--	--	--	--
Nickel, dissolved	3	9	1	--	--	--	--	--	--
Selenium, total	1	<1	--	--	--	--	--	--	--
Selenium, dissolved	3	<1	<1	--	--	--	--	--	--
Silver, total recoverable	1	<1	--	--	--	--	--	--	--
Silver, dissolved	3	<1.0	<1.0	--	--	--	--	--	--
Strontium, dissolved	3	92	71	--	--	--	--	--	--
Vanadium, dissolved	3	<6	<6	--	--	--	--	--	--
Zinc, total recoverable	1	20	--	--	--	--	--	--	--
Zinc, dissolved	3	9	<3	--	--	--	--	--	--
BIOLOGICAL									
Fecal coliform 0.7 µm-MF (cols./100 mL)	12	540	10	177	540	315	130	43	10
PHYSICAL PROPERTIES									
Discharge, instantaneous, stream (ft^3/s)	22	6.0	0.03	0.58	5.3	0.51	0.17	0.10	0.03
Pressure, air (mm of Hg)	21	762	755	758	762	759	758	757	755
Temperature, air (°C)	4	30.0	23.0	--	--	--	--	--	--
Temperature, water (°C)	22	24.5	20.5	22.4	24.4	23.0	22.5	22.0	20.6
Turbidity (NTU)	20	43	1.4	5.6	41	4.8	3.5	2.4	1.4
Oxygen dissolved (mg/L)	21	9.4	5.0	6.9	9.4	7.9	6.9	5.7	5.0
*Oxygen dissolved, percent	20	105	60	80	105	92	81	66	60
Solids, residue at 180°C, dissolved (mg/L)	3	148	136	--	--	--	--	--	--
Solids, residue at 105°C, suspended (mg/L)	15	13	<1	e6	13	9	5	<1	<1
*Solids, sum of constituents, dissolved (mg/L)	3	159	144	--	--	--	--	--	--
ORGANIC									
Carbon, organic, total (mg/L)	3	1.0	0.5	--	--	--	--	--	--
Oil and grease, total recoverable, gravimetric (mg/L)	2	2	<1	--	--	--	--	--	--

Pesticides and herbicides (total recoverable, µg/L)

None detected

Other organic constituents analyzed but not detected

Organic (total recoverable)	Number of samples	Detection limit (µg/L)	Organic (total recoverable)	Number of samples	Detection limit (µg/L)
Aldrin	3	0.01	Malathion	3	0.01
Chlordane	3	0.1	Methoxychlor	3	0.01
DDD	3	0.01	Methyl parathion	3	0.01
DDE	3	0.01	Methyl trithion	3	0.01
DDT	3	0.01	Mirex	3	0.01
Diazinon	3	0.01	Parathion	3	0.01
Dieldrin	3	0.01	Perthane	3	0.1
Endosulfan	3	0.01	Polychlorinated biphenyls	3	0.1
Endrin	3	0.01	Polychlorinated naphthalenes	3	0.1
Ethion	3	0.01	Silvex	3	0.01
Ethyl trithion	3	0.01	Toxaphene	3	1
Heptachlor	3	0.01	2,4-D	3	0.01
Heptachlor epoxide	3	0.01	2,4-DP	3	0.01
Lindane	3	0.01	2,4,5-T	3	0.01

Table 17.--Statistical summary of selected water-quality data collected at station 2709, Luluku Stream at altitude 220 feet near Kaneohe, from February 1983 to September 1989

[µS/cm @ 25°C, microsiemens per centimeter at 25 degrees Celsius; mg/L, milligram per liter; µg/L, microgram per liter; <, less than; *, calculated value; e, estimated using log-probability regression; tot., total; 0.7 µm-MF, 0.7 micron membrane filter; cols./100 mL, colonies per 100 milliliters; ft^3/s, cubic foot per second; °C, degrees Celsius; NTU, nephelometric turbidity unit; --, no data]

Property or constituent	Number of samples	Maximum	Minimum	Average	Percentage of samples that were less than or equal to those shown: 95	75	50 (Median)	25	5
INORGANIC									
Field Measurements									
Specific conductance (µS/cm @ 25°C)	48	195	126	165	190	177	162	157	139
pH (units)	48	8.3	6.3	7.2	7.7	7.6	7.2	6.9	6.5
Major ions (mg/L)									
Hardness, total (as $CaCO_3$)	9	61	46	49	61	51	48	46	46
Calcium, dissolved	9	12	8.5	9.5	12	9.8	9.2	8.8	8.5
Magnesium, dissolved	9	7.5	5.7	6.2	7.5	6.6	5.9	5.8	5.7
Sodium, dissolved	9	14	10	13	14	14	13	12	10
*Sodium adsorption ratio	9	0.8	0.6	0.8	0.8	0.8	0.8	0.8	0.6
*Sodium, percent	9	38	30	35	38	38	36	33	30
Potassium, dissolved	9	3.1	0.9	1.4	3.1	1.8	1.1	1.0	0.9
Alkalinity (as $CaCO_3$)	8	55	41	48	55	51	48	44	41
Sulfate, dissolved	9	15	<5.0	e5.8	15	5.9	4.7	3.5	3.0
Chloride, dissolved	9	20	15	17	20	18	16	15	15
Fluoride, dissolved	9	0.3	<0.1	--	0.3	0.1	<0.1	<0.1	<0.1
Silica, dissolved	9	29	21	26	29	28	27	24	21
Nutrients (mg/L)									
Nitrogen, nitrite plus nitrate, total (as N)	21	1.3	<0.10	e0.30	0.90	0.30	0.20	<0.10	<0.10
Nitrogen, ammonia plus organic, total (as N)	21	1.0	<0.10	e0.30	0.80	0.40	0.20	<0.20	<0.20
Phosphorus, total (as P)	21	0.29	0.010	0.050	0.28	0.030	0.020	0.020	0.010
Metals (µg/L)									
Aluminum, total recoverable	9	1,600	20	260	1,600	205	80	45	20
Aluminum, dissolved	3	160	<10	e26	160	20	10	<10	<10
Arsenic, total	9	2	<1	e1	2	2	1	<1	<1
Arsenic, dissolved	9	1	<1	e1	1	1	1	<1	<1
Barium, total recoverable	9	100	<100	--	100	100	<100	<100	<100
Barium, dissolved	9	7	<2	e5	7	6	5	<2	<2
Beryllium, total recoverable	9	<10	<10	--	<10	<10	<10	<10	<10
Beryllium, dissolved	9	<1.0	<0.5	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5
Cadmium, total recoverable	9	1	<1	--	1	<1	<1	<1	<1
Cadmium, dissolved	9	2.0	<1.0	--	2.0	<1.0	<1.0	<1.0	<1.0
Chromium, total recoverable	9	20	<10	e5	20	2	1	<10	<10
Chromium, dissolved	9	7	<1	--	7	1	<1	<1	<1
Cobalt, total recoverable	9	3	<1	--	3	2	<1	<1	<1
Cobalt, dissolved	9	<3	<1	--	<3	<3	<3	<3	<3
Copper, total recoverable	9	8	<1	e4	8	5	3	2	1
Copper, dissolved	9	3	<1	e2	3	2	2	<1	<1
Iron, total recoverable	9	4,400	40	760	4,400	950	100	75	40
Iron, dissolved	9	95	19	36	95	50	23	20	19
Lead, total recoverable	9	10	<1	e2	10	4	1	<1.0	<1
Lead, dissolved	9	2	<1	--	2	1	<1	<1.0	<1
Lithium, total recoverable	9	<10	<10	--	<10	<10	<10	<10.0	<10
Lithium, dissolved	9	10	<4	--	10	<4	<4	<4.0	<4
Manganese, total recoverable	9	130	<10	e36	130	60	20	10	10
Manganese, dissolved	9	37	5	13	37	16	9	6.0	5
Mercury, total recoverable	9	0.1	<0.1	--	0.1	<0.1	<0.1	<0.1	<0.1
Mercury, dissolved	9	0.2	<0.1	--	0.2	<0.1	<0.1	<0.1	<0.1
Molybdenum, tot. recoverable	9	3	<1	--	3	1	<1	<1	<1
Molybdenum, dissolved	9	<10	<10	--	<10	<10	<10	<10	<10

Table 17.--Statistical summary of selected water-quality data collected at station 2709, Luluku Stream at altitude 220 feet near Kaneohe, from February 1983 to September 1989--Continued

Property or constituent	Number of samples	Maximum	Minimum	Average	Percentage of samples that were less than or equal to those shown: 95	75	50 (Median)	25	5
Metals (µg/L)--continued									
Nickel, total recoverable	9	9	1	5	9	8	5	1	1
Nickel, dissolved	9	5	<1	--	5	1	<1	<1	<1
Selenium, total	9	<1	<1	--	<1	<1	<1	<1	<1
Selenium, dissolved	9	<1	<1	--	<1	<1	<1	<1	<1
Silver, total recoverable	9	<1	<1	--	<1	<1	<1	<1	<1
Silver, dissolved	9	<1.0	<1.0	--	<1.0	<1.0	<1.0	<1.0	<1.0
Strontium, dissolved	9	70	52	57	70	59	55	52	52
Vanadium, dissolved	9	<6	<6	--	6	<6	<6	<6	<6
Zinc, total recoverable	9	140	<10	e24	140	20	10	<10	<10
Zinc, dissolved	9	19	<3	6	19	6	5	<3	<3
BIOLOGICAL									
Fecal coliform 0.7 µm-MF (cols./100 mL)	19	9,000	68	1,320	9,000	1,100	590	160	68
PHYSICAL PROPERTIES									
Discharge, instantaneous, stream (ft^3/s)	48	222	0.07	6.12	16.0	1.50	0.78	0.16	0.08
Pressure, air (mm of Hg)	30	762	755	758	762	760	758	757	755
Temperature, air (°C)	9	30.0	25.0	26.9	30.0	28.3	26.5	25.5	25.0
Temperature, water (°C)	48	26.0	19.5	21.5	23.8	22.5	21.5	20.5	19.5
Turbidity (NTU)	30	140	0.2	10	93	2.2	0.9	0.4	0.2
Oxygen dissolved (mg/L)	30	9.8	6.8	8.2	9.7	8.8	8.2	7.6	6.9
*Oxygen dissolved, percent	30	113	79	94	109	101	94	87	80
Solids, residue at 105°C, suspended (mg/L)	24	81	<1	e10	29	11	5	<2	<1
Solids, residue at 180°C, dissolved (mg/L)	9	138	95	107	138	108	105	102	95
*Solids, sum of constituents, dissolved (mg/L)	8	118	96	106	118	110	106	104	96
ORGANIC									
Carbon, organic, total (mg/L)	9	5.4	0.5	2.0	5.4	4.2	0.7	0.6	0.5
Oil and grease, total recoverable, gravimetric (mg/L)	9	1	<1	--	1	<1	<1	<1	<1
Pesticides and herbicides (total recoverable, µg/L)									
Diazinon, total	9	0.01	<0.01	--	0.01	<0.01	<0.01	<0.01	<0.01

Other organic constituents analyzed but not detected

Organic (total recoverable)	Number of samples	Detection limit (µg/L)	Organic (total recoverable)	Number of samples	Detection limit (µg/L)
Aldrin	9	0.01	Methoxychlor	9	0.01
Chlordane	9	0.1	Methyl parathion	9	0.01
Dieldrin	9	0.01	Methyl trithion	9	0.01
DDD	9	0.01	Mirex	9	0.01
DDE	9	0.01	Parathion	9	0.01
DDT	9	0.01	Perthane	9	0.1
Endosulfan	9	0.01	Polychlorinated biphenyls	9	0.1
Endrin	9	0.01	Polychlorinated naphthalenes	9	0.1
Ethion	9	0.01	Silvex	8	0.01
Ethyl trithion	9	0.01	Toxaphene	9	1
Heptachlor	9	0.01	2,4,5-T	8	0.01
Heptachlor epoxide	9	0.01	2,4 D	8	0.01
Lindane	9	0.01	2,4 DP	8	0.01

Table 18.--Statistical summary of selected water-quality data collected at station 2722, Kamooalii Stream below Luluku Stream near Kaneohe, from October 1982 to September 1989

[µS/cm @ 25°C, microsiemens per centimeter at 25 degrees Celsius; mg/L, milligram per liter; µg/L, microgram per liter; <, less than; *, calculated value; e, estimated using log-probability regression; tot., total; 0.7 µm-MF, 0.7 micron membrane filter; cols./100 mL, colonies per 100 milliliters; ft^3/s, cubic foot per second; °C, degrees Celsius; NTU, nephelometric turbidity unit; --, no data]

Property or constituent	Number of samples	Maximum	Minimum	Average	Percentage of samples that were less than or equal to those shown: 95	75	50 (Median)	25	5
INORGANIC									
Field Measurements									
Specific conductance (µS/cm @ 25°C)	69	220	80	170	210	185	180	147	123
pH (units)	57	8.0	6.6	7.4	8.0	7.8	7.4	7.1	6.8
Major ions (mg/L)									
Hardness, total (as $CaCO_3$)	14	67	26	53	67	57	55	52	26
Calcium, dissolved	14	11	5.0	8.6	11	9.1	8.9	8.1	5.0
Magnesium, dissolved	14	9.6	3.3	7.8	9.6	8.5	8.0	7.6	3.3
Sodium, dissolved	14	16	5.7	14	16	16	15	15	5.7
*Sodium adsorption ratio	14	0.9	0.5	0.8	0.9	0.9	0.9	0.8	0.5
*Sodium, percent	14	38	30	36	38	38	37	34	30
Potassium, dissolved	14	2.1	0.9	1.1	2.1	1.1	1.0	0.9	0.9
Alkalinity (as $CaCO_3$)	14	59	21	48	59	56	52	45	21
Sulfate, dissolved	14	25	5.6	10	25	12	7.4	6.8	5.6
Chloride, dissolved	14	20	6.6	17	20	19	18	17	6.6
Fluoride, dissolved	14	0.3	<0.1	--	0.3	0.1	<0.1	<0.1	<0.1
Silica, dissolved	14	23	9.0	20	23	22	22	20	9.0
Nutrients (mg/L)									
Nitrogen, nitrite plus nitrate, total (as N)	41	0.80	<0.10	e0.32	0.70	0.30	0.30	0.20	<0.10
Nitrogen, ammonia plus organic, total (as N)	41	4.6	0.20	1.0	3.4	1.4	0.70	0.30	0.20
Phosphorus, total (as P)	41	0.75	<0.010	e0.22	0.71	0.41	0.050	0.020	<0.010
Metals (µg/L)									
Aluminum, total recoverable	16	34,000	90	4,400	34,000	5,400	260	132	90
Aluminum, dissolved	14	1,200	<10	e100	1,200	30	10	<10	<10
Arsenic, total	16	7	<1	e2	7	1	1	<1	<1
Arsenic, dissolved	14	2	<1	e1	2	1	<1	<1	<1
Barium, total recoverable	16	200	<100	--	200	<100	<100	<100	<100
Barium, dissolved	14	12	3	8	12	10	9	4	3
Beryllium, total recoverable	16	<10	<10	--	<10	<10	<10	<10	<10
Beryllium, dissolved	14	1.0	<0.5	--	1.0	<0.5	<0.5	<0.5	<0.5
Cadmium, total recoverable	16	1	<1	--	1	<1	<1	<1	<1
Cadmium, dissolved	14	1.0	<1.0	--	1.0	<1.0	<1.0	<1.0	<1.0
Chromium, total recoverable	16	80	<1	e13	80	10	<10	<10	<1
Chromium, dissolved	14	3	<1	--	3	<1	<1	<1	<1
Cobalt, total recoverable	16	30	<1	e5	30	3	1	<1	<1
Cobalt, dissolved	14	<3	<3	--	<3	<3	<3	<3	<3
Copper, total recoverable	16	70	<1	e13	70	5	4	3	2
Copper, dissolved	14	6	<1	e2	6	4	1	1	<1
Iron, total recoverable	16	43,000	170	5,800	43,000	9,100	420	270	170
Iron, dissolved	14	480	9	69	480	60	26	16	9
Lead, total recoverable	16	100	<1	e11	100	6	1	<1	<1
Lead, dissolved	14	4	<1	--	4	<5	<5	<1	<1
Lithium, total recoverable	16	<10	<10	--	<10	<10	<10	<10	<10
Lithium, dissolved	14	14	11	--	11	<4	<4	<4	<4
Manganese, total recoverable	16	870	30	169	870	132	65	42	30
Manganese, dissolved	14	45	7	19	45	24	16	11	7
Mercury, total recoverable	15	0.4	<0.1	e0.1	0.4	0.1	<0.1	<0.1	<0.1
Mercury, dissolved	14	0.3	<0.1	--	0.3	<0.1	<0.1	<0.1	<0.1
Molybdenum, tot. recoverable	16	5	<1	e1	5	2	<1	<1	<1
Molybdenum, dissolved	14	<10	<10	--	<10	<10	<10	<10	<10
Nickel, total recoverable	16	150	1	19	150	18	7	3	1
Nickel, dissolved	14	5	<1	e1	5	2	1	<1	<1

Table 18.--Statistical summary of selected water-quality data collected at station 2722, Kamooalii Stream below Luluku Stream near Kaneohe, from October 1982 to September 1989--Continued

Property or constituent	Number of samples	Maximum	Minimum	Average	Percentage of samples that were less than or equal to those shown: 95	75	50 (Median)	25	5
Metals (µg/L)--continued									
Selenium, total	16	8	<1	--	8	<1	<1	<1	<1
Selenium, dissolved	14	<1	<1	--	<1	<1	<1	<1	<1
Silver, total recoverable	16	4	<1	--	4	<1	<1	<1	<1
Silver, dissolved	14	2.0	<1.0	--	2.0	<1.0	<1.0	<1.0	<1.0
Strontium, dissolved	14	88	35	69	88	75	70	67	35
Vanadium, dissolved	14	<6	<6	--	<6	<6	<6	<6	<6
Zinc, total recoverable	16	190	<10	e37	190	50	10	<10	<10
Zinc, dissolved	14	10	<3	e5	10	6	4	<3	<3
BIOLOGICAL									
Fecal coliform 0.7 µm-MF (cols./100 mL)	23	22,000	19	1,350	18,200	300	120	32	19
PHYSICAL PROPERTIES									
Discharge, instantaneous, stream (ft^3/s)	99	1,180	0.29	185	705	305	32.0	5.80	3.00
Air pressure (mm of Hg)	40	764	754	760	764	762	761	758	754
Temperature, air (°C)	13	30.0	23.0	27.8	30.0	29.8	27.5	27.0	23.0
Temperature, water (°C)	57	31.0	20.5	24.7	28.1	26.5	25.0	22.5	21.0
Turbidity (NTU)	78	550	0.5	87	244	132	67	1.7	0.90
Oxygen dissolved (mg/L)	37	8.6	6.4	7.9	8.6	8.4	8.2	7.3	6.5
*Oxygen dissolved, percent	37	108	75	95	106	100	97	91	80
Solids, residue at 105°C, total (mg/L)	16	1,910	229	496	1,910	424	308	259	229
Solids, residue at 105°C, suspended (mg/L)	16	752	1.0	148	562	230	79.5	6.3	1.0
Solids, residue at 180°C, dissolved (mg/L)	14	134	70	105	134	113	108	98	70
*Solids, sum of constituents, dissolved (mg/L)	14	127	57	108	127	115	114	107	57
ORGANIC									
Carbon, organic, total (mg/L)	24	27	1.0	7	27	9.8	4.5	1.6	1.0
Oil and grease, total recoverable, gravimetric (mg/L)	13	2	<1	--	2	<1	<1	<1	<1
Pesticides and herbicides (total recoverable, µg/L)									
Aldrin	16	0.01	<0.01	--	0.01	<0.01	<0.01	<0.01	<0.01
Diazinon, total	16	0.01	<0.01	--	<0.01	<0.01	<0.01	<0.01	<0.01
Dieldrin, total	16	0.01	<0.01	--	0.01	<0.01	<0.01	<0.01	<0.01
Lindane	16	0.01	<0.01	--	0.01	<0.01	<0.01	<0.01	<0.01
2,4-D, total	15	0.04	<0.01	e0.01	0.04	0.02	<0.01	<0.01	<0.01
2,4-DP	15	0.04	<0.01	--	0.04	<0.01	<0.01	<0.01	<0.01

Other organic constituents analyzed but not detected

Organic (total recoverable)	Number of samples	Detection limit (µg/L)	Organic (total recoverable)	Number of samples	Detection limit (µg/L)
Chlordane	16	0.1	Methyl parathion	16	0.01
DDD	16	0.01	Methyl trithion	16	0.01
DDE	16	0.01	Mirex	16	0.01
DDT	16	0.01	Parathion	16	0.01
Endosulfan	16	0.01	Perthane	16	0.1
Endrin	16	0.01	Polychlorinated biphenyls	16	0.1
Ethion	16	0.01	Polychlorinated naphthalenes	16	0.1
Ethyl trithion	16	0.01	Silvex	15	0.01
Heptachlor	16	0.01	Toxaphene	16	1
Heptachlor epoxide	16	0.01	2,4,5-T	15	0.01
Methoxychlor	16	0.01			

Table 19.--Statistical summary of selected water-quality data collected at station 2750, Haiku Stream near Heeia, from March 1983 to September 1989

[µS/cm @ 25°C, microsiemens per centimeter at 25 degrees Celsius; mg/L, milligram per liter; µg/L, microgram per liter; <, less than; *, calculated value; e, estimated using log-probability regression; tot., total; 0.7 µm-MF, 0.7 micron membrane filter; cols./100 mL, colonies per 100 milliliters; ft^3/s, cubic foot per second; °C, degrees Celsius; NTU, nephelometric turbidity unit; --, no data]

Property or constituent	Number of samples	Maximum	Minimum	Average	Percentage of samples that were less than or equal to those shown: 95	75	50 (Median)	25	5
INORGANIC									
Field Measurements									
Specific conductance (µS/cm @ 25°C)	38	185	134	152	185	155	148	145	140
pH (units)	38	7.9	6.3	7.4	7.9	7.7	7.4	7.1	6.8
Major ions (mg/L)									
Hardness, total (as $CaCO_3$)	8	48	45	46	48	47	46	45	45
Calcium, dissolved	8	9.5	8.3	8.8	9.5	9.0	8.7	8.4	8.3
Magnesium, dissolved	8	6.2	5.5	5.9	6.2	6.1	5.8	5.7	5.5
Sodium, dissolved	8	12	12	12	12	12	12	12	12
*Sodium adsorption ratio	8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
*Sodium, percent	8	37	35	36	37	36	36	35	35
Potassium, dissolved	8	1.1	0.7	0.8	1.1	1.0	0.8	0.7	0.7
Alkalinity (as $CaCO_3$)	7	51	46	48	51	50	48	46	46
Sulfate, dissolved	8	4.0	2.9	3.3	4.0	3.5	3.2	3.0	2.9
Chloride, dissolved	8	18	10	14	18	16	14	14	10
Fluoride, dissolved	8	0.1	<0.1	--	0.1	<0.1	<0.1	<0.1	<0.1
Silica, dissolved	8	28	26	27	28	28	27	26	26
Nutrients (mg/L)									
Nitrogen, nitrite plus nitrate, total (as N)	15	0.20	<0.10	--	0.20	<0.10	<0.10	<0.10	<0.10
Nitrogen, ammonia plus organic, total (as N)	15	0.60	<0.20	e0.24	0.60	0.40	0.20	<0.20	<0.20
Phosphorus, total (as P)	15	0.14	<0.010	e0.040	0.14	0.060	0.020	0.010	<0.010
Metals (µg/L)									
Aluminum, total recoverable	8	130	30	62	130	92	45	40	30
Aluminum, dissolved	8	20	<10	--	20	10	<10	<10	<10
Arsenic, total	8	<1	<1	--	<1	<1	<1	<1	<1
Arsenic, dissolved	8	<1	<1	--	<1	<1	<1	<1	<1
Barium, total recoverable	8	100	<100	--	100	<100	<100	<100	<100
Barium, dissolved	8	6	<2	e4	6	6	2	<2	<2
Beryllium, total recoverable	8	<10	<10	--	<10	<10	<10	<10	<10
Beryllium, dissolved	8	0.9	<0.5	--	0.9	<0.5	<0.5	<0.5	<0.5
Cadmium, total recoverable	8	8	<1	--	8	<1	<1	<1	<1
Cadmium, dissolved	8	<1.0	<1.0	--	<1.0	<1.0	<1.0	<1.0	<1.0
Chromium, total recoverable	8	10	<1	--	10	2	<10	<10	<10
Chromium, dissolved	8	1	<1	--	1	<1	<1	<1	<1
Cobalt, total recoverable	8	10	<1	--	10	3	<1	<1	<1
Cobalt, dissolved	8	<3	<3	--	<3	<3	<3	<3	<3
Copper, total recoverable	8	5	1	2	5	4	2	1	1
Copper, dissolved	8	4	<1	e1	4	2	1	<1	<1
Iron, total recoverable	8	400	170	260	400	350	220	200	170
Iron, dissolved	8	120	57	91	120	108	95	74	57
Lead, total recoverable	8	4	<1	--	4	1	<5	<1	<1
Lead, dissolved	8	8	<1	--	8	1	<1	<1	<1
Lithium, total recoverable	8	<10	<10	--	<10	<10	<10	<10	<10
Lithium, dissolved	8	6	<4	--	6	4	<4	<4	<4
Manganese, total recoverable	8	30	10	22	30	30	20	16	10
Manganese, dissolved	8	20	8	16	20	19	16	13	8
Mercury, total recoverable	8	0.3	<0.1	--	0.3	0.2	<0.1	<0.1	<0.1
Mercury, dissolved	8	0.4	<0.1	--	0.4	<0.1	<0.1	<0.1	<0.1
Molybdenum, tot. recoverable	8	4	<1	--	4	2	<1	<1	<1
Molybdenum, dissolved	8	<10	<10	--	<10	<10	<10	<10	<10

Table 19.--Statistical summary of selected water-quality data collected at station 2750, Haiku Stream near Heeia, from March 1983 to September 1989--Continued

Property or constituent	Number of samples	Maximum	Minimum	Average	Percentage of samples that were less than or equal to those shown: 95	75	50 (Median)	25	5
Metals (µg/L)--continued									
Nickel, total recoverable	8	13	<1	e3	13	3	1	<1	<1
Nickel, dissolved	8	7	<1	e2	7	3	1	<1	<1
Selenium, total	8	<1	<1	--	<1	<1	<1	<1	<1
Selenium, dissolved	8	<1	<1	--	<1	<1	<1	<1	<1
Silver, total recoverable	8	<1	<1	--	<1	<1	<1	<1	<1
Silver, dissolved	8	1.0	<1.0	--	1.0	<1.0	<1.0	<1.0	<1.0
Strontium, dissolved	8	56	52	53	56	53	53	52	52
Vanadium, dissolved	8	<6	<6	--	<6	<6	<6	<6	<6
Zinc, total recoverable	8	420	<10	60	420	20	10	<10	<10
Zinc, dissolved	8	11	<3	--	11	6	<3	<3	<3
BIOLOGICAL									
Fecal coliform 0.7 µm-MF (cols./100 mL)	13	400	23	120	400	135	96	66	23
PHYSICAL PROPERTIES									
Discharge, instantaneous, stream (ft^3/s)	45	12	1.00	2.08	4.96	2.15	1.70	1.35	1.10
Air pressure (mm of Hg)	24	761	752	756	761	758	756	754	752
Temperature, air (°C)									
Temperature, water (°C)	45	23.0	19.5	21.0	22.0	21.5	21.0	20.5	19.5
Turbidity (NTU)	25	37	0.2	2.4	27	1.0	0.8	0.6	0.3
Oxygen dissolved (mg/L)	25	8.9	5.5	8.3	8.9	8.6	8.4	8.2	6.2
*Oxygen dissolved, percent	24	99	62	94	99	97	96	93	69
Solids, residue at 105°C, suspended (mg/L)	17	43	<1	e6	43	9	3	<1	<1
Solids, residue at 180°C, dissolved (mg/L)	7	99	85	94	99	99	95	88	85
*Solids, sum of constituents, dissolved (mg/L)	7	105	98	101	105	104	100	99	98
ORGANIC									
Carbon, organic, total (mg/L)	8	1.2	0.2	0.6	1.2	0.7	0.5	0.3	0.2
Oil and grease, total recoverable, gravimetric (mg/L)	8	2	<1	--	2	<1	<1	<1	<1

Pesticides and herbicides (total recoverable, µg/L)

None detected

Other organic constituents analyzed but not detected

Organic (total recoverable)	Number of samples	Detection limit (µg/L)	Organic (total recoverable)	Number of samples	Detection limit (µg/L)
Aldrin	8	0.01	Malathion	8	0.01
Chlordane	8	0.1	Methoxychlor	8	0.01
DDD	8	0.01	Methyl parathion	8	0.01
DDE	8	0.01	Methyl trithion	8	0.01
DDT	8	0.01	Mirex	8	0.01
Diazinon	8	0.10	Parathion	8	0.01
Dieldrin	8	0.01	Perthane	8	0.1
Endosulfan	8	0.01	Polychlorinated biphenyls	8	0.1
Endrin	8	0.01	Polychlorinated naphthalenes	8	0.1
Ethion	8	0.01	Silvex	7	0.01
Ethyl trithion	8	0.01	Toxaphene	8	1
Heptachlor	8	0.01	2,4 D	7	0.01
Heptachlor epoxide	8	0.01	2,4 DP	7	0.01
Lindane	8	0.01	2,4,5-T	7	0.01

Table 20.--Statistical summary of selected water-quality data collected at Wildlife Pond station 1 at altitude 190 feet near Kaneohe, from October 1983 to January 1984

[μS/cm @ 25°C, microsiemens per centimeter at 25 degrees Celsius; mg/L, milligram per liter; μg/L, microgram per liter; <, less than; *, calculated value; e, estimated using log-probability regression; tot., total; 0.7 μm-MF, 0.7 micron membrane filter; cols./100 mL, colonies per 100 milliliters; ft^3/s, cubic foot per second; °C, degrees Celsius; NTU, nephelometric turbidity unit; --, no data]

Property or constituent	Number of samples	Maximum	Minimum	Average	Percentage of samples that were less than or equal to those shown: 95	75	50 (Median)	25	5
INORGANIC									
Field Measurements									
Specific conductance (μS/cm @ 25°C)	6	180	167	169	180	171	167	167	167
pH (units)	6	7.0	6.6	6.8	7.0	6.9	6.8	6.8	6.6
Nutrients (mg/L)									
Nitrogen, nitrite plus nitrate, total (as N)	2	<0.10	<0.10	--	--	--	--	--	--
Nitrogen, ammonia plus organic, total (as N)	2	0.70	0.20	--	--	--	--	--	--
Phosphorus, total (as P)	2	0.030	0.010	--	--	--	--	--	--
BIOLOGICAL									
Fecal coliform 0.7 μm-MF (cols./100 mL)	2	290	20	--	--	--	--	--	--
PHYSICAL PROPERTIES									
Depth of reservoir (feet)	2	5.3	5.0	--	--	--	--	--	--
Sampling depth (feet)	5	4.5	1.0	--	--	--	--	--	--
Pressure, air (mm of Hg)	6	764	759	759	764	760	759	759	759
Temperature, water (°C)	6	23.5	22.0	22.4	23.5	22.8	22.2	22.0	22.0
Turbidity (NTU)	2	5.5	5.0	--	--	--	--	--	--
Oxygen dissolved (mg/l)	6	5.7	3.3	5.1	5.7	5.7	5.4	4.6	3.3
*Oxygen dissolved, percent	6	66	38	59	66	66	64	52	38
Solids, residue at 105°C, suspended (mg/L)	2	15	7	--	--	--	--	--	--

Table 21.--Statistical summary of selected water-quality data collected at Wildlife Pond station 2 at altitude 190 feet near Kaneohe, from October 1983 to January 1984

[µS/cm @ 25°C, microsiemens per centimeter at 25 degrees Celsius; mg/L, milligram per liter; µg/L, microgram per liter; <, less than; *, calculated value; e, estimated using log-probability regression; tot., total; 0.7 µm-MF, 0.7 micron membrane filter; cols./100 mL, colonies per 100 milliliters; ft^3/s, cubic foot per second; °C, degrees Celsius; NTU, nephelometric turbidity unit; --, no data]

Property or constituent	Number of samples	Maximum	Minimum	Average	Percentage of samples that were less than or equal to those shown: 95	75	50 (Median)	25	5
INORGANIC									
Field Measurements									
Specific conductance (µS/cm @ 25°C)	5	180	167	--	--	--	--	--	--
pH (units)	5	7.1	6.9	--	--	--	--	--	--
Major ions (mg/L)									
Hardness, total (as $CaCO_3$)	2	58	57	--	--	--	--	--	--
Calcium, dissolved	2	9.7	9.6	--	--	--	--	--	--
Magnesium, dissolved	2	8.1	8.0	--	--	--	--	--	--
Sodium, dissolved	2	14	14	--	--	--	--	--	--
*Sodium adsorption ratio	2	0.8	0.8	--	--	--	--	--	--
*Sodium, percent	2	34	34	--	--	--	--	--	--
Potassium, dissolved	2	1.1	0.9	--	--	--	--	--	--
Alkalinity (as $CaCO_3$)	2	60	58	--	--	--	--	--	--
Sulfate, dissolved	2	6.4	5.3	--	--	--	--	--	--
Chloride, dissolved	2	18	16	--	--	--	--	--	--
Fluoride, dissolved	2	<0.1	<0.1	--	--	--	--	--	--
Silica, dissolved	2	25	25	--	--	--	--	--	--
Nutrients (mg/L)									
Nitrogen, nitrite plus nitrate, total (as N)	2	0.10	<0.10	--	--	--	--	--	--
Nitrogen, ammonia plus organic, total (as N)	2	0.80	<0.20	--	--	--	--	--	--
Phosphorus, total (as P)	2	0.020	0.010	--	--	--	--	--	--
Metals (µg/L)									
Aluminum, total recoverable	2	270	170	--	--	--	--	--	--
Aluminum, dissolved	2	<10	<10	--	--	--	--	--	--
Arsenic, total	2	<1	<1	--	--	--	--	--	--
Arsenic, dissolved	2	1	<1	--	--	--	--	--	--
Barium, total recoverable	2	<100	<100	--	--	--	--	--	--
Barium, dissolved	2	7	6	--	--	--	--	--	--
Beryllium, total recoverable	2	10	<10	--	--	--	--	--	--
Beryllium, dissolved	2	<0.5	<0.5	--	--	--	--	--	--
Cadmium, total recoverable	2	<1	<1	--	--	--	--	--	--
Cadmium, dissolved	2	<1.0	<1.0	--	--	--	--	--	--
Chromium, total recoverable	2	10	<10	--	--	--	--	--	--
Chromium, dissolved	2	<1	<1	--	--	--	--	--	--
Cobalt, total recoverable	2	2	<1	--	--	--	--	--	--
Cobalt, dissolved	2	<3	<3	--	--	--	--	--	--
Copper, total recoverable	2	4	3	--	--	--	--	--	--
Copper, dissolved	2	3	2	--	--	--	--	--	--
Iron, total recoverable	2	860	770	--	--	--	--	--	--
Iron, dissolved	2	150	150	--	--	--	--	--	--
Lead, total recoverable	2	14	1	--	--	--	--	--	--
Lead, dissolved	2	2	<1	--	--	--	--	--	--
Lithium, total recoverable	2	10	<10	--	--	--	--	--	--
Lithium, dissolved	2	6	6	--	--	--	--	--	--
Manganese, total recoverable	2	110	110	--	--	--	--	--	--
Manganese, dissolved	2	110	60	--	--	--	--	--	--
Mercury, total recoverable	2	0.1	<0.1	--	--	--	--	--	--
Mercury, dissolved	2	<0.1	<0.1	--	--	--	--	--	--
Molybdenum, tot. recoverable	2	<1	<1	--	--	--	--	--	--
Molybdenum, dissolved	2	<10	<10	--	--	--	--	--	--

Table 21.--Statistical summary of selected water-quality data collected at Wildlife Pond station 2 at altitude 190 feet near Kaneohe, from October 1983 to January 1984--Continued

Property or constituent	Number of samples	Maximum	Minimum	Average	Percentage of samples that were less than or equal to those shown: 95	75	50 (Median)	25	5
Metals (µg/L)--continued									
Nickel, total recoverable	2	3	1	--	--	--	--	--	--
Nickel, dissolved	2	3	3	--	--	--	--	--	--
Selenium, total	2	<1	<1	--	--	--	--	--	--
Selenium, dissolved	2	<1	<1	--	--	--	--	--	--
Silver, total recoverable	2	<1	<1	--	--	--	--	--	--
Silver, dissolved	2	<1.0	<1.0	--	--	--	--	--	--
Strontium, dissolved	2	60	60	--	--	--	--	--	--
Vanadium, dissolved	2	<6	<6	--	--	--	--	--	--
Zinc, total recoverable	2	110	20	--	--	--	--	--	--
Zinc, dissolved	2	9	4	--	--	--	--	--	--
BIOLOGICAL									
Fecal coliform 0.7 µm-MF (cols./100 mL)	2	56	16	--	--	--	--	--	--
PHYSICAL PROPERTIES									
Depth of reservoir (feet)	2	4.8	4.5	--	--	--	--	--	--
Sampling depth (feet)	4	4.0	1.0	--	--	--	--	--	--
Pressure, air (mm of Hg)	5	764	759	--	--	--	--	--	--
Temperature, water (°C)	5	23.5	22.0	--	--	--	--	--	--
Turbidity (NTU)	2	4.4	3.4	--	--	--	--	--	--
Oxygen dissolved (mg/L)	5	6.8	6.5	--	--	--	--	--	--
*Oxygen dissolved, percent	5	78	74	--	--	--	--	--	--
Solids, residue at 105°C, suspended (mg/L)	2	11	7	--	--	--	--	--	--
Solids, residue at 180°C, dissolved (mg/L)	2	115	115	--	--	--	--	--	--
*Solids, sum of constituents, dissolved (mg/L)	2	117	115	--	--	--	--	--	--
ORGANIC									
Carbon, organic, total (mg/L)	2	1.6	1.6	--	--	--	--	--	--
Oil and grease, total recoverable, gravimetric (mg/L)	2	<1	<1	--	--	--	--	--	--
Pesticides and herbicides (total recoverable, in µg/L)									
Diazinon	2	0.01	<0.01						
2,4-D	2	0.03	<0.01						

Other organic constituents analyzed but not detected

Organic (total recoverable)	Number of samples	Detection limit (µg/L)	Organic (total recoverable)	Number of samples	Detection limit (µg/L)
Aldrin	2	0.01	Methoxychlor	2	0.01
Chlordane	2	0.1	Methyl parathion	2	0.01
Dieldrin	2	0.01	Methyl trithion	2	0.01
DDD	2	0.01	Mirex	2	0.01
DDE	2	0.01	Parathion	2	0.01
DDT	2	0.01	Perthane	2	0.1
Endosulfan	2	0.01	Polychlorinated biphenyls	2	0.1
Endrin	2	0.01	Polychlorinated naphthalenes	2	0.1
Ethion	2	0.01	Silvex	2	0.01
Ethyl trithion	2	0.01	Toxaphene	2	1
Heptachlor	2	0.01	2,4,5-T	2	0.01
Heptachlor epoxide	2	0.01	2,4 DP	2	0.01
Lindane	2	0.01			