

SECTION 6

AREA, GEOGRAPHY, ENVIRONMENT, AND CLIMATE

This section relates to area, climatologic, topographic, hydrologic, and other geographic measurements of Hawaii.

The State consists of eight major islands and 124 minor islands with a total land area of 6,425 square miles and a coastline of 750 miles.

Honolulu is 214 miles from Hilo, 1,367 miles from Kure Atoll (the westernmost end of the State), and 2,397 miles from San Francisco. The highest peak in the State is Mauna Kea, 13,796 feet above sea level; the longest stream is Kaukonahua Stream, 33 miles in length; the biggest lake is Halalii, 841 acres; and the highest named waterfall is Kahiwa, a 1,750-foot cascade.

Various measures of air pollution, such as suspended particulate matter and radioactivity, indicate that Honolulu is one of the cleanest cities in the nation. There is also very little water pollution: nine out of nine major Oahu beaches were rated "A" in 1969 (coliform not exceeding 50 per 100 ml) and none was rated either "B" (51-500) or "C" (501 or more).

Climatically, Hawaii is marked by remarkably balmy temperatures and wide variations in rainfall. The all-time temperature range in downtown Honolulu, for example, is from 57° to 88°F. Normal precipitation, however, ranges from 5.7 inches near Kawaihae to 486.1 inches atop Waialeale. The longest volcanic eruption in Island history lasted 547 days, and the highest tsunami wave reached 66 feet.

Important sources of data include the U.S. Geological Survey, U.S. Coast and Geodetic Survey, National Weather Service, U.S. Bureau of the Census Geography Division, the Division of Water and Land Development of the State Department of Land and Natural Resources, the State Department of Health, and the University of Hawaii Institute of Geophysics. Detailed information is given in *Geographic Statistics of Hawaii*, published by the Department of Planning and Economic Development. National data are reported in *Statistical Abstract of the United States: 1970*, Section 6.

Table 40.—GREAT CIRCLE DISTANCES IN STATUTE MILES BETWEEN HONOLULU INTERNATIONAL AIRPORT AND SPECIFIED PLACES

Place	Miles from Honolulu	Place	Miles from Honolulu
Hawaiian Islands:		Other Pacific, con.:	
Cape Kumukahi, Hawaii ¹	236	Hong Kong	5,541
Hilo, Hawaii	214	Johnston Island	820
Ka Lae (South Cape), Hawaii	221	Kingman Reef	1,073
Kailua, Kona, Hawaii	168	Manila, Philippines	5,293
Kahului, Maui	98	Pago Pago, Amer. Samoa	2,606
Lanai Airport	72	Palmyra Islands	1,101
Molokai Airport	54	Papeete, Tahiti	2,741
Lihue, Kauai	103	Suva, Fiji	3,159
Puuwai, Niihau	152	Sydney (Port Jackson), Australia	5,070
Nihoa	283	Tokyo, Japan	3,847
Necker Island	520	Wake Island	2,294
French Frigate Shoals	556		
Gardner Pinnacles	688		
Maro Reef	851		
Laysan Island	936		
Lisianski Island	1,065	North America:	
Pearl and Hermes Atoll	1,208	Anchorage, Alaska	2,781
Midway Islands	1,309	Chicago, Illinois	4,179
Kure Atoll ¹	1,367	Christobal, Canal Zone	5,214
		Los Angeles, California	2,557
Trust Territory of Pacific Islands:		Miami, Florida	4,856
Majuro, Marshall Islands	2,271	New York, N.Y.	4,959
Kwajalein, Marshall Islands	2,443	Portland, Oregon	2,595
Kolonia, Ponape, E.C.I.	3,087	San Diego, California	2,610
Saipan, Mariana Islands	3,704	San Francisco, California	2,397
Koror, Palau, W.C.I.	4,593	Seattle, Washington	2,679
		Vancouver, B.C.	2,709
Other Pacific locations:		Victoria, B.C.	2,668
Apra Harbor, Guam	3,806	Tijuana, Mexico	2,616
Auckland, N.Z.	4,393	Washington, D.C.	4,829

¹The great circle distance from Kure Atoll to cape Kumukahi, Hawaii, is 1,523 statute miles. This distance represents the total length of the Hawaiian Archipelago.

Source: U.S. Geological Survey measurements cited in the Hawaii State Department of Planning and Economic Development, *Geographic Statistics of Hawaii* (Statistical Report 67, July 1, 1969), p. 5.

Table 41.—AREA AND COASTLINE OF COUNTIES, ISLANDS, AND CITIES

County, island or city	Area in square statute miles			Coastline in statute miles	
	Total	Land	Inland water	General coastline ¹	Tidal shoreline
The State	6,450	6,425	25	750	1,052
Counties:					
Hawaii	4,038.0	4,037.0	1.0	266	313
Maui	1,161.1	1,160.3	0.8	}	343
Kalawao	13.3	13.3	—		
Honolulu	610.9	595.7	15.2		
Kauai	627.1	619.1	8.0	137	162
Islands:					
Hawaii	4,038.0	4,037.0	1.0	266	313
Maui	728.8	728.2	0.6	120	149
Kahoolawe	45.0	45.0	—	29	36
Molokini	<0.01	<0.01	—	—	—
Lanai	139.5	139.5	—	47	52
Molokai	261.1	260.9	0.2	88	106
Oahu	607.7	592.7	15.0	112	209
Kauai	553.3	548.7	4.6	90	110
Niihau	73.0	69.6	3.4	45	50
Lehua	0.4	0.4	—	—	—
Kaula	0.4	0.4	—	2	2
Northwestern Haw'n Isl.	3.2	3.0	0.2	25	25
Cities:					
Hilo	298.9	298.9	—	—	—
Honolulu	88.7	86.6	2.1	—	—
On Oahu	85.5	83.6	1.9	—	—
On NW Haw'n Isl.	3.2	3.0	0.2	25	25

¹Figures for the four islands of Maui County are not consistent with the published county total.

Source: Hawaii State Department of Planning and Economic Development, *Geographic Statistics of Hawaii* (Statistical Report 67, July 1, 1969).

Table 42.—ELEVATIONS OF MAJOR MOUNTAINS, BY ISLAND

Island and mountain ¹	Elevation (feet)	Island and mountain ¹	Elevation (feet)
Hawaii:		Oahu:	
Mauna Kea	13,796	Kaala	4,040
Mauna Loa	13,677	Puu Konahuanui	3,105
Hualalai	8,271	Tantalus	2,013
Kohala	5,480	Olomana Peak	1,643
Kilauea (Uwekahuna)	4,090	Diamond Head	760
		Punchbowl	500
Kahoolawe:		Koko Head	642
Lua Makika	1,477		
		Kauai:	
Maui:		Kawaikini	5,243
Haleakala (Red Hill)	10,023	Waialeale	5,148
Puu Kukui	5,788		
Iao Needle	2,250	Niihau:	
		Paniau	1,281
Lanai:			
Lanaihale	3,370	Kaula Island	550
		Nihoa ²	910
Molokai:			
Kamakou	4,970		
Puu Nana	1,381		

¹Highest elevation on each island and other important peaks.

²Highest elevation in the Northwestern Hawaiian Islands.

Source: U.S. Geological Survey data cited in the Hawaii Department of Planning and Economic Development, *Elevations of Major Mountains in Hawaii* (Statistical Report 52, November 7, 1967).

Table 43.—MAJOR STREAMS, LAKES, AND WATERFALLS

Subject	Name	Island	Magnitude
Streams:			
Longest water feature (mi.)	Kaukonahua Str.	Oahu	33.0
Second longest water feature (mi.)	Wailuku Riv.	Hawaii	32.0
Greatest ave. discharge (million gal./day)	Wailuku Riv.	Hawaii	303.5
Lakes:			
Greatest area (natural) (acres) ¹	Halulu	Niihau	182
Greatest area (man-made) (acres)	Koloa Res.	Kauai	422
Longest shoreline (miles)	Wahiawa Res.	Oahu	11
Highest (feet above sea level)	Lake Waiiau	Hawaii	13,020
Named waterfalls:			
Greatest sheer drop (feet)	Akaka	Hawaii	442
Highest cascade (feet)	Kahiwa	Molokai	1,750

¹Excludes fishponds and intermittent lakes. The largest intermittent lake is Halalii Lake, Niihau (840.7 acres).

Source: Hawaii State Department of Planning and Economic Development, *Geographic Statistics of Hawaii* (Statistical Report 67, July 1, 1969), as corrected.

Table 44.—WATER QUALITY DATA FOR OAHU BEACHES: 1950 TO 1969

Beach	Coliform per 100 milliliters (logarithmic average)					
	1950	1960	1966	1967	1968	1969
Ala Moana Park	177.0	11	7	1.6	14	5
Fort De Russy	19.2	7	15	18.7	25	13
Kuhio Beach	4.0	6	8	12.7	12	15
Hanauma Bay	3.9	2	45	6.3	6	13
Kailua Beach	6.4	6	8	37.3	12	13
Punaluu Park	6.3	157	311	49.5	20	7
Haleiwa Park	12.6	81	29	11.0	21	7
Waianae Park	1.7	3	10	10.4	52	9
Ewa Beach	2.4	9	22	5.9	6	6

Source: *Annual Report, Department of Health, State of Hawaii, Statistical Supplement, 1950-1969.*

Table 45.—AEROMETRIC SURVEY DATA FOR DOWNTOWN HONOLULU: 1968 AND 1969

(Aerometric survey conducted from the fourth floor lanai, State Health Department Building, 1250 Punchbowl Street, Honolulu. Concentration in parts per million.)

Year	Oxidant		Nitrogen dioxide		Sulphur dioxide		Carbon monoxide	
	Average	Maximum	Average	Maximum	Average	Maximum	Average	Maximum
1968003	.040	.030	.080	.011	.096	2.7	15.0
1969004	.035	.026	.077	.010	.082	2.4	16.6

Source: Hawaii State Department of Health, *Annual Report, Statistical Supplement, 1969*, p. 91, and records.

Table 46.—AEROMETRIC SURVEY DATA, FOR HONOLULU: 1957 TO 1969

Year	Suspended particulate matter (mean micrograms per cubic meter)	Benzene-soluble organic matter (mean micrograms per cubic meter)	Beta radioactivity (mean micromicrocuries per cubic meter)
1957	47	3.5	0.6
1958	59	7.5	3.3
1959	63	5.4	1.3
1960	47	4.1	0.0
1961	43	3.0	0.8
1962	41	3.1	4.0
1963	42	4.3	3.7
1964	44	2.3	0.9
1965	41	2.5	0.3
1966	35	2.8	0.2
1967	38	2.5	0.3
1968	45	2.8	(NA)
1969	43	2.3	(NA)

NA Not available.

Source: Hawaii State Department of Health, Environmental Health Division, Air Sanitation Branch, records.

Table 47.—CLIMATIC DATA FOR SELECTED PLACES

Island and station ¹	Ground elevation (feet)	Normal average temperature (°F.)		Extreme temperature of record (°F.)		Normal precipitation (inches)	Ave. ann. percent possible sunshine
		Coolest month	Warmest month	Lowest	Highest		
Hawaii:							
Hilo Airport	27	70.6	75.8	53	94	136.62	38
National Park Hdq.	3,971	57.9	63.6	37	85	98.45	—
Kona Airport	17	70.6	77.2	56	93	24.27	—
Puako (Mahukona)	11	73.9	80.4	52	98	9.46	—
Kamuela	2,670	62.0	66.5	34	90	37.90	—
Maui:							
Hana	120	71.3	76.8	50	90	70.32	—
Haleakala Summit	9,960	42.9	50.8	14	73	42.62	—
Kihei (Puunene A.P.)	90	71.1	78.5	49	98	12.33	—
Kahului Airport	48	71.7	79.0	48	95	16.33	69
Lahaina	45	71.3	77.8	52	93	13.59	—
Molokai:							
Kaunakakai	12	—	—	—	—	13.92	—
Molokai Airport	450	70.0	77.5	48	90	27.36	—
Oahu:							
Hon. Int. Airport	7	72.5	80.6	52	93	21.89	69
Hon. Federal Bldg. ²	12	71.9	78.4	57	88	23.96	65
Waikiki ³	10	72.1	81.1	53	93	33.13	—
Laie (Kahuku)	25	71.4	78.3	49	95	49.17	—
Waianae	20	71.8	80.3	45	96	19.64	—
Kauai:							
Hanalei (Kilauea Pt)	180	70.7	78.4	47	94	85.00	—
Wailua (Kealia)	9	71.0	78.8	44	93	42.71	—
Lihue Airport	103	70.7	78.4	50	90	43.00	56
Poipu (Makahuena Pt.) ...	52	72.0	79.2	50	93	34.82	—
Kokee (Kanalohuluhulu) ..	3,600	56.1	63.4	27	83	70.80	—
Waialeale	5,075	—	—	—	—	48.61	—

¹Temperature data are not available for Puako, Kihei, Laie, Hanalei, Wailua, Poipu and Kokee, and are accordingly based on data for the stations given in parentheses.

²Temperature sensors are 80 feet above the ground.

³Located at Honolulu Zoo. Available for only five years. The rainfall average in particular is thought to be well above the long term average. Average water temperatures off Waikiki Beach range from 75°F. in late February to 79° in late September.

Source: National Weather Service, Pacific Region, records.

Table 48.—CLIMATIC EXTREMES, EARTHQUAKES, VOLCANIC ERUPTIONS, AND TSUNAMIS

Subject	Date	Place	Magnitude
CLIMATE (VARYING PERIODS)			
Lowest monthly ave. temp. (°F.)	February	Mauna Loa Obs.	39.8
Highest monthly ave. temp. (°F.)	August	Honolulu Airport	82.3
Lowest temp. of record (°F.)	Jan. 2, 1961	Haleakala Summit	14.0
Highest temp. of record (°F.)	Apr. 27, 1931	Pahala	100.0
Lowest ave. annual rainfall (in.)	—	N. of Kawaihae	5.7
Highest ave. annual rainfall (in.)	—	Waialeale	486.1
Lowest annual rainfall of record (in.)	1953	Kawaihae	0.2
Highest annual rainfall of record (in.)	1947-1948	Waialeale	624.1
Highest wind speed of record (m.p.h.)	Jan. 17-18, 1959	Mauna Loa Obs.	105+
EARTHQUAKES, 1838-1970			
Greatest Richter magnitude	March 27, 1868	Hawaii	7½
Second greatest Richter magnitude	Jan. 23, 1938	Hawaii	6¾
VOLCANIC ERUPTIONS, 1832-1970			
Longest duration (days)	1873-1874	Mauna Loa	547
	1919	Kilauea	294
Greatest area covered (square mi.)	1950	Mauna Loa	35.0
	1840	Kilauea	6.6
Greatest lava volume (million cubic yds.)	1859, 1950	Mauna Loa	600
	1840	Kilauea	281
TSUNAMIS (1819-1970)			
Greatest wave height (feet)	April 2, 1868	S.E. Hawaii	66
Greatest damage (\$1,000)	April 1, 1946	All islands	26,000

Source: Hawaii State Department of Planning and Economic Development, *Geographic Statistics of Hawaii* (Statistical Report 67, July 1, 1969), and underlying data.