

Section 20

FORESTS, FISHERIES, AND MINING

This section presents data on forests and forest products, commercial fishing, and mining and mineral products.

The most recent available statistics show 1.2 million acres of forest and water reserve and 948,000 acres of commercial timberland in the State, most of it on the Big Island. Over 45,000 acres had been planted in eucalyptus and other species of trees by mid-1988. Recent surveys of vegetation on three islands show ohia lehua to be the most common type of tree on Oahu and Kauai (with acreages of 38,000 and 109,000, respectively) and kiawe the leading type (at 33,000 acres) on Molokai. Forest and brushland fires burned 54 square miles in fiscal 1988.

The commercial fish catch in fiscal year 1988 amounted to 11.1 million pounds, with a value of \$21 million to primary producers. Ahi (yellowfin) and aku (skipjack) accounted for 43 percent of the total value. Other important species are spiny lobster, opakapaka, mahimahi, and ono. Commercial fishermen numbered 2,627. Among Marine Life Conservation Districts, those with the most fish per acre were Hanauma Bay (4,660 inshore), Honolua-Mokuleia Bays (4,556), and Kealakekua Bay (3,828).

The value of mineral production reached \$78 million in 1988, almost all of it in cement (\$34 million) and crushed stone (\$41 million). The 1988 total was an all-time high.

Important sources of data on these subjects are the United States Census of Mineral Industries and reports and records of the U.S. Bureau of Mines and Hawaii State Department of Land and Natural Resources, Aquatic Resources Division and Forestry and Wildlife Division. Historical Statistics of Hawaii, Section 14, summarizes the data for earlier periods. Comparable Mainland statistics are reported in the Statistical Abstract of the United States: 1989, Sections 24 and 25.

Table 574.-- FOREST ACREAGE, BY ISLANDS: 1970-1988

Island	Conservation district forest land, June 30, 1988		Forest land, 1970		Planted forest, June 30, 1988	
	Forest reserve land <u>1/</u>	Private forest land <u>2/</u>	Commercial <u>3/</u>	Noncommercial <u>4/</u>	Planted in preceding year	Total standing
State total	840,540	327,845	947,800	1,038,600	705	45,390
Hawaii	585,000	106,745	569,400	583,100	666	16,789
Maui	93,320	53,180	67,500	172,300	22	11,682
Kahoolawe	-	-	-	15,800	-	-
Lanai	-	6,150	4,500	39,400	-	512
Molokai	44,290	-	34,000	44,100	-	3,205
Oahu	29,810	87,920	126,500	78,800	2	7,039
Kauai	88,120	73,850	145,900	74,000	15	6,163
Niihau	-	-	-	31,100	-	-
Other islands ..	-	-	-	-	-	-

1/ State owned and privately owned lands under surrender agreement in forest reserve system.

2/ Private forest land within conservation district. The majority of these lands were previously in the forest reserve system.

3/ Includes federal military, state, miscellaneous corporate, and miscellaneous individual forest land.

4/ Unproductive or productive-reserved.

Source: Hawaii State Department of Land and Natural Resources, Division of Forestry and Wildlife, records.

Table 575.-- LAND AREA, BY VEGETATION TYPE AND FOREST RESERVE STATUS, FOR MOLOKAI, OAHU, AND KAUAI: 1986

[In acres. Excludes land in forest plantations]

Vegetation type	Molokai		Oahu		Kauai	
	Total	Forest reserve	Total	Forest reserve	Total	Forest reserve
Total, all types	163,214	44,288	370,002	34,931	347,088	88,127
Tree type:						
Ohia lehua	32,833	30,161	37,563	9,524	109,040	50,702
Koa	-	-	28,548	6,601	13,438	6,223
Kukui	4,773	4,009	2,775	617	7,634	2,029
Kiawe	33,215	-	17,354	241	10,358	116
Eucalyptus	1,527	954	1,131	411	3,157	1,288
Guava	5,918	4,200	10,287	1,421	12,143	3,099
Other trees	2,673	573	36,700	6,776	32,763	6,043
Shrub type	16,417	1,527	33,974	2,965	36,061	7,189
Forb type	191	-	11,338	2,718	4,120	2,043
Grassland	38,751	764	45,102	3,261	34,168	5,198
Cultivated land	18,325	-	55,770	-	64,741	387
No vegetation	3,819	-	822	-	6,709	3,810
Urban and other	4,772	2,100	88,638	396	12,756	-

Source: Hawaii State Department of Land and Natural Resources, Division of Forestry and Wildlife, multi-resource inventory reports.

Table 576.-- FOREST LAND, TIMBERLAND AREA, VOLUME OF SAWTIMBER,
AND GROWING STOCK: JANUARY 1, 1987

Subject	1,000 acres	Subject	Amount
Total forest land	1,748	Sawtimber, net volume:	
		Total (mil. bd. ft.)	1,196
Timberland	700	Softwood (mil. bd. ft.)	18
Federal	-		
State or county	338	Growing stock, net volume:	
Private	362	Total (mil. cu. ft.)	280
		Softwood (mil. cu. ft.)	4

Source: U.S. Forest Service, cited in Statistical Abstract of the United States: 1989, p. 658.

Table 577.-- FOREST AND BRUSSLAND FIRES, BY COUNTIES: 1987 AND 1988
[Years ended June 30]

Subject	State total	Counties			
		Hawaii	Maui	Hono- lulu	Kauai
Number of fires:					
1987	109	58	38	11	2
1988	79	22	45	12	-
Acres burned:					
1987	6,713	4,356	449	1,905	3
1988	34,794	23,657	10,940	197	-

Source: Hawaii State Department of Land and Natural Resources,
Division of Forestry and Wildlife, records.

Table 578.-- COMMERCIAL FISHING: 1970 TO 1988

[Years ended June 30]

Year	Number of commercial fishermen	Commercial fish catch ^{1/}		
		Pounds caught	Pounds sold	Value to primary producers (dollars)
1970	1,264	9,786,726	9,588,319	3,585,166
1971	1,373	15,176,525	14,945,539	4,633,875
1972	1,544	15,577,669	15,246,519	5,536,521
1973	1,677	14,029,491	13,719,284	5,676,783
1974	2,085	13,997,774	13,660,574	6,234,924
1975	1,991	10,801,441	10,404,019	6,242,614
1976	2,283	11,893,141	11,332,659	7,508,395
1977	2,368	15,298,515	14,763,816	9,433,781
1978	2,574	13,672,061	13,139,142	11,115,964
1979	2,447	12,310,524	11,890,241	12,673,328
1980	2,525	10,418,964	9,946,065	10,497,456
1981	2,577	10,890,468	10,465,731	11,828,575
1982	2,525	9,178,789	8,824,348	10,754,276
1983	2,480	7,841,959	7,529,178	10,506,860
1984	2,940	9,819,800	9,344,200	13,556,184
1985	2,638	9,436,591	9,077,357	15,901,656
1986	2,880	9,503,193	9,081,881	18,557,533
1987	3,008	12,128,527	11,628,387	20,477,699
1988	2,627	11,052,502	10,592,287	20,541,580

^{1/} Represents the total catches of all licensed commercial fishers. Includes both sea and pond catches, but excludes coral harvests. Particularly for years since 1979, data may be incomplete due to unreported aku (skipjack tuna) and longline boat catches.

Source: Hawaii State Department of Land and Natural Resources, Division of Aquatic Resources, Commercial Fish Landings for Fiscal Year (annual), as revised, and records.

Table 579.-- COMMERCIAL FISH CATCH, BY SPECIES: 1988

[Year ended June 30, 1988]

Species <u>1/</u>	Pounds caught	Pounds sold	Value (dollars)
Total catch	11,068,246	10,599,714	20,597,610
Sea catch, all species <u>2/</u>	11,042,507	10,573,977	20,536,007
Aku (Skipjack)	3,877,692	3,789,006	3,947,685
Ahi (Yellowfin)	3,091,460	2,951,481	4,815,253
Ahi (Bigeye)	184,522	181,882	743,733
Striped marlin	206,243	191,409	246,206
Pacific blue marlin	487,140	444,892	365,449
Mahimahi	349,664	331,161	962,728
Ono	341,037	321,728	942,717
Hapuupuu	57,019	56,700	116,930
Opakapaka	355,315	343,540	1,215,539
Uku	180,444	178,426	477,223
Ehu	52,255	50,595	162,265
Onaga	170,279	167,904	775,450
Ulua	71,737	66,095	106,538
Akule	185,750	172,618	346,870
Lehi	36,444	35,249	108,346
Opelu	226,866	220,084	391,539
Lobster (Spiny)	233,986	220,897	2,301,571
Lobster (Slipper)	116,236	115,139	1,178,549
Pond catch, all species	25,739	25,737	61,603

1/ Shown separately for all species over 100,000 lb. or \$100,000.

2/ Including species not shown separately.

Source: Hawaii State Department of Land and Natural Resources, Division of Aquatic Resources, Commercial Fish Landings for Fiscal Year--July 1987 through June 1988.

Table 580.-- COMMERCIAL FISH LANDINGS, BY ISLANDS: 1988

[Year ended June 30, 1988]

Island	Pounds caught	Pounds sold	Value (dollars)
State total	11,068,246	10,599,714	20,597,610
Hawaii	2,438,212	2,363,229	4,084,482
Maui	867,612	768,181	1,559,799
Lanai	26,425	25,065	40,549
Molokai	67,300	58,612	179,748
Oahu	6,387,734	6,219,368	12,574,582
Kauai	1,261,474	1,148,304	2,116,270
Niihau	19,489	16,955	42,180

Source: Hawaii State Department of Land and Natural Resources, Division of Aquatic Resources, Commercial Fish Landings for Fiscal Year--July 1987 through June 1988.

Table 581.-- HAWAIIAN FISHPONDS, BY CONDITION, ON HAWAII, MOLOKAI, AND OAHU: 1989

Island	Classification 1/					
	Total	I	II-A	II-B	III	IV
Hawaii	118	24	52	31	10	1
Molokai	74	2	9	44	17	2
Oahu	178	4	8	22	134	10

1/ I, walls in good to excellent condition; II-A, in fair to good condition; II-B, in poor to fair condition; III, no visible surface, but location known; IV, reported in literature but precise location unknown.

Source: DHM Planners, Inc., and Bishop Museum, Hawaiian Fishpond Study (June 1989), table III-2.

Table 582.-- FISH POPULATIONS AROUND SELECTED SHORELINE AREAS:
YEAR ENDED JUNE 30, 1988

Location	Species	Fish per acre	Pounds per acre
Marine Life Conservation Districts:			
Hanauma Bay, Oahu: Inshore	70	4,660	2,400
Molokini Shoal, Maui	83	2,612	734
Honolua-Mokuleia Bays, Maui	69	4,556	1,114
Manele-Hulopoe Bays, Lanai	(NA)	3,465	1,337
Wailea Bay, Hawaii	69	963	290
Lapakahi, Hawaii	101	2,506	352
Kealakekua Bay, Hawaii	86	3,828	385
Artificial reefs:			
Maunalua Bay, Oahu: Cee Bee 24 ...	(NA)	(NA)	1,112
Mud scow	(NA)	(NA)	326
Transect	(NA)	(NA)	536
Waianae, Oahu	(NA)	(NA)	152
Shoreline Fisheries Management Areas:			
Waikiki-Diamond Head, Oahu	73	(NA)	273
Puako Reef, Hawaii (near shore) ...	42	1,882	214
Kailua Bay, Hawaii	63	1,860	263
Other areas:			
Barbers Point, Oahu.....	110	969	120
Wahikuli, Maui	(NA)	(NA)	11
Keawekapu, Maui	(NA)	(NA)	115
Hanalei Bay, Kauai	87	1,610	207
Poipu, Kauai	77	2,786	810
Salt Ponds, Kauai	43	2,195	527
Kipu Kai, Kauai	(NA)	(NA)	251

NA Not available.
Source follows next table.

Table 583.--MOST ABUNDANT AND HEAVIEST FISH SPECIES AT SPECIFIED
LOCATIONS: YEAR ENDED JUNE 30, 1988

[Three leading species at each location, based on both individuals per acre
and pounds per acre]

Location and species	Individuals per acre		Pounds per acre	
	Rank	Number	Rank	Number
Waikiki-Diamond Head Shoreline Fisheries Management Area:				
<u>Acanthurus triostegus</u> (manini)	1	168	2	25
<u>Thalassoma duperrey</u> (hinalea lauwili)	2	132	6	10
<u>Stethojulis balteata</u> (ohua)	3	122	(NA)	(NA)
<u>Acanthurus nigrofuscus</u> (maiii)	4	104	3	18
<u>Naso unicornis</u> (kala)	6	43	1	36
Hanauma Bay Marine Life Conservation District (inshore):				
<u>Acanthurus triostegus</u> (manini)	1	1,456	3	231
<u>Abudefduf abdominalis</u> (mamo)	2	624	8	114
<u>Kuhlia sandvicensis</u> (aholehole)	3	465	4	197
<u>Neomyxus leuciscus</u> (uouoa)	4	363	1	487
<u>Kyphosus bigibbus</u> (nenu)	7	134	2	404
Kealakekua Bay Marine Life Conservation District:				
<u>Zebrasoma flavescens</u> (pala)	1	862	1	66
<u>Ctenochaetus strigosus</u> (kole)	2	648	7	21
<u>Chromis vanderbilfti</u> (damsel)	3	385	(NA)	(NA)
<u>Melichthys niger</u> (ele'ele)	4	317	2	47
<u>Scarus sordidus</u> (uhu)	10	84	3	45

NA Not available.

Source: Hawaii State Department of Land and Natural Resources, Division of Aquatic Resources, Statewide Marine Research and Surveys, Survey of Fish and Habitat, July 1, 1987 to June 30, 1988.

Table 584.-- MINERAL INDUSTRIES: 1958 TO 1987

[Excluding mines at manufactures]

Subject	1958	1963	1967	1972	1977	1982	1987
Number of establishments 1/.....	20	44	12	15	7	12	9
With 20 employees or more	8	4	3	5	2	4	4
All employees:							
Number (1,000) .....	.4	.3	.2	.3	.1	.2	.2
Payroll (million dollars)	1.7	1.7	1.6	2.4	1.9	3.8	7.4
Production, development, and ex- ploration workers:							
Number (1,000) .....	.4	.2	.2	.2	.1	.1	.2
Hours (millions) .....	.7	.6	.4	.4	.2	.2	.4
Wages (million dollars)	1.4	1.5	1.3	1.8	1.5	2.6	5.7
Value added in mining (million dollars)	4.6	4.9	5.0	9.0	8.1	9.7	23.5
Cost of supplies used, purchased machinery installed, etc. (million dollars)	2.0	2.1	2.3	4.1	2.9	5.9	10.4
Value of shipments and receipts (million dollars)	5.8	6.5	5.5	11.0	9.7	12.8	31.1
Capital expenditures (million dollars) .....	.7	.5	1.8	2.0	1.3	2.7	2.8

1/ After 1963, data for single-unit establishments without paid employees were excluded from the census of mineral industries. Eight of the 12 establishments reported, including all 4 with 20 employees or more, were in SIC 142, crushed and broken stone, including riprap.

Source: U.S. Bureau of the Census, 1982 Census of Mineral Industries, Geographic Area Series, Pacific States, MIC82-A-9 (April 1985), tables 1 and 2a, and 1987 Census of Mineral Industries, United States, MIC87-SUM-1(P) (September 1989), table 2.

Table 585.-- NONFUEL MINERAL PRODUCTION: 1986 TO 1988

[Production as measured by mine shipments, sales, or marketable production, including consumption by producers]

Minerals	1986 <u>1/</u>	1987 <u>1/</u>	1988 <u>2/</u>
QUANTITY (1,000 SHORT TONS)			
Total	(X)	(X)	(X)
Cement:			
Masonry	7	10	10
Portland	287	324	400
Gem stones	(NA)	(NA)	(NA)
Lime	3	3	3
Sand and gravel (construction)	605	*700	600
Stone (crushed)	*7,100	5,732	5,700
Other industrial minerals	(X)	(X)	(X)
VALUE (\$1,000)			
Total	70,412	73,479	78,225
Cement:			
Masonry	1,078	1,559	1,600
Portland	24,253	26,550	32,800
Gem stones	25	25	125
Lime	(W)	(W)	(W)
Sand and gravel (construction)	2,666	*3,500	2,400
Stone (crushed)	*42,100	41,548	41,000
Other industrial minerals	290	297	300

* Estimated.

NA Not available.

W Withheld to avoid disclosing company proprietary data; value included with "other industrial minerals."

X Not applicable.

1/ Revised from Data Book 1988, table 611.

2/ Preliminary.

Source: U.S. Bureau of Mines, "The Mineral Industry of Hawaii," Mineral Industry Surveys (January 1989).