

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 46,000 acres had been planted in eucalyptus and other species of trees by mid-1987. 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 10.5 square miles in fiscal 1987.

The commercial fish catch in fiscal year 1987 amounted to 12.1 million pounds, with a value of \$20 million to primary producers. Ahi (yellowfin) and aku (skipjack) accounted for 38 percent of the total value. Other important species are spiny lobster, opakapaka, mahimahi, and ono. Commercial fishermen numbered 3,008. Among Marine Life Conservation Districts, those with the most fish per acre were Hanauma Bay (6,225 inshore), Manele-Hulopoe Bays (4,417), and Kealakekua Bay (4,149).

The value of mineral production reached \$73 million in 1987, almost all of it in cement (\$27 million) and crushed stone (\$43 million). The 1987 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: 1988, Sections 24 and 25.

Table 601.-- FOREST ACREAGE, BY ISLANDS: 1970-1987

Island	Conservation district forest land, June 30, 1987		Forest land, 1970		Planted forest, June 30, 1987	
	Forest reserve land <u>1/</u>	Private forest land <u>2/</u>	Commer- cial <u>3/</u>	Noncommer- cial <u>4/</u>	Planted in preced- ing year	Total standing
State total	840,540	327,845	947,800	1,038,600	715	46,700
Hawaii	585,000	106,745	569,400	583,100	676	18,099
Maui	93,320	53,180	67,500	172,300	3	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	1	7,039
Kauai	88,120	73,850	145,900	74,000	35	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 602.-- 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 603.-- FOREST AND BRUSHLAND FIRES, BY COUNTIES: 1986 AND 1987
 [Years ended June 30]

Subject	State total	Counties			
		Hawaii	Maui	Hono-lulu	Kauai
Number of fires:					
1986	140	73	32	22	13
1987	109	58	38	11	2
Acres burned:					
1986	25,329	25,246	17	58	8
1987	6,713	4,356	449	1,905	3

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

Table 604.-- COMMERCIAL FISH LANDINGS, BY ISLANDS: 1987
 [Year ended June 30, 1987]

Island	Pounds caught	Pounds sold	Value (dollars)
State total	12,140,193	11,638,645	20,512,519
Hawaii	3,818,341	3,717,915	4,802,594
Maui	1,018,660	939,515	1,719,597
Lanai	24,725	21,069	33,554
Molokai	77,112	65,723	166,045
Oahu	5,820,935	5,658,286	11,742,389
Kauai	1,372,916	1,229,309	2,034,598
Niihau	7,504	6,828	13,741

Source: Hawaii State Department of Land and Natural Resources, Division of Aquatic Resources, Commercial Fish Landings for Fiscal Year--July, 1986 through June, 1987.

Table 605.-- COMMERCIAL FISHING: 1970 TO 1987

[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

^{1/} Represents the total catches of all licensed commercial fishers. Includes both sea and pond catch, but excludes coral harvests. Particularly for years since 1979, data may be incomplete due to unreported aku (skipjack tuna) boat and flagline 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 606.-- COMMERCIAL FISH CATCH, BY SPECIES: 1987

[Year ended June 30, 1987]

Species <u>1/</u>	Pounds caught	Pounds sold	Value (dollars)
Total catch	12,140,193	11,638,645	20,512,519
Sea catch, all species <u>2/</u>	12,108,237	11,607,225	20,445,390
Aku (Skipjack)	3,006,280	2,933,191	3,166,412
Ahi (Yellowfin)	4,090,276	3,877,862	4,720,184
Ahipahala	189,459	188,386	136,545
Ahi (Bigeye)	201,103	197,190	502,330
Striped marlin	75,493	71,689	109,497
Pacific blue marlin	514,100	476,947	419,602
Mahimahi	702,745	669,592	1,523,454
Ono	455,083	432,246	1,023,329
Hapuupuu	92,384	893,330	158,998
Opakapaka	402,459	384,168	1,202,950
Uku	89,175	88,249	243,756
Ehu	56,839	54,013	156,057
Onaga	248,049	244,735	916,381
Akule	184,414	173,685	329,722
Lehi	38,609	36,653	100,368
Opelu	394,719	383,749	599,511
Lobster (Spiny)	318,424	317,054	2,756,854
Slipper lobster	156,835	156,660	1,025,411
Pond catch, all species	31,956	31,420	67,129

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 1986 through June 1987.

Table 607.-- COMMERCIAL FISH CATCH, BY HABITAT AND SPECIES:
1900 TO 1986

[1,000 lb.]

Habitat and species	1900	1950	1953	1985	1986
Total catch	6,207.4	16,217.5	18,862.8	8,551.9	11,202.1
Habitat:					
Coastal	3,640.8	878.2	791.2	575.1	627.6
Neritic-pelagic	998.5	610.3	566.9	459.9	597.9
Slope and seamount	211.9	806.8	600.2	1,595.5	1,717.9
Pelagic	1,306.6	13,805.9	16,793.8	5,909.1	8,252.9
Selected species:					
Opihi	147.2	7.2	3.0	14.9	14.4
Goatfishes	364.5	140.7	164.0	73.4	68.7
Pond and nearshore ^{1/}	1,319.8	216.7	140.9	32.9	28.3
Ulua	652.0	228.8	319.9	105.6	102.3
Surgeonfish, parrotfish	278.5	46.3	13.6	82.7	118.8
Akule	849.6	417.6	314.5	229.9	216.3
Opelu	138.8	183.7	248.7	210.7	359.1
Deepwater snappers, groupers	211.9	806.8	600.2	919.4	980.2
Lobsters	131.2	34.0	17.9	666.1	727.7
Aku	422.1	9,506.0	12,059.4	2,105.1	2,342.6
Ahi	31.7	2,627.6	3,497.3	2,652.1	4,262.0
Mahimahi, ono	22.8	334.0	213.4	676.1	902.4

^{1/} Includes awa, mullet, oio, and moi.

Source: Richard S. Shomura, Hawaii's Marine Fishery Resources: Yesterday (1900) and Today (1986) (National Marine Fisheries Service, Honolulu Laboratory, Southwest Fisheries Center, Administrative Report H-87-21, December 1987). Quoted with permission.

Table 608.-- FISH POPULATIONS AROUND SELECTED SHORELINE AREAS:
YEAR ENDED JUNE 30, 1987

Location	Species	Fish per acre	Pounds per acre
Marine Life Conservation Districts:			
Hanauma Bay, Oahu: Inshore	67	6,225	2,769
Offshore	82	1,934	435
Molokini Shoal, Maui	98	3,623	1,039
Honolua-Mokuleia Bays, Maui	58	1,576	509
Manele-Hulopoe Bays, Lanai	101	4,417	1,004
Wailea Bay, Hawaii	81	1,580	364
Lapakahi, Hawaii	96	2,392	353
Kealakekua Bay, Hawaii	103	4,149	628
Artificial reef:			
Maunalua Bay, Oahu: Cee Bee 24 ...	39	(NA)	433
Mud scow	50	(NA)	80
Transect	70	(NA)	406
Waianae, Oahu	(NA)	(NA)	65
Shoreline Fisheries Management Areas:			
Waikiki-Diamond Head, Oahu	(NA)	(NA)	279
Puako Reef, Hawaii (near shore) ...	118	3,294	374
Other areas:			
Barbers Point, Oahu.....	78	1,514	140
Olowalu, Maui	56	1,407	156
McGregor Point, Maui	77	1,882	686
Makaiwa Bay, Hawaii	93	2,924	543
Kipu Kai, Kauai	85	2,025	904

NA Not available.
Source follows next table.

Table 609.--MOST ABUNDANT AND HEAVIEST FISH SPECIES AT SPECIFIED
LOCATIONS: YEAR ENDED JUNE 30, 1987

[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	256	3	41
<u>Thalassoma duperrey</u> (hinalea lauwili)	2	224	4	19
<u>Acanthurus nigrofuscus</u> (maiii)	3	207	1	56
<u>Naso unicornis</u> (kala)	5	85	2	53
Hanauma Bay Marine Life Conservation District (inshore):				
<u>Kulelia sandvicensis</u> (aholehole)	1	1,201	2	344
<u>Acanthurus triostegus</u> (manini)	2	996	4	193
<u>Thalassoma duperrey</u> (hinalea lauwili)	3	525	(NA)	(NA)
<u>Acanthurus xanthopterus</u> (pualu)	(NA)	(NA)	1	454
<u>Kyphosus</u> sp. (nenu)	(NA)	(NA)	3	232
Kealakekua Bay Marine Life Conservation District:				
<u>Pervagor spilosoma</u> (oililepa)	1	661	7	21
<u>Zebrasoma flavescens</u> (pala)	2	618	2	70
<u>Ctenochaetus strigosus</u> (kole)	3	566	6	23
<u>Melichthys niger</u> (humuhumu ele'ele)	5	258	1	90
<u>Elops hawaiiensis</u> (awaawa)	(NA)	(NA)	3	50

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, 1986 to June 30, 1987.

Table 610.-- MINERAL INDUSTRIES: 1958 TO 1982

[Excluding mines at manufactures]

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

^{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.

Table 611.-- NONFUEL MINERAL PRODUCTION: 1985 to 1987

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

Minerals	1985 <u>1/</u>	1986 <u>1/</u>	1987 <u>2/</u>
QUANTITY (1,000 SHORT TONS)			
Total	(X)	(X)	(X)
Cement:			
Masonry	7	7	10
Portland	215	287	300
Gem stones	(NA)	(NA)	(NA)
Lime	(W)	3	(W)
Sand and gravel (construction)	*500	605	*600
Stone (crushed)	5,627	*7,100	6,800
Other industrial minerals	(X)	(X)	(X)
VALUE (\$1,000)			
Total	53,272	70,412	72,515
Cement:			
Masonry	588	1,078	1,500
Portland	16,050	24,253	25,300
Gem stones	*25	25	25
Lime	(W)	(W)	(W)
Sand and gravel (construction)	*2,100	2,666	*2,600
Stone (crushed)	34,183	*42,100	42,800
Other industrial minerals	326	290	290

* 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 1987, table 613.

2/ Preliminary.

Source: U.S. Bureau of Mines, "The Mineral Industry of Hawaii," Mineral Industry Survey (January 11, 1988).