

## Section 20

# FORESTS, FISHERIES, AND MINING

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

The most recent available statistics show 1.7 million acres of forest and 700,000 acres of 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-1990. 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 5.3 square miles in fiscal 1990.

The commercial fish catch in fiscal year 1990 amounted to 15.4 million pounds, with a value of \$36 million to primary producers. Ahi (yellowfin) and aku (skipjack) accounted for 44 percent of the total value. Other important species are swordfish, spiny lobster, opakapaka, mahimahi, akule, and ono. Commercial fishermen numbered 3,551. Among Marine Life Conservation Districts, those with the most fish per acre were Honolua-Mokuleia Bays (4,497), Hanauma Bay (3,788), and Kealakekua Bay (3,414).

The value of mineral production reached \$103 million in 1990, almost all of it in cement (\$42 million) and crushed stone (\$55 million). The 1990 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: 1991, Sections 24 and 25.

Table 576.-- FOREST AND NATURAL AREA ACREAGE: JUNE 30, 1990

Island	Conservation district forest land		Planted forest		Natural areas <sup>3/</sup>	
	Forest reserve land <sup>1/</sup>	Private forest land <sup>2/</sup>	Planted in preceding year	Total standing	Number of areas	Acres
State total ..	639,592	327,845	355	45,853	21	122,703
Hawaii .....	438,416	106,745	125	16,976	9	86,135
Maui .....	73,227	53,180	148	11,837	4	17,123
Kahoolawe .....	-	-	-	-	-	-
Lanai .....	-	6,150	-	512	-	-
Molokai .....	16,030	-	2	3,219	2	2,950
Oahu .....	28,626	87,920	45	7,084	3	1,770
Kauai .....	83,293	73,850	35	6,225	3	14,725
Niihau .....	-	-	-	-	-	-

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 Waimanu Research Reserve (3,600 acres) and Alakai Wilderness Preserve (9,939 acres).

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

Table 577.-- WOODLAND ON FARMS, 1978 TO 1987, AND BY COUNTIES, 1987

[Acres]

Use	1978	1982	1987				
			State total	Hawaii	Maui	Hono-lulu	Kauai
Total ....	145,802	117,270	99,135	75,331	14,024	7,085	2,695
Pastured .....	40,242	36,550	27,517	22,973	992	2,797	755
Not pastured ..	105,560	80,720	71,618	52,358	13,032	4,288	1,940

Source: U.S. Bureau of the Census, 1987 Census of Agriculture, Hawaii AC87-A-11 (August 1989), pp. 15 and 36.

Table 578.-- LAND AREA, BY VEGETATION TYPE AND FOREST RESERVE STATUS, FOR MOLOKAI, OAHU, AND KAUAI: 1986

[In acres. Excludes land in forest plantations. Surveys of Hawaii, Maui, Kahoolawe, and Lanai are planned for 1992]

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 579.-- 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: 1990, p. 672.

Table 580.-- FOREST AND BRUSHLAND FIRES, 1988 TO 1990, AND BY  
COUNTIES, 1990

[Years ended June 30]

Subject	1988	1989	1990, by counties				
			State total	Hawaii	Maui	Hono- lulu	Kauai
Number of fires ..	79	82	210	128	43	33	6
Acres burned .....	34,794	6,585	3,384	1,827	223	1,325	9

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

Table 581.-- COMMERCIAL FISHING: 1970 TO 1990

[Years ended June 30]

Year	Number of commercial fishermen	Commercial fish catch <sup>1/</sup>		
		Pounds landed	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 ....	3,155	11,052,502	10,592,287	20,541,580
1989 ....	3,491	13,493,866	13,010,973	28,003,055
1990 ....	3,551	15,370,302	14,836,135	35,984,313

<sup>1/</sup> Represents the total catches of all licensed commercial fishers. Includes both sea and pond catches, but excludes coral harvests. Particularly for 1979-1988, 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 582.-- COMMERCIAL FISH CATCH, BY SPECIES: 1990

[Year ended June 30, 1990]

Species <u>1/</u>	Pounds caught	Pounds sold	Value (dollars)
Total catch .....	15,370,302	14,836,135	35,984,313
Sea catch, all species <u>2/</u> .....	15,350,576	14,816,617	35,939,707
Tunas .....	7,666,660	7,498,663	16,016,478
Aku (Skipjack) .....	2,771,063	2,707,992	3,962,056
Ahipalaha .....	212,093	211,419	307,561
Bigeye (ahi) .....	1,549,390	1,546,048	5,094,899
Yellowfin (ahi) .....	3,103,943	3,010,869	6,624,431
Billfishes .....	3,442,745	3,329,065	6,700,151
Blue marlin .....	1,132,636	1,045,637	925,774
Striped marlin .....	643,310	633,141	846,966
Swordfish .....	1,523,285	1,522,002	4,766,443
Miscellaneous pelagic fishes ..	1,095,131	1,041,091	2,429,593
Mahimahi .....	510,696	477,768	1,207,137
Ono .....	360,365	341,212	1,013,209
Deep bottom fishes .....	789,564	746,764	2,875,925
Opakapaka .....	272,403	266,110	1,114,597
Uku .....	151,277	148,258	524,182
Ulaula .....	145,666	140,663	720,787
Akule/opelu .....	1,127,051	1,033,791	1,793,105
Akule .....	694,859	613,376	1,094,728
Opelu .....	372,773	362,596	599,241
Jacks .....	197,201	185,783	358,782
Inshore fishes .....	196,529	180,504	428,378
Sharks .....	84,115	74,535	62,826
Lobsters (ula) .....	341,383	325,123	3,602,803
Crabs .....	26,693	25,169	125,809
Shrimps .....	341,433	341,303	1,453,270
Other animals .....	27,557	22,941	59,012
Seaweeds .....	9,421	7,365	28,035
Miscellaneous .....	5,093	4,520	5,540
Pond landings, all species .....	19,726	19,518	44,606

1/ Shown separately for all species over 250,000 lb. or \$250,000.

2/ Including species not shown separately.

Source: Hawaii State Department of Land and Natural Resources, Division of Aquatic Resources, Commercial Fish Landings, State of Hawaii--Fiscal Year 1989-1990.

Table 583.-- COMMERCIAL SEA LANDINGS, BY ISLANDS: 1990

[Year ended June 30, 1990]

Island	Pounds landed	Pounds sold	Value (dollars)
State total .....	15,350,576	14,816,617	35,939,707
Hawaii .....	2,783,460	2,680,145	4,935,260
Maui .....	684,227	553,379	1,228,580
Lanai .....	21,852	18,397	43,807
Molokai .....	71,306	52,690	156,550
Oahu .....	10,841,040	10,681,796	27,799,187
Kauai and Niihau .....	948,691	830,210	1,776,317

Source: Hawaii State Department of Land and Natural Resources, Division of Aquatic Resources, Commercial Fish Landings, State of Hawaii--Fiscal Year 1989-1990.

Table 584.-- COMMERCIAL SEA LANDINGS, BY FISHING METHOD: 1990

[Year ended June 30, 1990]

Fishing method	Pounds landed	Pounds sold	Value (dollars)
All methods .....	15,350,576	14,816,617	35,939,707
Aku pole and line .....	2,477,726	2,477,726	3,564,296
Longline .....	5,790,578	5,773,081	14,814,658
Handline .....	2,662,734	2,570,405	6,492,913
Trolling .....	2,665,838	2,349,348	4,222,722
Net .....	929,949	848,787	1,482,361
Trap .....	720,701	708,141	5,147,193
All other methods .....	103,050	89,129	215,564

Source: Hawaii State Department of Land and Natural Resources, Division of Aquatic Resources, Commercial Fish Landings, State of Hawaii--Fiscal Year 1989-1990.

Table 585.-- FISH POPULATIONS AROUND SELECTED SHORELINE AREAS:  
YEAR ENDED JUNE 30, 1990

Location	Species	Fish per acre	Pounds per acre
<b>Marine Life Conservation Districts:</b>			
Hanauma Bay, Oahu (in shore) .....	60	3,788	3,186
Pupukea, Oahu .....	91	2,582	346
Waikiki, Oahu .....	(NA)	(NA)	427
Molokini Shoal, Maui .....	86	2,250	623
Honolua-Mokuleia Bays, Maui .....	74	4,497	1,377
Manele-Hulopoe Bays, Lanai .....	(NA)	2,338	430
Wailea Bay, Hawaii .....	73	1,524	372
Lapakahi, Hawaii .....	91	2,074	360
Kealakekua Bay, Hawaii .....	92	3,414	542
<b>Artificial reefs:</b>			
Maunaloa Bay, Oahu (tire modules) .	67	(NA)	3,133
Waianae, Oahu (tire modules) .....	(NA)	(NA)	932
Keawakapu, Maui .....	(NA)	(NA)	648
<b>Fisheries Management Areas:</b>			
Waikiki-Diamond Head, Oahu .....	(NA)	(NA)	252
Puako Reef, Hawaii .....	42	1,331	218
<b>Other areas:</b>			
Na Pali Coast, Kauai .....	77	2,692	296
Waimea Bay, Oahu .....	57	2,245	166
Honokahau, Kona .....	30	1,063	190
Wawahiwaa, Kona .....	58	2,229	204
Kaiwi, Kona .....	50	4,136	635
Red Hill, Kona .....	64	3,225	631

NA Not available.  
Source follows next table.



Table 586.--MOST ABUNDANT AND HEAVIEST FISH SPECIES AT SPECIFIED  
LOCATIONS: YEAR ENDED JUNE 30, 1990

[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
<b>Waikiki MLCD, Oahu:</b>				
Manini ( <i>acanthurus triostegus</i> ) .....	1	407	3	65
Lavender tang ( <i>acanthurus nigrofuscus</i> ) ....	2	294	2	78
Saddle-back wrasse ( <i>thalassoma duperrey</i> ) ..	3	245	5	19
Kala ( <i>naso unicornis</i> ) .....	4	143	1	151
<b>Hanauma Bay MLCD, Oahu:</b>				
Aholehole ( <i>Kuhlia sandivcensis</i> ) .....	1	864	3	382
Manini ( <i>acanthurus triostegus</i> ) .....	2	590	7	113
Mamo ( <i>abudedefduf abdominalis</i> ) .....	3	392	(NA)	(NA)
Nenu ( <i>kyphosus bigibbus</i> ) .....	5	235	1	1,200
Pualu ( <i>acanthurus xanthopterus</i> ) .....	9	158	2	1,013
<b>Kealakekua Bay MLCD, Hawaii:</b>				
Yellow tang ( <i>zebrasoma flavescens</i> ) .....	1	1,131	1	142
Kole ( <i>ctenochaetus strigosus</i> ) .....	2	378	7	15
Maikoiko ( <i>acanthurus leucopareius</i> ) .....	3	260	3	45
Eleele ( <i>melichthys niger</i> ) .....	7	164	2	103

NA Not available.

MLCD Marine Life Conservation District.

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, 1989 to June 30, 1990.

Table 587.-- MINERAL INDUSTRIES: 1958 TO 1987

[Excluding mines at manufactures]

Subject	1958	1963	1967	1972	1977	1982	1987
Number of establishments <u>1</u> /.....	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 by 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. In 1987, seven of the nine establishments reported, including three of the four 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, Geographic Area Series, Pacific States, MIC87-A-9 (October 1990), Hawaii table 1.

Table 588.-- NONFUEL MINERAL PRODUCTION: 1988 TO 1990

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

Minerals	1988	1989 <u>1/</u>	1990 <u>2/</u>
QUANTITY (1,000 SHORT TONS)			
Cement:			
Masonry .....	10	10	10
Portland .....	354	493	500
Gem stones .....	(NA)	(NA)	(NA)
Sand and gravel (construction) ....	652	600	1,000
Stone (crushed) .....	*5,700	6,205	7,000
VALUE (\$1,000)			
Total <u>3/</u> .....	74,932	92,051	103,144
Cement:			
Masonry .....	1,531	1,566	600
Portland .....	28,880	40,495	41,500
Gem stones .....	(W)	44	44
Sand and gravel (construction) ....	3,173	*3,200	5,600
Stone (crushed) .....	*41,000	46,746	55,400
Other industrial minerals <u>3/</u> .....	348	(W)	(W)

\* Estimated.

NA Not available.

W Withheld to avoid disclosing company proprietary data.

1/ Revised from Data Book 1990, table 603.

2/ Preliminary.

3/ Except for 1988, totals exclude values indicated by symbol W.

Source: U.S. Bureau of Mines, "The Mineral Industry of Hawaii in 1990," Mineral Industry Surveys (1991).