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SOUTHERN CALIFORNIA MARINE SPORT FISHING FROM
PRIVATELY-OWNED BOATS: CATCH AND EFFORT FOR
JULY-SEPTEMBER 1981

by
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ABSTRACT

The catch landed and effort expended by private-boat sport fishermen were studied in southern California between July and September 1981, in order to determine the impact of one segment of the sport fishery on local marine resources. Fishermen returning from fishing trips were interviewed at launch ramps, hoists, and boat-rental facilities. This report contains quantitative data and statistical estimates of total effort, total catch, catch of preferred species, and length frequencies for those species whose catches are regulated by minimum size limits.

An estimated 356,000 organisms were landed by 134,000 anglers and 5,400 divers. The major components of the catch were Pacific mackerel, *Scomber japonicus*, 89,000 landed; Pacific bonito, *Sarda chiliensis*, 82,000 landed; white croaker, *Genyonemus lineatus*, 34,000 landed; and bass, *Paralabrax* spp., 33,000 landed. These species made up two-thirds of the total catch.

Anglers' compliance with size-limit regulations was variable. Approximately 88% of all measured bass were legal size. The proportion of legal-size white seabass, *Atractoscion nobilis*, rose from 9% last quarter to 18% this quarter, but dropped for California halibut, *Paralichthys californicus*, from 79% to 66%. Divers' compliance with size limits on abalone, *Haliotis* spp., rose slightly from 89% to 91%.

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INTRODUCTION

Recreational fishing activity in southern California marine waters affects the abundance of local fish populations and also influences migratory fish populations. To determine the extent of these fishing activities the Department of Fish and Game studied one segment of the recreational fishery: fishermen using privately-owned, trailerable boats. The study began in 1975 and continued for 3 years. During the following 2 years, lack of personnel caused temporary cessation of the study. However, in 1980 this restraint was removed and the study began again.

The major purposes of the study were to estimate effort levels expended by anglers and divers, to estimate the magnitude and species composition of the catch by these fishermen, and to assess the degree of sport fishermen's compliance with size-limit regulations.

The information generated by this study provides: 1) a baseline study for future comparison of catch and effort trends, 2) evidence for adding, deleting, or changing fishing regulations, 3) an indication of fishing pressure on various species, and 4) supportive material for other agencies to use when assessing proposed actions which could affect southern California's living marine resources. The results of the study focus attention on areas in which management may be necessary.

OPERATIONS

Sampling Plan

The sampling plan consisted of a program of random field sampling at selected launch ramps, hoists, and boat-rental facilities in southern California. Sampling was conducted on all weekends and holidays, and on randomly chosen weekdays in accordance with available manpower. Field samplers remained at the sample locations from 1000 h to 1800 h, and

an attempt was made to interview all returning anglers and divers. Information on length of angling trip, number of hours spent diving, number of fishing poles used, and number of people angling or diving was gathered along with the identification and enumeration of all fishes, molluscs, and crustaceans in possession (no data were requested about species caught but not kept).

An attempt was made to measure all species with minimum size requirements.

Sampling Locations

The program was designed to cover five counties: Santa Barbara, Ventura, Los Angeles, Orange, and San Diego. We began sampling Los Angeles County in the summer of 1980, and slowly expanded the sampling frame to include other counties as additional personnel completed training as field samplers. This report contains the results of the second 3-month quarter of complete sampling coverage of all five southern California counties.

Statistical Analysis

Data were averaged on a daily basis for each county, then expanded to estimate the total catch and effort for each county, each month. Catch estimates were made for each species which had a legal minimum size limit, for the 20 most commonly landed species, for the *Sebastes* genus, and for the total number of organisms landed. Estimates were calculated separately for weekends and weekdays.

The number of boats that left a sampling area without being interviewed was recorded, providing an adjustment factor for the day's total catch or effort.

RESULTS AND DISCUSSION

Data Samples

During the July 1 - September 30, 1981 quarter, 19 launch ramps, four boat hoists, and four boat-rental facilities were sampled 388 times. Samplers interviewed 32,197 anglers and 1,570 divers who spent 215,286 angler-trip-hours^{3/} and 2,424 diver-hours^{4/} in southern California coastal waters. Samplers examined 80,610 fishes, mollusks, and crustaceans of 132 species in the angler catch, along with 3,838 filleted fishes and 98 fishes which could not be identified due to time constraints or the condition in which the fish were landed (Tables 1 and 2). In the sampled diver catch, 4,983 organisms of 72 species, plus 81 unidentified filleted fishes and 25 unidentified fishes and invertebrates were examined.

Effort

Angling effort increased by one-third compared to the previous quarter. Fair weather conditions, increased catch rates of favored game fishes, and the large number of anglers who spent considerable time trolling for marlin, *Tetrapturus* spp., and albacore, *Thunnus alalunga*, accounted for the increase.

Diving effort increased by almost one-half compared to the previous quarter. The increase in effort levels varied greatly between counties: diving activity tripled in Los Angeles County while in San Diego County it remained almost unchanged.

As in previous years, both angler and diver activity peaked in August.

An estimated 134,000 angler-days and 5,400 diver-days were expended during this quarter (an angler-day or diver-day is one angler or diver who fished for any amount of time on any given day).

^{3/} The unit of angler effort is 1 hour of trip time per angler. Adjustments are made for those using more than one fishing pole concurrently.

^{4/} The unit of diver effort is 1 hour spent underwater.

A breakdown of angler-effort levels by county shows that 35% of all angling activity originated in Los Angeles County, 30% in San Diego County, 25% in Orange County, and 10% in Santa Barbara/Ventura counties (Tables 3 and 4).

Diving effort was more evenly distributed in the survey area this quarter compared to the previous quarter. Approximately 33% of the diving activity originated in San Diego County, 29% in Los Angeles County, 25% in Santa Barbara/Ventura counties, and 13% in Orange County (Tables 5 and 6). Normally, a much greater percentage of diving effort is expended in San Diego County than in the other counties. This quarter, however, many divers reported a decrease in the availability of red abalone, *Haliotis rufescens*, the major component of the sport-diver catch. This decreased catch rate may have contributed to the decrease in diving activity.

Catch

An estimated total of 339,000 fishes and other organisms was landed by southern California anglers, and an estimated 16,600 organisms were landed by divers.

Over one-half of the angler catch was composed of only two species: Pacific mackerel, *Scomber japonicus*, 89,000 fish landed; and Pacific bonito, *Sarda chiliensis*, 82,000 fish landed. Rockfishes, *Sebastes* spp., (46,000 landed) accounted for 14% of the catch; white croaker, *Genyonemus lineatus*, (33,700) contributed 10%; and the three bass species, *Paralabrax* spp., (32,900) contributed 10%. Only 5% of the catch was made up of favored game fishes such as white seabass, *Atractoscion nobilis*; lingcod, *Ophiodon elongatus*; California halibut, *Paralichthys californicus*; yellowtail, *Seriola dorsalis*; California barracuda, *Sphyrna argentea*; striped marlin, *Tetrapturus audax*; and albacore.

This quarter marked the appearance of such migratory game species as yellowtail, albacore, and striped marlin in the angler catch. An estimated 7,100 yellowtail, 2,400 albacore, and 27 striped marlin were landed by anglers in southern California.

Approximately two-thirds of the diver catch was composed of four species: red abalone, 3,700 landed; rock scallop, *Hinnites multirugosus*, 3,200 landed; California sheephead, *Semicossyphus pulcher*, 2,100 landed; and green abalone, *Haliotis fulgens*, 2,000 landed.

Variation by County

Santa Barbara and Ventura county anglers landed an estimated 59,000 fishes, nearly half of which were rockfishes. Other major contributors to the catch were Pacific mackerel; Pacific bonito; kelp bass, *Paralabrax clathratus*; and white croaker (Table 7). The catch of favored game fishes (7,000 landed) was made up mostly of California halibut and kelp bass. The estimated diver catch nearly doubled compared to the previous quarter. Divers landed large quantities of red abalone and rock scallop. An estimated 4,800 organisms were landed by divers in these two counties.

Almost one-half of the total angler catch was landed in Los Angeles County. The estimated catch of 142,000 fishes was dominated by Pacific mackerel; Pacific bonito; white croaker; barred sand bass, *Paralabrax nebulifer*; and kelp bass. Approximately 13,000 favored game fishes were landed, nearly three-fourths of which were bass. Since divers are prohibited from taking abalone, *Haliotis* spp., along half of the county's coastline, abalone landings were low (400). Most divers targeted on rock scallop instead (1,400). A total of 4,100 organisms was landed by Los Angeles County divers.

In Orange County, the estimated angler catch of nearly 68,000 fishes was made up primarily of Pacific mackerel, Pacific bontio, bass, and white croaker. The catch of favored game fishes (8,600) was made up mostly of bass. Half of the landings of striped marlin were made in Orange County. Because the offshore habitat is unsuitable for such species as rock scallop and abalone, the estimated diver catch of 1,100 organisms was the lowest catch among the five counties surveyed. Rock scallop, green abalone, and California sheephead made up over three-fourths of the total diver catch.

San Diego County anglers landed an estimated 69,800 fishes. Unlike the other four counties surveyed, San Diego did not have Pacific mackerel as the top species in the angler catch. An estimated 11,100 Pacific mackerel were landed, ranking third behind Pacific bonito (18,700 landed) and bass (11,300 landed). Yellowtail was also a major component of the catch, with 6,100 landed. Over 85% of the yellowtail and nearly all the albacore were landed in San Diego County. More organisms were landed by divers here than in any other county. Red abalone and green abalone made up almost two-thirds of the total estimated diver catch of 6,000 organisms.

Length Frequencies

The length frequency data (Table 8, Figures 1-8) show a substantial lack of compliance with size limits for lingcod, white seabass, California halibut, and California barracuda. The size limit of 22 inches on lingcod was imposed in March of this year and has not yet become widely known by the angling public. Size-limit compliance for white seabass increased compared to the previous quarter (from 9% to 18%), but dropped considerably for California halibut, from 79% to 66%. Anglers followed the size limit on

the basses relatively well; the percentage of legal fish measured averaged 88% for the three bass species combined. The divers' catch of abalone generally reflected a close observance of size limits. The percentage of legal-size abalone measured averaged 91% for red, green, and pink abalone, *Haliotis corrugata*. The percentage of legal-size pink abalone rose from 79% last quarter to 94% this quarter. The low percentage of legal-size pink abalone last quarter was due to an isolated occurrence of one boat's entire catch being made up almost exclusively of sublegal-size abalone.

TABLE 1. List of Species Sampled from Southern California Private Boats;
July through September 1981.

Scientific name	Common name	No. sampled
<i>Alopias vulpinus</i>	common thresher	7
<i>Amphistichus argenteus</i>	barred surfperch	165
<i>Anisotremus davidsonii</i>	sargo	25
<i>Anoplopoma fimbria</i>	sablefish	46
<i>Atherinops affinis</i>	topsmelt	22
<i>Atherinopsis californiensis</i>	jacksmelt	311
<i>Atractoscion nobilis</i>	white seabass	160
<i>Balistes polylepis</i>	finescale triggerfish	25
<i>Calamus brachysomus</i>	Pacific porgy	1
<i>Caulolatilus princeps</i>	ocean whitefish	565
<i>Cheilotrema saturnum</i>	black croaker	50
<i>Chromis punctipinnis</i>	blacksmith	7
<i>Citharichthys sordidus</i>	Pacific sanddab	1,099
<i>C. stigmæus</i>	speckled sanddab	1
<i>C. xanthostigma</i>	longfin sanddab	3
<i>Coryphaena hippurus</i>	dolphinfish	15
<i>Cypselurus californicus</i>	California flying fish	6
<i>Damalichthys vacca</i>	pile surfperch	26
<i>Embiotoca jacksoni</i>	black surfperch	387
<i>E. lateralis</i>	striped surfperch	15
<i>Eopsetta jordani</i>	petrale sole	12
<i>Galeorhinus zyopterus</i>	soupfin shark	14
<i>Genyonemus lineatus</i>	white croaker	8,511
<i>Girella nigricans</i>	opaleye	333
<i>Gymnothorax mordax</i>	California moray	1
<i>Halichoeres semicinctus</i>	rock wrasse	32
<i>Hermosilla azurea</i>	zebraperch	4
<i>Heterodontus francisci</i>	horn shark	2
<i>Heterostichus rostratus</i>	giant kelpfish	83
<i>Hippoglossina stomata</i>	bigmouth sole	14
<i>Hydrolagus colliei</i>	ratfish	6
<i>Hyperprosopon argenteum</i>	walleye surfperch	45
<i>Hypsopsetta guttulata</i>	diamond turbot	46
<i>Hypsurus caryi</i>	rainbow surfperch	8
<i>Hypsypops rubicundus</i>	garibaldi	2
<i>Isurus oxyrinchus</i>	bonito shark	34
<i>Lepidopsetta bilineata</i>	rock sole	5
<i>Medialuna californiensis</i>	halfmoon	480
<i>Menticirrhus undulatus</i>	California corbina	2
<i>Merluccius productus</i>	Pacific hake	20
<i>Mola mola</i>	common mola	2
<i>Mugil cephalus</i>	striped mullet	7
<i>Mustelus californicus</i>	gray smoothhound	121
<i>M. henlei</i>	brown smoothhound	32
<i>M. lunatus</i>	sicklefin smoothhound	6

Table 1 - cont'd.

Scientific name	Common name	No. sampled
<i>Myliobatis californica</i>	bat ray	20
<i>Neoclinus uninotatus</i>	onespot fringehead	7
<i>Ophichthus triserialis</i>	spotted snake eel	1
<i>Ophiodon elongatus</i>	lingcod	103
<i>Oxyjulis californica</i>	senorita	57
<i>Paralabrax clathratus</i>	kelp bass	3,826
<i>P. maculatofasciatus</i>	spotted sand bass	1,207
<i>P. nebulifer</i>	barred sand bass	2,570
<i>Paralichthys californicus</i>	California halibut	969
<i>Phanerodon furcatus</i>	white surfperch	45
<i>Platichthys stellatus</i>	starry flounder	1
<i>Platyrrhinoidis triseriata</i>	thronback	18
<i>Pleuronichthys verticalis</i>	hornyhead turbot	1
<i>Porichthys myriaster</i>	specklefin midshipman	4
<i>Prionace glauca</i>	blue shark	82
<i>Rhacochilus toxotes</i>	rubberlip surfperch	92
<i>Rhinobatos productus</i>	shovelnose guitarfish	134
<i>Roccus saxatilis</i>	striped bass	2
<i>Roncador stearnsii</i>	spotfin croaker	2
<i>Sarda chiliensis</i>	Pacific bonito	18,022
<i>Sardinops sagax caeruleus</i>	Pacific sardine	1
<i>Scomber japonicus</i>	Pacific mackerel	21,446
<i>Scorpaena guttata</i>	sculpin	1,671
<i>Scorpaenichthys marmoratus</i>	cabezon	182
<i>Sebastes atrovirens</i>	kelp rockfish	516
<i>S. auriculatus</i>	brown rockfish	384
<i>S. babcocki</i>	redbanded rockfish	1
<i>S. carnatus</i>	gopher rockfish	154
<i>S. caurinus</i>	copper rockfish	1,661
<i>S. chlorostictus</i>	greenspotted rockfish	637
<i>S. chrysomelas</i>	black-and yellow-rockfish	90
<i>S. constellatus</i>	starry rockfish	691
<i>S. dallii</i>	calico rockfish	12
<i>S. elongatus</i>	greenstriped rockfish	126
<i>S. entomelas</i>	widow rockfish	37
<i>S. eos</i>	pink rockfish	1
<i>S. flavidus</i>	yellowtail rockfish	66
<i>S. gilli</i>	bronzespotted rockfish	3
<i>S. goodei</i>	chilipepper	183
<i>S. hopkinsi</i>	squarespot rockfish	33
<i>S. levis</i>	cowcod	37
<i>S. macdonaldi</i>	Mexican rockfish	1
<i>S. melanops</i>	black rockfish	1
<i>S. miniatus</i>	vermilion rockfish	853
<i>S. mystinus</i>	blue rockfish	3,119
<i>S. nebulosis</i>	China rockfish	1
<i>S. ovalis</i>	speckled rockfish	193
<i>S. paucispinus</i>	bocaccio	876
<i>S. phillipsi</i>	chameleon rockfish	1

Table 1 - cont'd.

Scientific name	Common name	No. sampled
<i>S. pinniger</i>	canary rockfish	20
<i>S. rastrelliger</i>	grass rockfish	582
<i>S. rosaceus</i>	rosy rockfish	630
<i>S. rosenblatti</i>	greenblotched rockfish	49
<i>S. ruberrimus</i>	yelloweye rockfish	1
<i>S. rubrivinctus</i>	flag rockfish	205
<i>S. rufus</i>	bank rockfish	4
<i>S. saxicola</i>	stripetail rockfish	5
<i>S. semicinctus</i>	halfbanded rockfish	1
<i>S. serranoides</i>	olive rockfish	1,442
<i>S. serriceps</i>	treefish	232
<i>S. umbrosus</i>	honeycomb rockfish	95
<i>Semicossyphus pulcher</i>	California sheephead	1,185
<i>Seriola dorsalis</i>	yellowtail	1,421
<i>Seriphus politus</i>	queenfish	1,474
<i>Sphyrna argentea</i>	California barracuda	623
<i>Sphyrna zygaena</i>	smooth hammerhead	2
<i>Squalus acanthias</i>	spiny dogfish	109
<i>Squatina californica</i>	Pacific angel shark	6
<i>Stereolepis gigas</i>	giant sea bass	9
<i>Strongylura exilis</i>	California needlefish	1
<i>Synodus lucioceps</i>	California lizardfish	112
<i>Tetrapturus audax</i>	striped marlin	9
<i>Thunnus albacares</i>	yellowfin tuna	41
<i>T. alalunga</i>	albacore	431
<i>Tilapia</i> spp.	tilapia	2
<i>Torpedo californica</i>	Pacific electric ray	1
<i>Trachurus symmetricus</i>	jack mackerel	263
<i>Triakis semifasciata</i>	leopard shark	46
<i>Umbrina roncadore</i>	yellowfin croaker	330
<i>Xystreurys liolepis</i>	fantail sole	6
<i>Zapteryx exasperata</i>	banded guitarfish	1
-	unidentified fish	110
-	unidentified filleted fish	1,661
<i>Sebastes</i> spp.	unidentified rockfish fillets	2,258

Mollusks and Crustaceans

<i>Cancer antennarius</i>	rock crab	83
<i>C. anthonyi</i>	yellow crab	10
<i>C. productus</i>	red crab	52
<i>Cypraea spadicea</i>	chestnut cowry	10
<i>Fissurella volcano</i>	volcano limpet	1
<i>Haliotis corrugata</i>	pink abalone	260
<i>H. cracherodii</i>	black abalone	86

Table 1 - cont'd.

Scientific name	Common name	No. sampled
<i>H. fulgens</i>	green abalone	388
<i>H. rufescens</i>	red abalone	1,094
<i>H. sorenseni</i>	white abalone	15
<i>Hinnites multirugosus</i>	rock scallop	1,109
<i>Kelletia kelletii</i>	Kellets whelk	17
<i>Loxorhynchus grandis</i>	sheep crab	38
<i>Megathura cremulata</i>	giant keyhole limpet	1
<i>Octopus bimaculatus</i>	twospot octopus	5
<i>Panulirus interruptus</i>	California spiny lobster	2
<i>Tivela stultorum</i>	pismo clam	73
Brachyura	unidentified crab	4
-	unidentified mollusk	9

Echinoderms and Coelenterates

<i>Strongylocentrotus purpuratus</i>	purple urchin	9
<i>Lytechinus</i> spp.	white sea urchin	10
<i>Pisaster</i> spp.	sea star	33

TABLE 2. Most Commonly Landed Species; July through September 1981.

Scientific name	Common name	No. sampled
<i>Scomber japonicus</i>	Pacific mackerel	21,446
<i>Sarda chiliensis</i>	Pacific bonito	18,022
<i>Genyonemus lineatus</i>	white croaker	8,511
<i>Paralabrax clathratus</i>	kelp bass	3,826
<i>Sebastes mystinus</i>	blue rockfish	3,119
<i>Paralabrax nebulifer</i>	barred sand bass	2,570
<i>Scorpaena guttata</i>	sculpin	1,671
<i>Sebastes caurinus</i>	copper rockfish	1,661
<i>Seriphus politus</i>	queenfish	1,474
<i>Sebastes serranoides</i>	olive rockfish	1,442
<i>Seriola dorsalis</i>	yellowtail	1,421
<i>Paralabrax maculatofasciatus</i>	spotted sand bass	1,207
<i>Semicossyphus pulcher</i>	California sheephead	1,185
<i>Citharichthys sordidus</i>	Pacific sanddab	1,099
<i>Paralichthys californicus</i>	California halibut	969
<i>Sebastes paucispinus</i>	bocaccio	876
<i>S. miniatus</i>	vermilion rockfish	853
<i>S. constellatus</i>	starry rockfish	691
<i>S. chlorostictus</i>	greenspotted rockfish	637
<i>S. rosaceus</i>	rosy rockfish	630
<i>Sphyraena argentea</i>	California barracuda	623
<i>Sebastes rastrelliger</i>	grass rockfish	582
<u>Mollusks and Crustaceans</u>		
<i>Hinnites multirugosus</i>	rock scallop	1,109
<i>Haliotis rufescens</i>	red abalone	1,094
<i>H. fulgens</i>	green abalone	388
<i>H. corrugata</i>	pink abalone	260
<i>H. cracherodii</i>	black abalone	86

TABLE 3. Catch and Effort Estimates for Anglers; July through September 1981.

	Santa Barbara/ Ventura Counties	Los Angeles County	Orange County	San Diego County	Total
Angler parties					
weekend	3,611	10,928	8,575	7,272	30,386
weekday	<u>2,559</u>	<u>6,917</u>	<u>5,261</u>	<u>6,624</u>	<u>21,361</u>
total	6,170	17,845	13,836	13,896	51,747
Angler days					
weekend	9,763	29,911	22,540	19,326	81,540
weekday	<u>6,370</u>	<u>17,023</u>	<u>12,488</u>	<u>16,129</u>	<u>52,010</u>
total	16,133	46,934	35,028	35,455	133,550
Angler-trip-hours					
weekend	62,848	199,184	145,358	147,208	554,598
weekday	<u>36,277</u>	<u>107,931</u>	<u>74,359</u>	<u>117,395</u>	<u>335,962</u>
total	99,125	307,115	219,717	264,603	890,560
Total fishes landed					
weekend	39,295	84,561	40,960	34,845	199,661
weekday	<u>19,988</u>	<u>57,565</u>	<u>26,745</u>	<u>35,005</u>	<u>139,303</u>
total	59,283	142,126	67,705	69,850	338,964
No. rockfishes landed					
weekend	15,818	9,545	1,447	4,088	30,898
weekday	<u>8,349</u>	<u>3,554</u>	<u>315</u>	<u>3,420</u>	<u>15,638</u>
total	24,167	13,099	1,762	7,508	46,536
<i>Atractoscion nobilis</i> (white seabass)					
	61	252	269	171	753
<i>Caulolatilus princeps</i> (ocean whitefish)					
	338	878	82	796	2,094
<i>Citharichthys sordidus</i> (Pacific sanddab)					
	827	2,866	123	2,001	5,817
<i>Embiotoca jacksoni</i> (black surfperch)					
	61	707	225	4	997
<i>Genyonemus lineatus</i> (white croaker)					
	4,356	20,601	6,583	2,182	33,722

Table 3 - cont'd.

	Santa Barbara/ Ventura Counties	Los Angeles County	Orange County	San Diego County	Total
<i>Girella nigricans</i> (opaleye)	100	451	140	130	821
<i>Medialuna californiensis</i> (halfmoon)	269	1,404	257	196	2,126
<i>Oncorhynchus tshawytscha</i> (king salmon)	0	0	0	0	0
<i>Ophiodon elongatus</i> (lingcod)	148	8	0	80	236
<i>Paralabrax clathratus</i> (kelp bass)	4,793	4,163	1,579	2,030	12,565
<i>P. maculatofasciatus</i> (spotted sand bass)	4	99	1,717	4,841	6,661
<i>P. nebulifer</i> (barred sand bass)	474	4,997	3,803	4,422	13,696
<i>Paralichthys californicus</i> (California halibut)	1,126	1,097	281	629	3,133
<i>Sarda chiliensis</i> (Pacific bonito)	8,487	33,480	21,410	18,709	82,086
<i>Scomber japonicus</i> (Pacific mackerel)	10,780	45,231	22,175	11,128	89,314
<i>Scorpaena guttata</i> (sculpin)	490	3,754	604	1,986	6,834
<i>Sebastes atrovirens</i> (kelp rockfish)	636	800	8	472	1,916
<i>S. auriculatus</i> (brown rockfish)	665	199	29	117	1,010
<i>S. caurinus</i> (copper rockfish)	3,434	243	21	134	3,832
<i>S. chlorostictus</i> (greenspotted rockfish)	1,249	755	118	286	2,408

Table 3 cont'd.

	Santa Barbara/ Ventura Counties	Los Angeles County	Orange County	San Diego County	Total
<i>S. goodei</i> (chilipepper)	142	299	39	204	684
<i>S. miniatus</i> (vermilion rockfish)	1,293	147	253	390	2,083
<i>S. mystinus</i> (blue rockfish)	5,286	376	54	221	5,937
<i>S. paucispinus</i> (bocaccio)	885	994	105	749	2,733
<i>S. rastrelliger</i> (grass rockfish)	816	875	58	123	1,872
<i>S. serranoides</i> (olive rockfish)	1,312	2,739	196	695	4,942
<i>Semicossyphus pulcher</i> (California sheephead)	268	415	773	548	2,004
<i>Seriola dorsalis</i> (yellowtail)	4	772	264	6,104	7,144
<i>Seriphus politus</i> (queenfish)	136	3,848	2,266	862	7,112
<i>Sphyræna argentea</i> (California barracuda)	88	1,781	677	763	3,309
<i>Tetrapturus audax</i> (striped marlin)	0	0	13	14	27
<i>Thunnus alalunga</i> (albacore)	0	0	17	2,401	2,418
<i>Trachurus symmetricus</i> (jack mackerel)	20	548	109	294	971

TABLE 4. Standard Error of the Estimates for Anglers; July through September 1981.

	Santa Barbara/ Ventura Counties	Los Angeles County	Orange County	San Diego County	Total
Angler parties	571	961	1,296	1,674	2,394
Angler days	1,528	2,645	3,086	4,436	6,207
Angler-trip-hours	9,016	19,527	19,344	36,922	46,905
Total fishes landed	5,094	10,456	6,787	11,967	18,015
No. rockfishes landed	3,243	1,136	334	1,330	3,700
albacore	0	0	11	1,066	1,067
barred sand bass	182	2,088	858	1,155	2,542
black surfperch	28	192	71	4	207
blue rockfish	532	70	33	71	542
bocaccio	135	256	47	187	348
brown rockfish	144	49	11	43	159
California barracuda	42	462	224	262	578
California halibut	294	197	55	143	386
California sheephead	93	77	246	116	297
chilipepper	32	117	23	108	164
copper rockfish	642	44	15	42	645
grass rockfish	190	180	23	38	266
greenspotted rockfish	361	225	60	131	449
halfmoon	98	334	59	63	359
jack mackerel	6	305	43	118	330
kelp bass	899	437	470	461	1,197
kelp rockfish	205	276	4	100	358
king salmon	0	0	0	0	0
lingcod	32	4	0	23	40
ocean whitefish	39	213	34	180	283
olive rockfish	197	393	50	159	471
opaleye	18	125	44	70	151
Pacific bonito	1,133	3,957	3,779	3,969	6,854
Pacific mackerel	931	5,384	2,379	2,645	6,520
Pacific sanddab	97	1,813	45	1,115	2,131
queenfish	48	794	1,445	256	1,669
sculpin	103	444	87	533	707
spotted sand bass	1	46	411	1,012	1,093
striped marlin	0	0	5	6	8
vermilion rockfish	228	57	135	87	285
white croaker	577	3,008	2,086	620	3,757
white seabass	35	72	70	64	125
yellowtail	1	183	69	2,132	2,141

TABLE 5. Catch and Effort Estimates for Divers; July through September 1981.

	Santa Barbara/ Ventura Counties	Los Angeles County	Orange County	San Diego County	Total
Diver parties					
weekend	316	364	227	643	1,550
weekday	174	149	103	265	691
total	<u>490</u>	<u>513</u>	<u>330</u>	<u>908</u>	<u>2,241</u>
Diver days					
weekend	839	851	515	1,592	3,797
weekday	456	304	216	626	1,602
total	<u>1,295</u>	<u>1,155</u>	<u>731</u>	<u>2,218</u>	<u>5,399</u>
Diver-hours					
weekend	1,311	1,463	904	1,866	5,544
weekday	955	1,170	240	1,085	3,450
total	<u>2,226</u>	<u>2,633</u>	<u>1,144</u>	<u>2,951</u>	<u>8,994</u>
No. organisms landed					
weekend	3,119	3,573	1,169	4,126	11,987
weekday	1,646	556	571	1,869	4,642
total	<u>4,765</u>	<u>4,129</u>	<u>1,740</u>	<u>5,995</u>	<u>16,629</u>
<i>Haliotis corrugata</i> (pink abalone)					
	334	55	16	74	479
<i>H. cracherodii</i> (black abalone)					
	219	22	9	0	250
<i>H. fulgens</i> (green abalone)					
	8	312	435	1,248	2,003
<i>H. rufescens</i> (red abalone)					
	1,076	8	0	2,643	3,727
<i>Hinnites multirugosus</i> (rock scallop)					
	1,033	1,379	579	185	3,176
<i>Panulirus interruptus</i> (California spiny lobster)					
	0	0	0	0	0
<i>Paralabrax clathratus</i> (kelp bass)					
	217	217	97	149	680
<i>Semicossyphus pulcher</i> (California sheephead)					
	372	699	320	697	2,088

TABLE 6. Standard Error of the Estimates for Divers; July through September 1981.

	Santa Barbara/ Ventura Counties	Los Angeles County	Orange County	San Diego County	Total
Diver parties	76	67	75	126	179
Diver days	190	155	159	318	432
Diver-hours	479	945	238	482	1,188
No. organisms landed	845	531	391	920	1,412
black abalone	119	13	8	0	120
California sheephead	46	158	70	157	237
California spiny lobster	0	0	0	0	0
green abalone	2	77	229	380	451
kelp bass	83	54	29	35	109
pink abalone	47	32	5	20	61
red abalone	333	4	0	441	552
rock scallop	183	280	274	48	435

TABLE 7. Ten Most Commonly Landed Species in Each County; July through September 1981.

County	Rank	Scientific name	Common name
Santa Barbara/ Ventura	1.	<i>Scomber japonicus</i>	Pacific mackerel
	2.	<i>Sarda chiliensis</i>	Pacific bonito
	3.	<i>Sebastes mystinus</i>	blue rockfish
	4.	<i>Paralabrax clathratus</i>	kelp bass
	5.	<i>Genyonemus lineatus</i>	white croaker
	6.	<i>Sebastes caurinus</i>	copper rockfish
	7.	<i>S. serranoides</i>	olive rockfish
	8.	<i>S. miniatus</i>	vermilion rockfish
	9.	<i>S. chlorostictus</i>	greenspotted rockfish
	10.	<i>Paralichthys californicus</i>	California halibut
Los Angeles	1.	<i>Scomber japonicus</i>	Pacific mackerel
	2.	<i>Sarda chiliensis</i>	Pacific bonito
	3.	<i>Genyonemus lineatus</i>	white croaker
	4.	<i>Paralabrax nebulifer</i>	barred sand bass
	5.	<i>P. clathratus</i>	kelp bass
	6.	<i>Seriphus politus</i>	queenfish
	7.	<i>Scorpaena guttata</i>	sculpin
	8.	<i>Citharichthys sordidus</i>	Pacific sanddab
	9.	<i>Sebastes serranoides</i>	olive rockfish
	10.	<i>Sphyræna argentea</i>	California barracuda
Orange	1.	<i>Scomber japonicus</i>	Pacific mackerel
	2.	<i>Sarda chiliensis</i>	Pacific bonito
	3.	<i>Genyonemus lineatus</i>	white croaker
	4.	<i>Paralabrax nebulifer</i>	barred sand bass
	5.	<i>Seriphus politus</i>	queenfish
	6.	<i>Paralabrax maculatofasciatus</i>	spotted sand bass
	7.	<i>P. clathratus</i>	kelp bass
	8.	<i>Semicossyphus pulcher</i>	California sheephead
	9.	<i>Sphyræna argentea</i>	California barracuda
	10.	<i>Scorpaena guttata</i>	sculpin
San Diego	1.	<i>Sarda chiliensis</i>	Pacific bonito
	2.	<i>Scomber japonicus</i>	Pacific mackerel
	3.	<i>Seriola dorsalis</i>	yellowtail
	4.	<i>Paralabrax maculatofasciatus</i>	spotted sand bass
	5.	<i>P. nebulifer</i>	barred sand bass
	6.	<i>Haliotis rufescens</i>	red abalone
	7.	<i>Thunnus alalunga</i>	albacore
	8.	<i>Genyonemus lineatus</i>	white croaker
	9.	<i>Paralabrax clathratus</i>	kelp bass
	10.	<i>Citharichthys sordidus</i>	Pacific sanddab

TABLE 8. Occurrence of Sublegal-Size Fishes in Examined Catches; July through September 1981.

Scientific name	Common name	No. examined	Percent legal
<u>Fishes</u>			
<i>Atractoscion nobilis</i>	white seabass	120	18
<i>Ophiodon elongatus</i>	lingcod	90	64
<i>Paralabrax clathratus</i>	kelp bass	2,982	91
<i>P. nebulifer</i>	barred sand bass	1,740	86
<i>P. maculatofasciatus</i>	spotted sand bass	867	81
<i>Paralichthys californicus</i>	California halibut	912	66
<i>Sphyræna argentea</i>	California barracuda	354	59
<u>Mollusks and Crustaceans</u>			
<i>Haliotis corrugata</i>	pink abalone	237	94
<i>H. fulgens</i>	green abalone	214	95
<i>H. rufescens</i>	red abalone	947	89

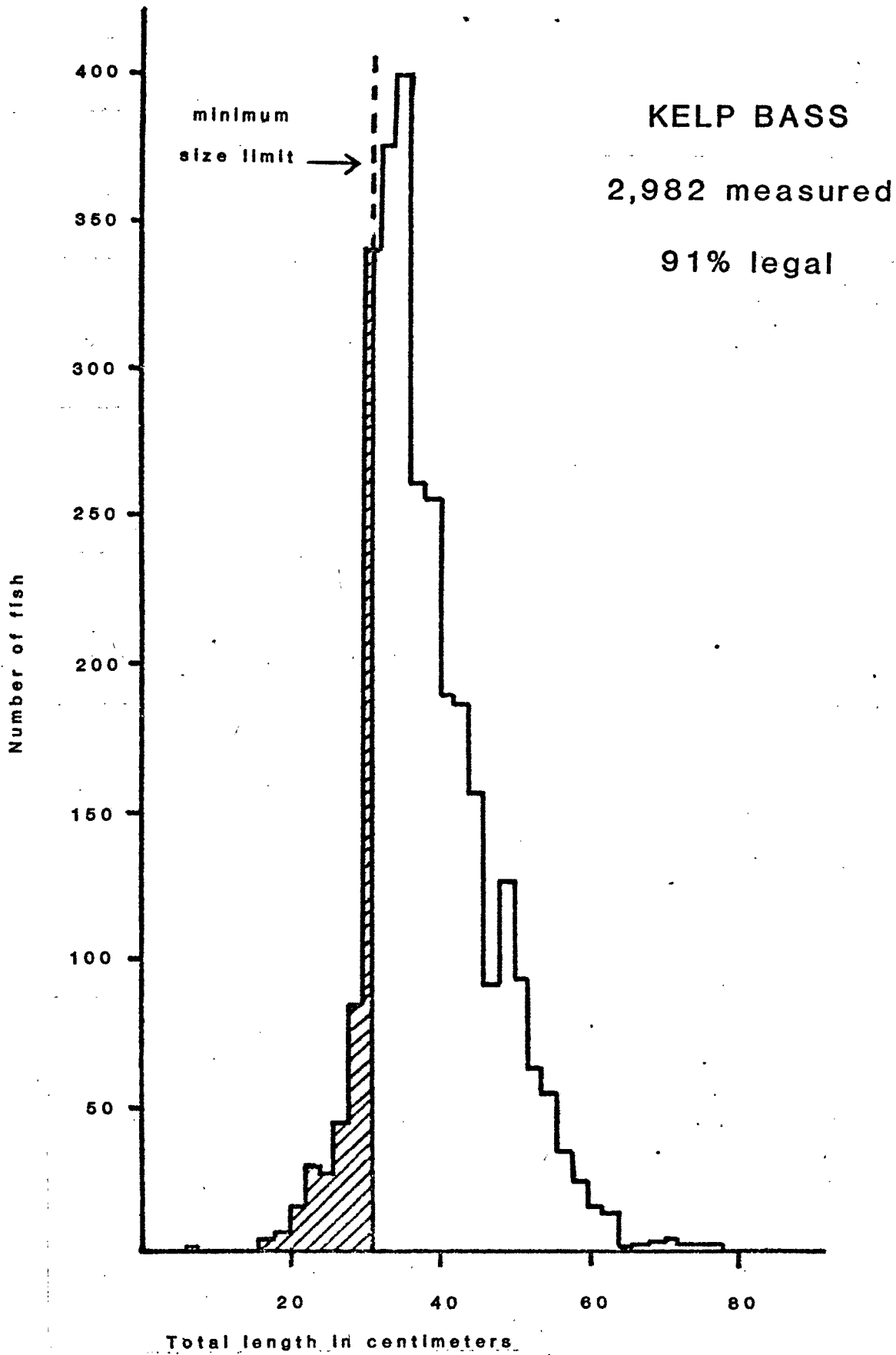


FIGURE 1. Length frequency of kelp bass

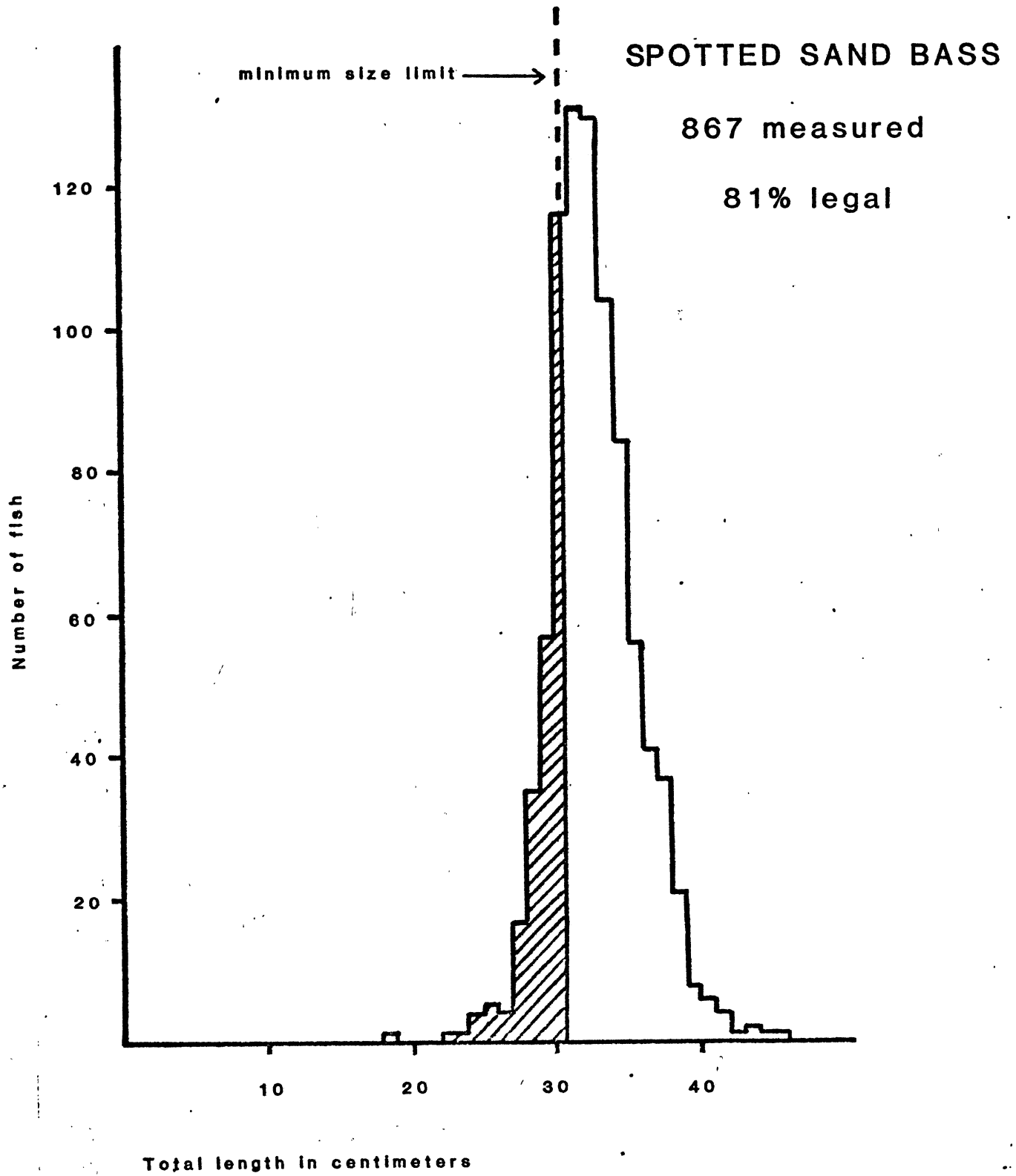


FIGURE 2. Length frequency of spotted sand bass

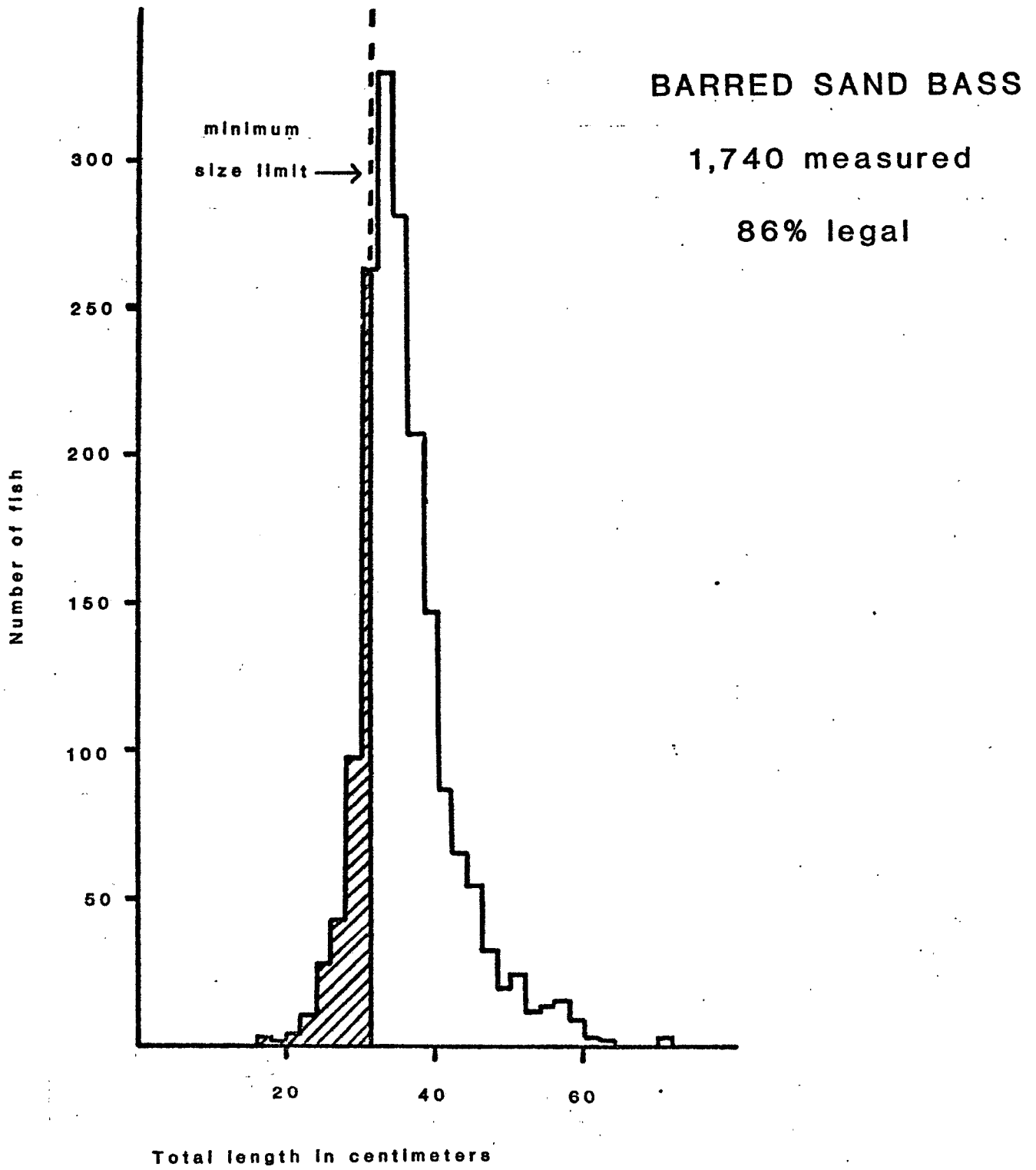


FIGURE 3. Length frequency of barred sand bass

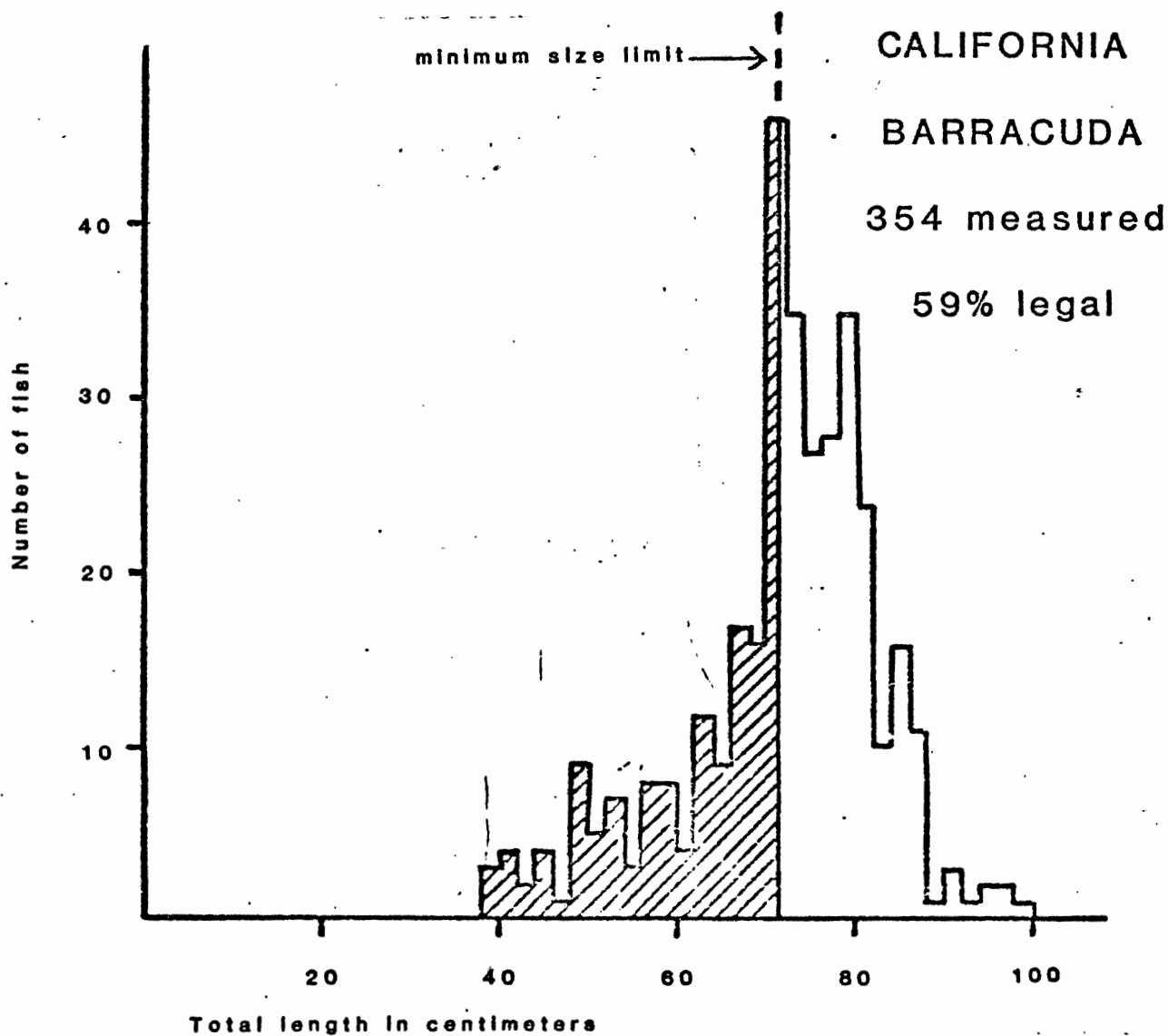
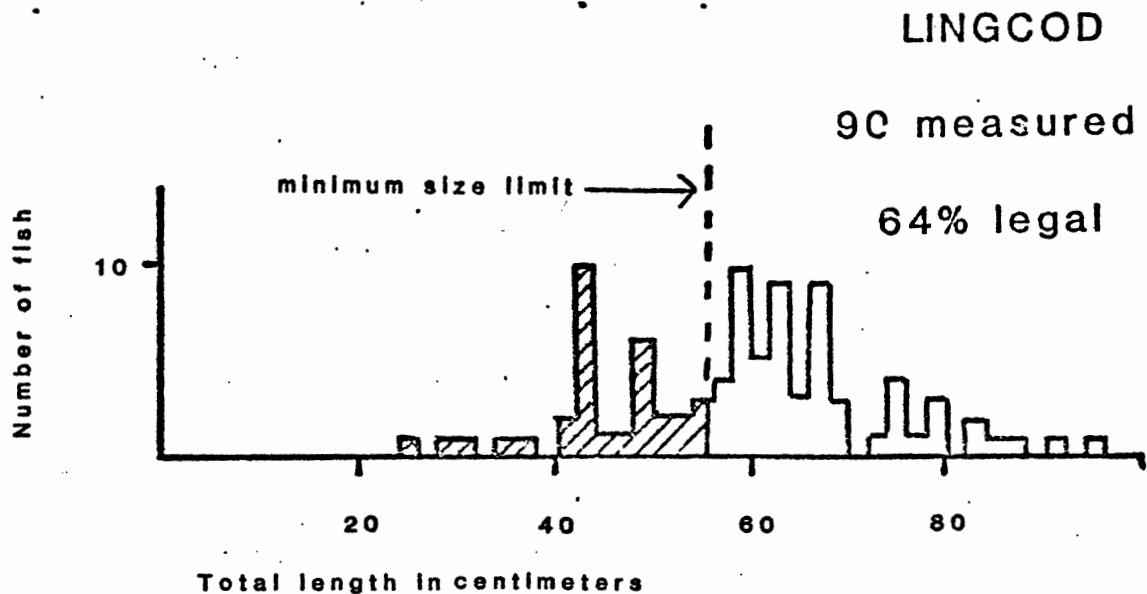


Figure 4. Length frequencies of lingcod and California barracuda.

CALIFORNIA HALIBUT

912 measured

66% legal

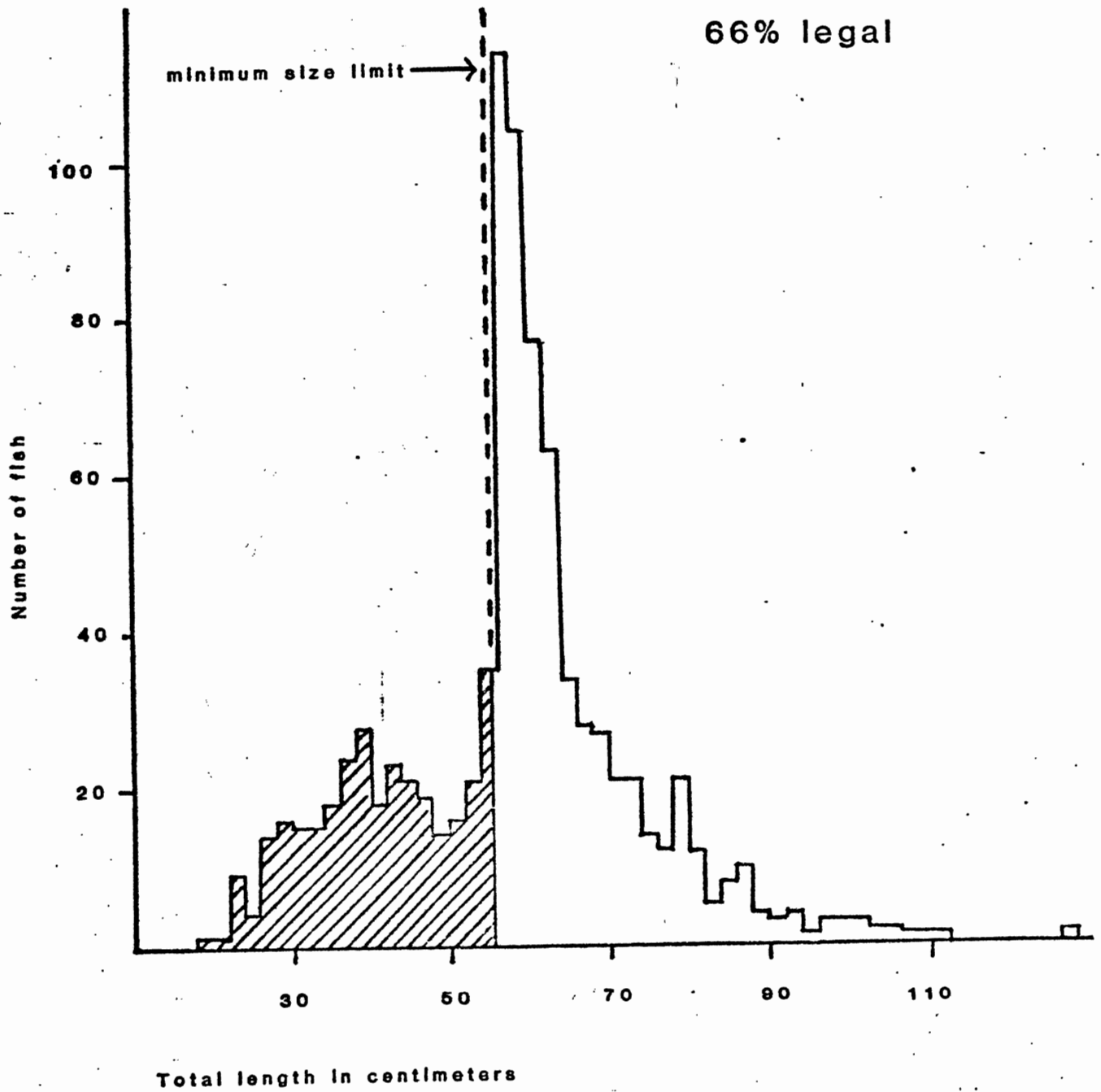


Figure 5. Length frequency of California halibut.

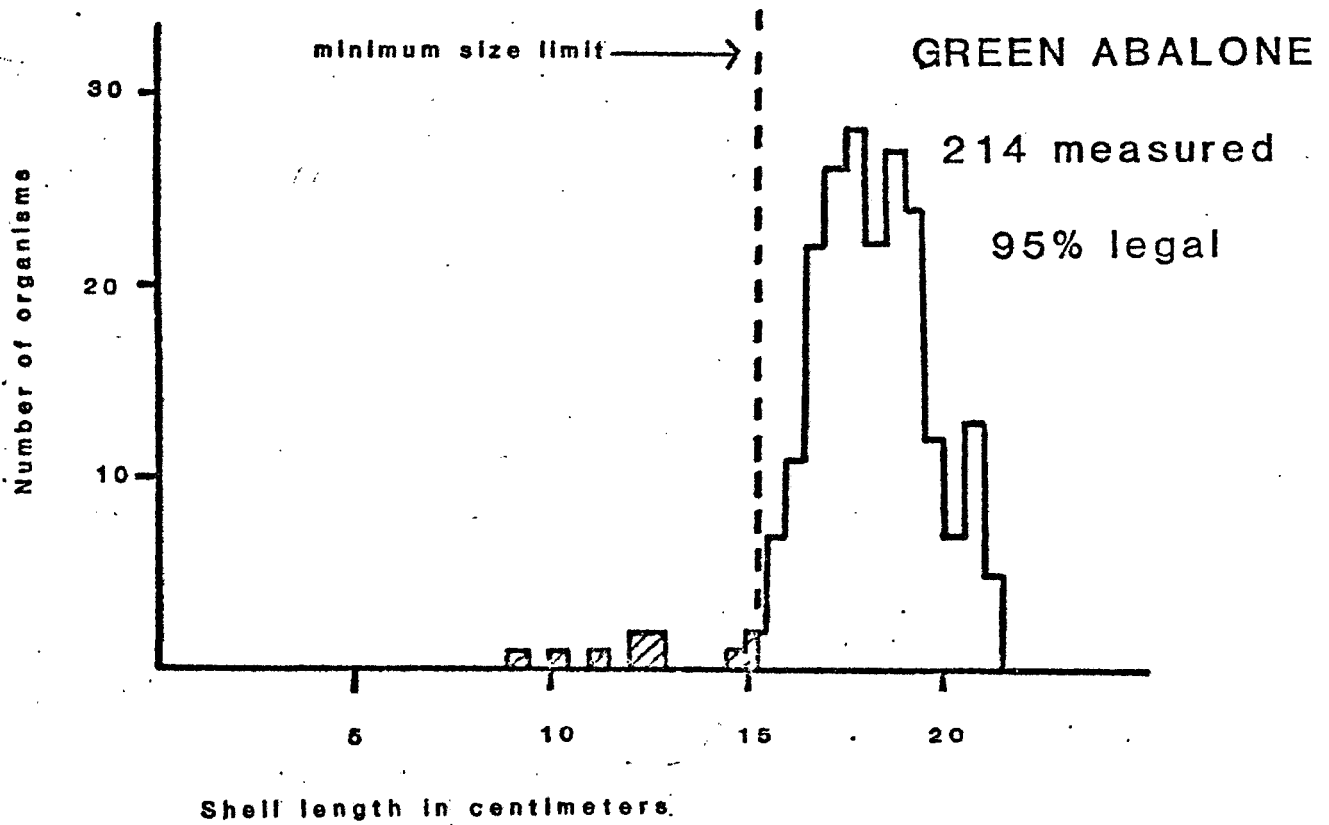
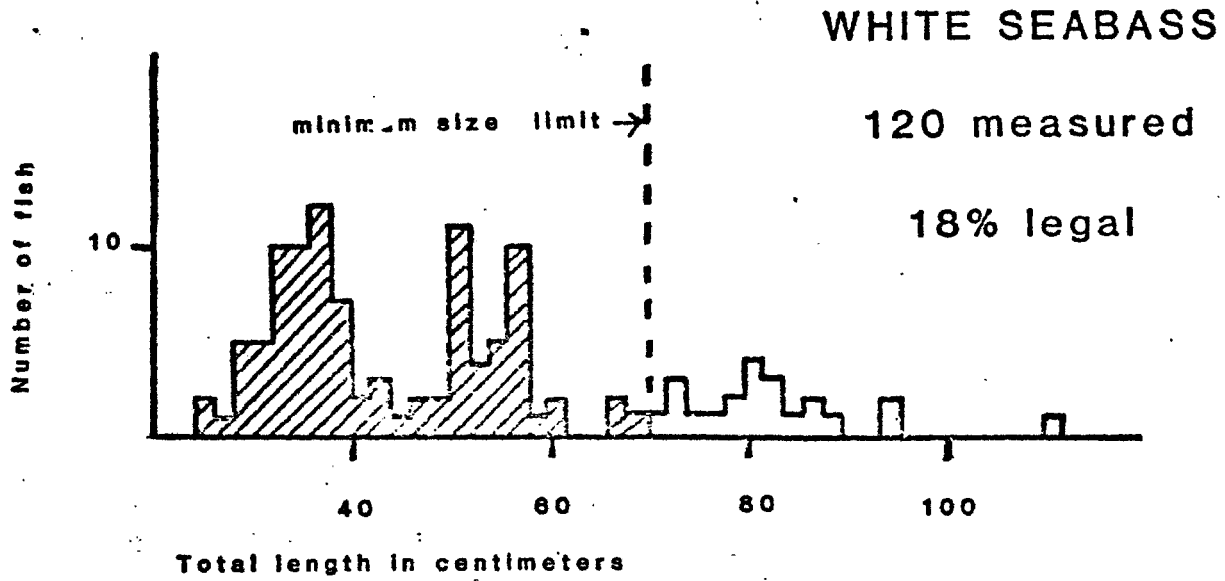


Figure 6. Length frequencies of white seabass and green abalone.

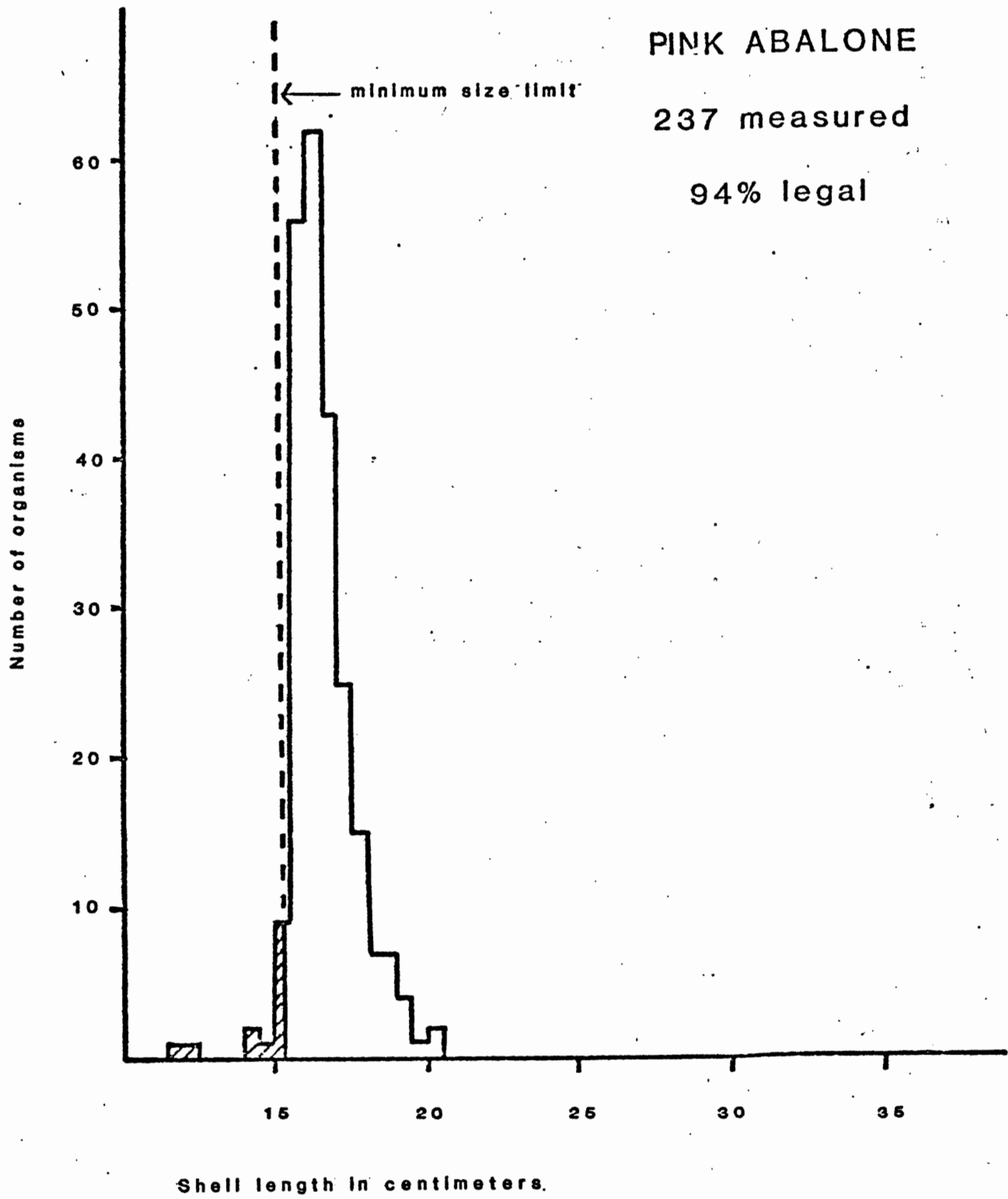


Figure 7.. Length frequency of pink abalone.

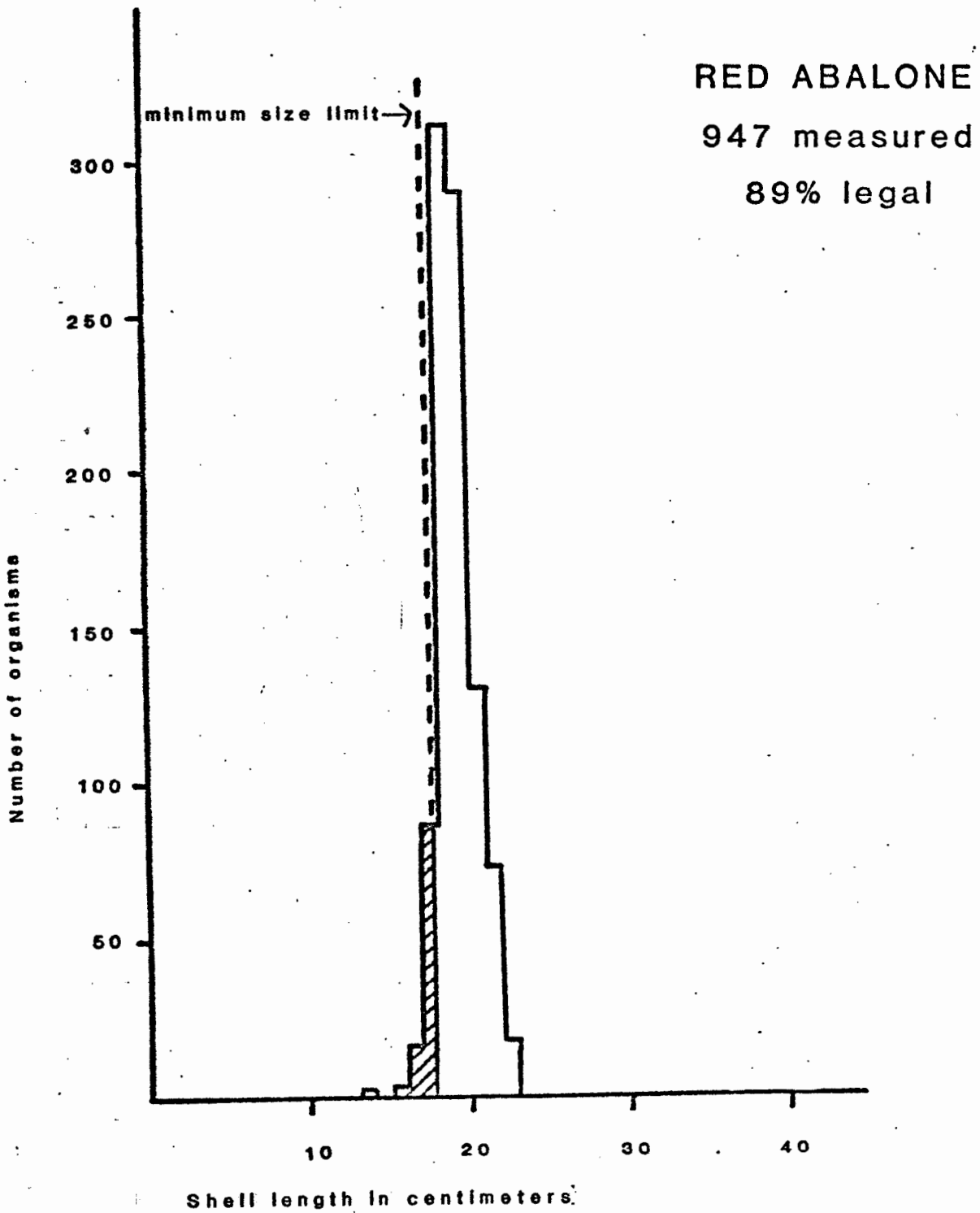


Figure 8. Length frequency of red abalone.