



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Northwest and Alaska Fisheries Center
Resource Assessment and Conservation
Engineering Division
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January 4, 1989

CRUISE RESULTS

Chartered F/V American Viking
Cruise No. 88-1

Sablefish Abundance and Size Composition at
Indexing sites off California and Southern Oregon

CRUISE PERIOD AND AREA

Between October 18 and December 4, 1988, the fishing vessel American Viking was under charter to obtain indices of sablefish (Anoplopoma fimbria) abundance at nine trap sites off California and southernmost Oregon (Figure 1). Depths surveyed ranged from 150 to 880 fathoms.

OBJECTIVES

The primary objective of the cruise was to obtain standardized catch per unit effort (CPUE) data at selected index sites which are fished every other year to obtain indications of population trends. Biological data including maturity, length, sex and age composition were obtained to determine the biological characteristics of the population. Those sablefish not required for biological samples were double tagged to obtain migration and growth information as well as tag loss rates.

GEAR

The conical traps employed in this study are constructed with a bottom ring which is 54 in O. D. and a top ring of 33.5 in O. D. and are 28 in high with a tunnel entrance on the side. The framework is covered with 2 1/4 in 42 thread nylon webbing. Tunnels are constructed of 2 in nylon knotless web and are rigged with a noose arrangement which is closed by a magnesium alloy timed release device 24 hours (+ 1 hour) after setting. Ten traps are attached by gangions at 50 fathom intervals on a 550 fathom groundline of 5/8 in synthetic line. Trap bridles are attached to the gangions by "C" hooks. A perforated plastic bait jar containing approximately two pounds of chopped herring is hung in each trap.





METHODS

Sampling was conducted from north to south at nine index sites off California and southern Oregon which were also sampled in 1984 and 1986 (Figure 1.) A 10-trap groundline was fished as near as possible parallel to the 225, 300, 375, 450, and 525 fathom isobaths at each site. An additional string was set in 150 fathoms at all sites except Pt. St. George, and between 617 and 880 fathoms at the eight southern sites. Two sets were made at each depth at most sites. Where only one set was made, the catch on the second set was estimated to allow for annual abundance comparisons. The catch for the second set was estimated by using the rate of decline between the first and second sets at all other sites and depths (catch on the second set averaged $0.703 \times$ catch on the first set).

Standard data collections included:

1. Number and weight of sablefish captured in each trap;
2. Number and weight of other species;
3. Length frequencies of all sablefish;
4. Otoliths, sex and sexual maturity from a random sample of 20 sablefish captured at each depth at each site.

RESULTS

Largest catches were made at the three southern sites (Cortes Bank, Carmel Bay, and Morro Bay), whereas catches were smallest at the four northern sites (Cape Sebastian, Cape Mendocino, Pt. Delgada, and Pt. St. George (Table 1). When site data are combined, the numbers caught generally decreased with depth beyond 225 fathoms. Standardized fishing effort at 150, 225, 300, 375, 450, and 525 and >600 fathoms produced 10.4%, 36.0%, 21.1%, 9.1%, 8.5%, 10.5%, and 4.4%, respectively, of the total number of sablefish captured within those depths. Catches averaged 3.8 sablefish per trap from 600-700 fathoms, 2.7 fish per trap from 700 and 800 fathoms and 1.5 fish per trap from 800-900 fathoms.

Catch rates in 1988, for the nine sites combined (in numbers of sablefish per trap), were approximately 132% higher than those obtained from the 1986 survey and approximately 8% higher than those from 1984. Catch rates at the five southern sites were up sharply in 1988. Catch rates at the four northern sites were generally slightly greater in 1988 than in 1986, but were still below those observed in 1984. In 1988, catches increased mainly at the shallow depths (150, 225, and 300 fathoms). These catches consisted almost entirely of undersize sablefish (<53 cm fork length) suggesting that the increase in catch rate is likely due to strong recruitment.

Sablefish length-compositions and mean lengths by site are shown in Figure 2. Mean lengths were greatest at the Cape Sebastian and Pt. Arena sites (53.0 cm, and 53.5 cm, respectively), and were smallest at Pt. St. George and the four southern sites ranging from 47.8 to 50.9 cm. Sablefish length-compositions and mean lengths by depth for all sites combined are shown in Figure 3. Mean lengths of sablefish were smaller at all sites in 1988 than in the 1986 survey. When the data from all sites (standard depths of 225-525 fms) were combined the mean length decreased from 53.6 cm in 1986 to 50.8 cm in 1988. This corresponds

to a decrease in mean weight from approximately 3.28 lbs in 1986 to 2.71 lbs in 1988. Mean weights of sablefish captured at depths of 600-700, 700-800, and 800-900 fathoms were considerably greater than those of sablefish captured at shallower stations, averaging 7.0, 6.8, and 6.9 lb, respectively. Combining all depths and sites, 67.0% of the sablefish catch was smaller than the legal limit (<53 cm fork length); 20.7% would be graded as small by processors (53-57 cm), 10.4% would be medium (58-67 cm) and 1.9% would be large (>67 cm).

Over 6,000 sablefish were double tagged with anchor tags and released during the survey.

SCIENTIFIC SAMPLES AND SPECIAL STUDIES

1. Stomach samples were collected from a random sample of 20 sablefish per depth per site at the four southern sites for feeding studies at Southwest Fisheries Center (SWFC), Tiburon.
2. One hundred and forty live sablefish from the Cortes Bank site were delivered to the SWFC in La Jolla, CA., for spawning and early life history studies.
3. The Northwest and Alaska Fisheries Center (NAFAC) completed a field test of an electronic fish measuring board. The field test was a continuation of development of an automated, multi-task device designed to improve data collection efficiency. Testing involved comparisons of accuracy and time required for collecting length data with the plastic strip and data logging system used presently.

SCIENTIFIC PERSONNEL

Leg I (October 18 - Nov. 9, 1988)

Norman Parks, NAFAC, Field Party Chief (Oct. 18 - Nov. 3)
Mark Wilkins, NAFAC, Fishery Biologist
Ken Weinberg, NAFAC, Fishery Biologist

Leg II (November 11 - November 27, 1988)

Frank Shaw, NAFAC, Field Party Chief
Rick Henry, NAFAC, Fishery Biologist
Ron Payne, NAFAC, Biological Technician
Joe Hightower, SWFC, Fishery Biologist (Nov. 11 - Nov. 16)
Don Pearson, SWFC, Biological Technician (Nov. 16 - Nov. 27)

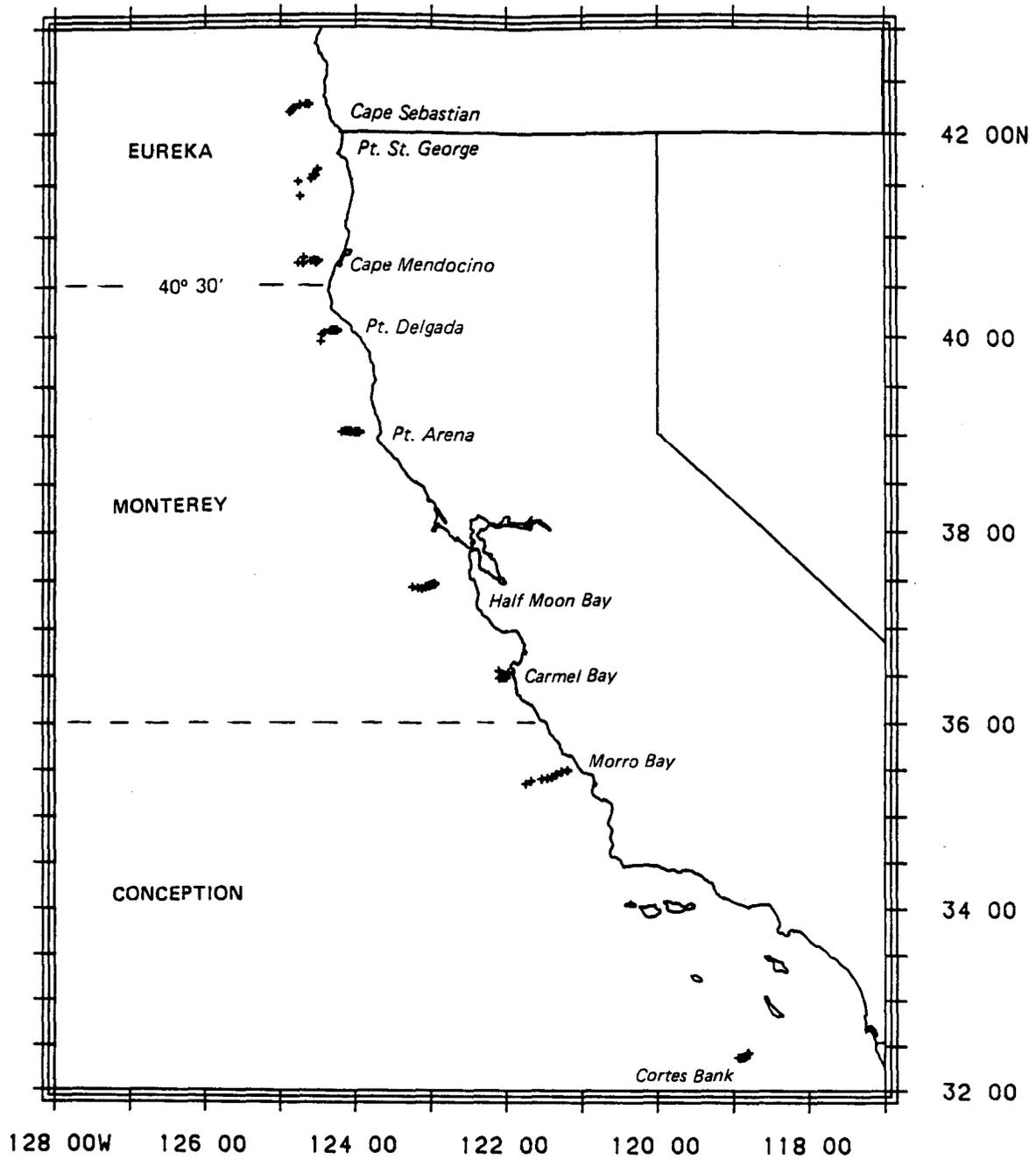


Figure 1.--Sites sampled off California and southern Oregon
(INPFC areas Eureka, Monterey, and Conception)
during the 1988 sablefish abundance indexing survey.

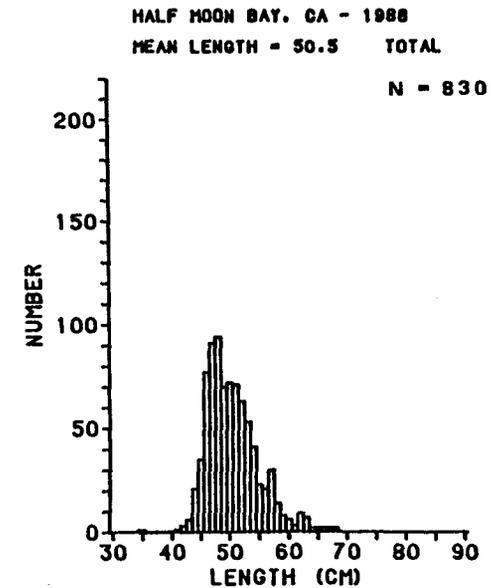
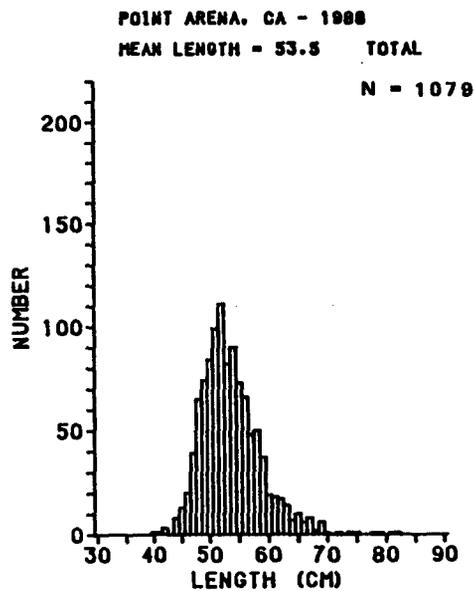
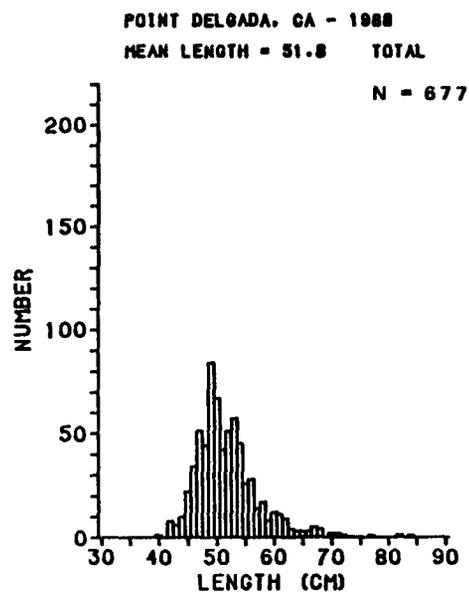
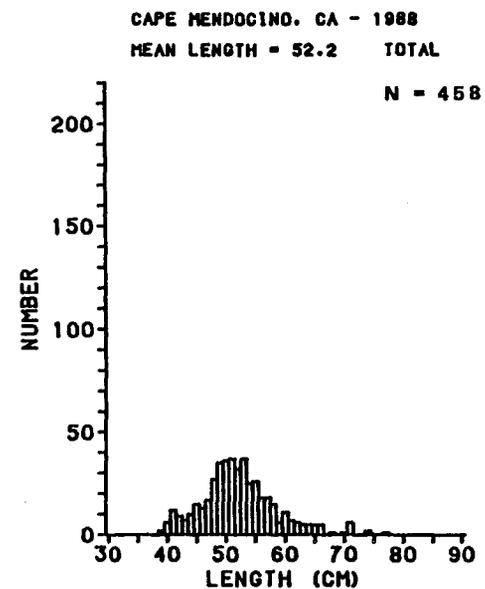
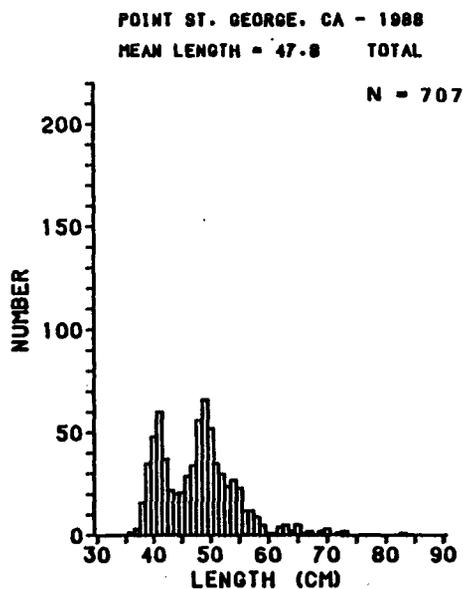
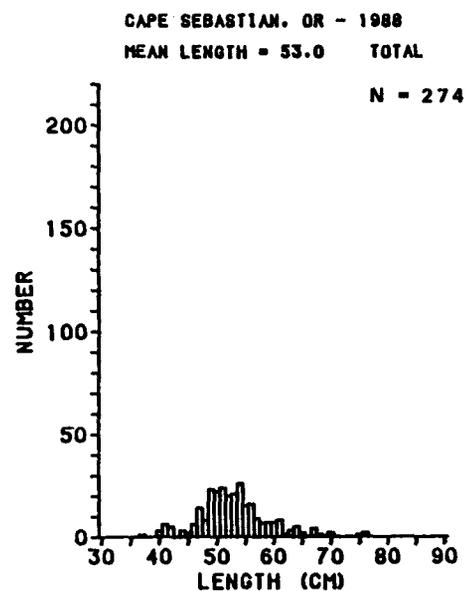


Figure 2.--Sablefish length compositions and mean lengths by abundance indexing site at the standard depths (225-525 fathoms), American Viking Cruise 88-1.

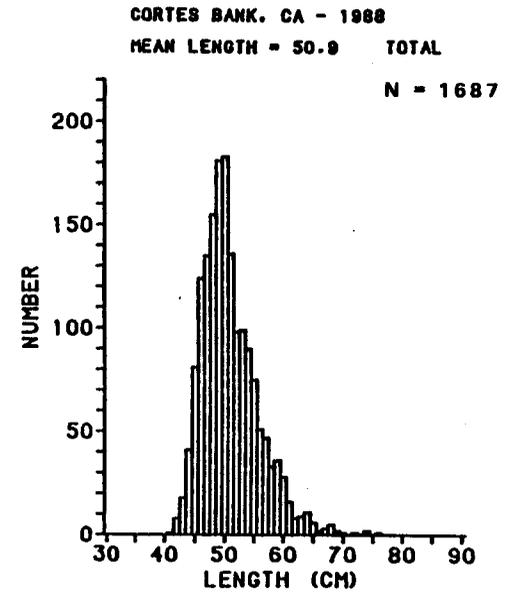
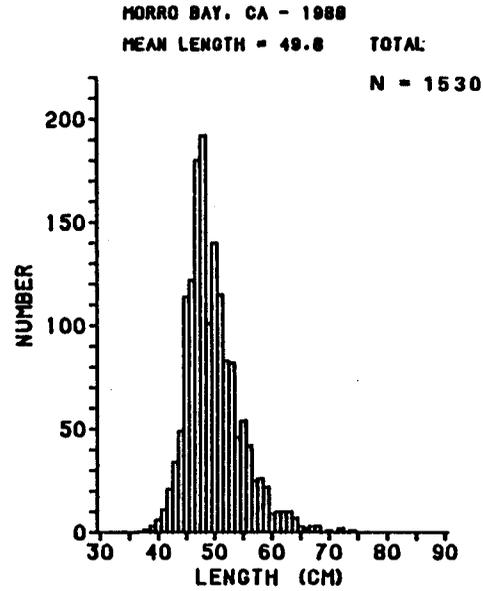
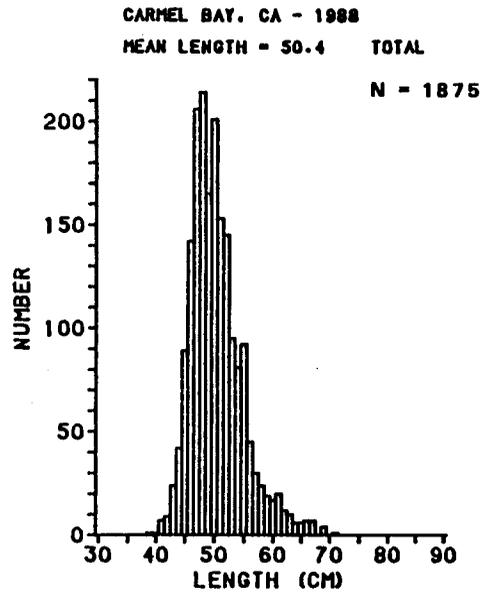
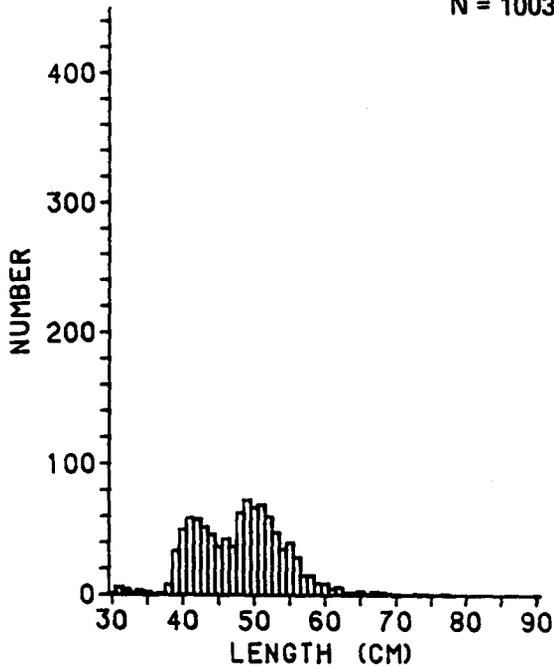
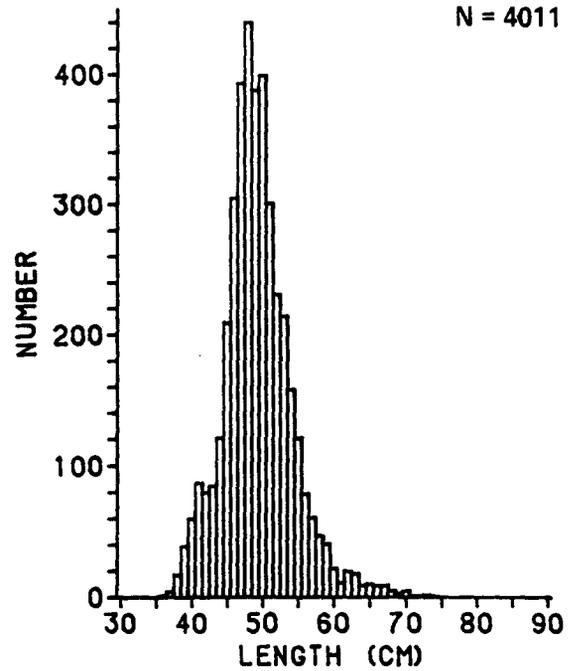


Figure 2.--(continued)

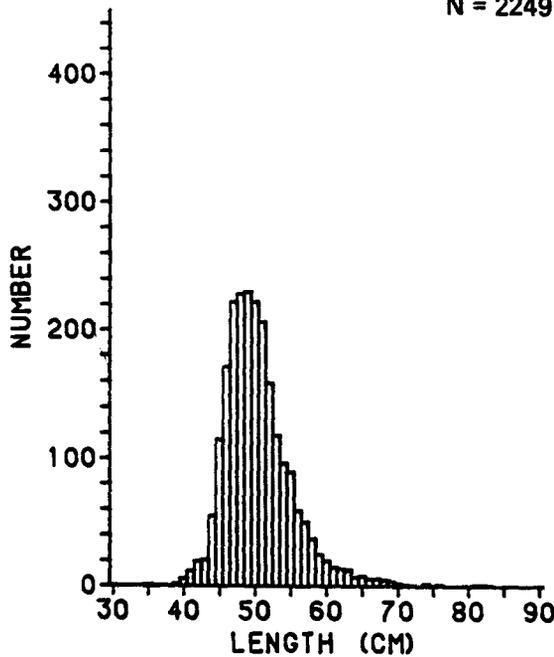
CALIF & S. OREGON - 150 FM - 1988

MEAN LENGTH = 48.1 TOTAL
N = 1003

CALIF & S. OREGON - 225 FM - 1988

MEAN LENGTH = 49.3 TOTAL
N = 4011

CALIF & S. OREGON - 300 FM - 1988

MEAN LENGTH = 50.4 TOTAL
N = 2249

CALIF & S. OREGON - 375 FM - 1988

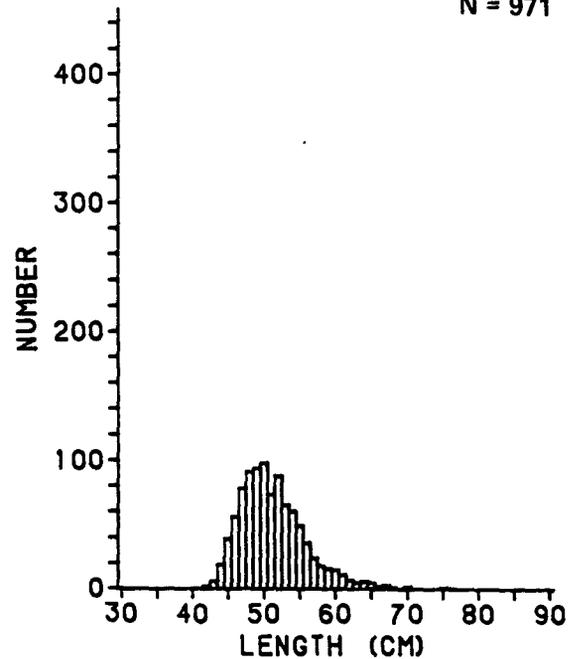
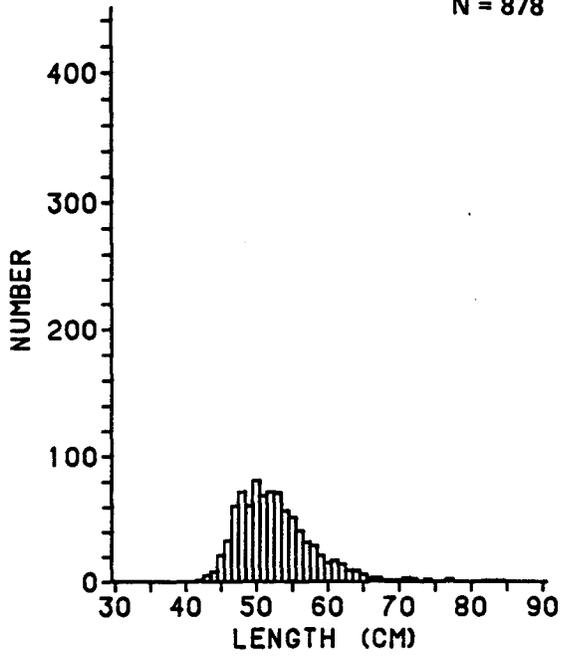
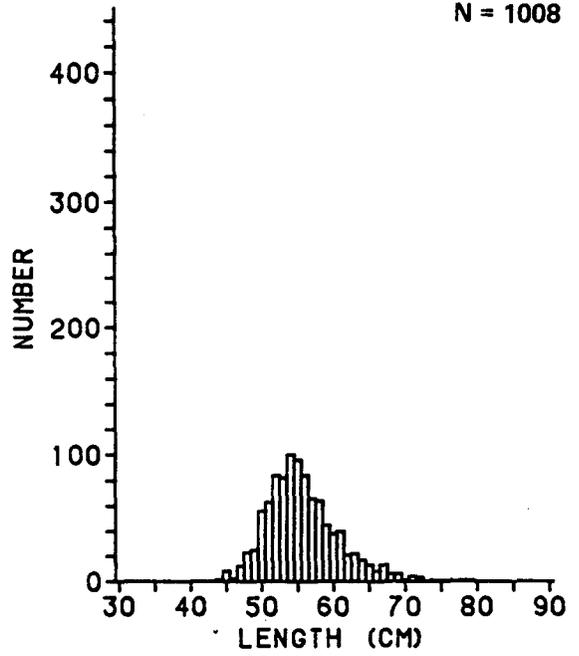
MEAN LENGTH = 51.3 TOTAL
N = 971

Figure 3.--Sablefish length compositions and mean lengths by depth for all sites combined, American Viking Cruise 88-1 (150 fathoms fished at all sites except Pt. St. George and > 600 fathoms fished at all sites except Cape Sebastian).

CALIF & S. OREGON - 450 FM - 1988
MEAN LENGTH = 52.7 TOTAL
N = 878



CALIF & S. OREGON - 525 FM - 1988
MEAN LENGTH = 55.7 TOTAL
N = 1008



CALIF & S. OREGON - >600 FM - 1988
MEAN LENGTH = 64.8 TOTAL
N = 350

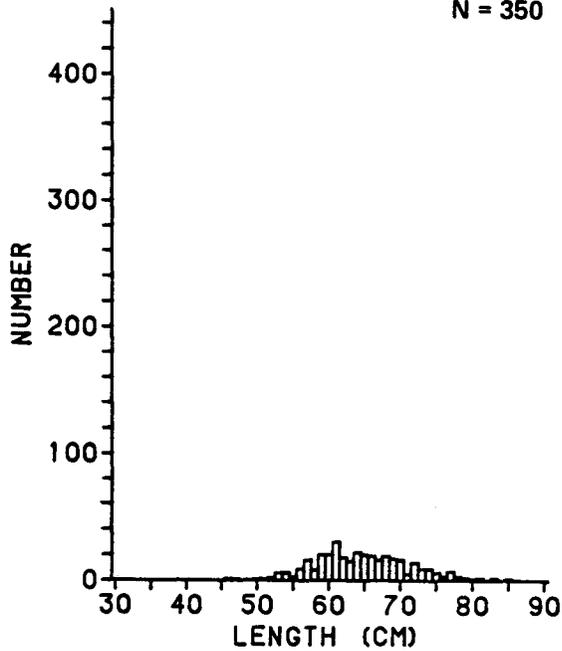


Figure 3.--(continued)

Table 1.--Sablefish catches, average number of fish per trap, average weight per trap (lb) and percentage above size limit^a by indexing site and for all sites combined by depth, American Viking Cruise 88-1.

Depth (fm)	Cape Sebastian, OR				Pt. St. George, CA				Cape Mendocino, CA			
	No. of fish	No. per trap	Wt. per trap (lb)	% above size limit	No. of fish	No. per trap	Wt. per trap (lb)	% above size limit	No. of fish	No. per trap	Wt. per trap (lb)	% above size limit
150	0 ^b	0	0	0	--	--	--	--	87	4.4	6.5	1
225	68 ^b	3.4	9.0	40	565	28.2	67.5	15	147	7.4	21.3	30
300	175 ^b	8.8	29.9	46	150 ^b	7.5	21.1	18	111	5.6	15.6	28
375	131 ^b	6.6	26.3	62	36 ^b	1.8	6.2	52	87	4.4	13.6	40
450	61 ^b	3.0	9.8	31	41 ^b	2.0	8.8	83	64	3.2	14.1	75
525	37 ^b	1.8	8.5	73	15 ^b	0.8	2.9	89	54	2.7	12.1	82
617-880	--	--	--	--	70 ^b	3.5	19.4	98	44	2.0	16.3	100
All Depths	472	3.9	14.4	50	877	7.3	21.0	24	589	4.2	14.2	42
	Pt. Delgada, CA				Pt. Arena, CA				Half Moon Bay, CA			
150	50	2.5	7.9	32	118	5.9	12.3	17	160	8.0	20.4	12
225	308	15.4	46.2	30	525	26.2	81.7	38	279	14.0	41.0	27
300	198	9.9	29.3	33	210	10.5	42.0	61	219	11.0	29.4	13
375	128	6.4	19.5	36	71	3.6	11.7	38	128	6.4	17.5	22
450	53	2.6	12.3	70	75	3.8	14.0	60	172	8.6	26.3	34
525	39	2.0	8.8	80	198	9.9	43.9	80	94 ^b	4.7	18.4	73
617-880	97 ^b	4.8	40.6	100	102 ^b	5.1	34.7	98	85 ^b	4.2	28.3	100
All Depths	873	6.2	23.5	42	1,299	9.3	34.4	51	1,137	8.1	25.9	28

Table 1.--(Continued)

Depth (fm)	No.	No.	Wt.	%	No.	No.	Wt.	%	No.	No.	Wt.	%
	of fish	per trap	per trap (lb)	above size limit	of fish	per trap	per trap (lb)	above size limit	of fish	per trap	per trap (lb)	above size limit
	<u>Carmel Bay, CA</u>				<u>Morro Bay, CA</u>				<u>Cortes Bank, CA</u>			
150	74	3.7	9.6	9	76	3.8	6.2	0	449	22.4	72.5	38
225	569	28.4	72.4	13	752	37.6	99.0	11	928	46.4	124.4	22
300	678	33.9	92.9	19	262	13.1	37.1	13	380	19.0	55.3	27
375	226	11.3	31.2	18	83	4.2	13.7	35	163	8.2	27.8	40
450	159	8.0	25.6	30	233	11.6	38.5	39	74	3.7	13.8	55
525	243	12.2	51.6	76	216	10.8	42.8	60	179	9.0	38.4	71
617-880	39	2.0	13.6	97	42	2.1	14.1	93	23	1.2	7.0	100
All Depths	1,988	14.2	42.4	26	1,663	11.9	35.9	24	2,196	15.7	48.4	33
	<u>All sites combined</u>											
150	1,014 ^c	6.3	16.9	23								
225	4,136	23.0	62.9	21								
300	2,382	13.2	39.2	26								
375	1,053	5.8	18.6	34								
450	932	5.2	18.1	45								
525	1,075	6.0	25.3	73								
617-880	502 ^d	3.1	21.7	98								
All Depths	11,094	9.1	29.3	33								

^a Sablefish smaller than 22 inches total length (52.4 cm fork length) or 15.5 inches dorsal length (origin of dorsal fin to the tip of the tail if beheaded).

^b Adjusted upward for second set which was not made.

^c 150 fathom depth fished at eight sites.

^d 617-880 fathom depth fished at eight sites.