

C-016

TM 205  
OCTOBER 1973

AN OTTER TRAWL SURVEY  
OFF THE PALOS VERDES PENINSULA  
AND SANTA CATALINA ISLAND,  
NOVEMBER-DECEMBER 1972

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OCTOPER 1968

ANNOTATION SHEET  
ON THE POLAR BEAR  
AND SANTA CATHERINE ISLAND  
NOVEMBER-DECEMBER 1968

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DOCUMENTATION OF POLAR BEAR  
SIGHTINGS IN SEPTEMBER, OCTOBER AND NOVEMBER 1968

## INTRODUCTION

The Los Angeles County Sanitation Districts and the Southern California Coastal Water Research Project jointly conducted a demersal fish survey off the Palos Verdes Peninsula on 9 November 1972 through 11 December 1972 and off Santa Catalina Island on 16 November 1972. The objectives of the survey were to determine the frequency of diseases and the population and community characteristics of fishes from both areas. This memorandum summarizes data on these objectives. (Data from a May-June 1972 survey of the same areas are summarized in Coastal Water Project TM204 (Mearns et al. 1973).)

## METHODS

All fish samples were taken by otter trawl aboard the "Sea-S-Dee," the County's ocean monitoring research vessel. The vessel speed during trawling was approximately 2.7 knots. The net differed from that used in earlier surveys in that it was a 25-ft (headrope length) rather than 40-ft otter trawl with a 1-1/2-in. stretch mesh bag and a 1/2-in. stretch mesh cod end. The otter boards were not attached directly to the net but were attached by a 10-ft lag line to the wings.

Twenty-six stations, ranging in depth from 23 to 146 meters, were sampled; the station numbers and locations are given in Figure 1. Haul duration at each station averaged 10 minutes from the time that the net reached bottom.

The fishes from each collection were identified, counted, and measured on board ship. The standard length of specimens in small catches was determined to the nearest millimeter; specimens in large catches were measured to the nearest centimeter. All specimens were examined for external signs of disease as they were measured.

## RESULTS

### Community and Population Parameters

A total of 31 hauls were made at the 26 stations. Haul and station characteristics are given in Table 1 and summarized in Table 2.

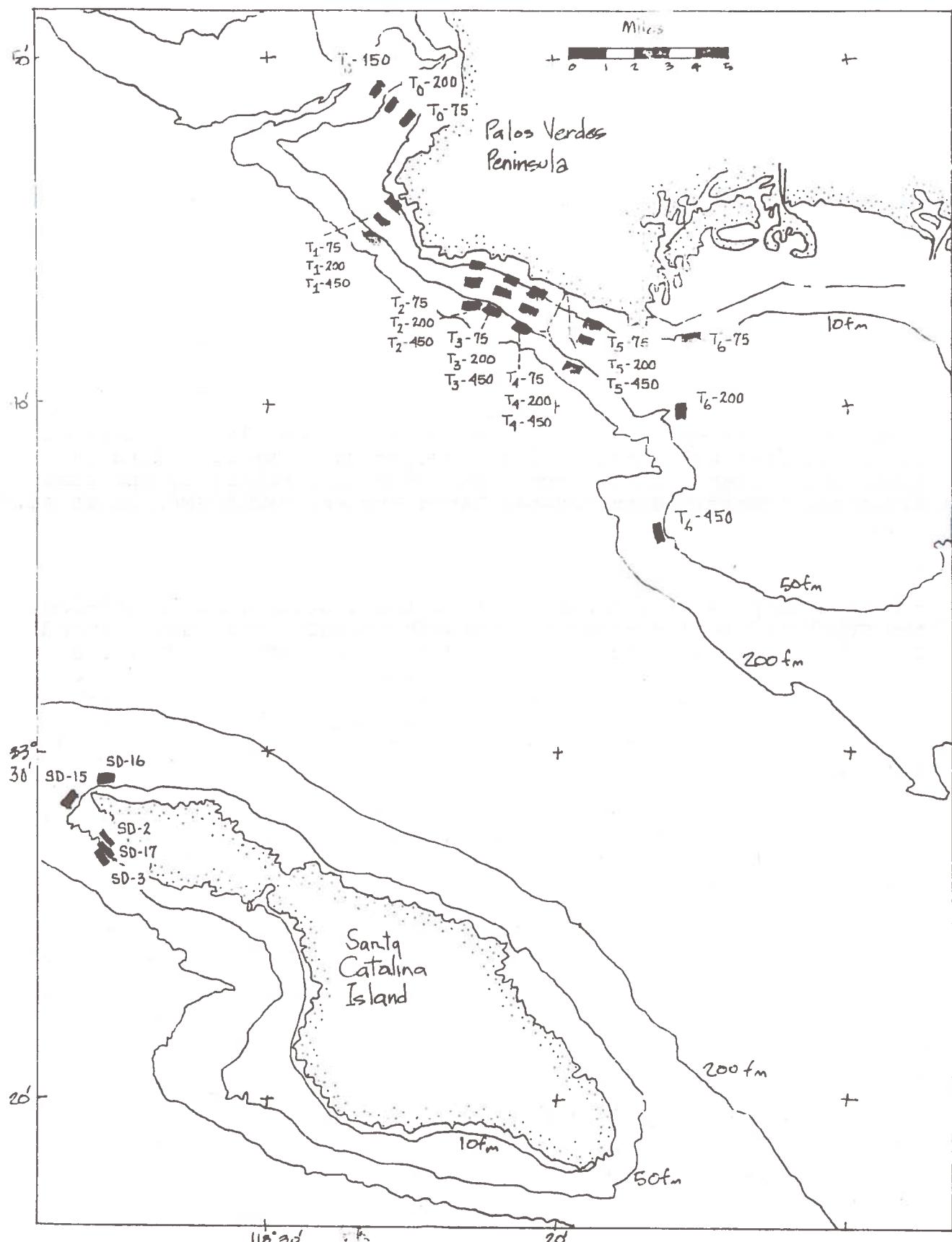


Figure 1. Stations trawled, Palos Verdes and Catalina survey, November-December 1972.

Table 1. Haul and station characteristics, Palos Verdes and Santa Catalina Island survey,  
November-December 1972

Station	Latitude	Longitude	Depth (m)	Date	Time of Day	Dir. of Haul	Length of Trawl (min.)	No. of Spec.	Indiv.	No. of Shannon- Weaver Diversity	Dominant Species	Recurrent Groups Present	Wt. of Haul (lb.)
T <sub>0</sub> -75	33° 48.50'	118° 25.00'	23	11-09-72	1415	S	10	11	496	0.44	Speckled sanddab	6	>8
T <sub>0</sub> -200	33° 48.58'	118° 25.66'	61	11-09-72	1450	-	10	13	491	1.06	Yellowchin Sculpin		>29½
T <sub>0</sub> -450	33° 49.00'	118° 26.00'	137	11-09-72	-	-	10	19	2733	1.14	Dover Sole	5	>35
T <sub>1</sub> -75	33° 46.00'	118° 25.66'	23	11-15-72	1645	-	10	12	529	0.83	Speckled Sanddab		>3
T <sub>1</sub> -200	33° 45.50'	118° 26.00'	61	11-15-72	1100	S	10	14	390	0.89	Speckled Sanddab		>5
T <sub>1</sub> -450	33° 45.00'	118° 27.40'	137	11-15-72	1530	-	5	20	228	2.37	Shiner perch	6	65
T <sub>2</sub> -75	33° 44.08'	118° 22.50'	23	11-09-72	1000	N	7½	12	173	1.94	Speckled sanddab		35
T <sub>2</sub> -200	33° 43.75	118° 23.00'	61	11-09-72	1130	N	10	22	2551	0.81	Northern anchovy	3	195
T <sub>2</sub> -450	33° 43.00'	118° 23.00'	137	11-09-72	1250	N	10	17	774	0.62	Stripetail rockfish		145
T <sub>3</sub> -75	33° 43.66'	118° 21.66'	23	12-11-72	-	-	10	17	128	1.91	Speckled sanddab	2	-
T <sub>3</sub> -200	33° 43.33'	118° 21.92'	61	12-11-72	1205	S	10	16	514	1.28	Shiner perch	3	62
T <sub>3</sub> -450	33° 42.58'	118° 22.00'	137	12-11-72	1500	S	10	19	988	1.79	Dover sole		170
T <sub>4</sub> -75	33° 43.18'	118° 20.50'	23	11-10-72	-	-	10	8	69	1.20	Speckled sanddab		-
T <sub>4</sub> -200				11-10-72	1530	-	10	6	54	1.06	Speckled sanddab		>1½
T <sub>4</sub> -450				12-11-72	1300	-	10	9	168	1.17	Speckled sanddab		>5½
T <sub>5</sub> -75	33° 42.42'	118° 21.18'	137	11-10-72	1300	-	10	13	1223	0.97	Shiner perch		>1½
T <sub>5</sub> -200	33° 42.00'	118° 19.00'	23	11-10-72	1040	N	10	13	1077	2.34	Stripetail rockfish	5	175
T <sub>5</sub> -450	33° 40.86'	118° 19.50'	61	11-10-72	1130	N	10	12	3055	0.78	Shiner perch		31
T <sub>6</sub> -75	33° 42.75'	118° 21.00'	61	11-10-72	1600	-	10	13	131	1.62	Speckled sanddab		>2½
T <sub>6</sub> -200	33° 42.08'	118° 21.18'	137	11-15-72	1300	-	10	22	3055	0.78	Shiner perch		10½
T <sub>6</sub> -450	33° 42.42'	118° 19.00'	23	11-10-72	1040	N	10	13	856	1.37	Stripetail rockfish		43
T <sub>6</sub> -2	33° 36.00'	118° 16.50'	61	11-15-72	1110	N	10	13	1396	1.01	Northern anchovy	3,7	68
SD-2	33° 27.50'	118° 35.58'	137	11-15-72	1030	N	10	13	256	1.48	Pacific sanddab		43
SD-3	33° 27.00'	118° 35.58'	137	11-16-72	1155	N	10	14	220	1.15	Pacific sanddab	1	43
SD-15	33° 28.50'	118° 37.00'	137	11-16-72	1523	-	15	13	168	1.54	Pacific sanddab		200
SD-16	33° 29.08	118° 35.66'	146	11-16-72	1258	N	10	16	91	2.12	Pacific sanddab		200
SD-17	33° 27.30'	118° 35.58'	91	11-16-72	1415	-	15	15	212	1.78	Pacific sanddab	1,6	110

Table 2

Summary of catch statistics, Palos Verdes and Catalina Island survey, November-December 1972.

Area	No. of Sta.	No. of Sam- ples	Total No. of Indiv.	Median Catch/ Haul	Total No. of Species	Species/ Haul		Shannon- Weaver Diversity/ Haul	
						Mean	SE	Mean	SE
Palos Verdes	21	26	19,768	494	74	15.3	0.9	1.37	0.11
Catalina	5	5	947	212	34	14.2	0.6	1.61	0.16
Total	26	31	20,715	313	80	15.1	0.8	1.41	0.10

Data on catch per haul is summarized in Figure 2. The highest catch per haul in the survey (3,055 fish) was taken at Station T5-200; Station T4-75 had the lowest catch per haul (54 fish; the median catch for this station was 64 fish). Off Santa Catalina Island, Station SD-2 had the highest catch (256 fish) and Station SD-16 had the lowest (91 fish).

A total of 80 species were taken in the survey (Table 3). The number of species per haul ranged from 6 at Station T4-75 to 27 at Station T1-200 (Table 1, Figure 3). The mean species per haul for these stations was 7.7 and 23.5, respectively--still the highest and lowest. Species per haul off Santa Catalina ranged from 13 to 16.

The species most abundant and most frequently occurring in the catches are listed in Tables 4 and 5, respectively.

Eleven species taken in the November-December survey had not been previously noted in the County's otter trawl surveys. These were:

- Pacific hagfish (Eptatretus stouti)
- Thornback (Platyrrhinoidis triseriata)
- Bat ray (Myliobatis californica)
- Pacific argentine (Argentina sialis)
- Kelp pipefish (Syngnathus californiensis)
- Barred sand bass (Paralabrax nebulifer)
- an undescribed species of ronquil (Rathbunella sp.)
- Bay goby (Lepidogobius lepidus)
- Brown rockfish (Sebastes auriculatus)
- Slim sculpin (Radulinus asprellus)
- Rock sole (Lepidopsetta bilineata)

Specimens previously labeled Rathbunella species were actually smooth ronquil (Rathbunella hypoplecta). Two specimens of Mexican

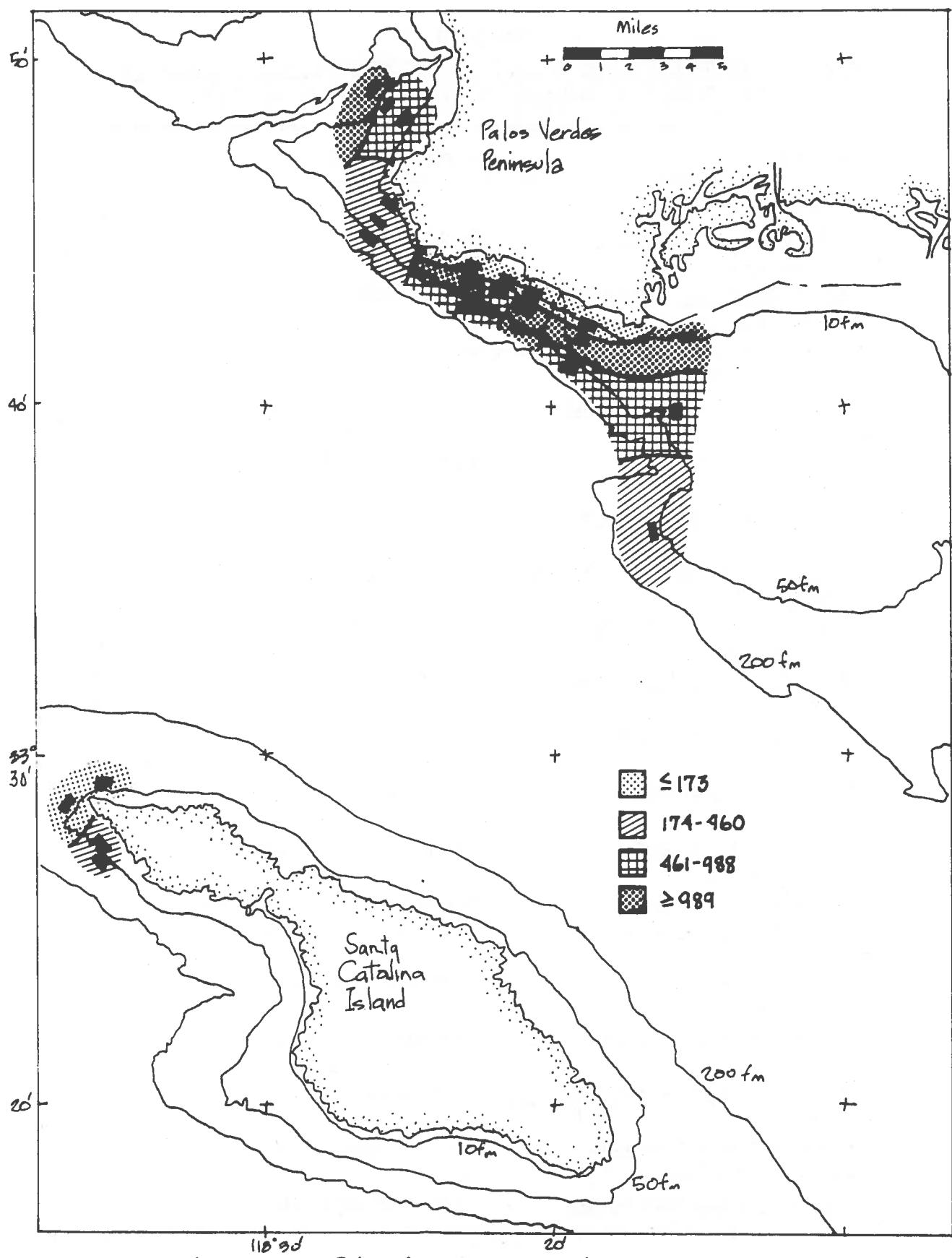


Figure 2. Catch per haul, Palos Verdes and Catalina survey,  
November- December 1972.

Table 3

Fishes taken by otter trawl off Palos Verdes Peninsula  
and Catalina Island, November-December 1972.

SPECIES	COMMON NAME
Myxinidae	
<u>Eptatretus stouti</u>	Pacific hagfish
Heterodontidae	
<u>Heterodontus francisci</u>	Horn shark
Scylliorhinidae	
<u>Cephaloscyllium ventriosum</u>	Swell shark
Carcharhinidae	
<u>Mustelus californicus</u>	Gray smoothhound
Squalidae	
<u>Squalus acanthias</u>	Spiny dogfish
Squatatinidae	
<u>Squatina californica</u>	Pacific angel shark
Rhinobatidae	
<u>Platyrhinoidis triseriata</u>	Thornback
Torpedinidae	
<u>Torpedo californica</u>	Pacific electric ray
Myliobatidae	
<u>Myliobatis californica</u>	Bat ray
Chimaeridae	
<u>Hydrolagus colliei</u>	Ratfish
Engraulidae	
<u>Engraulis mordax</u>	Northern anchovy
Argentinidae	
<u>Argentina sialis</u>	Pacific argentine
Batrachoididae	
<u>Porichthys myriaster</u>	Specklefin midshipman
<u>Porichthys notatus</u>	Plainfin midshipman
Ophidiidae	
<u>Chilara taylori</u>	Spotted cusk-eel
Zoarcidae	
<u>Lycodopsis pacifica</u>	Blackbelly eelpout
Syngnathidae	
<u>Syngnathus californiensis</u>	Kelp pipefish
Serranidae	
<u>Paralabrax nebulifer</u>	Barred sand bass
Branchiostegidae	
<u>Caulolatilus princeps</u>	Ocean whitefish

Table 3 (Cont)

SPECIES	COMMON NAME
<b>Sciaenidae</b>	
<u>Genyonemus lineatus</u>	White croaker
<u>Seriola politus</u>	Queenfish
<b>Kyphosidae</b>	
<u>Girella nigricans</u>	Opaleye
<b>Embiotocidae</b>	
<u>Cymatogaster aggregata</u>	Shiner perch
<u>Embiotoca jacksoni</u>	Black perch
<u>Hyperprosopon argenteum</u>	Walleye surfperch
<u>Phanerodon furcatus</u>	White seaperch
<u>Rhacochilus vacca</u>	Pile perch
<u>Zalembius rosaceus</u>	Pink seaperch
<b>Bathymasteridae</b>	
<u>Rathbunella sp.</u>	(Ronquil sp.)
<b>Gobiidae</b>	
<u>Lepidogobius lepidus</u>	Bay goby
<b>Stromateidae</b>	
<u>Peprilus simillimus</u>	Pacific pompano
<b>Scorpaenidae</b>	
<u>Scorpaena guttata</u>	California scorpionfish
<u>Sebastes auriculatus</u>	Brown rockfish
<u>Sebastes chlorostictus</u>	Greenspotted rockfish
<u>Sebastes crameri</u>	Darkblotched rockfish
<u>Sebastes dalli</u>	Calico rockfish
<u>Sebastes diploproa</u>	Splitnose rockfish
<u>Sebastes elongatus</u>	Greenstriped rockfish
<u>Sebastes goodei</u>	Chilipepper
<u>Sebastes hopkinsi</u>	Squarespot rockfish
<u>Sebastes jordani</u>	Shortbelly rockfish
<u>Sebastes levis</u>	Cow rockfish
<u>Sebastes macdonaldi</u>	Mexican rockfish
<u>Sebastes miniatus</u>	Vermilion rockfish
<u>Sebastes mystinus</u>	Blue rockfish
<u>Sebastes paucispinis</u>	Bocaccio
<u>Sebastes rosaceus</u>	Rosy rockfish
<u>Sebastes rosenblatti</u>	Greenblotched rockfish
<u>Sebastes rubrivinctus</u>	Flag rockfish
<u>Sebastes saxicola</u>	Stripetail rockfish
<u>Sebastes semicinctus</u>	Halfbanded rockfish
<u>Sebastes serranoides</u>	Olive rockfish
<b>Anoplopomatidae</b>	
<u>Anoplopoma fimbria</u>	Sablefish

Table 3 (Cont)

SPECIES	COMMON NAME
Hexagrammidae	
<u>Zaniolepis frenata</u>	Shortspine combfish
<u>Zaniolepis latipinnis</u>	Longspine combfish
Cottidae	
<u>Chitonotus pugetensis</u>	Roughback sculpin
<u>Icelinus cavifrons</u>	Pit-head sculpin
<u>Icelinus filamentosus</u>	Threadfin sculpin
<u>Icelinus quadriseriatus</u>	Yellowchin sculpin
<u>Icelinus tenuis</u>	Spotfin sculpin
<u>Radulinus asprellus</u>	Slim sculpin
Agonidae	
<u>Agonopsis sterletus</u>	Southern spearnose poacher
<u>Odontopyxis trispinosa</u>	Pygmy poacher
<u>Xeneretmus latifrons</u>	Blacktip poacher
<u>Xeneretmus triacanthus</u>	Bluespotted poacker
Bothidae	
<u>Citharichthys sordidus</u>	Pacific sanddab
<u>Citharichthys stigmaeus</u>	Speckled sanddab
<u>Hippoglossina stomata</u>	Bigmouth sole
<u>Paralichthys californicus</u>	California halibut
<u>Xystreurus liolepis</u>	Fantail sole
Pleuronectidae	
<u>Glyptocephalus zachirus</u>	Rex sole
<u>Hypsopsetta guttulata</u>	Diamond turbot
<u>Lepidopsetta bilineata</u>	Rock sole
<u>Lyopsetta exilis</u>	Slender sole
<u>Microstomus pacificus</u>	Dover sole
<u>Paraphrys vetulus</u>	English sole
<u>Pleuronichthys coenosus</u>	C-O sole
<u>Pleuronichthys decurrens</u>	Curlfin sole
<u>Pleuronichthys verticalis</u>	Hornyhead turbot
Cynoglossidae	
<u>Syphurus atricauda</u>	California tongue fish

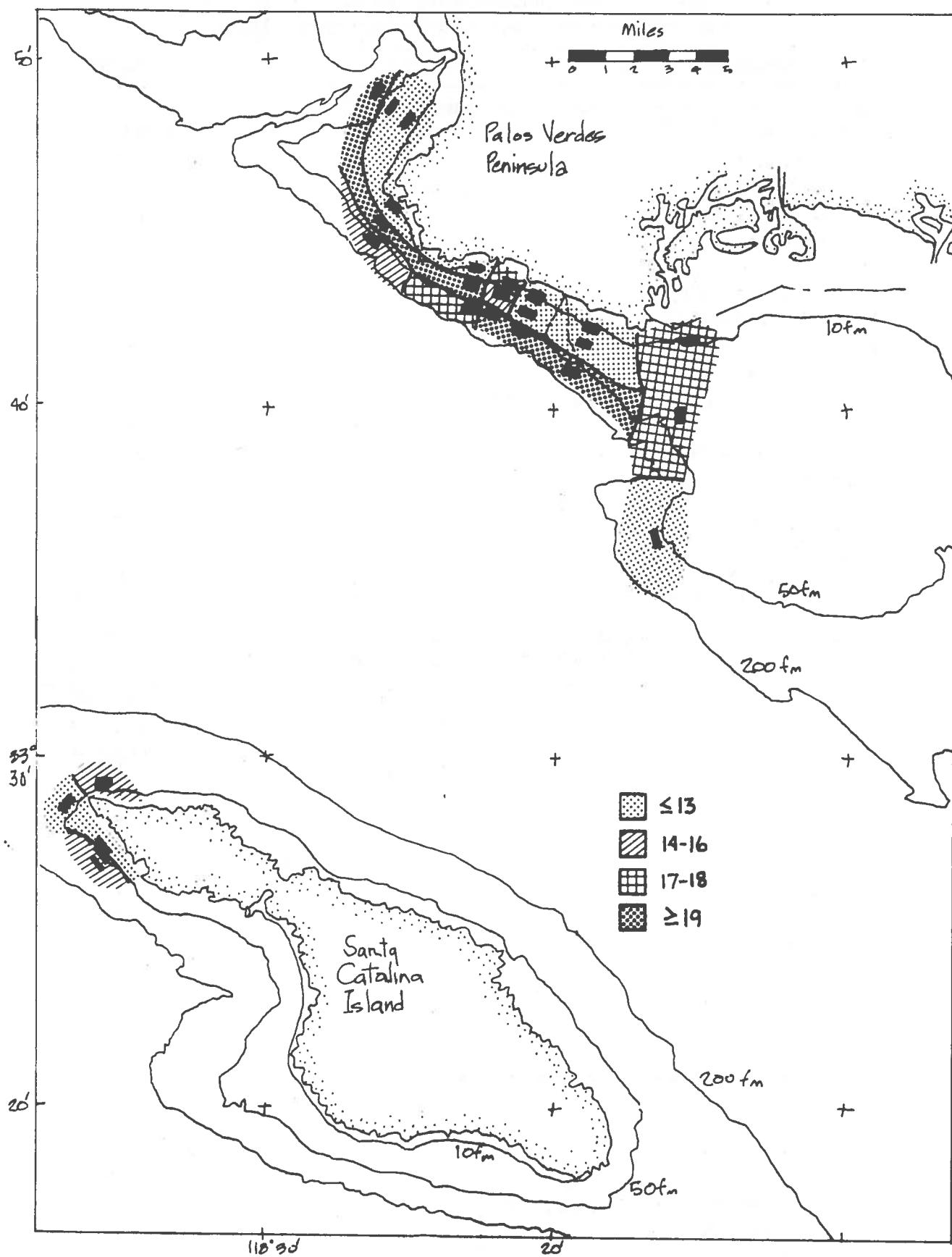


Figure 3. Species per haul, Palos Verdes and Catalina survey, November-December 1972.

Table 4. Species most abundant, Palos Verdes and Catalina survey, November-December 1972.

Species	Abundance
Overall survey (26 stations, 31 samples)	
Shiner perch	3,947
Northern anchovy	3,142
Dover sole	2,903
Stripetail rockfish	2,232
Speckled sanddab	1,588
White croaker	1,147
Pacific sanddab	1,086
Pink seaperch	598
Plainfin midshipman	566
Curlfin sole	529
Palos Verdes (21 stations, 26 samples)	
Shiner perch	3,947
Northern anchovy	3,142
Dover sole	2,897
Catalina (5 stations, 5 samples)	
Pacific sanddab	486
Pink seaperch	143
Stripetail rockfish	56

Table 5. Species most frequently taken, Palos Verdes and Catalina survey, November-December 1972.

Species	Frequency of Occurrence (No. of Samples)
Overall Survey (26 stations, 31 samples)	
Curlfin sole	21
Pacific sanddab	21
English sole	18
Plainfin midshipman	18
Pink seaperch	17
Speckled sanddab	17
Dover sole	17
Stripetail rockfish	16
Spotted cusk-eel	16
Shiner perch	15
Palos Verdes (21 stations, 26 samples)	
Curlfin sole	18
English sole	18
Speckled sanddab	16
Pacific sanddab	16
Catalina (5 stations, 5 samples)	
Pacific sanddab	5
Pink seaperch	5
Bigmouth sole	5

rockfish (Sebastes macdonaldi) taken in this survey were found to be identical to a specimen taken in the fall of 1971 and mistakenly identified as Pacific ocean perch (Sebastes alutus).

Shannon-Weaver diversities (Table 1; Figure 4) ranged from 0.44 at Station T<sub>0</sub>-75 to 2.59 at Station T<sub>1</sub>-200 (the mean diversity per haul at this station was 2.48). Diversities off Santa Catalina Island ranged from 1.15 at Station SD-3 to 2.12 at Station SD-16.

Table 6 shows the species caught at each station in the November-December 1972 survey. Figure 5 shows the recurrent groups of fishes identified in the data from other surveys of the southern California area (448 otter trawl samples taken in 1969-72 surveys between Port Hueneme and Dana Point; Coastal Water Project 1973 and unpublished data). To facilitate the identification of these groups in the data from the survey described here, the species in Table 6 are arranged according to the previously identified recurrent groups.

All group members of six of the eight groups were present in this survey. The most frequently occurring group was Group 6, which appeared at four stations (Figure 6) ranging from 61 to 91 meters.

Figure 7 shows the species numerically dominant in the catch at each station. The speckled sanddab was dominant in nine samples from six stations off Palos Verdes, all at 23 meters. The Pacific sanddab was dominant at all five stations off Catalina.

#### Diseased and Anomalous Fishes

A variety of fishes with anomalies--fin erosion, tumor-like growths, exophthalmia, and ambicoloration--were collected in the November-December 1972 survey. All anomalous specimens were from Palos Verdes collections. The prevalence of fin erosion, tumors, and ambicoloration in the catches is given in Table 7.

Dover sole were collected in greatest abundance at the offshore Palos Verdes stations and were found north of the outfall only at the 75-ft stations (Figure 8). Incidence of fin erosion per station for Dover sole (Table 8) ranged from 1.6 to 100 percent. Tumor-bearing Dover sole were collected primarily at the 450-ft stations, where the catches of this species were largest. Incidences of tumor-bearing Dover sole per station ranged from 0.17 to 8.3 percent and was greater than 5 percent at the three deep stations north of the outfalls.

White croaker were captured only at the Palos Verdes stations and were found in greatest abundance at the 200 ft stations (Figure 9); they were collected at the deep stations only north of the outfall pipes. Incidence of fin erosion per station in white croaker

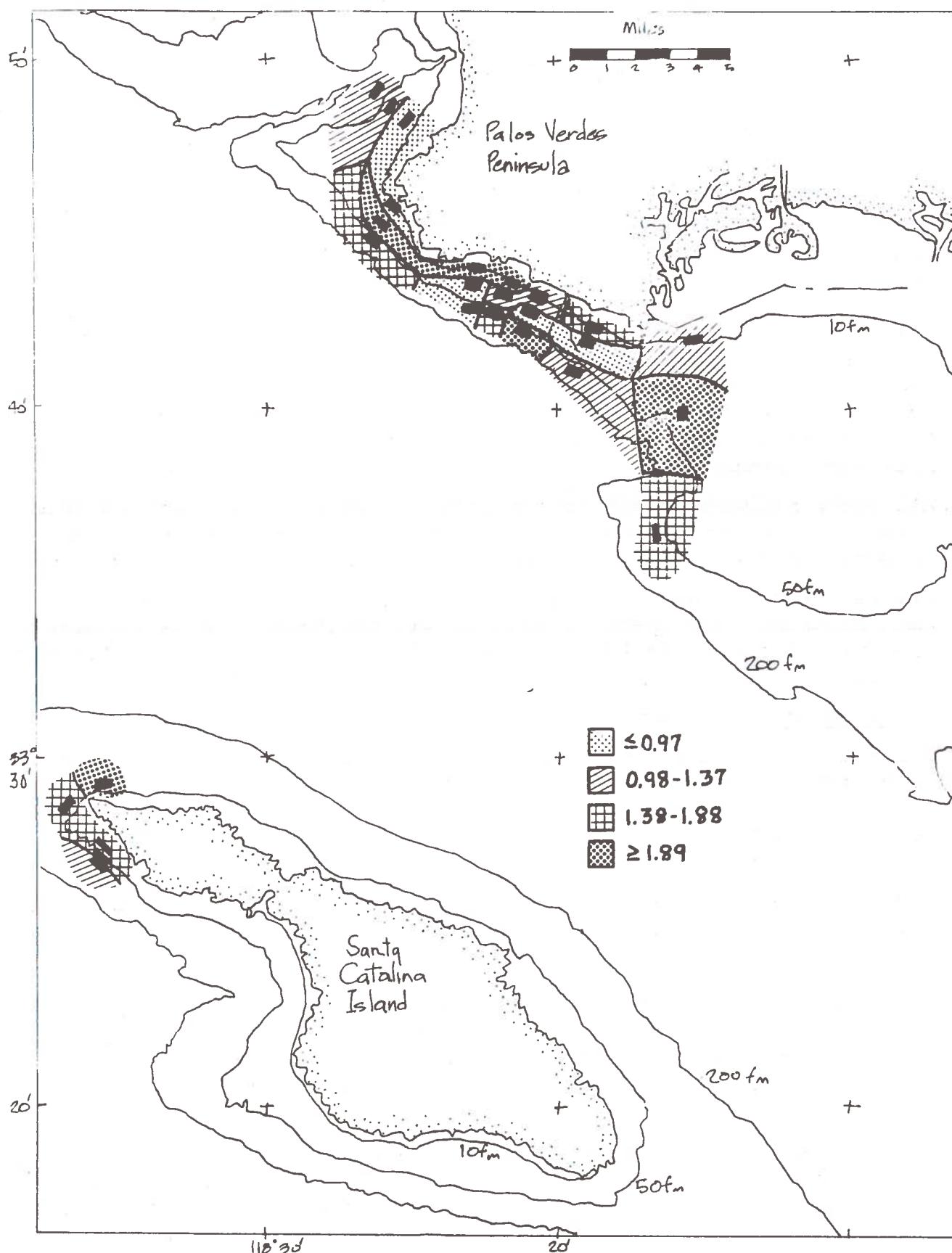


Figure 4. Shannon-Weaver diversity per haul, November-December 1972.

Table 6. Catch per species per haul, Palos Verdes and Santa Catalina Island surveys, November-December 1972.  
 Species are listed according to the recurrent groups in Figure 5; boxes mark the presence of all group members in a single collection.

Species	Palos Verdes Peninsula												Santa Catalina Island												Total*											
	T <sub>0</sub> 75	T <sub>0</sub> 200	T <sub>0</sub> 450	T <sub>1</sub> 75	T <sub>1</sub> 200	T <sub>1</sub> 450	T <sub>2</sub> 75	T <sub>2</sub> 200	T <sub>2</sub> 450	T <sub>3</sub> 75	T <sub>3</sub> 200	T <sub>3</sub> 450	Haul 1	Haul 2	Haul 1	Haul 2	Haul 1	Haul 2	Haul 1	Haul 2	T <sub>4</sub> 75	T <sub>4</sub> 200	T <sub>4</sub> 450	T <sub>5</sub> 75	T <sub>5</sub> 200	T <sub>5</sub> 450	T <sub>6</sub> 75	T <sub>6</sub> 200	T <sub>6</sub> 450	Subtotal*	SD 2	SD 3	SD 15	SD 16	SD 17	Total*
Walleye surfperch																																				
Black perch																																				
White croaker																																				
Quenquen																																				
Northern anchovy	2																																			
Shiner perch	18	1	2	43	4	1	B	266	332	20																										
Curfin sole	9	117	64	8	7	26	5	6	33	12	20	23	70	64	40	9	2																			
Speckled sandab	454	13	364	295	39	2	47	2	46	35	26	77	41	1	42	69																				
California tonguefish	3	1	1	2	29	8	12	11	3	1	3	1	4	41	2	20	5																			
Hornhead turbot																																				
English sole																																				
Pugby poacher																																				
Yellowchin seabream	356	28	8	4	9	22																														
Longspine seabream																																				
Scripttail rockfish	51	237	33	11	30	122	2	687	141	1	4	304	5	455	67	36	2176	113	140	4																
Pacific sanddab	9	12	2	3	90	2	11	18	7	1	212	1	1	285	9	17	600	116	146	101	37	62	496	155	56	13	2232	116	1086	121	1086	121	1086	121		
Dover sole	1	27	1794	24	37	188	30	11	18	7	421	1	1	285	126	9	2897	115	50	13	12	7	61	143	159	2953	117	2953	117	2953	117	2953	117			
Pink seaperch	2	473	1	7	3	2	15	1	2	11	1	1	27	1	6	86	103	41	2	9	2	6	7	5	13	13	586	118	586	118	586	118	586	118		
Plainfin midshipman																																				
Shortspine toadfish	3																																			
Bigmouth sole																																				
Slender sole	2																																			
Rex sole																																				
Blackbelly seipont																																				
Blacklip poacher	94																																			
Pacific hogfish																																				
Horn shark																																				
Swell shark																																				
Gray smoothhound																																				
Pacific dogfish	2																																			
Pacific angle shark																																				

\*Number in parentheses is number of hauls in which species was taken (frequency of occurrence).

Table 6 (continued)

Species	Palos Verdes Peninsula																Santa Catalina Island															
	T <sub>0</sub> 75	T <sub>0</sub> 200	T <sub>0</sub> 450	T <sub>1</sub> 75	T <sub>1</sub> 200	T <sub>1</sub> 450	T <sub>2</sub> 75	T <sub>2</sub> 200	T <sub>2</sub> 450	T <sub>3</sub> 75	T <sub>3</sub> 200	T <sub>3</sub> 450	T <sub>4</sub> 75	T <sub>4</sub> 200	T <sub>4</sub> 450	Haul 1	Haul 2	Haul 3	T <sub>5</sub> 75	T <sub>5</sub> 200	T <sub>5</sub> 450	T <sub>6</sub> 75	T <sub>6</sub> 200	T <sub>6</sub> 450	Subtotal*	SD 2	SD 3	SD 15	SD 50	SD 17	Subtotal*	Total*
	Haul	Haul	Haul	Haul	Haul	Haul	Haul	Haul	Haul	Haul	Haul	Haul	Haul	Haul	Haul	Haul	Haul	Haul	Haul	Haul	Haul	Haul	Haul	Haul	Haul	Haul	Haul	Haul	Haul			
Thornback																																
Pacific electric ray																																
Bay ray																																
Raftfish																																
Pacific Argentine																																
Spotted sculpin																																
Spotted eel																																
Kelp pipefish																																
Barred sandbass																																
Ocean whitetip																																
Opaleye																																
White seabream																																
Pile perch																																
<i>Rathbunella</i> sp. <sup>2</sup>																																
Bay goby																																
Pacific pompano																																
California Scorpionfish																																
Brown rockfish																																
Green-spotted rockfish																																
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Shortnose rockfish																																
Cow rockfish																																
Mexican rockfish																																
Vermilion rockfish																																
Blue rockfish																																
Bocaccio																																
Rosy rockfish																																
Greenblotched rockfish																																
Flag rockfish																																
Halfband rockfish																																
Olive rockfish																																
Sabretooth																																
Roughback sculpin																																
Pit-head sculpin																																
Threadfin sculpin																																
Spotfin sculpin																																
Slim sculpin																																
Southern spearnose poacher																																
Bluespotted poacher																																
California halibut																																
Fantail sole																																
Diamond turbot																																
Rock sole																																
C-O sole																																

<sup>a</sup>Number in parentheses is number of hauls in which species was taken (frequency of occurrence).

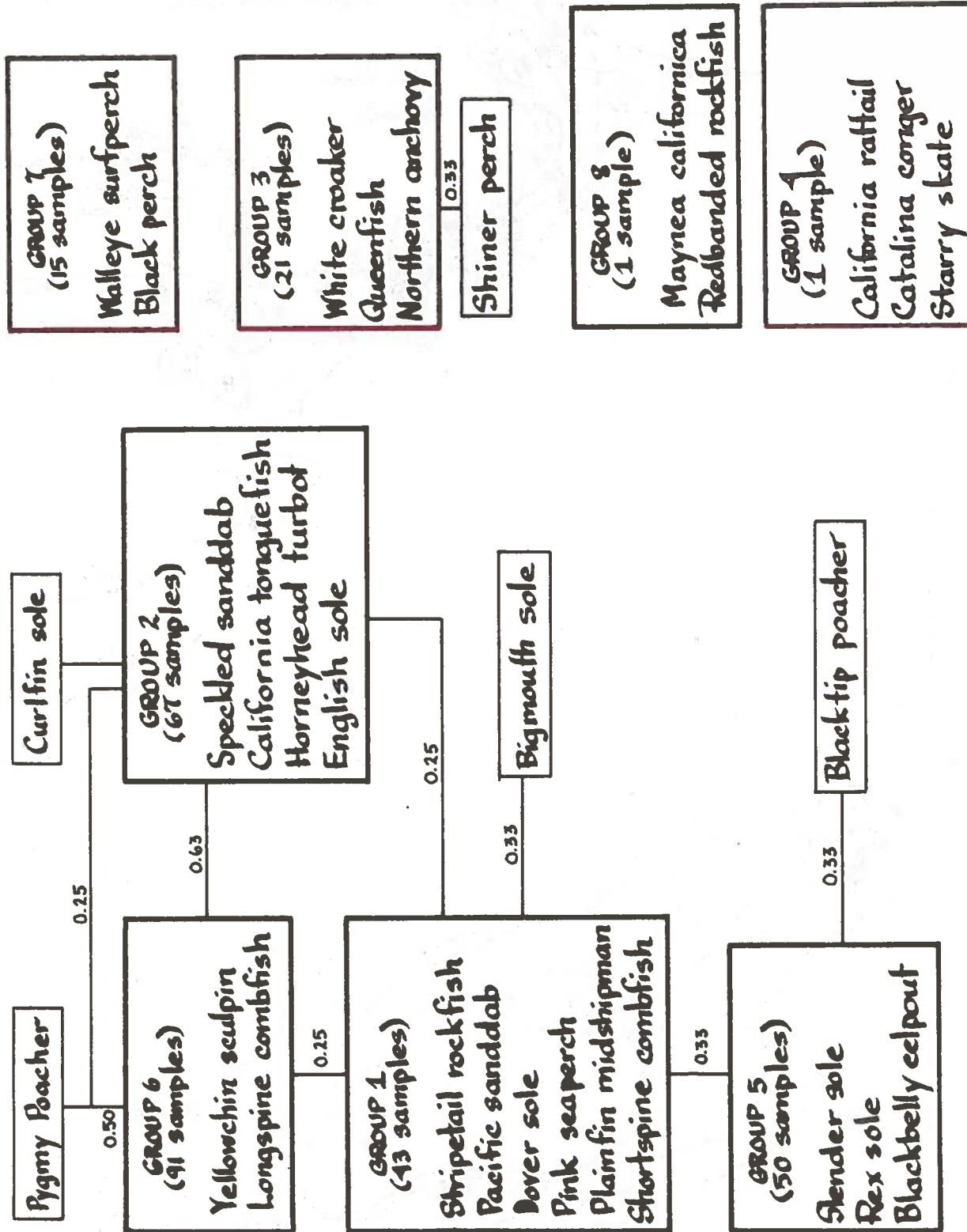


Figure 5. Species associations of southern California nearshore demersal fishes, 1969-72.  
Index of affinity: 0.50.

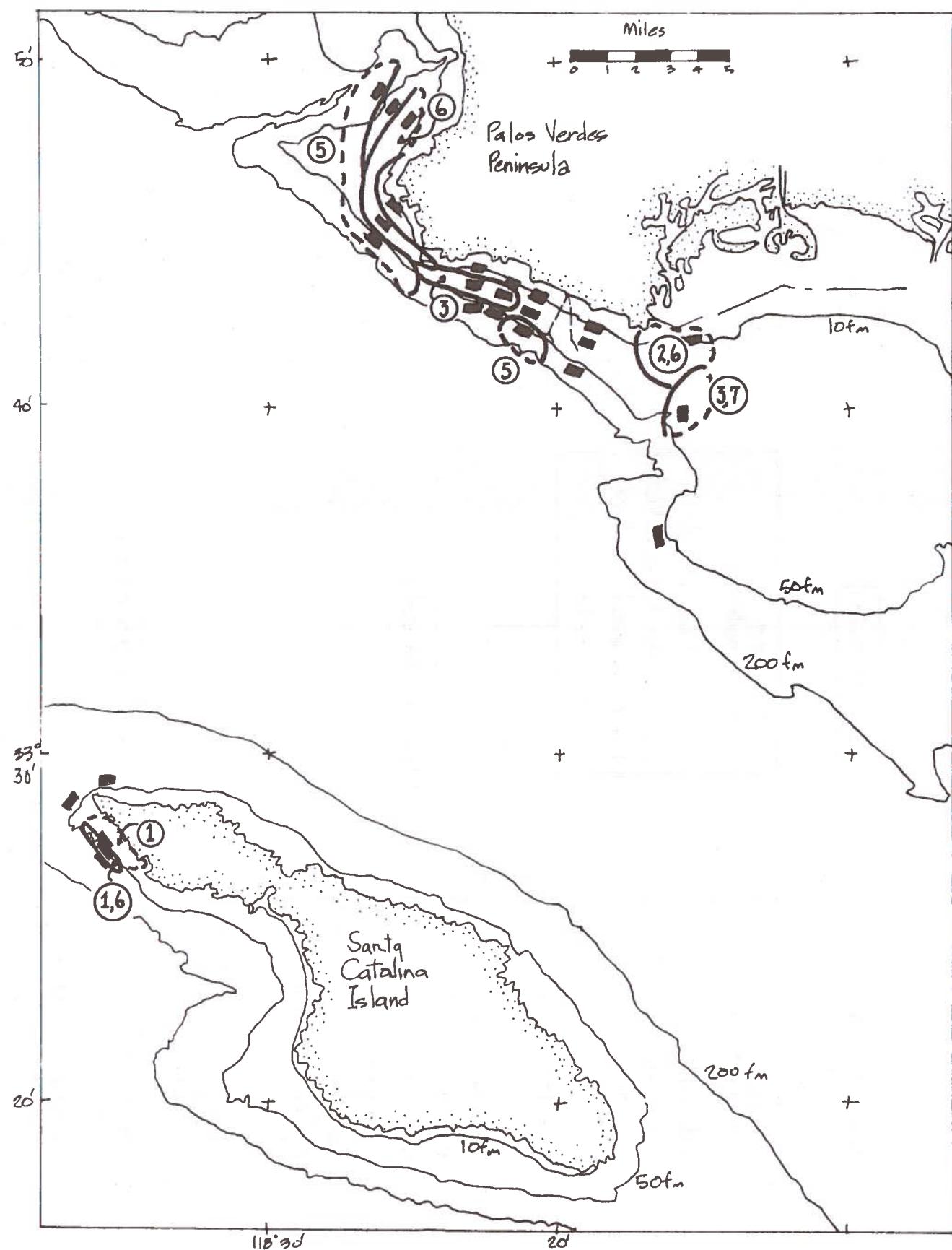


Figure 6. Recurrent groups of fishes present off Palos Verdes and Catalina, November-December 1972. Group members are given in Figure 5.

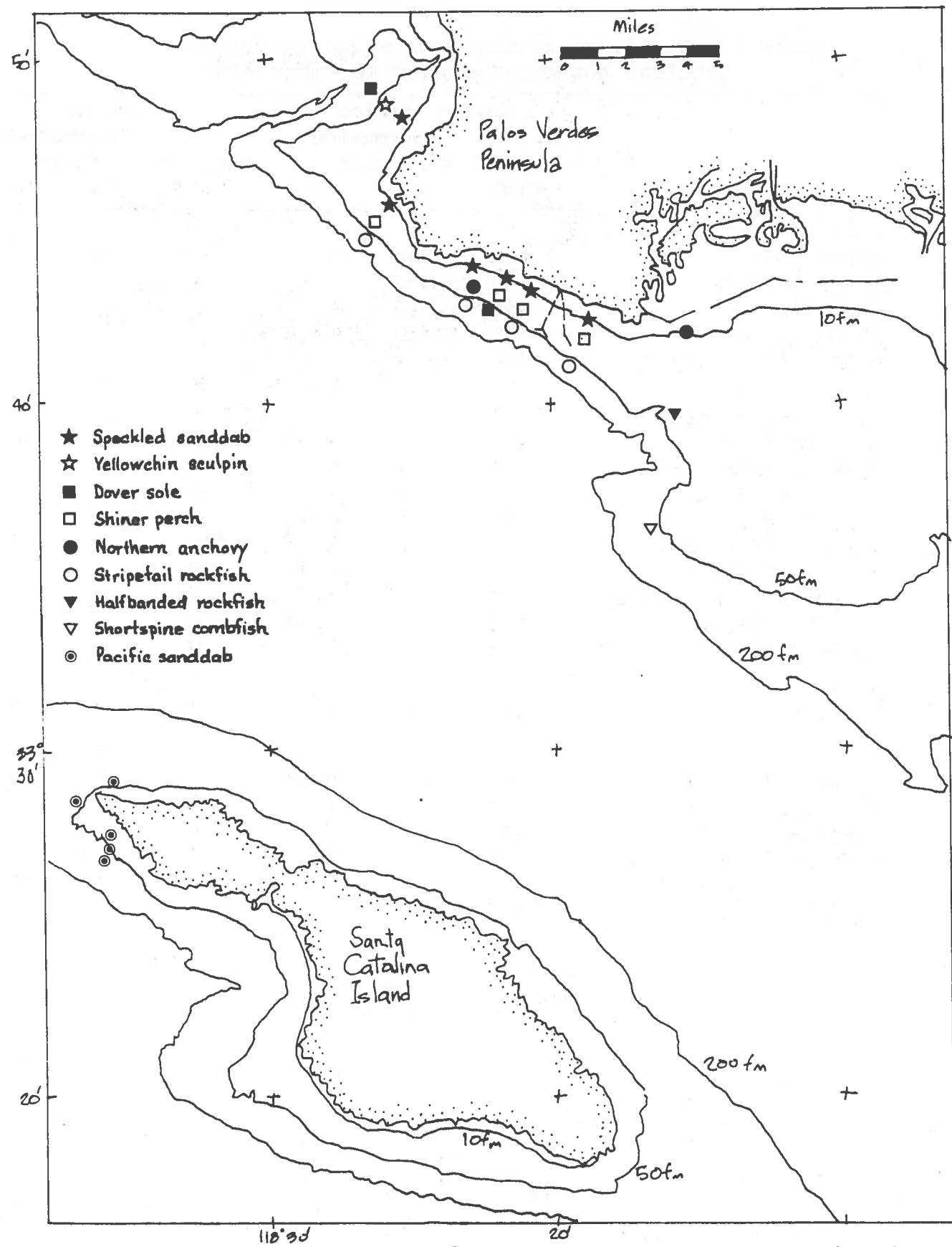


Figure 7. Dominance in abundance, Palos Verdes and Catalina survey, November-December 1972. Average rank was used for replicated stations.

Table 7. Incidence of disease, Palos Verdes and Catalina survey, November-December 1972

Species	Palos Verdes			Catalina		
	No. of Fish	Anomalous Fish No.	%	No. of Fish	Anomalous Fish No.	%
<b>FIN EROSION</b>						
Dover sole	2,897	750	26	6	0	0
White croaker	1,147	114	9.9	0		
Rex sole	146	27	18	0		
Shiner perch	3,947	7	0.18	0		
Shortbelly rockfish	158	6	3.8	0		
Slender sole	101	4	4.0	55	0	0
Longspine combfish	70	4	5.7	4	0	0
Curlfin sole	519	3	0.58	10	0	0
Greenstriped rockfish	8	3	38	12	0	0
Barred sand bass	5	2	40	0		
English sole	182	1	0.55	0		
Pacific sanddab	600	1	0.17	486	0	0
Hornyhead turbot	17	1	5.9	0		
California tonguefish	60	1	1.7	0		
Northern anchovy	3,142	1	0.03	0		
Fantail sole	4	1	25	0		
<b>TUMORS</b>						
Dover sole	2,897	58	2.0	6	0	0
<b>AMBICOLORATION</b>						
Dover sole	2,897	6	0.21	6	0	0
C-O sole	17	2	12	0		
English sole	182	1	0.55	0		
Fantail sole	4	1	25	0		

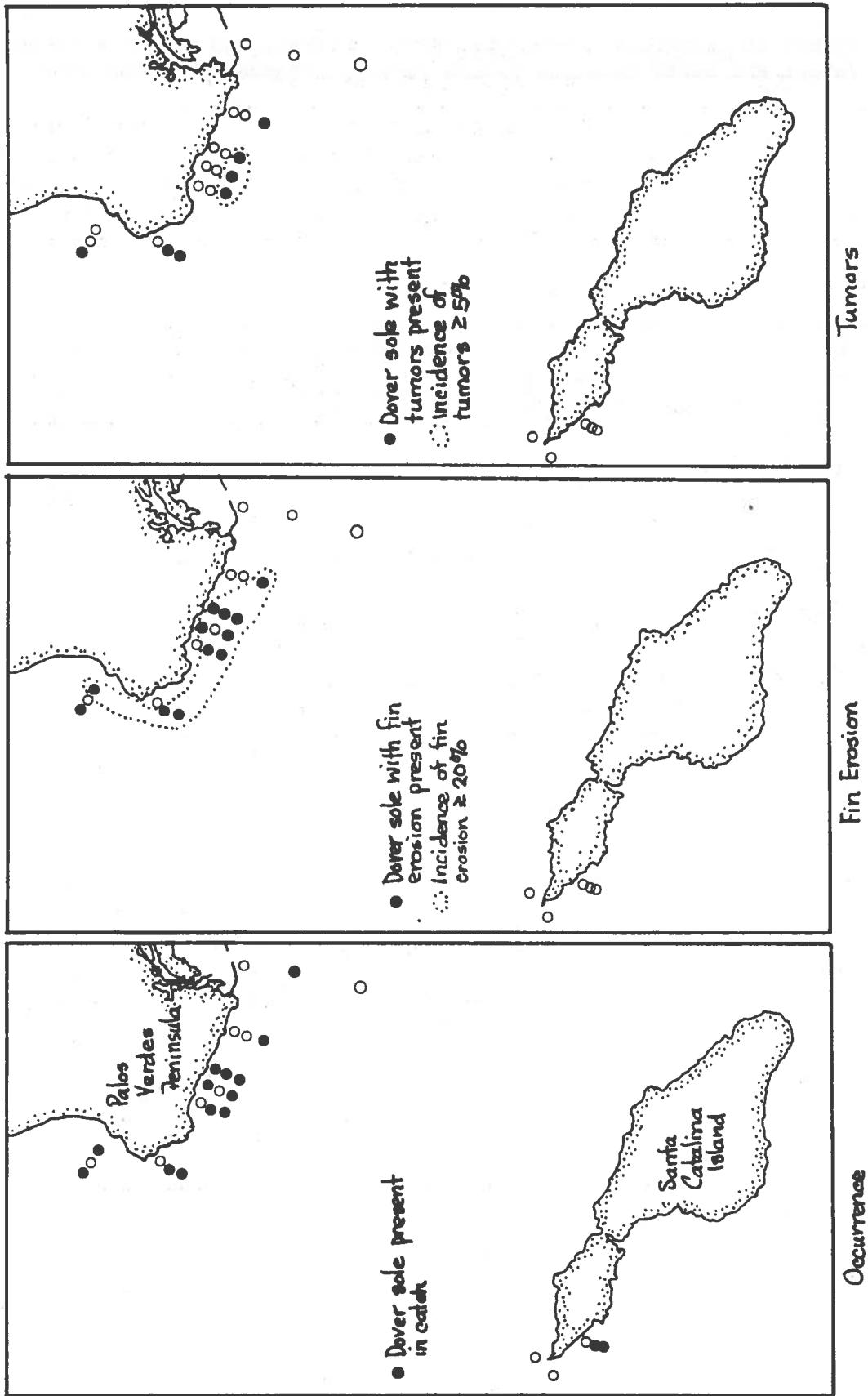
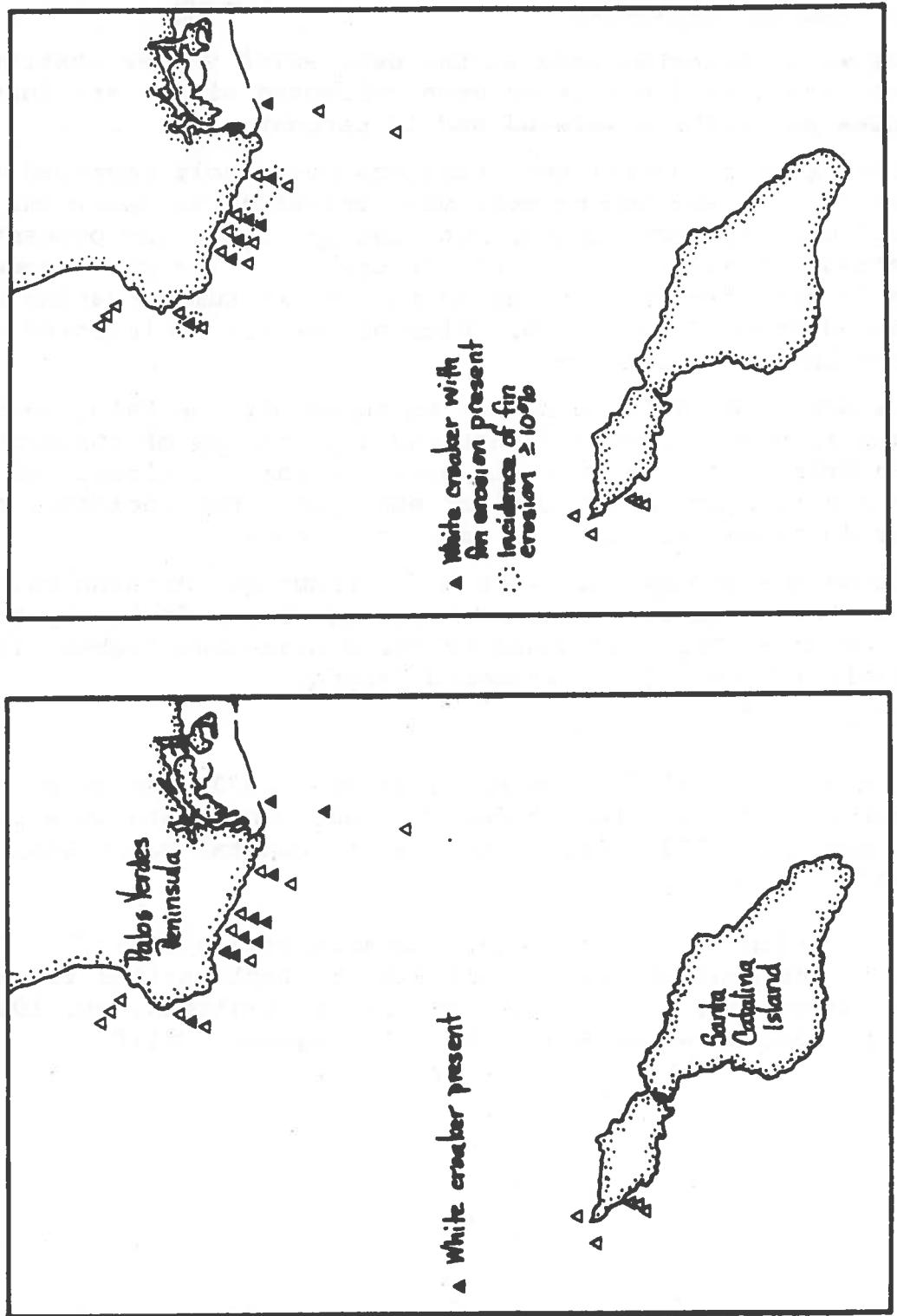


Figure 8. Distribution of diseased Dover sole, Palos Verdes and Catalina, November-December 1972.

Table 8. Number of anomalous Dover sole, White croaker, and Rex sole taken in Palos Verdes and Santa Catalina Island survey, November-December 1972.

Station	Dover Sole				White Croaker				Rex Sole				
	No. of Indiv.	Fin Erosion		Tumors		No. of Indiv.	Fin Erosion		Exophthalmia		No. of Indiv.	Fin Erosion	
		No.	%	No.	%		No.	%	No.	%		No.	%
T <sub>0</sub> -75	1	1	100			0					0		
T <sub>0</sub> -200	0					0					0		
T <sub>0</sub> -450	1794	28	1.6	3	0.17	0					64		
T <sub>1</sub> -75	0					0					0		
	0					0					0		
T <sub>1</sub> -200	24	8	33			1					0		
	37	19	51	1	2.7	2	1	50			0		
T <sub>1</sub> -450	188	49	26	1	0.53	0					23		
	30	24	80	4	13	0					1		
T <sub>2</sub> -75	0					15					0		
T <sub>2</sub> -200	11	5	45			266	12	4.5	4	1.5	0		
T <sub>2</sub> -450	18	6	33	1	5.5	0					0		
T <sub>3</sub> -75	7	5	71			0					0		
T <sub>3</sub> -200	0					68	8	12	1	1.5	0		
T <sub>3</sub> -450	421	304	72	26	6.2	16					41	26	63
T <sub>4</sub> -75	1	1	100			0					0		
	0					0					0		
	0					0					0		
T <sub>4</sub> -200	1	1	100			412	59	14	3	0.73	0		
T <sub>4</sub> -450	229	201	88	19	8.3	44	1	2.3	5	11	3		
T <sub>5</sub> -75	0					0					0		
T <sub>5</sub> -200	0					291	32	11	8	2.7	0		
T <sub>5</sub> -450	126	98	78	3	2.4	0					6	1	17
T <sub>6</sub> -75	0					31	1	3.2			0		
T <sub>6</sub> -200	9					1					0		
T <sub>6</sub> -450	0					0					8		
SD-2	0					0					0		
SD-3	3					0					0		
SD-15	0					0					0		
SD-16	0					0					0		
SD-17	0					0					0		

Figure 9. Incidence of fin erosion in white croaker, *Palos Verdes* and *Catalina* survey, November-December 1972.



ranged from 2.3 to 33 percent. White croaker with exophthalmia were also found at the deeper stations where the catch was greater than 40 specimens.

Rex sole were collected only at the deep Palos Verdes stations, and specimens with fin erosion were collected at two stations. Incidences per station were 63 and 17 percent.

Size histograms of normal and anomalous Dover sole revealed that both fin erosion and tumors were most prevalent in specimens 80 to 120 mm, standard length, but that the range and percentage of affected individuals differed (Figure 10). The size range of Dover sole with fin erosion was 70 to 220 mm; tumor-bearing Dover sole ranged from 80 to 170 mm. Five of the six ambicolored specimens were larger than 150 mm.

Size histograms of white croaker captured off the Palos Verdes Peninsula (Figure 11) showed that the size ranges of individuals with fin erosion and exophthalmia were similar. Incidence of exophthalmia was highest in the smaller specimens, but incidence of fin erosion showed no definite peaks or trends.

Size histograms of rex sole with and without fin erosion revealed that even the smallest specimens captured were affected by the disease (Figure 12). Incidence of the disease was highest in individuals 180 to 200 mm, standard length.

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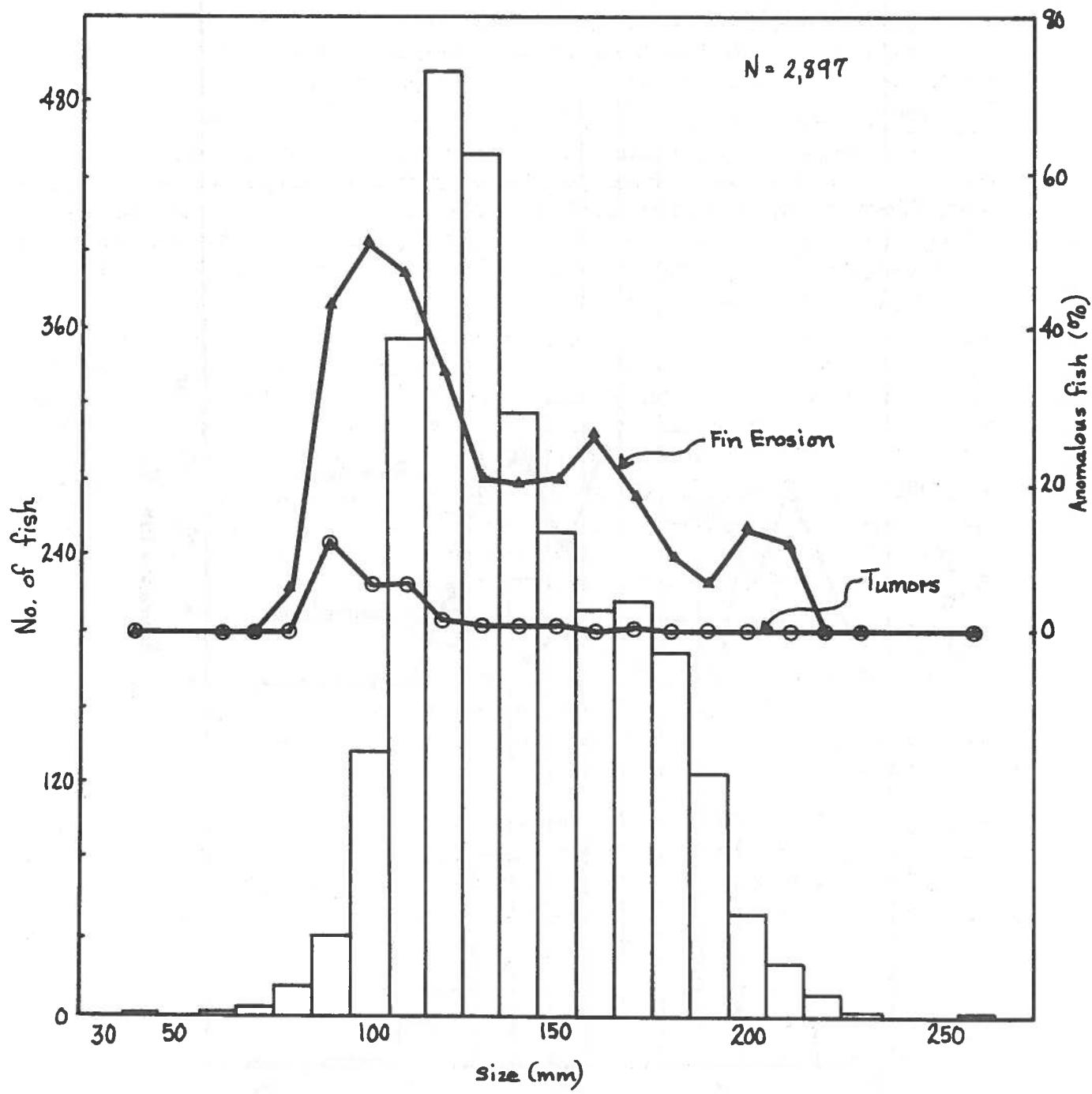


Figure 10. Incidence of disease in Dover sole captured off the Palos Verdes Peninsula, November-December 1972.

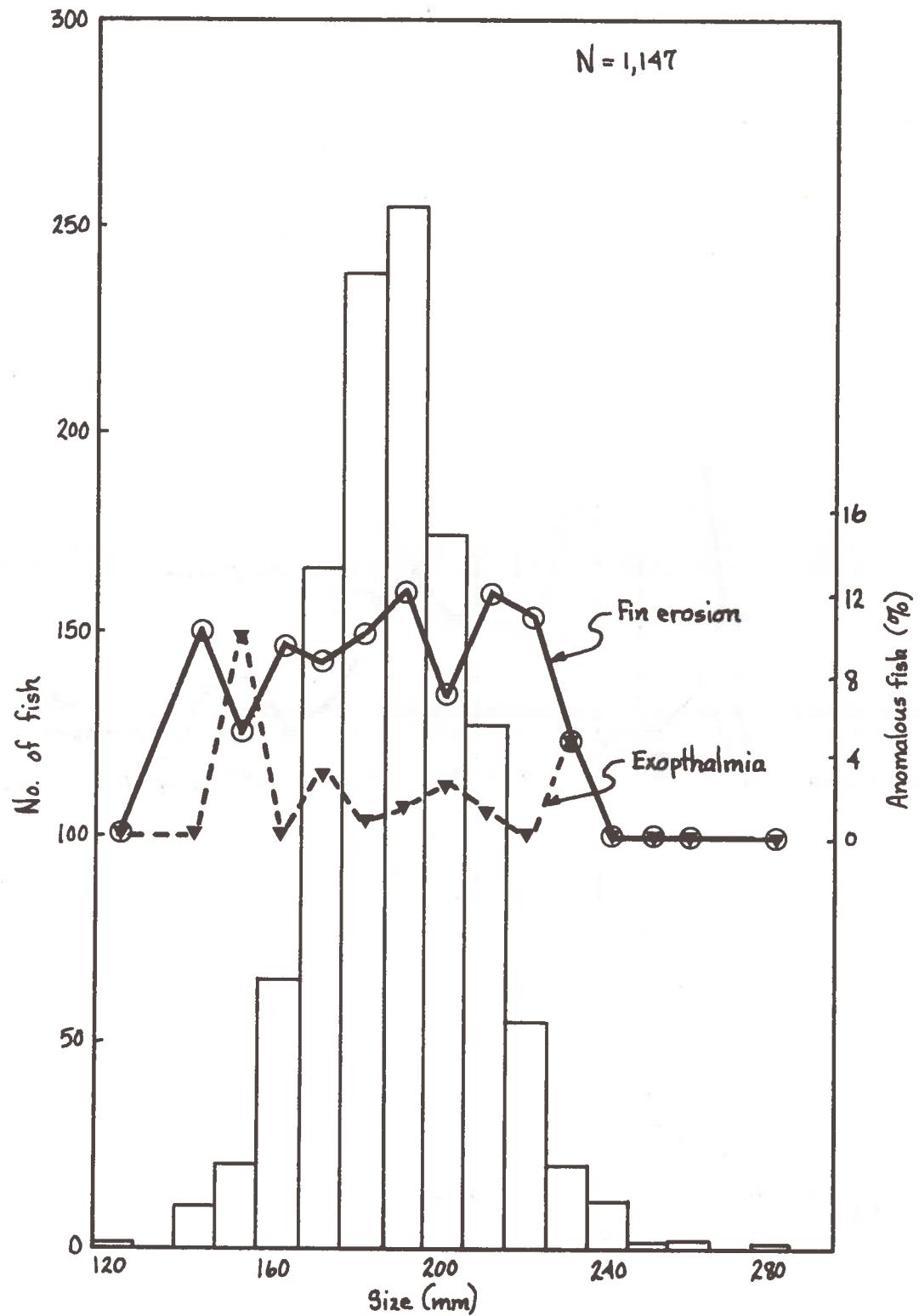


Figure 11. Incidence of disease in white croaker captured off Palos Verdes, November-December 1972.

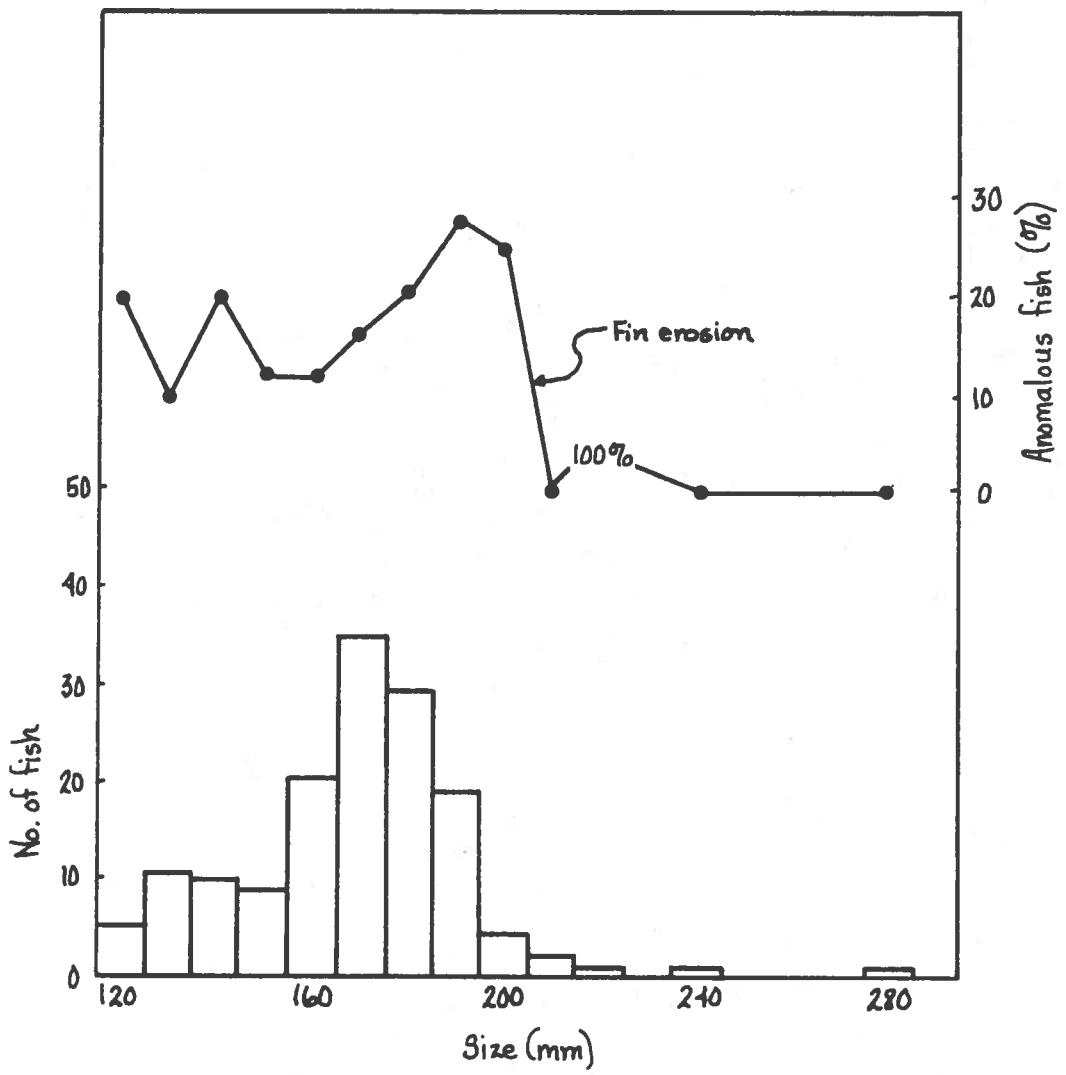


Figure 12. Incidence of rex sole with fin erosion captured off Palos Verdes, November-December 1972.

