69.03

State of California
Department of Fish and Game

PROGRESS REPORT ON WILDLIFE AFFECTED BY THE SANTA BARBARA CHANNEL OIL SPILL
January 28 - March 31, 1969

SUMMARY

On January 28, 1969, an oil well being drilled offshore 6½ miles south of Santa Barbara, California ruptured, spilling crude oil into the Santa Barbara Channel. The amount of crude oil spilled varied from a Union Oil Company estimate of 21,000 gallons per day to double this amount by equally qualified sources.

Departmental personnel were immediately rushed into the area, and on the third of February Wildlife Management Branch staff personnel from Sacramento were sent to Santa Barbara to set up a wildlife monitoring program. The objective of the program was to determine the oil spill effects on wildlife. Seven ocean aerial and four beach transects were established. With the cooperation of the U. S. Fish and Wildlife Service and local Audubon members, surveys were conducted daily in the first week and later on a weekly basis.

From February 3 to March 28, over 240 man hours were spent covering 178.1 miles of aerial transects and 5.7 miles of beaches to monitor wildlife populations and losses. Number of birds and marine mammals seen was recorded. During the same period of time, other people were collecting oil-stricken birds along the shore and taking them to bird treatment stations. An account of the bird rescue operation is covered in a report by Region 5.

Results of the aerial surveys indicated that bird numbers in the affected area remained relatively stable. Avian population for the 1,075 square miles sampled by the aerial transects was 12,000 birds. Species groupings in order of their

abundance were gulls, shorebirds, waterfowl, loons and grebes, cormorants and pelicans, and other waterbirds.

There was no great influx or exodus of birds. Most of the birds appeared to avoid the oil-contaminated areas. They were found either in flight, on the shoreline, or resting in open spaces of water which appeared to be free of oil.

Beach transects were established to derive an estimate of bird loss, because oil-affected birds either in distress or dead could not be readily determined from the air. Live birds observed along the 5.7 miles of beach transects average 439 birds per day. These were mostly shorebirds and gulls apparently little affected by oil. Dead birds, exclusive of those picked up by others and either taken to the bird treatment stations or disposed of during the beach cleaning operations, amounted to 70 birds. Of these dead birds, 9 showed no evidence of oil contamination. On the basis of the transect data, bird losses for the 75.5 miles of beach from Pt. Conception, Santa Barbara County, to the Ventura River mouth at Ventura, California, were estimated to be 1,603 birds. Added to this loss are the 1,388 birds which died after treatment and the 175 turned in to the treatment stations dead and another 439 dead birds reported by other sources and from areas not included in the study areas. An estimated loss of 3,600 birds can be attributed to the oil spill for this reporting period. This loss does not include birds which perished on the open water and failed to drift ashore.

The greatest number of marine mammals observed in any one day numbered 2,000 porpoise and 340 sea lions and/or harbor seals. In addition, 30 gray whales were observed migrating through the area. Within the study area 3 sea lions

and 4 porpoises were found dead. Autopsies were performed on 2 porpoises; their death could not be positively attributed to oil.

THE MONITORING PROGRAM

An oil well being drilled in the Santa Barbara Channel 6½ miles south of Santa Barbara, California, erupted on January 28, 1969. The amount of crude oil spilled varied from a Union Oil Company estimate of 21,000 gallons per day to double this amount by equally qualified sources.

Departmental personnel under the supervision of Robert Kaneen were rushed into the area on January 29. On February 3, Robert D. Mallette and J. Robert LeDonne of the Wildlife Management Branch staff in Sacramento were dispatched to Santa Barbara to set up a wildlife monitoring program designed to collect factual information relative to wildlife populations in the affected area and losses being sustained. Assistance was provided by U. S. Fish and Wildlife Service, Departmental regional personnel, and the Santa Barbara Chapter of the National Audubon Society.

Aerial Surveys

Methods

Seven aerial transects covering 178.1 lineal miles were established over the Santa Barbara Channel to determine the number and species of wildlife in the oil-contaminated area and in a noncontaminated area nearby. Five of these transects were located in the area of oil-contamination and two others were located outside the contaminated area. The location of these seven transects is shown in Figures 1 and 2 and were identified as follows:

Oil-Contaminated Study Area

Mainland Coastal Transect: 38.7 miles of mainland coastline from Coal Oil Point, Santa Barbara County, to the mouth of the Ventura River, Ventura County

Offshore Transects 1, 2, and 3: Three transects each 27 miles long over the Santa Barbara Channel spaced 5 miles apart

Island Coastal Transect: 31.6 miles of the north shoreline of Santa Cruz Island

Noncontaminated Study Area

Offshore Control Transect: 14.6 miles, 3 miles offshore from Gaviota, Santa Barbara County

Mainland Control Transect: 12.2 miles, from Gaviota to El Capitan State Beach along the mainland shoreline

Aerial surveys were flown at an indicated air speed of 100 miles per hour at an elevation of 150 to 200 feet. Air speed was increased to 140 miles per hour when only an occasional bird was sighted. The Fish and Wildlife Service's Cessna 185 was used exclusively until March 19, when the Department's plane was put into service. Two observers familiar with aerial survey methods and bird species found in the area accompanied each flight. All birds and marine mammals seen within 1/8 mile on either side of the plane were identified and counted. Inventory sheets were compiled for each transect and each flight flown.

The extent of oil contamination varied from day to day. Wind, wave and ocean currents, coupled with major storms, influenced the movement of oil. When

originally set up, the noncontaminated study area was free of oil; however, varying amounts of oil were carried northward, but the mainland control transect remained relatively free from oil.

Results

The numbers of birds and marine mammals observed within the 780 square mile study area shown in Figure 1 appeared to remain relatively stable, with birds and mammals moving away from the oil slick itself. There appeared to be no great influx of new birds or exodus of birds out of the coastal area during the 51-day period. Birds observed were largely winter visitant and resident species listed in the appended checklist. There were no mass movements of migratory birds through the study area, although black brant were observed moving northward through the area in their annual northward migration.

The number of birds counted in the two study areas during the 18 days the transects were flown averaged 3,490. Bird use along the mainland was 34 birds per lineal mile along the contaminated beaches and 47 per lineal mile along the noncontaminated areas. Gulls, shorebirds, loons and grebes were most prevalent along or onshore. Offshore the use was only 4 birds per square mile. Gulls were the most frequently observed birds in the open water. Bird use along the island transect was 45 birds per lineal mile. They were primarily gulls, waterfowl, and cormorants.

Table 1 summarizes the aerial counts made of each of the seven transects flown.

Beach Surveys

Beach Transects

Four beach transects totaling 5.7 miles were established to determine the bird use being made of the oil-contaminated and noncontaminated beaches and the

bird loss. Three of these transects were at locations where oil had covered the beach areas, and the fourth was located where the oil effects were very slight. These transects are shown in Figures 3, 4, 5, and 6.

Oil-Contaminated Beach Areas

Arroyo Burro Beach: 1.1 miles of beach

Carpinteria State Beach: 1.1 miles of beach

Rincon Beach: 2.6 miles of beach

Noncontaminated Beach Area

El Capitan Beach: 0.9 mile of beach

From February 5 to March 4 the beach transects were surveyed by State and Federal personnel. Commencing on March 5, members of the Santa Barbara Audubon Society were assigned this responsibility under the supervision of Mr. Waldo Abbott of the Santa Barbara Museum of Natural History and Mrs. E. A. Parkinson, Chapter President.

Beach transects were walked at or near low tide by two observers who recorded the number and species of birds using the beaches from the breakwater to the high tide line, flying overhead, and the birds found dead. An inventory record was made of each count for each transect. In addition to the above transects, the Audubon Society conducted weekly counts on El Estero Marsh, Goleta Marsh, Santa Barbara Bird Sanctuary, East-West Beach, and Devereaux Slough. The results of these counts will be provided in a subsequent report.

Results

The number of birds observed utilizing the 4.8 miles of contaminated beach transects during the counts averaged 290. Of these 39 were found dead, 6 of which had apparently died of something other than oil contamination. Averaging the

transect counts, 7 dead birds and 60 live birds were found for each lineal mile of transect. Bird losses along the 38.7 miles from Coal Oil Point to the Ventura River were estimated to be 499. This figure was derived from data obtained from the 4.8 miles of monitored beach in the area. To this figure must be added those birds received at the treatment station and reported elsewhere. The number of birds observed utilizing the 0.9 mile of noncontaminated beach transect during the counts averaged 149. Of these, 31 were found dead, 4 of which had apparently died of causes other than oil contamination. Projecting these count figures there were 30 dead birds and 165 live birds found for each lineal mile of transect. Summarized in Table 2 are the results of the beach surveys.

Bird losses along the 36.8 miles of beach from Pt. Conception to Coal Oil Point were estimated to be 1,104 birds. This figure was derived from survey of the El Capitan Beach transect, which was originally set up as a noncontaminated area but later became affected by oil. As mentioned earlier, the westward movement of oil was noticeable in the open water, and slight contamination of the beach areas occurred. Birds contaminated by oil in the open water washed ashore onto the El Capitan Beach transect and were counted. Since these birds were not picked up in the course of the beach cleaning and bird rescue operation, the mortality in the noncontaminated area in contrast to the oil-contaminated area appears to be much greater. This was not the case. As mentioned earlier, bird losses along the 38.7 miles from Coal Oil Point to Ventura based on the transects conducted in the oil-contaminated area were 499. To this figure must be added those birds received at the treatment stations and reported elsewhere.

The number of birds received at the bird treatment stations totaled 175 dead and 1,566 which were treated. Of these, 178 have survived to date. The Federal Water Pollution Control Authority personnel reported another 226 dead birds as a result of their beach surveys; and another 213 dead birds were reported by other sources.

These losses do not include birds which perished in the open water and failed to drift ashore. Total bird losses to date in the area affected by the oil spill were determined to be 3,600.

Marine mammals reported during this period to have washed ashore dead in the study area numbered 3 sea lions and 4 porpoises. Autopsies performed on 2 porpoises failed to incriminate oil contamination as the cause of death.

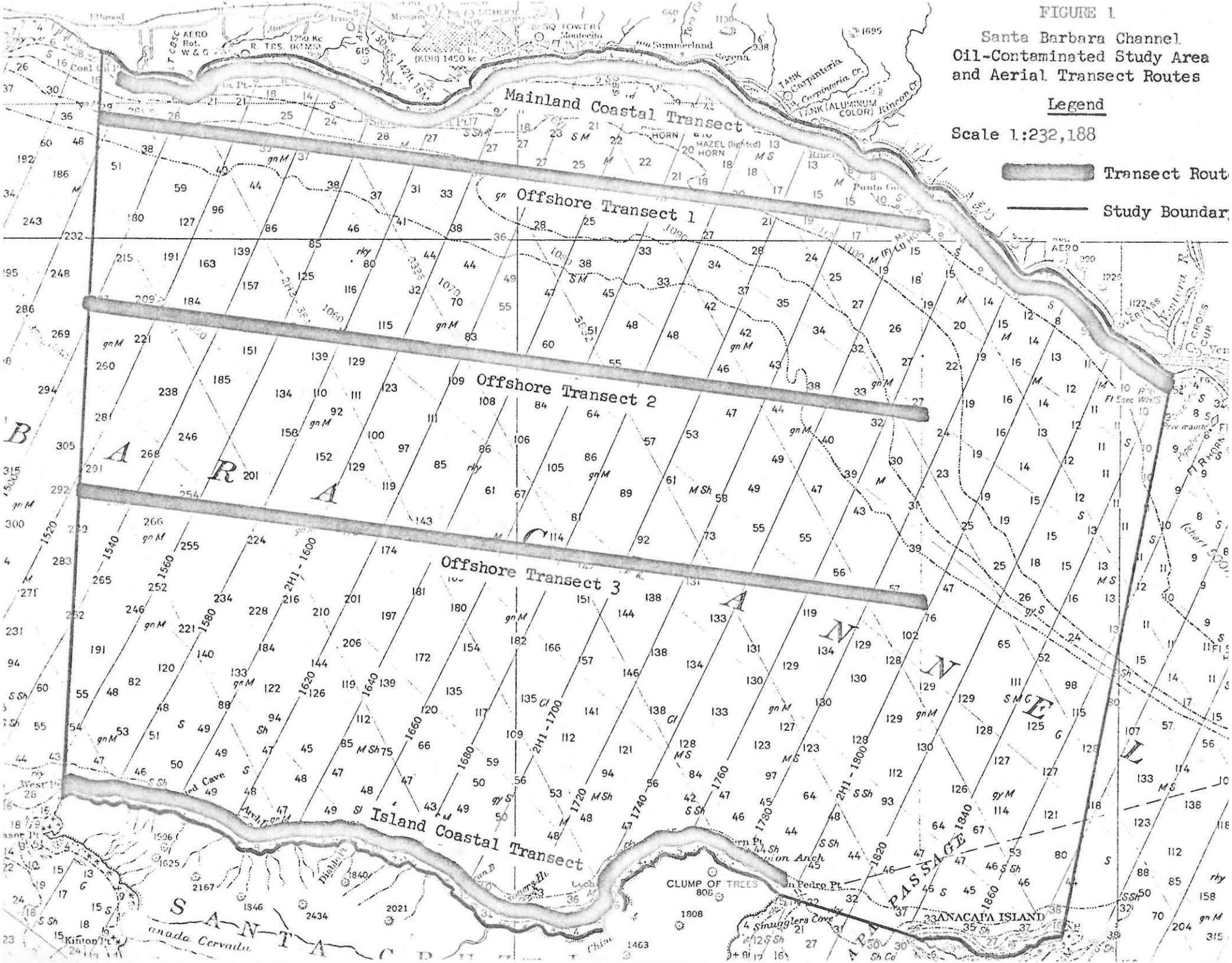

FIGURE 1

Santa Barbara Channel
Oil-Contaminated Study Area
and Aerial Transect Routes

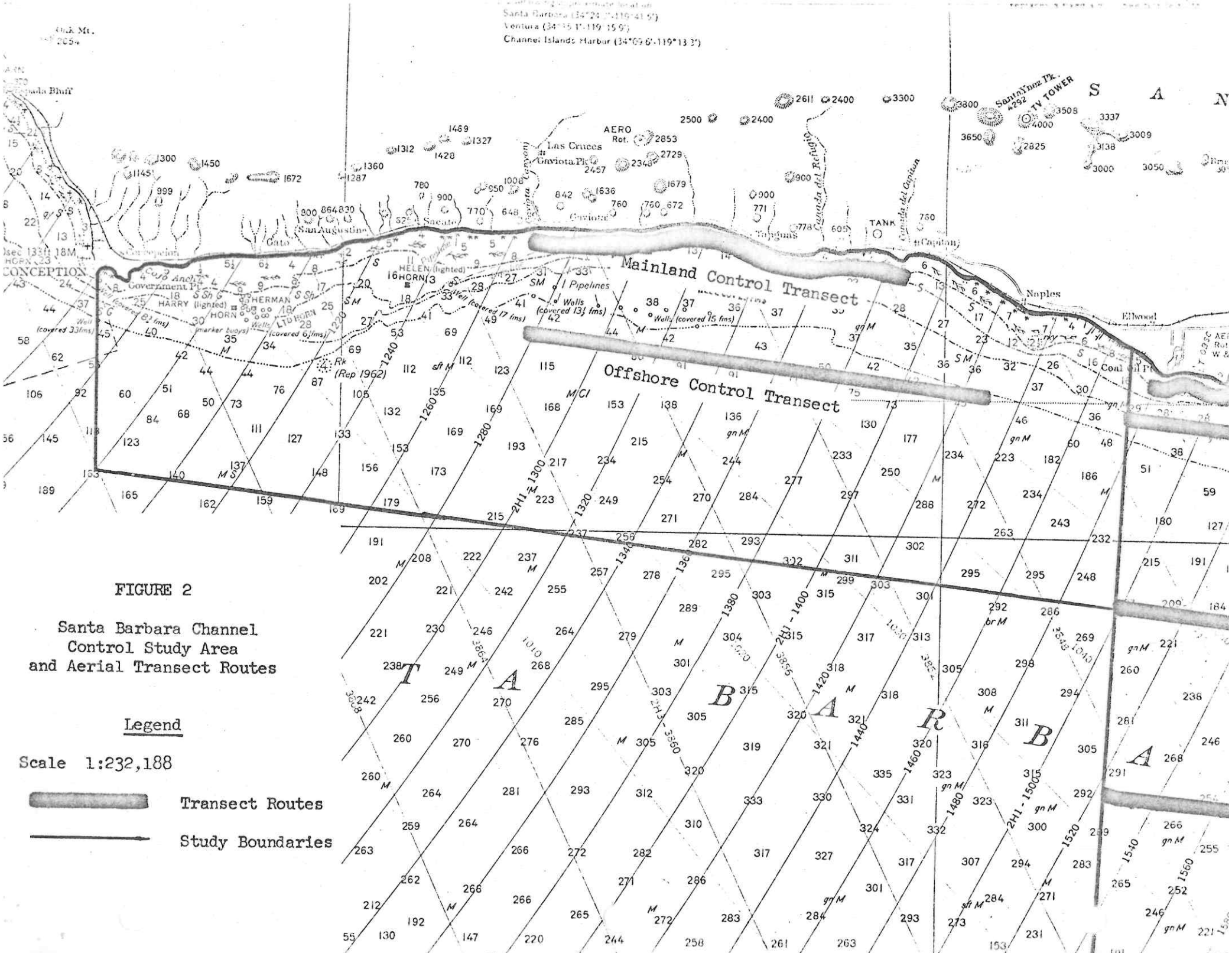

FIGURE 2

Santa Barbara Channel
Control Study Area
and Aerial Transect Routes

Legend

Scale 1:232,188

Transect Routes

Study Boundaries

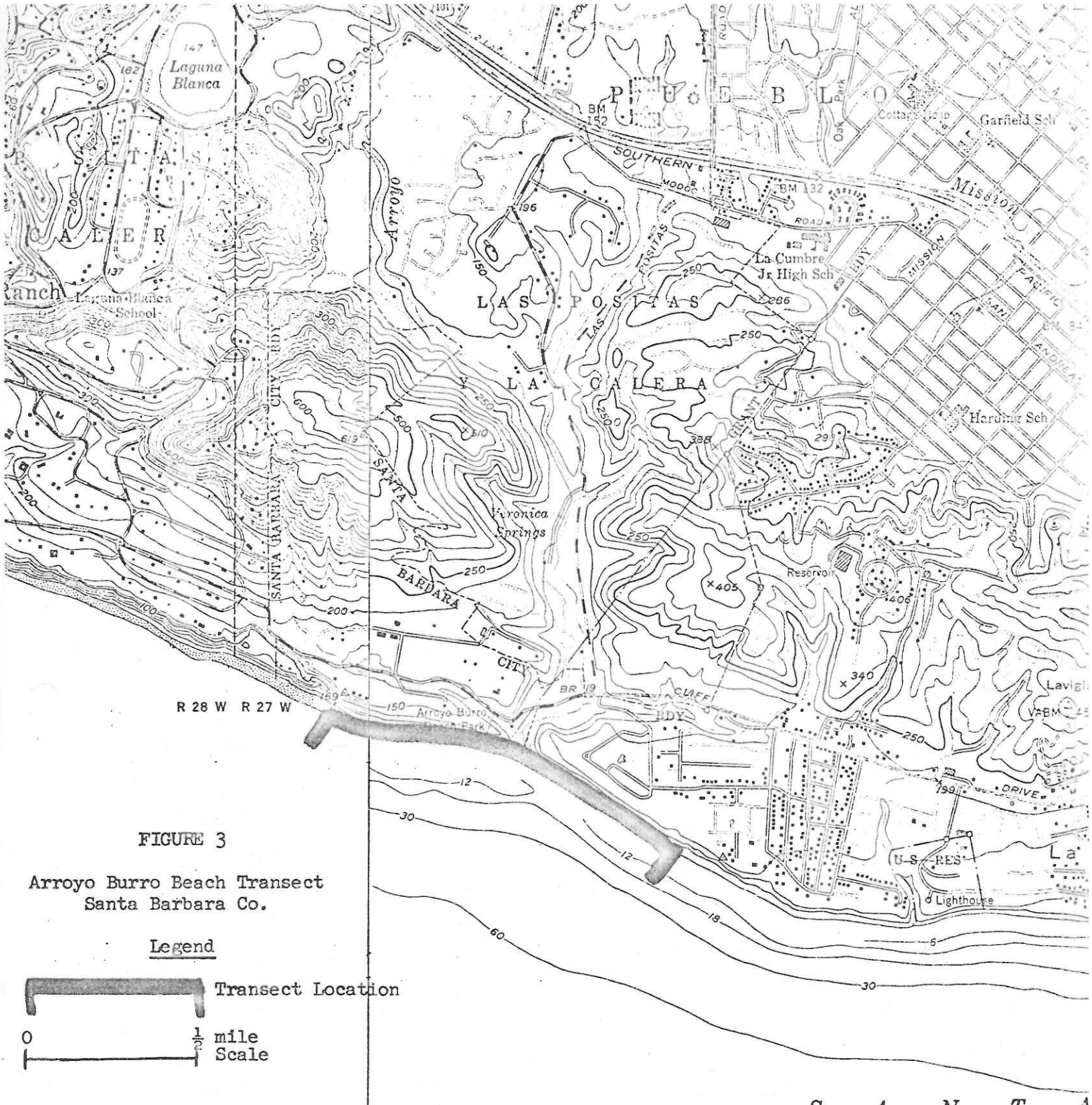

FIGURE 3

Arroyo Burro Beach Transect
Santa Barbara Co.

Legend

Transect Location

0 ½ mile
Scale

FIGURE 4

Carpinteria State Beach Transect
Santa Barbara Co.

Legend

Transect Location

FIGURE 5

Rinco Beach Transect
Ventura Co.

Legend

Transect Location

0 $\frac{1}{2}$ mile

Scale

FIGURE 6

El Capitan Beach Transect
Santa Barbara Co.

Legend

Transect Location

0 2 mile Scale

A C H A N N E L

APPENDIX

Listing of Species Observed in the
Santa Barbara Channel Area by Species Grouping

Species Grouping		Species
Loon & Grebe		
	Common loon	Gavia immer
	Arctic loon	Gavia arctica
	Red-throated loon	Gavia stellata
	Horned grebe	Podiceps auritus
	Eared grebe	Podiceps caspicus
	Western Grebe	Aechmophorus occidentalis
Pelagic Species		
	Black-footed albatross	Diomedea nigripes
	Sooty shearwater	Puffinus griseus
	Xantus' murrelet	Endomychura hypoleuca
	Pigeon guillemot	Cepphus columba
	Common murre	Uria aalge
Cormorant & Pelican		
	Brown pelican	Pelecanus occidentalis
	Double-crested cormorant	Phalacrocorax auritus
	Brandt's cormorant	Phalacrocorax penicillatus
	Pelegic cormorant	Phalacrocorax pelagicus
Waterfowl		
	Brant	Branta bernicla
	Green-winged teal	Anas carolinensis
	Canvasback	Aythya valisineria
	Common goldeneye	Bucephala clangula
	Bufflehead	Bucephala albeola
	Surf scoter	Melanitta perspicillata
	Common scoter	Oidemia nigra
	White-winged scoter	Melanitta deglandi
	Ruddy duck	Oxyura jamaicensis
	Red-breasted merganser	Mergus serrator
Water-Associated		
	Great blue heron	Ardea herodias
	Common egret	Casmerodius albus

APPENDIX (Continued)

Species Grouping		Species
Shorebirds		
	Black oystercatcher	Haematopus bachmani
	Snowy plover	Charadrius alexandrinus
	Black-bellied plover	Squatarola squatarola
	Black turnstone	Arenaria melanocephala
	Long-billed curlew	Numenius americanus
	Whimbrel	Numenius phaeopus
	Spotted sandpiper	Actitis macularia
	Willet	Catoptrophorus semipalmatus
	Knot	Calidris canutus
	Least sandpiper	Erolia minutilla
	Western sandpiper	Ereunetes mauri
	Marbled godwit	Limosa fedoa
	Sanderling	Crocethia alba
	Northern phalarope	Lobipes lobatus
Gull & Tern		
	Glaucous-winged gull	Larus glaucescens
	Western gull	Larus occidentalis
	Herring gull	Larus argentatus
	California gull	Larus californicus
	Ring-billed gull	Larus delawarensis
	Mew gull	Larus canus
	Bonaparte's gull	Larus philadelphia
	Heermann's gull	Larus heermanni
	Black-legged kittiwake	Rissa tridactyla
	Royal tern	Thalasseus maximus

TABLE 1

AERIAL SURVEY
SUMMARY OF BIRD COUNTS, SANTA BARBARA CHANNEL AREA
FEBRUARY 4 - MARCH 26, 1969

TRANSECT	SPECIES GROUPING	DATE OF AERIAL SURVEYS: FEBRUARY 4	5	6	7	8	9	11	13	19	26	MARCH 3	5	7	10	12	14	19	26	BIRDS OBSERVED NUMBER	PERCENT	AVG. BIRDS PER DAY
MAINLAND COASTAL TRANSECT																						
	LOON & GREBE	349	477	89	400	203	55	41	81	31	24	9	152	57	85	228	131	203	236	2,851	12	
	PELAGIC SPECIES											3							1	4	TR	
	CORMORANT & PELICAN	54	53	36	42	11	30	51	11	49	13	3	13	14	7	10	12	24	13	446	2	
	WATERFOWL	89	76	56	9	5	19	3	8			2	9		11	22	1	7	6	323	1	
	WATER-ASSOCIATED	2	3	1			2	5	1				2			1		1	1	19	TR	
	SHOREBIRDS	69	10	69	532	264	150	71	320	32	337	104	261	43	518	757	265	378	867	5,067	21	
	GULLS & TERNS	348	695	392	576	312	615	541	912	1,431	1,782	1,486	777	1,057	1,117	933	760	715	586	15,035	64	
	UNCLASSIFIED												2	3						5	TR	
	SUBTOTAL	911	1,314	643	1,559	795	871	712	1,333	1,543	2,156	1,607	1,236	1,174	1,738	1,951	1,169	1,328	1,710	23,750	100	1,319
OFFSHORE TRANSECTS (THREE OFFSHORE TRANSECTS COMBINED)																						
	LOON & GREBE		3		1	5	5	1		1		1	17	7	3	47	11	2	42	146	6	
	PELAGIC SPECIES		1	3			4	4	5				13			34	8		11	83	3	
	CORMORANT & PELICAN			1	1	3	1		3	2	1		2	3	1		4			22	1	
	WATERFOWL						1					5			120	7	1	50	4	188	7	
	WATER-ASSOCIATED																			0	0	
	SHOREBIRDS		2										7			33				42	2	
	GULLS & TERNS		40	32	76	60	110	19	283	16	18	16	125	37	66	151	658	148	144	1,999	79	
	UNCLASSIFIED						16						6	15		1				38	2	
	SUBTOTAL	-	46	36	78	68	137	24	291	19	19	22	170	62	190	273	682	200	201	2,518	100	148
ISLAND COASTAL TRANSECT																						
	LOON & GREBE		40	10	10	20		17	73	34	28		100	503	20	31	30	16	29	961	4	
	PELAGIC SPECIES		25		4	23		3	35	3	8	2			1			5	15	124	1	
	CORMORANT & PELICAN		84	142	149	53	131	259	150	142	89	15	86	2	41	44	25	148	82	1,642	7	
	WATERFOWL		68	50	28	40	21	293	82	368	823	11	207	203	131	190		277	349	3,141	13	
	WATER-ASSOCIATED		2	2	1		1	2										1	1	10	TR	
	SHOREBIRDS		8			2	1	2										3	27	43	TR	
	GULLS & TERNS		1,006	775	2,100	1,116	1,266	918	1,208	746	1,187	410	1,218	1,272	1,268	1,118	1,135	645	716	18,104	75	
	UNCLASSIFIED					75	1						39			1				116	TR	
	SUBTOTAL	-	1,233	979	2,292	1,329	1,421	1,494	1,548	1,293	2,135	438	1,650	1,980	1,461	1,384	1,190	1,095	1,219	24,141	100	1,420

TABLE 1 (CONTINUED)

TRANSECT	SPECIES GROUPING	DATE OF AERIAL SURVEYS: FEBRUARY 4	5	6	7	8	9	11	13	19	26	MARCH 3	5	7	10	12	14	19	26	BIRDS OBSERVED NUMBER	PERCENT	AVG. BIRDS PER DAY
OFFSHORE CONTROL TRANSECT																						
	LOON & GREBE									1	1		2		11	6	3	5	8	37	14	
	PELAGIC SPECIES														15			2		17	6	
	CORMORANT & PELICAN															1				1	TR	
	WATERFOWL																	4		4	1	
	WATER-ASSOCIATED																			0	0	
	SHOREBIRDS																			0	0	
	GULLS & TERNS								8	1	2	3	8		33	48	89	19	4	215	78	
	UNCLASSIFIED															4				4	1	
	SUBTOTAL	-	-	-	-	-	-	-	8	2	3	3	10	-	59	59	92	30	12	278	100	28
MAINLAND CONTROL TRANSECT																						
	LOON & GREBE							412	380	172	58		196			126	135	131	139	1,749	28	
	PELAGIC SPECIES																			0	0	
	CORMORANT & PELICAN							45	105	30	21	3	105		6	621	98	406	50	1,490	24	
	WATERFOWL							69	62	3	11	11	36			9	8	21	43	273	4	
	WATER-ASSOCIATED												3				1	4		8	TR	
	SHOREBIRDS							14	118	61	103		7		25	81	86	22	178	695	11	
	GULLS & TERNS							99	628	24	53	59	100		279	386	177	200	103	2,108	33	
	UNCLASSIFIED																			0	0	
	SUBTOTAL	-	-	-	-	-	-	639	1,293	290	246	73	447	-	310	1,223	505	784	513	6,323	100	575
TOTAL		911	2,593	1,658	3,929	2,192	2,429	2,869	4,473	3,147	4,559	2,143	3,513	3,216	3,758	4,890	3,638	3,437	3,655	57,010		3,490

TABLE 2

BEACH SURVEY
SUMMARY OF BIRD COUNTS, SANTA BARBARA CHANNEL AREA
FEBRUARY 5 - MARCH 28, 1969

TRANSECT	SPECIES GROUPING	DATE OF BEACH SURVEYS: FEBRUARY 5	7	8	9	11	12	14	19	20	26	27	MARCH 2	3	4	5	6	7	10	11	12	13	14	18	19	20	21	25	26	28	BIRDS OBSERVED NUMBER	PERCENT	AVG. BIRDS PER DAY
ARROYO BURRO BEACH TRANSECT																																	
	LOONS & GREBES		1	1			1	1			4		2		1	4		1		1		1		5						23	1.1	
	PELAGIC SPECIES																													0	-	
	CORMORANTS & PELICANS		1	1			1								1						2			2						8	0.4	
	WATERFOWL						1	1																						2	0.1	
	WATER-ASSOCIATED																				1									1	TR	
	SHOREBIRDS	30	31	77	40		52	125		208		70		89		144	157		61		178		107		125					1,494	72.2	
	GULLS & TERNS		58	71	4		15	9		93		22		21		95	68		34		31		10		7					538	26.0	
	UNCLASSIFIED																													0	-	
	SUBTOTAL	30	91	150	44	-	70	136	-	301	-	96	-	112	-	241	229	-	96	-	213	-	118	-	139	-	-	-	-	-	2,066	100.0	138
CARPINTERIA BEACH TRANSECT																																	
	LOONS & GREBES														1				1		1									3	0.4	
	PELAGIC SPECIES																													0	-	
	CORMORANT & PELICAN					1																					1			2	0.3	
	WATERFOWL																													0	-	
	WATER-ASSOCIATED																													0	-	
	SHOREBIRDS		1	1	11	29	8			1		34			1	20		6		24		24				19	49			228	29.0	
	GULLS & TERNS		5	81	14	17	39			1		4			11	47		3		86		150				70	26			554	70.3	
	UNCLASSIFIED																													0	-	
	SUBTOTAL	-	6	82	25	47	47	-	-	2	-	38	-	-	13	67	-	9	-	111	-	175	-	-	-	-	89	76	-	-	787	100.0	56
RINCON BEACH TRANSECT																																	
	LOONS & GREBES		2	8	3						1										9					3			47	73	6.4	
	PELAGIC SPECIES																				1									1	0.1	
	CORMORANT & PELICAN		1				1				2							1								5			11	21	1.8	
	WATERFOWL			1																										1	0.1	
	WATER-ASSOCIATED																													0	-	
	SHOREBIRDS		65	43	27		64	63			54				48			57		82		98				118			121	840	73.1	
	GULLS & TERNS		70	4	1		7	4			7				2			44		12		17				15			22	205	17.8	
	UNCLASSIFIED		8																											8	0.7	
	SUBTOTAL	-	146	56	31	-	72	67	-	-	-	64	-	-	50	-	-	102	-	94	-	125	-	-	-	-	141	-	-	201	1,149	100.0	96

TABLE 2 (CONTINUED)

TRANSECT	SPECIES GROUPING	DATE OF BEACH SURVEYS: FEBRUARY 5	7	8	9	11	12	14	19	20	26	27	MARCH 2	3	4	5	6	7	10	11	12	13	14	18	19	20	21	25	26	28	BIRDS OBSERVED NUMBER	PERCENT	AVG. BIRDS PER DAY
EL CAPITAN BEACH TRANSECT																																
	LOONS & GREBES			1			1		3		6		47		24	10	55		64		1			21		83		50	15		381	13.4	
	PELAGIC SPECIES						1						1								3										5	0.2	
	CORMORANT & PELICAN							1	1		4		2			46	45		80		18			4		19		20	20		260	9.2	
	WATERFOWL						3	5			1		4		1		50		4					8		10		6	5		97	3.4	
	WATER-ASSOCIATED															1	1		1							1		1			5	0.2	
	SHOREBIRDS	82	108	120	128		138	121	74		78		92		50	37	39		43		81		33	71		72		80	156		1,603	56.4	
	GULLS & TERNS	60	41		2		17	27			4		3		4	10	175		15		45		10	32		13		25	5		488	17.2	
	UNCLASSIFIED												1																		1	TR	
	SUBTOTAL	142	149	121	130	-	160	154	78	-	93	-	150	-	79	104	365	-	207	-	146	-	43	136	-	198	-	182	201		2,840	100.0	149
TOTAL		172	392	409	230	47	349	357	78	303	93	198	150	112	142	412	594	111	303	205	361	300	161	136	139	198	230	258	201	201	6,842		439

TABLE 3

AERIAL SURVEYS
SUMMARY OF MAMMAL COUNTS, SANTA BARBARA CHANNEL AREA
FEBRUARY 4 - MARCH 26, 1969

TRANSECT	SPECIES	DATE OF AERIAL SURVEYS: FEBRUARY 4	5	6	7	8	9	11	13	19	26	MARCH 3	5	7	10	12	14	19	26	MAMMALS OBSERVED NUMBER	PERCENT	AVG. MAMMALS PER DAY
MAINLAND COASTAL TRANSECT																						
	SEA LION & HARBOR SEAL	1					12	1	1		1		1					3		20	100.0	
	PORPOISE																			0	-	
	GRAY WHALE																			0	-	
	SUBTOTAL	1	0	0	0	0	12	1	1	0	1	0	1	0	0	0	0	3	0	20	100.0	1.1
OFFSHORE TRANSECTS																						
	SEA LION & HARBOR SEAL					2	1		3	1	2	1[1/]				2				12[1/]	0.5	
	PORPOISE								13	1	2,000		200			1		11	23	2,249[2/]	98.9	
	GRAY WHALE							2[2/]							2	3	6	1		14	0.6	
	SUBTOTAL	0	0	0	0	2	1	2	16	2	2,002	1	200	0	2	6	6	12	23	2,275	100.0	126.4
ISLAND COASTAL TRANSECT																						
	SEA LION & HARBOR SEAL	48[3/]	26	147	24	1	1	225	91	3	53	1		2	32	48	73	340	13	1,128[3/]	78.3	
	PORPOISE	4	300														3	6		313	21.7	
	GRAY WHALE																			0	-	
	SUBTOTAL	52	326	147	24	1	1	225	91	3	53	1	0	2	32	48	76	346	13	1,441	100.0	80.1
OFFSHORE CONTROL TRANSECT																						
	SEA LION & HARBOR SEAL									1								1		2	10.0	
	PORPOISE																		2	2	10.0	
	GRAY WHALE										3				7		5		1	16	80.0	
	SUBTOTAL	-	-	-	-	-	-	-	0	1	3	0	0	-	7	0	5	1	3	20	100.0	2.0
MAINLAND CONTROL TRANSECT																						
	SEA LION & HARBOR SEAL																	3		3	100.0	
	PORPOISE																			0	-	
	GRAY WHALE																			0	-	
	SUBTOTAL	-	-	-	-	-	-	0	0	0	0	0	0	-	0	0	0	3	0	3	100.0	0.3
TOTAL		53	326	147	24	3	14	228	108	6	2,059	2	201	2	41	54	87	365	39	3,759		209.9

1/ 1 DEAD SEA LION
2/ KILLER WHALE
3/ 1 DEAD PORPOISE

TABLE 4

BEACH SURVEYS
SUMMARY OF DEAD BIRD COUNTS, SANTA BARBARA CHANNEL AREA
FEBRUARY 5 - MARCH 28, 1969

TRANSECT / SPECIES GROUPING	DATE OF BEACH SURVEYS: FEBRUARY 5	7	8	9	11	12	14	19	20	26	27	MARCH 2	3	4	5	6	7	10	11	12	13	14	18	19	20	21	25	26	28	NO. BIRDS FOUND
ARROYO BURRO BEACH TRANSECT																														
LOON & GREBE						1	1				1		2		1			1*1		4		1		3						15*1
PELAGIC SPECIES																														0
CORMORANT & PELICAN						1									1	1				2										5
WATERFOWL						1	1																							2
WATER-ASSOCIATED																				1*1										1*1
SHOREBIRDS																														0
GULL & TERN							1											1*1												2*1
UNCLASSIFIED																														0
SUBTOTAL	0	0	0	0	-	3	3	-	0	-	1	-	2	-	2	1	-	2*2	-	7*1	-	1	-	3	-	-	-	-	-	25*3
CARPINTERIA STATE BEACH TRANSECT																														
LOON & GREBE														1																1
PELAGIC SPECIES																														0
CORMORANT & PELICAN																														0
WATERFOWL																														0
WATER-ASSOCIATED																														0
SHOREBIRDS																														0
GULL & TERN																														0
UNCLASSIFIED																														0
SUBTOTAL	-	0	0	0	0	0	-	-	0	-	0	-	-	1	0	-	0	-	0	-	0	-	-	-	-	0	0	-	-	1
RINCON BEACH TRANSECT																														
LOON & GREBE			1																		9*1									10*1
PELAGIC SPECIES																					1*1									1*1
CORMORANT & PELICAN											1*1																			1*1
WATERFOWL																														0
WATER-ASSOCIATED																														0
SHOREBIRDS																														0
GULLS & TERNS							1																							1
UNCLASSIFIED																														0
SUBTOTAL	-	0	1	0	-	0	1	-	-	-	1*1	-	-	0	-	-	0	-	0	-	10*2	-	-	-	-	0	-	-	0	13*3

* NUMBER OF DEAD BIRDS INCLUDED IN ABOVE TOTALS WHICH WERE FOUND WITH LITTLE OR NO OIL ON THEM.

TABLE 4 (CONTINUED)

TRANSECT	SPECIES GROUPING	DATE OF BEACH SURVEYS: FEBRUARY 5	7	8	9	11	12	14	19	20	26	27	MARCH 2	3	4	5	6	7	10	11	12	13	14	18	19	20	21	25	26	28	NO. BIRDS FOUND
EL CAPITAN BEACH TRANSECT																															
	LOON & GREBE						1*1		3		6*1		5		1						1			2							19*2
	PELAGIC SPECIES						1*1						1																		2*1
	CORMORANT & PELICAN								1		4		1																		6
	WATERFOWL										1		2																		3
	WATER-ASSOCIATED																														0
	SHOREBIRDS												1																		1
	GULL & TERN																														0
	UNCLASSIFIED																														0
	SUBTOTAL	0	0	0	0	-	2*2	0	4	-	11*1	-	10	-	1	0	0	-	0	-	1	-	0	2	-	0	-	0	0	-	31*3 + 2*2 SEA LIONS
TOTAL		0	0	1	0	0	5*2	4	4	0	11*1	2*1	10	2	2	2	1	0	2*2	0	8*1	10*2	1	2	3	0	0	0	0	0	70*9 + 2*2 SEA LIONS

* NUMBER OF DEAD BIRDS INCLUDED IN ABOVE TOTALS WHICH WERE FOUND WITH LITTLE OR NO OIL ON THEM.