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AERIAL SURVEYS OF PINNIPED POPULATIONS AT THE CHANNEL ISLANDS NATIONAL PARK AND NATIONAL MARINE SANCTUARY; 1983

BY

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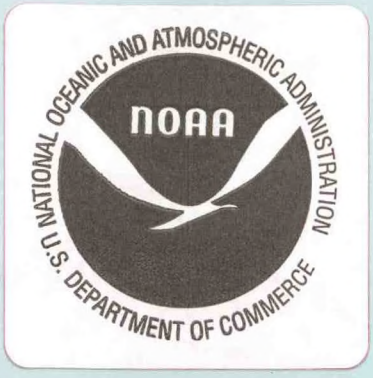

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INTRODUCTION

Six species of pinnipeds (northern elephant seal, northern fur seal, harbor seal, California sea lion, Stellar sea lion, Guadalupe fur seal) use the islands and waters of the Southern California Bight (SCB). The past histories of all six species were dramatically affected by commercial sealing (either for skins and oil or for management of commercial fisheries) in the 1800's and early 1900's and several were locally extinct in the SCB by the turn of the century (reviewed by Stewart, MS). Breeding populations of California sea lions, northern elephant seals, northern fur seals and harbor seals in the SCB have increased significantly during the past several decades (Antonelis et al. 1981, DeMaster et al. 1982, DeLong 1982, Cooper and Stewart 1983, Stewart et al. MS, Stewart and Yochem MS, Stewart MS). The Stellar sea lion population has been declining in the SCB in recent years and may now be locally extinct; sightings of Guadalupe fur seals in summer (including sexually mature fur seals) are increasing. Coincident with increases in species abundance at the Southern California Channel Islands has been recolonization of historical rookeries and expansion to areas that may not have been used in the past. Further changes in distribution will likely depend on the dynamics of interspecific interactions (among pinnipeds) and the effects of human disturbance (recreational boating, commercial and sport fishing, aircraft activity, human presence) to rookeries and hauling grounds (those presently used and those of potential use in the future).

We documented the seasonal distribution and relative abundance of pinnipeds at the islands of the Channel Islands National Park (CINP; San Miguel, Santa Rosa, Santa Cruz, Anacapa, and Santa Barbara Islands) by conducting seasonal aerial surveys (Table I). These surveys were conducted at times that are, biologically, of greatest importance in detecting long-term changes in distribution and relative abundance. The primary use of these data for northern fur seals, California sea lions, and northern elephant seals is in examining distribution of these species at each island and not in providing estimates of natality or pup production. Data on pup production, pregnancy rates, survival, etc. are more reliably obtained by other methods and we have collaborated in summarizing those methods elsewhere (DeMaster et al. 1984). Aerial surveys of harbor seals appear to be the best (and most cost-effective) method for documenting relative population size on each island and for examining long-term trends in population abundance and distribution.

Surveys were flown in either a Cessna 337 or a Brittan-Norman Islander at an altitude of approximately 170m. Oblique photographs were taken of all pinniped hauling areas and rookeries using an Olympus 35mm camera, motor drive, 75-250mm zoom lens, and Kodak Ektachrome film (200 ASA or 400 ASA). The survey team consisted of a pilot, a senior observer/photographer and a second observer who also served as data recorder.

Counts of pinnipeds were obtained by projecting processed slides on a large viewing screen and scoring each area for total number of pinnipeds present. Distribution of pinnipeds was coded by area designations similar to those of previous studies (Bonnell et al. 1980; Stewart 1981, 1982a, 1982b) and summarized by DeMaster et al. (1984). We have presented

maps indicating numerical designations and hauling areas of each species elsewhere (DeMaster et al. 1984).

RESULTS AND DISCUSSION

Harbor seal (Phoca vitulina richardsi)

Harbor seals occur at all islands in the CINP and rookeries exist at all islands except perhaps Santa Barbara Island. The largest populations occur at San Miguel and Santa Rosa Islands (Tables II and III) with numbers being generally larger at San Miguel Island. Santa Cruz Island hosts the third largest population (Table IV) followed by Anacapa (Table IV) and Santa Barbara Islands (Table V) in descending order of population size.

Seals commonly use a limited number of beaches, inshore rock ledges and offshore reefs (exposed at low tides) at each island. The greatest number of sites used occurs in April (at the end of the pupping season) and in May (when the number of seals hauled out is greatest). The areas where seals are most consistently seen throughout the year (i.e. both hauling areas and rookeries) are listed below.

San Miguel Island

- Hoffman Point
- Harbor seal coves/Harris Point
- Otter Harbor

Santa Rosa Island

- Several beaches east of Ford Point
- Area 626
- Area 615
- Several beaches west of Cluster Point

Santa Cruz Island

Several beaches between Kinton Point and Punta Arena

Several beaches between Valley Anchorage and Sandstone Point

Chinese Harbor and near Prisoners Harbor

Anacapa Island

Inshore rock ledges along the south side of West Island

Inshore rock ledges along south side of Middle Island

Offshore intertidal rocks between Middle and East Island on north side

Of seals observed in April, pups accounted for 29% of those at San Miguel Island, 19% of those at Santa Rosa Island, 15% of those at Santa Cruz Island and 6% of those at Anacapa Island. Three hundred and fifteen pups were observed in April, representing about 19% of all seals observed then. During peak annual abundance in late May, 2665 seals were counted.

Northern elephant seal (Mirounga angustirostris)

Except for one adult male observed near Black Point at Santa Cruz Island in January, elephant seals at the CINP occurred only at San Miguel and Santa Barbara Islands (Tables VI to IX).

San Miguel Island: Rookeries occur at Adams Cove, South Cove, West Cove, Northwest Cove, Landing Cove, Tyler Bight and at most accessible beaches east and west of Crook Point and at Cardwell Point. A few breeding seals use beaches on the north side of the island from Northwest Point to the middle of Simonton Cove, including Otter Harbor. A single pup was born at Harbor Seal Coves in 1983 (Stewart 1983). Including pups,

approximately 12,643 seals were counted at San Miguel Island at peak breeding season in January; 57% of the breeding population occurred on the beaches at Point Bennett. In April, most molting juveniles and adult females used beaches just east of Crook Point and at Tyler Bight, although large numbers also hauled out at South, West, and Adams coves. In late May most molting subadult males used beaches at South Cove, Adams Cove, and Tyler Bight. In July, most molting adult males occurred at West Cove and at Tyler Bight.

Santa Barbara Island: Elephant seals were seen at only three areas in January (Table VIII). In past years we have observed rookeries at other locations and have observed seals to be somewhat more abundant than in 1983. The unusually high tides and heavy surf in late January 1983 apparently washed seals off (and drowned pups) at most rookery areas. Similar effects were observed at San Nicolas and San Miguel Islands in January 1983 (Stewart 1983). Several areas at Santa Barbara Island were also used by small numbers of molting juveniles, subadult males, adult females and adult males from April through July (Tables VIII and IX).

California sea lion (Zalophus californianus)

Although California sea lions were observed at all islands but Santa Rosa Island, breeding is still apparently restricted to San Miguel and Santa Barbara Islands (Tables X through XV). Numbers of sea lions ashore at each island are greatest in early July at the height of the breeding season. Numbers decline through fall and winter and are lowest in January. Sea lions then increase in abundance through early May but decline briefly in late May just prior to the breeding season.

At San Miguel Island nearly all breeding animals occur on the beaches and rocky headlands at Point Bennett and at Castle Rock. Sea lions that haul out at Tyler Bight in summer are primarily bachelor males, subadult males, juveniles and non-parous females, although a few pups may be born there. We counted approximately 12,500 sea lions (including 4,434 pups) at San Miguel Island during the height of the breeding season in early July (Table XI).

The breeding population of California sea lions at Santa Barbara Island remains fairly small and most breeding occurs on the west and southeast coastlines (Tables XIV and XV). We counted approximately 1,169 sea lions (including 327 pups) at Santa Barbara Island in early July (Table XV). Several areas on Santa Cruz and Anacapa Islands are used throughout the year by small numbers of California sea lions but breeding apparently does not occur. We recommend that these areas (especially Gull Island at Santa Cruz Island) be examined by qualified biologists during the next several years. Historical data suggest that some of these areas were once rookeries of California sea lions. Recolonization of these areas by breeding sea lions could be reliably determined by monitoring them during the summer breeding season using boats as survey platforms.

Northern fur seal (Callorhinus ursinus)

Northern fur seals presently come ashore only at San Miguel Island and Castle Rock in the SCB. Breeding occurs at Adams Cove on Point Bennett and at the western end of Castle Rock. Few fur seals were ashore in winter and early spring but numbers increased in summer during the breeding season. Some juveniles and young pups remain ashore through October (Table XVI) and often into December (Stewart, pers. obs.). We

observed approxiately 1,159 fur seals, including 543 pups, during the breeding season on the two rookeries in July 1983 (Table XVI).

Steller sea lion (Eumetopias jubatus)

We observed one adult male Steller sea lion on Castle Rock off San Miguel Island during the July survey.

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Table 1. Dates of Aerial Surveys in 1983.

Date	Time of survey			
	San Miguel	Santa Rosa	Santa Cruz/Anacapa	Santa Barbara
31 Jan 1983	1032-1101	1000-1026	1109-1154	1234-1243
23 Apr 1983	1202-1225	1126-1252	1300-1344	1052-1059
24 May 1983	1604-1629	1532-1555	1400-1445	1719-1723
9 July 1983	0903-0933	0939-0958	1012-1048	1112-1116
14 Oct 1983	1123-1142	1115-1120, 1143-1153	1158-1242	1311-1316

Table II. Distribution of harbor seals at San Miguel Island, 1983.

Area	Date: 31 Jan 83 Time: 1032-1101 Total Seals	Pups	Date: 23 Apr 83 Time: 1202-1225 Total Seals	Pups	Date: 24 May 83 Time: 1604-1629 Total Seals	Pups	Date: 9 July 73 Time: 0903-0933 Total Seals	Pups	Date: 14 Oct 83 Time: 1123-1142 Total Seals	Pups
San Miguel Island										
102										
111										
112										
113										
114										
115										
116										
117										
118					6					
119										
120										
122	22		61	14	232	25	130		119	
123			25		15				5	
130	101		131	34	306	38	185		29	
141										
142	29		45	14	117	13	58		25	
144					64	9			28	
145	5		51	23						
146			58	18	39	7	100		32	
147			53	19	137	16	12			
150			13	3	88	11	1			
161			22	9						
160										
171										
172			3	1						
173										
Total	157	0	462	135	1004	119	486		238	

Table III. Distribution of harbor seals at Santa Rsa Island, 1983.

Area	Date: 31 Jan 83 Time: 1000-1026 Total Seals	Pups	Date: 23 Apr 83 Time: 1226-1252 Total Seals	Pups	Date: 24 May 83 Time: 1532-1555 Total Seals	Pups	Date: 9 July 83 Time: 0939-0958 Total Seals	Pups	Date: 14 Oct 83 Time: 1115-1120, 1143-1153 Total Seals	Pups
Santa Rosa Island										
610										
611			44							
612			105	5						
613									20	
614	1									
615			74	17	251	28	17		8	
616									10	
617			35	4	73	1				
618			21		19				6	
619			32	4						
621	8		189	48	143	6	66	3	6	
622									50	
624			58	12	47	6			9	
625			77	25	36	7	10		4	
626	1		28	9	300	20	170			
629					41					
Total	10		663	124	910	68	263	3	113	

Table IV. Distribution of harbor seals at Anacapa and Santa Cruz Islands, 1983.

Area	Date: 31 Jan 83 Time: 1124-1133, Anacapa, 1109-1124 1136-1154/ Santa Cruz		Date: 23 Apr 83 Time: 1300-1344		Date: 24 May 83 Time: 1400-1445		Date: 9 July 83 Time: 1012-1048		Date: 14 Oct 83 Time: 1158-1242	
	Total Seals	Pups	Total Seals	Pups	Total Seals	Pups	Total Seals	Pups	Total Seals	Pups
Anacapa Island										
660			43	5	127	10	19		61	
670	13		53	3	25	1	20	1	22	
680	43		64	1	11		16	1	16	
Total	56		163	9	163	11	55	2	99	
Santa Cruz Island										
641										
643			33	8	48	3				
645			18	3	19	2	19		10	
646			14		61	6				
647	1		26		98	8			12	
648			21	2						
649			35	4	33	2				
653	46		115	15	230	19	24	2	29	
654					8	1				
656	5		35	12	91	11	10	1	27	
568	4		8	3					26	
Total	56		305	47	588	52	53	3	104	

Table V. Distribution of harbor seals at Santa Barbara Island, 1983.

Area	Date: 31 Jan 83 Time: 1234-1243 Total Seals	Pups	Date: 23 Apr 83 Time: 1052-1059 Total Seals	Pups	Date: 24 May 83 Time: 1719-1723 Total Seals	Pups	Date: 9 July 83 Time: 1112-1116 Total Seals	Pups	Date: 14 Oct 83 Time: 1311-1316 Total Seals	Pups
Santa Barbara Island										
301										
302									4	
303										
394										
305			4							
306										
307										
308										
309										
310										
311							2			
312										
313										
314										
315										
317										
318										
322										
323										
324										
325			16							
Total	0		20		0		2		4	

Table VI. Distribution of northern elephant seals at San Miguel Island, surveys I-III, 1983.

Area	Date: 31 Jan 83 Time: 1032-1101 Adult Females	Pups	Males	Subadult Males and Juveniles	Date: 25 Apr 83 Time: 1020-1225 Subadult Males	Pups	Males	Subadult Males and Juveniles	Date: 24 May 83 Time: 1604-1629 Pups	Males	Subadult Males Juveniles and Adult Females
San Miguel Island											
102											
111	1685	1530	451	29				760			150
112											
113	965	890	191					1110			
114											900
115								350			225
116	627	515	139	43				1136			60
117								110			1020
118	56	85	16	18				217			
119											689
120	44	24	4	3				24			16
122	34	26	1					333			
123	3	7	4	4				113			
130		1	1					23			
141			1								
142											
144								2			
145	76	58	38	2							
146	521	525	45	35				2192			2
147	827	772	172	40							467
150	1157	808	236	15				2417			1706
161											
160				3							
171											60
172	6	9	1					41			32
173											
Total	6001	5250	1300	192		0	0	8828			5327

Table VII. Distribution of northern elephant seals at San Miguel Island, surveys IV-V, 1983.

Area	Date: 9 July 83 Time: 0903-0933 Adult Females	Pups	Adult and Subadult Males	Juveniles	Date: 14 Oct 83 Time: 1123-1142 Adult Females	Pups	Adult Males	Adult Females, Yearlings, and Juveniles
San Miguel Island								
102								
111			57					
112								
113			406					77
114								190
115								
116			440					280
117								
118								125
119								
120								
122			68					61
123								30
130								4
141								
142								
144								
145								
146			21					180
147			19					90
150			420					353
161			29					185
160								
171								
172			3					
173								29
Total			1463					1604

Table VIII. Distribution of northern elephant seals at Santa Barbara Island, surveys I-III, 1983.

Area	Date: 31 Jan 83 Time: 1234-1243				Date: 23 Apr 83 Time: 1052-1059				Date: 23 Apr 83 Time: 1052-1059		
	Adult Females	Pups	Adult Males	Subadult Males and Juveniles	Subadult Males	Pups	Adult Males	Adult Females and Juveniles	Pups	Adult Males	Subadult Males, Adult Females and Juveniles
Santa Barbara Island											
302											
303	9	12	2					27			25
304	3		1					24			
305								114			40
306											
307											
308											
309											
310	88	9	3					15			23
311								38			73
312								28			23
313											
314											16
315											
316											
317								73			15
318											
322								19			20
323											
324											
325											
Total	100	21	6	0	0	0	0	334	0	0	235

Table IX. Distribution of northern elephant seals at Santa Barbara Island surveys IV-V, 1983.

Area	Date: 9 July 83 Time: 1112-1116 Adult Females	Pups	Adult Males	Subadult Males and Juveniles	Date: 14 Oct 83 Time: 1311-1316 Adult Females	Pups	Adult Males	Juveniles Yearlings, and Adult Females
Santa Barbara Island								
301								
302								
303								45
304								
305								
306								
307								
308								
309				2				
310				22				
311								
312								
313								
314								
315								
316								
317								66
318								
322								43
323								
324								
325	0	0	0	24	0	0	0	154
Total								

Table X. Distribution of California sea lions at San Miguel Island, surveys I-III, 1983.

Area	Date: 31 Jan 83 Time: 1032-1101				Date: 23 Apr 83 Time: 1202-1225				Date: 24 May 83 Time: 1604-1629			
	Adult Males	Subadult Males	Others	Pups	Adult Males	Subadult Males	Others	Pups	Adult Males	Subadult Males	Others	Pups
San Miguel Island												
											214	
102						12	365		4		1285	
111			430		4	25	945				85	
112		1	118			3	215		6		1195	
113		8	1095		3	16	2660				118	
114							300				260	
115		11	386		5	4	685				328	
116	3	8	535		6	6	765		3		246	
117	1	13	1645		3	6	495				301	
118	2	1	116		3	4	336				72	
119	2	3	536							2		
120												
122												
123												
130												
141												
142												
144												
145												
146												
147												
150			120			5	430				180	
161		1	13				115					
160	1	2	148				85				30	
171												
172												
173			28									
							1					
Total	9	48	5170	0			20					
					24	81	7417	0	13	2	4314	0

Table XI. Distribution of California sea lions at San Miguel Island, surveys IV-V, 1983.

Area	Date: 9 July 83 Time: 0903-0933 Adult Males	Subadult Males	Others	Pups	Date: 14 Oct 83 Time: 1123-1142 Adult Males	Subadult Males	Others	Pups
San Miguel Island								
102	5		290	165			165	93
111	20	8	1552	1015			908	696
112								
113	43	12	1735	1310			1069	658
114								
115	9	6	428	260			115	63
116	31	12	1295	930			1011	716
117	15	8	616	401			431	212
118	5	6	490	268			310	165
119	4	4	150	79			100	83
120	2	9						
122	7	18	55					
123								
130								
141								
142								
144								
145								
146								
147								
150	85	20	969	6		2	95	80
161	2		55				180	138
160			40					
171								
172	2		25					
173			36					
Total	230	103	7736	4434	0	2	4384	2906

Table XII. Distribution of California sea lions at Anacapa and Santa Cruz Islands, surveys I-III, 1983.

Area	Date: 31 Jan 83 Time: 1124-1133/anacapa; 1109-1124, 1136-1154/Santa Cruz				Date: 23 Apr 83 Time: 1300-1344				Date: 24 May 83 Time: 1440-1445			
	Adult Males	Subadult Males	Others	Pups	Adult Males	Subadult Males	Others	Pups	Adult Males	Subadult Males	Others	Pups
Anacapa Island												
660												
670												
680	2	16	145	0	1	2	219			4	380	
Total	2	16	145	0	1	2	219	0	0	4	380	0
Santa Cruz Island												
641						1	18			3	82	
643												
645												
646												
647												
648	3	16									199	
649												
653												
654												
656												
658												
Total	3	16	165	0	0	1	18	0	0	3	281	0

Table XIII. Distribution of California sea lions at Anacapa and Santa Cruz Islands, surveys IV-V,

Area	Date: 9 July 83 Time: 1012-1048 Adult Males	Subadult Males	Others	Pups	Date: 14 Oct 83 Time: 1158-1242 Adult Males	Subadult Males	Others	Pups
Anacapa Island								
Island								
660								
670								
680	4		524		71	69	251	
Total	4		524	0	71	69	251	0
Santa Cruz Island								
641							30	
643								
645								
646								
647								
648			16				28	0
649								
653								
654								
656								
658								
655(Gull 1)	4		242					
Total	4		258	0			38	

Table XIV. Distribution of California sea lions at Santa Barbara Island, surveys I-III, 1983.

Area	Date: 31 Jan 83 Time: 1234-1243				Date: 23 Apr 83 Time: 1052-1059				Date: 24 May 83 Time: 1719-1723			
	Adult Males	Subadult Males	Others	Pups	Adult Males	Subadult Males	Others	Pups	Adult Males	Subadult Males	Others	Pups
Santa Barbara Island												
303												
302							18					
304												
305					1	4	88			3	110	
306												
307						3	20				30	
308											35	
309												
310			15								55	
311					1	5	51					
312											20	
313												
314			4							3	26	
315		2	122									
316	1	1	15		1	2	74				50	
317	3	3	299		2	1	64				110	
318												
322						3	210				264	
323						5	158					
324												
325					1	16	99					
Total	4	6	455	0	6	39	782	0	0	6	700	0

Table XV. Distribution of California sea lions at Santa Barbara Island, surveys IV-V, 1983.

Area	Date: 9 July 83 Time: 1112-1116 Adult Males	Subadult Males	Others	Pups	Date: 14 Oct 83 Time: 1311-1316 Adult Males	Subadult Males	Others	Pups
Santa Barbara Island								
301	1		45	12			62	29
302	1		18			1	47	31
303	7		123	63			88	62
304								
305								
306								
307								
308			8					
309			27					
310								
311								
312								
313								
314								
315								
316	3		199	69			111	58
317	1		55	20			140	74
318			5					
322	8		333	163			128	98
323			18					
324								
325								
Total	21		831	327		1	576	352

Table XVI. Distribution of northern fur seals at San Miguel Island, 1983.

Area	Date: 31 Jan 83 Time: 1032-1101			Date: 23 Apr 83 Time: 1202-1225			Date: 24 May 83 Time: 1604-1629			Date: 9 July 83 Time: 0903-0933			Date: 14 Oct Time: 1123-112		
	Adult Males	Others	Pups	Adult Males	Others	Pups	Adult Males	Others	Pups	Adult Males	Others	Pups	Adult Males	Others	Pups
San Miguel Island															
102					22		1	30	1	4	210	173		18	101
111		1								7	395	370		24	218
112															
113															
114															
115															
116															
117															
118															
119															
120															
122															
123															
130															
141															
142															
144															
145															
146															
147															
150															
161															
160															
171															
172															
173															
Total		1			22		1	30	1	11	605	543		42	319