

**MONITORING OF NORTHERN ELEPHANT SEALS
ON THE POINT REYES PENINSULA, CALIFORNIA,**

1989

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**Final report to the U. S. Dept. of Interior, Point Reyes
National Seashore submitted July 1989. For permission to
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INTRODUCTION

Northern elephant seals (*Mirounga angustirostris*) were harvested for oil in the late 19th century and Bartholomew and Hubbs (1960) speculated that there were fewer than 100 animals by the early 20th century. Since that time, elephant seals have made a remarkable recovery and the total population estimate for the U. S. in 1986 was 50,800 animals including 14,400 pups (Boveng 1988). The apparent growth rate between 1980 and 1986 was estimated to be about 8.75 percent annually (Boveng 1988). Associated with this rapid increase has been the colonization of many areas along the California coast, both on offshore islands and the mainland.

Scammon (1874) reported elephant seals as far north as the Point Reyes Peninsula before exploitation; however, there is no evidence to indicate that a breeding colony existed there. Whether northern elephant seals historically bred on the mainland rather than islands is not known. Le Boeuf and Panken (1977) speculated that mainland breeding was uncommon because of predation by grizzly bears and man. The first pup born on the mainland in this century was at Ano Nuevo Point in 1975. Since then other mainland pupping areas have been established at Cape San Martin (Monterey County), Point Saint George (Del Norte County), and Point Reyes (Marin County) (Bonnell et al. 1983,

Stewart and Yochem 1986, Allen et al. 1989). With the establishment of mainland colonies, researchers have speculated that the present abundance of elephant seals may actually be greater than prehistoric times (Boveng 1988).

Colonization in Point Reyes exemplifies the continued range expansion of northern elephant seals. The first pup was found on the Point Reyes Peninsula in 1976 and a colony was first noted in 1981 at Point Reyes Headland. Since then, the average annual rate of growth in pup counts has been about 67% (Allen et al. 1989).

This report provides a summary of the 1988-89 breeding season at Point Reyes Headland (PRH). The objectives of this study were 1) to provide baseline information on reproductive success and colony growth rate, 2) to document the expansion of the colony into other areas, and 3) to identify potential conflicts with park visitors. The results of this project may be applied to the development of a management plan for northern elephant seals in the Point Reyes National Seashore.

STUDY AREA AND METHODS

The Point Reyes Peninsula is in central California and extends from Bolinas Bay (37°55'N) north to Tomales Point (38°15'N). The coastline consists of sheer rocky cliffs, small

pocket beaches, and long, dune-backed sandy beaches. Elephant seals have been sighted in several areas here, including Point Reyes, Limantour, and Drakes Beaches. The greatest number, though, occurs within a series of inaccessible pocket beaches at Point Reyes Headland (PRH) (Figure 1).

Seals were counted weekly at PRH between December 23, 1988, and March 15, 1989, weather permitting. Several additional counts were conducted during the molt from late March through June. Seals were classified by sex and age class and categories included bull, subadult male, female, pup, weaned pup, and immature. Seals were counted at low to medium tides from cliffs 100 m above a series of pocket beaches using a 40x spotting scope. Direct counts may have underestimated true numbers present because I was unable to detect seals lying immediately next to the base of the cliffs. The maximum number of breeding animals present each year was derived from the maximum number of animals of each age and sex class recorded throughout the season. For example, not all females that gave birth during a season were present at the same time; however, a direct count of pups provided an estimate of the number of females.

I estimated the reproductive success of the PRH colony in 1989 as the proportion of pups surviving to the age of weaning divided by the number of pups born. A regression of the natural

logarithm of the pup count with year of the count yielded the average rate of growth in total pup count from 1981 to 1989.

For the first time, personnel from the Point Reyes Bird Observatory, in cooperation with the Point Reyes National Seashore, flipper-tagged weaned elephant seal pups in March, 1989, at the end of the breeding season. We used plastic Jumbo Roto tags manufactured by Dalton supplies and placed them in the webbing of the rear flippers. The color code for PRH elephant seals has been designated as pink by the National Marine Fisheries Service, as is the code for the Farallon Islands. We doubled tagged seals (one tag in each rear flipper) because tag loss may approach 40% in male seals (Le Boeuf and Reiter 1988). From resighting of tagged seals, we will be able to determine exchange between haul-out sites, and over the long term, provide estimates of survivorship and reproductive success (Le Boeuf and Reiter 1988).

To document the expansion of the colony into other areas in Point Reyes, I regularly surveyed Point Reyes and Drakes Beaches for elephant seals.

RESULTS AND DISCUSSION

Point Reyes Headland (PRH) continued to be the only location on the Point Reyes Peninsula in 1988 where seals congregated in

large numbers and where females gave birth. In addition, two subadult male seals were observed regularly during the breeding season at the south end of Point Reyes Beach.

The colony at PRH increased by 32% during the breeding season of 1988-89 from the previous year (Tables 1 and 2). The increase was primarily composed of female/pup pairs since the number of males remained about the same as that noted in 1988. Females and pups again accounted for 86% of the total estimated number for the breeding season (Table 2).

The first pup was observed during the first week of January at PRH and by February 17, all pups had been born. A maximum of 45 pups was counted and this represented a 32% increase from the previous year pup count. The average annual rate of growth for the Point Reyes colony between 1981 and 1988 was 67% (slope = 0.513, s.e. = 0.07, $p < 0.001$, $r^2 = 0.89$). This increase is larger than the average annual rate of growth of 13.7% for total California pup counts between 1965 and 1986 (Boveng 1988) and than the mean annual rate of 22.4% that Le Boeuf and Reiter (1988) observed at Ano Nuevo between 1964 and 1985. Of the total 45 pups, we flipper-tagged 41 (91% of the total) weaned pups over a two day period (31 on March 3 and 10 on March 7) at the end of the 1989 breeding season.

No dead pups or starvelings were recorded during the 1989 breeding season, and on March 7, 42 weaned pups were counted.

The survival rate to weaning is estimated to be 100% for the 1989 breeding season. This figure may be inflated, though, because of census interval; daily censuses were not conducted, and therefore, some dead pups may have washed away with high tides. The continued low mortality rate, however, is similar to that noted at other colonies (Boveng 1988). Pup mortality at San Miguel Island, California, in 1985 and 1986 was estimated to be 5%. The high survival rate at Point Reyes may be attributed to another mild winter and the absence of crowding on the haul-out area. Both factors have been implicated in the higher pup mortality at established colonies (Le Boeuf 1971, Huber et al. 1986).

During the molt season in 1989, I counted a maximum of 121 seals on May 2 at PRH, an increase of 102% from the previous year. The herd was composed of immatures and females during April and May and subadults males and bulls in July. One seal was documented at Drakes Beach near the Drakes Beach parking lot for a day during the molting season where it encountered the attention of numerous park visitors.

During the breeding and molt seasons, there were a total of 55 sightings of seals with flipper tags, ten with dye marks, and two with freeze brands (from Ano Nuevo). Four immature seals had orange tags indicating they were tagged by the California Marine Mammal Center. The rest had tags from Ano Nuevo (46%), the

Farallones (22%), Santa Rosa Island (13%), and San Miguel Island (11%). Most tagged animals were sighted during the molt period and were immature. All but one of the dye-marked animals were subadult males and the two freeze-branded seals were immatures.

The annual increase in the number of seals at PRH between 1984 and 1987 was modest in comparison to that noted at South Farallon Islands and Ano Nuevo when those colonies were initially growing (Cooper and Stewart 1983, Huber et al. 1986, Le Boeuf and Panken 1977). The slow rate of growth at PRH for those years may be attributed to the after-effects of the 1982-83 El Nino/Southern Oscillation (ENSO), which had a documented effect on other pinniped populations in California (Bayer 1985, Boveng 1988, Heath and Francis 1984, Huber et al. 1986). The large increase in the number of pups produced in 1988 and again in 1989 at PRH compared to previous years suggests that the after-effects of ENSO have diminished. Consequently, one can expect a renewed and continued rapid increase in this colony with the potential for expansion onto nearby beaches. If the colony continues to grow at 41% per year (as was the estimated rate of pup production at Ano Nuevo between 1962 and 1968) then by 1995 almost 380 pups may be expected at Point Reyes (Cooper and Stewart 1983). Only two interactions with park visitors were documented in 1988 and few will likely occur until seals become established at more accessible beaches.

ACKNOWLEDGMENTS

The Point Reyes National Seashore, Point Reyes Bird Observatory, and D. Miller provided support for this project. Tagging of animals was covered under PRBO permit number 423 of the National Marine Fisheries Service, Office of Protected Species. PRBO Farallon Island biologists supplied information on marked seals from the South Farallon Islands resighted at Point Reyes Headland. I am particularly indebted to B. Sydeman from PRBO for providing flipper tags and advice. In addition, R. Bryant, G. Fellers, C. Poulsen, and A. Rovetta assisted in the field. Finally, I am grateful to G. Fellers for advice and review of this manuscript.

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Table 1. Northern elephant seals at Point Reyes, California, during the 1988-89 breeding and molt seasons.

DATE	TOTAL	MALE	FEMALE	PUP	WEANED	OTHER
<u>1988</u>						
12-23	5	4				1
12-30	7	4	2			1
<u>1989</u>						
1-1	14	8	5			1
1-6	29	11	13	3		2
1-12	39	8	21	9		1
1-17	65	9	31	23		2
1-20	67	6	34	25		2
1-27	82	8	39	35		
2-3	84	8	39	37	(1)	
2-10	78	9	26	43	(19)	
2-17	70	8	17	44	(27)	1
2-24	62	8	11	43	(32)	
3-3	58	8	5	45	(41)	
3-7	56	8	3	45	(42)	
3-24	36				30	6
3-30	52				31	21
4-14	76		2		17	57
4-21	98				13	85
5-2	121		36			85
5-19	89		17			72
7-7	19	17				1

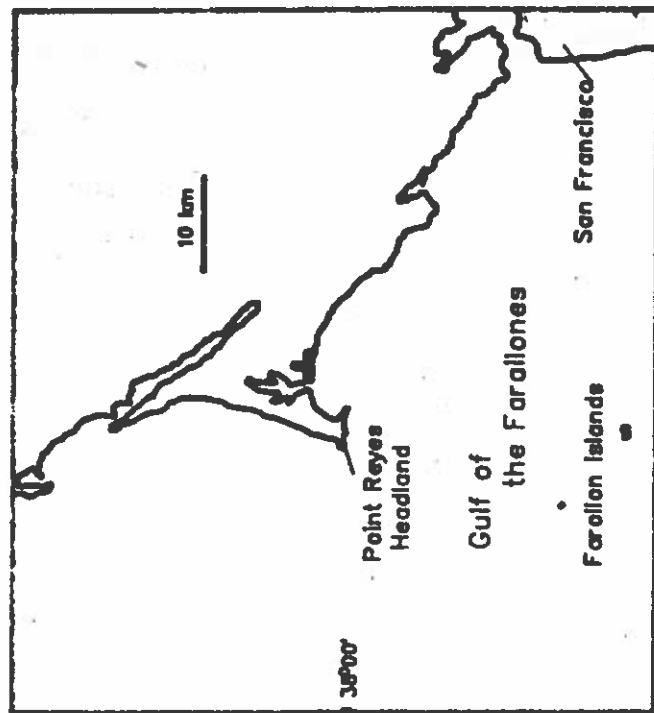
Table 2. Estimates of age and sex classes of northern elephant seals present during the breeding season at Point Reyes, 1981-1988.

YEAR	BULLS		SA MALES		FEMALES		PUPS		TOTAL	
	#	%*	#	%	#	%	#	%	#	%**
1981			3	50	2	33	1	17	6	
1982			3	50	2	33	1	17	6	0
1983	1	9	-	-	8	72	2	18	11	46
1984	1	3	5	17	12	40	12	40	30	173
1985	1	3	5	13	17	42	17	42	40	33
1986	1	2	6	13	19	42	19	42	45	13
1987	2	3	12	21	22	38	22	38	58	29
1988	3	4	8	14	34	43	34	43	79	36
1989	4	4	10	10	45	43	45	43	104	32

* Percent representation to the total estimate for each year.

** Percent increase from previous year.

Figure 1. Location of haul-out sites of northern elephant seals at Point Reyes Headland, 1988-89.



Point Reyes Beach

Haul-out site

Drakes Beach

Point Reyes Headland

Haul-out site

Haul-out site

Colony

Point Reyes Elephant Seals

