

POPULATION STUDIES OF SEA OTTERS IN CALIFORNIA

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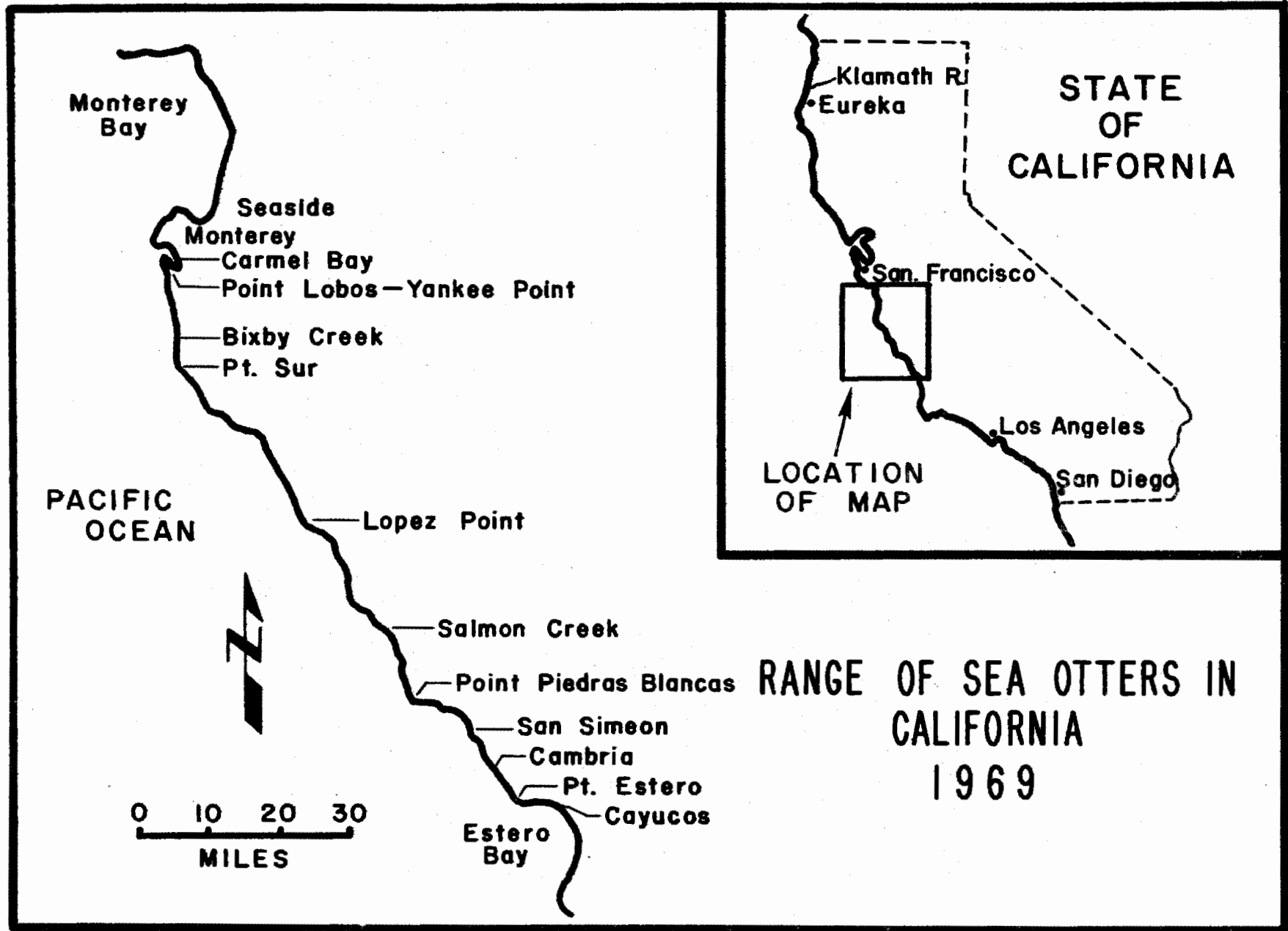
Abstract: An intensified study of the California population of sea otters, *Enhydra lutris*, utilizing aerial and shoreline surveys has indicated a population in excess of 1,000 sea otters between Seaside, Monterey County, and Point Estero, San Luis Obispo County. An analysis of past and present data indicates that the population can be divided into two groups; the northern part extending from Seaside to Point Sur, Monterey County, and the southern extending from Point Sur to Point Estero. The southern group is still expanding into new range whereas all suitable habitat in the northern portion of the range has been inhabited by sea otters. An analysis of the patterns of population growth suggest that the central California population may be nearing a maximal size.

INTRODUCTION

The re-establishment of a large population of sea otters in central California has brought about the need for the California Department of Fish and Game to gather information necessary for the proper management and conservation of sea otters and associated marine species in California. We gratefully acknowledge the efforts of warden-pilots Leo Singer and Bib Powers of the California Department of Fish and Game, Mr. Judson Vandevere and the late Richard S. Peterson of the University of California at Santa Cruz, and the Friends of the Sea Otter for their part in this research.

Prior to their exploitation by fur hunters, sea otters were distributed along the entire Pacific coast of North America north of central Baja, California. Harvesting of sea otters along the California coast was initiated in 1784 by the Spanish who were soon followed by Russian, Mexican, and American fur hunters. By 1817 sea otters were reported scarce in the Russian Sector (north)

FIGURE - 1



of the Golden Gate) and after 1840, otters were scarce in all but the edges of their range in southern California and Baja, California (Ogden, 1941).

By 1900, the sea otter was generally thought to be extinct along the California coast. However, numerous accounts attest to the existence of sea otters along the central and southern California coasts in the early 1900's (Bryant, 1915; Farnsworth, 1917; Oyer, 1917; Ogden, 1941). The present population is most probably descended from a remnant group of sea otters seen near Point Sur, Monterey County, California in 1914 (Bryant, op. cit.).

The "re-discovery" of sea otters in California by the scientific community occurred in 1938 when Bolin (1938) reported a group near Bixby Creek, four miles north of Point Sur. Initial reports gave the herd size as 100 to 150 otters (Fisher, 1939), although Boolootian (1958) estimates the population may have been as high as 300 at that time.

Sea otters have steadily increased in range and numbers and the present range extends from Seaside, on southern Monterey Bay, south to Point Estero, a distance of nearly 140 miles (Figure 1). In the northern portion of the range nearly every kelp bed is occupied by otters, while in the Point Estero area, the sea otter range is still expanding southward.

Sea otters have been sighted great distances north and south of these points; occasional reports from as far away as the Klamath River, north of Eureka, and San Diego continue to accumulate. We feel that the individuals or small groups seen in these outlying places are wanderers because we have no evidence of established populations beyond the limits mentioned above.

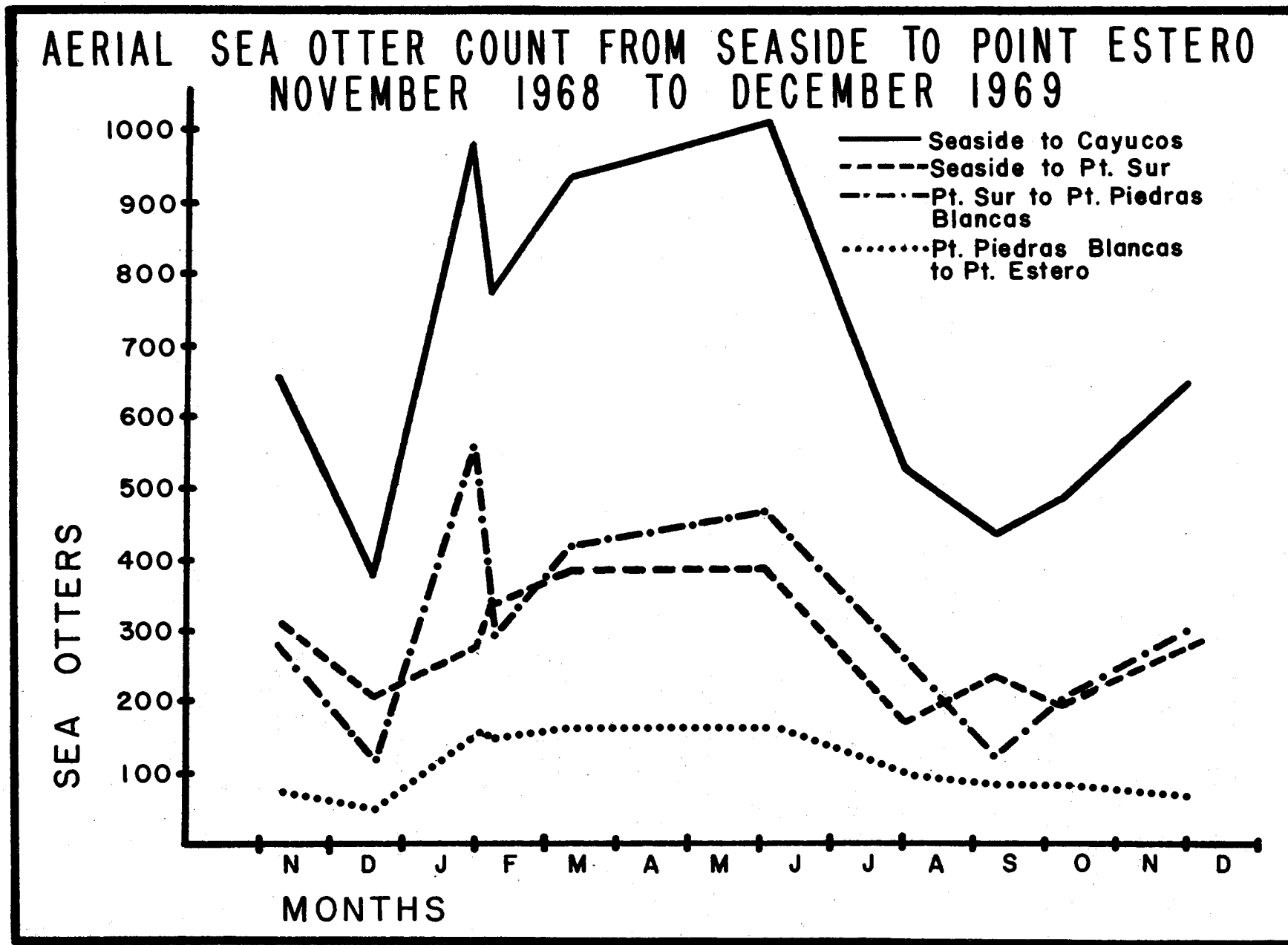
A census by helicopter in 1957 revealed a total count of 635 otters between Carmel Bay and San Simeon (Boolootian, 1961). Aerial surveys by the California Department of Fish and Game between 1964 and 1967 placed the population at less than 600 (Carlisle, 1966), and it was generally assumed that the population had stabilized; many feared it was decreasing.

A new series of censuses was begun by the Department of Fish and Game in August, 1968. A twin engine Cessna Super Skymaster was used during most of these flights.

Flights were scheduled on a monthly basis whenever possible. Personnel included a pilot and generally two Department biologists. Censusing usually began between 0800 and 0900 off Seaside and proceeded southward.

A flight pattern was developed in which from one to four passes were made over a given section of coast depending upon the configuration of the shoreline and extent of existing kelp beds. Altitudes flown ranged from 150 to 250 feet.

FIGURE - 2



Color and infra-red photography have not proved useful. Thus, we depend upon direct counts.

From August 1968 to December 1969, 13 aerial censuses were conducted, 10 of which were complete. Counts ranged from 377 to 1,014; the three highest were 983, 931, and 1,014 during January, March and June, 1969 (Figure 2).

Aerial censusing errors may be attributed to a number of adverse factors. Light conditions, heavy winds and accompanying ocean surface disturbances, low fog, the presence of extensive bull kelp beds, Nereocystis luetkeana, and observer fatigue may affect a count considerably.

Counts from the shore were made in several areas to aid in evaluating the validity of the aerial counts.

Several shore counts were made simultaneously with the aerial counts by volunteers from the Friends of the Sea Otter in the Monterey-Carmel area. The census areas were small enough to be adequately covered in a short time from shore. During five surveys the shore counts averaged 97 percent of the aerial counts and ranged from 89 to 141 percent.

Nine shore surveys were conducted by researchers from the University of California at Santa Cruz concurrent with our aerial surveys in the Lopez Point area. Their shore counts averaged 159 percent of the aerial counts and ranged from 82 to 235 percent.

Shore surveys conducted by the Department of Fish and Game south of San Simeon averaged 129 percent of the aerial counts for five counts and ranged from 63 to 168 percent.

The high correlation between aerial and surface counts in the Monterey-Carmel area and the lower correlations to the south are due to several factors.

In the Monterey-Carmel area the shore counts were simultaneous with aerial counts and the census areas were small, hence a high degree of correlation. However, in the Lopez Point area, the census area was large and the ground crew would spend a full day censusing an area the plane covered in 30 minutes. Therefore, a shift of animals in or out of the area during a census would alter the results. In the Cambria area the shore counts were not made on the same day as the aerial counts, and aerial counts were made late in the day when otters are most active and hard to count.

When aerial census fluctuations for the entire population are compared with fluctuations of aerial counts by area, we find the same general patterns and are unable to separate population changes from census errors (Figure 2).

Apparently, factors that are affecting the aerial counts have a similar effect on counts from the shore. It does appear, however, that the aerial counts are low, but we are not certain of the magnitude of the difference. Kenyon and Spencer (1960) feel that counts made from the sea or air in Alaska need be corrected by a factor of 1.6-1.7, but this may not necessarily apply in California.

Sea otters are usually found feeding in water less than 60 feet deep and there are approximately 50 square miles of marine habitat within the 60 foot depth contour from Seaside to Point Estero.

By plotting the distribution of the population density within the 60 foot contour, it appears that the population can be subdivided into two major groups (Figure 3).

The northern group extends about 46 miles, from Seaside in southern Monterey Bay to the vicinity of Point Sur. The highest concentrations of this group occur near Monterey and Point Lobos State reserve and lowest concentrations are immediately south of Point Sur where otters have been present for at least 50 years. A count made in 1957 (Booolootian, 1961) also revealed a low count in the same area.

The principal whelping area for the northern group is in the Carmel and Point Lobos area.

Otters are now occupying the entire northern range and expansion to the north is temporarily halted by the open, kelp-free expanse of Monterey Bay. This is creating a "bottling-up" of animals in the northern periphery. Occasional otters are venturing across Monterey Bay and as population pressures increase, we expect more animals to emigrate.

The southern group extends about 90 miles, from the vicinity of Point Sur to Point Estero. This southern part of the population is analogous in structure to the northern group wherein the main breeding component is located in the central portion of the range and a large group of non-breeding animals occurs at the periphery. Although density centers fluctuate within the southern group, large aggregations of animals are generally found in the vicinity of Salmon Creek. Females with pups are seldom seen south of San Simeon.

Sea Otters are newly established south of Point Piedras Blancas and have not yet fully inhabited their new range. It is here that the otters are in conflict with the abalone fishery. The southernmost group of sea otters is found near Point Estero and is comprised mainly of males. Of 26 otters captured by us during 1969, near Point Estero, 25 were male. Dead otters found on the beach also indicate a scarcity of females.

AVERAGE DISTRIBUTION OF SEA OTTERS FROM SEASIDE TO POINT ESTERO JANUARY, MARCH, AND JUNE 1969

SEA OTTERS PER SQUARE MILE OF HABITAT

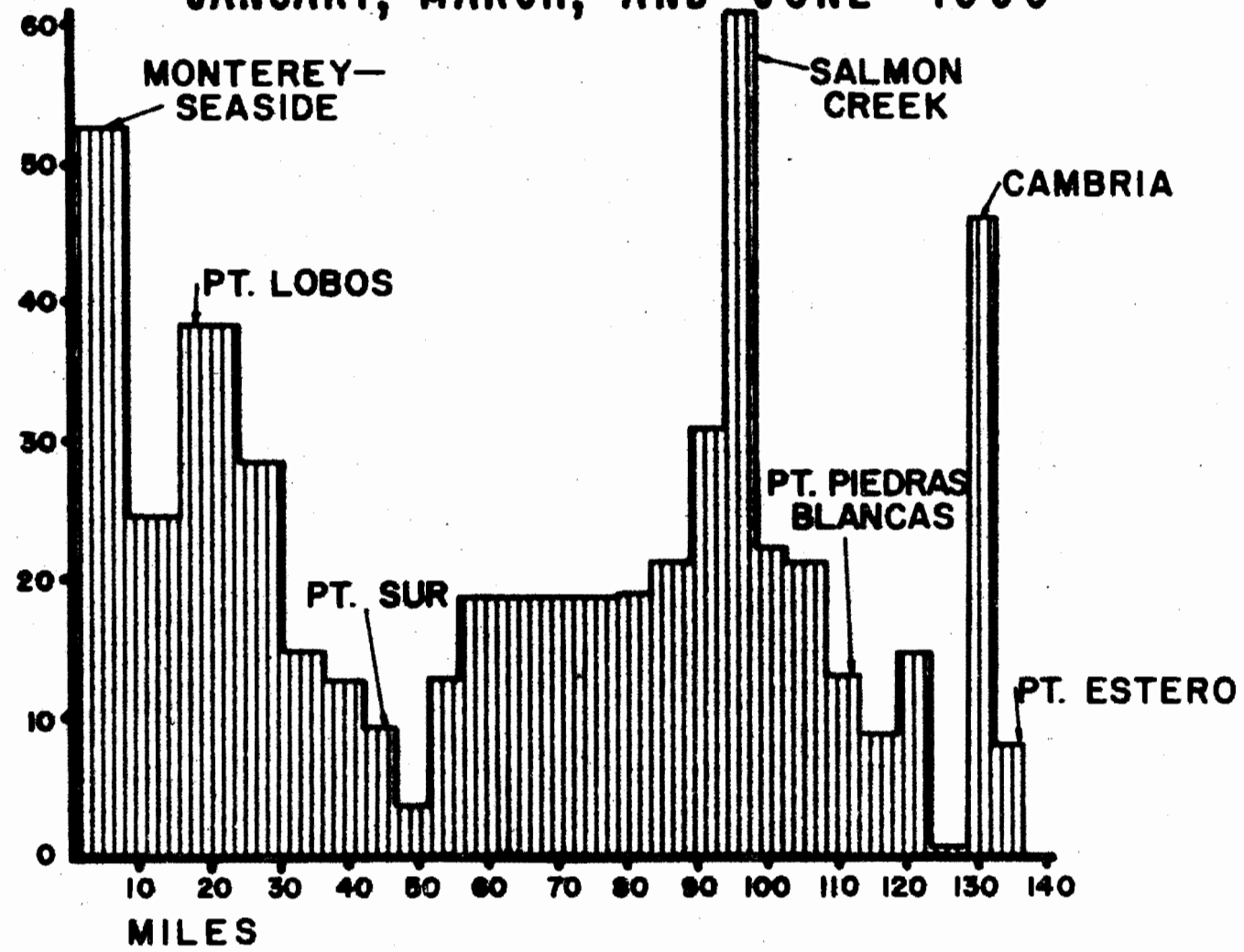


FIGURE-3

The expansion to the south is continuing and, if left unhindered, sea otters can be expected to soon expand their range to Cayucos. The sandy, kelp-free expanse south of Cayucos may temporarily halt the southern expansion of sea otter range.

Our highest counts in 1969, discounting censusing errors, indicate an apparent population increase of nearly 60 percent since 1957. This increase in counts has been greatest at the extremes of the range.

The count of sea otters north of Yankee Point dropped from 1957 to 1966, but by 1969 the average count of otters in this area was more than twice the 1966 figures.

The decrease from 1957 to 1966 is unexplained and may reflect censusing errors or a shift of animals out of the area. However, we feel the twofold increase from 1966 to 1969 is significant for these counts are an average of 18 censuses made throughout 1966 and 1969 using similar methods and personnel.

The doubling of population cannot be attributed solely to recruitment from within the northern group, but must be partially due to the northward movement of otters from areas to the south.

A comparison of Boolootian's 1957 data with recent data indicates that the number of otters between Point Sur and Point Piedras Blancas has increased proportionally less than the overall population increase. This indicates a leveling off of the population growth within this area which in turn may indicate that the central portion of the range is at or near capacity with surplus animals moving toward the peripheries of the range. Karl Kenyon, in a statement made during a conference on the sea otter-abalone controversy (Moss Landing Marine Laboratory, November 24, 1969, p. 17), stated that the California coastal population has probably distributed itself so that it is more or less in balance with its food resources and the extra increment of 5 percent per year extends itself.

The movement of animals to the periphery of the range creates a situation in which the peripheral populations increase at an inordinate rate and will reach capacity sooner. The rate of increase in the northern portion of the range must soon start to level off for it is doubtful if the environment north of Yankee Point can support a re-doubling of the population.

Census data indicate that the overall population density from Seaside to Point Estero is in excess of 20 otters per square mile of habitat, as is the density in the central portion between Point Sur and Point Piedras Blancas. Assuming otters have distributed themselves in balance with their food resources in the central portion of their range, the density of 20 otters per square mile may represent a natural and favorable balance between sea otters and their environment for these areas.

The average density of otters north of Yankee Point during nine censuses in 1969 was over 30 otters per square mile of habitat and exceeded 40 otters per square mile during one census. The estimated density of otters on Amchitka Island, where otters are being harvested to relieve a serious overcrowding situation, is estimated at 40 otters per square mile (Sea Otter-Abalone Controversy Conference, Moss Landing Marine Laboratory, November 24, 1969, p. 81).

The present population of sea otters between Seaside and Cayucos is in excess of 1,000 animals and may be inhibited from expanding freely outside of its present range. Although we have not determined the ultimate capacity of the range, our data indicate that the population between Seaside and Cayucos may be approaching maximal size, as was speculated in 1969 (Peterson and Odemar, 1969).

Klumov (1968), in describing sea otter populations in the Kurile Islands, Russia, states that a large colony of sea otters, particularly one which is increasing in numbers, may exhaust the regional supplies of food, with a resultant starvation of the colony.

To protect the California population from degradation due to overcrowding, we will continue to study the population and be prepared to enter a management program before serious damage occurs.

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