Distribution and abundance of sea otters (Enhydra lutris L.) in the area surrounding Bajo Point, Nootka Island, British Columbia August 1986.

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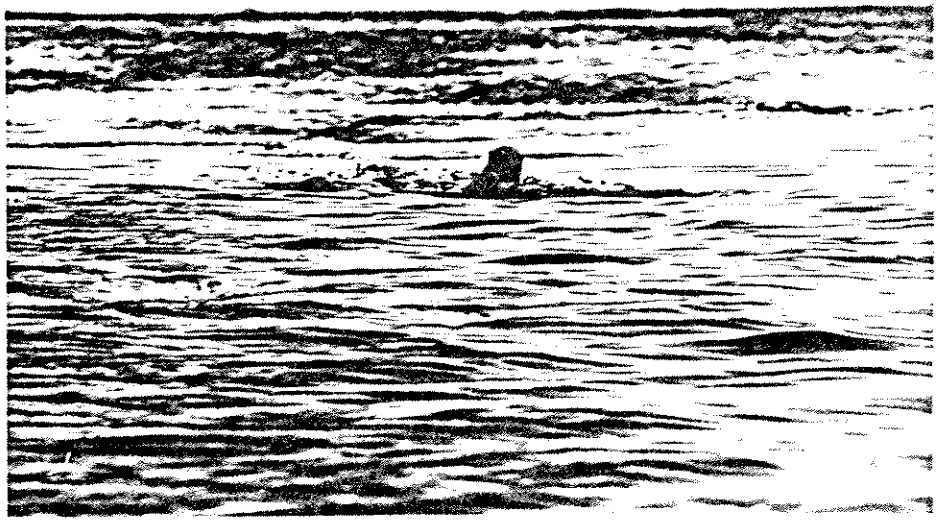
Abstract

Sea otter (Enhydra lutris, L.) abundance and distribution were assessed at Bajo Point, B.C. and the surrounding area from August 14-17, 1986. A combination of land-based, boat and plane censuses were employed and the strengths and limitations of each are discussed. Approximately 70 sea otters were seen in the area extending from Beano Creek to Calvin Creek and offshore to Bajo reef. Otters were more abundant on the inshore reefs in the evening than during the day. In intertidal observations, typical sea otter prey (such as abalone, goeducks and sea urchins) were found and excavations into the soft substrate were seen. These excavations were thought to be dug by otters foraging for bivalves. To more precisely assess abundance, distribution and behaviour patterns of the sea otter, we suggest a long term study that incorporates both aerial and land-based censusing techniques.



Introduction

Early in the 18th century the sea otter (Enhydra lutris, L.) inhabited the coastal regions of the northern Pacific Ocean (Figure 1A). The total population was estimated at 150,000 animals and the range extended from northern Japan to the Aleutian Islands to Baja California (Kenyon, 1969). Exploitation of the otters began in the late 18th century with the discovery of the value of the sea otter pelt by European explorers. By 1911 sea otters had been exploited to near extinction throughout their range (MacAskie, 1985). Sea otters were protected by a treaty signed by the United States, England, Japan and Russia in 1911 (Palmer, 1972). Populations throughout most of the range began to recover from over-exploitation; however, by 1929 otters were considered extinct in British Columbia (MacAskie, 1985).

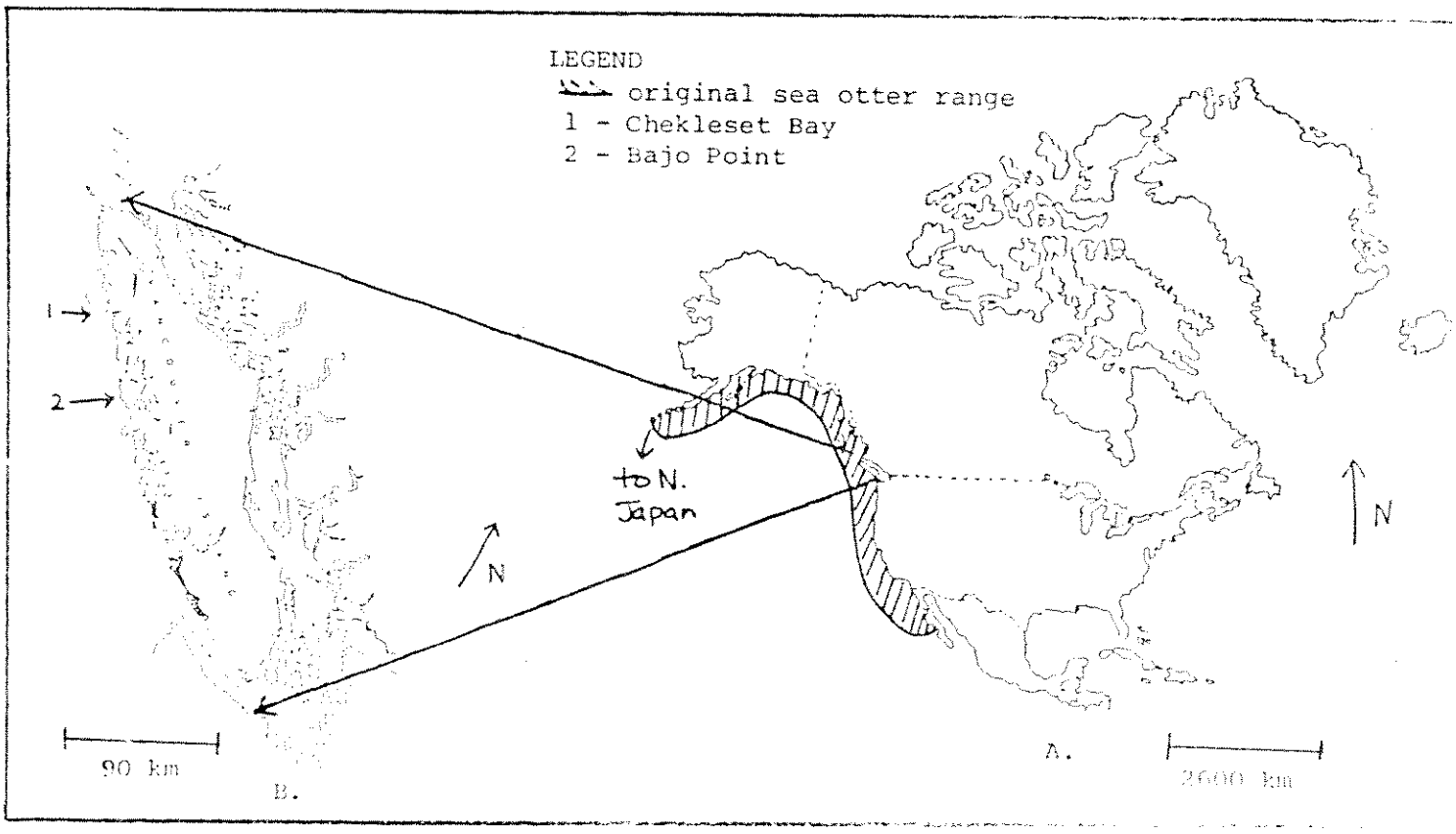


Figure 1. Historical distribution (A) and present distribution of sea otters on Vancouver Island (B).

In 1969, 29 sea otters were captured from Amchitka Island, Alaska for transport to Chekleset Bay on the northwest coast of Vancouver Island, British Columbia. Of the 29 animals captured all survived to be released but were unhealthy (Bigg, 1978). There were no confirmed sightings of sea otters in the Chekleset Bay area in 1970, so another transplant occurred.

In the 1970 transplant 14 of the 40 otters captured in Prince William Sound, Alaska survived to be transplanted (MacAskie, 1971). In 1972, 47 individuals were captured from the same location in Alaska and 46 of these animals survived to be released.(Bigg, 1978). In total 89 animals were successfully transplanted from Prince William Sound and Amchitka Island to Chekleset Bay (Figure 1B).

After a five year period the population was censused by boat and/or plane in 1977, 1978 and 1984 (MacAskie, 1985). In 1977 an aerial survey estimated 55 animals in Chekleset Bay. A small population of 15 individuals was also observed 75 km south of Chekleset Bay at Bajo Reef off Nootka Island. A boat survey in 1978 revealed minimal change in population size (51 in Chekleset Bay, 16 in Bajo Reef). By 1984 a boat and plane survey revealed that the Chekleset Bay population had increased over three-fold to 196 individuals. From an aerial survey the Bajo Reef population was estimated at 149 individuals - more than seven times the previous population (MacAskie, 1985).

The purpose of this project was to do a recent examination of the abundance and distribution of the Bajo Point population using land, boat and aerial survey techniques. Incidental observations of behaviour and feeding substrate were also noted.

Methods and Materials

Sea otter abundance and distribution were studied from August 14th to August 17th at Bajo Point, British Columbia. Bajo Point (48°36'N,127°50'W) is located on Nootka Island on the northwest coast of Vancouver Island. Censuses of this sea otter population were conducted from land, ocean and air. Observations of sea otter abundance and distribution were made using binoculars.

The two methods of censusing from land, included counts made from a fixed point (Bajo Point) and counts made while walking along the shore (Figure 2). The daily period was divided into four hour intervals beginning at 0600h until 2200h for the Bajo Point census. Censuses were taken during ten of these intervals over the four day study period. The Bajo Point land-based censuses were conducted in two ways. The first method involved scanning the area for three minutes. The other technique was to divide the area into three equal parts, taking a census of each part for three minutes. The mean value was determined. On August 15th between 0900h and 1200h a census was taken while walking the shore south of Calvin Creek to 0.5 km northwest of Beano Creek. During this census the offshore area was scanned for presence of sea otters.

Two types of boat-based censuses were conducted on August 16th from a four metre inflatable boat. The moving census occurred between 0800h and 1100h and followed the path illustrated in Figure 3. A census was taken between 1920h and 2030h while anchored to a kelp bed southeast of Bajo Point (Figure 4). During both censuses the entire area around the boat was scanned for otters.

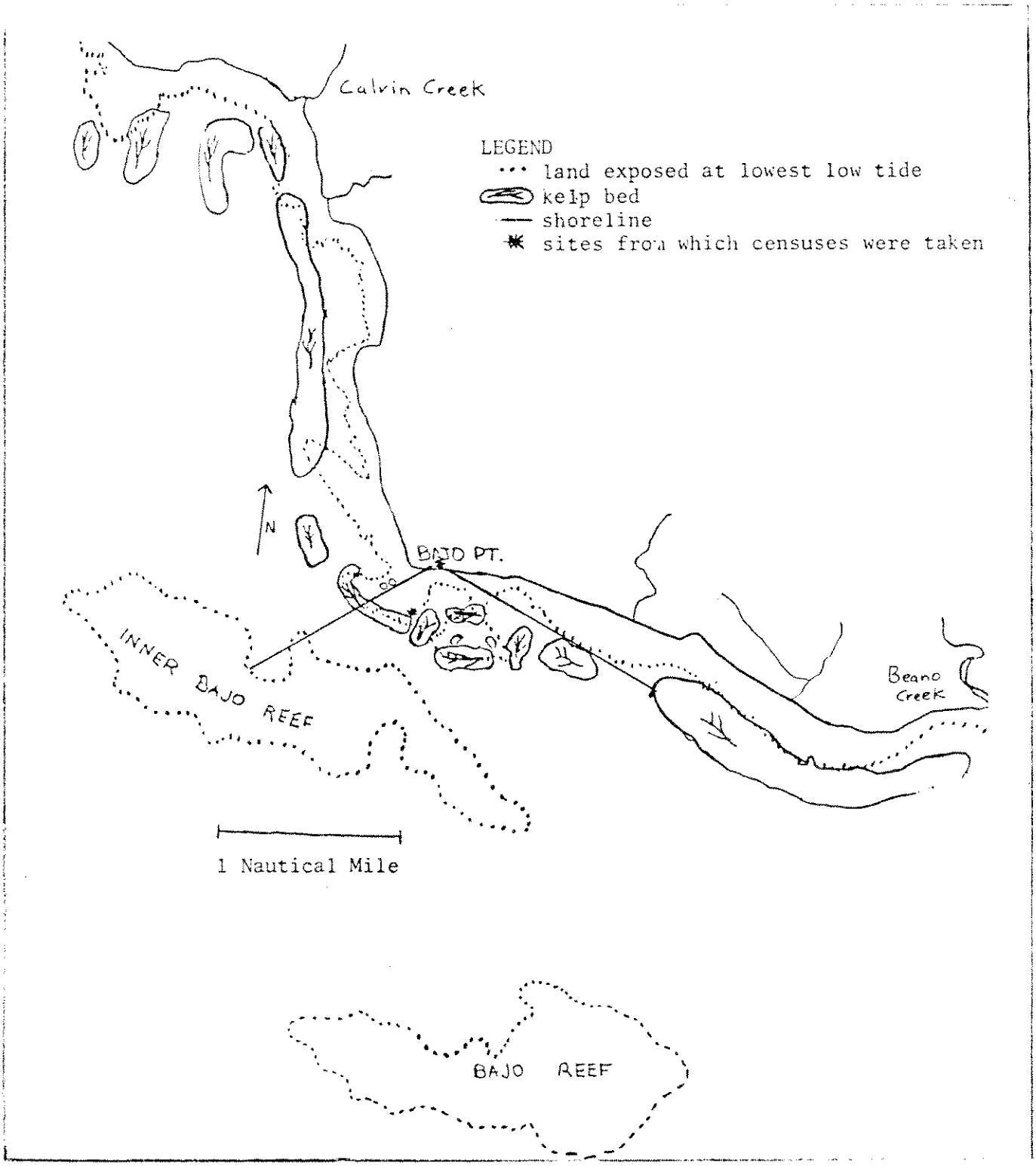


Figure 2. Area surveyed during stationary shore census at Bajo Point, August 14-17, 1986.

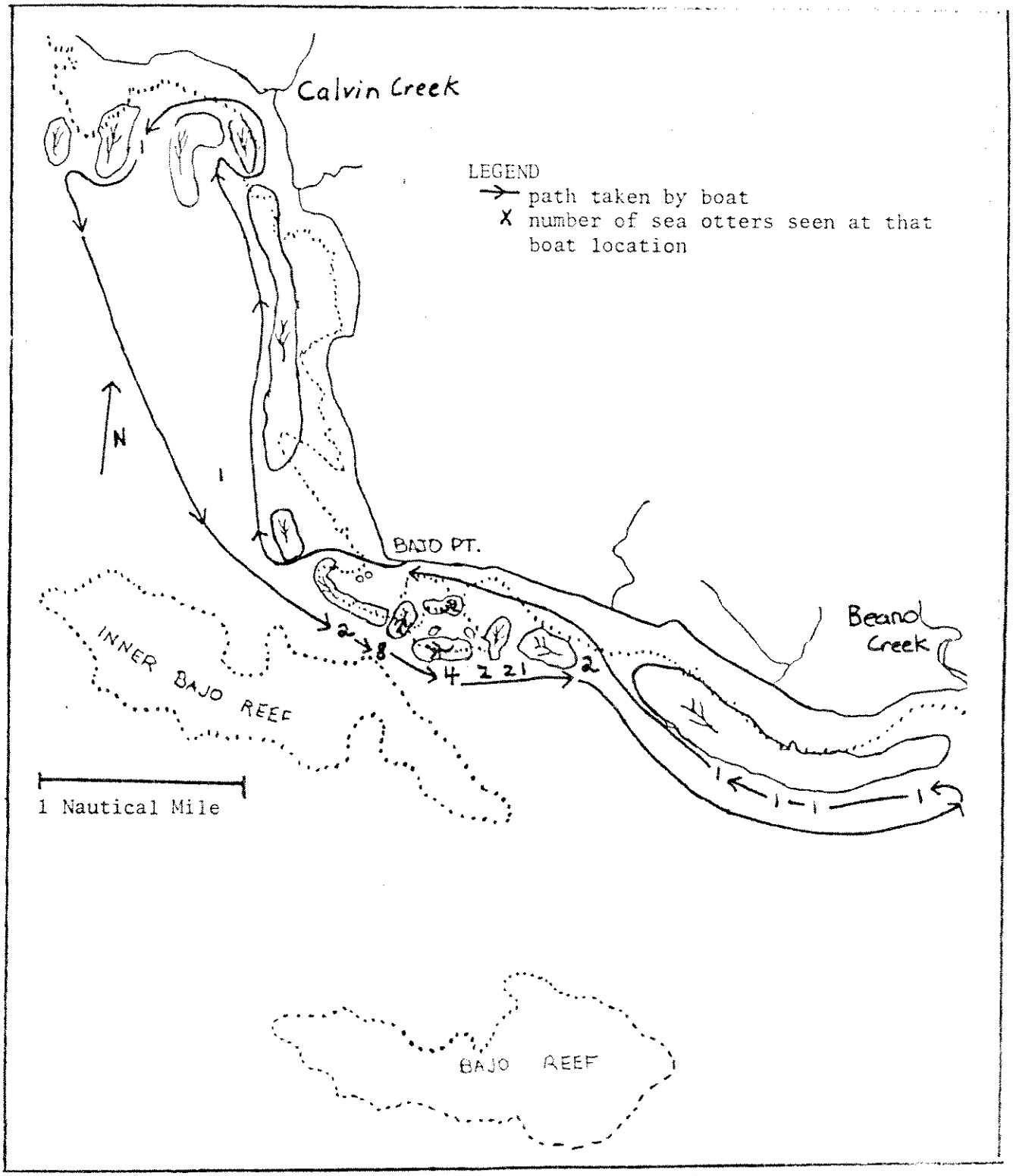


Figure 3. Abundance of sea otters as determined by census taken from a moving boat near Bajo Point, August 16, 1986.

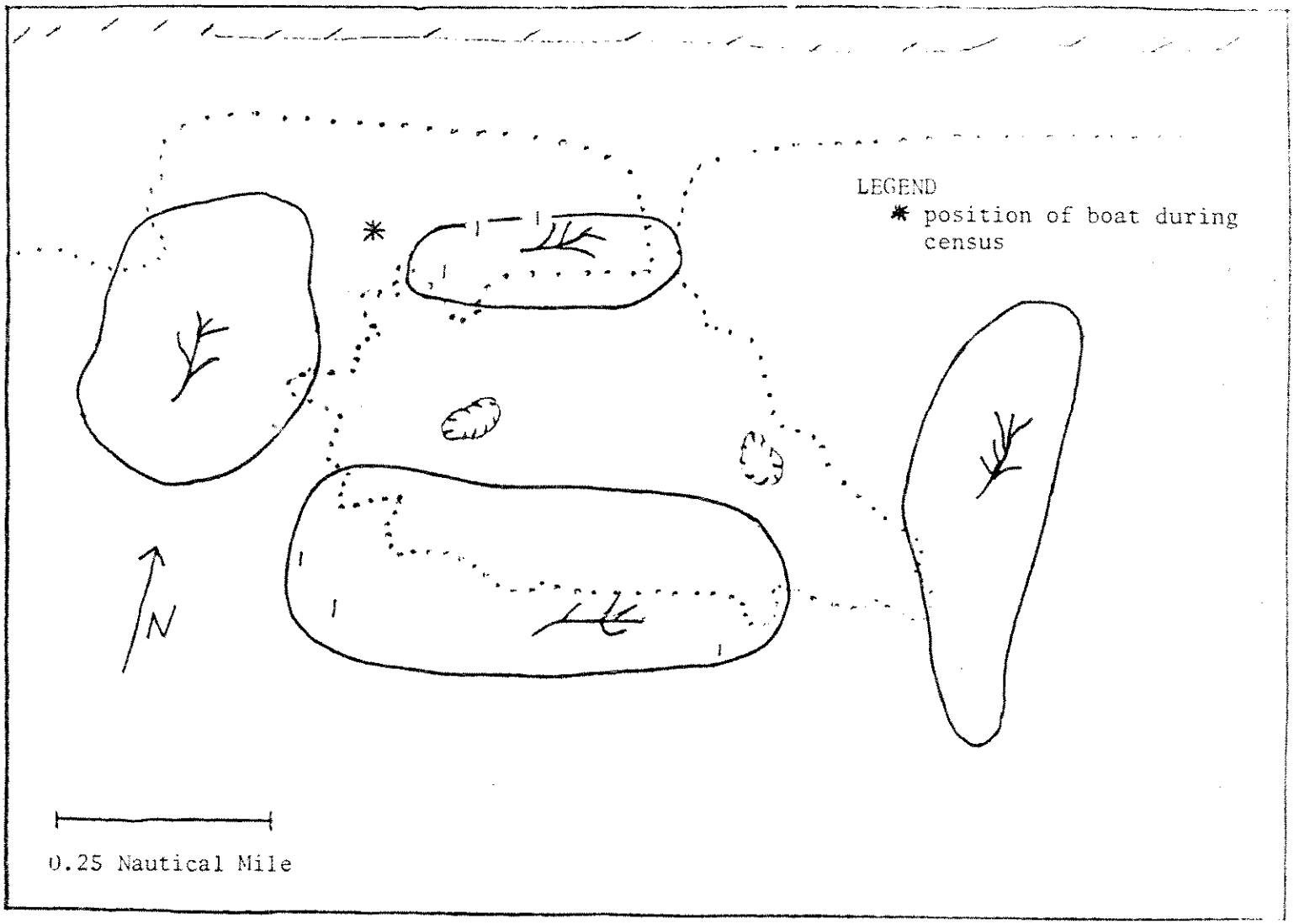


Figure 4. Abundance and distribution of sea otters seen during a stationary boat census off Bajo Point, August 16, 1986.

An aerial census was conducted on August 17th from a small floatplane at an altitude of 100 m. The plane circled the inner Bajo Reef twice and flew over Bajo Reef. This census took approximately ten minutes.

The intertidal zone exposed during the low morning tides on August 15th and 17th were observed. This area was examined for signs of otter feeding (such as holes chipped in bivalve and abalone shells and broken sea urchin tests). The invertebrate and algal fauna of the area were recorded.

The weather and tidal conditions during the land and boat-based censuses were noted.

Results

Sea otters were concentrated in and around kelp beds (Nereocystis, Macrocystis). Conservative estimates of sea otter numbers were reported due to difficulty in tracking individuals.

Land-based censuses were conducted from Bajo Point (Figure 2). The largest number of otters were seen between 1800h and 2200h on August 14th and 15th. The low numbers of sea otters seen during this period on the 16th may have been due to disturbance by censusing techniques. No diurnal trends were observed for the other time periods (Table 1). At approximately 2100h on August 15th an additional observation of the area was made and 20 otters were seen.

Table 1. Mean number of sea otters observed during stationary shore censuses on Nootka Island, British Columbia 1986.

Daily Period (hrs)	Date			
	August 14	August 15	August 16	August 17
0600 - 1000	-	0	0	4.0*
1000 - 1400	-	3.0*	-	3.0
1400 - 1800	-	1.0	2.3	-
1800 - 2200	5.5	14.0	1.3	-

* Values were observed from Point Reef.

On August 15th a total of 11 otters were observed between Calvin Creek and a point 0.5 km northwest of Beano Creek during a land-based walking census (Figure 5).

The total number of otters estimated from the shore censuses was 14.

During the moving boat census sea otters were observed in small groups of two to eight individuals around the Bajo Point area and were found singularily in other portions of the range. Fourteen otters were seen and their distribution noted (Figure 3). When the boat was anchored, two otters were observed in the kelp beds off Bajo Point (Figure 4). Otters dispersed when approached closely by the boat.

During the aerial survey, 45 otters were seen in the inner reef kelp beds and 12 otters were seen on the outer reef (Figure 6). The inner reef population was rafted tightly together.

The intertidal was examined for signs of otter use at low tide on August 15th and 17th. Depressions in soft substrate with a diameter of approximately 20 cm and a depth of approximately 12 cm were seen in the low intertidal region. Sediment was deposited along a portion of the periphery of each hole (Figure 7). Approximately 30 holes were scattered over a soft substrate intertidal area (100 m^2) (Figure 8). A list of the invertebrates and macroalgae examined is located in Appendix 1. Sea urchin tests, geoducks, butter clams, sea stars, abalone and mussels were seen in the intertidal.

Weather conditions over the four days are summarized in Table 2.

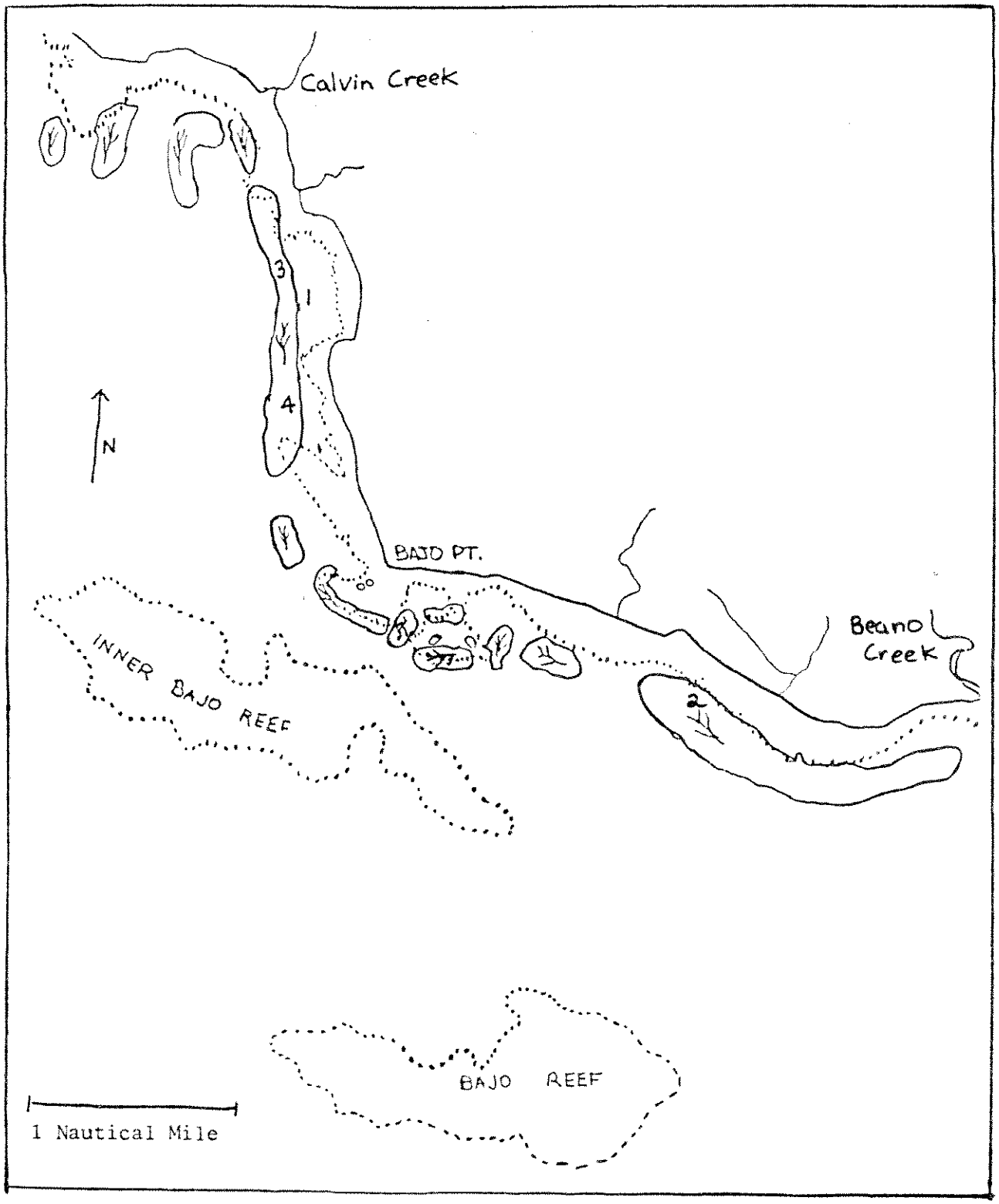


Figure 5. Abundance and distribution of sea otters seen during walking census near Bajo Point, August 15, 1986.

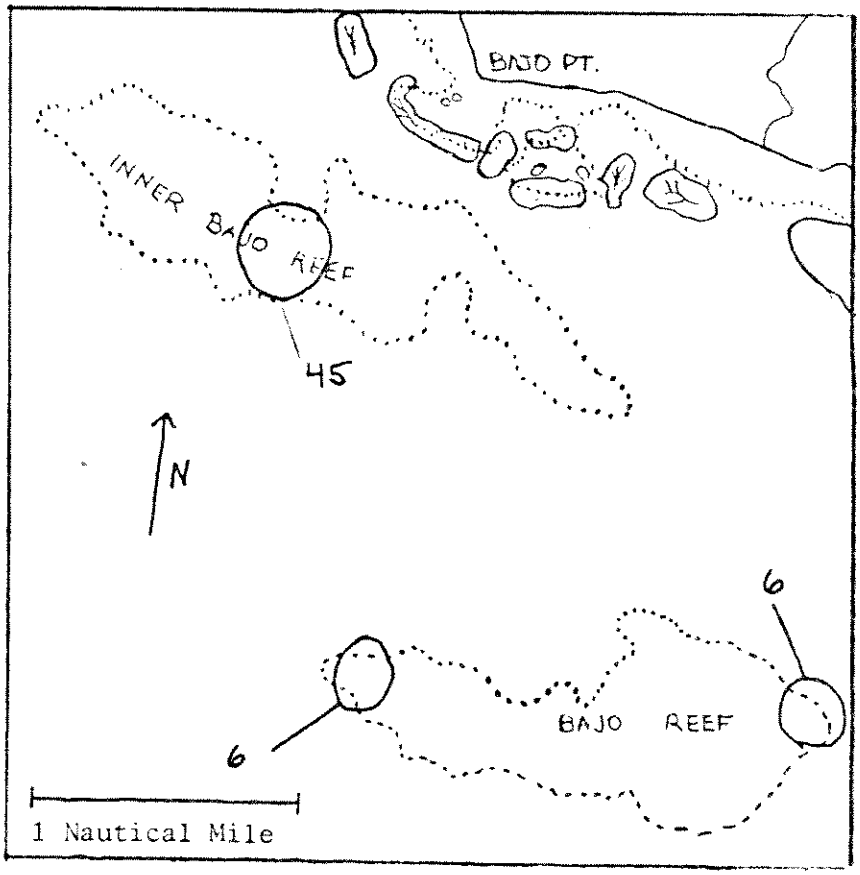


Figure 6. Abundance and distribution of sea otters seen during the aerial census in the area of Bajo Point, August 17, 1986.

Figure 7. Hole found in low intertidal region, Bajo Point, August 17, 1986.

Figure 8. Area surrounding hole shown in Fig. 7.

Table 2. Weather and water conditions at Bajo Point, British Columbia, August 1986.

Day	Wind	Water Conditions	Highest high tide time	Highest high tide height	Lowest low tide time	Lowest low tide height
August 14	NW (30-35 knots)	turbulent	2000	10.8	0210	2.7
August 15	NW (30-35 knots)	turbulent	2115	11.0	0330	2.2
August 16	W (5 knots)	moderate	2225	11.4	0435	1.7
August 17	W (5 knots)	moderate	2330	11.8	0535	1.1

Discussion

Approximately 70 otters were seen in the Bajo Point area from Calvin Creek to Beano Creek and seaward to Bajo Reef (Figure 9). The greatest abundance of otters was seen duing the aerial survey while the extent of the distribution along the coast was determined mainly from land-based and boat surveys.

Possible diurnal trends in otter abundance on an inshore reef were observed during the land-based censuses at Bajo Point. Sea otters tended to be more abundant in the inshore kelp beds off Bajo Point in the evening census (1800h-2200h). Otters rest at night (Kenyon, 1969) and it is possible that the inshore kelp beds afford shelter while resting. During the daylight hours the otters move from these beds, possibly to feed on the outer reefs. Inshore abundance also may have been affected by strong northwesterly winds and rough seas on the 15th and 16th forcing the otters into more protected areas. Any conclusions are speculative due to small sample size.

The small numbers of sea otters reported may have been an artifact of high winds during the walking shore census. The bright sunlight on the water made it difficult to see the otters, due to the glare. The numbers possibly reflect the diurnal trend observed from the Bajo Point census, in that otters may feed away from the inshore kelp beds.

The coastal distribution of sea otters around the Bajo Point area was determined from censuses taken while walking the shoreline and from a boat that followed the shoreline. The seaward distribution of otters was observed during an aerial survey on the Bajo reefs. The range of the population observed is similar to that reported in the 1984 survey (MacAskie, 1985).

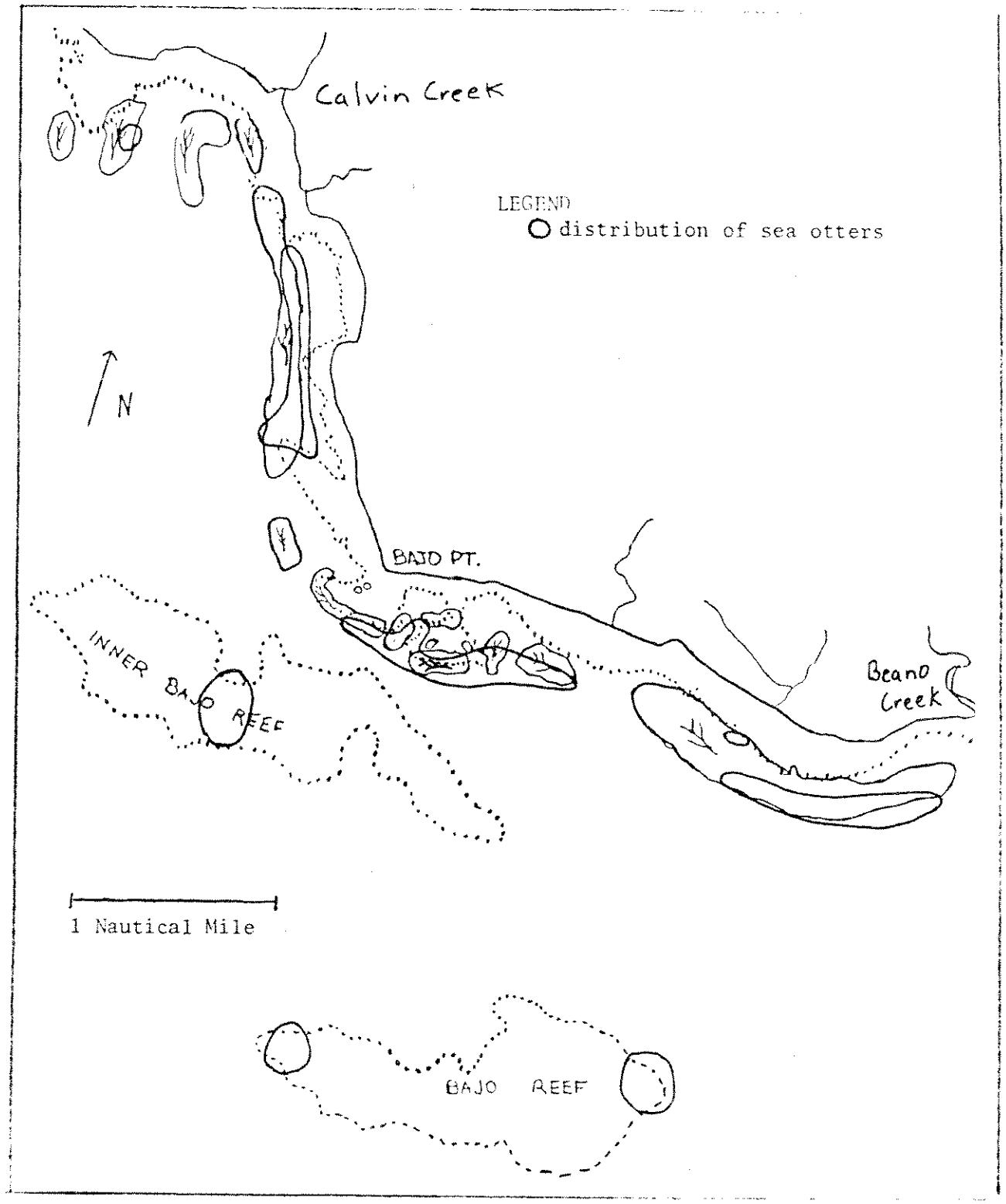


Figure 9. Distribution of sea otters at Bajo Point and surrounding area August 14-17, 1986.

The Bajo reef sea otter population was estimated at 149 individuals in the 1984 aerial census (MacAskie, 1985). Approximately 70 otters were counted in the present census. This is a conservative estimate in which the overlap between onshore and boat censuses was accounted for. While it is possible that the number of individuals in the population has declined since 1984, it is more likely that all of the otters in the population were not counted.

During the aerial survey only a brief scan of the areas of expected highest concentration was done. A more extensive census of the entire range determined by the land and boat censuses may have yielded more sightings. It is also possible that plane activity (landing and taking off) at Bajo Point may have caused the otters to disperse and therefore be less visible from the air.

The Bajo Point area is sheltered by offshore reefs and kelp beds and is rich in invertebrate life. These properties are important in the establishment of sea otters in an area (Kenyon, 1969; MacAskie, 1985). Typical otter prey species were found and excavations in the intertidal soft substrate were seen. These excavations are thought to be dug by otters foraging for bivalves (Calkins, 1978). It is therefore probable that a population is established in the area.

The strengths and limitations of each census method are outlined in Table 3. Stationary shore censuses are valuable in permitting more detailed behavioural observations with minimal disturbance to the animals. This method is limited in the distribution and abundance information obtainable. The main strengths of the census done while walking on the beach were the independence of weather conditions, as well as minimizing disturbance that may affect the animals. However, this method is time consuming and population estimates are difficult to infer on abundance data obtained.

Table 3. Relative strengths (+) and limitations (-) of census methods used at Bajo Point August 14-17, 1986.

	Land-base		Boat		Air
	fixed	walking	anchored	moving	
Distribution	-	+	-	+	+
Abundance	-	-	-	+	+
Amount of time required	na*	-	na*	+	+
Dependence on weather	+	+	-	-	-
Behavior	+	-	+	-	-
Disturbance	+	+	-	-	+

* not applicable

Observations made from an anchored boat have the potential to be valuable in obtaining behavioural data; however, engine noise may disturb the animals. Boat censuses of the coast were more time-efficient than walking censuses, but again the animals may have been affected by boat presence.

Aerial surveys have the potential to be the most efficient method of determining abundance and distribution. The main limit to this technique is the difficulty in obtaining detailed behavioural data. We suggest a combination of stationary shore surveys and aerial surveys be conducted to gain the optimum behavioural, abundance and distribution data.

In conclusion, the distribution and abundance of the Bajo reef

population was found to be similar to those previously reported (MacAskie, 1985). A more accurate estimate of these factors could be gained by a combination of both aerial and land based censuses. Due to the coastal distribution of a portion of the population, detailed behavioural observations are possible from a land-based camp. In the future, extensive behavioural observations in this area may provide support for the diurnal trends in movement and feeding strategies alluded to in this report.

Acknowledgements

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Appendix 1. Invertebrates and macroalgae seen off Bajo Point on August 15 and August 16, 1986.

Ulva

Fucus spiralis, *Fucus distichus*

Halosaccion glandiforme

Phyllospadix

Zostera

Leathesia difformis

Porphyra

Gigartina

Postelsia

Enteromorpha

Macrocystis

Nereocystis

Cladophora

Panopea generosa

Mytilus edulis

Saxidomus giganteus

Polinices lewisii

Pisaster

Olivella biplicata

Searlesia dira

Calliostoma ligatum

Anthopleura xanthogrammica

Protothaca staminea

hermit crabs

tube worms

barnacles (*Balanus*)

limpets (*Collisella*, *Notoacmea*)

Patiria miniata

chitons