



Figure 1. Named for its large, inflatable snout, the elephant seal (male shown here) is making a pronounced comeback at Point Reyes National Seashore. Colonization of the seashore began in the early 1970s with a breeding colony first noted in 1981. The park is monitoring the growth of the population, estimated at 1,500 in 1998.

Mirounga massing at Point Reyes

By SARAH G. ALLEN

While exploring tide pools at a remote area at Point Reyes Headland, park rangers discovered a female elephant seal and pup in 1981. From that first birth, a colony grew and swelled in number over 15 years with nearly 400 pups born in 1998. They are a challenging addition for Point Reyes National Seashore (California), though, as the park is visited by more than two million humans annually. The park is currently developing a strategy for protecting and managing elephant seals by gathering sufficient information on seal habitat needs and potential conflicts.

Elephant seals of the genus *Mirounga* are the largest in size of all pinnipeds of the world. The term *Mirounga* is derived from an Australian aboriginal name for the elephant seals and represents two species in the genus; the northern species (*Mirounga angustirostris*) is of the northern latitudes. The name "elephant seal" derives from the large inflatable snout of the male (fig. 1). They rely on a thick layer of subcutaneous fat for insulation and use this fat for energy when fasting onshore for long periods. Females lack the large nose and are much smaller in size. Elephant seals weigh up to 2,300 kg (3,000-5,000 lb) and tend to be around 380-410 cm (12-14 ft) in length, whereas females weigh 600-800 kg (1,320-1,760 lb) and are 280-300 cm (9-10 ft) long. The life span of elephant seals is poorly studied but the oldest female whose

age is known at Point Reyes Headlands was 21 years.

Charles Scammon, a British seal hunter who explored and exploited the Pacific coast in the 1800s, recorded that northern elephant seals were distributed from Cabo San Lazaro, Baja, Mexico, to Point Reyes, California. By the turn of the century, elephant seals nearly were extinct because sealers hunted them for the high quality oil that could be produced from their blubber; one bull elephant seal could yield nearly 25 gallons of oil.

With protection provided first by the Mexican government on Isla Guadalupe and later by the United States on the Channel Islands, California, the population recovered at an astounding rate, growing an estimated 6-8% per year. As the colony grew, seals began colonizing new sites, expanding northward. Pups were first seen on San Miguel Island, California, in 1957. From a low count of only a few hundred animals in the 1890s, the worldwide population has grown in 100 years to around 150,000.

Colonization of Point Reyes

Point Reyes is just one of around 11 breeding sites for this species along the eastern Pacific rim and until the mid 1990s was the most northern. Colonization of Point Reyes began in the early 1970s when individual animals were sighted with increasing frequency. Then in 1981, a breeding colony formed at Point Reyes Headland when a pup was seen with a female and

attended by an adult male. The colony was situated in an inaccessible pocket beach at the base of a steep cliff. Since then, the colony has grown exponentially. In 1998, the estimated number was around 1,500.

The park has monitored the growth of the colony with weekly surveys, flipper-tagging individuals, and monitoring human interactions with remote camera. During winter 1994-95 and the El Niño of 1998, severe storms and high tides (aggravated by the elevated sea level of the El Niño) pummeled the pocket beach where the main colony congregates. Many pregnant females were unable to find space for birthing in the midst of these storms and a few selected alternative beaches at Point Reyes with its relatively tranquil waters and ample space. These new subcolonies were revisited annually since then, indicating that the colony is spreading.

Annual cycle

Elephant seals congregate onshore at these terrestrial colony sites three times per year, but the total numbers and proportion of various age and sex categories varies per season: the breeding season (December-March), the molt (March-July), and the juvenile haul out (September-November). During the rest of the year (nearly 80%), the seals are entirely pelagic, living only in the ocean.

Elephant seals have a hierarchical breeding system with large dominant males aggressively defending their position near



Figure 2. With numbers on the rise at Point Reyes, elephant seals are overflowing onto publicly accessible beaches. Resource managers now have several considerations to balance along with species recovery: public safety, wildlife harassment, transmission of diseases between seals and dogs and cattle, and disruption of colonization at new beaches.

groups of females. Females begin pupping within a few days of their arrival with the first pup born around mid-November. Small discrete colonies such as the Point Reyes Headland colony may have only a few dominant bulls, whereas large, continuous colonies such as the San Miguel Island colony may have an array of bulls and subordinate males at intervals along a beach.

Females usually give birth to a single pup, weighing around 32 kg (70 lb) and displaying a black coat of fur. Pups cannot swim at birth, and consequently, are vulnerable to storms and disturbance. Mortality rates of pups have been low most years at Point Reyes Headland, but with increased density coupled with severe storms as occurred in 1992, 1995, and 1998, the survival of pups decreased. In 1995, survival was only around 45% and only around 25% in 1998.

Marine habitats

Elephant seals spend 60-80% of their time at sea, but little is known about their distribution or behavior at sea. In recent years, though, new technology in the form of satellite tags and time-depth recorders has enabled researchers to discover that elephant seals can dive up to one mile deep and stay under water for almost two hours. Elephant seals disperse rapidly and widely from the colonies; one elephant seal tagged at San Miguel Island, for example, was located in the Bering Sea within two weeks. They range west as far as 173°W longitude, beyond the Hawaiian Islands, and north to the Bering Sea and eastern Aleutians. In the Gulf of the Farallones, we have correlated

elephant seal distribution with deep waters off the continental shelf. The most current information on the diet of elephant seals indicates that they forage in the mid-water zones, likely eating cephalopods and Pacific hake, although seals are also known to prey on skates, rays, sharks, shrimp, and crab.

Elephant seals are in turn preyed upon by primarily the great white shark (*Carharodon carcharias*). Point Reyes Bird Observatory biologists on the Farallon Islands estimate that around 10% of the elephant seal population is preyed upon annually by great white sharks. Many incidences of shark attacks on seals and sea lions have been observed at Point Reyes Headland by park personnel over the past decade.

Management issues

The arrival of elephant seals at Point Reyes is an extraordinary example of the benefits of simple protective measures like the Marine Mammal Protection Act; however, now many land management agencies such as the National Park Service are faced with several new issues. The main colony was inaccessible, but with crowding, the colony began to overflow onto three nearby beaches, two of which are accessible to park visitors (fig. 2).

Issues that surfaced since 1995 include public safety from seals, harassment of seals by park visitors, potential disease transmission between seals and dogs and cattle, and disruption or deterrence of colonization at new beaches. Park docents logged 880 hours over 35 days of educating visitors during weekends and holidays, and on nearly 30% of these days, people were observed harassing seals. Most pinnipeds on land react to the approach of humans (especially with dogs) and will stampede into the water when approached too closely. Behavioral changes, such as retreating into the water or cessation of nursing activity, are defined as disturbance under the Marine Mammal Protection Act. At newly established colonies, human presence can deter pregnant females from pupping on beaches. Of additional concern is the transmission of serious diseases (e.g., canine dis-

temper) from dogs to seals, and the National Marine Fisheries Service recommends that dogs be prohibited on beaches where pinnipeds occur.

Safety issues are of concern from both direct and indirect encounters with seals. Elephant seals are known to chase and bite people when seals are approached too closely. This is of special concern during the breeding season when male seals are fighting and females are defending their young. Because elephant seals are a favored prey item of great white sharks, there is concern that the visiting public may be at greater risk while boating or swimming in Point Reyes waters around seal haul out sites; the region has one of the highest incidence rates of white shark attacks on people in the world.

The park produced an elephant seal management plan to address the myriad of issues associated with the seal colony expansion. Some additional long-term potential conflicts include impact of elephant seals to other resources in the park such as the western snowy plover (*Charadrius alexandrinus nivosus*), which was listed as a threatened species by the U.S. Fish and Wildlife Service in 1993 and several rare native plants in the coastal dune community.

Elephant seals are a heroic species that exemplifies the remarkable recovery of a species given simple protective measures; they are also impressive and fascinating to the visiting public. The task of the park is to strike a balance between enabling the elephant seal colony to continue to recover and responding to the visitor interest. Beginning in 1996, the park initiated a docent program to educate visitors and protect seals; a total 33-45 volunteers interacted with visitors and collected data. This coming year, the program will be expanded, as will research on the colony as we attempt to discern why seals choose some beaches over others for breeding. **P**

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