



NPS Photo

## A Life of Singular Extremes

Weaned pups hang out together before learning to swim and hunt.

POINT REYES NATIONAL SEASHORE is one of the few places in California where you can see *Mirounga angustirostris*, the northern elephant seal. Individuals spend only a few months each year on shore, but there are elephant seals on the Point Reyes beaches many months of the year. Their ability to thrive in the harsh Pacific Ocean habitat in which they hunt is the result of millions of years of evolutionary adaptation. While today you can see hundreds of elephant seals on our beaches in winter, a hundred years ago they were hunted to near extinction. This is the story of a surprising creature, that made a remarkable recovery, and lives a life of extremes.



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### What a Trip!

Northern elephant seals make semiannual visits to the beaches of Point Reyes—in winter for pupping and mating, and in spring and summer for molting. In total, over the course of a year, elephant seals migrate 12,000 to 14,000 miles! Find out more about this amazing feat—the longest migration of any marine mammal.

PAGE 2

#### ELEPHANT SEAL FACTS

Maximum dive depth:  
5500 ft (1678 m)



Maximum time between breaths:  
90 minutes

Adult males:  
12-18 ft (3.7-5.5 m)  
4400-6000 lbs (2000-2722 kg)  
Oldest Known Male: 18 Years

Adult females:  
9-10 ft (2.7-3 m)  
1300-1900 lbs (590-862 kg)  
Oldest Known Female: 22 Years

Foods: squid, octopus, sharks, rays,  
ratfish, hake, rockfish, and salmon

Nearest relative: *Mirounga leonina*, the  
southern elephant seal



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Above: Adult male elephant seals develop the enormous proboscis and chest shield that give the species its common name.

Below: Along the outer beaches at Point Reyes, hundreds of northern elephant seals gather in spring and summer to molt, or shed their fur (note the patchy coat of the seal indicated with an arrow).

### Evolution & Adaptation

All marine mammals evolved from terrestrial animals that are now extinct. Their evolution from four-legged creatures that hunted on land to animals with flippers and fins took millions of years. Learn more about the phenomenal changes they went through over time.

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### Point Reyes “Aloha”

Park Ranger Anela Ramos writes about her impressions coming from Hawai'i to Point Reyes and working her first winter supervising the Winter Wildlife Docent Program. It's cold out there in February, but maybe you'll be inspired to join the team and volunteer!

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### A Remarkable Recovery

Charles Scammon, a 19th Century whaler and sealer, first documented the elephant seal rookeries from California to Mexico. He was also one of the many commercial hunters who, in less than half a century, decimated the elephant seal populations. Despite this low point in the relationship between humans and elephant seals, they have made a remarkable recovery from the very brink of extinction.

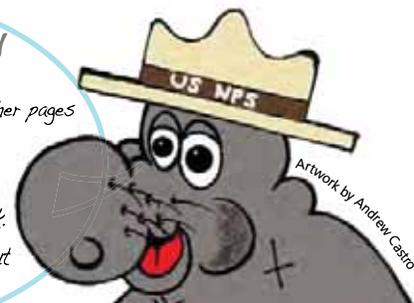
PAGE 6

Calling All Kids!

The back page is just for you, but other pages have information and activities.

Find this  symbol on each page to help solve the puzzles on the back.

We hope you have fun learning about these amazing critters!



# What a Trip!

DURING SEMIANNUAL MIGRATIONS, adult males and females travel thousands of miles apart from each other, and tend to have different feeding patterns. Males return to the same feeding areas off the Aleutian Islands each year, while females feed in the northeast Pacific and near Hawaii. To complete their two annual round-trips, females journey over 11,000 miles, while males travel 13,000 miles!

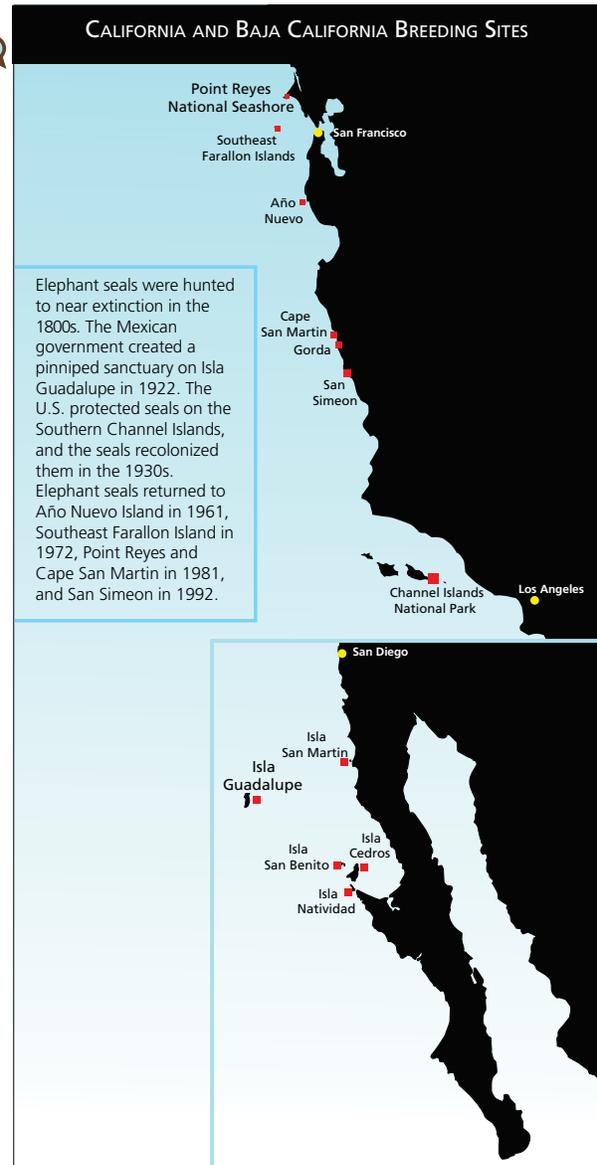
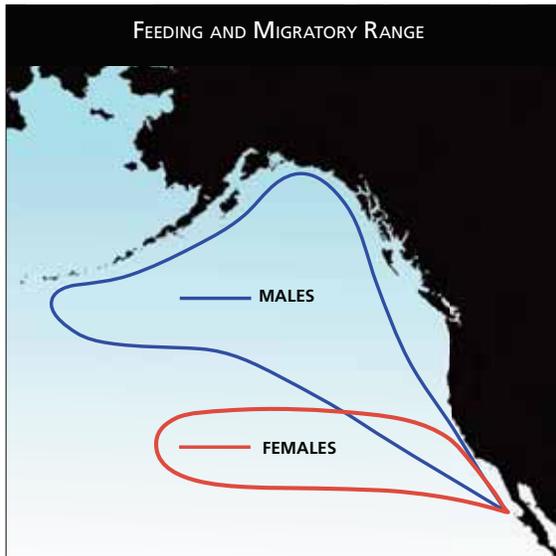
Males dive deeply for food, only surfacing briefly to breathe. After several weeks of feeding, they have gained weight and the added fat makes them more buoyant and their dive pattern becomes shallower. Females also dive deeply, more deeply during the day than at night because of the nocturnal migrations of prey species. During El Niño years, dive patterns and locations may change when seals seek food in different places.

Males dive repeatedly during summer and fall, while females spend two months at sea in the spring and eight months at sea in summer and fall. Research suggests that elephant seals forage continuously during their migrations and, furthermore, they don't sleep! They may take "cat-naps" when they dive, as their heart rate slows, making only brief, infrequent surface appearances. This pattern, and the incredible amount of time spent below the surface, explains why so few of them have been seen in the open ocean despite their rapidly growing population.

ADULT NORTHERN ELEPHANT SEALS VISIT POINT REYES and other California beaches twice a year. They arrive in early winter from their feeding grounds off Alaska and far out in the open ocean (see left and below). The males travel the longest distances between their feeding grounds and breeding territories, a distance of between 6,000 and 7,000 miles. During the time they are onshore they are fasting.

The largest congregations occur in the winter, when the females arrive to deliver their pups and nurse them, and in spring when immature seals and adult females return to molt. The females almost invariably have one pup, but occasionally pups, separated from their mothers, may be nursed by a strange female.

Because they are fasting, the mothers lose 30 to 40 percent of their body weight while nursing and defending their pups. The production of their high-fat milk takes its toll on the females' fat reserves and muscle. The hungry pups grow rapidly, and when weaned, resemble overstuffed sausages affectionately called "weaners." Some pups even reach "super weaner" status. After the pups are weaned in 30 days, the females are ready to mate. Dominant males form large groups of females, called harems, which they defend from other males. After mating, females head back out to the open ocean, leaving their weaned pups to fend for themselves.

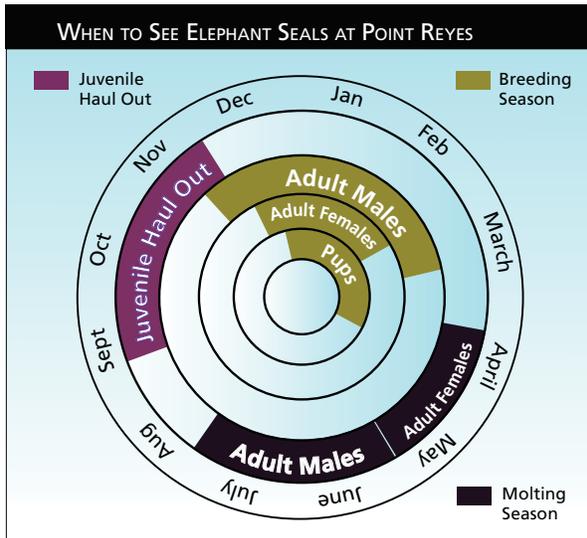


**POINT REYES NATIONAL SEASHORE**  
 1 Bear Valley Road  
 Point Reyes Station, CA 94956  
 Bear Valley Visitor Center  
 415-464-5100  
 Monday–Friday, 10 am–4:30 pm  
 Saturday–Sunday, 9 am–4:30 pm  
 Lighthouse Visitor Center  
 415-669-1534  
 Friday–Monday, 10 am–4:30 pm  
 Kenneth C. Patrick Visitor Center  
 at Drakes Beach  
 415-669-1250  
 Check park's website for hours  
<https://www.nps.gov/pore>

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ELEPHANT SEALS VISIT POINT REYES BEACHES throughout the year. Breeding and pupping season is in the winter, molting occurs in segregated groups in spring and summer, and the juveniles show up in the fall. The best place to see elephant seals at Point Reyes is at Chimney Rock, which is a 45-minute drive from the Bear Valley Visitor Center (see map top right). It's a short walk from the Chimney Rock parking lot to the elephant seal overlook. On winter weekends you will find winter wildlife docents with spotting scopes there to help you spot the seals and discuss their behaviors.



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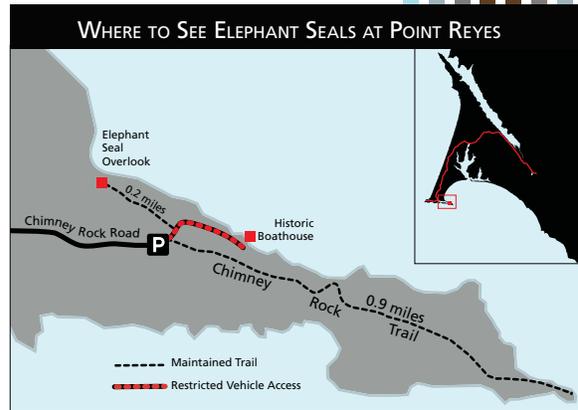
January is when most of the pups are born. At birth, they are only 3–4 feet long (1–1.3 m) and weigh a mere 60 pounds (27 kg). Western gulls and other scavengers often show up to clean up the afterbirth. In 33 days, the pups are weaned, at which time the females mate and then head out to sea to hunt for food and replenish the stores of fat and muscle lost while on the beach. Pups learn to swim on their own, gradually venturing out as they become hungry.

Elephant seals born on Point Reyes National Seashore beaches are tagged by Point Reyes biologists soon after they are weaned and separated from their mothers. The Point Reyes tags are pink and have a discrete number for each individual. When these seals turn up on other beaches, researchers can look up information about the seal. Pups born at Point Reyes have been seen in Canada, Alaska, and Russia!



NPS Photo

Biologist tags a weaned pup. The pink tag above indicates a female, that was tagged on Drakes Beach Colony at Point Reyes in February, 2010. NMFS Permits no. 373-1868-00



In February there's lots of activity. While some mothers are still nursing, the dominant bulls face off to defend their harems, both on the beach and out in the surf. They align their head and body at their rivals, rear up to show off their chest shields, raise their heads, and “trumpet.” This sound often scares off other bulls, but a chase may ensue to drive the interloper off the beach.



NPS Photo

It makes sense to combine your elephant seal discovery with a walk along the Chimney Rock Trail. It's only 1.8 miles round trip, and the views are stunning. In March and April, as the adult elephant seal population thins out and the pups are left behind, the Chimney Rock wildflower bloom begins! This is also a great time to visit the Point Reyes Lighthouse and look for Pacific gray whales on their northern migration.



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Elephant seals undergo a “radical molt,” unlike other mammals, they lose all their fur at once and grow a completely new coat. Their fur provides some insulation from the cold Pacific waters, so they remain on the beach during this month-long process. The pups molt in March and April before going to sea for the first time. Females and juveniles molt in April and May, and adult males in July and August. In the fall the juveniles return for a pre-breeding season haul out.

Groups of elephant seals are a spectacular sight, but please keep at least 100 feet away from all marine mammals. Bulls may be triggered to fight each other when humans approach, separating a female from her pup or even crushing a pup. Seals have been known to bite or chase people when surprised or approached too closely. Even on a leash, dogs may threaten seals by barking, so please refrain from taking your pets to areas where seals may be present.

Winter and early spring are wonderful times at the seashore. Each year the elephant seal population continues to grow. It's up to us and future generations to educate ourselves about the obstacles they face, so we can help ensure their continued survival.

# Evolution & Adaptation

## From the Land Into the Sea

CATASTROPHIC NATURAL EVENTS, like massive volcanic eruptions and meteorite collisions, have spelled the end for many millions of the Earth's life forms. Around 65 million years ago (mya), ecological catastrophe struck, most likely as a result of a large meteorite that struck the Earth offshore of the Yucatan Peninsula in Mexico. This led to the mass extinction of perhaps 70% of all species living on Earth, including marine dinosaurs, and provided a niche for the surviving mammals to move into the ocean.

In 1979, fossils of a hoofed mammal, dated to approximately 55 mya and thought to be the earliest ancestors of modern whales, were found in Pakistan. The ancestors of whales preceded seal ancestors into the ocean and eventually completely adapted to their marine home, never coming to shore to accomplish any of life's processes—feeding, mating, giving birth, and nursing are all done at sea.

Seals are pinnipeds, which means “feathered or wing-like foot.” For some time, the evidence suggested that all seals evolved from a single ancestor, the remains of which are found in California and Oregon Miocene sediment layers of approximately 23 mya. This animal, called *Enaliarctos*, was most closely related to bears. In 2007, Canadian researchers found a fossil at an early Miocene lake deposit (about 21–24 mya) in the Canadian Arctic. It is called *Puijila darwini*, and might be a transitional link between the terrestrial and marine ancestors of seals. This may mean that the entire pinniped family originated in the Arctic and then spread into the Atlantic and Pacific Oceans. Elephant seals are most closely related to monk seals which live in the Mediterranean and Caribbean Seas. Elephant seal's ancestors are believed to have first entered the Pacific around 5 mya, when the straits between North and South America were open.

### Adapt, Adapt, Adapt

Whatever their pedigree, pinnipeds have had to make many adjustments to a life at sea. Like all seals, elephant seals have atrophied hind limbs that end in rear flippers. These were once legs that carried their land-based ancestors on the hunt.

Each fin-like foot has five long webbed fingers. These structures are used to propel them through the water. In contrast, the pectoral fins which are analogous to the fore-limbs of their ancestors, are little used for swimming. On land the situation is reversed and the hind flippers are useless for locomotion, so elephant seals undulate with their stomach muscles and pull with their front flippers. They have a very ungraceful, lumbering gait on land, but are able to travel up to five miles per hour for short distances, easily catching up to a male interloper, a breeding female, or a human intruder.

Like humans, marine mammals maintain a core body temperature of about 99° F (37°C) in frigid waters as low as 30°F (-1°C). They have adapted to this seemingly inhospitable environment using several strategies to conserve heat. Consider the elephant seal's large size. Heat is lost from our body's surface area. The larger an animal's size, the smaller the relative surface area is to their total volume, limiting the amount of heat loss. Under their skins, seals have a thick layer of blubber, or fat, that helps to insulate them from the cold waters through which they travel, and provides some extra buoyancy. It also acts as a nutritive source during periods of fasting while onshore. Their circulatory system has adapted to the cold water with a network of strategically placed small veins surrounding the arteries, capturing heat from them.

Elephant seals are rarely seen out in the open ocean because they spend so little time on the surface. Northern elephant seals are the deepest divers of the seal community. Small tracking devices attached to the seals allow researchers to measure dive location as well as depth and duration. Dives as deep as over one mile (5500 ft, 1700 m) have been recorded, with average dives being around 1000 ft (300 m) deep lasting as long as 90 minutes. Hunting for food such as squid or fish at these depths required elephant seals to adapt to pressures that would crush land mammals.

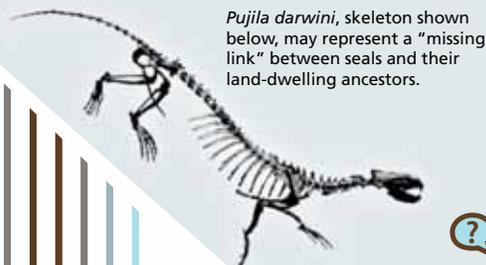
To cope with the added pressure when diving, elephant seals exhale most of the oxygen from their lungs allowing them to dive more quickly and preventing them from developing a condition affecting human divers called “the bends.” They can also slow their heart rate down so that they require less oxygen, and they store oxygen in their muscles and spleen.

Elephant seals and their ancestors, like all creatures living today, have successfully navigated through eons of twists and turns on their evolutionary road. Changing, adapting, struggling, and ultimately surviving into our present day. The great diversity of life on earth, with all its fantastic variety is a result of vastly different habitats and vast amounts of time during which small changes lead to animals well-adapted to the great challenges that elephant seals face.

### Who Are Their Ancestors?



For many years, *Enaliarctos*, shown in the drawing above, was the oldest known pinniped fossil. It had a short tail and developed limbs with webbed feet. *Enaliarctos* had some sea lion-like characteristics such as large eyes, sensitive facial hairs, and a specialized inner ear for hearing underwater.



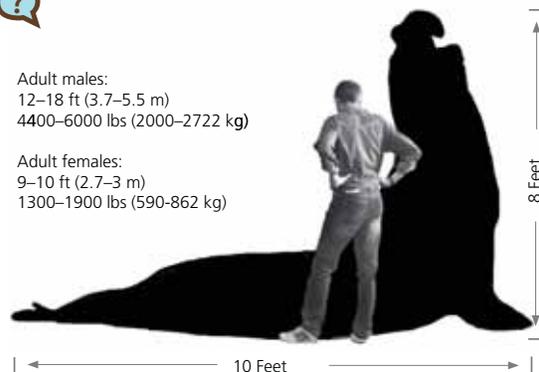
*Puijila darwini*, skeleton shown below, may represent a “missing link” between seals and their land-dwelling ancestors.

### Just How Big Do They Get?



Adult males:  
12–18 ft (3.7–5.5 m)  
4400–6000 lbs (2000–2722 kg)

Adult females:  
9–10 ft (2.7–3 m)  
1300–1900 lbs (590–862 kg)



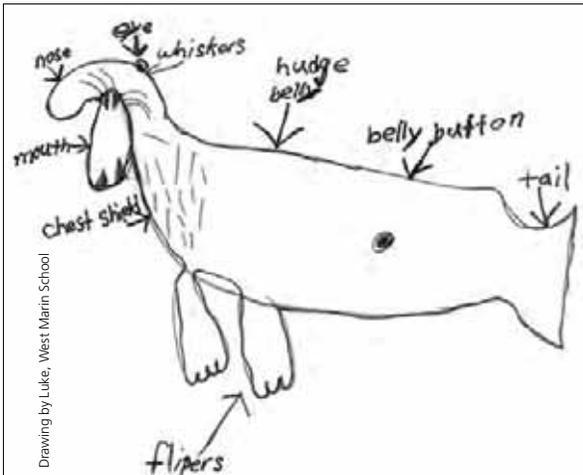
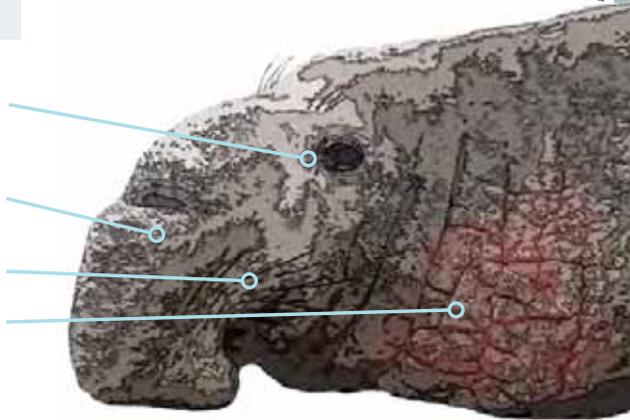
## A Face Only a Mother Could Love

**Those Eyes:** endowed with specialized pigments to allow them to see their prey in the deep ocean, nictitating membranes that act as an inner eyelid to wipe away sand and debris, and tear ducts that lubricate the eye and help to protect it.

**The Snout:** creates a resonating chamber allowing bulls to make their distinctive “trumpeting” noise, which sounds like a single-stroke engine.

**The Vibrissae:** specialized sensory facial hairs may help detect the water movement that their prey make.

**The Chest Shield:** males develop cornified, or thickly calloused, skin on their chests as they mature. During the mating period, attacks from other males can lead to this skin being bloodied.



Size comparison of an adult male, an adult female, and a young pup. Pups are born with black fur.

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## What Do They Eat?



Elephant seals are carnivores, they eat meat. Some examples of Elephant seal prey are squid, rockfish, and hake that live in the deep waters off the continental shelf.



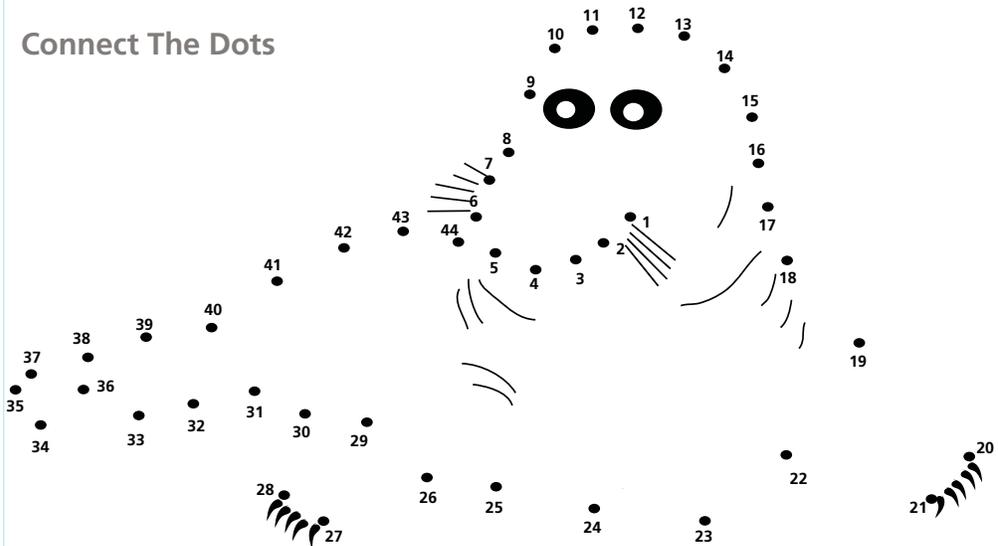
Squid

Rockfish



Hake

## Connect The Dots



# Dance With Extinction



Overland Monthly

Charles Scammon (1825–1911) was a New England whaler and one of the first commercial hunters of northern elephant seals. He also authored *The Marine Mammals of the North-western Coast of North America*, considered a classic of nature writing.

WHILE EXPLORING THE PACIFIC COAST in the mid 1800s, Charles Scammon, an American whaler, saw northern elephant seals hauled out on beaches from Baja California in Mexico, to Point Reyes. While Scammon was one of the first to hunt the seals for their oil-rich blubber, many others followed. The slaughter of a single bull yielded up to 25 gallons of oil. The indigenous peoples of California and Mexico also hunted the seals, but not on a scale approaching that of the commercial outfits. Elephant seal populations quickly went into a steep decline.

Marine mammals have been hunted for food and clothing since the dawn of human civilization. Whales were hunted in bays and on the open ocean as they never come to shore except when ill or dead. For millennia, this was done from small boats and was very dangerous. Seals, on the other hand, must come up onto beaches to give birth, nurse their pups, mate, and molt, times when they are very vulnerable. This made hunting seals easier and safer.

With the swift rise of the American whaling industry in the early 1800s, sperm whales, humpback whales, and Atlantic gray whales were killed in large numbers. Whales provided many materials the hunters were after: whale baleen for corsets and buggy whips, teeth for carving, and, most important, their blubber for oil. This

**“There shall be a moratorium on the taking and importation of marine mammals and marine mammal products... no permit may be issued for the taking of any marine mammal and no marine mammal or marine mammal product may be imported into the United States...”**

The Marine Mammal Protection Act, 1972 (16 U.S.C. 1361)

was the beginning of the Industrial Revolution, and machines used animal oils for fuel and lubrication. Marine mammals produce oil that can be highly refined, making it very valuable. Humpback and gray whale numbers were in decline just as the Gold Rush fueled an economic boom in San Francisco and on the west coast. The demand for oil for lighting and industry went through the roof. At that time, elephant seals' migration patterns remained unknown. But that would soon change.

When commercial elephant seal hunting began in 1846, the early accounts told of extraordinary abundance. Sometimes the seals were shot in the head while they slept. On some beaches the seals were herded to one end of the beach, killed with clubs, and then butchered. The blubber was taken leaving the skin, meat, bones, and guts for scavengers. The bulls, cows, and pups were all taken.



Joseph Hatch (label above from harness oil container) harvested penguins and Southern Elephant seals for their valuable oil on the sub-Antarctic Macquarie Island from 1890 to 1919.



After just 15 years, elephant seal populations were so decimated that it was difficult to make money on the hunt anymore. Between 1884 and 1892, not a single elephant seal was sighted anywhere and they were thought to be extinct. Expeditions from museums, such as the Smithsonian, located a few elephant seals on Guadalupe Island off the Mexican coast. The animals were killed and taken as specimens. Desperate to save the few remaining seals, the Mexican government banned elephant seal hunting in 1922, followed by the United States.

At that time, by some estimates, only 100 northern elephant seals were still in existence. From this small group of individuals, these animals have made an impressive recovery, increasing in population size by about six percent per year. Today, estimates hover at around 150,000 northern elephant seals.



NPS Photo

This immature northern elephant seal looks as if it got tangled in plastic strapping. It's important to keep our trash out of the ocean to prevent injuring marine creatures.

The Marine Mammal Protection Act (MMPA) of 1972 prohibits the taking of marine mammals, and places a moratorium on the import, export, and sale of any marine mammal, or any marine mammal part or product within the United States. However, this law can't prevent the effects that climate change, pollution, overfishing, and plastic waste have on elephant seals. Elephant seals and other marine mammals suffer injury and death when caught in fishing nets, struck by ships, and strangled by plastic. Although the callous hunt is in the past, human activities still have grave consequences for these remarkable and resilient creatures.



# FUN & GAMES

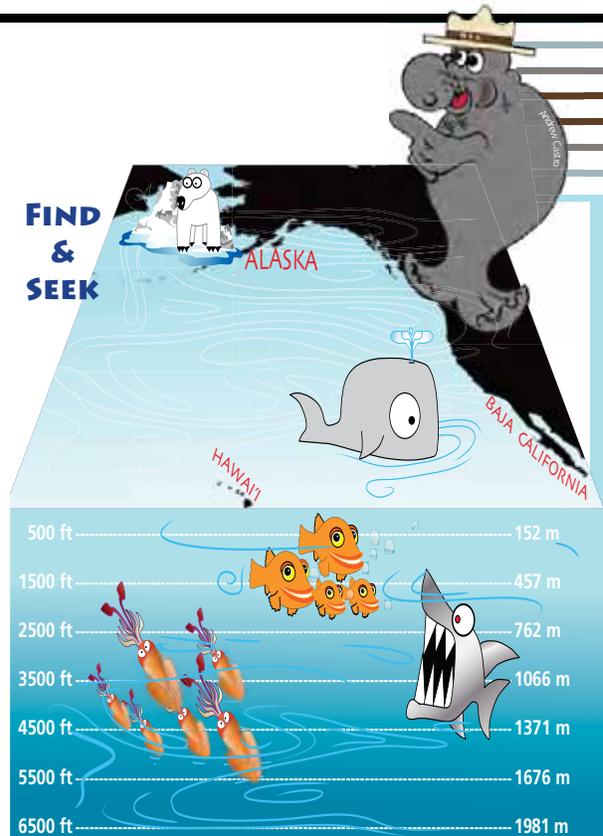
## WORD SEARCH

Find these words in the puzzle below

Adapt / Alaska / Baleen /  
 BLUBBER / Bulls / Dive /  
 Evolution / EXTINCTION / Flipper /  
 MEXICO / Molt / OIL /  
 PINNIPED / Pups / Sharks  
 / Squid / Trumpet

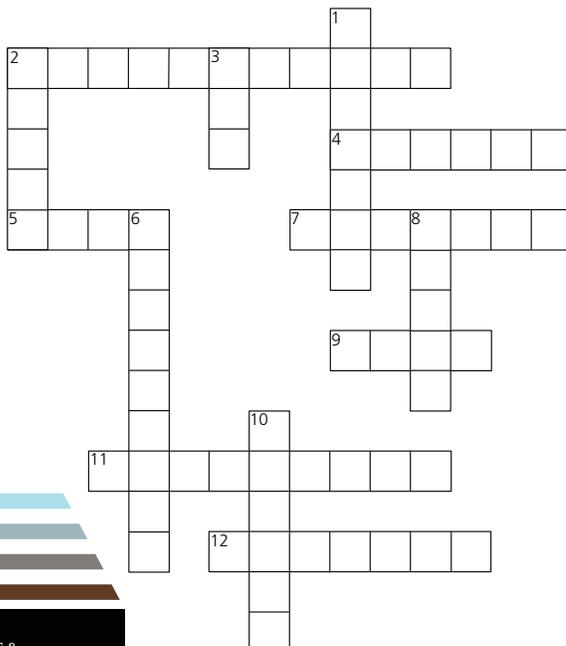
P M N Q J B P L F V E X N W F  
 N U R Q X U J I M O N G E W U  
 E V O L U T I O N O W F E E V  
 U D Q Z E W S G I N L C L A Z  
 E S J R A K S T Z I I D A F P  
 E V I D R C C T P B S P B M V  
 M O S A T N Q P O L H W E T H  
 A A H P I E E M B U G C M D E  
 P S K T U R T U Z B H T X E T  
 M U X S T P L O S B G U H K B  
 A E F L A L O V M E X I C O S  
 G D I E S L M A H R Q X I X Q  
 L O A Z F I A G T L C X E M U  
 N C H P Z O T E P M U R T L I  
 T F H P T A X B P X M S W T D

## FIND & SEEK



1. Name and circle two elephant seal foods.
2. Name and circle an elephant seal predator.
3. Name and circle a migratory marine mammal.
4. Put an X showing how deep elephant seals can dive.
5. Name and circle a large land predator.
6. Draw in the migration range for elephant seals, males and females.

## CROSSWORD PUZZLE



### ACROSS

2. The maximum weight, in pounds, of an adult male elephant seal.
4. The first country to protect elephant seals.
5. Elephant seals do this to hunt.
7. One adaptation that keeps elephant seals warm in the cold Pacific waters.
9. Elephant seals come to shore to have their pups, mate, and to what?
11. What is it called when animals travel long distances at certain seasons?
12. The places where elephant seals have their pups.

### DOWN

1. Humans and seals are both what kind of animal?
2. A funny-looking animal that elephant seals eat.
3. Name one product for which elephant seals and whales were hunted.
6. What is it called when animals adapt or change over time?
8. What are male elephant seals called?
10. What are groups of female elephant seals called during mating season?