National Park Service
Point Reyes National Seashore

Winter Wildlife Docent Manual

Sue Van Der Wal Collection

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Striving Towards Excellence/ Docent Duties

As a Docent you will represent the National Park Service and its mission. It Is your job to help the National Park Service preserve and protect its resources. Remember that you are representing the Seashore and the agency when you are working as a Docent. Please wear volunteer hats at all times, and put your best foot forward when talking to the public.

· Remember that your purpose as a docent is to educate visitors about the elephant seals, whales and Point Reyes History as well as the rules and regulations designed to protect them.
· Remember that by inspiring visitors we are helping preserve the Parks and their resources- "Knowledge leads to understanding. Understanding leads to love. Love leads to protection "
· Try to engage visitors by offering them information about the behaviors happening on the beach, inviting them to use the scope or see and touch the exhibits you may have. Envision what you would want if you were a visitor.
· Read and re-read your docent manual a few times during the season so you can be knowledgeable and answer as many questions as possible . If you do not know the answer, ask if another nearby docent does.
· Arrive on time on the days you have committed to work. If you are unable to be present on a day you have agreed to work, contact Steve Anastasia at 415-464-5147 as soon as possible to allow time for other arrangements to be made.
· Dress for the weather - Point Reyes can be colder, wetter and windier than other places as little as ten miles away. Make sure to wear your volunteer hat at all times.
· Bring food if you plan on eating lunch on your docent days - going out or picking up is not feasible.
· **HAVE FUN**

Remember

Difficult visitors are rare but do occur. Don't try to deal with a difficult visitor. If the visitor is endangering themselves or other visitors or is directly disturbing the elephant seal colony, call "Any North District Ranger" on the radio immediately.

Visitors at Elephant Seal Overlook

How to Reach Visitors

The Role of Interpretation

The main purpose of any kind of interpretation is to communicate with visitors. Interpretation can relate new information, stimulate the senses, challenge the imagination, as well as incite new perspectives. Interpretation enhances the public's understanding and enjoyment of the natural, cultural, and recreational resources by encouraging appreciation. Interpretation not only enables visitors to better understand their relationship to the environment, but it also helps to promote the preservation and sustainable use of resources.

Interpretation is founded on the premise that knowledge deepens the park experience, providing lasting benefits not only to individuals, but also to society in general. The formal standards for interpretation, established by Freeman Tilden in 1957, remain relevant today. His approach to communicating with the public stressed six interpretive principles:

1. Any interpretation that does not somehow relate what is being displayed or described to something within the personality or experience of the visitor will be sterile.

2. Information, as such, is not interpretation. Interpretation is revelation based upon information. But they are entirely different things. However, all interpretation includes information.

3. Interpretation is an art, which combines many arts, whether the materials presented are scientific, historical, or architectural. Any art is in some degree teachable.

4. The chief aim of interpretation is not instruction, but provocation.

5. Interpretation should aim to present a whole rather than a part, and must address itself to the whole [person] rather than any phase.

6. Interpretation addressed to children (say, up to the age of twelve) should not be a dilution of the presentation to adults, but should follow a fundamentally different approach. To be at its best it will require a separate program.

In more recent years, Sam H. Ham in his book, Environmental Interpretation, has distilled the interpretive approach to four main ideas:

1. Interpretation is pleasurable.

2. Interpretation is relevant.

3. Interpretation is organized.

4. Interpretation has a theme.

Larry Beck and Ted Cable in their book, Interpretation for the 21st Century, provide these principles, which correlate to Tilden's, with assorted quotes from Mills:

1. To spark an interest, interpreters must relate the subject to the lives of visitors.
Mills: The nature guide is at (their) best when (they) discuss facts so that they appeal to the imagination and reason (of the visitor).

2. The purpose of interpretation goes beyond providing information to reveal meaning and truth.
Mills: The nature guide arouses interest by dealing in big principles – not with detached and colorless information. The aim is to illuminate and reveal the alluring world.

3. The interpretive presentation – as a work of art – should be designed as a story that informs, entertains, and enlightens.
Mills: Our (interpreter) had the art and the vision which enabled her to make these outings permanent, purposeful, growth compelling experiences.

4. The purpose of the interpretive story is to inspire and provoke people to broaden their horizon.
Mills: This new occupation (interpretation) is likely to be far reaching in its influences; it is inspirational and educational…and possess(es) astounding possibilities for arousing the feelings and developing the unlimited resources of the mind.

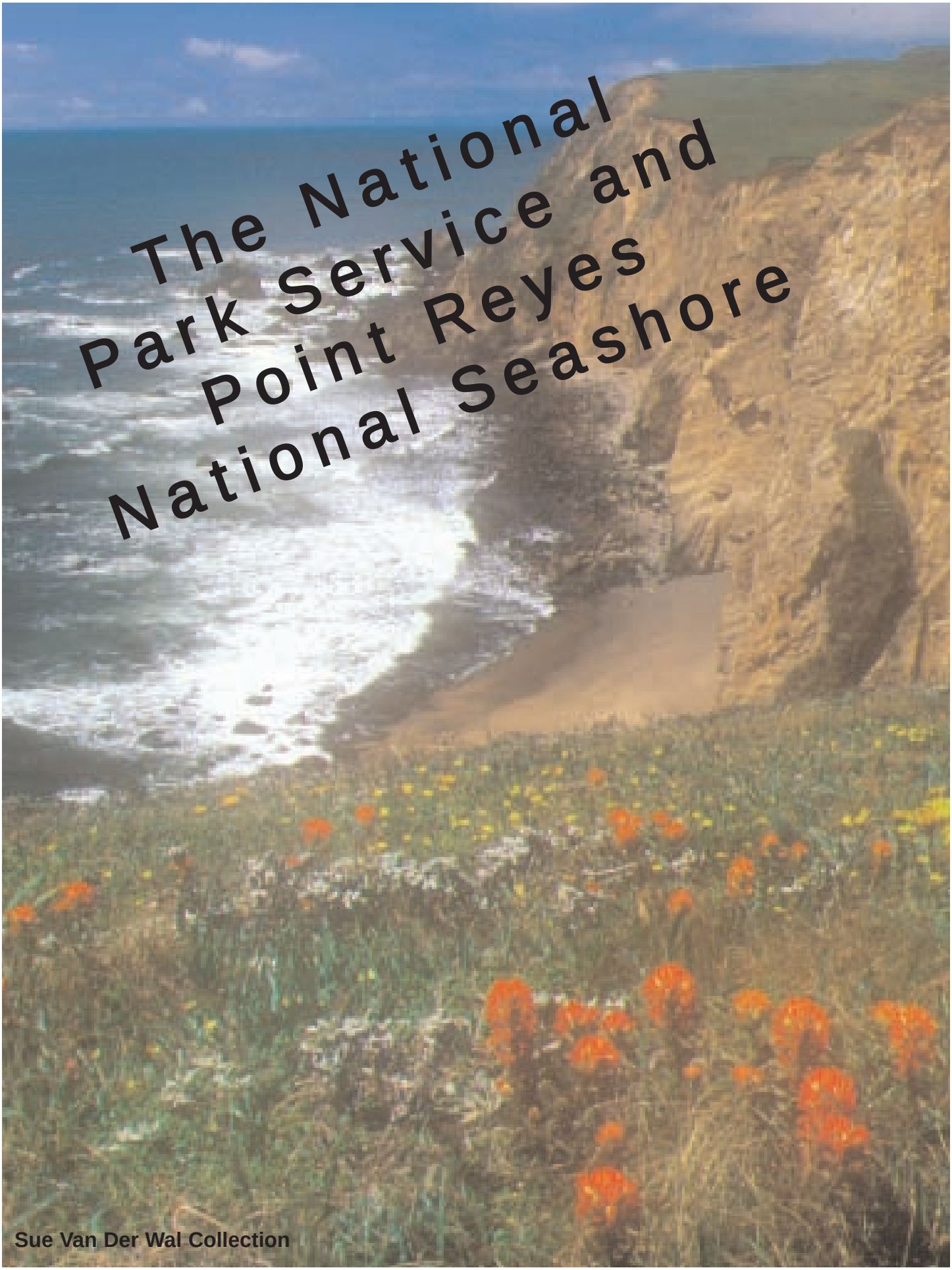
5. Interpretation should present a complete theme or thesis and address the whole person.
Mills: quoting Liberty Bailey: This [person] (the recipient of good interpretation) will see first the large and significant events; he will grasp relationships, he will correlate; later, he will consider the details.

The following is an interesting essay by Freeman Tilden.
Mindsight: The Aim of Interpretation

Now comes upon the scene the interpreter, to reveal the beautiful truths that lie behind the appearances. Since the early days of interpretation we have multiplied and refined many times the devices that he employs. But basically, the principles upon which he works are unchanged. He must love his work and his subject, and he must like people. Not necessarily persons: some of these vacationers are deplorable specimens. No; people. He must ever be learning while he teaches. Patient; enthusiastic. He sees the vital importance of relating the subject of his discourse to something within the knowledge, the experience and ideals of his group. He will not belabor his matter. Often, a single spark will set the desirable fire. He will not forget, in his enthusiasm to teach the story of nature and man, that the basic need is to make come clear the reasons why we have parks at all.

The good interpreter will have developed a philosophy about life and about human needs of his own. It will be frail, gauzy, since there is so much that nobody knows, and perhaps can ever know. He will not detail his philosophy. It will be implicit in what he says and in his attitude. His job is very little to instruct, but rather to provoke the desire to know. He plants this seed of provocation and will not know the harvest, nor need he worry about that, if it be that he has demonstrated that the beauty that lies behind what the eye sees is far greater than that which is so often seen.

One thing is sure, and must be underlined: that what one sees with the eyes is not enough for the attainment of understanding, either of the natural world or the social world of man. As Charles Darwin said, “We must see with the eye of the mind.” Interpretation, whether in the National Park System or in any other place where it is offered, promotes that mindsight.



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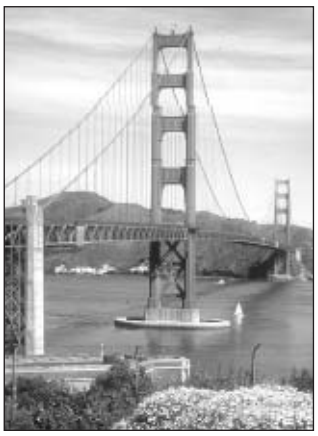
The National Park Service

The National Park Service cares for special places saved by the American people so that all may experience our heritage.

Olympic National Park

On August 25, 1916, President Woodrow Wilson signed the act creating the National Park Service, a new federal bureau in the Department of the Interior responsible for protecting the 40 national parks and monuments then in existence and those yet to be established.

This "Organic Act" of 1916 states that "the Service thus established shall promote and regulate the use of Federal areas known as national parks, monuments and reservations . . . by such means and measures as conform to the fundamental purpose of the said parks, monuments and reservations, which purpose is to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations."


Golden Gate National Recreation Area

The National Park Service still strives to meet these original goals, while filling many other roles as well: guardian of our diverse cultural and recreational resources; environmental advocate; world leader in the parks and preservation community; and pioneer in the drive to protect America's open space.

Mesa Verde National Park

The National Park System of the United States comprises over 379 areas covering more than 83 million acres in 49 states, the District of Columbia, American Samoa, Guam, Puerto Rico, Saipan, and the Virgin Islands. Although not all parks are as well known as the Grand Canyon and Yellowstone, all are areas of such national significance that they have been included in the National Park Service — ancient ruins, battlefields, birthplaces, memorials, recreation areas, and countless other wonders. Point Reyes National Seashore is one of ten national seashores.

Grand Canyon National Park

The future of the National Park System lies in understanding and protecting its meanings, values, and resources. Each part of the system represents the United States and a part of our heritage. Preservation of individual sites and the entire system will ensure the essence of quality remains in our lives and the lives of all future generations.

Point Reyes National Seashore

Bruce Farnsworth

Point Reyes National Seashore was established to preserve and protect the natural and cultural features and natural ecosystems along the diminishing undeveloped coastline of the western United States. Located just an hour's drive from a densely populated metropolitan area, the Seashore is a sanctuary for countless plant and animal species. With half of Point Reyes National Seashore designated as wilderness, it provides a sanctuary for the human spirit — for discovery, inspiration, solitude, and recreation — and a reminder of the human connection to the land.

Sue Van Der Wahl

Point Reyes National Seashore comprises over 71,000 acres, including 32,000 acres of wilderness area. Estuaries, windswept beaches, coastal scrub, coastal grasslands, salt marshes, and coniferous forests create a haven of 80 miles of unspoiled and undeveloped coastline located just an hour's drive from an urban area populated by seven million people. Abundant recreational opportunities include 140 miles of hiking trails, backcountry campgrounds, and numerous beaches.

The San Andreas Fault separates the Point Reyes Peninsula from the rest of the North American continent. Granite bedrock found here and not found again until the Sierra Nevada range suggests the peninsula is geologically dynamic. According to geologists, the land that is now called Point Reyes has moved some 300 miles northwest over a period of 100 million years and is still moving.

Rich Stallcup

As wildland habitat is developed elsewhere in California, the relevance of Point Reyes as a protected area with a notably rich biological diversity increases. Over 45% of North American avian species and nearly 18% of California's plant species are found here. Point Reyes also contains some examples of the world's major ecosystem types. For this reason, and because Point Reyes is dedicated to the conservation of nature and scientific research, it was recognized in 1988 by the United Nations Educational, Scientific, and Cultural Organization (UNESCO) Man and the Biosphere program and named as part of the Central California Coast Biosphere Reserve.

Bruce Farnsworth

The cultural history of Point Reyes spans many lives and ways of living with the land. The Coast Miwok people are the first known residents of this peninsula. Archeologists have identified over 100 village sites in the Seashore and cultural traditions are still celebrated in the Park annually. Overlapping the Coast Miwok were Mexican land grantees, lighthouse keepers, and lifesaving station crews. To this day, agricultural operations that were built near the turn of the twentieth century continue within the Seashore's pastoral zone.

NPS Collection

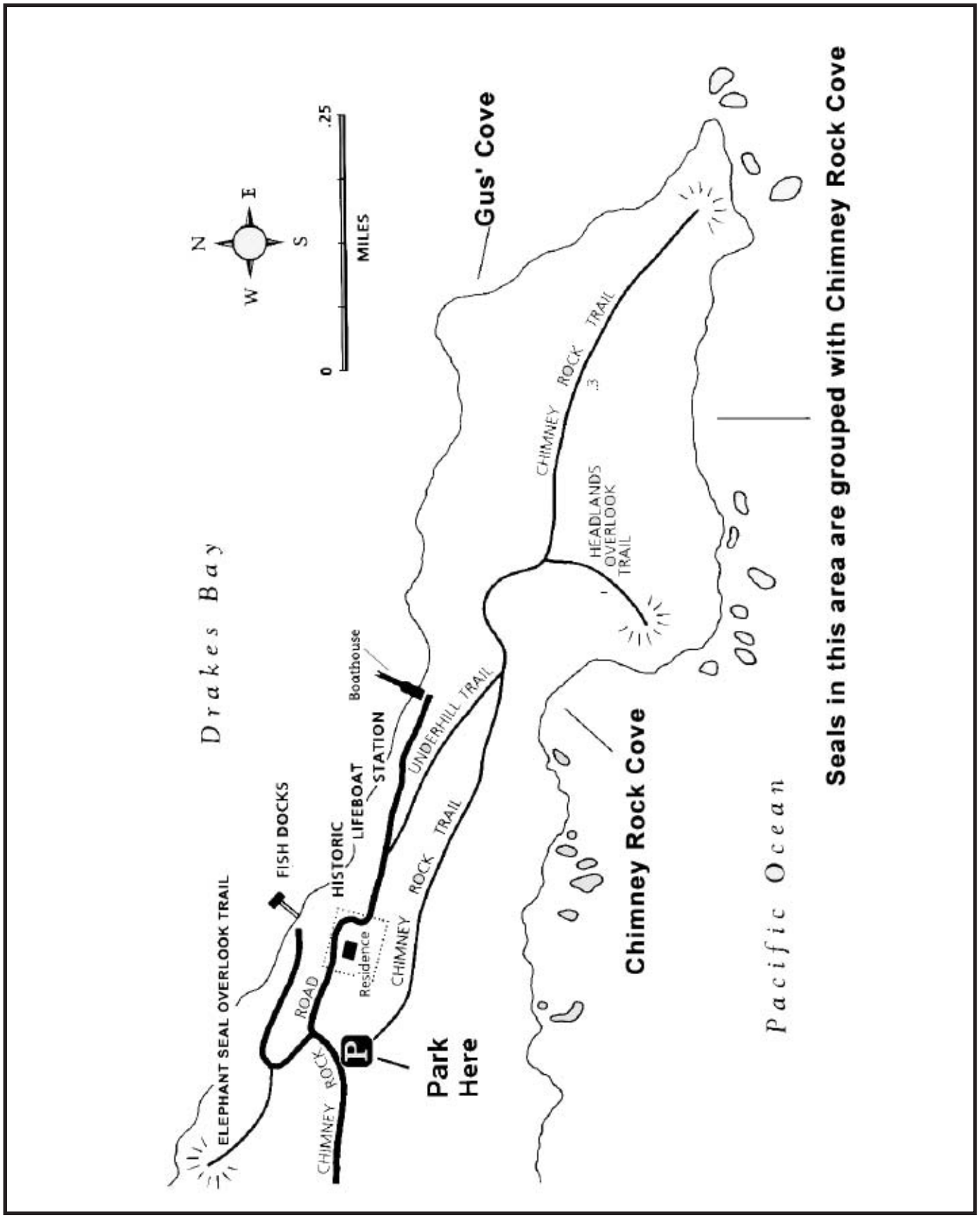
Maps and Locations

Point Reyes National Seashore

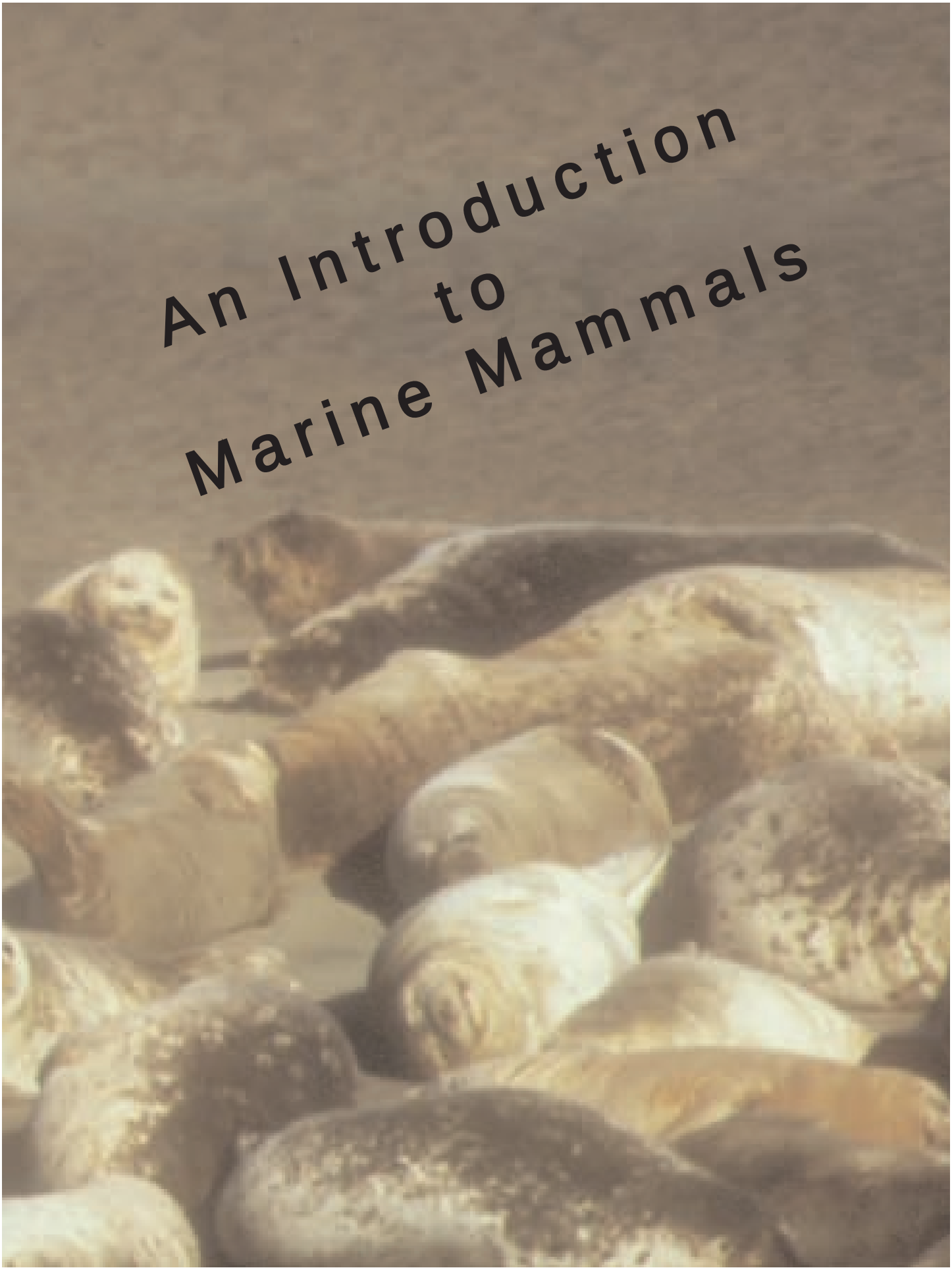
Point Reyes Headlands and Vicinity

Elephant Seals at Main Colony

Elephant Seal Overlook and Cove Names at Chimney Rock



An Introduction to Marine Mammals



OVERVIEW OF MARINE MAMMAL CLASSIFICATION

MAMMALS are a group of vertebrates possessing a combination of characteristics that distinguish them from all other animals:

mammals breath air
mammals bear live young
mammals produce milk to nourish their young
mammals are warm-blooded
mammals possess hair.

MARINE MAMMALS are mammals that have adapted to life in the oceans. They possess all the characteristics of other mammals, but exhibit distinctive appearances and survival strategies. There are three orders of mammals that include marine mammals.

I - ORDER CARNIVORA

A. SUBORDER PINNIPEDIA - The Pinnipeds.

Pinnipeds are "wing-footed" carnivorous marine mammals. They are distinguished from the next order, Cetacea, by giving birth on land. There are three families in this suborder.

1. EARED SEALS, FAMILY OTARIIDAE - These seals are commonly called sea lions, but include the California Sea Lion, the Steller Sea Lion, and Northern Fur Seal. Eared seals have visible external ear flaps, and can "walk" on all four flippers by rotating their flippers forward, thus they are more mobile on land than other pinnipeds and are often seen in circuses and oceanaria. Eared seals use their large front flippers for swimming, and use their hind flippers for steering and walking.

2. TRUE OR EARLESS SEALS, FAMILY PHOCIDAE - Commonly called simply "seals", this family includes Harbor Seals, Elephant Seals, and many others. Earless seals have no external ear flap, and have to crawl on land because their hind flippers cannot rotate forward. Their swimming power comes from their large, almost fan-like, rear flippers, and their small front flippers are used for steering while swimming.

3. WALRUSES, FAMILY ODOBENIDAE - Distinctive for their two long tusks, walruses inhabit the Artic seas and ice floes. They have no external ear flap, but can rotate their hind flippers forward and "walk" on land. They are distinguished from other pinnipeds not only by their tusks, but also by the presence of two large air pouches or sacs extending off either side of the pharynx. These pouches can be inflated to hold the head above water when sleeping, or used as resonance chambers to enhance underwater sounds.

B. SUBORDER FISSIPEDIA

1. SEA OTTERS, FAMILY MUSTELIDAE - Sea Otters are the only marine representative of the mustelid family, which includes such land mammals as weasels and skunks. They are the smallest marine mammals and occur near shores. They live among coastal kelp beds and in estuaries, where they dive and hunt for a variety of shellfish, fish, kelp, greenling and other food items. Their exceptionally thick dark fur, with a dense inner fur, a longer tail, and the absence of true flippers distinguish them, as does their ability to use rocks as a tool to help open shellfish while feeding.

2. POLAR BEARS, FAMILY URSIDAE - Polar Bears are considered marine mammals because they depend on the ocean for a majority of their food. They are protected under the Marine Mammal Protection Act. Polar bears range throughout the Arctic regions, including parts of Alaska. They prey on pinnipeds.

II. ORDER CETACEA

This order includes all whales, dolphins, and porpoises. Cetaceans have two front flippers, and their tails are uniquely shaped into horizontal extensions called flukes, which provide their tremendous swimming power. There are two suborders of cetaceans.

A. SUBORDER ODONTOCETI, TOOTHED WHALES - This suborder includes dolphins, porpoises, and those whales possessing distinct teeth, such as Sperm Whales, Orca Whales, Narwhal Beaked Whales, and the Beluga Whale. These whales have some one to fifty teeth, and breath through a single blowhole.

B. SUBORDER MYSTICETI, BALEEN WHALES - This suborder includes Blue, Gray, Humpback, and Bowhead Whales, to name a few. Instead of teeth, baleen whales have rows of strong closely spaced baleen plates along each side of the upper jaw. These plates function to filter out and trap small sea life, such as krill and small fish. A large volume of water is first taken into the whale's mouth, and is then forcibly ejected through the baleen plates, trapping krill and other small organisms. Baleen whales breath through a pair of blowholes.

III. ORDER SIRENIA

The sirenians includes two groups of plant eating marine mammals, Dugongs and Manatees. These marine mammals occur in warmer, tropical waters. Manatees are found in some areas of coastal Florida. Another species of sirenians, the Steller Sea Cow, once inhabited Arctic waters, but by 1768, 30 years after its discovery, had been hunted to extinction.

Protecting Marine Mammals via the Marine Mammal Protection Act

The Marine Mammal Protection Act (MMPA) was passed by Congress in 1972 and was a milestone for marine protection. The MMPA makes it illegal for anyone to kill, injure, or bother any and all species of marine mammals; these animals include dolphins, seals, sea otters, whales, and polar bears.

The Marine Mammal Protection Act also makes it illegal to import marine mammals or related products to the United States. Exceptions to the Marine Mammal Protection Act include subsistence hunting and incidental catching by commercial fishermen.

Alaskan Aleuts, Indians, and Eskimos who reside in Alaska are permitted to take marine mammals for subsistence purposes or for use in the manufacture and sale of native handcrafts.

The Secretaries of Interior and Commerce may grant permits for importation of marine mammals for scientific research or public display purposes.

Two federal agencies are in charge of administration of the Marine Mammal Protection Act. The National Marine Fisheries Service (NMFS) under the Commerce Department is responsible for whales, dolphins, and seals. The Fish and Wildlife Service under the Department of Interior is responsible for all other marine mammals.

It is illegal to:

- Take any marine mammal on the high seas or in waters or on lands under U.S. jurisdiction.
- Import any marine mammal or marine mammal product into the United States.
- Use any port or harbor under U.S. jurisdiction for any purpose connected with unlawful taking or importation of any marine mammal.
- Possess any unlawfully taken marine mammal, including parts and products.
- Transport, purchase, sell, or offer to purchase or sell any marine mammal, including parts and products.

It is also illegal to harass marine mammals:

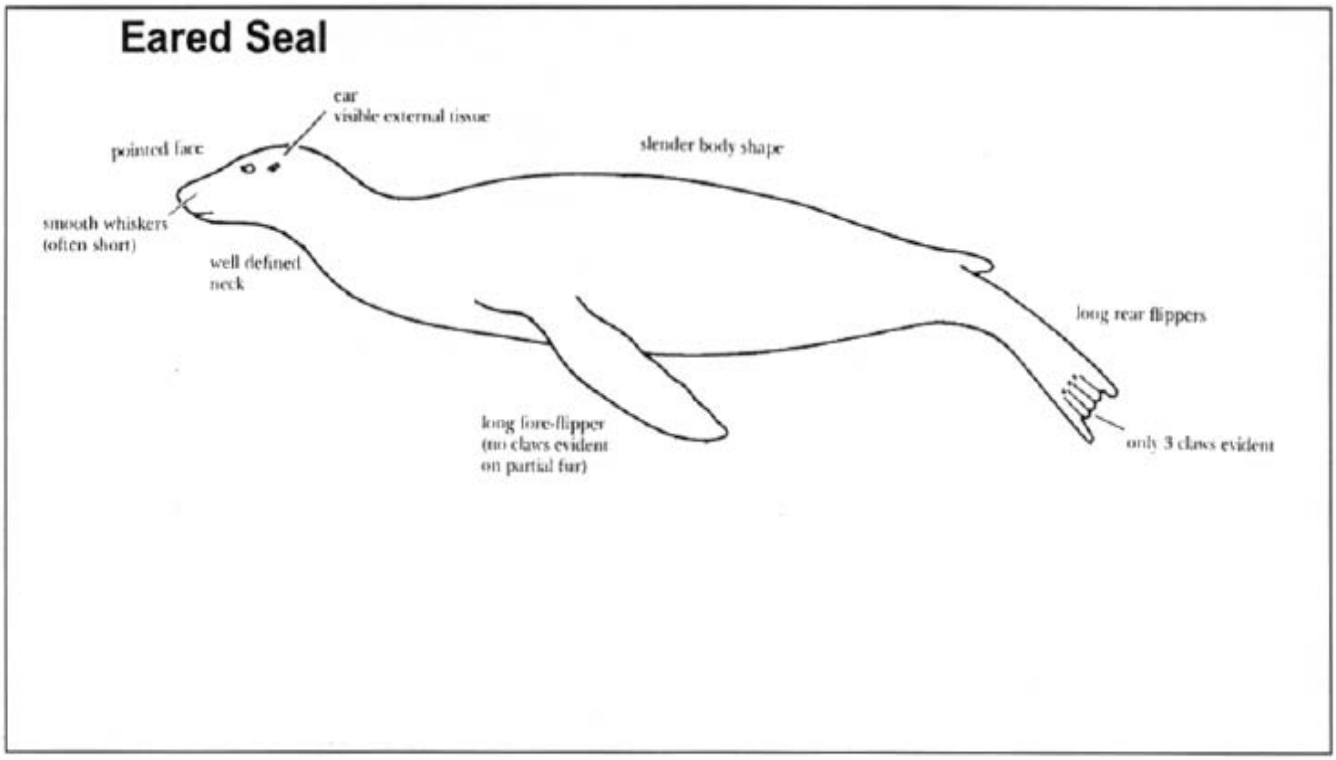
- There are two levels of harassment.

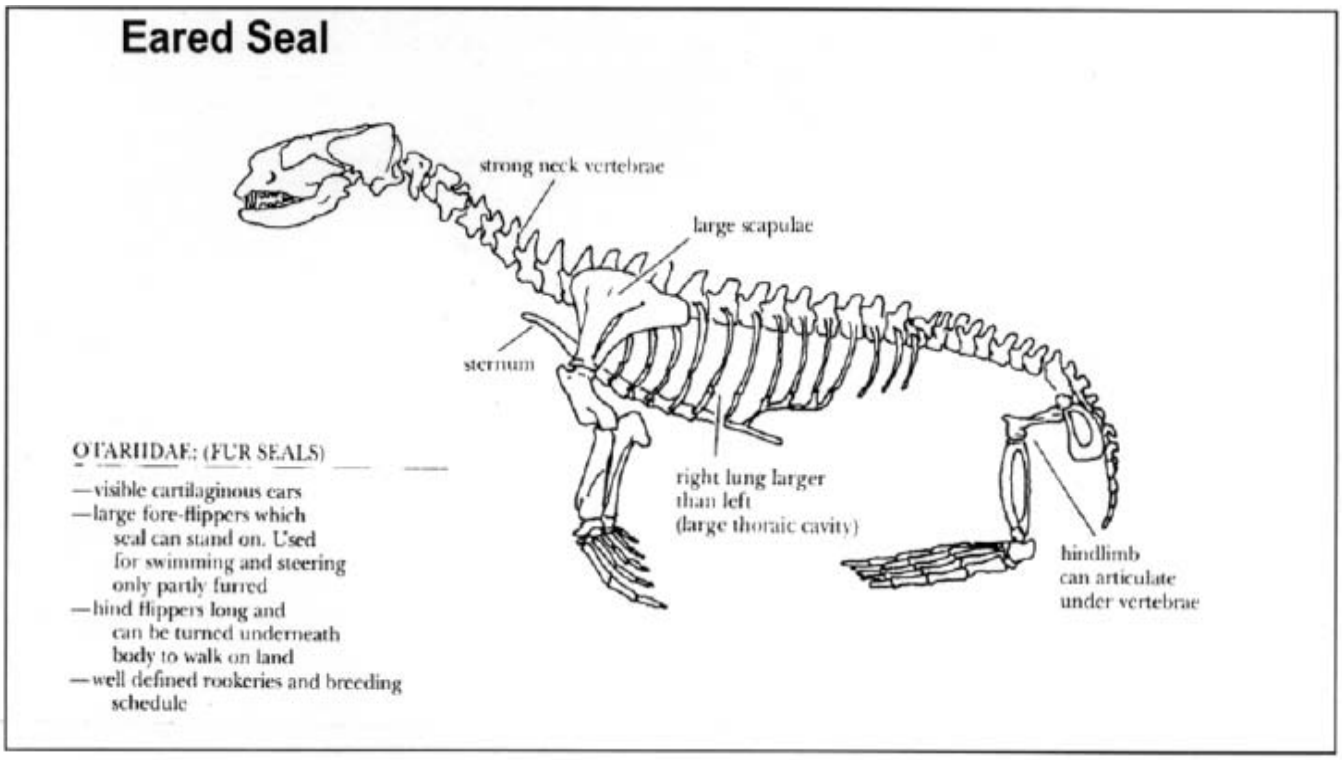
  Level A Harassment is defined as any act of pursuit, torment, or annoyance that has the potential to injure a marine mammal or marine mammal in the wild.

  Level B Harassment is defined as harassment having the potential to disturb a marine mammal or marine mammal in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering.

Family Otariidae - Eared Seals
(Stellar sea lion, California sea lion, northern fur seal

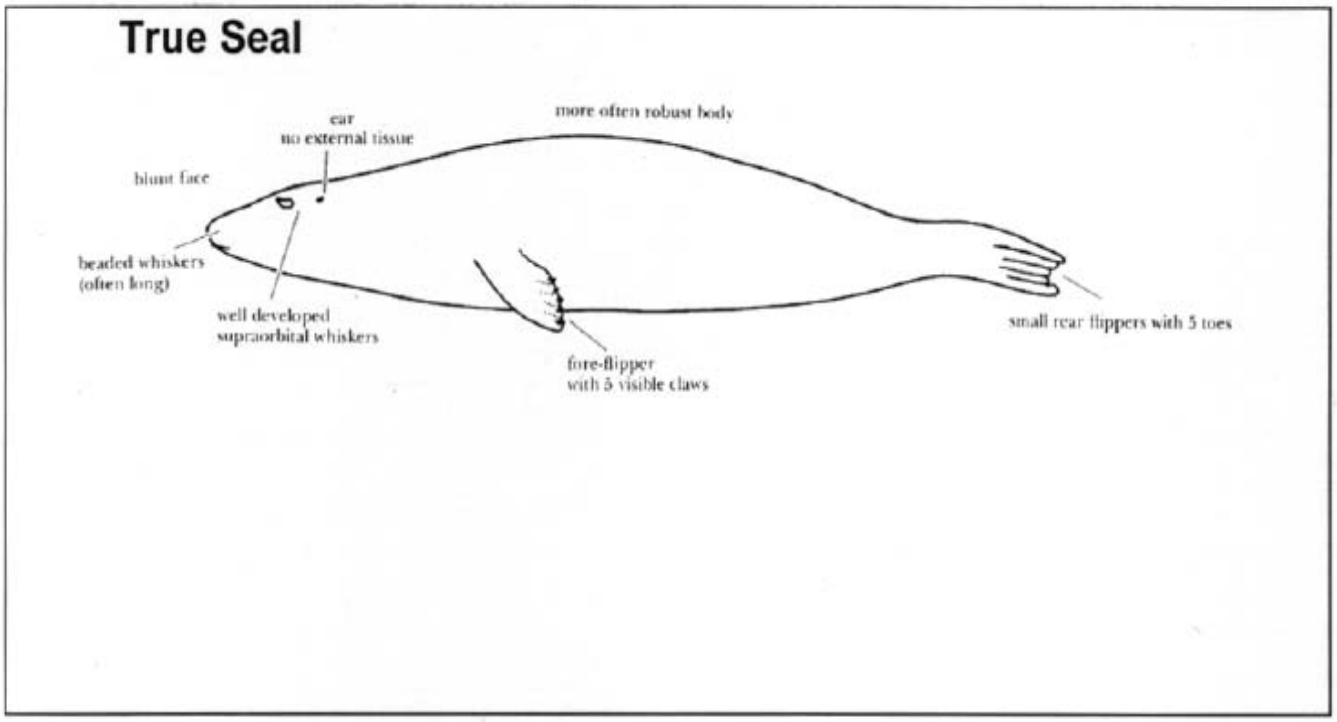
1. Have obvious ear flaps
2. Are able to walk on land
3. Have hind flippers that are used for steering while swimming, and for walking on land
4. Have large front flippers for swimming

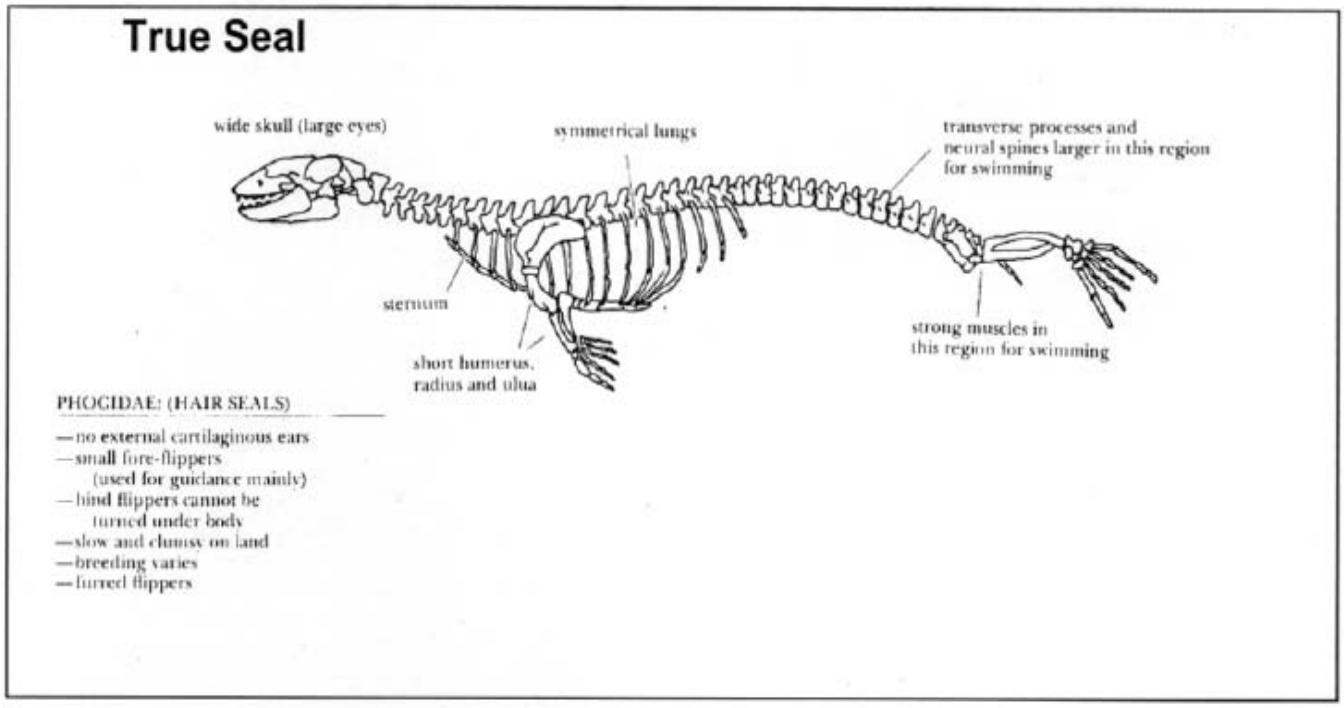




Family Phocidae, True or Earless Seals
Northern elephant seal, harbor seal

1. Do not have ear flaps
2. Are awkward while moving on land
3. Have hind flippers that extent backward, and are used mainly for swimming
4. Have small front flippers that are used for steering while swimming





SIZE ESTIMATES OF SEALS AND SEA LIONS AT POINT REYES NATIONAL SEASHORE

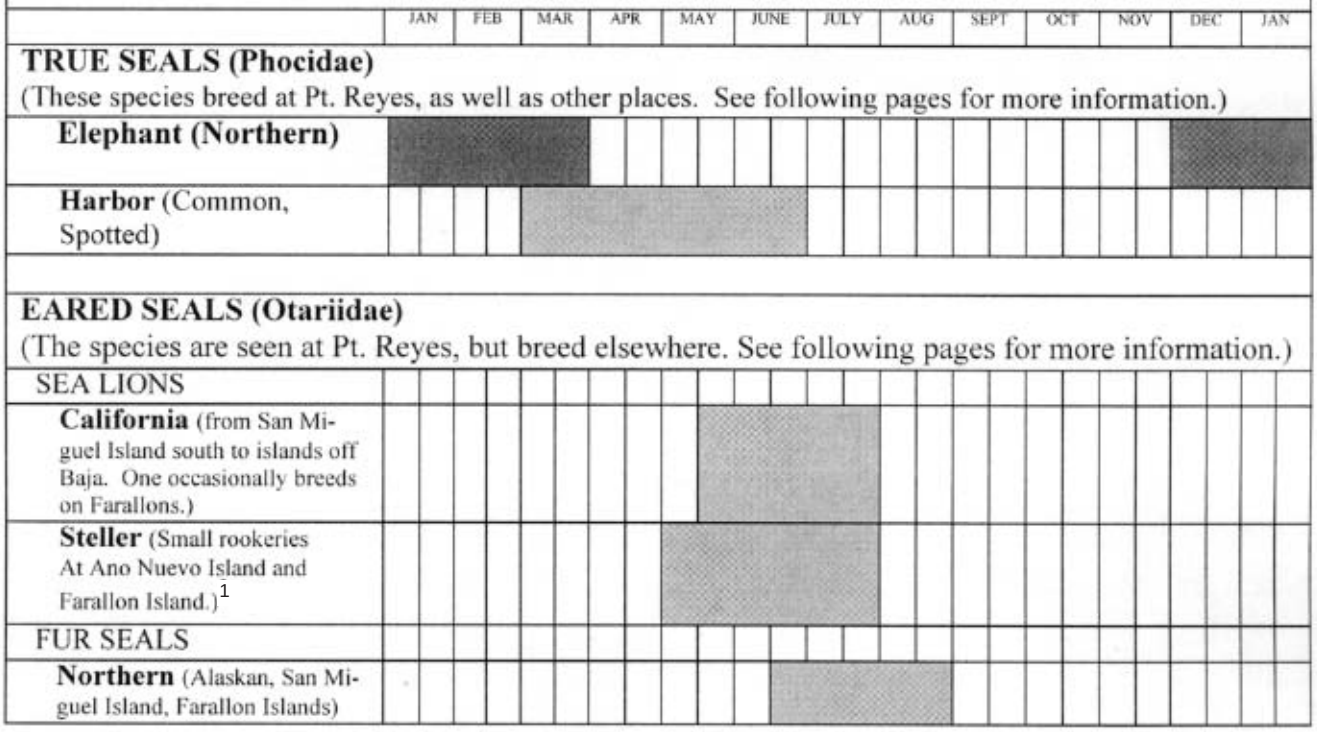
	Male	Female	Pup (at birth)			
	Length (ft.)	Weight (lbs.)	Length (ft.)	Weight (lbs.)	Length (ft.)	Weight (lbs.)
TRUE SEALS (Phocidae)						
Elephant (Northern)	**13-18**	**3,000-5,000**	**8-10**	**800-1,200**	**3-4**	**70**[1]
Harbor (Common, Spotted)	4--5	150-250	4-5	150-250	2	25
EARED SEALS (Otariidae)						
SEA LIONS						
California	7-9	500-900	5-6	200-350	2	13
Steller	8-11	2,000	6-9	600-900	3	45
FUR SEALS						
Northern (Alaska, San Miguel Island, Southeast Farallon Island)	7	600	4.5	100	2	11-12

[1] Elephant seal pups weigh up to 300 pounds at weaning.

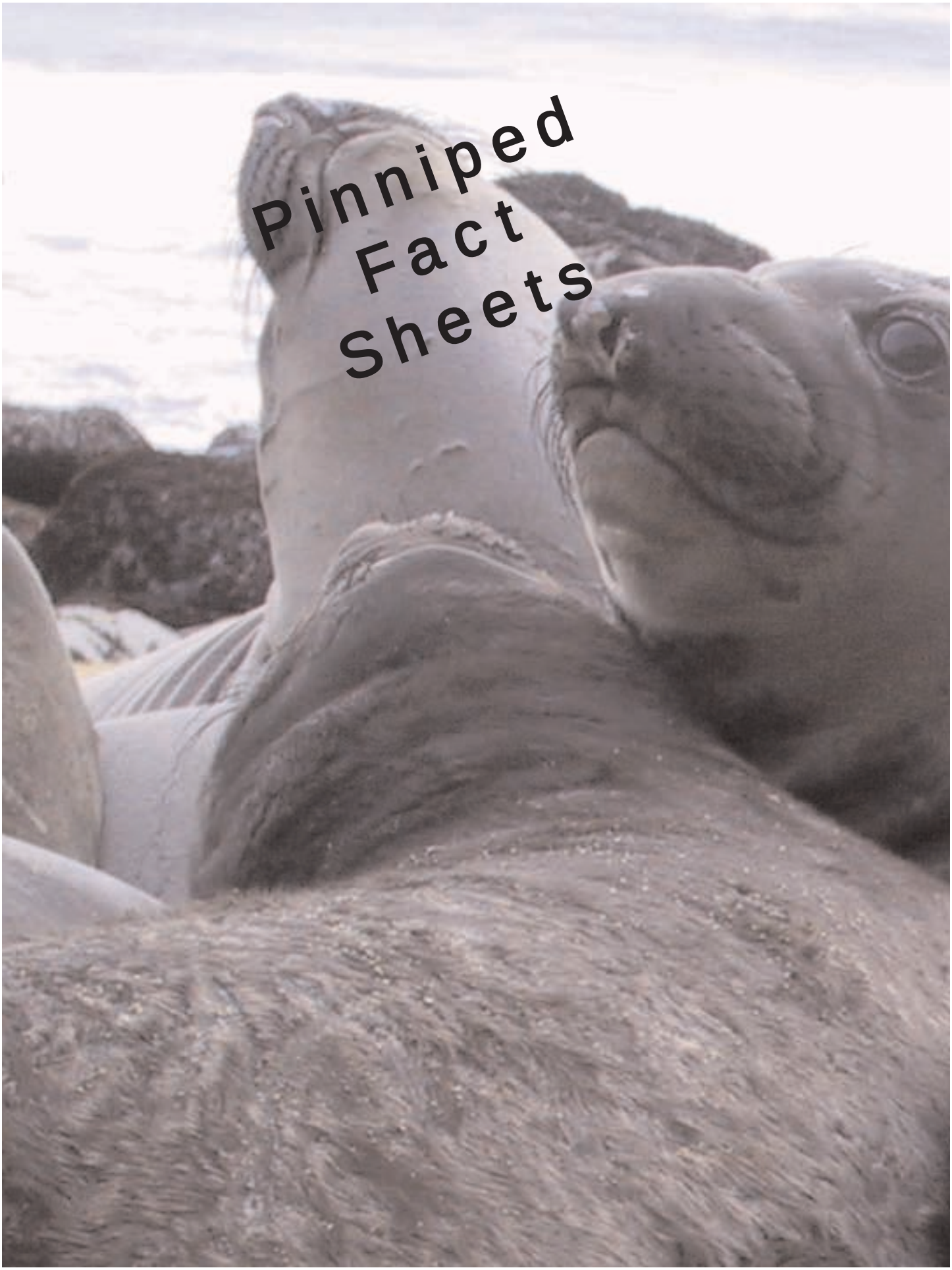
POPULATION ESTIMATES OF SEALS AND SEA LIONS OF POINT REYES NATIONAL SEASHORE 1999

	Pt. Reyes (varies seasonally)	California (varies seasonally)	World
TRUE SEALS (Phocidae)			
Elephant (Northern)	**1,500-2,000**	**84,000**	**150,000**
Harbor (Common, Spotted)	**3,000-5,000**	30,000	380,000-399,000
EARED SEALS (Otariidae)			
SEA LIONS			
California	**<1,000**	80,000	150,000
Steller	**<50**	<5,000	200,000
FUR SEALS			
Northern (Alaska, San Miguel Island, Southeast Farallon Island)	**200,000 (off shore)**		1,765,000

APPROXIMATE PUPPING SEASONS OF SEALS AND SEA LIONS AT POINT REYES NATIONAL SEASHORE



[1] The last Steller sea lion pup born at Point Reyes was born in the 1970s.


Pinniped
Fact
Sheets

CALIFORNIA SEA LION
(Zalophus californianus)

Suborder: Pinnipedia Family: Otariidae

Genus: Zalophus Species: californianus

RANGE AND HABITAT

Range: Found from Vancouver Island, British Columbia, south to the Tres Marias Islands off Baja, Mexico. Sightings in Alaska waters are rare, but increasing. Most are found between British Columbia and Baja, CA. View sea lions on Pt. Reyes at Sea Lion Overlook, 0.2 of a mile east of the Lighthouse parking lot. California sea lions can also be found at Seal Rock near the Cliff House, or at "K" dock, PIER 39, in San Francisco.

Habitat: Coastal. Haul out on sandy or rocky shore, buoys, docks, rafts, etc. Remote, sandy island beaches used for rookeries. In general, the females stay near rookeries year-round, while the males move north in the summer/fall after breeding season. For this reason, few females are seen on Pt. Reyes.

Breeding Grounds: Mainly on the offshore islands from San Miguel Island, part of the Channel Islands National Marine Sanctuary, south to the San Benito Islands off Baja, Mexico, on either rocky or sandy spots. One occasionally breeds on the Farallon Islands.. A geographically distinct sub-species once found in the Sea of Japan is thought to have been exterminated by humans during World War II.

DESCRIPTION

Weight and Length: Males (bulls) are 500 to 900 lbs. and 7 to 9 ft. in length. Females weigh 200 to 350 lbs. and are 5 to 6 ft. in length.

Fur/Color: Short, coarse guard hairs cover minimal underfur. Fur is light brown to chocolate brown; often females will be a lighter buff color.

Head: Pointed dog-like muzzle. In males, a sagittal crest develops on the forehead at around four to five years. This crest and the muzzle area often get lighter in color with age. Please note: Juvenile male sea lions show no adult characteristics and are between weaning age to approximately 4 years of age. Sub-adult male sea lions show adult characteristics that are not fully developed and range in age from 4 to about 7 years.

Ears: 1" external ear flaps.

Nostrils: Contractile valves.

Eyes: Small, dark, adapted for clear vision in and out of the water.

Vibrissae (or whiskers): Smooth. Thought to be highly sensitive and used for detecting vibrations of prey in the water. The position of a sea lion's whiskers - held back or stiffly forward - conveys such states as attentiveness or aggression.

HABITS AND ADAPTATIONS

Movement: The ability to rotate rear flippers underneath its body, enabling it to stand and walk on all four flippers. This adaptation makes sea lions good climbers.

Intelligence: Researchers have discovered that sea lions understand complex commands and can even learn a simplified sort of language.

Neck: Sea lions can bend their long neck back almost touching the base of their tail. This position is comfortable and sea lions are often seen sleeping like this. Adult males have thick necks.

Habits: The California Sea Lion has a highly developed social organization, is gregarious and is one of the most vocal (especially males) of all mammals, marine or otherwise. Most males spend the bulk of the non-breeding season along the coast from California to British Columbia. Most females spend the year off southern California and Mexico at or near the breeding areas. A group of sea lions resting at the ocean's surface is called a "raft" of sea lions.

Locomotion: They can swim up to 25 mph in short bursts, descend 450 feet below sea level, and remain submerged for 20 minutes. To increase speed and perhaps "play," sea lions will propel themselves out of the water, a behavior called "porpoising."

DIET

Natural: Squid, octopus, abalone, herring, rockfish, mackerel hake, anchovies and lampreys. California Sea Lions are called "opportunistic feeders" eating whatever fish is in abundance at a given time and place. They learn when and where fish will be in abundance at particular times during the year. California Sea Lions forage at night and during early morning or twilight evening hours, but will also forage during the day when prey is abundant.

BREEDING AND MATURATION

Birth: Usually a single pup is born in June or July.

Gestation: One year--delayed implantation with 9 months' development.

Birth Weight and Length: Approximately 13 to 14 lbs. and up to 2 feet in length.

Mother-Pup Suckling and Recognition: Immediately after birth, even before the pup nurses, the mother and pup will vocalize back and forth until they learn each other's call. The mother also learns her pup's scent. When a mother comes ashore after feeding, she vocalizes repeatedly while visually examining all pups. However, her pup's scent is probably the feature that confirms recognition. Recognition between mother and pup probably is mutual by two months; until then it depends on the mother. Females will only suckle their own pups. A pup learns the location of the mother's four retractable teats and goes from one to the other as it suckles. Nipples emerge during suckling; after a pup releases a nipple, it retracts. Suckling is surprisingly noisy.

Weaned: 5 to 6 months, occasionally extended to as much as 1.5 years.

Breeding: Females come into estrus about two week after their pup is born. At a rookery, a male's breeding territory can include both sandy beach and low reefs in the water. Males will patrol their territory either on land or by swimming back and forth between its boundaries, barking continuously and posturing at neighboring males or possible challengers. California Sea Lions do not actively heard and keep females in a group or "harem" as Northern fur seals do; females can easily move between territories if they choose. Bulls leave in late July and August, after breeding with the females in their territory.

Sexual Maturity: Female: Approx. 3 years. Male: Approx. 5 years.

Life Expectancy: In the wild, California Sea Lions will live 18 to 25 years. In captivity, they have lived 25 years or more.

Predators: Killer whales, sharks and humans. Historically, sea lions have been hunted and killed for oil and dog food.

MISCELLANEOUS

The California sea lion is the well-known "trained seal" that is commonly found in acts at zoos, circuses, and oceanaria.

STELLER SEA LION (northern sea lion)
(Eumetopias jubatus)

NOTE: THIS SPECIES IS FEDERALLY LISTED AT THREATENED!

Suborder: Pinnipedia Family: Otariidae

Genus: Eumetopias Species: jubatus

RANGE AND HABITAT

Range: throughout the North Pacific rim from Central California through Alaska to Japan, sometimes moving as far north as St. Lawrence Island in the Bering Sea during the summer months. At the end of the breeding season, late fall, there is a northward movement of adult males. They return the following spring. At Pt. Reyes, Steller sea lions may be viewed from the Sea Lion Overlook, 0.2 of a mile east of the Lighthouse parking lot.

Breeding Grounds: Currently Steller sea lions breed mainly on rookeries off the central coast of the Gulf of Alaska, along the Alaskan peninsula, and throughout the Aleutian and Pribilof Islands. In the western North Pacific, off the coast of Asia, rookeries are found on Kuril Islands, Kamchatka Island, and on the islands in the Okhotsk Sea. In California, small rookeries are found in Año Nuevo Island, Southeast Farallon Island, Ft. Ross and Cape St. George in Northern California. Historically, rookeries were found on Pt. Reyes and on San Miguel Island, in California's Channel Islands. However, the last pups were born in the 1970's on Pt. Reyes and in 1982 on San Miguel.

Population: Approximately 200,000. However, the population is experiencing a drastic decline, over 80%, since 1965. In 1990 the Steller sea lion was placed on the United States' threatened species list.

DESCRIPTION

Weight and Length: Largest sea lion. Males measure 8 to10 feet in length and weigh up to 2,000 lbs.; females measure 6 to 9 feet in length and weigh 600 to 900 lbs.

Fur/Color: The animal was named after Wilhelm Steller, who first described the species in 1741 calling it lion of the sea because of the lion-like mane of the male, leonine golden eyes and roar. Males are light tan to auburn with darker shading on the chest, abdomen and flippers. The fur around the neck and chest of adult males is long and mane-like. Young females are comparatively lighter. Pups are a silvery black color when born, but within two years, and after several molts, their coats are similar to the adult color. The coat can be chocolate-brown in immatures.

Head: Broad and bear-like, with visible external ear flaps. The snout is short and straight. The hairless black tip of the nose is larger than that of California sea lions. (Males do not have the sagittal crest as do California Sea Lions.)

Vibrissae (or whiskers): Long and smooth. Thought to be highly sensitive and used for detecting vibrations of prey in the water. The position of a sea lion's whiskers - held back or stiffly forward - convey such states as attentiveness or aggression.

HABITS AND ADAPTATIONS

Movement: Like all Otariidae, Stellers have reversible rear flippers which rotate underneath, enabling them to walk of all four flippers. Their broad, long front flippers power them through the ocean.

Diet: Steller sea lions forage near shore and over the continental shelf. In Alaska, they feed primarily on walleyed pollock. (Now competing with a rapidly expending commercial fishery.) In other parts of their range, they are more opportunistic feeders, eating herring, cod, squid and rockfish, blackfish, greenling, sardines, salmon, steelhead and, occasionally, harbor seal pups. Those that frequent river mouths in Oregon sometimes feed on lampreys and salmon parasitized by lampreys.

BREEDING AND MATURATION

Birth: Single pup born primarily May through June.

Gestation: One year--delayed implantation, with 9 months' development.

Breeding: Most females arrive at the rookery only a few days before delivering a single pup. Within two weeks, they mate with a territorial male, usually once. On rookeries, males establish breeding territories using ritualized displays and vocal threats. Actual fights are occasional but brief. Females move around the rookery freely.

Swim: Pups gain swimming experience by swimming in the tidepools. At one month of age, pups begin accompanying their mother on short trips to sea.

Mother/Pup Suckling and Relations: Female leaves 1-3 month old pup on shore during extended foraging bouts.

Sexual Maturity: For both males and females, sexual maturity comes around three years. The males begin to return to the rookery beach at this age, but must wait until they are fully grown before they can challenge the dominant males for territorial rights.

Predators: Killer whales, sharks, humans, bears (in Alaska).

MISCELLANEOUS

Because the Steller sea lion population has declined drastically (by 52% in parts of Alaska between 1960 and 1985) it was placed on the U.S. threatened species list in the spring of 1990.

NORTHERN FUR SEAL
(Callohorinus ursinus)

Suborder: Pinnipedia Family: Otariidae

No Picture This Year

Genus: Callorhinus Species: ursinus

RANGE AND HABITAT
Range: North Pacific. Long-distance seasonal migrants. Leave rookeries in October through November and remain offshore until March through June. Adult males overwinter in north Pacific, females and subadult males spend winter offshore from southeast Alaska to central California.

Breeding Grounds: Remote Alaskan Islands (primarily Pribilofs), but also San Miguel Island, CA, and Farallon Islands, CA.

Population: 1,765,000 world-wide.

DESCRIPTION
Weight and Length: Males to 7 ft. and 600 lbs., females 4.5 ft. and 100lbs., pups 2 ft. long and 11-12 lbs.

Fur/Color: Thick fur, silver gray to brown with lighter throat, appears black when wet.

Head: Round with large eyes and short, conical snout. Adult males have thickened neck and pronounced furred crown.

Vibrissae (or whiskers): Black at birth and lighten with age until white by age 6-8 years.

HABITS AND ADAPTATIONS
Behavior: Inquisitive and mostly solitary at sea. Adults come ashore only briefly, congregate on rookeries annually to pup and breed. Sleep with nose, one front, and both hind flippers above the water while at sea. Occur in deep waters off the continental shelf.

Diet: Feed primarily at night on squid and a variety of schooling fish such as Pacific whiting, herring, pollock and capelin, and crustaceans.

BREEDING AND MATURATION
Birth: Single pups born late June through July.

Gestation: Almost 12 months

Breeding: Late May or June

Swim: Dive up to 7 minutes to over 600 ft.

Mother/Pup Suckling and Relations: Lactation lasts 4 months; pups suckle intermittently between females' foraging trips at sea (up to 250 miles from rookery).

Sexual Maturity: 4-5 years.

Predators: Killer whales, sharks, humans, bears.

PACIFIC HARBOR SEAL
(common seal , spotted seal, hair seal)
(phoca vitulina)

Suborder: Pinnipedia Family: Phocidae

Genus: Phoca Species: vitulina
Subspecies: richardsi

RANGE AND HABITAT

Range: North Pacific coastlines from the Arctic and Bering Seas to Baja, California. (Other subspecies of harbor seals occur on either side of the North Atlantic and North Pacific Oceans.)

Habitat: Rocky shores as well as estuaries and bays, and where sandbanks are uncovered at low tide. Found in the San Francisco Bay. They tend to haul out on offshore rocks or secluded beaches and sand bars at low tide. They can often be seen from a distance at Drake's Estero, either on shore or sometimes paralleling a hiker from the water (harbor seals are very curious when in the water).

DESCRIPTION

Weight and Length: Average adult weighs 150 to 250 lbs. and is 4 to 5 ft. in length. There is little sexual dimorphism. Smallest seal in the United States, chunky shape.

Fur/Color: Generally silvery or gray with a black spotted coat, or black with white spots. Some are rusty-colored due to iron oxides attaching to hair. Appears dark or black in the water. There is no color difference between males and females.

Head: Round, cat-like.

Flippers: Nailed; soles and palms are covered with hair; small front flippers.

Ears: No external ears, but the ear hole is visible when open.

Nostrils: Contractile valves.

HABITS AND ADAPTATION

Movement: Cannot rotate hind flippers underneath. Movement on land includes sliding, wriggling or rolling movements that resemble a caterpillar. In the water, harbor seals are often seen floating with just their heads poking out of the water. They can dive 1000 feet and may remain underwater for up to one hour.

Social Life: Usually found in small groups of 100 animals, but may congregate in groups of up to 1000 individuals. Males engage in rivalry in the water. Harbor seals are both year round residents and long distance migrators. Movements are associated with feeding and breeding. Unlike elephant seals they are not strongly thigmotactic.

Voice: Harbor seals grunt and snort. Pups have a crying sound very much like "Maa." Adults and immatures also produce sounds by slapping the surface of the water with their flippers.

DIET

Whatever is locally abundant. Small schooling fish. Herring, anchovy, rockfish, flounder, sculpin, octopus, squid and crustaceans

BREEDING AND MATURATION

Birth: In California, single pups are usually born from March to June on land. Occasionally, pups are born in the water. Pups can swim at birth.

Gestation: One year -- delayed implantation of 1.5 to 3 months -approx. 9 months development.

Birth Weight and Length: Approximately 20 to 24 lbs. and 24" length. At birth pups have the adult spotted coat --color may be bluish-gray. A white to blue-gray lanugo pelage (fine dense fur) is usually shed before birth in this sub-species, but retained in the Alaskan sub-species.

Swimming: Pups can swim at birth.

Mother/Pup Suckling and Relations: Pups nurse about 4 weeks, reaching a weight of about 50 lbs.
In attendance continuously, the mother takes the pup into the water to feed.

Breeding: Mating usually takes place in the water. They have a mating system in which males compete in courtship displays to attract females. There is much to be learned regarding their breeding behavior.

Sexual Maturity: Female: 2 to 4 yrs. Male: 2 to 4 yrs.

Lifespan: Approximately 20 to 25 yrs. The oldest animal recorded was about 30.

Predators: Killer whales, polar bears, sharks, dogs, coyotes; golden eagles and Steller sea lions may prey upon pups.

MISCELLANEOUS

Harbor seals, as many pinnipeds, are sensitive to human activities nearby their terrestrial haul out sites. Seals will stampede into the water when approached too closely. Mothers become separated from pups during such disturbances. We recommend that people approach no closer than 300m or 1000 ft, or if you see seals move towards the water, retreat away from the seals.

Each year people find harbor seal pups and pick them up thinking that they have been abandoned. Usually they are not abandoned; the mother seal is no doubt watching nearby. Wait, observe, and call Pt. Reyes National Seashore at 415 663-8525 if you find a pup. Park Service policy is to always leave the pup.

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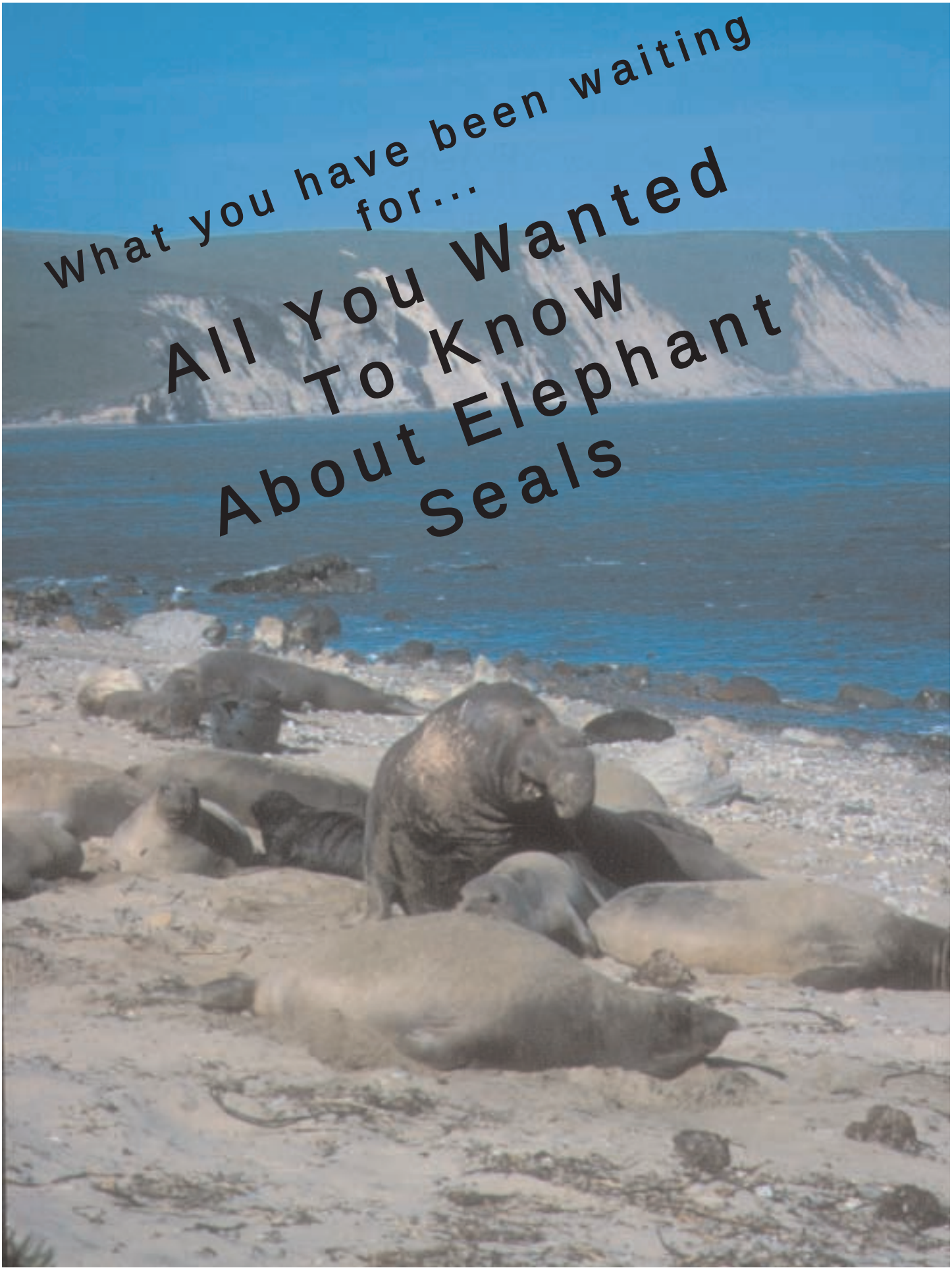
What you have been waiting for...
All You Wanted To Know About Elephant Seals

Elephant Seals

Susan Van der Wal

Point Reyes National Seashore

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On Land 4
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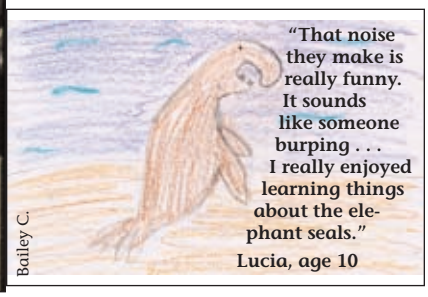


Bailey C.

"That noise they make is really funny. It sounds like someone burping . . . I really enjoyed learning things about the elephant seals."
Lucia, age 10

Wild Wonders of the Deep

Point Reyes National Seashore is one of the few places in California where you can see North America's largest seal, the northern elephant seal. On shore for only a few months each year, these large but elusive creatures are often heard before they are seen. They are very social on land yet live a solitary existence at sea. This is the story of a remarkable species, living a life of extremes.

A Close Call with Extinction

While exploring the Pacific Coast in the 1800s, a British whale and seal hunter named Charles Scammon saw northern elephant seals from Baja California in Mexico, to Point Reyes, California, north of San Francisco. Elephant seals currently range from Mexico to Alaska and spend 80 percent of their life in the open sea. Sharing the fate of many of the oceans' great whales, they were hunted to the brink of extinction for their oil-rich blubber. One bull elephant seal would yield nearly 25 gallons of oil. Though we don't know exactly how many northern elephant seals were alive before the twentieth century, it has been estimated that fewer than 1,000 existed by 1910. The Mexican government banned elephant seal hunting in 1922, followed shortly by the United States government. Since then, the population of northern elephant seals has recovered at an average annual rate of 6 percent. Today, thanks to government protection and the seals' distant lives at sea, the worldwide population has grown to an estimated 150,000 animals.

Elephant seals exemplify the remarkable recovery of a near-extinct species.

After being absent for more than 150 years, elephant seals returned to Point Reyes Headlands in the early 1970s. In 1981, the first breeding pair was discovered near Chimney Rock. Since then, researchers have found that the colony is growing at a dramatic annual average rate of 16 percent. When severe storms occurred in 1992, 1994, and 1998, many pups were killed. During the El Niño winter of 1998, storms and high tides washed away approximately 85% of the 350 young pups before they had learned to swim. Nevertheless, the Point Reyes winter population of elephant seals is between 1,500 and 2,000. Fanning out from their initial secluded spot, the seals' expansion to popular beaches is causing concern for both their safety and that of their human visitors.

Proximity of People and Pets Raises Concern

A beach full of lumbering and slumbering seals is a rare and spectacular sight. Some people feel compelled to get "just a little closer". Unlike other seals and sea lions that react by stampeding into the water when disturbed, elephant seals do not always retreat from humans. Instead they may react by fighting with each other or moving to another section of beach. An ill-timed move could crush a pup or separate a female from her pup, creating a possible life-or-death situation for the young elephant seal. Human presence especially frightens pregnant females and new mothers, discouraging them from returning the next year. When surprised or approached too closely, elephant seals will also chase or bite people. Any change in elephant seal behavior caused by a person is, by definition, a violation of the Marine Mammal Protection Act. If you are less than 100 feet from an elephant seal, you are too close.

Dogs pose a safety concern to elephant seals. Predatory behavior and possible disease transmission (from dogs to seals, or vice versa!) could create serious problems for either animal. A dog's scent can frighten and disturb seals. Even on a leash, a dog may threaten seals by barking or cause injury by biting. Some beaches in the Park will temporarily be closed to dogs as the beaches become inhabited by breeding elephant seals.

Kim Linse

Leashed dogs are welcome on South Limantour, North, South, and Kehoe Beaches when wildlife restrictions are not in place. Please inquire at the Visitor Centers about pet restrictions and watch for closure signs.

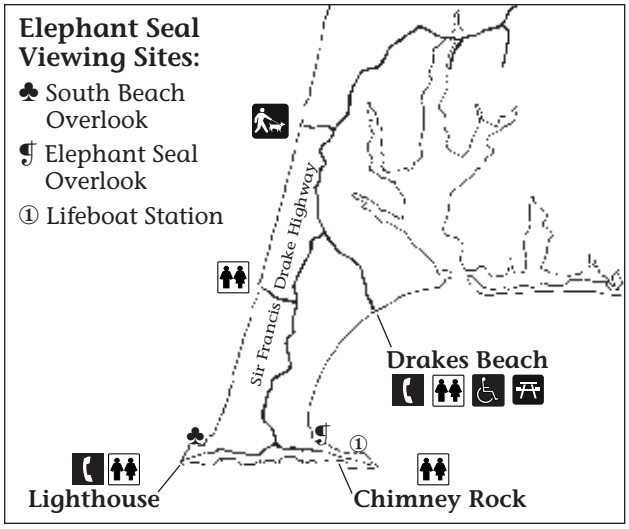
Competition for Habitat

Sensitive resources such as birds and plants are also affected by elephant seals. The western snowy plover, a federally-threatened species under the Endangered Species Act, breeds on few California beaches. Loss of habitat to beachfront development and human recreation has forced elephant seals and plovers to compete for limited protected space. Also, rare plants native to coastal dunes are potentially at risk. Elephant seals and their curious

human visitors may physically crush plants that are struggling to remain alive.

The Park's task is to balance the expansion of the elephant seal colony while providing for the health of other species. To manage this balance, the Park will continue its docent program, which provides visitors with on-site information and safety messages at the overlooks. To anticipate where the elephant seals might expand to next, researchers will attempt to discover why seals prefer to breed on some beaches and not others. This information will allow the Park to make informed choices about appropriate beach use by people, pets, and wildlife.

Biologists monitor seal behavior.



At Sea

The Secret Lives of Elephant Seals

Northern elephant seals are mysterious and unique creatures. Not only do they spend most of their life in the ocean, but 90 percent of that time is spent underwater: eating, sleeping, digesting, and traveling. They are built to survive continuous dives to depths that would squeeze the life out of any other mammal. The average dive reaches 2,000 feet, lasts close to half an hour and is followed by only 3 to 5 minutes at the surface to breathe. Imagine being able to live in such extremes!

The deepest dive on record is over 5,000 feet and the longest dive is 2 hours!

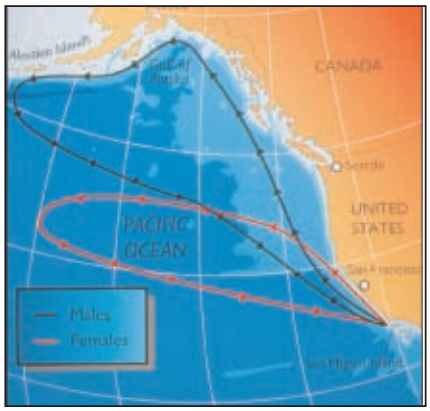
Why do they dive so deep? The oceans are full of food for millions of animals, but relatively few feed at the depths elephant seals prefer. As a result, they face little competition for food. Feeding in almost total darkness, elephant seals use their large eyes and the bioluminescence of some prey, such as octopus and squid, to find food where other predators would not even be able to see. They may use their stiff yet sensitive 3- to 8-inch whiskers to "feel" some food, such as Pacific hake, skates, rays, shrimp, small sharks and crabs.

What allows such deep diving? Pressure increases as any object goes deeper into the ocean. As animals dive, the pressure on the outside compresses the air in their bodies. Elephant seals differ from humans in that when they dive, they carry all the oxygen they need in their blood rather than in their lungs. Before they dive, elephant seals exhale, collapsing their lungs so there is little air to be compressed. As they dive, the seals' fat is also compressed so that the animals lose buoyancy and sink, allowing the seals to achieve great depth with little effort.

Electronic devices (time depth recorders) attached to elephant seals measure the depth and duration of dives, the amount of time spent resting at the surface between dives, and the sequential patterns of dives.

Elephant seals prolong their dives by reducing their heart rates. A seal resting on land has a heart rate of 55 to 120 beats per minute, but when diving, the heart slows to 4 to 15 beats per minute. The seal maintains normal blood pressure by decreasing the blood supply to its extremities, allowing the blood to flow primarily to the vital organs and the brain. This also helps the seal conserve body heat when down in the cold ocean depths.

During semiannual migrations, adult males and females not only travel thousands of miles apart, but also tend to have different feeding patterns. Males tend to return to the same feeding areas off the Aleutian Islands each year, while females tend to feed in the northeast Pacific and near Hawaii. To complete their two annual round-trips, females journey over 11,000 miles, males 13,000 miles. Males dive deeply and repeatedly for food. After about 3 weeks, they have eaten so much that their dive pattern changes to a flat-bottom dive, following the bottom contours as they rest and digest. Females also dive deeply and repeatedly, but they go deeper during the daytime than at night.



Joe LeMonnier/(c)1996. Reprinted with permission of Discover Magazine

Northern elephant seals journey between their feeding grounds and land twice each year. They return to land in winter to breed and in spring/summer to molt (shed).

Although their locations and diving patterns differ, both sexes dive repeatedly for 4 to 5 months during summer and fall. Research suggests that elephant seals forage continuously during their migrations and, furthermore, they don't sleep! They may take underwater "catnaps" 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.

Point Reyes National Seashore is one of the few places on the Pacific Coast where northern elephant seals can be observed and studied on shore. Their semiannual sojourns to the shores of Point Reyes provide a unique opportunity to glimpse the lives and behaviors of these elusive ocean giants. Visit the Elephant Seal Overlook near Chimney Rock and discover for yourself the secrets of these wild wonders of the deep!

On Land

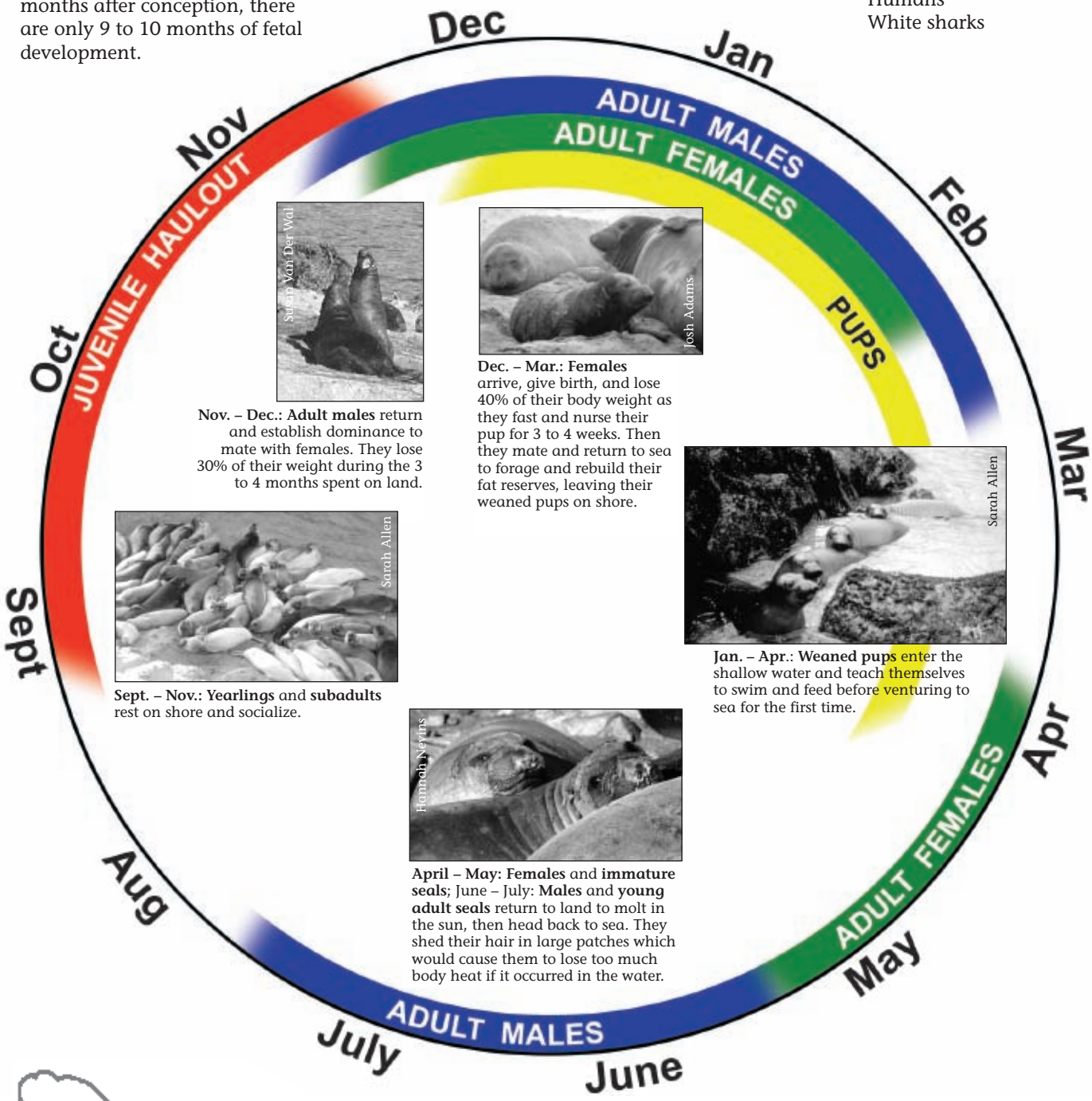
Northern elephant seals can be seen on land at Point Reyes National Seashore for a few months each year. During the rest of the year, elephant seals live only in the ocean.

Delayed Implantation

Although pups are born 12 months after conception, there are only 9 to 10 months of fetal development.

Predators

Orcas
Humans
White sharks



Nov. – Dec.: Adult males return and establish dominance to mate with females. They lose 30% of their weight during the 3 to 4 months spent on land.

Dec. – Mar.: Females arrive, give birth, and lose 40% of their body weight as they fast and nurse their pup for 3 to 4 weeks. Then they mate and return to sea to forage and rebuild their fat reserves, leaving their weaned pups on shore.

Jan. – Apr.: Weaned pups enter the shallow water and teach themselves to swim and feed before venturing to sea for the first time.

Sept. – Nov.: Yearlings and **subadults** rest on shore and socialize.

April – May: Females and **immature seals**; June – July: **Males** and **young adult seals** return to land to molt in the sun, then head back to sea. They shed their hair in large patches which would cause them to lose too much body heat if it occurred in the water.

0 feet — 13 -18 feet

Bulls weigh 3,000-5,000 pounds.

0 feet — 8 -10 feet

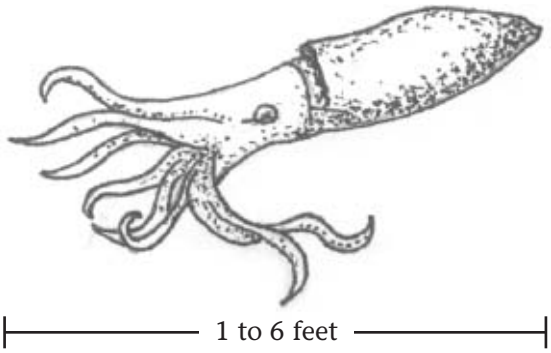
Cows weigh 800 -1,200 pounds.

0 feet — 3 - 4 feet

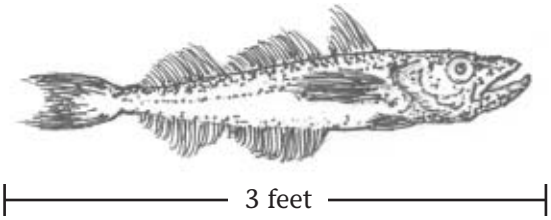
Pups weigh 70 pounds at birth. When weaned at 4 weeks, they weigh nearly 300 pounds.

What Do Elephant Seals Eat?

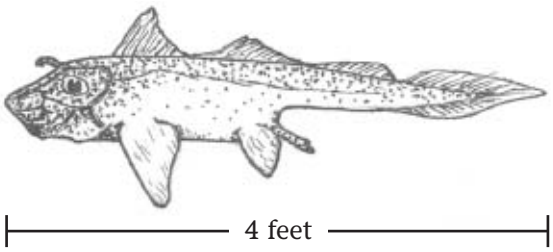
While elephant seals are at sea, they need to store enough energy to sustain themselves when they haul out to give birth and mate in the winter and again in the summer when they molt. But how do you find out what an elephant seal eats at sea when it dives to depths of up to 5,000 feet? By looking at the stomach contents of elephant seals that have died, scientists have found that seals have a varied food source with their favorite or most common food being squid that can be up to 6 feet long.



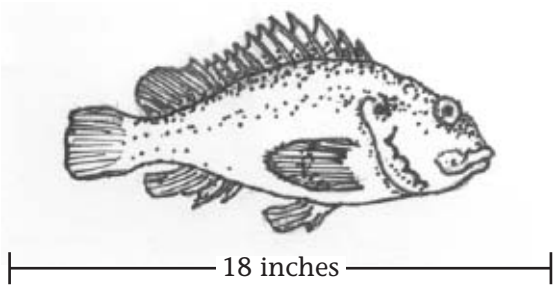
Squid are the most frequently consumed prey of the northern elephant seal. They live far offshore in deep water and are found in large groups. This grouping occurs during the breeding cycle and also when following large schools of prey.



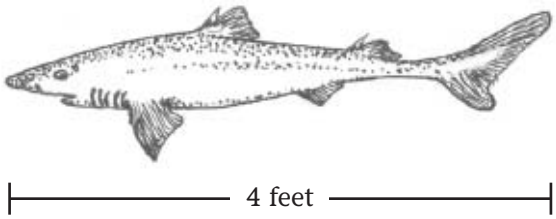
Pacific hake range from northern Alaska to Magdalena Bay in California, and are found at depths of 183 to 914 meters. They are schooling fish migrating vertically each day (feeding nearer to the surface as night approaches), and offshore in the winter. It feeds mainly on fishes, but also on squid and crustaceans.



Ratfish are found mainly in the cooler regions of the Atlantic, Pacific and Indian Oceans. They are long-bodied fish, sharklike in many respects, with a long dorsal spine that is connected to a venom gland. They are very abundant and are found at depths of 92 to 913 meters.

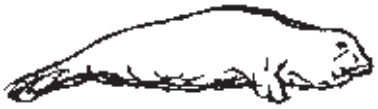
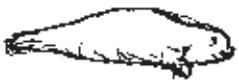


Rockfish belong to the family of redfishes and scorpion fishes, and are found worldwide, except in the Antarctic region. They are abundant fish living at depths of 73 to 640 meters, and are important commercial species, as well as an important prey of halibut and albacore. Average length is 18 inches.



Dogfish have a sharp spine in front of the dorsal fin which can inflict serious wounds made worse by the venom that is injected. These sharks are found worldwide in inshore waters at depths up to 950 meters.

Identifying Elephant Seals by Age and Sex

Bull	– heavy pink scarring – chest shield rises above eyes – big heavy nose with notch across top
Sub-adult 4	– less scar tissue on chest – chest shield does not rise above eyes – less of a notch
Sub-adult 3	– light scarring – while lying on sand, nose will touch ground – wrinkles on chest
Sub-adult 2	– while lying on sand, nose will not touch ground – no chest shield – definite male nose
Cow	– often seen with pup – can see nipples when lying on back – no big nose
Yearling	– harbor seal size – blonder, lighter fur – smaller than other adults
Weaner 	– not associated with a female – silver coat, patchy black fur on some
Pup 	– black fur – close to a female – wrinkly when first born – nursing

Elephant Seal Monitoring

Sean Case

Have you ever wondered how scientist learn about animals as unusual as elephant seals? By monitoring elephant seals at Point Reyes researchers and scientists determine trends in seal populations, migration, and reproductive success. This data is used as a baseline to determine trends, quantify annual reproductive success, and learn about their biology.

When Does the Monitoring Happen?

Elephant seals arrive at Point Reyes in December through March during the breeding season and again during May through July, as seals return to Point Reyes to molt (shed and regrow their entire fur coat).

Where Does the Monitoring Happen?

The monitoring occurs in all the elephant seal colonies found on the Point Reyes Headlands including the colony that you will visit at Chimney Rock.

What Are the Methods?

Researchers visit elephant seal colonies regularly during the pupping and mating season. They count seal numbers, births, deaths, and document unusual behavior. Listed below are other methods that researchers use to determine biology and to track individual animals.

Flipper Tags

These tags are made of colored plastic. The color of tags used by researchers can let you know the geographic location where the animal was tagged. Marine mammal rehabilitation hospitals, like The Marine Mammal Center, tag their rehabilitated patients that are released back to the wild with orange tags only. Sea lions are tagged on their front flippers. Seals are tagged in the webbing between digits on their hind flippers.

Brands

Researchers will tag and permanently brand numbers on the animal's back or side in an effort to track the animal during its entire life. Tags are not as reliable as a brand. Tags may fall off, or the numbers may rub off. Tags are harder to see. The continued observation of branded individuals can provide a wealth of information about range, behavior, and life history of not only that individual but the entire species. The numbers are put on with either a hot brand or a cold brand. A hot brand is done with a heated metal number. The cold brand is a copper number chilled with liquid nitrogen. With both procedures the animal must be held still—not an easy task. The hot brand takes seconds to leave a mark, while the cold brand may take a minute or more. Hot brands are easier to apply, but they kill the fur follicles and cause deep damage if done carelessly. Cold brands are not as damaging. The fur grows back white in color, so the number is visible.

Dye Marks

Numbers, names, or identifying marks are sometimes dyed into the fur of seals and sea lions. Regular hair dye, donated by a company or by Lady Clairol TM, is used. Dye marks are only temporary as they disappear when the animal molts.

Time Depth Recorders, Radio Tags and Satellite Tags

Time depth recorders (TDRs) are set in a white plasterlike base and are glued with epoxy to the seal's back. These are convenient to use with elephant seals that return to the same location on land when they molt, so the TDR can be easily retrieved. The information gathered by a TDR is transferred to a computer for analysis. TDRs are activated by sensing light and dark. TDR data enable scientists to see how often the animal dives, and the depth and duration of the dive. Researchers have also used TDRs with harbor seals.

Radio tags and satellite tags have a small transmitter and battery encased in epoxy. The antenna can be internal or protrude. The tags may be attached to a flipper or glued to the head or back with super glue. Each radio tag has a specific radio frequency. The signal is detected using a handheld receiver.

Seal Viewing Tips

For your own safety...

-Always observe elephant seals from a distance. Use binoculars and spotting scopes. If a seal becomes alert or nervous and begins to move away, you are too close. Stay at least 100 feet from any marine mammal.

-Do not come between a cow and pup, a bull and a group of cows, or two bulls challenging each other.

-Watch quietly; whisper. Move slowly.

-Bring your pets only where they are allowed.

-Observe beach closures and restrictions.

Susan Van Der Wal

Special Thanks

Special thanks for support and contributions:

Point Reyes National Seashore Association
Gulf of the Farallones National Marine Sanctuary
Año Nuevo State Reserve
Marine Mammal Center
Canon, USA, Inc. "Expeditions in the Park"
National Park Foundation

NORTHERN ELEPHANT SEAL (MIROUNGA ANGUSTIROSTRIS) FACT SHEET

Suborder: Pinnipedia **Family:** Phocidae
Genus: Mirounga **Species:** angustirostris
As a phocid, elephant seals like harbor seals are “true seals.”

HISTORICAL CONTEXT:
By the turn of the 20th Century, the Northern Elephant Seal had been hunted nearly to extinction for their blubber, which was used for heating oil. In 1910 there were only a few thousand elephant seals left, and these were on Guadalupe Island off Baja, Mexico. The Mexican Government gave protective status to the species in 1922, and the U.S. Government followed suit a few years later.

POPULATION ESTIMATES:
The 1994 population is estimated at 150,000; this is an increase of approximately 6% per year since 1991 when the population was estimated at 127,000. In 2001, the population is estimated at 170,000 individuals. No one really knows when the population will level off or even what the historic populations were prior to hunting.

CURRENT HAUL OUT AND BREEDING LOCATIONS:
Mainland - Point Reyes, Año Nuevo, Cape San Martin/Gorda, Piedras Blancas, Crescent City, and southern Oregon

California Islands - Southeast Farralon, Año Nuevo Island, San Miguel, Santa Rosa, Santa Barbara, San Nicolas, San Clemente.

Mexican Islands - San Martin, Guadelupe, San Benito, Cedros, Natividad

DESCRIPTION
Fur/Color: Adults are brown to gray above, lighter below. Pups are born with a black pelage or "lanugo" (they are often called "blackcoats"). This coat is molted after weaning when a sleek, silver/gray coat appears. Within a year, the coat will turn to a dull brown color, due to wear.

Proboscis: An enlarged proboscis develops on the males beginning at sexual maturity (about 3 - 5 years) and is fully developed by about 7 - 9 years.

Fur Color and Proboscis

Flippers and Locomotion: The front flippers have fur and 5 nails, while rear flippers have hair but no nails. The rear flippers cannot articulate forward of their point of attachment as they do on sea lions, therefore they move differently on land as well as in the sea. The shorter front flippers of elephant seals are held close to their body while swimming, and they use powerful hip muscles and their rear flippers to propel them through water. When moving on land, elephant seals use their front flippers and heave their body forward, enhanced by an undulating motion similar to the that of an inch worm. Their rear flippers are dragged behind uselessly. As a result, they can not haul out on offshore rocks.

Their preferred haul out sites are gradually sloped beaches often where sand is prevalent. When necessary they can move very quickly on land for short distances.

Ears: The northern elephant seal lacks external ear flaps, and the ear holes are almost invisible.

Eye size, closed nostrils and and lack of external ears

Eyes: Elephant seals possess many characteristics that assist them in seeing underwater. They have very large eyes in proportion to their body size, up to 3" in diameter. The eyes have a much greater density of photoreceptors than in other pinnipeds. The lens is large and spherical to compensate for the absense of the refractive power of the cornea in water. There is also a membrane in back of the eye called a tapetum lucidum, which reflects some of the light rays back to the photoreceptors of the retina, thus magnifying the light received. This membrane is characteristic of nocturnal carnivores.

Nostrils: The nostrils contain contractile valves that close tightly when asleep and have to be snorted open upon awakening. This allows the seal to dive without taking in water through their nostrils. Also an extensive honeycomb structure in the nasal cavities, called the turbinate process, acts as a condensation chamber to minimize water loss during breathing.

SIZE: (mean standard length and weight)
As a result of sexual dimorphism, the size of males and females differ greatly.
Adult males weigh an average of 3.5 times the females (range 2 - 7).
Adult males are on average 1.4 times longer than mature females.

Female with Pup

Adult male: 11.5 - 15 feet (the longest bull measured in recent times was 16.5 feet)
3,146 - 5,060 pounds (one photographed male was estimated to weigh 5,610 pounds).
Adult female: 8 - 9 feet, (792 - 1562 pounds)
Pups: approximately 3 - 4 feet, (60 - 80 pounds)
Weaners: approximately 4.5 feet, (264 - 330 pounds)

Bull, Full Grown

While fasting during the breeding season, both sexes lose slightly more than 1/3 of their mass.
Males lose up to 1,048 - 1,870 pounds. Females lose 264 - 520 pounds

LONGEVITY AND MORTALITY:
Females 20 years. Maximum age at Point Reyes was 22 years.
Males 14 years. Maximum age at Año Nuevo was 17 years.

Super-weaner

Predation
Predators are white shark (Carcharodon carcharias), blue shark and killer whale (Orcinus orca). Cookie cutter sharks also feed on elephant seals, but are considered a parasite. Cookie cutter sharks are members of the dogfish family and are small sharks. Their upper teeth are all connected together as are the lower teeth. This tooth arrangement creates a blade-like morphology within the mouth of the shark. These sharks use

suction to attach to their prey. They latch onto their prey, bite, and then spin. This movement removes an almost perfect circular chunk from their prey. Look for these circular scars on the bodies of elephant seals.

Bears were terrestrial predators of elephant seals.

SEXUAL MATURITY:
Females give birth for the first time at an average age of 3 - 4 years (range 2 - 6 years).
Males are sexually mature at age 5, fully developed at age 9. The prime breeding years are 9-12.
Males do not reach high rank before age 8.

BREEDING SEASON: (December through mid-March)
The breeding season is from December through mid-March. Adult males arrive on the breeding beaches first, with all the serious mating competitors present at the rookery by the end of December. Younger males leave the rookery in February, but the larger bulls remain on the rookery until the end of March, long after the last female has departed.

Birth: Pregnant females begin arriving in early to mid-December and reach a peak during the period from January 26 to February 2. Females give birth within 6 days after arriving. At birth, pups weigh about 70 pounds, and their weight increases to about 300 pounds by the time they are weaned in about 4 weeks.

Mother-Pup Suckling and Relations: Pups nurse for about 25 days (ranging from 25 to 28 days), generally gaining nearly 10 pounds each day on average. At the end of this period of nursing, the female, who has been out of the water and fasting for about 35 days, weans her pup by returning to the sea on her last day of estrus.
Note: Pups gain on average, 57.5% of the mass lost by their mothers.

Breeding: During the last 3 - 5 days of nursing the female is in estrus and copulates. A female will come into estrus and mate (sometimes before weaning) with one or more of the socially dominant males on the rookery beaches, or as she is leaving and entering the ocean.

Gestation:
Though gestation last for 11 months actual fetal development lasts 9 months after a delayed implantation. After fertilization of the egg, the blastocyst, or fertilized egg follows several cell divisions and remains free in the uterus. At the end of 2 months the blastocyst implants in the uterus wall, and active fetal development begins.
Delayed implantation is common among pinnipeds.

Pup and Weaner Maturation:
Pups are born lacking the muscular development and motor coordination necessary for prolonged travel at sea. Following weaning, at about 25 days, they spend about a month on the rookery beach playing and venturing into the water shallows for short periods of time, developing and perfecting their ability to swim and feed, before finally leaving for offshore waters.

Notes: Approximately 48% of the weight of healthy pups at weaning consists of fat. They lose about 2.2 to 4.4 pounds a day while fasting during the first two weeks as weaners. During the following eight to ten weeks of fasting they lose about 1.5 pounds each day, so that at the end of ten weeks of fasting they will have lost from 115 to 146 pounds of their initial weight (35% to 55% of their initial weaning weight).

MALE REPRODUCTIVE SUCCESS:
There is great variance in the reproductive success of males during their lifetime, from zero to frequent mating. In a sample of 91 male pups from Ano Nuevo, only 19 (21%) reached breeding age. Of these 19, three were very successful at mating, mating with an estimated 131, 97, and 63 females respectively during their lifetimes (totaling 291 matings). Five other males from the original 19 mated with a total of 69 females, while the remaining 11 surviving males did not mate at all during their lifetimes. In this study, 91.2% (83) of the original 91 male pups did not mate, only 8.8% (8) of them were successful at mating, and of the 19 male pups to survive to breeding age, fewer than half, or 42.1% (8) were successful at mating. In another view, only 8.8% (8) of the original 91 male pups mated with a total of 360 females during the lifetime of this group of males. It would appear that relatively few males contribute to the gene pool of this population of elephant seals.

FEMALE CHOICE IN MATES:
Female elephant seals appear to demonstrate some choice concerning the particular male with which they will mate. If they are not ready to mate, they protest, resist and try to escape. When approached by a male other than the dominant bull, the female will usually protest loudly to alert the dominant bull of the other male's presence. This behavior increases the probability of matings with the largest and strongest males. Sometimes, however, less dominant males do succeed in mating with a receptive female, and often females are mated by sub-dominant males as they are leaving the breeding rookery.

MOLTING
The molting haul out marks the end of the first ocean bound migration for all elephant seals with the exception of the pups. Most mammals shed hair and dead skin layers continuously, but elephant seals lose hair and skin all at once, over a brief period while on land during this haul out. This molting process is so abrupt that it is referred to as being a radical or catastrophic molt. Elephant seals haul out onto rookeries and beaches during the spring and summer months for an annual molt.
Each sex and age class molts at a different time, as follows:
Juveniles and adult females *- during the spring haul out of mid-March through June, peaking in late April;*
Young males *- early summer; and*
Older males *- late summer.*

Juvenile Haul-out: Juveniles haul out in the fall, between mid October and November, resting on shore about 3 weeks. One possible reason for this haul-out is to allow time for immature bones to develop; another reason is that the immatures are starting to follow the haul-out pattern of adults during the breeding season, which begins in November.

MIGRATIONS AND FEEDING:
Annual Migrations:
Pups depart on their first trip to sea by 3 months of age, and spend 4 to 5 months at sea, returning to the rookery in the fall for 3 to 4 weeks. Juveniles make two trips to sea each year, each for about 5 months, returning to the rookery for about 1 month in the spring, mid-March through June, and 1 month in the fall, mid-October through November. As juveniles approach breeding age, the fall haul out occurs closer and closer to the time of the regular breeding season, that is, December through March.

Females make two trips to sea, the first for approximately 2 months in the spring following breeding, and a second trip, of approximately 8 months, following their molt in late spring, for a total of about 10 months at sea.

Males also make two trips to sea, the first following the breeding season, and the second after they have molted in early summer. But, since males arrive before females for breeding, and may stay ashore through most of the breeding season of mid-December to mid-March, their total time at sea of 8 to 9 months is slightly less than the total time females spend at sea.

FEEDING RANGE:
Elephant seals are solitary when at sea, compared to their gregarious social life while ashore. After the breeding season there is a generally northwestern dispersal from the breeding grounds.
The males travel as far north as the Gulf of Alaska and the eastern Aleutian Islands, a round trip of about 4,660 miles, and tend to stay near the continental shelf.
Females head in a more westerly direction to open waters far past the continental shelf, and have been detected far north of the Hawaiian Islands at about 45 to 50 degrees latitude, midway between the Hawaiian and Aleutian Islands. The longest recorded round trip of a post breeding female was about 3,024 miles. Following their molt, pregnant females make round trips of between 2,423 and 4,225 miles.

DIET:
At sea, when foraging, food habits are not well known, but available information indicates that they feed on deep-water bottom-dwelling and mid-water marine life such as ratfish, hagfish, sharks, spiny dogfish, eels, various rockfish, octopus and squid.
While ashore, elephant seals (aside from new pups) neither eat nor drink but fast, subsisting on stored fats, or blubber. Even weaned pups fast for up to a month before leaving the rookery.
At The Marine Mammal Center pups are fed a pureed herring and cream formula or "fish milk-shake."

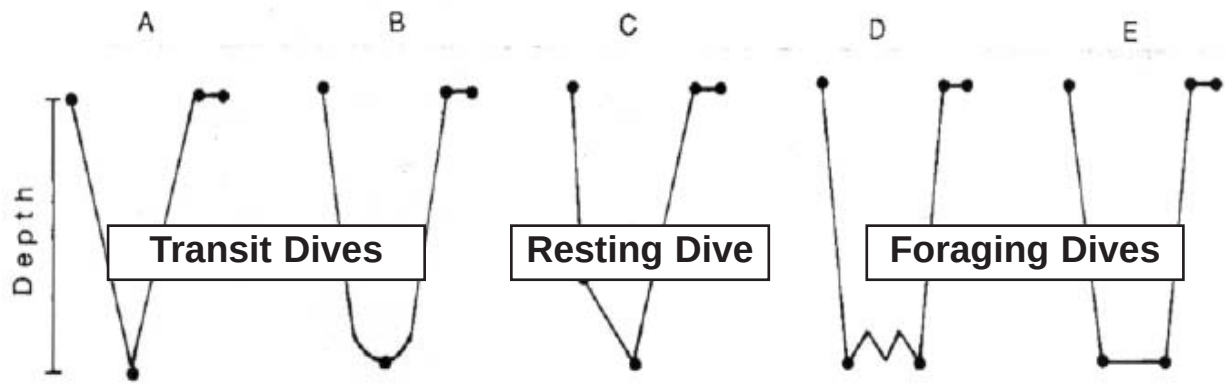
DIVING:
During their entire time at sea, both sexes and all ages dive deep, long, and continuously in search of food. About 90% of their time at sea is spent underwater searching for food items. Dives may last for 40 minutes and to depths of 1,000 to 2,000 feet, spending about 5 minutes at the surface between dives. The maximum recorded depth was to more than a mile, that is, over 5,000 feet. By age 2 the dive patterns of juveniles is similar to those of adults. Dive depths and duration are not influenced by age or mass in animals over 2 years old. Post breeding females, those that have weaned their pups, been mated, and have left the breeding rookery, do not migrate as far to sea and they do not dive for as long periods during foraging, as do pregnant females, those mature females that are on their second annual migration to sea following a brief molting haul out in the spring. One 3 month old in its first trip to sea had a mean dive depth of 675 feet, and a maximum dive depth of 1,813 feet.

Fish Found In Diet

Note: Pregnant females dive longer than non pregnant females. One explanation is that it takes pregnant females longer to reach the same depths. Because pregnant females are fatter and therefore more buoyant, they may require more effort to reach the same depth.

Below: Key statistics of the dive patterns of post breeding females (non pregnant), pregnant females, and males, 5 to 10 years of age.

	Mean dives /hour	Mean % time on surface (min)	Maximum depth (m)	Mean depth (m)	Maximum duration (min)	Mean duration (min)	Mean SI (min)
Post breeding Females (N = 10)*	2.6	9.7	1273	509 ± 147	47.5	20.8 ± 4.1	2.1 ± 0.5
Pregnant females (N = 5)	2.0	7.7	1181	473 ± 151	67.9	27.7 ± 6.4	2.1 ± 0.6
Adult males (N = 5)	2.5	13.5	1503	330 ± 127	66.7	21.2 ± 4.6	2.7 ± 0.9



Above: Schematic profiles of five dive types observed in the dive records of northern elephant seals (adapted from Le Boeuf et al. 1992). The points of each dive type were digitized to determine dive elements.

Elephant seals exhibit five characteristic dive types; A, B, C, D, and E. Schematic profiles of these dive types are shown below.

A and B type dives are thought to be primarily transit dives. Females and males exhibit these dives as they move from Año Nuevo to their preferred foraging areas. Type C dives are thought to be processing dives that facilitate digestion or serve for rest or sleep. Swim velocity meters have shown that the elephant seals are actually drifting (not actively swimming) from the second to third point (diagram above) during this dive type. Type D and E dives are both believed to be foraging dives. Type D dives are hypothesized to serve as pelagic foraging dives (foraging dives in deep, open water) whereas type E dives are believed to serve, possibly, as benthic foraging dives (foraging along the bottom of the seafloor). Females exhibit primarily D dives while males exhibit primarily E dives. The vertical excursions seen at the bottom of type D dives are consistent with searching, pursuing and capturing prey. D dives also follow a diurnal variation in depth. Female elephant seals dive deeper during the day and shallower at night, suggesting that they are feeding on organisms that comprise the deep scattering layer (a layer of organisms that rises to the surface at night and then sinks down to depth during the day). Males perform type E dives in long series and the depth of these dives is relatively invariant. This gives the impression that males are following the bottom topography, though more accurate geolocation and bottom depth measurements are needed to be conclusive. Type E dives are strongly associated with coastal regions. However the geolocation of

many dives may have occurred sufficiently far away from the continental shelf to preclude benthic foraging. Again, more accurate instrumentation will be needed to determine whether or not male elephant seals are truly benthic foragers.

You might ask why males and females forage in different areas. A possible explanation follows. Both male and female elephant seals lose up to forty percent of their arrival weight during the breeding season. Forty percent of a male is quite a bit more weight than forty percent of a female. Yet, both males and females are able to replenish the lost forty percent; males are putting on a lot more weight than females and in a shorter time period (adult males spend less time in the water than adult females). It may be that males have to prey on larger or more abundant or more energy rich food items to attain larger sizes. Keep in mind that only large males enjoy great reproductive success!

MISCELLANEOUS

Hunting: The northern elephant seal was hunted to the brink of extinction for their blubber, which was used for heating oil. By 1910, there were only a few thousand northern elephant seals on Guadalupe Island off Baja, Mexico. The Mexican government gave protected status to elephant seals in 1922, and the U. S. government followed suit a few years later.

Predators: Killer whales and great white sharks prey upon all age classes.

Elephant Seal Adaptations

Thermoregulation: Size Matters

Elephant seals are BIG. Males grow up to be 15 feet long and may weigh more than 5,000 pounds. Females grow to 9 feet long and weigh about one-third as much as adult males. Pups are 3 to 4 feet long and weigh 60 to 80 pounds at birth. Elephant seals' blubber accounts for much of their weight and is an adaptation to help them stay warm. The bigger an animal is, the less surface area (or skin exposed to the air) it has in relation to its volume, so it loses less heat.

Locomotion

The flippers of seals(elephant seals and harbor seals) are different from those of sea lions, and therefore they move differently on land and in the ocean. Seals have shorter front flippers they hold close to their bodies as they swim, using powerful hip muscles and their rear flippers to propel them. Seals cannot rotate their rear flippers forward under their bodies. When moving on land they move with their front flippers and heave their bodies forward, undulating like an inchworm. Their rear flippers drag uselessly behind. Because they are not able to climb onto rocks, they haul out on low sloped, sandy beaches. When necessary, elephant seals can move very quickly for short distances.

Looking for someone to nurse from, this weaner is moving on land with its front flippers.

Sleep Apnea/ Breath Holding

The apnea (breath-holding) duration of young weanlings averages four minutes. The apnea duration of older weanlings averages eight minutes, close to the average duration of juveniles and subadult males (9.7 minutes), adult females (8.7 minutes), and adult males (7.4 minutes). During apnea the heart rate of weaners drops from an average 65 beats per minute to 4-15 beats per minute during slow wave sleep, the predominant form of sleep. Only during rapid eye movement sleep does the heart rate drop to 20 to 25 beats per minute. Sleep apnea is a great strategy for conserving energy and water loss while on land.

Black Fur

Pups are born with soft, black fur attached to skin that is extremely loose and wrinkled. A newborn has no blubber, but gains weight very rapidly, nursing on milk that is over 50 percent fat (human mother's milk is 4 percent fat). Until the pup has accumulated blubber, its black fur, which absorbs heat, helps the pup keep warm. The black coat begins to molt within 3 to 4 weeks, and is replaced by silvery-tan hairs, in a process that takes 2 to 3 weeks to complete.

This pup's black fur will help keep it warm until it has enough blubber.

Molting

All mammals lose and replace their hair. For example, dogs and humans shed their hair. Similarly, elephant seals molt. Once a year elephant seals lose and replace all their hair over a period of just a few weeks. They slough off their fur in patches and this is called a radical molt. This process reduces insulation, due to hair loss, and requires increased blood flow to the skin's surface in order to supply nutrients to the newly growing hair. Because heat loss occurs more rapidly in water than on land, elephant seals haul out onto beaches while the radical molt occurs.

Timing of radical or catastrophic molts varies with ages and sex

Vocalization

The sounds made by elephant seals are distinctive, meaningful, and play a role in their social order. Males rear up, throw back their heads, open their mouths wide and trumpet to advertise challenges and threats. Females use different sounds to discourage unwanted suitors and to warn other females away from their pups. Each mother and pup have special Vocalization that are instantly recognized by each other. These help to keep the female and pup together during the first week of nursing. Scientists have determined that different colonies even have different dialects.

Deep Continuous Diving at Sea

Elephant seals dive deeper and longer and more often than any other marine mammal. The average adult dive is about 2,000 feet, but they often dive over 5,000 feet deep (about a mile)! They stay down an average of 22 minutes but may remain underwater for more than 90 minutes. They spend 3 to 5 minutes resting at the surface and then dive again. They do this continuously, spending 85 to 90 percent of their time underwater. Scientists are not sure why elephant seals are able to accomplish this, but they suspect that at such great depths elephant seals have almost no competition for their food. They are also safer from their primary nonhuman predator, the great white shark. Scientists are not absolutely certain about what elephant seals eat, but it is likely that they feed on octopus, squid, rays, hake, salmon, and rockfish.

Female Choice in Mates

Female elephant seals have some choice in deciding with which male they will mate. If they are not ready to mate they protest, resist, and try to escape. When approached by a male other than the dominant bull, the female will usually protest loudly to alert the dominant bull of the other male's presence. These behavioral adaptations enable the biggest, strongest males to mate with females. Sometimes, however, less dominant males do succeed in mating with a receptive female, and often females mate with nondominant males as they leave the colony.

Females "choose" their mate by alerting the dominant male of interloping beta males

Delayed Implantation

Most adult female elephant seals mate and have a pup each winter. A pup is born 11 months after its mother mates. But a female elephant seal does not become pregnant immediately after mating. Fetal development stalls for 2 to 3 months; then the embryo implants on the wall of the uterus and the active

gestation period of 8 to 9 months begins. Delayed implantation allows the pregnant female to build her strength back up (after fasting) before the new fetus begins to develop. This adaptation also makes it possible for birthing and mating to occur close together while large numbers of mature animals are on the same beach.

Big Noses/ Proboscis

As a secondary sex trait (like a man's deepening voice), male elephant seals develop a large bulblike snout known as a proboscis. Females and young males are very hard to tell apart. But when a male is about 2 years old, and the nose starts to grow, they can easily be distinguished. By the time a male reaches sexual maturity, at about 4 years, its nose may be a foot long. A fully developed bull, age 8 or 9 years old, may have a nose 2 feet long. The size of the snout and the loudness of the vocal threat will often discourage a challenge and allow a male to save energy by avoiding actual battles.

Chest shields and the proboscis are fully developed on males of 8-9 years

Chest Shields

As a secondary sex trait (like a man's beard), male elephant seals develop a hard chest shield of thickened skin and scar tissue. It begins to develop when the animal is about 2 to 3 years old. By the time the male is a fully developed bull, about 8 to 9 years old, the shield covers most of the chest. It grows up to slightly above the level of the male's eyes, almost forming a type of "necklace." The chest shield protects them from major injuries during fights with other males.

Thermoregulation: Keep Cool, Stay Warm

Elephant seals have "shunts" in their circulatory systems. A shunt acts like a valve, diverting blood flow in one direction or another. When in the water, they shunt blood away from their body surface in order to keep their core and vital organs warm. When on land, they cool off by sleeping with a front flipper raised straight up in the air. They shunt blood to the surface and heat is "dumped" into the air. Blubber helps them stay warm in cold water. It insulates like a wetsuit. Imagine that a human wetsuit is a quarter-inch thick, and an elephant seal blubber layer may be 6 inches thick. So much blubber makes it hard to stay cool on land. Sometimes elephant seals sleep in tidepools or rain puddles. This is a good adaptation for staying cool and losing less water to evaporation. Elephant seals also flip cold, damp sand on their backs to reflect the sun away and stay cool.

Sand flipping is a method for regulating temperature

Energy from Fat

In adult males, blubber may account for nearly 50 percent of an adult male's weight at the beginning of the breeding season. By the end of breeding season adult elephant seals (of both sexes) lose about one-third of their weight. Blubber is an adaptation for animals that fast. When they are fasting, elephant seals use their blubber as stored energy. As they use their blubber for "food" a chemical by-product of their metabolism is water. This is how they can produce enough energy and water while fasting.

Though huge when first arriving on the beaches, seals loose weight quickly as fat stores are used for energy while fasting.

Fasting

Adult male elephant seals do not eat for up to 3 months while they are on land trying to establish and maintain dominance over other males. If they were to leave their harem, other males might mate with the females. Female elephant seals fast for a month while they give birth, nurse their pups, and mate. Weaners will fast for 1 to 2 months after weaning. This is an advantage because it postpones the time they need to search for food until they have learned to swim.

Concentrated Urine

Animals need to flush out wastes that are formed by digesting food for energy. One type of waste formed through digestion is urine. Urine helps to flush out toxins and excess water. Elephant seals have large and powerful kidneys, an adaptation that concentrates large amounts of toxins into a small amount of urine. This helps them to save precious water all the time, but especially while fasting. Elephant seal urine is thick and brightly colored.

NORTHERN ELEPHANT SEAL
POINT REYES FACTS

HISTORY

The northern elephant seal has lived in the eastern North Pacific for at least several hundred thousand years. The species was known to occur at Point Reyes prior to the sealing activity in the nineteenth century, which nearly eliminated the species. However, it is not known whether elephant seals bred at Point Reyes historically.

Individual seals were observed at Point Reyes beginning in the 1960s. The first birth in the current colony occurred in 1981.

BREEDING SITES

The oldest re-established site is at an inaccessible area of the Headlands. Births have occurred at Drake's Beach since 1995, and at South Beach in 1976 and 1995 - present.

ORIGIN OF THE POINT REYES COLONY

The early colonizers appeared to come from both Año Nuevo and the Farallon Islands. Within the first five years animals tagged in the Channel Islands were also observed.

PUP MORTALITY

The first three years no pups survived, due to exposure to storms and high tides in a south facing cove. The colony reformed in a more favorable cove in 1984. During the drought of 1987 through 1990 there were few deaths. In 1991 and 1993 there were density dependent deaths, related to a larger colony located in a small cove which was exposed to large storm swells.

PREDATION

Most elephant seal colonies were originally on offshore islands, to avoid predation by grizzly bears, cougars, wolves and aborigines. This was not true at the Point Reyes headland, which was mostly inaccessible.

The marine predators of elephant seals, white and blue sharks and killer whales, are present here. Point Reyes is one of three main areas where white sharks congregate in the Gulf of the Farallones - the other two are the Farallon Islands and Año Nuevo. These sharks are attracted by harbor seals, elephant seals and sea lions - what ever is concentrating at the time. In the spring they are likely attracted to the concentration of harbor seals and weaned elephant seal pups, and in the fall to the immature elephant seals.

SEASONS

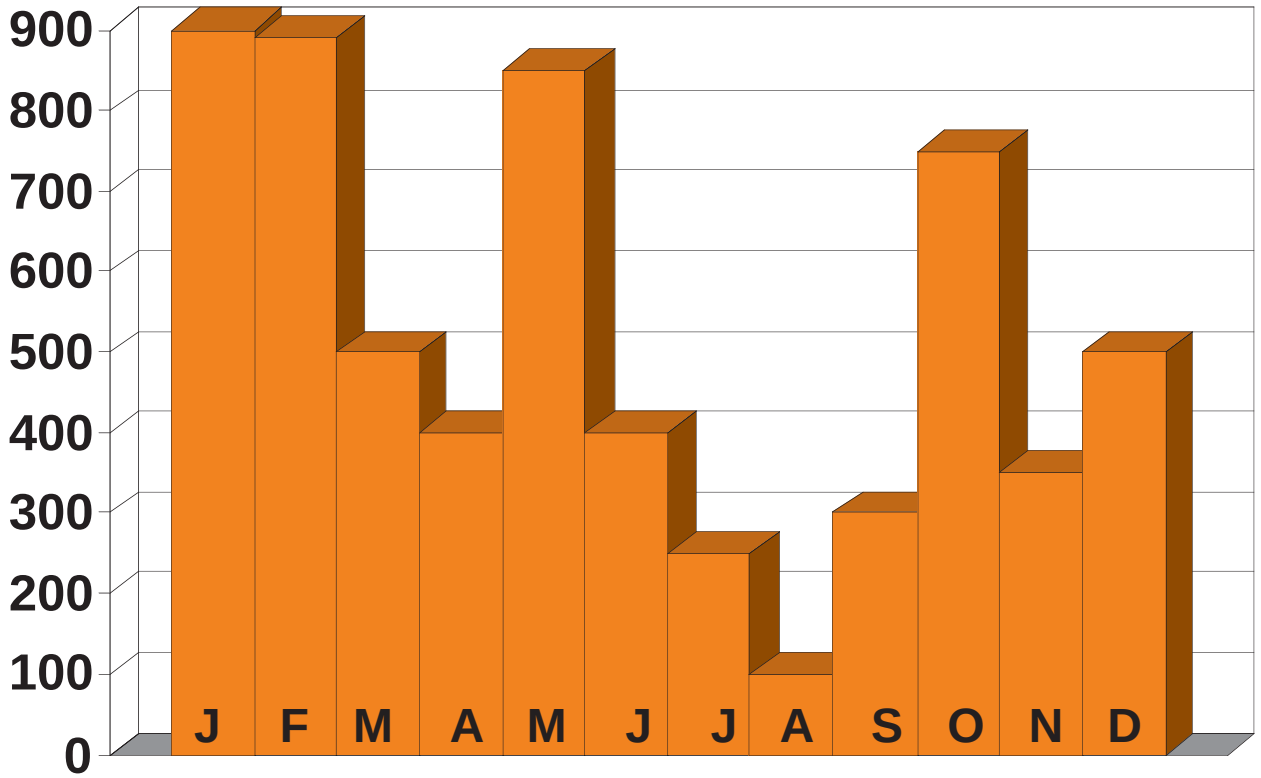
The seasonal occurrences of elephant seals at Point Reyes are the same as other sites:

Breeding	Early December through mid-March. Births peak at end of January
Molting	Females and juveniles: April through June
	Males: June through August
Juvenile Haul Out	September through November

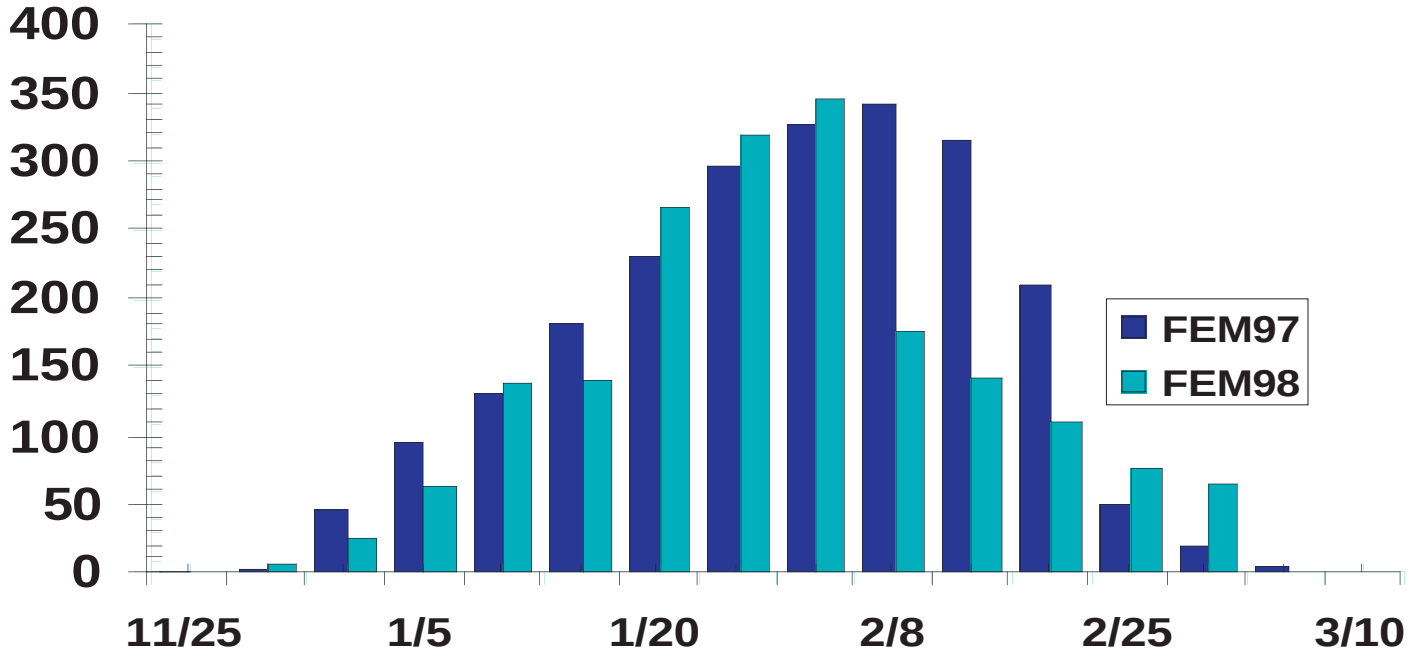
See elephant seal population at Point Reyes by month on the following page.

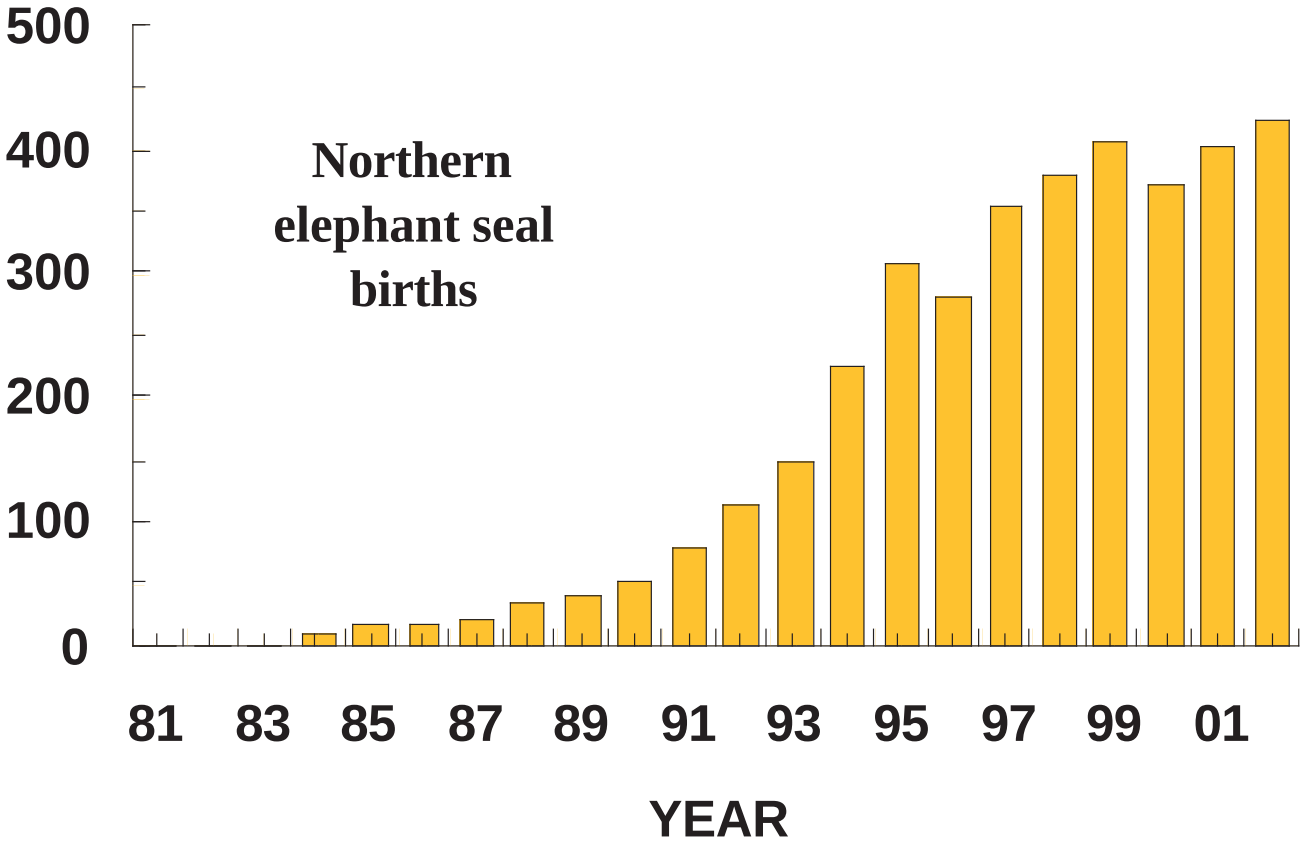
IS POINT REYES THE NORTHERNMOST BREEDING SITE?

It was when the seals first returned here. Now there are breeding sites at Crescent City, CA and in southern Oregon.

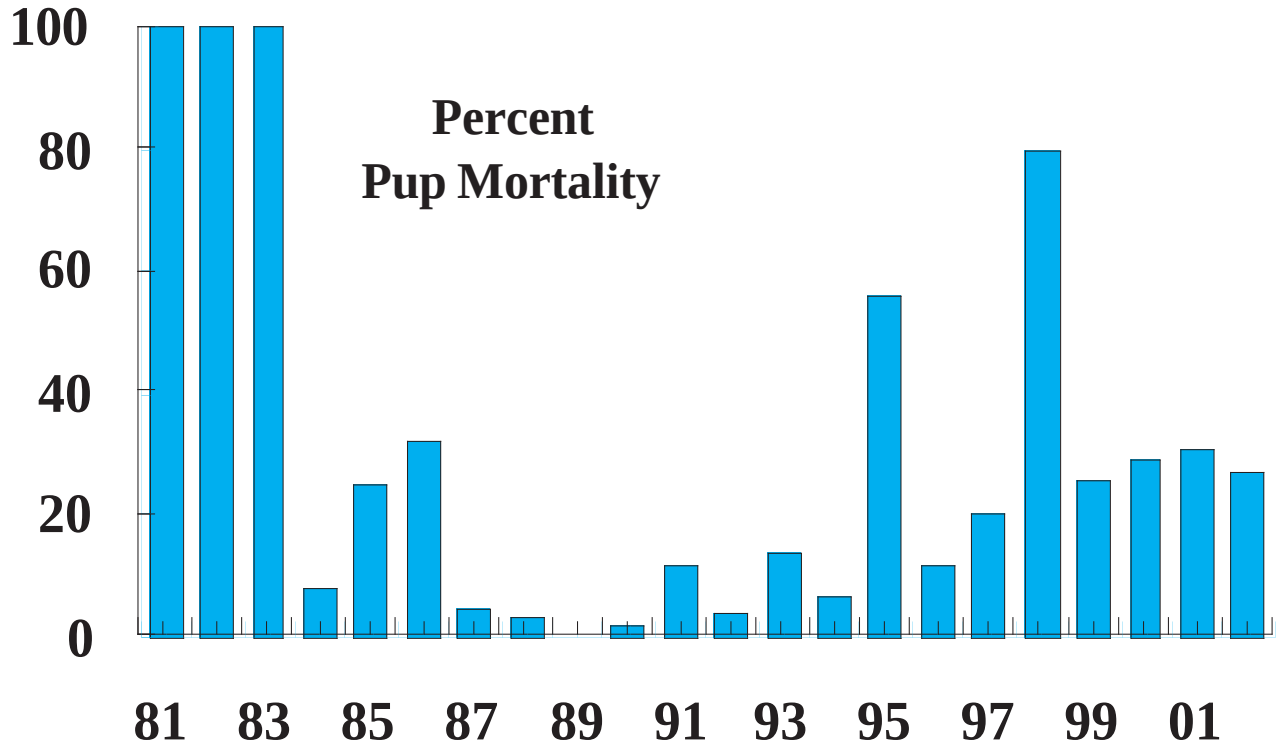


Above: **Point Reyes National Seashore elephant seal population by month starting in January.**
Below: **Population of female elephant seals in 1997 and 1998. The bell-shaped population curve of 1997 which is representative of most years can be disrupted by El Nino or other severe storms events as in 1998.**





Above: **Elephant seal births by year at Point Reyes**
Below: **Elephant seal pup mortality per year, Large mortality rates are often associated with El Nino years. The first three years of 100% mortality were caused by poor pupping sites chosen by females.**



Frequently-Asked Questions
by Sterling Hada

1. Why does it seem as though all they're doing is sleeping?

When elephant seals are on land, they're very ungainly. These are water-borne creatures, at home in the ocean where their sheer mass is buoyed up. When they're on land, gravity works against them. And remember that whenever elephant seals are on land, they're not eating. So to conserve their energy, they reduce their metabolism by using as little energy as possible (between fighting and mating, of course). And the best way to do this is by sleeping. Often, elephant seals will enter into an even deeper state of sleep, known as apnea.

2. Apnea? What's that?

Put simply, apnea is an induced state whereby the body's metabolism is severely reduced: Breathing is reduced to one breath every 7 - 10 minutes (Sometimes as few as one breath every 90 minutes while diving); heart rate is approximately three - five beats per minute.

3. How does apnea work? Does it occur in any other animals?

Apnea is a survival mechanism, which serves many purposes for elephant seals. While on land, it reduces moisture loss, allowing a seal to retain much-needed water. At sea, it reduces the body's need for oxygen. The body shunts off oxygen demand to all but the most vital organs (the heart and brain), allowing it to dive to those incredible depths.

Other than seals, there are several animals that exhibit apnea: Some bears that hibernate, grizzlies (Ursus horribilis) and polar bears (Ursus maritimus), for example, will go into apnea to conserve energy during the winter months; certain types of amphibians will undergo a form of apnea to weather out long periods of drought. And desert animals, such as kangaroo mice or certain species of toads hibernate during hot weather and will retain moisture during these periods.

4. Why don't the elephant seals implode when they dive so deeply? Or conversely, explode when they come up to the surface from such depths?

Elephant seals are the second-deepest diving marine mammals in the world (first is the sperm whale), diving to recorded depths of over 5000 feet. At that depth more than a mile below the surface, ambient water pressure is more than one ton per square inch. Animals do live at that depth, but tend to die when brought to the surface. Yet elephant seals are equally at home at that depth AND at the surface.

Much of the reason for the elephant seals' survivability lies in the laws of physics and in their physiology. We know from physics that gases compress more easily than solids. If you have two items, say a solid piece of rubber and a swatch of neoprene, and take them to four atmospheres (99 feet), you'll notice little change to the rubber. The neoprene, on the other hand, will shrink and appear thinner. This is because the ambient pressure acting on the neoprene has compressed the air pockets in the fabric, making it generally smaller.

5. So how does this relate to elephant seals?

Because of their physiology, elephant seals collapse their lungs at 30 to 40 meters into a dive, thus eliminating the largest “air pocket” in their bodies. A large portion of their body is adipose tissue, fat or blubber. This blubber corresponds to the piece of rubber mentioned in the previous example: It compresses very little at depth. It also serves as an insulative barrier for the seal, keeping the seal warm at depth where temperatures can range at approximately 2 – 5 degrees Celsius.

6. How do the seals dive to such depths when they’re so fat?

This poses an interesting question: If a seal’s bulk, much of which is blubber, is so buoyant, how can it dive to such depths? The answer may be apparent to any scuba divers. On the surface, fat is very buoyant, or positively buoyant. But at a certain depth fat is compressed enough so that the body will, in fact, sink (Muscle and bone, which do not compress as much as fat, are negatively buoyant; that is to say, they sink).

What a seal will do to reach and surpass this depth is to use its powerful hind flippers. Once it becomes negatively buoyant, a seal then only needs to kick a little to propel itself deeper. And this adds to any energy savings.

7. So where do they store the oxygen they need to dive?

In their muscles. During a dive, oxygen is pumped from the muscles into the bloodstream by the spleen (much like a racehorse), where it is, in turn, pumped to all vital organs by the heart. Keep in mind, however, what we said about apnea during diving: when an elephant seal undergoes apnea during a dive, the body’s need for oxygen is severely reduced, and oxygen is shunted to those most vital organs, the brain and heart.

8. How do the seals get their water when they’re on land? What about when they’re in the water?

Unlike certain sea birds, elephant seals have no filtration system for water extraction from any ingested saltwater. Therefore, when at sea, they will obtain their water from whatever prey they eat. Water is absorbed in the blubber, whereupon the body extracts it, as it needs it. This is metabolic water.

On land, at least during the mating and birthing season, adult seals don’t eat. Water needs are met via a combination of storage and conservation. Water is retained in the blubber. And to conserve the body’s water needs, a seal will retain moisture through irregular breathing patterns (apnea) and possibly by recapturing and retaining moisture through the nasal cavity (turbinate process).

9. How does the nasal cavity in a seal work? Does it aid in their vocalization at all?

There is no conclusive evidence, but scientists theorize that the turbinate process, the honeycombing bony structure in a seal’s nasal cavity, may be used to recapture and retain moisture from its exhalations. This biological “vapor barrier” would allow a seal to recapture much-needed moisture, especially when it is fasting on land.

As to the question of whether the nasal cavity aids in a seal’s vocalization, the simple answer is “Yes.” Any cavity will serve to resonate and amplify a vocalization, although vocalization is not completely dependent on the nasal cavity: the peritoneal cavity, blubber and cranial cavity all serve as resonators when a seal vocalizes.

10. How are the seals able to see so well in the water at such depths? Is there anything different about their eye physiology?

Seals have several adaptive traits, which allow them to see well on land and underwater:

Pinnipeds have a high number of rods in their eyes that help to gather light, especially underwater where light is absorbed very quickly at shallow depths. Additionally, elephant seals have an especially well developed tapetum lucidum, a layer behind the retina which allows the retina to reflect light like a mirror. The tapetum sends the light back through the retina, thus doubling the amount of light being sent to the rods. A similar analogy would be a mirror (catadioptric) lens, which bounces incoming light several times through its tube before going through the exit pupil; one gets a large amount of light compressed in a smaller space. Thus, the short answer as to why seals can see so well at such great depths? It's done with "mirrors"!

Underwater, seals have evolved an extremely rounded "fish-eye" lens, which refracts light properly so they can see well. This means, however, that a seal's visual acuity on land is not as good as in the water, as this rounded lens will not focus properly. Vision will tend to be blurry or astigmatic in all but the brightest of lighting conditions.

A seal's eye is composed of a strongly keratinized corneal epithelium. Also, the sclera forms a tough, protective coating that shields the eye from the tremendous pressures at great depths. Tear ducts (lacrimal glands) keep a seal's eyes lubricated and clear of salt, sand and other debris. And finally, elephant seals have a nictitating membrane, which will wipe away any debris in the eye.

11. What's the seals' range?

Currently, elephant seal rookeries range from as far south as Isla Natividad off the coast of Baja California to as far north as the California/ Oregon border. The greatest concentration of elephant seals is on San Miguel Island, westernmost of the Channel Islands off the central California coast. In terms of foraging, though, adult elephant seals range as far north as the Pribilof Islands in the Bering Strait, to as far west as Japan.

12. What is the seals' historical range?

The historic terrestrial sites ranged as far north as Point Reyes and possibly as far south as Bahia San Hipolito on Baja California, but it's likely that Northern Elephant Seals foraged at sea as far north as the Bering Sea, as they do today.

13. Where did the seals come from?

Fossil records show that elephant seals evolved from prehistoric pinniped groups (Callophoca) that migrated into the Pacific from the Caribbean through what is now Central America during the early Pliocene Epoch (5.3 to 1.8 million years ago). Mirounga angustirostris was present off California by the late Pleistocene (approximately 30,000 to 15,000 years ago).

14. No, where did THESE seals come from?

The Point Reyes colony has been in existence since the late '70s. Tagging studies showed that it was an offshoot of the SE Farallones rookery. Currently, the Point Reyes colony is growing while the

Farallones colony is dwindling, due to large part to loss of suitable birthing and mating habitat on SE Farallones Island. Demographics – through tagging studies – has shown that a significant number of elephant seals at Point Reyes are from the Channel Islands rookeries, rather than from Ano Nuevo, as was previously thought.

15. How many elephant seals are there, worldwide?

Accurate determination of the total population of Mirounga Angustirostris is difficult to determine, since surveys of the larger colonies (San Miguel, San Nicolas, with populations in excess of approx. 30,000) are only approximations. Also, different researchers will use different multiplying factors when applying these surveys to an extrapolated total number. The range goes from a (disturbingly) low figure of 80,000 to as high as 180,000 individuals, with figures also obtained in between. Keep this in mind when citing total numbers. There is no set determination, although taking the mean of these two extremes as an approximate figure (about 140,000) would be acceptable.

16. Weren't Northern elephant seals almost wiped out?

Yes. The species was considered extinct by 1892, the victim of commercial harvesting for their blubber, which was tried into oil. A small number (sources vary from 24 to as many as 150) of seals managed to survive on Isla Guadalupe. It is from this gene pool that the total stock of Northern elephant seals is descended.

17. Is there any danger of a genetic catastrophe because of a lack of diversity?

In any recovering species that undergoes this "genetic bottleneck," one would expect little genetic variability. In fact, several studies have shown just this. This has raised a concern about potential genetic catastrophes or inbreeding and the rise of resulting negative recessive traits. However, despite this "bottlenecking," the population seems to be healthy and is increasing. Only time will tell whether this concern will be justified.

18. What kind of predators did the seals have, historically? And now?

Historically, Mirounga would have had a number of predators, both marine and terrestrial.

On land, elephant seals would have had to contend with brown bears (grizzlies) and Native Americans.

In the water, their predators would have been the same that exist now: Great White Sharks (Carcharadon carcharias), Blue sharks (Prionace glauca) and transient (free-roaming) Orca (Orchinus orca).

Tagging and Marking of Pinnipeds for Research

TAGGING AND MARKING OF PINNIPEDS

Marine mammals are marked for identification in order to track and study them. Marine mammal scientists and marine mammal rehabilitation hospitals are permitted by the National Marine Fisheries Service to mark marine mammals. Permits are specific and parameters are clearly set. The permit can be revoked if the established procedures are not followed. The different marking methods discussed here include flipper tags, brands, dye, radio tags, satellite radio tags and time depth recorders (TDR).

Flipper Tags

These tags are made of colored plastic. (In the past they were made of metal.) The color of tags used by researchers denotes the geographic location where the animal was tagged (see chart of tag colors). Marine mammal rehabilitation hospitals, like The Marine Mammal Center, tag their rehabilitated patients that are released back to the wild with orange tags only. Sea lions are tagged on their front flippers. Seals are tagged in the webbing between digits on their hind flippers.

Brands

Researchers will tag and permanently brand numbers on the animals back or side in an effort to track the animal during its entire life. Tags are not as reliable as a brand. Tags may fall off, or the numbers may rub off. Tags are harder to see. The continued observation of branded individuals can provide a wealth of information about range, behavior and life history of not only that individual but the entire species.

The numbers are put on with either a hot brand or a cold brand. A hot brand is done with a heated metal number. The cold brand is a copper number chilled with liquid nitrogen. With both procedures the animal must be held still - not an easy task. The hot brand takes seconds to leave a mark, while the cold brand may take a minute or more. Hot brands are easier to apply, but they kill the fur follicles and can cause deep damage if done carelessly. Cold brands are not as damaging. The fur grows back white in color, so the number is visible.

Dye Marks

Numbers, names or identifying marks are sometimes dyed into the fur of seals and sea lions. Regular hair dye, donated by a company or by Lady Clairolä, is used. Dye marks are only temporary as they disappear when the animal molts. Dye marks are used by researchers at several sites to monitor individual seals during the breeding season and molt.

Harbor seal pups released by The Marine Mammal Center are all tagged with orange tags on their hind flippers. In addition some are marked with hair dye and/or radio tags to improve the chance of resighting them. Dye marks may be light or dark, depending on the color of the harbor seal, and are usually on their head or back. Identification dye marks of harbor seals that have been rehabilitated at The Marine Mammal Center include a line, x, o, or a number.

Researchers throughout California, including Point Reyes, also tag harbor seals with a blue colored flipper tag.

TDRs, Radio Tags and Satellite Tags

Time depth recorders (TDRs) are set in a white plaster-like base and are glued with epoxy to the seal's back. These are convenient to use with elephant seals that return to the same location on land when they molt, so the TDR can be easily retrieved. The information gathered by a TDR is transferred to a computer for analysis. TDRs are activated by sensing light and dark. TDR data enables scientists to see how often the animal dives, and the depth and duration of the dive. Researchers have also used TDRs with harbor seals.

Radio tags and satellite tags have a small transmitter and battery encased in epoxy. The antenna can be internal or protrude. The tags may be attached to a flipper or glued to the head or back with super glue. Each radio tag has a specific radio frequency. The signal is detected using a hand held receiver. Signals from satellite tags are picked up by satellite. Signals from radio and satellite tags can only be received if the tag is out of the water.

Reporting Animals with Tags, Brands, Dye Marks, Radio Tags or TDRs

When a tagged animal is observed and the number is legible, it is vital that as much information as possible is gathered and that the observation is reported. The following data are important:

1. the color and number of the tag and/or the number of the brand or hair dye mark
2. where on the animal's body the tag, brand, or dye mark is located, i.e. Right or left, front or hind flippers
3. the animal species
4. the date and time the tagged animal was sighted
5. whether there were one or two tags
6. the geographic location of the tagged animal
7. the condition of the animal (live, dead, sick, injured, etc.)
8. whether the animal is with other seals

Sea lions, seals and other marine mammals are protected by law from harm and harassment. Always observe and report, rather than moving the animal or interfering with its natural habits.

Tag Colors and Locations

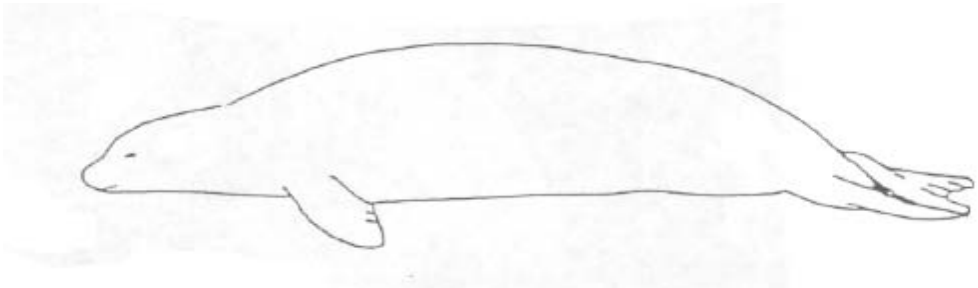
TAG COLOR	SPECIES	LOCATION
white	California Sea Lion	San Clemente Island, CA Playa Atyla Island, MX Angel de la Guarda, MX
	Northern Elephant Seal	San Clemente Island, CA Cedros Island, MX San Benito Island, MX Sand Island, OR San Simeon/Gorda, CA Piedras Blancas, CA
	Harbor Seal	Santa Rosa Island, CA
yellow	California Sea Lion	San Miguel Island, CA
	Harbor Seal	San Miguel Island, CA Puget Sound, WA Gray's Harbor, WA (females only)
	Northern Elephant Seal	San Miguel Island, CA
orange	all species	Rehabilitation Centers-California and Northwest Marine Mammal Stranding Networks
pink	Northern Elephant Seal	Farallon Islands, CA **Point Reyes, CA**
red	California Sea Lion	San Nicolas Island, CA
	Northern Elephant Seal	
dark green	Northern Elephant Seal	Año Nuevo, CA
	Steller Sea Lion	
	California Sea Lion	
lime green	California Sea Lion	Morro Bay, CA
	Harbor Seal	Morro Bay, CA **Point Reyes, CA**
light blue	Northern Elephant Seal	Mexico
	California Sea Lion	Monterey Bay, CA
	Harbor Seal	
blue-green	California Sea Lion	Santa Barbara Island, CA
	Northern Elephant Seal	
	Harbor Seal	Puget Sound, WA Gray's Harbor, WA (males only)
purple	Northern Elephant Seal	Cape San Martin, CA
metal	Northern Fur Seal	Alaska
NUMBER BRAND	California Sea Lion	San Miguel Island, CA Seattle, WA
	Northern Elephant Seal	Año Nuevo, CA
HAIR DYE	California Sea Lion	San Miguel Island, CA Seattle, WA
	Northern Elephant Seal	San Miguel Island, CA San Nicolas Island, CA Año Nuevo, CA Farallon Islands, CA **Point Reyes, CA**
	Northern Fur Seal	San Miguel Island, CA

Female Scar Card

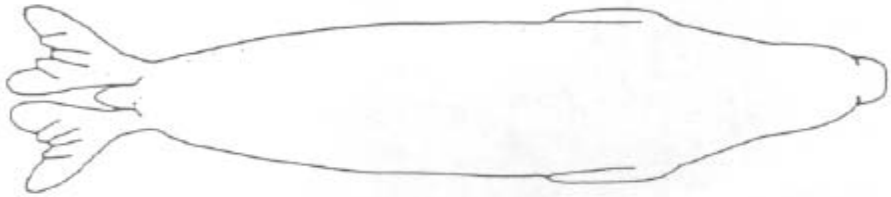
Scar cards are used to note any characteristics of individual elephant seals that could be used to identify this elephant seal in the future. Researchers mark scars, shark bites, or unusual coloration. Identifying individual seals can allow researchers to follow seal movement between colony sites throughout the breeding and pupping season.

Right side view

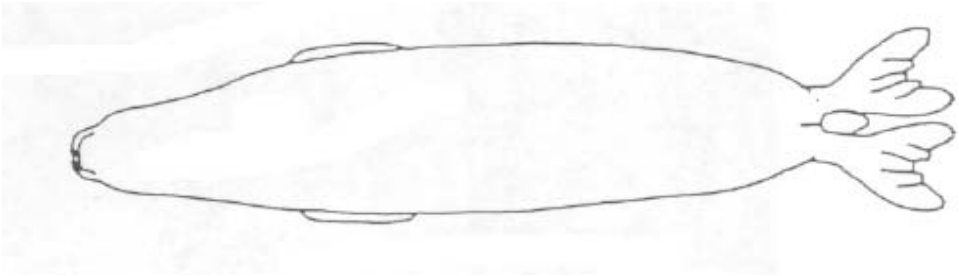
Left side view



Top side view



Bottom view



Male Scar Card

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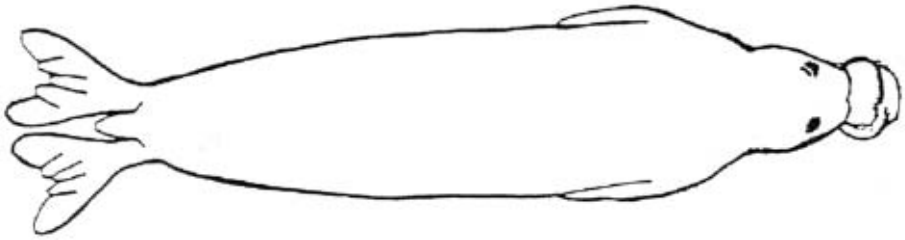
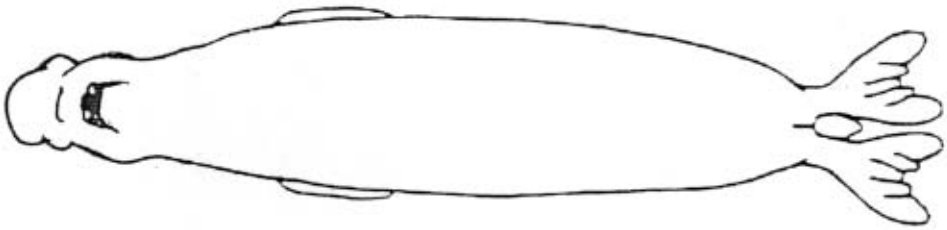
Right side view

Left side view

Top side view



Bottom view



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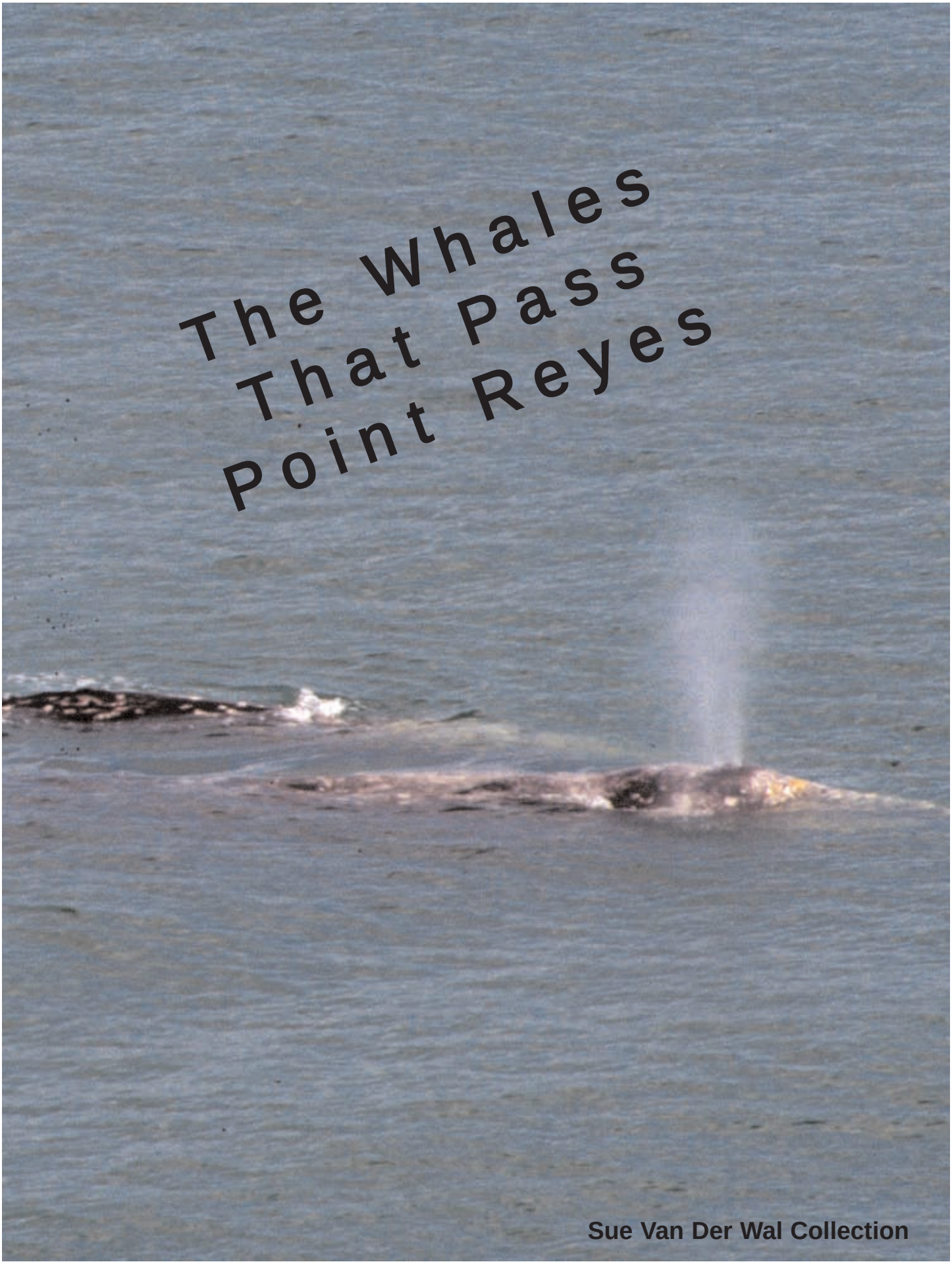
The Whales
That Pass
Point Reyes
Sue Van Der Wal Collection

Cetaceans Overview

Marine mammals have the five characteristics of all mammals, yet they are distinctive in their appearance and survival strategies. Over millions of years, they have adapted to life in the ocean. To keep warm in the ocean, most of them depend more upon a thick layer of blubber or fat than on fur. They have streamlined bodies to help them swim faster. They can stay under water for a long time, but they must come to the surface to breathe. To be able to stay under water for long periods, they store extra oxygen in their muscles and blood. They also have more blood than land mammals in proportion to their body sizes. The young are born well developed, and the high protein and fat content of their mother's milk allows them to add fat to their bodies quickly for insulation from the cold and to provide energy for metabolism.

The cetacean order of marine mammals includes whales, dolphins and porpoises. Millions of years ago, cetacean ancestors lived on land. Over time, these ancestors adapted to their new ocean environment. Cetacean adaptations included a horizontal fluke, that moves in an up-and-down motion for propulsion, evolving from the tail. Flukes are actually made up of fibrous connective tissue, without any bone or muscle inside. Pectoral fins, or flippers for steering, turning and stopping evolved from forelimbs. The bones of a whale's flippers are similar to the bones found in a human hand. The whale nostrils migrated to the top of their head and became a blowhole, allowing them to surface and breathe quickly.

Cetaceans are separated into two groups: toothed whales and baleen whales. As their name suggests, toothed whales (suborder odontoceti) have teeth, as well as a single blowhole opening. Toothed whales range in size from the 60-foot sperm whale to the small harbor porpoise, which is less than 5 feet. There are 73 species of toothed whales, divided into ten families. They tend to be social and live in groups called pods. They use echolocation or sonar to detect objects in their environment. They do this by producing sounds in the air passages in their heads, which are sent out through the front of their heads. This front area is called the melon, which is filled with oil and can focus or direct sounds. As sound waves hit something, such as prey, they bounce back to the whale like an echo, and the whale can get a "picture" of what is around it. Many species seem to have individually identifiable vocalizations, and research is being done on these whale sounds.

The other group of cetaceans contains 11 species of baleen whales (suborder mysticeti). Instead of teeth, these whales have hundreds of hard baleen plates, which are made of a protein called keratin (similar to fingernails). Mysticeti means "whale with mustache", which refers to these baleen plates. These plates act as filters for catching food. The baleen varies in length, with the longest being that of the bowhead whale, whose baleen can be 14 feet long. Gray whales have 140-180 baleen plates on each side of their mouths, measuring about 15 inches or less. Most baleen whales feed by skimming or gulping huge amounts of prey and water. The water is forced out of the mouth by the huge tongue past the hundreds of baleen plates. The food then gets trapped in the baleen hairs inside the mouth, and it is swallowed. Most baleen whales eat plankton, such as krill (shrimp-like animals) or small schooling fish. Gray whales feed a bit differently; they feed on the ocean floor by taking in a large mouthful of mud and amphipods (small crustaceans). Mud is then filtered through the baleen plates, leaving amphipods trapped in the baleen hairs. It's amazing that these baleen whales, some of which are the largest animals to have ever lived on earth, eat some the smallest, most abundant life in the oceans.

Baleen whales tend to be solitary animals, traveling alone or in very small groups called pods. Female baleen whales are larger than male baleen whales. Most migrate each year, from their cold-

water feeding grounds to their warm-water breeding grounds, then back again. The blowhole of baleen whales has two openings.

Many whales are endangered, largely due to past hunting. Whales were harvested for their blubber, baleen, and meat. Blubber was rendered to oil, which was used for lamp oil and manufacturing cosmetics. Baleen was used for stays in women's corsets, shirt collars, umbrella ribs and decorative items. Whale meat was used for pet food while sinews or tendons were used for tennis racket strings. Today cetaceans, along with other marine mammals, are protected in the United States. However, many of their populations have not recovered from past hunting.

Pacific Gray Whales

Point Reyes National Seashore

Inside:

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Passing by Point Reyes

Thousands of people come to Point Reyes National Seashore every year to look for gray whales. They awaken in us a sense of awe and wonder with their size and grace, and with their stunning life habits that are so different from ours.

A few decades ago, the delicate plume of a spout rising into the air and then slowly fading would have been a rare sight for whale watchers. Hunting had devastated the Pacific gray whale population and put them in danger of extinction. As a result of international and national protection, we can glimpse the gray whales once again as they travel on their annual migratory path.

Many whale species are visible from the the shore of Point Reyes, but the most common is the Pacific gray whale. Each year in January, gray whales pass by the Point Reyes Headlands as they migrate southward from their summer feeding grounds in the arctic Bering and Chukchi Seas to the warm calving lagoons of Baja California. In late March and early April, they pass by the Headlands on their northward return to their feeding grounds. We humans might find a commute of 50 miles much too long, but these whales make an annual round-trip journey of 10,000 miles and travel for almost 2 months each way!

Pacific gray whale migration route

Whales are completely at home in an environment that to us can be harsh and deadly. They dive to depths that would crush us and live in temperatures that would rapidly drain our warmth and life.

They are mammals, like us, and must breathe air to live, but they spend little time above water. They surface, exhale, and take a breath before they disappear back into the dark waters. The spout, a heart-shaped plume of mist, is like your breath on a cold morning, but much, much larger. It seems so thin and wispy from afar, but if you could stand on the back of a gray whale, you would see the spout whoosh up into the air some 10 to 15 feet.

Whales are the ambassadors of the incredible undersea world. They tell us about their lives and their world, but if we listen, they will also tell us about ourselves. They sing to us about the best and the worst of human nature and our own hope for the future.

Since they were first seen, whales have most likely been viewed with the same sense of wonder we have today. However, 100 years ago (and more) whales were a commodity to be hunted and sold. The oil and baleen of thousands of whales produced a livelihood for hundreds of people. Wavering at the edge of extinction, many whale species nearly disappeared forever. Today, they are viewed as a natural gift to be treasured.

People made the choice to save the whales. Individuals spoke out to protect the whales that remained. Governments listened, and eventually passed laws that gave protection to these magnificent animals. And the whales recovered. The world is an incredible place, infinitely and intricately interconnected, full of mysteries we are only slowly unraveling. Whales provide us with a connection to some of those mysteries. They are symbols of the resilience of nature and of the idea that it is not too late to make the world a better place. They symbolize our hope in the future. In today's world, it is important to know that each of us can make a difference. Maybe that is why people love to watch for whales.

Whale Adaptations

Gray whales are not the largest, fastest or deepest diving whale, but they are marvelous animals that have adapted to a life at sea. Gray whales have taken advantage of niches in the marine environment that other whales are unable to use.

During the northern migration, gray whale cows and their calves often swim so close to the shoreline that lighthouse whale watchers can hear them breathing.

Gray whales are an illustration of millions of years of adaptation. Fifty million years ago, mesoncychids, a primitive relative of the deer and the ancient ancestor of the whale, left the land in search of food. As their descendants adapted to living in the water, they became some of the most highly specialized creatures of all time. Gray whales share many of the adaptations that make whales in general so successful and have a few that make them unique.

SEAGOING MAMMALS

The body of the whale has adapted to make it more efficient in the water. The tail grew large muscles and developed flukes to gain more power for swimming. The forelegs developed into pectoral flippers that help it to maneuver and the hind legs slowly disappeared. Today, the only vestiges of those hind legs are small bones hidden inside the whale's body. The nostrils, or blowholes, moved to the top of the head to make breathing while swimming easier. The rostrum and the top of the head took on a shape that helps to direct the water around the blowhole so as not to flood the whale as it breathes. Unlike humans, whale's lungs and mouths are not connected. A whale can both breathe and feed at the surface, all without drowning. Like humans, gray whales are mammals. They are warm-blooded, give birth to live young, and have hair. Pacific gray whales give birth to their calves in the protected, warm bays and estuaries of Baja California. Most birthing occurs in January and February. At birth, a single calf weighs up to 2,000 pounds and is 15 feet long. The calf nurses from mammary glands tucked inside narrow slits on the belly of the female. The rich milk is about 40% fat and is the consistency of cottage cheese or margarine. After several months of consuming more than 50 gallons per day, the calf is 26-30 feet long and nearly double its original weight when finally weaned.

We all love the ocean's surface with its beautiful sparkle blue. But beneath it, down deeper, whales are moving with slow, drifting currents - whales that are great, gentle, cloudlike beings.

Roger Payne, whale biologist, 1991

MIGRATION

The life of the gray whale includes a migration that ranks as one of the longest of any species of mammal. Migration is a behavioral adaptation that allows animals to take advantage of rich resources that may be available only at certain times in the year. Most gray whales migrate every spring from their birthing and breeding lagoons in Baja California to the shallow, muddy waters of the Bering Sea. This 5,000 mile journey takes over 55 days. They follow the coastal contours as they migrate, but are also thought to navigate by magnetic pathways. They often will avoid areas with heavy ship traffic or cloudy waters, such as the sediment-filled plume of San Francisco Bay. Not all gray whales make the full return journey to the northern waters of the Bering Sea. Some will linger along the migratory route or even summer at other locations. In recent years, small numbers of gray whales have summered in Tomales Bay and near the Farallon Islands. They can find food in Drakes Bay and Tomales Bay, where they are occasionally seen feeding just beyond the surf.

The National Oceanic and Atmospheric Administration (NOAA) provides additional protection to the ocean waters around Point Reyes National Seashore. The Cordell Bank, Gulf of the Farallones, and Monterey Bay National Marine Sanctuaries protect over 7,100 square miles of California's marine habitat. Winds, waves and ocean currents converge along the continental shelf that stretches within these sanctuaries, creating a resource-rich environment. This habitat is essential to whales and other species, including humans.

Spotting Pacific Gray Whales at Point Reyes

Gray whales can be seen from January to early May.

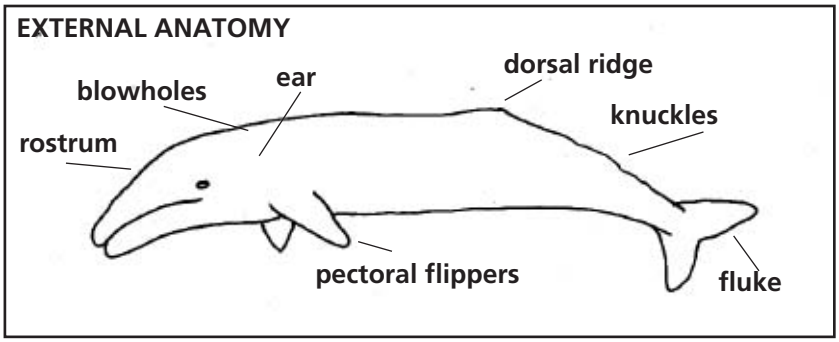
The peak of the migration south to Baja, CA is in January.

The peak of the migration north is in March.

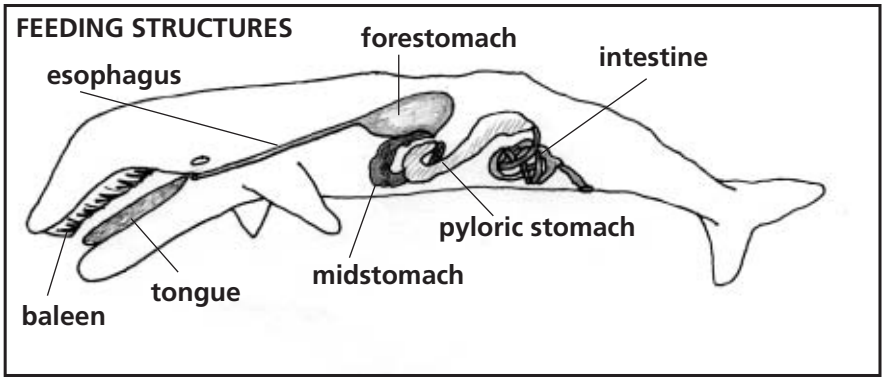
Poor visibility and high wind speeds can greatly reduce sightings.

Evolution and Anatomy

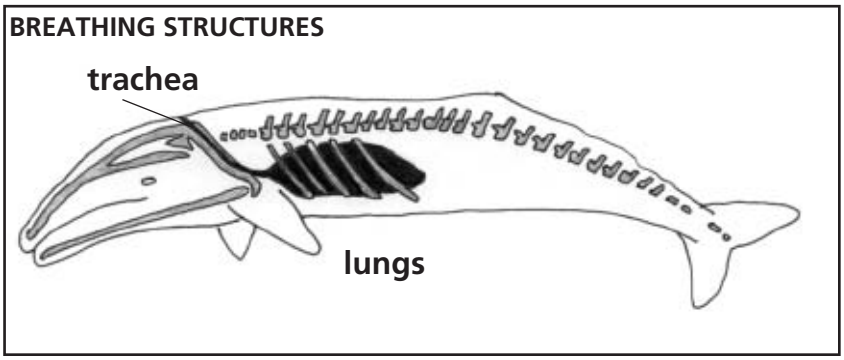
When spotting gray whales, look for the external anatomy which can be easily seen. Locating a gray whale's blowholes is easy as soon as you see one spout. The spout is often the first thing that you will see but it is not the last. As the whale surfaces to breathe, its rostrum, back, dorsal ridge and knuckles come into view. When it sounds, you can often see the tail fluke. Keep your eyes open, sometimes a whale will breach and a full view of the external anatomy will be seen in all its splendor!

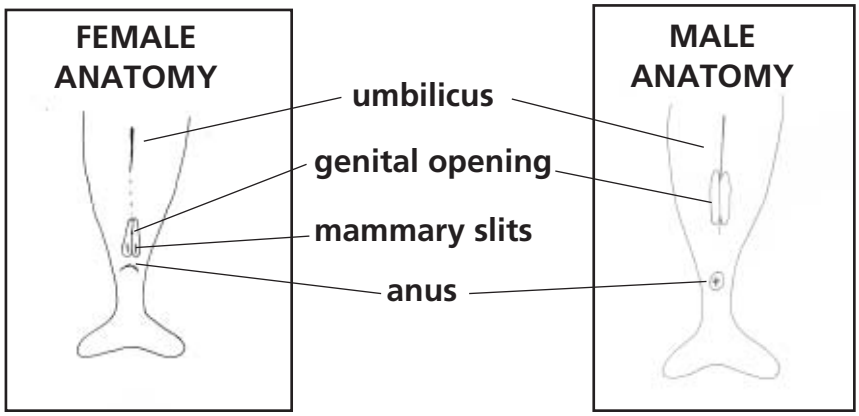


If you were an amphipod scooped up from the ocean floor by a gray whale, you would be in for an exciting ride. As the whale's tongue forced you against the baleen you would be separated from the mud and water that surrounded you. Then you would feel the mouth sweeping you toward the back of the throat to be swallowed. How much you would feel after that point could be debated. As a human however, there's not to much to worry about. The opening to the esophagus is much too small to accommodate anything of our size.



As a gray whale you would never have to worry about having your food go down your windpipe. That's because a gray whale's mouth and lungs are not connected. The lungs of a gray whale and all other whales are connected only to the blowholes, not to the mouth. If we had evolved similarly, we would be able to drink and breathe at the same time. This is not something that would concern a whale, however, because they never drink. Whales get all their water from the food they eat. If this is true, why would they have evolved in such a manner?



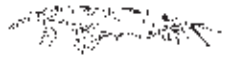


Adapting to life in the ocean has brought many changes to the gray whales' anatomy, yet they are distinctly mammals. In that regard, we are not so different. We are both warm-blooded, nurse our young from mammary glands, have some hair and breathe air. We also have an umbilicus or "belly button". These common traits are shared by all mammals regardless of whether they swim in the ocean waters, walk on land, or fly in the skies. These traits also set us apart from birds, reptiles, amphibians and other types of life.

Filling a Niche

SHALLOW FEEDERS

Gray whales migrate and forage along the continental shelf and have adapted to diving in shallow water. Typically, they stay in waters approximately 30 fathoms (180 feet) deep. Most whales feed at the surface of the open ocean, using their baleen to filter the water for krill and small fish. Gray whales have adapted to a special niche that other whales don't feed in. Gray whales literally suck mud up from the bottom of the Bering and

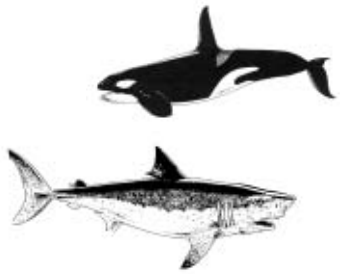


Amphipod

Chuckchi Seas feeding on the invertebrates that inhabit the top few inches of mud. Gray whales mostly eat shrimp like amphipods, but also eat surface-dwelling swarms of krill and, sometimes, small schooling fish.

A Pacific gray whale feeds by swimming slowly above the surface of the muddy bottom, at depths of up to 200 feet. Rolling over on its side, it opens its mouth slightly, and retracts its tongue (which weighs around 2,500 pounds). This action forms a powerful suction that enables the whale to suck up the food-filled mud. The tongue then forces it through the baleen on the opposite side of the whale's mouth. Working as a filter, the baleen traps the invertebrates and then the tongue maneuvers the food for swallowing. “Right-handed" whales feed by tilting onto their right side. Some prefer to feed on their left - you can tell by the absence of barnacles on the side of the head that is rubbed against the ocean bottom. During each summer, gray whales can consume around 65 tons of food, gaining up to 30% in weight.

Much of the energy from this feeding is saved for the future. The food energy is stored as a thick layer of fat, or blubber. Blubber is an adaptation common among many marine mammals. It helps to insulate the whale in cold waters and provides a stored energy reserve for the rest of the year. While gray whales typically don't feed much after they leave the northern feeding grounds, they probably take advantage of food sources if they find them.



The presence of orcas and white sharks in the waters surrounding Point Reyes may force gray whales to travel very close to the shorelines as they travel north with their calve

IMPORTANT PART OF THE ECOSYSTEM

Gray whales are an important part of the food web and play a large role in the success of their feeding-ground ecosystems. As they plow the bottom of the Bering Sea, one gray whale can dredge 100 acres of mud per summer. Their foraging behavior releases sediments upward into the water column. This provides a significant source of nutrients for other organisms in the coastal ecosystem. Furthermore, the deep depressions left by their plowing creates habitat for many of the organisms that colonize the ocean floor, or benthic zone. Among these organisms are the very amphipods the whales feed on.

Other species of animals have adapted to, and depend on, the presence of the whales. Orcas are one of the major predators of gray whales. The fins of many gray whales show the scars of their encounters with these predators. White sharks may prey on calves, but probably don't attack adult whales. Smaller creatures make their home on the grays. Several species of whale lice, amphipods related to the food of the gray whale, crawl about feeding on the skin of the whale. Several different species of barnacles can be found on gray whales.

Whale lice

Whole colonies attach themselves to the whale's skin and live their entire lives there.

At Point Reyes, we watch the whales as they migrate past, but only glimpse a small part of their complex lives. Over thousands, if not millions, of years the whales have adapted to their environment, even as they have helped to shape it. Sometimes it is difficult to see the whales and appreciate the great changes and forces that have influenced their very lives. Like so many things in the world around us, each piece of the environment is interconnected and influences the other. Perhaps we

For More Information

Point Reyes National Seashore
Point Reyes Station, CA 94956
www.nps.gov/pore

Gulf of the Farallones
National Marine Sanctuary
GGNRA, Fort Mason
San Francisco, CA 94123
www.farallones.org

American Cetacean Society
P.O. Box 2639
San Pedro, CA 90731-0943
http://www.acs-la.org

Marine MammalCenter
MarinnHeadlands, GGNRA
Sausalito, CA 94965
www.tmmc.org

Humans and Gray Whales

Our fascination with whales has had a huge impact on all species of whales world wide. Human demands have pushed many whale populations to the edge of extinction, or beyond, and human convictions have brought many of them back.

Using hand-held spears and small boats, Native Americans of Alaska and the Pacific Northwest hunted gray whales for food. Europeans used whale baleen in making hoopskirts, corsets, and buggy whips, and found whale blubber to be a valuable source of oil for lanterns and factory machinery. The growing industrial nations demanded this oil in huge amounts.

At first, gray whales were not a popular target for many whalers. Their oil was of poor quality and their baleen was too coarse to bring much profit. Right and bowhead whales were preferred, but as those declined in number, the price of oil soared. Even if less valuable, an adult gray whale could produce up to 25 barrels of oil that sold for as much as $45 a barrel. Shore whaling stations sprang up along the migration route on the California coastline. New technology made whaling more efficient. Explosive harpoons, known as "bomb lances," were invented in 1865. By 1874, a whaling captain and early naturalist wrote:

"the mammoth bones of the California Gray Whale lie bleaching on the shores of those silvery waters and scattered along the broken coasts, from Siberia to the Gulf of California; and ere long it may be questioned whether this mammal will not be numbered among the extinct species of the Pacific."
-Captain Charles Scammon

As gray whales vanished, the shore stations closed. But in 1914, fast, new steam-powered whaling ships with harpoon- firing cannons made escape all but impossible. While electricity and petroleum products replaced whale oil in lanterns and machines, their oil was still used to make soap and their meat used in fertilizers and pet food. It has been estimated that as few as 1,000 Pacific gray whales were left alive in the 1930s.

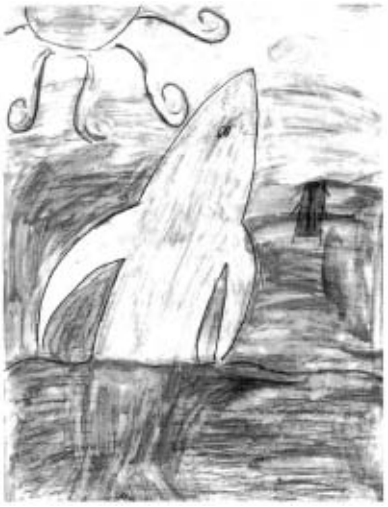
Even the whalers realized that extinction seemed imminent. A ban on hunting gray whales was implemented in 1937. In 1946, an international agreement to ban commercial whaling was signed by most of the whaling nations. Subsistence hunting still continues in some cultures and

commercial whaling still continues in Japan, Finland, and Iceland.

Many people have learned to value whales beyond their monetary worth. The grandeur of whales has captured the hearts of people around the world. In the 1960s and '70s, many adults and school children wrote letters to Congress, expressing their concern for the protection of the environment and especially for the whales. Laws, like the Marine Mammal Protection Act, were created to help preserve whales and other marine mammals. These efforts led to the recovery of the gray whale population. Today there are an estimated 25,000 to 27,000 gray whales, perhaps nearing the number that existed before commercial whaling. Whale watching has replaced whaling as a profitable industry.

Although gray whales are protected, there are still risks for them. Whales, and other sea mammals and birds, get caught in gill nets used for fishing. Unable to reach the surface to breathe, they drown. Whales are susceptible to pollution dumped into the oceans, and some have scars that show the danger of collisions with ships. New studies also indicate that noise pollution from ships and industry may cause harm to the whales' hearing and ability to navigate.

Gray whales have provided food, supplied power and wealth for growing nations, and have become a respected symbol of the ocean environment. More importantly, they symbolize how much impact our choices and decisions can have on the world around us - each of us can make the world a better place.

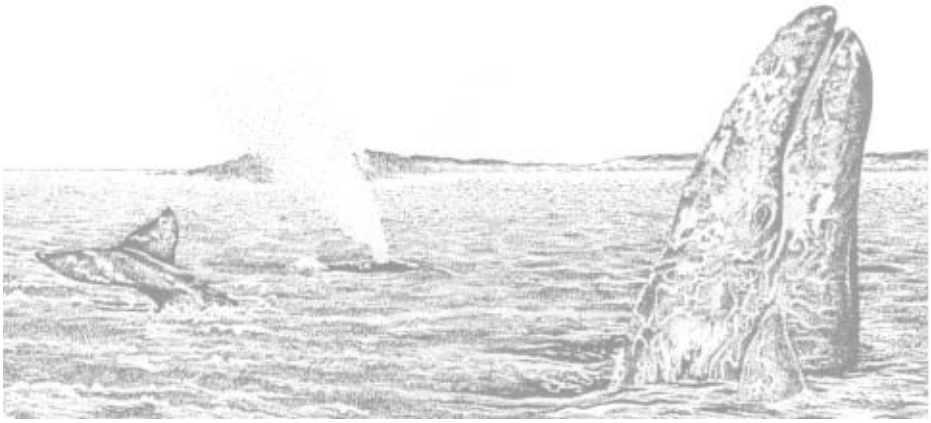


"We are the only species which, when it chooses to do so, will go to great effort to save what it might destroy."
Wallace Stegner

Humans and Gray Whales

Speculative Estimates of Historic Gray Whale Populations

Human Actions	Year	Gray Whale Populations
Traditional hunting for food	before 1800's	
Shore whaling starts in California	1854	
Discovery of Baja lagoons	1855	
Petroleum first used for fuel	1859	
Bomb lance invented	1865	
Whalers find few gray whales	1875	
Native Siberian whalers starve	1880's	
Shore whaling in California dies out	1880-1900	
Spring steel replaces baleen in corsets	1909	
Steam-powered whaling ships start hunting gray whales	1914	
Factory ships process whales quickly at sea	1920's-30's	
Whalers ban hunting grays	1936	
International Ban on whaling	1947	
Marine Mammal Protection Act	1972	
Endangered Species Act (1973)		
Grays removed from Endangered Species List	1955	
Proposed and vetoed salt refining in Baja	2000	



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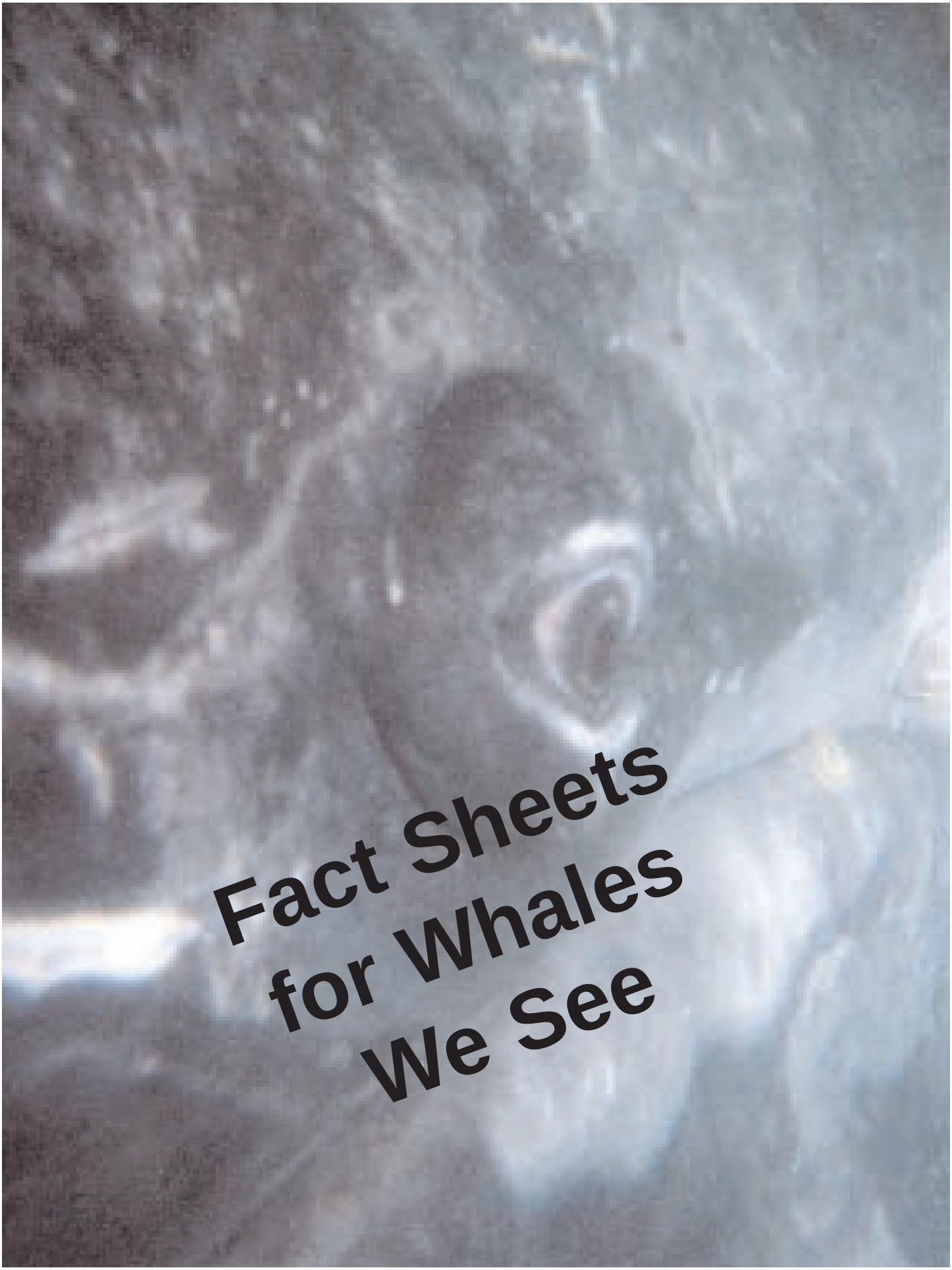
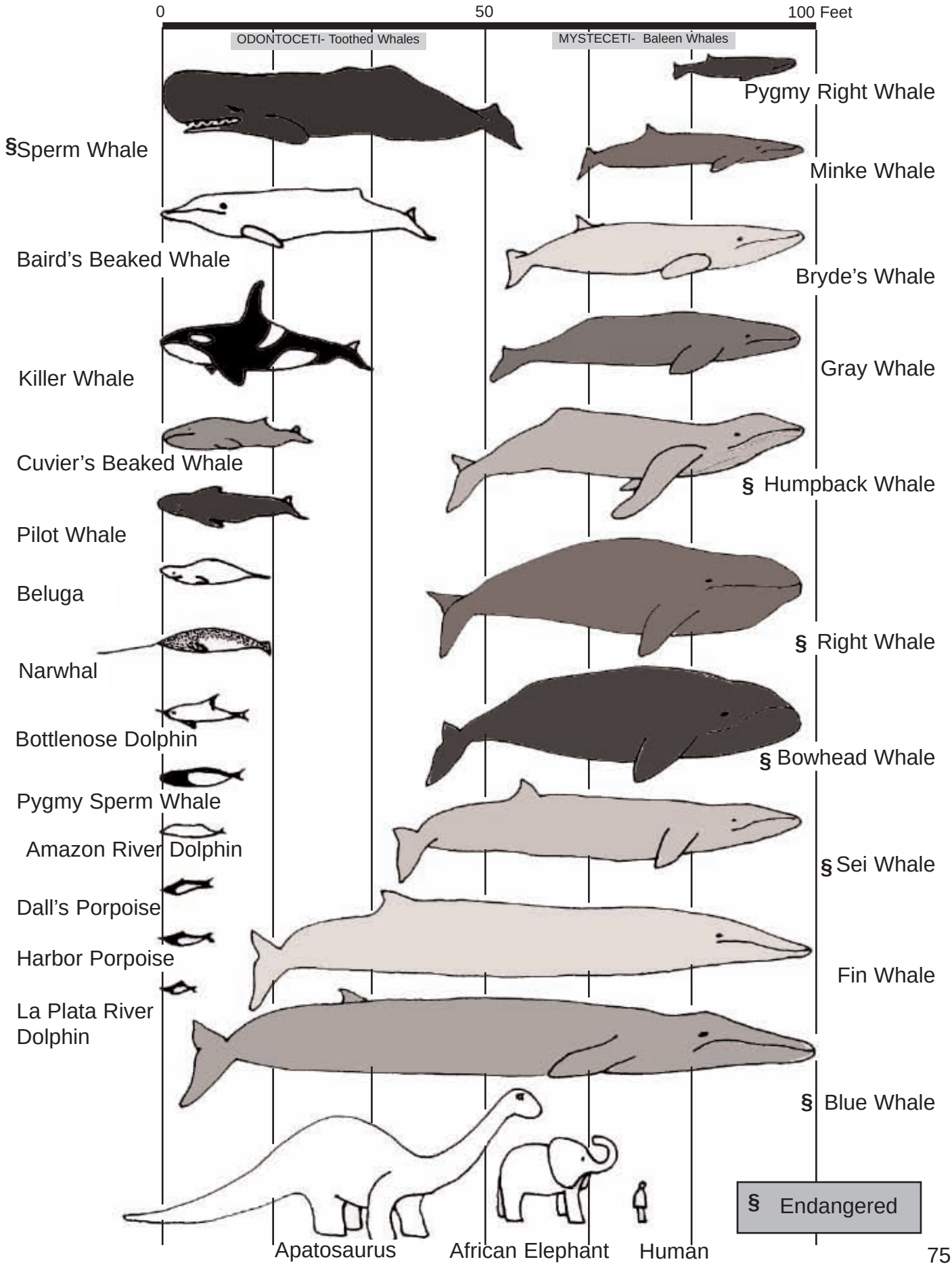


Fact Sheets for Whales We See

Cetacean Comparison Chart

Whales, Dolphins, and Porpoises



GRAY WHALE

Eschrichtius robustus

CLASS: Mammalia
ORDER: Cetacea
SUBORDER: Mysticeti
FAMILY: Eschrichtiidae
GENUS: Eschrichtius
SPECIES: robustus

The only member of the family Eschrichtiidae, the gray whale is a mysticete, or baleen whale. It is a "coastal" whale that migrates along the North American Pacific Coast between arctic seas and the lagoons of Baja California, Mexico. Frequently visible from shore, gray whales provide a unique opportunity for land and boat observation, and commercial whale watching has become a major industry along its migration route. Visitors to the calving and breeding lagoons sometimes encounter the phenomenon of the "friendlies"; gray whales that closely approach small boats and allow themselves to be touched by humans.

PHYSICAL DESCRIPTION Gray whales have a streamlined body, with a narrow, tapered head. The upper jaw is arched in profile, and slightly overlaps the lower jaw. The rostrum (upper jaw) is dimpled and each of the little depressions contains one stiff hair. There are 2-5 grooves on the ventral throat 5 feet (1.5 m) in length.

COLOR The gray whale received its name from the gray patches and white mottling on its dark skin. On the skin are many scratches, scattered patches of white barnacles, and orange whale lice. Newborn calves are dark gray to black, although some may have distinctive white markings.
surface characteristics

FINS AND FLUKES The gray whale has no dorsal (top) fin. About 2/3 of the way back on its body is a prominent dorsal hump followed by a series of 6-12 knuckles along the dorsal ridge that extend to the flukes (tail lobes). Its flippers are paddle shaped and pointed at the tips. Its fluke is about 10-12 feet (3.7 m) across, pointed at the tips, and deeply notched in the center.

LENGTH AND WEIGHT Adult males measure 45-46 feet (13.7-14 m) and adult females measure slightly more. Both sexes weigh 30-40 tons (27,200-36,300 kg).

FEEDING Gray whales feed on small crustaceans such as amphipods, and tube worms found in bottom sediments. They feed primarily during the summer months of long daylight hours in the cold Arctic waters of the Bering and Chukchi seas. As a baleen whale, it has a series of 130-180 fringed overlapping plates hanging from each side of the upper jaw, where teeth might otherwise be located. These plates consist of a fingernail-like material called keratin that frays out into fine hairs on the ends inside the mouth next to the tongue. The plates are off-white and about 2-10 inches (5-25 cm) in length. To feed, a whale dives to the bottom, rolls on its side and draws bottom sediments and water into its mouth. As it closes its mouth, water and sediments are expelled through the baleen plates, which trap the food on the inside near the tongue to be swallowed.

MATING AND BREEDING Gray whales reach sexual maturity at 5-11 years of age, or when they reach 36-39 feet (11-12 m) in length. Gestation is 12-13 months. The calf weighs 1,100-1,500 pounds (500-680 kg) and is about 15 feet (4.5 m) at birth. Calves nurse 7-8 months on milk that is 53% fat (human milk is 2% fat). Females bear a single calf, at intervals of 2 or more years.

Courtship and mating behavior are complex, and frequently involve 3 or more whales of mixed sexes. Mating and calving both occur primarily in the lagoons of Baja California, Mexico, although both have been observed during the migration.
range map

DISTRIBUTION AND MIGRATION Gray whales inhabit shallow coastal waters of the eastern North Pacific. The gray whale makes one of the longest of all mammalian migrations, averaging 10,000-14,000 miles (16,000-22,530 km) round trip. In October, the whales begin to leave their feeding grounds in the Bering and Chukchi Seas and head south for their mating and calving lagoons in Baja California, Mexico. The southward journey takes 2-3 months. The whales remain in the lagoons for 2-3 months, allowing the calves to build up a thick layer of blubber to sustain them during the northward migration and keep them warm in the colder waters. The return trip north takes another 2-3 months. Mothers and calves travel very near shore on the northbound migration. There are some individual gray whales that are found year round in the Straits of Juan de Fuca between the State of Washington and Vancouver Island, Canada, and some that are seen during the summer months off the northern California coast.

NATURAL HISTORY A migrating gray whale has a predictable breathing pattern, generally blowing 3-5 times in 15-30 second intervals before raising its fluke and submerging for 3-5 minutes. A gray whale can stay submerged up to 15 minutes, and travel at 3-6 miles per hour (4.8-9.6 km/hr). Mothers are very protective of their calves, and earned the name "Devilfish" from early whalers in the lagoons because of their violent defensive behaviors. Orcas (killer whales) are a cause of gray whale deaths, and many gray whales have orca teeth scars on their flukes.

STATUS At one time there were three gray whale populations: a north Atlantic population, now extinct, possibly the victims of over-hunting; a Korean or western north Pacific stock now very depleted, also possibly from over-hunting; and the eastern north Pacific population, the largest surviving population. Hunted to the edge of extinction in the 1850's after the discovery of the calving lagoons, and again in the early 1900's with the introduction of floating factories, the gray whale was given partial protection in 1937 and full protection in 1947 by the International Whaling Commission (IWC). Since that time the eastern north Pacific gray whale population has made a remarkable recovery and now numbers between 19,000 and 23,000, probably close to their original population size.

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FACT SHEETS MAY BE REPRINTED FOR EDUCATIONAL OR SCIENTIFIC PURPOSES

HUMPBACK WHALE

Megaptera novaeangliae

CLASS: Mammalia
ORDER: Cetacea
SUBORDER: Mysticeti
FAMILY: Balaenopteridae
GENUS: Megaptera
SPECIES: novaeangliae

The humpback whale is one of the rorquals, a family that also includes the blue whale, fin whale, Bryde's whale, sei whale, and minke whale. Rorquals have two characteristics in common: dorsal fins on their backs, and ventral pleats running from the tip of the lower jaw back to the belly area. The shape and color pattern on the humpback whale's dorsal fin and flukes (tail) are as individual in each animal as are fingerprints in humans. The discovery of this interesting fact changed the course of cetacean research forever, and the new form of research known as "photo-identification," in which individuals are identified, catalogued, and monitored, has led to valuable information about such things as humpback whale population sizes, migration, sexual maturity, and behavior patterns.

PHYSICAL DESCRIPTION The head of a humpback whale is broad and rounded when viewed from above, but slim in profile. The body is not as streamlined as other rorquals, but is quite round, narrowing to a slender peduncle (tail stock). The top of the head and lower jaw have rounded, bump-like knobs, each containing at least one stiff hair. The purpose of these hairs is not known, though they may allow the whale to detect movement in nearby waters. There are between 20-50 ventral grooves which extend slightly beyond the navel.

COLOR The body is black on the dorsal (upper) side, and mottled black and white on the ventral (under) side. This color pattern extends to the flukes. When the humpback whale "sounds" (goes into a long or deep dive) it usually throws its flukes upward, exposing the black and white patterned underside. This pattern is distinctive to each whale. The flippers range from all white to all black dorsally, but are usually white ventrally.

FINS AND FLUKES About 2/3 of the way back on the body is an irregularly shaped dorsal (top) fin. Its flippers are very long, between 1/4 and 1/3 the length of its body, and have large knobs on the leading edge. The flukes (tail), which can be 18 feet (5.5 m) wide, is serrated and pointed at the tips.

LENGTH AND WEIGHT Adult males measure 40-48 feet (12.2-14.6 m), adult females measure 45-50 feet (13.7-15.2 m). They weigh 25 to 40 tons (22,680-36,287 kg).

FEEDING Humpback whales feed on krill, small shrimp-like crustaceans, and various kinds of small fish. Each whale eats up to 1 and 1/2 tons (1,361 kg) of food a day. As a baleen whale, it has a series of 270-400 fringed overlapping plates hanging from each side of the upper jaw, where teeth might otherwise be located. These plates consist of a fingernail-like material called keratin that frays out into fine hairs on the ends inside the mouth near the tongue. The plates are black and measure about 30 inches (76 cm) in length. During feeding, large volumes of water and food can be taken into the mouth because the pleated grooves in the throat expand. As the mouth closes water is expelled through the baleen plates, which trap the food on the inside near the tongue to be swallowed.

MATING AND BREEDING Humpback whales reach sexual maturity at 6-10 years of age or when males reach the length of 35 feet (11.6 m) and females reach 40 feet (12 m). Each female typically bears a calf every 2-3 years and the gestation period is 12 months. A humpback whale calf is between 10-15 feet (3-4.5 m) long at birth, and weighs up to 1 ton (907 kg). It nurses frequently on the mother's rich milk, which has a 45% to 60% fat content. The calf is weaned to solid food when it is about a year old.

DISTRIBUTION AND MIGRATION Found in all the world's oceans, most populations of humpback whales follow a regular migration route, summering in temperate and polar waters for feeding, and wintering in tropical waters for mating and calving. In the Arabian Sea, a year-round non-migratory population of humpbacks appears not to follow this general rule.

NATURAL HISTORY At least 3 different species of barnacles are commonly found on both the flippers and the body of the humpback whale. It is also home for a species of whale lice, Cyamus boopis

Humpback whales are active, acrobatic whales. They can throw themselves completely out of the water (breaching), and swim on their backs with both flippers in the air. They also engage in "tail lobbing" (raising their huge flukes out of the water and then slapping it on the surface) and "flipper slapping" (using their flippers to slap the water). It is possible that these behaviors are important in communication between humpbacks.

Perhaps the most interesting behavior of humpback whales is their "singing." Scientists have discovered that humpback whales sing long, complex "songs". Whales in the North American Atlantic population sing the same song, and all the whales in the North American Pacific population sing the same song. However, the songs of each of these populations and of those in other areas of the world are uniquely different. A typical song lasts from 10-20 minutes, is repeated continuously for hours at a time, and changes gradually from year to year. Singing whales are males, and the songs may be a part of mating behavior.

STATUS Because their feeding, mating, and calving grounds are close to shore and because they are slow swimmers, the humpback whales were an easy target for early whalers. The International Whaling Commission (IWC) gave them worldwide protection status in 1966, but there were large illegal kills by the Soviets until the 1970's. It is believed they number about 30,000-40,000 at present, or about 30-35% of the original population.

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FACT SHEETS MAY BE REPRINTED FOR EDUCATIONAL OR SCIENTIFIC PURPOSES

ORCA (Killer Whale)

Orcinus orca

CLASS: Mammalia
ORDER: Cetacea
SUBORDER: Odontoceti
FAMILY: Delphinidae
GENUS: Orcinus
SPECIES: orca

The orca, or killer whale, with its striking black and white coloring, is one of the best known of all the cetaceans. It has been extensively studied in the wild and is often the main attraction at many sea parks and aquaria. An odontocete, or toothed whale, the orca is known for being a carnivorous, fast and skillful hunter, with a complex social structure and a cosmopolitan distribution (orcas are found in all the oceans of the world). Sometimes called "the wolf of the sea", the orca can be a fierce hunter with well-organized hunting techniques, although there are no documented cases of killer whales attacking a human in the wild.

PHYSICAL SHAPE The orca is a stout, streamlined animal. It has a round head that is tapered, with an indistinct beak and straight mouthline.

COLOR The orca has a striking color pattern made up of well-defined areas of shiny black and cream or white. The dorsal (top) part of its body is black, with a pale white to gray "saddle" behind the dorsal fin. It has an oval, white eyepatch behind and above each eye. The chin, throat, central length of the ventral (underside) area, and undersides of the tail flukes are white. Each whale can be individually identified by its markings and by the shape of its saddle patch and dorsal fin.

FINS AND FLUKES Another distinctive feature of the orca is its dorsal fin, which can reach 6 feet (1.8 m) high in males and is shaped like an isosceles triangle. The immature male and the female dorsal fins are also large, reaching 3 feet (.91 m) high, but are falcate (curved). The dorsal fin often has identifying nicks, cuts, scars and indentations. The paddle-shaped pectoral flippers are broad, rounded, and can reach a length of nearly 6 feet (1.8 m) and a width of 3 feet (.91 m).

LENGTH AND WEIGHT Males can grow as large as 32 feet (9.6 m) long and weigh 8 to 9 tons. Females can reach 23 feet (8.2 m) in length and weigh up to 4 tons.

FEEDING The mouth of the orca is large and well adapted for hunting. It has 46 to 50 conical shaped teeth that point slightly backwards and inwards. The upper and lower teeth interlock, which aids in gripping large prey and tearing it into smaller pieces for easier swallowing. Depending on the population and geographic area, the diet of orcas varies. Food preference and availability may have led to the distinct population types, such as resident, transients, and offshores that have been observed/identified in the Pacific Northwest region of the United States and other areas around the world. Generally speaking, transients will feed on a variety of animals including: sea lions, elephant seals, harbor seals, porpoises, squid, sharks, fish, penguins, smaller whales, such as belugas and narwhals and even large baleen whales, such as gray whales. Resident whales tend to feed primarily on fish species such as salmon or herring. The diet of offshores is still being studied by scientists.

MATING AND BREEDING Little is known about the orca's breeding habits. Newborn calves have been observed throughout the year suggesting that that mating can occur at any time with no

particular breeding season. In the wild, orcas become sexually mature between the ages of 10 and 18 years of age and are thought to be actively reproducing by the time the male reaches about 20 feet (5.1 m) in length and the female reaches about 16 feet (4.1 m). Based on long-term field studies, females are believed to be reproductively active into their early 40's. The maximum age for males is unknown. Captive females can bear a calf every two years, but a more typical period between calves in the wild is 3 to 5 years. The gestation period is estimated to be between 13 to 17 months. At birth, a calf is generally about 6-7 feet long (1.8-2.1 m) and weighs around 400 pounds. However, calf size and weight does vary slightly between populations/regions.
range map

DISTRIBUTION AND MIGRATION The orca is found in all the oceans of the world, though they are more abundant in cooler waters. Unlike some other species of whales, which follow a regular migration route each year, the orca seems to travel according to the availability of food. They are one of the few species of whales that move freely from hemisphere to hemisphere.

BEHAVIOR & NATURAL HISTORY Orcas generally live in pods (groups) consisting of several females, calves, one or more males, and/or juveniles. Some pods consist of a mother and her offspring who stay with her for life. This type of matrilineal family structure has been observed in the U.S. Pacific Northwest where resident pods have been documented as stable, consistent matriarchal family groups with several generations traveling together. Transient pods appear to be more fluid; individuals come and go, groups often contain unrelated females with offspring, offspring do not stay with their mother and pods may form solely as a temporary foraging pack. The social structure of other populations, including offshore orcas, is being studied to document whether certain family groups always stay together or return to each other after periods of time. Mothers are very protective of their calves, and orcas are known to protect and care for sick and injured companions.

Sparked by the increase in live capture for aquaria and public concern, scientists have been studying resident pods along the northern Pacific coast of the United States and Canada since 1970. By 1973, photographs were being used to identify individuals based on differences in saddle color pattern, dorsal fin shapes and other identifying marks and scars. Identified orcas have all been numbered and careful records are kept of their re-sightings. Recordings of the sounds made by these orcas have revealed that each pod has its own "dialect." Each pod has some sounds in common with other pods, and other sounds that are unique to its own pod. Through these scientific studies, much has been learned about population, travel patterns, reproduction, behavior and social habits of orcas.

POPULATION STATUS Although orcas are widely distributed, total world population is still unknown. They have no natural enemies and have not been hunted as much as other whales. Recent studies suggest that a significant threat to orcas, and other marine mammals, may come from man-made chemicals. Yet, toxins are not the only threats facing orcas. Many fish populations around the world are decreasing. This may be having a direct effect on the populations of fish-eating resident whales. Loss of fish may also cause a decline in seals and sea lions, often the primary prey of transient orcas.

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FACT SHEETS MAY BE REPRINTED FOR EDUCATIONAL OR SCIENTIFIC PURPOSES

FIN WHALE

Balaenoptera physalus

CLASS: Mammalia
ORDER: Cetacea
SUBORDER: Mysticeti
FAMILY: Balaenopteridae
GENUS: Balaenoptera
SPECIES: Balaenoptera physalus

The fin whale is one of the rorquals, a family that includes the humpback whale, blue whale, Bryde's whale, sei whale, and minke whale. Rorquals all have a dorsal fin and throat grooves that expand when the animal is feeding. The fin, or finback whale is second only to the blue whale in size and weight. Among the fastest of the great whales, it is capable of bursts of speed of up to 23 mph (37 km/hr) leading to its description as the "greyhound of the sea." Its most unusual characteristic is the asymmetrical coloring of the lower jaw, which is white or creamy yellow on the right side and mottled black on the left side. Fin whales are found in all oceans of the world, though they seem to prefer temperate and polar waters to tropical seas.

PHYSICAL DESCRIPTION The fin whale is long, sleek, and streamlined, with a V-shaped head which is flat on top. A single ridge extends from the blowhole to the tip of the rostrum (upper jaw). There is a series of 50-100 pleats or grooves on the underside of its body extending from under the lower jaw to the navel.

COLOR The fin whale is light gray to brownish-black on its back and sides. Two lighter "colored" chevrons begin midline behind the blowholes and slant down the sides towards the fluke (tail) before turning and ending right behind the eye. The underside of its body, flippers, and fluke are white. The lower jaw is gray or black on the left side and creamy white on the right side. This asymmetrical coloration extends to the baleen plates as well, and is reversed on the tongue.

FINS AND FLUKE The fin whale has a prominent, slightly falcate (curved) dorsal fin located far back on its body. Its flippers are small and tapered, and its fluke is wide, pointed at the tips, and notched in the center.

LENGTH AND WEIGHT Adult males measure up to 78 feet (24 m) in the northern hemisphere, and 88 feet (26.8 m) in the southern hemisphere. Females are slightly larger than males. Weight for both sexes is between 50-70 tons (45,360-63,500 kg).

FEEDING Fin whales feed mainly on small shrimp-like creatures called krill or euphausiids and schooling fish. They have been observed circling schools of fish at high speed, rolling the fish into compact balls then turning on their right side to engulf the fish. Their color pattern, including their asymmetrical jaw color, may somehow aid in the capture of such prey. They can consume up to 2 tons (1,814 kg) of food a day. As a baleen whale, it has a series of 262-473 fringed overlapping plates hanging from each side of the upper jaw, where teeth might otherwise be located. These plates consist of a fingernail-like material called keratin that frays out into fine hairs on the ends inside the mouth near the tongue. The baleen on the left side of the mouth has alternating bands of creamy-yellow and blue-gray color. On the right side, the forward 1/3 section of the plates is all creamy-yellow. The plates can measure up to 30 inches (76 cm) in length and 12 inches (30 cm) in width. During feeding, large volumes of water and food can be taken into the mouth because the

pleated grooves in the throat expand. As the mouth closes water is expelled through the baleen plates, which trap the food on the inside near the tongue to be swallowed.

MATING AND BREEDING Adult males reach sexual maturity at about 6-10 years of age. As in some other whales, sexual maturity is reached before physical maturity. Gestation is 12 months, and calves are believed to be born at 3-4 year intervals. Length at birth is 14-20 feet (5.5 -6.5 m) and weight is 2 tons (1,814 kg). Calves nurse for 6-8 months and are weaned when they are 30-40 feet (10-12 m) in length.
range map

DISTRIBUTION AND MIGRATION Fin whales are found in all oceans of the world. They may migrate to subtropical waters for mating and calving during the winter months and to the colder areas of the Arctic and Antarctic for feeding during the summer months; although recent evidence suggests that during winter fin whales may be dispersed in deep ocean waters.

NATURAL HISTORY Fin whales are found most often alone, but groups of 3-7 individuals are common, and association of larger numbers or concentrations may occur in some areas at times. Because their powerful sounds can carry vast distances, fin whales may stay in touch with each other over long distances. The fin whale's blow is tall and shaped like an inverted cone, and the dive sequence is 5-8 blows approximately 70 seconds apart before a long dive. They rarely raise their flukes as they begin their dive, which can be as deep as 1,800 feet (550 m).

STATUS The fin whale's speed, plus the fact that they prefer the vastness of the open sea, gave them almost complete protection from the early whalers. With modern whaling methods, however, finback whales became easy victims. As blue whales became depleted, the whaling industry turned to the smaller, still abundant fin whales as a replacement. As many as 30,000 fin whales were slaughtered each year from 1935 to 1965. The International Whaling Commission (IWC) placed them under full protection in 1966 beginning with the North Pacific population. Precise estimates are unavailable today, but it is thought that present populations are about 40,000 in the northern hemisphere and 15,000-20,000 in the southern hemisphere, a small percentage of the original population levels.

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FACT SHEETS MAY BE REPRINTED FOR EDUCATIONAL OR SCIENTIFIC PURPOSES

BLUE WHALE

Balaenoptera musculus

CLASS: Mammalia
ORDER: Cetacea
SUBORDER: Mysticeti
FAMILY: Balaenopteridae
GENUS: Balaenoptera
SPECIES: musculus

The blue whale is one of the rorquals, a family that also includes the humpback whale, fin whale, Bryde's whale, sei whale, and minke whale. On land an animal the size of a blue whale would be crushed by its own weight without the support of large heavy bones. Because its body is supported by water, as a sea animal, the need for heavy bones to support its weight disappeared. This, plus the availability of a large food supply, have made it possible for the blue whale to reach such an enormous size. The blue whale makes deep and rumbling sounds which can be felt as much as heard. These low-frequency sounds travel long distances through water, allowing blue whales to communicate with each other over hundreds of miles of ocean.

PHYSICAL DESCRIPTION The blue whale is the largest mammal, possibly the largest animal, to ever inhabit the earth. Its body is long, somewhat tapered, and streamlined, with the head making up less than one-fourth of its total body length. Its rostrum (upper part of the head) is very broad and flat and almost U-shaped, with a single ridge that extends just forward of the blowholes to the tip of the snout. Its blowholes are contained in a large, raised "splash guard", and the blow is tall and straight and over 20 feet (6 meters) high. Its body is smooth and relatively free of parasites, but a few barnacles attach themselves to the edge of the fluke and occasionally to the tips of the flippers and to the dorsal fin. There are 55-68 ventral grooves or pleats extending from the lower jaw to near the navel.

COLOR The blue whale is blue-gray in color, but often with lighter gray mottling on a darker background (or with darker spots on a lighter background). The underside of its flippers may be a lighter color or white, while the ventral (underside) of the fluke is dark. The blue whale acquires microorganisms called diatoms in the cold waters of the Antarctic and North Pacific and North Atlantic which give the underside of its body a yellowish green caste. Because of this yellow color, the early whalers gave it the name "sulfur bottom."

FINS AND FLUKES Its dorsal (top) fin is small and triangular or falcate (curved) in shape, and is located three-fourths of the way back on the body. The fin measures only one foot (30 cm) at its highest point though its size and shape are highly variable. Its flippers are tapered and relatively short, about 12% of the total body length. The flukes are broad and triangular. The rear edge is smooth with a slight median notch.

LENGTH AND WEIGHT The longest blue whale ever recorded was a 108-foot adult female caught during whaling efforts in Antarctica! In modern times, blue whales in the Southern Hemisphere reach lengths of 90-100 feet , but their Northern Hemisphere counterparts are smaller, on average 75 to 80 feet (23 to 24.5 m). Blue whales can weigh over 100 tons (99,800 kg). Females are larger than males of the same age, the largest perhaps weighing as much as 150 tons (136,000 kg).

FEEDING The blue whale is thought to feed almost exclusively on small, shrimp-like creatures called euphausiids or krill. During the summer feeding season the blue whale gorges itself, consuming an astounding 4 tons (3.6 metric tons) or more each day. This means it may eat up to 40 million krill a day. As a baleen whale, it has a series of 260-400 fringed overlapping plates hanging from each side of the upper jaw, where teeth might otherwise be located. These plates consist of a finger-nail-like material called keratin that frays out into fine hairs on the ends inside the mouth near the tongue. The plates are black and measure about 20 inches (51 cm) in length toward the front of the mouth and about 40 inches (102 cm) at the rear. During feeding, large volumes of water and food can be taken into the mouth because the pleated grooves in the throat expand. As the mouth closes water is expelled through the baleen plates, which trap the food on the inside near the tongue to be swallowed.

MATING AND BREEDING Recent research indicates that blue whales reach sexual maturity between the ages of 6-10 years, or when males average about 74 feet (23 m) and females are about 79 feet (24 m). Calves are born at intervals of 2 to 3 years and gestation is about 12 months. Calves are 23 to 27 feet (7-8.2 m) long at birth and 3 tons (2,722 kg). Calves nurse for 7 to 8 months and are weaned when they reach 52 feet (16 m) in length. At that time they weigh about 23 tons (20,900 kg). During the nursing period, calves consume 100 gallons (379 liters) of the fat-rich mother's milk each day, gain 200 pounds a day, or 8 pounds an hour, and grow 1 and 1/2 inches in length a day.

DISTRIBUTION AND MIGRATION Blue whales may be found in all oceans of the world. They migrate to tropical-to-temperate waters during winter months to mate and give birth to calves. They can feed throughout their range, in polar, temperate, or even tropical waters.

NATURAL HISTORY Though they may be found singly or in small groups, it is more common to see blue whales in pairs. They are sometimes seen in larger groups and loosely defined concentrations of 50-60 have been observed. They are fast, strong swimmers, capable of reaching 30 mph (48.3 km/hr) when alarmed, but they usually cruise along at about 12 mph (19.3 km/hr)

STATUS Because of their enormous size and speed, blue whales were safe from early whalers, who could not pursue them in open boats with hand harpoons. But in 1868 a Norwegian, Sven Foyn, revolutionized the whaling industry with the invention of the exploding harpoon gun and by using steam and diesel powered factory ships and catcher boats. He also perfected the technique of inflating dead whales with air so they wouldn't sink after being harpooned. The whaling industry began to focus on blue whales after 1900. A single 90-foot blue whale could yield up to 120 barrels of oil, and the blues were killed by the thousands. The slaughter peaked in 1931 when over 29,000 were killed in one season. After that blue whales became so scarce that the whalers turned to other species and, belatedly, the International Whaling Commission (IWC) banned all hunting of blue whales in 1966 and gave them worldwide protection. Recovery has been extremely slow, and only in the last few years have there been signs that their numbers may be increasing. Pre-whaling population estimates were over 350,000 blue whales, but up to 99% of blue whales were killed during whaling efforts. Presently, there are an estimated 5-10,000 blue whales in the Southern Hemisphere, and only around 3-4,000 in the Northern Hemisphere.

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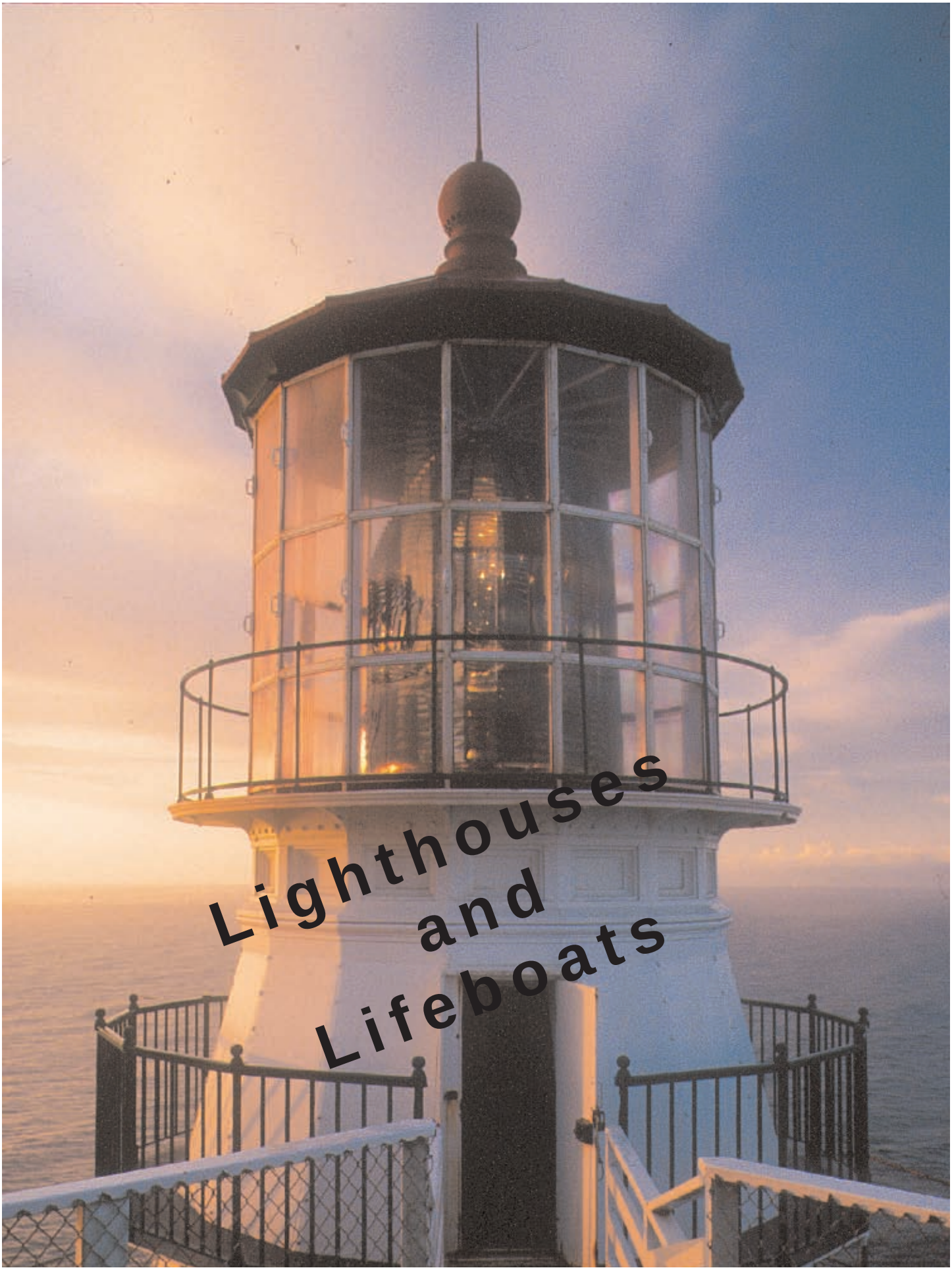


Lighthouses and Lifeboats

The Historic Point Reyes Lighthouse

Punta de los Reyes . . . God help the hapless mariner who drifts upon it!"- San Francisco Chronicle 1887

Point Reyes: A Treacherous Obstacle to Mariners

Point Reyes is the windiest place on the Pacific Coast and the second foggiest place on the North American continent. Weeks of fog, especially during the summer months, frequently reduce visibility to hundreds of feet. The Point Reyes Headlands, which jut 10 miles out to sea, pose a threat to each ship entering or leaving San Francisco Bay. The historic Point Reyes Lighthouse warned mariners of danger for more than a hundred years. The historic Point Reyes Lighthouse, built in 1870, was retired from service in 1975 when the U.S. Coast Guard installed an automated light. They then transferred ownership of the lighthouse to the National Park Service, which has taken on the job of preserving this fine specimen of our heritage.

All lighthouses in the United States are now automated because it is cheaper to let electronics do the work. Many decommissioned- lighthouses were transformed into restaurants, inns, or museums. The lighthouse at Point Reyes National Seashore is now a museum piece, where the era of the lightkeepers' lives, the craftsmanship, and the beauty of the lighthouse are actively preserved.

The Point Reyes Light First Shone in 1870

First-order Fresnel lens seen from inside the lens, Point Reyes Lighthouse. The electric lights are a modern addition.

The Point Reyes Lighthouse lens and mechanism were constructed in France in 1867. The clockwork mechanism, glass prisms, and housing for the lighthouse were shipped on a steamer around the tip of South America. The parts from France and the cast iron tower, which was built in San Francisco, were then hauled on ox-drawn carts from the landing on Drakes Bay to the cliff 600 feet above sea level.

Meanwhile, 300 feet below the top of the cliff, an area had been blasted with dynamite to clear a level spot for the lighthouse. To be effective, the lighthouse had to be situated below the characteristic high fog. It took 6-weeks to lower the materials from the top of the cliff to the lighthouse platform and construct the lighthouse.

Finally, after many years of tedious political pressure, transport of materials, and difficult construction, the Point Reyes Light first shone on December 1, 1870.

"No keepers ever volunteer to transfer to Point Reyes, and almost without exception the keepers on the station are the ones who have entered the service there." **-Superintendent of Lighthouses, 1926**

The Lighthouse, Fog Signal and Lifesaving Station Saved Lives

Lighthouses provide mariners some safety by warning them of rocky shores and reefs. They also help mariners navigate by indicating their location as ships travel along the coast. Mariners recognize lighthouses by their unique flash pattern. On days when it is too foggy to see the lighthouse, a fog signal is essential. Fog signals sound an identifying pattern to signal location to the passing ships. However, the combination of lighthouses and fog signals does not eliminate the tragedy of shipwrecks.

The highest wind speed recorded at Point Reyes was 133 m.p.h., and 60 m.p.h. winds are common.

Because of this ongoing problem, a lifesaving station was established on the Great Beach north of the lighthouse in 1890. Men walked the beaches in 4-hour shifts, watching for shipwrecks and the people who would need rescue from frigid waters and powerful currents. This lifesaving station was later moved to Drakes Bay near Chimney Rock and was active until 1968. Today it is a National Historic Landmark and can be viewed from the Chimney Rock Trail.

The Lonely Life of a Lighthouse Keeper

Keeping the lighthouse in working condition was a 24-hour job. The light was lit only between sunset and sunrise, but there was work to do all day long. The head keeper and three assistants shared the load in four 6-hour shifts.

Every evening, a keeper walked down the wooden stairs to light the oil lamp, the lighthouse's source of illumination. Once the lamp was lit, the keeper wound the clockwork every 2 hours and 20 minutes to turn the lens so the light would flash. Then, throughout the night, he kept the lampwicks trimmed so that the light would burn efficiently, thus the nickname "wickie."

Daytime duties included cleaning the lens, polishing the brass, stoking the steam-powered fog signal, and making necessary repairs. At the end of each shift, the keeper trudged back up the wooden staircase. Sometimes the winds were so strong that he had to crawl on his hands and knees to keep from being knocked down by the wind.

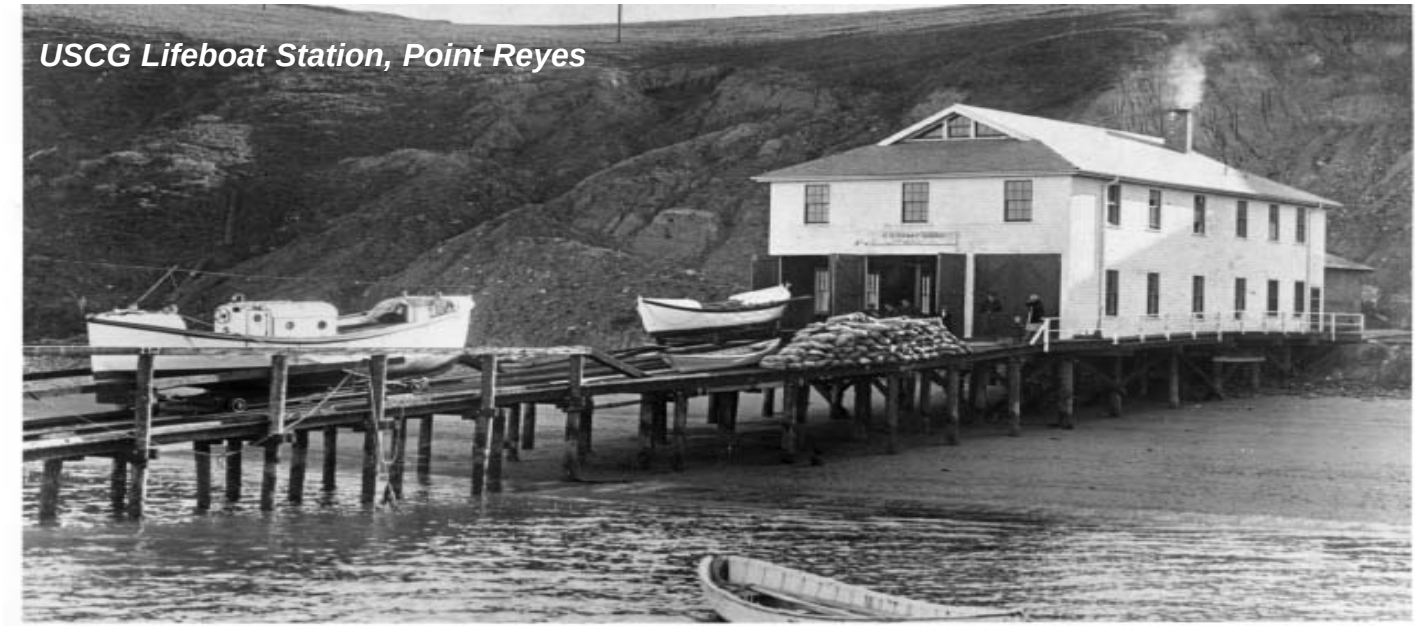
The hard work, wind, fog, and isolation at Point Reyes made this an undesirable post. Even so, one keeper stayed for more than 20 years, a testament to his devotion and love of Point Reyes!

The Lighthouse Is an Enduring Historical Legacy

The historic Point Reyes Lighthouse served mariners for 105 years before it was replaced. It endured many hardships, including the 1906 earthquake, during which the Point Reyes Peninsula and the Lighthouse moved north 18 feet! The only damage to the Lighthouse was that the lens slipped off its tracks. Thirteen minutes after the earthquake, the Lighthouse was once again in working order.

The National Park Service is now responsible for maintenance of the Lighthouse. Park rangers now clean, polish, and grease it, just as lighthouse keepers did in days gone by. With this care, the light can be preserved for future generations - to teach visitors of maritime history and of the people who worked the light, day in and day out, rain or shine, for so many years.

The Point Reyes Historic Lifeboat Station



How many prayers went unanswered along this prominent point? How many lives were lost and how many tears of sorrow fell for those who drowned in a cold dangerous sea?

A Call to Action

Before the establishment of Life Saving and Lifeboat Stations, the remains of vessels littered the beaches and the rocks along the United States coastline. Horrified spectators witnessed the drowning of passengers and crew, helpless to do anything. In the same waves that smashed hulls and took lives of the unsuspecting, some heard a call to action.

The US Lifesaving Crew

Though lifesaving's role in maritime history, begins in the 1780's, it was not until 1871 that a coordinated government agency was established to aid distressed mariners. The United States Life-Saving Service (USLSS) provided hope for those whose fate was once sealed by pounding ocean waves and foreboding coastlines of the United States. The USLSS was a model agency and its surfmen would earn a place in the hearts of Americans for their feats of bravery.

A New Hope at Point Reyes

In 1890, alone on the long stretch of empty beach, the Point Reyes Life-Saving Station opened with a crew of eight and a seasoned keeper on a lonely stretch of Great Beach known for its notorious pounding surf and bad weather. Their positions were poorly paid, difficult and full of danger. The surfmen patrolled the beaches of Point Reyes with an ever-vigilant eye, looking for shipwrecks and their desperate crews. They walked the beaches day and night, with the fog chilling them to the bone and the wind blasting sand at the unprotected skin of their faces.

Breeches Buoy Rescue

When a wreck was found, the surfmen did what they did best, they saved lives. A shipwrecked mariner you could be assured that the surfmen's presence gave you close to a 99% chance of survival. Equipped with a surf boat and breeches buoys, a keeper would determine the best way to aid those in distress. Using a surfboat with the eight surfmen rowing and the keeper steering, the crew of the lifesaving station would take the imperiled mariners back to shore. But there were times when the boat could not safely reach a wreck. In those instances the breeches buoy and Lyle gun were used. Using a small cannon called a Lyle gun, a line would be shot to the wreck. The breeches buoy which was a life preserver ring with an oversize pair of canvas legs would then be sent to the wreck to remove crew and passengers one at a time.

A New Name, a New Site and New Technology

As the century turned, The United States Lifesaving Service was combined with the US Revenue Cutter Service to form the Coast Guard. This newly formed agency was now charged with aiding those in distress. Very little changed in the first years under Coast Guard management but in 1927, operations moved from Great Beach to the protected waters of Chimney Rock. At Chimney Rock, a new station was built as longer, heavier, motorized lifeboats replaced the old, human-powered, surf-boats.

The size and weight of these boats meant that they had to be launched using a pier and a marine railway that descended from the Boathouse to the water. Chimney Rock and the calm protected waters was the ideal place. With the calm waters, its proximity to the headlands, the new faster boats had a greater command of the Point Reyes Peninsula.

US Coastguardsmen with 36 ft Lifeboat

Heroes of the Coast
"Ye have to go out but ye don't have to come in."

In the early years of lifesaving at Point Reyes, the surfmen knew of danger. But it was not the isolation of the beach or the vast open ocean that they feared. It was the unrelenting, pounding surf that lay between. Strong surf could keep a rescue operation at bay for hours or capsize a surfboat, taking a man's life in a cold sea. In the first three years of operation, three surfman lost their lives while they honed their lifesaving skills in drills. These experiences resonated throughout the Life Saving Service in its motto "Ye have to go out but ye don't have to come in."

The move to Chimney Rock in 1927 relieved many who faced the dangers of the Great Beach surf but lives risked and lost in the pursuit of saving others were not a thing of the past. After only two months at the new site, the men of the station responded to their first rescue saving the crew from a

burning vessel. As the years passed and the Coast Guardsmen left their marks in the Station's logbooks, hints of their bravery can often found. Life saving crews risked their lives in rough seas, near the rocky headlands and among towering waves saving the lives of many. In the process they lost two of their own. In 1960, on Thanksgiving Eve two Coast Guardsmen were lost in an ordinary call for assistance. After securing a disabled vessel in Bodega Bay, the two-man crew radioed their arrival time to the Life Boat Station. That was the last that was heard from the crew. In the morning, their boat was found grounded on Great Beach with the propellers still turning. What happened to the crew? The answer was lost with them, leaving a mystery in its place.

Whatever the answer, there is no question of the surfman's bravery. Even with all these tragedies, the lives and vessel saved far outnumbered those lost by the duty bound. In the 80 years of life saving at Point Reyes, countless vessels, their crews and passengers and millions of dollars worth of ships and cargo were saved.

Our Maritime Past and Future

Eventually modern technologies eclipsed the need for the Lifeboat Station at Point Reyes. The quick response of larger faster coast Guard Cutters and helicopters have meant the need for fewer lifesaving sites and less staff. In 1969 the Point Reyes Lifeboat Station was closed. Much of this history and these lives lived in service to others are now gone. All that remains in its place is a building. Silent and decommissioned, it embodies all the perils endured, and all the lives saved that would have otherwise be lost forever. The Historic Lifeboat Station at Chimney Rock stands as a monument to their stories of service and sacrifice.

These stations and those who staffed them fulfilled their roles in the development of coastal cities and industries.

Today the Historic Lifeboat Station at Point Reyes National Seashore is used as a educational facility for non-profit groups learning about the resources of the natural and cultural resources of Point Reyes. The building is visible from the Chimney Rock Trail and on weekends and holidays from January to mid-March. For more information, please call the National Seashore at 415-464-5100.

NPS Restoration Crew

Historic Life Saving and Lifeboat Stations at Point Reyes

“Ye have to go out but ye don’t have to come in.”

Historical Dates

1878 Lifesaving Service established
1889 - 90 The Lifesaving Station was constructed on Point Reyes Beach
1915 The Lifesaving Service merges with the US Revenue Cutter Service and becomes the US Coast Guard
1927 The Coast Guard builds the Lifeboat Station at Drakes Bay
1968 Lifeboat Station is decommissioned
1969 The Lifeboat Station becomes part of Point Reyes National Seashore
1982 The motor lifeboat #36542 is returned to Point Reyes National Seashore after it is surveyed as surplus property
1990 The Lifeboat Station is opened as an educational facility with newly remodeled kitchen and accessible restrooms
1991 Lifeboat #36542 is restored

How many people staffed the life-saving and lifeboat stations?

When fully staffed the original Life-saving station had a crew of 8 surfmen and a keeper.
The Lifeboat station averaged 9 coastguardsmen in the early years of the station plus the Officer in Charge.
In WWII there were as many as 40 men staffed at the sight.
In the 1950’s there was a staff of 14.

Why did the location change from the original Lifesaving Station on Point Reyes Beach to Drakes Beach?

The surf along great beach is among the heaviest surf along the California coast. Its size and severity cost four lives in boat launching drills, caused a 2 1/2 hour delay in rescuing a ship. (The surfboat could not get through the breakers)
With the development and use of motorized lifeboats, a pier was needed to launch the boats. The heavy surf would destroy this pier every year.

How many rescues were performed by the Lifeboat Station crew?

In the first nine years of the establishment of the Lifeboat station, 45 rescues were performed with 280 lives saved and 3 million dollars in ships and cargo. Rescues decreased as navigational aids improved during WWII. Most of the rescues were performed on smaller vessels and fishing boats after the war (1945).

What drills and duties were practiced by the Coastguardsmen?
Duties included:
Rescuing crews and vessels
Beach walks to look for wrecks
Staffing of look outs

Logging ships passing the Point
Performing maintenance
Moonlighting on the fishdocks (even though it was against regulations, the officer in charge would allow it to fight isolation and idleness)

Drills included:

- Lessons in regulations
- Morse Code
- Resuscitation
- Fire Arms
- Breeches Buoy rescues
- Boat launching, capsizing and operation
- Swimming

What were some of the major wrecks along Point Reyes?

The *Henrietta*, Nov 6, 1927 The first rescue for the newly built Boathouse. A 72.5 foot fishing trawler catches fire off of Point Reyes and the crew is saved while the boat is a total loss

.

The *Hartwood*, June 27, 1929, 9:00 p.m. A fixture in the northwest lumber trade, the *Hartwood* went aground on the rocks near the stations lookout tower. The 200-foot steamer had encountered heavy wind and fog on the Marin coast and ran aground near Chimney Rock. Both the 36 foot motor boat and breeches buoy were used to rescue the crew of 28. The boat was a total loss.

The *Richfield*, May 8, 1930 A gasoline tanker that made supply runs between Long Beach and San Francisco, struck a submerged reef of Chimney Rock. The tanker was carrying 25,000 gallons of gasoline when it was picked up and dropped on the reef by a huge comber in the thick fog off the Marin Coast. 2,000 gallons were spread across the sea while the remainder was able to be pumped off.

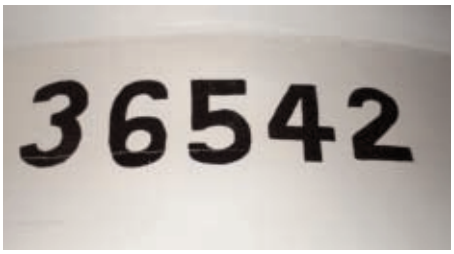
The *Munleon*, November 7, 1931 A cargo ship sailing from Portland to Oakland misjudged their location, changed course and ran at full speed onto the Headlands of Point Reyes.

The *Tai Yin*, March 14, 1934 A Danish freighter, the *Tai Yin* ran aground at full speed on Point Reyes Beach in foggy weather. The vessel was pulled free by tugs and no major damage was sustained.

United DC-3, November 29, 1938 The United DC-3 ran out of fuel off of Point Reyes after becoming lost in a storm. The plane made an emergency landing into the ocean and drifted into the rocks.

What is the history of Lifeboat #36542?

Built in 1953 in Curtis Bay, Maryland, the boat was brought to Point Reyes after a stint at Point Arena. The boat served at Point Reyes without distinct tion until Thanksgiving Eve, 1960.



The Tragedy of Lifeboat #36542
With a crew of two was sent out on Thanksgiving Eve in 1960 to aid a fishing boat near Bodega Bay. After securing the boat in Bodega, the crew started back for Point Reyes and radioed the Station that they would be returning within the hour. When the boat did not return, the station crew became worried and started a rescue. The boat was found crewless on Point Reyes Beach with the propellers still turning.

It is believed that the boat was knocked over and its crew was tossed. The boat which was designed to be self-righting continued on while leaving the disorient men in a cold dark sea.

Lifeboat #36542's return to service and return to Point Reyes.
After some minor repairs the boat continued its career at Point Reyes and then was transferred to Bodega Bay in 1963. It served at the Bodega Bay Station until 1976. It was moved to Yerba Buena Island for a lengthy stint and then to Fort Point. Lifeboat #36542 finished its service at Humbolt Bay. It was surveyed as surplus property in 1982 and transferred to Point Reyes National Seashore and then restored in 1991. It currently resides in the Historic Lifeboat Station boat bay.

What is the historical significance of the Point Reyes Lifeboat Station?

Very few of the lifeboat stations still survive today. The Historic Point Reyes Lifeboat Stations is one of the best surviving examples of these stations and their architecture.

It is also one of the last intact marine railways on the west coast and for that reason is deemed historically significant and given a high priority for preservation efforts.

Why save the Boathouse? Why is it important? Things to interpret.

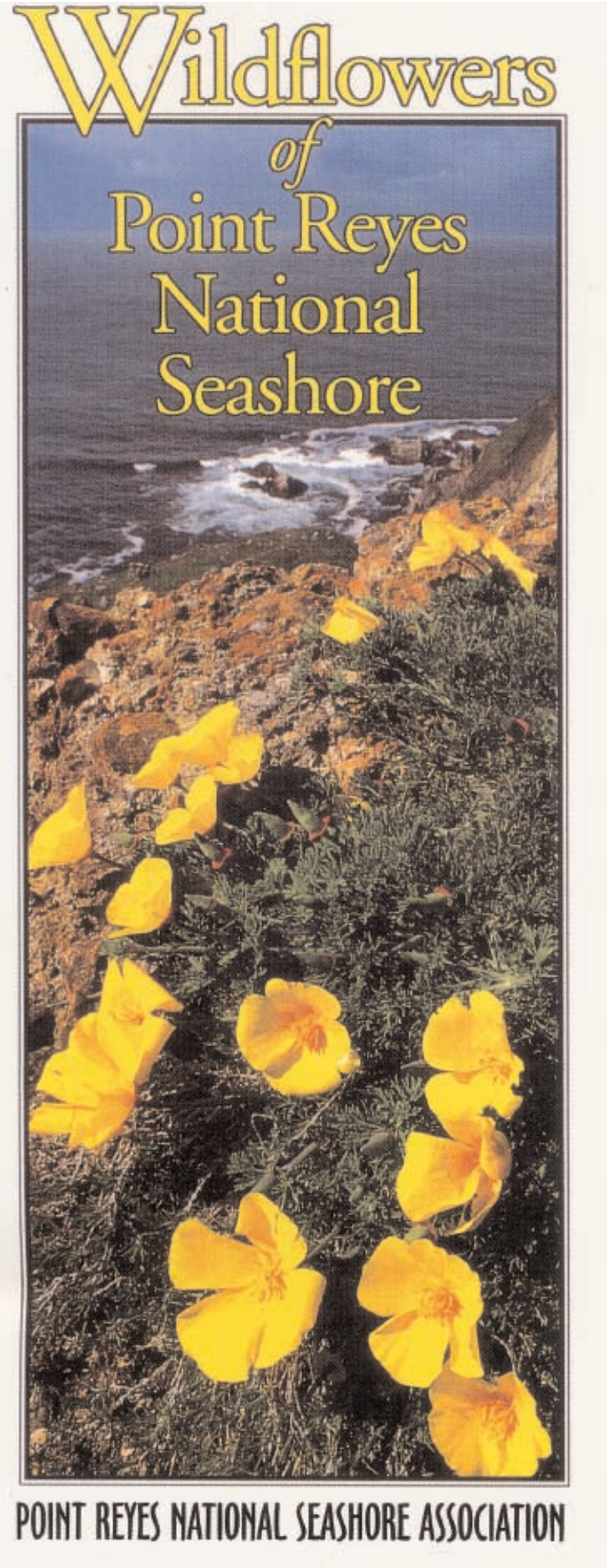
The Boathouse stands as a testament of many things.
How we developed as a country/maritime influences on CA history.
Where we have come from (perspective)
Insight into us as a society what we valued (lifesaving) and what we still value (preservation)
The story of ordinary people and how they and we represent history
A monument to lives lost and lives saved
Risk and sacrifice for the wellbeing of others
Change in technology.

What are some good sources of information on Lifesaving and Lifeboat Stations?

Two good sources exist among many others.
Lighthouses and Lifeboats on the Redwood Coast by Ralph Shanks, Jr. and Janetta Tompson Shanks.
The History and Architecture of the Point Reyes Lifeboat Station by Dewey Livingston

Flowers and Facts

Splashes of Color on the Landscape



Flowers are the culmination of a year's work for plants and their attempt at success. Point Reyes National Seashore is home to nearly 850 species whose seeds will offer us the possibilities of future flowers and splashes of color. While the height of the wildflower season is in the early spring flowers flourish nearly year-round. Look for wildflowers at Chimney Rock and throughout the Seashore.

"Wildflowers of Point Reyes National Seashore." are available for sale from any visitor center for $5.00. Remember, as a volunteer, you get a 15% discount!!!

Indian paintbrush (*Castilleja sp.*)
Figwort family. Blooms March-June in scrub and grasslands. Red, orange, yellow and cream are common.

Baby Blue Eyes (*Nemophelia menziesii*)
Waterleaf family. Blooms March-May in grasslands. The coastal form is often white.

California phacelia (*Phacelia californica*)
Waterleaf family. Blooms March-May in grasslands. The coiled flower heads resemble hairy caterpillars.

Checkerbloom (*Sidalcea malvaeflora*)
Mallow family. Blooms February-May in grasslands. Flowers vary in size and shade of pink.

Cow parsnip (*Heracleum lanatum*)
Parsley family. Blooms March-June in coastal scrub. This giant (3-7ft) is often seen along the roadside.

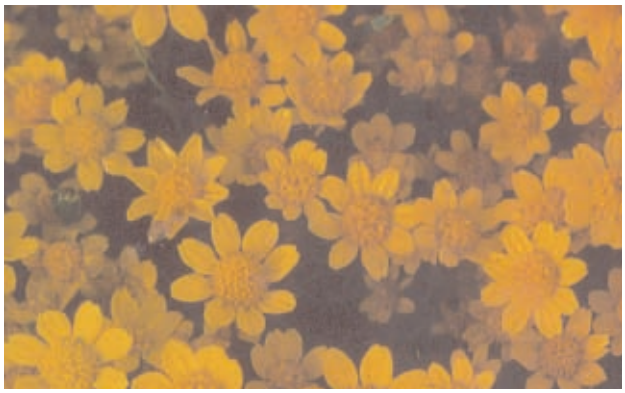
Coast rock cress (*Arabis blepharophylla*)
Mustard family. Blooms February-May in grasslands. Conspicuous near the Lighthouse.

Beach strawberry (*Fragaria chiloensis*)
Rose family. Blooms February-May in dunes and grasslands. Berries are uncommon, but small and delicious.

Blue-eyed grass (*Sisyrinchium bellum*)
Iris family. Blooms March-May in grasslands. A related wetlands species has yellow flowers.

Mission bells (*Fritillaria affinis*)
Lily family. Blooms February-March in grasslands. Two forms of this plant grow at Point Reyes.

Cobweb thistle (*Cirsium occidentale*)
Aster family. Blooms April-May in grasslands. Silvery leaves distinguish this butterfly favorite.



Goldfields (*Lasthenia californica*)
Aster family. Blooms February-May in grasslands. Carpets the headlands with golden flowers.

Sea thrift (*Armeria maritima*)
Leadwort family. Blooms April-July on coastal bluffs. Characteristic of Northern Hemisphere coasts.

California buttercup (*Ranunculus californicus*)
Buttercup family. Blooms February-May in many habitats. Flowers have shiny petals which may fade to white.

Douglas' Iris (*Iris douglasiana*)
Iris family. Blooms February-May in grasslands. Each clump of flowers may vary in color from blue to purple.

Gumplant (*Grindelia stricta var. platyphylla*)
Aster family. Blooms March-August in dunes and grasslands. Buds exude a protective, sticky, white fluid.

Seaside daisy (*Erigeron glaucous*)
Aster family. Blooms March-July in grasslands. A handsome, rock garden perennial.

Iceplant (*Carpobrotus edulis*)
Carpetweed family. Blooms March - August in dunes. A South African plant which crowds out native species.

Cow clover (*Trifolium wormskioldii*)
Pea family. Blooms March-July in grasslands. One of the many clover species at Point Reyes.

Field chickweed (*Cerastium arvense*)
Pink family. Blooms March-June in grasslands. Occurs in large patches like drifts of snow.

Pussy ears (*Calachortus tolmiei*)
Lily family. Blooms April-May in grasslands. Pale purple hairs inside the petals give this plant its name.

Wallflower (*Erysimum menziesii*)
Mustard family. Blooms March-may in dunes and grasslands. Showy, fragrant flowers on a compact plant.

Ithuriel's spear (*Triteleia laxa*)
Lily family. Blooms may-june in grasslands. This coastal form has short stems and large, pale blue flowers.

Coast rock cress (*Arabis blepharophylla*)
Mustard family. Blooms February-May in grasslands. Conspicuous near the Lighthouse.

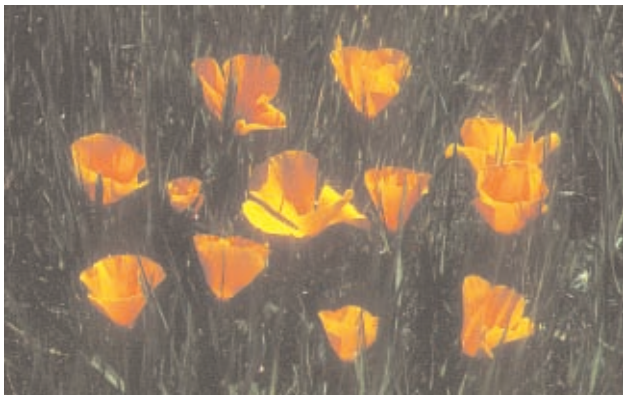
Wild cucumber (Marah oreganus)
Cucumber family. Blooms February-May in scrub and grasslands. Trailing, herbaceous perennial.

Miner's lettuce (*Claytonia perfoliata*)
Purslane family. Blooms February-May in many habitats. Used as salad greens by miners.

Mule ears (*Wyethia angustifolia*)
Aster family. Blooms March–May in grasslands. These low-growing plants bear large sunflower-like heads.

Scarlet pimpernel (*Anagallis arvensis*)
Primrose family. Blooms March-June in many habitats. It opens only in the sun.

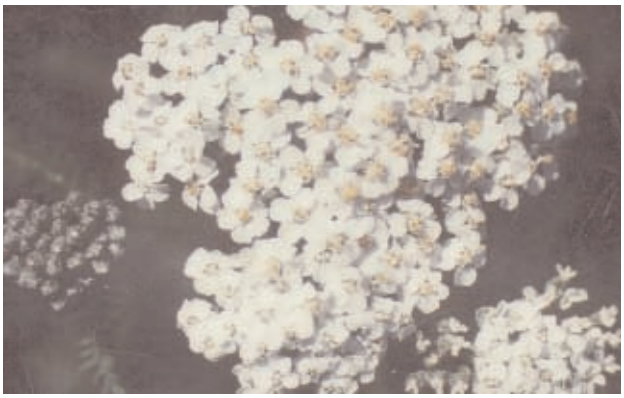
Monkeyflower (*Mimulas guttatus*)
Figwort family. Blooms March-August near freshwater marshes, springs, and ditches. A snapdragon-like flower.



California poppy (*Eschscholzia californica*)
Poppy family. Blooms February through July in grasslands. A yellow coastal form thrives at Point Reyes.

Milk maids (*Cardamine californica*)
Mustard family. Blooms January-May in grasslands and woodlands. One of the earliest wildflowers to bloom.

Point Reyes meadowfoam (*Limnanthes douglasii*) Meadowfoam family. Blooms April-May in grasslands. Another common form is entirely yellow.



Yarrow (*Achillea millefolium*) Aster family. Blooms March-August in grasslands. Wide distribution in the Northern Hemisphere.

Tidy tips (*Layia platyglossa*) Aster family. Blooms April-May in grasslands. Flowers may be all yellow or edged in white.

Sky lupine (*Lupinus nanus*) Pea family. Blooms March-May in grasslands. Grows in bright blue masses.

The color and diversity of wildflowers are reminders of life's vitality and fragility that all species share.

Frequently Asked Questions

WEATHER

Q. Does the wind meter (anemometer) register mph or knots (nautical mph)?
A. Miles per hour

Q. When is it foggy here?
A. The foggy season is between June and mid-September, but as this is the foggiest point on the Pacific Coast and the second foggiest on the continent (Nantucket is the first), there is "some fog" throughout the year. Fog banks can extend over 50 miles out to sea when it is *really* thick.

Q. Which months are most clear?
A. September, October, January (between storms), April and May.
NOTE: April, May and June are typically the windiest months, too!

Q. What makes the fog?
A. It is the result of a combination of many factors: a high pressure system about 1,000 miles offshore which generates onshore winds, the interface between moist air and cold surface waters (from upwelling) and a temperature differential between coastal and inland areas. Weather of the San Francisco Region by Harold Gilliam is agreat resource for more detailed information.

Q. What is the prevailing wind?
A. Point Reyes is the windiest point on the Pacific Coast. Prevailing winds are out of the northwest. Winter storm winds come out of the southeast or southwest. The Great Beach may have the roughest surf (strongest rip current) of any beach between Canada and Mexico!

Q. What is the average wind speed?
A. Average wind speed is 25-30 mph. The highest recorded wind speed was 133 mph.

Q. How much does the average air temperature vary throughout the year?
A. Air temperatures in the park vary only about 28 degrees, but the average temperature at the Lighthouse only varies about 5-10 degrees. This is due to the moderating effect of the ocean, warming the air in the winter months, and cooling it during the summer months.

Q. What are the highest summer temperatures and lowest winter temperatures at the LH?
A. Highest summer = 89 degrees (June 1993); average 55-60 degrees
Lowest winter = 35 degrees (January 1993); average = 50-55 degrees
(High and Low since July 1997)

Q. Why is the annual precipitation at Bear Valley so much higher than at the Lighthouse (36 inches vs. 12 inches)?
A. The damp air blowing off the ocean only cools sufficiently to precipitate when it rises over the Inverness Ridge. The rain then falls on its eastern side. This is a curious reversal of the rain shadow effect.

NAVIGATION AND OCEANIC INFORMATION

Q. What is a nautical mile?
A. One nautical mile equals 1.15 statute miles or 6,076 ft.

Q. How deep is a fathom?
A. Six feet

Q. How deep is the water off the Lighthouse?
A. Within .5 miles from shore = 95-100 ft deep
0.5 - 2 miles from shore = 150 ft deep
2 - 5 miles from shore = 750 ft deep
5 - 6 miles from shore = 3,000 ft deep
beyond 8 miles from shore = 6,000 ft. deep

Q. How deep is the water in Drake's Bay?
A. 30-80 feet.

Q. What is the difference (in feet) between High and Low tide in the Point Reyes area?
A. The average difference is 4 feet; much less than the East Coast, where the tidal variation may be 10-20 ft. The Bay of Fundy (Nova Scotia) has the greatest tidal differential; a maximum 52.5 feet!

Q. What causes the foam on the ocean?
A. See info in Facts du Jour book at VC. It is made up of organic marine material, zooplankton and phytoplankton: their proteins churned into foam by wave action on rocks. Similar to egg whites **(protein source for chicken embryo) being whipped into meringue.**

Q. What causes the foam to drift in lines?
A. The ocean currents and surface winds (wind-driven surface waves coming and reflection off rocks going out). You will notice that the configuration of the foam changes day to day, but it usually parallels the Great Beach coastline.

Q. Why do you see so many large ships from the Lighthouse area?
A. There are two major shipping lanes off the coast of the lighthouse. The northern outbound lane is three miles out is one mile wide. Then there is a mile-wide separation zone and then a northern inbound lane which is one mile wide. All ships must stay within these designated lanes from Point Reyes into San Francisco Bay (see Farallones map). Note: If you see a ship at sea during the night, you can tell which direction it's going by its running lights. Red lights are on the port (or left) side; green lights are on the starboard (or right) side.

Q. What is the average ocean temperature?
A. It varies between 50-55 degrees Fahrenheit throughout the year. Some shallow areas will get warmer at low tide, and Tomales Bay is consistently a bit warmer. In July '95 the ocean water at the Farallones was 62 degrees Fahrenheit! Prolonged absence of wind had decreased white caps; sun penetrated more deeply into the water, and a red tide bloom was caused.

THE FARALLON ISLANDS AND THE MARINE SANCTUARY

Q. What does Farallon mean?
A. In Spanish: Outjutting rock, cliff, or headland.

Q. How big are the Farallon Islands?

A. The Southeast Farallon is approximately 120 acres (this is where the research is conducted). The North Farallon islands are actually a big rock outcropping with no habitation.

Q. How far are the Farallon Islands from the lighthouse?

A. The Southeast Farallon island is 21 miles away; the North Farallones are 16 miles away.

Q. Who manages the Farallon Islands?

A. The Farallon Islands are a US Fish & Wildlife Service National Wildlife Refuge entitled Farallon National Wildlife Refuge

Q. Who manages the National Marine Sanctuary?

A. The National Oceanic and Atmospheric Administration; Marine and Estuarine Management Division (NOAA is under the Department of Commerce).

Q. When was the sanctuary officially designated?

A. 1981

Q. Are people allowed to go on the Farallones?

A. Only researchers, their assistants, and members of the Coast Guard are allowed to set foot on the islands. Tours around the islands are available through the Oceanic Society and the Whale Center. See Farallones brochure for phone numbers.

Q. How many people live on the Farallones?

A. Six people year-round conduct biological research. A minimum of three people are there at all times. (Scot A. 6/95) Two structures exist: one for researchers, one for Coast Guard.

Q. What kind of research is conducted there?

A. Seabird and marine mammal research, primarily. The Farallones are the largest seabird rookery south of Alaska. There are also large populations of seals, sea lions, and elephant seals in the numerous coves of the island. Humpback, blue and gray whales can all be seen near the Farallones at different times of the year, with occasional sightings of minke, sei, fin, Baird's beaked and orca whales and various dolphins. Scot Anderson is conducting research on great white sharks (his is the only research that does not bait the sharks; all attacks/ feedings are natural).

Q. What was done on the Farallon Islands before it became a research station?

A. Egg collection from the murre colony was a major industry from the mid 1800s in to the early 1900s. Egg collectors would stamp thousands of murre eggs, so they could be assured of collecting fresh eggs the next day! There was also an intense fur seal hunting period in the late 1800s which nearly extirpated (locally extinct) the entire population. The first northern fur seal pup was born (in this century) on this island summer of 1996.

Q. Is commercial fishing allowed in the Marine Sanctuary?

A. Yes. See Farallones brochure for restrictions.

Q. What kind of wildlife inhabits the island?

A. Harbor seals, California and Stellar sea lions, elephant seals, tufted puffins, common murres, rhinoceros auklets, pigeon guillemots, cormorants, oyster-catchers, Cassin's auklets, storm petrels, house mice and about 350 species of land birds (in the fall). There is only one tree

on the island.

WHALES

Q. What are the long bones outside the VC?

A. Those are the lower jaw bones of a humpback whale that washed ashore near Abbott's Lagoon in 1993.

Q. When can you see the gray whales here?

A. The peak of the southbound migration is in mid-January (end of December through February). The peak of the northbound migration is mid March, when the bulls and newly pregnant cows swim by. The mothers (cows) and babies (calves) are the last to leave the lagoons in Baja and are seen here April through mid-May. Today, their population is estimated at 22,000 (9/99). They were taken off the endangered species list in 1994.

Q. How close do they come?

A. 95 percent of those seen from Point Reyes are seen 1/4 mile to 5 miles off the Point.

Q. When are they the closest to the land?

A. Typically, they swim closer on the northbound migration, peaking in mid-March. The cows and calves travel closest to the shore, and are seen here mid-April through mid-May.

Q. Why is the lighthouse such a good area for whale watching?

A. The peninsula juts out ten miles from the general coastline and the elevation above sea level provides us with excellent perspective.

Q. Where else in the park can whales be viewed?

A. Tomales Point and South Beach during the southbound migration; Drakes Beach, Chimney Rock and Limantour Beach during the northbound migration.

Q. How long is the entire migration and how fast do the whales travel?

A. The migration is anywhere from 10,000 to 14,000 miles long, round-trip. Gray whales swim 90 to 100 miles/day at an average speed of 5 mph.

Q. Do they eat while they're migrating?

A. Most researchers believe that they do not, although whales have been seen swimming up through kelp beds which is interpreted by some as feeding behavior. They are "opportunistic feeders;" may break with stereotypical behavior when especially tasty morsels are available. Predominantly, they metabolize their blubber and loose about 30% of their body weight during the entire migration.

Q. Do whales migrate at night?

A. Based on radio-telemetry studies, they migrate 24 hours a day.

Q. Do they sleep during migration?

A. (See above) It is not known for sure, but most researchers believe they do not sleep, as we do, for several consecutive hours. They travel slow & steady, and have been seen "resting" in Baja and Alaska, floating near the surface (perhaps standing on their fluke) for up to 20 minutes.

Q. What is the average length and weight of a gray whale?

A. Length = 35-40 feet
Weight is approximately one ton per foot at maturity. Females are slightly larger than males.

Q. How much do calves weigh at birth and how fast do they grow?
A. Calves are about 15 feet long and weigh 1,200 to 1,500 pounds at birth. They grow *very* rapidly. Males reach about 28 feet in their first year; females reach about 30 feet. This growth slows in the second year, but whales continue to grow for about 30 years.

Q. What is the average life span of a gray whale
A. The average is 30-40 years, but they can live to be 60.

Q. How much milk does a calf drink in a day?
A. About fifty gallons.

Q. What is the fat content of whale milk?
A. Whale milk is 53% fat, cow milk 4%, and human milk 4.5%. Whale milk is the consistency of cottage cheese!

Q. How long is the gray whale's gestation period?
A. Eleven to 13 months.

Q. At what age can gray whales reproduce?
A. They are sexually mature when they are 7 to 11 years old.

Q. How deep do gray whales dive?
A. Normal dive depth = 120 feet. Estimated maximum = 500 feet.

Q. Can you see other kinds of whales here?
A. Yes. Blue whales, humpbacks, minke, sei, fin, orca, and sperm whales, and others are frequently seen in the Gulf of the Farallones and sometimes seen from here. Blue whales and humpbacks are the most common (late summer and fall). See Marine Mammals of the Farallones poster.

Q. How many species of whales have baleen and how are they different from toothed whales?
A. There are 10 species of baleen whales. Baleen whales are generally larger than toothed whales (minke and sperm whales are exceptions), and they have two blowholes instead of one. Most baleen whales have grooves in their throat so that the throat area can be expanded when full of water. Baleen whales appear to be much less sociable and gregarious than toothed whales. Gray whales are thought to be the most primitive of the remaining baleen whales **(why?)**.

Q. Where are the whale fossils in the park and how old are they thought to be?
A. There are many whale fossils in Drake's Estero, from a time when the water was much deeper, effectively an inland sea. The fossils are estimated to be 5 - 9 million years old (when Pt. Reyes was in Monterey)! They document an evolutionary forward migration of the blowhole(s) in at least baleen whales (the fossils are thought to be predecessors to the present-day gray whale). A man named Roberto Anima doing research for the park in the estero has mapped out all the shoreline fossils (a report is forthcoming). NOTE: Many visitors may associate whales with echolocation. Baleen whales do not apparently use echolocation. Dolphins

do, however.

RANCHING

Q. Why is ranching allowed in the park?

A. The enabling legislation for the park stipulated that ranching be preserved as a cultural resource. Many ranches date back to the 1800s, when Point Reyes dairy products were the best in the area (including San Francisco markets). The ranching that occurred on the peninsula was the genesis for the California Agricultural movement.

Q. Are the ranches private?

A. The original lands set aside for ranches were leased out by Shafter family. Around the late 1920's the Shafter's sold the land to man by the last name of Rapp. Rapp immediately sold the ranches to the ranchers. In 1962 the land was purchased by the Federal Government (1960s-1970s). The land is leased back to the ranchers on long term leases ranging from 5-15 years. The original reservations ranged from 20-25 years. The Vedanta Retreat (a private operation) also has cows.

Q. Why are the ranches lettered*?

A. The Shafter brothers subdivided their land and rented it to ranchers. An easy way for them to keep track of their parcels was to give each parcel a letter (A-Z) name. *Please familiarize yourself with the ranch names.

Q. What will happen when a rancher loses interest in the business or dies?

A. The NPS would come up with a plan of action for each ranch on a case by case basis.

Q. How many acres of land are used for grazing within Point Reyes National Seashore?

A. 16,037 acres are used for grazing; 1,420 acres are used for cultivation of silage. That's 24% of the Seashore. (1997 figures)

Q. How many dairy ranches are there and what kind of cows do they raise?

A. There are 6 dairy ranches which raise a total of approximately 3,400 dairy cows (Holsteins).

Q. How many beef ranches are there and what kind of cows do they raise?

A. There are 7 beef ranches in this park and there is one in Olema Valley. There are a total of 20 beef ranches on land administered by PORE and GOGA. They raise Black Angus, Herefords (white faced) and Angus/Hereford crossbreeds (which are brownish-black). There are approximately 1,740 beef cows in total.

Q. What resource management measures are taken to insure that land is not overgrazed or eroded?

A. The number of acres/cow is limited based on the condition of the land. Approximately four acres per cow. Lagoons and creeks are fenced to prevent cattle from damaging riparian vegetation and pooping in the creeks. A certain amount of residual dry matter (RDM) must be left on the land in the fall to hold the soil during the wet season (the grasses cannot be chewed down to the ground). 1,200 lbs./acre is considered adequate. Dairying has a locally more severe (more centralized) impact than beef ranching because the cows must travel to and from the milking area twice each day. Species composition on the land is monitored in the spring and RDM is measured in the fall. This indicates the health of the land. There is, curiously, evidence that moderate grazing (which may mimic the grazing situation when there were more grazing ungulates, like elk, or some other previous condition) *may* perpetuate

some of the rare plants in the park: *Chorizanthe valida* (low growing flowering forb found near Abbott's) and *Alopercurus aequalis sonomensis* (a small grass, near Bolinas and Abbott's). Counts are being taken inside and outside enclosures to verify this.

MISCELLANEOUS

Q. How big is Point Reyes National Seashore?
A. 71,405 acres; 100 square miles

Q. What is the annual visitation at Point Reyes National Seashore?
A. There are over 2.5 million visitors annually. Visitor contacts total 486,000. Visitor contacts at the lighthouse are 126,747 (FY96).

Q. Does Point Reyes National Seashore manage land for Golden Gate National Recreation Area?
A. Yes, 15,293 acres.

Q. Is Point Reyes the furthest point west on the Pacific Coast?
A. No. Point Arena in Sonoma County is further west than us and Cape Mendocino in Humboldt County is the western most point in California. Point Reyes juts out into the ocean in relation to its adjacent coastline farther than anywhere else (10 miles) and is the western most point in West Marin County.

Q. What is the San Augustin and where is it?
A. The San Augustin was the first recorded European shipwreck in the Pacific Coast (1599). It may be located in Drake's Bay. The NPS Submerged Cultural Resources Unit (SCRU) will survey the area this fall (Oct. 1997). NOTE: All shipwrecks in the area are buried under 20-30 feet of sand due to shifting of the ocean bottom sediments. Any artifacts on these sunken ships would be protected either by the park boundary (1/4 mile out) or by the Gulf of the Farallones National Marine Sanctuary and ARPA (Archeological Resources Protection Act).

Q. Where is that brass plaque?
A. It is actually a copy of a plaque, which was found in 1936 and was believed for a long time to be the plaque, which Sir Francis Drake left while he was in the area. It has since been proven a fake and resides in the Bancroft Library at UC Berkeley. See article on the Plate of Brass in the log book at the KPVC for details.

Q. What are all the poles and satellite dishes north of us on Sir Francis Drake Boulevard?
A. These are two separate facilities. The poles with red lights on top are owned by AT&T and are a high seas ship to shore relay station. It is one of three such facilities in the country. It primarily takes calls from the Pacific and Indian Oceans and from the Caribbean. The satellites were owned by RCA, then MCI and provided a satellite link with Alaska, routing calls into the continental U.S. They also did ship-to-shore Morse code communications. This facility was closed in July of 1997.

Q. How many species of exotic plants are in the park?
A. About 280 species (1997). Resource Management prioritizes the removal of the most invasive species (biggest threat to native species). Right now, 30 species are targeted and 10 (of the 30) are being aggressively removed. (1997)

Q. What does Estero mean?
A. In Spanish, it means estuary.

Q. What is an estuary?
A. An estuary, is and area where fresh water and salt water mix (often tidal). The esteros (or estuaries!) in the park are saline and tidal up to the head and only have one or two small creeks which drain into them.

Q. What's that orange stuff on the rocks?
A. Technically, it's a green algae, *Trentifolia spp?*. It photosynthesizes, like all green algae. We can't see it with a naked eye, but under a microscope, the green (chlorophyll) can be seen.

Fascinating Facts and Superlatives about Point Reyes National Seashore Marin County, California

_ First recorded shipwreck on West Coast, 1595, the *San Augustin*

_ Windiest and Foggiest point on the West Coast, Point Reyes Headlands

_ First trans pacific wireless radio broadcast from, Bolinas to Hawaii in 1914, from the Marconi Wireless Telegraph Co.

_ First recorded landing by an Englishman on West Coast, June, 1579 by Sir Francis Drake and his ship the *Golden Hind* at Drakes Bay, Point Reyes National Seashore

_ First and only National Seashore along the entire Pacific Coast (authorized in 1962)

_ Largest avian species diversity in any California National Park unit (over 470 species recorded which is equal to approximately 45% of the avian species in North America!)

_ Largest producer of turkey eggs in the world in the town of Tomales, Nicholas Turkey Farms

_ The biggest U.S. 19th Century dairy ranch, owned by the Shafter family, now Point Reyes National Seashore

_ First square-bottomed paper grocery bag produced at Pioneer Paper Mill (now Samuel P. Taylor Sate Park) circa 1860s

_ First fish ladder on the West Coast along Lagunitas Creek, near present day Samuel P. Taylor State Park

“TOP TEN” BIRDS FOR MIROUNGA DOCENTS

This guide is for docents who know little about birds, but want to be able to respond to visitors’ bird questions. Once you learn these top ten birds, please buy a real birdbook. This guide is specific to the Drakes Overlook mirounga colony during docent season; it may not work elsewhere.

Birds in this Guide are listed divided in the same order found in guide books. Behavior such as swimming or foraging are good to notice but go one level deeper to see how the bird was swimming (paddling with friends along the surface or diving alone?) or how it was foraging (standing erect and picking or constantly probing?). Get the big picture of habitat and behavior before looking for field marks.

Field marks in birdbooks often require a level of detail that beginning birders lack; we’ll stick to the easy ones.

Size in birdbooks (measured bill-to-tail) can be misleading, for example, the difference between a 6” bird vs a 7” bird will be very noticeable (better to compare the “square” of the birdbook measures, or 6x6 vs 7x7). This guide will identify size in relation “buffleheads are half the size of scoters.”

Names are often based on breeding plumage not seen here at this time, so you will have to learn non-intuitive names.

Don’t worry if what you see isn’t a bird.
Seals can look like birds; but fur glistens; birds don’t.
Buoys are colored; but birds are gray/brown.
Debris doesn’t move, but birds do.

Birding is a skill that is best learned from a birder. Birders enjoy helping, so please don’t be afraid to ask.

Gordon Bennett / Kate Carolan 12/04

LOONS

Common Loon

Behavior: Usually seen as singles, almost never in a flock. Dive by kicking forward and sliding smoothly under the surface; they often put their face in the water to look for fish before diving. Bills held horizontal. Never seen perched.
Field Marks: Large birds, almost three times the size of scoters. Bodies are grayish On back with white throats that blend raggedly into the gray side-neck. Necks are thick and curved-up. Head has “flat-top” look. Bills: pointed, grayish.

GREBES

Western Grebe

Behavior: Western Grebes are seen in large flocks, small flocks or singly. Sleep with their heads facing forward; other birds tuck head backwards. Grebes dive by throwing heads forward into the water. Never seen perched.
Field Marks: Western Grebes are elegant long necked diving birds about twice the size of scoter. Body is black on the back, but the chin, throat and chest are white. Bill is pointed held horizontal, and pea-soup yellow. Note: a grebe half the size of a western, is a horned or eared grebe.

PELECANIFORMES

Brown Pelican

Behavior: Seen singly, not in flocks. Forage from the surface or dive from the air, landing awkwardly with a splash. Soaring with a few flaps followed by a glide, sometimes very close to the wave tops. Seen perched or on water
Field Marks: We presume you know these big billed birds. They are huge (4 times the size of a scoter) with a wingspan pf 6_ ft. Backs are light brown; belly is light brown. Necks and heads of adults are white, but of juveniles are brown.

Double-Crested Cormorant

Behavior: In flocks, or singly. Dive by arching into the water. These birds perch, oftern holding their wings out to dry.
Field Marks: Cormorants are about the same size as common loons (three times the size of scoters), but slimmer. Bodies black with bright yellow bills and chins. Immatures have pale feathering on chest and can be mistaken for loons.

DUCKS

Surf Scoter

Behavior: These ducks are in large (100's) loose flocks o smaller mating groups (a few males show off around a single female. Dive from the surface with a splash. Never perched.
Field Marks: Surf scoters are a little smaller than mallards. Females re gray black with a white smudge on cheek. Males are blacker with a white patch on back of the head and knobby colorful bills so some visitors think they are puffins. Silent except for the sqeaking from their wings on take off.

Bufflehead

Behavior: These ducks are often in small flocks (5-7) with 1-2 males and a few females. Diver from the surface without a noticalbe splash. They are usually more than a few yards off-shore, never inside the surf line; never perched.
Field Marks: Half the size of surf scoters. The males are black and white with a large white iridescent patch on the side of head that fans opens with mood. Female: duller brownish black with a clear white horizontal patch on cheek. Bills are grayish and standard duck-shaped. Voice is silent.

Red-breasted Merganser

Behavior: These ducks are often in small flocks (5-7) with 1-2 males and a few females. Mergansers often but not always swim with their face in the water looking for prey before diving smoothly into the water. Never seen perched.
Field Marks: Mergansers are a bit bigger than scoters but their bodies are longer and thinner. Females a grayish body with a brick-red head. Males have a gray, black and white body, brick-red breast, and iridescent green head. Both sexes have a scraggly feaths spiking out behind head. Bills are orange and thin, not sharply pointed. Voice is silent.

GULLS

Western Gull

Behavior: Aggressive; in flocks or single; perched or on water.
Field Marks: Large (50% bigger than scoters) pink-legs, white chest & head but dark gray backs and black wingtips.
Note: A light gray gull the same size as a Western is a Glaucous-wing; half the size of a Western is a **Mew Gull**.

SHOREBIRDS

Sanderling

Behavior: These shorebirds run up and down picking behind surf line, usually in groups ranging from 2-15
Field Marks: small whitish shorebirds whose bill length is about 1 x their head length. Sometimes seen resting on shore onone leg. Never swim. Sometimes perch on rocks, never on docks.
Note: black (top) and white (bottom) shorebirds flipping over seaweed on rocks are black turn-stones.

Willet

Behavior: These shorebirds probe or steal. Loud alarm calls. Sometimes seen resting on shore on one leg. Never swim. Perch on rocks, not docks.
Field Marks: Grey w/ long legs; wings open black&white; bill length is about 1_ x head length.
Note: Large pinkish brown shorebirds with long (3 x head) bill slightly upturn are marbled godwits.

BIRDS SEEN ON…

The Dock:

Cormorant
Pelican
Western gull
Glaucous-Wing gull

On Rocks:

Same as on dock plus Mew Gulls,Turnstones

On Land:

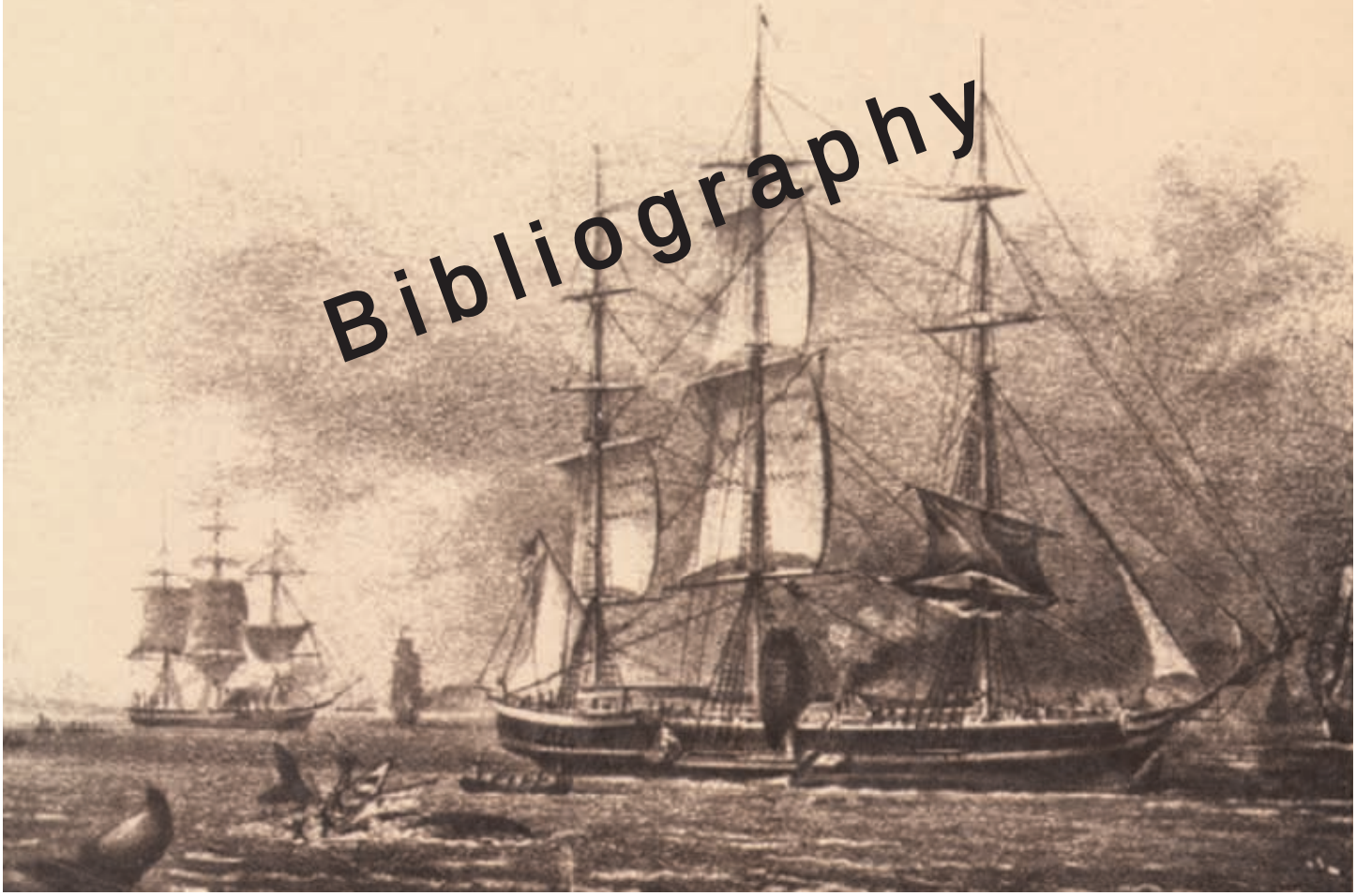
Ravens: large aggressive, inquisitive glossy black birds (there are no crows here). Protect your lunch.
Turkey Vultures: Fly unsteadily; body/wings form a “V”; black with unfeathered red head
Red-Tail Hawks: High soaring flyers. Often perch on posts. Red tail on topside only.
Harriers: fly just over tops of bushes; white band on the rump (ie topside of lower back…not tail).
White-Crowned Sparrows: small, brown birds with un-strped chest; head has white strip down middle.
Song Sparrows: small, brown birds with streaked chest; head has assorted brown stripes.
Kestrels: robin-sized, perch or hover in the air, females are rusty, males are rusty with blue wings.
Scrub Jays: are not eastern “blue jays.” No crest on head. Aggressive; protect your lunch.

$4.00

the MARINE MAMMALS of the NORTHWESTERN COAST of NORTH AMERICA

Together with an account of the American Whale-Fishery

Charles M. Scammon



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