



Pacific Gray Whales



Inside:

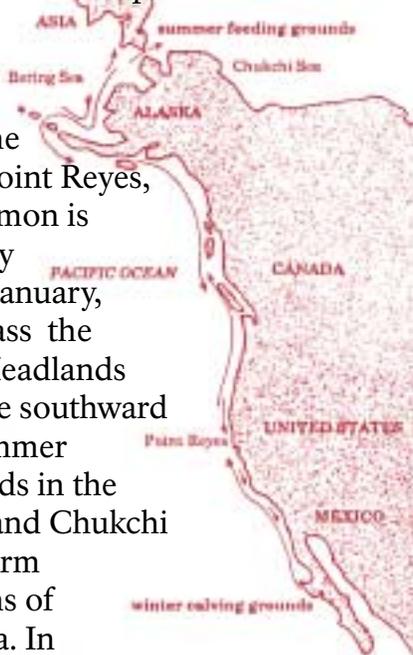
Whale Adaptations	2-3
For More Information	3
Humans and Gray Whales	4

Photo © Sue Van der Wal

Thousands of people visit Point Reyes National Seashore every year to watch the passage of Pacific gray whales. The size and grace of whales awaken a sense of wonder in us, and we are awed by their life habits, which are so different from our own.

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 now glimpse gray whales once again as they travel their annual path.

Many whale species are visible from the shore of Point Reyes, but most common is the Pacific gray whale. Every January, gray whales pass 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 again pass the Headlands on their northward return to feeding grounds. Humans might find a commute of fifty miles much too long, but these whales make an annual round-trip journey of 10,000 miles and swim for almost two months each way!



Pacific gray whales migrate along the west coast.

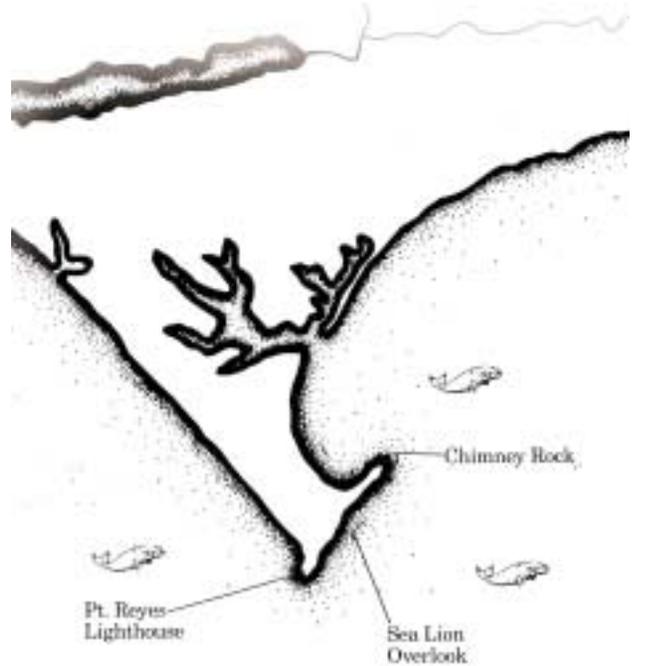
Since they were first seen, whales have most likely been viewed with the same sense of wonder we have today. However, for centuries whales were commodities to be hunted and sold. The oil and baleen of thousands of whales produced livelihoods for hundreds of people. Pushed to the brink of extinction, many whale species nearly disappeared forever. Today, many people see living whales as natural treasures.

People chose to save whales. Thousands spoke out to protect those that remained. Governments listened, eventually passing laws protecting these magnificent animals.

And Pacific gray whales recovered.

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 of our own hope for the future.

The environment is infinitely and intricately interconnected, full of mysteries we are only slowly unraveling. Gray whales provide us with connections to some of those mysteries. As survivors, they are symbols of the resilience of nature and of the hope

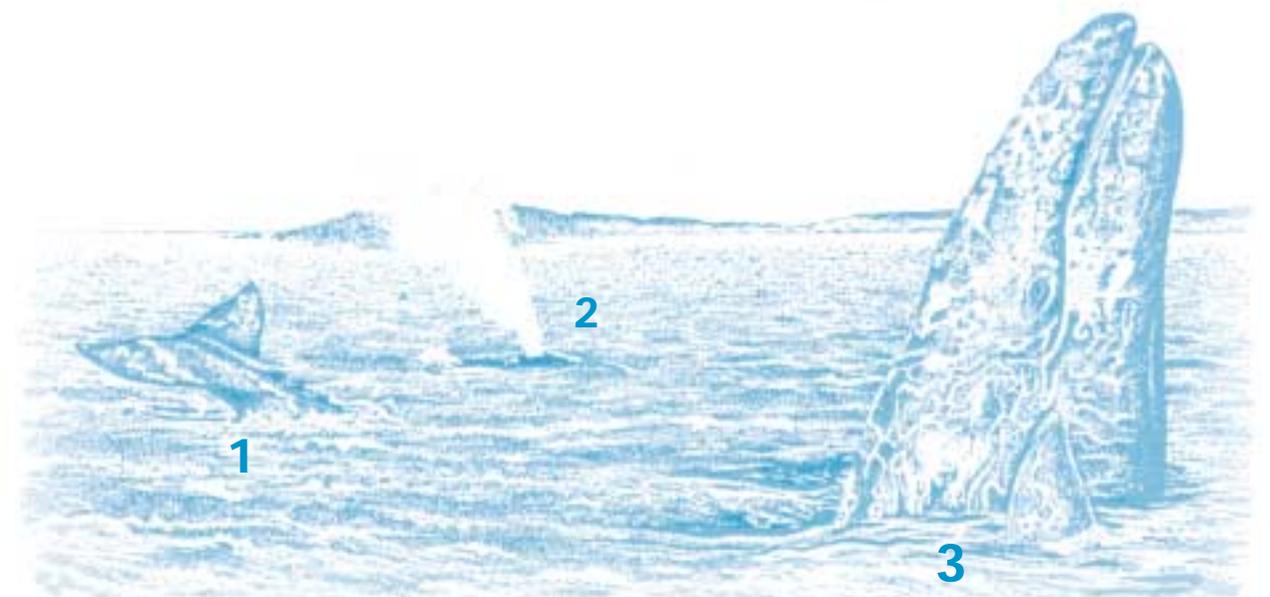


Whale watching is best along the Point Reyes Headlands.

that it is not too late to make the world a better place. Today, it is important to know that each of us can make a difference. Maybe that is why people love to watch for whales.

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

Mammals like us, they must breathe air to live, but they spend little time above water. They surface, they exhale, and they breathe before disappearing beneath the dark waters. The spout, a heart-shaped plume of mist, is like a breath on a cold morning, but much, much larger. Although a spout seems wispy from afar, if you could stand on the back of a gray whale, the spray would whoosh up over twice your height.



Commonly seen gray whale behaviors, left to right: (1) sounding, (2) spouting and (3) spyhopping

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



Photo © Sue Van der Wal

California, mostly in January and February. Fifteen feet long at birth, a newborn calf weighs up to 2000 pounds. It nurses from mammary glands tucked inside narrow slits on the belly of the female. This rich milk is about 40% fat, with the consistency of cottage cheese or margarine. After several months of consuming more than 50 gallons per day, the calf grows to 26-30 feet long and nearly doubles its birth weight by weaning age.

Migration

The life of a 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 of year. Most gray whales migrate every spring from their birthing and breeding lagoons in Baja

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

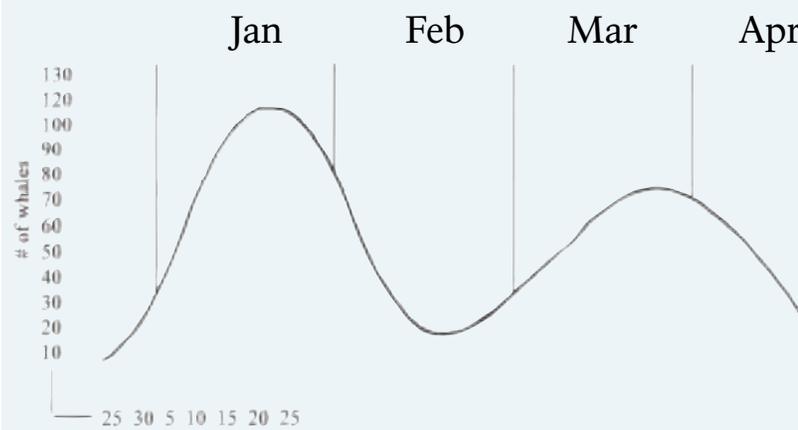
Gray whales exemplify millions of years of adaptation. Fifty million years ago, mesonychids, a primitive relative of the deer and the ancient ancestor of the whale, left the land in search of food. As their descendants adapted to living in the water, they became some of the most highly specialized creatures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

Sea-going Mammals

The body of the whale has adapted to make it more efficient in the water. The tail developed large muscles and flukes for more powerful swimming. The forelegs developed into pectoral flippers that help it to maneuver, while the hind legs slowly disappeared. Today, the only vestige of those legs are small bones hidden inside the whale's body. The nostrils, blowholes, migrated 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 lungs and mouths of humans, whales' lungs and mouths are not connected. Whales can breathe while feeding at the surface, without drowning.

Like humans, gray whales are mammals. Warm-blooded, they give birth to live young, and grow hair. Pacific Gray whales give birth to their calves in the warm, protected bays and estuaries of Baja,

Gray Whale Sightings at Point Reyes National Seashore



Gray whales are most commonly seen near Point Reyes when they migrate south in January and when they return north in March.

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 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 linger along the migratory route or summer at other locations. In recent years,



The National Oceanic and Atmospheric Administration (NOAA) also protects the 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 through these sanctuaries, creating a resource-rich environment. This habitat is essential to whales and other species, including humans.

small numbers of gray whales have summered in Tomales Bay, around Point Reyes Headlands and near the Farallon Islands. They find food in Drakes Bay and Tomales Bay, where they are occasionally seen feeding just beyond the surf.

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 California is in January.
-  The peak of the migration North to Alaska is in March.
-  Poor visibility and high wind speeds can greatly reduce sightings.

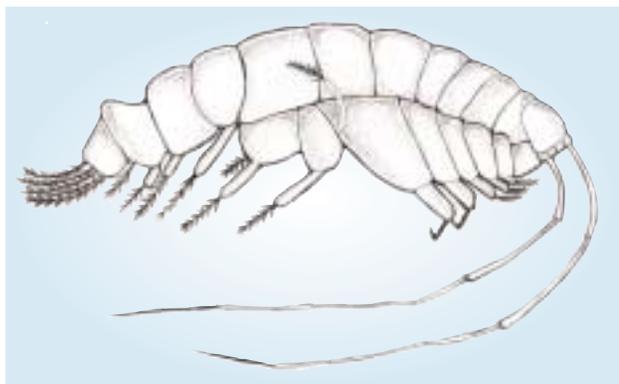
We all love the ocean's surface with its beautiful sparkle blue. But beneath it, down deeper, whales are moving with slow, drifting currents - whales that are great, gentle, cloudlike beings.

Roger Payne, whale biologist, 1991

Shallow Feeders

Gray whales migrate and forage along the continental shelf and have adapted to diving in shallow water. They typically 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 niche where other whales do not feed. They literally suck mud up from the bottom of the Bering and Chuckchi Seas - feeding on 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 small, schooling fish.

A Pacific gray whale feeds by swimming slowly over the muddy bottom, at depths down 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 causes powerful suction, enabling the whale to suck up the food-filled mud. Then the tongue forces the mud through baleen plates on the opposite side of the whale's mouth.



A close cousin to krill, amphipods are the main food source of the bottom-feeding gray whales.

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 the whale rubs against the ocean bottom. In a single summer, a gray whale can ingest about 65 tons of food, gaining up to 30% in weight.

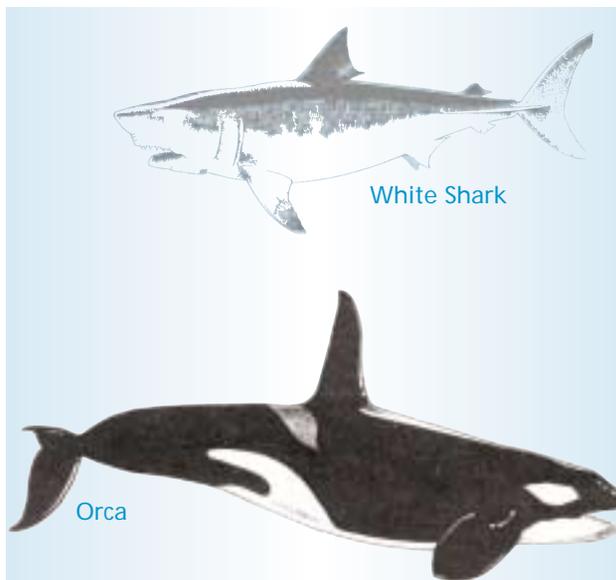
Much energy from this feeding is stored as a thick layer of fat or blubber. Blubber, an adaptation common among marine mammals, insulates them in cold water and holds energy in reserve for the rest of the year. While gray whales typically do not

feed much after leaving northern feeding grounds, they likely take advantage of food sources when they find them.

Shapers of the Ecosystem

Gray whales are important to the food web and play a large role in the success of their feeding-ground ecosystems. Plowing the bottom of the Bering Sea, a single gray whale can dredge up 100 acres of mud per summer. Such foraging releases sediments upwards into the water column. In turn, the sediments release a significant amount of nutrients beneficial to other organisms in the coastal ecosystem. The deep furrows left by the plowing creates habitat for many organisms that colonize the ocean floor, or benthic zone. Among these organisms are the very amphipods the whales eat.

Other species of animals have adapted to and depend upon the presence of gray whales. Orcas are one of their major predators. The fins of many gray whales show scars of their encounters with orcas. White sharks may prey on calves, but probably do not attack adult whales. Smaller creatures make their homes on the grays. Several species of whale lice, an amphipod related to the food of the gray whale, crawl about, feeding on the skin of the whale. Several species of barnacles can also be found on gray whales. Whole colonies attach themselves to the whale's skin where they live their entire lives.



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



Whale lice can grow over 1/2" long, and may cluster in the thousands. While parasitic, they may help whales by keeping wounds clean and disease-free.

At Point Reyes, we watch whales as they migrate past, but only glimpse 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 lives. Like so much in the world around us, every piece of the environment is interconnected, influencing the others. Perhaps we should pause and ask ourselves how we fit into the lives of whales.

For Further Exploration, Contact:

Point Reyes National Seashore

Point Reyes Station, CA 94956
<http://www.nps.gov/pore>

Gulf of the Farallones

National Marine Sanctuary
GGNRA, Fort Mason
San Francisco, CA 94123
<http://www.farallones.org>

American Cetacean Society

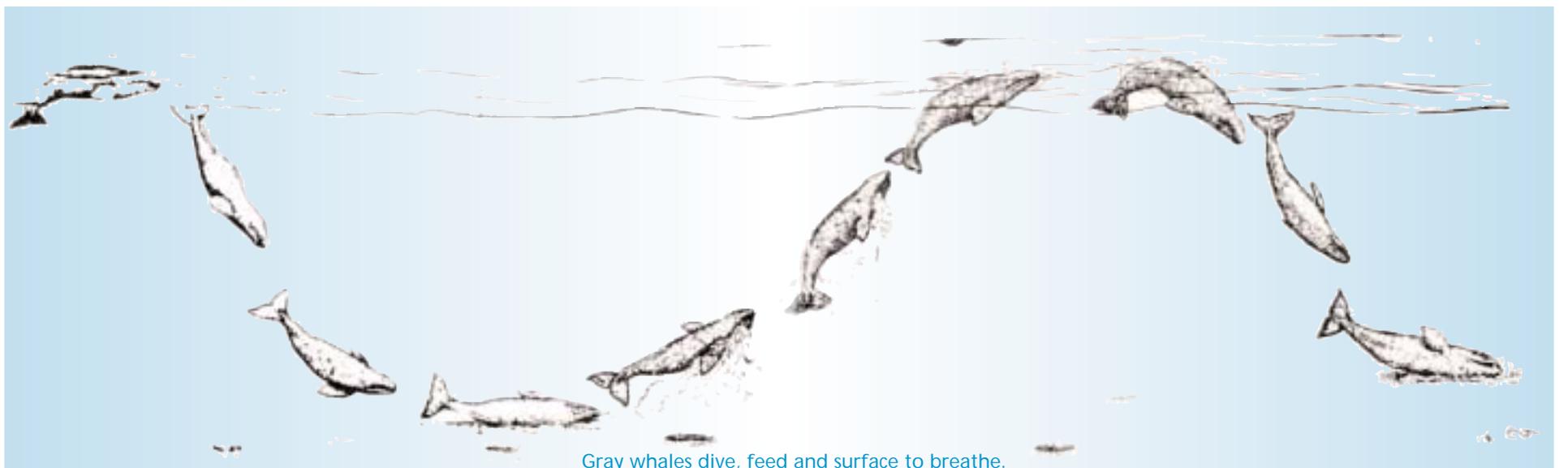
P.O. Box 2639
San Pedro, CA 90731-0943
<http://www.acs-la.org>

Marine MammalCenter

MarinHeadlands, GGNRA
Sausalito, CA 94965
<http://www.tmmc.org>

Monterey Bay Aquarium

886 Cannery Row
Monterey, CA 93940-1085
<http://www.montereybayaquarium.org>



Gray whales dive, feed and surface to breathe.

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, yet human convictions have brought many of them back.

Wielding hand-held spears aboard small boats, Native Americans of Alaska and the Pacific Northwest hunted gray whales for food. Europeans made hoop skirts, corsets, and buggy whips from whale baleen, and found whale blubber a valuable source of oil for lanterns and machinery. Growing industrial nations consumed this oil in huge volumes.

At first, gray whales were not popular targets for many whalers. Their oil was of poor quality and their baleen was too coarse to gain much profit. Right whales and bowhead whales were preferred, but as they declined, oil prices soared. Though less valuable, an adult gray whale still could yield up to 25 barrels of oil that sold for up to \$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 cannons made escape nearly impossible. While electricity and petroleum products replaced whale oil, it was still used to make soap, and whale meat went into fertilizers and pet food. It has been estimated that as few as 1,000 Pacific gray whales were left in the 1930s.

Even whalers realized that extinction seemed imminent. Hunting gray whales was banned in 1937. In 1946, an international agreement to ban all commercial whaling was signed by most whaling nations. Yet subsistence hunting still continues in some cultures and commercial whaling persists in Japan, Finland and Iceland.



Many people have come 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 protecting the environment, especially whales. Laws such as the Marine Mammal Protection Act were created to help preserve whales and other marine mammals.

Such efforts have led to the recovery of the gray whale. Today an estimated 25,000 to 27,000 gray whales swim the ocean, perhaps nearing the number that lived before commercial whaling. Whale watching has now replaced whaling as a profitable industry.

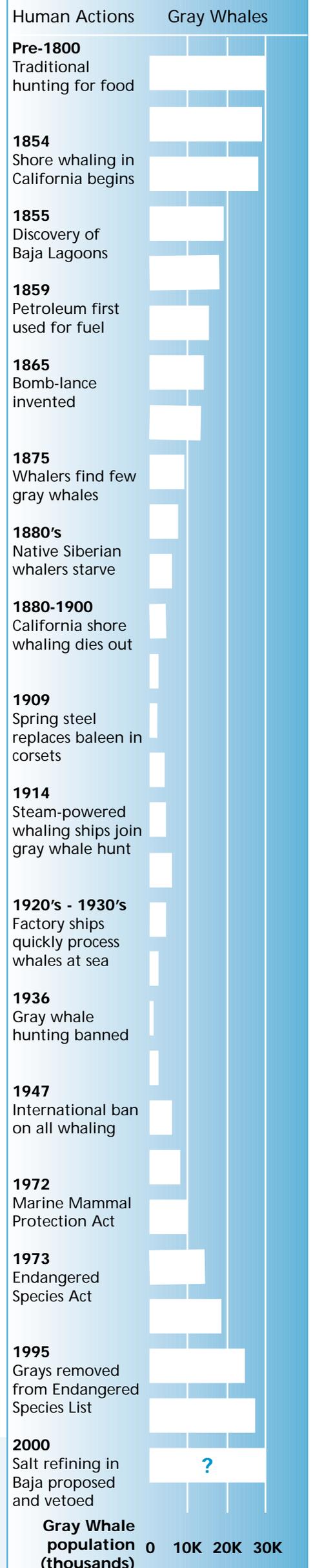
Although gray whales are protected, they are still at risk. Whales, other sea mammals and birds get caught in gill nets used for fishing. Unable to reach the surface to breathe, they drown. Whales are susceptible to pollutants dumped into the oceans, and some bear scars revealing the dangers of colliding with ships. New studies also indicate that noise pollution from ships and industry may harm whales' hearing and ability to navigate.

Gray whales have provided food, have supplied power and wealth for growing nations, and have become a symbol of the ocean environment. More importantly, they show how much our choices and decisions can influence the world around us, and that we can work to correct harm done in the past.

“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

Estimated Gray Whale Populations



Acknowledgements

Special thanks for support and contributions:

Point Reyes National Seashore Association

American Cetacean Society

Gulf of the Farallones National Marine Sanctuary

Monterey Bay Aquarium



Science Advisor: Sarah Allen, Ph.D.

Writer: John Golda

Editor: Rod Torrez

Design/Layout: John Golda & Rod Torrez

Artwork: Christie Denzel Anastasia & David Willard

All Photos © Sue Van der Wal