

= Humpback whale =

The humpback whale ( *Megaptera novaeangliae* ) is a species of baleen whale . One of the larger rorqual species , adults range in length from 12 ? 16 m ( 39 ? 52 ft ) and weigh about 36 @,@ 000 kg ( 79 @,@ 000 lb ) . The humpback has a distinctive body shape , with long pectoral fins and a knobby head . It is known for breaching and other distinctive surface behaviors , making it popular with whale watchers . Males produce a complex song lasting 10 to 20 minutes , which they repeat for hours at a time . Its purpose is not clear , though it may have a role in mating .

Found in oceans and seas around the world , humpback whales typically migrate up to 25 @,@ 000 km ( 16 @,@ 000 mi ) each year . Humpbacks feed only in summer , in polar waters , and migrate to tropical or subtropical waters to breed and give birth in the winter when they fast and live off their fat reserves . Their diet consists mostly of krill and small fish . Humpbacks have a diverse repertoire of feeding methods , including the bubble net technique .

Like other large whales , the humpback was a target for the whaling industry . Once hunted to the brink of extinction , its population fell by an estimated 90 % before a 1966 moratorium . While stocks have partially recovered , entanglement in fishing gear , collisions with ships and noise pollution continue to impact the population of 80 @,@ 000 .

= = Taxonomy = =

Humpback whales are rorquals ( *Balaenopteridae* , a family that includes the blue , fin , Bryde 's , sei and minke whales ) . The rorquals are believed to have diverged from the other families of the suborder Mysticeti as long ago as the middle Miocene . However , it is not known when the members of these families diverged from each other .

Though clearly related to the giant whales of the genus *Balaenoptera* , the humpback is the sole member of its genus . More recently , though , DNA sequencing analysis has indicated the humpback is more closely related to certain rorquals , particularly the fin whale ( *B. physalus* ) and possibly to the gray whale ( *Eschrichtius robustus* ) , than it is to other rorquals such as the minke whales .

The humpback was first identified as baleine de la Nouvelle Angleterre by Mathurin Jacques Brisson in his *Regnum Animale* of 1756 . In 1781 , Georg Heinrich Borowski described the species , converting Brisson 's name to its Latin equivalent , *Balaena novaeangliae* . In 1804 , Lacépède shifted the humpback from the family *Balaenidae* , renaming it *B. jubartes* . In 1846 , John Edward Gray created the genus *Megaptera* , classifying the humpback as *Megaptera longipinna* , but in 1932 , Remington Kellogg reverted the species names to use Borowski 's *novaeangliae* . The common name is derived from the curving of their backs when diving . The generic name *Megaptera* from the Greek mega- / ????- " giant " and ptera / ????? " wing " , refers to their large front flippers . The specific name means " New Englander " and was probably given by Brisson due to regular sightings of humpbacks off the coast of New England .

Genetic research in mid @-@ 2014 by the British Antarctic Survey confirmed that the separate populations in the North Atlantic , North Pacific and Southern Oceans are more distinct than previously thought . Some biologists believe that these should be regarded as separate subspecies and that they are evolving independently .

= = Anatomy = =

Humpbacks can easily be identified by their stocky body , obvious hump , black dorsal coloring and elongated pectoral fins . The head and lower jaw are covered with knobs called tubercles , which are hair follicles and are characteristic of the species . The fluked tail , which typically rises above the surface when diving , has wavy trailing edges .

Humpbacks have 270 to 400 darkly colored baleen plates on each side of their mouths . The plates measure from 18 in ( 46 cm ) in the front to about 3 ft ( 0 @.@ 91 m ) in the back , behind the hinge .

Ventral grooves run from the lower jaw to the umbilicus , about halfway along the underside of the body . These grooves are less numerous ( usually 14 ? 22 ) than in other rorquals , but are fairly wide .

The female has a hemispherical lobe about 15 cm ( 5 @. @ 9 in ) in diameter in her genital region . This visually distinguishes males and females . The male 's penis usually remains hidden in the genital slit .

#### == Size ==

Fully grown males average 13 ? 14 m ( 43 ? 46 ft ) . Females are slightly larger at 15 ? 16 m ( 49 ? 52 ft ) ; one large recorded specimen was 19 m ( 62 ft ) long and had pectoral fins measuring 6 m ( 20 ft ) each . The largest humpback on record , according to whaling records , was a female killed in the Caribbean ; she was 27 m ( 89 ft ) long with a weight of 90 metric tons ( 99 short tons ) , although the reliability of this information is unconfirmed due to illogicality of the record . Body mass typically is in the range of 25 ? 30 metric tons ( 28 ? 33 short tons ) , with large specimens weighing over 40 metric tons ( 44 short tons ) .

Newborn calves are roughly the length of their mother 's head . At birth , calves measure 6 m ( 20 ft ) at 2 short tons ( 1 @. @ 8 t ) . They nurse for about six months , then mix nursing and independent feeding for possibly six months more . Humpback milk is 50 % fat and pink in color .

Females reach sexual maturity at age five , achieving full adult size a little later . Males reach sexual maturity around seven years of age .

#### == Fins ==

The long black and white tail fin can be up to a third of body length . Several hypotheses attempt to explain the humpback 's pectoral fins , which are proportionally the longest fins of any cetacean . The higher maneuverability afforded by long fins and the usefulness of the increased surface area for temperature control when migrating between warm and cold climates possibly supported this adaptation .

#### == Identifying individuals ==

The varying patterns on the tail flukes distinguish individual animals . A study using data from 1973 to 1998 on whales in the North Atlantic gave researchers detailed information on gestation times , growth rates and calving periods , as well as allowing more accurate population predictions by simulating the mark @-@ release @-@ recapture technique . A photographic catalogue of all known North Atlantic whales was developed over this period and is maintained by College of the Atlantic . Similar photographic identification projects operate around the world .

#### == Life history / behavior ==

The lifespan of rorquals ranges from 45 to 100 years .

#### == Interactions ==

The humpback social structure is loose @-@ knit . Typically , individuals live alone or in small , transient groups that disband after a few hours . Groups may stay together longer in summer to forage and feed cooperatively . Longer @-@ term relationships between pairs or small groups , lasting months or even years , have rarely been observed . Some females possibly retain bonds created via cooperative feeding for a lifetime . The humpback 's range overlaps with other whale and dolphin species ? for instance , the minke whale .

#### == Courtship and reproduction ==

Courtship rituals take place during the winter months , following migration toward the equator from summer feeding grounds closer to the poles . Competition is usually fierce . Unrelated males , dubbed escorts , frequently trail females , as well as cow @-@ calf pairs . Males gather into " competition groups " around a female and fight for the right to mate with her . Group size ebbs and flows as unsuccessful males retreat and others arrive . Behaviors include breaching , spyhopping , lob @-@ tailing , tail @-@ slapping , pectoral fin @-@ slapping , peduncle throws , charging and parrying .

Whale song is thought to have an important role in mate selection ; however , they may also be used between males to establish dominance .

Females typically breed every two or three years . The gestation period is 11 @.@ 5 months . The peak months for birth are January , February ( northern hemisphere ) , July and August ( southern hemisphere ) . Females wait for one- to two ? years before breeding again . Recent research on mitochondrial DNA reveals that groups living in proximity to each other may represent distinct breeding pools .

= = = Interspecies interactions = = =

Humpbacks are a friendly species that interact with other cetacean species such as bottlenose dolphins . Right whales interact with humpbacks . These behaviors have been recorded in all oceans . A record of a humpback and a southern right whale demonstrating what was interpreted to be mating behaviors was documented off the Mozambique coast . Humpback whales appear in mixed groups with other species , such as the blue , fin , minke , gray and sperm whales . Interaction with gray , fin , and right whales have been observed . Teams of researchers observed a male humpback whale singing an unknown type of song and approaching a fin whale at Rarotonga in 2014 . One individual was observed playing with a bottlenose dolphin in Hawaiian waters .

= = = Song = = =

Both male and female humpback whales vocalize , but only males produce the long , loud , complex " song " for which the species is famous . Each song consists of several sounds in a low register , varying in amplitude and frequency and typically lasting from 10 to 20 minutes . Individuals may sing continuously for more than 24 hours . Cetaceans have no vocal cords . They vocalize by forcing air through their massive nasal cavities ( blowholes ) .

Whales within a large area sing a single song . All North Atlantic humpbacks sing the same song , while those of the North Pacific sing a different song . Each population 's song changes slowly over a period of years without repeating .

Scientists are unsure of the purpose of whale songs . Only males sing , suggesting one purpose is to attract females . However , many of the whales observed to approach a singer are other males , often resulting in conflict . Singing may , therefore , be a challenge to other males . Some scientists have hypothesized the song may serve an echolocative function . During the feeding season , humpbacks make unrelated vocalizations for herding fish into their bubble nets .

Humpback whales make other sounds to communicate , such as grunts , groans , " thwops " , snorts and barks .

= = = Breathing = = =

Whales are air @-@ breathing mammals who must surface to get the air they need . The stubby dorsal fin is visible soon after the blow ( exhalation ) when the whale surfaces , but disappears by the time the flukes emerge . Humpbacks have a 3 m ( 9 @.@ 8 ft ) , heart @-@ shaped to bushy blow through the blowholes .

They do not generally sleep at the surface , but must continue to breathe . Possibly only half of their brain sleeps at one time , allowing the other half to manage the surface / blow / dive process without

awakening the other half .

= = = Migration = = =

Migratory patterns and social interactions were explored in the 1960s and by further studies in 1971 . Calambokidis et al. provided the " first quantitative assessment of the migratory structure of humpback whales in the entire North Pacific basin . "

= = Ecology = =

= = = Range and habitat = = =

Humpbacks inhabit all major oceans , in a wide band running from the Antarctic ice edge to 77 ° N latitude . The four global populations are North Pacific , Atlantic , Southern Ocean and Indian Ocean populations . These populations are distinct . Although the species has cosmopolitan distribution and is usually not considered to cross the equator line , seasonal observations at Cape Verde suggest possible interactions among populations from both hemisphere .

Whales were once uncommon in the eastern Mediterranean or the Baltic Sea , but have increased their presence in both waters as global populations have recovered . Recent increases within the Mediterranean basin , including re @-@ sightings , indicate that more whales may migrate into the inland sea in the future . They have also returned to Skagerrak and Kattegat , as well as Scandinavian fjords such as the Kvænangen , where they had not been observed for decades .

In the North Atlantic , feeding areas range from Scandinavia to New England . Breeding occurs in the Caribbean and Cape Verde . In the South Atlantic and Indian Oceans , whales may breed off Brazil , as well the coasts of central , southern and southeastern Africa ( including Madagascar ) . Whale visits into Gulf of Mexico have been infrequent , but occurred in the gulf historically . In the South Atlantic , about 10 % of world population of the species possibly migrate to Gulf of Guinea . Comparison of songs between those at Cape Lopez and Abrolhos Archipelago indicate that trans @-@ Atlantic mixings between western and southeastern populations occur .

A large population spreads across the Hawaiian Islands every winter , ranging from the island of Hawaii in the south to Kure Atoll in the north . These animals feed in areas ranging from the coast of California to the Bering Sea . Humpbacks were first observed in Hawaiian waters in the mid @-@ 19th century and might have gained a dominance over North Pacific right whales as the right whales were hunted to near @-@ extinction .

A 2007 study identified seven individuals then wintering off the Pacific coast of Costa Rica as having traveled from the Antarctic ? around 8 @,@ 300 km ( 5 @,@ 200 mi ) . Identified by their unique tail patterns , these animals made the longest documented mammalian migration . In Australia , two main migratory populations were identified , off the west and east coasts . These two populations are distinct , with only a few females in each generation crossing between the two groups .

In Panama and Costa Rica , humpback whales come from both the Southern Hemisphere ( July ? October with over 2 @,@ 000 whales ) and the Northern Hemisphere ( December ? March numbering about 300 . ) South Pacific populations migrating off mainland New Zealand , Kermadec Islands , and Tasmania are increasing , but less rapidly than in Australian waters because of illegal whaling by the Soviet Union in the 1970s .

Some recolonizing habitats are confirmed , especially in the North and South Atlantic ( e.g. English and Irish coasts , English Channel to coasts in the north such as the North Sea and Wadden Sea , South Pacific ( e.g. New Zealand coasts and Niue ) , pelagic islands of Chile such as Isla Salas y Gómez and the Easter Island where possibilities of undocumented wintering grounds have been considered , southern fiords of Chile and Peru ( e.g. Gulf of Penas , Strait of Magellan , Beagle Channel ) and in Asia . Areas in the Philippines such as in Babuyan Islands , Cagayan and Calayan and Pasaleng Bay , Ryukyu Islands the Volcano Islands in Japan and the Northern Mariana Islands

recently , again became stable / growing wintering grounds while Marshall Islands , Vietnamese , Taiwanese and Chinese coasts show slow or no obvious recovery .

Whales again migrate off Japanese archipelagos and into the Sea of Japan . Connections between these stocks and whales seen in Sea of Okhotsk , on Kamchatka coasts and around Commander Islands have been studied . Historical wintering distributions could have been much wider , as whales were seen areas along Batanes , Sulu and Celebes Seas including off Palawan , Malaysia and Mindanao with higher densities at around today 's Cape Eluanbi and Kenting National Park . Unconfirmed sightings have been reported near Borneo in Modern . The first confirmation in modern Taiwan was of a pair off Hualien in 1994 , followed by successful escape from entanglement off Taitung in 1999 , and continuous sightings around Orchid Island in 2000 . Few / none regularly migrate into Kenting National Park . In addition , despite sightings reported almost annually at the islands of Green and Orchid Islands , relatively short stays in these waters indicate recoveries as winter foraging has not occurred . Around Hong Kong , two documented sightings were recorded in 2009 and in 2016 . One of the first documented sighting within the Yellow Sea was of a group of 3 or 4 individuals , including a cow calf pair in Changhai County in October , 2015 .

Since November 2015 , whales gather around Hachijō , far north from the known breeding areas in the Bonin Islands . All breeding activities except for giving births had been confirmed as of January , 2016 . That makes Hachijō the northernmost breeding ground in the world , north of breeding grounds such as Amami Ōshima , Midway Island , and Bermuda .

== = Arabian Sea population == =

A non migratory population in the Arabian Sea remains there year round . More typical annual migrations cover up to 25 ,000 km ( 16 ,000 mi ) , making it one of the most traveled mammalian species . Genetic studies and visual surveys indicate that the Arabian group is the most isolated of all humpback groups and is the most endangered , numbering possibly fewer than 100 animals .

Whales were historically common in continental and marginal waters such as Hallaniyat Islands , along Indian coasts , Persian Gulf and Gulf of Aden and recent migrations into the gulf including by cow calf pairs . It is unknown whether whales seen in the Red Sea originate in this population , however sightings increased since in 2006 even in the northern part of the sea such as in Gulf of Aqaba . Individuals may reach the Maldives , Sri Lanka , or further east .

Origins of whales occurring at Maldives are not clear as those from Arabian and south Pacific populations are possible .

== Feeding and predation ==

Humpbacks feed primarily in summer and live off fat reserves during winter . They feed only rarely and opportunistically in their wintering waters . The humpback is an energetic hunter , taking krill and small schooling fish such as herring , salmon , capelin and American sand lance , as well as Atlantic mackerel , pollock and haddock in the North Atlantic . Krill and copepods are prey species in Australian and Antarctic waters . Humpbacks hunt by direct attack or by stunning prey by hitting the water with pectoral fins or flukes .

== Bubble net ==

The humpback has the most diverse hunting repertoire of all baleen whales . Its most inventive technique is known as bubble net feeding ; a group of whales swims in a shrinking circle blowing bubbles below a school of prey . The shrinking ring of bubbles encircles the school and confines it in an ever smaller cylinder . This ring can begin near 30 m ( 98 ft ) in diameter and involve the cooperation of a dozen animals . Using a crittercam attached to a whale 's back , researchers found that some whales blow the bubbles , some dive deeper to drive fish toward the surface and others herd prey into the net by vocalizing . The whales then suddenly swim upward through the " net " ,

mouths agape , swallowing thousands of fish in one gulp . Pleated grooves in the whale 's mouth allow the creature to easily drain the water initially taken in , filtering out the prey .

So @-@ called lobtail feeding was observed in the North Atlantic . This technique involves the whale slapping the surface of the ocean with its tail between one and four times before creating the bubble net . Using network @-@ based diffusion analysis , the study authors argued that these whales learned the behavior from other whales in the group over a period of 27 years in response to a change in the primary form of prey .

= = = Killer whale predation = = =

Visible scars indicate that killer whales can prey upon juvenile humpbacks , though until recently hunting had never been witnessed and attacks were assumed to be superficial in nature . However , a 2014 study off Western Australia observed that when available in large numbers , young humpbacks can be attacked and sometimes killed by orcas . Moreover , mothers and ( possibly related ) adults escort neonates to deter such predation . The suggestion is that when humpbacks suffered near @-@ extinction during the whaling era , orcas turned to other prey , but are now resuming their former practice .

= = Relation to humans = =

= = = Whaling = = =

Humpback whales were hunted as early as the 18th century . By the 19th century , many nations ( the United States in particular ) , were hunting the animal heavily in the Atlantic Ocean and to a lesser extent in the Indian and Pacific Oceans . The late @-@ 19th @-@ century introduction of the explosive harpoon allowed whalers to accelerate their take . This , along with hunting in the Antarctic Ocean beginning in 1904 , sharply reduced whale populations . During the 20th century , over 200 @,@ 000 humpbacks were taken , reducing the global population by over 90 % . North Atlantic populations dropped to as low as 700 individuals .

= = = = Ban = = = =

In 1946 , the International Whaling Commission ( IWC ) was founded to oversee the industry . They imposed hunting regulations and created hunting seasons . To prevent extinction , IWC banned commercial humpback whaling in 1966 . By then , the global population had been reduced to around 5 @,@ 000 . The ban remained in force as of 2016 .

Prior to commercial whaling , populations could have reached 125 @,@ 000 . North Pacific kills alone are estimated at 28 @,@ 000 . The Soviet Union deliberately under @-@ recorded its catches ; the Soviets reported catching 2 @,@ 820 between 1947 and 1972 , but the true number was over 48 @,@ 000 .

As of 2004 , hunting was restricted to a few animals each year off the Caribbean island of Bequia in the nation of St. Vincent and the Grenadines . The take is not believed to threaten the local population . Japan had planned to kill 50 humpbacks in the 2007 / 08 season under its JARPA II research program . The announcement sparked global protests . After a visit to Tokyo by the IWC chair asking the Japanese for their co @-@ operation in sorting out the differences between pro- and antiwhaling nations on the commission , the Japanese whaling fleet agreed to take no humpback whales during the two years it would take to reach a formal agreement .

In 2010 , the IWC authorized Greenland 's native population to hunt a few humpback whales for the following three years .

In Japan , humpback , minke , sperm and many other smaller Odontoceti , including critically endangered species such as North Pacific right , western gray and northern fin , have been targets of illegal captures . The hunts use harpoons for dolphin hunts or intentionally drive whales into nets ,

reporting them as cases of entanglement . Humpback meat can be found in markets . In one case , humpbacks of unknown quantities were illegally hunted in the Exclusive Economic Zones of anti @-@ whaling nations such as off Mexico and South Africa .

= = = Whale @-@ watching = = =

Whale watching is the leisure activity of observing humpbacks in the wild . Participants watch from shore or on touring boats . Humpbacks are generally curious about nearby objects . Some individuals , referred to as " friendlies " , approach whale @-@ watching boats closely , often staying under or near the boat for many minutes .

Because humpbacks are typically easily approachable , curious , identifiable as individuals and display many behaviors , they have become the mainstay of whale tourism around the world . Hawaii has used the concept of " ecotourism " to benefit from the species without killing them . This business brings in revenue of \$ 20 million per year for the state 's economy .

= = = Famous individuals = = =

= = = = The Tay whale = = = =

In December 1883 , a male humpback swam up the Firth of Tay in Scotland , past what was then the whaling port of Dundee . The whale was exhibited to the public by a local entrepreneur , John Woods , both locally and then as a touring exhibition that travelled to Edinburgh and London . The whale was dissected by Professor John Struthers , who wrote seven papers on its anatomy and a 1889 monograph on the humpback .

= = = = Migaloo = = = =

An albino humpback whale that travels up and down the east coast of Australia became famous in local media because of its rare , all @-@ white appearance . Migaloo is the only known all @-@ white specimen and is a true albino . First sighted in 1991 , the whale was named for an indigenous Australian word for " white fella " . To prevent sightseers approaching dangerously close , the Queensland government created a 500 @-@ m ( 1600 @-@ ft ) exclusion zone around him .

= = = = Humphrey = = = =

In 1985 , Humphrey swam into San Francisco Bay and then up the Sacramento River towards Rio Vista . Five years later , Humphrey returned and became stuck on a mudflat in San Francisco Bay immediately north of Sierra Point below the view of onlookers from the upper floors of the Dakin Building .

He was twice rescued by the Marine Mammal Center and other concerned groups in California . He was pulled off the mudflat with a large cargo net and the help of the US Coast Guard . Both times , he was successfully guided back to the Pacific Ocean using a " sound net " in which people in a flotilla of boats made unpleasant noises behind the whale by banging on steel pipes , a Japanese fishing technique known as oikami . At the same time , the attractive sounds of humpback whales preparing to feed were broadcast from a boat headed towards the open ocean .

= = = Media = = =

Analyses of whale songs in the 1960s led to worldwide media interest and convinced the public that whales were highly intelligent , aiding the antiwhaling advocates .

= = Status = =

### === Threats ===

While whaling no longer threatens the species, individuals are vulnerable to collisions with ships, entanglement in fishing gear and noise pollution. Like other cetaceans, humpbacks can be injured by excessive noise. In the 19th century, two humpback whales were found dead near sites of repeated oceanic sub-bottom blasting, with traumatic injuries and fractures in the ears.

Saxitoxin, a paralytic shellfish poisoning from contaminated mackerel, was implicated in humpback whale deaths.

### === Conservation ===

The worldwide population is at least 80,000, with 18,000–20,000 in the North Pacific, about 12,000 in the North Atlantic and over 50,000 in the Southern Hemisphere, down from a prewhaling population of 125,000.

### === Least concern ===

In August 2008, the IUCN changed humpback's status from Vulnerable to Least Concern, although two subpopulations remain endangered. The United States is considering listing separate humpback populations, so smaller groups, such as North Pacific humpbacks, which are estimated to number 18,000–20,000 animals, might be delisted. This is made difficult by humpback's migrations, which can extend 5,157 miles (8,299 km) from Antarctica to Costa Rica. In Costa Rica, the Ballena Marine National Park is designed for humpback protection.

Areas where population data are limited and the species may be at higher risk include the Arabian Sea, the western North Pacific Ocean, the west coast of Africa and parts of Oceania.

The species was listed as vulnerable in 1996 and endangered as recently as 1988. Most monitored stocks have rebounded since the end of commercial whaling. In the North Atlantic stocks are believed to be approaching prewhaling levels. However, the species is considered endangered in some countries, including the United States.

### === United States ===

A 2008 US Department of Commerce analysis (SPLASH) noted that the many challenges to determining the recovery status included the lack of accurate population estimates, the unexpected complexity of population structures and their migration. The report was based on data collected from 2004 to 2006. At the time, the North Pacific population was some 18,302. The estimate is consistent with a moderate rate of recovery for a depleted population, although it was considered to be a "dramatic increase in abundance" from other post-1960s estimates. By comparison, Calambokidis et al. estimated 9,819, covering 1991–1993. This represents a 4% annual increase in population from 1993 to 2006. The sanctuary provided by US national parks, such as Glacier Bay National Park and Preserve and Cape Hatteras National Seashore, became major factors in population recovery.

### === Canada ===

Off the west coast of Canada, the Gwaii Haanas National Marine Conservation Area Reserve covers 3,400 square kilometres (1,300 sq mi). It is "a primary feeding habitat" of the North Pacific population. Their critical habitat overlaps with tanker shipping routes between Canada and its eastern trade partners. In 2005 the North Pacific population was listed as threatened under Canada's Species at Risk Act (SARA). In April 19, 2014 the Department of the Environment recommended an amendment to SARA to downgrade their status off the Pacific coast from "



threatened " to " species of special concern " . According to Committee on the Status of Endangered Wildlife in Canada ( COSEWIC ) , the North Pacific humpback population increased at about 4 % annually from 1992 to 2008 . Although socioeconomic costs and benefits were considered in their decision to upgrade their status , according to the University of British Columbia ' s Marine Mammal Research Consortium 's research director , the decision was based on biology , not politics .

= = = = United Kingdom = = = =

The United Kingdom , among other countries , designated the humpback as a priority species under the national Biodiversity Action Plan .

= = = Books = = =