

= Narwhal =

The narwhal , or narwhale (*Monodon monoceros*) , is a medium @-@ sized toothed whale that possesses a large " tusk " from a protruding canine tooth . It lives year @-@ round in the Arctic waters around Greenland , Canada , and Russia . It is one of two living species of whale in the Monodontidae family , along with the beluga whale . The narwhal males are distinguished by a long , straight , helical tusk , which is an elongated upper left canine . The narwhal was one of many species described by Carl Linnaeus in his publication *Systema Naturae* in 1758 .

Like the beluga , narwhals are medium @-@ sized whales . For both sexes , excluding the male 's tusk , the total body size can range from 3 @.@ 95 to 5 @.@ 5 m (13 @.@ 0 to 18 @.@ 0 ft) ; the males are slightly larger than the females . The average weight of an adult narwhal is 800 to 1 @,@ 600 kg (1 @,@ 800 to 3 @,@ 500 lb) . At around 11 to 13 years old , the males become sexually mature ; females become sexually mature at about 5 to 8 years old . Narwhals do not have a dorsal fin , and their neck vertebrae are jointed like those of other mammals , not fused as in dolphins and most whales .

Found primarily in Canadian Arctic and Greenlandic and Russian waters , the narwhal is a uniquely specialized Arctic predator . In winter , it feeds on benthic prey , mostly flatfish , under dense pack ice . During the summer , narwhals mostly eat Arctic cod and Greenland halibut , with other fish such as polar cod making up the remainder of their diet . Each year , they migrate from bays into the ocean as summer comes . In the winter , the male narwhals occasionally dive up to 1 @,@ 500 m (4 @,@ 900 ft) in depth , with dives lasting up to 25 minutes . Narwhals , like most toothed whales , communicate with " clicks " , " whistles " , and " knocks " .

Narwhals can live up to 50 years . They are often killed by suffocation when the sea ice freezes over . Another cause of fatality , specifically among young whales , is starvation . The current population of the narwhal is about 75 @,@ 000 , so narwhals qualify for Near Threatened under the criterion of the International Union for Conservation of Nature (IUCN) . Narwhals have been harvested for over a thousand years by Inuit people in northern Canada and Greenland for meat and ivory , and a regulated subsistence hunt continues .

= Taxonomy and etymology =

The narwhal was one of the many species originally described by Linnaeus in his *Systema Naturae* . Its name is derived from the Old Norse word *nár* , meaning " corpse " , in reference to the animal 's greyish , mottled pigmentation , like that of a drowned sailor and its summer @-@ time habit of lying still at or near the surface of the sea (called " logging ") . The scientific name , *Monodon monoceros* , is derived from the Greek : " one @-@ tooth one @-@ horn " .

The narwhal is most closely related to the beluga whale . Together , these two species comprise the only extant members of the family Monodontidae , sometimes referred to as the " white whales " . The Monodontidae are distinguished by medium size (at around 4 m (13 ft) in length) , forehead melons (round sensory organs) , short snouts , and the absence of a true dorsal fin . Although the narwhal and the beluga are classified as separate genera , with one species each , there is some evidence that they may , very rarely , interbreed . The complete skull of an anomalous whale was discovered in West Greenland circa 1990 . It was described by marine zoologists as unlike any known species , but with features midway between a narwhal and a beluga , consistent with the hypothesis that the anomalous whale was a narwhal @-@ beluga hybrid .

The white whales , dolphins (Delphinidae) and porpoises (Phocoenidae) together comprise the superfamily Delphinoidea , which are of likely monophyletic origin . Genetic evidence suggests the porpoises are more closely related to the white whales , and that these two families constitute a separate clade which diverged from the rest of Delphinoidea within the past 11 million years . Fossil evidence shows that ancient white whales lived in tropical waters . They may have migrated to Arctic and sub @-@ Arctic waters in response to changes in the marine food chain during the Pliocene .

= Description =

Narwhals are medium sized whales , and are around the same size as beluga whales . Total length in both sexes , excluding the tusk of the male , can range from 3 to 5 m (13 to 18 ft) . Males , at an average length of 4 m (13 ft 5 in) , are slightly larger than females , with an average length of 3 m (11 ft 6 in) . Typical adult body weight ranges from 800 to 1 600 kg (1 800 to 3 500 lb) . Male narwhals attain sexual maturity at 11 to 13 years of age , when they are about 3 m (12 ft 10 in) long . Females become sexually mature at a younger age , between 5 and 8 years old , when they are around 3 m (11 ft 2 in) long .

The pigmentation of narwhals is a mottled pattern , with blackish brown markings over a white background . They are darkest when born and become whiter with age ; white patches develop on the navel and genital slit at sexual maturity . Old males may be almost pure white . Narwhals do not have a dorsal fin , possibly an evolutionary adaptation to swimming easily under ice . Their neck vertebrae are jointed , like those of land mammals , instead of being fused together as in most whales . Both these characteristics are shared by the beluga whale . The tail flukes of female narwhals have front edges that are swept back , and those of males have front edges that are more concave and lack a sweep back . This is thought to be an adaptation for reducing drag caused by the tusk .

== Tusk ==

The most conspicuous characteristic of the male narwhal is a single long tusk , a canine tooth that projects from the left side of the upper jaw , through the lip , and forms a left handed helix spiral . Their tusks grow throughout life , reaching lengths from about 1 m (4 ft 11 in) to 3 m (10 ft 2 in) . It is hollow and weighs around 10 kg (22 lb) . About one in 500 males has two tusks , which occurs when the right canine also grows out through the lip . Females sometimes grow tusks ; although only about 15 percent of females have a tusk and female tusks are smaller than those of males , with a less noticeable spiral . Females may produce a second tusk , but there is only a single recorded case of such happening (left image) . The tusks are surrounded posteriorly , ventrally , and laterally by several small teeth which vary in morphology and histology . These teeth are vestigial , and can sometimes be extruded from the bone . Their varied morphology and anatomy indicates a path of evolutionary obsolescence The narwhal 's mouth usually appears toothless .

The tusk is an innervated sensory organ with millions of patent nerve endings connecting seawater stimuli in the external ocean environment with the brain . The rubbing of tusks together which males engage in is now hypothesized to communicate information about the water each has traveled through rather than to represent the previously assumed ? male to male rivalry ? . Narwhals have only occasionally been observed using the tusk for aggressive behavior .

== Distribution ==

The narwhal is found predominantly in the Atlantic and Russian areas of the Arctic Ocean . Individuals are commonly recorded in the northern part of Hudson Bay , Hudson Strait , Baffin Bay ; off the east coast of Greenland ; and in a strip running east from the northern end of Greenland round to eastern Russia (170 ° East) . Land in this strip includes Svalbard , Franz Joseph Land , and Severnaya Zemlya . The northernmost sightings of narwhal have occurred north of Franz Joseph Land , at about 85 ° North latitude . Most of the world 's narwhals are concentrated in the fjords and inlets of Northern Canada and western Greenland . They are able to survive in depths of up to 1 500 m (4 900 ft) below sea level .

== Migration ==

Narwhals exhibit seasonal migrations , with a high fidelity of return to preferred , ice free

summering grounds , usually in shallow waters . In summer months , they move closer to coasts , usually in pods of 10 ? 100 . In the winter , they move to offshore , deeper waters under thick pack ice , surfacing in narrow fissures in the sea ice , or leads . As spring comes , these leads open up into channels and the narwhals return to the coastal bays . Narwhals from Canada and West Greenland winter regularly in the pack ice of Davis Strait and Baffin Bay along the continental slope with less than 5 % open water and high densities of Greenland halibut . Feeding in the winter accounts for a much larger portion of narwhal energy intake than in the summer .

= = Behaviour = =

Narwhals normally congregate in groups of about five to ten , and sometimes up to 20 outside the summer . Groups may be " nurseries " with only females and young , or can contain only post @-@ dispersal juveniles or adult males (" bulls ") , but mixed groups can occur at any time of year . In the summer , several groups come together , forming larger aggregations which can contain from 500 to over 1000 individuals .

At times , a bull narwhal may rub its tusk with another bull , a display known as " tusking " and thought to maintain social dominance hierarchies . However , this behaviour may exhibit tusk use as a sensory and communication organ for sharing information about water chemistry sensed in tusk microchannels .

= = = Diet = = =

Narwhals have a relatively restricted and specialized diet . Their prey is predominantly composed of Greenland halibut , polar and Arctic cod , cuttlefish , shrimp and armhook squid . Additional items found in stomachs have included wolffish , capelin , skate eggs and sometimes rocks , accidentally ingested when whales feed near the bottom . Due to the lack of well @-@ developed dentition in the mouth , narwhals are believed to feed by swimming towards prey until it is within close range and then sucking it with considerable force into the mouth . It is thought that the beaked whales , which have similarly reduced dentition , also suck up their prey .

Narwhals have a very intense summer feeding society . One study published in the Canadian Journal of Zoology tested 73 narwhals of different age and gender to see what they ate . The individuals were from the Pond Inlet and had their stomach contents tested from June 1978 until September 1979 . The study found in 1978 that the Arctic cod (*Boreogadus saida*) made up about 51 % of the diet of the narwhals , with the next most common animal being the Greenland halibut (*Reinhardtius hippoglossoides*) , consisting of 37 % of the weight of their diet . A year later , the percentages of both animals in the diet of narwhals had changed . Arctic cod represented 57 % , and Greenland halibut 29 % in 1979 . The deep @-@ water fish - halibut , redfish (*Sebastes marinus*) , and polar cod (*Arctogadus glacialis*) - are found in the diet of the males , which means that the narwhals can dive deeper than 500 m (1 @,@ 600 ft) below sea level . The study found that the dietary needs of the narwhal did not differ among genders or ages .

= = = Diving = = =

When in their wintering waters , narwhals make some of the deepest dives recorded for a marine mammal , diving to at least 800 metres (2 @,@ 600 feet) over 15 times per day , with many dives reaching 1 @,@ 500 metres (4 @,@ 900 feet) . Dives to these depths last around 25 minutes , including the time spent at the bottom and the transit down and back from the surface .

= = = Communication = = =

As with most toothed whales , narwhals use sound to navigate and hunt for food . " Clicks " , " whistles " and " knocks " , may be created via air between chambers near the blow @-@ hole , and reflected off the sloping front of the skull . These sounds are then focused by the animal 's melon ,

which can be controlled by musculature . " Click trains " are produced both for echo @-@ location of prey , and for locating obstacles at short distances . It is possible that individual " bangs " are capable of disorienting or incapacitating prey , making them easier to hunt , but this has not been verified . The whistles of a narwhal are rarely heard , especially compared to the beluga . Other sounds produced by narwhals include trumpeting and squeaking door sounds .

= = = Breeding and early life = = =

Females start bearing calves when six to eight years old . Adult narwhals mate in April or May when they are in the offshore pack ice . Gestation lasts for 14 months and calves are born between June and August the following year . As with most marine mammals , only a single young is born . Newborn calves average 1 @.@ 6 metres (5 @.@ 2 feet) in length and are dark grey . The newborn calves begin their lives with a thin layer of blubber which thickens as they nurse their mother 's milk which is rich in fat . Calves are dependent on milk for around 20 months . This long lactation period gives calves time to learn the skills they need for survival . Mothers and calves stay close and when travelling , the calf stays by its mother 's back for assistance in swimming .

= = = Life span and mortality = = =

Narwhals can live up to at least 50 years . Almost all modern predation of narwhals is by humans ; other predators are polar bears , which attempt to swipe narwhals at breathing holes and mainly target young whales , and killer whales (orcas) which can group together to overwhelm narwhals . Greenland sharks and walruses may take a few small young or weak and wounded adults , though this is likely quite rare . When it comes to escaping predators such as orcas , narwhals typically use prolonged submergence to hide under the ice rather than relying on speed .

Mortality often occurs when the narwhals suffocate after they fail to leave before the surface of the Arctic waters freeze over in the late autumn . Open water is formed in ice @-@ covered water by fracturing events induced by strong winds , but when these conditions are absent ice can quickly form . The last major entrapment events occurred when there was little to no wind . Narwhals are mammals and need air to breathe , so when open water is no longer accessible and the ice is too thick for them to break through , they can drown . Maximum aerobic swimming distance between breathing holes in ice is less than 1 @, @ 450 m (4 @, @ 760 ft) which limits the use of foraging grounds and these holes must be at least 0 @. @ 5 m (1 @. @ 6 ft) wide to allow an adult whale to breathe . The events can trap groups as large as 600 individuals . Most entrapment events occur in narwhal wintering areas such as Disko Bay . In the largest entrapment in 1915 in West Greenland , over 1 @, @ 000 narwhals were trapped under the ice .

Despite the decreases in sea ice cover , there were several large cases of sea ice entrapment in 2008 ? 2010 in the winter close to known summering grounds , two of which were locations where there had been no previous cases documented . This suggests later departure dates from summering grounds . Sites surrounding Greenland experience advection (moving) of sea ice from surrounding regions by wind and currents , increasing the variability of sea ice concentration . Due to strong site fidelity , changes in weather and ice conditions are not always associated with narwhal movement toward open water and therefore more data is needed to determine how vulnerable narwhals are to future sea ice changes . Narwhals can also die of starvation , especially the young .

= = Conservation issues = =

Narwhals are one of many mammals that are being threatened by human actions . The world population of narwhals is currently estimated to be around 75 @, @ 000 . They are considered to be near threatened and several sub @-@ populations have evidence of decline . In an effort to support conservation , the European Union established an import ban on tusks . Many other countries have quotas on catches , which will be important also in newly opening areas caused by decreasing sea ice cover . Narwhals are difficult to keep in captivity .

Inuit people , who call a tusked narwhal qilalugaq tugaalik , are allowed to hunt this whale species legally for subsistence . Narwhals have been extensively hunted the same way as other sea mammals , such as seals and whales , for its large quantities of fat which are one of the most important resources of the native people in Arctic regions . Almost all parts of the narwhal , meat , skin , blubber and organs are consumed . Mattak , the name for raw skin and blubber , is considered a delicacy , and the bones are used for tools and art . The skin is an important source of vitamin C which is otherwise difficult to obtain . In some places in Greenland , such as Qaanaaq , traditional hunting methods are used , and whales are harpooned from handmade kayaks . In other parts of Greenland and Northern Canada , high @-@ speed boats and hunting rifles are used .

During growth , the narwhal accumulates metals in its internal organs . One study found that many metals are low in concentration in the blubber of narwhals , and high in the liver and the kidney . Zinc and cadmium are found in higher densities in the kidney than the liver , and lead , copper and mercury were found to be the opposite . Certain metals were correlated with size and sex . During growth , it was found that mercury accumulated in the liver , kidney , muscle and blubber , and that cadmium settled in the blubber .

Narwhals are one of the most vulnerable Arctic marine mammals to climate change due to altering sea ice coverage in their environment , especially in their northern wintering grounds such as the Baffin Bay and Davis Strait regions . Satellite data collected from these areas shows the amount of sea ice has been markedly reduced . Narwhals ' ranges for foraging are believed to be patterns developed early in their life which increase their ability to gain necessary food resources during winter . This strategy focuses on strong site fidelity rather than individual level responses to local prey distribution and this results in focal foraging areas during the winter . As such , despite changing conditions narwhals will continue returning to the same areas during migration . Despite its vulnerability to sea ice change , the narwhal has some flexibility when it comes to sea ice and habitat selection . It evolved in the late Pliocene , and so is moderately accustomed to periods of glaciation and environmental variability .

An indirect danger for narwhals associated with changes in sea ice is the increased exposure in open water . In 2002 there was an increase in narwhal catches by hunters in Siorapaluk that did not appear to be associated with increased effort , implying that climate change may be making the narwhal more vulnerable to harvesting . Scientists urge assessment of population numbers with the assignment of sustainable quotas for stocks and the collaboration of management agreements to ensure local acceptance . Seismic surveys associated with oil exploration have also disrupted normal migration patterns which may also be associated with increased sea ice entrapment .

= = Cultural depictions = =

= = = In legend = = =

In Inuit legend , the narwhal 's tusk was created when a woman with a harpoon rope tied around her waist was dragged into the ocean after the harpoon had struck a large narwhal . She was transformed into a narwhal , and her hair , which she was wearing in a twisted knot , became the characteristic spiral narwhal tusk .

Some medieval Europeans believed narwhal tusks to be the horns from the legendary unicorn . As these horns were considered to have magic powers , such as neutralising poison and curing melancholia , Vikings and other northern traders were able to sell them for many times their weight in gold . The tusks were used to make cups that were thought to negate any poison that may have been slipped into the drink . In 1555 , Olaus Magnus published a drawing of a fish @-@ like creature with a horn on its forehead , correctly identifying it as a " Narwal " . During the 16th century , Queen Elizabeth I received a carved and bejewelled narwhal tusk worth 10 @,@ 000 British Pounds ? the cost of a castle (approximately £ 1 @.@ 5 ? 2 @.@ 5 million in 2007 , using the retail price index) from Sir Humphrey Gilbert , who proposed the tusk was from a " sea @-@ unicorn " . The tusks were staples of the cabinet of curiosities . European knowledge of the tusk 's origin

developed gradually during the Age of Exploration , as explorers and naturalists began to visit Arctic regions themselves .

= = = In literature and art = = =

The narwhal was one of two possible explanations of the giant sea phenomenon written by Jules Verne in his 1870 novel *Twenty Thousand Leagues Under the Sea* . Verne thought that it would be unlikely that there was such a gigantic narwhal in existence . The size of the narwhal , or " unicorn of the sea " , as found by Verne , would have been 18 m (60 ft) . For the narwhal to have caused the phenomenon , Verne stated that its size and strength would have to increase by five or ten times .

Herman Melville wrote a section on the narwhal (written as " narwhale ") in his 1851 novel *Moby @-@ Dick* , in which he claims a narwhal tusk hung for " a long period " in Windsor Castle after Sir Martin Frobisher had given it to Queen Elizabeth . Another claim he made was that the Danish kings made their thrones from narwhal tusks .

The narwhal is largely mentioned in the book *Lore of the Unicorn* . In the book , the author Odell Shepard describes the earlier interpretations of the narwhal , from being a fish with a horn in its forehead , to a sea @-@ unicorn . Shepard tells that from the Danish and Dutch , the world was told of the importance of both narwhals and their tusks , and how they had lived for at least 200 years until being discovered by the explorers . Later , after the narwhal had been identified , two tusks were presented to the King of Denmark . One of these tusks was apparently 10 ft (3 @.@ 0 m) long , and was then transported to a region then known as Nova Zembla .

= = Gallery = =