

ASSESSMENT OF THE POPULATION OF THE NORTH PACIFIC HUMPBACK WHALE (*Megaptera novaeangliae*) Fact sheet

Status

USA

Endangered Species Act (ESA): *Endangered*—throughout its range

Marine Mammal Protection Act (MPA): *Depleted and Strategic*—throughout its range

Canada

Species at Risk Act (SARA): *Threatened*—North Pacific

Mexico

Norma Oficial Mexicana (Mexican Official Standard) 059 (NOM059): *Special Protection*—Mexican waters

International

World Conservation Union (IUCN—International Union for the Conservation of Nature and Natural Resources) (Cetacean Specialist Group 1996): *Vulnerable*

Convention on International Trade in Endangered Species (CITES): *Appendix 1*

Taxonomy

Kingdom: Animalia

Phylum: Chordata

Class: Mammalia

Order: Cetacea

Suborder: Mysticeti

Family: Balaenopteridae

Genus: *Megaptera*

Species: *Megaptera novaeangliae* (Borowski 1781)

The genus *Megaptera* is monotypic, and is one of two genera in the family *Balaenopteridae* (the “rorquals”). No subspecies are recognized. The binomial *Megaptera novaeangliae* derives from the Greek for “big wing” (mega + pteron) and the Latin for “New England,” which was the origin of the specimen used by Borowski in his description of the species in 1781.

Species Description

The humpback whale is one of the best-known and most easily recognizable of the large whales. It is known for its frequent acrobatic behavior and its occasional tendency to approach vessels.

At close range, humpback whales are easily distinguished from any other large whale by their remarkably long flippers, which are approximately one-third the length of the body. Flippers are ventrally white, and can be either white or black dorsally depending on the population and the individual; the flippers of North Atlantic humpbacks tend to be white, while those in the North Pacific are usually black (Fig. 1). The body color is black dorsally, with variable pigmentation on the underside (black, white or mottled). The head and jaws have numerous knobs called tubercles, which are also diagnostic of the species. The dorsal fin is small but highly variable in shape, ranging from low (almost absent) to high and falcate. Like all rorquals, humpbacks have a series of pleats running from the tip of the lower jaw to the umbilicus. The tail (fluke) is usually raised during a dive; the underside exhibits a pattern that is unique to each individual and which ranges from all white to all black. The presence of white on the ventral surface and the prominent serration

of the trailing edge distinguish humpbacks from other whales that “fluke” while diving, such as right, bowhead, blue, gray and sperm whales.

Adult female humpback whales are typically 1–1.5 m longer than males. Maximum reliably recorded adult lengths are in the 16–17 m range, although 14–15 m is more typical. Calves are 3.96–4.57 m at birth, and approximately 8–10 m at independence, which occurs at the end of the calf’s natal year. There are no easily observable differences between male and female humpbacks. Females possess a grapefruit-sized lobe at the rear of the genital slit; this lobe is absent in males. In addition, the spacing between the genital slit and the anus is considerably greater in males.

The skull of the humpback whale is easily distinguished from that of other baleen whales (suborder *Mysticeti*) by the narrowness of the rostrum relative to the zygomatic width. The humpback has between 270 and 400 baleen plates on each side of the mouth, replacing teeth and functioning as a sieve in the capture of food. The plates are usually black, although those close to the tip of the jaw are sometimes white or partly white.

The humpback whale has a generalist diet, feeding on euphausiids and various species of small schooling fish. The latter include herring (*Clupea* spp.), capelin (*Mallotus villosus*), sand lance (*Ammodytes* spp.) and mackerel (*Scomber scombrus*). Humpbacks appear to be unique among large whales in their use of bubbles to corral or trap schooling fish. Whales blow nets, clouds or curtains of bubbles around or below schools of fish, then lunge with mouths open into the center of the bubble structure. As with other balaenopterids, the ventral pleats expand when a humpback is feeding, allowing the animal to greatly increase the capacity of its mouth. The whale closes its mouth on its catch and expels the excess water through the baleen.

Breeding in humpback whales is strongly seasonal. Females come into estrus in winter, at which time testosterone production and spermatogenesis also peaks in males. The gestation period is about 11½ months, with the great majority of calves born in mid-winter. Calves probably begin to feed independently at about six months of age, but nursing likely continues in many animals until shortly before independence at about a year of age. The age at which sexual maturity is reached appears to vary among populations, from five to ten years. Interbirth intervals in females are most commonly two years, although annual calving is not unknown. Although multiple fetuses have been recorded in dead pregnant females, living twins or multiples are unknown.

The social organization of the humpback is characterized by small unstable groups, and individuals typically associate with many companions on both feeding and breeding grounds. Longer-term associations (those lasting days or weeks) are occasionally recorded, but their basis is unclear. There appears to be no territoriality in this species. In winter, male humpback whales sing long, complex songs, the primary function of which is presumably to attract females, although a role in dominance-sorting among males has also been suggested. All whales in a given population sing essentially the same song, and although the form and content of all songs change over time, the whales somehow coordinate these changes. Males also compete very aggressively for access to females, and the resulting “competitive groups” can last for hours and involve tail slashing, ramming or head butting. Males may also form coalitions, but further research is required to assess the significance and composition of such alliances. In part because of the prominent male display aspect (i.e., singing behavior), the mating system has been compared to a lek (communal area where two or more males stage competitive courtship rituals) system, although it does not possess the rigid territoriality common to such systems. Males almost certainly remain in breeding areas longer than females and attempt to obtain repeated matings, while newly pregnant females return quickly to higher latitudes where they will feed for many months in order to prepare for the considerable energetic cost of lactation.

Rake-mark scars from teeth attest to the fact that humpbacks are commonly attacked by killer whales (*Orcinus orca*). However, it seems likely that fatal attacks are largely confined to very young calves, and predation does not appear to be a significant effect in the social organization of the humpback.

Humpbacks are well known for their often spectacular aerial behaviors. These include breaching, lobtailing and flipping. Such behaviors occur at all times of year and in a variety of contexts, and it is clear that they perform a range of functions. These may include play, communication, parasite removal, and expression of excitement or annoyance.

Habitat and Distribution

Humpback whales are found in all oceans of the world. They are a highly migratory species, spending spring through fall on feeding grounds in mid- or high-latitude waters, and wintering on calving grounds in the tropics, where they do not eat. Humpback whales are typically found in coastal or shelf waters in summer, and close to islands or reef systems in winter.

Some documented migratory movements of this species represent the longest-known migration of any mammal, being almost 5,000 miles one way. It is possible that some humpbacks do not migrate every year, although the number and sex/age class of these animals remain unclear.

In the North Atlantic, humpbacks return each spring to specific feeding grounds in the Gulf of Maine, the Gulf of St. Lawrence, Newfoundland, Labrador, Greenland, Iceland and Norway. Fidelity to these areas is strong, and is determined by where a mother took its calf in its natal year. Whales from all feeding grounds migrate to a common breeding area in the West Indies, where they mate and calve. However, genetic data indicate the existence of a second breeding population composed of many of the animals from Iceland and Norway, whose migratory destination is unknown.

In the Southern Hemisphere, humpbacks feed in circumpolar waters around the Antarctic and migrate to relatively discrete breeding grounds in tropical waters to the north. Seven breeding populations in “management areas” in the Southern Hemisphere are recognized by the International Whaling Commission, and these are linked with varying confidence to six feeding areas in the Antarctic. Some movement between these regions is very likely, but the extent of such exchange remains unquantified.

The stock structure of North Pacific humpback whales is complex and not well known. There are at least four separate breeding grounds around Hawaii, coastal Mexico, offshore Mexico (the Revillagigedo Archipelago), and Japan. Whales from these wintering areas migrate primarily to Alaska, California, possibly the Bering Sea/western Gulf of Alaska, and the western North Pacific, respectively. However, crossover is not unknown and some trans-oceanic movements have been recorded (e.g., British Columbia to Japan and back).

Within the US Exclusive Economic Zone (EEZ) of the North Pacific, three stocks are recognized as management units. These three stocks migrate between their respective summer/fall feeding areas and their winter/spring calving and mating areas but their migratory destinations are not completely known.

- *Eastern North Pacific stock*: This stock spends its winter/spring off coastal Central America and the Pacific coast of Mexico and migrates to an area off the coast of California to southern British Columbia in summer/fall.

- *Central North Pacific stock*: This stock spends its winter and spring mating and calving seasons around the Hawaiian Islands and migrates to the waters of northern British Columbia/southeast Alaska, Prince William Sound, and west beyond the Shumagin Islands for the summer and fall.
- *Western North Pacific stock*: The third stock is the winter/spring population, which winters in Ogasawara, Okinawa, the Mariana Islands, and the Philippines. Though the current migratory destinations are unknown, this population has been found all along the eastern Pacific Rim (northern Washington/southern British Columbia, northern British Columbia, Kodiak/Shumagin Islands).

Population Trends

The exact global population size is unknown, though it has been estimated to be between 15,000 and 20,000 animals (approximately 15 to 20 percent of the pre-exploited population).

In the North Pacific, the historical population of humpback whales may have exceeded 15,000 individuals prior to the onset of commercial exploitation. Commercial whalers are thought to have killed more than 28,000 humpbacks during the 20th century alone, bringing the number of humpback whales in the North Pacific down to 13 percent of carrying capacity. By the mid-1960s, this population may have been reduced to as few as 1,000 individuals before the species was placed under international protection by the International Whaling Commission after the 1965 harvest.

An estimate of 6,000–8,000 for the North Pacific humpback population is widely regarded as conservative and new estimates will shortly be available from a major international collaborative study in this ocean. The eastern North Pacific population appears to be growing at an estimated rate of 8 percent per year, and the growth of the central North Pacific population appears to be at least 6.5 percent per year. The western North Pacific population growth rate is currently unknown.

Threats

While the major threat to the great whales—commercial whaling—has long been curbed, several other factors affect the recovery of this species. At present, entanglements in fishing gear and ship collisions appear to be the greatest sources of mortality; noise disturbance, food availability, loss of prey habitat and unknowns affecting prey species also may be factors in some subpopulations. Humpback whales are targets of increasing levels of commercial whale-watching activities and many important habitat areas have seen rapid human development. Primary threats to humpback whales in the North Pacific (Canada, Mexico, and the United States) include entanglement; ship strikes; vessel disturbance (i.e., whale watching); noise/ acoustic injury and disturbance; impacts on habitat and prey; and contaminants/pollution, which are further described in detail below.

Conservation Efforts

The Humpback Whale (*Megaptera novaeangliae*) North American Conservation Action Plan (NACAP) is the result of a trilateral workshop hosted by the CEC in San Francisco, California, in March 2004, and has benefited from the in-depth review of an extensive list of wildlife experts with diverse backgrounds from Canada, Mexico and the United States. Furthermore, the content of this NACAP has been shared with diverse government agencies within each country that are related to the well-being of the species (see list of acknowledgments, below). The humpback whale Action Plan is divided into eight sections, providing a trilateral outlook related to the species. The initial four sections provide an updated account of the species and its current situation. The fifth section identifies the main causes of loss or decline and puts into perspective the ensuing sections, related

to current management and actions taken in each country, as well as public and commercial perception of the species and the threats it faces. Against this background, the last section offers a list of key trilateral collaborative conservation actions. The identified actions address the following main objectives:

1. Support for the SPLASH (Structure of Populations, Levels of Abundance and Status of Humpbacks) program

A better understanding is needed concerning the status of humpback whale populations in the North Pacific Ocean, their trends, how these populations are structured, and the level at which human and environmental impacts are occurring. The SPLASH program (2004–2007) addressed specific priority areas that benefitted from coordination activities through the CEC (i.e., generating support for the project, information-sharing between the three Parties, and assessment of humpback whale populations and environmental impacts, by regional experts and organizations). SPLASH received support from the National Marine Fisheries Service, National Marine Sanctuary Program, National Fish and Wildlife Federation, Marine Mammal Commission, and other sources, for the initial sampling. Cost-sharing on the project, from sources in Canada, Mexico and the United States, will help continue the ongoing efforts. Specific trilateral actions could include the following:

1. Provide additional implementation funding (or identify other leveraged funding resources) for portions of the SPLASH program to encourage the Parties to continue the program with appropriate resources.
2. Promote the benefits of the SPLASH program for all three CEC Parties, and publicize the need to manage threats to humpback whales to decision-makers and the public.

2. Reduce entanglement

Entanglement is a source of mortality for humpback whales in all three countries. Humpback whales found entangled in fishing gear in one country's waters may be affected by gear deployed in another country. While the overall problem of entanglement is complex and not easily solved, specific trilateral actions could include the following:

1. Facilitate information-sharing between agencies and the Parties about entanglement events, in order to better understand the nature, source, and extent of the problem in North America. In addition, promote information-sharing on the development and efficacy of gear modifications in order to reduce the likelihood of these events.
2. Raise to the ministerial level of each Party the concern over increasing entanglement rates.
3. Increase the effectiveness of disentanglement efforts. While training and equipment have been put into place in a number of areas in the United States and Canada, problems with reporting and implementation have prevented effective action and successful outcomes. Training and coordination with Mexican response teams could also be promoted by the CEC.

3. Prevent ship strikes

Many of the ships involved in collisions are fast-moving vessels engaged in diverse economic activities, including tourism. The primary way to reduce the incidence of collisions would be for ships to reduce speed during specific seasonal concentrations of humpback whales, or in regions where their numbers are known to be high. Specific trilateral actions could include the following:

1. Identify the principal regions and time periods posing the greatest risk of ship strikes to humpback whales.

2. Produce and provide to masters of vessels, to their companies, and to passengers information about ways to effectively avoid striking whales in sensitive migratory pathways, feeding areas, breeding areas, and calving areas.

4. Address impacts of ecotourism

Whale-watching for humpback whales is a growing business within all three countries, and many of the participants on Mexican whale-watching trips are from the United States and Canada (Hoyt 1995; Young 1999). While this industry has large economic benefits, it can also serve as an important platform to deliver marine education and stimulate public interest in marine mammals. When conducted inappropriately, however, it has a negative impact on the health of the whales and the industry itself by negating the potential value of whale watching as an educational platform. While all three countries have regulations or guidelines regarding whale-watching and vessel approaches, often enforcement of the regulations is not pursued, due to funding constraints. Specific trilateral actions could include the following:

1. Encourage and facilitate the development of voluntary mechanisms and incentives within the marine tourism industry that will lead to greater compliance with existing or future whale-watching regulations and guidelines.
2. Promote the creation and dissemination of quality whale biodiversity education and outreach materials and activities aboard whale-watching vessels in the three countries.
3. Encourage cruise ships and other tourism vessels to carry a qualified naturalist and provide passengers with educational and outreach materials on humpback whales and the conservation and protection of their habitats.
4. Identify cooperative training for enforcement of existing whale-watching regulations. Often even a few enforcement actions are enough to change the behavior of vessel operators.
5. Encourage coordinated trilateral or multinational research efforts on the impact of vessels on whales and the effectiveness of existing regulations.

5. Address acoustic impacts

Many of the recent studies and initiatives involving the impacts of sound on whales have had an international component or have benefited from the involvement of other nations. Specific trilateral actions could include the following:

1. Encourage sharing of information and collaboration among countries about the sources of anthropogenic sounds and their impacts on whales.
2. Encourage the partner nations to promote the use of mitigation measures, such as marine mammal observers and electronic tracking of whales in projects involving production of loud low-frequency anthropogenic sounds, and encourage careful evaluation of guidelines for sound-generating projects in areas and times that are important to humpback whale populations.

Regulatory Overview

Canada

The Humpback Whale, North Pacific population, is protected in Canada by both the Fisheries Act and by the Species At Risk Act (SARA). Management of humpback whales falls under the responsibility of the Department of Fisheries and Oceans. It is forbidden to disturb a marine mammal except under the authority of the Marine Mammal Regulations of Canada's Fisheries Act.

The goal of the Species at Risk Act is to prevent endangered or threatened wildlife from becoming extinct or lost from the wild, and to help in the recovery of these species. The North Pacific humpback whale is listed as threatened under SARA. This listing offers immediate species protection by making it an offence to kill, harm, harass, capture or take an individual of a listed species that is threatened. As a threatened species, a recovery strategy will be developed that outlines what is scientifically required for the successful recovery of a species at risk. This includes an identification of its critical habitat and what needs should be addressed. The recovery strategy will then be used to develop an action plan that identifies those specific actions needed to help in the whale's recovery. Under SARA, the following activities may be allowed as long as measures are taken to minimize the impact, and the activities do not jeopardize the survival or recovery of the listed species: scientific research about the conservation of the species done by a qualified person, an activity that benefits the species or enhances its chances of survival in the wild or an activity whose effect on the listed species is incidental.

Mexico

In Mexico, no single body of legislation exists for the sole benefit of humpback whales. Instead, several different laws relevant to their conservation and management exist, and they apply to all of Mexico. The General Ecological Balance and Environmental Protection Act (*Ley General del Equilibrio Ecológico y la Protección al Ambiente*—LGEEPA), enacted in 1988, is currently the responsibility of the recently restructured Secretariat of the Environment and Natural Resources. In 2000, the General Wildlife Act (*Ley General de Vida Silvestre*) was approved under the responsibility of Semarnat (*Secretaría de Medio Ambiente y Recursos Naturales*—Ministry of the Environment and Natural Resources). This is the first pertinent Mexican law related to wildlife that confronts the challenges of balancing protection of the country's biodiversity with the need for socio-economic development. In 2002, Article 60-B was added, which states that no specimen of any marine mammal can be the subject of subsistence or commercial use, with the exception of captures for scientific research and educational purposes, which still require prior approval of the authorities. The Mexican Government's Official Standard NOM-059-ECOL-1994 lists all the marine mammal species considered endangered or under special protection. The Mexican Government's Official Standard NOM-131-ECOL-1998 provides specific guidelines for whale-watching activities compatible with the conservation of whales and their habitat. Additionally, in May 2002, Mexico established the Mexican Whale Sanctuary (*Santuario Ballenero Mexicano*), comprising its entire Exclusive Economic Zone (about three million square kilometers).

United States

In the United States, the Endangered Species Act (ESA) and the Marine Mammal Protection Act (MMPA) primarily govern management of humpback whales; NMFS implements these federal statutes. Under the ESA, conservation actions for humpback whales have largely been guided by the objectives of the 1991 Humpback Whale Recovery Plan: maintain and enhance habitat; identify and reduce human-related mortality, injury and disturbance; measure and monitor key population parameters to determine if recommended actions are successful; and improve administration and coordination of the overall recovery effort for this species.

Key References

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Further Reading

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More information

American Cetacean Society, Fact Sheet, Humpback Whale *Megaptera novaeangliae*. <<http://www.acsonline.org/factpack/humpback.htm>>

Cascadia Research Collective. <<http://www.cascadiaresearch.org>>

Hawaiian Islands Humpback Whale National Marine Sanctuary. SPLASH main page: <http://www.hihwnms.nos.noaa.gov/special_offerings/sp_off/splash/splash.html>

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