Megaptera novaeangliae (Humpback Whale)

Family: Balaenopteridae (Baleen Whales)
Order: Cetacea (Whales and Dolphins)
Class: Mammalia (Mammals)

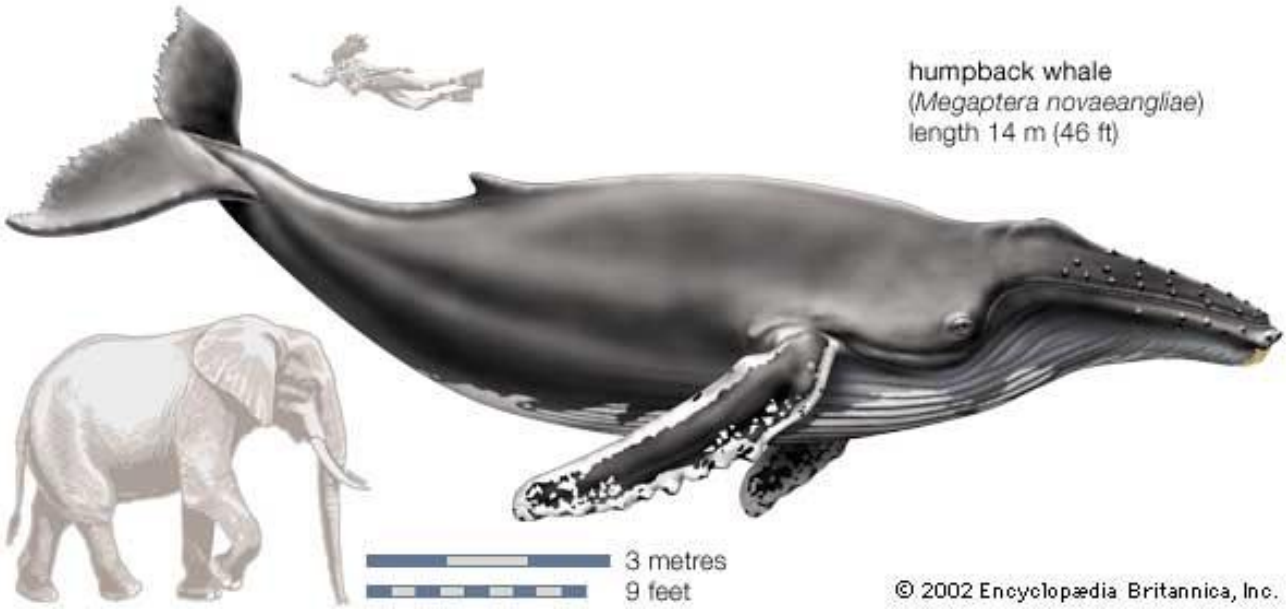

Fig. 1. Humpback whale, *Megaptera novaeangliae.*

[http://www.britannica.com/EBchecked/topic/276337/humpback-whale, downloaded 12 November, 2014]

TRAITS. The humpback is a moderately large baleen whale, and has the longest flippers of all cetaceans. The group name comes from the 300-400, 50-100cm long, flexible, fringed baleen plates that hang from the upper jaw of the mouth, and are used to strain food from seawater (Cupka and Murphy, 2014). Characterised by its large, stocky body, stub-like dorsal fin and broad, rounded head; the humpback whale has knobs that are hair follicles called tubercles on its rostrum (beaklike upper part of mouth) and lower lip. 12-36 ventral throat grooves extend from the lower jaw to the umbilicus (point of attachment for umbilical cord when in juvenile stage) on the underneath of the whale (Phillip and James, 1999). The long flippers, 25-33% of the body length, have tubercles on the anterior edges. Symmetrical, broad tail flukes contain an irregular trailing edge and are one-third the length of the body. Each humpback displays a unique pattern on its fins. Black in colour with white on the throat and belly and varying amounts underneath flukes and on the flippers. A sometimes heart-shaped blow hole expels water in a pear-shaped blow approximately 1.8 m high (Johnson and Wolman, 1984). Adults range in length from 11-16 m and weight of up to 40 tons (Cupka and Murphy, 2014). Humpback whale females are slightly longer, ranging from 14-16 m whilst males range from 13-14 m. Calves at birth measure 6 m and weigh 2 tons. Females have a hemispherical lobe (15 cm wide) that is externally visible in the genital region whilst the male's penis is hidden in a genital slit (Phillip and James, 1999).

ECOLOGY. Found in all seas between the Arctic and Antarctic depending on migrational patterns (Johnson and Wolman, 1984). Humpbacks are a pelagic and coastal species as they are found in shallow banks and shelf waters whilst breeding and foraging. However, they travel over open oceans whilst migrating. Humpback whales are a migratory species as they annually feed and forage during summers in cold, high-latitude waters that are generally nutrient-rich and travel far distances (up to 25,000 km) to warmer low-latitude tropical and subtropical waters for breeding and calving (giving birth to calves) during winter (American Cetacean Society, 2007). Feeding most actively occurs at night. Prey species and abundance in specific areas determine the distribution of humpbacks and their feeding grounds. Humpbacks and their calves will mostly, if not always, return to the same feeding grounds. Primarily piscivorous (fish as mainstay) but occasionally feeds on other food types like krill. They are opportunistic foragers, taking small fish like herring, salmon, capelin, mackerel, pollock and haddock in the North Atlantic and krill and copepods in Australian and Antarctic ecosystems (Whitehead, 1987). During winter periods, whilst on breeding and calving grounds, humpbacks survive off of their large blubber reserve as fasting occurs (Cupka and Murphy, 2014). Extensive overlap in habitat with other cetacean species such as the minke whale and dolphin species.

SOCIAL ORGANIZATION. There are two distinct populations of humpback whales: the northern and southern hemisphere populations. Formed based on migration patterns, these two populations do not venture into polar pack ice zones or inter mingle. The northern hemisphere population subgroups into North Pacific stocks (groups), North Atlantic stocks and the North Indian Ocean stocks, each with preferred feeding and breeding grounds. The southern hemisphere population does not subgroup but has six distinct breeding grounds and feeding grounds. These stocks return to the same feeding grounds each year but generally do not mix. However, individuals from varied feeding areas do mix whilst on breeding grounds (Johnson and Wolman, 1984). Humpback social structure is generally a solitary structure but co-operation and bonds are seen within certain circumstances. Small transient groups are formed and diffused after hours or weeks. Travelling humpbacks travel in small groups that use the same feeding grounds (Valsecchi.et al., 2002). Females tend to associate with one another more often than males as males travel generally alone. Lone males may join temporarily when looking for females but this is short-lived. Mother-calf associations exist for a year where the mother travels and feeds with the calf (Valsecchi.et al., 2002). Females give birth to one calf per year. Lone males will join these pairs only if no other male is accompanying the pair (Smith et al., 2008). During feeding, humpbacks interact and cooperate to perform different foraging behaviours as this maximises energy and food gain. These interactions are seen amongst individuals with compatible feeding styles. Continuous association between whales is seen where interaction would occur for up to seven days or recurring association where interaction occurs at least a certain number of times within a period of weeks. Continuous association can last up to 79 days or more. These associations are generally reformed annually between the same groups as stocks return to the same feeding grounds (Weinrich, 1991). After the feeding period, feeding groups disband and migrate to breeding grounds. Any social organization seen, is formed when needed and not a permanent aspect of populations (Valsecchi.et al., 2002).

ACTIVITY. Highly active both in day and night periods. Most time spent foraging and feeding, with twice the amount of time spent feeding being spent at night than during the day. Transitory behaviour seen directly after feeding. Period in which whales regain energy lost during feeding and food is digested, prey allowed to regroup in this period. Rest and play behaviour is seen in the day and rarely at night. However, levels of this behaviour is very low compared to time spent feeding. Most of the daytime behaviour seen is transitory with more low level activity in the day than night. However, most activity both in the day and night is high level with the highest being at night. Subsurface feeding (bottom feeding and feeding within the water column) occur at night as whales do not feed on the surface at night. Mainly surface feeding occurs during the day with some

subsurface feeding also. Rest occurs closer in-shore along coastal shelves (Goodyear, 1989).

FORAGING BEHAVIOUR. Primarily feed during summer periods. Foraging behaviour is dependent on available prey species and abundance (opportunistic). Very energetic hunter that displays a diverse range of surface and subsurface foraging techniques carried out either singly or in a group. Surface techniques range from horizontal lunging, where a whale swims rapidly back and forth in a small area with its mouth agape to catch prey; circular swimming, where a whale swims in a shrinking circle around prey to herd large numbers together (fish); thrashing, where a whale may thrash its head on the surface of water to stun prey; flick feeding, where a whale will use its fluke to concentrate or stun prey; and inside loop, where fluke slaps are used. Subsurface feeding techniques utilize cooperation between whales in feeding grounds. The main subsurface technique observed is bubble net feeding, where a group or a single submerged whale will swim in a shrinking circle beneath the group of prey, whilst releasing bubbles in a pattern such as lines or circles. The shrinking, rising bubble pattern encircles the prey and corrals them into a smaller tight cylinder where a whale or group of whales will then swim vertically, open mouthed through the concentrated net of prey (Johnson and Wolman, 1984). Water taken in is drained through the baleen plates.

COMMUNICATION. A diverse, rich variety of songs and sounds are produced over a tonal scale. The males' song is a series of different repeated sounds in sequence over half hour periods, used in intersexual communication. These songs change from year to year and are similar in stocks over years (Johnson and Wolman, 1984). Females' songs are shorter and less complex.

SEXUAL BEHAVIOUR. Male and female humpbacks become sexually mature at around nine years old. In the breeding season, males look for a female travelling with a calf only and joins them. Mother-calf pairs already accompanied by a male will not be joined by another male. A complex song is then produced to "seduce" the female. In the presence of other males, singing males will stop singing but still accompany the mother-calf pair. Singers will sing the longest and associate longest when accompanying a mother-calf pair. Little information is known about the exact singing behaviour and function in males (Smith.et al., 2008). Birthing occurs between January and March and gestation lasts approximately 12 months, lactation a full year. Most females wait one or more years after giving birth and becoming pregnant again. The normal reproductive cycle for humpback whales is two years (Johnson and Wolman, 1984).

JUVENILE BEHAVIOUR. At birth, mothers push calves to the surface to take a breath. Nursing occurs for approximately six months and mothers lactate for up to a year. Juveniles swim and travel with their mothers for the first year of life before becoming solitary. Annually, juveniles return to the same feeding and breeding grounds as mothers and will generally form cooperative groups with their mothers during feeding periods. Playful and social (Valsecchi.et al., 2002).

ANTIPREDATOR BEHAVIOUR. Humpbacks only known predators are sharks and killer whales. However, due to their massive size these predators do not pose much of a danger, usually inflicting minor skin injuries, or loss of flippers (humpbacks can still swim with one flipper). The biggest threat is to juveniles as death sometimes occurs. Humpbacks swim rapidly with flippers exposed at angles, which contain sharp edges to cut predators (Johnson and Wolman, 1984). Thrashing/banging of the fluke, breaching out of water and travelling in small groups whilst migrating are also used to evade predators.

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