

EDUCATIONAL BOOKLET

FOR PRIMARY SCHOOLS, grades 3 to 6 (9 to 11 years old)



TOHORĀ, HUMPBAC WHALE
WHO ARE YOU ?



Presentation of the booklet

This educational booklet has been created for kids in grades 3-6 of Primary schools in French Polynesia.

It has been created to be compatible with the official school programs content and validated by educational counselors.

The Te mana o te moana association was founded in 2004 with a goal of raising environmental awareness. This booklet was published in 2011 as part of the creation of the Cetacean Observatory in French Polynesia.

« Through the fascination and admiration they generate, whales are considered as the ambassadors of the oceans...and they are also witness of our planet's good health. They remind us it is urgent to change our behaviors as individuals and communities so we can guaranty oceans will stay balanced, diversified, harmonious and fertile for the future generations. »

**Cécile Gaspar, veterinary,
Doctor in Ecology, president of
Te mana o te moana Association**

www.temanaotemoana.org

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A Marine mammal...

Every year from June to November, humpback whales come to French Polynesia. They are often observed from the coast by their incredible breaches.

Humpback whales are easy to spot due to their coloring : dark on top and white underneath.

- Scientific name: *Megaptera novaeangliae*
- Common name: Bunch, hump whale, hunch-backed whale
- Class: *Mammalia* (mammals)
- Order: *Cetacea* (cetaceans)
- Suborder: *Mysticeti* (baleen whales)

There are 14 known species of baleen whales. 6 are present in French Polynesia but the humpback whale is the most encountered.

As for all marine mammals, their body shape is hydrodynamic.

Other examples of marine mammals:



The manatee



The polar bear



The dugong



The sperm whale



The sea otter



The seal



©Alexis Rosenfeld

FACTS TO REMEMBER:

- Adult size: the males' average 43-46 ft, females are slightly larger at 49-52 feet.
- Weight: 28-33 short tons for adults
- Very long pectoral fins up to 1/3 of the body length
- Cauliflower shaped exhalation blow, up to 9 ft high
- Lifespan : 50 years

Why are they called humpback whales?

The common name is derived from the curving of their backs when diving.



Migrating

From the Antarctic waters through the Pacific Ocean to French Polynesia, humpback whales travel more than 3 800 miles when they migrate.

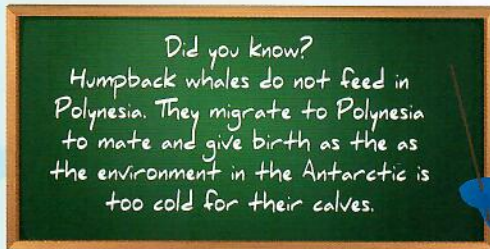
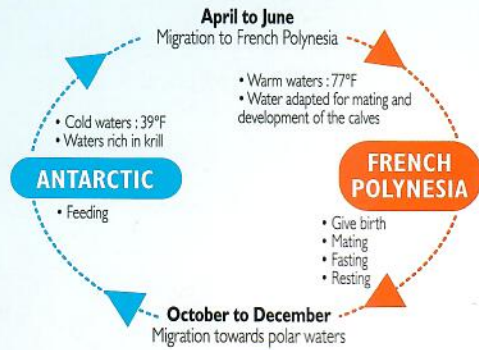
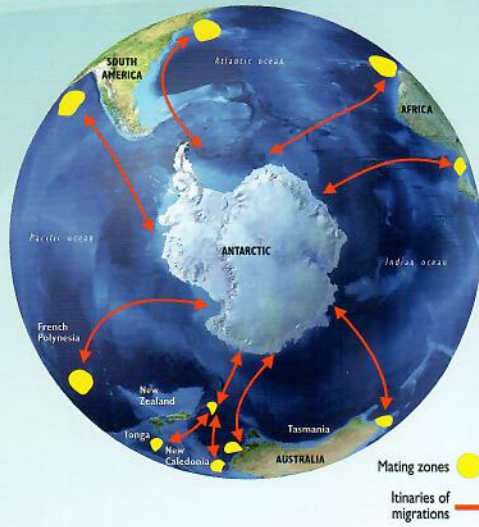
Feeding grounds are located in the cold waters located by the north and south poles, and mating areas are located in warm tropical waters.

Humpback whales do not cross over the equator: they stay in the hemisphere that they come from.

How do humpback whales find their way?

They direct themselves using the earth's magnetic field as they have magnetite crystals in their brain that function as an internal compass.

Their arrival and departure from Polynesia are determined by their age and stage of reproductive cycle. Females that gave birth are usually the last ones leaving in November.



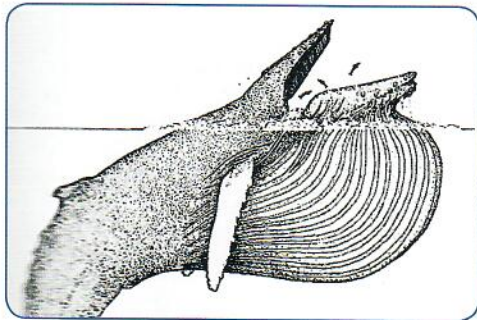
A seasonal feeder

Humpback whales exclusively feed in Antarctic before they travel to Polynesia where waters are low in krill and plankton population. While in Polynesia, humpback whales can lose up to 30% of their body mass as they live off reserves. Their nutrition is based on krill, plankton and small fish.

Nutrition based on krill and plankton:

To catch the food :

- 1) The humpback whale has got darkly colored baleen plates on each side of the mouth and swallow huge quantities of water in one gulp.
- 2) Using its long tongue, water drains out through the plates.
- 3) Plankton and krill are caught and swallowed.

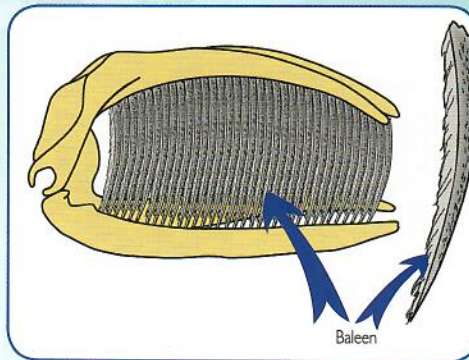


FACTS TO REMEMBER

- 1 ton = daily weight of food than can be eaten by a whale
- 1 585 gallons = quantity of water swallowed in one gulp
- 12 to 36 = throat grooves on the lower jaw
- 19.7 feet = length of a throat groove

Krill is a group of small crustaceans measuring 0.19 to 3.9 inches.

Humpback whales have 200 to 400 baleens = thin plates (31.5 inches high strips) fixed on the top jaw and composed of keratin (same material than our nails).



Diet based on small fish:

To catch small fish:

- 1) The humpback whale rapidly swim around the schools of fish while blowing bubbles.
- 2) Bubbles act like a net.
- 3) The whale then suddenly swims upward through "the net", swallowing thousands of fish in one gulp.



A particular anatomy and physiology

TAIL FLUKES: THE ENGINE OF THE WHALE

- Moves up and down
- 6.5 to 10 feet wide
- Is the Identity card of the animal by its unique shape and colors
- Plays a major role for the speed

UNDER SKIN FAT

- Can be 7 inches thick
- Plays a role of thermal insulating
- Is an Energy reserve
- Helps for floatability

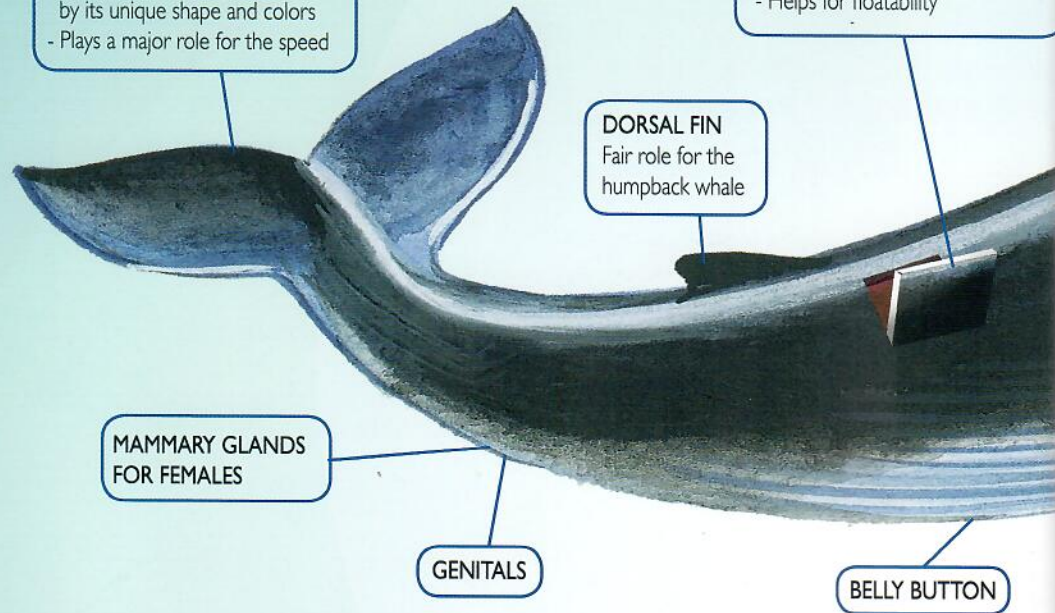
DORSAL FIN

Fair role for the humpback whale

MAMMARY GLANDS FOR FEMALES

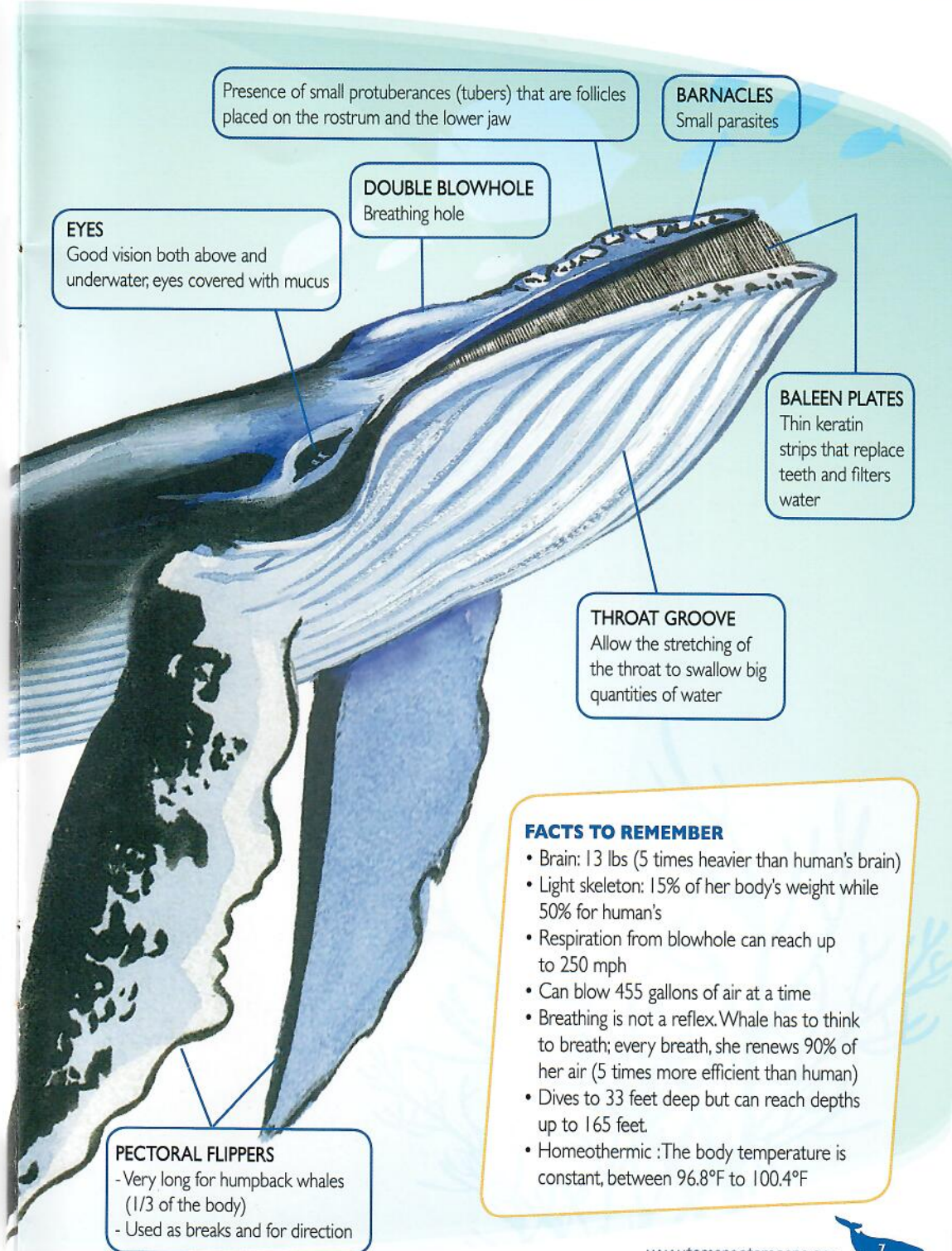
GENITALS

BELLY BUTTON



©Rodolphe Holler





Presence of small protuberances (tubers) that are follicles placed on the rostrum and the lower jaw

BARNACLES
Small parasites

DOUBLE BLOWHOLE
Breathing hole

EYES
Good vision both above and underwater; eyes covered with mucus

BALEEN PLATES
Thin keratin strips that replace teeth and filters water

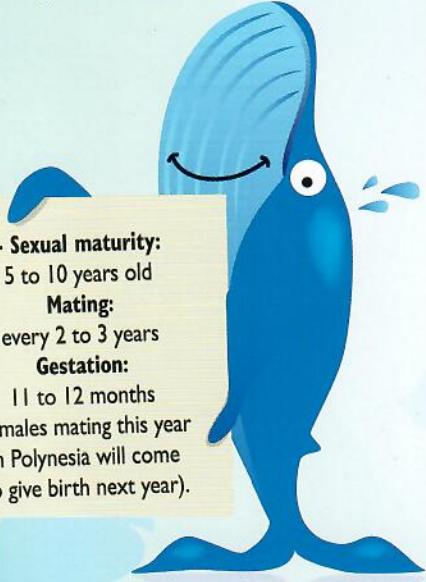
THROAT GROOVE
Allow the stretching of the throat to swallow big quantities of water

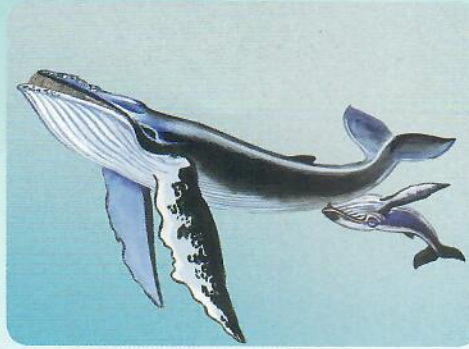
PECTORAL FLIPPERS
- Very long for humpback whales (1/3 of the body)
- Used as breaks and for direction

- FACTS TO REMEMBER**
- Brain: 13 lbs (5 times heavier than human's brain)
 - Light skeleton: 15% of her body's weight while 50% for human's
 - Respiration from blowhole can reach up to 250 mph
 - Can blow 455 gallons of air at a time
 - Breathing is not a reflex. Whale has to think to breath; every breath, she renews 90% of her air (5 times more efficient than human)
 - Dives to 33 feet deep but can reach depths up to 165 feet.
 - Homeothermic :The body temperature is constant, between 96.8°F to 100.4°F

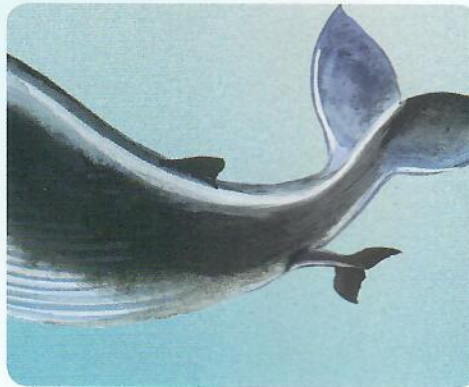
Mating in French Polynesia

When temperatures in Antarctic go down and food becomes rare, humpback whale starts to migrate to French Polynesia. It is an ideal place to mate, to rest and to give birth.

- 
- Sexual maturity: 5 to 10 years old
 - Mating:** every 2 to 3 years
 - Gestation:** 11 to 12 months (females mating this year in Polynesia will come to give birth next year).



To nurse, the calf receives milk through the mammary glands of the mother.



- Size of the calf at birth: 20 feet
- Weight: 1 500 to 2 000 lbs
- Feeds exclusively on milk for at least the first 6 months
- Whale's milk contains 30 to 50% of fat level while only 15% for humans
- At first the baby whale gains 130 lbs. per day drinking from 80 to 130 gallons of milk per day. The calf doubles its birth weight within the first 2 weeks (it takes 6 months for humans).
- The newborn is light grey to white in color
- Right after the birth you can see the contraction marks on the side of their body
- Females with their newly born calves are the last ones to leave Polynesia (end of November).



Behaviors to discover...

Humpback whales are solitary animals. They sometimes live in small groups of 15 individuals at most but for a short period of time. In Polynesia, we usually encounter them alone or surrendered by males during the courtship rituals or alone with their calves at the end of the season.

In French Polynesia it is common to see them with other species of whales and dolphins: short-finned pilot whales, rough-toothed dolphins (steno) or spinner dolphins (pink belly dolphin).



© Renaud Fayada

Communication using different behaviors.

- Jumping, breaching
- Tail-slapping, lob-tailing, peduncle throws
- Fin-slapping
- Spy-hopping
- Speed swim.

Communication using contacts

- Between mother and calf
- Between adults

Communication by songs

- Sounds dispatch faster in the water than in the air
- Humpback whales have great hearing and can hear sounds hundreds of miles away
- Male's songs: the courtship songs can be heard a few miles away. Very often, the male is head down, in a vertical and static position. He can sing for more than 30 minutes. Is it a courtship song or a threat to other males?

Did you know?

All those behaviors are visual but also serve as acoustic signals. Breaches and flapping in the water can be heard miles away.



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Threats and Hopes

Humpback whales were hunted as early as the 17th century. And during the 20th century, it's estimated that over 200,000 humpbacks have been hunted, reducing the global population by over 90%. The meat was used as well as the skin, bones, baleen and fat.

The IWC (International Whaling Commission) was founded in 1946 to oversee the whaling industry. To prevent extinction, the IWC banned commercial humpback whaling in 1966 but few countries do not respect the rules and justify their hunt under unacceptable scientific purposes.

The actual populations are estimated to be:

- 35,000 individuals worldwide
- 11,000 in the North Atlantic
- 7,000 in the North Pacific
- 17,000 in the South Hemisphere

The species status is actually classified as "least concern" by the annex I of the CITES* and the IUCN* (except in the South Pacific and the Arabia sea).

Categories of the IUCN "Red list" status:

- Extinct in the Wild (EW): Known only to survive in captivity, or as a naturalized population outside its historic range
- Critically Endangered (CR), Endangered (EN), Vulnerable (VU) and Near-Threatened (NT)
- Least concern (LC)
- Data Deficient (DD) and Not Evaluated (NE)



Besides whaling, other threats are:

- Natural predators: killer whales hunting humpback calves
- Plastic pollution by ingestion
- Chemical pollution that affects the immune system, fecundity and contaminate mother's milk
- Viral sicknesses, infections and immune deficiency
- Global warming that affects the resources of food
- Noise, sonar and airwaves
- Boat collisions
- Accidental bycatch
- Disrespectful viewing that harms animal's tranquility and modify animal's behaviors



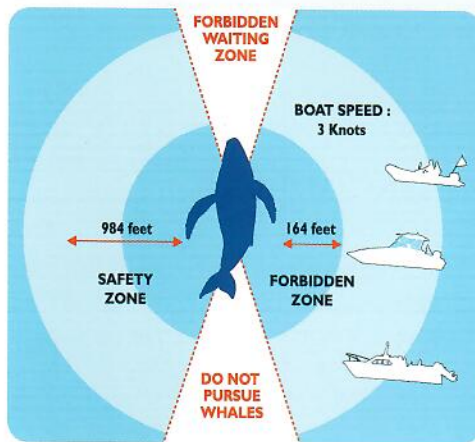
Learn to observe while respecting them!

In 2002, the Ministry of Environment of French Polynesia created the "Marine Mammals Sanctuary of French Polynesia". Marine mammals are listed as category "B" species considered as rare, or of particular interest; rules were set up in the Code of the Environment (Articles A 121-3 to A 121-36) to preserve cetaceans in French Polynesia.

Rules to follow when observing them by boat

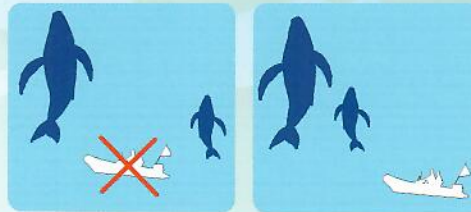
(extracts from the Code of the Environment):

- Stay at a distance of a 165 feet for a single animal, 330 feet if a calf is present.
- Do not go straight towards the group.
- Approach by following a 30° angle relative to the group's heading.
- Do not encircle the animals or separate any members of the group.
- Do not turn off the engine, put it in neutral.
- Respect a 3 knots speed close to the animals.



(DIREN Source)

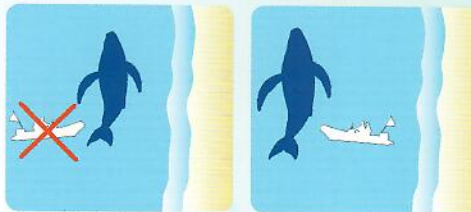
- Observe quietly and fill up the observation form
- Find out the number of animals, the specie, the size and behaviors observed
- Take pictures
- Note the GPS position and weather condition if possible
- Send your observations to the Direction of the Environment (DIREN): direction@environnement.gov.pf / association Te mana o te moana : temanaotemoana@mail.pf



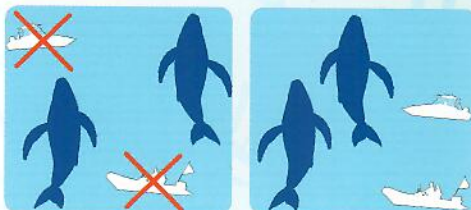
Do not place yourself between a mother and its calf



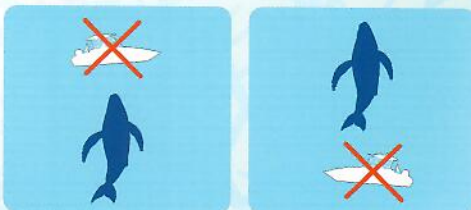
Do not navigate in the middle of a group, stay aside of it.



Do not block the animals against the reef.



Do not encircle the animals.



Do not place yourself in front or behind the animals.
(DIREN Source)

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Glossary

Arched: curved (behavior when starting a dive)

Earth's magnetic field or geomagnetic field: magnet "effect" located at the center of the Earth.

Cetacean: word given to the group of whales, dolphins and porpoises.

Collision: collision between two things.

Courtship: period during which animals develop a relationship to seduce another one

CITES: Convention on International Trade in Endangered Species of Wild Fauna and Flora.

Contaminate: transmission of infectious sickness.

Echolocation: phenomenon used by animals such as dolphins to locate objects by reflected sound.

Blowhole: nostril of the cetacean.

Baleen: keratin sticks fixed to the whale's upper jaw, and used as teeth.

Fecundity: Producing or capable of producing an abundance of offspring, fertile.

Homeothermic: an organism that maintains its body temperature at a constant level, usually above that of the environment, by its metabolic activities.

Hydrodynamic: shape of animal adapted to marine life that offers minimum resistance to the water:

Inhale: breathe in (air, gas, smoke...).

Krill: small shrimp-like planktonic crustacean of the open seas notably eaten by baleen whales.

Lifespan: length of life



Mammal: name given to the family of vertebrate that shares characteristics such as a constant bloody temperature, a pulmonary breathing, the presence of hairs, nursing of young and give birth (viviparous).

Mating: Behavior of animals coming together to breed

Migration: seasonal movement of animals from one region to another.

Mysticetes: cetaceans (dolphins, whales and porpoises) with baleen.

Odontocetes: cetaceans (dolphins, whales and porpoises) with teeth

Plankton: Small and microscopic organisms drifting or floating in the sea. Baleens feed of plankton.

Predator: animal that naturally preys on other to feed.

Solitary: alone, isolated

Thermoregulation: mechanism that allows the whale to regulate and conserve her body at constant temperature.

Throat groove: skin wrinkle starting from the chin to the belly button

Tohoroā: tahitan name for "humpback whale"

IUCN: *International Union for the Conservation of Nature*

Viviparous: of an animal bringing forth live young that has developed inside the body of the parent.



Observation sheet for cetacean of French Polynesia

Name of observer:

Mailing address, phone, address,

Where you on a canoe, a boat or on land?

OBSERVATION

Date :

Time at the beginning of the observation:

Island and district:

Weather condition

WIND Weak Moderate Strong

OCEAN Calm Rough Very rough

SKY Clear Cloudy Rainy

ANIMAL IDENTIFICATION

Number of individuals

Calves sighted: Yes No

Size Less than 9 feet between 9 to 33 feet more than 33 feet

Color White Black Grey Spotted

Other :

PLEASE SEND YOUR OBSERVATION SHEETS TO :

Direction of Environment of French Polynesia

direction@environnement.gov.pf - BP 45 62 Papeete - 98 713 Papeete - Tahiti

Phone : 40 47 66 66

And :

Te mana o te moana non profit Foundation

temanaotemoana@mail.pf - BP 1374 Papetoai - 98729 Moorea - Phone 40 56 40

www.temanaotemoana.org



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Circle the shape of the head :



Circle the shape of the rostrum :



Circle the shape of the dorsal fin :



Circle the shape of the tail :



Circle the shape of the blowhole (imagine yourself placed behind the animal) :



Draw the animal you observed :



TOTAL POLYNÉSIE

Total Polynésie has been working in French Polynesia for more than 55 years and furnish petroleum products daily to the five archipelagos of the territory.

Total Foundation et Te mana o te moana Association

The Total foundation focuses its action in the Environment field, and particularly on the preservation of marine biodiversity through research, preservation programs for endangered species and conservation actions. Throughout those actions, Total emphasizes long term partnerships. Beside the financial support, the goal is to share experiences and increase everybody's knowledge.

In 2011, the Total foundation supported Temana o te moana association by contributing to the creation of the Cetaceans Observatory in French Polynesia.

The goal was to develop knowledge on cetacean's species in French Polynesia through the development of a network of observers, locals and tourists, to increase the awareness on the biology of cetaceans and inform residents, students and tourists about the different local regulations.

Total Polynesia and Temana o te moana

Concerned by the actions conducted by the Total Foundation in 2011, Total Polynesie wanted to pursue the collaboration in 2012-2013 with Temana o te moana through the French booklet "Tohorā, humpback whale, who are you?" distributed in all primary classes of Tahiti and Moorea.

The goal is to help the kids to better understand cetaceans, for a better conservation of the emblematic species of Polynesian waters.

TEMANAOTE MOANA ASSOCIATION

The association was created on September 23rd, 2004. Through its education, conservation and research programs, the association strives for the protection of the marine Environment in French Polynesia and in the world. Temana o te moana is state-approved and officially recognized by the Environment code. It has been recognized as General Interest since 2008 and is a member type B (c) of IUCN (International Union for Conservation of Nature), as a national non-governmental organization. It is managed by veterinaries, marine biologists, specialized educators, environment engineers...

CETACEANS OBSERVATORY IN FRENCH POLYNESIA

French Polynesia is a natural sanctuary as vast as Europe. The Polynesian government officially created in 2002 the Marine Mammal Sanctuary with specific regulations. Humpback whales are unique biodiversity jewels that always amaze residents and tourists as they reveal some of their mysteries every time they come along our coasts.

Te mana o te moana created the Cetacean Observatory in French Polynesia to regroup and structure efficiently the actions realized and ensure longevity and efficiency of the Sanctuary.

For more information's, documents and observation's form, please visit our web site www.temanaotemoana.org

