

PRESENT

WHALE SHARK

Rhincodon typus

The whale shark is a highly migratory and solitary species that can form aggregations in specific areas around the world. Whale shark populations are decreasing worldwide as a result of targeted fishing and bycatch so many countries, including Mexico, are implementing conservation measures to protect this gentle giant. In the areas where aggregations occur, swimming with whale sharks generates significant economic benefits to coastal communities that depend on tourism.

TAXONOMY

Kingdom: Animalia
Phylum: Chordata
Class: Elasmobranchii
Order: Orectolobiformes
Family: Rhincodontidae
Genus: *Rhincodon*
Species: *R. typus*



Conservation Status:
• Nom 059 – A (Threatened)
• IUCN – VU (Vulnerable)



Distribution: It lives in all of the seas and oceans of the world, except the Mediterranean.



Diet: Filter feeder: omnivore. It feeds on copepods, shrimp, crab larvae, fish eggs and larvae, and small fish.



Reproduction: Ovoviviparous; eggs develop inside the mother.



predators: Large pelagic species like billfish and sharks that attack weak or sick individuals; orcas and large sharks can attack adult individuals.

CONSERVATION TIMELINE



2007: México regulates the shark and ray fisheries (NOM-029-PESC-2006) and establishes protection of all whale shark populations in national waters.



2009: The Whale Shark Biosphere Reserve is established North of the state of Quintana Roo.



2010: The species is added to Mexico's official list of protected species, NOM-059-SEMARNAT-2010, as threatened (A).



2016: The IUCN includes the whale shark in the Red List of Threatened Species under the threatened category.



2018: A Refuge for the protection of the Whale Shark is established in the Bay of La Paz, Baja California Sur.



2018: SEMARNAT/CONANP publish the Conservation Action Program for the whale shark (*Rhincodon typus*).



2019: Observation and swimming activities with whale sharks are regulated through the NOM-171-SEMARNAT-2018.

ANATOMY

The whale shark is the largest fish in the world.

Average life span:
50 - 130 years

18.8 meters
maximum length recorded for adults.
(Average size: 12 meters)

34 tons
maximum weight recorded.
(Average weight: 11 tons)

300

Number of pups a female can be pregnant with.

50-64 cm

average size of pups at time of birth.

The skin can be up to
15 cm thick

The skin is covered in dermal denticles, or placoid scales, which are made up of a core of pulp, a layer of bony tissue and an enamel outer layer.

5 pairs
of gills.

They have the ability to regenerate and heal wounds on their skin and fins.

Filter pads located behind the vestigial teeth help to filter food.

Unlike other sharks, its mouth is located on the front of the head.

Coloration on its dorsal side is dark with white intermittent lines and spots. This pattern serves as camouflage and protects from UV rays when it swims at the surface.

The mouth can measure up to
12% of its total length.

The mouth has up to
300 rows
of vestigial teeth.

DISTRIBUTION

Whale sharks are highly migratory and they live in all tropical and subtropical oceans of the world, except for the Mediterranean.

• **Known aggregation sites**



- 1 Mexican Caribbean
- 2 Gulf of California
- 3 Mexican Pacific
- 4 Coast of Nayarit

In Mexico, they can be found in all coasts:



TOURISM

This species is important for the tourism industry in Mexico and the world.

\$10 to \$13 million*

Direct economic contribution that swimming with whale sharks generates in three conservation areas in Mexico (1,2,3).

\$63.7 million*

Indirect economic benefits that swimming with whale sharks generates in the Mexican Caribbean (1).

*Amounts in US dollars



123 countries
Have reported their presence in national waters.



21-32°C
Range of water temperature they prefer.



12,000 km
Distance they can travel during long migrations.



Umbrella species
Conservation efforts directed at whale sharks protect other species in their habitat indirectly.

BEHAVIOR



Although generally solitary, whale sharks can form aggregations of
200-400 individuals
in areas where food is abundant.



67 km/day
swimming speed they can sustain.

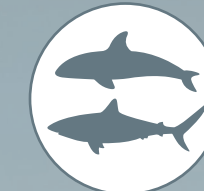


When they are born, pups are completely independent.

ECOLOGICAL IMPORTANCE



They maintain ecosystems in equilibrium by regulating their preys' populations.

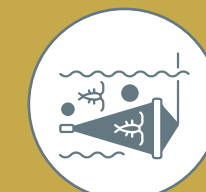


They are food to large species of predators like sharks and orcas.



Their presence is an indicator of ecosystem health.

THREATS



Zooplankton composition and abundance, their main food source, can change as climate changes.



Due to their slow movements, they are vulnerable to boat strikes.



Bycatch and commercial fishing are a threat in countries without conservation programs in place.

CREDITS:

Aurora Pimentel Tovar, Laboratorio Marino Virtual, Mares Mexicanos
Esmeralda Morales Domínguez, CICESE
Omar Valencia Méndez, CICESE
Rebeca Granja Fernández, CUCBA, Universidad de Guadalajara

SOURCES:

SEMARNAT. 2018. Programa de Acción para la Conservación de la Especie Tiburón Ballena (*Rhincodon typus*). SEMARNAT/CONANP, México (año de edición 2018).

Motta et al. 2010. Feeding anatomy, filter-feeding rate, and diet of whale sharks *Rhincodon typus* during surface ram filter feeding off the Yucatan Peninsula, Mexico. *Zoology*, 113(4), 199–212.

Martin, R. A. 2007. A review of behavioural ecology of whale sharks (*Rhincodon typus*). *Fisheries Research*, 84(1), 10–16.

Montero-Quintana, A.N. (2019). Efecto del comportamiento del tiburón ballena (*Rhincodon typus*) en la industria del tiburón ballena: contribución económica y satisfacción con el pase en tres áreas naturales protegidas de México. *Veis Maestria: UAEM- CIBYC*. <http://ria.uaem.mx/handle/20.500.12055/1814>

Womersley, Freya; Hancock, James; Perry, Cameron T.; Rowat, David (February 2021). "Wound-healing capabilities of whale sharks (*Rhincodon typus*) and implications for conservation management". *Conservation Physiology*, 9 (1): coaa120.