
SAVING THE BIGGEST
FISH IN THE SEA.
Paul Wags
"In our quest to save the world's oceans let's begin by celebrating and preserving the world's biggest fish." Tim Winton - Author
ECOCEAN
www.whaleshark.org

"WOW!"

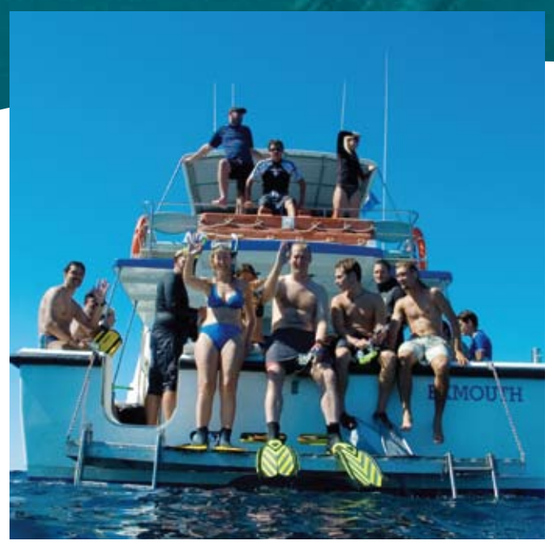
"Anyone lucky enough to have encountered a whale shark face-to-face will tell you that it's an awesome experience. And size is not the only amazing thing about this fish. Hard as it might be to fathom, the gentle giants are now classified as 'vulnerable to extinction"

"The oceans are our inheritance and our legacy. I don't want to surf in a dying sea. It's so important to act now to preserve the health of our oceans and amazing creatures like the whale shark."

Stephanie Gilmore,
World champion women's surfer 2008

"The ocean is the biggest part of our earth, so for me that means the biggest part of our ecosystem. All sorts of creatures help maintain marine eco-systems and as whale sharks are the biggest fish in the oceans, if we can't help them then who knows what will happen? "

Mick Fanning,
World champion men's surfer 2008



Amazing Facts

• Whale sharks (*Rhincodon typus*) have been reported to reach a length of 20meters and a whopping 34 tonnes, but they are typically encountered in a size range of 5 to 10m

• Ecotourists can photo-tag whale sharks via the ECOCEAN photo-identification library and have helped track more than 1200 individual whale sharks worldwide since it started 13 years ago

• Whale sharks have been recorded from more than 100 countries worldwide

• Ancestry of the whale shark dates back to the Jurassic and Cretaceous periods 245-65 million years ago, when the present groups of sharks began to appear

• The first whale shark specimen was not known to science until 1828 and before the mid-1980s there had only been 320 documented sightings

• Whale sharks are now (officially) protected in Australia, Honduras, India, the Maldives, Mexico, South Africa, Thailand, Taiwan, the Philippines, the Seychelles, the United Arab Emirates and the USA

• Whale sharks have been reported to travel up to 13,000 kilometers across ocean basins

• The whale shark produces more pups than any other species of shark – 300 live young

• Whale sharks are the thickest skinned of all animals

• Whale sharks are closely related to the bottom-dwelling sharks (Orectolobiformes) which include the wobbegong

PROTECTION FOR WHALE SHARKS IS GROWING BUT...

"Her Deepness", Dr Sylvia Earle is the best-known woman marine scientist on the planet. Chief scientist U.S. National Oceanic and Atmospheric Administration 1990-1992. She has authored more than 150 scientific, technical, and popular publications and lectured in more than sixty countries. In 1979, Sylvia Earle walked untethered on the sea floor at a lower depth than any living human being before or since.

"As long as whale sharks prosper and coral reefs thrive, there is reason for hope that humankind will achieve an enduring relationship with the ocean, the cornerstone of Earth's life support system. The dramatic loss of reefs and the shocking decline of sharks, large and small, the undoing of millions of years in a few decades, should put all of us into a state of high alert. Until now, who knew that humans had the power to so alter the nature of the world? Who has the once and perhaps never-again opportunity to stabilise the destructive trends and put us on a positive course? As never before, we know enough to know that the oceans - and therefore we - are in trouble. As never again, we have a chance to do something about it."

The majestic whale shark is currently classed as 'vulnerable to extinction' in the World Conservation Union's (IUCN) Red List of Threatened Species. Despite this, they are protected under law in the waters of only about 10 percent of countries the species is known to visit.

This means that in many countries it is still legal to kill a whale shark and even in some of the developing countries that have outlawed their killing, it is extremely difficult to ensure these laws are complied with.

Little is known about the whale shark: its basic biology; ecology and actual numbers worldwide. Unknown levels of fishing have the potential to seriously threaten a species which is considered to be highly migratory and known to cross international boundaries.

In recent years concern over the future of the species has effected some change. The whale shark received greater international protection in 2002 through listing on the Convention on International Trade in Endangered Species (CITES). This means the 160 member countries have undertaken to monitor more carefully the level of international trade in whale shark products.

The whale shark is listed on the Bonn Convention for the Conservation of Migratory Species (CMS), identifying the whale shark as a species whose conservation status would benefit from the implementation of strong international cooperative agreements.

ECOCEAN successfully nominated the whale shark as a threatened species under the Australian Environment Protection & Biodiversity Conservation Act in 2001, providing full protection within Australian (Commonwealth) waters.

10metre whale shark caught off the coast of China

Threats.

The most significant threat to the whale shark is human activity. Before hunting was banned in India, as many as 1,000 whale sharks were believed killed in 1999 and 2000.

Whale shark flesh is considered to be low-grade but comes in such substantial quantities that it represents a bountiful catch. The fins, while not really favoured for shark fin soup, do fetch high prices for display purposes in restaurants and at weddings in some Asian cultures.

The whale shark has very few other known predators. In nature, the most dangerous period in its life cycle is likely to be when young. Whale shark pups are born at a fraction of their adult size (only ~ 55cm). Few juvenile whale sharks have been reported throughout history, but we know that small individuals are sometimes preyed upon by blue marlin and blue sharks.

The skin of an adult whale shark is its main protection. On average, the thickness of the skin on the dorsal surface is 12-15cm making it the thickest skinned of all living animals.

The whale shark's habit of swimming at the surface makes the animal susceptible to fishing pressure but also to boat-strike and almost certainly to plastic ingestion, known to be deadly to many marine species. Many whale sharks bear the scars of propellers and there have been numerous confirmed reports of whale sharks being hit by ships.

Further Urgent Action Required.

Despite some increases in protection, the threats to whale sharks continue in many parts of the world. To ensure the future of the whale shark governments of all 'range states' need to urgently facilitate and encourage:

- research programs aimed at better understanding the movements and habits of whale sharks
- an international program to actively identify habitats critical to the survival of the species (e.g. breeding grounds);
- establishment of a formal international agreement to protect whale sharks from fishing and other threats;

Propeller cuts

"The world's oceans are in trouble. We need ready, inexpensive ways to develop our picture of where marine systems are at, so that we can begin the task of restoring them. ECOCEAN's methods are a great example of participatory science and whale sharks themselves are beautiful emblems for marine conservation. They open debates about the need to protect both the species and the critical habitats that sustain them. The fact that whale sharks cross international boundaries should unite us in our concern and in our efforts." *Tim Winton*

FACT

Distribution

Whale sharks are known to inhabit both deep and shallow coastal waters and the lagoons of coral atolls and reefs across a broad distribution in tropical and warm temperate seas. While Australia is one of the most reliable locations to find whale sharks, regular sightings are also recorded in the Philippines, India, the Maldives, Mozambique, Seychelles, Belize, Mexico, the Galapagos Islands, Thailand and other parts of Asia.

Whale sharks are widely distributed in Australian waters although they are most common at Ningaloo Marine Park. They also have a short season at Christmas Island and are sighted in the Coral Sea.

Support ECOCEAN

Adopt-A-Shark

www.ecocean.org

Rolex Awards / Kurt Amsler

"Stunning views from space have taught us all that we live on "The Blue Planet". But this inspiring phrase fails to bring home to us some even more important points: the blue ocean that distinguishes our earthly home is also a vital living realm … the largest habitat on our planet, in fact … and our own terrestrial lives are linked inextricably to it. As go the seas and the life they contain, so will we quite likely go."

Kathryn Sullivan, the first American woman to walk in space. Flew three space shuttle missions and logged 532 hours in space. In addition to a 13-year career as an astronaut with NASA, she served as an oceanography officer in the U.S. Naval Reserve and was chief scientist for the National Oceanic and Atmospheric Administration.

Ecotourism – a sustainable alternative to hunting

Whale sharks are not subject to fishing pressure in Australia. Ningaloo Marine Park in Western Australia is one of the most reliable places in the world to see whale sharks during the season from April to June each year. Protection for these sharks is provided directly under state and federal law.

Ecotourism has the potential to provide an economically viable alternative to hunting in developing countries. Due to its sheer size, 'tofu shark' as it is often called, can provide protein for many members of the community despite the fact that it has relatively low value and a short shelf life. The fact that a dead whale shark provides such a windfall is a significant issue for their survival as they traverse poor, remote and unregulated areas. Often in such countries the sea has been a traditional source of food, but is becoming less and less productive due to overfishing and other impacts.

In at least some of these regions, there is the potential to turn from hunting whale sharks to whale shark-focussed ecotourism. This has been achieved in Donsol, Philippines where annual visitor numbers now exceed 8,000. Providing it is well-managed, this form of 'nature-based' tourism can build new industries in places that have few economic alternatives. And importantly, as people travel to these new destinations they upload photographs of the whale sharks they swim with to the ECOCEAN Library, these images contribute dramatically to our understanding of global whale shark movements and population dynamics (see page 7).

MORE FACTS

Habits

Whale sharks are fish, and therefore they have no obvious physiological requirement to swim at the surface (i.e. to breathe air) even though they are most often observed there during 'seasonal' aggregations. Tracking studies indicate that whale sharks can dive to great depths (>1500m). They can remain away from the surface for long periods and this makes their movements difficult to study.

Feeding

Whale sharks generally feed on very small planktonic prey (e.g. krill, copepods, small fish etc.) that they 'filter' from the water using the fine mesh of their gill-rakers. Whale sharks are often found in areas where large concentrations of this food source are found.

The predictable annual whale shark aggregation at Ningaloo Marine Park is closely linked with an increase in productivity of the region associated with the mass coral spawn around March/April each year. Similarly, their appearance at Christmas Island appears linked to the red crab spawns in December/January.

Migration

Whale sharks are regarded as highly migratory - although their 'migration patterns' are poorly understood. Research at Ningaloo Marine Park suggests that some sharks undertake a northerly migration when leaving the area. Limited satellite tracking data combined with their seasonal appearance at Christmas Island provides support for this theory.

Satellite tracking of whale sharks in US waters and also in the South China Sea have revealed that whale sharks can travel great distances (1,000s of kilometres). These migrations may take years to complete. A far greater understanding of whale shark movements will be possible with global 'photo-tagging' via the ECOCEAN Library in combination with limited satellite tracking studies throughout the world.

As a giant filter-feeder, reliant upon large quantities of food from seasonal 'food pulses', the whale shark is potentially susceptible to declines in productivity at its feeding locations. It is therefore essential that migratory paths are confirmed and we more fully understand which whale shark sighting locations are critical to their survival.

Dangerous?

Whale sharks are filter-feeders and pose no immediate threat to humans. Whale sharks are very large and powerful animals and should be treated with the utmost respect. Their tail in particular has the potential to harm.

Brad Norman

ECOCEAN – A SMALL GROUP MAKING BIG WAVES.

Brad Norman

Gil Grosvenor (National Geographic Society Chairman)

"National Geographic is proud to have Brad Norman as a member of the Emerging Explorer class of 2008. He exemplifies National Geographic's mission to inspire people to care about the planet with his visionary work with whale sharks. The time is now for us to all focus on the plight of our oceans. There are few better flagships for that protection than the biggest fish in the sea - the whale shark."

Shark researcher Brad Norman began studying the whale sharks of Ningaloo Reef in 1995. He was able to confirm that the spot patterning on the skins of the whale sharks could be used to identify individuals. This fact then formed the basis of the ECOCEAN Whale Shark Photo-Identification Library, a database which today has input from 38 countries and has identified more than 1200 individual sharks from 4500 logged encounters. Photographs are submitted to www.whaleshark.org, mainly by researchers and ecotourists.

Through this 'citizen science' and its high-powered computing technologies, ECOCEAN has developed the capacity for a meaningful study of whale sharks. By tracking individuals across time and space, the database has the potential to reveal the migratory movements of whale sharks around the globe, identify their critical habitats, and determine any variation in population numbers at locations where whale sharks aggregate.

In January 2008 the ECOCEAN team published a scientific paper in the US journal Ecological Applications on the health of the population of whale sharks at Ningaloo Reef, Western Australia. The largest study of its type for whale sharks, it showed that the population of sharks returning to Ningaloo was stable.

One of the benefits of the study is that its findings can be used to support the argument that successful management practices should be considered for application in the other parts of the world where similar industries are operating or planned.

ECOCEAN has recently signed a Memorandum of Understanding with the United Nations Environment Program (UNEP) to develop materials on sustainable practices for countries with existing or new whale shark industries.

The expansion of the ECOCEAN Whale Shark Photo-identification Library creates opportunities to advocate for whale shark protection; promote their sound management; educate; encourage shifts away from hunting toward whale sharked-based ecotourism; and deliver marine conservation messages and resources globally, including to developing countries.

ECOCEAN has received numerous prestigious awards for its scientific and conservation achievements. Brad Norman was a Rolex Award laureate in 2006.

ECOCEAN is a small, non-government, non-for-profit group working hard to live up to its potential. For more on ECOCEAN's programs or to become a supporter, please visit www.ecocean.org

ECOCEAN WHALE SHARK PHOTO-ID LIBRARY

Brad Norman

1

Individual whale sharks can be clearly indentified by their spots, so plan to take photos!

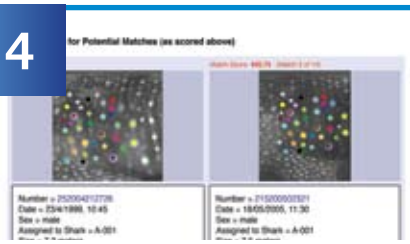
2

A 'standardised photo' is of the left side behind gills but other shots are helpful too, eg. of scars.

3

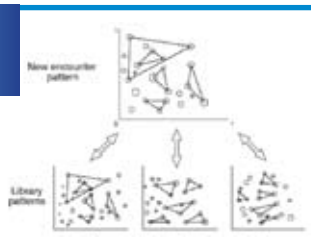
Upload your photos to www.whaleshark.org - it's easy to do!

4



We do all the rest. Pattern-matching computer algorithms look for similarities.

5



The pattern matching software was adapted from NASA Hubble telescope technology for mapping stars.

6

Matches are rated by the computer for likelihood, then confirmed by a trained eye.

7

If a shark you have uploaded is resighted you will get an automated email letting you know.

8

Researchers can analyse the database to establish whale shark movements, important habitats and population health.

9

ECOCEAN is using state-of-the art technology to measure sharks to help determine growth rates over time.

10

ECOCEAN is now applying its cutting-edge software to other species.

11

ECOCEAN is working in developing countries to encourage a shift from hunting to ecotourism.

12

Find out more about whale sharks and how you can support ECOCEAN at www.ecocean.org

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