FACT SHEET

BACKGROUND ON ECOCEAN

ECOCEAN Inc. is a not-for-profit, non-government organisation (NGO). ECOCEAN is committed to the protection and restoration of the world's oceans through the development of research software, applied research, advocacy, education and direct conservation activities. It uses whale sharks (*Rhincodon typus)* as a flagship species to achieve its mission:

> **To contribute substantially to the protection and restoration of the world's oceans through the development of research software, applied research, advocacy, education and direct conservation activities.**

ECOCEAN was founded by Western Australian marine scientist Brad Norman. His long-term study of whale sharks at Ningaloo Reef led him to collaborate with US scientists Jason Holmberg and Zaven Arzoumanian on the development of computer-assisted photo-identification system as the new way forward in whale shark research. In 2005, the team's efforts won a Duke's Choice Award. Past winners of the Award include such technology giants as Boeing, eBAY, and NASA for its Mars Rover mission.

Brad Norman has been at the forefront of calls for protection of the whale shark for many years. He was involved in the listing of whale sharks as a protected species both in Australia and internationally and he was also involved in their listings in the Convention on International Trade in Endangered Species (CITES) and the Convention on Migratory Species (CMS).

ECOCEAN was originally formed to expand the Ningaloo study to include whale sharks worldwide. Rare and found only in the world's warmer seas, whale sharks are listed as 'vulnerable to extinction' by the World Conservation Union (IUCN). A large and primarily solitary fish, whale sharks are difficult to study. ECOCEAN's large photo-id database, which includes contributions from researchers and eco-tourists, promises to provide a global picture of whale shark movements and population dynamics in a timely and cost-effective way. Over 1000 individual whale sharks have now been identified, and images have been provided from 37 countries to date.

The expansion of the ECOCEAN Whale Shark Photo-Identification Library creates opportunities to advocate for whale shark protection; promote their sound management; promote shifts away from hunting toward whale sharked-based eco-tourism; educate; and deliver additional marine conservation messages and resources.

Through a combination of 'citizen science' and its high-powered computing technologies, ECOCEAN has developed the capacity for a meaningful study of whale sharks, one of the planet's most enigmatic animals. Now researchers of other species are approaching ECOCEAN with requests to provide similar pattern-matching capacity for their projects. ECOCEAN is now exploring ways in which it can continue its work on whale sharks and marine conservation while providing access to its programming and volunteer management systems to groups working on other species.

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PUBLICATIONS

Ecological Applications - Ecological Society of America 2008
ROBUST, COMPARABLE POPULATION METRICS THROUGH COLLABORATIVE PHOTO-MONITORING OF WHALE SHARKS *Rhincodon typus* JASON HOLMBERG, BRADLEY NORMAN AND ZAVEN ARZOUMANIAN

Translating Scientific Results into Conservation Actions: New Roles, Challenges and Solutions for 21st Century Scientists. Boston: Earthwatch Institute; 2007. A Cooperative Approach for Generating Robust Population Metrics for Whale Sharks *Rhincodon typus*. Norman, B. & Holmberg, J. In: Maldini D, Meck Maher D, Troppoli D, Studer M, and Goebel J, editors.

Journal of Applied Ecology - British Ecological Society 2005
METHODOLOGICAL INSIGHTS: An astronomical pattern-matching algorithm for computer-aided identification of whale sharks *Rhincodon typus* Z. ARZOUMANIAN, J. HOLMBERG and B. NORMAN

Fisheries Research – 2007. Whale Sharks: Science, Conservation and Management - Proceedings of the First International Whale Shark Conference, First International Whale Shark Conference. Size and maturity status of the whale shark *Rhincodon typus* at Ningaloo Reef in Western Australia B. Norman & J. Stevens

MAJOR AWARDS

The Peter Benchley (JAWS) Shark Conservation Award 2007 (Science)
ROLEX Awards for Enterprise 2006
2005 Duke's Choice Award for Innovative Use of Java Technology Sun Microsystems

CONTACT DETAILS

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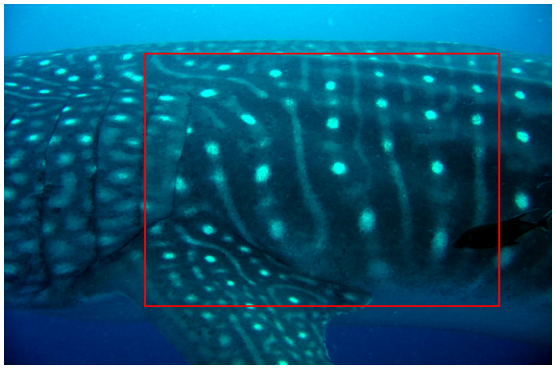
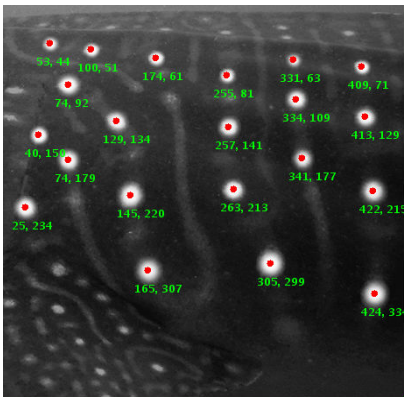
About spot patterning: *Photographs of this area at this angle maximize our ability to use software pattern recognition algorithms to identify this animal within a catalog of thousands of images using its unique "bodyprint" as an identifier.*



This is how our computer database sees the natural patterning in this image:



For previously sighted individuals, such as H-019 in Utila, Honduras, a pattern match looks like this in our database: