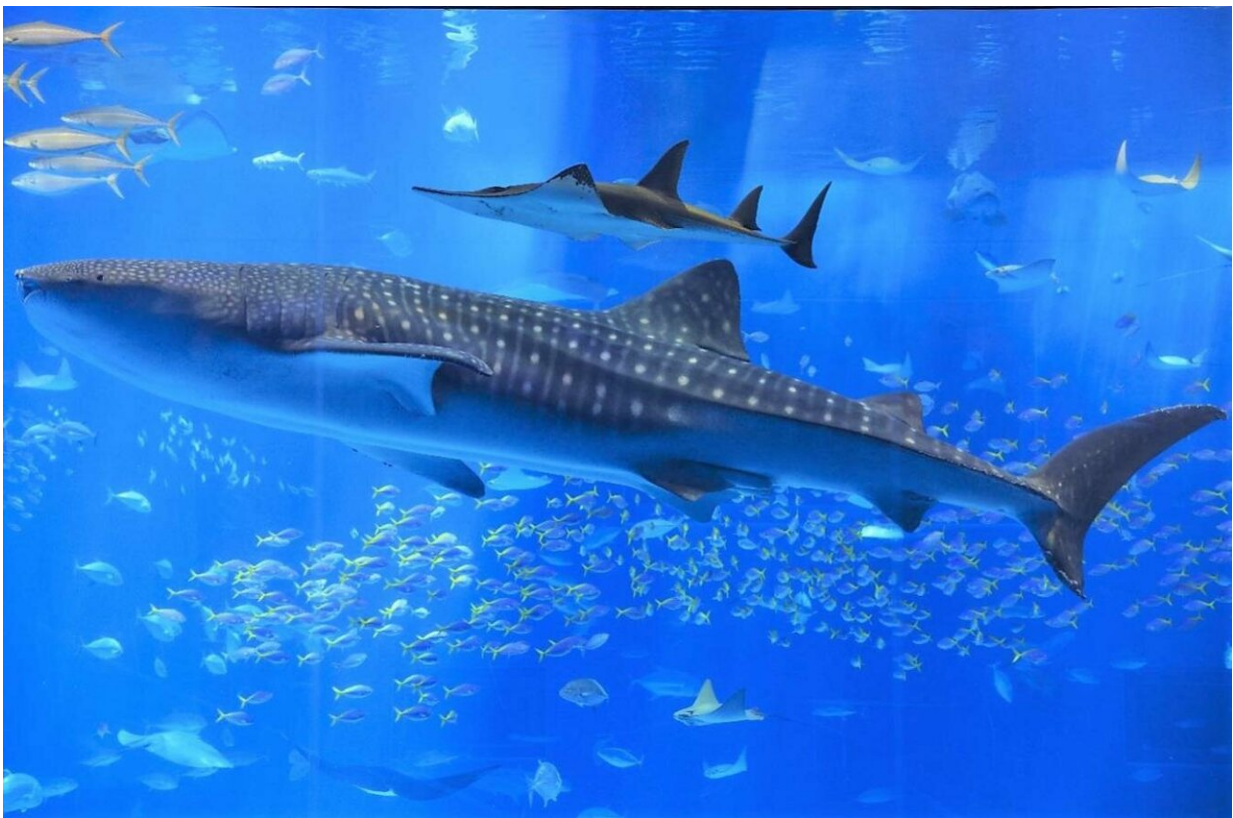


Ocean giant gets a health check: Combination blood, tissue test reveals whale shark diets

January 16 2019



Whale sharks, like this individual at the Okinawa Churaumi Aquarium, are the world's largest species of fish, growing to 10 to 12 meters in length. Despite their large size and threatened status, whale shark ecology remains mysterious. A University of Tokyo research team led by Alex Wyatt, a project researcher at the Atmosphere and Ocean Research Institute, created a blood test and tissue isotope analysis health check to better understand the animals. Credit: K. Sato, Okinawa

Churashima Foundation Research Center CC-BY-NC-ND.

Whale sharks, the world's largest fish, likely endure periods of starvation and may eat more plants than previously thought, according to the first results of a new health check developed at the University of Tokyo. Ocean scientists now have a powerful, simple tool to discover the diets, migrations, and conservation needs of this endangered species.

Whale sharks are filter-feeding, soft-bodied fish that travel tropical oceans in search of their microscopic food. They grow 12 meters (39 feet) long and weigh 21 metric tons (46,297 pounds), about as long as a public city bus and as heavy as three African elephants. Despite their conspicuous size, many details of [whale sharks'](#) lives in the [open ocean](#) remain a mystery, even 183 years after they were first discovered.

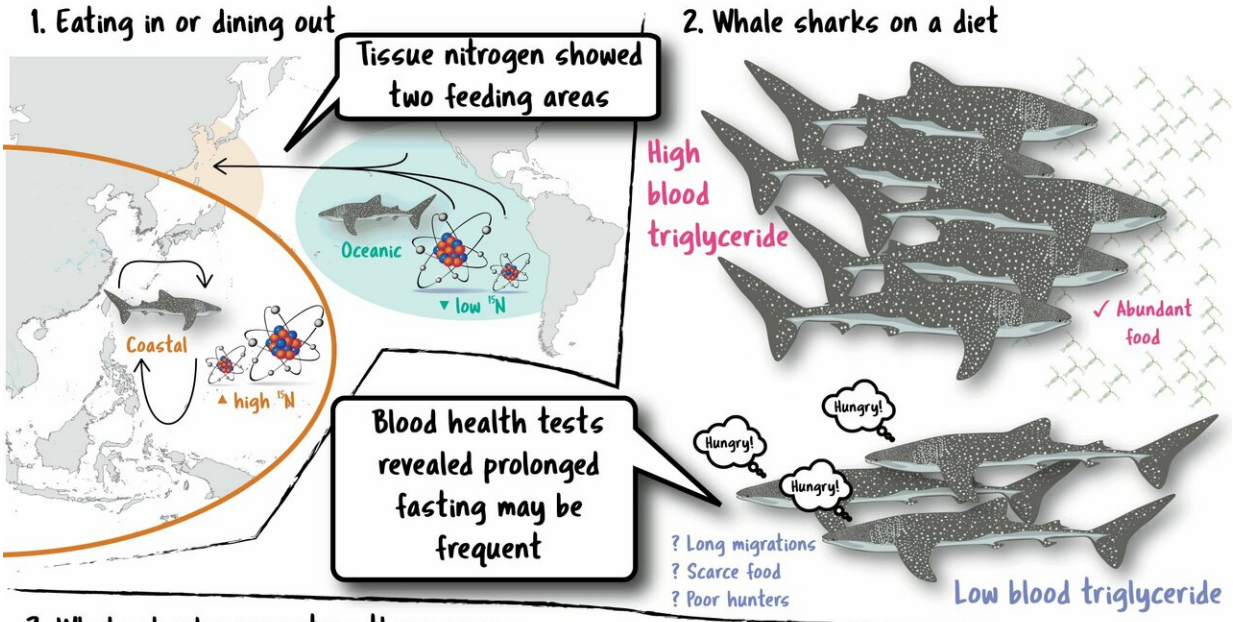
The research team led by Alex Wyatt, a project researcher at the Atmosphere and Ocean Research Institute, carefully monitored the growth, diet, and [health](#) of three whale sharks living in an aquarium and two whale sharks living in ocean net cages.

"Whale sharks are one of the most exciting organisms to encounter for tourists and scientists alike, not just due to their sheer size, but also their grace and beauty. It is a privilege to unveil some of the mystery surrounding their lives," said Wyatt.

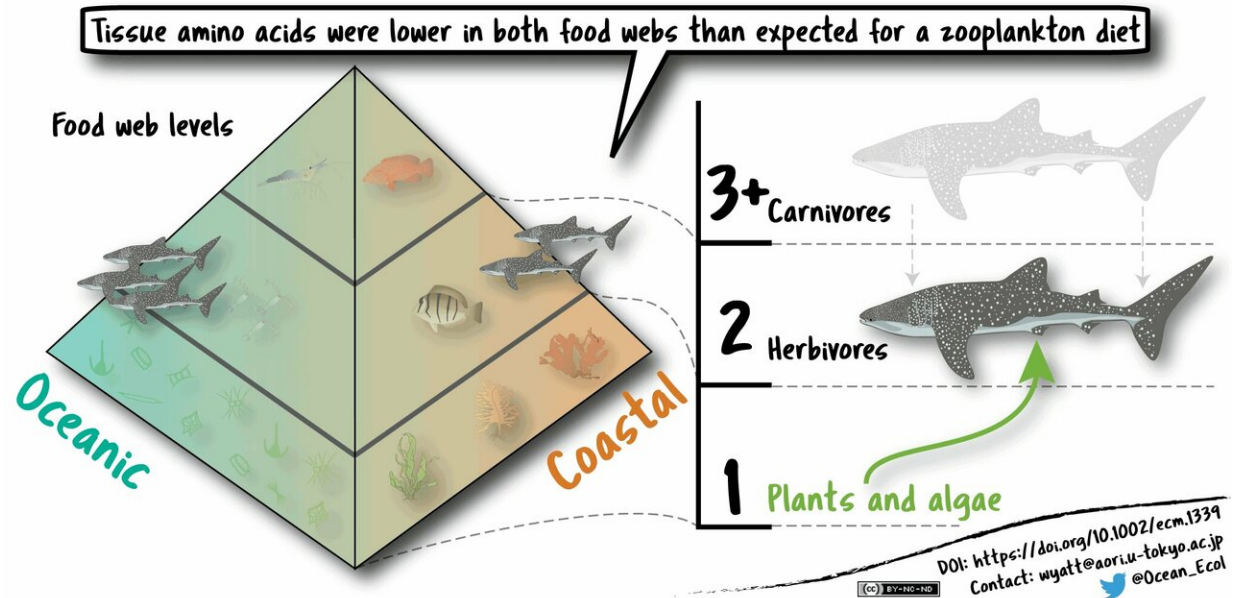
Traditionally, researchers track whale shark feeding by taking samples of different body tissues and analyzing the different forms, or isotopes, of carbon and nitrogen inside the tissues. Researchers realized that they could interpret tissue isotope levels correctly only if they knew each whale shark's history of growth and diet.

Tracking the growth and diet of wild whale sharks over time is impractical, so Wyatt used a blood test to complement tissue isotope analyses. Researchers take about 10 milliliters (2 teaspoons) of blood from one of the whale shark's pectoral fins. Scientists can analyze [blood samples](#) immediately on board a research ship, but tissue isotope analysis requires specialized laboratory equipment.

Where and what do whale sharks eat?



3. Whale sharks are eating their greens



A research team from the University of Tokyo developed a powerful, simple tool to discover the diets, migrations, and conservation needs of whale sharks, the world's largest fish and an endangered species. Credit: Alex Wyatt CC-BY-NC-SA.

"Similar to blood tests performed when you visit the doctor, we are able to assess the health of whale sharks based on the contents of their blood," said Wyatt. "We combine blood tests and tissue isotope analyses to create an accurate health check for the animals."

The complete health check was given to eight wild whale sharks off the coast of Okinawa, Japan. Researchers collected samples while freeing whale sharks from accidental entanglement in fishing nets.

Several of the wild whale sharks may have not eaten for weeks or months, according to [blood test](#) results.

"Maybe they didn't encounter any food, or maybe they just do not eat while migrating long distances," said Wyatt.

Groups of whale sharks at coastal sites have been seen eating a range of prey, from tiny krill and fish eggs up to small fish and squid. A new finding of the health check is that all sharks tested showed signs of eating significant amounts of plants and algae.

"This is a somewhat surprising and controversial finding, since whale sharks are generally assumed to feed strictly on higher levels of the food chain. However, some whale sharks have been found with seaweed in their stomachs and eating plants might make sense if feeding opportunities can become as limited as our [blood](#) tests suggest," said Wyatt.

The health check and diet discoveries from wild Okinawan whale sharks may not be the same for other species, or possibly even other whale shark populations. However, Wyatt hopes that the complete health check approach will be used to investigate the possibility of starvation, individual foraging specialization, and unexpected food choices in a wide variety of other threatened marine animals.

More information: Alex S.J. Wyatt et al. Enhancing insights into foraging specialization in the world's largest fish using a multi-tissue, multi-isotope approach. 16 Jan 2019. *Ecological Monographs*. [DOI: 10.1002/ecm.1339](https://doi.org/10.1002/ecm.1339)

Provided by University of Tokyo

Citation: Ocean giant gets a health check: Combination blood, tissue test reveals whale shark diets (2019, January 16) retrieved 16 April 2024 from <https://phys.org/news/2019-01-ocean-giant-health-combination-blood.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.