## Explorers Push the Boundaries of the World's Longest-Known Underwater Cave

# Ox Bel Ha Exploration Report: February 2006

By Fred Devos and Chris Le Maillot


*It is the duty of explorers to document what they find*

### History

Exploration efforts of the Ox Bel Ha cave system, which began in 1998, have established it as the world's longest underwater cave. More than 144,000 meters (472,000 feet) of cave passage interconnect ninety-five cave openings, with three distinct vents tying the system to the Caribbean Sea. Extending beneath an area of approximately ten square kilometers (six square miles), Ox Bel Ha plays a vital role in the region's complex hydrological puzzle. Adding to its importance, this cave system extends below one of Mexico's unspoiled natural jewels: the Sian Ka'an Biosphere Reserve.

Mayan for "where the sky is born," the Sian Ka'an biosphere has been listed as a World Heritage site since 1987. The biosphere covers 528,000 hectares (1.3 million acres) of low-and medium-altitude forest, palm savannas, fresh and saltwater marshes, beaches and mangroves. The diversity of its flora and fauna is astonishing: More than 850 species of plants, 150 species of algae and 120 trees and scrubs have been categorized over the years, along

with 103 species of mammals, forty-two species of amphibians and reptiles, 550 terrestrial and 840 aquatic invertebrates, and some-330 bird species. Several important archaeological sites are also located here, dating human civilization in this area back to the Maya.

### Area Orientation

Ox Bel Ha is situated south of the town of Tulum in Mexico's Yucatan state of Quintana Roo, just north of the vast Sian Ka'an biosphere. It is the direct link between two very different and often incompatible worlds. Recent and future development plans for the area have raised questions regarding ecological impact, making continued exploration in Ox Bel Ha a pressing need.

It is evident that much of the water coming from Ox Bel Ha directly feeds the nature reserve. The southern part of the cave system, called Yax Chen, has routes running directly below the northern tip of the biosphere.

Intensive exploration efforts over the past four years have mainly focused in this area. This has proved to be quite a challenge in terms of exploration and logistics.

### Project Objectives

The objectives of this latest project, conducted from February 6 to 11, 2006, were two-fold: to establish a link between Ox Bel Ha and Sian Ka'an, and to extend the farthest reaches of Yax Chen toward greater Ox Bel Ha.

### Ox Bel Ha

The Ox Bel Ha team focused on long-range dives entering from Yax Chen. Dives toward the south concentrated on extending the leads headed toward the biosphere, while dives to the north pushed wide-open, promising tunnels discovered during previous exploration efforts.

Southern Ox Bel Ha is characterized by large, cloudy main tunnels with deeper offset mazes. Much of this area runs below mangrove terrain, with large open pools inhabited by schools of tarpon and the occasional Morelet crocodile. Leads toward Sian Ka'an are especially challenging, due to poor visibility caused by halocline, hydrogen sulfide and tannic water. In contrast, the northern part of the cave boasts near-perfect diving conditions, replicating the more-common decorated caves found in Mexico.

For the team to conduct these dives, the main passages first had to be set up with safety tanks and scooters. By the end of the first day, safety stations had been established up to 4,545 meters (fifteen thousand feet). Subsequent push dives required set-up teams and clean-up dives to help explorers reach these remote areas.

### Sian Ka'an

Concurrently, a smaller team prepared for reconnaissance dives from some of the known cave openings in the shallow lagoons of the Sian Ka'an biosphere. In July 2005, scouting efforts had revealed several interesting outflows in the biosphere. In addition to re-surveying established caves, the aim was to push toward Ox Bel Ha.


*Chris Le Maillot prepares for an exploration dive*


*The Ox Bel Ha team surveyed more than 4,000 meters of cave passage*

Although initial equipment needs were minimal, getting to the cave openings posed quite a challenge. Water levels in the lagoon range from six meters (twenty feet) to less than twenty centimeters (twelve inches). At times, divers had to kayak to the site while the boat was pushed slowly through the mud by a gondolier's pole. The caves themselves posed added challenges, with a unique combination of high water flow and thick organic sediment.

### Team

An international team of skilled and experienced divers was assembled to realize the goals of the project. It was composed of: Alex Alvarez, Franco Attolini, Lars Barstad, Bruno Borreli, Fred Devos, Jarrod Jablonski, Tom Karch, Sigurd Kowitz, Chris Le Maillot, Luca Magheli, Andrea Marassich, Per Thomsen, David Rhea, Simon Richards, Daniel Riordan and Gianmario Rocca.

Sam Meacham—founder of Cindaq, a non-profit organization dedicated to the study and conservation of the area's water resources—joined the project with his unrivalled passion and dedication to the further understanding and protection of Ox Bel Ha. His long-term work with Sian Ka'an was a tremendous help in gaining access to the caves in the biosphere.

### Results

Over the course of six days, twenty-three dives were conducted from Yax Chen while nine dives were conducted from Sian Ka'an. More than eighty hours of combined bottom time was logged by the team, and total surveyed passage on this project equaled more than four thousand meters (thirteen thousand feet).

### 1. Ox Bel Ha

Some 2,400 meters (eight thousand feet) of new cave passage was added to the Ox Bel Ha cave system, further emphasizing its enormity as the world's longest underwater cave with presently more than 146 kilometers (ninety miles) of surveyed passage.

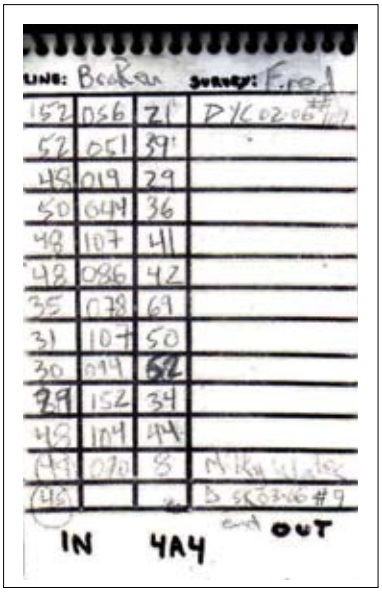
Southern leads resulted in more than 1,090 meters (3,600 feet) of cave being charted en route to the biosphere, but due to challenging conditions, exploration was as difficult as anticipated. This deeper saltwater section of the cave is noted for its abundance of cave life, especially *remipedea*.

In the north, several long-range dives uncovered 1,331 meters (4,367 feet) of passage. Of these, the longest bottom time exceeded eight hours, with a penetration distance of some 5,700 meters (nineteen thousand feet). This is one of the most beautiful areas discovered in Ox Bel Ha to date, with huge galleries and canyons abundant with colorful speleothems.

### 2. Sian Ka'an

Although the caves of Sian Ka'an were first explored by a French team, over the years much of their original guideline had become buried under an accumulation of organic sediment. New guidelines were installed and surveyed, totaling more than 1,500 meters (five thousand feet) of surveyed passage.

Although the cenotes closest to Ox Bel Ha offered little promise for further exploration, their existence plays an important role in understanding the complexity of the area's caves. Beautiful orange stalagmites extend from the grey, jelly-like floor as thousands of juvenile shrimp scurry along the bottom. Much of the passage is clogged with silt, due to the fact that water flow is limited to the ceiling of the cave with saltier, stagnant water below.




*Typical underwater slate used during the Ox Bel Ha project*

However, dives in other vents resulted in the discovery of open, ongoing passages; of special interest was a high-magnitude spring where a large deeper passage shows great promise.

## Data Collection

As it is the duty of explorers to document what they find, data collection is one of the team's central objectives. On this project, a standardized underwater slate was used to record important details during exploration dives. Photo and video footage further documented the exploration areas of the cave.

## Future Efforts

As often is the case with cave exploration, more questions were raised than answered. Over the coming months, exploration will continue to further the original goals of this project: to extend the known reaches of Ox Bel Ha, and to learn more about the caves beneath the Sian Ka'an biosphere.


## Acknowledgments

Thanks to the diving team, Sam Meacham, and everyone else who helped, for their hard work and dedication before, during and after the project. Special thanks to Gary and Kay Walten, Jim Coke, Christian Thomas, Dr. Panos Alexakos, and: Comision Nacional de Area Naturales Protegidas La Reserva de la Biosfera de Sian Ka'an, The Nature Conservancy, The Summit Foundation, Amigos de Sian Ka'an AC, CINDAQ AC, Alltournative SA de CV, Ecocolors SA de CV, Sian Ka'an Visitors Center, Cooperativa U Yo Ochel Maya, and Raga Tours.



*Team members prepare for an exploration dive*