

Single diver fatality in Cenote Vaca Ha (Sistema Zapote) Jul 12th 2020 – Final report

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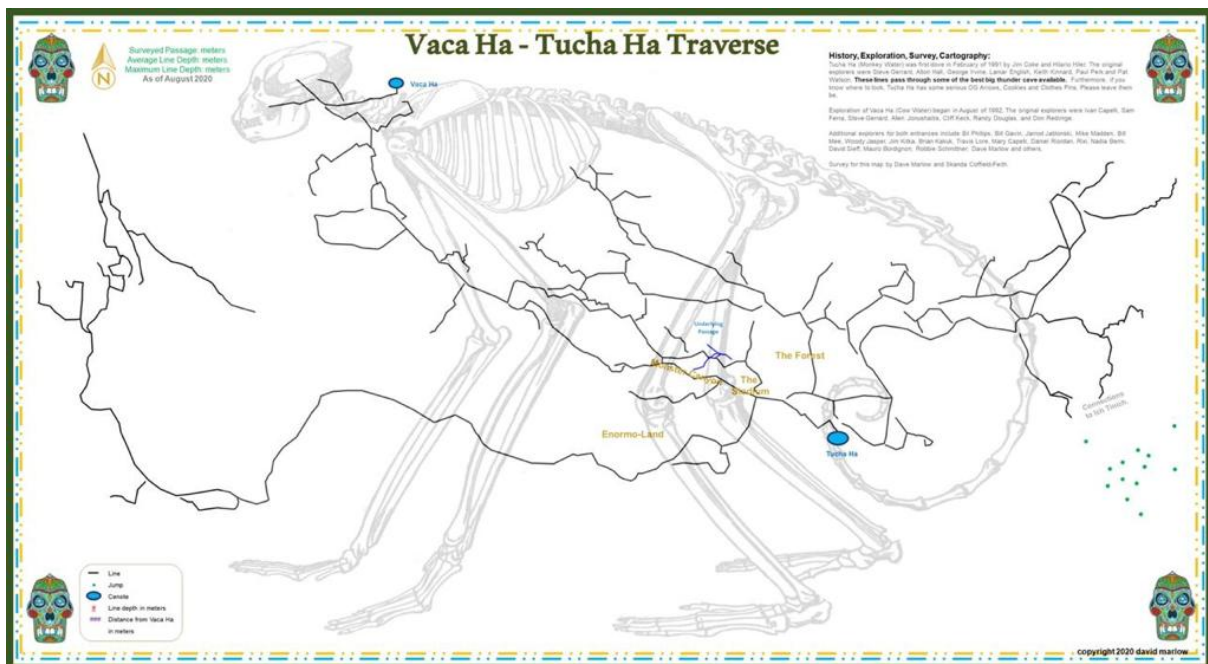
Location:

Cenote Vaca Ha is part of Sistema Zapote in Mexico, located on the Coba road, 7 km from Tulum. The cave is for the area considered deeper with an average depth of approximately 21m / 70ft. There is low flow by Mexican standards with a direction from Cenote Vaca Ha toward Cenote Tucha Ha; the flow is in a southeast direction. On the day of the accident, there was a low flow.

Incident:

A solo diver entered the water at Cenote Vaca Ha at approximately 09:30am on Sunday, Jul 12th 2020. The diver was very familiar with the cave and area as he had resurveyed all the existing lines in order to make a line map of the system. He had also made further explorations and added new lines to the system. He had been at the dive site very frequently over the last months, the caretaker of the property knew the diver and raised the alarm when he did not exit. He notified the dive center that the diver used for fills and logistical support, the dive center informed the search and recovery team.

Line map of the system:



Note: Map produced by the diver. Some lines are missing from the map, due to the project still being under resurvey and exploration. The above map is the latest and most updated version.

Search and recovery:

Once the call went out search team divers Skanda Coffield, Rob Bartlett, and Patrick Widmann met at ProTec Dive Center at 19:30 in the evening. The search team prepared rebreathers and DPVs (underwater scooters) as someone had heard the victim had planned to dive to the "far reaches". Due to the depth and uncertainty on the diver's route, this was the best option. The exact dive plan of the missing diver was unknown.

As the search team was gearing up at 21:30, Robbie Schmittner and Kent Stone arrived at Cenote Vaca Ha. They had made a search by land looking at another entrance connected to the system, called Cenote Tucha Ha. With no sign of the missing diver and no other known exits, the team realized that they most likely were looking for a drowned diver.

The search team planned to dive for a maximum of four hours using side-mounted closed circuit rebreathers, taking two side mount tanks, and an additional third tank as bailout and a DPV each with O₂ to drop at 6m / 20ft. The plan was to first traverse to Cenote Tucha Ha, and then if they did not find the missing diver continue through the Enormo land section to look for clues.

They descended at 22:00, dropped the O₂, and confirmed that the divers O₂ tank was still attached to the line and functional. The team regrouped and continued into the cave. At the first jump left, approximately 90m/300ft into the cave, what was believed the route that the diver had taken, leading to the area they thought he might be found. There was no jump spool installed, the team installed a jump and proceeded along. Patrick and Rob were ahead with Skanda following behind. Because this section of the cave is a low silty bedding plane (low floor to ceiling height with very fine sediment on the floor) visibility was quite reduced as silt was disturbed.

The team reached a restriction 215m / 700ft from the entrance where they encountered the diver without signs of life. The diver was found on the cave side of the restriction, passing the restriction would force a diver carrying three tanks, to remove at least one of the three tanks to pass. The diver was found carrying all three of his tanks, all tanks being completely empty and the DPV (underwater scooter) was still attached to the diver. There was no sign of distress or panic. Swimming the distance from the entrance would take a diver approx. 12-15 min.

Having confirmed the death and location of the missing diver, the search team exited towards Cenote Vaca Ha to inform the local authorities and to start planning for the body recovery. The total dive time for the search team was 40 minutes.

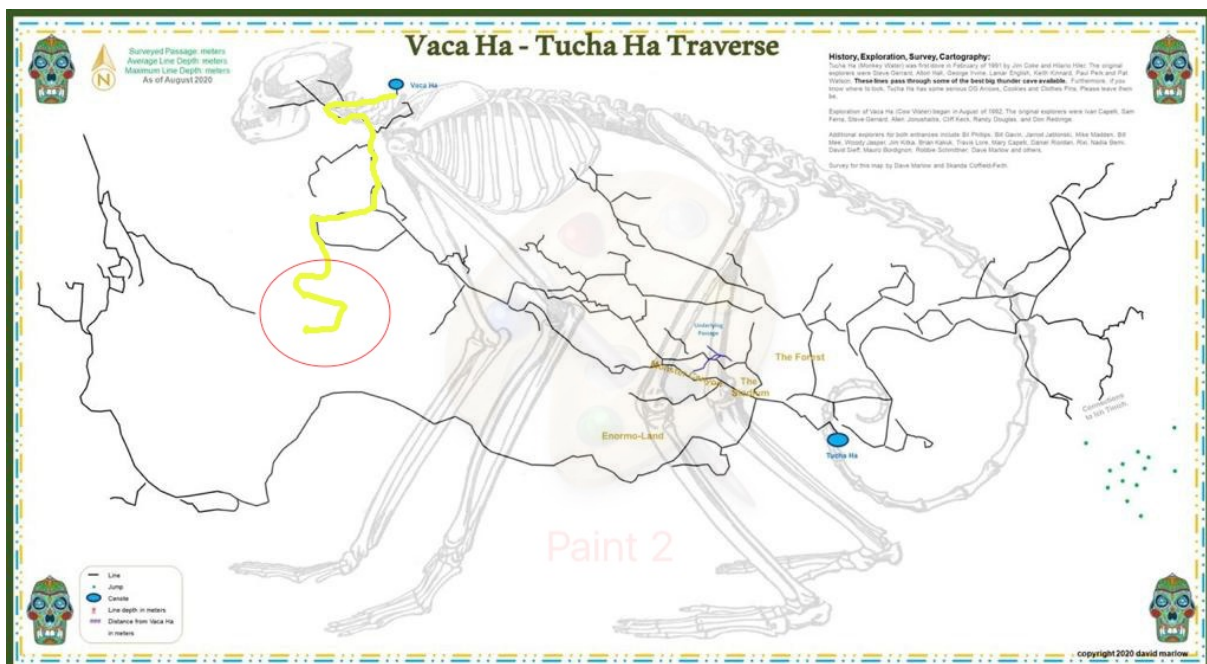
The body recovery was scheduled for the next morning. When a team of three divers (Rob Bartlett, Patrick Widmann and Kim Davidsson), entered the water for documentation and recovery. Recovery was successful with a total dive time of less than an hour. As well as the recovery team there were officials from Protection Civil, the police, and the Coroner's Office. Alex Alvarez was also there as support representing the divers through BUCEMA. Due to environmental conditions (zero visibility) during the recovery, a third dive was conducted by Skanda and Tamara Adame to recover the final pieces of equipment of the diver on the following day.

Victim:

The victim was a 49 year-old male, an American citizen. The diver was certified as a full cave diver in 2007 and did his original training in Mexico. On multiple subsequent trips, he continued his training and experience building. He was certified as an Advanced Side Mount diver, and in the use of multiple extra tank stages and also the use of DPVs (underwater scooters). He had visited Mexico many times after his initial certification and had professionally retired to Tulum in 2019. He had approximately 470 cave dives at the time of the accident. Since moving to Tulum he had been resurveying, exploring, and then creating line maps of the caves. He was a very active cave diver, having made many other line maps and projects.

Dive route:

The diver was using side-mounted cylinders configuration (2 x 80cft) with an additional stage tank (1 x 80cft) filled with 32% Nitrox and using a deco tank (40cft) of O2 left at the entrance. The diver was also using a DPV (underwater scooter) for propulsion and entered at Cenote Vaca Ha. The diver took the first jump left but did not install a spool to make the jump. No further navigation, spools or markers, were left. Later dives were made to the area to verify this. However, survey data from the diver's Mnemo survey device corresponded with lines of a section that had recently been explored. On the day of the accident, the diver had surveyed three different lines with a total of 300m / 900ft. These lines were either explored by the diver or a resurvey of existing lines or a combination. It is not clear how far the victim progressed into the cave, but he did not go past the jump to Enormo land as this shallows up to 6m / 20 ft. This we could confirm checking the victim's profile logged by the dive computer. Further analysis of the diver's computer gave the diver a maximum depth of 24m / 78ft with an average depth of 18m / 60ft and a total dive time of 160 minutes until running out of gas.



Note: The yellow highlighted line shows the divers route and the red circle shows the area the diver was working in.

Equipment analysis:

Forensic analysis of the equipment revealed no malfunctions or other likely cause for the accident. All regulators, valves, and tanks were in working order when tested after the accident. The tanks were completely empty. The DPV, a SeaCraft, had 73 percent battery remaining and was fully functional. The victim used equipment suitable for cave diving including all necessary safety equipment.

Conclusion:

Solo diving is a very controversial topic in cave diving. Not having a “backup brain” or partner to help you in case of a problem or emergency. Not having a second or third opinion in the planning or execution phase of the dive. It’s, however, a common practice in the area, especially for exploring smaller cave passages. One could always argue given the specific type of cave if solo diving increases or decreases the risks involved while cave diving. We do not know exactly what happened on the dive. We know where the victim started from, we know where the victim ended, we know the maximum depth, we know the average depth and we know at what time the victim ran out of gas. We know roughly in what area the diver was working and what route he took. What exactly happened on the victim’s last dive? One can only speculate and make educated assumptions. Becoming very comfortable in a normally very uncomfortable and unforgiving environment most likely played a factor. Solo diving, complex navigation, exploration, use of a DPV, recalculating gas range and penetration most likely were also contributing factors. But this is, as said, speculation and guess at best. What we do know is that scuba diving in water-filled caves with a limited gas supply can be an extremely unforgiving and dangerous activity. One major mistake or multiple minor mistakes on the diver’s behalf can have a fatal outcome.