TitiKayak expedition
Kayak the 1125 km(*) coast around Lake Titicaca, 16 Aug – 23 Sept 2013

Flag 117 report

EC member Louis-Philippe Loncke (left, Belgium) and Gadiel Sanchez Rivera (Peru)

(*) According to Wikipedia. No defined accurate distance has been measured or found. The journey of the expedition was around 1100km. We will never know exactly how many kms we paddled as we didn't count the distance going to the shore or while being lost in the Totora labyrinths.
The Lake

Lake Titicaca is one of the most iconic lake on the planet and certainly in South America. It is located between Peru and Bolivia at around 3810m altitude. It is often referred as the “highest navigable lake in the world” and is the largest lake in South America not connected to the sea.

I prefer to mention that its culture in the Andes is important and that with a growing population, climate change, the lake is in movement so it is important to conduct measurements on it to be able to take proper decisions to its management with respect of ecologic and geographic aspects.

The lake is around 8400km², contains 930 km³ of fresh water and around 2.5 million people have direct influence on the lake. It’s the primary tourist destination of Bolivia and second of Peru after Cusco.

Objectives

1) **Adventure:** Kayak around the lake in the 2 countries of Peru and Bolivia. The challenge was big enough especially in the winter and with the altitude. Winter has less rain so more clear days. We slept almost always in the tent on the lake’s shore. We met the locals around the lake and raised awareness about the expedition and the lake in danger. We also received testimonies of current issues. We tried to paddle within 100m of the coast hence doing the world first full tour of Lake Titicaca. This was not always possible as at times being 100m from the coast we were stuck in 5cm of water with the kayaks being laying on a muddy bottom.

2) **Geography:** take GPS points of the shoreline + GPS of the progress of the adventure. All GPS coordinates are freely available. (drop me a line/Google Earth file will be send to the EC HQ with a PDF of this file)

3) **Geography:** A photo inventory of the background of the lake has been created. Taking photos of the lake from the water in order to see how the background looks like and being able to compare it with the future. Exactly the same process as we do today with the retreating glaciers. (see further for more)

4) **Science & awareness:** Help the amphibian biologist Arturo Muñoz Saravia (below) to locate better the habitats of the endangered Lake Titicaca water frog (Telmatoechus culeus), the largest world’s freshwater frog. This was done by taking underwater photography with a GoPro camera. Awareness that this frog exists and needs protection.

Team

- Louis-Philippe LONCKE, 36 years old, Belgian explorer. Member of The Explorers Club.
- Gadiel “Cho” Sanchez Rivera, 34 years old, Peruvian adventurer and jungle expert. He has walked for 2 years with Ed Stafford the length of the Amazon River to its end. [www.gadielsanchez.com](http://www.gadielsanchez.com)

Louis-Philippe LONCKE (team leader) : [BelgianAdventurer@gmail.com](mailto:BelgianAdventurer@gmail.com)
Gadiel “Cho” Sanchez Rivera : [info@GadielSanchez.com](mailto:info@GadielSanchez.com)

Partners

- Save the Frogs: I met Dr. Kerry Kriger in Colombia. He wrote an article about the expedition and the endangered frog. Also in his newsletter his +20,000 contacts around the globe.
Each day of the journey is shown by the alternate of the colours yellow and blue. 2 dots indicate waiting days in Yunguyo.
Sponsors

PowerTraveller: gave a set of solar panel and battery

Select Paddles: gave 2 carbon paddles for seakayaking

Julbo: gave 4 pairs of sunglasses

Edgar Adventures (Puno, Peru): rented free the use of 2 kayaks from Universal Kayaks (Chile): 1 stable but slower CAROLINA (Cho) and 1 longer and faster MAGELLAN (LouPhi)

During the expedition, we received 1 free night stay at the Castillo Del Lago Titicaca and 1 night at Casa Andina on the island of Suasi. Remark: We received our sponsored equipment very late for the last 7 days of the expedition. It was blocked/delayed at the customs in Lima. A daily boat from Puno to the Isla Suasi brought us the vital equipment. We were entering the most remote part and we had pains in our upper body as it was literally collapsing from the effort at altitude, in the winter with not enough calories intake.

Media

The expedition was featured on Bolivian TV in a morning show walled “Hola Pais” on PAT TV.

In the national TV news of Belgium on RTBF and VTM.

Numerous web articles and in several major papers in Belgium. In the Caretas magazine and GPS magazine of Peru. Total press: http://louphi.blogspot.com/2004/06/titikayak-expedition-press.html

Resources

- Lake Titicaca Water frog: http://www.snre.umich.edu/current_students/masters_projects/telmatobius_culeus_and_lake_titicaca_bolivia_estimating_population
- Bolivian Amphibian Initiative - http://www.bolivianamphibianinitiative.org/
- Save the Frogs! - http://savethefrogs.com/
- Articles about the problems in Titicaca - http://pulitzercenter.org/search?terms=titicaca
- Video: http://www.youtube.com/watch?v=KCLNKUSN3mY
- Lake article and management: http://www1.american.edu/iced/ICE/titicaca.html
- Powerpoint presentation from Belgian Christian Nonis (owner Castillo Del Lago Titicaca), made in Nov 2005.

The photographic inventory

The aim is to be able to do the same as for the glaciers: http://geo.gl/IL7o87 Photos uploaded are about 0,5 megapixel. Enough to select a photo and see already a difference. The GPS location is in the comment of each photo. There are about 1500 photos organized in 9 coastal areas. Please drop me an email to receive the full 12 Megapixels. Free for science / NGO / non-commercial use.

Growing need in water of the population, less rainfall, melting glaciers, large evaporation... The problem is complex. Photography can help as form of measurements and awareness of the current state of the lake.
Will Lake Titicaca disappear?

Lake Titicaca is not the Aral Sea but the same outcome could happen in the future if we do not take care. Of course, there are some natural factors we cannot stop. Evaporation accounts currently for 90% of the water going out of the lake. If the sunshine increases and the water coming to the lake decreases, the lake might completely change and desertification will start and the lake will become like the rest of the Altiplano.

The problem is complex as one must take into account the entire basin. Most of the studies done by the government bodies of the lake, like the ALT (Binational Autonomous Authority of Lake Titicaca) do only encompass the basin they call TDPS (Titicaca-Desaguadero river-Poopo-Coipasa). They do not take Salar de Uyuni into account. The only river exit from Lake Titicaca is the Desaguadero River. The gate controls the level of water in the lake and the amount of water going into the river system. I personally believe that the gate will never be open to flood back until Uyuni (let alone if possible?) Is this the reason why the ALT doesn’t take Uyuni into account? Uyuni is at a lower altitude than Coipasa, thus could receive water.

For the Aral Sea that was diverted for agriculture purposes, the consequences are still today: desertification, increase of diseases of 3000%, high infant mortality, life expectancy reduced to 38. (Source: Christian Nonis)

My main concern is about the villages and towns living alongside the Desaguadero. If there is a large shortage in water, the gate must be opened, hence the level of Lake Titicaca might start to decrease.

What will be the political decision between Bolivia and Peru in this case? Let the Bolivians suffer or take a risk of decreasing the entire lake’s level for the Bolivians and the Peruvians?

When we kayaked, we definitely saw the impact it could have on lake minor (Bolivian part) as we were at times several hundred meters away from dry land and the depth was only a 3 inches. At one location we were “escaping” the jungle of Totora and at 2km from the coast I could see the bottom of the lake a less than 1 meter deep.

Let’s have a look at Christian Nonis’ study about the decrease of water level of Titicaca.
The preparation

I prepared the expedition in Lima at the non-for-profit South American Explorers where I could access WiFi, maps and they helped me with some difficult phone calls in Spanish I could not make. They got also in contact with Edgar Adventures and secured me a free rent of a kayak. A few weeks later, Edgar heard we were 2 and decided to give us 2 kayaks, paddles, drybags and spraydeck. At that time, I knew I could not stop the preparation and that we have the strict minimum to go. Remark: At the end of the expedition I sold to Edgar my new carbon Select Paddle for 1/3 of the price as to repay him for the small damages on the kayaks.

Finding equipment in Lima is very hard, especially electronics that is imported with a heavy tax.

I did all the preparation myself including blog, Gadiel’s website, contact my press contacts. I paid a bilingual volunteer 3 days to work on the press but that didn’t deliver much media as it is very hard to make the Peruvian press move. I even met 2 TV stations myself in Lima by coincidence, contacted them but they didn’t react before or after the expedition. I felt disappointed for my the publicity of the expedition but even more for the Peruvians who have no much clue about the importance of Lake Titicaca.

The expedition

We had mainly sun during the day, which made a perfect temperature between 9am and 5pm. Before and after that we were freezing. When there were clouds, we were cold. In the 4 storms we passed, we were fighting for our lives as swimming in that cold water would have been a life treat. We can only sustain 5 minutes in that cold water. At the end of the first week, leaving Pomata we were caught by a storm and heavy rain that lasted 2 days (see on the daily progress map the short stretches of colours before arriving to the border). We had to bail out on a beach after paddling for 2 hours along tall cliffs.

Edgar told us we picked up the worse time to paddle with respect to the wind. In August the season starts to go back from winter to spring and the winds can suddenly change in direction with a strong burst that can turn a kayaker over. We experienced this a few times and even a small tornado with the fastest winds we had ever seen. A small twirl passed us with tiny debris of dust. But luckily we were in low water and we rushed for the coast to get protection in the Totora plants. The incident lasted only a few minutes.

We got several times lost in the Totora trying to find a way out or a way in to the coast. Our biggest fear was to have to pass a freezing night in the kayaks. In Bolivia, the water is so shallow, there are 2 areas where we didn’t map the coastline with GPS as we just couldn’t reach the coast. I took the decision not to continue attempting reaching this part as it would have put us in danger and we would need perhaps 2 weeks to
cover the 45km of coastline. We didn’t have the time to do that. It would be more efficient to take the GPS points just walking. But we managed to go on an island and get high enough to take long distance photos of the background to at least have some data.

Another part not mapped near the West part of the lake in Peru is the national protected reserve. We didn’t receive the permission from Victor, the chief of the reserve. He promised us to allow us to go with a zodiac in the protected area with him, under supervision, for an hour but that did not happen. We are actually happy he said NO as that part would have been the worse if not impossible to reach the shore. Because it is protected, there are no “canals”, hence attempting to jungle-kayak across a wide 2-3 km of Totora would be insane and probably become your own tomb as going out could perhaps be impossible. We had a machete with us but luckily we never had to use it... but we lost at times hours and sweat to get us with bare hands across the Totora.

On day 31, we arrived at the Isla of Suasi. Christian Nonis had called Marta and her son Miguel and we could stay on the island. We had no clue we could rest in fact at the island’s resort for the night. We spent the afternoon resting and doing emails, saving photos... and recharge the batteries. We ate as much as we could as we were waiting for the next day noon to receive our sponsored gear from the daily boat coming from Puno. Just in time! I called Christian to thank him for the contact and he asked us why we didn’t update the blog and if we were safe with THAT winter. There was no blog update as we were in a remote place. There was no internet in Bolivia, not even at the Bolivian Naval base in Tiquina. When I asked him why he was concerned about the winter, I told him I had my toes and fingers frozen every morning and evening. He told us what was really going on. Puno and the entire region had suffered from the coldest winter in 30 years. Snow topped in a few hours to 30 cm and several houses collapsed killing the inhabitants. We had of course no idea that this winter was so cold, for us it was normal. We had actually a very few days without frost on our kayaks and in our tents in the morning. I had 2 toes who became numb and were back “alive” in December, so 3 months after the end of the expedition.

**Diving with the Frogs**

In Tiquina, we met the Bolivian army and especially their dive centre: Centro de Instrucción de Buceo en Altura (CIBA), which is the highest diving centre of the planet. They showed us around the facilities including the new decompression chamber. Sad thing is that there is no permanent doctor to operate the chamber.

On our second passage to the Detroit of Tiquina, I had the privilege to dive (with only 8mm suit) in the cold waters of Lake Titicaca. We stayed only 20 minutes at 6m deep but I saw about 30 freshwater frogs. These animals are indeed huge frogs.

**Drinking water from the lake**

We resupplied in water in towns where we could. For the last 2 weeks, it was remote so we started drinking water from the lake without any purification method. We just took the water in our 2 litre bottles about 500m from the shore.
The Uros and the floating islands
We spent the last evening on a floating island as we couldn’t reach land. Gadiel was suffering at the stomach so we decided to stop at 7 pm. A gentle family allowed us to stay on their island and take photographs. They are located on the furthest floating island of the lake from Puno. They are thus the least visited. But indeed, they continue living there for the tourism industry. They had a TV, solar panels and even a large reservoir of water supply. They don’t drink often water from the lake as that areas is extremely polluted by toxic chemicals coming from the industries in Juliaca, the “China” factory of Peru. The kids were very curious of all our gear: tents, headlights, gas stove, sleeping mat...

The locals
We always had a good contact with the locals. They all were curious about our kayaks, as they had never seen one before except near Puno. In Bolivia, none had seen one. They all wanted to buy it once we said we never capsized. Indeed, some fishermen died after having their boat being overturned by a wave. Also we had to convince them we had no engine and could go faster than their rowing boats.

The kayak really helped to break the ice and then we could explain what we were doing and why, which was appreciated. Old people never hesitated to tell us about all the problems they had. One farmer told us his cows refused to eat the Totora plant that was near shore (containing pollution) so he had to cut the grass far from the shore. The fault of the “Gringos” he said. Only one man started shouting at us once he saw us, he was very old and thought we were Chileans (he remembers the war). We proved with our passports we were not and started a conversation.

Most of the villages are very poor, especially in Bolivia. We saw kids working as well but I think classes start early and finish in the early afternoon. Fishermen do only row in Peru but Bolivian do row or sail. A rich Bolivian fisherman has an engine! On the boats we also see Totora planet cutters. They cut it for construction but mainly to feed the animals. Some do specialize, as women, in collecting the algae in the water to feed to cattle.
Procedure for the GPS points and photos

To take a GPS point, we just put the nose of the kayak on the beach (or the back) and if possible (in the Totora mainly) we go parallel to the shore so our point taken is exactly where the water meets land.

In the Totora, it takes time to navigate through it but safe as the waves are broken by the plant. Near cliffs or rocks it is very tricky and we have to go fast along the edge and quickly go back in the lake to avoid collision. Even on the beach is hard as the waves break and we do get water into the spraydeck that wasn't very efficient to block water out the cockpit.

On the photo below, Gadiel goes backward into the rocks, stretches his arm backward, takes a point then enter in the GPS how many meters (1 or 2) he is from the rocks.

While he is doing this, I wait for safety. Then when he moves to safety back in the water, I go away about 50 meters to take a photo of the location. Our GPS and Photocamera do have the same time so it’s easy to know where the photo was taken. This is illustrated in the photo below I took the photo while he moves to the beach. That photo is important as with the high resolution one we can count the houses, almost count the trees and in 10 or 50 years there might be no more trees and 5 times more houses. We need to be able to monitor this evolution.
On the photo above, I went straight into the beach, my GPS point is accurate and we can see the patterns of the cut trees. It seems every person cut the trees is his backyard. What when there are no more trees? Good news is that we saw a few hills with dark green squares or rectangles of new planted trees. It seems there is a movement in progress and hopefully it will spread all around the lake.

For the underwater photos for Arturo, I just took a photo 30 cm under water when we could see the bottom. Arturo told us the frog likes a rocky bottom like the photo below. When I dived I saw many frogs hidden in the grass.
Type of pollution

Lake Titicaca is in danger, the potential slow evaporation is an issue but one of the largest problem is pollution. It is all due to human activity. I consider 3 types of pollution:

1. **Sewage water**: As there is no sufficient water treatment plants; caca, urine and dirty water goes directly in the lake. The best example is the bay of Puno where caca floats around. If the Westerners do not bring technology and investments to help building water treatment stations, with a growing population moving to larger cities like El Alto near La Paz, the lake will face a terrible change of its ecosystem.

2. **Plastic and other trash**: Plastic and tretrapacks are everywhere in the water near villages and towns. We also saw many plastic bags 50 to 1 meter deep in the water. Fishing nets do trap birds. Gadiel saved 2 ducks from drowning by cutting them free from a loose net. Martha told us plastic is the worse, it is said that when Cousteau was here (she met him) and went to the bottom of the lake (max depth = 273m) he saw tyres, plastic and all kind of waste covering the bottom. That was in the seventies. How is it now?

3. **Chemicals**: This is the worse as it is impossible to really see it and to retrieve it. It gets ingested by the plants and fish. Plants are eaten by cows and other far animals. Fish are eaten by men. According to the UN water report of 2003 (see resources) there are already kids have diseases from it. We saw a fisherman complaining about his forearms burnt by chemicals near the river outlet where he is fishing.

Type of molecules found are dropped by the gold mining industries (Rio Ramis): Hg, Co, Pb, Cd, Cn, and Zn. In 2002 it was demonstrated that fish in the markets in Puno contained mercury.

Trout culture uses Fish flour (4kg to produce 1kg of fish). Trout is not native from the lake. Eggs are still imported, antibiotics and some toxic substances (banned in EU but not in Peru) are used. There is a risk to spread diseases. 70% of food pellets is not eaten by the fish (in cages) and sinks to the bottom creating phosphorus and nitrogen that develop algae and drives away the native fish hence changing the ecosystem in place for years. The change of the ecosystem brings new parasites because its kills local bacteria in the water. The cages allow migratory birds to rest and eat some of the fish. To stop that, fisherman poison them and dead bodies sink in the water.
Conclusion

The data we gathered was +1500 photos of landscapes, more than 1 per km. Sometimes for each GPS points I took 1 photos left and 1 right of it to increase the area that can be monitored / compared with the future.

I took 90 underwater photos that are in possession (with GPS coordinates) of Arturo. These GPS points were taken in and agreed area where he no diving has been carried out: between Tiquina and the border with Peru (Northern part of the lake).

979 GPS points were taken and we shot 9 hours of HD video.

A typical day was to wake up at 5.30 and paddle until 10pm or when safety required to stop for the day just after the sun went down. We paddled almost every day after the sun went down.

We are very proud of the success of this expedition. The adventure was great. We reached all our scientific goals. We have no major injury or disease apart from Gadiel who had a tendinitis at his forearm on day 4 to 6. Then we were forced to rest due to the storm and time to do the paperwork to cross the border with the kayaks. He then felt no problem anymore. During the rest of the journey he had diarrhoea so he used mostly all the toilet paper. The first day his nose bled a bit due to the altitude.

Personal thoughts and advice

Titikayak was my 10th expedition and the one I liked the most because it included everything: sharing the days with another adventure, who has the same mental strength. I was happy of my decision to propose him to join me and very glad he accepted. Alone, this expedition would have been very hard. It's impossible to access the hatches and take out some equipment when you are alone on the water. There were days were we did not get out of the kayak. We reached shore or a few meters from it, took our point and went to the next one.

Gadiel picked up kayaking very quickly. Luckily none of us capsized. If we had done so in very dangerous moments -like paddling at night in the Totora or following a stretch of several kms of cliffs before reaching a safe beach- we would have been in trouble, or dead by hypothermia or smashed on the boulders.

At one occasion, a wave lift me and my kayak and dropped me on the rocks. It was a very dangerous and uncomfortable situation. Gadiel was not able to help me. Doing so would have put him in danger as well. Luckily, I stayed calm, water for a wave big enough to tilt with vigorous force and my kayak went back in the water.

Communication with Gadiel was not always easy. We spoke in Spanish as his English is not sufficient. Due to a cultural and education difference, he often didn't understand what I meant and told me afterwards he felt stupid as I was sometimes screaming. And I was of course as I was not sure he could hear me properly -sound of waves and wind- and I got pissed off a several occasions as he didn't do what I asked him to do. This was all because it was hard to tell him where to go next as we simply didn't know exactly how the coastline would look like after a cliff corner. I gave instructions, changed my mind when I had a better view... not easy. But all in all, we get along very well. The focus on taking the GPS points and the photos was the primary objective. The last 2 weeks, when he was more comfortable with the kayak, I let him go to the shore to take GPS points when I was going more in the lake to have a large overview of the coastline and take the corresponding photo. This worked well and saved us some time.

We are very proud of what we did. I am not sure someone will do this again in the future (I hope so) as it is harder kayaking than it seems to be. Progression is slow, not only because of the altitude but also because of the coast itself that has mainly a low slope and makes it hard it reach the shore.

There is not much to prepare for this expedition really. With good kayaking equipment, a team could go in a few days. The most important is to be ready for being in real trouble (life danger situation) if the weather or wind changes direction or becomes a storm like we experienced a few times. And of course to be ready
to be lost in the Totora (attach something that floats to your GPS because if you lose your GPS, especially when dark, you cannot see the coast and get disoriented) and pass one night sleeping in the kayak.

I hope to finish putting the GPS points into the photos early 2014, contact universities to make them aware this inventory exists and start writing my first book about the expedition and the science part as well.

I personally thank everyone involved in this project. You all contributed to its success. I thank especially Gadiel for being my partner and very courageous and patient with me. Before the expedition, he had never seen a kayak, never been on altitude, never been in cold temperature and of course never seen Lake Titicaca. I trained him with the basics of seakayaking in 3 hours, then he trained for 3 days around our home base, the YAVARI boat / museum.

A special thanks to Mr. Jean-Luc Sanchez (French living in La Paz) for putting us in touch with the CIBA. Many thanks to Christian Nonis, Blas, Martha, Miguel, Mr. Michel Dewez the Belgian ambassador in Lima, the Belgian staff of the CTB, Gary Catterall, Andrea Zuniga, the South American Explorers and Guy Vanackeren.

To all the friendly people we met in this human adventure: WE will not forget you. I hope to find the force and resource to write my first book (first in FR then EN, ES and DE) and produce the documentary about this expedition.

Finally I want to thank the board and directors of the FLAG Committee who awarded us the privilege to carry FLAG 117.

From left to right: Commandant Renan Guardia (CIBA, Bolivian Navy), Gadiel, LouPhi and second in charge Wilson.