

# JAMES RENNIE BEQUEST

## REPORT ON EXPEDITION/PROJECT/CONFERENCE

<b>Expedition/Project/ Conference Title:</b>	Operation Wallacea Mexico Expedition
<b>Travel Dates:</b>	25 <sup>th</sup> July – 10 <sup>th</sup> August
<b>Location:</b>	Mexico
<b>Group member(s):</b>	Abigail Robinson
<b>Aims:</b>	Research assistant in biodiversity and conservation field work

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### OUTCOME (not less than 300 words):-

In the summer of 2016 I was trained and volunteered as a research assistant in biological conservation management and biodiversity fieldwork. During this placement with Operation Wallacea I spent three weeks living in the Mayan jungle and three weeks at the marine site in Akumal, Mexico.

Mexico is home to the largest expanse of forest north of the amazon, the Mayan Jungle. Rich with the historic culture of Ancient Mayan civilization and still surviving Mayan communities, these forests support a vast diversity of wildlife. The habitats supported by this extensive area in the Calakmul Biosphere Reserve studied by Operation Wallacea serve as important migratory routes between populations and resources, particularly for key endemic species found nowhere else. The problems being addressed by operation Wallacea stem from the effects of deforestation, climate change and increasing tourism in these areas, disturbing ecosystems and local communities. In order to combat these problems ecotourism and sustainable agricultural projects with locals have been developed in conjunction with constant ecosystem monitoring and data collection carried out by academics and students such as myself. The data collated over large areas can be used to assess changes in ecosystem dynamics, give insight into improvement of conservation management methods, and provide evidence required to maintain the protected status of these crucial areas.

I spent the first introductory week at Mancolona camp in the north of Calakmul reserve. Here, myself and other students were given a series of lectures to prepare us for the following weeks, covering topics such as the ecosystem and species supported in the reserve, particularly those endemic to the Yucatan peninsula. Head scientist Kathy Slater showed us how she uses data from the reserve for conservation schemes. The project in Mexico has been running for a few years now, and coming out of the baseline stage of data collection and into long-term data analysis. This has allowed Kathy to look at long-term patterns in the reserve, and try to disentangle natural cycles in the ecosystem from more serious changes that may require human intervention.

Drought is a huge problem in the Yucatan peninsula. There has been a 20% reduction in rainfall over the past few years, with no pattern in rainfall whatsoever. Crops are failing and there are no rivers or streams to supply people and wildlife with water. The bedrock is limestone and porous, therefore when it does rain, the water quickly erodes and destroys ground vegetation. The only source of permanent, or often semi-permanent water is in aguadas - small pools of water. This year most of the aguadas have dried up, therefore artificial water troughs have been installed to provide water

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for animals. Water is even brought into remote villages in tanks.

As a result endemic crocodile species have shown abnormal migration patterns, moving closer to Guatemala to find water. This has also been seen with Jaguars, who move in response to prey movement south of the border, also in search of water. Opwall is looking into whether these cycles of drought, and then periods of rain are a way of restoring natural balance in the ecosystem, or if these are irregular patterns, that are detrimental to the ecosystem that we should be interfering with and trying to rectify.

If the jaguars and leopards aren't moving they are instead preying on livestock, and therefore come in contact with humans, who then hunt the large cats to prevent them from preying on their livestock. Furthermore, hunting deer is not against the law for locals, however hunting peccary is, since by hunting the prey of the jaguar, the jaguar then turns to kill more livestock.

These are but a few problems Calakmul biosphere suffers from, further demonstrating the importance of data collection by organisations such as Operation Wallacea in order to design projects such as sustainable hunting quotas and ecotourism, and thereafter monitoring these to assess their effectiveness. This is where my role as a research assistant is important. Calakmul is a large reserve, and a large group of people are required to collect sufficient data.

During the initial training week, we were split into groups and rotated between surveys to get an idea of what each scientist was doing there. The jungle site is made up of four separate camps spread out around the reserve. Within each camp there are four transects, each of which is two kilometres long. Five habitat plots are measured out (20 m x 20 m) along the transects so that the habitat type in that area can be identified and compared with recordings from other species surveys to look at habitat preference. My job was to assist in setting up traps and nets, as well as recording data in spreadsheets. It was important for some surveys for me to be familiar with the species being handled by the scientist I was assisting, to speed up the recording process, for example with bats.

At each camp there were scientists focusing on mammals, bats, birds, Herpetofauna and habitat. Every day each scientist would do one transect, either looking for signs of different species or the species themselves, depending on the survey. For the second and third week in the jungle we were located in a very remote and pristine area of jungle called Dos Naciones, where our camp was very basic, and the climate and terrain more challenging. However, this environment only enriched my experience, I found these two weeks very exciting since I chose to spend the majority of my time working with the bat team. During these two weeks we carried out mist netting surveys along transects in order to catch bats. Once caught, the bats were measured, sexed and species identified and recorded. I showed particular interest in the bats and identifying the species, therefore the scientists allowed me to put up nets myself, and carry out some identification. This was really important to me, since bats are an area I have considered specialising in before, and one in which I appreciated the experience and creating links with various scientists. A lot of the scientists gave me really good advice as to what I can do in the future and suggestions of future career paths.

My interest in bats lies in their importance within the ecosystem. As such a diverse mammal, there are various different species that feed on almost any food source. Therefore bats are indicators within the forest. For example we found many frog eating bats (*Trichops cirrosus*) near areas of water, and areas nearer livestock and civilisation we found caves full of common vampire bats (*Desmodus rotundi*). Bats are extremely important for bio control, since they consume a vast quantity of insects, particularly mosquitos. But most importantly they are extremely important in regenerating forest. Since fruit bats can fly far from a roost in one night, they deposit droppings filled with seeds throughout the forest away from the source tree, therefore spreading seeds to

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areas where regeneration may not have occurred otherwise.

In my fourth week I moved to the marine site in Akumal. I had the advantage that I could already dive so spent my first week learning to identify fish, invertebrates, macroalgae and corals. These lectures were accompanied by ID dives with marine biologists, who pointed out different species under water. This process was important for us so that in the following weeks we could confidently identify species for different surveys. Within this week, various academics lectured to us the importance of the marine environments, the problems these ecosystems are facing and therefore why it is important that we are collecting data.

One of the biggest problems in Akumal itself is with tourism. Akumal bay is home to a large number of turtles, which attracts tourists to the beach. Operation Wallacea is looking at whether the high density of tourists is affecting the behaviour of the turtles and increasing stress, which may be lead to immunocompromised turtles. The majority of the green turtles in the bay show external tumours, thought to be brought about by a virus exacerbated by the stress caused by tourists. Everyday we carried out snorkel transects to look at the number of turtles present, their behaviour, the number of tourists present around the turtle and the tourists' behaviour. We were appalled to find that many tourists showed extremely invasive behaviour towards the turtles, including touching, grabbing and standing on them. This demonstrates the extent to which tourists may be causing stress. Akumal has recently become a protected region of the coastline, and in the future Operation Wallacea hopes to control tourist activity in the area more, and reduce the stress to turtles.

As a diver my job was part of a team that would go to different sites just outside of the bay and lay down 50 m transect lines on the reef. From this we swam along the line to record the number of herbivorous fish (those that feed on coral), types of coral, types of substrate, and the presence and absence of sea urchins. Reefs are extremely important ecosystems, they protect coastlines from wave erosion, support extremely high diversity of organisms and are important sources for the pharmaceutical industry, for example for the use of antibiotics. Of 34 known animal phyla, 32 are found on coral reefs, for ecosystems that make up only 2% of the ocean, 1/3 of marine life occupies them. 38% of organisms that live in coral reefs are so rare that they have only been encountered once, however coral reefs are extremely fragile.

Coral reefs have specific requirements. Not only do they require a stable sea surface temperature, but also a stable community of fish, algae and invertebrates. As a result, our data collection allowed us to look at the health of the reef. If there are a high number of herbivorous fish, then this may correlate with evidence that corals are being eaten. However, fish are also required to eat the algae which often clings to the coral, and prevents light reaching the polyps of the coral to produce sugars. This is where urchins become important, by further grazing on the macroalgae and preventing it from essentially suffocating the coral.

Another aspect that we were looking at was coral bleaching and regeneration. This we would carry out by measuring corals along transects and estimating the percentage of the coral alive, or bleached or damaged. This is important to assess since the Caribbean has recently experienced mass coral bleaching due to rising sea surface temperatures. Therefore assessing how well the corals are doing a few years on is important in understanding how ecosystems are responding to climate change.

I thoroughly enjoyed this experience, and greatly appreciated the opportunity to expand my knowledge of aspects of animal behaviour, ecosystems, as well as environmental management. I felt that these six weeks were invaluable in being able to apply the past three years of my degree to real situations. My field skills are now far more refined, particularly diving, which will help in my

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future career. This was also a very important opportunity for me to contribute towards research and be part of projects that are new and experimental.

I have made some very important connections with fellow students as well as academics that have offered support in the future either in further study or future career. Importantly I have developed social skills in group work and leadership, as well as dealt with talking to and trying to educate the public and tourists about the environment. These are all skills that I can apply in my final year at university and throughout the rest of my life.

I would like to thank you for your support, I am very grateful for the experience. I hope you enjoyed hearing about the work that went on in Mexico while I was there.



Scarlet Flycatcher



Common Vampire Bat



Frog Eating Bat



White Eye Tree Frog



My team doing reef surveys