

INTRODUCTION

My name is Emily and I am an undergraduate at Royal Holloway studying Zoology. I was awarded the Peter Marsh Prize which helped me fund a research project with Operation Wallacea in Akumal Bay, Mexico. I spent six-weeks researching the effect tourism was having on the immature Green Turtle (*Chelonia mydas*) population found in the bay, collecting data for my third-year research project.

LOCATION AND SUBJECT

Akumal (meaning 'home of the turtles' in Mayan) suffered a hurricane in 2005 which dragged most of the beach into the bay. This created the perfect conditions for seagrass growth and meant the bay could now support up to 80 immature Green Turtles, a species categorised as endangered by the IUCN. Juvenile Green Turtles have an omnivorous diet, living in the pelagic zone of the ocean, but immature Green Turtles have an herbivorous diet, consisting of mainly seagrass. This diet restricts the turtles to areas close to shore until they



mature. There are no other areas near Akumal that can sustain the turtles and thus the turtles remain in the bay all year round for approximately five years. The high density of turtles in the bay has made Akumal into a well-known tourist attraction. By 2010, 2000 tourists could be found in the bay at any one time, crowding, touching, and, in some cases, picking up and throwing turtles. Hotel waste, sun cream, insect repellent and Sargassum influxes also created high levels of pollution in the water.

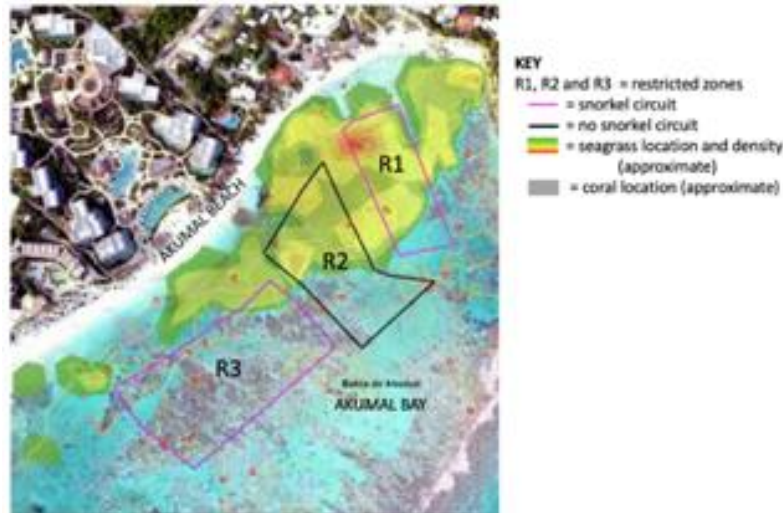


THE PROJECT

This project was started in 2014 by Operation Wallacea in order to assess the effects the tourists and their associated pollution were having on the turtles as well as the ecosystem and reef in the bay. It was found that the pollution was causing epiphyte growth on the seagrass which meant the turtles would not eat it. The water pollution also leads to the advancement of Fibropapillomatosis (FP), a disease affecting the turtles that causes external tumours and internal fibromas. If they are unable to fight the virus, tumours on the eyes can blind them, while internal fibromas will eventually kill the individual. Stress, a known immunosuppressant that prevents the turtles fighting the virus, massively increases when tourists are present.



Operation Wallacea's research led to the bay becoming a Marine Protected area, with regulations starting in 2017 and designated snorkel circuits being put into place in 2018. Further research is still being done to find out whether the regulations are aiding the turtles, and also to prove whether more policing of the regulations is needed to protect this endangered species.



DATA COLLECTION

For my project I wanted to find out the effect tourism was having on the behaviour and distribution of long-term residents compared to recent immigrants in the bay. Distribution data was collected using twenty-one 200m transects which were swum six times in total (three times in the morning and three in the afternoon) using GPS navigation. The number of tourists and turtles found within 2.5m of the transect were recorded, along with their distance along the transect. These could later be correlated to a map of the bay to see whether the turtles and tourists were found in the same areas.



Behavioural observations consisted of two-hour intervals between 7am and 7pm. Three (out of six timeslots) were used each day and rotated to ensure equal collection of data at each time of day. We used focal animal sampling, observing each turtle for 20-minute periods (with a minimum total observation time of one hour). An observation had to be over twelve minutes in length to be used in the analysis. Pre-determined behaviours were recorded and the time at which they took place were noted. The area the turtle was in (and moved to) were

also recorded. Tourists within five metres of a turtle during an observation were recorded, also using pre-defined behaviours.

THE FINDINGS

While the final statistical analyses are yet to be completed, it was found that turtles spent over 90% of their time in restricted areas (where tourists could not get too close), suggesting avoidance behaviour. Higher rates of evasive behaviour have been found when turtles are in the presence of tourists (although statistical significance has not yet been analysed).

Anecdotally, recent immigrants to the area seemed to be more skittish in the presence of tourists as well.

THE EXPERIENCE

This project has helped me realise that I do really want to continue with field work after university, but it has also opened my eyes to some of the practical challenges that come with carrying out what seems like a simple plan. Ill health, poor visibility, lightning storms and misunderstandings with the locals were a few of the issues we faced during this project. I am unbelievably grateful for the experience – I will remember it, the people and the turtles for the rest of my life, and I won't be able to stop talking about it for years to come. The expedition also allowed me to gain my PADI open water diver qualification, through which I have found another passion which I plan to pursue. I hope to return to Akumal and Operation Wallacea expeditions, whether that be to undertake more research or as a staff member.

