

Murray Foundation University Award: Operation Wallacea Post-Season Report 2019

Callum Hudson - Honduras

Shelter competition between Lionfish and Caribbean spiny lobster

The invasive lionfish, Pterois volitans, is native to the SE Asian Pacific. Following it's hypothesised release off the coast of Florida in the 1930s however, the species has spread throughout the Mesoamerican reef system. Lionfish now pose a large threat to many crucial reef species, such as herbivorous (algal grazing) fish, which are essential for maintaining coral dominated reefs. Such fish can effectively mediate reef resistance to phase-shifting to algal dominance in the stead of Lionfish.

P. volitans however, eat many juvenile fish, produce up to 20,000 eggs at once, and have few, if any, natural predators in their invasive range. Reports from fisherman also suggest they may be negatively affecting the charismatic Caribbean spiny lobster; the effects of which are two-fold. Ecologically, lobster are a keystone species on Caribbean reefs (acting as important scavengers and predators), helping to support a healthy reef system. Economically, they represent a major source of income for many coastal dwelling Hondurans, with exports yielding over \$100 million annually.



My experiments whilst working with Opwall in Honduras this summer aimed to examine how lionfish may be affecting lobster in terms of sheltering (critical to their lives, as they spend much of the day hiding from predators). I performed my tests by collecting specimens from the local reef of Ensenada and conducting lab behavioural experiments in tanks containing a single shelter, for which the species must compete. Individuals were first acclimatized for 24 hours in holding tanks, before they were transplanted to trial tanks. Here, over a second 24-hour period, the interactions and shelter use of each species was recorded for each trial utilizing an IR camera (lionfish + lobster, lionfish alone or lobster alone) with hope to demonstrate whether the lionfish is indeed having an effect on lobster sheltering.

The video data analysis consisted of measuring the relative times each individual spent either active or inactive whilst near or within the shelter. These measurements, we predict, will accurately yield an indication of how natural sheltering behaviours may be altered by heterospecifics. Other behaviours of interest were also noted, including lionfish fin flares and lobster antennae whips. Following the lab trials, the lionfish were dissected, and morphological measurements were recorded. This data will also be included in our analyses to examine whether physical characteristics explain the observed interactions and behaviours.



On the reef, we also performed coral habitat assessments on shelters and in areas that both lionfish and lobster use naturally, to observe what distinguishing features they prefer in their refugia. Using this data I will be determining a 'background' reef assessment, to characterise the reef's 'average' structural characters, before performing specific Lionfish/Lobster shelter assessments (on refugia in which they have been found). From here I will compare the assessments to determine how the shelters used by each species may differ from the reef average, and in what ways (ie. more or less rugose...). An overlap in shelter structure characters between the two species would provide one explanation for any shelter conflict, however we are yet to reach such conclusions.

My time in Honduras did not solely consist of work however! Over the 7-week trip I would dive twice per day on beautiful and incredibly healthy Caribbean coral reef. I was lucky enough to spot a massive range of great finds, from a 8-9ft nurse shark to 2mm Sea Goddess Nudibranchs! Between diving and data analysis, with the large group of other Opwall students, I would fill my time by snorkelling just offshore in search of rays and barracuda, kayak on the lagoon, play beach volleyball, swim in the house pool and run my own mini beach cleans.







Kate Sharmen – Indonesia



Wow... what a summer that was! I've just arrived back to the UK after spending two amazing months with Operation Wallacea in the coral triangle on a tiny island called Hoga in Indonesia. Though I was a long way from home (more than 8,770 miles to be precise) as soon as I stepped off the boat onto Hoga I knew that I had nothing to worry about. Everyone from site staff, to research students, to volunteers to local staff were so welcoming, loving and happy to share their culture with me. I soon settled into my beautiful traditional mandi-hut which I shared with Holly who was a volunteer who quickly became a good friend.

I didn't want to waste any time therefore the day after arrival I started a week-long Reef Survey Techniques course, where I attended a series of enthusiastically delivered marine ecology and diving skill lectures. Part of this course included snorkelling within a nearby mangrove forest which absolutely amazed me as this was the first time that I have ever seen a mangrove ecosystem. During this course I also undertook training in scientific diving where I practiced and built upon skills such as transect laying, belt transects and species identification.

Upon completing the Reef Survey Techniques course, I was excited to spend the second

week carrying out preliminary data collection snorkels. This week was so important in terms of ensuring that my actual data collection went smoothly as it gave me the opportunity to practise and refine my data collection method. By the third week of my expedition I was comfortable and confident with my data collection method which meant that I was ready to jump into action and start collecting the data for my MSc research project – the main reason why I embarked on this science expedition to Hoga.

So, for the next five weeks, I utilised 3D modelling techniques and conducted habitat assessment scores and rugosity measurements alongside fish, invertebrate and coral ID surveys. This data will be used for my MSc research project which focuses on how the structure and spatial distribution of coral bommies in a coral reef patch impact upon fish and invertebrate diversity. Due to the large amount of time that I was able to spend collecting my data, I managed to collect a much larger dataset than I ever anticipated by surveying over 200 bommies and identifying 8719 fish and 4108 invertebrates. I hope that this research will both show the conservation value of coral patch reefs and contribute recommendations for the structure and spatial distribution of future artificial reefs to increase their effectiveness.





Though the main reason why I went to Hoga with Operation Wallacea was to collect research data, I ended up leaving Hoga with so much more. I grew as a conservation biologist by learning new field data collection skills whilst collecting data and improving my communication skills through delivering a presentation on my research to approximately 50 people (of staff, volunteers and locals). I built upon my diving skills through assisting with any science dives that I could jump on. Through the locals sharing their culture with me, my eyes have been opened and I have adopted their outlook of appreciating what I have rather than wanting more. My life has become so much richer with the many friends (both volunteers and local staff) that I now have. I have memories of fun, laughter and the feeling of awe when I saw both marine and terrestrial animals which will last a life-time. In Hoga I think that it's safe to say that I found my home-away-from-home.



Duncan Swanney – Mexico

In the initial week of arriving at the base the beginning day was relaxed to accommodate for jet lag and tiredness from traveling whilst allowing for accommodation to be set up and facilities to be toured. Additionally, a rough briefing to the weeks schedule was done allowing for a more precise idea of day to day events. The rest of the week consisted of training for the PADI open water certificate, in the mornings the theory-based aspect was taught and reviewed followed by an examination to ensure full understanding. In the afternoon we headed to the beach to do confined water dives just before noon the followed by open water dives testing the skills in the afternoon. Some slight schedule changes were required to be made due to weather warnings creating restrictions on the open water dives delaying the final dive until the Monday starting on week 2.









Week 2 began with the completion of the PADI open water training and after passing all my courses became a fully certified open water diver. The permit allowing us to undertake the studies only arrived on the Saturday of week 2 to during the remainder of the week practices were done in monitoring the turtle behaviour and tourist behaviour additionally. On the Saturday the first official day of data collection was undertaken, and we went in 2 pairs with one member in each pair analysing the turtle behaviour and the other member analysing the tourist behaviour. This was done in 2 different 2-hour periods during the data collection. On Sunday of week 2 the data was analysed with the turtles being identified and the behaviour data being upload to the master copy.

Week 3 is when the schedule started to become more rigid and we were performing data collection every day excluding Sunday. We had scheduled times to analyse turtle behaviour and around these times we also would do the other data collection we needed to perform such as seagrass plots, and turtle transects. The turtle behaviour was monitored by following a chosen turtle after photographing the tops of their heads to ID. The chosen turtle was then followed for 20 minutes (assuming it wasn't lost for a period longer than 2 minutes) and every time a different behaviour occurred the time to the second and behaviour was recorded. The behaviours exhibited were feeding (along with seagrass being fed on), surfacing, diving, swimming, resting, cleaning and other. Additionally, in sync with the turtle behaviour the other person in the pair would be recording tourist behaviour by swimming along with the turtle and recording the tourists near the chosen turtle using the same 20-minute focal data. The tourist behaviours were listed as acceptable (3-5m), approaching (1-3m), crowding (<1m), chasing, photo (any recording or photography), and touching.

The seagrass plots involved a 3 person team using a GPS to move to the preprogramed points across Akumal bay and dispatching a 1m2 quadrat with the quadrat centre on the point and analysing the area. Within the quadrat area the abundance of each seagrass present was recorded along with the max height of each seagrass, epiphyte presence and grazing across the whole area, and other species present. The turtle transects were straight forward using a transect tape along the GPS lines someone would record the number of tourists and turtles along with the distances along the line. My final week ended on the 28th of July and I returned home a few days after.





Justine Thompson - South Africa

From the moment I selected my expedition with Operation Wallacea I was in absolute awe of Gondwana. I spent six weeks of my summer in Gondwana Game Reserve, South Africa conducting research for Operation Wallacea and for my master's project. When I arrived at Gondwana, I couldn't believe I was there, having to pinch myself to make sure it was all real. The scenery itself was just breath taking, alongside the encounters with the wildlife throughout my stay. Gondwana was my first time in South Africa and it provided me with a lot of first experiences!



My project "The Relevance of Primary Productivity for Ungulate Habitat Selection in The Cape Floral Region, South Africa" primarily focused on the use of the Game Transect data collected on Gondwana. These were conducted every day via a 4x4 vehicle along predetermined transects routes. During these surveys is when I saw my first impala, wildebeest, eland, red hartebeest, bushbuck, bontebok, springbok, rhino, zebra, giraffe and elephant! Data collection included GPS coordinates, distance bearing, habitat, visibility, number of individuals, sex of individuals and herd condition. This survey was a new methodology to me and provided me with new skills including use of equipment for measuring and counting, species id and sexing of individuals.

My project relied on another type of survey, habitat mapping, newly developed for this year's expedition. This was also a

new methodology to me but very quickly myself and the other dissertation students picked it up. Following the same game transects, plant species were identified in patches which allowed broad habitat types to be classified. Patches were drawn on QGIS to create and overall habitat map; a first created for the reserve! Already having experience with GIS from my master's course, I found myself helping other students to use the software. This allowed me to increase my own confidence in the software and give help when required to other people. I also used GIS to produce NDVI maps for my project, something I had not even heard of before my project and now find super interesting. My project excited me every day, as every day was different in terms of the data that was collected and what wildlife I was going to see.









I participated in other surveys during my time in Gondwana including bird point counts and vegetation surveys. The bird point counts always meant a very early morning, but the beautiful sunrises made the early starts worthwhile. Not to mention, watching the high diversity of birds dancing through the Protea and Erica plants learning each distinctive bird song. Without a doubt, you would see a new plant species every day during the vegetation surveys, counting 20 different species in quadrats, sometimes more. I could even put my own camera trap out in the vegetation plots. Waking up every day with butterflies in your stomach with excitement for the day ahead of you truly made writing my master project very special to me.

Around the data collection I had many breath-taking first-time moments too, from the starry night sky, the intense sunsets, encountering lions for the first time, finding the mythical buffalo, seeing a baby rhino to the elephant herd coming up to the vehicle with each one being as magical as the other. Even speaking to the staff, research assistants, field guides and reserve conservation mangers inspired me and motivated me to complete my masters and continue in the conservation sector. Gondwana is a very special place and certainly an experience I will hold in my heart forever.







Conor Anderson – Indonesia

I am Conor Anderson; I am doing a BSc in Environmental Science at the University of Leeds. I choice to do my dissertation through Operation Wallacea as it allowed me to get experience of doing research in the field for a prolonged period, an experience I would not get during my undergraduate degree. My expedition was at Hoga Island, within the Wakatobi Park in Indonesia, where I was investigating the recruitment, growth (or lack of), and death of corals which had been set up the previous year.

Week 1: As this was my first time SCUBA diving, I had to spend my first week on Hoga undertaking PADI open water course, this was extremely fun and eye opening. The first time I descended was slightly daunting as I was unsure if I was equalising my ears correctly, but after my dive instructor reassured me, I then descended again. The under-water world was beautiful and awe inspiring, filled with brightly coloured fish going about their lives. The rest of the week was spent learning essential diving skills in the water and doing dive theory on land.

Week 2: The second week I was learning Reef Survey Techniques (RST), this was a course that both taught me how to do science dives, and learn theory on coral reefs, including the identification of corals, sort corals, invertebrates and fish. The diving was a big step up from open water, but a crucial one, I learnt how to lay transects under water, do under-water visual counts, line point intercepts and continuous point intercept. Learning these increased my ability diving ability phenomenally, which was extremely useful during my own research. The theory of RST was also very useful, as I needed to be able to identify corals under water for my own research.

Week 3: I helped the monitoring team for the third week, seeing them in action was another big step up. The comparison between new divers laying a transect and dive masters laying a transect was inspiring. During RST it took us 20 minutes to lay a 20m transect, it took monitoring 5 minutes to lay a 50m transect. This set the standard of how I should be conducting my work. The analysis of their data also helped me plan how I would approach the analysis of my own data the following week.

Week 4: As my data collection was quite complex the management staff at Hoga gave me a dive master as my Research Assistant (RA). My RA helped me plan out the methodology of my research, and then helped me with any back up plans if my primary plan were to fall through. Essentially, he helped me prepare for all possible outcomes in the water, I kept this approach up for the rest of my research.

Week 5: New week, new RA. This RA had a comprehensive knowledge on corals and was an accomplished diver to was able to help me improve my planning before I entered the water. Before every dive we would spend 2 hours analysing the corals present at a plot, where they are on the site, and repeating this process for a backup plot. Unsurprisingly, ability to identify coral reefs during this week skyrocketed.

Week 6: My RA this week was not as proficient as my previous two RA's, but this was a bless in disguise. I was able to use what I had learnt the previous 3 weeks and apply it to helping improve my new RA's coral identification and his diving ability in the water. This week will likely be the most useful week I have had, and I will likely use it for examples for interviews for the coming years.





Katerina Boskova – Honduras

<u>A mission to save the scary-looking but charismatic long-spined black sea</u> <u>urchin</u>

It has been months since I have returned from an expedition with Operation Wallacea and I am still living through my memories as it was still happening. I am so grateful that I had the opportunity to spend my summer in Honduras looking into the aspects of slow recovery of a local keystone species, long-spined black sea urchin. The generous financial gift towards my expedition costs from the Murray foundation made an immense help to my funding the trip.

After a rather stressful journey, that took me through the US, where I unexpectedly spend two nights at the airport because my flight was cancelled. I arrived in Utila, a small but vibrant island of the coast of Honduras. Warm and friendly welcome by the staff, the sun and the ocean made me thrilled about the upcoming six weeks and put me into an expedition mode right away. In the first two weeks I was taking the reef ecology lectures and was offered to complete my PADI rescue diver course, while already diving into the ecological surveys looking for the spiny creatures, baby corals, and fish. After the reef ecology lectures, I managed something I though was impossible, I was able to identify all the hard coral species, macroalgae, fishes, and invertebrates and everything underwater started to look real and more exciting.





Me and other three girls from Princeton University together with our project leader worked on the sea urchin project. Our role was to assess biotic and abiotic factors that might have led to a slow recovery of the long spined black sea urchin. We were diving twice a day, six times a week, so we soon developed an effective way of collecting our data. Identifying past-swimming fish while laying a transect line, spotting minuscule corals. or finding well-hidden sea urchins became a second nature. We were collecting data on the demographics and population density of the urchin, its heterospecific species, coral recruit species, competitive herbivorous fish, predators, temperature, habitat structure, and benthic cover. After each dive we compared our counts and inserted data into an Excel sheet and had a video of the benthic floor to analyse.

So far, we know that the urchin is an essential herbivore in the Caribbean coral reefs and in ideal conditions it maintains the health of the reef by grazing on the overgrowing macroalgae. However, since the 1980s after a major mortality event when over 90% of the urchins disappeared from the Caribbean, the fast growing macroalgae started taking over and are now suffocating the much slower growing and more vulnerable corals. Several factors have been suggested as the reasons for the slow recovery. Starting with insufficient habitat complexity, increasing the water temperature, pollution, and compromised reproduction success by the low-density population.



The scientists from Operation Wallacea and university students have been gathering data on this topic since 2013 and even though there is a clear general understanding of the issue, more research into the specific variables is required so the knowledge can be successfully applied to helping the sea urchin recovery.

And why does it all matter? Why do we need more hard corals and less macroalagae? Hard coral cover is the marker for a healthy reef because its structural complexity creates a unique habitat for millions of other marine organisms. However, we depend on them as well, as they support fisheries, tourism, and provide coastal protection during storms, hurricanes, typhoons, and even tsunamis. Therefore, it is in our best interest to keep the coral reefs, not only in the Caribbean, thriving, which proves to be one of the greatest challenges of today marine conservation efforts.







Conor Berney - South Africa



I was fortunate enough to have the opportunity to spend 6 weeks in Gondwana Game Reserve in South Africa this summer, it was an amazing experience that I'll never forget.

My own project focused on the distributions and habitat preferences of the large herbivores within the reserve. How these large herbivores utilise and impact on the typically nutrient-poor, endemic fynbos vegetation is relatively unknown although it is important information for solid conservation management. To collect the data, we carried out several transects – recording species, GPS location, numbers, habitat type and several other factors every time any large herbivores were seen along the transects.

However, we were all also expected to chip in and help out with the other projects and research going on in camp, rather than just focusing on our own individual project s. I was slightly apprehensive about that going out to South Africa, but actually working with the group of other dissertation students carrying out bird point counts, vegetation surveys, collecting elephant dung for stress hormone analyses and creating a habitat map of the reserve was one of the highlights of my trip. I was very lucky to end up in such a great group where everyone got on so well, it really made the whole experience that bit extra enjoyable.



In addition to being part of a great group of students, the staff were all amazing as well and I can't thank them enough for making my time in South Africa so special, I wouldn't have a bad word to say about any of them. They were all so nice and friendly as well as being some extremely knowledgeable and inspiring people that were only delighted to help or just chat with us students.

Meeting all these awesome people, hopefully making some lasting friendships, learning about fynbos, and interacting with these amazing animals in such an amazing setting was a privilege and an experience I will never forget. I am so glad I took this opportunity with Opwall and WEI, it might just be the best decision I've ever made. This taste of field work has definitely helped me realise that this is what I want to do in the future.

Unfortunately, my time in South Africa had to come to an end at some point but I could've happily stayed on for at least another 2 months. Now that I'm back home I suppose it's time now to analyse the data I've collected and actually write up my dissertation. While it doesn't quite compare to being in the field, I'm actually not dreading reading and writing about this project as I am genuinely interested



in it. If it all goes according to plan, I hope to investigate some of the reasons behind the habitat preferences of the large herbivores. In particular, looking in to how the different species of herbivore partition resources and assessing the potential for interspecific competition for the limited resources within the fenced reserve. Finally, I hope to tie in how the landscape of fear affects the distributions of the herbivores and determine whether the different herbivores are selecting areas for the resources present or if they prefer more open areas with good visibility where they can see any would-be predators coming.

The Fynbos Biome is a unique part of the world with amazing wildlife, I thoroughly enjoyed my time there and am extremely grateful to everyone who supported and helped me get there and make the most of this once in a life -time opportunity.





Lyndsay Walsh - Peru

This Summer I was lucky enough to travel to the Peruvian Amazon and carry out research in conjunction with Operation Wallacea and Fund Amazonia. The Amazon basin is one of the most biologically vital and diverse parts of the world and these two organisations and the work that they do is absolutely essential to the conservation of this region.

Arriving in Iquitos late Sunday evening, jet-lagged and extremely sweaty (us Irish are not well-adapted to humidity), I was greeted by Sarah at the entrance to the Casa Moray hotel. Sarah immediately set the tone for the entire trip with her energy and enthusiasm. When you are exhausted and have slight cabin fever from being on a boat the majority of your time, you sometimes forget about the amazing circumstances you have found yourself in – living on a boat in the Amazon basin! The expedition staff were always quick to raise spirits or stoke intrigue with an interesting fact or two.

Our research station was situated on the lower Yarapa river. The 'Rio Amazonas' is a boat refurbished from the rubberboom era and each time we would come back from a survey on our little propeller boats, particularly in the soft light of the evenings, I would be slightly in awe of its presence. My project was specifically looking at the sustainability of the fisheries in this part of the river. Now bear with me for a second. I know that when people think of the Amazon they immediately picture sloths and jaguars – but the fish are absolutely crucial in maintaining the functionality of this ecosystem. Even if they are perhaps not the most charismatic of fauna. That being said, piranhas are pretty awesome and it was often during the quiet of a fishing survey that you would look up and notice a sloth or two perched above you.



The sustainability of fishing has never been assessed in this area of river, which has several villages of people living along it, and so we decided to carry out a Stock-Abundance-Sustainability-Analysis. This entails estimating how many fish are in the river, how many fish are being taken out of the river due to fishing, and judging whether this is a sustainable take-off. To collect the data we carried out fishing surveys using nets, used side-scan sonar (which is an amazing technology whereby the sonar detects individual fish in the water and you can count them), and interviewed local people.





This data is extremely important as it provides baseline data against which future analyses can compare. Baseline studies are sometimes regarded as 'boring' but their importance cannot be understated. They are the foundation of conservation science; how can you assess an environment if you do not know what is already there? Without baseline studies your picture of an ecosystem is blurred and unclear. Once you begin to build and compare using baseline data it is like putting on a pair of glasses, the picture comes into focus.

I had a fantastic experience collecting this data and one of the highlights of the entire experience was having the opportunity to go into the village and speak to the local persons about what we are studying, and including them in our research. Too often environmental research excludes the very persons it is meant to benefit most. Through talking to the communities about their experience of fishing and how it has changed over the years, it gave the research added context and importance. I have done a few expeditions now and while each time I consolidate my passion for environmental science and protection, one thing in particular becomes clearer every time: it is the people who truly make the experience.



Adam Kiani – Mexico

Mexico was never a country on my travel bucket list; I had no real idea of what any of it was like and had never really considered the nature it might contain. Tropical dry forests were not a habitat type that would have entered my mind when I was daydreaming about the natural wonders I might like to see, and they had never been presented to me as a habitat under immense threat from climate change (this might instead be replaced by tropical rainforest, in both situations). So I was going in rather blind, driven by some gorgeous photos and an enticing description of the bird diversity project, when I chose my project in the Calakmul biosphere reserve in southern Mexico.



After a soul-destroying 4:30am start, followed by a 10 hour plane journey I was greeted unawares by the best burrito ever to grace my mouth on arrival to Cancun. Another agonising 4:30m start for the 8-hour coach journey into the forest was sweetened by the excitement of my imminent arrival into the mysterious jungle.

Arrival to the Mancolona camp, despite my stiff back from the journey and discovering that I was due for ANOTHER 4:30 start the next morning, did not disappoint. I was surrounded by sunlight seeping through a gorgeous green canopy, with the sounds of unknown creatures, tantalisingly close, tempting me already



And then came the animals. Even before I began the week's survey, I had noticed the fascinating trails of the leaf-cutter ants, cutting across the paths between the tent and the hub of science and food. Once the week had got up and running and provided me with a collared forest falcon outside my tent, a sheep frog on the way to a midnight bathroom trip and a scorpion in the shower, along with countless more species of all groups outside camp, I was enthralled I the forest and ready to begin my dissertation research

The next 5 weeks were spent at various different camps, going on bird surveys; both point counting and mist netting. Stupidly early starts were more than made up for by the grand total of 116 species of birds that I had never seen before in my life. Some highlights include spending two weeks sleeping in a hammock in the heart of the southern forest (Dos Naciones camp), being charged by a howler monkey and seeing my life flash before my eyes (!!) and discovering the most colourful and beautiful beautiful bird species' I have ever seen (e.g. the green honeycreeper and the collared aracari). I was able to get hands-on experience taking measurements of birds caught in mist nets, and learn more than I could have imagined from a birding genius named Ezequiel.



This really was the experience of a lifetime, and I am so grateful to the Murray foundation for the financial support they gave.



Alice Thwaites - Honduras

My experience in Honduras was the best 6 weeks of my life. I worked on the Stereo Video Survey project collecting data on fish and benthic diversity to form my undergraduate dissertation: looking at the role of herbivorous species on a coral reef. The research provided me with countless skills, such as scientific scuba diving techniques, knowledge of Event Measure software and teamwork – to name a few. I worked with an amazing team of people on our project, everyone was kind and helpful, I love diving with them every day.



Every morning I was so excited to get on the boat to go out and dive with some great friends. I fell even more in love with scuba diving whilst I was there, and I was lucky enough to see so many exciting things – my favourites being dolphins and a shark!



The beaches in Honduras were so beautiful and I felt so lucky to be at the beach every single day. One of my favourite memories from my expedition was our trip to Punta Sal. Scuba diving there was a completely unique experience as the coral reef was so close to shore and it was so diverse. The rest of the day we were able to explore the beaches and forest and it was the most beautiful place I've ever been.

In my unforgettable experience I found my love for research. Tela had such a beautiful coral reef and it was so exciting being able to work first-hand on a project which supports the conservation and protection of these valuable ecosystems. Despite the data forming the



basis of my dissertation, it was amazing knowing that the data we collected is part of something much bigger – raising awareness for the critical function of coral reefs and ensures its future protection. Tela Bay was recently designated a Marine Protected Area, thanks to data collected by Operation Wallacea this fundamental ecosystem (with over 70% coral coverage) is protected. It was also amazing to carry out research in Tela Bay, to support Antal, who discovered this reef system. Antal's vision is to transition the income of the local community from the reef, from fishing to education and recreation. Antal has built the largest aquarium in Honduras and offers this free for schools to bring local children to educate them and inspire them with science. So – being able to carry out research, not only for myself, but for a wider agenda felt meaningful and exciting.

I'd like to thank Operation Wallacea for providing this amazing experience and for teaching me so many amazing skills. I never could have had such an amazing 6 weeks without Opwall. Also huge thanks to the Murray Foundation award which made this possible through funding for my project.

