



Operation  
Wallacea

SCHOOLS BROCHURE 2018



[www.opwall.com](http://www.opwall.com)

# What is Operation Wallacea?

Operation Wallacea (Opwall) is an organisation that runs a series of biological and conservation management research programmes that operate in remote locations across the world. These expeditions are designed with specific wildlife conservation aims in mind - from identifying areas needing protection, through to implementing and assessing conservation management programmes. What is different about Operation Wallacea is that large teams of ecologists, scientists and academics, who are specialists in various aspects of biodiversity or social and economic studies, are concentrated at the target study sites. This gives volunteers the opportunity to work on a range of projects. The surveys result in a large number of publications in peer-reviewed journals each year and have resulted in 30 vertebrate species new to science being discovered, 4 'extinct' species being re-discovered and \$2 million levered from funding agencies to set up best practice management examples at the study sites. These large survey teams of scientists and volunteers, funded independently of normal academic sources, have enabled large temporal and spatial biodiversity and socio-economic datasets to be produced, and provide crucial information to help with organising effective conservation management programmes.

All students pay to join the expeditions; this is how the entire unique programme is funded and our research possible. The vast majority of science programmes

that deliver key research outcomes are characterised by short-term funding with restricted aims and bio-geographical ranges. Long-term projects covering large biogeographical scales that incorporate more than one ecosystem are rare. The Operation Wallacea programme provides the opportunity to do just this, and consider science and conservation of key ecosystems from a global perspective. Opwall is able to draw upon researchers from a wide range of different disciplines and academic institutions to address major issues related to the sustainable management and conservation of some of the world's most diverse but threatened environments.

Groups of sixth form/high school students in their last two years before going on to university can join these biodiversity survey expeditions as long as they are accompanied by a teacher. The school groups are required to collect data for at least part of their expedition which helps with the research objectives and publications for that site. During their 2 week expeditions the school groups also have the opportunity to work alongside a range of different field scientists and learn about the survey techniques and species encountered. At each of the sites a lecture series is run to provide background information about the habitats and species, which are tied into many of the concepts learned in pre-university biology, geography and environmental science courses.

## What is involved in taking an expedition with Operation Wallacea?

Planning an expedition takes on average between 10-20 months. The organising teacher does not have to accompany the group but a staff member/responsible adult must join the trip. A free teacher place is given for every 8 students joining (or part-thereof).

**Initial Meeting** – a very short meeting to find out exactly what options are available, all cost and time implications, expedition places and benefits for students. This can be given over the phone, via skype or as preferred, in person.

**Expedition Launch** – if senior management approve the trip and teachers are interested then the expedition can be widely advertised around the school. Promotional materials, assembly videos, powerpoint slides and invitation letters can all be provided. This meeting would be presented to students, parents and teachers, by an Opwall staff member, usually in the early evening to ensure parental attendance. A digital version of the presentation can also be given.

**Fundraising Assistance** (if required) – similar to the expedition launch we can provide fundraising advice to the group (students and parents) either by a visit or skype meeting. Whether raising all or part of the funds we can provide information and support for events and activities in addition to charity and trust grant giving.

**Expedition Training** – provided digitally so a group meeting can be held with parents or information can be sent home.

**Expedition Review** – a reflection on the whole process.

### KEY BENEFITS TO STUDENTS

**Research projects:** Students can (if desired) spend some of their time on site utilising data collected to complete an independent project. Qualifications vary widely depending on country and schooling system with the most common being: EPQ, EE/Extended Essay, Independent Research Project or Mini Research Project. Support is given by Operation Wallacea staff and your in-school coordinator to ensure the best quality projects can be completed.

**Qualifications:** University Award, CoPE Level 3, Community, Action and Service (CAS), University course credit, PADI OW can be available to students.

**Gaining a hands-on experience of course syllabuses:** The expeditions provide examples that can be used to illustrate many of the principles of biology, environmental science and geography courses. Syllabus matching for various exam boards is included in the schools booklets.

**Practical field experience:** Often many classroom aspects of science can be considered 'dry'. Operation Wallacea provides a hands-on approach to research and ecological survey techniques. Students work with dedicated and passionate scientists on site. This gives them an insight and understanding of how exciting a future in science and geography could be.

**University entrance:** Expeditions give students something tangible to discuss when applying to universities, writing personal statements and attending interviews. Operation Wallacea gives each student the opportunity to take something completely different from the expedition.

**Career development:** The research expeditions provide an ideal opportunity for students to meet a range of university academics, ecologists and scientists. Also, depending on the expedition, to work alongside university students doing degree courses of potential interest to them. Many of the students that have joined the expeditions then complete degrees in related subjects, have gone on to careers in conservation and field research, or returned to Opwall to complete their final year dissertation.

### KEY BENEFITS TO TEACHERS

**Supported expedition experience:** The opportunity to travel to some of the most remote research sites in the world. To see how your students react to your subject, in the field, whilst having all logistical and research aspects organised. Risk assessments, health and safety information, insurance, local authority compliance and bonding is completed by Operation Wallacea.

**CPD - Continuing Professional Development:** Introducing teachers to new ideas, relevant concepts and international best practice. In turn, improving the quality of teaching and leadership, enhancing the quality of students' learning.

**Country selection:** You choose the country you visit while becoming the most popular teacher in school!

### KEY BENEFITS TO SCHOOLS

**Helping the school to stand out among other leading schools in the country/local area:** Happier and more inspired students.

**Greater aspiration for teachers and pupils:** It is almost impossible to join Operation Wallacea and not want to have a connection to some of the most prestigious institutions and scientists in the world. This then creates an environment where students want to select the best universities available to them and teachers want to bring more innovative ideas from their field into the classroom.

**Developing long-term links with key researchers, academics and institutions:** Many scientists visit schools after field seasons to deliver talks, have communications with teachers and pupils, provide support for in-class learning and even links to specific in-country projects.

**Classroom resources:** Datasets from all our field sites and syllabus relevant lectures alongside a series of educational posters are available and are completely free.

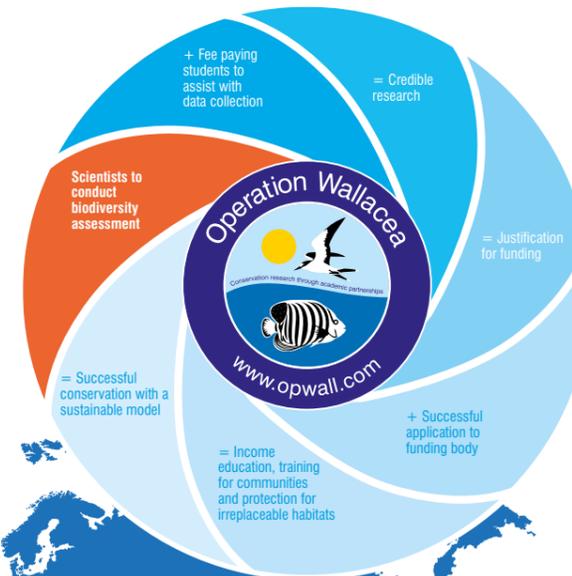
**Educational and exciting school expeditions:** Helping make your school/college even more desirable, increasing applications and student retention.



## Expeditions

Croatia	6-7	Indonesia	20-21
Cuba	8-9	Madagascar	22-23
Dominica	10-11	Mexico	24-25
Ecuador & Galapagos	12-13	South Africa	26-27
Fiji	14-15	Peru	28-29
Great Rift Valley	16-17	Transylvania	30-31
Honduras	18-19		

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	TERRESTRIAL AND MARINE EXPEDITIONS											TERRESTRIAL ONLY	
	CROATIA	CUBA	DOMINICA	ECUADOR AND GALAPAGOS	FIJI	GREAT RIFT VALLEY	HONDURAS	INDONESIA	MADAGASCAR	MEXICO	SOUTH AFRICA	PERU	TRANSYLVANIA
EXPEDITION 1	14 June – 27 June	22 June – 5 July	11 June – 23 June	12 June – 25 June	10 June – 23 June	12 June – 25 June	13 June – 26 June	12 June – 25 June	17 June – 29 June	<b>25 June – 8 July</b>	9 June – 22 June	10 June – 22 June	20 June – 3 July
EXPEDITION 2	21 June – 4 July	<b>29 June – 12 July</b>	18 June – 30 June	<b>19 June – 2 July</b>	17 June – 30 June	19 June – 2 July	20 June – 3 July	19 June – 2 July	24 June – 6 July	<b>2 July – 15 July</b>	16 June – 29 June	24 June – 6 July	4 July – 17 July
EXPEDITION 3	28 June – 11 July	<b>6 July – 19 July</b>	<b>25 June – 7 July</b>	<b>26 June – 9 July</b>	24 June – 7 July	<b>26 June – 9 July</b>	27 June – 10 July	<b>26 June – 9 July</b>	<b>1 July – 13 July</b>	<b>9 July – 22 July</b>	<b>23 June – 6 July</b>	<b>8 July – 20 July</b>	<b>18 July – 31 July</b>
EXPEDITION 4	5 July – 18 July	<b>13 July – 26 July</b>	<b>2 July – 14 July</b>	<b>3 July – 16 July</b>	<b>1 July – 14 July</b>	<b>3 July – 16 July</b>	<b>4 July – 17 July</b>	<b>3 July – 16 July</b>	<b>8 July – 20 July</b>	<b>16 July – 29 July</b>	<b>30 June – 13 July</b>	<b>22 July – 3 August</b>	<b>1 August – 14 August</b>
EXPEDITION 5	12 July – 25 July	<b>20 July – 2 August</b>	<b>9 July – 21 July</b>	<b>10 July – 23 July</b>	<b>8 July – 21 July</b>	<b>10 July – 23 July</b>	<b>11 July – 24 July</b>	<b>10 July – 23 July</b>	<b>15 July – 27 July</b>	<b>23 July – 5 August</b>	<b>7 July – 20 July</b>		
EXPEDITION 6	19 July – 1 August	<b>27 July – 9 August</b>	<b>16 July – 28 July</b>	<b>17 July – 30 July</b>	<b>15 July – 28 July</b>	<b>17 July – 30 July</b>	<b>18 July – 31 July</b>	<b>17 July – 30 July</b>	<b>22 July – 3 August</b>	30 July – 12 August	<b>14 July – 27 July</b>	<div style="border: 2px solid red; padding: 10px; text-align: center;"> <p><b>Our most popular dates are printed in bold</b></p> </div>	
EXPEDITION 7	<b>26 July – 8 August</b>		<b>23 July – 4 August</b>	<b>24 July – 6 August</b>	22 July – 4 August	24 July – 6 August	<b>25 July – 7 August</b>	<b>24 July – 6 August</b>			<b>21 July – 3 August</b>		
EXPEDITION 8				<b>31 July – 13 August</b>	29 July – 11 August						28 July – 10 August	<div style="border: 2px solid blue; padding: 10px; text-align: center;"> <p><b>www.opwall.com</b></p> </div>	

### Expedition Costs

The costs vary depending on where your group is based and where they want to go, the size of the group and the exact week you want to join the expedition.

Costs start from £1750\* per student for a UK based group going to Transylvania in July 2017 or US\$2850\* for a Florida based group going to Mexico in June 2017. Prices include ALL estimated costs including international flights, travel within the country to and from the expedition including any hotels needed, participation in the two week research expedition including all food, accommodation, training and joining all the field research projects, £1 million medical and evacuation and insurance cover, Park fees and one eighth of the flight and internal travel costs paid by each student towards the costs of the accompanying teacher (for every group of 8 students one teacher travels and joins the expeditions for free).

\*prices correct at time of going to print

### Contact us

Please contact your nearest Opwall office (see back cover of brochure) for a detailed quote for any of the expeditions of interest to you. Opwall can provide the whole expedition package or you can source your own international flights and Opwall can just charge you for the expedition and in country travel costs to and from the start and end points of the expedition.

### Insurance

Insurance is included in the expedition fees to provide medical and repatriation cover up to £1million for all participants. In addition to this cover it is advisable to check that the school insurance for participants on school trips also includes: cover for existing medical conditions, trip cancellation, flight delays, loss of baggage and personal items etc.

### Health and Safety

All the expeditions provided by Operation Wallacea meet the requirements of BS8848 Specification for the provision of visits, fieldwork, expeditions and adventurous activities outside the UK. In addition Opwall has been audited and awarded a Learning Outside the Classroom badge for taking students on overseas expeditions. Medical support is arranged for each of the sites and safety auditing is performed during the research programmes. On the Opwall website (www.opwall.com) you can find details, for each country, of the risk management systems, how the expedition meets and exceeds each clause of the BS8848, the information describing the support and leadership at each point on the expedition, the medical and evacuation report and a summary of the accidents and illnesses at each site in the previous year. Looking at the statistics from each site it is apparent that joining an Opwall expedition is less risky than most sports tours and considerably less risky than activity type trips such as skiing.





## Croatia overview

Diving ✓ Forest ✓

**Expedition length** 2 weeks

- Key facts**
- Opportunity to work in the spectacular Krka river valley in an area with wolves, jackals and other keystone species
  - Only European based expedition that provides the opportunity to combine marine and terrestrial research work
  - Includes boat trip through the Adriatic Islands and the chance to work at a research centre in the marine National Park

## Research Aims

During glacial times the main biodiversity refuges of Europe were the Iberian, Apennine and Balkans peninsulas, which managed to conserve tropical elements of the flora and fauna. One example is the nocturnal Cat snake, closely related to other tropical species and is still found in the Balkans. The most important biodiversity elements of the present day Balkan region are the short but very large river valleys through the karst limestone areas and the biogeography of the numerous Adriatic islands. This expedition combines both of these important areas working in the spectacular Krka National Park and on Mljet Island in southern Dalmatia off the coast of Dubrovnik.

The high Dinaric Arc mountains that run along the border of Bosnia and Croatia separate much of the European continental fauna from the Mediterranean fauna of coastal Croatia. The Krka River, in a distance of only 60km, runs from the high Dinaric mountains down to the sea and contains an excellent example of a speciation gradient. The National Park is rich in freshwater biodiversity because of the long geographical isolation of the catchment and has around 20 unique species of fish to the river. Since much of the water in the karst (limestone) region is found underground, the cave systems and this habitat provides the highest rate of new species discoveries from any habitat in Europe. One of the unique cave species is the blind Cave salamander featured in "The Natural World - Attenborough's Ark", in which David Attenborough chooses his ten favorite animals that he would most like to save from extinction. The salamander is the third most genetically distinct amphibian in the world, with its closest relative found now in the Yucatan Peninsular of Mexico, having diverged 200 million years ago when the Pangea supercontinent was separating.

The Krka National Park authorities have established a research base station in the centre of the valley that they want to develop into a central biodiversity research hub

for the eastern Adriatic region. Two new museums have been built on the site to illustrate the unique ecology of the valley and also the historical context, since there are numerous Roman sites in the Park and surrounding plateaus. The role of Operation Wallacea in this plan is to develop the most detailed biodiversity annual monitoring programme of key taxa yet undertaken in Croatia and from this programme, examine community structure and changes over time. In particular the research objectives are:

- To quantify the effect on jackal, fox and other mammal fauna of the recent return and increase in wolf populations in the region
- To determine how the height in the valley affects the bird and reptile communities
- To help quantify the biodiversity of the unique cave fauna
- To quantify the fish communities and habitat associations in the Krka River

The Mljet National Park is the oldest marine national park in the Mediterranean and was designated in 1960 to protect the largest *Cladocera caespitosa* reef within the Mediterranean. Mljet Island is one of the most beautiful of the Croatian Islands with large stands of Holm Oak and Aleppo Pine forest. The Mljet National Park has established a research centre at the north western tip of the island and Opwall is helping to build up the research outputs with initial concentration on:

- Monitoring changes in fish communities using stereo video within the proposed 'No Take Zones' and immediately adjacent to them
- Determining the distribution and quality of the *Posidonia* seagrass beds around the island
- Quantifying the tortoise populations within the Park

## Expedition Structure

- Week 1: Krka National Park
- Week 2: Mljet Marine National Park

## Facilities

### Krka National Park

Students will stay in newly built research accommodation in shared rooms. There is a separate lecture room, open air auditorium and restaurant on site all with spectacular views over the river gorge.

### Mljet National Park

The accommodation in the second week is very similar to the first week, students will be based in Mljet National Park research centre in shared rooms. There are showers and toilets on site. The site is also equipped for diving including a small research boat.



## Details of projects and expeditions

### Week 1: Krka National Park

**Fish surveys:** These are boat and foot-based electrofishing and netting surveys of various habitats along the Krka River. There are a number of endemic species including two endemic trout species (*Salmo visovacensis* and *Salmo obtusirostris krkensis*) that are being investigated. All fish captured will be identified, measured and genetic samples taken.

**Reptile surveys:** Surveys are performed by checking under previously placed cover boards and completing standard search times in different habitats and heights in the valley. The Park authorities are keen to determine how the Four lined snake (*Elaphe quatuorlineata*) which grows to 2.5m, the venomous Nose horned viper (*Vipera ammodytes*) and the Leopard rat snake (*Zamenis situla*) separate their niches. In addition the surveys will be recording the distribution of the giant Glass Lizard (*Pseudopus apodus*), which grows to a length of 1.2m and tortoises (*Testudo hermanni*). Night surveys are also done for the Cat snake (*Telescopus fallax*) which is the only nocturnally active snake species in the region.

**Cave surveys:** Students assisting with these surveys will be led by cave biology specialists, in caves which are not open to the public and will involve completing transects and quadrats within the cave systems to estimate diversity of groups adapted to cave living. Soil samples will also be taken from different parts of the cave system and sorted in the lab to estimate soil biodiversity.

**Bird surveys:** These surveys will involve setting mist nets early in the morning at different heights in the valley. Point count surveys will be completed either side of the mist net surveys each day. Target species for the birds include the Natura 2000 important bird species.

**Butterfly surveys:** Students will complete Pollard counts of the butterflies.

**Mammal surveys:** The large mammal species are surveyed using camera traps and searching areas for footprints and faecal samples. Within the Krka valley and surrounding plateau there are two large wolf packs and these appear to be reducing the jackal and fox populations. In addition to downloading images from the camera traps and analyzing the footage these teams will also be setting and emptying small mammal traps and in particular looking for the endemic vole (*Dinaromys bogdanovi*) found in the Dinaric mountains.

The group will have a series of lectures covering Mediterranean wildlife ecology and conservation, including presentations on: freshwater fish speciation and survey techniques, reptile communities and niche overlap, apex predators and food webs in Mediterranean mammal communities, cave biodiversity, bird communities of the Mediterranean and threats to Mediterranean fauna and conservation initiatives.

### Week 2: Mljet National Park

choose to:

Complete the reef ecology course\*\*

Learn to dive\*

by snorkelling

by scuba diving

Students will also participate in the following activities:

- Helping with surveys and analysis of data from stereo video monitoring
- Transect surveys to monitor tortoise populations in the Park
- Assisting with seagrass monitoring surveys

\*This course involves a combination of theory lessons, confined water dives and open water dives to gain an official scuba diving qualification.

\*\*The course teaches identification of common genera and species of coral and other macroinvertebrates, identification of the major reef-associated fish families and common species and introduces a variety of methods and practices used for scientific research in the marine environment.

## Travel information

The expeditions start on a **Thursday at 1600hrs** at the Krka National Park Research Centre and finish on a **Wednesday at 0700hrs** at the Mljet National Park Research Centre. Groups need to book international flights to arrive in Split before 1500hrs on the Thursday the expedition starts and to depart Dubrovnik after 1400hrs on the Wednesday the expedition finishes.

The internal transfer package\* between Split Airport and the expedition start and Mljet National Park Research Centre and Dubrovnik airport will be arranged by our Internal Travel team and is not included in the expedition cost, unless you have chosen a fully inclusive expedition package. Additional guided excursions and day trips to be taken prior to and after your expedition are available upon request.

\*Includes airport meet & greet, any required travel and accommodation and full representation.



## Example day schedule in Krka National Park

Time	Activity
0600	Emptying small mammal traps
0900	Downloading data from the camera traps and completing transects for signs of wolf, jackal and other large mammals
1200	Lunch
1300	Analysis of camera trap data
1700	Mediterranean wildlife course lecture
1800	Dinner
1900	Call back surveys for jackals and opening small mammal traps



“Unforgettable experience and recommended to anyone with an interest in marine biology.”  
**Victoria Ashworth**, School student, Blackburn College

## Cuba overview

Diving ✓ Forest ✓

Expedition length 2 weeks

- Key facts**
- Cuba is one of only 5 remaining communist states in the world
  - Some of the best underwater visibility and pristine reefs in the Caribbean
  - Opportunity to live in a local Cuban community
  - Opportunity to work alongside scientists from the University of Havana
  - New forest based project in the remote east end of the island where the now extinct Ivory-billed woodpecker was last seen

## Research Aims

Cuba is home to a wealth of ecosystems and wildlife. However, the country has reached an important crossroads, with the thawing of diplomatic isolation opening the doors for mass tourism in the coming years. It is critical that the tourism industry grows in a sustainable and ecologically minded way, focusing on the stunning natural world Cuba has to offer rather than exploiting it for economic wealth. Collaborating with scientists from Havana University, to date, Opwall has focused its research efforts on the reefs and coastal habitat on the southern side of the Isle of Youth. The western end of the island has been designated as the Punta Frances Marine National Park, and a large section of the southern part of the island has been proposed as a Sustainable Use and Protected Area. Working alongside the Centre for Marine Research at the University of Havana, Opwall's objectives include the long term monitoring of reef fish community diversity and biomass, annual assessments of reef benthic health, population assessments of manatees and identifications of their preferred feeding areas, and surveying populations of sharks and other large predatory fish.

The Alejandro de Humboldt National Park is the only significant rainforest area in Cuba, and is a terrestrial biodiversity hotspot for the entire Caribbean, with National Park and Biosphere Reserve status. In the 1990s the Cuban government planned their largest hydroelectric project in the park, damming Cuba's largest river and flooding thousands of hectares of pristine forest. A group of biologists wrote to Fidel Castro explaining the biodiversity value of the park and Fidel was so impressed he ended the project immediately! However, the area is also home to Cuba's most valuable metal reserves, meaning biologists are battling with ever expanding industrialism on the fringes of the park. The aim of Opwall's new collaboration with local Cuban conservationists would be to help ensure that growing tourism to the park is conducted sustainably with maximised benefits going to the local communities.

## Expedition Structure

Choose:

- 2 weeks marine only
- 2 weeks terrestrial only

## Facilities

### Isle of Youth

Time is split between the Colony Hotel and accommodation in the local village of La Victoria. The hotel has A/C, swimming pool, showers and many of the luxuries you would not expect on an Operation Wallacea research expedition! Breakfast and dinner are taken at the hotel with packed lunches provided for the field team. La Victoria has small houses with dormitory style rooms, A/C and running water. Food will be provided by the local community, giving students the unique opportunity of living amongst the welcoming Cuban people. Students may also have the opportunity to spend one or more nights on the University of Havana research ship (a converted fishing boat) the Felipe Poey, where available. The boat is fitted with berths below deck, although most choose to sleep under the stars on deck.

### Baracoa

The Alejandro de Humboldt National Park Field Centre is located on a hillside overlooking the beautiful waters of Taco Bay. Consisting of a series of basic, traditionally constructed buildings, accommodation is in large dormitory style rooms with fans, with an adjacent shower and toilet block. Food is provided by local staff in a covered seating area that will also be used for lectures and practicals. The majority of survey work will be conducted in the surrounding forest via hiking, but students will also participate in snorkelling and boat practicals in Taco Bay.

**Travel information**

**Isle of Youth marine expeditions** start on a **Friday at 0800hrs** at the Colony Hotel, Isla de la Juventud, and finish on a **Thursday at 0800hrs** at the same location.  
Groups need to book international flights to arrive in to Havana on the Wednesday before the expedition starts and to depart Havana on the Friday after the expedition finishes.

**Baracoa forest expeditions** start on a **Friday at 0800hrs** at the Alejandro de Humboldt National Park Field Centre, Baracoa, and finish on a **Thursday at 0800hrs** at the same location.  
Groups need to book international flights to arrive in to Holguin on the Wednesday before the expedition starts and to depart Holguin on the Friday after the expedition finishes.

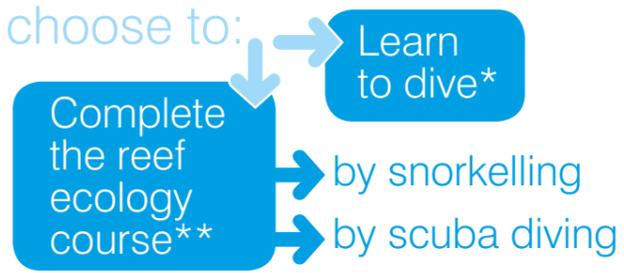
The internal transfer package\* between Havana Airport or Holguin Airport and the expedition start and end points will be arranged by our Internal Travel team and is not included in the expedition cost, unless you have chosen a fully inclusive expedition package. Additional guided excursions and day trips to be taken prior to and after your expedition are available upon request.

\*Includes airport meet & greet, any required travel and accommodation and full representation.

## Details of projects and expeditions

### Isle of Youth Expedition: 2 week marine only

choose to:



\*This course involves a combination of theory lessons, confined water dives and open water dives to gain an official scuba diving qualification.

\*\*The course teaches identification of common genera and species of coral and other macroinvertebrates, identification of the major reef-associated fish families and common species and introduces a variety of methods and practices used for scientific research in the marine environment.

Following dive training and reef ecology students will be tested on species ID, and high marks are required in order to join the research teams.

**Reef fish surveys:** This project involves diving to complete stereo video surveys of the reef fish communities. Once video data have been collected the students are involved in the identification and measurement of the species from analysis of the video to calculate biomass.

**Coral surveys:** Students will dive to complete video line intercept surveys on the reefs. Back on land videos are analysed by the students to identify the benthic organisms intercepting the line and calculate total coral and macroalgal cover at each site.

**Coastal fish communities and recruitment:** Seine nets will be deployed close to the beach to explore fish usage of the intertidal zone. Light traps will also be used to assess larval populations in coastal waters.

**Sharks and large carnivores:** Baited remote camera drops will be used to assess densities of sharks and other large carnivores as part of the Global FinPrint Project. When conditions allow,

baited long lines will also be set from the Felipe Poey to tag and release sharks.

**Invasive lionfish dissection:** This involves dissections of speared lionfish to examine 'size-class structure', stomach contents and other morphological and physiological characteristics.

**Manatee surveys and capture:** The manatee surveys are conducted in the mangrove channels and lagoons using side scan sonar surveys and observational transects. The position of all sighted manatees are logged and environmental data collected. In addition, the movement of manatees is studied using marked animals and students will be helping with manatee captures using nets. Any manatees captured will be measured, the sex determined, DNA and blood samples taken and the animal marked before release.

### Baracoa Expedition: 2 week forest focused

Groups participate in the following surveys and activities alongside the team of Cuban scientists in addition to completing an ecology course:

**Jungle skills training:** Learning how to survey safely in the jungle, identify animal signs, estimating distances, navigation using a compass and learning to use a GPS.

**Bird surveys:** The students will be helping the survey teams with assessing bird communities from point counts and mist net surveys where the students will learn how to identify birds in the hand and take morphometric measurements.

**Herpetofauna surveys:** Students will work with Cuba's leading expert to explore community diversity and distribution patterns, as well as population estimates of key species. Surveys include standard search times and spotlighting for amphibians.

**Invertebrate surveys:** Light traps will be used at night along with flight intercept and sweep net surveys during the

day. Students will also use mark recapture method to quantify populations of endemic snails.

**Forest structure:** Groups will mark and survey 20m x 20m forest quadrats. Numbering all trees for subsequent species identification, measuring the diameter at breast height (DBH) of each tree, the abundance and height distribution of understorey vegetation, leaf litter depth, canopy openness and measures of forest regenerations.

**Marine environmental profiling:** The adjacent waters of Taco Bay have never been studied, and students will help an expert team characterising the bay's environmental conditions and habitat distributions.

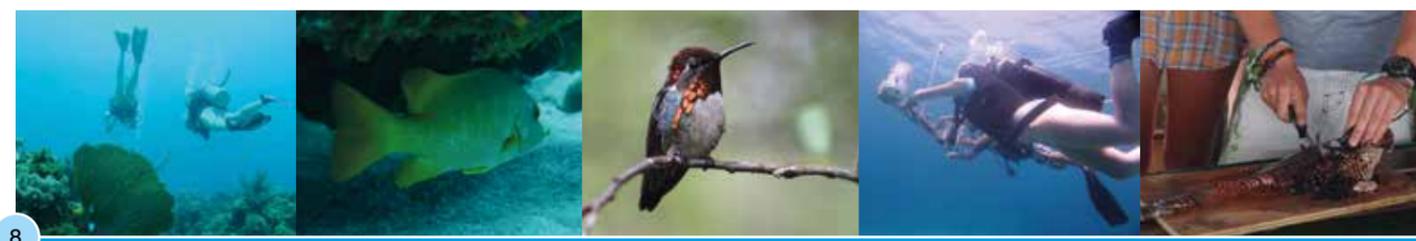
**Marine biodiversity surveys:** Students will join snorkel and boat surveys to complete assessments of fish and invertebrate communities. These data will be used to produce a species guide for visitors to the Park.



**Example Day Week 1**

Time	Activity
0900	Boat departs to Punta Frances National Park
1100	Open Water Dive 1
1230	Lunch
1500	Open Water Dive 2
1830	Dinner
1900	Caribbean reef ecology lectures 1 & 2

Isle of Youth project for a PADI Open Water dive trainee that has completed all the theory and skills training earlier in the week.





“Students and teachers alike benefit from the knowledge gained in the expedition, not only the research programmes but also why the research is so important.”  
**Laura Kile, Teacher,**  
*Webb School of Knoxville*

## Dominica overview

Diving ✓ Forest ✓

Expedition length 2 weeks

- Key facts**
- Highest percentage of original vegetation of any Caribbean island
  - Specific research on how climate change may affect tropical island species
  - Combines whale watching, abseiling/rappelling with forest research and the chance to dive

## Research Aims

This expedition is run on the most unspoilt island in the Caribbean. Forests cover much of Dominica and there are many deep unsurveyed gorges. Steep forested cliffs rise straight out of the sea and sheer slopes lead into deep canyons with huge waterfalls. This topography means the use of mechanical forest clearance methods are impossible in Dominica, and therefore the forest is protected. 20% of the island is now protected as national parks or forest reserves and the island has some of the largest stands of primary forest of all the Caribbean islands. Dominicans are proud of their wildlife and the island is known as the Nature Island of the Caribbean.

The research programme being run by Opwall involves helping with a series of projects designed on behalf of the Forestry Department to enhance datasets on the island's forest dynamics and faunal communities. The aims are:

- To help develop an aquatic macroinvertebrate biotic index which can be used to assess water quality of the island's rivers.
- Adding to the species lists for a series of invertebrate taxa.
- Monitoring the spread of an invasive lizard species, and investigate the likelihood of the native species of anole surviving under current climate change projections.
- Helping to identify the bird communities in a range of habitats.
- To assess carbon standing stock and turnover in the island's forests.

## Expedition Structure

- 1 week in tropical rainforest
- 1 week marine at Fort Shirley

## Facilities

### Forest week camps

Accommodation in the forest camps is either in tents or small single-sex dormitories with shared bathrooms. There are both flush toilets and earth closets (dry toilets) and running water for basic showers. Meals are taken in a shared eating area by the forest and there are basic lecture/classroom facilities available.

### Fort Shirley marine week

The Fort grounds have stunning views out over the island. Accommodation is also in single-sex dormitory rooms in a renovated barracks building overlooking the bay. All meals, lectures and diving/snorkelling will be run from the fort.

*Example Day Week 1*

Time	Activity
0800	Forest structure survey
1230	Lunch
1330	Freshwater invertebrate surveys using kick samples and then sample sorting
1800	Dinner
1900	Caribbean Island Ecology course lecture

*schedule at forest camp*

## Details of projects and expeditions

### Week 1: Forest week

Seminars will cover topics such as the importance of the Caribbean biodiversity hotspot, the formation of the Lesser Antilles, biodiversity of Dominica and survey techniques being used on the various projects during the week. The rest of the course covers biodiversity and evolution, ecological survey techniques, herpetofauna and birds of the Caribbean, freshwater biology and conservation synthesis. The groups on site each week are divided into teams and complete the following activities:

**Bird surveys:** This team will complete early morning mist net surveys for the birds in the standard monitoring site, set up in 2016 in order to monitor species diversity and abundance. They will also gather information about the processes of moult and migration in this region of the world. Birds caught in the nets will be identified and sexed before morphometric measurements are taken.

**Forest structure:** The forest structure team will be conducting surveys of large habitat plots to monitor the changes in forest structure over time. This project will be conducted in tandem with the Dominican Forestry Department and will involve recording the size, class, structure of the trees, amount of light penetrating to the forest floor and forest regeneration rates.

**Herpetofauna research:** This team is documenting the spread and abundance of an invasive Anolis lizard as well as collecting data on metabolic characteristics, thermal and habitat niche partitioning by both the invasive and endemic anole species. Surveys will take place in two locations across the island, one being a 'hot site' and the other a 'cold site'. Both the invasive and native species of anole from each of these sites will be tested for thermal tolerances and potential adaptations that may be favourable with current climate change projections.

**Freshwater ecology:** This team will be gathering kick samples for aquatic macroinvertebrates which are being identified so that a biological water quality index can be developed. To do this, students will need to be wading in streams at varying altitudes and in areas of varying disturbance levels (some streams will be close to settlements, some will be high up in the mountains).

**Invertebrate surveys:** There is still incomplete knowledge of the diversity of a number of the invertebrate taxa and there will be an invited invertebrate taxonomist working on completing collections of specimens from across the island.

**Bat surveys:** The bat team will be conducting standardised mist net surveys to monitor bat diversity and abundance around each of the target sites. The nets will be open (weather permitting) every night from dusk to around midnight and bats caught will be identified using dichotomous keys before being released.

**Marine invertebrate surveys:** Currently the ambient pH of the sea is 8.1-8.2, but with ocean acidification it is predicted to drop to 7.7 in the next 100 years. Champagne Reef in the south of Dominica provides a unique opportunity to look into the future and predict how marine species will survive at a lower pH. Champagne Reef is named as such because there are CO<sub>2</sub> bubbles coming out of vents in the sea. The CO<sub>2</sub> bubbles have lowered the pH, so this site can be used as a natural experiment, one of only four sites like this in the world. Students will snorkel during this survey and complete a number of water sample transects, measure the pH, and collect intertidal invertebrates to look at adaptations to the lower pH. Please note this survey is subject to research permit approval.

**Volcanology or Canyoning:** Dominica sits on 9 active volcanoes (none of which have erupted since Columbus visited the island, which is partly what gives Dominica its stunning topography and extensive pristine rainforests). Students will be taken on a day excursion with an experienced volcanologist where they will visit several key sites of volcanic interest, including hot sulphur springs and a crater lake formed by one of the previous eruptions. This gives students a chance to experience and learn about Dominica's incredible geothermal activity. Alternatively, students have the opportunity to complete a half day of canyoning, experiencing abseiling down into the deep gorges that cover much of the island. The canyoning experience is an optional extra and is run by an established operator, Extreme Dominica.

### Week 2: Marine week choose to:



Groups will travel to nearby Roseau, the capital of Dominica, where they will join a sea mammal search on a small catamaran. Here they will learn about some of the sea mammal research taking place around Dominica, and hopefully locate a sperm whale pod using hydrophones. The sea mammal search will end in Portsmouth in the north of Dominica where groups will make the short transfer to Fort Shirley in the Cabrits National Park.

\*This course involves a combination of theory lessons, confined water dives and open water dives to gain an official scuba diving qualification.

\*\*The course teaches identification of common genera and species of coral and other macroinvertebrates, identification of the major reef-associated fish families and common species and introduces a variety of methods and practices used for scientific research in the marine environment.

*Example Day Week 2*

Time	Activity
0800	PADI Open Water skills training session in shallows
1000	Caribbean reef ecology lecture and land based practical
1200	Lunch
1300	PADI Open Water skills training session in shallows
1500	Caribbean reef ecology lecture and land based practical
1800	Dinner

*Schedule for PADI Open Water dive training student at Fort Shirley who has completed the theory section of the training*

## Travel information

The expeditions start on a **Monday at 0900hrs** at the forest campsite and finish on a **Saturday at 0800hrs** at Fort Shirley. Groups need to book international flights to arrive in to Dominica – Douglas Charles Airport (formerly known as Melville Hall) – on the Sunday before the expedition starts and to depart Dominica after 1000hrs on the Saturday the expedition finishes.

The internal transfer package\* between Dominica Airport and the expedition start and end points will be arranged by our Internal Travel team and is not included in the expedition cost, unless you have chosen a fully inclusive expedition package.

\*Includes airport meet & greet, any required travel and accommodation and full representation.





“When on day 2 a student comes up to you and says ‘I’m changing my major’, you know you’ve done something incredibly right and inspiring.”  
**Amelia Wright, Teacher, Tabor Academy**

## Ecuador and the Galapagos overview

Diving ✓ Forest ✓  
**Expedition length** 2 weeks

- Key facts**
- Chance to combine the species rich forests of the Ecuadorian Amazon with the unique Galapagos Island fauna
  - Best opportunity to see many of the iconic Neotropical forest species
  - Complete a course on the wildlife and conservation of the Galapagos islands
  - There are 317 mammal species in Ecuador

### Research Aims

One of the greatest threats to the most biodiverse areas of Amazonian forest is from oil extraction. In 2010 Ecuador was promised an agreement with the UN to protect its forests from oil extraction. A number of countries promised a total of US\$3.6billion but the total received by Ecuador was claimed to be less than 4% of this figure. Originally thought to be ground breaking, this pledge had the potential to undo the power of the oil companies and protect key conservation areas, but in the end failed, leaving the forests at the mercy of extractive industry. Traditionally deforestation occurs after oil extraction and often with little benefit to the native people. However in an area of the Ecuadorian Amazon the Sani people have rejected the oil money and instead established a prestigious Eco Lodge with many distinguished visitors and supporters. This business provides sustainable jobs and income whilst leaving their forests intact. Opwall is helping at this site by providing baseline data on the key taxa and monitoring the success of this venture in providing long-term protection of the biodiversity.

In stark contrast to the plight facing the Ecuadorian Amazon, the Galapagos Islands has long funded its wildlife protection through tourism. However, the benefits of this income have not been spread evenly with islands such as Floreana being the least developed for tourism visits. Operation Wallacea are working with the Floreana community (total population 120) to develop homestay tourism on the island which will help substantially increase the economic benefits of tourism to the islanders. The cooperation and active support of the local community is needed to ensure the successful re-introduction of local extinct species such as the Floreana mockingbird, now found on just one small islet offshore.

“The type of learning environment I’ve always needed – staff and students who share the same passions.”

**Natalie Corondoni, Student, Patrick Henry High School**

### Expedition Structure

- Week 1: Amazonian forest
- Week 2: Galapagos Island of Floreana

### Facilities

#### Sani research camp

In the Amazonian forest week students will be staying in tents in the Sani research camp which is accessed by an hour long canoe ride from Sani Lodge, which in turn is reached by a 3 hour boat ride along the Sipuruni river. The camp has a shared lecture and dining room where meals are served. There are shared field toilets and showers at this site.

#### Floreana

The second week in the Galapagos will be spent in local homestays. Students will be in shared rooms in small groups and have shared bathroom facilities. Meals will be taken in a communal building and will be prepared by local staff.

*Example Day Week 1*

Time	Activity
0600	Bird mist netting
1230	Lunch
1400	Fish surveys with gill nets and rod and line
1800	Dinner
1900	Neotropical Forest Ecology course lecture

**Travel information**

The expeditions start on a **Tuesday at 1800hrs** at the Sani Forest Research Camp and finish on a **Monday at 0900hrs** at Floreana Island in the Galapagos. Groups need to book international flights to arrive in Quito on the Monday before the expedition starts and to depart Quito on the Tuesday after the expedition finishes or from Guayaquil after 1700hrs on the Monday the expedition ends.

The internal transfer package\* between Quito Airport and the expedition start point together with the travel from the forest to the Galapagos at the end of the first week and back to Quito at the end of week 2, will be arranged by our Internal Travel team and is not included in the expedition cost, unless you have chosen a fully inclusive expedition package.

\*Includes airport meet & greet, any required travel and accommodation and full representation.

## Details of projects and expeditions

### Week 1: Amazonian forest

During this week the groups will be split into smaller teams and will rotate between the following activities:

**Habitat surveys:** Students will work alongside the habitat survey team to mark and then survey 20m x 20m forest quadrats. Surveys will involve numbering all trees for subsequent species identification, measuring the diameter at breast height (DBH) of each tree, the abundance and height distribution of understorey vegetation, leaf litter depth, canopy openness and measures of forest regenerations.

**Butterfly surveys:** Students will be assisting in the setting and collecting of traps, identifying and recording species alongside pollard count transects.

**Fish community surveys:** Groups will assist with fish surveys using gill nets and a rod and line. All fish captured will be measured and identified to build a database on species diversity in the river.

**Herpetofauna surveys:** The reptile and amphibian communities will be assessed from visual encounter surveys along forest transects and active searching and pitfall trapping. Species will be identified, weighed, measured and GPS coordinates taken.

**Bird surveys:** The students will be helping the survey teams with assessing bird communities from point counts and mist net surveys where the students will learn how to identify birds in the hand and take morphometric measurements.

**Large mammal surveys:** These are conducted using line transect surveys for the species where visual encounters can be used (e.g. primates) and on patch occupancy analysis for those species recorded by tracks or droppings (e.g. jaguar). Students will also be shown how camera trapping is being used to estimate population levels of species.

**Jungle skills training:** Learning how to identify animal tracks and signs, estimating distances, navigation using a compass and learning to use a GPS. Exercises designed to teach students to make a shelter, find food/water, make a fire and cook in the forest.

**Introduction to Amazonian tribal communities:** Students will have the opportunity to visit Sani village and learn about some of their culture and customs. This area of the Amazon is within a few miles of Amerindian tribes that have yet to be contacted by the outside world.

In addition to these surveys the groups will also be completing an Amazonian wildlife and conservation course which comprises lectures and related activities/discussions on: Amazon geography and biodiversity, flooded forest and upland forest ecology, conservation strategies in the Amazon, Ecuadorian Amazonian birds, mammals of the forest, Amazonian fish, amphibians and reptiles, wildlife monitoring and calculating sustainable hunting levels, examples of best practice conservation management in the Amazon.

### Week 2: Galapagos Islands

During this week groups will complete a Galapagos Island ecology course which will cover the following topics: introduction to the Galapagos Islands, vegetation zones and how species arrived, introduction to the Galapagos marine environment, fish and invertebrates of the Galapagos, endemic species of the islands, marine megafauna of the Galapagos, adaptive radiation and conservation of the Galapagos.

Alongside the lectures series students will also complete associated land and marine based practicals. Marine practicals are completed by snorkelling only.

**Galapagos fish identification:** Students will learn the key species found in the Galapagos, then will test this knowledge by completing snorkel Underwater Visual Census transect surveys and recording abundance and species of each fish encountered.

**Marine benthic transects:** Groups will be learning how to lay 50m transects by snorkelling and then how to identify macroinvertebrate communities within a 2m band either side of these transects. This practical gives students the opportunity to swim alongside sea lions and see the iguanas underwater.

**Floreana Island habitats and terrestrial fauna:** This is a day-long practical which includes hiking through the volcanic hills down to Post Office Bay. The various island vegetation communities will be pointed out along with some of the Galapagos endemic species. In addition students learn about those who first inhabited the island as well as visiting the famous postbox established by early whalers visiting the island and which has been responsible for hand delivering mail for over 300 years. This day practical will also include a snorkel in Post Office Bay, followed by a speed boat ride back to camp.

**Intertidal surveys:** At low tide, groups will learn to identify some of the rocky area invertebrates.

**Bird identification:** This practical will train students in the identification of some of the Galapagos endemic species such as the Galapagos shearwater, Galapagos penguin, flightless cormorant, Swallow-tailed gull, Galapagos flycatcher and some of the species of Darwin finch found on the island.

In addition to the training programme students can choose to take part in a PADI Discover Scuba course or if a qualified diver, complete two dives, for an additional cost of US\$160 per person.

*Example Day Week 2*

Time	Activity
0900	Trek across island via the highlands to study vegetation communities and key fauna to Post Office Bay
1200	Packed lunch in the field
1400	Snorkel in Post Office Bay
1800	Dinner
1900	Galapagos Island Wildlife and Conservation course lecture

*Example day schedule on Floreana Island*



# Ecuador and the Galapagos



“If you have the opportunity to join an Opwall expedition do it. It's really worth it, great experience. 10/10”  
**Louisa Price, Student, SA expedition 2016, German European School Manila**

## Fiji overview

Diving ✓ Forest ✓

Expedition length 2 weeks

- Key facts**
- Be involved with the creation of the first large national park in Fiji
  - Dive in the largest bay in the South Pacific
  - Explore previously unsurveyed reefs
  - Spend time with local Fijian communities and learn about the ecology of Pacific islands

## Research Aims

In the 1800's many of the smaller Melanesian and Polynesian Pacific Islands were colonised by European powers. One of the last to be colonised was Fiji because of their fearsome reputation as cannibals. This late colonisation had the advantage that some of the mistakes that had been made on other colonised islands could be avoided. For example, in places such as Hawaii, land was bought freehold by foreign investors often for tiny sums of money and the local people were disenfranchised. However, in Fiji, the British banned all freehold sales which protected the land for the indigenous people.

One of the side effects of this policy was that it became much more difficult for Fiji to declare national parks, as had been done on government land in places such as the US, Australia and New Zealand. In Fiji, over 95% of all high value conservation land is owned by hundreds of Mataqali (pronounced as matangali) which are extended family units. To overcome this problem, in 2013 one of the Mataqali put much of their land into the Nambu Conservation Trust to form Fiji's first national park. Since that time there has been considerable interest from surrounding Mataqali in extending this national park to include traversing and no logging or hunting rules onto the rest of the high conservation value forests in the Natewa tribal district. This has effectively created a national park that covers much of the high quality conservation land on the Natewa Peninsula.

The peninsula is geologically and biologically an 'almost island' that is 60km long and averages over 10km wide. At its eastern end it is 10km from Taveuni Island, and at its western end (where it is connected by a narrow neck of land to Vanua Levu) the peninsula is only half a kilometre wide. The Natewa Peninsula is the wildest remaining area in Fiji with forests still containing some of the largest native trees and highest floristic and faunal diversity in the Fijian islands. It is also home to a number of the Fijian endemic species including the Silktail flycatcher which is found only on the peninsula and in one small island offshore.

Natewa Bay, at 1000 km<sup>2</sup>, is the largest bay in the South Pacific and bounds the northern part of the Natewa Peninsula. This bay has very low levels of fishing pressure and some superb reefs. Moreover, due to geological faults, the centre of the bay is over 500m deep. Amazingly, no biological surveys have ever been completed on this bay. The Natewa National Park, which includes the waters of the bay opposite their land, is keen to investigate the biodiversity of the bay and use the data collected to make a World Heritage Site. The first step in this process which was completed in 2017 was to establish a marine research centre and the students on this expedition in 2018 will be contributing to launching a marine monitoring programme for the bay.

## Expedition Structure

- Week 1: Forest at Natewa village site
- Week 2: Marine at Natewa Bay research centre

## Facilities

### Natewa forest

The first night is spent in a Fijian village homestay, following this the rest of the week will be spent in our forest research camp. Approximately a 2 hour trek from the village. Students will sleep in hammocks and tents, with shared toilet and washing facilities. Lectures and meals are taken at the dining area in camp.

### Natewa Bay

Based from a dive centre students will share dormitory style accommodation with bunk beds and shared toilet and shower facilities. There is a dining room where meals are taken and course lectures given.

### ✈️ Travel information ✈️

The expeditions start on a **Sunday at 1600hrs** in one of the Natewa villages and finish on a **Saturday at 0800hrs** in Natewa Bay. Groups will need to book international flights to arrive in Nadi on the Saturday before the expedition start and depart Nadi on the Saturday after 2200hrs or on the Sunday after the expedition finishes.

The internal transfer package\* between Nadi and the expedition start will be arranged by our Internal Travel team and is not included in the expedition cost, unless you have chosen a fully inclusive expedition package.

\*Includes airport meet & greet, any required travel and accommodation and full representation.

## Details of projects and expeditions

### Week 1: Forest week

**Fijian culture and environment course:** This one day course gives the students an introduction to the natural history and cultural history of the mountains and forests of Fiji. Training will be given in identification of the important tree species and their uses, as well as major agricultural crops including taro and kava, the history of the landscape, and how to identify some of the common bird calls.

**Forest measurements:** Students will be working in teams completing measurements of 20m x 20m quadrats to collect data on the diameter at breast height of all woody species, canopy height, quantity of vegetation at different heights from a touch pole, canopy density, evidence of disturbance (e.g. cut stumps) and sapling density. These data will then be used to calculate carbon levels and the degree of disturbance at each of the sites.

**Bird surveys:** Students will be working with an experienced field naturalist completing point count surveys where all birds seen or heard are identified. In addition, mist nets will be used to gather data on understory bird communities and from the banding programme, data on breeding, moult patterns, longevity and movement between years can be derived.

**Invertebrate surveys:** These surveys are designed to collect as wide a range of invertebrate specimens as possible to help build a catalogue of these taxa for the area. Techniques will include sweep netting, suction devices, Malaise traps, pitfall traps and light traps. Students will be involved in setting and emptying these traps and under supervision will help in sorting the collected specimens into Orders. The samples will be exported for identification by various international specialists.

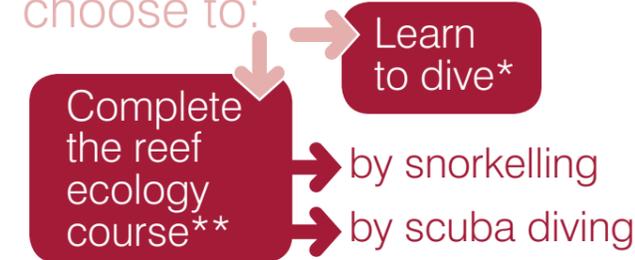
**Herpetofauna surveys:** The surveys for herpetofauna will be done from standard timed searches along transects and pitfall traps with drift fences. Species will be identified and GPS coordinates taken.

**Bat surveys:** In the evenings students will be assisting with mist net surveys to determine bat communities. How captured bats are removed, handled, identified and morphometric measurements recorded will be demonstrated.

In addition to the practicals, students will also complete a course (in camp) on Pacific island ecology including lectures on island biogeography, threats to island wildlife, recent extinctions of Pacific species and conservation initiatives in the Pacific.

### Week 2: Marine week

choose to:



\*This course involves a combination of theory lessons, confined water dives and open water dives to gain an official scuba diving qualification.

\*\*The course teaches identification of common genera and species of coral and other macroinvertebrates, identification of the major reef-associated fish families and common species and introduces a variety of methods and practices used for scientific research in the marine environment.

### Example Day Week 1

Time Activity

- 0800 Forest structure survey
- 1200 Lunch
- 1300 Herpetofauna transect survey
- 1700 Pacific Island Ecology course lecture
- 1800 Dinner
- 1900 Mist netting bat survey

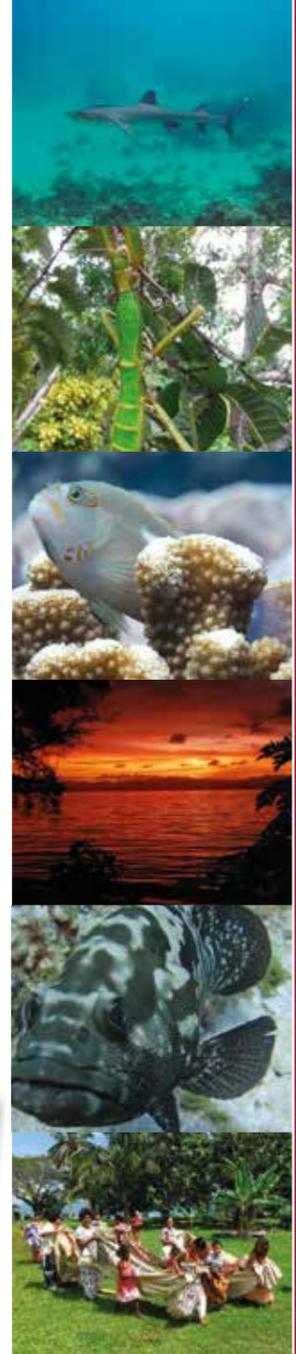
Schedule for Natewa forest camp

### Example Day Week 2

Time Activity

- 0800 PADI theory lecture 1
- 0900 PADI theory lecture 2
- 1000 PADI in-water skills 1 and 2
- 1230 Lunch
- 1330 PADI theory lecture 3
- 1430 PADI in-water skills plus catch up of any skills that need repeating from morning session
- 1800 Dinner
- 1900 Pacific reef ecology and survey techniques course lecture

Schedule for dive trainee just starting on the course



“Fantastic experience. My students didn't want to go home. We are already planning another!”  
**Victor Garcia**, Teacher, Cuba expedition,  
 Anacortes High School



## Great Rift Valley overview

Diving ✓ Forest ✓

**Expedition length** 2 weeks

- Key facts**
- Work with a team of academics whose work on speciation has been published in nature
  - The only Opwall expedition that is run over 2 countries (Tanzania & Malawi)
  - Chance to visit the Great African Rift Valley – birthplace of humankind – and learn about its ecology
  - Learn to dive in Lake Malawi which has a greater diversity of fish than the Great Barrier Reef

## Research Aims

Lake Malawi has the highest diversity of endemic fish species in the world with more than 650 species of cichlids. Normally, speciation occurs when two populations become isolated and adaptive changes, in their separate environments, cause the two populations to drift apart. After several thousand years, if the two populations meet again, they are so different interbreeding cannot occur. How does this happen in a lake? One theory is that changes in water level in the lake have caused separation into smaller lakes which have re-joined as water levels rose; but is this sufficient to see the huge diversity that appears in Lake Malawi? Studies in the volcanic crater lake, Lake Barombi Mbo, in Cameroon cast doubt on the possibility of speciation occurring only by geographical isolation. The crater lake is essentially a cone of water and therefore changes in water level could not result in separate lakes forming. However the dozen or so species of cichlid in this lake were revealed from DNA analysis to be more closely related to each other than to any other fish species, which suggests that speciation had occurred within the lake from a single founder species. The mechanism for sympatric speciation of this type still remains unknown.

North of Lake Malawi there are 14 crater lakes which provide an ideal natural laboratory to study how sympatric speciation might occur. Each lake appears to have been invaded independently by an ancestral species of Haplochromine cichlid from Lake Malawi, that has then speciated within the lake. The crater lakes have different habitats (e.g. depth, size) and different fish communities, yet are relatively simple systems compared to the much larger Lake Malawi so will hopefully provide clues as to how this speciation occurred. Samples of the fish from each lake will be taken back to UK universities for complete genome sequencing. In addition small numbers of live fish will be exported for mate selection studies.

Lake Malawi itself though is an important source of fish for the communities surrounding the lake. A series of standard transects to survey the fish communities around the Nkhata Bay area have been established to monitor population changes over time and determine whether fishing levels are sustainable. In addition to these direct observation surveys, fish landing surveys are also being conducted.

## Expedition Structure

- Part 1: Speciation mechanisms in crater lakes
- Part 2: Lake Malawi dive training and fish surveys
- Part 3: Liwonde National Park

## Facilities

### Crater Lakes

Groups will be staying in a campsite, a short walk from the beautiful Masoko Lake. There are hammocks and tents, long-drop toilets and jungle showers at this camp. Living in a small Tanzanian rural community will also give students the chance of learning about local agriculture and experience living in a different culture and community from their own.

### Lake Malawi

The groups are based at the Maru Lake Malawi Research Centre at Nkhata Bay on Lake Malawi. Accommodation here will be in shared rooms in buildings set in the grounds of the nearby lodge with shared bathrooms and shower blocks. There is a dining room and rest areas and a fully equipped dive centre on site set on a private beach.

### Liwonde

For the final part of the expedition the students will be staying in the Liwonde Safari Camp. Accommodation will be in thatched dormitories with separate toilet and shower blocks in the camp.

**Travel information**

The expeditions start at Masoko in the Crater Lakes region at **1600hrs on a Tuesday**. You will need to book flights which arrive in Dar es Salaam on the Monday before your expedition starts and back from Lilongwe (Malawi) after 0930hrs on the day the expedition ends. The expedition finishes on **Monday at 0930hrs**.

The internal transfer package\* from Dar es Salaam to Masoko and from Liwonde National Park to Lilongwe International Airport will be arranged by our Internal Travel team and is not included in the expedition cost, unless you have chosen a fully inclusive expedition package.

\*Includes airport meet & greet, any required travel and accommodation and full representation.

## Details of projects and expeditions

### Part 1: Speciation mechanisms in crater lakes

The first 5 nights will be based in Masoko, south western Tanzania, helping with the under-surveyed volcanic crater lakes in the area. The groups will be split into smaller teams which will spend a day on each of the following activities:

**Fish surveys:** This will involve setting and emptying fish traps at different depths as well as beach seining. The fish captured will be identified and morphometric measurements recorded.

**Limnology surveys:** Helping to bathymetrically map the lakes and survey the water temperature and oxygen profiles at different depths.

**Aquatic invertebrate surveys:** This will involve taking kick samples around the edge of the lakes and using grab sampling for the deeper areas to sample the aquatic invertebrate communities at different depths and on different substrates.

**Wildlife surveys of the lake surrounds:** One of the objectives of the crater lake surveys is to highlight the area for potential tourist homestay visits. However for this to happen data need to be gathered on the birds and other wildlife around the lakes and communities. This survey will involve walking based surveys with an experienced naturalist.

In addition, the students will be completing a lecture course on the Evolution of Species which covers much of the A-level, AP or IB syllabus on genetics and speciation but goes into more depth on the different mechanisms of speciation. Living in a small Tanzanian rural community will also give students the chance to learn about a different culture and community from their own.

### Part 2: Lake Malawi dive training and fish surveys

choose to:

Join Lake Malawi fish surveys\*\*

Learn to dive\*

\*This course involves a combination of theory lessons, confined water dives and open water dives to gain an official scuba diving qualification.

\*\* This involves training on fish species identification and helping experienced fish biologists on twice daily in-water transect surveys of different parts of the lake. In addition this team will be helping fish biologists with fish landing surveys.

### Part 3: Liwonde National Park

On the final days of the second week the group will be transferred to the Liwonde National Park in Malawi. No visit to the Great Rift Valley is complete without seeing some of the large game species that provide such a draw for tourists to East Africa. The Liwonde National Park is the best national park in Malawi and it

will give the group the chance to see many of the charismatic megafauna including elephant, hippo and rhino. A day will be spent in the camp and all students will experience a boat based safari and a vehicle safari with experienced local guides.

*Example Day Part 1*

Time	Activity
0800	Emptying fish traps and snorkel surveys of cichlid fish
1000	Aquatic invertebrate kick sampling and sample sorting
1230	Lunch
1330	Bird, mammal and other wildlife attraction survey of the area
1800	Dinner
1900	Africa Rift valley Ecology and Evolution course lecture

*Schedule at Masoko Camp*

*Example Day Part 3*

Time	Activity
0800	Vehicle based game survey
1230	Lunch
1330	Boat based river survey of birds and large mammals
1830	Dinner

*Schedule at Liwonde National Park*





“If my students could only go on one trip during the 4 years of their high school career, I would highly recommend an Opwall expedition that incorporates real and relevant science that students directly participate and enjoy because of such great scientists!”  
**Anthony Cantatore, Teacher,**  
 Louisville High School

## Honduras overview

Diving ✓ Forest ✓

Expedition length 2 weeks

- Key facts**
- Largest number of forest research scientists and most published research site in Honduras
  - In the top 50 most irreplaceable forest sites in the world
  - Data used to protect forests based on their carbon and biodiversity value
  - Opwall's flagship Caribbean marine research site
  - Home to Opwall's 3D modelling of coral reefs initiative

## Research Aims

The forests of Central America are some of the most species diverse forests in the world partly because they are the meeting point of two great faunas – those from North America and those from South America which have both evolved separately. Many of these forests have now been badly damaged but there is a proposal to join currently discontinuous areas of forest into a continuous Mesoamerican Forest Corridor running from the forests of the Yucatan Peninsula in Mexico (where there are other Opwall teams) to the forests of Panama. Part of this corridor will be the cloud forests of the Cusuco National Park in Honduras which, sadly, has suffered significant deforestation. The Opwall survey teams have been working in Cusuco Park since 2003 and the data produced has resulted in the park being listed in the top 50 most irreplaceable forest sites in the world from a review of 173,000 protected areas worldwide. All the data have been summarised into a report using the Natural Forest Standard guidelines. This report will then be independently verified and once completed, Natural Carbon Credits can be issued and sold by the Honduras Forestry Department to multinational companies wishing to offset their carbon emissions and simultaneously helping biodiversity. Funding raised in this way is then used to manage and protect the park. By 2018 this funding should hopefully be in position and the Opwall teams will be completing annual surveys of how effectively the park is being protected.

In the Caribbean there are a number of core issues that have been affecting the biodiversity of the reefs – including the decline of sea urchins that allowed algal colonisation of reef areas, lionfish (an unregulated invasive species) spreading across the Caribbean that acts as a predator of reef fish and overfishing of reef fish by local communities. Opwall has monitoring sites in Cuba, Dominica, Mexico and two in Honduras, thus achieving a good representation of the Caribbean. One of the Honduran sites is on the island of Utila and the second on the island of Roatan. Research efforts at these sites aim to address key conservation concerns for the wider Caribbean in order to build our understanding of how best to improve the health of Caribbean coral reefs throughout the region.

## Expedition Structure

Choose:

- 1 week forest and 1 week marine
- or
- 2 weeks marine only

## Facilities

### Cusuco

Half of the time in the forest will be spent either in Base Camp or the mountain village of Buenos Aires whilst the other part will be spent in one of the more remote forest camps at Guanales or Cantiles. At Base Camp students will be in tents and there are toilets and showers. For those staying in Buenos Aires accommodation is in local houses. From Base Camp it is approximately a 3-4 hour trek to your satellite camp where accommodation is in hammocks or tents (depending on availability) and with the river as the shower facility.

### Utila

The teams are based at the Coral View Research Centre, a one-hour ferry crossing from the mainland. Accommodation is in shared rooms with fans. The hotel is situated beside the island's fringing coral reef and its largest mangrove lagoon.

### Roatan

At Ecodivers, a 90 minute ferry crossing from the mainland, accommodation is in shared cabins with fans, located on a small peninsula surrounded by pristine coral reefs.

**Scuba diving at both sites is a combination of shore and boat diving.**

### Travel information

All expeditions start on a **Wednesday at 0700hrs** in San Pedro Sula and finish on a **Tuesday at 0630hrs** on either Utila or Roatan. Groups need to book international flights to arrive in to San Pedro Sula on the Tuesday before the expedition starts and to depart San Pedro Sula after 1600hrs on the Tuesday the expedition finishes.

The internal transfer package\* between San Pedro Sula Airport and the expedition start and end points will be arranged by our Internal Travel team and is not included in the expedition cost, unless you have chosen a fully inclusive expedition package.

\*Includes airport meet & greet, any required travel and accommodation and full representation.

## Details of projects and expeditions

### Week 1: Forest week in Cusuco National Park

**Jungle skills training:** Students will learn to work safely in a forest research site and about the survey techniques being used. In addition the students can partake in a short optional course on learning how to ascend into the canopy. Canopy access training costs US\$170 extra for this additional course.

**Forest measurements:** Students will be working in teams each completing measurements of 20m x 20m quadrats to collect data on the diameter at breast height of all woody species, canopy height, quantity of vegetation at different heights from a touch pole, light penetration to forest floor using a canopy scope, evidence of disturbance and sapling density.

**Invertebrate surveys:** A light trap is being run at each camp to monitor nocturnal invertebrates such as moths and Jewel scarab beetles. Pitfall traps baited with dung need checking and emptying regularly as do other traps used to survey the genetic diversity of the invertebrate communities in the park. Other projects include the diversity of aquatic invertebrates in bromeliads and use of freshwater invertebrates to assess water quality.

**Bird surveys:** The students will be helping the survey teams with assessing bird communities from point counts and mist net surveys where the students will learn how to identify birds in the hand and take morphometric measurements.

**Herpetofauna surveys:** The reptile and amphibian communities will be assessed from standard search time surveys and pitfall trapping. Species are identified and GPS coordinates taken. The Cusuco Park is particularly important for amphibians and these small and unique populations are suffering from chytrid fungal infections which in most cases is fatal. The survey teams are collecting swab samples from all captured amphibians to check for the presence of the fungus using the on-site genetics lab.

**Mammal surveys:** This survey involves checking previously baited traps for small mammals, identifying any individuals caught and marking them before release (mark-release-recapture). In addition there are distance, patch occupancy and camera trap surveys used to describe large mammal communities.

**Bat surveys:** Students will be shown how mist netting and soundscaping for bats can be used to monitor changes in bat community structure and/or abundance over time. Captured bats are removed, handled, identified and morphometric measurements recorded.

In addition to the above practicals the students will also complete a course (in camp) on neotropical ecology including: rainforest structure and biodiversity, adaptations and co-evolution, amphibians and reptiles, cloud forest birds, cloud forest mammals and conservation synthesis.

### Week 2: Marine week on Utila or Roatan

choose to:



\*This course involves a combination of theory lessons, confined water dives and open water dives to gain an official scuba diving qualification.  
 \*\*The course teaches identification of common genera and species of coral and other macroinvertebrates, identification of the major reef-associated fish families and common species and introduces a variety of methods and practices used for scientific research in the marine environment.

### Marine only Expedition

A combination of both our marine research sites can be used for a marine only expedition. Students can spend some of their time working towards a more in-depth research project in addition to dive training, partaking in a reef ecology course and assisting with a range of research projects including: Stereo video surveys, line intercept video surveys and macroinvertebrate surveys.

### Example day Week 2

Time	Activity
0700	Caribbean reef ecology and survey techniques course dive practical
1100	Caribbean reef ecology and survey techniques course lab practical
1300	Lunch
1430	Caribbean reef ecology and survey techniques course dive practical
1800	Dinner
1900	Evening research lecture

Schedule on Utila for a qualified diver

### Example day Week 1

Time	Activity
0800	Canopy access training
1200	Lunch
1300	Herpetofauna transect surveys
1700	Neotropical forest ecology course lecture
1800	Dinner
1900	spotlighting for amphibians and swabbing for chytrid fungus

Schedule at Base Camp





“If you want to know what scientists do in the field – come here.”  
**Michael Righton, Teacher,**  
*Stowe School*

## Indonesia overview

Diving ✓ Forest ✓

Expedition length 2 weeks

- Key facts**
- In the centre of the Coral Triangle - the world's most biodiverse reefs
  - Endemic rich forests with new species described and more still to be discovered
  - Most published research site in the Coral Triangle and third most published terrestrial site in Sulawesi
  - Most developed Opwall site for conservation interventions with carbon and seaweed projects

## Research Aims

Sulawesi and the surrounding smaller islands were identified as a unique biogeographical region by the naturalist Alfred Russel Wallace. These islands are now known as the Wallacea region of Indonesia, and formed their unique fauna due to their isolation from other landmasses by the deep ocean channels that surround the islands. Sulawesi has a high percentage of endemic species with 127 known mammals (62% endemic); 700 species of bird (36% endemic); and 74 species of herpetofauna (38% endemic). Despite such high numbers of endemic species in these forests, the Wallacea region remains one of the least biologically studied areas in the world and one of the most likely places to discover new vertebrate species. The reefs in this part of the world are the most biologically rich of anywhere on earth and form part of the Coral Triangle – which are a formation of reefs with the highest richness of hard coral genera.

The biodiversity and carbon data from the forests on Buton Island, studied by Opwall over the last few years, are being submitted to the Indonesian authorities for funding to be received under the REDD+ scheme. This is to ensure the long term protection of these forests which contain many of the Sulawesi endemic species. The 2018 programme will be completing the annual monitoring of the target taxa to monitor the effectiveness of the proposed conservation measures. In the Wakatobi marine park the monitoring data are being used to assess the recovery of the reefs from excessive fishing pressure. The Pantai Nirwana datasets are being used to identify a potential new marine park/protected area.

“A great way to experience field research.”  
**Kiara Johnson, Student,**  
*Shanghai Community International School*

## Expedition Structure

Choose:

- 1 week forest and 1 week marine
- or
- 2 weeks marine at both Pantai Nirwana and Hoga Island

## Facilities

### North Buton, Central Buton and South Buton

When staying at the South Buton camp, the first night is spent in local houses before moving to the more remote camp where accommodation is in hammocks. At central camp students go direct to the camp and accommodation is also in hammocks. In North Buton there are shared tents with camp beds, all camps have communal eating and lecture areas. Field toilets are built at each of the camps and shower systems are built into waterfalls on the rivers next to each of the camps.

The experience of living and working in these remote forest camps is one that few people forget.

### Pantai Nirwana

The South Buton marine research centre has shared rooms with air conditioning, showers and flush toilets. There is a central dining hall where meals are taken and a lecture room set away from the main building.

### Wakatobi

Students are sharing local cabins on stilts set back from the white sand beach island of Hoga. Meals are taken together in a shared lecture and dining room. Showers are the traditional Indonesian mandi style, where you use a scoop to wash from a large water tank.

### ✈️ Travel information ✈️

The forest/marine combination expeditions start on a **Tuesday at 1000hrs** in Bau Bau, and finish on a **Monday at 0900hrs** in either Wanci (if your last week is in the Wakatobi) or Bau Bau (if your last week is at the South Buton marine site). The marine only expedition starts on a **Tuesday at 1000hrs** in Bau Bau and finishes on a **Monday at 0900hrs** in Wanci.

For all options groups need to book international flights to arrive in to Makassar (known as Ujung Pandang) on the Monday before the expedition starts and to depart Makassar after 1800hrs on the Monday the expedition finishes.

The internal transfer package\* between Makassar Airport and the expedition start and end points will be arranged by our Internal Travel team and is not included in the expedition cost, unless you have chosen a fully inclusive expedition package.

\*Includes airport meet & greet, any required travel and accommodation and full representation.

## Details of projects and expeditions

### Week 1: Forest week on Buton Island

**Jungle skills training:** Students will learn to work safely in a forest research site, how to identify animal tracks and signs, estimate distances, navigate using a compass and identify some of the common bird calls. Exercises are designed to teach students how to make a shelter, find food and water, make a fire and cook in the forest. In addition the students can partake in an optional short course on learning how to ascend into the canopy. Canopy access training costs US\$170 extra for this additional course.

**Forest measurements:** Students will be working in teams completing measurements of 50m x 50m quadrats to collect data on the diameter at breast height of all woody species, canopy height, quantity of vegetation at different heights from a touch pole, canopy density, evidence of disturbance (e.g. cut stumps) and sapling density.

**Butterfly surveys:** Students will be helping with pollard counts of butterflies.

**Bird surveys:** Students will be working with an experienced field naturalist completing point count surveys where all birds seen or heard are identified.

**Herpetofauna surveys:** Students will be working with an experienced herpetologist emptying pitlines, completing standard time scan searches and also spotlighting at night for frogs.

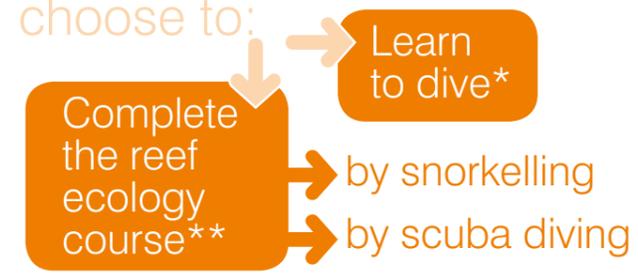
**Large mammal and bird surveys:** Students will be walking quietly along transects to record large mammals and birds (macaques and hornbills) using distance based sampling. Signs (footprints and droppings) of other species (anoa and wild pig) will be recorded and patch occupancy analysis used to identify their abundance. In addition camera traps have been set at some of the camps and their use to estimate abundance of large mammals will also be demonstrated.

**Bat surveys:** Students will be shown how harp trapping and mist netting for bats can be used to determine bat communities. How captured bats are removed, handled, identified and morphometric measurements recorded will be demonstrated.

In addition to the practicals listed the students will also complete a course (in camp) on Wallacea wildlife including lectures on biodiversity and endemism in Wallacea forests, birds, amphibians and reptiles, Sulawesi mammals and conservation synthesis.

### Week 2: Marine week in either Wakatobi or Pantai Nirwana

choose to:



\*This course involves a combination of theory lessons, confined water dives and open water dives to gain an official scuba diving qualification.

\*\*The course teaches identification of common genera and species of coral and other macroinvertebrates, identification of the major reef-associated fish families and common species and introduces a variety of methods and practices used for scientific research in the marine environment.

### Marine only Expedition

A combination of both our marine research sites can be used for a marine only expedition. Students can spend some of their time working towards a more in depth research project in addition to dive training, partaking in a reef ecology course and assisting with a range of research projects including: Stereo video surveys, line intercept video surveys, macroinvertebrate surveys and fisheries surveys.

*Example day Week 1*

Time	Activity
0700	Checking and emptying pitlines for herpetofauna
1200	Lunch
1300	Jungle skills training
1800	Dinner
1900	Wallacea wildlife and conservation course lecture
2000	Harp trapping for bats schedule at forest camp

*Example day Week 2*

Time	Activity
0800	PADI Open Water skills training session in shallows
1000	Indo Pacific reef ecology lecture and land based practical
1200	Lunch
1300	PADI Open Water skills training session in shallows
1500	Indo-Pacific reef ecology lecture and land based practical
1800	Dinner

*Schedule for PADI Open Water dive training student on Hoga Island who has completed the theory section of the training*



“Opwall brought biology out of a text book and into hands on real life experiences.”  
**Dakota Creed, Student, KEVICC**



## Madagascar overview

- Diving ✓ Forest ✓
- Expedition length 2 weeks
- Key facts**
  - 90% of all animals and plants found on Madagascar are endemic to the island
  - Only 10% of original Madagascar forest coverage remains so urgent need for conservation
  - Unstudied coral reef systems at Nosy Be
  - World's fourth largest island

### Research Aims

Madagascar has some of the most spectacular biodiversity in the world (lemurs, tenrecs, baobabs and over half of all known chameleon species), much of which is endemic. The Opwall teams are conducting a long term monitoring programme in the Mahamavo dry forests. Whilst Madagascar has now declared 17% of its land area as protected areas, much of this land is already severely degraded, so the actual area of land under protection is much smaller. An alternative approach to just declaring land as protected and not allowing any usage, is to develop community managed areas such as Mahamavo, where there is a patchwork of protected and managed areas. DTZ, the German Technical Cooperation Agency, has established a series of community managed forests in the Mahamavo area that appear to be successful and may form the basis for conservation and improving livelihoods in other parts of Madagascar.

The objectives for the Opwall research programme are to monitor how the forest structure and biodiversity changes over time in the community managed dry forests of Mahamavo, both to document the performance of a community managed area in terms of biodiversity conservation as well as to identify additional areas where a forest replanting programme could be initiated to extend the forest coverage. In addition the Opwall teams are documenting the biodiversity value of the adjacent wetlands with a view to getting this area upgraded to a Ramsar site.

The marine research camp is based on Nosy Be Island at the north western tip of Madagascar. The research objectives at this site are to complete annual surveys of the reef fish and coral communities to assess the effectiveness of the national park in protecting the reefs.

“Really excellent. The science programme is the outstanding feature of Opwall.”  
**Jon Porter, Teacher, King Edward's School Birmingham**

### Expedition Structure

- Week 1: Mahamavo forest
- Week 2: Nosy Be

### Facilities

#### Mahamavo forests

The students will be based in a camp near to Mariarano village. There are large covered areas for meals and a field laboratory with library, computers running the biodiversity database, GIS and statistics software. Accommodation is in tents, there are jungle showers and toilets in the camp. Part of the time of the expedition will be spent in this main camp and the other part in one of two satellite camps.

#### Matsedroy

This camp is adjacent to the lake, a second camp Antafiameva is also used and a short walk from a mangrove system. Both are set up in the same way as the main camp at Mahamavo with tent accommodation.

#### Nosy Be

A small camp set within a walled area next to the beach at Maradoka village. There is a shared communal dining and lecture area where lectures are given and meals served. Accommodation is in shared tents with toilet and shower facilities.

### ✈️ Travel information ✈️

✈️ The expeditions start on a **Sunday at 1200hrs** at Mariarano Village and finish on a **Friday at 1300hrs** at Nosy Be marine site.

✈️ Groups need to book international flights to arrive in to Antananarivo (Ivato Airport) on the Friday before the expedition starts and to depart Antananarivo on the Sunday after the expedition finishes.

✈️ The internal transfer package\* between Antananarivo Airport and the expedition start and end points, and between the expedition sites, will be arranged by our Internal Travel team and is not included in the expedition cost, unless you have chosen a fully inclusive expedition package.

✈️ Travel in Madagascar can be a slow process and the remote nature of our sites means that to get from Antananarivo to the forest site, and to get from the forest site to the marine site, you will be spending several days travelling. You will take a combination of buses and 4x4 vehicles to move around Madagascar and will stay in hotels or campsites. Additional guided excursions and day trips to be taken prior to and after your expedition are available upon request.

✈️ \*Includes airport meet & greet, any required travel and accommodation and full representation.

## Details of projects and expeditions

### Mahamavo forest week

**Herpetofauna routes:** A small group of students led by a herpetologist walk sample routes scanning the vegetation and ground carefully for reptiles and amphibians since many species, particularly leaf tailed geckos, are quite cryptic. When an individual is detected the location, species and the distance from the route centre line are recorded. These transects are completed both during the day and at night using spotlights.

**Lemur routes:** Groups walk slowly along the route with a lemur specialist scanning the canopy closely for groups of lemurs. When a troop is detected the location, species, troop size and the distance from the route centreline are recorded. These transects are completed both during the day and at night using spotlights.

**Bird point counts and mist netting:** Students join an ornithologist completing point counts in the early morning. Teams form an outward facing circle and record all the birds seen or heard over a 10 minute period. Mist nets are also used for cryptic species and when birds are caught, the ornithologist will demonstrate how they are removed from the net, handled and morphometric measurements recorded. Blood samples are also taken from the first 20 individuals caught from each species for genetic analysis.

**Amphibian surveys:** Groups of students are led by a herpetologist to an inland lake or rice paddy and collect as many frogs as possible over a 40 minute standard search period. Each frog collected is identified to species, weighed and the snout to vent length (SVL) taken to determine the abundance of each frog species in the area as well as the population structure.

**Butterfly surveys:** Pollard surveys of butterflies are completed along a series of fixed transects.

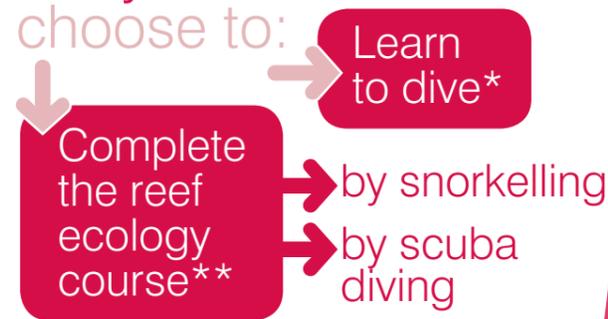
**Bat mist netting:** Mist nets are used to sample the bat communities and all bats captured are identified. Students are shown how captured bats are removed, handled, identified and morphometric measurements recorded.

**Forest structure plots:** The aim of taking measurements in a stratified sample of 20m x 20m plots in the forests is to track changes in the biophysical properties of the forest such as canopy height, sapling density and basal area.

The groups will also complete a Madagascar wildlife and culture course with lectures on: Introduction to Madagascar, biogeography and evolution of Madagascar, species concept, biodiversity conservation in Madagascar, people in Madagascar and conservation synthesis.

### Nosy Be marine week

choose to:



*Example day Week 2*

Time	Activity
0700	Indian Ocean reef ecology dive based practical
1000	Reef ecology lecture
1100	Indian Ocean reef ecology land based practical
1300	Lunch
1400	Indian Ocean reef ecology dive based practical
1600	Reef ecology lecture
1700	Indian Ocean reef ecology land based practical
1800	Dinner

*Itinerary for a qualified diver at the Nosy be site*

*Example day Week 1*

Time	Activity
0600	Bird point counts
1000	Butterfly sweep netting
1230	Lunch
1400	Herpetofauna
1800	Dinner
1900	Madagascar Wildlife Ecology lecture

*Itinerary at the Matsedroy camp*





Best experience ever. So much learnt and very influential and encouraging with regards to conservation. Imagine the best and then it's even better. ”  
**Abigail Kelly, Student, St Leonards**

## Mexico overview

Diving ✓ Forest ✓

Expedition length 2 weeks

- Key facts**
- The Selva Maya (Mayan Jungle) is the largest expanse of tropical forest outside of the Amazon
  - Calakmul is one of the two largest ancient Mayan ruined cities
  - Best chance of seeing endangered species like jaguar
  - Akumal has huge numbers of nesting turtles and a permanent population of green turtles

## Research Aims

In addition to housing a large collection of ancient Mayan ruins, the Selva Maya is one of the largest remaining strongholds of endangered mammals such as jaguar and tapir and is an important biological corridor for a wide variety of species. Opwall is based in the Calakmul Biosphere Reserve (CBR) located in the Yucatan Peninsula. CBR is a UNESCO World Heritage Site of both culture and nature – a prestigious award that only 32 reserves in the world have received. In conjunction with the reserve management team and their project partners Pronatura Peninsula de Yucatan, Operation Wallacea has developed ecotourism and sustainable agriculture projects with local Mayan communities in the buffer zone of the reserve so that they can live in harmony with the forest ecosystem. The data collected by students is being used to monitor the efficacy of these projects in protecting the forest and its wildlife and to increase our knowledge of the abundance, diversity and distribution of large mammals, birds, bats, butterflies, reptiles and amphibians.

The second week of the expedition will be run from the marine research site operated by Operation Wallacea in Akumal, a popular tourist spot due to the beautiful beaches, coral reefs and permanent presence of turtles. Tourism provides income for local fishing communities that were previously over-fishing the reefs, but tourism is having a huge impact on the marine ecosystem. The primary aim of the Operation Wallacea project is to assess the impact of tourism on the reefs, seagrasses and turtle population and to provide guidelines for sustainable dive and snorkel based tourism. During this week students will mainly be completing dive training or the reef ecology course (if already dive certified or only snorkelling), but will also contribute to ongoing data collection. During in-water practicals (diving or snorkelling) students will assist with abundance surveys of lionfish (an invasive species), sea urchins (important grazers that maintain coral health) and sea grasses (food supply for the resident turtles).

## Expedition Structure

- Week 1: Calakmul Biosphere Reserve
- Week 2: Akumal marine research centre

## Facilities

### Calakmul

In the forest, small camps are set up with communal eating and lecture areas. Students are in shared tent and field type bathroom facilities. To minimise water usage, showers are replaced by rustic bucket showers.

### Akumal

During the second week students stay outside of Akumal in a newly-built, treehouse-style lodge. They will sleep in bunk beds with dormitories spread across three floors. Rooms are shared with up to 14 people. Each dormitory has its own shower and toilet block. There is a communal eating and lecture area on each floor.

### Example day Week 1

Time	Activity
0800	Large mammal and primates transect survey
1200	Lunch
1400	Mayan forest ecology course lecture
1530	Butterfly survey
1800	Dinner
1900	Mist netting for bats

### Travel information

The expeditions start on a **Monday at 1300hrs** at the Calakmul Biosphere Reserve and finish on a **Sunday at 1200hrs** at Akumal. Groups need to book international flights to arrive in to Cancun before 1800hrs on the Sunday before the expedition starts and to depart Cancun after 1600hrs on the Sunday the expedition finishes.

The internal transfer package\* between Cancun Airport and the expedition start and end points will be arranged by our Internal Travel team and is not included in the expedition cost, unless you have chosen a fully inclusive expedition package.

\*Includes airport meet & greet, any required travel and accommodation and full representation.

## Details of projects and expeditions

### Week 1: Calakmul forests

The teams will spend their time in the jungle field camps distributed across the Calakmul Reserve, with a day visit to a Mayan archaeological site. During their week in the Mayan jungle the students will complete activities as follows:

**Introduction to the Ancient Maya:** Includes a visit to the breathtaking Calakmul ruins, and information relating to the effect of ancient Mayan agroforestry on tree and wildlife diversity in the reserve.

**Jungle skills training:** Learning how to design a field camp and work safely in a jungle environment, navigation using a compass and learning to use a GPS. Exercises designed to teach how to make a shelter, find food and water, make a fire and cook in the forest.

**Habitat surveys:** Students will work alongside the habitat survey team to mark and then survey 20m x 20m forest quadrats. Surveys will involve numbering all trees for subsequent species identification, measuring the diameter at breast height (DBH) of each tree, the abundance and height distribution of understorey vegetation, leaf litter depth, canopy openness and measures of forest regenerations.

**Bird surveys:** The students will be helping the survey teams with assessing bird communities from point counts and mist net surveys where the students will learn how to identify birds in the hand and take morphometric measurements.

**Bat mist netting:** Mist nets are used to sample the bat communities and all bats captured are identified. Students are shown how captured bats are removed, handled, identified and morphometric measurements recorded.

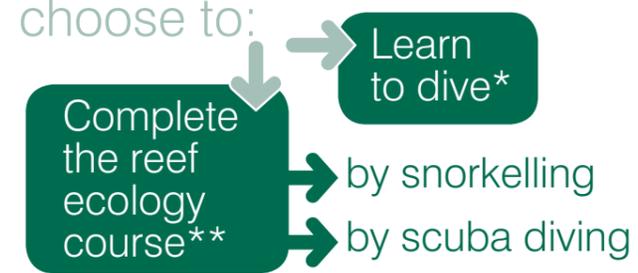
**Herpetofauna surveys:** The reptile and amphibian communities will be assessed from visual encounter surveys along forest transects and active searching and pitfall trapping in and around aguadas (temporary and permanent lakes that are the only water sources in the reserve). Species will be identified, weighed, measured and GPS coordinates taken.

**Large mammal surveys:** These are conducted using line transect surveys for the species where visual encounters can be used (e.g. primates) and on patch occupancy analysis for those species recorded by tracks or droppings (e.g. jaguar, tapirs). Students will also be shown how camera trapping is being used to estimate population levels of species' use of aguadas.

Students also complete a Mayan forest ecology and conservation course including lectures on the following topics: Conservation, Operation Wallacea and the Calakmul monitoring project, biodiversity gradients and methods for biodiversity monitoring, endemism, biodiversity hotspots and forest structure in Calakmul Biosphere Reserve, herpetofauna, butterflies and adaptation, neotropical birds and neotropical mammals.

### Week 2: Akumal marine site

choose to:



\*This course involves a combination of theory lessons, confined water dives and open water dives to gain an official scuba diving qualification.  
 \*\*The course teaches identification of common genera and species of coral and other macroinvertebrates, identification of the major reef-associated fish families and common species and introduces a variety of methods and practices used for scientific research in the marine environment.

“I wanted to get out of bed every day, even at 5:30am!!”  
**Liz Knight, Teacher, Guildford County School**

Students will also participate in the following activities:

- **Monitoring of sea urchins, turtles and key fish species on the reefs**
- **Seagrass and juvenile green turtle monitoring via snorkelling in Akumal Bay.**

### Example day Week 2

Time	Activity
0700	PADI Open Water dive 1
1000	Caribbean reef ecology and survey techniques course lecture
1100	Caribbean reef ecology and survey techniques course lab practical
1200	Lunch
1300	PADI Open Water dive 2
1500	Caribbean reef ecology and survey techniques course lecture
1600	snorkel based survey of turtles and seagrass
1800	Dinner
1900	Evening research lecture

Schedule at Akumal for a trainee diver that has completed the theory and skills elements of the course





“This week was an amazing experience from a photographer point of view, the scenery is beautiful, the animals were exhilarating. Overall, I wish we could have stayed longer.”  
**Kevin Gofar, Student,**  
*German European School Singapore*

## South Africa overview

- Diving ✓ Bush ✓
- Expedition length 2 weeks
- Key facts ● The Opwall site with the most abundant terrestrial megafauna
- Opportunity to work on foot in a Big-5 reserve
- Diving in the UNESCO World Heritage site, iSimangaliso Wetland Park

### Research Aims

Operation Wallacea and our partners, Wildlife and Ecological Investments (WEI), coordinate large-scale research programmes to provide an empirical backbone for key conservation projects in South Africa. From evaluating the impact of elephant browsing pressure on forage availability for other herbivores, to assessing the roles of protected areas as sanctuaries for persecuted free-ranging leopard populations, the South African research programme is designed to assist conservation managers with pressing large-scale issues that they do not necessarily have the resources to address. In the Dinokeng and Balule reserves we are assessing the impact of elephant populations on the vegetation and associated diversity of key taxa. Big game areas in South Africa are fenced in order to avoid the spread of disease and conflicts between communities and dangerous animals. However, this restricts movement of species such as elephants, which can lead to excessive habitat damage within reserves where elephant feeding pressure is too high. The Walker scale of elephant browsing pressure is being used by the Opwall and WEI teams to assess the levels of vegetation damage differing elephant feeding pressures and assess the impact on the carrying capacity of the reserve for other large herbivores. This will allow reserve managers to better understand how to manage their elephant populations to maintain a healthy and diverse ecosystem. In Dinokeng reserve we are also assisting the Panthera conservation organisation with their Leopard Project, which supports the South African Department of Environmental Affairs with data for decision-making regarding leopard conservation. This involves extensive camera trapping in reserves in the Limpopo and Gauteng regions, allowing estimations of regional population densities of this poorly understood species.

In the Gondwana Reserve in the Western Cape we are monitoring the development of the first Big 5\* reserve created within the world-renowned fynbos region. While both Fynbos and Renosterveld are some of the most species-rich and threatened vegetation types in the world, they hold little browsing or grazing value for many of the game species commonly found in tourist reserves. The problem is particularly noticeable for elephants, who even in high-value vegetation require a huge amount of sustenance a day to support their body size. Since elephants are an important component of any tourism-driven reserve, the management have asked us to look at how they can use fire management techniques to maximize forage for the large, enigmatic game species, whilst at the same time maintaining floristic diversity.

### Facilities

#### Balule

Students will be staying in a large main camp. There is a communal area where lectures and meals are taken, a small tuck shop, pool and a lookout tower. Students here will be staying in single-sex 6-bed dormitories, with shared bathroom facilities.

#### Gondwana

The camp students stay at is within a fenced compound. Lectures and meals are taken in the same shared communal area. Accommodation is in shared rooms with showers and shared toilet facilities.

#### Dinokeng

Students will be staying at a small fenced camp within the reserve. There is a communal area used for lectures and dining. Accommodation is in shared dormitory style bedrooms with shared bathroom facilities.

#### Sodwana Bay

Accommodation is in tents situated in a shaded bush camp. Meals are served in a separate dining area which also serves as a lecture hall. There is a shared toilet and shower block.

### Travel information

The expeditions start on a **Saturday at 0800hrs** at Balule or Dinokeng and finish on a **Friday at 0800hrs** at Sodwana Bay if doing options 1 or 2 or Gondwana Reserve if doing option 3. If doing option 4 then the expeditions start on a **Saturday at 1500hrs** in Gondwana and finish at the same site on a **Friday at 0800hrs**.

For groups doing options 1 or 2 they need to book international flights to arrive in to Johannesburg before 0800hrs on the Friday before the expedition starts and to depart Johannesburg after 2000hrs on the Friday the expedition finishes.

For those doing option 3 they need to book flights to arrive in to Johannesburg before 0800hrs on the Friday before the expedition starts and to book return flights from Cape Town on a Friday after 1800hrs. We recommend that the internal flight from Johannesburg to Cape Town is booked as part of the international flight. This flight should be booked to arrive in Cape Town by 1200hrs on the middle Friday of the expedition.

For those doing option 4 they need flights to Cape Town arriving on the Saturday before 0800hrs and returning on a Friday after 1800hrs.

The internal transfer package\* between your arrival airport and the expedition start and end points will be arranged by our Internal Travel team and is not included in the expedition cost, unless you have chosen a fully inclusive expedition package.

\*Includes airport meet & greet, any required travel and accommodation and full representation.

## Details of projects and expeditions

**Expeditions** Select one expedition from the 4 options below:

- 1 Dinokeng Reserve & Sodwana Bay**  
One week in Dinokeng Reserve, a high veld Big 5\* reserve followed by a week dive training, or diving if already qualified, at Sodwana Bay.
- 2 Balule Reserve & Sodwana Bay**  
One week in Balule Reserve, a low veld Big 5\* reserve followed by a week dive training, or diving if already qualified, at Sodwana Bay.
- 3 Dinokeng Reserve & Gondwana Reserve**  
One week in the high veld Dinokeng Reserve and one week in the fynbos reserve of Gondwana.  
\*Big 5 refers to African lion, African elephant, Cape buffalo, African leopard and rhinoceros.
- 4 Gondwana Reserve, Western Cape**  
Students spend half days in the field working on the effects of a burning regime on wildlife and floristic diversity and will be immersed in the issues affecting wildlife management in this reserve.

### Dinokeng and Balule Reserves

The students will complete two part days of bush skills training and four part days helping with biodiversity research in the reserve. The other part of each day will be in camp completing the African Wildlife Management course. The research activities in both reserves include helping with the following:

**Elephant impact on vegetation:** This is assessed using the Walker scale of damage within ha plots selected randomly from within 3 bands of distance from water sources.

**Quantifying the carrying capacity of the reserve for other large mammals:** This is done by measuring the quantity of forage available within the reserve in a height of up to 2m and measuring the weight and calorific value of that forage.

**Estimating large mammal populations:** Completing distance based large mammal surveys from vehicles to estimate abundance of the target species.

**Leopard, caracal and hyena surveys:** Helping to check and analyse data from a network of 80 camera traps.

**Bird and herpetofauna surveys:** Completing foot based point counts and transects to determine bird and herpetofauna diversity.

### Gondwana Reserve

Students spend full days in the field working on the effects of a burning regime on wildlife and floristic diversity and will be immersed in the issues affecting wildlife management in this reserve. In addition the students will be completing an African wildlife management course. The research activities include:

**Bird, invertebrate, flora and small mammal surveys:** These are the standard surveys that are completed on a series of plots in areas with different burn histories. A bird point count will be performed at the south-west corner of the study followed by sweep netting to capture and identify flying invertebrates at the site. Data will be collected on the floristic diversity of the plot using line transect sampling in the fynbos/renosterveld habitats. For the grassland areas quadrat sampling will be used. When these surveys are completed small mammal traps will be set and emptied the following morning.

**Grazing activity of large mammals:** Fynbos habitat is meant to have no forage value for large mammals, but a number of species have been seen feeding in this habitat. These surveys are designed to calculate the relative proportion of time that game is spending in fynbos compared to other habitats using vehicle based game transects and distance sampling.

**Focal sampling of feeding activity:** When game animals are observed grazing in fynbos, specific individuals of interest will be selected and their feeding behaviour recorded.

## Sodwana Bay

choose to:

- Learn to dive\*\*
- Complete the reef ecology course\*\*\*
- by snorkelling
- by scuba diving

\*\*This course involves a combination of theory lessons, confined water dives and open water dives to gain an official scuba diving qualification.

\*\*\*The course teaches identification of common genera and species of coral and other macroinvertebrates, identification of the major reef-associated fish families and common species and introduces a variety of methods and practices used for scientific research in the marine environment.



### Example day Week 1

Time	Activity
0700	Bird point counts on foot with armed guard
0900	Herpetofauna surveys on foot with armed guard
1100	Large mammal surveys from vehicle
1230	Lunch
1350	Course lecture and practical in camp
1800	Dinner
1900	Analysis of camera trap data images

Schedule from Dinokeng Reserve



## South Africa



“Operation Wallacea provided me with so many great opportunities scientifically, culturally and socially. I would've never thought that a mere 14 days could have such a positive influence on my life.”

Natalie Davis, Student,  
The Hun School of Princeton

## Peru overview

Diving ✗ Forest ✓

Expedition length 2 weeks

- Key facts**
- The largest protected seasonally flooded forest in South America
  - The only Opwall site to find pink and grey river dolphins
  - Travelling and staying on historically restored Amazon rubber boom ships

## Research Aims

The Pacaya-Samiria National Reserve is the second largest protected area in Peru, spanning over 20,000 km<sup>2</sup> of tropical rainforest and is a truly exceptional wilderness area. There are two main objectives of the research programme:

1. To collect data on the sustainability of forest resource use by the indigenous Cocama people within the reserve.
2. To provide information on the impacts of climate change and anthropogenic disturbance in the Amazon.

The second objective is made possible by long-term datasets that are gathered using standardised methods and effort. Flooded forests are more sensitive to climate change than non-flooded forests because very high water levels reduce the amount of dry land available in the reserve to around 2%, thereby affecting population levels of species such as agouti, deer and peccaries, whereas very low water levels cause problems for the fish populations and consequently dolphins. These factors make the Samiria Reserve a perfect site to study the impacts of both climate change and exploitation on wildlife and overall biodiversity.

Dolphins, wading birds and fishing bats are being used as indicators of the aquatic hydroscape and macaws, small primates and understorey birds are used as indicators of the terrestrial landscape. Fish are used as indicators of the impact of fisheries. Primates and other terrestrial wildlife are used as indicators of wildlife management of bushmeat and caimans as indicators of the recovery of species after excessive overhunting. Turtles are used as indicators of intensive restocking management.

Expeditions from late June until August are in the low water season (water levels falling from June to August). Over this season, surveys of two sites will be completed on the Samiria River – the mouth and Tacshcocha. The exact schedule depends on water levels and when sites can be reached. During their two weeks in the Amazon the students will be undertaking two main tasks: helping with the biodiversity surveys and completing an Amazonian wildlife and conservation course.

## Facilities

### Research ships

Students will be based on the Rio Amazonas research ship, moored adjacent to the flooded forest. Accommodation is in single sex shared cabins (4-10 people) with fans. There are manual flush toilet and shower facilities on board and electricity for charging computers when the generator is on. With a communal eating and lecture area, living on a research ship in the heart of the biodiverse Amazon is a truly memorable experience.

*Example day*

Time	Activity
0900	Dolphin surveys from boat based transects
1230	Dinner
1400	Fish surveys using gillnets
1800	Dinner
1900	Spotlighting and noosing caiman

*Example day itinerary on the Peru expedition.*

### Travel information

The expeditions start on a **Sunday at 1330hrs** in Nauta and finish on a **Friday at 1300hrs** at the same location. Groups need to book international flights to arrive in Iquitos on the Saturday before the expedition starts and to depart Iquitos on the Saturday after the expedition finishes.

The internal transfer package\* between Iquitos Airport and the expedition start and end points will be arranged by our Internal Travel team and is not included in the expedition cost, unless you have chosen a fully inclusive expedition package.

\*Includes airport meet & greet, any required travel and accommodation and full representation.

## Details of projects and expeditions

**Primates, large mammals and game birds:** Distance based survey transects will be completed by the students for these groups along 2 - 3 km trails. The method and theories behind distance sampling will be explained to students and they will be taught how to recognise different species and the main identification features. These data are then combined with the camera trap data to estimate abundance of the main species and with time-series analyses look at the impacts of climate change and the sustainability of subsistence hunting.

**Macaw surveys:** Boat based point counts are used to monitor macaws with each point separated by 500m. Fifteen minutes will be spent at each point with censuses carried out twice a day. Within the fifteen minute counts, all macaw species either perched or flying are noted and the time of observation and distances of the birds from the observer estimated.

**Wading bird surveys:** These surveys include 5km river transects divided into 500m subsections where all river edge bird species are recorded (this survey is dependent on water levels). Line transects are conducted along the river for 5km where all shore bird species are recorded. The abundance of bird species is calculated and is used as an indicator of the aquatic ecosystem, especially fish production.

**Understorey birds:** Mist nets are set at replicate sites in a range of habitats (riverine forest, open understorey, levees, liana forest, palm forest). All birds captured are identified and morphometric measurements taken. Data are compared between years to identify population trends.

**River dolphin transects:** 5km transects at each site are travelled downstream using a boat with the engine turned off. Information collected on sightings includes: species, group size, group composition, behaviour (travelling, fishing, playing, resting), time and position at first sighting. During these surveys students will be taught how to record the distribution and behaviour of both pink and grey river dolphins. Expeditions later in the survey season (depending on water levels being low enough) may also include turtle monitoring. The turtle monitoring method consists of registering the number of individuals sighted, either sunbathing or swimming. Students will be taught how to differentiate between the two turtle species found in the reserve.

**Fish surveys:** Students will be able to work with a team who are setting standard gillnets to quantify the catch per unit effort (CPUE) in order to examine the sustainability of fishing by local indigenous people. The students will learn how gillnet surveys are implemented and will help with measuring, weighing and identifying all fish captured. They will also take part in surveys using fishing lines.

**Butterfly and moth surveys:** This is a new project using standardised baited catch-and-release traps. Students will learn how to set-up the traps and handle butterflies and moths. The diversity of butterflies and moths along transects and in different forest types will be examined.

**Habitat surveys:** These surveys are designed to produce quantitative data on the various forest habitats (size, structure and biomass of trees, levels of light penetration, flood level, ground vegetation, regeneration rates).

**Canopy access training:** The students can complete a short course on learning how to ascend into the canopy which is run by the team that does much of the canopy filming for BBC wildlife films. This is an optional course and costs US\$170 extra.

**Nighttime caiman surveys:** This survey involves spotlight surveys to locate and identify caiman species in order to estimate population trends and distributions. Noosing is used to capture caiman to obtain data on morphological measurements, sex and age.

**Nighttime amphibian floating meadow surveys:** An auxiliary boat is driven into a raft of floating vegetation and students spend 15 minutes searching for amphibians within 2m around the boat. Upon detection individuals are captured and morphological measurements taken. Amphibian species are used as biological indicators and the survey identifies species using the floating vegetation as breeding platforms.

**Fishing bat surveys:** This river survey involves travelling along the river for 5km, during dusk, recording the number of fishing bats seen flying over the river. The students will also use a batbox (ultrasonic bat detector) to help detect and identify the bats.

The students will also be completing an Amazonian wildlife and conservation course, comprising of lectures and related activities/discussions. Areas covered are: Amazon geography and biodiversity, flooded forest ecology, conservation strategies in the Amazon, survey methods, wildlife monitoring, Pacaya-Samiria birds, mammals, fish, amphibians and reptiles, sustainable use, community-based conservation, and examples of best practice conservation management in the Amazon. During the course the students will also get the opportunity to visit an indigenous Cocama community.

“It's hard to quantify how much was learned. They'll be realising for years to come in the context of conservation and the world.”

Mark Paul, Teacher,  
Essex High School







## Participating Academics

Operation Wallacea works with specialists in numerous fields from a range of universities and institutions around the world. In total there are more than 200 academics involved in the research programme. A sample of the academics are listed below that have been involved in recent years in the field research programmes, contributing to publications, supervising PhD students who form part of the programme or are involved in data analysis or conservation management outputs from the research.

### Conservation Management Scientists

Dr Julian Clifton - University of Western Australia  
Tom Avert - Wetlands and Wildfowl Trust, UK  
Dr Angela Benson - University of Brighton, UK  
Dr Richard Bodmer - University of Kent, UK  
Dr Keri Brondo - University of Memphis, USA  
Dr Alice Eldridge - University of Sussex, UK  
Barry Ferguson - University of East Anglia, UK  
Dr Jeri Fox - University of New England, USA  
Chris Majors - Operation Wallacea, Indonesia  
Dr Ruth Malleson - Social and Economic Consultant, UK  
Professor Aubrey Manning - University of Edinburgh, UK  
Dr Wanda McCormick - Moulton College, UK  
Dr Bob Payne - Lakehead University, Canada  
Dr Mika Peck - University of Sussex, UK  
Dr Richard Phillips - University of Liverpool, UK  
Dr Sarah Pilgrim - University of Essex, UK  
Dr Edi Purwanto - Tropenbos, Indonesia  
Dr Ali Reza - Delta State University, USA  
Dr Selina Stead - Newcastle University, UK  
Prof Ian Swingland - Operation Wallacea Trust, UK  
Dr Chui Ling Tam - Calgary University, Canada  
Dr Raquel Thomas - Iwokrama Rainforest Research Centre, Guyana  
Helen Tedds - Moulton College, UK  
Dr Katharine Vincent - University of the Witwatersrand, South Africa  
Roger Wardle - Consultant on agri-environmental schemes, UK  
Dr Atiek Widayati - Northumbria University, UK  
Dr Tony Whitten - Flora and Fauna International, UK  
Dr Olivia Norfolk - Anglia Ruskin University, UK  
Dr Kathy Veldner - Napier University, UK  
Dr Graham Wragg - Nambu Conservation Trusts, Fiji

### Genetics, Oceanography and Geology Scientists

Dr Danielle Gilroy - Operation Wallacea, UK  
Sylvie Bardin - University of Ontario Institute of Technology, Canada  
Dr Stephen Burrows - Clark University, USA  
Dr Giulia Casasole - University of Antwerp, Belgium  
Dr Greg Cowie - University of Edinburgh, UK  
Dr Alan Dykes - Kingston University, UK  
Dr Leanne Hepburn - University of Essex, UK  
Dr Tom Horton - SUNY ESF, USA  
Dr Ben Horton - Upenn, USA  
Dr Richard Hunter - Salisbury University, USA  
Dr John Milsom - University College London, UK  
Dr Claire Raisin - University of Kent, UK  
Professor George Turner, Bangor - University, UK  
Dr Cathy Walton - University of Manchester, UK  
Dr Moyra Wilson - Curtin University, Australia  
Dr Gerd Winterleitner - Royal Holloway, University of London, UK

### Invertebrate (terrestrial and freshwater) Specialists

Professor Martin Speight - University of Oxford, UK  
Dr Jan-Robert Barr - University College Dublin, Ireland  
Dr George Beccaloni - Natural History Museum London, UK  
Dr Sarah Beynon - University of Oxford, UK  
Professor Mark Brown - Royal Holloway, UK  
Dr Moya Burns - University of Oxford, UK  
Dr Patricia Chow-Fraser - McMaster University, Canada  
Professor James Cook - University of Reading, UK  
Michael Geiser - Natural History Museum London, UK  
Dr Francis Gilbert - University of Nottingham, UK  
Andy Godfrey - Consultant Entomologist, UK  
Dr Sammy de Grave - Oxford Natural History Museum, UK  
Dr Neal Haddaway - Royal Swedish Academy of Sciences  
Dr Ian Hardy - University of Nottingham, UK  
Dr Merlijn Jocke - University of Leuven, Belgium  
Dr Mary Kelly-Quinn - University College Dublin, Ireland  
Dr Stuart Longhorn - NUI Maynooth, Ireland  
Dr Erica McAlister - Natural History Museum, UK  
Dr Kenneth McCravy - Western Illinois University, USA  
Dr José Nuñez-Mino - Bat Conservation Trust, UK  
Dr Paul O'Callaghan - University College Dublin, Ireland  
Dr Graham Rotheray - National Museum of Scotland, UK  
Dr Simon Segar - University of Reading, UK  
Dr Jo-Anne Sewlal - University of the West Indies  
Dr Sergiu Torok - Babes-Bolyai University, Romania  
Dr Roy Wilkes - University of Glamorgan, UK  
Dr Keith Willmott - Florida Museum of Natural History, USA

### Ornithologists

Dr Tom Martin - Operation Wallacea, UK  
Dr Jake Bicknell - DICE, University of Kent, UK  
Dr Alan Blackburn - University of Lancaster, UK  
Dr Robin Brace - University of Nottingham, UK  
Dr Simon Butler - University of Reading, UK  
Dr Bruce Byers - UMass Amherst, USA  
Dr Hannah Clarke - University of Dundee, UK  
Dr Nicola Goodship - Wetlands and Wildfowl Trust, UK  
Dr Claus Holzappel - Rutgers, Newark College of Arts and Sciences, USA  
Dr Martin Jones - Manchester Metropolitan University, UK  
Dr Dave Kelly - Trinity College Dublin, Ireland  
Dr Sean Kelly - Trinity College Dublin, Ireland  
Paul Leate - Montgomeryshire County Recorder, UK  
Dr Nicola Marples - Trinity College Dublin, Ireland  
Martin Meads - Sparsholt College, UK  
Dr Mark Miller - James Cook University, Australia  
Dr Brian O'Shea - North Carolina Natural History Museum, USA  
Dr Joel Prashant Jack - Environmental Protection Institute, India  
Sam Jones - University College London, UK  
Fabiola Rodriguez - Universidad Nacional Autónoma de Honduras  
Dr Eimear Rooney - Queens University Belfast, UK  
Cindy Stacier - Dalhousie University, Canada  
Matthew White - RSPB, UK  
Dr Nurul Winarni - World Conservation Society, Indonesia  
Dr Rueven Yosef - Arava Institute for Environmental Studies, Israel

### Herpetologists

Dr Steve Green - Cornwall College, UK  
Dr Scott Boback - Dickinson College, USA  
Dr Jeff Burkhart - University of La Verne, USA  
Tim Colston - University of Mississippi, USA  
Dr Jacquelyn Eales - University of Bangor, UK  
Julius Frazier - California Polytechnic State University, USA  
Dr Graeme Gillespie - University of Melbourne, Australia  
Monique Holting - Senckenberg Museum, Frankfurt, Germany  
Jon Kolby - James Cook University, Australia  
Dr Mike Logan - Harvard, USA  
Dr Chad Montgomery - Truman State University, USA  
Professor Randall Morrison - McDaniel University, USA  
Dr Eridani Mulder - Central Queensland University, Australia  
Jose Nobrega - Universidad de Aveiro, Portugal  
Dr Silviu Petrovan - University of Hull, UK  
Dr Bob Reed - USGS, Guam  
Stephen Roussos - Texas Tech University, USA  
Mariano Suarez - Centro Ecologico Akumal, Mexico  
Dr Katy Upton - Chester Zoo, UK

### Botany, Plant Sciences and Forestry Specialists

Dr Bruce Carlisle - Northumbria University, UK  
Dr Harrison Andriambelo - Antananarivo University, Madagascar  
Dr Sven Batke - Trinity College Dublin, Ireland  
Dr Gareth Bruce - Glamorgan University, UK  
Dr Jon Cocking - JCA Ltd, UK  
Dr Anke Dietzsche - Trinity College Dublin, Ireland  
Dr Daniel Kelly - Trinity College Dublin, Ireland  
Dr Grace O'Donovan - Independent ecology consultant, UK  
Dr Pascale Poussart - Princeton University, USA  
Dr Andrew Powling - University of Portsmouth, UK  
Dr Andrew Smith - University of Oxford, UK  
Dr Sarah Taylor - University of Keele, UK  
Dr Peter Thomas - University of Keele, UK  
Caroline Whiteford - Natural History Museum, UK  
Dr Samy Zalal - Nature and Science Foundation for Egypt, Egypt

### Marine Scientists

Professor Dave Smith - University of Essex, UK  
Dr Dan Exton - Operation Wallacea, UK  
Dr Gabby Ahmadi - World Wildlife Fund, USA  
Prof Jorge Angulo Valdes - University of Havana, Cuba  
Dr Arthur Anker - Muséum National, Paris, France  
Dr Dan Bailey - University of Cambridge, UK  
Dr Richard Barnes - University of Cambridge, UK  
Professor James Bell - Victoria University of Wellington, New Zealand  
Dr Wayne Bennett - University of West Florida, USA  
Dr Paul Bologna - Montclair State University, USA  
Dr Heidi Burdett - St Andrews University, UK  
Dr Isabelle Cote - Simon Fraser University, Canada  
Professor James Crabbe - University of Bedfordshire, UK  
Dr Simon Cragg - Portsmouth University, UK  
Dr Leanne Cullen - Cardiff University, UK  
Dr Jocelyn Curtis-Quick - Independent consultant, UK  
Dr Caine Delacy - University of Western Australia, Australia  
Dr John Eme - University of North Texas, USA  
Dr Teresa Fernandes - Heriot Watt University, UK  
Dr Andy Gill - Cranfield Institute, UK  
Dr Helen Graham - Institute of Marine Research, Bergen, UK  
Dr Ben Green - Environment Agency, UK  
Dr Emma Hayhurst - University of Glamorgan, UK  
Dr Ian Hendy - University of Portsmouth, UK  
Dr Sebastian Hennige - Heriot Watt University, UK  
Dr Jess Jaxion Harm - University of Vienna, Austria  
Dr Magnus Johnson - University of Hull, UK  
Dr Tim Johnson - University of Glamorgan, UK  
Dr Jamal Jompa - COREMAP, Indonesia  
Dr Nick Kamenos - University of Glasgow, UK  
Dr Tina Kutti - Institute of Marine Research, Bergen, UK  
Dr James McDonald - Rutgers University, USA  
Dr Steve McMellor - University of Aberdeen, UK  
Dr Ed Morgan - University of Glamorgan, UK  
Dr Clare Peddie - University of St Andrews, UK  
Dr Alan Pinder - Dalhousie University, Canada

Dr Johanna Polsenberg - US House of Representatives, USA  
Dr Niamh Quinn - University of Galway, Ireland  
Dr Sam Rastrick - Institute of Marine Research, Bergen, UK  
Dr Dai Roberts - Queens University Belfast, UK  
Professor Alex Rogers - University of Oxford, UK  
Dr Pelayo Salinas de Leon - Charles Darwin Foundation, Galapagos, Ecuador  
Dr James Saunders - St Andrews University, UK  
Dr Patric Scaps - University of Perpignan, France  
Dr Jon Shrivies - Jersey State Fisheries Department, UK  
Dr Edd Stockdale - University of Western Australia, Australia  
Dr Dave Suggett - University of Technology, Sydney, Australia  
Prof Chris Todd - University of St Andrews, UK  
Dr Richard Unsworth - Swansea University, UK  
Dr Nerida Wilson - Western Australia Museum, Australia  
Dr Kyle Young - Universidad de los Lagos, Chile

### Mammal Specialists

Dr Kathy Slater - Operation Wallacea, Mexico  
Dr Heather Gilbert - Operation Wallacea, UK  
Dr Kirsten Bohn - Florida International University, USA  
Dr Mark Bowler - St Andrews University, USA  
Dr Jedediah Brodie - University of British Columbia, Canada  
Professor Mike Bruford - University of Cardiff, USA  
Dr Anthony Caravaggi - Queens University Belfast, UK  
Dr Ruth Cox - University of Prince Edward Island, Canada  
Dr Christian Dietz - University of Tuebingen, Germany  
Dr Nigel Dunstone - Natural History New Zealand  
Dr Jonathan Flanders - University of Bristol  
Dr Ivar Fleur - Universidad Nacional Autónoma de México  
Matthew Hallett - University of Mississippi, USA  
Dr Abdul Harris Mustari - IPB, Bogor, Indonesia  
Dr Justin Hines - Operation Wallacea, Canada  
Andrew Jennings - IUCN/SSC Small Carnivore Specialist Group, UK  
Dr Marine Joly - University of Portsmouth, UK  
Dr Tigga Kingston - Texas Tech University, USA  
Juliet Leadbeater - University of Chester, UK  
Dr Burton Lim - Royal Ontario Museum, Canada  
Professor Aubrey Manning - University of Edinburgh, UK  
Professor Suzanne MacDonald - York University, Canada  
Dr Niall McCann - University of Cardiff, UK  
Dr Nkabeng Mzileni - WEI, South Africa  
Dr Sarah Papworth - Royal Holloway, UK  
Huma Pearce - Independent Bat Consultant, UK  
Dr Abigail Phillips - University of Birmingham, UK  
Dr Rob Pickles - Panthera, USA  
Rob Pitman - Panthera, South Africa  
Dr Nancy Priston - Oxford Brookes University, UK  
Professor Ute Radespiel - Hannover University, Germany  
Dr Felix Rakotondrapary - Antananarivo University, Madagascar  
Dr Osvaldo Eric Ramires-Bravo - Universidad de America, Puebla, Mexico  
Dr Neil Reid - Queens University Belfast, UK  
Dario Rivera - University of Queensland, Australia  
Dr Steve Rossiter - Queen Mary University of London, UK  
Dr Adrian Seymour - Independent wildlife film maker, UK

Dr Myron Shekelle - National University of Singapore, Singapore  
Dr Andrew Smith - Anglia Ruskin University, UK  
Dr Kym Snarr - University of Toronto, Canada  
Dr Peter Taylor - University of KwaZulu Natal, South Africa  
Dr Pamela Thompson - UCLA, USA  
Professor Stewart Thompson - Oxford Brookes University, UK  
Dr David Tosh - Queens University Belfast, UK  
Ivar Vleut - UNAM, Mexico  
Dr Kevena Vulinec - Delaware State University, USA  
Dr Phil Wheeler - University of Hull, UK  
Dr C.B Wood - Providence College, USA  
Dr Anne Zeller - University of Waterloo, Canada  
Heike Zitzer - Pongola Elephant Reserve, South Africa

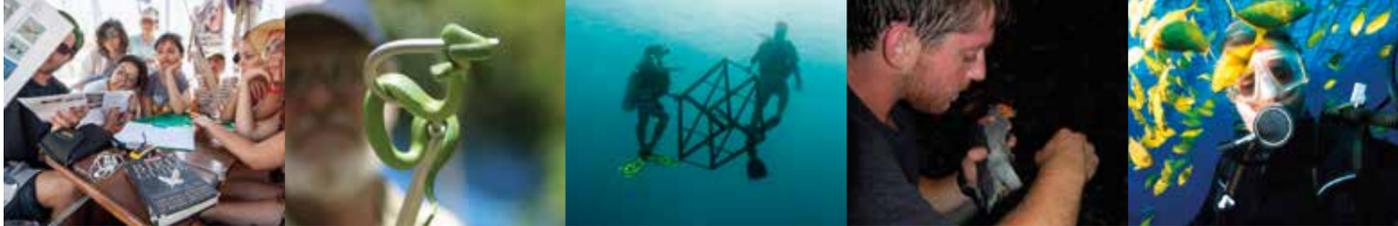
### Fisheries Scientists

Dr Tim Coles OBE, Operation Wallacea, UK  
Dr Dave Bird - University of Western England, UK  
Dr Iven Forbes - Environment Agency, UK  
Dr Emmanuel Frimpong - Virginia Polytechnic, USA  
Professor Tim Gray - Newcastle University, UK  
Dr Peter Henderson - University of Oxford, UK  
Piotr Kainowski - Fisheries consultant, UK  
Dr Duncan May - Fisheries consultant, UK  
Joel Rice - Fisheries consultant, USA  
Dr Rodney Rountree - University of Connecticut, USA  
Paul Simonin - Cornell University, USA  
Professor Michael Stewart - Troy University, USA  
Dr Mike Walkey - University of Kent, UK  
Paul Simonin - Cornell University, USA

### GIS and Statistical Analysis

Dr Peter Long - University of Oxford, UK  
Joe Bailey - University of Nottingham, UK  
Jesse Blits - University of Amsterdam, Netherlands  
Oliver Burdakin - BurdGIS, London, UK  
Dr Natalie Cooper - Harvard University, USA  
Dr Bella Davies - Oxford Brookes University, UK  
Dr Richard Field - University of Nottingham, UK  
Dr Fiona Hemsley Flint - University of Edinburgh, UK  
Dr Alan Jones - University of Sheffield, UK  
Dr Marco Lusquinos - Imperial College London, UK  
Cristi Malos - Babes-Bolyai University, Cluj, Romania  
Dr Gareth Mann - Rhodes University, South Africa  
Dr Lisa Anne - CUNY, USA  
Dr Peter Randerson - Cardiff University, UK  
Dr Allister Smith - Oxford Brookes University, UK  
Dr Emily Woollen - University of Edinburgh, UK  
Professor Kathy Willis - University of Oxford, UK





Since 2004\* Operation Wallacea has...

...taken 900 school groups → of 14169 volunteers

from 26 countries

of 82 nationalities

→ to 15 countries

resulting in 250+ journal articles

\*Operation Wallacea has been running expeditions since 1995. In 2004 the expeditions were opened to school groups following an enormously successful pilot expedition from Wellington College to Indonesia.



### Academic journals in which Opwall teams have published

**General Science**

- Nature
- PLoS ONE
- Caribbean Journal of Science

**General Conservation Biology**

- Biological Conservation
- Conservation Biology
- Biodiversity and Conservation
- Animal Conservation
- Oryx
- Global Ecology and Conservation
- Conservation Genetics Resources
- Environmental Conservation
- Aquatic Conservation: Marine and Freshwater Ecosystems
- Conservation and Society

**General Ecology and Zoology**

- Proceedings of the Royal Society B: Biological Sciences
- Ecological Applications
- Global Change Biology
- Ecography
- Functional Ecology
- Journal of Zoology
- Biodiversity and Ecology
- Animal Behaviour
- Integrative and Comparative Biology
- Diseases of Aquatic Organisms
- Ecological Indicators
- Integrative Zoology
- Bioscience Horizons
- Journal of Tropical Ecology
- Biotropica
- Aerobiologia
- Hydrobiologia
- Zoological Journal of the Linnean Society
- Biological Journal of the Linnean Society
- Aquatic Biology
- ISRN Zoology
- Australian Journal of Zoology
- Egyptian Journal of Biology
- Proceedings of the Biological Society of Washington
- Micronesica

**Applied and Theoretical Biology**

- Molecular Phylogenetics and Evolution
- Environmental Microbiology
- Journal of Thermal Biology
- Environmental Science and Technology
- Computational Biology and Chemistry
- Environmental Modelling and Software

**Faunistics and Taxonomy**

- The Raffles Bulletin of Zoology
- European Journal of Taxonomy
- Zootaxa
- Zoologica Scripta
- Checklist
- Annalen des Naturhistorischen Museums in Wien
- Acta Societate Zoologica Bohemia
- Comptes Rendus Biologies

**General Marine Biology**

- Marine Biology
- Marine Biodiversity
- Marine Ecology Progress Series
- Coral Reefs
- Frontiers in Marine Science
- Journal of Marine Biological Association of the United Kingdom
- Journal of Experimental Marine Biology and Ecology
- Bulletin of Marine Science
- The Open Marine Biology Journal
- Marine and Freshwater Research
- Gulf and Caribbean Research
- Ocean Challenge
- Atoll Research Bulletin
- Revista Investigaciones Marinas
- Diving Hyperbaric Medicine

**Ichthyology**

- Journal of Fish Biology
- Copeia

**Mammalogy**

- American Journal of Primatology
- International Journal of Primatology
- Small Carnivore Conservation
- Acta Chiropterologica

**Herpetology**

- Journal of Herpetology
- Herpetological Review
- Herpetological Conservation and Biology
- Herpetologica
- Salamandra
- Herpetozoa

**Ornithology**

- Bird Conservation International
- Ostrich
- Cotinga
- Sandgrouse
- Forktail
- Ornitologia neotropical
- BirdingASIA
- The Ring

**Botany**

- Journal of Phycology
- PhytoKeys
- American Fern Journal
- Palms
- New Phytologist
- International Journal of Plant Physiology and Biochemistry
- Reinwardtia
- Journal of the Botanical Research Institute of Texas
- Annals of the Missouri Botanical Garden
- Assiut University Journal of Botany

**Entomology and other Invertebrates**

- Journal of Insect Science
- Journal of Insect Conservation
- Ecological Entomology
- Journal of Crustacean Biology
- Crustacean Research
- Crustaceana
- Nematology

**Social science, Policy and Environmental Management**

- Forest Ecology and Management
- International Journal of Pest Management
- Sustainability
- Marine Policy
- Human Ecology
- Society and Natural Resources
- Ocean and Coastal Management
- Fishery Management
- The International Journal of Interdisciplinary Social Sciences
- Indian Journal of Traditional Knowledge
- SPC Traditional Marine Resource Management and Knowledge
- Information Bulletin
- Madagascar Conservation and Development

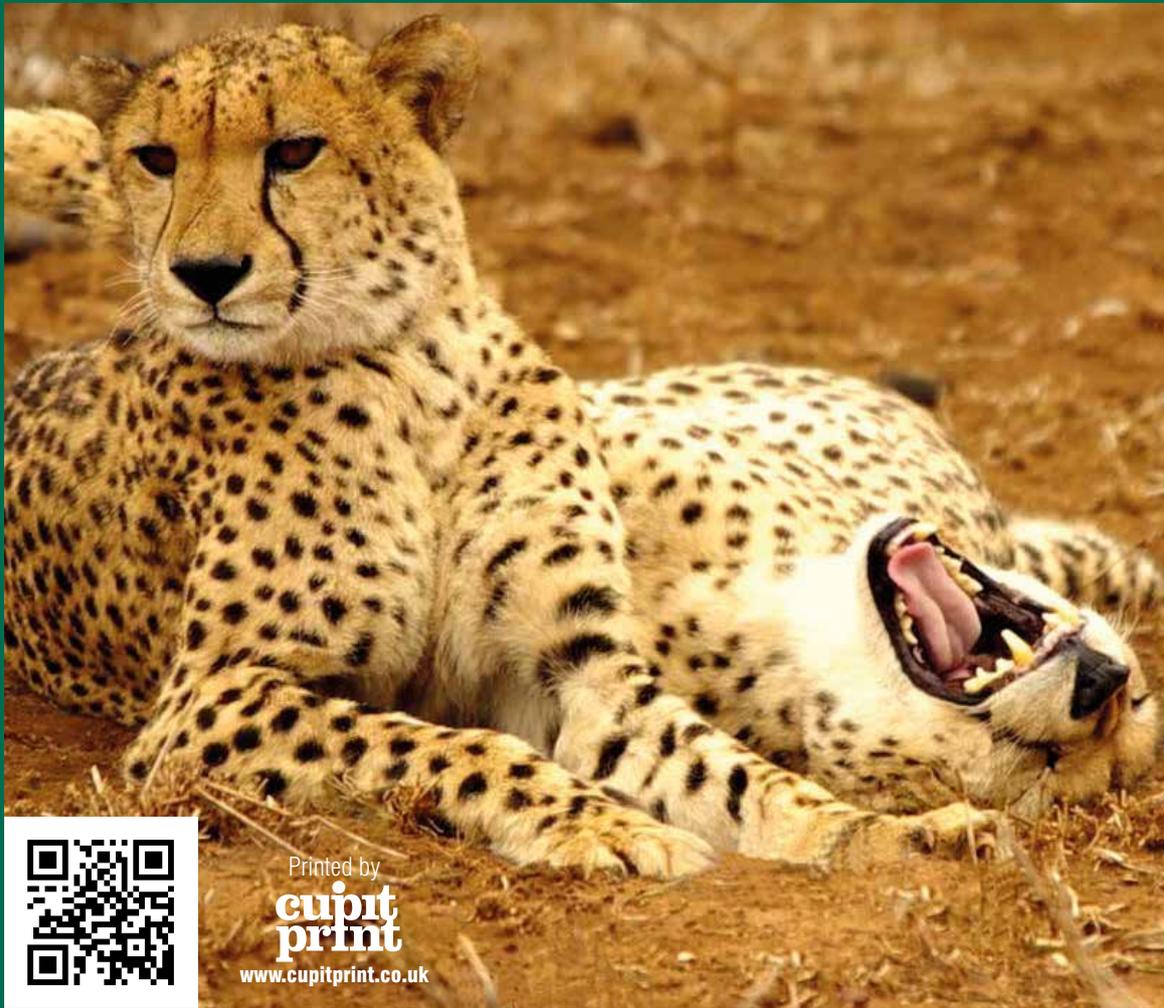
**Education and Tourism**

- Journal of Biological Education
- Journal of Ecotourism

**Physical Geography and Geology**

- Journal of Quaternary Sciences
- Limnology and Oceanography
- Proceedings of the American Society of Limnology and Oceanography
- Estuarine, Coastal and Shelf Science
- Cave and Karst Science
- AAPG Bulletin





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