



Operation
Wallacea

SCHOOLS BROCHURE 2017



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 bio-geographical 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 place is given for every 8 students joining (or part there of).

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 to students, parents and teachers 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. If raising all or part of the funds we can provide information and support for events, 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.

BIODIVERSITY SCIENCE - www.biodiversityscience.com

Opwall is the publisher of Biodiversity Science. An online journal that describes developments in biodiversity monitoring, new species discoveries and advances in conservation management. Articles are peer reviewed by a team of editors from Harvard, Oxford, Cambridge, McMaster and Essex Universities, Scottish Wildlife Trust and the Royal Geographical Society. If you would like to receive the quarterly free journal then please visit the Biodiversity Science website and sign up.

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 have been 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: Giving 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

Cuba	10-11	Madagascar	26-27
Dominica	12-13	Mexico	28-29
East Timor	14-15	South Africa	30-31
Ecuador & Galapagos	16-17	Tanzania & Malawi	32-33
Fiji	18-19	Guyana	34-35
Greece	20-21	Peru	36-37
Honduras	22-23	Transylvania	38-39
Indonesia	24-25	www.opwall.com	





2017 DATES

	MARINE	TERRESTRIAL AND MARINE											TERRESTRIAL		
	CUBA	DOMINICA	EAST TIMOR	ECUADOR AND GALAPAGOS	FIJI	GREECE	HONDURAS	INDONESIA	MADAGASCAR	MEXICO	SOUTH AFRICA	TANZANIA AND MALAWI	GUAYANA	PERU	TRANSYLVANIA
EXPEDITION 1	23 June – 6 July	12 June – 24 June	11 June – 23 June	13 June – 26 June	11 June – 24 June	15 June – 28 June	7 June – 20 June	14 June – 27 June	18 June – 30 June	19 June – 2 July	10 June – 23 June	13 June – 26 June	13 June – 26 June	11 June – 23 June	14 June – 27 June
EXPEDITION 2	30 June – 13 July	19 June – 1 July	18 June – 30 June	20 June – 3 July	18 June – 1 July	22 June – 5 July	14 June – 27 June	21 June – 4 July	25 June – 7 July	26 June – 9 July	17 June – 30 June	20 June – 3 July	20 June – 3 July	25 June – 7 July	21 June – 4 July
EXPEDITION 3	7 July – 20 July	26 June – 8 July	25 June – 7 July	27 June – 10 July	25 June – 8 July	29 June – 12 July	21 June – 4 July	28 June – 11 July	2 July – 14 July	3 July – 16 July	24 June – 7 July	27 June – 10 July	27 June – 10 July	9 July – 21 July	28 June – 11 July
EXPEDITION 4	14 July – 27 July	3 July – 15 July	2 July – 14 July	4 July – 17 July	2 July – 15 July	6 July – 19 July	28 June – 11 July	5 July – 18 July	9 July – 21 July	10 July – 23 July	1 July – 14 July	4 July – 17 July	4 July – 17 July	23 July – 4 August	5 July – 18 July
EXPEDITION 5	21 July – 3 August	10 July – 22 July	9 July – 21 July	11 July – 24 July	9 July – 22 July	13 July – 26 July	5 July – 18 July	12 July – 25 July	16 July – 28 July	17 July – 30 July	8 July – 21 July	11 July – 24 July	11 July – 24 July		12 July – 25 July
EXPEDITION 6	28 July – 10 August	17 July – 29 July		18 July – 31 July	16 July – 29 July	20 July – 2 August	12 July – 25 July	19 July – 1 August	23 July – 4 August	24 July – 6 August	15 July – 28 July	18 July – 31 July	18 July – 31 July		19 July – 1 August
EXPEDITION 7		24 July – 5 August		25 July – 7 August	23 July – 5 August	27 July – 9 August	19 July – 1 August	26 July – 8 August		31 July – 13 August	22 July – 4 August		25 July – 7 August		26 July – 8 August
EXPEDITION 8					30 July – 12 August	3 August – 16 August	26 July – 8 August	2 August – 15 August			29 July – 11 August				2 August – 15 August
				<div style="border: 2px solid red; padding: 5px; text-align: center;"> Our most popular dates are printed in bold </div>									Out of season / spring dates: For the full research experience we only recommend the dates listed above. Some school visits are only possible at other times of the year, so for those, we offer a reduced research expedition running in South Africa and Peru. The expedition fees are the same as the standard summer fees.		
SPRING SEASON											18 March – 14 April			19 March – 14 April	



Costs and Expedition Details

Expedition fees

The cost of all the expeditions payable to Opwall is:

£1,225 UK, Europe and Middle East

US\$1,925 US, Asia, Central & South America, Africa, Australia & New Zealand

Can\$2,075 Canada

This cost covers all the transport between the sites from the start and finish points of the expeditions except Madagascar, South Africa and Ecuador. The cost also covers food, accommodation, training courses that form part of the schools programmes (e.g. PADI Open Water dive training), diving or snorkelling, participation in the various science projects, safety and medical cover and medical and evacuation insurance cover. In addition one teacher goes free for each group of 8 students or part-thereof.

Travel costs

The travel costs to and from the start and finish point of the expeditions are not included in the expedition fees. The international and in-country travel costs vary enormously depending in which country the school is based and the distance/cost of travel once in-country. For some countries (e.g. Transylvania, Honduras, Mexico) the start of the expeditions is not far from the international arrival point, whereas for others (e.g. Madagascar, Indonesia) the travel is much more extensive. When deciding which of the expeditions would be of most interest please ask your local Opwall office to send you a costings sheet for the expedition which includes the per person expedition costs, an estimate of the international travel costs, the internal travel costs and sum to cover the costs of the accompanying teacher.

Organising the packages

Opwall can provide a complete package for the expedition including international travel, in-country travel and teacher flights costs enabling the entire expedition to be invoiced through the Opwall office. In Canada the expeditions are packaged through Victor Travel who offer a similar service.

Schools can book as a group and collect the part payments for the expedition. There is also the option for each of the group members to be invoiced individually by Opwall.

Insurance

Opwall has insurance in place to provide medical and repatriation cover up to £1million for all participants on the expedition. In addition to this medical 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 interruption and loss of personal baggage or other items.

Health & Safety

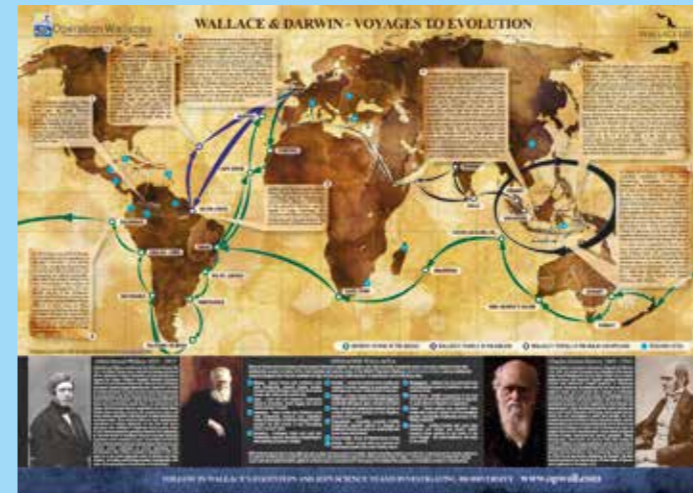
Risk is inherent in everything that we do in life. Without accepting and understanding these risks we would not be able to do anything at all. The first concern of all activities undertaken as part of Operation Wallacea expeditions is to gain an understanding of the environments we will be working in, and from this, to reduce risk to health and safety as far as is possible. 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.



Free School Resources

FREE CLASSROOM POSTERS

Coral Reefs
Wallace and Darwin Voyages to Evolution Map
Mammals of Operation Wallacea
Fishes of Operation Wallacea



Wallace and Darwin - Voyages to Evolution Map

To mark the 100th anniversary of Alfred Russel Wallace's death Opwall produced a poster showing the voyages of Wallace and Darwin and how they both developed the idea of evolution by natural selection.



Corals of the Tropics

Reefs are one of the most over-exploited but limited resources on the planet, and the poster focuses on where corals are most species rich, as well as some of the most pressing issues concerned with their conservation.



Mammals of Operation Wallacea

Celebrating Operation Wallacea's research, looking at key exciting species and bringing them together in a fantastic collection of posters. The first being Mammals of Operation Wallacea.



Fishes of Operation Wallacea

Marine research is one of Operation Wallacea's proudest achievements and bringing together all the sites to showcase fish species, is an exciting addition to the new series.

Datasets and Biodiversity Lectures

Using data collected from our expeditions the Operation Wallacea Trust has developed a resource to use in classrooms, set as homework and aid exam revision.

Full instructions are given as if students haven't ever used a dataset before or a PowerPoint can be used by the teacher if working in the classroom.

Each module contains between 3 and 4 datasets, each have 2 research questions and are marked out of 10 for difficulty. Special mentions are made when using stats tests and when there is more data to process.

Most exam specifications worldwide have undergone considerable change and updating and they all now place a greater emphasis on mathematical skills.

In many the practical work is now only assessed utilizing a theory question in an examination paper. WRL datasets have great potential value in helping with both of these areas.

In the updated Wallace Resource Library (WRL) Opwall has included a number of smaller 'biodiversity data tasks' based around each dataset that adopt the style of an examination question (10+ marks worth) or a much shorter homework task (40 mins). These should be standalone, and where possible, have explanatory notes to help with the answers.

Five modules are available:

- Ecosystems – Coral reefs (e.g. sea urchins as Caribbean keystone species)
- Ecosystems – Rainforests (e.g. quantifying forest disturbance)
- Ecological survey techniques (e.g. distance sampling for herbivores in South Africa)
- Animal behaviour (e.g. scan and focal sampling of macaques)
- Natural resource utilisation and sustainability (e.g. determining sustainable hunting quotas in the Amazon)

To view a sample of the Resource Library and view the lectures available please visit: wallaceresourcelibrary.com

The posters, datasets and lectures are entirely free, to receive a copy please email us: info@opwall.com



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 Avent – 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 Zhiming Niu - Asian Development Bank, China
 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 Wattle - Consultant on agri-environmental schemes, UK
 Dr Atiek Widayati - Northumbria University, UK

Dr Tony Whitten - Flora and Fauna International, UK
 Dr Kathy Velander - Napier University, UK

Genetics, Oceanography and Geology Scientists

Dr Kim Hunter - Salisbury University, USA
 Sylvie Bardin - University of Ontario Institute of Technology, Canada
 Dr Stephen Burrows - Clark University, USA
 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 Millsom - University College London, UK
 Dr Mark Tibbett - University of West Australia
 Dr Cathy Walton - University of Manchester, UK
 Dr Moyra Wilson - Curtin University, Australia
 Dr Sam Rastrick - University of Southampton
 Dr Gerd Winterleitner - Royal Holloway, University of London, UK

Invertebrate (terrestrial and freshwater) specialists

Professor Martin Speight - University of Oxford, UK
 Dr George Beccaloni - Natural History Museum London, UK
 Dr Sarah Beynon - University of Oxford, UK
 Dr Moya Burns, Operation Wallacea, 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 Jocque - University of Leuven, Belgium
 Dr Mary Kelly-Quinn - University College Dublin, Ireland
 Dr Stuart Longhorn - NUI Maynooth, Ireland
 Dr Kenneth McCravy - Western Illinois University, USA
 Dr Olivia Norfolk - University of Nottingham, UK
 Dr José Nuñez-Mino - Bat Conservation Trust, UK
 Dr Paul O'Callaghan - University College Dublin, Ireland
 Dr Mary Kelly-Quinn - 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 Wiles - University of Glamorgan, UK
 Dr Keith Willmott - Florida Museum of Natural History, USA

Ornithologists

Dr Tom Martin - University of Hull, UK
 Dr Jake Bicknell - DICE, University of Kent, UK

Dr Alan Blackburn - University of Lancaster, UK
 Dr Robin Brace - University of Nottingham, UK
 Dr Jedediah Brodie, University of British Columbia, Canada
 Dr Simon Butler - University of Reading, UK
 Dr Bruce Byers - Umass Amherst, USA
 Dr Hannah Clarke - University of Dundee, UK
 Dr Nico Dauphine - University of Georgia, Athens, USA
 Dr Nicola Goodship - Wetlands and Wildfowl Trust, UK
 Dr Claus Holzapfel, Rutgers, Newark College of Arts and Sciences, USA
 Dr Martin Jones - Manchester Metropolitan University, UK
 Dr Dave Kelly - Trinity College Dublin, Ireland
 Paul Leaf - Montgomeryshire County Recorder, UK
 Dr Nicola Marples - Trinity College Dublin, Ireland
 Martin Meads - Sparsholt College, UK
 Mark Miller - James Cook University, Australia
 Dr Brian O'Shea - North Carolina Natural History Museum, USA
 Dr Joel Prashant Jack - Environmental Protection Institute, India
 Fabiola Rodriguez - Universidad Nacional Autónoma de Honduras
 Dr Eimear Rooney, Queens University Belfast, UK
 Wael M Shohdi - Al-Azhar University, Egypt
 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 - Operation Wallacea, 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 Bjorn Lardner - USGS, Guam
 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

Botany, Plant Sciences and Forestry Specialists

Dr Bruce Carlisle - Northumbria University, UK
 Dr Harison Andriambelo - Antananarivo University, Madagascar
 Dr Gareth Bruce - Glamorgan University, UK
 Dr Lu Cai - Beijing Forestry University, China
 Dr Jon Cocking - JCA Ltd, UK

Dr Anke Dietzsche - Trinity College Dublin, Ireland
 Professor Lei Guangchun - Beijing Forestry University, China
 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
 Dr Raquel Thomas - Iwokrama Rainforest Research Centre, Guyana
 Dr Clay Trauernicht - University of Hawaii, USA
 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 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 - Cape Eleuthera Institute, Bahamas
 Dr Caine Delacy - University of Western Australia, Australia
 Dr John Eme - University of North Texas, USA
 Dr Dan Exton - Operation Wallacea, UK
 Dr Teresa Fernandes - Heriot Watt University UK
 Dr Andy Gill - Cranfield Institute, 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 Hamm - University of Vienna, Austria
 Dr Magnus Johnson - University of Hull, UK
 Dr Tim Johnson - University of Glamorgan, UK
 Dr Jamal Jompa - COREMAP, Indonesia
 Dr James McDonald - Rutgers University, USA
 Dr Steve McMellor - University of Aberdeen, UK
 Anastasia Miliou - Archipelagos Institute of Marine Conservation, Greece
 Dr Ed Morgan - University of Glamorgan, UK
 Huma Pearce - Independent bat consultant
 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 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 Anne 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 Kirsten Bohn - Florida International University, USA
 Dr Mark Bowler - St Andrews University, USA
 Professor Mike Bruford - University of Cardiff, USA
 Jill Carpenter - Independent bat consultant, UK
 Dr Ruth Cox - University of Prince Edward Island, Canada
 Dr Hannah Clarke - University of Dundee, UK
 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
 Dr Sharon Gursky-Doyen - SUNY Stony Brook, USA
 Matthew Hallett - University of Mississippi, USA
 Dr Abdul Haris Mustari - IPB, Bogor, Indonesia
 Dr Justin Hines - Operation Wallacea, Canada
 Andrew Jennings - IUCN/SSC Small Carnivore Specialist Group, UK
 Jim Jones - Surrey Wildlife Trust, 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 Rob Pickles - Panthera, USA
 Dr Abigail Phillips - University of Birmingham, UK
 Amy Porter, University of California, USA
 Dr Nancy Priston - Oxford Brookes University, UK
 Professor Ute Radespiel - Hannover University, Germany
 Dr Felix Rakotondraparany - Antananarivo University, Madagascar
 Dr Osvaldo Eric Ramirez-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
 Professor Stewart Thompson - Oxford Brookes University, UK
 Dr David Tosh - Queens University Belfast, UK
 Jeremy Truscott - Sheffield Biodiversity Steering Group, UK
 Ivar Vleut - UNAM, Mexico
 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

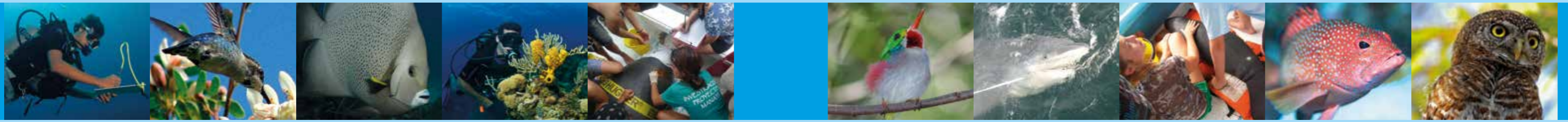
Fisheries Scientists

Dr Dave Bird - University of Western England, UK
 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 Kalinowski - Fisheries consultant, UK
 Dr Duncan May - Fisheries consultant, UK
 Joel Rice - Fisheries consultant, USA
 Dr Rodney Rountree - University of Connecticut, USA
 Professor Michael Stewart - Troy University, USA
 Professor George Turner, Bangor University, UK
 Dr Jason Vokoun - University of Connecticut, USA
 Paul Simonin - Cornell University, USA

GIS and Statistical Analysis

Dr Peter Long - University of Oxford, UK
 Joe Bailey, University of Nottingham, UK
 Dr Craig Beech - Peace Parks Foundation, South Africa
 Jesse Blits - University of Amsterdam, Netherlands
 Oliver Burdekin - 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 Manne - CUNY, USA
 Dr Peter Randerson - Cardiff University, UK
 Dr Eimear Rooney - Queens University Belfast, UK
 Dr Allister Smith - Oxford Brookes University, UK
 Dr Emily Woollen - University of Edinburgh, UK
 Professor Kathy Willis - University of Oxford, UK





CUBA

RESEARCH OBJECTIVES

The Cuba expedition is run on the reefs and coastal habitat on the southern side of the Isle of Youth (Isla de la Juventud), the largest island off the coast of Cuba. Here, Operation Wallacea and the Centre for Marine Research at the University of Havana (CIM-UH) have developed a long-term collaborative partnership to implement a biodiversity monitoring programme. The western end of the Island has been designated as the Punta Frances National Park, and a large section of the southern part of the Island has been proposed as a Sustainable Use and Protected Area (APRM) due to its importance to biodiversity. The research objectives of the Operation Wallacea teams are:

- To explore changes in the biomass and diversity of reef fish communities in the Punta Frances National Park.
- To quantify coral cover and community structure in the Punta Frances National Park and identify any significant changes from previous years.
- To evaluate macroinvertebrate diversity and abundance on the reef systems of the southern Isle of Youth.
- To survey the manatee population and preferred feeding areas in the southern Isle of Youth.
- To assist with shark tagging as part of a Cuba wide study of shark migration patterns and population levels.

EXPEDITION STRUCTURE

The first week is spent learning to dive and how to identify the reef fish and coral communities. During the second week teams will be divided into groups and will rotate between the research surveys.

Week 1: Training week

During this training week the school will be completing one of the following options:

- **PADI Open Water dive training course:** This course involves a combination of theory lessons, confined water dives and open water dives to gain an official scuba diving qualification. Note: on this option you still need to complete the fish identification training elements of the Caribbean

reef species course and pass the test, as well as completing your dive qualification.

- **Caribbean reef species course:** This week long course is designed to give practical training in the survey techniques being used. Students will learn how to collect stereo video data on the fish communities and how to analyse those data in the lab. A large proportion of this course concentrates on learning to identify the reef fish commonly encountered on the surveys. In addition, the students will learn how to complete video line intercept transects and how to analyse the footage to determine coral cover and coral community structure. Training will be given on how to effectively complete belt transect surveys for



macroinvertebrates. Each part of the course (stereo video surveys of fish, line intercept video surveys and macroinvertebrate belt transects) will have tests with high marks required for passing.

Week 2: Research week

- **Reef fish surveys:** This project involves diving to complete stereo video surveys of the reef fish communities. Once data have been collected the students are involved in the identification and measurement of the fish from analysis of the video. Only those students who have passed their Caribbean reef fish species identification test will be able to participate in this activity.
- **Coral surveys:** This project involves diving to help complete video line intercept surveys on the reefs. Back in the lab these videos are analysed by the students to identify the hard and soft coral species intercepting the line and to calculate total coral cover.
- **Macroinvertebrate surveys:** This project involves diving to help with 5m wide belt transects to identify the distribution and abundance of macroinvertebrate species (e.g. sea cucumbers, molluscs, lobsters).
- **Shark tagging:** In the evening long baited lines are set from the research ship and in the early morning these long lines are checked for sharks. All captured sharks are measured and tagged before release.
- **Lionfish surveys:** This involves dissecting captured invasive lionfish specimens to examine size, class, structure and stomach contents.
- **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 (e.g. salinity, temperature and aquatic vegetation) is collected at each site to determine the importance of freshwater upwellings and vegetation communities in affecting the distribution of manatees. In addition the movement of manatees is being studied using tagged individuals 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 tagged before release.

FACILITIES

All the teams will be staying in the Colony Hotel for the first week and 3-4 nights in the second week. The Colony Hotel has fan cooled rooms, a 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. Two nights will be spent on a liveboard research vessel, the Felipe Poey, which is being used as the platform for the stereo video surveys and shark tagging. The Felipe Poey has berths both above and below decks, though most people choose to sleep under the stars on the top deck.

TRAVEL INFORMATION

The 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.

The internal transfer package* between Havana 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.



“Classroom learning pales in comparison to spending a week aboard a research vessel helping to gather data on marine ecology and biodiversity.”

Lucas Sorbara, Teacher,
Toronto Waldorf School, Canada



“A wonderful place that will inspire you.”

Jack Taylor, Student, Lancing College, UK



DOMINICA

RESEARCH OBJECTIVES

This expedition is run in one of the most unspoilt islands 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 leading into deep canyons with huge waterfalls have made use of mechanical forest clearance methods impossible in Dominica, and thereby protected the forests. 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. The islanders are proud of their wildlife and the island is marketed 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 forests 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.
- Helping to identify the bird communities in a range of habitats.
- To assess carbon standing stock and turnover in the island's forests.

STRUCTURE OF THE EXPEDITION

The students spend their first week in one of a series of camps that the Opwall teams are using across the island to access the forests, where they will be on site with an international team of research scientists. The second week will be spent in the north of the island completing marine training courses.

Week 1: Forest week

The first day will be spent participating in seminars, practical demonstrations of research methods and being given an orientation of the research site. The first part of the Caribbean island ecology course will be run on this first day. The seminars will cover topics such as the importance of the Caribbean biodiversity hotspot, the formation of the Lesser Antilles and biodiversity of Dominica and survey techniques being used on the various projects during the week. For the remainder of the week, the group will then divide into teams and complete the following activities:

- **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) for a discounted price of US\$120.
- **Bird surveys:** This team will complete early morning mist net surveys for the birds in the areas surrounding the campsite 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. Information will be recorded about the stage of moult that the bird is in before a small band is placed on the bird in order to be able to re-identify the individual in future years. Standard point count surveys will also be completed in the areas around the campsite to establish a baseline against which future species diversity, abundance and population density can be monitored.
- **Forest structure:** Dominica's dense forests are one of the island's key features, supporting a unique wildlife community and drawing in many ecotourists every year. 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. Opportunistic records will also be made of all other reptile and amphibian species encountered during these surveys.

- **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 in undisturbed areas). Students can also snorkel to assess invertebrate and fish community composition.

- **Invertebrate survey:** 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 survey:** 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.

In addition to these activities there are a series of lectures on Caribbean island ecology covering biodiversity and evolution, ecological survey techniques, herpetofauna and birds of the Caribbean, freshwater biology and conservation synthesis.

Week 2: Marine week

At the end of the week 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. The Fort grounds have stunning views out over the island. During their second week students will be completing one of the following:

- **PADI Open Water dive training course:** This course involves a combination of theory lessons, confined water dives and open water dives to gain a scuba diving qualification.
- **Caribbean reef ecology course:** This consists of lectures and in-water practicals either by diving (if a qualified diver) or snorkelling. The

lectures cover an introduction to coral reef ecosystems, coral and algal species (growth forms and common species), mangrove and seagrass ecology, tourism development impacts on Caribbean mangroves and reefs, ecologically important invertebrates (lobster fishery, conch fishery), identification of coral reef fish (main reef fish families), reef survey techniques (quadrats, transects, stereo video), threats to reefs (climate change, fisheries, invasive species) and marine conservation strategies in the Caribbean.

- **PADI Open Water referral course:** Students need to arrive having already completed their theory and pool training components. This course takes three days to complete, after which students will join the Caribbean reef ecology course.

FACILITIES

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. Accommodation at Fort Shirley 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.

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.

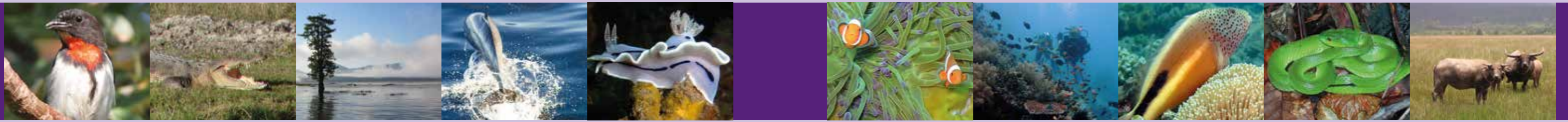
*Includes airport meet & greet, any required travel and accommodation and full representation.



“Opwall have given the students experience of science in a real life and inspirational setting.”
Jessica Wright, Teacher,
Jersey College for Girls, Channel Islands.



“Exposure to a different part of the world was life-changing along with the opportunity to interact and learn with other students and scientists from all over the world.”
Michael Rinko, Student,
Bishop Guertin School, USA.



EAST TIMOR

RESEARCH OBJECTIVES

Timor Island is part of the unique Wallacea bio-geographic region described by the naturalist Alfred Russel Wallace. In 2002 the Catholic eastern part of the island gained its independence and is now the only part of the Wallacea region that is not within Indonesia. Timor Island has a high percentage of endemic species with 5 unique mammals including the Timor shrew, 44 Wallacea endemic birds including 9 endemics found only on Timor and 6 endemic reptiles including the Timor longneck turtle. There are 4 globally threatened and 16 near threatened bird species alone on Timor. In common with other parts of the Wallacea region the top predators are giant reptiles – reticulated pythons and saltwater crocodiles. In 2007 East Timor declared the whole of the eastern end of the island as the Nino Konis Santana National Park which covered 1236 km². In addition this new Park included 556 km² of reefs that lie within the Coral Triangle – the most diverse reefs in the world as measured by the diversity of hard coral genera. The Coral Triangle Initiative funded by USAID has surveyed reefs across the whole Coral Triangle, but their report on the reefs of East Timor noted in particular how impressed this team was with the high biodiversity of the reefs, also how the marine elements of the Nino Konis Santana National Park had anchored many of the best reefs in the country within a protected area.

In 2016 the Opwall teams will have started on a series of annual surveys of the forests of the Nino Konis Santana National Park that will produce data on forest loss, carbon levels and changes in diversity of a series of faunal taxa. Over time these data sets will be used to lever funds to help protect the National Park using similar carbon schemes that have been implemented by the Opwall teams in the Sulawesi part of the Wallacea region. In addition, a community based dive operation was established on the mainland opposite Jaco Island so that safe and high quality dive and reef ecology training could be delivered. In 2017 this new marine base will be expanded to develop an annual reef monitoring programme similar to that completed annually in the Wakatobi Marine National Park in Sulawesi.

EXPEDITION OPTIONS

The students spend their first week in one of a series of camps that the Opwall teams are using across the National Park to access the forests. The second week is spent in the extreme east opposite Jaco Island completing marine training courses.

Week 1: Forest week

During the first week the teams will complete training and surveys including:

- **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 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.
- **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), leaf litter depth and sapling density. The students will be shown how the carbon levels at each site are then calculated from these data for both above and below ground carbon as well as how to quantify levels of human disturbance.
- **Invertebrate surveys:** Two taxa will be studied in particular – the dung beetle communities from baited pitfall traps and butterflies from pollard transects.
- **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 and moult patterns, longevity and movement between years will be derived.
- **Herpetofauna surveys:** The surveys for herpetofauna will be done from standard timed searches along transects, pitfall traps with drift fences and spotlighting and nocturnal soundscape analysis for amphibians.

■ **Large mammal and ground bird surveys:** Students will be walking quietly along transects to record large mammals and birds using distance based sampling. Signs (footprints and droppings) of other species (deer, wild pig) will be recorded and patch occupancy analysis used to identify their abundance. In addition camera traps will be set to determine the presence of other species (e.g. civets, ground bird species).

■ **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 above practicals 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

During their marine week the school will be completing one of the following options:

- **PADI Open Water dive training course:** This course involves a combination of theory lessons, confined water dives and open water dives to gain an official scuba diving qualification.
- **Indo-Pacific reef ecology and survey techniques course:** This consists of lectures and in-water practicals either by diving (if a qualified diver) or snorkelling. The lectures cover an introduction to coral reef ecosystems, coral and algal species, mangrove and seagrass ecology, economically important invertebrates, identification of coral reef fish, reef survey techniques, threats to reefs and marine conservation. Following each lecture the students will then complete an in-water practical by diving (if already qualified) or by snorkelling.
- **PADI Open Water referral course:** For this option students need to arrive having already completed their theory and pool training components. This course takes three days to complete, after which students will join the Indo-Pacific reef ecology and survey techniques course.

FACILITIES

The forest week is spent in one of the forest camps that have been installed at various points across the national park to incorporate different forest types and disturbance levels. The camps are set up with hammocks, tents and communal eating areas. Dry/field toilets and washing facilities are built at each of the camps. The community based marine research centre on Jaco beach has tents, showers, flush toilets and is a fully equipped dive training centre.

TRAVEL INFORMATION

The expeditions start on a **Sunday at 0800hrs** in Baucau, and finish on a **Friday at 1900hrs** in Dili.

For all options groups need to book international flights to arrive in Dili on the Saturday before the expedition start and to depart Dili on the Saturday after the expedition finishes.

The internal transfer package* between Dili Airport 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.



“I am frequently approached by other organisations but would not consider anyone else due to the quality of the experience the students receive. Another great trip!”

Dave Arnold, Brookfield Community College, UK

EAST TIMOR





ECUADOR AND THE GALAPAGOS

RESEARCH OBJECTIVES

Large areas of the Amazonian forests of Ecuador are under threat from oil extraction. Traditionally deforestation occurs after oil extraction and often with little benefit to the native people. The Huaorani Amerindians have managed to protect their forests against proposed oil extraction. Working with Tropicoco (an Ecuadorian ecotourism operator) has enabled them to develop an ecotourism income that provides the Huaorani with sustainable jobs and income, yet leaves their forests intact. However, these areas are still under threat and what is needed is evidence, of the Huaorani Amerindians' forests' biological importance, to potentially upgrade their conservation status.

The first week of the expedition will be spent in the remote Nenkepare Forest Camp which is accessed by long boat along the Sipuruni River. The groups based at this camp will be helping a team of specialists with surveying different taxa.

The second week is spent in the Galapagos Islands. The objective is to help develop research facilities and ecotourism income for Floreana Island, which, with only 120 inhabitants, is the least developed for tourist visits of all the Galapagos Islands. Tropicoco are working with the Floreana community 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 objective is to develop a marine monitoring and training centre on the island but this is subject to approval of the plans by the numerous layers of bureaucracy. If by 2017 the plans have not been approved then the second week will be spent on one of the other Galapagos Islands.

EXPEDITION STRUCTURE

This expedition combines working on a biodiversity research project with the Huaorani Indians in the Amazon, with a week visiting the Galapagos Islands, learning about Galapagos Island ecology from lectures and field based practicals.

Week 1: Amazonian forest

During this week the groups will complete the following surveys on a series of transects radiating out from the camp:

- **Bird point counts and soundscape analysis:** Surveys for birds will be completed by students, together with an ornithologist, using bird point counts and analysing sound recordings of the dawn chorus to complete species lists of the forests.
- **Fish community surveys:** Groups will assist with fish surveys of the Sipuruni River 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.
- **Reptile and amphibian surveys:** Together with a herpetologist, students will be helping with boat based spotlight surveys of caiman and foot based spotlight surveys to determine amphibian diversity. Pitlines will be installed and checked for reptile and insectivore catches. Observational transects will be completed during the day for larger species.
- **Camera trap and live trap surveys:** Students will be helping with setting and checking camera traps in a wide range of habitats to determine large mammal diversity. Small mammal community structure will be assessed from live captures using Sherman traps.
- **Forest structure and habitat surveys:** Here teams of students working with a forest ecologist will be helping with forest structure and habitat surveys. Sample points will be focused around ideal locations for birds and herpetofauna and the positioning of camera traps, in order that species distributions can be related to habitat and forest structure.

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
- Survey methods
- 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

There will also be the opportunity to visit a Huaorani Indian 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.

Week 2: Galapagos Islands

The group will fly to Baltra Island just north of Santa Cruz, the largest and most populated of the Galapagos Islands. From here they will transfer by boat to Floreana Island or Santa Cruz and during this week will complete a Galapagos Island ecology course which will cover the following topics:

- Volcanic origin of the Galapagos and arrival of founder species which then speciated on the various islands
- The voyage of HMS Beagle and how the visit to the Galapagos influenced Darwin's thinking on evolution
- Darwin's finches and measuring evolutionary changes in these birds
- Threats to the survival of the island fauna and flora from introduced plants and fauna, such as rats, goats, pigs and disease vectors
- Extinctions on the islands and conservation success stories

- Managing tourism impacts on the islands
- Key species in the marine environment (marine iguanas, penguins, sea lions etc.) and management of the local fisheries

This course involves lectures followed by field visits. Some of these field visits involve snorkelling or, if already a qualified diver, then the marine practicals can be done by diving.

FACILITIES

In the Amazonian forest week students will be staying in tents in the Nenkepare Research Camp which is accessed by a 2 hour long boat ride along the Sipuruni river. There are flush toilets and hot showers at this site. Meals are cooked by research camp Huaorani staff and combine traditional Ecuadorian and international recipes. The second week on the Galapagos Islands 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.

TRAVEL INFORMATION

The expeditions start on a **Tuesday at 1800hrs** at the Nenkepare Forest Research Camp and finish on a **Monday at 0900hrs** at Floreana Island or Santa Cruz Island in the Galapagos.

Groups need to book international flights to arrive in to Quito on the Monday before the expedition starts and to depart Quito on the Tuesday after the expedition finishes.

The internal transfer package* between Quito 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.

“If you want to know what real field research is like, go on an Opwall expedition. You won't regret it!”

Jason Anderson, Teacher,
Ponderosa High School, USA



FIJI

RESEARCH OBJECTIVES

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 for 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 enlightened 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 more enlightened 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 the majority of all 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 km², 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 is to establish a marine research centre and the students on this expedition in 2017 will be contributing to getting the marine research and training centre launched.

STRUCTURE OF THE EXPEDITION

The expedition starts in one of the Natewa villages at 4pm on a Sunday. On the first night the students will be staying in homestays in a traditional Fijian village. On the Monday the group will trek up the mountains to a camp in the heart of the National Park. After a week in the National Park the group will descend to the coast and will be based in the Natewa Bay Marine Research Centre.

Week 1: Forest week

During this week the students will complete the following:

- **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 the degree of disturbance at each of the sites.
- **Invertebrate surveys:** These surveys are designed to collect as wide a range of invertebrate specimens as possible to help build a catalog of these taxa for the area. Techniques will include sweep netting, suction devices,

Malaise traps, pit fall 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.

- **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.
- **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

During their marine week the school will be completing one of the following options:

- **PADI Open Water dive training course:** This course involves a combination of theory lessons, confined water dives and open water dives to gain a scuba diving qualification.
- **Pacific reef ecology and survey techniques course:** This consists of lectures and in-water practicals either by diving (if a qualified diver) or snorkelling. The lectures cover an introduction to coral reef ecosystems, coral and algal species, mangrove and seagrass ecology, economically important invertebrates, identification of coral reef fish, reef survey techniques, threats to reefs and marine conservation. Following each lecture the students will complete in-water practicals by diving (if already qualified) or by snorkelling.

■ **PADI Open Water referral course:** For this option students need to arrive having already completed their theory and pool training components. This course takes three days to complete, after which students will join the Indo-Pacific reef ecology and survey techniques course.

On the last day before flying home the students will be joining the local Fijian villages to play sports and games and learn about local culture and customs.

FACILITIES

The first night will be spent in a homestay in a Fijian village but the rest of the first week will be in a forest camp. It is approximately a 2 hour trek. The camp will be set up with hammocks, tents and communal eating areas. Field toilets and washing facilities are built at each of the camps. The Natewa Bay Marine Research Centre where the students will be based for the second week has bunk bed accommodation in dormitories, showers, flush toilets and is a fully equipped dive training centre.

TRAVEL INFORMATION

The expeditions start on a **Sunday at 0800hrs** in one of the Natewa villages, and finish on a **Saturday at 0800hrs** in Natewa.

For all options groups need to book international flights to arrive in Nadi on the Saturday before the expedition start and to 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.

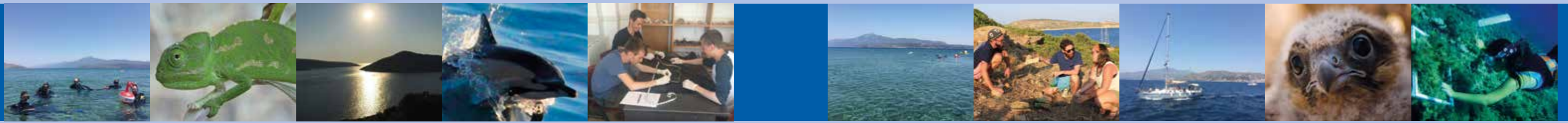


FIJI



“This is an excellent hands-on experience to gather ecological data, learn about birds, butterflies, plants and mammals while immersed in the culture.”

Tammy Mandwelle,
South Glens Falls Sr High School, USA



GREECE

RESEARCH OBJECTIVES

These expeditions will take place in the stunning eastern Aegean islands of Greece just off the Turkish coast. The area represents a unique biogeographical crossroad between three continents: Europe, Asia and Africa. This Greek archipelago has been established by a complex series of geological events caused by tectonic movements. Climatic shifts and the subsequent Pleistocene glaciations have resulted in cyclic sea level fluctuations causing the land masses of Europe and Asia and many terrestrial species to become isolated and reconnected. These patterns of connectivity and separation have led to high species richness.

The Aegean sea, where the Cyclades and Dodecanese Islands are situated, support a rare and unique biodiversity that includes some of the most important remaining populations of marine mammals and turtles in the Mediterranean, and have extensive areas of protected habitats such as Posidonia seagrass beds and Coralligene reefs. These marine habitats, and the fauna that they house, are also threatened by disturbances (e.g. development, illegal fishing practices, bycatch and persecution of marine mammals). The Opwall teams, along with their Greek partners Archipelagos, will be part of a long term monitoring effort being implemented by PhD students from universities in the UK and US in order to advise management efforts and protection strategies.

STRUCTURE OF THE EXPEDITION

This expedition is unlike all other Opwall projects because there are both marine and terrestrial elements that are mixed together as part of one combined research programme. The first week is spent at a research centre on Samos Island and the second week travelling south and working in either Foyrni and Icaria and surrounding islets, or Lipsi and Arki and surrounding islets.

Week 1: Samos Island

During this week the students will complete the following:

- **PADI Open Water dive training course:** This course involves a combination of theory lessons, confined water dives and open water dives to

gain a scuba diving qualification. If the students arrive having completed a PADI referral (the theory and confined water elements of the PADI Open Water training course) then they will complete their qualification in around 3 days and spend more time on the marine surveys.

- **Seagrass surveys:** Students will learn the methods for completing Seagrass Watch surveys on 50m transects. Those students who are already dive trained will learn the Seagrass Watch survey methods and will then be helping with collecting data on permanent monitoring seagrass sites (in depths of up to 10m), whilst the other students complete their dive training.
- **Aegean fish identification:** This course trains students in the identification of the Aegean fish species likely to be encountered on the same transects as the seagrass surveys.
- **Mammal surveys:** This involves helping with radio tracking and nocturnal call back surveys for the golden jackal which has a surviving population on Samos. The objective is to trap and attach radio collars on a series of animals around the research centre to look at home range size and habitat usage.
- **Chameleon surveys:** This involves spotlight searches for chameleons in different habitats around the Island to estimate the remaining population size of this species, which in the past has been heavily collected for the pet trade.
- **Wetland bird surveys:** Samos Island has some extensive wetland areas still remaining, although these are under significant threat from development pressures. The diversity of the wetlands appears to be high with species such as greater flamingo, ruddy shelduck, European roller, black-winged stilt, Alpine swift, olivaceous warbler and many others. These wetlands are being monitored year round by Archipelagos staff with a view to making an application for the wetlands to be protected and produce income from specialist birders visiting during the migration season.
- **Aegean Island ecology part 1:** In addition to the above activities, the students will also complete the first part of the Aegean Island ecology course (Aegean ecology and conservation - an introduction, fish identification and freediving theory, Mediterranean fisheries, marine survey techniques, terrestrial survey techniques, terrestrial conservation and protected species).

Week 2: Lipsi and Arki Islands option

For the second week the teams will be based south of Samos on the more remote islands of Lipsi (population 750) and Arki (population 45). During this time the teams will be helping different scientists with the following projects:

- **Bird surveys:** Helping with bird surveys on Lipsi and Arki and the surrounding uninhabited islets that have been designated as wildlife refuges. Some of these islands are home to breeding Eleanora's falcons, Audouin's gulls and Yelkouan shearwaters.
- **Invertebrate surveys:** On this project the students will be helping with a survey of beetle biodiversity on a series of islands using a range of sampling techniques including pit fall trapping, light trapping and flight intercept traps.
- **Open Sea Aquarium surveys:** Archipelagos has initiated an innovative project where the end of a bay is being netted off with a copper mesh net and an adjacent wall of sea cage netting. Within the netted off bay, which is 120m x 20m wide and up to 25m deep, the intention is to recreate an Aegean fish community as it would have been before the area became over fished. The clarity of the water in this part of the Aegean is outstanding so the whole of the aquarium area can be easily observed from the surface. The Lipsi government are keen to use this development as a way of increasing tourism to the island. Students on this project will be completing surveys of the seagrass beds and fish communities within the open sea aquarium as part of a constant monitoring programme.
- **Aegean Island ecology part 2:** In addition to the above activities the students will also complete the second part of the Aegean Island ecology course (marine conservation and protected species, environmental impacts - invasive species, conservation in action - examples from the Mediterranean marine plastics pollution and marine mammal first aid).

Week 2: Foyrni and Icaria islands option

The projects on this option are the same as for Lipsi and Arki except that the bird and invertebrate surveys cover a wider range of habitats including the spectacular scenery on Icaria. In Foyrni and Icaria the students will still complete snorkel surveys of seagrass and their associated fish communities but not in an open sea aquarium area.

There is also a project looking at the deep sea coralligene reefs which is a research boat based project. This project will be running as part of the Opwall research programme but it is not known at this stage which of the two island options the research boat will be operating from in any particular week. When moving around between the islands the groups will record sea mammal sightings.

FACILITIES

On Samos Island students will stay in a small hotel near the fishing village of Pythagorio which is about 300m from the Archipelagos research base. The base is located only a few metres from the beach and where you can see the sun rising behind the Turkish mountains. The second week the students will be based in tents or bunk accommodation on the southern islands and travelling between them on ferries.

TRAVEL INFORMATION

The expeditions start on a **Thursday at 1200hrs** at the Archipelagos Research Centre and finish on a **Wednesday at 0800hrs** at the same location. Groups need to book international flights to arrive in to Samos before 1200hrs on the Thursday the expedition starts and to depart Samos after 0900hrs on the Wednesday the expedition finishes.

The internal transfer package* between Samos 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.

“The friendly and entertaining staff at Opwall have not only made the expedition an enjoyable learning experience but also a funny and worthwhile opportunity.”

Rebecca Mocatta, Student,
Sevenoaks School, UK

“Without Opwall I wouldn't have had this experience to gain valuable knowledge of marine biology – hands on, in the field!”

Aurora Kellam-Pearson, Student,
Hockerill Anglo-European College, UK





HONDURAS

RESEARCH OBJECTIVES

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 Meso American 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 100 most irreplaceable forest sites in the world from a review of 173,000 protected areas worldwide. All the data collected by the Opwall teams have been summarised into a report using the Natural Forest Standard guidelines. This report will then be independently verified and once this is completed, Carbon Natural Forest 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 2017 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 OPTIONS

In Honduras there are two types of expedition that can be joined. The first combines a week helping the biodiversity teams in the forest with a second week learning to dive or completing a reef ecology course (at the marine site either on Utila or Roatan). A second option is to combine the two marine sites by spending a week at each.

Week 1: Forest week in Cusuco National Park

Students' time will be split between two research camps. Over the course of the week the groups will participate in the surveys and activities running at the different camps including the following:

- **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 orchid bees and aquatic invertebrates in bromeliads.
- **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. In addition, sound recorders will be positioned around the forest, and students will have the opportunity to use the software that searches these recordings for known species calls.
- **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.

- **Mammal surveys:** This survey involves checking previously baited traps for small mammals, identifying any individuals caught and marking them before release (mark-release-recapture). Tissue samples are also taken, for stable isotope analysis, providing useful information on food web dynamics. In addition camera traps are being used to describe large mammal communities.

- **Bat surveys:** Students will be shown how mist netting 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

During their marine week the groups will be based at either the Coral View Research Centre on Utila or Ecodivers in West End, Roatan, depending on availability. At both sites the students will be completing one of the following options:

- **PADI Open Water dive training course:** consisting of two days of confined water dives and theory classes, followed by the remainder of the week diving on the surrounding coral reefs to complete their globally recognised qualification.
- **Caribbean reef ecology and survey techniques course:** Consisting of lectures and in-water practicals either by diving (if a qualified diver) or snorkelling. The lectures cover an introduction to the tropical marine environment (reef formation, importance of reefs), coral and algal species (common taxa and ecological role), mangrove and seagrass ecology, ecologically important invertebrates (particularly keystone sea urchins), identification of coral reef fish, reef survey techniques (quadrats, transects, stereo video), threats to reefs (climate change, overfishing, invasive species) and marine conservation (top-down and community-based conservation strategies).

FACILITIES

Accommodation in the forest will either be in Base Camp or the mountain village of Buenos Aires at the start of the week. After this the groups will move to a more remote forest camp in the centre of Cusuco. 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.

On the island of 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. At Ecodivers, on the island of Roatan, 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 0900hrs** in La Ceiba.

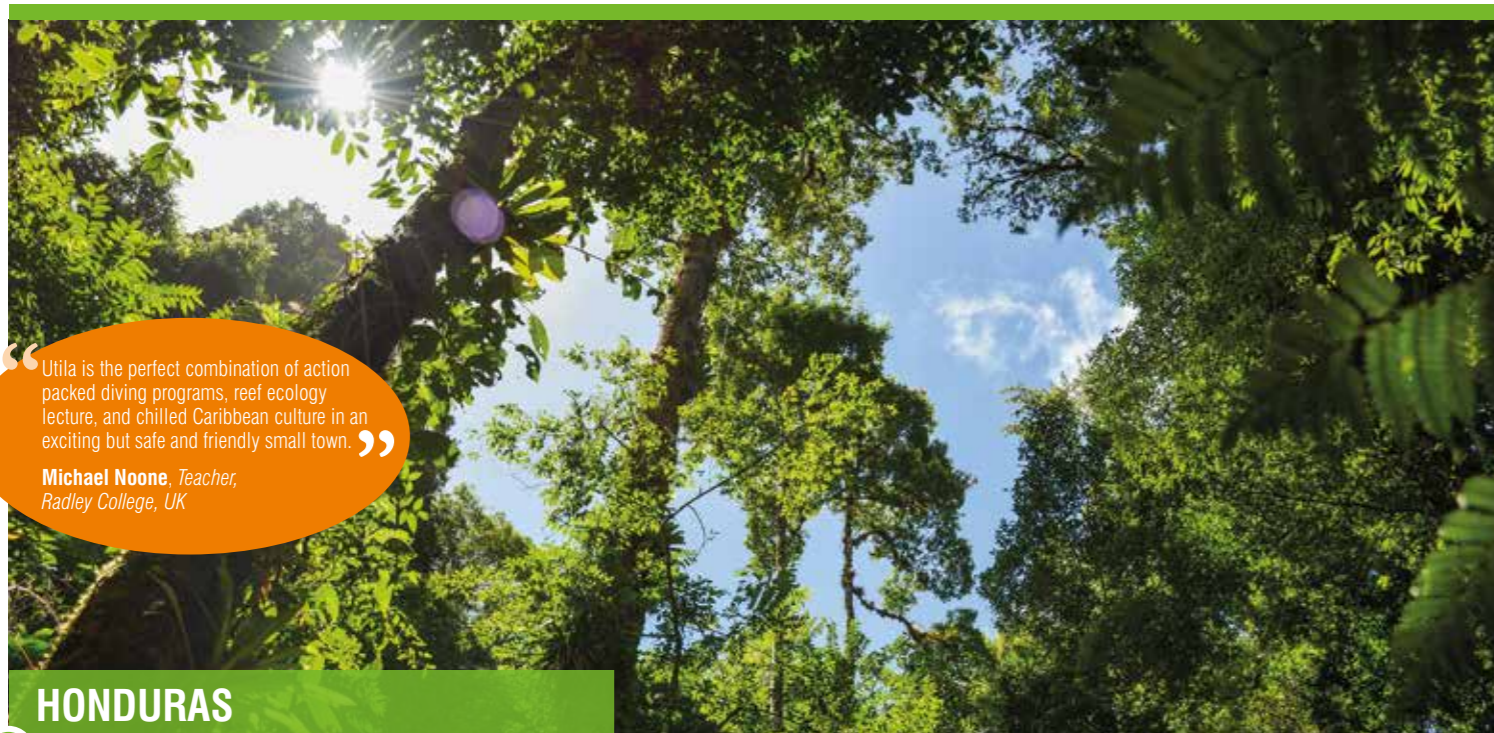
Groups need to book international flights to arrive in to San Pedro Sula on the Tuesday before the expedition starts and to depart San Pedro Sula after 1600hrs on the Tuesday the expedition finishes.

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.

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.



“Utila is the perfect combination of action packed diving programs, reef ecology lecture, and chilled Caribbean culture in an exciting but safe and friendly small town.”

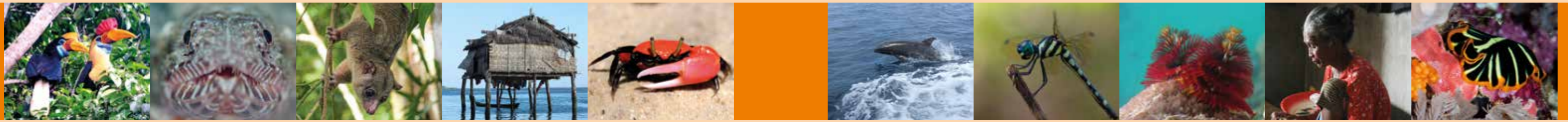
Michael Noone, Teacher, Radley College, UK

HONDURAS



“A truly thrilling way to experience science first hand.”

Jennie Nelson, Teacher, Bullitt East High School, USA



INDONESIA

RESEARCH OBJECTIVES

Sulawesi and the surrounding smaller islands were identified as a unique biogeographic 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 vertebrate species, which are new to science. 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 2017 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 South Buton datasets are being used to identify a potential new marine park/protected area.

EXPEDITION OPTIONS

There are two types of expedition available in south east Sulawesi. One option is to visit either the forests of North or South Buton for one week and then to head to either the Wakatobi Marine National Park or the reefs of South Buton for the second week. A second option is to combine the two marine sites, spending a week at each.

“An amazing experience that exceeded my expectations. I learnt a lot which will be invaluable in my teaching of biology.”

Gill King, Teacher,
Sacred Heart College, Australia

Week 1: Forest week in northern or southern camps

During the first week the teams will complete training and surveys including:

- **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

During their marine week the school will be completing one of the following options:

- **PADI Open Water dive training course:** This course involves a combination of theory lessons, confined water dives and open water dives to gain an official scuba diving qualification.
- **Indo-Pacific reef ecology and survey techniques course:** This consists of lectures and in-water practicals either by diving (if a qualified diver) or snorkelling. The lectures cover an introduction to coral reef ecosystems, coral and algal species, mangrove and seagrass ecology, economically important invertebrates, identification of coral reef fish, reef survey techniques, threats to reefs and marine conservation. Following each lecture the students will then complete an in-water practical by diving (if already qualified) or by snorkelling.
- **PADI Open Water referral course:** For this option students need to arrive having already completed their theory and pool training components. This course takes three days to complete, after which students will join the Indo-Pacific reef ecology and survey techniques course practicals.

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.

FACILITIES

The forest week is spent in one of the forest camps that have been installed at various points in the Lambusango to North Buton forests to incorporate different forest types and disturbance levels. The camps are set up with hammocks, tents and communal eating 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. The South Buton research centre has shared rooms with air conditioning, showers and flush toilets whilst the Wakatobi site has traditional mandis.

TRAVEL INFORMATION

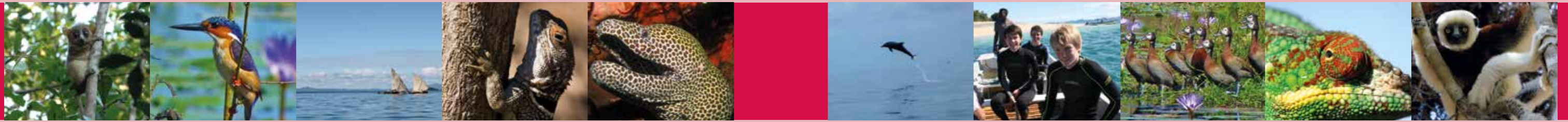
The forest/marine combination expeditions start on a **Wednesday at 1000hrs** in Bau Bau, and finish on a **Tuesday at 0900hrs** in either Wanci (if your last week is in the Wakatobi) or Bau Bau (if your last week is at the South Buton marine site). The marine only expedition starts on a **Wednesday at 1000hrs** in Bau Bau and finishes on a **Tuesday at 0900hrs** in Wanci. For all options groups need to book international flights to arrive in to Makassar (known as Ujung Pandang) on the Tuesday before the expedition starts and to depart Makassar after 1600hrs on the Tuesday after 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.



“I have been a research assistant for two years with Operation Wallacea. My second experience was just as amazing as the first time. The knowledge and experiences are wonderful and the locals taught me so much.”

Kayla Bergal, University Student,
Grand Valley State University.



MADAGASCAR

RESEARCH OBJECTIVES

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, which despite hosting a large number of rare, endangered and range restricted species, currently receives no formal protection. Data collected on community economics, carbon and patterns and trends in biodiversity data will provide the information needed to produce an application establishing the forests as a community managed protected area for sustainable use. Once established, data can be used to develop of the management plan of the protected area and help determine alternative sustainable livelihoods for the local community that can be linked to its long term protection.

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.

STRUCTURE OF THE EXPEDITION

The expedition is structured so that the first week is spent working with the Mahamavo forest research teams. For the second week the groups have the option of travelling to the island of Nosy Be to complete a dive training course or learn about Indian Ocean reef ecology or, alternatively, groups can remain in the Mahamavo forest.

Week 1: Mahamavo forest week

During the first week the teams will complete surveys including:

- **Herpetofauna routes:** A small group of students led by a herpetologist walk slowly along forest 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 centreline 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 will be 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.
- **Small mammal trapping:** Small mammal traps are baited and set in the evenings and students will then check traps and help process any captures in a morning session.
- **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 estimate the amount of carbon stored in woody vegetation. In addition this activity monitors trends in some indicators of forest physical parameters (canopy cover, sapling density).

The groups will also complete a Madagascar wildlife and culture course with lectures on: Introduction to Madagascar (diversity of Madagascar wildlife, people and cultures), biogeography and evolution of Madagascar wildlife (why so many species are endemic, distribution of major habitats), species concept (endemic amphibian, reptile, bird and mammal species in Madagascar, what is a species?), biodiversity conservation in Madagascar (national park system, human impacts on wildlife), people in Madagascar (major cultures and

languages) and conservation synthesis (how the data from Mahamavo are being used).

Week 2: Nosy Be marine site

On this option the school will be based at the Nosy Be marine site and will be completing one of the following options:

- **PADI Open Water dive training course:** This course involves a combination of theory lessons, confined water dives and open water dives to gain an official scuba diving qualification.
- **Indian Ocean reef ecology course:** Completion of an Indian Ocean reef ecology course consisting of lectures and in-water practicals either by diving (if a qualified diver) or snorkelling. The lectures cover an introduction to coral reef ecosystem (reef formation and East Africa reef distribution), coral and algal species (growth forms and common species), marine megafauna (whale shark migrations, whales of southern Africa), mangrove and seagrass ecology, ecologically important invertebrates (lobster fishery, mollusc fishery), identification of coral reef fish (herbivores, piscivores, omnivores and specialists such as cleaner fish), reef survey techniques (quadrats, transects, stereo video), threats to reefs (climate change, fisheries, invasive species) and marine conservation (Madagascar marine protected areas).
- **PADI Open Water referral course:** For this option students need to arrive having already completed their theory and pool training components. This course takes three days to complete, after which students will join the Indian Ocean reef ecology course.



FACILITIES

In the Mahamavo forests the students will be based in a camp near to Mariarano village. Accommodation is in tents next to a building converted for use as a field laboratory with a library, computers running the biodiversity database, GIS and statistics software. There are jungle showers and toilets in the camp. In addition to the camp at Mariarano, two further tented forest camps will also be used. One is adjacent to Matsedroy Lake and a second a short walk from a mangrove system. At Nosy Be Island the marine week accommodation is in tents next to the beach in a walled camp at Maradoka village.

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. For those groups wishing to stay two weeks at Mahamavo Forest the expedition will finish on **Friday at 1300hrs**.

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.

“The hardest thing I have ever done but by far the best experience ever. It has opened my eyes.”
Harpreet Hallaith, Student,
 Wolverhampton Girls Grammar, UK

“Trip of a lifetime. Amazing wildlife, scenery, activities, camps and staff. Thank you.”

Phillip Price, Teacher,
 Woldingham School, UK

MADAGASCAR





MEXICO

RESEARCH OBJECTIVES

The Mexican research project is run in the vast Mayan Jungle (Selva Maya) which is the largest expanse of tropical forest in the Neotropics outside of the Amazon. 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. The Operation Wallacea research project is based in the Calakmul Biosphere Reserve (CBR) located in the Yucatan Peninsula. CBR is an 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 (with a focus on Baird's tapir, felids such as jaguar and puma and primates), 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. Akumal is 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 if not carefully managed, tourism will start to impact on the marine ecosystem causing irreversible damage. 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 Caribbean reef ecology course (if already dive certified or wishing only to snorkel), 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).



“Your students working side by side with real scientists contributing to scientific data is an invaluable and irreplaceable experience for high schools!”
Tina Lanter-Skokan, Teacher,
 Lincoln High School, USA

MEXICO

In addition, students will be helping with surveys to determine abundance and health of juvenile turtles in the sea grasses and the annual abundance and distribution of turtle nesting sites.

STRUCTURE OF THE EXPEDITION

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 museum tour, a visit to the breathtaking Calakmul ruins, and information relating to the effect of ancient Mayan agro-forestry on tree and wildlife diversity in the reserve.
- **Jungle skills training:** Learning how to identify animal tracks and signs, estimating distances, navigation using a compass and identifying some of the common bird calls. 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 (measuring all dead wood and counting the number of the saplings in the quadrat).
- **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 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 etc.). Students will also be shown how camera trapping is being used to estimate population levels of the cat species and mammal use of aguadas.

In addition to these activities the students will also complete a Mayan forest ecology and conservation course including lectures on the following topics: biodiversity, evolution and classification, endemism, biodiversity hotspots and forest structure in Calakmul Biosphere Reserve, herpetofauna and adaptation (reptile and amphibian diversity in Calakmul, snake teeth and venom, Batesian mimicry, herpetofauna survey methods), Neotropical birds (bird identification and ecology, birds as indicators of forest health, bird survey methods), Neotropical mammals (effect of forest disturbance on bat diversity, forest ungulates and seed predation, spider monkey social structure, jaguar ranging patterns in Calakmul, mammal survey methods) and conservation synthesis (the use of Opwall datasets to monitor changes to forest cover and biodiversity over time, GIS and modelling species distribution patterns, sustainable hunting of peccary and deer, REDD+ scheme).

Week 2 Akumal marine site

During their marine week the groups will be based in Akumal which is a small coastal town located approximately 2 hours drive south from the major tourist destination of Cancun. During their time in Akumal students will complete one of the following options:

- **PADI Open Water dive training course:** This course involves a combination of theory lessons, confined water dives and open water dives to gain an official scuba diving qualification.



- **Caribbean coral reef ecology course:** Lectures cover topics such as the ecology and biology of coral reefs, seagrass beds and mangrove forests, important Caribbean species identification for coral, algae and fish, common marine biology survey techniques and conservation priorities for Mexican coral reefs. Each lecture is accompanied by an in-water practical (diving or snorkelling).

- **PADI Open Water referral course:** For this option students need to arrive having already completed their theory and pool training components. This course takes three days to complete, after which students will join the Caribbean coral reef ecology course.

In addition to the above, students will also participate in the following activities:

- Turtle nesting site monitoring – this takes place at night on the beaches in Akumal.
- Monitoring of sea urchins, turtles and key fish species on the reefs.
- Seagrass and juvenile green turtle monitoring via snorkelling in Akumal Bay.

FACILITIES

In the forest, camps are set up with tents, communal eating areas and with field type bathroom facilities. So as to minimise water usage showers are replaced by rustic bucket showers. The second week is a little more comfortable with students based in bunk bed shared dormitories from 8 - 12 people.

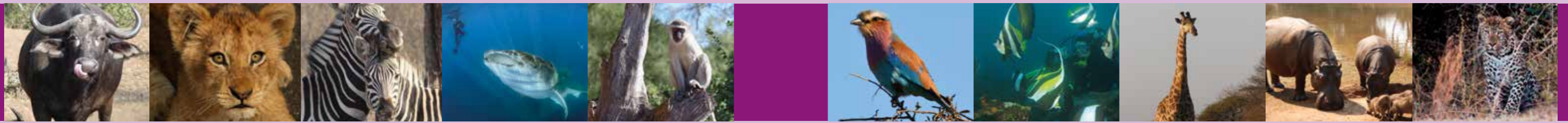
TRAVEL INFORMATION

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 1800hrs 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.

“Opwall expeditions are a once in a lifetime opportunity to learn more about field science, meet lots of interesting people and have loads of fun.”
Megan Fox, Student,
 Chellaston Academy, UK





SOUTH AFRICA

RESEARCH OBJECTIVES

The South African expeditions are run alongside a South African NPO (non-profit organisation), Wildlife and Ecological Investments (WEI), who undertake research in a number of reserves across the country.

WEI are coordinating a large scale research programme on the impact of the expansion of elephant populations on vegetation and biodiversity. The research programme covers a series of reserves across the country, each using slightly different management strategies, to address the problem of controlling their elephant populations.

The majority of big game areas in South Africa are fenced for a number of reasons including; reducing spread of disease, mitigation of conflict between dangerous animals and communities and facilitating management. However, there are a number of problems caused by fences, most importantly restricting the movement of animals. Some species such as elephants thrive in these protected areas, which as ecosystem engineers, could result in significant impact on the protected flora and fauna. This impact needs to be monitored and evaluated to ensure conservation goals are achieved and one species protection doesn't come at the cost of other species.

STRUCTURE OF THE EXPEDITION

The first week of the expedition is spent in Balule Game Reserve in the Greater Kruger Area. Here the school teams use identical monitoring methods to those being used by university teams in other reserves around South Africa and together these projects have the following objectives:

1. To quantify the impact of elephants around artificial and natural waterholes.
2. To assist with the calculation of the reserves' carrying capacity for elephants.
3. To understand the distribution of large herbivores and predators on the reserves.
4. Complete annual surveys on the structure and density of winter bird communities in areas of habitat with differing levels of elephant impact.

At the end of the first week the groups will move to WEI's Indian Ocean Marine Training Centre which is based in the Sodwana Bay section of iSimangaliso Wetlands Park, a UNESCO World Heritage Site. Here they will complete a dive training or reef ecology course.

Week 1: Bush week

During the first week in the Balule Reserve the groups will spend half of their time in the bush, either in game viewer vehicles or on foot (with armed guards) and half of their time in the large fenced camps learning about bush skills, African ecology and conservation. The bush skills course teaches students about a number of different aspects of bush life, for example, safe distances for viewing game, how to identify tracks and signs of large mammals, how to respond if a large herbivore or predator is encountered and how to use a GPS and compass for navigation.

The lectures on ecology and conservation cover a diverse number of topics, mainly focused on savannah ecology: Africa's biodiversity (formation of biomes in southern Africa), southern African birds (classification, sample techniques and conservation), herbivores of southern Africa (adaptation in rhinos, buffalo, impala, nyala, wildebeest and zebra), predators (niche separation in lion, leopard, cheetah, wild dog and hyena), managing elephant populations (social structure, impact on habitat and methods of controlling elephant numbers), African conservation issues (fenced reserves, maintaining balanced herbivore and predator communities and fire management) and a conservation synthesis (calculating elephant carrying capacity).

The groups will also undertake a couple of days of practical sessions focusing on showing them the African bush, before starting field based surveys that include:

- **Game transects:** Each group will have the opportunity to undertake monitoring of large mammal populations. Game transects are carried out in a vehicle driving a pre-planned route marking all game sightings on a GPS.
- **Bird point counts:** Students with a field guide will travel out to a number of GPS coordinates identified for bird point counts. On arrival by vehicle, they will trek into the bush on foot, then form an outward facing circle. All bird species seen or heard over a 10 minute period are identified and recorded.

- **Elephant impact surveys:** Two half days will be spent completing habitat surveys on foot, in one hectare blocks. Items such as grass density, tree structure and size, and levels of elephant damage are all surveyed.

Week 2: Marine week

The students will spend their second week in Sodwana Bay in KwaZulu Natal, South Africa and will complete one of three options:

- **PADI Open Water dive training course:** This course involves a combination of theory lessons, confined water dives and open water dives to gain an official scuba diving qualification.
- **Indian Ocean reef ecology course:** This consists of lectures and in-water practicals either by diving (if a qualified diver) or snorkelling. The lectures in Sodwana Bay cover an introduction to coral reef ecosystem (characteristics of a reef, distribution of reefs in east Africa), coral and algal species (growth forms and common species), megafauna (whales, sharks, manta rays), mangrove and seagrass ecology (importance of connective systems, threats to mangroves), economically important invertebrates (lobster fishery, aquarium trade), identification of coral reef fish (main reef fish families), reef survey techniques (quadrats, transects, stereo video), threats to and conservation of reefs (protected marine areas in South Africa and Mozambique).
- **PADI Open Water referral course:** For this option students need to arrive having already completed their theory and pool training components. This course takes three days to complete, after which, students will join the Indian Ocean coral reef ecology course.

FACILITIES

During the terrestrial section of the expedition students will be staying in single-sex shared accommodation in either dormitory style rooms or large tents. The camp is within the reserve but surrounded by electric fences and has hot running water and electricity. When in the marine section of the expedition students will be living in a camp site just outside the iSimangaliso Wetlands Park. Each day they will transit to the ocean or the dive training centre on the back of 4x4 vehicles from the camp which is situated up on the sand dunes a

few km from the beach. In the camp site students will stay in tents with shared hot and cold shower facilities. There is a lecture room and communal eating area.

TRAVEL INFORMATION

The expeditions start on a **Saturday at 0800hrs** at Balule and finish on a **Friday at 0800hrs** at Sodwana Bay.

Groups 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.

The internal transfer package* between Johannesburg 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.

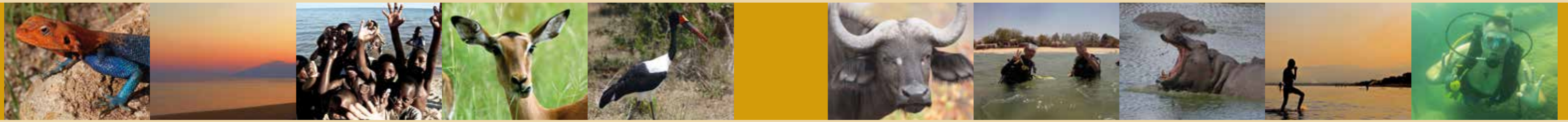


“Life changing – this experience has decided my future.”
Rhiannon McGuire, Student,
 Larbert High School, UK

“Amazing experience for pupils. Would highly recommend an Opwall expedition to anyone – truly lifechanging.”

Sorsha Imrie, Teacher,
 Lornhill Academy, UK





TANZANIA AND MALAWI

RESEARCH OBJECTIVES

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 casts 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, this 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

This expedition is divided into three parts: 5 days working in western Tanzania with a team of scientists producing high impact publications looking at how speciation occurs in lakes, 6 days dive training and/or helping with fish surveys in Lake Malawi and 2 days visiting the Vwaza Reserve, in Malawi, learning bush survival skills.

Part 1: Speciation mechanisms in crater lakes

The first 5 days will be based in Kyela, 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

For this part of the expedition the students will be based at the Maru Lake Malawi Research Centre at Nkhata Bay. Here the students will complete one of the following options:

- **PADI Open Water dive training course:** This course involves a combination of theory lessons, confined water dives and open water dives to gain an official scuba diving qualification.
- **Lake Malawi fish surveys:** This involves training on fish species identification and helping experienced fish biologists on twice daily scuba transect surveys of different parts of the lake. In addition this team will be helping fish biologists with fish landing surveys.
- **PADI Open Water referral course:** For this option students need to arrive having already completed their theory and pool training components. This course takes three days to complete, after which students will join the Lake Malawi fish surveys.

In addition, the students will have nightly lectures and occasional field trips, between other activities, to complete a Malawi culture and environment course. This will cover subjects such as the Lake Malawi fishery, local agriculture, history of the local people and local speciality dishes.

Part 3: Vwaza Wildlife Reserve

On the Saturday of the second week the group will be transferred to the Vwaza Marsh Wildlife Reserve in Malawi. The Reserve covers an area of 1000km² and comprises mopane and miombo woodland and marshy wetlands. The Reserve has good numbers of elephant, buffalo, kudu, roan, eland, impala and hippos as well as attracting large numbers of birds particularly to the wetland areas including openbill storks and Goliath herons. The group will be camping in the reserve and will be taught some bush survival skills, such as how to identify what large mammals are in the area from spoor (footprints) and scat (droppings) and how to trek safely in the bush. Part of the time will be spent wildlife viewing.

FACILITIES

During the first week at the crater lakes, groups will be staying in tents in the grounds of a local community school where field showers and toilets have been established. The camp site has beautiful views out over the nearby Masoko Lake. The Operation Wallacea expedition falls in the dry season in Ruaha, with temperatures regularly reaching 35°C so you will welcome the chance to cool off with a bucket shower at the end of a day in the field. The Malawi tented camp is in Nkhata Bay with spectacular views over Lake Malawi. The campsite has showers, toilets, a dining area as well as a fully equipped dive centre. In the Vwaza Reserve Malawi there is a tented camp with associated bathroom facilities inside the reserve. This camp is not fenced so has armed guards in the camp whenever the camp is occupied.

TRAVEL INFORMATION

The expeditions start on a **Tuesday at 1600hrs** in Kyela and finish on a **Monday at 0800hrs** at the Vwaza Reserve.

Groups need to book international flights to arrive in to Dar Es Salaam on the Monday before the expedition starts and to depart Dar Es Salaam after 2300hrs on the Monday the expedition finishes.

The internal transfer package will include return flights from Dar Es Salaam to Mbeya in western Tanzania and bus transfers from the airport to Kyela at the start of the expedition and back from Vwaza Reserve to Mbeya airport at the end of the expedition. The internal transfer package* 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.

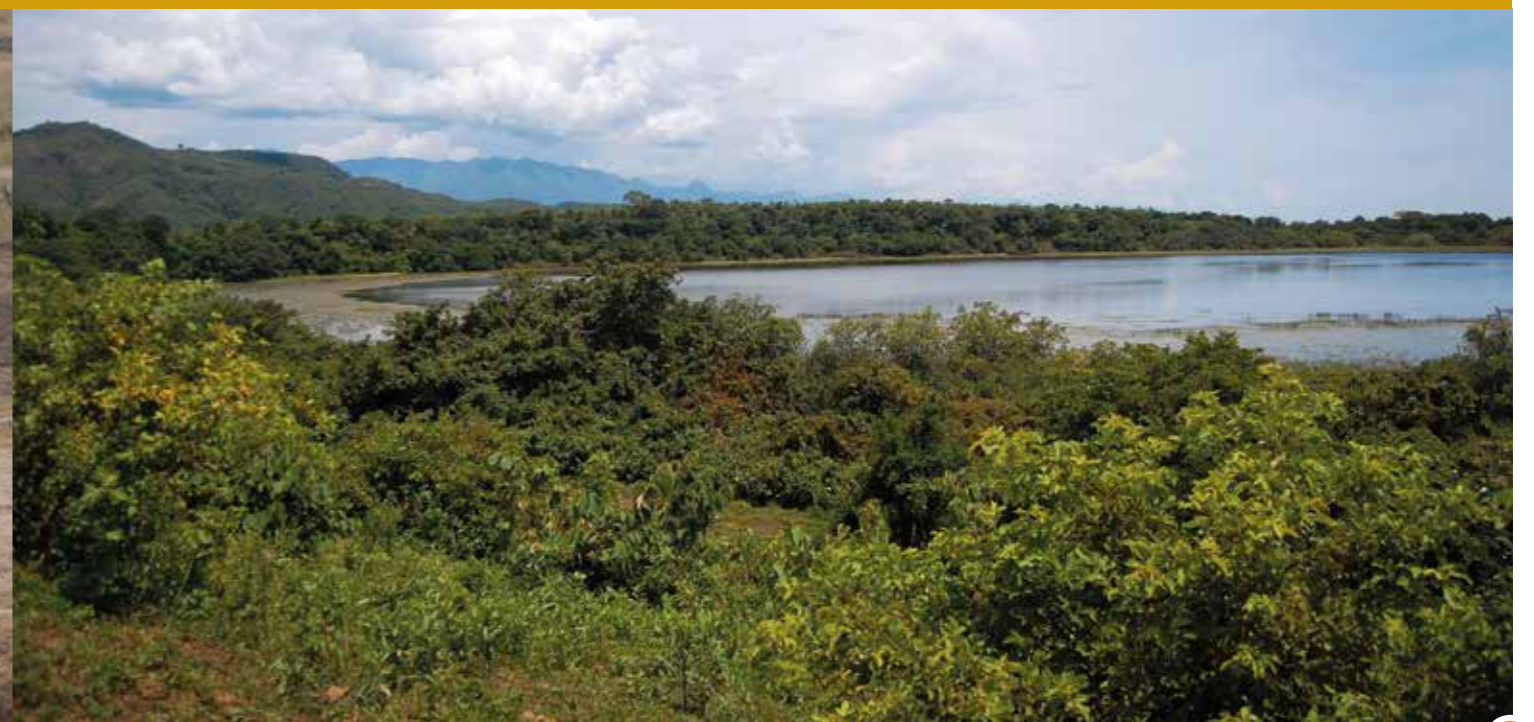


“Operation Wallacea was an amazing and eye-opening experience.”

Abby Maltzer, Student,
Holliston High School, USA



TANZANIA AND MALAWI





GUYANA

RESEARCH OBJECTIVES

The Guyana research project is run in the heart of the vast Guiana Shield forests that make up northern South America. This 2 week expedition gives students the opportunity to see much of the stunning wildlife of the Guiana Shield and to help with data collection for a biodiversity assessment survey. The Guyana expedition takes students into the heart of one of the last strongholds of intact tropical rainforest left on the planet.

When preserving rainforests, conservationists must ensure that the local communities can still have the ability to derive an economic income from their surroundings and not suffer lost opportunity costs. This is the basis of many of the REDD+ type data collection monitoring projects being run by Opwall (e.g. Indonesia, Honduras, Mexico). In these projects funds are raised through the preservation of the carbon content of forests enabling local communities to make an income from their protection rather than from extractive and often highly destructive processes. However, REDD+ projects are not always suitable and as an alternative in Guyana, the Opwall teams are exploring methods of sustainably exploiting timber using a Reduced Impact Logging protocol developed by the Iwokrama International Centre for Rainforest and Development.

Within the reserve a 60 year rotation between different forest blocks has been agreed. Approximately 1% of the trees are logged and removed in any one block in each rotation, with detailed planning, ensuring that cut and skid trails to export trees to the mill cause minimal impact. For the most part, this level of cutting allows the canopy and overall age structure of the trees to be maintained, even in the harvested blocks, whilst simultaneously generating a substantial income for the local communities as only the high value commercial species are removed.

The teams will start at the beautiful Iwokrama River Lodge and Research Centre situated on the bank of the Essequibo River and after 3 days will travel to one of the field camps in the Iwokrama/Surama forests, where they will spend a week completing data collection. During the last few days, the groups will be completing a boat survey along the Burro-Burro River running from Surama

GUYANA

Village through the centre of the Iwokrama Forest where there is a chance of encountering large animals such as anacondas, jaguars and giant river otters.

STRUCTURE OF THE EXPEDITION

Part 1: Training course on Guiana Shield forest ecology and survey techniques

The first 3 days of the expedition are based at the Iwokrama Research Centre where the students will be completing a Guiana Shield forest ecology course comprising lectures on Guiana Shield geography and structure, survey methods, how the data is used to describe community structure of key taxa, examples of species likely to be encountered and how Reduced Impact Logging is carried out. Mornings, late afternoons and evenings will comprise of small groups of students joining biologists demonstrating survey techniques used to quantify bird, bat and dung beetle communities, amphibians and reptiles, abundances of target mammal species (e.g. jaguars, tapirs, brocket deer etc.), as well as how to measure forest dynamics and structure. In addition, there will be short training sessions on forest survival skills such as how to live in hammocks in field camps in, navigation and trekking skills as well as the main risks posed by animals and diseases in the forests and rivers and how to reduce those risks.

Part 2: Biodiversity surveys in forest camps

For the next 6 days the teams will be based in one of the forest field camps and will be completing the standardised surveys required to quantify the diversity of the various taxa. These sites will either be in areas that have already been selectively logged, are due to be logged, or will never be logged (control sites). These surveys include:

- **Bird surveys:** Helping an experienced ornithologist with collecting data from mist net captures from dawn to midday. These surveys use standardised mist net hours to help quantify the changes in understory bird communities. All birds captured are measured, data taken on moult and breeding condition to determine breeding cycles, photographed and coloured rings attached to collect data on movements and longevity of the various species before the birds are released. In addition, soundscape recordings from a series of digital sound recorders at each site are collected and analysed in camp. The software used for the analysis has been 'trained' to recognise many of the Guyana species which allows extensive recordings to be analysed for the presence

of these species. Point counts are also completed by the survey teams to provide comparative data sets.

- **Herpetofauna surveys:** Assisting an experienced herpetologist with standard search scan samples for reptiles and amphibians. In the evenings transects will be completed to record the soundscapes and these recordings will be analysed by a herpetologist for amphibian diversity and relative abundance and by an ornithologist for nocturnal birds.
- **Dung beetle surveys:** Helping with installing and emptying baited pit fall trap lines to quantify the dung beetle communities since these are excellent indicators of forest change.
- **Large mammal surveys:** Helping to check and download data camera traps that have been left for up to 12 months around the various camps. The groups are involved in analysis of the images and these data are used to assess ground based mammal abundance including the big cats and herbivores such as tapirs, deer and agouti. In addition, the students will be completing transect surveys to collect data on primate abundance, (e.g. black spider monkey, red howler monkey, wedge-capped Capuchin, white-faced saki) which will not be sampled by the camera traps.
- **Bat surveys:** Mist nets run for standard periods of time are being used to quantify the bat communities. Volunteers who have had their rabies vaccinations will be able to help with the processing of the captured bats (identification of the species, photographing each bat, measurements, wing punctures for genetic sampling etc.) and their release. In addition soundscape recordings are completed to monitor the bat species flying too high for the mist nets.
- **Forest structure and dynamics surveys:** Students will assist a forest ecologist with quantifying the forest structure (age, class, structure of trees, amounts of understory vegetation, sapling regeneration, canopy cover etc.) of permanent monitoring plots. These data are re-used to quantify changes in the forest. In some sites there are no permanent forest plots nearby so these surveys are working on smaller plots and quantifying the forest structure around the survey sites for different taxa.

Part 3: River based surveys

The last 3 days of the surveys will be spent on a river based survey along the Burro Burro River through the heart of the Iwokrama rainforest to complete annual monitoring of key wildlife indicators to the health of the river. These include giant river otters, Arapaima (a type of huge fresh-water fish), caiman, anaconda and many species of water birds. The teams will start at Surama village in the savannahs of the North Rupununi. For two days downstream drift surveys and the wildlife records will be completed. This is a deep forest experience and the teams will be setting up camp on the river bank in hammocks each night and helping the boat drivers and guides porter the boats around fallen trees. The teams will sleep at camps on the banks of the river each night and on the last day will motor back up to Surama.

FACILITIES

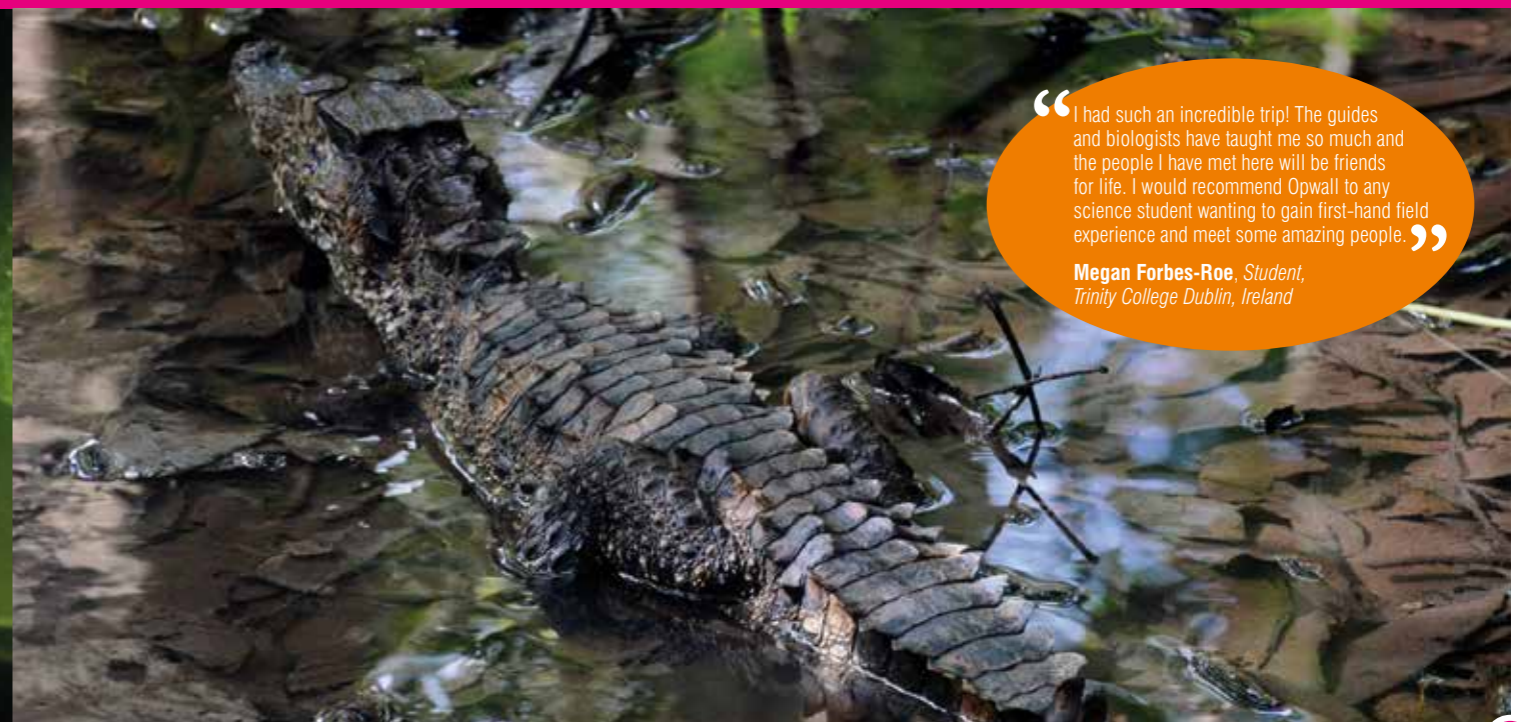
The first part of the expedition will be at the Iwokrama River Lodge on the bank of the Essequibo River. Accommodation is in dormitories with communal bathrooms. There is a well-equipped research centre with a lecture room and restaurant overlooking the river. The second part of this expedition will be in a remote field camp where accommodation will be in hammocks with bashas and integral mosquito nets. There are temporary field toilets and washing will be done in the rivers, or from a bucket. For the river surveys the groups will be in hammocks in temporary overnight camps. This is the most remote expedition but probably the one with the best sightings of forest based animals.

TRAVEL INFORMATION

The expeditions start on a **Tuesday at 1700hrs** at the Iwokrama Research Centre and finish on a **Monday at 0800hrs** at Surama Village. Groups need to book international flights to arrive in to Georgetown on the Monday before the expedition starts and to depart Georgetown on the Tuesday after the expedition finishes.

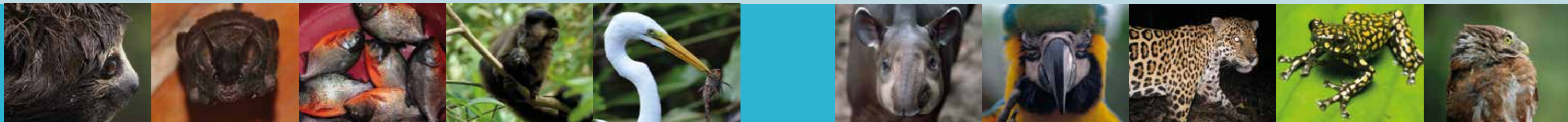
The internal transfer package* between Georgetown Airport and the expedition start and end points will be arranged by our Internal Travel team and is not included in the expedition cost, unless you have chosen a fully inclusive expedition package. Additional guided excursions and day trips to be taken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

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



“ I had such an incredible trip! The guides and biologists have taught me so much and the people I have met here will be friends for life. I would recommend Opwall to any science student wanting to gain first-hand field experience and meet some amazing people. ”

Megan Forbes-Roe, Student,
Trinity College Dublin, Ireland



PERU

RESEARCH OBJECTIVES

The Pacaya-Samiria National Reserve is the second largest protected area in Peru, spanning over 20,000 km² 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 Cocama Indians 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 understory 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 January to March are in the high water season (water rising from January to March) and from late June until August are in the low water season (water levels falling from June to August). Over these seasons, 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.

STRUCTURE OF THE EXPEDITION

Students will be based on research ships moored adjacent to the flooded forest (at a series of sample points along the Samiria river) and will be split into small groups that have the opportunity to take part in the following research projects over the two weeks. Each student will be expected to join one of the morning and one of the afternoon/evening activities alongside assisting with data entry.

- **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-space analyses to estimate densities. The density data are then used to calculate whether hunting levels are sustainable.
- **Macaw surveys:** Boat based point counts are used to monitor macaws with each site 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).
- **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. Catch per unit effort data are compared between years to identify population trends.
- **Soundscape surveys:** Sound recorders are being set at a series of sites to record the bird and amphibian calls. The difficulty with completing normal point counts for birds in the Amazon is that most species recorded at a point count are identified by their calls and given the diversity of birds in the Pacaya-Samiria Reserve, a small change in the knowledge of calls by the observer can make a big difference to the diversity recorded. The software used to analyse the soundscape recordings can be trained to recognise the calls of the various species so that there is a verifiable check on the bird species data being recorded.

- **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 gill nets to quantify the catch per unit effort (CPUE) experienced by the Cocama Indians. The students will learn how gill-net surveys are implemented and will help with measuring, weighing and identifying all fish captured. They will also take part in surveys using fishing lines.
- **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 and 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.
- **Night time caiman surveys:** This survey involves spotlight surveys of the river after dark to locate and identify caiman species in order to estimate population size and distributions. Noosing is used to capture caiman to obtain data on morphological measurements, sex and age.
- **Amphibian surveys:** Transects of 500m at a series of sites are being surveyed with replicates conducted night and day during the period when amphibians are most active. Visual encounter surveys (VES) during the day will be carried out using a probe to disturb leaf litter and vegetation. To identify anurans during night transects, instead of probing through leaf litter, torches will be used to catch the reflection of light from the eyes of anurans. Upon detection and capture of an individual each specimen will be handled carefully and morphological measurements taken. Surveys of the rafts of

floating vegetation are also conducted at night to identify amphibian species using them as breeding platforms.

- **Fishing bat surveys:** This river survey involves travelling along the river for a 1hr period 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 which comprises of lectures and related activities/discussions on Amazon geography and biodiversity, flooded forest and upland forest ecology, conservation strategies in the Amazon, survey methods, Pacaya-Samiria birds, mammals of Pacaya-Samiria, Amazonian fish, amphibians and reptiles, wildlife monitoring and calculating sustainable hunting levels and examples of best practice conservation management in the Amazon. During the course the students will also get the opportunity to visit a Cocama Indian community.

FACILITIES

Accommodation will be on the Rio Amazonas research ship where students are in 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. Living on a research ship in the heart of the biodiverse Amazon is a truly memorable experience.

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.

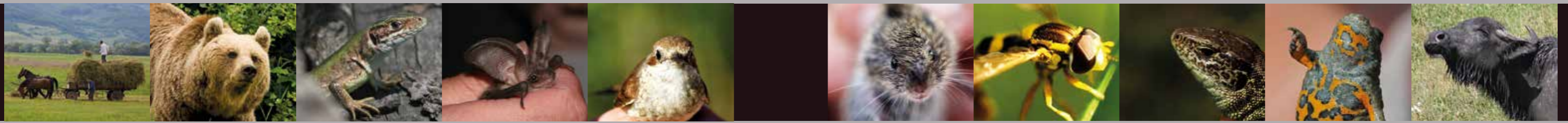
*Includes airport meet & greet, any required travel and accommodation and full representation.

“Any high school teacher looking for a science program where students are engaged in the scientific process and have experience of working with biologists, experts in their field, need to take their students on an Opwall expedition.”

Vicki Lee Landersman, Teacher,
DeMatha School, USA

“I learned so much throughout this trip and it will definitely inspire me for the rest of my life. Do it while you can, enjoy it while you have it, don't regret after, somethings will never come back once it's gone.”

Christina Liang, Student,
Southridge School, Canada



TRANSYLVANIA

RESEARCH OBJECTIVES

The Tarnava Mare Natura 2000 Region comprises 85,000ha of particularly rich landscape and is one of Europe's last medieval landscapes. The area has arguably the most extensive flower-rich grasslands remaining in lowland Europe, as well as the continent's last remaining lowland bears. The landscape still presents a medieval land use pattern: forested ridges and gullies, pasture and hay meadows on gentler slopes and terraces, with arable land and smaller meadows on the flat valley bottoms near villages.

Inclusion of the area in the EU Natura 2000 network enables funding to be obtained to maintain the low input traditional based farming that has created such a high biodiversity. The Opwall teams are completing an annual biodiversity survey of the region in order to assess the effectiveness of maintaining the traditional farming practices in protecting this outstanding area. The work is being completed with Fundatia ADEPT, a Romanian based NGO, with the Opwall teams providing annual data on a series of biodiversity performance and farming criteria.

STRUCTURE OF THE EXPEDITION

During this expedition the teams will split their two weeks between two picturesque and remote Saxon villages in the foothills of the Carpathians. The study sites have been paired into villages and over the course of the expedition each group of students will spend 5 – 6 days surveying in each of the target valleys. They will then trek over the hills to the next village. In each valley the students will be split into one of several study teams (described below) and over the course of the two weeks will have the chance to participate in each of the teams for at least two days:

■ **Large mammals:** This team will position camera traps in key locations in the forests and on the valley transects in order to capture sightings of large mammals such as bears, wild boar and deer. The team will also carry out track and sign transect surveys checking for scat and any additional evidence of large mammals.

“Very well run and informative expedition that gives students a fantastic opportunity to see and learn about wildlife and conservation.”

Dr Jay Denny, Lecturer,
South Essex College, UK



■ **Small mammals and herpetofauna:** This team will set small mammal traps late at night which will be checked and emptied each morning; students will assist with taking metamorphic measurements of any mammals captured. They will also complete standard searches around the edge of river and wetland areas for amphibians and reptiles.

■ **Birds:** The bird team will be leaving at dawn and walking the long transect sample routes that traverse the valleys either side of the village. They will complete point count surveys at 500m intervals en route, looking for sightings and listening for calls of the wide range of birds found in the area. The bird assemblage includes an abundance of woodpeckers, shrikes, warblers and many birds of prey (such as eagles and hawks). In the evening call-back surveys are also completed for corn crake and owls. There may also be the opportunity to observe and assist with a bird ringing program where species can be seen up close.

■ **Plants:** The plant team will be focusing on 30 target species which are good indicators of grassland types or have medicinal use. Transects will be completed in low, medium and high nature value grasslands along the different sample routes where the presence of different key species will be noted. Because this area contains some of the most diverse grasslands in Europe this project will be a chance to work in a spectacular and rarely seen habitat.

■ **Butterflies:** The butterfly team will be covering the same 50m transects as the plant team, recording the butterflies encountered and using sweep nets to catch and identify the rarer species. Light trapping will be completed for moths in the evenings, with early mornings then spent identifying those species caught.

■ **Bats:** The bat team will be using a number of methods to establish the species present in the area which may include the use of recordable bat detectors, observation of roosting bats and mist netting. To quantify the species present various survey techniques will be used, such as counting bats emerging from roost and using handheld bat detectors on walking transects.

■ **Farms:** The traditional farming methods used in this region play a crucial role in the maintenance of high biodiversity. Part of the monitoring effort therefore includes visiting a number of farms in each village and recording the numbers

of livestock, dates of grassland cutting and type of arable crops grown etc. They will also be gathering data on bear attacks on the livestock and will have a unique opportunity to experience methods of farming which were lost many years ago in most of the world.

The students will also be completing a Transylvanian ecology course comprising the following lectures: Transylvanian landscapes (Saxon history, management and threats to the landscape and farming strategies), sampling techniques (the types of survey methods employed and how certain species can act as indicators), biodiversity in Tarnava Mare (biodiversity and endemism in general terms and specific to the region), classification focusing on the mammals and herpetofauna of the region (amphibians and snakes of Europe, bears, wolves and cats), bird diversity and classification, and conservation strategies in Transylvania (habitats and bird directives, ecotourism and traditional products).



FACILITIES

This Opwall expedition gives students the chance to join a small team which will move between remote villages across the region. Each village is nestled in one of many valleys running north to south and after completing surveys for 5-6 days (in each village) the team will trek up the side of the adjacent valley and down into the next one. Luggage can be transported on an oxcart or by a 4x4 vehicle.

When in the villages, teams will usually be staying in basic campsites, with tents pitched under the fruit trees and where the water in the showers is heated by the sun each day. Meals are locally prepared and the majority of the food on the expedition is baked, grown, or farmed in the same village in which it is consumed. In some villages, volunteers will be able to stay in local guesthouses, which gives a fantastic insight into the Saxon culture and traditions.

It should be noted that on this expedition almost all surveys are conducted on foot. Volunteers can be out in the sun surveying the remote forests, meadows and grasslands for long periods of time each day, in addition to collecting more data during the evenings where possible. Therefore, it is essential to have a reasonable level of fitness.

TRAVEL INFORMATION

The expeditions start on a **Wednesday at 1600hrs** in your first village and finish on a **Tuesday at 1000hrs** in your last village. Groups need to book international flights to arrive in to Targu Mures before 1330hrs on the Tuesday the expedition starts and to depart Targu Mures on the Tuesday the expedition finishes.

The internal transfer package* between Targu Mures 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.

“Thank you so much for such a wonderful experience! My expedition with Operation Wallacea has given me a real passion for conservation, an increased curiosity in the natural world and a greater desire to travel and gain similar experiences.”

Imogen Cripps, University of Cambridge





Printed by
**cupit
print**
www.cupitprint.co.uk



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IMPORTANT NOTE: The details of the expedition programmes described in this brochure are correct at the time of going to print. However, note that you will be joining a real scientific expedition and that on occasion the work carried out on individual projects will differ from that described in order to respond to scientific priorities. Please keep checking our website www.opwall.com for the most up-to-date information about the expeditions.



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