

TUESDAY 12 DECEMBER 2017

ZSL SCIENCE AND CONSERVATION EVENT

The Meeting Rooms, Zoological Society of London,
Regent's Park, London NW1 4RY

AGENDA

Can we still save coral reefs and what if we don't?

Chair: Matthew Hatchwell, Director of Conservation, ZSL

Receive the following communications:

Charles Sheppard OBE, Professor Emeritus, University of Warwick
Coral reefs: effects of climate change on their continued functioning

John Turner, Bangor University, and Rachel Jones, ZSL
Coral reef condition in the Chagos Archipelago;
Monitoring for BIOT's management needs, and reef change and resilience research

Anne Sheppard, University of Warwick
What will we lose when the coral reefs are gone?

**David Obura, CORDIO East Africa & Chair: IUCN SSC Coral Specialist Group,
and Paul Pearce-Kelly, ZSL**
Coral threat assessment progress and conservation initiatives

ABSTRACTS

Can we still save coral reefs and what if we don't?

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The Meeting Rooms, The Zoological Society of London, Regent's Park, London NW1 4RY

Coral reefs: effects of climate change on their continued functioning

Charles Sheppard OBE, Professor Emeritus, University of Warwick

Coral reefs cover less than 1% of the world's oceans, but support about a quarter of all marine species. They are the habitat with greatest diversity, they support a billion people, including some of the poorest in the world, and they protect thousands of miles of shorelines, most notably low-lying island states. This presentation focuses on the UK's Chagos Archipelago, where I and numerous colleagues have researched for many years. Being a UK Territory, this makes us one of the most coral-rich countries of the world, and indeed, this archipelago contains the UK's highest marine species diversity.

But, reefs have been suffering greatly and will become the first marine habitat to become functionally extinct on this planet. Indeed many reefs already are – this is not only something predicted for the future. Many impacts, often of local origin, such as sewage, agricultural or industrial pollution, or fishing, have destroyed reefs. Chagos has experienced none of these impacts because it is a giant Marine Reserve and is uninhabited, but it is being affected by climate change, and today is in a much degraded state. It may recover... or it may not. This presentation shows what is happening to the UK's largest reef system, and discusses the likely, predicted consequence.

Charles Sheppard has been researching marine habitats for 40 years, especially coral reefs and other tropical habitats, and in particular, the effects of man upon them. His work was recognised in 2015 as being one of the 'Top 20 most impressive examples of UK research contributing to global development' by a group of 14 UK government bodies, (selected from the 7,000 UK scientists submitted in university assessment exercise). Charles has been editor of the journal *Marine Pollution Bulletin* for much of this time, and is now *Editor of Advances in Marine Biology*. He has written 250 papers and articles, and about 12 books (written or edited). He has been on advisory panels for EU, Arabian and UK grant bodies (marine science), was a review member of the Intergovernmental Panel for Climate Change from 2004, and has been the Advisor on environmental matters to the Commissioner of UK Overseas Territories. In 2014 Charles was awarded the OBE for services for the latter. Most especially, he, with his wife Anne, a photographer and marine biologist, enjoys diving and researching coral reefs.

Coral reef condition in the Chagos Archipelago; Monitoring for BIOT's management needs, and reef change and resilience research

John Turner, Bangor University, and Rachel Jones, ZSL

Britain aims to create a 'Blue belt' of the world's largest marine protected areas around our Overseas Territories, thus improving scientific understanding of the marine environment to ensure evidence-based, sustainable and long-term management strategies. The uninhabited islands and surrounding coral reefs of the Chagos Archipelago in the British Indian Ocean Territory provide an important bench mark for understanding the functioning of coral reefs and observing the effects of climate change and response of coral reefs in the absence of direct human impacts. Building on previous research funded by the Overseas Territories Environment Fund and DEFRA's Darwin Initiative, current and future research is being supported by the Bertarelli Foundation Programme in Marine Science. The next four years will see the most intensive research initiative ever undertaken in the Chagos Archipelago involving more than 50 scientists from 14 institutions across the world, in order to inform government on how to monitor and enforce the Marine Protected Area. These remote reefs have been impacted by coral diseases and ocean warming induced bleaching between 2014 and 2016, causing significant coral mortality and consequent erosion. This research will assess the changing structure of the living coral canopy as a three dimensional habitat by measuring biomass, diversity, coral cover, reef calcification and growth, and regeneration. Coral reef structure influences other reef flora and fauna and there are connections between deep water, open water, shallow lagoon and island ecosystems, all of which will be investigated by a suite of projects within the Programme. The vulnerability of different reefs within the Archipelago will be assessed by understanding how exposure and sensitivity to impact is moderated by a reef's adaptive capacity. The aim of management is to reduce stressors and decrease sensitivity to maximise ecosystem persistence in the face of global climate change.

John Turner is a marine biologist working in the field of marine conservation, protection and management. His projects have developed ecosystem based Marine Protected Area systems (e.g., in Cayman Islands), often linking with terrestrial systems (e.g., Socotra) and the effects of climate change (coral bleaching, coastal protection in various Indian Ocean island states including BIOT). He has introduced practices of monitoring and adaptive management in Environmental Impact Assessment (e.g., for waste water, Mauritius) and developed and implemented baseline survey methods for the sustainable use of marine biodiversity (e.g., Socotra and Andaman Islands). He developed an international Master's course in Marine Environmental Protection, and is Dean of Postgraduate Research at Bangor University.

Rachel Jones has worked for ZSL for 20 years, for most of that time in London Zoo's aquarium collecting and caring for the country's largest collection of live coral. Rachel has had a long relationship with the British Indian Ocean Territory since first going there in 2006. She was actively involved in the campaign to have it declared a marine reserve in 2010 and has been fascinated by it ever since. Since January this year she has been the project manager for the Bertarelli Programme in Marine Science.

What will we lose when the coral reefs are gone?

Anne Sheppard, University of Warwick

Coral reefs are a wonderful, rich and diverse ecosystem that is under serious threat from human effects, primarily from climate change. They feed a billion people, protect the tropical coastlines and

provide homes and income for the millions of people in many countries that depend on them. The national economies of many governments also depend on them. As the reefs die and are eroded away, what are the implications for all of us? What are the effects of the loss of coral reefs, what will we lose, will we survive and can we do anything about it anyway? This presentation illustrates how these factors are important, in particular the recently understood services provided by shore protection and food provision, which show that coral reefs provide about one third of a million dollars per hectare per year to the global economy. This is the value which we would have to replace by some artificial means every time a reef is functionally killed off. Finally this presentation will illustrate some of the most effective things that we, as individuals rather than governments, might do.

Anne Sheppard has worked in marine science for 40 years, primarily in the field of taxonomy and coral reef ecology. She has also taken many underwater photographs, using them to illustrate the beauty and problems of coral reefs, and she wrote the book *Coral Reefs: Secret Cities of the Seas* for the Natural History Museum for their special coral reef exhibit, which included many of the photographs she has taken over the years. She has been a co-author of several research papers and coral taxonomy works, the most recent being the online Coral Identification guide to *Corals of Chagos*, for which she again supplied most of the images.

Coral threat assessment progress and conservation initiatives

David Obura, CORDIO East Africa & Chair: IUCN SSC Coral Specialist Group, and Paul Pearce-Kelly, ZSL

As detailed in the preceding talks, the severe environmental threats facing coral reef ecosystems and their reliant biodiversity is the most urgent conservation challenge facing humanity. A vitally important action for meeting this challenge is to ensure that formal species and ecosystem-level threat assessments are as accurate and effective as possible in order to catalyse sufficiently robust conservation action. This talk will summarise the coral assessment challenges and progress to date, including regional reviews and IUCN Red List of Threatened Species and Ecosystems initiatives. How current conservation policy measures up to our understanding of threat realities will also be discussed.

David Obura is a Director of CORDIO East Africa, a research organization focused on coral reef and marine systems in the Western Indian Ocean. His primary research is on coral reef resilience, climate change, and the biogeography of Indian Ocean corals. This work provides a platform for contributing to regional scale marine management in the Northern Mozambique Channel and in relation to sustainable development principles. He chairs the IUCN Coral Specialist Group and is spearheading parallel initiatives to strengthen global coral reef monitoring and compiling a global assessment of coral and coral reef vulnerability.

Paul Pearce-Kelly specialises in the development and management of species conservation programmes. This has included Polynesian tree snails, Seychelle's Frigate beetles and a wide range of native invertebrate species recovery programmes. His research interests focus on demographic and genetic management of group-living species; insect monitoring programmes and the evaluation of climate change impacts on species and ecosystems. In this last capacity, he chairs the World Association of Zoos and aquariums Climate Change Task Force and is Horizon Scanning Work Theme Leader for IUCN's Climate Change Specialist Group.

FORTHCOMING SCIENCE AND CONSERVATION EVENTS

www.zsl.org/science/whats-on

Collaborating for conservation in China

Tuesday 13 February 2018, 6pm - 7.45pm

ZSL Science and Conservation Event

China is a vast 'megadiverse' country that contains over 10% of global mammal species and a wide range of ecosystems. However it is experiencing a loss of natural habitats due to recent economic growth. This event will present the range of conservation projects being delivered by multiple organisations to protect China's unique biodiversity.



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FIND OUT MORE

www.zsl.org/science/whats-on/collaborating-for-conservation-in-china

Safeguarding space for nature, securing our future: developing a post-2020 strategy

27-28 February 2018

Symposium

An international science-policy symposium to support negotiations on the Convention on Biological Diversity's post-2020 strategy and the 2030 Agenda for Sustainable Development



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BOOK TICKETS

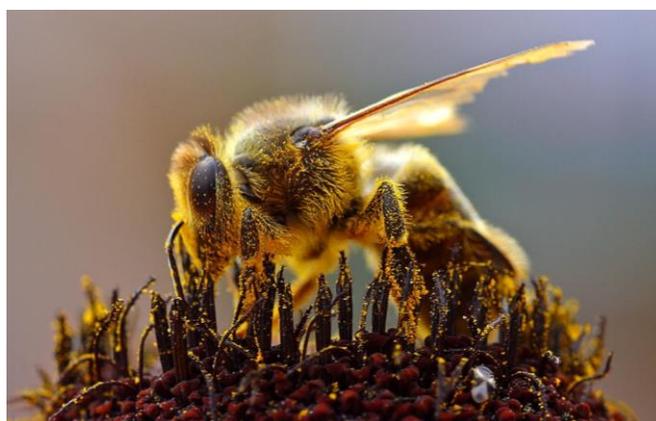
<http://www.zsl.org/spacefornaturesymposium>

Ecosystems under the microscope: why microbes matter

Tuesday 13 March 2018, 6pm - 7.45pm

ZSL Science and Conservation Event

Microscopic organisms are found everywhere on Earth: in soils, oceans, and living in association with animal and plant hosts. This event will explore how understanding these complex microbial communities, known as the 'microbiome', reveals how they play an essential role in maintaining the health of both individual species and entire ecosystems.



FIND OUT MORE

www.zsl.org/science/whats-on/ecosystems-under-the-microscope-why-microbes-matter-for-conservation