ZSL SCIENCE AND CONSERVATION EVENT

Tuesday 12 February 2019

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

AGENDA

How electronic animal tracking has revolutionised marine conservation

Chaired by Dr David Curnick
Zoological Society of London

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Receive the following communications

Dr Matthew Witt, University of Exeter
Highly migratory species and pelagic longline fisheries: conserving leatherback turtles in the Atlantic Ocean

Dr David Jacoby, Zoological Society of London
Technological networks in elasmobranch conservation and Marine Protected Area (MPA) management

Dr Nicole Esteban, Swansea University
Satellite tracking of hawksbill and green turtles to inform marine conservation

Dr Henri Weimerskirch, Centre d'Etudes Biologiques de Chizé (CEBC) - Le Centre national de la recherche scientifique (CNRS)
Albatrosses as Ocean Sentinels of fishing activities

ABSTRACTS

How electronic animal tracking has revolutionised marine conservation

Highly migratory species and pelagic longline fisheries: conserving leatherback turtles in the Atlantic Ocean

Dr Matthew Witt, University of Exeter

Large oceanic migrants play important roles in marine ecosystems, yet many species are of conservation concern as a result of anthropogenic threats, of which incidental capture by fisheries is frequently identified. The last large populations of the leatherback turtle, *Dermochelys coriacea*, occur in the Atlantic Ocean, but interactions with industrial fisheries could jeopardise recent positive population trends, making bycatch mitigation a priority. Here, using satellite tracking technologies and a multi-partner collaboration, we perform a pan-Atlantic analysis of spatio-temporal distribution of the leatherback turtle and ascertain overlap with longline fishing effort. Data suggest that the Atlantic likely consists of two regional management units: northern and southern (the latter including turtles breeding in South Africa). Although turtles and fisheries show highly diverse distributions, we highlight nine areas of high susceptibility to potential bycatch (four in the northern Atlantic and five in the southern/equatorial Atlantic) that are worthy of further targeted investigation and mitigation. We demonstrate how animal tracking, along with collaborative working, data sharing and data on relevant threats, can help improve information for conservation management.

Dr Matthew Witt is a marine scientist and conservation biologist working to improve stewardship of the marine environment. His research at the University of Exeter focuses on animal habitat-use and human-wildlife conflict. He uses a variety of remote technologies to help in his research, including satellite tracking and remote deployable video systems. His research places a strong emphasis on data visualisation, spatial ecology and satellite remote sensing to improve capacity to manage human activities at sea. He has worked on a range of marine species in the Atlantic Ocean and Mediterranean Sea, including basking sharks, leatherback turtles and Atlantic bluefin.

Technological networks in elasmobranch conservation and Marine Protected Area (MPA) management

Dr David Jacoby, Zoological Society of London

Marine tracking technologies are beginning to get smaller, lighter and more powerful and there is now a dizzying array of products available to track individual movements and behaviour at a variety of spatial and temporal scales. New low cost, open source software and hardware are becoming increasingly more abundant, driving down the cost of technology-based conservation research. For those very well-established technologies such as acoustic tracking, the methods have changed very little, yet there are new ways in which we can explore and analyse the data that can reveal important ecological patterns for species conservation. Focusing on multiple species, I will discuss the power of using network theory to understand the behaviour of sharks tracked inside acoustic receiver arrays. Specifically, what ecological functions they serve, how they connect different locations and how this information can be used to facilitate the enforcement of Marine Protected Areas.

Dr David Jacoby is a marine and behavioural ecologist with a keen interest in the connectivity of animal populations and the application of network theory to their movements and social interactions. David has 14 years' experience in tracking sharks and rays to understand both the behavioural motivation of individuals and the pressures facing shark populations at the local and global scale. He has a BSc in Zoology from Leeds, an MRes in Marine Biology from Plymouth and a PhD in shark ecology from the University of Exeter. David has been based at ZSL's Institute of Zoology for 5 years where he is now a Research Fellow working predominantly in the British Indian Ocean Territory on reef sharks, illegal fishing and MPA enforcement as part of the Bertarelli Program in Marine Science.

Satellite tracking of hawksbill and green turtles to inform marine conservation
Dr Nicole Esteban, Swansea University

The conservation status of sea turtles has been of concern for many years due to targeted harvesting (for food and jewellery trade), coastal development and fisheries bycatch. Satellite tags have been used to track the movements of sea turtles from their nesting beaches since the early 1980s, providing movement data to inform conservation policy development. Since then, thousands of satellite tags have been attached to turtles at both their breeding and foraging grounds. In comparison to other marine taxa, satellite tracking of sea turtles is relatively easy: tags are attached to shells during nesting emergences and successive locations are transmitted to satellites when turtles surface to breathe.

This presentation will highlight results from early satellite tracking studies carried out in the Eastern Caribbean and will then focus on the Chagos Archipelago in the British Indian Ocean Territory (BIOT). BIOT hosts one of the world's largest marine protected areas (MPA), and some of the most remote and pristine tropical marine ecosystems anywhere. During 2012-2017, 23 post-nesting green turtles (*Chelonia mydas*) were satellite tracked using Fastloc-GPS telemetry and migrated to foraging grounds ranging in distance between 75 and 4,000 km. Five of the green turtles settled within the BIOT MPA and provided evidence of extensive seagrass meadows in the Chagos Archipelago. In 2018, we attached satellite tags to post-nesting hawksbill turtles (*Eretmochelys imbricata*) for the first time in BIOT and are just now learning that all 5 tagged turtles have migrated to areas that are fully protected by the BIOT MPA. The presentation will incorporate examples of how sea turtle satellite tracking locations can be analysed to increase our understanding of fine- and large-scale movement of sea turtles, learn more about their associated habitats and inform marine conservation.

Dr Nicole Esteban is a marine ecologist focusing on tropical marine ecosystems, with 20 years' experience of working in coastal zone management with research institutes, NGOs and government agencies in the UK and overseas in the Caribbean, Red Sea and Indian Ocean. Nicole has a BSc in Marine Biology from Swansea University, MSc in Tropical Coastal Management from Newcastle University and PhD in sea turtle ecology from Swansea University. Nicole spent 8 years managing a Caribbean marine and terrestrial protected area and is currently a Research Fellow at Swansea University with ongoing research projects including sea turtle conservation research in the British Indian Ocean Territory.

Albatrosses as Ocean Sentinels of fishing activities

Dr Henri Weimerskirch, Centre d'Etudes Biologiques de Chizé (CEBC) - Le Centre national de la recherche scientifique (CNRS)

Seabirds, especially albatrosses, are threatened by the development of fisheries operating worldwide over nation's Economic Exclusive Zones (EEZ), as well as over international waters. Information on the location of fishing is rarely known, particularly in international waters, yet it is critical. In many oceanic sectors, non-declared and illegal fisheries are negatively affecting ecosystems through overexploitation and bycatch of non-target species, such as albatrosses. Therefore knowledge about the distribution of fishing boats is fundamental not only for the regulation of fishing activities, but also for the conservation of the oceans. Over the past 20 years, bio-logging has allowed us to improve the conservation of seabirds by providing critical information on their distribution. During the last 3 years we have developed a new concept of ocean surveillance through the Ocean Sentinel Programme, funded by the European Research Council (ERC). The programme is based on new bio-logging technologies fitted on albatrosses, which couple GPS, radar detectors and Argos transmission. This enables us to detect and locate radar emissions of fishing boats, instantaneously transmit the location of vessels to a receiving site, and inform authorities in case of illegal fishing. By deploying these loggers on a large number of albatrosses from the Crozet Islands, the Kerguelen Islands, and Amsterdam Island, we are in a position to locate most fishing boats – both legal and non-declared – over a significant area of the western Indian Ocean. The project is being carried out between November 2018 and April 2019, after which the first results will be presented. Ocean Sentinel should lead to further discoveries on the relationship between seabirds and fisheries, as well on the extent of fisheries in zones where surveillance by conventional methods is not possible.

Dr Henri Weimerskirch is the Director of Research at CNRS and Head of the Marine Predator Group at the Chizé CNRS Lab. He has worked for 40 years on seabird ecology, with albatrosses being one of the main focuses of his research. He works on the demography and foraging ecology of seabirds, and on the conservation of albatross and petrels that are threatened by long line fishing, especially in the Southern Ocean. As part of his programme in the French Southern Territories, where they have monitored albatross populations annually for more than 50 years, he has developed this concept of "Ocean Sentinel" with the help of two European Research Council programmes.

Join us at our next event

Can we find better ways to live with wildlife?
Tuesday 12 March 2019, 6:00pm – 7:45pm

Using real-world examples, leading experts will untangle the complex relationship between humans and wildlife, and how conservation practice can sometimes interfere. Often, what appears to be direct conflict with wildlife may reflect clashes between different groups of people with competing interests. Find out how different world views can be integrated into the decision-making process of governing natural resources in order to mitigate these conflicts.

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https://www.zsl.org/science/whats-on/can-we-find-better-ways-to-live-with-wildlife