Symposium

ZOOLOGICAL SOCIETY OF LONDON
REGENTS PARK, LONDON, NW1 4RY

ZSL
LET'S WORK FOR WILDLIFE

29 April 2016

Space - the final frontier for biodiversity monitoring?

ABSTRACTS

SPEAKER BIOGRAPHIES

POSTER ABSTRACTS

DELEGATE LIST

#RSConservation

measurements of tropical forests made using laser scanning can provide unique estimates of tree size and shape, forest biomass and other properties that are very hard to measure in other ways. I will show how these measurements are changing the way we can view and assess forest structure, allow us to address key uncertainties in our understanding of forest carbon stocks, and exploit new satellite observations of forests which will become available in the near future.

12.45 LUNCH

SESSION 3: Unveiling what the future holds for satellite remote sensing and biodiversity monitoring
Chair: Doreen Boyd, University of Nottingham, UK

14.00 Introducing the concept of satellite remote sensing Essential Biodiversity Variables
Nathalie Pettorelli, Zoological Society of London, UK

Although satellite-based variables have for long been expected to be key components to a unified and global biodiversity monitoring strategy, a definitive and agreed list of these variables still remains elusive. The growth of interest in biodiversity variables observable from space has been partly underpinned by the development of the essential biodiversity variable (EBV) framework by the Group on Earth Observations – Biodiversity Observation Network, which itself was guided by the process of identifying essential climate variables. This contribution will introduce a set of principles that are believed to be necessary if ecologists and space agencies are to agree on a list of EBVs that can be routinely monitored from space. Progress toward the identification of such a list will require a clear understanding of what makes a biodiversity variable essential, as well as agreement on who the users of these variables are. Technological and algorithmic developments are rapidly expanding the set of opportunities for satellite remote sensing in monitoring biodiversity, and so the list of EBVs that can be monitored from space is likely to evolve over time. This means that a clear and common platform for data providers, ecologists, environmental managers, policy makers and remote sensing experts to interact and share ideas needs to be identified to support long-term coordinated actions. Ultimately, EBVs represent only one of the frameworks put forward for prioritizing monitoring needs in the face of biodiversity loss. Identifying priorities for global product development based on satellite remote sensing data and relevant to biodiversity conservation is urgently needed for the potential of SRS information to support conservation to be reached, and this discussion requires all segments of the relevant scientific community to be consulted and engaged.

14.30 Biodiversity from space: pitfalls in measuring community diversity from outside the Earth
Duccio Rocchini, Fondazione Edmund Mach, Italy

Field based biodiversity monitoring presents a number of issues, mainly related to time and cost efficiency, beside the difficulty to guarantee a robust sampling design. In this view, remote sensing represents a powerful approach to predict species richness (alpha-diversity) and species community turnover (beta-diversity). In fact, it is expected that a higher spatial and ecological variability is related to a higher number of available niches, thus leading to a direct connection

between remotely sensed heterogeneity and species diversity. Measuring ecological variability from remotely sensed images over space and time becomes crucial to gather effective indicators of biodiversity from space. However, the devil is in the detail. Once using remote sensing to predict biodiversity at different spatial scales and in different habitat types, pitfalls might arise.

The aim of this talk is to ascertain potentials and pitfalls of monitoring alpha- and beta-diversity from space.

15.00 **Satellite remote sensing and the IUCN Red List of Ecosystems**
Emily Nicholson, Deakin University, Australia

The current suite of global conservation goals and targets demand a method for monitoring the changing state of ecosystems. Recent advances in risk assessment protocols for ecosystems are a promising solution for this gap. One such protocol is the IUCN Red List of Ecosystems, adopted by the IUCN as the global standard in 2014, with the ambitious aim of assessing all the world's ecosystems by 2025. Ecosystem risk assessments synthesize a wide range of data types and sources from remote sensing, long-term environmental monitoring and ecosystem models to understand the likelihood of ecosystem collapse. Given the patchiness (both spatially and temporally) of field-data, satellite remote sensing data can play a critical role in the definition of ecosystem types, evaluating their distribution and change in distribution, and in assessing degradation and change in ecological function. In this talk we outline the role of remote sensing data in ecosystem risk assessment, focussing on the IUCN Red List of Ecosystems. We present recent examples where remote sensing data have informed assessments, and future directions and opportunities. Given the paucity of indicators for assessing progress against conservation targets at the ecosystem level, global expansion of ecosystem risk assessments such as the IUCN Red List of Ecosystems will enhance our capacity to measure and address the current trajectory of biodiversity globally.

Co-authors: Nick Murray (University of New South Wales, Australia), Lucie Bland (University of Melbourne, Australia), JP Rodriguez (IUCN, IVIC & Provita, Venezuela) and David Keith (University of New South Wales, Australia)

15.30 **Ocean remote sensing for modelling and monitoring marine autotrophic biodiversity**
Shovonlal Roy, University of Reading, UK

The microscopic autotrophs in the upper ocean are responsible for almost half of the annual global carbon fixation, and are the basis of marine food webs. However, an accurate estimation of the biomass stocks and biodiversity of these species on a global scale is a non-trivial task. This presentation will deal with some recent developments towards this direction. It will include some recently developed methods and models to use ocean colour remote sensing for understanding and monitoring the size-based community structure of marine autotrophic phytoplankton. It will also deal with certain approaches for minimizing the uncertainties in remote-sensing based estimates, particularly, for phytoplankton community structure. These approaches will provide independent estimates of biomass and biodiversity of marine autotrophs from space using remote sensing, which are potentially important for understanding and monitoring the dynamics and diversity of marine ecosystems.