

**ANNUAL RESEARCH SEMINAR
SATURDAY 2nd DECEMBER 2017**

Venue: Slapton Village Hall
Chair: Claire Fowler, Field Studies Council

Abstracts

Session 1: Birds and Invertebrates

Barn Owls in South Devon

David Ramsden MBE, Head of Conservation, Barn Owl Trust

Imagine how South Devon used to look. Small lightly grazed fields of long grass with countless wild flowers, bees and butterflies, interspersed with equally small crop fields with colourful 'weeds'. A landscape where numerous Barn Owls found food and places to nest. Now imagine that Barn Owls are an invasive species and you wanted to get rid of them, what would you do?

First, get rid of all that prey-rich long grass. Graze it off, spray it, plough it up. Make the fields unsuitable for small mammals. Rip out hedges. Poison the rats they hunt for around farm buildings. Convert the barns they live in. Erect cables for them to fly into. Provide steep-sided cattle troughs for them to bathe and drown in. And finally, create long strips of prey-rich rough grass right across the landscape and send lorries along them at 70mph. In 2008 two local broods of Barn Owls were radio tagged (n=5) as part of a wider scientific study. Their dispersal was tracked as they moved across South Devon trying out different sites. One died on the A38, one was predated, and three were still alive at the end of the study. Their stories provide an insight into the challenges faced by Barn Owls today.

The birds of Slapton Ley: 40 years on

Graham Burton, Field Studies Council

40 years ago Burton and Mercer published a paper in the FSC journal, *Field Studies*, on the Birds of Slapton Ley. In this presentation, I will look at that paper and discuss the changes to the status of key species - those that have left, those that have arrived and perhaps changes that may happen in future. Are the most important factors agricultural developments, climate change or other influences yet to be assessed?

The invertebrates of Slapton Ley National Nature Reserve

Rachel Clark, Natural History Museum

In July 2014 a field trip to Slapton Ley National Nature Reserve (NNR) was organised, funded and undertaken by the Natural History Museum, London (NHM). The main objective for the Museum was to acquire tissue samples from UK invertebrates for the Molecular Collections Facilities (MCF). All tissue samples collected were the first UK terrestrial invertebrate samples for the MCF which opened in 2012, with the voucher specimens being housed in the main collections of the relevant departments in the NHM. The groups include; Araneae, Diptera, Hymenoptera, Lepidoptera, Opiliones and Orthoptera. We also collected to increase the collection's diversity of under-represented

species, which are to be housed in the main collections of the relevant departments at the NHM. Our paper published in the Field Studies Journal 'Invertebrates of Slapton Ley National Nature Reserve (FSC) and Prawle Point (National Trust)' (in press, Sept 2017) is one of the few pieces of literature on the diversity of Slapton Ley's invertebrates. The last generalised sampling and publication was the Invertebrate Site Register in 1987 by the Nature Conservancy Council (now Natural England). The paper represents over seventy species including five notable species, *Euplagia quadripunctaria* (Lepidoptera), *Goedartia alboguttata* (Hymenoptera), *Eurcera longicornis* (Hymenoptera), *Ectobius panzer* (Blattodea) and *Platycleis albopunctata* (Orthoptera).

All of our species records are accessible via the National Biodiversity Network (NBN) <https://nbnatlas.org/>. Details of our molecular collection can be obtained via the NHM Data Portal <http://data.nhm.ac.uk/>.

Session 2: Invasive Species and Citizen Science

Slowing the spread of Invasive Non-Native Species: Best practice and stakeholder engagement
Cat Shamon, Leeds University

Biological invasions have been recognised as the one of the greatest threats, after habitat loss, to biodiversity globally. Non-native species (also called alien species) are species moved (intentionally or unintentionally) through human activity outside their natural distribution into novel terrestrial, freshwater and marine environments. Currently there are over 2000 established non-native species in the UK, but only 10-15% that become established cause significant adverse effects on the environment, economy and society. Non-native species that have negative ecological, economic or social impacts in their novel range are termed invasive non-native species (INNS). Accidental introduction and/or spread of INNS can result from a range of activities including agriculture, transport, trade, recreation and research. INNS have the potential to survive on equipment and/or footwear for up to 16 days in damp conditions and can therefore be accidentally transported to new locations. Biosecurity measures cover all activities aimed at preventing the introduction and/or spread of INNS and can involve simple practices such as employing cleaning measures. Therefore, biosecurity is key to preventing the introduction and spread of INNS. Better biosecurity aims to raise awareness about INNS and the risks posed by various activities in the field. Training also aims to improve the behaviour of individuals undertaking activities in the natural environment, and ultimately reduce the risk of accidentally spreading INNS.

Westcountry CSI – Citizen Science Investigations: river survey and water quality monitoring
Rosie Lear, Westcountry Rivers Trust

Westcountry CSI is a scheme where volunteers can carry out brief surveys of rivers and streams around them – each one should only take a few minutes, and requires little or no training. There is a survey form which aims to capture information on plants, wildlife, river condition and any visible pollution, and regular contributors will then qualify for a water quality testing kit comprising tests for turbidity, dissolved solids (using electrical conductivity) and phosphate. Volunteers are asked to complete surveys in the field and upload data and photographs to a website via an online version of the survey form. Data can then be viewed by volunteers using an interactive online map.

This talk will explain what Westcountry CSI is all about and what we hope to achieve with the scheme. It will include a look at the survey form, data upload site and interactive map-based visualisation and some examples of how Westcountry Rivers Trust are using the data collected by over 100 volunteers that have signed up to take part.

Ocean Literacy – What's it all about?

Fiona Crouch, Marine Biological Association, Plymouth

Ocean Literacy (OL) means 'An understanding of the Ocean's influence on you – and your influence on the Ocean. The concept is made up of 7 principles which were developed by hundreds of scientists and educators in the United States in reaction to the lack of ocean content in school curricula; work which began back in 2006. Since that time the Ocean Literacy movement has grown and is increasingly being used across the globe to support marine education initiatives.

In Europe the Commission provided funding under the H2020 programme to develop OL in Europe through two projects: Sea Change and ResponSEABLE. The former is coordinated by the Marine Biological Association. Since the project began in 2015 the consortium has produced a plethora of resources to support OL around the topic of Ocean Health, Human Health and has provided a catalyst for other initiatives. This presentation will explain the Ocean Literacy Framework, the work of Sea Change, OL evaluation being conducted by the Field Studies Council and future International initiatives.

Encounters at the zoo: The role of emotions in contributing to the wildlife conservation mission

Susan Warren, University of Exeter / Whitley Wildlife Conservation Trust

Today zoos position themselves as centres for wildlife conservation. Central to this role is engaging visitors, through which zoos aim to increase awareness of the challenges to wildlife, and to secure changes in visitor behaviour in support of wildlife and nature conservation. To date zoos have utilised community based social marketing as the predominant approach to deliver such behavioural changes. This is reflective of the wider framework for addressing environmental challenges, where a predictive approach to behaviour change has provided the dominant paradigm within neo-liberal governance agendas. However the limitations of such an approach in effectively tackling environmental problems has led environmental social scientists to develop alternative conceptualisations of behaviour change, which engage more richly with the emotional dimension of decision making. The multi-sensory zoo experience has the power to elicit a range of emotional responses. Through enabling close-up encounters between human and non-human, often exotic animals, I argue that the zoo provides a rich environment in which to explore the utility of the emotional dimension in relation to environmental attitudes and behaviours. Applying an ethnographic approach to explore the lived experience of a visit to the zoo, I am exploring the emotional landscape of the zoo experience with a range of visitors, and the meaning of these emotional encounters on visitors' relationships to wildlife.

Restoration of Lost Species

Derek Gow, independent consultant

The restoration of lost species as an aspect of potential rewilding projects in Britain has become a hotly debated topic. No strategic overview has been applied to a myriad of proposals which are therefore commonly driven by emotion rather than structured logic or need. Commonly simplistic efforts to have been opposed by other land use groups without sufficient effort having been made to prepare their way. Dialogue between organisations has commonly been poor and areas of surprising opposition to novel restorations have proved on occasion to be more problematic than expected. This presentation will examine the hurdles to effective restoration projects gained for a broad kaleidoscope of restoration projects.

Embayment dynamics using multi-method surveys - an assessment of seasonal to decadal barrier response to a variable bi-modal wave climate

Tim Scott, Plymouth University

Full embayment sediment budgets calculated over a five-year period quantify the response and recovery of a semi-sheltered gravel barrier to the variance of its bi-directional wave climate. Multi-method morphodynamic surveys (LiDAR, UAV, GPS and multibeam bathymetry) highlight the spatial and temporal redistribution of beach sediment, spanning the sub-aerial to sub-tidal shore face. Thorough assessment of instrument uncertainties allows total sediment budgets within the embayment to be calculated with associated errors. 642,000 m³ ($\pm 10\%$ error) of gravel was transported between 2013-2016 under predominantly southerly wave conditions, with only 290,000 m³ ($\pm 16\%$ error) between 2016-2017 under increased easterly waves. In both epochs, sediment within the entire embayment was balanced, with no significant net change, confirming previous consensus of a closed sediment cell; however, headland bypassing within the study site is evidenced through the net imbalance of volume change within individual sub-embayments, as well as significant sub-tidal elevation change around headlands. Current trends in intertidal beach profiles show the embayment gradually rotating northward in the last 11 years, with an underlying decrease in easterly wave events, reducing contributions of southward sediment transport. Modelled wave data from 1980 to 2016 (WaveWatch III) discovered a significant negative correlation ($r = -0.64$; $p = 0.0000$) between the North Atlantic Oscillation index and the occurrence of easterly winter waves at this location. The recent Western Europe Pressure Anomaly climate index was significantly and positively correlated ($r = 0.84$; $p = 0.0000$) with southerly wave contributions and significant wave height. Multi-decadal variations in both climate indices, calibrated with previous orientations of the shoreline, suggest that future predictions of the embayment morphology may be possible, providing valuable insights for shoreline planning, erosion and flood risk management.

Marine Litter: The Plastic Problem

Sarah Nelms, University of Exeter

Growing evidence suggests that anthropogenic litter, particularly plastic, represents a highly pervasive and persistent threat to global marine ecosystems. Multinational research is progressing to characterise its sources, distribution and abundance so that interventions aimed at reducing future inputs and clearing extant litter can be developed. Here, we discuss two elements of our marine litter research. Firstly, citizen science projects, whereby members of the public gather information, offer a low-cost method of collecting large volumes of data with considerable temporal and spatial coverage. Furthermore, such projects raise awareness of environmental issues and can lead to positive changes in behaviours and attitudes. We present data collected over a decade (2005-2014 inclusive) by Marine Conservation Society (MCS) volunteers during beach litter surveys carried along the British coastline, with the aim of increasing knowledge on the composition, spatial distribution and temporal trends of coastal debris. Secondly, ingestion of plastic by marine mammals has been documented in a range of taxa, including cetaceans, pinnipeds and sirenians. Yet the number of studies investigating the presence of microplastics (plastic particles $<5\text{mm}$ in size) in these animals is low and those that do, generally examine only one or two individuals. Though less conspicuous than larger plastic debris, microplastics are ubiquitous within the marine environment and their presence throughout the global ocean is of equal concern. Here, we report on the abundance, distribution, type and colour of microplastics found within the digestive tracts of a range of marine mammal species (including phocid seals, porpoises, dolphins and toothed whales; $n = 50$ individuals) stranded around the UK coastline during 2011 – 2017.