Following a bird's life at sea

October 8 2012, by Pete Wilton

Manx Shearwaters at sea. Credit: Ben Dean

Studying land-based birds is tough enough, but studying seabirds that spend much of their time over, on, or under water presents a new set of challenges.

In this week's *Journal of the Royal Society: Interface* a team led by Oxford University scientists describes how new technologies and techniques made it possible to follow an important British seabird, the Manx Shearwater.

OxSciBlog asked lead author Ben Dean of Oxford University's Department of Zoology about the study and how the team's findings might help in efforts to conserve shearwaters and other seabirds…

What are the challenges of studying shearwaters?

Manx Shearwaters are elusive seabirds. They visit their breeding colonies only at night and nest underground in burrows where they rear single large chicks. The rest of the time they spend foraging at sea, often travelling hundreds of kilometres in search of food.

Studies at the colony have taught us much about their breeding and parental behaviour, while ship-based surveys have given us an understanding of the overall at-sea distribution of the species, yet we still know relatively little about patterns of behaviour at sea.

Understanding the at-sea behaviour of seabirds such as shearwaters is important because of their vulnerability to changes in the marine environment and their status as indicators of ocean health. But because of their elusive life-style and relatively small size, following individual birds from known colonies and recording detailed behavioural data is difficult.

What technologies did you use to investigate their behaviour?

Advances in miniature data logging technology have revolutionised the remote observation of long-distance movements in seabirds. We deployed three types of miniature bio-logger simultaneously, each collecting different types of behavioural data:

Global Positioning System (GPS) loggers recorded the routes and

movement speeds of foraging birds, saltwater immersion loggers recorded the proportion of time spent on and off the sea, and time-depth recorders logged each dive made in pursuit of prey.

Handling the increasingly complex datasets generated by these technologies is in itself challenging and so we employed a machine learning method to build a detailed picture of the at-sea behaviour and then applied what we had learnt to a large dataset in which we had tracked the movements of shearwaters from different colonies over three years.

How do your results add to what we already knew?

First, we were able to show where and when shearwaters from different colonies engaged in three principal activities at sea: resting on the surface, commuting flight between colonies and foraging areas, and foraging behaviour. This type of information is of high value in conservation planning, particularly with respect to interactions between particular threats and those behaviours that increase risk: for example roosting and surface pollution, commuting flight and wind turbines, or foraging and fisheries.

Second we were able to reveal details of the foraging behaviour of this species, which primarily involves tortuous searching flights over relatively restricted search areas interspersed with frequent landings and take offs and diving in pursuit of prey.

Third we showed that birds from two different colonies in the Irish Sea foraged in local waters that were exclusive, but that birds from both colonies overlapped in one key area: the western Irish Sea and the Irish Sea Front.

Birds breeding at the colony furthest from the front spent more of their

time at sea engaged in commuting flight and less time engaged in foraging activity than birds breeding close to the front. This suggests that birds breeding far from this important foraging area must work harder to locate prey, presumably at a greater cost to their own body condition.

What further research is needed to discover more about the lifestyle of Shearwaters/other seabirds?

Further studies combining detailed data from multiple loggers will allow us to investigate how shearwaters respond to oceanographic features such as fronts, or prey distributions and to understand the kinds of decisions they make when searching for food.

Given that these birds cover such large distances during foraging trips, the analysis of GPS tracks to investigate the mechanisms of navigation and the learning of locations and routes is also likely to uncover interesting facets of seabird behaviour.

The future of seabird research almost certainly lies in multidisciplinary approaches that combine classical field biology with bio-logging, computational biology, molecular and chemical techniques. Such approaches will increasingly reveal ever more fascinating aspects of the elusive lifestyles of seabirds.

More information: rsif.royalsocietypublishing.or … 10/03/rsif.2012.0570%20

Source: Oxford University

https://phys.org/news/2012-10-bird-life-sea.html