

# NCSE Newsletter

## NCSE celebrates its first birthday

NCSE is now a year old.

Staff and students of the Centre have been busy over the last 12 months, recruiting new members, setting up research projects and making excellent progress towards a unified Centre for research in statistical ecology.

This summer NCSE students have been involved in fieldwork in locations as far afield as the Pacific northwest, where Ella Marley-Zagar took part in an ongoing photo-recognition study of resident killer whales, and the Nature Reserve at Nunnerly Lakes, where Vanessa Cave was involved in the British Trust for Ornithology's Constant Effort Site ringing activity. You can read more about their experiences and how this fieldwork is influencing their research projects in this edition of the Newsletter.

Kelly Moyes previously spent a year on the island of Rum as part of her project to study the



*A killer whale breaching during Ella Marley-Zagar's fieldwork trip to the Pacific Northwest © Ella Marley-Zagar*

local red deer colony. Her expertise is currently being put to good use as she assists the BBC with their Autumnwatch programmes, being televised from the island. We will invite Kelly to tell us about her experiences in the next issue of the Newsletter.

To find out who has joined the Centre or moved on to pastures new, take a look at 'Snippets!'

on page 5; here you'll also find information on forthcoming opportunities and seminars.

The next issue of the Newsletter is scheduled for the New Year. Contributions are always welcome, so please start thinking. Photos to illustrate articles are particularly welcome!

## First annual workshop at St Andrews

NCSE had its first annual workshop in St Andrews, May 15-19. Over 40 people attended, mostly from Kent, Cambridge and St Andrews, but also Stephen Baillie and Stephen Freeman from the BTO, Ian Jolliffe from Reading University, John Simmonds and Rob Fryer from the Marine Laboratory at Aberdeen, Paul Blackwell from the University

of Sheffield, and Giacomo Tavecchia from IMEDEA in Italy. Workshop sessions on methods for fitting models of population dynamics to time series of data early in the week were followed by conference-style talks, with a very full and stimulating programme. For light relief, there was an excursion up East Lomond on the Wednesday afternoon.

The second annual workshop is currently being planned for the week beginning Monday 18th June 2007 and will be held in Canterbury.

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### Special points of interest:

- An update on research projects
- NCSE presents a workshop on Bayesian computation for population ecology
- The first annual NCSE workshop is held in St Andrews
- NCSE attendance at the IBC conference
- Arrivals, departures, and appointments
- Forthcoming opportunities
- NCSE seminar—29th November

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## NCSE at IBC in Montreal

The NCSE was very well represented at the International Biometric Conference held at McGill University, Montreal, in July.

In all 8 of us (Kelly Moyes, Ruth King, Len Thomas, Steve Brooks, Daniel Brown, David Miller, Rachel Borysiewicz and Byron Morgan) made the journey, giving a range of contributed and invited talks, as

well as posters.

NCSE co-organised one of the invited paper sessions and the JABES invited session. We were also represented on the editorial advisory committee, the committee of past presidents and the Council meeting of the Society.



**James McGill**  
© Ruth King

## Sika deer in the Scottish Borders

Research interests in the St Andrews group of NCSE are wide-ranging. One of the key topics is the use of Bayesian methods to model population dynamics, and this is the area of most interest to NCSE postdoc Chris Lynam, and the two postgraduate students funded through NCSE, Ella Marley-Zagar and Toby Reynolds.

Chris is developing models for the spatial distribution of sika deer in the Scottish Borders. Japanese sika deer are a naturalised species in mainland Scotland and the population can broadly be divided into two: those deer distributed across the northern and western highlands of Scotland and a separate sub-population located in the Scottish Borders. The Borders population began with the introduction of 18 animals

in 1908 to a single estate, yet sika deer are now found in numerous forests (at least 41) across the counties of Peebles-shire and Tweedsmuir. Sika deer are primarily a woodland species and within this habitat they can become highly productive, reaching high densities. Because sika deer damage trees and hybridize with red deer, they are considered a pest by foresters and conservationists alike. The abundance of sika deer in 41 estates in the Borders was estimated through dung-surveys using line transect methods in the late 1990s and early 2000s. Chris is using them, coupled with prior information on the recruitment, survival and dispersal of deer, to fit state-space models describing the growth and spread of the population from 1908 to 2002. Fitting is achieved using sequential

***“Models developed for the spatial distribution of sika deer will help determine the effectiveness of culling strategies.”***

importance sampling, and Akaike weights are used for model averaging. The objectives are threefold: (i) to estimate the current population size and its likely range; (ii) to forecast any population growth and/or further spread in the sika deer range; and (iii) to determine the effectiveness of particular culling strategies on curtailing any range expansion or population growth.

## Fieldwork with killer whales

Ella Marley-Zagar was invited to the Center of Whale Research in the Pacific northwest for a two-month visit in June and July, to participate in a project run by John Durban, Ken Balcomb, David Ellifrit and Astrid van Ginneken. The primary aim of the research is to continue an ongoing photo-identification study of the resident killer whales. The recent decline in numbers of the southern resident killer whale population has been sufficient for it to be listed as “Endangered” by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), and the key aim of the study was to identify the possible causes of decline. A boat-based population study was carried out, in which each member of the southern residents was identified and recorded, with data on environmental condi-

tions, boat presence, whale movements, associations and behaviour also being documented. Whales returning from their winter period of feeding at sea looked in fairly poor condition, especially the sprouting and adult males, which displayed thinner blubber layers and smaller body sizes than expected. The good news was that three new calves were born this year (taking the population number to 92), with one calf being sighted when only a few hours old. In addition, the oldest member of the population (named K7) was again accounted for this year – she is estimated to have been born in 1910! Ella says that it was a real privilege to be invited to take part in the research conducted at the centre, and to learn so much more about this dynamic and complex population. She is



**Killer whale calf and mother**  
© Ella Marley-Zagar

now using her experience at the centre and the knowledge acquired during her stay to build an age-structured demographic model, in an attempt to identify the factors affecting the population dynamics of the southern-resident killer whales.

## Population regulation in British common guillemots

Toby Reynolds is investigating population regulation in British common guillemots. The common guillemot is the most numerous breeding seabird in Britain and Ireland, with approximately one million pairs recorded during the latest census. Numbers have increased substantially during the last 30 years but the rate of increase is slowing and some of the largest colonies have undergone significant recent declines. Additionally, the last three years have seen widespread breeding failures in many species of seabird, which have been linked to environmental change through a drop in sand eel abundance, which is an important food source. Toby is investigating which mechanisms are leading to apparent population regulation in guillemots and how they might be affected by environmental

change. Possible mechanisms for consideration include reductions in breeding success, in adult survival or in recruitment to the breeding population, and either breeding sites or food might be the limiting resource. Toby is currently building a state-space model of population dynamics for the Isle of May colony (Firth of Forth, Scotland) using long-term data on abundance and demographic rates. A mis-match in the colony growth rate predicted by these two datasets seems to suggest a net emigration of juvenile birds from the island of around 20% per year, which may be useful in explaining the dynamics of neighbouring colonies.



*Guillemots on the Isle of May, taken from the Cornerstone hide*  
© Mike Harris

## Bayesian computation for population ecology

This NERC workshop was held in Cambridge, from 4-8 September 2005. It covered the concepts underlying the Bayesian approach for the analysis of common models from population ecology. The course instructors were Steve Brooks, Olivier Gimenez, Ruth King and Byron Morgan, assisted by David Revell. In the workshop, participants gained practical experience

through computer programs written in WinBUGS. The workshop was oversubscribed, and the final number of attendees was 31. We have been encouraged to give repeats of the workshop, in the USA and New Zealand. A slimmer version of the workshop is planned for the next EURING meeting in New Zealand in January 2007, to be given by Olivier, Chiara and Byron. A

***“NCSE workshop scheduled for January 2007 in New Zealand.”***

book is in preparation.

## First hand experience of mist-netting

As data collected by the BTO under the Constant Effort Site Scheme (CES) is at the core of Vanessa Cave's research project, she thought it would be beneficial to experience at first hand a visit to a CES site. Fortunately she was spared an early morning start (4am!) as her visit to the BTO's headquarters in Thetford coincided with a mist-netting demonstration.

“A CES survey involves capturing birds, during 12 visits that span the summer months, in mist nets at sites throughout the UK. Within sites the mist-netting process is standardized. Ringers standardize the timing and duration of their visits across and within years, and use the same net position, net length and net type each time the site is operated. The BTO's CES site at the Nunnery Lakes Nature Reserve is lo-

cated on a grassy track surrounded by woodland and scrub, and is rich in bird life. The demonstration net when erected was barely visible against the background foliage and, 10 minutes after we'd discretely distanced ourselves, was laden with a dozen or so birds (Greenfinches, Goldfinches, Siskins, Blue Tits, Great Tits and a Tree Creeper). The ringers (you must be expertly trained to be one) painstakingly disentangled the birds from the fine mesh and 'bagged' them. Blue Tits, who are particularly feisty, managed to get themselves into an awful knot, and displayed their displeasure by vigorously pecking the hand trying to free them. Once separately deposited in cotton bags the birds are taken to the 'processing' table where they're weighed, measured and have their species identified. Aging (juvenile or adult) and



***Expert hands release a Bullfinch***  
© Mark Grantham

gender identification is done by examining plumage, and fatness levels ascertained by inspection of the bird's underbelly. Finally the delicate procedure of ringing the bird's leg with a uniquely numbered aluminium ring occurs. The bird is then released, perhaps to be encountered again in future mist nets.”

## “Bird watchers placed on flu-watch” – BBC online headline 11 October 2005



The 3000 volunteers who take part in the Wetland Bird Survey (WeBS) go out to their local wetland once a month, in all weathers, to count birds. They are now being asked to be on the alert for dead birds as well as live ones. The monthly systematic survey of the UK's wetlands means that any cases of highly pathogenic H5N1 avian influenza are more likely to be found quickly than in countries where there isn't such a great tradition of amateur participation in collecting ecological data.

Teresa Frost, based at Kent, didn't imagine when she began her project two years ago that migratory wetland bird data would become quite so topical. WeBS data, consisting of bird counts from all over the UK

from the past 40 years, as well as data from metal-ringing of birds, are being used to inform risk assessment of H5N1 both spreading and arriving at new locations within the UK as a result of wild bird movements – something that is not just of conservation concern, but of serious concern to the poultry industry and the wider public.

It's not easy counting possibly 50 different species in one short session. Wetland birds tend to be easier to see than most terrestrial ones, but they still do awkward things like dive under the water and hide behind islands. Teresa's working in collaboration with ornithologists from the Wildfowl and Wetlands Trust to get as much value as possible out of the data collected so diligently, with the aim of better understanding the population movements of the ducks, geese and swans that spend their winter holidays with us. With the advent of



**Counting wetland birds at Oare Marshes, Kent – the white notice tells birdwatchers who to inform if they see suspicious numbers of dead birds © Teresa Frost**

concern over the possible transmission of H5N1, this knowledge may be even more valuable than previously thought.

## Distance sampling workshops in St Andrews

A series of three distance sampling workshops were held in St Andrews, 23 August-1 September 2006. This is a continuation of a long-standing series of workshops offered by staff members in the Research Unit for Wildlife Population Assessment. Instructors for this year included Steve Buckland, David Borchers, Len Thomas, Louise Burt, Laura Marshall, Tiago Marques, and Eric Rexstad. A total of 37 participants from 17 countries took part in one or more of the courses. Topics discussed in the introduc-

tory and advanced workshops included fundamental distance sampling concepts through modelling detection functions with covariates and double observer distance sampling. New to the course offerings this year was a module on density surface modelling of distance sampling data.

In addition, two workshops were given outside the UK in 2006. In March, Steve Buckland gave a workshop in Saratov (Russia), together with Patrick Osborne

(Southampton), to train participants in line and point transect methods, for application to great bustard surveys. At the end of June, David Borchers and Steve Buckland, together with Rachel Fewster, gave an introduction to distance sampling workshop in Auckland, New Zealand, just prior to the joint conference of the Australian and New Zealand statistical associations.

The series of workshops is scheduled to be held in St Andrews in late August 2007.

## The joy of orchids . . .

David Miller is based at Kent. He's working on modelling the effects of weather and population processes on orchid population dynamics.

“The aim of my PhD is to understand the population dynamics of *himantoglossum hircinum* (lizard orchids) and much of my research will be based on the extensive data set that has been provided by the collaborating body, the Centre of Ecology and Hydrology. It is important to understand the nature of the data and this has been achieved through experiencing field work at Royal St Georges golf course in Sandwich, Kent. The prospect of getting out of the office on a summer's day to spend a day on the golf course looking at the orchid

populations was very appealing...until the day arrived. A bitter wind and torrential rain was far from ideal, but the day did provide a valuable experience in understanding how the data on the orchids is collected. There are three orchid plots on the golf course, each of which is monitored twice yearly. The size and location of each plant is recorded, and in the summer monitoring, measurements of the flowering height and number of seed pods are recorded. Although the plots are only 10m x 10m, there can be up to 300 plants within a single plot and so the process of collecting information about individual plants is very slow. Through recording the co-ordinates of each observed plant, it is possible to track a plant's life history and the ultimate



**Lizard orchid  
© Pete Carey**

aim of my work is to understand the spatial development of orchid populations.”

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NCSE was set up in October 2005 as a joint venture between the Universities of Kent, Cambridge and St Andrews, with funding from the EPSRC. Its objectives include:

- To be a Centre of international repute for the development and application of novel statistical methods in population ecology, integrating the partner Universities' research programmes and activities in statistical ecology.
- To develop novel statistical methodology for the analysis of complex data sets arising in ecology and to apply these methods to a broad collection of topical and important data sets.
- To train PhD and postdoctoral researchers to work as statistical ecologists.
- To develop a computer software system to enable ecologists to use cutting edge statistical methodology on their own data.
- To train end-users in the use of methodology and accompanying software developed by NCSE.
- To build upon and create new collaborations with relevant stakeholders.
- To develop and deliver a programme of workshops and conferences.



## Snippets!

### Welcome to:

Eleni Matechou, a new research student who will divide her time between the statistics group at Kent and the Max Planck Demographic Institute in Rostock in Germany, where she will be supervised by David Thomson. She'll be developing new statistical methods to model age-specific demographic rates, particularly in marked populations.

Joanne Potts, who has just started a PhD in the St Andrews group. She will be developing new methods for estimating abundance of a particularly problematic study species: a threatened population of wood rats on Key Largo. Joanne was previously the sole statistical consultant at the Arthur Rylah Institute for Environmental Research at Melbourne.

Lindesay Scott-Hayward, who has also just started her PhD at St Andrews. Her project will look at methods to address the problems of predicting distributions in regions where there are clearly defined physical limits on where a species can and cannot occur. This work will focus on data from line-transect surveys of cetaceans in enclosed areas, such as the North Sea and Baltic, but will be useful for spatial data of this type in general.

### New appointments:

Colin Millar, currently a statistician at the FRS Marine Laboratory at Aberdeen, has accepted the NCSE fisheries studentship, to be co-supervised by Rob Fryer at FRS and Steve Buckland. Colin will

start his PhD in autumn 2007.

### Movements:

Chiara Mazzetta will be moving from Cambridge to Kent in December, to work on the BBSRC-supported project: Linking ecological and evolutionary dynamics, co-supervised by Tim Coulson, a member of the NCSE Management Committee. The first postdoc on this project was Giacomo Tavecchia, who now has a permanent position in IMEDEA in Majorca.

Bobby Gramacy has taken up a 2-year temporary lectureship in Cambridge, but will continue to be actively involved in the NCSE.

Steve Brooks is taking leave from Cambridge for 2 years, but will continue to be a co-Director of the NCSE.

### Forthcoming opportunities:

PhD studentship based at Kent: Models for long-term individual-based ecological time series—starting October 2007. To be supervised by Byron Morgan and Tim Coulson (Imperial College).

### NCSE seminar:

Wednesday 29th November, 4pm: Carmen Fernandez (Spanish Oceanographic Institute) - Inference for state space models of wild animal populations. To be broadcast from St Andrews. Enquiries to Len Thomas ([len@mcs.st-and.ac.uk](mailto:len@mcs.st-and.ac.uk)).