

# Ecotype

Spring 2012

*Ecotype* is the biodiversity and conservation newsletter produced by Forest Research's Centre for Human and Ecological Sciences.

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Green-winged Orchid. Photographed at Forest Research, Alice Holt.

Pictured here outside the Research Station at Alice Holt, *Anacamptis morio*, the Green-winged Orchid, can be found flowering during the months of May and June. In a steady decline across the country, this population is one of few that remain in North Hampshire.

## Editorial

Welcome to the Spring 2012 issue of *Ecotype*, the biodiversity and conservation newsletter produced by Forest Research's Centre for Human and Ecological Sciences (CHES).

### What's in this issue:

Following the arrival of the two Giant Pandas at Edinburgh Zoo, [Mike Smith](#) introduces us to some exciting new collaborative work on forest landscape restoration and giant panda habitat conservation.

As phase four of the European Genetic Resources Programme (EUFORGEN) kicks off, [Joan Cottrell](#) outlines its aims and objectives, and highlights the roles two CHES members are taking in the process.

In conjunction with Forestry Commission England, [Kevin Watts & Phil Handley](#) present a new tool, developed to measure the resilience of woodlands to change.

[Nadia Barsoum](#) gives us an insight into a new forest management strategy dealing with adaptation to changes in environmental conditions, and introduces some recently established trials distributed across the UK.

Our featured PhD student for this issue is [Claire Stevenson](#), from the University of Cumbria, who reports on the novel use of global positioning system technology to track squirrel movements across the landscape. This research has been carried out in collaboration with FR scientists from the Land Use and Ecosystem Services Group within CHES. Claire passed her PhD viva in April 2012 with her dissertation entitled 'Modelling habitat networks and dispersal in the grey squirrel *Sciurus carolinensis*'.

We round the issue off with our [news and conferences](#) page which contains information on a number of 2012 conferences.

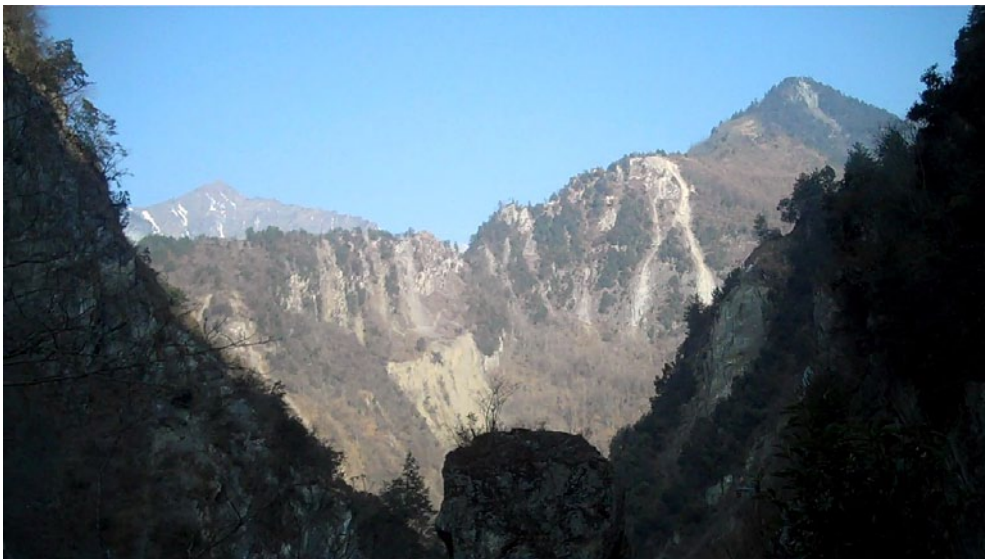
All together these articles highlight a small selection of the current projects we are working on at Forest Research. I hope you find this Spring 2012 issue of *Ecotype* informative and enjoyable to read.

Claire Noël  
Editor

## Giant Panda Conservation & Forest Landscape Restoration

Mike Smith

Edinburgh Zoo has recently taken two Giant pandas on loan from the China Conservation and Research Centre for the Giant Panda (CCRCGP) based in the Wolong Nature Reserve, Sichuan province in the south-west of China. The Wolong region is the largest and most significant remaining contiguous area of giant panda habitat in the world and is one of the most botanically rich sites within temperate regions of the world. As part of this agreement the Royal Zoological Society Scotland (RZSS) will develop a 'Joint Laboratory' to facilitate collaborative research on giant panda conservation in China and Scotland. The restoration of its forest habitat is a key topic.



Wolong Nature Reserve, Sichuan

This restoration will be undertaken based on the principles of the Global Partnership for Forest Landscape Restoration (GPFLR), building on a number of existing and proven rural development, conservation and natural resource management principles and approaches. There is no single blueprint for successful forest landscape restoration so the project will reflect and develop from local circumstances in a way that is gradual, iterative, adaptive and responsive.



The Forest Landscape Restoration element aims to deliver the 10-year Research Programme in partnership with Wolong and Sichuan colleagues. The 'Joint Laboratory' will bring together organisations from both within and outwith China (including Forest Research) to further enhance panda conservation through collaborative learning and spatial planning, leading to direct species and habitat conservation action. There is the potential for collaboration on a number of different research topics but most crucially on habitat connectivity and climate change issues. This will be built upon a well-structured development phase over the first year that will produce a coordinated programme of research activities and an associated business plan to deliver giant panda conservation.

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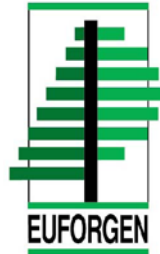
## Participation of FR staff in EUFORGEN Phase IV

Joan Cottrell

The genetic diversity held in our tree populations will have a key role in maintaining our forests' resilience to climate change by providing the basic material that will allow evolutionary adaptation to occur. The importance of these resources and the management options that they offer however, has not yet been fully recognised in national adaptation strategies or harnessed appropriately in practical forest management. The fourth phase of the European Genetic Resources Programme (EUFORGEN) therefore aims to promote the use and conservation of forest genetic resources as part of sustainable forest management. It will concentrate on development of appropriate guidelines and advice for two main areas which will become particularly important for forest survival during climate change. The first objective aims to provide informed guidelines for future use and transfer of forest genetic resources as climate change is expected to alter the current provenance areas. Secondly, recommendations on appropriate management of existing forests will be provided so that they are managed to maximise their chances of survival during the process of climate change.

The EUFORGEN Steering Committee has identified the following tasks or themes for the working groups to undertake during this phase:

1. Assessment of gene conservation status of forest trees in Europe (based on the common action plans and the new data made available by the EUFGIS information system) and development of pan-European gene conservation strategies.



2. Development of genetic monitoring methods for gene conservation units of forest trees.
3. Development of guidelines for use and transfer of forest reproductive material in the face of climate change.
4. Incorporation of conservation and use of forest genetic resources into national forest programmes and other relevant policies and strategies (and how to support these kinds of linkages at national level).
5. Management of gene conservation units in the face of climate change.

Stuart A'Hara and Joan Cottrell of CHES are both members of these working groups and have recently attended their first group meetings. Each working group is composed of selected experts from different countries who are invited to provide their inputs to specific tasks based on their experience and knowledge. The groups will report their final outputs to the Steering Committee and will present their results during the workshops and/or in EUFORGEN publications.

Further details of the activities of [EUFORGEN](#) can be found on their website.

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## A New Woodland Resilience Indicator for FC England

Kevin Watts & Phil Handley

Forest Research has been working with Forestry Commission England (FCE) to develop an indicator to measure the resilience of woodlands to change, such as climate change. It is based on the size and spatial configuration of woodland patches within the landscape, with the assumption that larger woodlands which are near other wooded areas are more resilient to change and other impacts. As such, this indicator favours landscape actions (e.g. woodland planting) which create or maintain larger, clustered woodlands as opposed to those that are smaller and isolated.

The second of FCE's sixteen 'State of England's Woodland Indicators' included in their [Corporate Plan](#), it is intended to act as one of the measures used to help monitor the well-being of forestry, directly supporting the delivery priority of protecting England's woodland.

The indicator is underpinned by a number of scientific theories, such as island biogeography (MacArthur and Wilson, 1967) and metapopulation dynamics (Hanski, 1998). These theories suggest that larger areas will have bigger, more robust populations that are less likely to suffer from

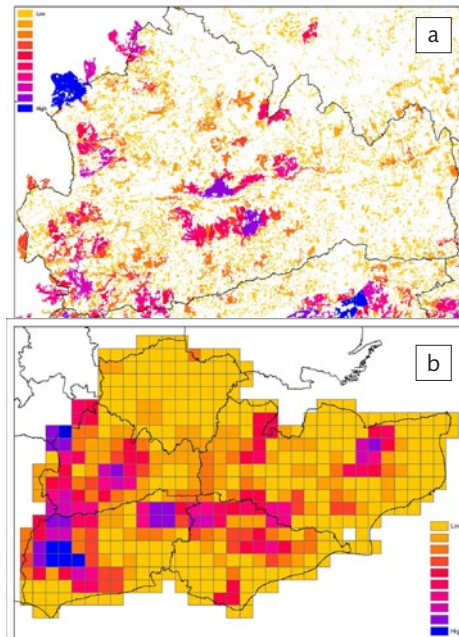


Illustration of provisional woodland resilience indicator values for individual woodlands in Surrey (a) and 5km squares in south east England (b)

local extinctions; and areas which are closer together are more likely to exchange individuals and increase their long-term viability. In response to climate change, larger woodlands which are in close proximity will also provide an opportunity for species to adjust their distribution to more suitable conditions, i.e. to larger woodlands which may contain greater environmental variation, or to more suitable neighbouring woodlands. These woodlands may also be more economical to manage and this in turn may support their resilience. This indicator is aligned with the UK biodiversity indicator on habitat connectivity, which was developed by Forest Research and the [Centre for Ecology and Hydrology](#).

The indicator uses the new spatial data from the [National Forest Inventory](#) (including current woodland planting and felling data) to provide annual updates of changes in woodland resilience across England. The NFI records any forest or woodland (urban or rural) that is at least 0.5 hectares in area with a minimum width of 20m and a tree canopy cover of at least 20%.

Although the indicator is capable of being used to report change at a fine scale, e.g. county or district, it will primarily be used to report change at the national level for England.

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# Climate change adaption - Assessing the implications of assisted migration of tree provenances on associated biodiversity

Nadia Barsoum

Forest trees are long-lived, slow growing species that cannot rapidly adapt to changes in environmental conditions that occur within the lifespan of an individual. As climates are predicted to change rapidly, many tree species planted today are likely to be poorly adapted to future environmental conditions. Trying to mitigate this, a new forest management strategy named 'climate-matching' is currently being trialled in the UK. This involves sourcing seeds from geographical locations (or provenances) that today experience the climate predicted for the UK in 50 to 100 years time and replanting selected areas with these imported genotypes. Although this climate change adaptation strategy is attractive from the perspective of maintaining the growth and productivity of trees, little is known of how large scale planting of non-native provenances will affect associated biodiversity. Animal communities are known to be highly sensitive to genetic and phenotypic diversity in keystone tree species.

'Climate-matching' provenance trials have recently been established in Kent, Derbyshire and Staffordshire by Forest Research to examine the performance of different provenances of four important broadleaf tree species in Britain: wild cherry, ash, oak and sweet chestnut. Provenance performance is related to the incidence of associated biodiversity in pure and mixed blocks, where



Climate-matching provenance trial at Hartshorne in the Midlands.  
Photo John Lakey

the latter design is considered to confer greater 'resilience' to environmental change. The provenance trials consist of several different blocks, see Figure 1.

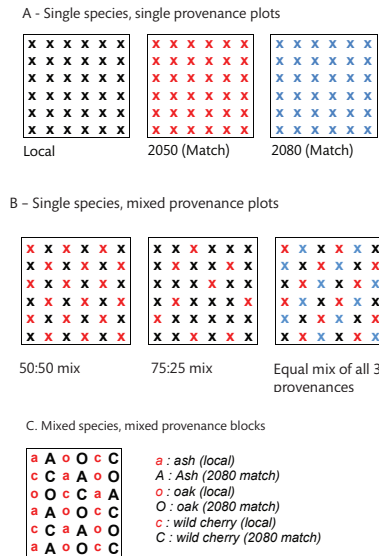


Figure 1. Planting design

Cheryl Pilbeam (MSc student - Conservation and Forest Protection, Imperial College London) is making a first collection of data in the 2012 field season, relating differences in planting design and in the growth, form and phenology (e.g. budburst) of the different provenance material to the incidence of associated species (e.g. gallers, leaf miners and free feeding caterpillars), including various pests and diseases. Dr. Melanie Gibbs from the Centre for Ecology and Hydrology (Wallingford) is offering support in sampling methods for herbivorous insects. These provenance trials have recently been included in a global network of planting trials investigating provenance and tree species diversity effects on associated biodiversity (<http://www.treedivnet.ugent.be>). The National Forest Company and the Woodland Trust are project partners.

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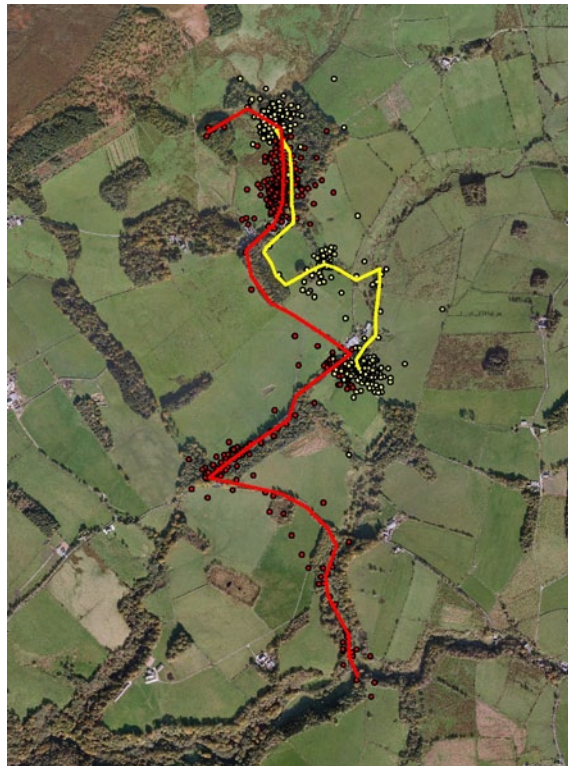
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## Assessing grey squirrel movement with GPS technology

Claire Stevenson

Due to the negative effects the invasive grey squirrel population is having upon forestry and biodiversity, understanding how they move around the landscape is important to aid their management. General evidence suggests that certain landscape features (e.g. hedgerows & riparian woodland) may facilitate movement whilst others (e.g. roads & water) may hinder them. Although some studies have investigated landscape use by the grey squirrel, no study has recorded their movement accurately using Global Positioning System (GPS) technology.

GPS units were previously limited to use on larger mammals. However, a collaborative project between the [Centre for Wildlife Conservation](#) at the University of Cumbria and Forest Research has adapted a sport-based GPS device which is small and light enough to be used on grey squirrels. The GPS unit is a programmable store



GPS points and movement pathways for two grey squirrels within the study landscape (2km by 3km)

on board device which was set to record locations every 3 minutes enabling the recording of movements within the landscape matrix for up to five days.

Collars were fitted to nine grey squirrels and released in the field. Five of the nine squirrels were recaptured and their movement paths were downloaded to a Geographic Information System (GIS). The results showed that the grey squirrels within this study had a strong preference for moving within wooded riparian corridors, road and track verges, and field and woodland edges, and an aversion to open agricultural fields.



This is the first study to use GPS telemetry on grey squirrels, and it has shown that this technique is successful in gaining detailed information on movement and landscape use. The data gained from such GPS studies can be used to assist the construction and validation of models which aim to predict movement of species within the landscape to aid management and conservation.

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## News and conferences

### BES & IUCN UK Peatland Programme Symposium 2012

CHES's Russell Anderson will be giving a presentation entitled 'Restoration of afforested peatlands - ecosystem service gains and losses' on June 26th at the joint [British Ecological Society and IUCN UK Peatland Programme Symposium](#) 'Investing in Peatlands - Demonstrating Success' at Bangor University 26-28 June 2012.

On June 27th, Forest Research's Samantha Broadmeadow will also be presenting. The talk, 'A [strategic assessment of afforested peat resources in Wales](#)', was co-authored with Russell and a number of other FR members.

### IUFRO 2012

The [Second International IUFRO Conference on Biodiversity in Forest Ecosystems and Landscapes](#) will be taking place at University College Cork 28-31 August 2012. CHES's Nadia Barsoum will be convening a symposium at this conference entitled 'Using long-term data to investigate forest biodiversity'.

The 'Managing forests for ecosystem services: can spruce forests show the way?' conference, jointly organised by IUFRO and FR, will be taking place at the Heriot-Watt University in Edinburgh between the 8th and 11th of October 2012. Head of CHES Chris Quine will be giving a presentation entitled 'Atlantic spruce forests: an assessment within an ecosystem services framework'.

### ECCB2012

The European Congress of Conservation Biology 2012 (ECCB2012) will be held between 28th August and 1st September 2012 at the Scottish Exhibition and Conference Centre, Glasgow. CHES's Kevin Watts will be jointly running a symposium entitled [Landscape scale conservation](#).

### Two PhD students join CHES

CHES recently welcomed two PhD students from the University of Valencia, Spain on a short-term scientific mission. Pablo Valls and Marina Segura are working on deliverables for the [FORSYS Cost Action FP0804](#). Pablo is researching stakeholder involvement in decision support system (DSS) development with CHES's Amy Stewart and other social scientists – assessing advantages, and difficulties, of stakeholder involvement, and the methods and approaches best suited to stakeholder involvement. Marina will be developing a knowledge-base on the methods and approaches best suited to specific types of DSS and the problem types that particular DSS applications seek to address.



## About Ecotype

*Ecotype* addresses forestry practitioners and conservation professionals, in both the public and private sectors. Amongst our readership are people from:

- County and District Councils
- Natural England
- DEFRA
- Wildlife Trusts
- National Trust
- British Trust for Ornithology
- RSPB
- Woodland Trust
- Forestry Commission, Forest Enterprise
- Centre for Ecology & Hydrology
- Natural Environment Research Council
- Universities, Museums
- Private consultants
- Interested individuals

### Who contributes

Most of the articles are written by people within the Centre for Human and Ecological Sciences and sometimes other parts of Forest Research about work related to biodiversity and conservation management of forests and woodlands. Contributions may also be invited from other parts of the Forestry Commission, and others working within forest biodiversity and conservation, subject to relevance to the main themes of *Ecotype*.

Note that the editor reserves the right to edit, delay or reject articles depending on the space available and relevance of the subject.

## Contacts

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### Web links

[www.forestry.gov.uk/fr/ecology](http://www.forestry.gov.uk/fr/ecology)

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