HIGHLIGHTS FROM THE HEN HARRIER SEASON

The final summer field season for the PLANFORBIO Hen Harrier project has been very successful for ongoing research and monitoring breeding biology. Twenty Hen Harrier nests were located and followed intensively over the breeding season, and together these nests produced 25 fledged young, 16 of which were wing-tagged with colour coded tags as part of the ongoing PLANFORBIO Hen Harrier wing tagging programme. This programme has resulted in 170 juvenile Harriers being tagged in Ireland since 2007 thanks to the hard work of Barry O'Mahony and the rest of the Hen Harrier project team. A recent Irish Birds paper, based on the work of the PLANFORBIO project, reported a decline in the number of Hen Harrier pairs breeding in each of the project's three study areas in the Ballyhoura and Slieve Aughty mountains and in West Clare. Breeding productivity has been low over the five years of the study but has been just high enough to allow Harrier populations in these areas to remain stable, provided that adult survival and recruitment of fledged young to the breeding population are sufficiently high, as it is the balance of losses from and inputs to a population that determines its viability.

The 2011 season was the second year that GPS tags were deployed on adult Harriers and a total of 7 tags have now been deployed resulting in 8 days of data from 3 birds in the Ballyhouras. Preliminary data analysis has been carried out and presented recently by Mark Wilson at the 7th European Ornithologists' Union Conference in Latvia. During a total of 8 days of tracking, the maximum distance from the nest travelled by a hunting Hen Harrier was 11.4km. Despite the large distances travelled the majority of foraging was concentrated relatively close to the nest and more than half of all GPS registrations consistent with hunting behaviour were taken at locations within 2km of the bird's own nest. Another interesting feature of Hen Harrier hunting behaviour was the apparent lack of overlap in hunting range between neighbouring birds, suggesting that foraging behaviour can be affected by neighbouring breeding pairs. Much more detailed analysis will be done over the coming months on habitat selection and use, from determining the types of forest and farmland that are selected by hunting Hen Harriers, to investigating the flight patterns of Hen Harriers within these different landscapes. Such information will improve our understanding of hunting birds' selection of habitat features such as hedgerows and forest edges in the landscape, as well as the ways in which they adapt their movements to these features, which will, in turn, allow us to make recommendations for management of upland landscapes to enhance their value for Hen Harriers

Hen Harrier Food Pass.
Picture by Rebecca Whatmore

BIRD HABITATS IN IRELAND

Ireland's bird fauna is different from that of the rest of Europe. It is a stronghold for some species while other common European species are completely absent. Our coasts and wetlands host huge numbers of wintering birds and act as the crossroads for migratory species moving between the Arctic and Africa. Lowland farmland, estuaries and coastal lagoons are the richest habitats in Ireland for birds, with over 80 species occurring in each. In terms of specialists, woodlands, forest and scrub have the highest number of species at 29, similar to that found in Britain. Not surprisingly, given Ireland's importance for seabirds, cliffs, islands and rocky coasts are the second richest habitat for specialist birds.

To focus attention on the habitats as well as the bird species, a symposium will be held in the RDS Dublin on Friday 18th May 2012. Organised by BirdWatch Ireland, British Trust for Ornithology, RSPB and University College Cork, further details are available on the website www.birdhabitats.wordpress.com .

The symposium will coincide with the launch of the new book 'Bird Habitats in Ireland' a lavishly illustrated new work on Irish birds and their habitats edited by Richard Nairn and John O'Halloran. This book is a comprehensive review of published and unpublished work on the bird communities of all the habitats found on the island of Ireland. It is a joint initiative by 25 authors to bring together all the available information in twelve chapters on bird habitats throughout the island of Ireland. There are also chapters on Habitat Structure and Complexity, Habitat Management, Climate Change and Birds and a stimulating Synthesis of the main themes that emerge from this work. The book also contains a comprehensive bibliography that will be valuable for future ornithological research. The book will be available in all good bookshops in April 2012. For more details check the website www.collinspress.ie.

Woodcock. Photo by Ian Herbert

EMPLOYMENT OPPORTUNITIES

We are looking to recruit a number of people at present. Research Assistant positions are available on the Hen Harrier research project on the PLANFORBIO programme, and on the new deer management project at UCC and WIT. UCC seeks to recruit one post-doctoral researcher on deer population ecology and one PhD student on the interactions of deer and forestry, and WIT seeks to recruit one PhD student on molecular genetics of deer populations. For further information please contact *Sandra at s.irwin@ucc.ie.*

PROJECT PARTNERS

University College Cork
PI: Prof. John O'Halloran

Coillte
PI: Mr. Mick Keane

Trinity College Dublin
PI: Dr. Daniel Kelly

Forest Research, UK
PI: Dr. Nadia Barsoum

Waterford Institute of Technology
PI: Dr. Nick McCarthy

PLANFORBIO

FOR FURTHER INFORMATION

Sandra Irwin
Programme Manager,
School of Biological, Earth & Environmental Sciences
University College Cork,
PHONE 021 4904595
E-MAIL s.irwin@ucc.ie

NDP
National Development Plan 2007 - 2013

COFORD
NATIONAL COUNCIL FOR FOREST RESEARCH & DEVELOPMENT

PLANFORBIO NEWS

Issue 10
December 2011

INSIDE THIS ISSUE

www.ucc.ie/en/planforbio

WELCOME

PLANFORBIO research team members have been extremely busy and productive during the period since the last newsletter in June, doing fieldwork, authoring papers and books, presenting at conferences and completing theses. Three MSc theses have recently been completed by Nova Sharkey (Turlough plant communities - links with hydrology, hydrochemistry, soils and management), Rob Deady (The importance of brash-lines & clear-fell debris in plantation forests for saproxylic fungus gnats) and Steven Keady (Ground based LiDAR for forest biodiversity assessment). A study on climate change impacts on forest biodiversity has also begun at TCD as part of the BIOPLAN project. This study will examine some of the impacts of climate change on forest biodiversity and further information on this study is provided in this issue. The PLANFORBIO research programme has a strong presence in the most recent issue of the journal *Irish Birds*, where papers appear on both the FORESTBIO and HEN HARRIER projects.

INTERNATIONAL FOREST VEGETATION MANAGEMENT CONFERENCE

Eddie Daly

Two members of the PLANFORBIO team Nick McCarthy and Eddie Daly, WIT, recently attended the 7th IURFO Forest Vegetation Management Conference in Valdivia, southern Chile. The city is situated at the confluence of the Calle-Calle, Valdivia and Cau-Cau rivers and the area has a heavy reliance on commerce from forestry. It's lucky then for the locals that in this temperate rainy climate that the average rotation for Eucalyptus is a sharp 11 yrs with canopy closing after the 1st year! The city is located not far from the foot of the Andes so, as you can imagine, the vistas were extraordinary. On the post conference tour we got an opportunity to climb a couple of the smaller volcanoes and got a look at an active volcano spewing ash and gas into the sky.

In Chile vegetation management chiefly concerns water and nutrient competition between the crop trees and undesirables, while in Ireland we are mostly concerned with light competition. What was an eye opener was the results the Chileans were getting from their vegetation management experiments. On a field trip we visited a weed control trial on Eucalyptus where researchers concluded that an increase of 60cm of weed control diameter around a plant translates into an extra 35m3/ha after six years. That's quite staggering when you think about it!

My presentation on the germination efficacy of Rhododendron went very well. I learned of some very interesting methods that fellow researchers from far flung corners of the world had to deal with similar problems and also we heard of unique approaches to assessing and dealing with vegetation management problems. For example Yukihiro Chiba from the Forestry and Forest Products Research Institute in Japan demonstrated a simulation model to predict forest stand growth including undergrowth. Using this simulator he could draw a 2-D model of the forest canopy providing a convenient tool for evaluating canopy openness and thus the amount of light reaching the forest floor.

The conference was a great success, though not as well attended as previous years, but those that did make it felt that the very long journey was worth it. It was the first time the conference was held in South America which helped reinforce one of the central themes of IURFO which is the facilitation of the transfer of knowledge to a worldwide audience. And by following the philosophy of the Cost Action meetings (supporting cooperation between EU scientist and researchers) the organisers of IURFO hope that the same collaboration and sharing can be achieved on the world stage.

Plot at field trial using herbicide. The eucalypts are this big after just 6 years.

View of an erupting volcano, part of the Puyehue-Cordón Caulle volcano complex and first began erupting in June 2010.

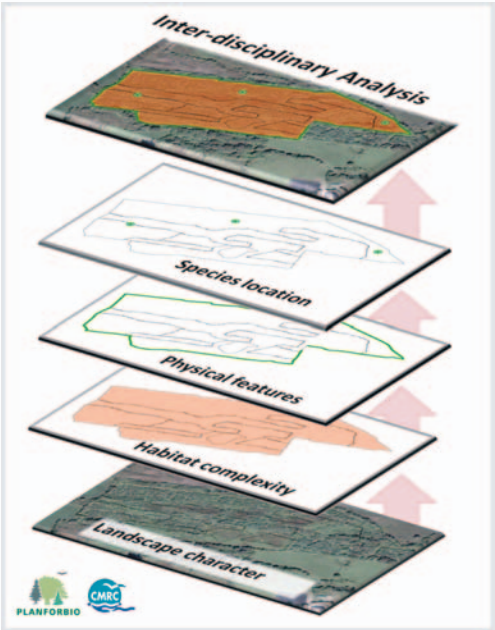
ENHANCING PLANFORBIO'S RESEARCH VALUE WITH GIS

Rory Scarrott & Kathrin Kopke

As the FORESTBIO project ended at the end of 2010 and the PLANFORBIO research programme progresses into 2012, researchers have collated datasets about numerous different aspects of our island's forest landcover. These datasets include for example, information on environmental conditions, habitat structure, communities and species distributions, as well as detailed species tracking data. Such a wealth of data is often difficult to visualise, and to facilitate a more in-depth examination of this information all data from PLANFORBIO projects is stored in a centralised Geographical Information System (GIS).

The PLANFORBIO GIS, compiled by the Coastal & Marine Research Centre at University College Cork, is essentially a tool, used to store, manipulate, display, and analyse the collated data. On one level, the GIS acts as a single data repository available to PLANFORBIO researchers. It brings together scientific data from several disciplines, across all the study sites and subjects. However, at a higher level, the structure and design of the PLANFORBIO GIS also allows for further analysis and consideration of the data. It exploits the spatial element to look at datasets within the wider context of PLANFORBIO, offering multi-disciplinary views of the forest sites examined.

Furthermore, each dataset is also accompanied by detailed information on data quality, origin, context and content (known as metadata), allowing researchers to evaluate others dataset's. This "information about the data" is INSPIRE (EC Directive 2007/2/EC) compliant, complying to required EU standards of data and metadata provision. Finally, for people new to PLANFORBIO and GIS, the datasets are accompanied by basic, friendly, and easy-to-use visual ArcMap, and ArcReader display documents. These have been designed to invite exploration of the data, encouraging multi-disciplinary thinking. In summary the final PLANFORBIO GIS will not only be a convenient and efficient storage depot for the researcher's data, but a tool to invite further inquiry and exploration in the context of the entire multi-disciplinary PLANFORBIO programme long after the research has concluded.



The GIS database allows for many aspects of PLANFORBIO to be explored visually and in context with data from different disciplines.

CAN FORESTRY PLANTATIONS SUPPORT WOODLAND PLANT SPECIES

Linda Coote

With Ireland one of the least wooded countries in Europe, the availability of habitat for woodland species is quite limited. The majority of the woodland area in Ireland is, and will continue to be, made up of forestry plantations of both native and non-native species. What is of interest is whether these plantations can provide suitable habitat for native woodland species.

Data from the PLANFORBIO programme and the earlier BIOFOREST project is being used to answer this question for woodland plants. The analysis looked at plantations of native ash and non-native Sitka spruce, Norway spruce and larch and compared them to semi-natural oak and ash woodlands. Native ash plantations planted on or adjacent to areas with historic woodland cover could have similar woodland plant communities to semi-natural ash woodlands, although fewer woodland plant species were found in the plantations. None of the non-native plantation types or the ash plantations planted on historically unwooded sites had plant communities similar to semi-natural oak or ash woodland. This suggests that both site history and tree species selection are important factors in determining the types of woodland plant communities found in plantations.

While the non-native plantations did not have similar plant communities to the semi-natural woodland types, where they were established on or adjacent to areas with historic woodland cover they could still support high numbers of woodland plant species. This is most likely due to the fact that many woodland plant species have difficulties in dispersing over long distances, so having a seed source for these plants close by significantly increases the number of woodland species able to colonise. However, the conditions in the plantations also need to be suitable for the growth of these woodland plants. A high cover of the tree canopy has been found to negatively affect the number of woodland species in a plantation because of the reduction in the amount of light reaching the forest floor. This means that the management of plantations to open up the tree canopy is very important.

These findings suggest that there is significant scope for the planning and management of plantations so that they support more woodland species, and plant communities closer to those of semi-natural woodlands.

A Norway spruce/Scots pine mix plantation, planted on the site of former woodland and supporting a large number of woodland plant species.

DEER MANAGEMENT PROJECT TO BE FUNDED BY DAFM

A new landscape level study of deer populations and behaviour in forest and agricultural habitats has recently been funded by the Department of Agriculture, Food and the Marine. This is a joint initiative between University College Cork and Waterford Institute of Technology, supported by Trinity College Dublin, National Parks & Wildlife Service, Coillte and the Agri-Food and Bioscience Institute of Northern Ireland which aims to develop an all-island approach to deer -management. This is a three year project that will run until the end of 2014 and will employ one post-doctoral researcher and two PhD students.

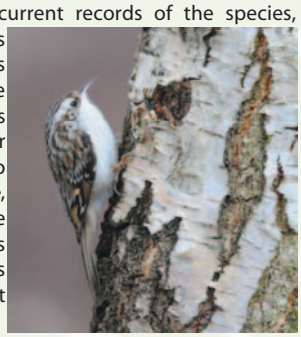
FORESTS, BIODIVERSITY AND CLIMATE CHANGE

Forests are natural regulators of carbon dioxide in the atmosphere and can help to mitigate the effects of climate change. They are, however, also themselves vulnerable to climate change, particularly rapid climate change, which affects ecosystem and species ability to adapt, and so presents a serious threat for biodiversity. Our global climate is changing rapidly, with average temperatures rising at an unprecedented rate, by more than 0.7°C over the past century with surface temperatures projected to increase by between 1.1°C and 6.4°C by 2100. These changes in climate are projected to have significant impacts on forest biodiversity and ecosystem function and may lead to widespread changes in species distribution and community composition among a range of taxa throughout the world. The Convention on Biological Diversity (CBD) predicts that habitats will shift towards the poles and move upwards in elevation. With the shift of these habitats, forest biodiversity will be forced to adapt and as a result species compositions in forests is likely to change and those species and populations which are already vulnerable will potentially become extinct. Evidence from the past has shown that changes in climate can cause rapid changes to community distribution and composition, leading to major biodiversity loss, within a matter of decades. Given the anticipated threats of climate change, our forests will have to be managed in a pro-active adaptive manner, for which we require an understanding of forest biodiversity capacities and management options.

A new study within the BIOPLAN project, being conducted by Nova Sharkey, Dave Bourke and Mike Jones, aims to investigate the use of species distribution models to project future changes in the ranges of Ireland's forest biodiversity, including species of conservation interest, under future climate change. The results will inform recommendations in the context of future conservation management of European protected habitats and their adaptation strategies.

The most commonly used method to assess the impacts of projected climate change on the distribution of biodiversity are species distribution models (SDM) which statistically relate current species distributions with climatic variables enabling projections of distributions under future climate change scenarios. Species distribution modelling is a useful aid in determining the potential impact of climate on species and communities and is important in informing conservation strategies. A machine learning technique called Artificial Neural Networks (ANN) will be used in this project to learn underlying patterns between observed input (environmental/climatic variables) and target (species presence/absence) data .

The illustration below shows preliminary distribution maps for the treecreeper (Certhia familiaris). In these maps the blue grid squares indicate occurrence within that grid square while green squares indicate absence. 'Observed' highlights those grid squares containing current records of the species, 'Predicted' refers to the current distribution as defined by the model, and 'Projected' shows the grid squares which are forecast to have suitable habitat. The two dispersal scenarios are 'Unlimited', in which the species can occur in any grid square and 'Limited' which is no dispersal, i.e. no range expansion. In this case, the 'Observed' and 'Predicted' distributions are very similar, which indicates the model works well. The model suggests that this bird species may experience a 65% retraction of its current range under future climate change.



IUFRO 2012 CALL FOR ABSTRACTS

Abstracts are now being accepted for the 2nd IUFRO International Conference on Biodiversity in Forest Ecosystems and Landscapes, which will be held at UCC in August 2012. Among the topics included in this conference are conservation management, climate change, biodiversity indicators and invasive alien species. For more information on abstract submission please visit www.ucc.ie/iufro2012. The Department of Agriculture, Food and the Marine are the title sponsor of this event, and we have also been successful in securing additional sponsorship from the Environmental Protection Agency and Science Foundation Ireland. If you would like to be involved in this conference please contact iufro2012@ucc.ie.

THREATENED HOVERFLY SPECIES SUPPORTED BY IRISH FORESTS

Lauren Fuller

Last year the intrepid PLANFORBIO entomology team (consisting of Rob Deady and myself) set up Malaise net traps to catch flying insects in two different forest types. Traps were set in five mature conifer plantations and five forests which had been planted on agricultural grasslands. The purpose of this study was to sample hoverflies, which play an important functional role in forest ecosystems and are useful bioindicators of habitat quality and heterogeneity.

Tom Gittings, who is another member of the PLANFORBIO research group, very kindly identified the samples for us and we are pleased to say that Irish forests appear to be supporting a number of threatened and vulnerable hoverfly species. The presence of these hoverflies is very small, with only a few individuals of each species caught, however it is nice to see evidence that Irish forests are providing an important habitat for them. Species from the mature conifer plantations included Cheilosia longula, which is threatened in Ireland, and Cheilosia nebulosa which is vulnerable in Ireland. Species from the afforested agricultural land included Chrysogaster coemiteriorum considered to be vulnerable in Ireland, Parasyrphus nigritarsis categorised as threatened/decreasing in Ireland and Xylota florum considered to be threatened in Ireland.

Parasyrphus nigritarsis. Photo by Lauren Fuller

The invertebrate fauna of Irish forests tends to be characterised by generalist species, due to the relatively recent establishment of most forests in the Irish landscape. However, these hoverfly species require very specific habitats. For example Cheilosia longula is associated primarily with fungi of coniferous forests, and Xylota florum is associated with "cold" wet Salix woodland with a well-developed layer of herbaceous ground vegetation. This is evidence that within Irish forests a range of habitats are present that support small populations of specialist invertebrate species.

As forest cover continues to increase in line with government targets, invertebrate species will colonise these newly created habitats and population sizes will increase across the country. It is hoped that within these forests the habitats that specialist species such as these hoverflies utilise, will continue to increase and thus provide enough habitat for larger population sizes.

BIRDS OF IRISH FORESTS

A recent publication in Irish Birds reported on 7 years of bird diversity monitoring in Irish native and plantation forests by members of the PLANFORBIO and earlier BIOFOREST teams. The results reveal a total of 39 different bird species in our forests, with broad separation between forest types in the bird species that they support. Between 20 and 26 different species were found in different types of plantation forests, while 23 different species were found in Ash and 27 in Oak native woodlands. Several bird species were recorded only in plantation forests, and the majority of these were found in young pre-thicket plantations. Different ages of plantation forests supported different bird species with young pre-thicket forest being the most distinct habitat in this regard. The bird assemblages of plantation forests were also affected by rotation, particularly within the first 10 years after planting, when densities of migrant bird species were much higher in second rotation than in first rotation forests. Plantation forests are an important habitat for birds in Ireland, particularly given the scarcity of native woodland habitats. The findings of this study suggest that the value of plantations can be improved for bird conservation through effective management. Ideally this would be focussed on increasing the diversity of commercial forests habitats, by encouraging the development of shrub and understory vegetation layers, and including more broadleaved trees in planting mixtures.