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scrr

Scottish Consortium for Rural Research

formerly the Edinburgh Consortium for Rural Research

SCRR Newsletter
formerly The Bush Telegraph

Issue 77
Summer 2013

www.scrr.ac.uk



SNOW BUNTING: LORNE GILLISNH; ASPEN HOVERFLY: IAN MACGOWAN/SNH; ARCTIC SKUA: LORNE GILLISNH; FRESH WATER PEARL MUSSEL: SUE SCOTT/SNH

This issue in unusual words

'Flame shells' are a small scallop-like bivalve recently found living in large reefs off Skye – **page 4**

'Ruralities' were the focus for a gathering of social scientists at Perth in March 2013 – **page 5**

'Metagenomics' is a way to study a habitat through the DNA of its inhabitants, which will be highlighted by an SCRR event in October – **page 5**

'UAV' or 'unmanned aerial vehicle' is a small remote-controlled aeroplane being trialled by Forest Research for aerial photography – **page 7**

'Elicitors' are compounds that provoke a natural defence response to protect plants from disease – **page 10**

'Slow tourism' means taking enough time to soak up a country's cultural and natural heritage – **page 11**

Evidence-based policy making

Prof Stuart Monro, scientific director of SCRR, discusses the importance of providing explanation and interpretation alongside the research data

THE PHRASE 'EVIDENCE-BASED POLICY MAKING' is embedding itself at all levels of government, both national and local. As scientists working in the area of rural research, our expertise is regularly sought as part of the policy-making process. Two problems for government – and to some extent for the public – are where does the relevant information lie, and who should be asked to interpret it.

There is an old maxim that I, as a geologist, quote regularly: 'Geologists are good company, especially for other geologists'. I am also sure this could also be said about other scientific specialisms and many professions beyond. We are good at talking to each other but less good at communicating the implications to government or the public.

I take heart from exploring Scotland's Environmental Web (environment.scotland.gov.uk),

a one-stop shop for information from a wide range of organisations, many of them associated with SCRR, presented as a compendium of the key research outcomes relating to our environment.

The value of this resource will be in how it is used. If it is regarded as the source of all the evidence required to formulate policy, it will fail. But it can act to promote dialogue between policy makers and the originators of the research, so that government may have access to exactly what is required, clothed in the right context. The scientists themselves retain control of the original data, and the most up-to-date interpretation resides in the expertise of the scientists.

Scotland's Environmental Web is a great step forward in making research outcomes widely available, but it is the dialogue between scientists and policy-makers that remains the key to sound decision-making.

Pictured above: four species that are indicative of the state of the Scottish environment

About SCRR

THE SCOTTISH CONSORTIUM FOR RURAL RESEARCH – known until May 2012 as the Edinburgh Consortium – exists to promote sharing of ideas and techniques among a group of organisations active in research into land, freshwater, coastal and marine resources, and their uses.

Our member organisations have bases throughout Scotland and are at work all over the world: details on the back page.

Members' reports

British Geological Survey

Impact of Icelandic volcanism in the UK

Report by Charlotte Vye-Brown, Sue Loughlin and Evgenia Ilyinskaya of the BGS Volcanology Team

IN THE LAST FEW YEARS, we have witnessed first-hand the impact that a small-moderate ash-rich Icelandic volcanic eruption can have on the UK and Europe. We will be affected by volcanism again in the future. The impacts will depend upon the meteorological conditions, eruption type and eruption duration. Ash is not the only product of volcanic activity that will impact us. Volcanoes also produce gases and aerosols in significant quantities, including sulphur dioxide (SO₂) and hydrogen fluoride (HF) and aerosols such as sulphuric acid (H₂SO₄). The rate of conversion of sulphur dioxide to sulphuric acid depends on a range of things including altitude and season.

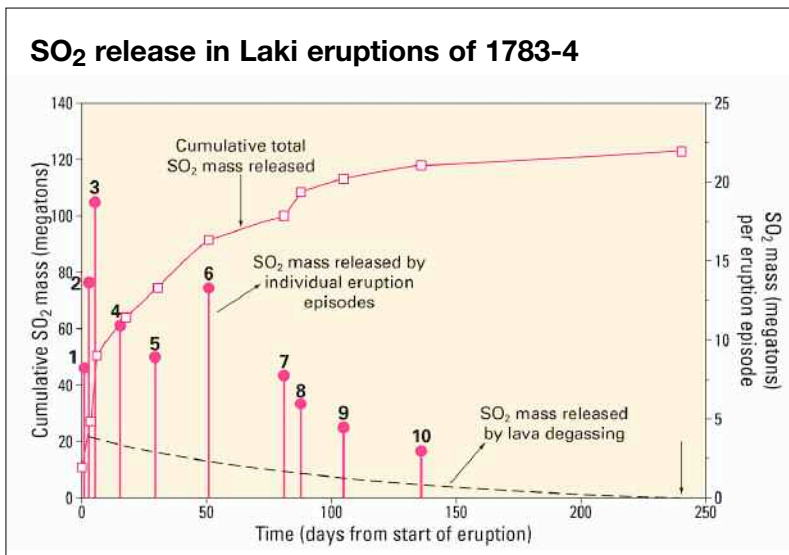
Eruptions from Iceland in the past have resulted in impacts in the UK due to the atmospheric dispersion of gases and aerosols (1). One such eruption started in 1783 and lasted for eight months from the fissure vent known as the 'Laki Craters', part of the Grimsvötn volcanic system in south eastern Iceland. This eruption differed in style from those we have recently experienced. The vent for the eruption was 27 kilometers long and it produced a large volume of lava (~15 km³) with abundant gases, mostly in the first five months of the eight-month-long eruption (2 and the graph reproduced below).

The 'Laki eruption' is similar in style to four other eruptions in Iceland



PHOTOGRAPH: R. M. C. LOPES, NASA

FROM THORÐARSON ET AL., 2003



The Laki craters, part of the Grimsvötn volcanic system in south-eastern Iceland

in the last 1150 years. When a similar large-magnitude fissure eruption occurs again, the volcanic gases and aerosols produced will potentially be hazardous to the UK.

Analysis of selected parish records in England from the time of the Laki eruption suggest that there were two unusual peaks in mortality in 1782-3 that may have been caused either directly or indirectly by the Laki eruption (3). The authors noted that the first mortality peak occurred some weeks after the first observations of an atmospheric haze so was not likely

It was suggested that the potential effect of a Laki-type eruption today could result in 21,200 additional cardiopulmonary fatalities in the UK and up to 142,000 across Europe

JHI showcases 'Best Soil in Show'

Bernardo Rodriguez-Salcedo of the James Hutton Institute describes an initiative to draw attention to the ground beneath our feet

caused by gas but could have been related to air pollution combined with unusually high summer temperatures. Recent modelling (4) found that the concentration of PM2.5 particulate matter (<2.5 micron) is likely to double across central, western and northern Europe during the first three months of the eruption. The World Health Organisation PM2.5 air quality guideline would be exceeded for an additional 36 days on average during the eruption. It was suggested (4) that the potential effect of a Laki-type eruption today could result in 21,200 additional cardiopulmonary fatalities in the UK and up to 142,000 across Europe (with a 95% confidence interval 52,000-228,000).

Sulphate aerosol (in the form of sulphuric acid) also causes volcanic fogs that can impact visibility, is corrosive, and can affect airworthiness. In addition, deposition of sulphate can cause vegetation damage, soil acidification and pollution of surface water.

Considerable uncertainty remains about the impacts of the Laki eruption on the UK in 1783-84. Research is needed to assess in more detail what the impacts of such a scenario might look like in the future. We need to better identify what the optimum monitoring and observation networks might be. Research investigation is required to better understand complex atmospheric processes, how volcanic air pollution affects human health, animal health and other sectors, and how it might interact with anthropogenic air pollution.

Increasing understanding will facilitate planning for a future event in terms of both advice and management and help to build long-term resilience in the UK to volcanic eruptions.

References

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2. J. Geophys. Res. D: Atm., (2003), 108 (1), pp. AAC 7-1 AAC 7-29.
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FOR THE YEAR OF NATURAL SCOTLAND, the James Hutton Institute is highlighting the importance of the very land beneath your feet and will be showcasing the 'Best Soil in Show' at the Royal Highland Show.

Experts from the Institute will be on hand at a series of soil clinics throughout the four days of the Ingliston event demonstrating a range of soil analysis equipment and providing advice on soil health.

As part of the clinics they will showcase soil samples from across Scotland that have been analysed to find the 'Best Soil in Show' and explain how different soil properties suit different purposes to ensure visitors can learn to get the most from their land.

Soils are essential to the delivery of many basic biological and ecological benefits and land managers and farmers need a good understanding of the character of their soil, in order to be able to make informed decisions about managing it.

The James Hutton Institute has over 90 years' experience in soil and



Pictured above and below: samples of good Scottish soil

crop research and also hosts the National Soils Archive that is a reference to the state of the soils in the past and is used to test new analyses and monitor changes in soil over time.

Access to data from the National Soils Archive will also be demonstrated live at the show using a new iPhone app, which enables land managers, farmers and enthusiastic amateur growers to learn more about their soil while out in the field or allotment.

You can visit the James Hutton Institute experts at the Royal Highland Show in their marquee at Stand 231, Avenue Q.



Members' reports

Heriot-Watt University / Moredun

PHOTOGRAPHS: G. SAUNDERS



Left: Surface of flame shell reef with sea fans, brittle stars and a range of sea weed species



Right: flame shell at nest entrance

Flame shell reef discovered

Dan Harries of Heriot-Watt reports on an exciting find off Skye

IN SUMMER 2012, DIVERS from Heriot-Watt University's Centre for Marine Biodiversity and Biotechnology were commissioned by Marine Scotland to survey the sea bed of the outer part of Loch Alsh. This survey revealed the presence of the largest known flame shell reef in the UK. The reef covers an area of over 75 hectares blanketing most of the sea bed in the

tideswept narrows of Kyle Akin near the Skye Bridge.

Flame shells (*Limaria hians*) are small scallop-like bivalves that build nests on the sea bed by binding together pebbles and shell fragments with a meshwork of tough fibrous threads. The animals live hidden in cavities and galleries within their nest material. In their favoured habitat of

tideswept channels they can reach abundances where nests merge into a continuous mat covering the sea bed. In these circumstances they effectively form living reefs stabilising the loose gravel on the sea bed and creating an irregular and complex surface. It is this that makes them remarkable. The complex and stable surface that they create provides habitats for a diverse range of other species. It is difficult to quantify but evidence indicates that the number of species they support is at least twice as many as would be present in the absence of the reef.

The species-rich living reefs formed by flame shells are considered to be of great conservation value and the study of these and similar habitats is well established at Heriot-Watt University including research into reef-forming fan worms (*Serpula vermicularis*), horse mussel reefs (*Modiolus modiolus*) and deep water coral reefs (*Lophelia pertusa*).

Livestock keepers: a new science engagement project

Lee Innes of Moredun describes an initiative being launched at this year's Royal Highland Show

MOREDUN FOUNDATION and the Scottish Government are teaming up to develop a new science engagement project which will tour around Scotland over the next 12 -18 months. The objectives of the project are to stimulate debate and discussion around the subject of keeping livestock and how new scientific advances have helped to improve health, welfare and sustainable efficiency of

production. A major aim of the project is to discuss how livestock contribute to the sustainability of remote rural communities and to both economic and cultural development.

The basis of the project will be to tell the story of each of the featured Livestock Keepers covering, their



PHOTOGRAPH: LEE INNES

'In Orkney there are around 10 cattle for every person living on the islands'

work, livestock and the landscape they live and work in and how they have adapted and diversified their businesses to contribute to the economy and culture of remote rural areas. The narratives will be

captured through dialogue with the Livestock Keepers and the use of audio, video and photography as the project unfolds at the different venues. The project will highlight different aspects of keeping livestock to include; health and welfare; food and drink; genetics and breeds;

diversification of businesses; fashion arts and crafts; biodiversity and sustainable rural businesses. The project will endeavour to be a catalyst for people to share their stories and experiences of diversification and adaptation of livestock based industries to enable both economic and cultural benefits. Livestock play a key role in the economy of many rural communities e.g. in Orkney there are around 10 cattle for every person living on the islands.

The project will be launching at the Royal Highland Show (18th -22nd July) and visitors are very welcome to attend at the Moredun marquee on avenue 7.

www.moredun.org.uk/knowledge-exchange/livestock-keepers

Researching Scotland's Ruralities

SCRR's one-day event in Perth in March 2013 examined 'social science perspectives on current issues in rural Scotland'

PHOTOGRAPH: STEPH WRIGHT



A wide variety of social science researchers gathered in Perth to share perspectives on rural matters

LOOKING AT SOCIAL SCIENCE is a relatively novel undertaking for SCRR, which to date has concentrated more on the biological, agricultural and environmental aspects. The aim was to encourage social scientists (broadly interpreted) working on topics in a rural context to come together to exchange information and insights, and to help SCRR develop a more fully cross-disciplinary approach to 'rural research'.

The meeting had a number of focus points but was also planned to encourage researchers to network: researchers who were not presenting were invited to display posters giving information about their projects. It was supported by SCRR and by the ESRC Genomics Policy and Research Forum, based at the University of Edinburgh.

The meeting was structured around four main sessions, each designed to push at the boundaries of the

conventional conception of rural sociology/rural social anthropology.

The session on 'multiple land uses, knowledges and the resulting tensions' focused on the increasing diversity of land uses in rural areas of Scotland: agriculture, forestry, conservation, building, hunting, species re-introductions, leisure industries and 'alternative' energy. It examined the different kinds of rural land, as understood from an agro-environmental point of view, and looked at the ways in which competition between various land-use objectives is handled. Consideration was also given to the ways in which various forms of expertise are invoked to legitimise different land-use practices.

Rural social science often tacitly overlooks questions of political culture and party politics in rural areas, focusing instead on rural identities. The

session on the 'political sociology of rural Scotland' took advantage of the current urgent debate over national identity to explore some aspects of the political sociology of rural Scotland and, in the light of the changing demography of Scotland's rural regions, to examine new kinds of emerging ethnic identities in rural areas.

Policy makers are keen to envisage a rural Scotland characterised by vibrancy and empowerment. The session on 'empowerment and vibrancy in rural society' used case-study material to examine the extent to which different forms of rural community in Scotland can be viewed in this light. It also highlighted recent policy initiatives, including initiatives around rural transport and around capacity-building and leadership in communities, to investigate whether they have acted to promote dynamism in rural communities and to see who the principal beneficiaries have been.

The final main session was entitled 'Sustainability in rural Scotland'. It considered how communities are affected by national and international sustainability agendas, looking – for example – at the way that livestock farmers understand and respond to the recent policy focus on sheep and cows as contributors to global warming and at the ways in which rural communities have responded to new opportunities for devolved electricity generation. In this way the session enquired into the local meanings attached to sustainability in rural cultures and practices.

During the closing discussion panellists and the audience attended to broad conclusions from the day's presentations, and expressed a strong enthusiasm to take forward work on rural social science as part of SCRR's developing activities.

Environmental and Agricultural Metagenomics Forum

October 2nd, 2013, Battleby Conference Centre, Perth

METAGENOMICS IS A NEW AREA of research and innovation which studies the genetic code of multiple species extracted directly from environmental samples of diverse kinds. It crosses molecular biology, informatics, ecology, soil, water and other environmental sciences. There are several international initiatives in this area; for example, The Human Microbiome Project has shown the importance of understanding the

microbiome that is associated with every macroorganism.

The aim of this workshop is to raise awareness of the opportunities and benefits of these approaches for agriculture and the environment in Scotland. It will update attendees on the latest technologies, new scientific frontiers and the range of



potential applications and benefits for answering the important questions we have about agriculture, biodiversity, environmental well-being and conservation.

Registration fee is £50.

Further details are available from the events page of the SCRR website at www.scrr.ac.uk/events.php

Members' reports

James Hutton Institute / Society, Religion and Technology Project

Can community ownership of energy make a difference for rural Scotland?

Bill Slee of the James Hutton Institute looks at some of the arguments around the transformative effect of national energy policy on rural development

THE 20TH CENTURY HISTORY of rural Scotland shows that energy can be transformational in delivering rural development outcomes.

Tom Johnston, the charismatic chairman of the North of Scotland Hydro Electric Board, built on the vision of the Tennessee Valley Authority to provide a postwar platform for rural development by creating large-scale hydropower from the glens. Then oil brought (and continues to bring) wealth to some parts of the Highlands and Islands from the 1970s to the present, particularly in the rig construction phase.

Wind energy could be equally transformative, but with privatised utilities dominating the developments, almost all the value is stripped out of rural areas, creating at best a few local jobs in construction and small crumbs of comfort in community funds.

But where communities own the energy supply, the income generated in rural areas is much more likely to be retained and reinvested. The same is also likely where the farming community invests in wind energy and use the proceeds to reinvest in their



PHOTOGRAPH: BILL SLEE

Wind turbines on Gigha

businesses or in local consumption. Bodies such as Community Energy Scotland are supporting community renewables developments, but unless planners bite the bullet and recognise that social and economic dimensions of any proposal are important 'material considerations' and that the external ownership model expropriates

Community wind farms: a case in point

On May 13th, 2013 a four-turbine community wind farm opened in Neilston, a village in the uplands to the southwest of Glasgow. The people of Neilston had bought a 28 per cent share in the wind farm with their partners, Carbon Free Developments. They raised £950,000 in cash to buy their stake, which was loaned in part to them by the Scottish Government and other organizations.

The arrangement will give the village of Neilston around £10 million of income over the lifetime of the wind farm, supporting the village's sustainable development and empowering residents to make improvements locally.

most of the benefits, community energy groups may well struggle to assert their claim.

Community-owned wind energy could be transformative in terms of rural development outcomes, helping to inject resources into local development projects and sustain rural services in fragile rural economies.

Renewable energy and rural fuel poverty

Murdo Macdonald and Adrian Shaw of the Society, Religion and Technology Project discuss how the income from wind farms could relieve fuel poverty

THE CHURCH OF SCOTLAND

submitted evidence to the recent Scottish Government review of land reform. One of the issues highlighted was the rapid recent expansion of wind power in Scotland. This expansion has not always been of benefit to local communities, which do not see significant income.

If we are to meet targets to reduce carbon emissions in Scotland we need to develop renewable energy. However, this must not be done in a way that takes money from the poor – those living in fuel poverty – and gives it to the rich – the owners of large landed estates. Many people in rural

communities complain that large energy companies are developing wind farms across Scotland with no direct benefit to these local communities, and at a time when many are experiencing fuel poverty. The Church is calling on the review of land reform to look at this issue in more detail.

It is a paradox of life in rural Scotland that the rapid growth of



PHOTOGRAPH: ADRIAN SHAW

Beinn Ghlas wind farm, Argyll

renewable energy is accompanied by a growth in fuel poverty. We are repeatedly reminded that Scotland has one of the best resources of renewable energy in Europe. The abundance of wind power, the availability of sites for small scale hydro or forest biomass, and the potential for tidal and wave energy together place Scotland in the forefront of the renewable energy revolution.

At the same time rising fuel prices, the lack of piped mains gas, colder winter temperatures and lower incomes place rural communities at a disadvantage. Levels of rural fuel poverty are correspondingly higher.

If landowners are gaining financial rewards from renewables at the same time as a growing number of households are living in fuel poverty, then there is a strong case for re-examining land reform to ensure the financial benefits of renewables are shared more equitably.

High-resolution aerial photography for forestry

Bill Jones, Duncan Ireland and Steve Penny from Forest Research explore the usefulness of an 'unmanned aerial vehicle'

A NEW UNMANNED AERIAL VEHICLE (UAV) has been developed that can provide high-resolution aerial photography for forestry. The small 'plane' offers benefits over traditional aerial photography and has already attracted much attention after demonstrations to Forestry Commission staff at meetings in Scotland.

Developed in Sweden and evaluated by Forest Research's technical experts, the plane has much potential to assist in forest planning, monitoring and management. The images gathered give valuable information on Britain's forests and can assist in many different scenarios:

- Biosecurity and disease monitoring
- Wind-blow assessment
- Stocking density assessment
- Site planning
- Vegetation monitoring
- Conformance monitoring /recording

Compared with traditional aerial photography methods, the UAV is able to take images at a higher resolution, comfortably covering 100 hectares per day. The images are ready for use with

Geographic information Systems. The device allows a targeted rapid response for time-critical applications, such as checking wind damage after severe storms, giving up-to-date information compared with traditional aerial photography.

Unlike some UAVs, this model is launched by hand, making it ideal for use within a forest area where there may not be large open spaces. Despite its small size, it also has a sturdy design that can withstand frequent use in typical forest conditions, as well as light rain and winds up to 10 m/s.

Right: tiled images of areas of woodland captured using the UAV system



PHOTOGRAPH: SMARTPLANES AB



PHOTOGRAPH: FOREST RESEARCH

Ash die-back disease (*Chalara fraxinea*)

Sophie Williams of the Royal Botanic Garden Edinburgh on raising awareness

IN THE LAST DECADE there has been a substantial increase in diseases affecting trees in the Scotland. Because of this, in this Year of Natural Scotland, we are likely to see the beginning of a considerable shift in our landscape. Ash dieback disease has arrived and will not be going away. Scotland's 10 million ash trees, with the wildlife that depends on them, are vulnerable.

In response to the arrival of ash dieback, the Scottish Tree Health Advisory Group coordinated a public engagement project, funded by RESAS, to explore and explain the implications of this disease in Scotland. We have developed an exhibit that will travel to over 20 venues across

Scotland in the next six months and we have created three podcasts. And in partnership with Edinburgh-based animators Red Kite, we have produced a short film about ash dieback.

From August 7th – 13th, 2013 the Royal Botanic Garden Edinburgh will be hosting the Virtual Landscape Theatre. This interactive exhibit allows an audience to decide what should be done to reduce the impact of ash dieback and to explore the implications of their choices.

To find your nearest exhibit venue, or to listen to the ash dieback podcasts and to see the animation, visit www.rbge.org.uk/whats-on/ashdieback or use the QR code.



RBGE: 2051

PHOTOGRAPH: LORNE GILL/SNH



Members' reports

University of Stirling / Centre for Ecology and Hydrology / Sniffer

PHOTOGRAPHS: DARREN GREEN



Is your salmon really wild?

Do anglers know what an escaped farmed salmon looks like? Darren Green, University of Stirling, suspects not...

ATLANTIC SALMON FARMING is an important and expanding industry in Scotland, particularly in rural and island areas. Inevitably, some fish escape from their cages, for example during extreme weather events, and there are concerns over the potential impact of these escapees on wild

salmon populations. Research into salmon escapes relies in part on good data and the ability of researchers and anglers to distinguish farm escapes from their wild counterparts.

As part of continuing research at the Institute of Aquaculture, Jennifer Murphy-O'Connor, a final-year



Above: researcher Jennifer Murphy-O'Connor on location delivering her questionnaire

marine biology student, set out to investigate how good anglers and biologists are at identifying salmon, and what features they use to determine the wild or farmed origin of their catch. Over 200 respondents were contacted through an online questionnaire and face-to-face interviews, and were presented with photographs of salmon of varied origin.

Both anglers and biologists tended to use the fins, tail, and number of spots on the fish as part of their assessment.

Though more experienced anglers and biologists classified more of the photographed fish correctly, there was no difference between groups, with on average four out of six of the identification questions correctly answered. Nevertheless, the anglers were more confident in their ability than the biologists.

Identifying salmon in a photograph is not the same as bank-side assessment of live animals, however we can still learn much here about anglers' confidence in categorising their catch and features they are relying on in their assessment.

For more, see www.pinkmongoose.co.uk/Escapes or contact Darren Green, darren.green@stir.ac.uk

Climate change in the UK: effects on biodiversity

The Centre for Ecology and Hydrology and Sniffer present a brief summary of findings from Living With Environmental Change's 'Terrestrial Biodiversity Report Card' 2012-13

THERE IS STRONG EVIDENCE that climate change is already affecting UK biodiversity. Impacts are expected to increase as the magnitude of climate change increases.

We expect there to be regional differences in the impact of climate change on biodiversity, reflecting different species, climate, soils and patterns of land use and management.

Many species are occurring further north and at higher altitudes than in previous decades, including some species that have colonised large parts of the UK from continental Europe. Some habitats are particularly vulnerable to climate change; the risks are clearest for montane habitats (increased temperature), wetlands (changes in water availability) and coastal habitats (to sea-level rise). Climate change exacerbates the risk

that many non-native species (e.g. insect pests and pathogens) may establish and spread.

Extreme weather events, such as droughts and floods, have clear impacts on ecosystems and the ecosystem services they provide; climate change may change the frequency and severity of such events.

More detailed information is available from: www.lwec.org.uk/resources/report-cards/biodiversity

Adaptation Scotland is an initiative that brings together stakeholders in Scotland to collectively address and prepare for the impacts of climate change – to get climate-ready. For further information see www.sniffer.org.uk/knowledge-hubs/climate-resilience/adaptation-scotland/



PHOTOGRAPH: LORNE GILLISNH

Snow bunting: its marginal high-altitude habitat is threatened

Giant Panda (*Ailuropoda melanoleuca*) Research Symposium

September 10th-12th, 2013, RZSS, Edinburgh

A TWO-DAY MEETING within the SCRR scientific events programme is being convened by the RZSS to which fellow SCRR members and scientists are cordially invited to participate.

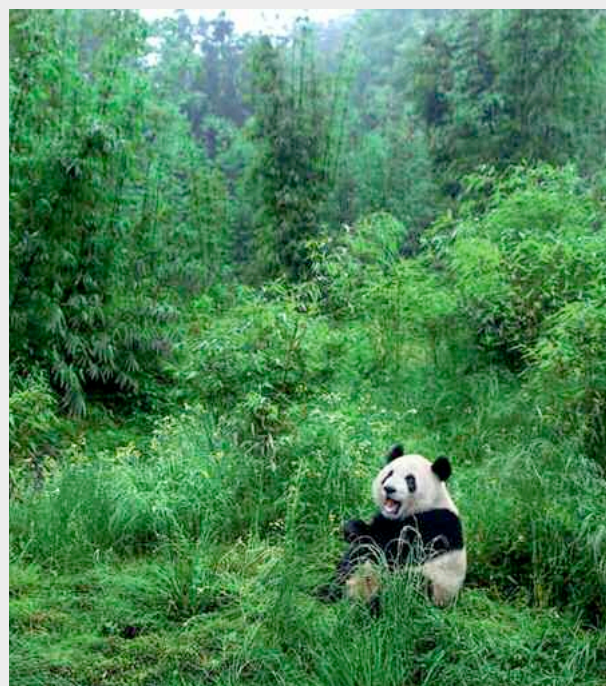
The aim is to enable those researchers and research institutes based in Scotland and overseas who are interested in being involved with giant panda conservation and research work to come together with our Chinese and American colleagues to formulate a five year Giant Panda/China Research and Training Plan: 2013-2017.

Building on an extensive and well-founded platform of previous research investigations, five topics of current

and future work have been identified for the symposium:

- Field ecology: e.g. landscape features that facilitate wildlife movements
- Genetic management: e.g. scientific management of the global ex situ population
- Artificial reproduction and infant panda care: e.g. enhancement of reproduction
- Veterinary management and research: e.g. optimization of health care
- Cognitive evolution and behavioural research: e.g. learning and memory

Further information from Iain Valentine, RZSS, ivalentine@rzs.org.uk



PHOTOGRAPH: ZHOU MENGJIA

SCRR Cairngorms Research Meeting

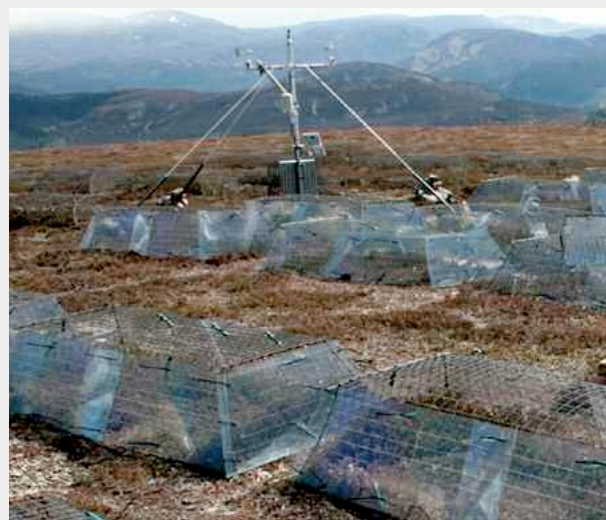
November 14th, 2013, Aviemore

CAIRNGORMS NATIONAL PARK will formally be launched as the first Long-Term Socioecological Research (LTSER) site in the UK, together with the launch of the Cairngorms Research Portal. All researchers currently or recently active in the Cairngorms will be invited to submit details of their research before the meeting. The meeting will comprise presentations on LTSER and on research in the Cairngorms and there will be opportunities for researchers to present their work on posters.

Workshops will also be held to define the potential research priorities in the context of the research strategy for Cairngorms National Park.

The meeting will be supported by the Cairngorms National Park Authority together with funds awarded to the Centre for Mountain Studies at Perth College UHI as winner of Round 2 of the Edinburgh Beltane Public Engagement Challenge.

Further details will be placed on the Events page of the SCRR website as they come available.



PHOTOGRAPH: WILL BOYD WALLIS, CNPA

Ecotourism and Rural Tourism: Policy, Practice and Sustainability

November 7th, 2013, Perth

THIS EVENT WILL BRING TOGETHER researchers, consultants, NGOs, public sector employees and businesses to discuss policy, practical methodology and ongoing support for ecotourism and rural tourism. Presentations and discussions will include current research, methods for developing community-based tourism

and local and European initiatives supporting sustainable tourism.

If you would like to offer a presentation or require further information, please contact: Dr. Kathy Velander, School of Life Sport and Social Sciences, Edinburgh Napier University, Edinburgh, email k.velander@napier.ac.uk



PHOTOGRAPH: MIKE TALBOT

Members' reports

Scotland's Rural College

Protecting vegetables from disease through natural mechanisms

Sarah Hunter-Argyle of SRUC on a new two-year research project

AS CONCERNS OVER PESTICIDES

such as neonicotinoids grow, Scotland's Rural College (SRUC) and The James Hutton Institute have launched a new research programme looking into activating plants' natural defences.

The two year project funded by the Horticultural Development Council aims to determine whether elicitors – compounds that induce a natural defence response – can be used effectively on a range of horticultural crops such as cabbages, Brussels sprouts and onions.

Prof Adrian Newton, cereal pathologist at the James Hutton Institute, says: 'Resistance elicitors offer great potential for reducing disease in integrated management systems and reducing the use of conventional pesticides at the same



PHOTOGRAPH: NICOLA HOLDEN, JHI

time. They do not replace conventional pesticides; they complement them whilst enhancing the plant's own ability to defend itself.'

Broccoli trials, Invergowrie

For some plant diseases there are currently no adequate treatments. Light leaf spot, which often affects Brussels sprouts, is one example and it is a similarly desperate situation with head rot in broccoli and other bacterial diseases of brassicas and alliums.

Even when control measures are available these cannot always be relied upon. Growers are heavily dependent both on fungicides and resistant varieties when it comes to crop protection. Pathogens can develop a resistance to fungicides and can over time break down resistant varieties. However, elicitors could offer alternative treatments.

Prof Dale Walters of SRUC's Crop Protection Team says: 'Elicitors could activate natural defence mechanisms such as strengthening cell walls, putting up physical barriers to the invading organism, or releasing toxic chemicals to damage or kill the invader. For crop diseases for which no adequate control exists, elicitors offer new hope.'

www.sruc.ac.uk/news/article/427/getting_to_know_sruc_the_crop_protection_team

Introducing the Solway Centre for Environment and Culture

Valentina Bold of the Solway Centre, University of Glasgow, outlines the work of the Dumfries-based organisation

BASED AT THE University of Glasgow in Dumfries, the Centre brings together ecologists, geographers, anthropologists and literary critics to investigate rural landscape management, sustainable rural tourism, and the links between landscape, memory and place. Current projects explore landscape in its physical, and intangible, senses.

'Responsible Innovation' is part of the Engineering and Physical Sciences Research Council project 'Synthetic Biology Applications to Water Supply and Treatment'.

'The impact of severe wildfires on moorland carbon dynamics' is supported by the Natural Environment Research Council.

'Discovering Dumfries and Galloway's Past', funded by Leader, the Crichton Foundation and the University of Glasgow, uses geophysical survey – 'Time Team' techniques – to raise awareness of archaeological heritage.

The Adam Smith Research Foundation supports both



PHOTOGRAPH: VALENTINA BOLD

'StorySCAPE', promoting heritage landscapes through storytelling, and creative partnerships between 'Poets and Landscape Workers'.

'Heritage Route Research', alongside the Whithorn Trust and Third

Above: no brownies at Bodsbeck farm

Sector Internships Scotland, is mapping out traditional pilgrimage routes, for economic benefit.

www.gla.ac.uk/schools/interdisciplinary/research/solwaycentre/



'Slow tourism' takes centre stage at Skye conference

Report by Steve Taylor of West Highland College, UHI

A **THREE-DAY CONFERENCE** took place May 21st - 23rd at Sabhal Mòr Ostaig on the Isle of Skye, hosted by West Highland College UHI's Centre for Recreation and Tourism Research, and supported by Sport Scotland, Visit Scotland, the Highland Council and Highlands and Islands Enterprise.

The Centre has a growing reputation for study into all aspects of tourism and has conducted research on behalf of organisations in Iceland, Norway, Sweden and Germany, as well as those closer to home.

A particular area of interest was the growing trend towards 'slow tourism', where participants slow the pace of the trip and immersing themselves in music, food, landscape, personal journeys and culture.

New genetic test for wildcats

Andrew Kitchener of National Museums Scotland on the solution to a longstanding problem of mistaken identity

THE SCOTTISH WILDCAT, *Felis silvestris*, is critically endangered, with perhaps only a few hundred animal surviving throughout Scotland and only a handful in captivity. The main threat to the wildcat is introgressive hybridisation with feral domestic cats, *Felis catus*. Many hybrids are very similar in appearance to wildcats and in a field situation can be almost impossible to identify.

Given that the wildcat is fully protected under UK and EU law, the identification of suspected wildcats that have been illegally killed can be a problem. Conservation management of wild and captive wildcats is also compromised by the lack of a reliable and robust method of distinguishing them from hybrids and domestic cats.

For more than 20 years, National Museums Scotland collected hybrid and wildcat specimens in an effort to develop a method of distinguishing wildcats based on the markings on their skins. In 2005 in collaboration with the Dr Nobuyuki Yamaguchi of University of Oxford's Wildlife Conservation Research Unit, seven key pelage characters were identified, but using these is not always practical.

In collaboration with Dr Paul O'Donoghue of Chester University, we have identified the very best museum



PHOTOGRAPH: NATIONAL MUSEUMS SCOTLAND

Left to right: wild, hybrid, domestic

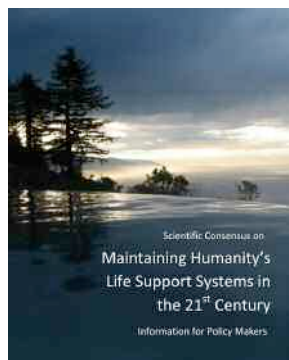
specimens of Scottish wildcat and run DNA extracted from them on the Morris Animal Foundation's Feline SNP Chip. This chip is able to survey for up to 63,000 single nucleotide polymorphisms across the cat genome. By comparing our select band of wildcats with domestic cats, we have found more than 50 diagnostic markers that can be used to distinguish the two species. Over the next few months these markers will be validated and used to develop a robust genetic testing protocol for identifying Scottish and other European wildcats.

Scientists sign up to consensus on global problems

Plan to keep 'humanity's life support systems' in working order

MORE THAN 500 SCIENTISTS worldwide have signed up to a consensus statement intended to clarify five interlinked problems – climate disruption, extinction, ecosystem loss, pollution, and human population growth – and 'outline broad-brush actions that, from a scientific perspective, will be required to mitigate these threats'.

The document is aimed directly at policy makers and is distributed through the Millennium Alliance for Humanity and the Biosphere (MAHB) at Stanford University. Members of the scientific community and the wider public are encouraged to add their support via the MAHB website.



'Earth is rapidly approaching a tipping point,' begins the one-page executive summary. 'Human impacts are causing alarming levels of harm to our planet.'

As scientists who study the interaction of people with the rest of the biosphere using a wide range of approaches, we agree that the evidence that humans are damaging their ecological life-support systems is overwhelming.

'We further agree', the executive summary continues, 'that, based on the best scientific information available, human quality of life will

suffer substantial degradation by the year 2050 if we continue on our current path.'

It concludes: 'As members of the scientific community actively involved in assessing the biological and societal impacts of global change, we are sounding this alarm to the world. For humanity's continued health and prosperity, we all – individuals, businesses, political leaders, religious leaders, scientists, and people in every walk of life – must work hard to solve these five global problems, starting today.'

mahb.stanford.edu/consensus-statement-from-global-scientists/

SCRR member organisations

The University of Edinburgh	www.ed.ac.uk
Moray House School of Education	www.ed.ac.uk/schools-departments/education
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British Geological Survey, Edinburgh	www.bgs.ac.uk
Centre for Ecology & Hydrology, Edinburgh	www.ceh.ac.uk
Crichton Carbon Centre	www.carboncentre.org
Forest Research, Northern Research Station	www.forestresearch.gov.uk
Heriot Watt University	www.hw.ac.uk
School of Life Sciences	www.sls.hw.ac.uk
University of Stirling	www.stir.ac.uk
Institute of Aquaculture	www.aquaculture.stir.ac.uk
James Hutton Institute	www.hutton.ac.uk
Moredun Research Institute	www.moredun.ac.uk
Napier University, School of Life, Sport & Social Sciences	www.napier.ac.uk/fhlss/SLSSS
National Museums of Scotland	www.nms.ac.uk
Roslin Institute, University of Edinburgh	www.roslin.ed.ac.uk
Royal Botanic Garden Edinburgh	www.rbge.org.uk
Royal Society for the Protection of Birds - Scotland	www.rspb.org.uk/scotland
Royal Zoological Society of Scotland	www.rzss.org.uk
Science & Advice for Scottish Agriculture	www.sasa.gov.uk
Scotland's Rural College (formerly Scottish Agricultural College)	www.sruc.ac.uk
Scottish Natural Heritage	www.snh.gov.uk
SNIFFER	www.sniffer.org.uk
Society, Religion and Technology Project	www.srtp.org.uk
University Marine Biological Station Millport	www.gla.ac.uk/marinestation
University of the Highlands and Islands (UHI)	www.uhi.ac.uk
Agronomy Institute, Orkney College	www.agronomy.uhi.ac.uk
Centre for Mountain Studies, Perth College	www.perth.uhi.ac.uk/specialistcentres/cms
Centre for Remote and Rural Studies, Inverness College	www.crrs.uhi.ac.uk
Environmental Research Institute, North Highland College	www.eri.ac.uk
Lewis Castle College, Stornoway	www.lewis.uhi.ac.uk/research
NAFC Marine Centre, Shetland	www.nafc.ac.uk
Scottish Association for Marine Science, Oban	www.sams.ac.uk
West Highland College, Fort William	www.whc.uhi.ac.uk

Members' meetings

- MONDAY AUGUST 19, 2013
Executive Committee meeting 11:00
The James Hutton Institute, Dundee
Directors' Research Lunch, 12.30
Host Prof. Iain Gordon
- MONDAY OCTOBER 28, 2013
Executive Committee meeting 11:00
Centre for Ecology & Hydrology
Directors' Research Lunch, 12.30
Host Dr Alistair Dawson
- MONDAY DECEMBER 2, 2013
Executive Committee meeting, 11:00
Sniffer, Greenside Ho, Edinburgh EH1 3AA
- MONDAY JANUARY 13, 2014
Royal (Dick) School of Veterinary Studies
Board meeting, 11:00
Directors' Research Lunch, 12:30
Host, Prof David Argyle

Events

- www.scrr.ac.uk/events.php
- TUES-THUR SEPTEMBER 10-12, 2013
Giant Panda Research Meeting
The Royal Zoological Society of Scotland,
Edinburgh
- WEDNESDAY OCTOBER 2, 2013
Environmental and Agricultural
Metagenomics Forum
Battleby Conference Centre, Perth
- THURSDAY NOVEMBER 7, 2013
Ecotourism and Rural Tourism
Perth Concert Hall, Perth
www.scrr.ac.uk/events.php
- THURSDAY NOVEMBER 14, 2013
Cairngorms Research meeting
Venue to be confirmed

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Design by [mobo media](#)

Printed in Scotland on recycled paper (100% post-consumer waste) by The Jane Street Printing Company, Leith, Edinburgh.

ON THE WEB

Back issues at www.scrr.ac.uk

COPY DEADLINE

The deadline for copy in the next issue is September 6, 2013.

DISTRIBUTION

For all queries about the distribution of this newsletter, please contact the Secretary/Treasurer by email as above.

FUTURE ISSUES

Contributions to the SCRR newsletter (formerly the ECRR newsletter, and before that The Bush Telegraph) are welcomed. All contributions, comments and suggestions should be emailed to the Secretary/Treasurer as above.

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