## A better future for hill sheep

Fighting disease to preserve a way of life and a landscape

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## The people of the islands

New thinking on depopulation in remote communities

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SCRR Newsletter Issue 100 Winter 2022/3

www.scrr.ac.uk



# Looking back, looking forward

SCRR's scientific director Prof Sarah Skerrat is joined by her predecessor, Prof Stuart Monro, to discuss the organisation's past and its exciting future

THE EDINBURGH CENTRE for Rural Research (ECRR) started life in 1989 with Prof Peter Wilson as the midwife. The objective was to encourage collaboration between institutions based on the Bush Estate and to seek out synergies in rural research.

Peter ensured that the new centre had a close relationship with the University of Edinburgh, with the chair of the main board being a senior member of the University appointed by the University Court. The collaborations flourished with increased impact being achieved for rural research.

The name was quickly tweaked from a 'centre' to a 'consortium'. The regular house magazine, the Bush Telegraph, spread news of contemporary research beyond the confines of the Bush Estate and more organisations sought to join. In 2011,

the Bush Telegraph gave way to a new, full-colour newsletter with an associated website further spreading news of Scotland's rural research.

With membership spreading from Shetland to the Borders and from the Outer Isles to Aberdeen, the name focused on Edinburgh became inappropriate and, after a lot of discussion, was changed to the Scottish Consortium for Rural Research (SCRR) in 2012.

The 'light touch' approach of the consortium enabled members to recognise what was happening sector-wide and to collaborate where appropriate while retaining autonomy. From those early years, the diversity of research into the rural environment expanded dramatically, placing traditional farming-related research alongside forestry, earth science and

Above: view of the Bush Estate, where SCRR was established in 1989

# **Celebrating our** 100th edition!



biodiversity emphasising the need for interdisciplinarity in addressing rural challenges. From these beginnings 33 vears ago SCRR has developed, but where next for the consortium?

SCRR moves into its next decade with greater focus and purpose.

Continued on page 2

## **About SCRR**

#### THE SCOTTISH CONSORTIUM FOR RURAL

**RESEARCH** 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.



#### From page 1

We have recently reflected on SCRR's 'added value' at a time when we are all increasingly well-networked, nationally and internationally, yet when rural research still has such a critical role in addressing grand challenges in Scotland and globally. Looking to the future, SCRR - through its 24 member organisations - will:

- promote the critical role of rural research in addressing resilience and sustainability, and the climate, biodiversity and rural livelihood crises, by positively influencing both practice and policy;
- 2. build the capability and networks of Scotland's rural researchers, particularly those in the earlier stages of their careers.

Priority actions to deliver this dual purpose include: a clear focus on Early Career Researchers (ECRs) and supporting ECR Equality, Diversity and Inclusion (EDI); mapping and gap analysis of rural research taking place in Scotland – research that is



The 'Edinburgh' consortium changes its name to cover all Scotland, Summer 2012

about Scotland and the wider world; exploring and expanding partnerships and networks to mobilise and amplify this rural research, thereby enhancing its shared impact; and ensuring engagement with rural communities.

This consortium's purpose and focus is underpinned by the same collective effort as when the centre started 33 years ago, and that is why it continues to survive and thrive.

We look forward to reaching out more in 2023, building on the legacy of the past while being excited by where the ECRs take us in the future!

### SPOTLIGHT: EARLY CAREER RESEARCHERS

# Preventing unexplained losses of sheep in upland farming

Fiona McAuliffe is a PhD student in Clinical Veterinary Sciences at Scotland's Rural College (SRUC) and the University of Edinburgh. Her research interests involve livestock health and diseases, ecology and sustainability

MY PHD project aims to investigate causes of lamb loss in hill sheep systems. These unexplained losses are known as blackloss and typically occur in extensive grazing systems. Blackloss is a widespread challenge on hill sheep farms and crofts throughout rural Scotland, particularly the western Highlands and Islands regions.

Tackling blackloss requires us to first understand the causes and consequences of these lamb losses, which is one of the core aims of my research project. Trace element deficiencies, high parasite burdens, plochteach (also known as yellowses) and predation are among presumed reasons for the losses.

This project will focus on these: however it is likely that a combination





of these factors is causing blackloss. I have worked closely with study farms and crofts in the Highlands and Islands to monitor their levels of blackloss and assess health challenges facing their

### SPOTLIGHT: EARLY CAREER RESEARCHERS

# Consumer acceptance of gene-editing technologies

Hellen Mbaya is a PhD student with the Global Academy of Agriculture and Food Security at the University of Edinburgh and the International Livestock Research Institute (ILRI)





PRIOR TO MY PHD, I worked for the National Biosafety Authority in Kenya which oversees all activities involving Genetically Modified Organisms (GMOs) in the country. My current research is focused on genome editing and in particular how the new technology and its products will be

regulated in different parts of the world.

The low cost of genome editing and its availability to a wide range of stakeholders both public and private means that it could be exploited as a tool to address food security issues in low- and middle-income countries, particularly in sub-Saharan Africa.

Consumer acceptance and commercial cooperation are key to enabling the adoption of gene-editing technologies towards sustainable agriculture. Research into regulatory frameworks for genome editing in agriculture led by the Global Academy of Agriculture and Food Systems has highlighted the challenges and opportunities faced by countries around the world in implementing this technology. Gene editing presents an



lambs. This has involved attending gathers and handling events to check lambs for signs of ill health, such as tick burdens, wounds, infections, and photosensitisation. Dung samples were regularly collected from ewes and lambs to follow the gastrointestinal worm and fluke burden. To look at the role nutrition might play, pregnant ewes' energy and protein levels were

measured pre-lambing and lambs were assessed at weaning for cobalt or selenium deficiencies.

I have now completed the fieldwork element of my research and am currently working to analyse and write up my findings. Once finished, the project will contribute to fundamental knowledge about the causes of blackloss and may enable shepherds

Above: hill sheep in Mull

to alter management strategies and prevent a proportion of these losses, helping to improve the sustainability and welfare of hill sheep systems.

Due to the hefted nature of hill flocks, each year a portion of ewe lambs born on the hill are kept as replacement stock. Lamb losses can result in poorer quality lambs being retained for breeding and lead to a gradual decline in the flock's quality and further blackloss within the flock. with some shepherds withdrawing from keeping sheep altogether.

Areas of extensive grazing in the uplands also provide ecosystem services such as flood attenuation, carbon sequestration and biodiversity. These ecosystem services are vital for the health of our environment and benefit society. A loss of agriculture in these areas would result in changes to the ecosystem services farms and crofts provide.

Hill farming and crofting has created and helps to maintain the iconic landscapes that Scotland markets for recreation opportunities and tourism. Agriculture is an essential element of rural Scotland, often providing jobs in remote areas and supporting the local economy.

opportunity to contribute to sustainable agriculture and offers market access for small and medium-sized organisations, the survey found. However, it also showed that challenges are presented by international trade barriers and limited customer acceptance of gene editing technologies.

Researchers sought to understand how countries are regulating frameworks for gene editing tools by interviewing government officers in regulatory agencies and academic experts in Asia, the Americas, Africa and Australia. All the regions chosen have activity related to genetically modified crops in regulation, production or trade. The team sought to determine the regulatory frameworks used around gene editing from country to country, the types of applications made to use the technology, and the perceived risks and rewards associated with it.

Applications to use gene editing in sustainable foods and livestock included heat-tolerant cattle in Australia, weed-resistant grass in Kenya and rain-resistant wheat in Japan.

Approaches to regulation varied between regions, with some applying or amending regulations for genetic modification and others developing novel regulations. Participants in

the survey indicated the benefits associated with gene-editing to include contributing to sustainable agriculture, and to innovation. Perceived challenges included trade barriers from variations in regulation, public acceptance, and potential detrimental effects.

Researchers suggest that countries could agree on a common framework for risk assessment, which can be adapted for individual countries. The study also showed that optimistic messaging to consumers

around the benefits of gene-edited crops or animals, and empowering farmers and end-users, will lead to greater acceptance and adoption of innovations in society.

The research, published in Frontiers in Bioengineering and Biotechnology, was carried out with the Centre for Tropical Livestock Genetics and Health and supported by the Bill & Melinda Gates Foundation and the UK Foreign, Commonwealth and Development Office (FCDO).



Below: cattle farming



#### SPOTLIGHT: EARLY CAREER RESEARCHERS

# Crop species mixtures as a sustainable crop production system

Roisin McGrory is a recent graduate of the MSc Wildlife Biology and Conservation programme at Edinburgh Napier University whose work focuses on crop mixtures as a way to sustain biodiversity

HAVING PREVIOUSLY worked in consultancy as a field ecologist. I conducted my MSc research project this summer with Dr. Rob Brooker of the James Hutton Institute, Dr. Dave Parish of the Game and Wildlife Conservation Trust and Dr. Patrick White of Edinburgh Napier University. My study complemented the work of the James Hutton Institute's SEAMS (Sustainability in Education and Agriculture using MixtureS) project, which worked to develop 'crop species mixtures as a sustainable crop production system in Scotland' and as 'a resource for knowledge exchange on food production, agricultural ecology and environmental sustainability'.

My research aimed to compare the use of crop mixtures and crop monocultures by foraging wild birds across the main arable region of Scotland, to consider whether mixtures could bring benefits to biodiversity.

The SEAMS project employs a voluntary-participatory approach, whereby farmers and landowners volunteer to trial crop mixtures, with autonomy over the species grown.





The data has been gathered over three years (2020-2022) and will be used to inform on mixtures as a crop system, as well as on finer details such as the application and results in a variety of locations and conditions.

I visited 14 sites, from Elgin in Moray to Kelso in the Scottish Borders. Each consisted of a mixture plot and one or more monoculture plots growing the same species as in the mixture.

At each site, one mixture and one monoculture plot were observed for 20 minutes each and all visits by Below: a typical single-crop field at Alford, Aberdeenshire birds were recorded. All sites were visited in four 'rounds' of surveys, beginning at the most southerly sites and progressing north to account for longitudinal variation in crop development. Overall, 112 surveys were completed.

In addition to bird data, crop measurements were also recorded during each survey, including the area, crop cover, weed cover, bare ground and crop height.

I used generalised linear mixed modelling to analyse the data and, using ANOVAs, found significantly higher mean species richness and significantly higher mean frequency of visits in crop mixtures.

Further statistical analysis found an interesting effect of area on visit frequency in each treatment. In crop mixtures, increasing area resulted in increased frequency of visits, while in crop monocultures, increased area had little distinguishable effect on visit frequency, suggesting increased area leads to increased detectability and attractiveness to wildlife.

The results show that crop mixtures do hold potential biodiversity value by supporting a greater species richness and activity among birds compared to crop monocultures and provide a basis for further research to examine these benefits in greater depth.

The research also offers additional supporting evidence to support the implementation of crop mixtures in agrienvironmental policy and as a collective approach to more sustainable farming, increased biodiversity and enhanced food security.







### SPOTLIGHT: EARLY CAREER RESEARCHERS

# Island connections and return migration

Kirsten Gow is a PhD student with the University of Aberdeen and the James Hutton Institute, investigating balanced and sustainable population levels in the Scottish islands

IN THE NARRATIVE around the depopulation of Scotland's islands something is missing. Long-term outmigration from these areas has left islands facing demographic challenges, but it has also led to a community of people with island connections living elsewhere. This community of people, 'the islands diaspora', have created spaces of interaction in their new locations and, more recently, online.

The islands diaspora forms this missing piece of the narrative and is the focus of the initial stage of Kirsten Gow's research into balanced and sustainable populations on Scotland's islands.

The research, funded by the Macaulay Development Trust, recognises that people do not automatically stop being part of a community when they move away from a place and asks how we should consider the islands diaspora and return migration when thinking about ways to tackle depopulation.

Existing research recognises that in-migration will be key to sustaining



and growing populations in sparsely populated areas of Scotland, and it is likely that this will involve people from many walks of life. Return migrants or in-migration from those with preexisting connections to an island has the potential to contribute to this not only in numbers of people, but also in the local knowledge, established social capital, and people-place connections they bring – factors that have already been identified as a crucial part of resilience in small communities.

Gow's initial mapping of the islands diaspora will be followed by interviews with aspiring return migrants, as well as those who have already made the Above: North Uist and its dispersed communities, seen from Pobull Fhinn stone circle



move, in order to establish the aims and realities of return.

The research will attempt to understand some of the blockers, opportunities and triggers related to return migration and understand how a connection to place can influence migration decisions and experience. In doing so, Gow hopes to provide insights into the potential for return migration to Scotland's islands and the factors that are likely to affect this, in order to contribute to the development of effective policy and practice.

To provide context for the research and to address issues of anonymity when working with small populations, Gow has created a typology that groups islands based on three categories: population level and change; logistical connectivity; and the availability of amenities and services on an island.

This is a new way of considering islands that moves beyond categorisations based on governance or spatial location and may allow us to better understand shared and individual experiences of island life within certain island types and across the Scottish islands.

As she begins year two of her PhD, supervised by the University of Aberdeen and the James Hutton Institute, Gow has been collecting data about the island diaspora via an online survey and will be commencing focus groups and interviews in the new year.

Find out more about this research and opportunities to get involved at www.islandsresearcher.uk

# Members' reports

# Royal Botanic Garden Edinburgh



# Edinburgh garden achieves first UK industry biosecurity accreditation

The Royal Botanic Garden Edinburgh has become the first public garden in the UK to be accredited under the Plant Healthy assurance scheme

AT A TIME when the threat of pests and diseases to our plants and landscapes has never been greater, the Royal Botanic Garden Edinburgh (RBGE) is setting new standards by becoming the first UK public garden to hold the important new Plant Healthy assurance scheme.

The scheme paves the way for widespread improvement of biosecurity practices throughout the horticulture sector, setting standards for clearer checks

and procedures around the movement of plants - and any bugs they might potentially be carrying.

Instigated by the Plant Health Alliance, the scheme sets out to audit every facet of business operations, from plants bought in or collected from their natural habitats, to pallets and packing materials, tools, equipment – even the basic hygiene of garden practices.

After a year of painstaking work by the Horticulture team at RBGE's flagship site in the Scottish capital, team lead Pete Brownless described it as an immensely worthwhile undertaking. 'It is a major achievement for us to be the first garden to achieve accreditation. I have worked here for more than 35 years and one of my key objectives has long been the protection of the plants against the big

threats of pests and disease, and climate change. This has been a very rigorous process: as scary as my A-levels!'

The achievement is seen as an important landmark for

RBGE, which is not only a plant science research institute, a centre of horticultural excellence and a public visitor attraction; it is also part of the International Plant Sentinel Network, the group of botanic gardens working to act as warning beacons as new pest and disease threats are spotted in Britain and around the world.

At the heart of the Plant Healthy scheme is the Plant Health Management Standard, setting out key quality checks with which businesses and organisations must now comply.

Director of Horticulture at RBGE,

Raoul Curtis-Machin, was a key player in creating the scheme five years ago, prior to joining the Garden. He explained: 'With disease threats such as *Xylella fastidiosa*, and pests including the emerald ash borer beetle having profound impacts on our landscapes, it is critical everyone plays their part.

'Any biosecurity chain is only as good as each individual link, and this scheme includes all the links in the horticulture supply chain: plant growers, retailers, landscapers, arborists and public gardens.

'It is great that the Royal Botanic Garden Edinburgh has achieved this accreditation and it is excellent to see the scheme gaining traction across the industry.'

The UK Government recognises the Plant Healthy accreditation and is piloting a procurement scheme which specifies that Government tree buying must be done through accredited nurseries. King Charles III, the former Prince of Wales, took a personal interest in the initiative, convening a Highgrove conference in 2018. This led to the creation of the cross-industry Plant Health Alliance which now administers the Plant Healthy scheme.

Plant Health Alliance is a cross-sectoral group with membership spanning ornamental horticulture, forestry and general land management as well trade associations, environmental NGOs and government – planthealthy.org.uk/planthealth-alliance

International Plant Sentinel Network, through Botanic Gardens Conservation International – <u>www.bgci.org/our-work/</u> networks/ipsn/





# Members' reports

SRUC; Scottish Association for Marine Science

SRUC STUDIED six case studies of land use partnerships in the UK to explore how partnerships were developed, how natural capital risks and benefits were identified, how the value of natural capital was appraised and how the partnerships drove engagement with a range of actors.

Case studies included: the Eden Catchment Partnership; Galloway Glens Landscape Partnership; Landscape Enterprise Networks, North Pennines AONB; South Downs People and Nature Network; and the Spey Catchment Initiative.

Regional Land Use Partnerships (RLUPs) are being set up in Scotland to help achieve Scotland's climate change targets through land use change and a natural capital approach. These partnerships facilitate engagement between local and national government, communities, landowners, land managers, and a range of other relevant stakeholders.

Five RLUP pilots will produce a Regional Land Use Framework (RLUF) by 2023 using a natural capital approach which considers key natural assets and the benefits these provide to communities and the regional economy.

The project examines evidence from the UK and Europe for the use of the natural capital approach in successful partnerships, working across multiple sectors and landownership boundaries. It focuses on outcomes for climate change, biodiversity and benefits to local communities. It includes six case studies of partnerships that have incorporated elements of a natural capital approach.



# Success of Land Use Partnerships with a natural capital approach

A study at SRUC learned valuable lessons from partnerships throughout the UK

Based on our analysis, a natural capital approach can help in five ways.

First, to build a balanced overview of the range of ecosystem services and benefits to communities and stakeholders that land and natural assets can provide. Second, to develop an understanding of how different services may interact in response to projects and interventions, leading to multiple benefits or negative

unintended consequences. Third, to contextualise and respond to the different priorities and interests of specific partners and stakeholders, helping pre-empt and manage conflicts of interest. Fourth, to act as a stimulus for local investment; and fifth, to bring stakeholders together to co-produce plans that can meet multiple objectives.

Read the full report: bit.ly/3GZyUTX

# Scholarships announced for aquaculture Masters

The Scottish Association for Marine Science in Oban has a world-class offer for aspiring international students

THE SCOTTISH Association for Marine Science (SAMS), a partner of the University of the Highlands and Islands (UHI), is looking to produce the aquaculture industry leaders of the future, as it invites applications for its world-class Erasmus Mundus Joint Master Degree course.

The specialised degree in Aquaculture, Environment and Society-STAR (ACES-STAR) is part of the European Unionís ambitious Erasmus+ programme, making it one of Europe's highest-ranked academic programmes.

Through Erasmus+, the ACES-STAR programme has secured £5M

over the next five years to fund 81 scholarships for international students.

The two-year course, which has been running since 2015 and has trained 110 students from 38 countries, is looking to attract students with a bachelor's degree (or equivalent) in one of the fields of environmental or social sciences and will be run in partnership with the universities of Crete, Greece and Nantes, France.

The course is also supported by 63 affiliated partners from across the world, which have offered to provide guest scholars and/or support internships or dissertation projects. Three scholarships funded by Scottish Aquaculture Innovation Centre (SAIC) are also now available for ACES-STAR. The successful recipients of the SAIC scholarships must have Scottish residency and undertake their dissertation project with one of SAIC's consortium partners. Successful applicants spend their first semester at SAMS in Oban, before going on to study finfish aquaculture in Greece and shellfish aquaculture in France.

To find out more and to apply visit www.emm-aces.org or email aces@ sams.ac.uk



## **SCRR** member organisations

The University of Edinburgh www.ed.ac.uk Moray House School of Education www.ed.ac.uk/schools-departments/education Royal (Dick) School of Veterinary Studies www.ed.ac.uk/schools-departments/vet School of Biological Sciences www.ed.ac.uk/schools-departments/biology School of Engineering www.see.ed.ac.uk School of GeoSciences www.ed.ac.uk/schools-departments/geosciences School of History, Classics and Archaeology www.shca.ed.ac.uk/Research/ School of Social and Political Studies www.sps.ed.ac.uk Biomathematics and Statistics Scotland www.bioss.ac.uk British Geological Survey, Edinburgh www.bgs.ac.uk Centre for Ecology & Hydrology, Edinburgh www.ceh.ac.uk Edinburgh Napier University, School of Applied Sciences www.napier.ac.uk/fhlss/SLSSS Field Studies Council, Millport enquiries.sco@field-studies-council.org Forest Research, Northern Research Station www.forestry.gov.uk/forestresearch Heriot Watt University. School of Life Sciences www.sls.hw.ac.uk James Hutton Institute www.hutton.ac.uk Moredun Research Institute www.moredun.ac.uk 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 Association for Marine Science, Oban www.sams.ac.uk Scottish Natural Heritage www.snh.gov.uk SNIFFER www.sniffer.org.uk Society of Antiquaries of Scotland www.socantscot.org Society, Religion and Technology Project www.srtp.org.uk University of Glasgow www.gla.ac.uk College of Medical, Veterinary and Life Sciences www.gla.ac.uk/colleges/mvls/ College of Social Sciences www.gla.ac.uk/colleges/socialsciences/ 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 www.lews.uhi.ac.uk/research Lews Castle College, Stornoway NAFC Marine Centre, Shetland www.nafc.ac.uk West Highland College, Fort William www.whc.uhi.ac.uk University of St Andrews, Earth and Environmental Sciences www.st-andrews.ac.uk/gg University of Stirling www.stir.ac.uk Institute of Aquaculture www.aquaculture.stir.ac.uk Biological & Environmental Sciences www.stir.ac.uk/natural-sciences/about-us/bes/

#### **EVENT NEWS**

# Early Career Researchers mini-conference

In order to enable ECRs to engage with a wider network of people, and therefore gain the most benefit from the experience on the day, we have taken the decision to reschedule our **ECR mini-conference** to May 2023 so that it combines with the prestigious annual event jointly organised by the Royal Society of Edinburgh and SCRR, our **Peter Wilson Lecture**. This will give greater exposure for new research and open up networks more widely.

We would like to offer ECRs the opportunity help us co-organise the ECR miniconference in 2023 and receive a Certificate of Co-Management from this prestigious event for their CV. If interested in taking up this opportunity, please contact Lyndsey Hayes at the email address below before January 19, 2023.

scrr.ac.uk/events

#### PEOPLE AT SCRR

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#### **CONTACT SCRR**

Please contact SCRR by email via the Secretary/Treasurer

### **COPY DEADLINE**

The deadline for copy in the next issue is February 24, 2023

### **DISTRIBUTION**

For all queries about distribution, please contact the Secretary/ Treasurer by email.

### **FUTURE ISSUES**

Contributions to the SCRR newsletter are welcomed. All contributions, comments and suggestions should be emailed to the Secretary/Treasurer as above.

### ON THE WEB

Back issues: scrr.ac.uk/newsletters

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