

SEFARI



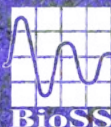
Leading ideas on biodiversity



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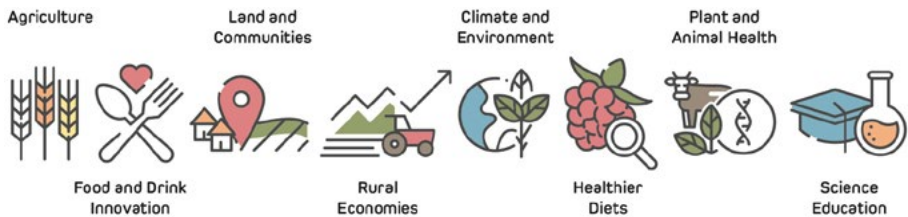
Leading ideas for Scotland's biodiversity

The Scottish Environment, Food and Agriculture Research Institutes (SEFARI) is a collective of six research institutes, each with their own global capability, expertise and reputation. The six institutes are: Biomathematics and Statistics Scotland, the James Hutton Institute, the Moredun Research Institute, the Rowett Institute, Royal Botanic Garden Edinburgh and Scotland's Rural College.

Through collaborative multi- and interdisciplinary research, SEFARI are responsible, with Higher Education Institute partners, for delivering the Scottish Government (Rural and Environment Science and Analytical Services, RESAS) funded Strategic Research Portfolio on environment, agriculture, land, food, and rural communities (2016-2021). The Portfolio includes the Strategic Research Programme, Centres of Expertise, Innovation Partnerships and Underpinning Capacity funding of national resources within SEFARI.

The SEFARI Gateway is the knowledge exchange and impact hub for SEFARI. The Gateway works to enhance stakeholder access to the individual and interdisciplinary expertise of the Portfolio; to improve the flow of research-knowledge to and from the Portfolio to Scotland's policy, industry-sector representatives and public audiences and to increase the impacts from those activities. Gateway also seeks to ensure that Portfolio research is actively informed by stakeholders and knowledge networks across Scotland, UK and internationally.

SEFARI focuses its work under eight 'Leading Ideas':



With examples from 'Climate & Environment', 'Land & Communities' and 'Plant & Animal Health', this leaflet highlights SEFARI Scottish Government funded strategic research to protect and enhance Scotland's biodiversity.





Charles Bestwick
Director
SEFARI-Gateway




Lorna Dawson
SEFARI Advisor

Contact us

 www.sefari.scot

 @SEFARIScot
#LeadingIdeas

 info@sefari.scot

New tools to assess the experiences of greenspace: participatory video

Contact: antonia.eastwood@hutton.ac.uk



Having access to safe, good quality greenspace is important for health and wellbeing. Cumbernauld Living Landscape aims to improve the quality and accessibility of Cumbernauld's greenspaces by empowering local communities to connect with nature, and with each other, thereby improving health and well-being as well as fostering stewardship of the environment.

The use of participatory video (PV) is currently being explored by SEFARI researchers as a monitoring and evaluation tool to assess the impacts of the project. To date, work reveals:

- PV is empowering, giving a 'voice' to communities often overlooked in decision-making
- Greenspaces are not seen as safe places by young people
- Nature-health programmes are essential for some community groups to access the health and well-being benefits of greenspaces
- Engaging young people in meaningful, supported activities such as PV in greenspaces can lead to transformational changes in their views and attitude towards nature

One young person living in Cumbernauld said: *"I never really understood nature... until we did that project, I never went out. I never went out just to walk about and see how beautiful nature is, how you can connect with different things, and how calm it could be. ... It helped me see the world in a different way."*



Delivery of public benefits: integrated upland management

Contact: davy.mccracken@sruc.ac.uk

Nearly 70% of Scotland's land area consists of uplands (or land of upland character) dominated by rough grazing; a term used for vegetation of poor agricultural productivity consisting largely of moorlands, heathlands, bogs and wet grasslands.

The way this land is managed can play a key role in dictating how valuable it is for maintaining habitats and wildlife species considered of high nature conservation value and/or providing a wide range of other public benefits to society.

- In upland situations, public goods (often referred to as ecosystem services) can include flood mitigation and carbon sequestration
- These public goods can be achieved through the maintenance and restoration of degraded peatlands or by the establishment of new woodlands planted next to watercourses

This research is assessing public good provision from two adjacent large Highland glens, one which was planted with montane woodland twenty years and the other which has continued to be grazed by sheep and cattle.

Although provision of most goods differs between glens, when they are considered together it is clear that a range of goods can be delivered at a farm level. It is concluded that more integrated land management can help ensure the delivery of multiple outcomes from individual upland units in the future.



Indicators for monitoring Scotland's environmental health

Contact: rob.brooker@hutton.ac.uk

Having responsive environmental indicators is critical for monitoring the state of our natural environment and helping stakeholders to target the most appropriate action on areas most in need of protection and restoration. Working with key stakeholders, in particular Scottish Natural Heritage, two national-scale environmental indicators have been developed.

- Scotland's Natural Capital Asset Index (NCAI) helps track changes in Scotland's natural capital stock and has demonstrated potential to contribute to wellbeing changes on an annual basis. The NCAI has been chosen as a National Performance Framework Indicator by the Scottish Government, helping with policy decision making
- A new Ecosystem Health Indicator has been developed using long-term national-scale bryophyte records. This enables the health of the environment to be tracked at national and regional scales, and identifies environmental responses to key drivers of change such as climate and pollution

Working collaboratively this work will further promote existing indicators, and identify new ways to address gaps in the set of indicators available in Scotland.



Protecting Scotland's temperate rainforest

Contact: c.ellis@rbge.org.uk

Temperate rainforest is globally rare, and Scotland has the best remaining examples of this ecosystem in Europe. Nevertheless, Scotland's temperate rainforest – such as west coast hazelwoods, oak and ash woods, and pinewood – is highly fragmented, and threatened by overgrazing, invasive non-native species and climate change.

- Many of our rainforest's key species occur only as small populations in isolated woodland patches, and they will be unable to respond to climate change
- Using novel DNA techniques to trap and identify microscopic propagules dispersing across the landscape, spatial planting strategies have been optimised, to ensure that rainforest species can spread to regenerated areas of woodland
- In the most extreme situations, where species have been lost from entire regions, experimental translocation methods have been developed to reinstate rainforest species and recover biodiversity and ecosystem function

This research helps to ensure the climate change resilience of Scotland's rainforests and their biodiversity, by increasing the size and number of species populations. Helping to support native forest expansion is in line with Scotland's Forestry Strategy 2019-2029 and is informing landscape-scale multi-partner initiatives, such as the Atlantic Woodland Alliance.



Liver fluke risk and natterjack toads

Contact: philip.skuce@moreun.ac.uk

Understanding the risk of liver fluke to livestock associated with agri-environment schemes is important to help design the most appropriate management practices. Natterjack toads are a protected species in Scotland, with the only breeding population found on the Solway Firth. Conservation grazing of the saltmarsh (merse) is required to provide the optimal habitat for toad feeding and breeding, while also taking into account

the perceived risk to livestock health from the liver fluke parasite in the wet marginal land where they graze. Field work was carried out by SEFARI scientists with the SNH Project Team at Caerlaverock Estate, Solway Firth.

- To date liver fluke and rumen fluke eggs have been detected in cattle and sheep grazing the merse, but no evidence of infection in the resident mud snail population has been found (certain species of mud snail can act as an intermediate host to disseminate the parasite's infectious stages)
- Results indicate that saltmarsh represents a relatively low fluke risk to livestock, although it is important that every agri-environment scenario must be risk assessed and management decisions made based on evidence and testing

The research provides best practice livestock grazing guidelines that simultaneously promote biodiversity and animal health, whilst incorporating informed decision-making regarding risks and benefits.

CaperMap: a communication and planning tool for capercaillie conservation

Contact: scott.newey@hutton.ac.uk



CaperMap is a participatory Geographic Information System (GIS) to promote the conservation of the capercaillie, one of Scotland's rarest and most threatened bird species. Bringing conservationists, local communities and other stakeholders together to co-construct management options is vital to their conservation. In supporting the Capercaillie Framework (<https://cairngormsnature.co.uk/capercaillie-framework>), CaperMap aims to :

- Allow users to interactively and visually explore complex spatial information and compare outcomes of different scenarios, assumptions and opinions
- Promote effective capercaillie conservation in landscapes in which there are multiple land uses/users

CaperMap is currently being used to support the Cairngorms Capercaillie Project (<https://www.cairngormscapercaillie.scot/>) and was developed by SEFARI in collaboration with Scottish Natural Heritage, the Royal Society for the Protection of Birds, and the Cairngorms National Park Authority.