

Ecosystems and Land Use Policy Exchange Group (ELPEG) Bulletin

Issue 3, January 2017

What is the ELPEG Bulletin?

The ELPEG Bulletin will provide updates for policy stakeholders on research activities being undertaken in the Scottish Government Strategic Research Programme, in particular in the areas of Biodiversity and Ecosystems, and Integrated Natural Assets. The focus will be the policy areas of:

-) Scottish Biodiversity Strategy; Land Use Strategy for Scotland; Report on Proposals and Policies (Climate Change); SRDP and CAP greening; Scottish Forestry Strategy.

This edition of the Bulletin does not try to cover all of the research being undertaken in the Biodiversity and Ecosystems and the Integrated Natural Assets work packages. It focuses on the work where there will be policy-related outputs and stakeholder engagement during the period January 2017 to March 2017, and which we believe will be of direct interest to policy makers working in these areas.

This Issue of the ELPEG Bulletin is complemented by a separate document summarising the work that will be undertaken during the whole of year 2 (April 2017-March 2018) of the Strategic Research Programme – the ELPEG Year 2 Bulletin. A further issue of the Bulletin is planned in conjunction with the next ELPEG meeting in May 2017, looking ahead to December 2017.

The text below includes information on what has happened to date and what is planned over the next six months. The researchers involved would welcome and queries, input and discussions concerning their work, and can be contacted directly via the e-mail addresses provided. Given the post ‘Brexit’ context, we would particularly welcome any insights and suggestions from you regarding how and when work may need to be adjusted to take account of changes in policy objectives and/or policy delivery mechanisms, including funding availability.

Scottish Biodiversity Strategy

This work is aimed at supporting delivery of the Scottish Biodiversity Strategy. It involves studies examining the ecology of keystone species of conservation concern, both native and non-native (including pests and diseases), as well as the relationships between biodiversity, people and the delivery of ecosystem services. It also includes work helping support delivery processes for the SBS, including for example the development of Ecosystem Health Indicators, or development of a National Ecological Network for Scotland.

-) The **impact of management regimes on biodiversity, ecosystem function and ecosystem service delivery** (1.3.1, O1.3a) is being examined in upland ecosystems. Large-scale studies in upland management systems (1.3.2, O2.2) will explore how changes in management regime alter ecosystem service supply; first findings from this work will be discussed with local stakeholders (**February 2017**) and the wider stakeholder community (**March 2017**); intended audience SG, agencies, land managers; Davy.McCracken@sruc.ac.uk).
-) The development of **Ecosystem Health Indicators** (1.3.1, O2.1) is being supported through work in the Strategic Research Programme (SRP), and collaboration between SRP researchers and key stakeholders (e.g. SNH staff). Following discussions to define stakeholder needs in 2017, we aim to produce information notes to support development of new EHIs, in particular indicators on access to green space and “complex” diversity measures. Discussions also identified links to work on refinement of the **Natural Capital Asset Index** (NCAI) (1.4.1, biii). SRP researchers will contribute to a review of the current NCAI indicators (**March 2017**); intended audience agencies, SG, SRP researchers; Rob.Brooker@hutton.ac.uk).

ELPEG SPOTLIGHT

The Natural Asset Register and Natural Capital Accounts: research outcomes from year 1 (RD1.4.1)

Research Deliverable 1.4.1 comprises objectives covering the development of a) the Natural Assets Register (NAR), b) Assessing ecosystem service delivery and interactions, and c) Natural Capital Accounts (NCA). Here we will summarise the activities in developing the NAR and NCA.

In determining the scope and use of the NAR we undertook a review of existing initiatives across the UK. These were found to either i) provide an assessment of functionality (6 initiatives, e.g. SNH NCAI), or ii) provide environmental data and information (13 UK initiative, 4 international, e.g. SEWeb and Atlas of Living Scotland). The results of this review have been discussed with both the MRP research community and wider stakeholders (ELSEG) to guide the future development and use of the NAR. Candidate focus areas of relevance to the SRP include: SRDP (or replacement) targeting, Ecosystem Health Indicators, and NCAI. Comments from the ELSEG workshop included the need to consider the types of decisions that end users are making and the scales and locations at which those decisions are made. The next steps for the NAR are to develop its formal specification in terms of structure, software (proprietary or open source) and data (compliance and metadata). The data will then be collated, this will include decision on reporting units such scale (e.g. sub-catchment) and resolution. We also consult further on access to the NAR to consider both resources and end user needs.

Our review of NCA focussed on some of the conceptual issues of identifying the value of the ecosystem services that flow from natural capital. To allow us to incorporate the spatial outputs from the NAR, these conceptual issues included how we deal with the spatial configuration of natural capital and ecosystem service delivery (e.g. distance decay, proximity of substitute and complementary assets). Conceptually, where the NAR is mapping supply of natural capital, the NCA seeks to map demand. Our review of existing accounting initiatives such as the ONS noted that these are largely physical accounts without a valuation element.

The NCA will take a case study approach and these will initially include forests and agriculture. To inform these accounts we are undertaking two primary valuation studies. The first will consider the impacts on water quality and biodiversity of agricultural management (funded by the H2020 PROVIDE project). The second is a forest recreation valuation (funded by the SRP) that considers the impact of different forest characteristics (species composition, age, 'naturalness') on recreational demand. The forest valuation is also being replicated across a number of European countries.

For further information contact

Alistair McVittie (RD1.4.1c, NCA) alistair.mcvittie@sruc.ac.uk

David Donnelly (RD1.4.1a, NAR) david.donnelly@hutton.ac.uk

-) **Animal diseases and the spread of INNS** are a threat to Scotland’s natural environments. Good scientific knowledge is essential to underpin management. Work within the SRP (1.3.3, O3.2b) examines in particular the role of squirrelpox virus (SQPV) in the replacement of native red squirrels by invasive grey squirrels. Data on this topic will be provided to the Scottish Squirrel Group (**March 2017**; intended audience SG, NGOs, agencies; Colin.McInnes@more.dun.ac.uk).
-) **System – including ecosystem – resilience** (1.3.3, O1.1) is becoming an important focus for research. To better understand the complexity of systems, research is exploring concepts of resilience in relation to key environmental drivers. It is synthesising the findings of previous studies, identifying the state of current knowledge, and distilling elements of wider applicability of the study of resilience to a range of ecosystems in Scotland. The aim is to enable the development and targeting of management actions to enhance resilience. Synthesis of current scientific understanding, including research and stakeholder workshops (November 2016), will lead to the development of a science brief on the potential to apply resilience concepts to Scottish biodiversity (**March 2017**; intended audience SG, agencies, NGOs, land managers; Glenn.lason@hutton.ac.uk),
-) Understanding the **relationships between biodiversity and cultural ecosystem services** is a key current research priority. A rapid evidence assessment literature review on the effects of biodiversity enhancement on the delivery of cultural ES will be conducted (1.3.2, O1.1), focussing on “does the ecology of a place matter in terms of cultural ecosystem services being delivered” (**March 2017**; intended audience SG, SNH, researchers; Katherine.Irvine@hutton.ac.uk).
-) At the heart of developing an ecosystem approach within the 2020 Challenge for Scotland’s Biodiversity is the concept of a **National Ecological Network**. Work in the SRP (1.3.1, O3.2 and O3.2) is helping to take forward this concept, contributing to a major exercise to co-ordinate actions to support the delivery of landscape-scale habitat connectivity across Scotland. This will include an integrating scoping workshop including SRP researchers and experts/key contacts from national institutes, agencies and the two National Parks (**March 2017**; intended audience SG, agencies, NGOs, land managers; Alison.Hester@hutton.ac.uk).
-) A **working tool to account for habitat/species distributions and impacts of habitat loss and gain** in the context of urban planning will be developed (1.3.4, O3). This work will consider both habitats at risk from different types of development (identified at local and national levels) and where habitats might be created (e.g. green infrastructure investments such as in the Central Scotland Green Network). The biodiversity and ecosystem services associated with these habitat changes will be characterised. Models will be used to analyse the potential effects that habitat change might have depending on their spatial context, and translated into draft maps for ground-truthing with stakeholders (Alistair.Mcvittie@sruc.ac.uk, **March 2017**).

Land Use Strategy for Scotland

This research is designed to support the delivery of the Land Use Strategy 2016-21, including the vision, objectives, principles and particularly the policies 1, 2, 4, 6, 7, 8 and 9; and the proposals 1, 3 and 5.

-) A draft **Natural Asset Register** (1.4.1a) will be developed by **Spring 2017**. A review on existing natural asset or ecosystem service registers and databases is available on request (intended audience: SG, agencies, NGOs and academics involved in developing and using web-based databases). Based on the outcome of this review, we are now consulting key stakeholders in policy and academia to ensure the Natural Asset Register database is

designed to complement and duplicate existing initiatives. A consultation on a prototype NAR will commence in **March 2017** (audience as above). (David.Donnelly@hutton.ac.uk).

-) These tools will identify **current status and historic trends associated with delivery of ecosystem services** (1.4.2a) (e.g. nutrient retention, sediment retention, carbon storage, provision of arable, livestock grazing or timber, pollination and habitat networks) and results will be presented to the ELPEG or the Soils Engagement Group, if requested in **Spring 2017**. We have begun to scope out **Policy option appraisal for delivery of multiple benefits** (1.4.2ci) through technical discussions with staff from WP2.4 about how to combine ecosystem service and land use/land management data (e.g. from IACS returns to look at outcomes from LFASS payments and project ANC payments). Using opportunities at other workshops, we have identified some candidate policy topics and options to model (intended audience: SG and agency staff working on Areas of Natural Constraint or another policy pilot case study). (deliverable available on request, Alessandro.gimona@hutton.ac.uk).
-) **Opportunities to increase multiple benefits through policy and industry delivery mechanisms** (1.4.2bi). We are currently applying an evaluation framework derived from institutional and policy assessment literatures to a sample of incentives (Water Environment Fund), regulations (CAR), good practice guidance (Farming for a Better Climate) and partnership projects (CSGN) and we are working with RD1.3.4 to plan a joint know exchange event in **Spring/Summer 2017**. (Kerry.Waylen@hutton.ac.uk).
-) Research on **using social innovation to deliver multiple benefits** (1.4.2biii) will develop a typology of social innovation for testing in Scotland (**Spring 2017**, intended audience: agencies involved in LEADER, Forestry Commission, Scottish Forum for Natural Capital, ECom, Maria.Nijnik@hutton.ac.uk). The work has benefitted from interactions with the [H2020 project SIMRA](#), where ideas of social innovation and its use across Europe are being discussed.

Report on Proposals and Policies (Climate Change) & Climate Change Adaptation Programme

This research addresses some of the major challenges arising from the RPP and CCAP, including understanding how climate-induced land-use change might alter the delivery of climate-relevant ecosystem services such as soil carbon storage and forestry. It will also look ahead to support development of the next Scottish Climate Change Bill.

-) Research is ongoing to improve our understanding of **ecosystem service flows and our inventory of natural assets** (1.4.1bii). We are improving the spatial resolution of ecosystem service modelling (using a range of tools and refined data sets) to answer future policy questions, particularly how ESS might respond to future climate change. A report on improvements to these models is due in **February 2017** (intended audience: SG and agencies with an interest in modelling ESS delivery, Alessandro.gimona@hutton.ac.uk).
-) Many projects listed under other headings include an aspect of climate change adaptation including: **using social innovation to deliver multiple benefits** (1.4.2biii); **adaptive management approach to facilitate the evaluation and coordination of measures to deliver multiple benefits** (1.4.3a); **assessing multiple land use options** (1.4.2cii); **woodland supply of ecosystem services** (1.3.2a).

SRDP and CAP greening

This research is designed to support the implementation of the Scottish Rural Development Programme (2014-20), in particular the implementation of the Agri-Environment Climate Scheme management and capital options; the Environmental Cooperation Action Fund; and the Forestry Grant Scheme. However, research may also inform the implementation of LFASS/ANC, beef efficiency scheme, and the advisory services plus we support and contribute to the Scottish Rural Network.

-) Work to assess **new management options for agri-environment schemes** (1.3.4, O1.1 & O1.2) will bring together existing evidence, and information gathered from engagement with stakeholders, to propose new management measures for inclusion in agri-environment schemes in Scotland. It will link to work being undertaken on perceptions of and attitudes towards management options. A stakeholder consultation on novel measures will be undertaken, with stakeholders identifying those novel measures to be tested in the field (**March 2017**), and an associated policy brief (1.3.4, O2) will be written (**March 2017**; intended audience: SG and agencies involved in AECs implementation; Robin.Pakeman@hutton.ac.uk).
-) An associated activity is the development of methods for **targeting SRDP payments for biodiversity** (1.4.1bv). Some data on species and habitat links to management has been received and collated and assessed for its utility in spatial targeting, but we are waiting on species distribution data from Scottish Government. The final analysis will inform the consultation on how to refine SRDP AECs targeting and how species respond to targeting (**Spring 2017 onwards**; intended audience: SG and agencies involved in AECs implementation post 2021, Robin.Pakeman@hutton.ac.uk).
-) Research is **assessing the potential for Environmental Focus Areas (EFAs), Agri-Environmental Climate Schemes (AECS) and the Environmental Cooperation Action Fund (ECAF) to deliver multiple benefits at a landscape scale** (1.4.3b) within case study catchments based around i) the arable Balruddery Centre for Sustainable Cropping and ii) the three MRP grassland research farms (Glensaugh, Hartwood and Kirkton/ Auchentyre). Farm managers have been interviewed to identify EFA/AECs preferences resulting in a brief report ((**February 2017**, intended audience: SG and agencies with an interest in EFAs, AECs and ECAF). Spatial data has been collected to allow ecosystem service delivery from the catchments to be identified. ECAF data is being obtained and will be analysed to establish barriers and enabling aspects of collaboration. RD staff have been involved in learning best practice in implementing demonstration days and planning for the annual demonstration day, provisionally at Glensaugh, looking a soil liming and woodland expansion issues, is underway (**May 2017**) (intended audience: local farmers, NFUS, SLE). (Justin.Irvine@hutton.ac.uk).
-) Research will also consider how to **integrate SRDP interventions with Natural Flood Management (NFM) and General Binding Rules (GBR) for the delivery of multiple benefits** (1.4.3d). This work is collaborating with ongoing catchment initiatives such as Tweed and the Dee to consider an adaptive management approach as called for by Scottish Freshwater Group and SEPA Natural Flood Management Handbook (Kit.Macleod@hutton.ac.uk). We will produce a short report on how we link across Practical interventions to realise multiple benefits and manage trade-offs (1.4.3) and Effectiveness of water management (1.2.4) due in **March 2017** (intended audience: SEPA and Scottish Freshwater Group).
-) Research on **improving the environmental performance of beef supply chains** (1.4.2biv) will classify Scottish beef production systems and design a conceptual model for quantitative modelling of how changes to the supply chain will deliver multiple benefits (Simon).

Willcock@sruc.ac.uk). Progress has been made on identifying where models for parts of the supply chain exist or are being developed, using existing characterisations of the Scottish Beef industry. The conceptual framework for analysis of trade-offs will be available by **March 2017** (intended audience: NFUS, QMS, SG and agencies with an interest in circular economy).

Scottish Forestry Strategy

This research aims to support the implementation of the Scottish Forestry Strategy, including the vision, objectives, outcomes and themes, particularly climate change, biodiversity, environmental quality, community development and access and health. The research will also provide evidence, as requested for the SFS review (as highlighted in the Land Use Strategy and Programme for Government).

-) Woodland systems will be the focus of work considering how management interventions, and their effect on the relationship between people and the environment, can alter the **supply of ecosystem services**. Using case studies of woodland management in the Cairngorms National Park (potentially as part of the Capercaillie conservation programme), and the Central Scotland Green Network, initial activities include developing a conceptual framework (1.3.2, O1.1) - through engagement with stakeholders - for assessing the production of woodland ecosystem services, and developing scenarios for the outcome of management interventions (e.g. ecosystem restoration) for discussion with stakeholders. A stakeholder engagement weekend (1.3.2, O1.8) has been undertaken at the Royal Botanic Gardens, Edinburgh (intended audience: general public; David.Miller@hutton.ac.uk). The framework will be discussed with the wider stakeholder groups (including ECom) by **February 2017** (intended audience: researchers, SG, agencies; Anke.Fischer@hutton.ac.uk) and will be followed by the development of a draft specification of scenarios for discussion with local stakeholders (intended audience: land managers; **March 2017**).
-) Related work to develop **approaches that reconcile woodland expansion with other land use priorities** (1.4.3c) will address benefits and trade-offs from woodland expansion, incentivised by the Woodland Grants Scheme, in: i) in Cumbernauld (Central Scotland Green Network) and ii) Boat of Garten + Carrbridge within Cairngorms National Park. Meetings have been held with stakeholders e.g. CNPA, Capercaillie BAP Group, Capercaillie HLF bid team, Community council members and staff from the Cumbernauld Living Landscape Project to co-construct the focus of the research (summary of issues available on request). A report on the benefits derived by communities from the case study areas, identifying the main trade-offs, is currently in an early draft form (due **February 2017**, proposed audience: local stakeholders and LUS team). A workshop on the potential for national ecological network of woodland connectivity is being held in Edinburgh on **March 15th 2017** (audience: SG policy, SNH, NGOs, land managers, Justin.Irvine@hutton.ac.uk). The development of maps of woodland expansion options and consequences for ecosystem services and biodiversity (Proposed audience: SG agency staff) is ongoing (due **March 2017**; katrina.brown@hutton.ac.uk).

Summary of activities in next 3 months

Topic	Contact	Activities and Due dates
Scottish Biodiversity Strategy		
Impact of management regimes on	Davy.McCracken@sr	Findings discussed with local

biodiversity, ecosystem function and ecosystem service delivery (1.3.1, O1.3a)	uc.ac.uk	stakeholders - February 2017 Findings discussed with wider stakeholder community - March 2017
Ecosystem Health Indicators & NCAI (1.3.1, O2.1)	Rob.Brooker@hutton.ac.uk	Contribution to revision of NCAI – March 2017
Animal diseases and the spread of INNS (1.3.3, O3.2b)	Colin.McInnes@mor.edun.ac.uk	Information to Scottish Squirrel Group – March 2017
System – including ecosystem – resilience (1.3.3, O1.1)	Glenn.lason@hutton.ac.uk	Science brief – March 2017
Relationships between biodiversity and cultural ecosystem services (1.3.2, O1.1),	Justin.Irvine@hutton.ac.uk	Literature review – February 2017
Biodiversity governance mechanisms: what can we learn from farmland biodiversity governance? (RD 1.3.4, O1.1) Review of Governance mechanisms Report	Paula.Novo@hutton.ac.uk	ESCom event - March 2017 Review report - March 2017
Working tool to account for habitat/species distributions and impacts of habitat loss and gain (1.3.4, O3)	Alistair.Mcvittie@sru.ac.uk	Draft maps of habitat change impacts – March 2017
Land Use Strategy for Scotland		
Natural Asset Register (1.4.1a)	David.Donnelly@hutton.ac.uk	Review available now on request Consultation on prototype due Spring 2017
Current status and historic trends associated with delivery of ecosystem services (1.4.2a)	Alessandro.gimona@hutton.ac.uk	Presentation to ELPEG or SEG if requested (Spring 2017)
Using social innovation to deliver multiple benefits (1.4.2biii)	Maria.Nijnik@hutton.ac.uk	Typology of social innovation (Spring 2017)
Report on Proposals and Policies (Climate Change) & Climate Change Adaptation Programme		
Ecosystem service flows and our inventory of natural assets (1.4.1bii)	Alessandro.Gimona@hutton.ac.uk	Report on model developments - February 2017
SRDP and CAP greening		
New management options for agri-environment schemes (1.3.4, O1.1 & O1.2)	Robin.Pakeman@hutton.ac.uk	Stakeholder consultation on novel measures and associated policy brief – March 2017
Targeting SRDP payments for biodiversity (1.4.1bv)	Robin.Pakeman@hutton.ac.uk	Consultation on how to refine AECs – Spring 2017

<p>Assessing the potential for Environmental Focus Areas (EFAs), Agri-Environmental Climate Schemes (AECS) and the Environmental Cooperation Action Fund (ECAAF) to deliver multiple benefits at a landscape scale (1.4.3b)</p>	<p>Justin.Irvine@hutton.ac.uk</p>	<p>Report on farmers attitudes to SRDP uptake - Feb 2017</p>
<p>Integrating SRDP interventions with Natural Flood Management (NFM) and General Binding Rules (GBR) for the delivery of multiple benefits (1.4.3d).</p>	<p>Kit.Macleod@hutton.ac.uk</p>	<p>Report on linking interventions to realise multiple benefits and Effectiveness of water management - March 2017</p>
<p>Improving the environmental performance of beef supply chains (1.4.2biv)</p>	<p>Simon.Willcock@sruc.ac.uk</p>	<p>Conceptual Framework – March 2017</p>
<p>Scottish Forestry Strategy</p>		
<p>Supply of ecosystem services (1.3.2, O1.1 & O1.8)</p>	<p>Anke.Fischer@hutton.ac.uk</p>	<p>Discussion of ES conceptual framework with stakeholders – February 2017 Draft specification of scenarios – March 2017</p>
<p>Approaches that reconcile woodland expansion with other land use priorities (1.4.3c)</p>	<p>katrina.brown@hutton.ac.uk</p>	<p>A report on the benefits derived by communities -February 2017 A workshop on the potential for national ecological network - March 2017 Maps of woodland expansion options and consequences - March 2017</p>