Ecosystems and Land Use Stakeholder Engagement Group (ELSEG) 2017 Pre-Meeting Briefing

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Our annual Ecosystems and Land Use Stakeholder Engagement Group meeting aims to discuss progress across the Biodiversity and Ecosystems and the Integrated Natural Assets work packages of the Strategic Research Programme; and get stakeholder feedback on research direction for 2018 onwards.

We will present research results and research plans around three common areas across both work packages: biodiversity, climate change and land use. In order to help stakeholders engage on the day, we present some selected highlights below. This is an edited selection of the work underway, and we encourage participants to ask questions about any other topics of interest on the day so we can ensure that they are put in touch with the correct person for more detailed discussions.

Biodiversity:

This research 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 Scottish Biodiversity Strategy, including for example the development of Ecosystem Health Indicators, or development of a National Ecological Network for Scotland.

Work already completed includes:

- Studies of the links between biodiversity and ecosystem function (including resilience) in crop systems,
- Studies of the ecology of a range of rare species (including mountain plants, Capercaillie, and natterjack toads) and other species of conservation concern (including ticks, invasive non-native species, and novel plant pathogens),
- A review of resilience concepts and thinking,
- Work identifying gaps and data sets to support the Natural Capital Asset Index and Ecosystem Health Indicators (including reports on the potential to develop new indicators for urban green space and using bryophyte and lichen diversity data),
- Supporting the development of the National Ecosystem Network concept (see reports here),
- Review of biodiversity mechanisms and how they are delivering (workshop report) ,
- Review of methods to improve habitat mapping.

In terms of current and future work, we are researching:

- Underlying mechanisms linking biodiversity and ecosystem service delivery building on our 2016 experimental study of barley-weed interactions,
- Understanding the impacts of genetic factors on reintroduction of alpine plant species success,

- The impact of management regimes on biodiversity, ecosystem function and ecosystem service delivery in upland ecosystems,
- Woodland habitat connectivity,
- Management actions to support system – including ecosystem – resilience,
- Relationships between biodiversity and cultural ecosystem services,
- The consequences of environmental and climate change for ecosystem resilience particularly the impact of human disturbance and mitigation measures on resilience of Capercaillie
- The potential for using different governance mechanisms (including market, non-market and hybrid mechanisms) for biodiversity management in Scotland,
- Modelling approaches to explore the consequences of woodland habitat loss, and assessments of habitat/species distributions and impacts of habitat loss and gain in the context of urban planning,
- Developing improved habitat maps based in the EUNIS classification,
- Understanding drivers of change in woodland diversity and the implications of these drivers for conservation management ,
- The impacts of tree pests and diseases including detailed studies of key pathogens e.g. *Phytophthora ramorum* and other *Phytophthora* fungi.

Climate Change:

This research addresses some of the major challenges arising from climate change mitigation and adaptation, 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.

The main outputs from this work to date consist of:

- Briefing on fodder supply under climate change scenarios,
- Briefing on the climate impacts of distillery by-products.

In terms of current and future work, we are researching:

- The extent to which biodiversity of insects associated with and ecosystem foundation tree species (Scots pine) depends upon the provenance of the tree and the effect of climate,
- How land use intensification and extensification scenarios (for 2050) are affected by climate adaptation and mitigation impacts,
- The response of key pest species to climate change – specifically to predict tick distribution over the UK and Europe,
- A model of peatland condition based on MODIS satellite images focussed on its contribution to climate change mitigation,
- Improving the environmental performance of beef supply chains through the quantification of the main material/energy flows and emissions along the supply chain.

Land Use:

This research is designed to support the delivery of the Land Use Strategy 2016-21, the implementation of the Scottish Rural Development Programme (2014-20), in particular the implementation of the Agri-Environment Climate Scheme management and capital options; and the Forestry Grant Scheme.

The main outputs from this area of work to date consist of:

- Review of gaps in current agri-environment climate Schemes and follow up workshop report,
- Review of approaches to natural capital accounting and natural asset registers,
- Review of data gaps for cultural ecosystem services and potential methods to fill these gaps,
- Consideration of need for policy coordination (workshop report); enabling new approaches to environmental governance; and how to 'drive nature up the agenda',
- Review of how to integrate ecosystem services into macro-economic modelling,
- Review of approaches to adaptive management suitable for Scotland,
- Scoping report on farmers' views about environmental challenges and cooperation in case study catchments,
- Report on benefits and trade-offs of woodland management and community engagement,
- Stakeholder views on integrated land and water management (report).

In terms of current and future work, we are researching:

- A draft prototype Natural Asset Register (NAR),
- Cultural ecosystem services (CES) indicators and mapping,
- Current status and historic trends associated with delivery of ecosystem services,
- Policy option appraisal of agricultural payments and delivery of multiple benefits,
- Role of social innovation in understanding of multi-functional changes to forest ecosystem services,
- Initial case studies of Natural Capital Accounting for the agriculture and forests and woodland sectors,
- Case study assessing economic and ecosystem service impacts of changes in diet,
- How best to align existing policy mechanisms governing soil, water and biodiversity,
- How monitoring and evaluation of water, soil and biodiversity meets international good practice for adaptive management of natural assets,
- Assessing new management options for agri-environment schemes including the impact of liming,
- Developing methods for targeting SRDP payments for biodiversity,
- Assessing the potential for Environmental Focus Areas (EFAs), Agri-Environmental Climate Schemes (AECS) and farmer cooperation to deliver multiple benefits at a landscape scale
- How to integrate SRDP interventions with Natural Flood Management (NFM) and General Binding Rules (GBR) for the delivery of multiple benefits,
- Effect of management interventions on the supply of ecosystem services including those co-produced with local communities,
- The adaptive management approach to facilitate the evaluation and coordination of measures to deliver multiple benefits,
- Working on woodland expansion and woodland management for recreation and conservation,
- Integrated catchment management for water flows and water quality (Water for All).

We hope this helps you to understand the breadth of topics being researched within these work packages and allow you to consider where you might want to follow up mutual interests. We look forward to welcoming you on 20th November.