ECOLOGICAL COHERENCE: A PRACTITIONERS' GUIDE

AN INTEGRATED APPROACH TO PLANNING HABITAT CREATION AND ENHANCEMENTS

The EcoCo project (2014-2019) developed an 'ecological coherence protocol' to identify the best places across central Scotland for carrying out management interventions to maximise ecological, ecosystem services and socio-economic benefits. Inner Forth Futures piloted the approach to produce a revised version of the protocol in collaboration with staff from local government, statutory bodies and conservation organisations in late 2018.

Findings from the Inner Forth are presented as a case study. Testing the ecological coherence approach has allowed the partners to develop a habitat network for a large management zone area of the CSGN area, as well as refine an approach that can deliver multiple benefits for stakeholders, communities and sites throughout the Central Scotland Green Network area and further afield.

This guide introduces practitioners to the streamlined ecological coherence approach and provides guidance to those looking to undertake similar work in their landscape, land-holding or area.

You can find full guidance at www.ecocolife.scot

AN INTRODUCTION TO ECOLOGICAL COHERENCE AND THE APPROACH

In 2010, the 'Making Space for Nature' review undertaken by Sir John Lawton argued for a "step-change in the UK's approach to wildlife conservation", outlining a vision where a landscape-scale approach to habitat restoration is "under-pinned by the re-establishment of ecological processes and ecosystem services, for the benefits of people and wildlife." The Review's call for more, bigger, better and better connected is the driver behind EcoCo and is the underlying thread to the approach that we have piloted and refined in central Scotland. We have adopted Scottish Natural Heritage's proposed definition of ecological coherence throughout this work;

"... At the scale of the whole network, coherence is achieved when: the full range of variation in valued features is represented; replication of specific features occurs at different sites over a wide geographic area; dispersal, migration and genetic exchange of individuals is possible between relevant sites; all critical areas for rare, highly threatened and endemic species are included; and the network is resilient to disturbance or damage caused by natural and anthropogenic factors."
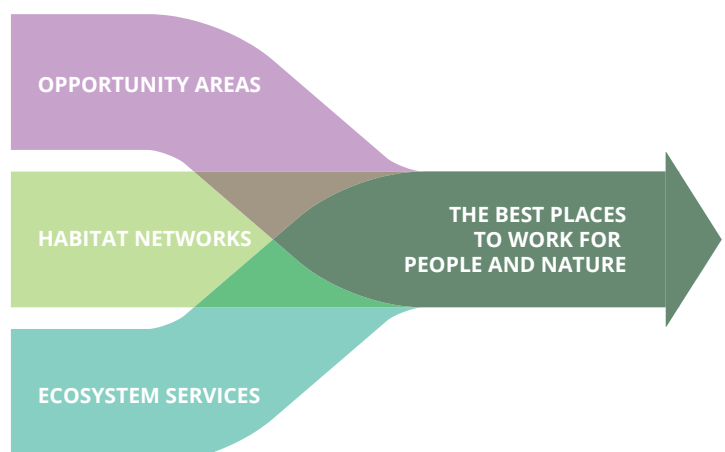
The ecological coherence approach has three components: habitat networks; ecosystem services; and opportunity areas. When relevant data and information relating to all three are considered within a set geographical boundary, the best places to carry out ecologically coherent habitat work can be found. These areas are called 'triple-win' locations. You can start with whichever component you choose, provided that you consider the other two components as you work through the process. Inside this guide we lead you through using the approach, using the Inner Forth as a case study.

THE ECOLOGICAL COHERENCE APPROACH IN PRACTICE

PREPARATION

Engage appropriate stakeholders and secure their participation. Define your project boundary and scale.

Considerations: Involve different organisations with a range of interests, people who are delivering projects in the area and those who own or manage land. Be clear about what you are asking them to commit to (eg frequency, location and length of meetings) and how their skills, knowledge and experience will influence and strengthen the process. You may need to explain the concept of ecological coherence, why working in a collaborative way is beneficial, and how results from the project will be used. Define the geographical area you will be focusing on.

Include a briefing sheet in your invitation so recipients can consider and discuss with colleagues. Remember to ask people you work with regularly 'Who else should be involved in this process?'. Don't be afraid of inviting people or organisations that you have not worked with before.

START THE PROCESS

Choose your entry point:

- **HABITAT NETWORKS**
- **ECOSYSTEM SERVICES**
- **OPPORTUNITY AREAS**

Considerations: This may be an easy decision if one of the entry points fits well with your organisational vision or the main driver for the process. If not, consider which component your organisation, project or stakeholders are most informed about and what data you have access to at this stage.

If you are a landowner or manager, 'Opportunity Areas' may be the most practical place to start. You can use land management plans or maps of possible project sites as your data for this stage. If you are an agency, habitat networks or ecosystem services may be the place you want to start.

FIRST COMPONENT

DATA IDENTIFICATION

Based on your chosen starting point, eg habitat networks, identify and source data related to your project's geographical area. Generate maps of this data to take to your stakeholders for review.

Considerations: Why are you undertaking this work? What data or knowledge does your organisation hold or have access to that will inform this process? Are there existing preconditions such as protected areas to consider?

COLLABORATIVE DATA REVIEW & SENSE-CHECKING

Gather your stakeholders to review and sense-check the data you used. Based on the collective view, revise your maps. For habitat networks you should now have an agreed version for the future network.

Considerations: Where and when will the review take place? How long will you allow? Are there others that you can ask to help with facilitation to ensure a consistent approach to editing the mapped data as the stakeholders sense-check it? Exactly what is the group being asked to consider?

SECOND COMPONENT

DATA IDENTIFICATION

Choose a second component eg ecosystem services and identify and source data related to your project's geographical area. Generate maps of this data to take to your stakeholders for review.

Considerations: Will the data sources you have identified help to refine the outputs from the first stage? Data may be interesting but not have any bearing on where you plan to work.

If you are not confident in selecting which datasets to help refine outputs from the first stage, create a long-list of data then ask stakeholders to steer you on which to provide for your area.

COLLABORATIVE DATA REVIEW & SENSE-CHECKING

Gather your stakeholders to review and sense-check the outputs from stage 1, considering this second set of data. Based on the collective view, revise your maps. They should now show win-win locations.

Considerations: Reviewing this second set of data is designed to help refine and inform the outputs from stage 1 – don't start over. It may help to ask stakeholders 'what difference do the new data make to the collaborative view or decisions previously agreed?'

Remember to take on-board any feedback from your stage 1.

THIRD COMPONENT

DATA IDENTIFICATION

Consider the third component, eg opportunity areas, and identify and source data related to your project's geographical area. Generate maps (if relevant) of this data to take to your stakeholders for review to inform the outputs from the previous stages.

Considerations: This final stage should help to steer where you should work so it may be useful to make the third component the stage that introduces the practical constraints – in many cases this will be the opportunity areas. For example, where land ownership or management provides opportunities.

COLLABORATIVE DATA REVIEW & SENSE-CHECKING

Gather your stakeholders to review and sense-check the outputs from your second workshop, considering this final set of data. Based on the collective view, revise your maps, ready to present the outcomes.

Considerations: Your third data set will help refine and further inform your existing mapped outputs. Consider how to present your outputs based on how they will be used. For example, if the purpose is to identify a small number of specific project sites for habitat creation, you will need to refine to that level.

CONCLUSIONS

Define the actions and outcomes from the process and seek consensus on those.

Considerations: Have you arrived at a clear conclusion of where to work that will help guide practical action? Will this help drive delivery of habitat enhancement and creation and is the output owned by all the stakeholders who took part? Do you have broad consensus on the outcomes?

Ensure there is time to review the conclusions and that stakeholders have time to raise any concerns. Review language and explanatory text as well as mapped outputs so that conclusions cannot be misinterpreted.

IMPLEMENTATION

Work with stakeholders to deliver actions from the process so that change is realised on the ground.

Considerations: You may benefit from prioritising actions, identifying lead bodies or responsible parties plus indicating timescales and costs for delivering each action.

Timescales could be short, medium or long-term. Costs to implement actions could be low, medium or high. Considering these will assist with prioritisation and targeting resources or be proactive with applications for funding.

THE INNER FORTH CASE STUDY

The Inner Forth Futures partnership (IFF) works across parts of Stirling, Falkirk, Fife and Clackmannanshire. In testing the ecological coherence approach, we used the boundary of the Central Scotland Green Network area (CSGN) within each of these four local authority areas as the extent of the project's scope. Mapping a habitat network in this area supports delivery of a Central Scotland Green Network (CSGN) ambition within the theme 'A Place for Nature'. Our aim was also to help illustrate what a spatially depicted National Ecological Network (NEN) for Scotland could look like on the ground. The NEN would be a Scotland-wide framework for steering and facilitating spatially-targeted habitat action at the local and regional level.

1. PREPARATION

The IFF team invited staff from the IFF partner organisations, other species-focused NGOs who work in area, statutory agencies, environmental project staff and Local Biological Record Centres to participate in three facilitated meetings, each a month apart. This allowed the team time to select data sources, generate maps and plan activities between each meeting. Not everyone was able to commit to each meeting, but stakeholder participation at each stage helped to refine the ecological coherence approach and the Inner Forth Habitat Network outputs.

2. START THE PROCESS

The Inner Forth Futures partnership wished to create a shared habitat network vision for the area so started the process using the habitat networks component. This stemmed from the interests of the Inner Forth Natural Heritage Working Group, which is a collection of local authority, NGO and agency stakeholders who have met regularly since 2011 to discuss and share habitat and species-focused projects and activity in their geographical area of interest.

3. DATA IDENTIFICATION

Based on ecological knowledge of the area, the team selected six habitat types to map: woodland; peatland; wetland; inter-tidal; grassland; and open mosaic habitat (shown below). The team had ready access to a range of habitat data for the case-study area, which was complemented with Integrated Habitat Network datasets from local authorities. ArcGIS was used to handle the datasets and produce bespoke A0 basemaps, which were then printed.

4. COLLABORATIVE DATA REVIEW & SENSE CHECKING

The first stakeholder meeting included participants from a wide range of organisations. The purpose of the ecological coherence approach was explained and the outputs that the team hoped to achieve in each of the three meetings were outlined. Stakeholders collaborated to answer key questions and annotated A0 maps of each individual habitat type to present their answers. Questions posed were:

Where are the important areas of existing habitat that should be protected? Where are the opportunities for habitat creation and/or habitat network development?

The six habitat maps were then brought together and overlaid on a 'master-map'. This allowed the group to see the landscape-wide habitat network vision that was beginning to emerge and spot overlaps or conflicts. Following the meeting, this 'master-map' was digitised using ArcGIS.

5. DATA IDENTIFICATION

The Inner Forth Futures team chose ecosystem services as the second component to be considered. At the end of the first meeting, the facilitator asked the group which ecosystem services data should be taken into account. The group discussed the main services delivered by habitats in the study area and identified air quality, flood risk, land capability for agriculture and Scottish Index of Multiple Deprivation (shown below) as the most useful data. The IFF team sourced data relating to these services and brought simple maps showing each dataset, to the next meeting.

6. COLLABORATIVE DATA REVIEW & SENSE CHECKING

At the second meeting, stakeholders used maps of the four previously agreed ecosystem services to review the master-map created following the first meeting. They were asked:

What difference do the new datasets make to the collaborative vision previously created?

The group also looked again at the habitat network data to see whether any key locations had been accidentally missed off during digitisation or the initial review. The group made a number of amendments to the master-map, which was then re-digitised for meeting three.
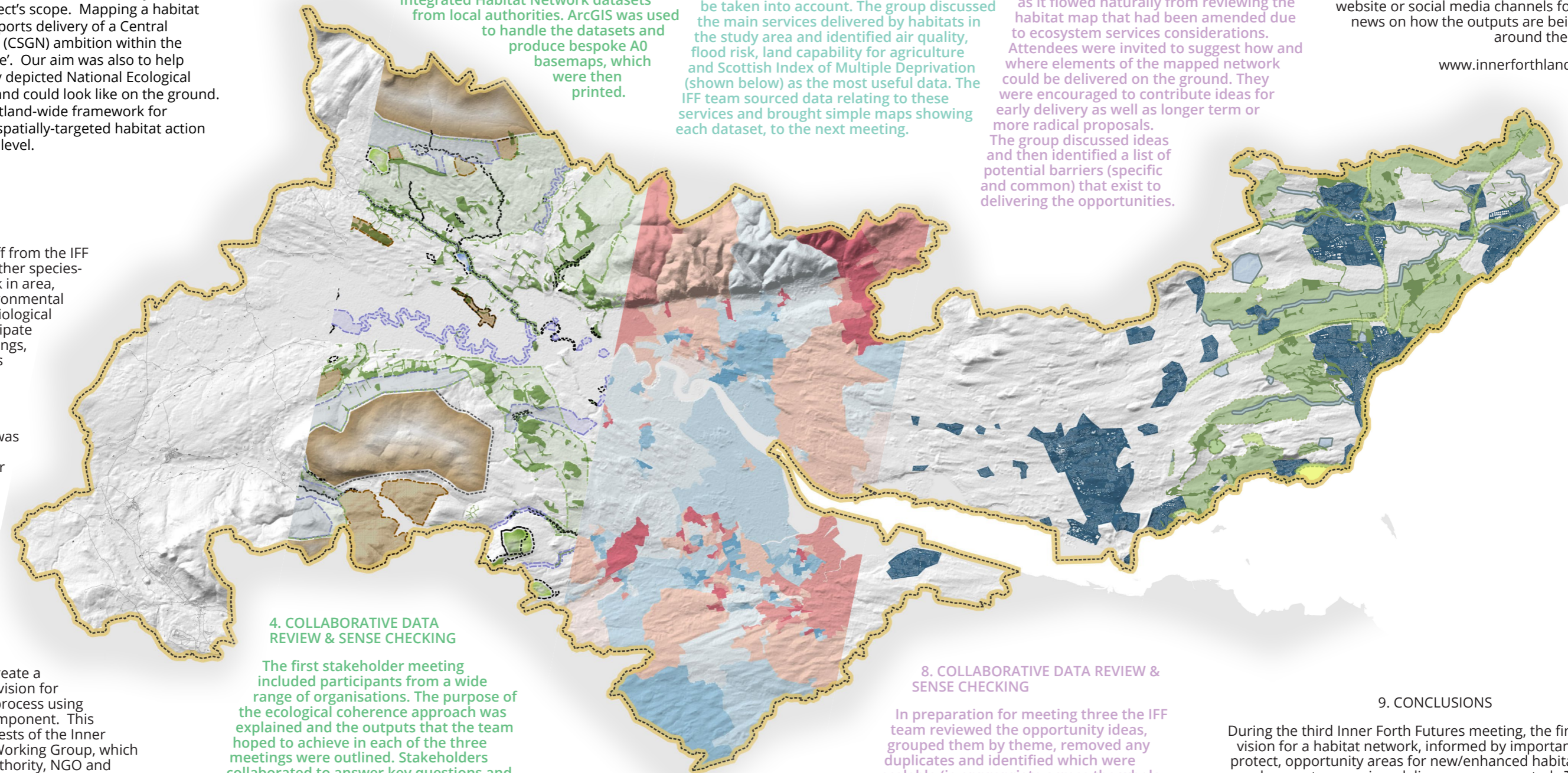
7. DATA IDENTIFICATION

The third component considered by Inner Forth Futures was opportunity areas. This was discussed during the second workshop as it flowed naturally from reviewing the habitat map that had been amended due to ecosystem services considerations. Attendees were invited to suggest how and where elements of the mapped network could be delivered on the ground. They were encouraged to contribute ideas for early delivery as well as longer term or more radical proposals.
The group discussed ideas and then identified a list of potential barriers (specific and common) that exist to delivering the opportunities.

8. COLLABORATIVE DATA REVIEW & SENSE CHECKING

In preparation for meeting three the IFF team reviewed the opportunity ideas, grouped them by theme, removed any duplicates and identified which were scalable (ie appropriate across the whole landscape) versus those which were location specific. The third meeting was aimed at action-planning the collective vision and gaining further support for the mapped network that had emerged through piloting the ecological coherence approach with Inner Forth stakeholders. The opportunities that stakeholders had identified to deliver the mapped vision were presented, alongside the potential barriers. The group drafted a call to action to deliver and promote the collective vision, and identified where each organisation represented had a role in taking the vision forward.

9. CONCLUSIONS

During the third Inner Forth Futures meeting, the final mapped vision for a habitat network, informed by important areas to protect, opportunity areas for new/enhanced habitat creation, and ecosystem services delivery, was presented. The group agreed the value of the process and discussed next steps, including taking the mapped vision out to wider audiences to gain further input. The participating stakeholders agreed that the collective approach to mapping and identifying an Inner Forth Habitat Network and associated ambitions meant that:

- We can be clear about which areas to protect
- We can maximise ecological benefits
- We can look for win-wins for people, wildlife and nature
- An agreed network ambition could help to
  - Target resources
  - Help funders focus on the priorities
  - Influence agri-environment and land use plans
  - Direct mitigation and planning gains
- A collective voice is more representatives of shared aims

10. IMPLEMENTATION

The outputs of the pilot project have been shared online via the EcoCoLife website and adopted by the Inner Forth Natural Heritage Working Group as part of the EcoCo 'afterLIFE'. They invite you to visit the Inner Forth Futures website or social media channels for up-to-date news on how the outputs are being delivered around the Inner Forth.

www.innerforthlandscape.co.uk

DATA SOURCES FROM THE INNER FORTH CASE STUDY

HABITAT DATA

CSGN Integrated Habitat Networks http://gateway.snh.gov.uk/natural-spaces/index.jsp and https://www.nature.scot/professional-advice/land-and-sea-management/managing-land/habitat-networks/central-scotland-green-network-habitat-maps

SEPA Wetland Inventory (2018) https://spatialdata.gov.scot

Ancient Woodland Inventory http://gateway.snh.gov.uk/natural-spaces/index.jsp

Carbon and peatland 2016 map, SNH and James Hutton Institute http://soils.environment.gov.scot/

ECOSYSTEM SERVICES DATA

Scottish Index of Multiple Deprivation. Copyright Scottish Government, contains Ordnance Survey data © Crown copyright and database right (2016) www.data.gov.uk

Air Quality www.scottishairquality.scot

Flood Maps, SEPA www.sepa.org.uk/

Land capability for agriculture http://soils.environment.gov.scot/

Buglife B-Lines (2018) https://www.buglife.org.uk/b-lines-hub/map

FURTHER READING AND RESOURCES

ECOSYSTEM SERVICES

Ecosystem Knowledge Network https://ecosystemsknowledge.net/

Ecosystem Services Community for Scotland https://oppla.eu/groups/escom-scotland

Scottish Wildlife Trust's EcoServe GIS project and toolkit to help identify and map the multiple benefits of the natural environment. https://scottishwildlifetrust.org.uk/our-work/our-evidence-base/mapping-ecosystem-services/

The Scottish Government 'Environment, Agriculture and Food Strategic Research Programme 2016 – 2021' has undertaken interdisciplinary research including on the theme of Natural Assets, to provide cross-cutting evidence to inform policy. SEFARI, the Scottish Environment, Food and Agriculture Research Institute, is a consortium of six globally renowned research institutes who as SEFARI deliver this Strategic Research programme. https://sefari.scot/

Examples of research and work undertaken by SEFARI include: 'Indicators of Ecosystem Services in Scotland', James Hutton Institute. http://www.arcgis.com/apps/MapSeries/index.html?appid=a1c9afe0f8594c3da68654f8124632fa

UK National Ecosystem Assessment www.uknea.unep-wcmc.org

OPPORTUNITY AREAS

Scottish Natural Heritage's 'Talking about our Place' toolkit provides guidance, resources and ideas to help groups think about and discuss their landscape/place as a community. https://www.nature.scot/enjoying-outdoors/communities-and-landscape/talking-about-our-place-toolkit

National Standards for Community Engagement (reviewed and updated during 2015/2016) www.voicescotland.org.uk/

MAPPING HABITATS, PROTECTED AREAS AND SPECIES

Sitelink provides access to data and information on key protected areas across Scotland. https://sitelink.nature.scot/home also https://www.nature.scot/information-library-publications-data-and-research Natural Spaces holds a wide range of spatial data held by SNH including habitats and access http://gateway.snh.gov.uk/natural-spaces/index.jsp

Scottish Spatial Data Infrastructure Metadata Portal. Here you can find, share and reuse spatial data provided by Scottish public sector organisations. https://spatialdata.gov.scot

Scotland's Environment. Find out about issues facing Scotland's environment, discover spatial data published by partner organisations, search features and environmentally sensitive areas and submit your data. https://www.environment.gov.scot/

Habitat Map of Scotland (HabMoS). The 2020 Challenge for Scotland's Biodiversity, part of the Scottish Biodiversity Strategy, made a commitment to produce a 'comprehensive map of Scotland's main habitats'. HabMoS will publish all available habitat data and manage a programme to survey those areas for which new information is needed. https://www.nature.scot/landscapes-and-habitats/habitat-map-scotland

NBN Atlas Scotland. The atlas brings together habitat and species data in one place and as the country's largest collection of biodiversity information can be used to explore data. https://scotland.nbnatlas.org/

ACKNOWLEDGEMENT

Joining up nature across central Scotland