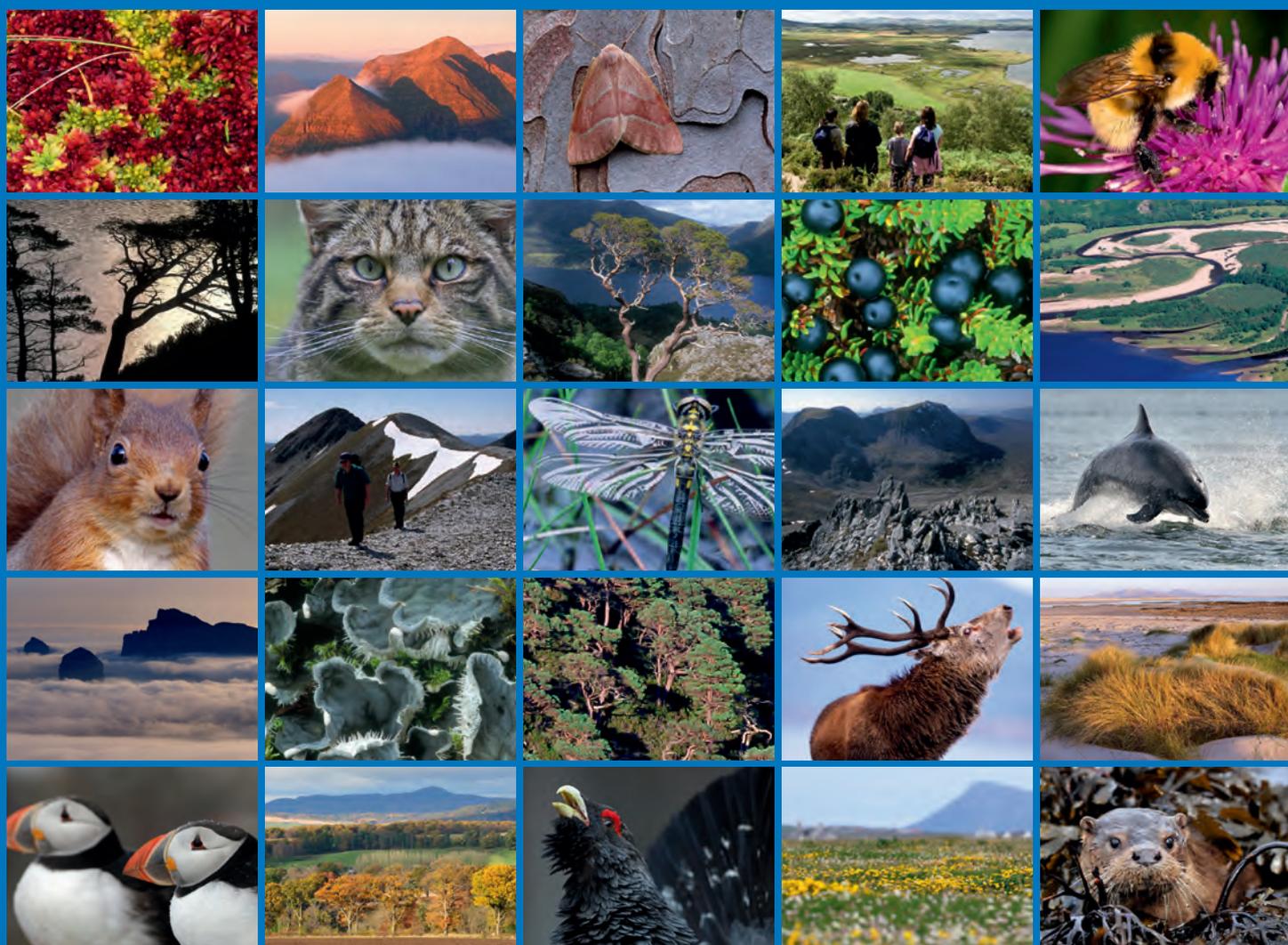


Scottish Natural Heritage
Commissioned Report No. 676

Carse of Stirling - an ecosystems approach demonstration project Technical Report





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All of nature for all of Scotland
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COMMISSIONED REPORT

Commissioned Report No. 676

**Carse of Stirling - an ecosystems approach
demonstration project**

Technical Report

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COMMISSIONED REPORT

Summary

Carse of Stirling - an ecosystems approach demonstration project: Technical Report

Commissioned Report No. 676

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Background

This project explored the application of an ecosystems approach to the management of land within the Carse of Stirling. The project was designed to explore ways in which local stakeholders, who provide and derive benefits from land, can be involved in decisions about land use and land management. The method enabled testing of a model that could be used elsewhere in Scotland.

The project was also intended to deliver practical outputs, bringing different interests together, identifying potential projects and providing an input to the development and implementation of public policy. The project focused around a Stakeholder Panel, comprising land managers, local businesses and people from local communities and recreation interests. The Panel explored the benefits currently derived from the project area and how these could change in the future before preparing a vision and action plan for future management of the Carse.

The report presents an evaluation of the project method and implementation, identifying lessons learned and recommendations for future projects of its kind. Some of the key findings and lessons are summarised below.

Main findings

In exploring the ecosystem approach, the project demonstrated a method for helping people think about land use and its management and the options, choices and trade-offs this can involve. The project found that the presentation of data to a lay audience needed to be managed with care and that Panel-generated data was both rich and more easily understood, although less comprehensive. The Panel engaged well with the idea of benefits from land and responded well to the language and tools used to explain and work with benefits. Sufficient time is required to explain the purpose of the work and its aims and outputs, given the very open scope of the ecosystem approach. Working towards achieving a vision and actions helped focus minds on collaboration, problem solving and solutions.

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We would also like to acknowledge the constructive inputs of the Local Project Advisory Group, the Technical Advisory Group and the Project Management Group, and the agency specialists who provided technical support to the fourth Panel Meeting.

Pauline Roberts from Stirling Council kindly administered the Project webpages on the Stirling Council website and Laura Graham managed the project Facebook page, as well as taking part in a number of Panel Meetings.

1. INTRODUCTION

This report sets out the results of the Stirling Ecosystems Approach Demonstration Project, commissioned by SNH and SEPA in 2012 and undertaken by a consultant team comprising LUC and STAR.

The project had its origins in the Scottish Land Use Strategy Action Plan which highlighted the role of demonstration projects in exploring the application of an ecosystem approach in decision making and taking account of climate change. It was therefore designed to test the application of an ecosystems approach to land management, delivering benefits for the project area and practical lessons for similar projects elsewhere.

This report comprises a detailed evaluation of the methodology as it was applied and refined within the Carse of Stirling Project. A separate Vision and Action Plan was prepared as a practical output from the project.

1.1 Project purpose and outcomes

The purpose of this work was to deliver a project which demonstrates the practical application of the Ecosystems Approach to land use management and decision making that integrates public policy objectives and local preferences and is practical, realistic and replicable.

The original statement of requirements defined two key outcomes for the Project, namely:

- to identify priority actions within the Project area to deliver improved benefits from nature in a way that integrates public policy objectives and local perspectives;
- to demonstrate the benefits of applying an ecosystems approach to land use, and a way of doing this that is practical and realistic.

Key objectives for the project included:

- to identify key stakeholders who benefit from and manage the environment in the area, including land managers, local communities, visitors and interest groups;
- to identify and map the baseline ecosystem (landscape, land use and habitats);
- to identify the public policy objectives that influence management or delivery of ecosystem services;
- to identify the benefits (ecosystem services) which people receive from the environment using local as well as scientific knowledge;
- to work with local stakeholders to value or prioritise the ecosystem services;
- to assess the current capacity of the natural environment to support and deliver ecosystem services in the area, identifying barriers to delivery;
- to identify drivers for change, including the implications for ecosystem services at various scales;
- to work with local stakeholders to develop a vision and identify options for the future;
- to work with local stakeholders to assess and elicit preferences for the options, including assessment of trade-offs and synergies;
- to identify the mechanisms, opportunities and barriers to delivering the preferred options; and
- to evaluate the success of the Project.

1.2 Overview of the project

The Stirling Ecosystems Approach Demonstration Project ran between Autumn 2012 and the late summer of 2013. The work included five Panel Meetings, technical analysis and reporting and other events to maintain momentum and build capacity.

1.3 Structure of the report

The remainder of this report comprises the following sections:

- Section 2 Methodology – explains what took place;
- Section 3 Evaluation – assesses whether the project met its objectives;
- Section 4 Recommendations – points to consider in applying an ecosystems approach elsewhere;
- Section 5 Project management and skills;
- Section 6 Stakeholders and an ecosystems approach – describes how stakeholders engaged in the Project and the lessons learnt;
- Section 7 Data, mapping and analysis – describes how data were used and lessons learnt;
- Section 8 Issues, options and action planning – describes how the Project took account of drivers of change in the area, explored options, and identified a vision and actions;
- Section 9 Next steps for the Carse of Stirling Project.

The sections are written so that they can be read on their own, hence some of the material is repeated. Lessons learnt are highlighted throughout as bullets in boxed text.

2. METHODOLOGY

2.1 Summary of methodology

LUC and STAR were commissioned to develop a methodology for the Stirling Ecosystems Approach Demonstration Project in 2012, with the results being published in 2013. This 'methods study' was based on a review of similar projects from across the UK and led to the definition of an approach which formed the basis of the project being reported here.

The key elements of this approach were as follows:

- identification of a proposed project area;
- recruitment of a Stakeholder Panel with representatives of local land managers, communities, businesses and recreation interests;
- a series of five facilitated Panel meetings at intervals of around a month or six weeks focused around the following themes:
 - Introduction and identification of benefits provided by land in the study area;
 - Mapping the provision of benefits;
 - Past, present and future change;
 - Scenarios for the future;
 - Vision and action;

The agendas and formats for these five meetings are summarised in Table 1.

- in addition to recruiting the Panel and facilitating the process, the project team reviewed the outputs from each meeting and carried out technical analysis to inform discussions at each meeting;
- Panel members were invited to provide feedback at the end of each meeting.

The approach that was defined at the outset is summarised in Figure 1.

In addition to engagement with the Stakeholder Panel, a number of other structures were set up to facilitate engagement with policy stakeholders and to facilitate management of the project:

- a Project Management Group (PMG) was established, comprising officers from SNH and SEPA, with responsibility for day to day management of the project;
- a Technical Advisory Group (TAG) was established, comprising scientific and technical advisers from SNH, SEPA and partner organisations, with responsibility for providing arms' length advice on methodologies and reviewing progress;
- a Local Project Advisory Group (LPAG) was established comprising representatives from the Stirling Environment Partnership and other policy interests. The purpose of the LPAG was to provide the local policy interface in a way that did not impinge on the work of the Panel.

2.1.1 Project area

The project area comprised the catchment of the River Forth to the west of the M9 near Stirling, extending as far west as the A81 near Gartmore. To the south, the project area was defined by the watershed between the Forth and Endrick catchments. To north the area was adjusted to include the lowest part of the Teith catchment, with the boundary running through Doune and west along the minor road to the south of the Teith. While the project was referred to as the Carse of Stirling Project, it in fact included areas of moorland hills to the south and lower, farmed hills to the north, as well as the true Carse itself. The project area is shown on Figure 2. The project area was reviewed at the first Stakeholder Panel meeting and the draft project boundary amended in light of local understanding of the geography.

Table 1. Panel Meeting agendas and formats

Stakeholder Panel Meeting 1: Introduction to the project and to benefits from the land
<p>Introduction to the project – presentation and plenary discussion Defining the project area – presentation and plenary discussion Identifying current land uses – presentation and group discussion Benefits from the land – presentation, group discussion, plenary review Next steps</p>
Stakeholder Panel Meeting 2: Mapping benefits
<p>Welcome and introduction - presentation Recap of meeting 1 - presentation Mapping benefits – presentation and group discussion Who benefits – presentation and group discussion Next steps</p>
Stakeholder Panel Meeting 3: Past present and future change
<p>Welcome and introduction - presentation Recap of meetings 1 and 2 - presentation Changes and impacts – presentation and discussion Developing future scenarios – presentation and discussion Next steps</p>
Stakeholder Panel Meeting 4: Scenarios for the future
<p>Welcome and introduction – presentation Scenario display and review by the Panel</p> <ul style="list-style-type: none"> • Business as usual • Maximising food production • Farming and wildlife • Flood management • Carbon management • Sustainable communities <p>Next steps</p>
Stakeholder Panel Meeting 5: Vision and action
<p>Welcome and introduction – presentation Recap of meeting 4 – presentation Presentation of Draft Vision and Action Plan – presentation and plenary discussion Detailed feedback on Draft Action Plan – review by the Panel Implementing the Action Plan – review and plenary discussion Next steps</p>

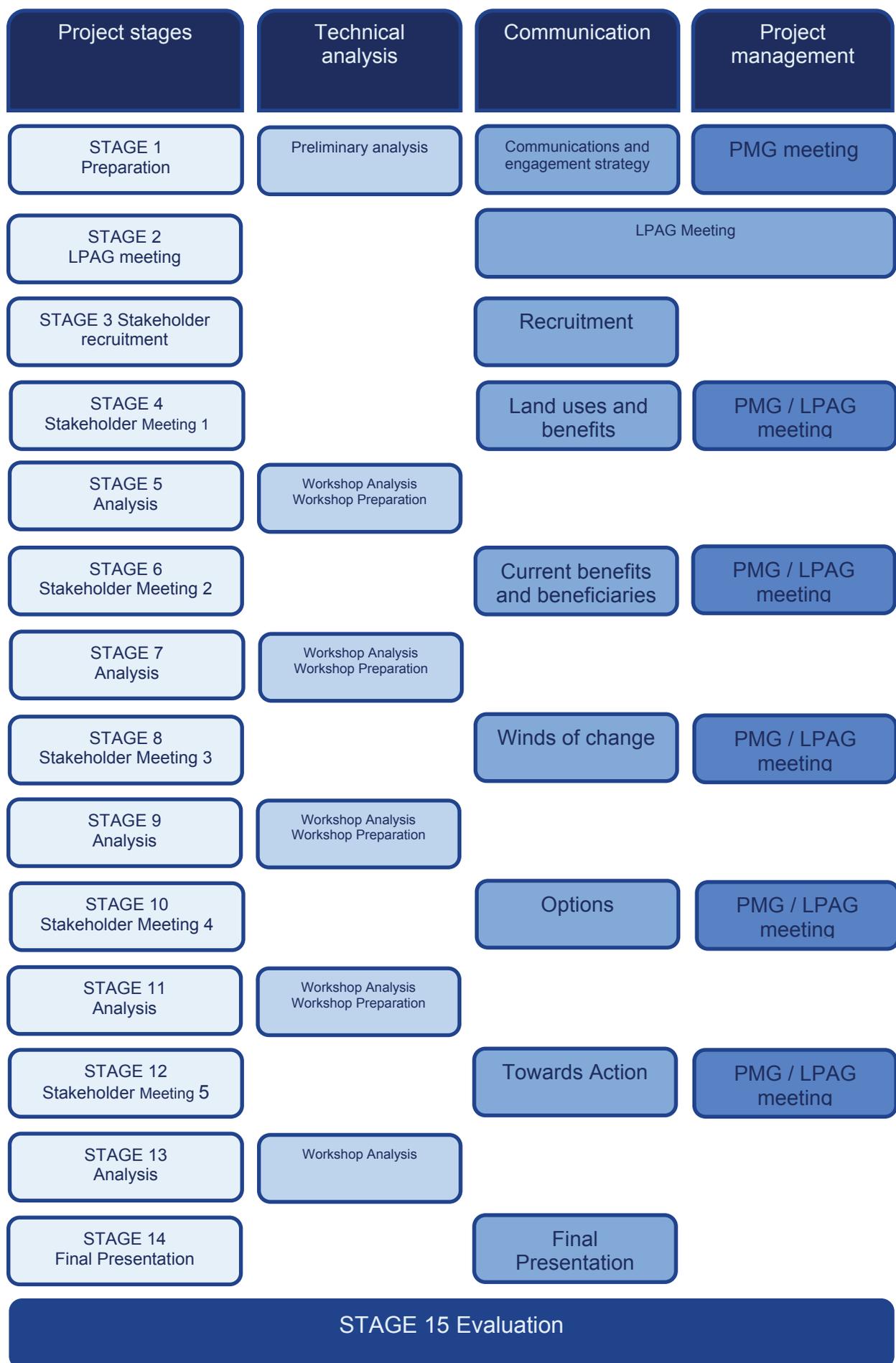
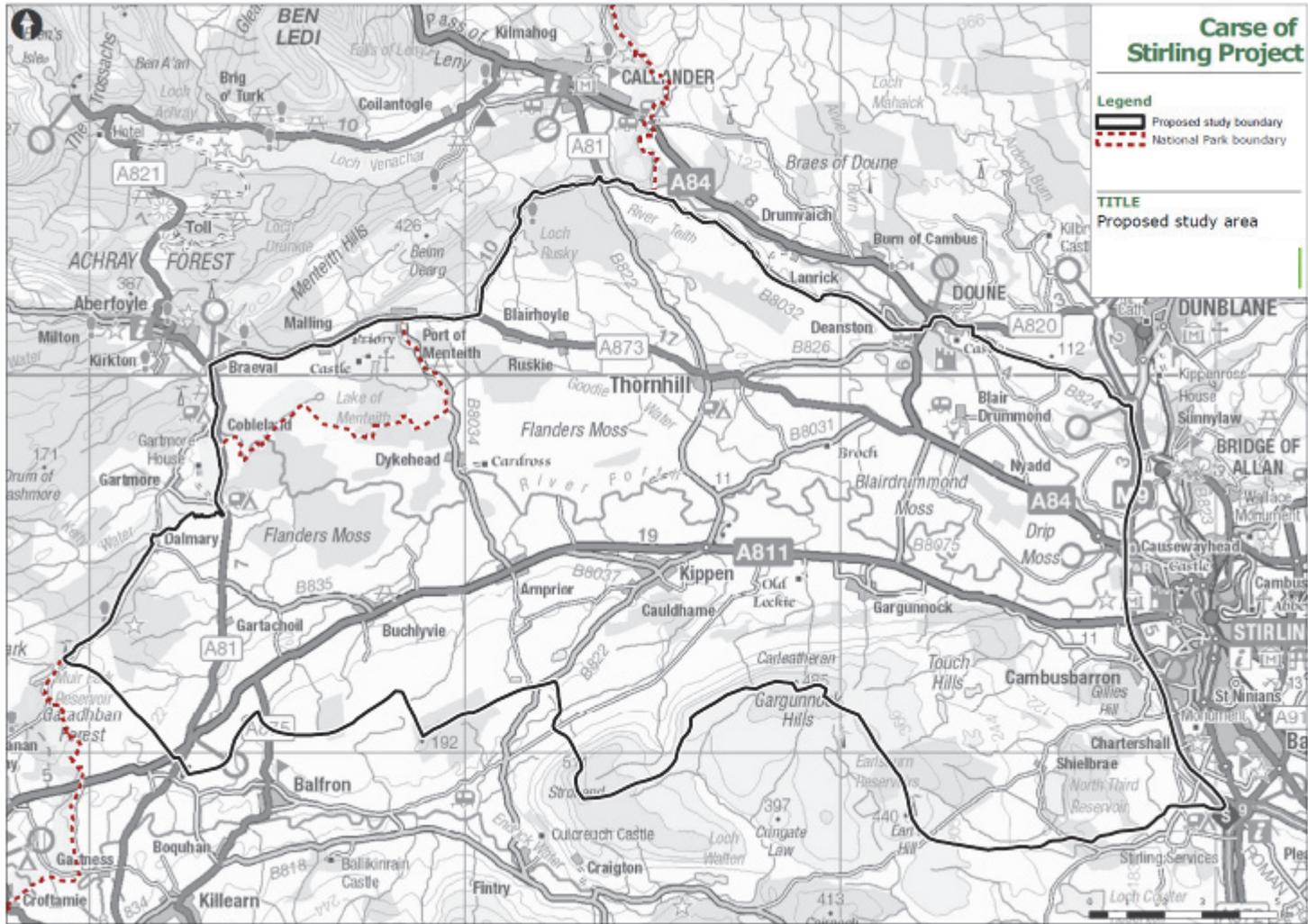


Figure 1. Project process



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Figure 2. Project area

2.2 Comparison with agreed approach

While the approach set out at the outset of the project was generally followed, the consultant team made a number of changes and refinements as the work progressed. The most significant of these variations are list below, with fuller descriptions following in subsequent sections.

- the use of questionnaires (paper and online) to gather more detailed Panel responses and help maintain momentum between Panel Meetings (see section 6.2.7);
- the decision not to proceed with network analysis as a means of highlighting the range of ecosystem services provided by different ecosystems or land uses because of the negative reaction of the panel to complex GIS-derived mapping (see section 6.2.1);
- the use of a simplified approach to mapping ecosystems and ecosystem services, responding to data inadequacies and stakeholder concerns that technical maps were too detailed (see section 7);
- the involvement of agency specialists to provide advice to the Panel during the fourth Panel Meeting which focused on the evaluation of six alternative scenarios for the area's future (see section 6.2.8);
- limited use of social media to complement more traditional communication media, with the aim of engaging with local stakeholders beyond the Panel (see section 6.2.11);
- the addition of a schools competition about the area (see section 6.1.1).

3. EVALUATION

One of the principal aims of the Carse of Stirling project was to demonstrate the value of applying an ecosystems approach to land use. This section therefore explores the practicalities and benefits of adopting an ecosystems approach in a stakeholder based project focused on land use in an area such as the Carse of Stirling.

3.1 Applicability and value of the ecosystems approach

The Convention on Biological Diversity defined an ecosystems approach as:

'a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way, and which recognises that people with their cultural and varied social needs are an integral part of ecosystems'

In describing how such an approach could be applied in Scotland, SNH (2009) identified three key aspects:

- taking account of how ecosystems work - implying a need to consider the broad scale as well as the local, the long term as well as the immediate; recognising that change is inevitable; considering the consequences of resource use and pollution for natural processes; using up-to-date scientific information and taking account of uncertainty;
- taking account of the services that ecosystems provide to people – for example through provisioning, regulation of the environment or contributing to quality of life;
- involving people – those who benefit from ecosystem services and those involved in managing them should be involved in decisions that affect them, following principles of equity and environmental justice.

Reflecting on these principles, the first part of this chapter focuses in particular on the following issues:

- the extent to which the project was able to develop an integrated approach to the management of land, water and living resources;
- the extent to which the project was able to take full account of how ecosystems work;
- the extent to which the approach took account of ecosystem services provided to people; and
- the extent to which the approach was equitable in the way it involved people benefiting from ecosystem services or managing areas that provide them.

3.1.1 Integration

The Stakeholder Panel was established to achieve representation of a broad cross section of interests including land managers, business owners, local residents and those with a recreational interest in the area. This meant that many participants were understandably bringing a sectoral perspective to the Panel. One of the key questions, therefore, was whether an ecosystems approach could help engender a more integrated approach based on greater awareness and understanding of interests beyond individuals' sphere of influence. Developing such an understanding would be critical in moving towards a consensus view of how the area should be managed in the future.

The project introduced the concept of ecosystem services (referred to as benefits) in the first meeting. This took the form of a presentation which explored visually the range of benefits provided by an area of farmland, followed by a plain English description of the four main categories of ecosystem service (supporting, provisioning, regulating and cultural) and individual services. This was followed by a fairly short (30 minute) group discussion during which each of seven groups was asked to identify the top five benefits provided by the project area. This began to get people thinking beyond their principal area of interest, be

that agriculture, nature conservation or recreation. A plenary session was used to compare each of the groups' top five benefits. Recognising that discussion at the meeting had been quite short, it was followed up with a questionnaire survey allowing all participants to record their opinion on how important the project area was in providing each category of benefit. The results of this were fed back to the Panel at the start of the second meeting.

A key finding at this point was that while a few benefits were consistently identified as being most important (food, wildlife/habitats, sense of place), there was also a broad spread across many of the other categories of service or benefit. This conclusion meant the project team was able to emphasise the importance of reflecting this range of services in the way the area is managed in the future.

This initial focus on a broad range of benefits was actively maintained during subsequent stages of the project. This included:

- technical and stakeholder mapping of key categories of benefit
- gaining stakeholders' views on where the different types of benefit are 'consumed' (e.g. in the project area, wider Stirlingshire, wider Scotland, globally)
- reviewing the key forces for future change and focussing group discussion on the potential implications for the most important categories of benefit identified by the Panel;
- providing an evaluation of what each scenario for the future of the area could mean for the provision of ecosystem services (major or minor increase or decrease, no effect);
- evaluating each of the proposed actions in the draft Action Plan in terms its implications for ecosystem services.

The effectiveness of this benefit led approach was evident in Panel meeting discussions, particularly as the project progressed. It was interesting that some comments on the scenarios (which tended to focus on a limited number of benefits) were that they needed a more integrated approach, selecting elements from a number of different scenarios.

An integrated approach was also encouraged by the mix of people making up the Stakeholder Panel. By deliberately building in time for informal socialising over soup and sandwiches at the start of each meeting, and by forcing some mixing of people in discussion groups and in the way people engaged with display materials, participants were able to hear other people's views and perhaps gain a fuller understanding of their concerns. While it was perhaps unrealistic to expect full agreement across all issues, the team was struck by the growing consensus during the course of the project, and the willingness to take an integrated view of the benefits provided by the project area.

It is important that future work of the Panel including implementation of the Action Plan aims to maintain this integrated approach. There is a risk that a series of groups will focus on individual themes such as flood management or recreation, with the result that, while actions may be delivered on the ground, the benefits of the integrated approach will be diluted. It is therefore recommended that support is provided to the Panel once the initial work is complete in order that its work continues to reflect the principles of an ecosystem approach. This could involve thematic groups working within a more integrated 'umbrella' organisation.

Learning points:

1. The methodology is effective in encouraging people to take an integrated view of their area;
2. Panel members themselves recognised the integrated nature of the scenarios;
3. There would be value in providing the Panel with support to set up structures which

allow thematic priorities to be delivered while maintaining an integrated approach.

3.1.2 *Taking full account of the way ecosystems work*

The main focus of the work with the Stakeholder Panel was on understanding which types of ecosystem service are most important, the spatial pattern of provision and the factors affecting provision (including the interrelationships between services such as flood regulation and food production, for example). The work was carried out at quite a broad scale and, for the most part, did not explore the detail of how ecosystems in the area operate.

The main exceptions to this were as follows:

- Flood regulation, where there was some discussion (led by the project team) about the actual or potential role of different land uses or ecosystems within the project area in contributing to flood management. This was a conscious attempt to facilitate discussion which moved beyond the problem (flooding and waterlogging affecting agriculture in particular) to measures that could form part of a solution (e.g. upland peat management, or woodland management higher in the catchment);
- Carbon, where there was discussion about the relative contribution of different land uses to carbon sequestration and storage and an awareness of the range of measures that could be used to reduce carbon emissions;
- Wildlife and habitats, where there was considerable local knowledge of biodiversity to add to published information on designated sites, and a growing awareness of the need to conserve and link habitats across the area.

It is fair to say, however, that discussion tended to focus either on the principles guiding delivery of a particular service, or 'menus' of possible measures which could improve service delivery, rather than specifics of how ecosystems of a particular type, or present in the area, actually operate.

The project took a broadly quantitative approach to mapping the extent of different ecosystems or land uses, but did not aim to describe their quality nor the quantity or quality of services provided (the main exception being flood regulation where discussion focused on the problems associated with its delivery). It therefore was not able to take a consistent, critical and detailed view of the functioning of ecosystems. This reflected the data (see Section 7, below) which was available to help characterise service provision, and the technical knowledge available within the project team and the Panel. The decision to invite external specialists to join the fourth meeting was in part an acknowledgement of this, and a recognition that consideration of how the area could be managed in the future should be grounded in an understanding of how different ecosystems or land uses operate, and the efficacy and practicality of different measures in helping improve service delivery.

The involvement of external specialists was also intended to help inform uncertainty or disagreement around the provision of certain services (e.g. the relative value of different land uses in sequestering carbon, or the effectiveness of different measures in contributing to flood regulation).

The aim of taking full account of the way that ecosystems work was also affected by the differing levels of awareness and knowledge applying to different ecosystem services. The Panel brought greatest knowledge and awareness about services such as food provisioning, flood regulation, wildlife and habitats and several of the cultural services relating to quality of life. As would be expected, some of the more 'scientific' services, particularly those falling into the category of 'supporting services' were much less well understood and, as a result, received comparatively little attention in the subsequent discussions and analysis,

irrespective of their actual importance and the factors affecting their provision currently and in the future. Proper consideration of supporting services in particular would have required a technical analysis to be carried out in advance or in parallel with the stakeholder based work.

The limited way in which this study was able to take full account of the way that ecosystems within the project area operate should be acknowledged in the way that the findings of the work are implemented. To meet the defined requirements of an ecosystems approach, policies and projects based on this work should take account of services which were 'underplayed' in the stakeholder discussions, and need to be informed by more detailed knowledge of the function, condition and interrelationships of different ecosystems and the services they provide. However, given these provisos, the work carried out by the Panel does provide an excellent and rounded starting point in developing such policies and projects.

Looking to the future, and to other projects of this type, it is important to ask how critical and realistic is it to develop a detailed, accurate and comprehensive picture of how ecosystems operate and ecosystem services interact in a particular area. To do this for the project area would have required additional data and specialist knowledge, potentially needing a series of technical studies to be carried out in advance or in parallel with the main study. Issues in the availability of suitable data would have needed to be addressed and it might have been difficult to fully integrate the results into the stakeholder led approach (which revealed challenges in working with detailed technical maps, for example). Standing back from the process a little, it might also be concluded that some of the more familiar types of service (e.g. food production, wildlife and habitats) to some degree act as a proxy for the less accessible supporting services and for ecosystem health.

One option, which might be considered for future projects, would be to adopt a staged approach, focusing on relevant provisioning, regulating and cultural services initially, and subsequently moving on to consider the supporting services upon which the most important of these depend, assessing the effects of different options on these, and monitoring these effects as part of implementation.

Learning points:

4. The aim of developing a full picture of how ecosystems function may not be a realistic and achievable aim of the work; consider whether it is critical to the success of the project;
5. Focus initially on more easily understood categories of provisioning, regulating and cultural services, then move on to consider supporting services as a second step once the most important services have been identified.
6. Indicators of ecosystem health appropriate to the Project area could be used as part of the options assessment and implementation monitoring.

3.1.3 *Value to people*

The Carse of Stirling project had a clear and explicit emphasis on developing an understanding of the importance of ecosystem services to people. In practice, this was a two way process. Firstly this involved working with the Stakeholder Panel to encourage and facilitate a comprehensive and integrated view (subject to the observations above regarding the coverage of more technical or scientific services, particularly those within the supporting category). This provided Panel members with the knowledge and tools to think about the Project Area in terms of the full range of benefits it provides 'to people and nature'. Secondly, it allowed the process to explore with the Panel which types of service they considered were most important within the project area. Discussions and questionnaires quickly revealed three categories of benefit which were consistently regarded as being of

greatest importance (food, wildlife, sense of place), a longer list of services which were regarded as being second order importance, a small number of services where there was disagreement about their importance, and one (flood regulation) which was seen as being of great importance, but where there was a clear deficiency in provision at the current time – with holding water in the Carse seen as a local disbenefit.

One area of potential weakness with the project methodology was its ability to capture the importance of ecosystem services to people living beyond the boundaries of the project area. This was recognised in the original methodology and it had been hoped to capture this perspective via the LPAG. In practice, a number of wider values were discussed but there was an evident tension between local and wider interests. Examples included:

- the role of the area in providing recreation benefits for people living in Stirling, Bridge of Allan or beyond;
- the role of the area in contributing to flood management to protect property and infrastructure downstream in Stirling.
- the role of the area in contributing to global greenhouse gas emissions through carbon storage and sequestration in vegetation and soils.

The process did encourage the Panel to consider those services that were ‘consumed’ beyond the project area boundary, using a questionnaire survey to ask people how important the benefits derived by the area were locally, in wider Stirlingshire, wider Scotland and globally. Discussions later in the process revealed some awareness of these broader patterns of service consumption, though it is fair to conclude that the results of the work should be qualified in the extent to which they provide a comprehensive picture of wider values.

It would be difficult for a project of this kind to fully represent wider values associated with the ecosystem services provided by a particular project area. It would be possible to involve stakeholders from surrounding areas (in this case from nearby urban areas) though this would create its own challenges in terms of representation, balance and maintaining engagement throughout the process. It would be more difficult to involve stakeholders from wider areas, so some form of proxy measure, parallel analysis or qualification is likely to be necessary. One option would be to include one or more questions about the relative importance of ecosystem services into SNH’s annual omnibus survey of public opinion.

Learning points:

7. Services will be consumed outside the project area and the project needs to capture the importance of this. Stakeholders will be able to provide their perspective, but it is necessary to include some form of proxy measure or qualification to add to this;
8. The SNH Omnibus survey, or similar, could be used to develop a national baseline of public views on the importance of different ecosystem services.

3.1.4 *Equitable*

By adopting a stakeholder led approach, the Carse of Stirling Project was designed to provide a more equitable way of considering the management of land within the project area. The Stakeholder Panel was designed to provide a reasonably representative cross section of interests, with those involved in managing the land making up the largest proportion alongside representatives from local businesses, communities and recreation interests. Many more people were interested in sitting on the panel than there were places available. About one hundred people were placed on a wider list and their views were sought through questionnaires and updates provided by email. The Local Project Advisory Group included

support staff from the local authority, agencies and representative groups who advised the project management team on local issues.

There were inevitable questions about the true representativeness of the Panel and its ability to 'speak' on behalf of the wider population. This emerged as a particular issue towards the end of the process as the draft Action Plan was presented and discussed by the Panel. To some extent this was turned around by noting that the Action Plan, which reflected the comments and views expressed by the Panel over the previous four meetings, was in fact a balanced document which, while setting out an ambitious vision for the area, did not include measures likely to provoke strong disagreement. It was also agreed that the Action Plan, once finalised, would be presented by the Panel at a public meeting, providing an opportunity to share the outputs and gain wider ownership.

Another issue relevant to whether the approach was equitable is the difficulty in including values of other people, as mentioned above.

Learning points:

9. Having a mixed range of interests represented on the Panel will help ensure that the process is equitable.
10. Maintaining contact with a longer list of interested people who were not on the panel and using local advisers helped ensure that the project built on the views of as many local people as possible.
11. It is important to have methods of feeding out the interim and final outputs to the wider community. As consensus builds, the Panel may be in a position to present the outputs at a public meeting.

3.1.5 Ecosystems approach and decision making

This project had a number of parallel objectives. In addition to exploring the potential to apply an ecosystems approach in a stakeholder led process, it was intended to identify specific projects and inform policy and decision making. It was recognised that its success in meeting the latter two of these objectives would depend on the extent to which the work of the Panel could build consensus, and the extent to which such a consensus either fitted with existing policy, or could practically be used to guide or inform future policy.

At this stage it is too early to draw conclusions on the extent to which the work has successfully influenced policy and decision making. However, it is fair to say that the emerging Action Plan contains a number of priorities which directly or indirectly reflect current policy (and could therefore be implemented) or, more commonly, could provide a valuable input to future policy or strategy development. Specific examples include development planning, the forthcoming flood risk management plan and rural priorities under the Scotland Rural Development Programme. This presents two particular challenges:

- firstly, maintaining the momentum created by the project once the Action Plan has been finalised and 'launched', including finding practical and structural ways for the Panel to make an input to policy development;
- secondly, addressing the difference in spatial scales between the project area and areas covered by policy and strategy 'vehicles'. For example, under the current SRDP, priorities have been defined for the whole of the Forth RPAC area which includes the Lothians and Fife. Similarly, Stirling Council will be preparing a Flood Risk Management Plan for the whole of the council area, so may not be able to work at the level of detail appropriate to the much smaller project area.

There is a role for the commissioning agencies and partner organisations to respond positively and visibly where it is practical and realistic to carry the Action Plan forward to inform policy and decision making. This will be important in reflecting the resources and time invested in the project by the Panel and agencies and in demonstrating the value of the approach.

The project, and the ecosystems approach it adopted, should also have an influence on decisions made by land managers and communities within the area. While it is too early to comment on the extent to which this has occurred, discussions at the final Panel Meeting were positive, pointing to the potential for collaborative approaches and exploring the potential to consolidate the Panel in partnership with the wider community.

Learning points:

12. It is important that commissioning agencies and partner organisations demonstrate commitment by using the work to inform local and national policy and practice wherever possible
13. Support needs to be provided to ensure that momentum is maintained to realise the benefits through delivery of the action plan
14. There is misalignment between the project scale and policy and organisational scales that may present challenges in delivering the action plan.

3.2 Summary evaluation – strengths, weaknesses, challenges, responses

This section of the report provides a summary of the project evaluation, drawing on the above discussion and structured in terms of the evaluation questions defined at the outset of the project.

1 Did the project identify and engage successfully with stakeholders who benefit from, and manage, the environment in the area including land managers, local communities, visitors and interests? Which groups proved more difficult to engage with? Were there issues of numbers, representativeness, continuity or ability to engage with aspects of the process? How might this be improved in the future?

A previous review of the methods that might be used in carrying out the Stirling Ecosystems Approach Demonstration Project (James, Roxburgh and Orr, 2013) had recommended convening a Stakeholder Panel and working with its members over a period of six months. Given the complexity of concepts and issues it was felt that the continuity provided by such an approach would allow in-depth discussion and a staged approach to the work. Alternatives, for example public meetings, did not offer the same potential to explore issues in detail and to support an informed and integrated discussion about the area's future.

The project engaged successfully with stakeholders who benefit from and manage the environment of the project area. The principal challenges were around land manager concerns about the purpose of the project and motivation of the commissioning agencies and representation of interests from outwith the project area. The Panel comprised a broad range of interests and, while not statistically representative of the wider population was able to bring express a good range of views. A high degree of continuity within the Panel, with most people staying involved for most meetings, was critical to success. Poorer attendance at the last meeting was attributed to fine weather which meant that several land managers were engaged in farming activity.

This area is explored in more detail in Chapter 6.

2 Did the project successfully identify and map baseline ecosystems? Was there agreement between stakeholder and technical perspectives?

The project did successfully identify and map baseline ecosystems and ecosystem services. The Panel quickly grasped the concept of benefits (ecosystem services) but the project identified challenges in the use of technical mapping which was too complex for use in a workshop setting. Simplified mapping is therefore recommended for future projects of this kind.

While there was some focus on more familiar types of service over more scientific or esoteric benefits (section 6.2), the project confirmed the role of the area in contributing to a wide number of services, with a smaller number consistently identified as being of particular importance. Technical analysis was constrained by the availability of a full range of relevant data, but corresponded broadly to the views of the Panel (section 7.1). One category of benefit which was under-recognised in early discussions was the role of the area in contributing to global climate regulation, and given the presence of significant carbon stores within the project area (lowland and upland peat, woodlands); this was carried forward into the workshop discussion.

3 Did the project successfully identify the links between public policy objectives, land management and the provision of ecosystem services? Was there agreement between stakeholder and technical perspectives?

The project carried out policy mapping at the start of the project (section 8.2) and used this to inform the discussion of future change, scenarios and the development of the vision and action plan. Discussions with the Panel could have made a clearer distinction between policies which the work of the panel could influence, and those which are likely to be 'givens'. The importance of the national low carbon policy agenda confirmed the importance of keeping global climate regulation on the table (section 8.3).

4 Did the project successfully identify the ecosystem services derived from the study area environment and 'consumed' within the study area and more broadly? Was there agreement between stakeholder and technical perspectives? How were any information gaps or disagreements resolved?

The project did highlight the different scales and areas within which ecosystem services are consumed. This was understood by the Panel, with a questionnaire between meetings 2 and 3 exploring this in some detail (Annex 3). There were strong views regarding the role of the area in providing flood protection for Stirling. Concern stemmed from the impacts imposed on land managers without financial redress and perceptions that the situation was being made worse by development on the floodplain downstream of the project area. While this was not fully resolved during the course of the project, there was increasing discussion about alternative ways of managing areas at risk of frequent flooding allied to catchment scale flood management to reduce the scale of the flood risk.

5 Did the project successfully evaluate or prioritise the provision of ecosystem services within the study area? Was there agreement between stakeholder and technical perspectives? How were any differences resolved?

Prioritisation of ecosystem services was based on the work carried out by the Stakeholder Panel (pages 13 and 14 of Action Plan, Annex 5) with the technical analysis highlighting only global climate regulation as being a service also of particular importance. This was explained to the Panel and 'carbon' subsequently featured in the discussion about future change, scenarios and the final action plan.

6 *Did the project assess the current and potential capacity of the study area to provide ecosystem services, identifying key barriers to delivery? Was there agreement between stakeholder and technical perspectives? How were any differences resolved?*

The project mapped the current ecosystem services provision (7.1.2) but did not address potential capacity to provide ecosystem services. However, the use of scenarios and development of a vision for the area provided an opportunity to explore with the Panel which types of services could be increased. It is worth noting that some opportunities were identified for multiple benefits (e.g. new farm wetlands contributing to biodiversity and flood management) while in other cases there was a clear need to trade-off different types of benefit (e.g. food provisioning and flood regulation). The principal barriers to delivering increased benefits included the complexity of SRDP, the availability of funding and challenges around the changing climate.

7 *Did the project successfully explore options for future change, identifying the implications for ecosystem service provision at different scales?*

The third Panel Meeting explored past, present and, in particular, future change (section 4.7). Following a presentation reviewing the key trends and pressures likely to affect the area in the future, groups of panel members discussed the implications of these changes for the key benefits or services provided by the area. This set the context for the development and evaluation of a suite of scenarios covering a series of themes (e.g. flood management, carbon management), each of which was presented in terms of the broad effects on ecosystem service provision (e.g. positive, negative, neutral). It did not, however, explicitly address any differences according to scale. While a more detailed approach, considering the implications of each potential measure on ecosystem service provision at different scales would have been possible, this would have made communicating the scenarios in a simple and accessible way much more challenging, and could have overloaded the Panel Members with information.

8 *How successful was the work with local stakeholders to define and evaluate options? Did this identify positive and negative effects, trade-offs and potential synergies? What problems were encountered and how were they resolved?*

The generation of scenarios was led by the project team, informed by the policy mapping exercise carried out at the outset of the project and, in particular, discussions at Panel Meetings (section 8.4). Key issues such as flooding were obvious subjects for consideration, and the discussion around future change (section 7.3) had 'flushed out' a small number of alternative futures to do with the balance of agricultural production with other benefits such as biodiversity.

The project team took these 'cues' and developed them into a series of six scenarios (including business as usual). These scenarios explored different aspects of the area's management (e.g. carbon management, sustainable communities) and were therefore not mutually exclusive. Within each, Panel members were able to record which measures they liked or disliked, effectively allowing them to develop a 'shopping list' of things they would like to see within the area (section 8.1.2). Some Panel members began to identify synergies – linking aspects of flood management, agricultural production, landscape management and biodiversity and began to see how elements from different scenarios could be pieced together to provide an integrated vision for the future.

People's comments on the scenarios did, however, reveal a number of remaining areas of disagreement. These were particularly around issues of woodland expansion, land drainage, flood embankments and additional provision for walking and cycling. The team noted these areas of disagreement when reporting back to the Panel, suggesting these were

key issues to explore in more detail in finalising and implementing the Action Plan, indicating that some of these issues might be addressed by considering how and where such measures might be implemented.

9 *Did the project successfully build consensus around a preferred vision? What was the nature of any disagreements and how significant were these?*

A draft vision was prepared drawing on feedback from the scenario work, and was presented to the Panel at the fifth meeting. The vision comprised a headline statement referring to the provision of a wide range of benefits and a series of thematic statements based around the most important benefits identified by the panel. It was deliberately written in way that was positive and focused on building consensus. Interestingly, there was very little in the way of feedback (positive or negative) on the vision statement itself. Discussion at the meeting moved quickly to consider how the Panel could organise itself in the future to implement the Action Plan which followed the vision, while detailed comments from the last meeting focused on the detail of the Action Plan.

10 *Did the project identify mechanisms, opportunities and barriers affecting the implementation of the preferred vision?*

As part of the Action Plan, the project considered 'how' actions should be implemented and 'who' should be involved. In doing this, it became clear that actions to implement the vision fell into a number of different categories:

- measures that could be implemented by local stakeholders;
- measures that will require support and involvement of agencies and the local authority;
- measures which will require the Panel to feed their views and the Action Plan into national and local policy development processes;
- measures which are dependent on higher level policies which the Panel is unlikely to be able to influence;
- measures which have no current mechanism for implementation;
- measures which run contrary to existing policies or regulations.

Key barriers to implementation included:

- the Panel's own capacity to maintain momentum and develop a structure geared around development and delivery of actions. SNH therefore agreed to provide additional technical support to help the Panel with this;
- the extent to which the wider community of the project area would recognise and 'own' the work carried out by the Stakeholder Panel. It was therefore agreed that the Panel would hold a public meeting at which the draft results of the work would be presented;
- the complexity of funding mechanisms, particularly SRDP, and the challenges this presents particularly for smaller land managers. Collaborative approaches were therefore suggested as a means of bringing larger numbers of land managers into the process and providing support in securing funding, implementing innovative measures and possibly marketing products. Vehicles such as EU LIFE funding and HLF Landscape Partnership funding were suggested as alternatives;
- the gap between current and future financial support and the funding necessary to incentivise or compensate land managers who are willing to bring forward measures (habitat enhancement, flood management, landscape restoration) on their land.

11 *What were the views of different types of stakeholders on the relevance of the study, the process of engagement and the recommendations flowing from the work?*

A follow up questionnaire survey was carried out once the project was complete (Annex 3). Although this only achieved a response rate of around 22% the findings do support the wider conclusions emerging from the project.

The questionnaire asked members of the Panel to comment on various aspects of the meetings. The results are shown in Figure 3 shows that respondents considered that almost all aspects of the meetings were judged to be 'good' or 'ok'. The only aspect judged to be less satisfactory was 'clarity about the project aims and purpose' which more than half of respondents considered to be poor. This confirms some of the challenges associated with communicating the purpose of the project at the outset.

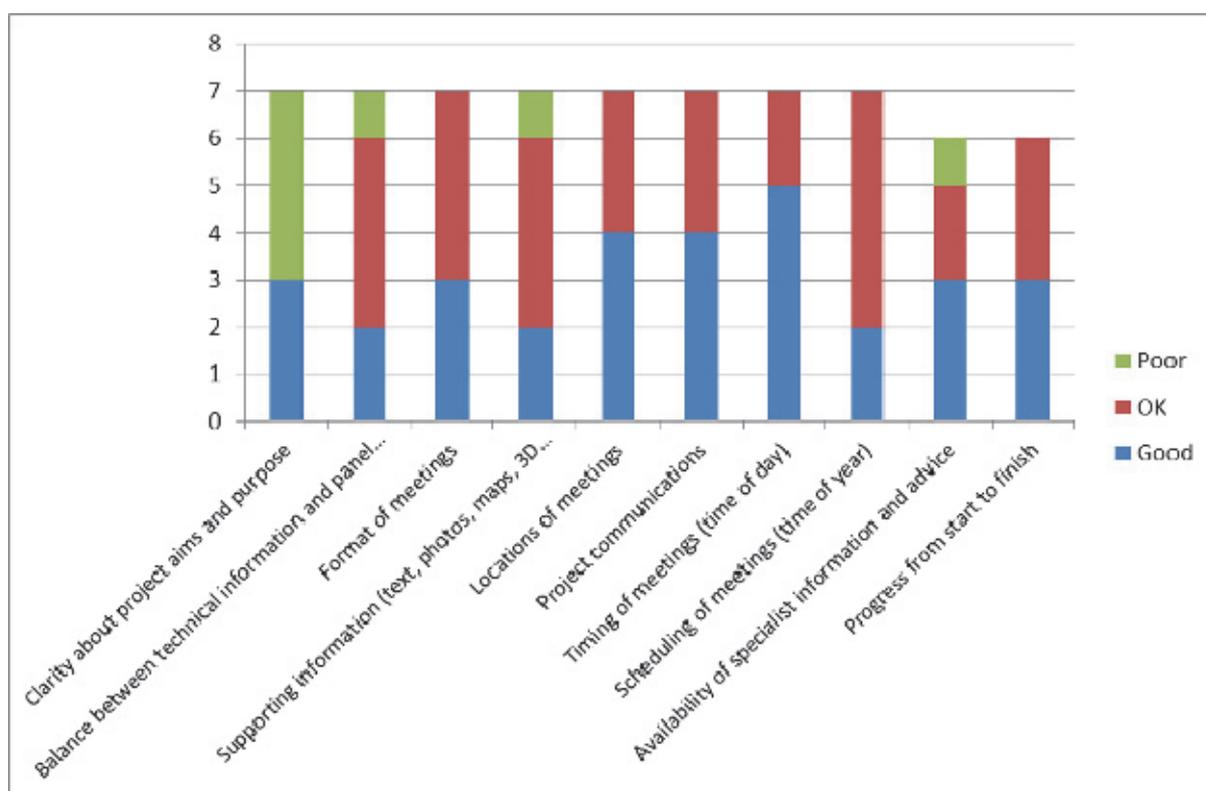


Figure 3. Looking back over the whole series of meetings, please could you tell us what you think about the following aspects of the project

The questionnaire also asked respondents about the Action Plan document which formed a key output from the project. Everyone considered it provided a good or very good summary of the process and of the local priorities for the project area.

A visit to the project area by members of the SNH and SEPA Boards in August 2013 provided a further opportunity to gauge stakeholders' opinions on the relevance of the study, the process of engagement and the project's outputs. Key points recorded in this discussion included:

- confirmation that there was a degree of scepticism and uncertainty at the start of the project, with concerns that there was a hidden agenda and a lack of understanding about what the project was aiming to achieve. Stakeholders indicated that it took time to build trust and for the real aims of the project to become clear. It was suggested that there could have been earlier reference to

similar projects elsewhere since these might have allayed fears and made the purpose of the work clearer. One comment was that the focus was clearly on benefits to people;

- some stakeholders found the process professional and stimulating while others commented that some of the information presented was impenetrable or that there was insufficient time to absorb and comment on the material (specific reference to the scenarios);
- there were a number of comments about 'next steps' including retitling the Action Plan as a 'Benefit Plan for the people of the Carse' and ways of organising the Panel into smaller groups to help deliver projects and progress local examples. Involving local people and local knowledge in providing a sounding board for agency actions and proposals was suggested. It was identified that pilot projects could be used to explore what things like sustainable flood management would look like;
- there appeared to be some concern that the multiple benefit approach promoted by the project might not be achievable in practice and that trade-offs between agricultural production and other types of benefit would inevitably be required;
- uncertainties around funding (CAP reform and SRDP) and climate change were highlighted as constraints that would affect implementation of the Action Plan.
- turning to ways in which the approach might be applied elsewhere in Scotland, stakeholders indicated the importance of being clear from the start about what the project is about (or not about). It was suggested that a few key farmers or the NFUS should be involved at an early stage to improve understanding.

12 *Was the project successful in raising awareness of the benefits provided by the environment of the study area?*

The project was successful in raising awareness of the benefits provided by the environment of the study area (Fig. 4).

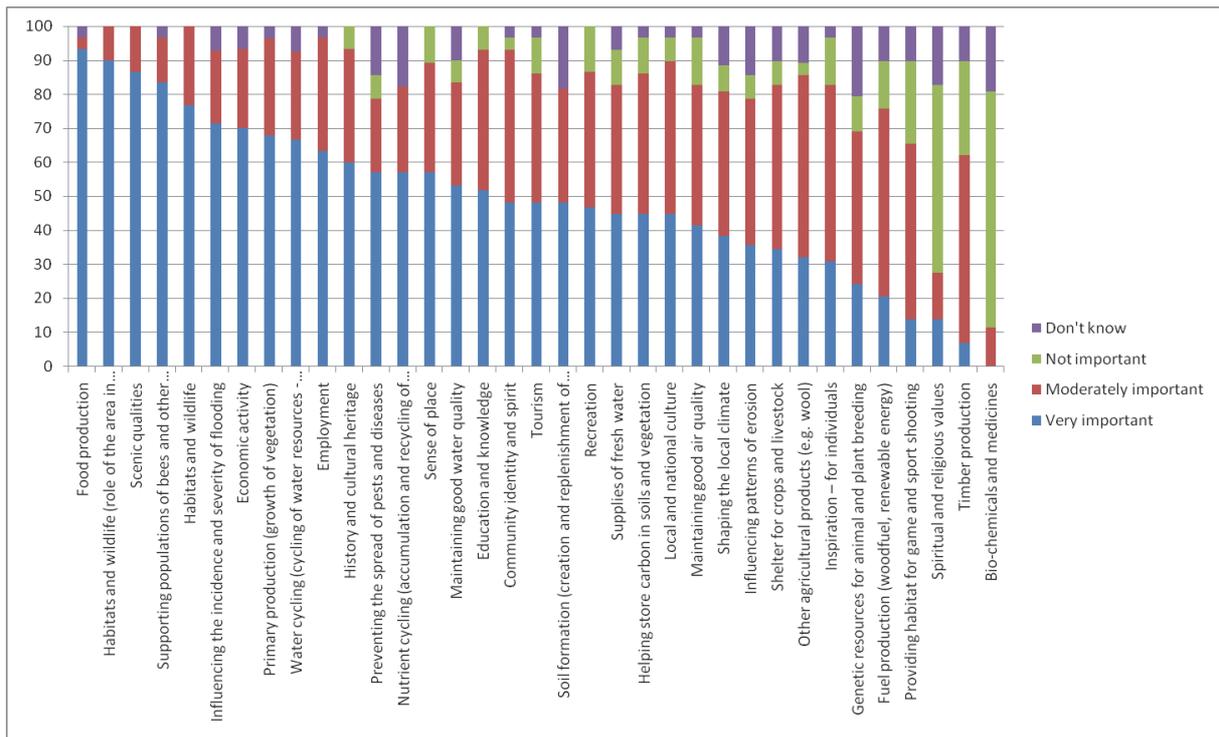


Figure 4. Relative importance of benefits provided in the study area

Participants were required to consider the project area from a number of different perspectives, not simply from their 'normal' point of view, whether a local resident, land manager or someone using the area for recreation (Figure 5).

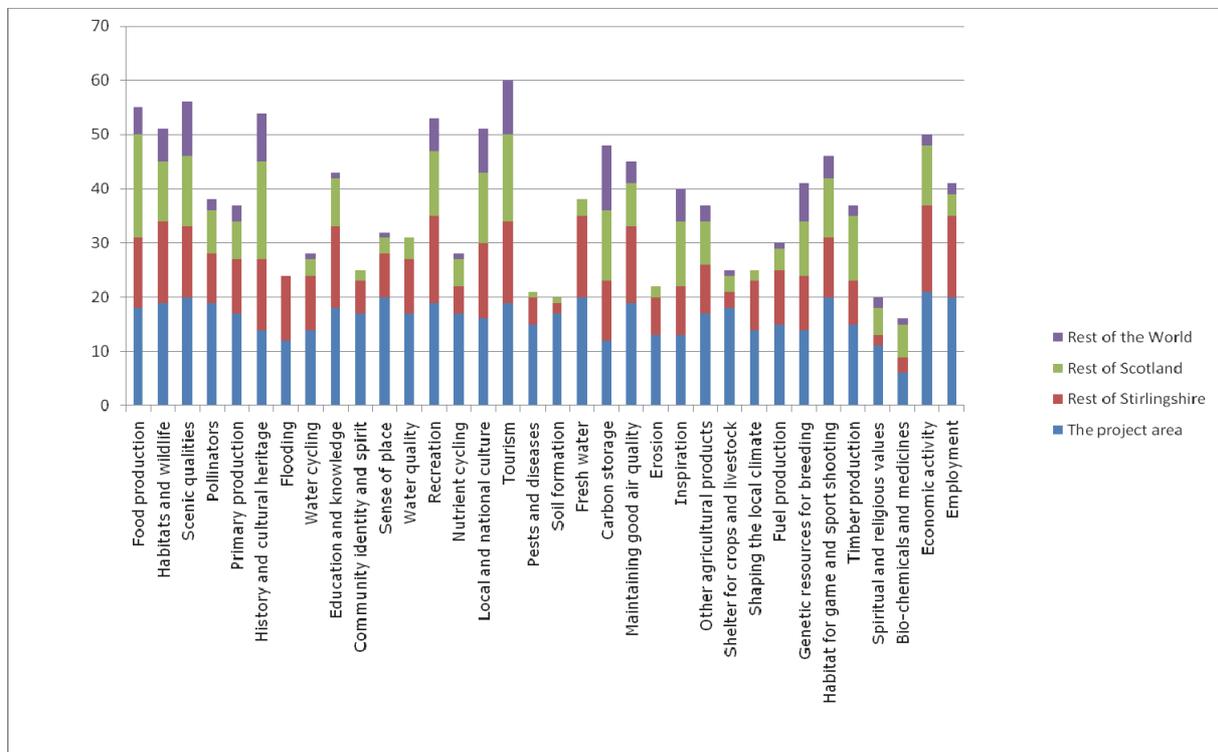


Figure 5. Relative importance of benefits provided by the study area for different beneficiaries

This was reinforced by presentations which, while highlighting the categories of benefit judged by the panel to be of greatest importance, set these within the context of the wider suite of benefits. The benefits of bringing different interests together should also not be overlooked in achieving this outcome.

13 Did the project successfully integrate and balance public policy objectives and local perspectives? What tensions or areas of disagreement were identified? Is there potential to address these by changes in policy, interpretation of policy locally, or in the way the area is managed?

The project allowed for public policy objectives to be integrated into the discussion, albeit in general rather than specific way. Discussion relating to the main drivers for change referred to the existing and emergent policy framework where appropriate, and the scenarios were informed but not entirely driven by public policy objectives, allowing space for locally held views and priorities to emerge. The main areas where there was apparent disagreement between local perspectives and public policy, and potential ways in which these tensions could be addressed, are listed below:

- flood management: Although Panel views did appear to shift in favour of an integrated, catchment wide approach to flood management, a number of people continued to call for specific measures such as flood embankments to protect farmland, dredging to improve flow along rivers and land drainage to address the issue of waterlogging. The relative weight given to protecting low lying parts of Stirling from flooding with the impacts on land management on the Carse was a further cause for concern for some. Discussion with SEPA and Stirling Council during preparation of the scenarios indicated that none of these measures will be ruled out, but that there is a need to set them within a more strategic approach. Ensuring that the Panel engages with flood risk management planning will be essential in helping to ensure these issues are addressed effectively and reflected in co-ordinated action on the ground;
- woodland expansion: There were mixed views about the desirability of additional woodland planting within the project area. Some were concerned that it would impact on productive farmland or take whole farms on less productive land out of production. Others saw the potential benefits for habitat networks, landscape, carbon and recreation. During the process, the project team emphasised that different approaches would be appropriate in different parts of the project area and that maintaining agricultural production should be a key factor influencing the location and type of any new planting. While the Forest and Woodland Strategy for Stirling and Clackmannanshire is now complete, there would be value in Forestry Commission Scotland working with the Panel to consider how the objectives of the strategy could be implemented in the project area. By moving to the next level of detail, it is possible that some of the concerns about woodland expansion could be addressed. Funding mechanisms to support field boundary and hedgerow management and restoration are a key issue;
- lowland raised bog management: Early in the process several Panel members suggested that the high water table necessary to maintain surviving area of lowland bog was impacting on land management by contributing to soil waterlogging, and contributing to elevated flood risk. Some argued that the bogs should be drained so they could provide flood storage following heavy rain. Discussion with agency specialists provided an alternative perspective, suggesting that improved management of bogs could form part of an integrated approach to flood management whilst enhancing their ecological value. While this tension did not emerge strongly towards the end of the project, there would be benefit in SNH and SEPA working more closely

with the Panel to explore how management of the mosses could be more closely integrated both with flood management and agricultural production, and what implications there would be for funding, land holdings etc.;

- access and recreation: Throughout the project there was a tension between some land managers who were concerned about existing levels of public access and the right of responsible access confirmed under the Land Reform Act, and community and recreation interests (including businesses) who saw the potential to improve opportunities for walking and cycling, both for recreation and active travel. Resolving this disagreement is likely to come down to the detail of individual routes and negotiation with land owners and land managers. The Panel could be supported in this by Stirling Council Access Officers.

14 Did the project identify specific priority actions which will deliver improved benefits from nature?

The draft Action Plan (Annex 5) which was prepared on behalf of, and with input from, the Panel, identifies a total of 50 actions covering a range of themes. Many of these provide more detail, or activities necessary to deliver the vision, but most do not go as far as identifying specific actions on the ground. All, either directly or indirectly, are designed to help deliver improved benefits from nature within the project area. Definition of site specific measures requires ownership of the Action Plan among the wider community, and more detailed work by the Panel and others to work them up. Many of the actions depend on ownership and further action by the community itself. SNH and others may need to strongly continue to support implementation to ensure trade-offs are addressed and benefits realised.

15 Did the project establish a practical and realistic methodology capable of application in other locations?

The methodology established by the project provided a sound basis for application in other locations in Scotland. A number of refinements were made during the course of the project and these are described elsewhere in this report. Additionally, a series of learning points or recommendations have been identified (summarised below). Taken together, the project team considers the original methodology; refinements and recommendations provide a sound basis for carrying out similar work elsewhere. Inevitably, there will be a need to adapt or tailor the process to reflect the area in question, relevant key issues and the nature and composition of the Panel.

Working in a detailed way with stakeholders is more comprehensive than traditional methods of 'inform and consult' but therefore is likely to be more expensive. Lessons from this project indicate that it would be possible to reduce the level of data collection and analysis through using proxy data. It may be possible to reduce the number of workshops, but this would require more work to be done by the stakeholders between meetings.

16 How successful was the use of the Scotland Environment Web in providing spatial information, receiving spatial information, hosting project materials and publicising the study findings?

The project made less use of the Scotland Environment Web as a source of data and in receiving and publicising information about the project than had been anticipated at the outset. This is largely a reflection of the stage of development of Scotland Environment Web and it is anticipated that its role in relation to projects of this kind could be significantly enhanced in the future. As alternatives, this project used a dedicated series of web pages kindly hosted by Stirling Council, together with a Facebook page.

4. RECOMMENDATIONS FOR FUTURE APPLICATION OF THE METHODOLOGY

Points to consider when applying an ecosystems approach and employing ecosystem service mapping, options analysis and stakeholder engagement techniques elsewhere are summarised below.

4.1 Scale

Consider the scale of the project, and the relationship between the project and policy, delivery mechanisms, communities of interest and local projects. There are advantages in matching the project to the area covered by policies which it is aiming to inform, whether local development plans, flood risk management plans or SRDP regional priorities. However, the larger a project area becomes, the more difficult it will be to secure a Stakeholder Panel that is able to represent all the interests and communities present. It will also be harder to translate the outcomes of the project into practical projects on the ground without additional work. Challenges that a larger scale project will need to address include:

- aligning local desires and specific locational interests to public policy;
- aligning delivery mechanisms to different sizes of geographical project area;
- incorporating all the various and varied communities of interest that exist in a large area;
- the number and diversity of potential stakeholders that will need to be engaged and kept informed in a larger study area, and the number of panels, and number of panel meetings possible;
- not all the methods of working and engagement may easily be scaled up to areas as large as a catchment or a Local Authority region – in terms of time, resources and manpower;
- representativeness becomes ever more challenging, the wider the scope of the project.

4.2 Governance

Identify a simple governance structure that facilitates engagement, project management and the input of wider interests. The Stirling Project benefited from several 'layers' of governance covering project management, inputs from other agency partners and technical advice and review. This partly reflected the novel and demonstration status of the project, with the Technical Advice Group providing knowledge and advice from elsewhere to inform the project as it progressed. This element of the governance structure could be omitted for future projects, though there are benefits in having independent review of the project as it is implemented.

Running projects through intermediary organisations (e.g. Community Planning Partnerships or third sector trusts) could help dispel stakeholder concerns and build stronger links to local policy development and implementation.

4.3 Inception phase

Invest time in planning the inception phase which lays the foundations for all that follows. Of particular importance are:

- identifying and involving representatives of key stakeholder groups in the final project design so there is good understanding about the project aims and methodology before the project team begin to engage with the wider community. This could, for example, include representative organisations such as NFUS or key individuals within the local area. This will help avoid misunderstandings, rumours and suspicions about the project spreading before it is underway, and

should help with recruitment of the Stakeholder Panel and subsequent dissemination of results;

- agreeing how ‘technical’ and ‘policy’ stakeholders will engage with the project. In the Stirling project it was agreed not to overload the Stakeholder Panel meetings with representatives from agencies and the council, but to hold separate meetings to explore policy drivers and policy implications;
- agreeing which datasets will be required for the project and securing access to them at the outset. This is likely to require negotiations with partner agencies, local authorities and other data custodians including the James Hutton Institute and the Centre for Ecology and Hydrology. Without having this in place, considerable time can be wasted trying to acquire data that is either not available or forthcoming, or which is not appropriate to the project. The balance between the technical and stakeholder elements of the work, and the scale of the project, are important factors to consider in identifying what data are needed;
- consider whether analysis is likely to be required to test the statistical significance of the project findings. If so, agree methods with statistical specialists and design as many part of the Panel selection and questionnaire processes with this in mind.
- consider whether to include before and after questionnaires to understand how stakeholders awareness and values change during the Project.

4.4 Communicating aims and objectives

Plan how best to communicate the aims and objectives of the Project. The stakeholder focused nature of this type of project means that communication and information will be critical for success, particularly to set out clearly what the project is and what it is not. The relative novelty of the ecosystems approach and the lack of an obvious driver for the work can raise concerns and suspicions which can undermine efforts to explain the project’s aims, objectives, method and outputs. The Stirling project used a communications plan that sought to identify communications messages and recipients at the outset.

One way to help address concerns is to draw on experience from similar projects elsewhere, e.g. as an introductory presentation from a representative from one of these projects, or via information presented on the project website. Involving stakeholder groups in selecting appropriate projects to present will help to ensure that these are relevant to the local area and local issues.

4.5 Wider engagement

Consider how the project will engage with stakeholders beyond those sitting on the Panel. This is particularly important where the project is addressing contentious issues or covering a large area. Methods worth considering include:

- detailed stakeholder mapping at the outset of the project and definition of a communications strategy;
- maintaining a long list of interested stakeholders and providing them with regular updates on progress of the project;
- establishing a project website and social media sites to host and disseminate formal and less formal project information, and secure two way engagement (potentially repeating some of the questionnaire surveys used for the Panel);
- working through representative organisations (e.g. NFUS);
- encouraging and helping members of the stakeholder panel engage with others locally;
- running project events (e.g. school arts projects or project open day);
- holding a public meeting, led by the Panel, towards the end of the project once a draft Action Plan is in place.

4.6 Making information and concepts accessible

Establish the technical requirements appropriate to the project. It is difficult to bring together a detailed technical assessment of ecosystems and their functioning (even if possible) with a stakeholder-led approach. Using technical information and concepts requires time to make it accessible and useful for stakeholders, for example:

- translating the terminology of an ecosystems approach into plainer English, e.g. talking about benefits from nature rather than ecosystem services;
- simplifying mapping for the area;
- focusing on the needs of the stakeholder discussions, e.g. those services most relevant to the area, rather than mapping and quantifying everything possible.

4.7 Change

Exploring how the project area has changed, is changing and could change in the future is an important step in the process, providing context for the identification and evaluation of scenarios. Good, locally relevant information will assist this part of the work, hopefully chiming with stakeholders' own experience and providing an evidence base for contentious topics such as climate change.

The Stirling project drew on information showing how the climate of the area has changed over recent decades as well as current climate change projections to illustrate how it could change in the future. Historic information and discussion on past land uses and experience helped dispel any views that the climate is not changing and resonated with land managers who have had to cope with increasingly wetter winters.

In presenting information on future change, it may be helpful to distinguish between those things that the project could influence (e.g. the way flood risk is managed locally) and aspects where there is likely to be little or no opportunity to reflect local issues and concerns (e.g. macro-economics, the effects of peak oil or CAP reform).

4.7.1 Scenarios

Scenarios provide a valuable way of describing how the area could change in the future depending on different policy emphases. Factors to consider include:

- whether the scenarios are aiming to be realistic (in policy terms) or whether they should explore more extreme alternatives;
- describe scenarios which reflect the priorities, issues and concerns raised by Stakeholders;
- use specialists (e.g. from partner agencies) to refine scenarios;
- presenting the chosen scenarios to make them attractive and accessible. This project used a concise description of the scenario and its key components, a series of illustrative photographs, a 3D projection on which the measures were mapped in a general sense and a table recording how the scenario could affect the range of benefits (services) provided by land in the project area.
- allowing time for informal discussion and interaction.

4.8 Practicalities

Choosing the right venue for meetings is important. Location, space, acoustics, catering and comfort are all factors to consider. Where possible, the project should benefit local organisations or businesses by hiring local venues and using local caterers. Where practical, the series of meetings should use more than one venue, moving around the project area and not favouring one venue over others.

Catering, in the form of soup, sandwiches, teas and coffees allows people to come straight from work and provides an opportunity for informal networking and socialising. The design of meetings should create opportunities for the Panel to get to know each other informally. Displaying graphic materials around the meeting room can provide reference points for participants, and feedback information from previous meetings.

It is important to schedule meetings in a way that reflects local priorities and events. Wherever possible, the busiest times of year for land managers should be avoided (e.g. lambing or harvesting) and clashes with other events should also be minimised. This requires good liaison with local stakeholders and a flexible approach to the programme.

There is a need to get a balance between providing information through presentations to ensure the Panel members start work from a common point and overloading them with information or delaying their input. Feedback on this project suggested that some panel members would have preferred less formal presentation of information at the start of each session.

4.8.1 Beyond and between meetings

It is important to maintain interest and momentum between meetings, particularly where there is an extended break to accommodate harvesting or other local priorities. A number of measures can help ensure that interest in the project does not tail off, including:

- holding follow up questionnaire surveys between meetings. This provides an opportunity to gather more detailed and 'individual' responses to issues covered in the previous meeting, or to introduce issues that will be explored at the next meeting. It may be appropriate to run these surveys both for the Panel and for wider stakeholders, allowing any variances in response to be assessed;
- a project website and social media pages can help disseminate information collected or discussed at the previous meeting, and provide a forum for people to submit their comments, photographs or information about local events;
- events such as schools arts competition or other outreach initiatives can be helpful in maintaining the profile of the project, particularly where the Panel takes ownership of part of the process (e.g. judging the competition, donating prizes).

4.8.2 Specialist inputs

The project team has a key role to play in facilitating the process and encouraging all stakeholders to engage in discussions about the project area. Presenting information and evidence, and exploring possible futures for the area are important parts of this, but it is important for the team to remain relatively neutral, particularly where strong views are expressed by Panel members. It is therefore helpful to be able to draw on the knowledge and expertise of agency specialists at key points in the process in order to provide information and advice in particular areas. In the Stirling project, these specialists were involved in the fourth meeting, which focused on scenarios, and were made available as a resource which the Panel could draw upon as they considered appropriate.

4.8.3 Implementation

It is important to consider what will happen at the end of the project, once the Action Plan has been drafted on behalf of the Stakeholder Panel. Clearly much will depend on the issues raised during the work, the degree of consensus achieved and the implementation pathway planned by the commissioning organisation. Factors to consider include:

- is there a need to support further consolidation of the Stakeholder Panel if there is interest in the group continuing together? In the case of the Stirling project, this has been achieved by arranging a social evening where people can get to know

- each other better, and some additional funding to help the group organise itself around developing and implementing projects set out in the Action Plan;
- what role can the commissioning organisation and partner agencies play in supporting implementation of the Action Plan, either through project work or by ensuring the results of the work are clearly fed into policy development?
 - how can implementation of the Action Plan best be monitored, both in terms of projects and the overall effect on the provision of ecosystem services?

5. PROJECT MANAGEMENT AND SKILLS

This part of the report describes the arrangements for project management and governance, and the role of the project team.

5.1 Governance and project management

A number of structures were set up to facilitate management of the project and to facilitate engagement with policy stakeholders:

- a Project Management Group (PMG) was established, comprising officers from SNH and SEPA, with responsibility for day to day management of the project;
- a Technical Advisory Group (TAG) was established, comprising scientific and technical advisers from SNH, SEPA and partner organisations, with responsibility for providing arms' length advice on methodologies and reviewing progress;
- a Local Project Advisory Group (LPAG) was established comprising representatives from the Stirling Environment Partnership and other policy interests. The purpose of the LPAG was to provide the local policy interface in a way that did not impinge on the work of the Panel.

Although appearing rather cumbersome, this structure did allow for routine interfaces between the protect team and the Project Management Group, with reflective and specialist inputs coming from the Technical Advisory Group on a less frequent basis. Towards the end of the project the PMG and TAG meetings were conjoined, meaning there was less risk of duplication or of the two groups being out of step in terms of big picture issues and day to day management decisions.

Communications between the project team and PMG could have been systematised to provide regular (perhaps fortnightly) updates to the PMG in order to provide comfort regarding progress and preparation between Panel Meetings.

The LPAG provided useful inputs throughout the project. In practice the group met at arm's length from the project and operated in a slightly ambiguous relationship with the consultants' project team and entirely separate from the Stakeholder Panel. On reflection, it might have been helpful to bring that group more fully into the project, running a series of meetings in parallel with the Panel meetings. This would have increased the cost of carrying out the work, but would have provided policy stakeholders with clearer link to the project, potentially enhancing the influence over future policy development. It would also have assisted in the identification of contacts for the project. It might also have been valuable to hold a joint LPAG and Stakeholder Panel meeting towards the end of the project to explore issues around implementation of the Action Plan.

Learning points:

15. other projects would benefit from a 'hands-on' client group responsible for managing the work and an arm's-length group able to provide specialist and technical advice. It is, however, important that advice from these two groups is synchronised and ideally that their role transparent to the stakeholder panel;
16. given the rolling programme for the work with the periods between Panel meetings focusing on processing outputs from one meeting and preparing for the next, it would be sensible to agree a process for the project team to provide the PMG with regular updates (e.g. by email);
17. the role and input of the LPAG could be enhanced by bringing it more clearly into the project process, for example by holding more frequent meetings, facilitated by the project team and holding a joint LPAG and Panel meeting towards the end of the project

5.2 Project team skills and specialist inputs

The consultant project team included the following skills:

- stakeholder meeting organisation and facilitation;
- environmental planning;
- spatial data analysis (GIS);
- graphic design and representation; and,
- specialist inputs on landscape, ecology, cultural heritage, recreation and land management.

As noted below (Section 6.1.8) the project also involved a number of agency specialists in sense-checking the draft scenarios and attending the fourth Panel Meeting at which the scenarios were discussed. This allowed the Panel to draw on specialist knowledge and expertise, independent of the project team and the client representatives. Topics covered by specialists included:

- flood management;
- farming and wildlife;
- agriculture;
- access and recreation; and,
- peat and carbon.

This provided an effective resource for the Panel and allowed a series of informed discussions to take place in relation to the scenarios, without the risk of the project team being seen to take sides with a particular option or measure.

In introducing the agency specialists to the Panel, it was important to acknowledge that the Panel itself included people with considerable knowledge of the area and expertise in particular areas.

Learning points:

18. projects of this kind need to be able to draw on a multidisciplinary team with skills including stakeholder workshop organisation and facilitation, and a range of environmental planning skills;
19. there can be benefits in bringing in external specialists as a resource for the Panel to draw upon in considering options for the future;
20. it is important to acknowledge skills, knowledge and specialisms from within the Panel itself.

6. STAKEHOLDERS AND AN ECOSYSTEMS APPROACH

The Stirling Ecosystems Approach Demonstration Project placed stakeholder engagement and involvement at the heart of the project methodology. This section reviews the challenges, opportunities and techniques that were used to facilitate such an approach.

6.1 Aims and objectives

An important aim of the project was to develop and test wide ranging stakeholder engagement as an integral part of an ecosystems approach to land and environmental management. It was anticipated that this would benefit the study by tapping into local knowledge and expertise. It would provide local stakeholders with an opportunity to become involved in the way their area is managed in the future and help build consensus and partnership in such management.

More detailed communication objectives included:

- to engage successfully with a broad range of stakeholders – identifying different groups of stakeholders and engaging with each in the most appropriate way;
- to develop a language which is non-technical and which helps engagement with stakeholders;
- to identify and communicate the benefits of involvement in the project;
- to implement a programme of meetings which is interesting, stimulating and which helps maintain stakeholder involvement;
- to keep interested stakeholders informed during the course of the project; and,
- to monitor and evaluate the effectiveness of stakeholder engagement, amending the project methodology and recording lessons learned for future projects, as appropriate.

Engagement with local stakeholders was designed:

- to raise general awareness of the project in the target area;
- to identify key stakeholders to take part in the Local Panel meetings;
- to provide invitation and briefing information to invitees;
- to assist in the dissemination of information and updates from the stakeholder panel meetings; and,
- to invite wider participation beyond the local stakeholder panel.

Engagement with local agencies and Stirling Council was designed:

- to assist in the identification of potential members of the Stakeholder Panel;
- to solicit inputs from a local policy and environmental management perspective; and,
- to explore the implications of the project for future policy and implementation.

Engagement with national stakeholders was designed:

- to ensure the project benefits from expertise, best practice and relevant experience from elsewhere;
- to ensure that national stakeholders are kept informed about progress; and,
- to ensure that the results of the project are available to inform national policies and programmes, as appropriate.

The rest of this chapter explores ways in which the project was designed to meet these objectives.

6.2 Stakeholder engagement

The methodology that was agreed at the outset focused around the establishment and recruitment of a panel of local stakeholders, representing the key groups of people with an interest in management of land within the project area. This part of the report considers how successful was stakeholder engagement and what lessons could be learned for similar projects in the future.

6.2.1 Risks

It was recognised that the process of engaging with stakeholders, while a key objective of the study, presented a number of risks and uncertainties. At the outset of the project an assessment was undertaken to identify and plan for these risks. This section reflects on the anticipated risks, and those which were identified during the course of the project, describing how they were managed and issues that arose in relation to each.

The initial risk assessment identified the following risks relating to engagement with stakeholders.

1 Potential for lack of agreement among technical partners on the purpose, the study area and relevant stakeholders for the project. The preparatory work contained in the 'methods study', together with early engagement of SNH and SEPA with the Stirling Environment Partnership, meant there was agreement on these aspects of the project.

2 Lack of success in recruiting representative samples from each stakeholder group. The process of identifying potential Panel Members involved compiling a long-list of potential participants and then targeted invitations designed to secure representation of different interests and localities (section 6.2.5). There had been concerns that the project team might have difficulty in recruiting sufficient local people to the Panel, particularly from the land management sector. In the event, the project team was presented with the opposite situation, with larger numbers of land managers wishing to join the meetings than could be accommodated. This appeared to be the result of uncertainties about what the project was aiming to achieve and how it might impact on the way that people manage their land. A further concern for some land management interests was that inclusion of community and recreation interests on the Panel would result in 'the community' influencing how their land was managed or different activities funded.

This might have been avoided had there been more preparatory work, including contact and involvement of representative bodies such as the NFUS. This might have helped identify the correct language and provided reassurance to potential participants. Media uptake of press releases and slightly skewed presentation of press material served to upset and concern the farming community. The interest that this generated was helpful in some ways, but the project team in no way intended to upset or worry people. A careful and sensitive process was therefore needed to confirm who was included on the Panel and who was not. While this was in some senses a good problem to have, it did create some understandable difficulties amongst those who were not included on the Panel.

To some extent this was mitigated by setting up a stand-by list, and by maintaining communication with the wider list of stakeholders. It suggests that anticipating how a study will be perceived by different types of stakeholder, and ensuring that early communication is very clear about what it is and is not, is essential. In the case of the Carse of Stirling, the project intentions were set out clearly, but preceding perceptions of agency intentions meant there was considerable mistrust about the project ambitions.

It might also have been helpful to distinguish more clearly between different types of land management interest represented in the project area, ranging from market focused businesses through to smallholders and part time farmers. Each of these groups has a different perspective and different priorities.

3 *Difficulties in maintaining stakeholder attendance over the course of the project.* A small number of people withdrew from the Panel during the course of the project. Perhaps a greater issue was the variability in attendance that resulted from the exercise coinciding with key periods of land management such as lambing and hay-making. While one spring meeting was postponed to try and avoid the lambing period, the fifth meeting was held on a fine June evening and many of the farmers were understandably engaged in land management activities. Recognising that attendance might vary, the project team provided opportunities for people to input or contribute their views between most meetings. Additionally, a schools competition (which members of the Panel judged) was held during the 'lambing break' to maintain momentum. While it would have been possible to reduce the conflict with busy periods in the farming calendar by concentrating meetings during the winter months, this would have created pressures for the project team who had to analyse and prepare information ahead of each meeting, and could have been disrupted by inclement weather.

4 *Stakeholder engagement on network analysis – difficulty in establishing links from land uses, through ecosystem services to socio-economic benefits.* The methods study identified 'network analysis'¹ as a means of demonstrating the links between different land uses and the range of ecosystem services derived from the project area. It could, for example, map out the range of provisioning, regulating and cultural services derived from rivers and watercourses, comparing these with the different services associated with woodland, farmland or moorland. Some preliminary network analysis was carried out by the project team at the outset of the work, but a decision was taken not to use this within Panel Meetings.

Technical GIS-derived mapping had produced a negative reaction from the Panel during the first meeting, so the project team deliberately simplified the range of information presented in subsequent meetings in order to facilitate fuller engagement of participants. Greater effort was instead put into preparing simplified and more accessible mapping as a way of demonstrating the spatial pattern of ecosystem service provision within the project area.

It is therefore concluded that while network analysis provides a valuable way of thinking about the links between land uses and service provision, it should be used to assist technical analysis rather than stakeholder engagement.

5 *Stakeholder engagement across all relevant services – stakeholders focusing on some but not all relevant ecosystem services.* As noted earlier in this section the Panel's knowledge of the ecosystem services provided by the project area did vary. The Panel brought greatest knowledge and awareness about services such as food provisioning, flood regulation, wildlife and habitats and several of the cultural services relating to quality of life. Members of the Panel quickly understood the concept of multiple benefits, even where their primary interest might have been a single issue, such as food production.

As would be expected, some of the more 'scientific' services, particularly those falling into the category of 'supporting services' were less well understood and, as a result, received comparatively little attention in the subsequent discussions and analysis, irrespective of their actual importance and the factors affecting their provision currently and in the future. This

¹ 'Network analysis' in this sense is a shorthand for Bayesian belief networks – a probabilistic graphical model for understanding dependencies of particular activities on defined variable.

was as anticipated, suggesting that the assessment of supporting services may be more of a technical exercise which should be undertaken in parallel, or to inform, a stakeholder based approach.

Most of the services regarded as less important by the Panel were either supporting services (and therefore to some extent picked up in provisioning, regulating and cultural services) or relatively unimportant within the project area (e.g. provisioning of natural medicines). The principal exception to this was in relation to global climate regulation, or carbon management as the project referred to it. Given the presence of significant carbon stores within the project area, and the national policy emphasis on carbon reduction (including sequestration), this was a category of service that the project team ensured remained 'on the table' alongside more frequently cited benefits.

6 Stakeholder engagement on option development – difficulties in defining appropriate range of realistic options. The process of scenario development was informed by, but not defined by the Stakeholder Panel. The third workshop, which explored past, present and future change, concluded with a short discussion around preferred futures for the area and a questionnaire exploring people's responses to different types of change (e.g. more food production, same food production, less food production) relating the most important categories of benefit. The resulting information provided the basis for the generation of six scenarios, most of which explored different facets of future management of the Carse (and which were therefore not mutually exclusive). Most were reasonably realistic, though one (maximising agricultural production over other types of benefit), which emerged from Panel discussions, was less realistic in terms of its acceptability within the current policy framework (e.g. effects on Natura sites). The six scenarios were developed by the project team and reviewed by a group of technical specialists from SNH, SEPA and Stirling Council to help ensure they were reasonably realistic.

The team faced a choice between preparing mutually exclusive scenarios, which would probably have been more extreme and less realistic, or exploring how different policy themes and related measures could play out across the project area. The latter could be seen as thematic options or choices rather than separate scenarios.

7 Reality and relevance of socio-economic scenarios – lack of credibility with stakeholders. The original plan had been to describe how each of the main scenarios might vary under different socio-economic scenarios (e.g. the four scenarios developed to sit alongside the UKCIP02 climate change scenarios (UK Climate Impacts Programme, 2001) – world markets, global sustainability, national enterprise and local stewardship). In discussion with the PMG it was agreed that the layering of these additional dimensions onto the main scenarios could unnecessarily complicate the process and make it more difficult to build consensus in moving towards a vision and action plan for the future. That said, some of the scenarios are quite well aligned with aspects of the socio-economic scenarios.

8 Stakeholder engagement on evaluation of options – stakeholders unable to provide input in terms of evaluating options. Considerable effort was put into presenting the six scenarios in a way that was attractive, accessible and that illustrated the kinds of changes that were being proposed. Each scenario included a short written description with bullet lists of measures, illustrative photographs, an indicative and annotated 3D map of the area showing in broad terms how the scenario might be realised, and an evaluation of the scenario against the framework of ecosystem services. Six stalls were set up for the Panel meeting, each with a different scenario. Panel members were invited to visit each stall, give their overall reaction to the scenario and to identify which measures they particularly liked or disliked. The meeting was kept informal without PowerPoint presentations, but technical specialists and others from the project team and PMG were on hand to help and answer

questions. The materials were circulated electronically after the meeting to allow further reflection and inputs from those who had been unable to attend.

This approach proved very successful and people were able to engage with the scenarios and provide clear feedback along the lines intended. The process took longer than had been anticipated meaning that an exercise to synthesise and feedback Panel views at the end of the meeting was abandoned. Several people noted that aspects of each of the scenarios could be seen as complimentary or not mutually exclusive and recognised the potential to piece together a preferred option based on elements of each. There was some confusion about the status and purpose of the 'business as usual' scenario which perhaps could have been addressed by having a more formal introduction to each scenario at the outset, though a deliberate decision had been made to keep presentations to a minimum in latter parts of the process.

9 *Lack of success in building consensus within and between stakeholder groups, and between local and national (policy levels).* There had been a clear concern that a project of this kind had the potential to expose but not resolve differences in stakeholder views, and / or to generate priorities which were incompatible with local or national policies. While there were some continuing areas of disagreement (e.g. around woodland expansion, flooding or additional walking and cycling networks), the Panel discussions moved towards greater levels of consensus, particularly during the last two meetings. It was at this point that people could get a clearer idea of how the area might change in the future (perhaps being reassured that the project was not cover for a woodland expansion or flood management scheme) and that the outcomes could be beneficial overall. At the same time, some of the suggestions about priorities became moderated by awareness of the implications for other types of benefit, with the result that the Action Plan output was ambitious but not unrealistic, nor widely out of step with the policy context.

Of course, it could be argued that the project team, who used the outputs from each meeting to develop a draft vision and action plan, were also a moderating influence, preparing a document which would fit with, or reflect current or evolving policy. The level of support for the Action Plan evident from the fifth meeting, and the fact that discussion focused on how to implement it rather than on its content, suggests that this influence was kept to a minimum.

Learning points:

21. it is important to consider how a project will be received and perceived within a project area since this is likely to affect people's interest and willingness to take part and the entire success of the project. Potential participants are likely to be driven by a range of motivations including concerns about the effects of the project, a desire to see a particular project progressed, or an understanding of the project aims and objectives;
22. it is prudent to consider the risks of too many people wanting to sit on the panel as well as the risks of too few being interested;
23. as far as possible, time the meetings to avoid busy periods in the farming calendar. Use frequent contact and reminder emails to encourage people to attend meetings;
24. be pragmatic when it comes to the complexity of analysis that is appropriate to explore during stakeholder meetings. The Panel will be assimilating a large amount of information and there is a risk that overly complex or apparently theoretical information could encourage people to disengage. This applies particularly to technical mapping, use of network analysis and integration of socio-economic scenarios into the work;
25. recognise that stakeholders are likely to focus on categories of service or benefit with which they are most familiar. Where there is a type of benefit that is important, either in terms of the area or the national policy agenda, it may be necessary for facilitators

to keep these on the table to ensure they are considered through later stages of the work;

26. consider whether scenarios should aim to provide mutually exclusive (and therefore probably unrealistic) alternative visions of the future, or whether they more accurately describe options in relation to different themes;
27. invest resources into developing and presenting scenarios to make them as accessible and realistic as possible.

Concerns about the aims and objectives of the project

The main additional risk that emerged during the course of the project was the level of concern, even suspicion, about why the project was being carried out and what the objectives of the commissioning agencies were. Some were worried the aim was really to plant trees over the Carse, others that it was about flooding the Carse to protect Stirling, and others that it was about expanding the boundaries of the Loch Lomond and Trossachs National Park. The work also coincided with Scottish Government consultation on the review of the Land Reform Act which added a further layer of concern in some people's minds. There may also have been a legacy from previous projects carried out in the area, such as the 'Wise Use of Floodplains' project which includes the Forth catchment as a case study. Awareness of these issues at the outset could have identified and helped avoid a number of concerns at the outset of the project.

These concerns occupied a significant part of the discussion at the first Panel Meeting and were not really resolved until the fourth and fifth meetings when people could begin to see what would be emerging from the process. To some extent, this reflected a degree of mistrust in the role, function and intention of the agencies, and was something that might have been anticipated.

The project team, backed by representatives from SNH, aimed to make it clear at each stage what the project was aiming to achieve, its role as a national demonstration project, and the aim of delivering something that would be valuable at a local level. However, it seems that the novelty of the approach, with stakeholders being asked to contribute rather than being informed about what is going to happen, and the influence of issues such as a series of wet years, EU Common Agricultural Policy (CAP) reform and emergence of a new forestry and woodland strategy (and the Scottish Government's woodland expansion aims in general), all fuelled concerns about what the project was really about.

As more projects of this kind are carried out, it is likely that the sense of novelty and suspicion will be reduced. There will also be much greater potential for information sharing between project areas – something that is being considered in relation to implementation of the Action Plan, but something that might have allayed fears if it had taken place at the outset. If, for example, a land manager from the Carse of Gowrie or another similar project, had been invited to speak about their project for 20 minutes at the first Panel meeting, many of the participants might have been less concerned and readier to engage with the process.

It would also have been helpful to engage earlier with representatives of key stakeholder groups (in this case, land managers via the NFUS) to more clearly communicate the purpose of the project and help identify potential participants. This could have reduced the scope for misinformation about the project circulating early on, raising concerns for all involved.

Learning points:

28. consider the possibility that the project will generate concern and even suspicion about its motivation and the aims of the commissioning organisations. Consider

drawing on experience from other projects to demonstrate what the project is about and the benefits that could be delivered for the local area. There may also be considerable potential in gathering information on existing and emerging tensions to inform the project development process, to ensure fears are allayed at the earliest opportunity;

29. it is worth investing time early on to engage with representatives from key stakeholder groups where this helps communicate the aims and objectives of the work. It can all assist with identifying potential stakeholders and the issues likely to be of particular concern.

6.2.2 *Managing expectations*

The exploratory nature of the Carse of Stirling Project meant that managing the expectations of participants was a key challenge, particularly given the concerns about the purpose of the study that were voiced by members of the Stakeholder Panel at various points.

On the one hand, the project team were keen to emphasise the national importance of the work as a 'demonstration project' flowing from the Land Use Strategy. Introductory presentations and written descriptions of the project highlighted the role of the work in developing and testing a new approach to planning the way that land is managed. The national profile of the work was noted, with reference to the interest of the Scottish Government, SNH, SEPA and other partner agencies. The significance of the work was reflected in the deliberate titling of the stakeholder group as a Panel.

On the other hand, the project had the explicit objective of identifying projects and initiatives that would help deliver real benefits at the local level. The success in delivering this aim would of course depend on the extent to which the priorities emerging at the end of the process were realistic and capable of implementation within the existing policy framework, or could be used to inform the development of future policy. Understandably, this was the area that was of most interest to stakeholders, but one where a degree of uncertainty applied.

In the event, the process of taking an integrated approach to the identification of benefits, the exploration of options and choices through the scenario work, the involvement of agency specialists who helped define the parameters of what was possible, allied to careful facilitation and preparation of the draft Action Plan, meant that many of the priority actions either fitted with existing policy or could positively inform the development of future policy. However, this raises further challenges in terms of implementation, both for the Panel itself and agencies' ability to support and facilitate its work.

It is important to note that the draft Action Plan was prepared on behalf of the Stakeholder Panel rather than SNH and SEPA as commissioning organisations. This was deliberate and intended to give the Panel ownership of the document, hopefully laying to rest concerns that the project had a hidden agenda, and intended to encourage local involvement in implementation. The project team were uncertain as to whether the Panel would want to take ownership of the document, but a significant part of the discussion at the fifth Panel meeting focused on how the Panel could continue to work after the end of the 'project' and how various actions could be implemented. Ownership of the project by the Panel had also been encouraged by reviewing the project area and project title at the first Panel meeting.

Given the diversity of interests represented on the Panel together with the potential conflicts and areas of mistrust that existed at the outset of the project, it is not surprising that some areas of disagreement or dissent remained at the end of the project. It was anticipated that

some of these could be addressed in the way that the Action Plan was refined and implemented by the Panel.

Learning points:

30. recognise that managing expectations about what the project can deliver will be a key challenge and will depend, to some degree, on the success of the project in delivering outputs that are realistic and practical.

6.2.3 *Communications and language*

At the project outset, it was recognised that the concept of ecosystem services, and the rather technical language typically used, could act as a real barrier to successful engagement with stakeholders. Agreeing a common language, and suite of terms, was therefore critical in achieving the aim of making the process simple and accessible.

Defining the principles of an ecosystems approach

The first step in this was spelling out the principles of an ecosystems approach in simple terms:

- it takes into account and values the land as a whole – land use, landscape and nature – the ecosystem;
- it aims to identify a wide range of benefits (ecosystem services) that stem from land and the way it is managed;
- it takes stock of a wide range of policies and the influences that affect land use, landscape and nature and the ability to deliver benefits;
- it takes account of how nature works. This means working with nature rather than against it, and often thinking in the longer term and at a wider scale. It may be difficult to anticipate the consequences of land management. This requires an adaptive approach, being flexible and responsive to changes in the environment, just as farmers or foresters respond to changing commodity markets and other economic factors;
- it involves and supports those that manage and benefit from the land in identifying local priorities designed to maximise these benefits; and
- it aims to help realise these plans and priorities through local projects and through influencing policies and programmes of support.

In practice, this meant asking questions about land use and management, for example:

- What will be the long term effects of a land management decision?
- How can land management make more space for natural processes?
- How healthy is the soil, and what are the pressures on it?
- How well connected are habitats across the land that provide benefits to pest control or pollination?

Ecosystems or land uses?

It was recognised that the term ecosystems can imply a focus on natural habitats such as wetland, bogs, native woodlands and rivers. Most projects based on an ecosystems approach take a much broader view, for example identifying the benefits derived from farmland, greenspaces or cultural heritage.

It was agreed, therefore, that, while the project would not lose reference to the concept of ecosystems as underpinning the work, discussion would more normally talk about land and land uses and the benefits they provide (see below). This in turn might need further explanation to confirm the types of land being discussed, and the scales which may be relevant (e.g. from a hedge to a mountain range). Rivers, burns and waterbodies were included within this broader definition of 'land' uses.

Ecosystem services or benefits?

Perhaps the most challenging part of moving to an ecosystem approach is the idea of ecosystem services. This can be difficult to communicate effectively – both as a concept and for some of the individual services. To simplify the approach, and make it more accessible, the project referred to ecosystem services as the different kinds of benefit that we get from the land. This proved more straightforward than had been anticipated with the idea of 'benefits' being frequently articulated by Panel members as well as the project team.

A distinction is usually drawn between four main types of ecosystem services – supporting, provisioning, regulating and cultural services. In talking about the benefits derived from land, this distinction was maintained, but the language simplified as follows:

- products we obtain from the land (provisioning services);
- regulation of our environment (regulating services);
- culture and quality of life (cultural services);
- supporting plant and animal life (supporting services).

The project team prepared a plain English description of each of the services or benefits in each category (see Annex 1).

In practice, discussion at Stakeholder Panel Meetings tended to adopt a shorthand for a number of categories of benefit. Provision of food, for example, was often referred to simply as 'food' or sometimes combined with other forms of agricultural production (including fibres such as hay). More significant perhaps, was the use of the term 'flooding' as a more accessible term than 'flood hazard regulation' though this had the effect of confusing the positive role of the environment in contributing to flood regulation, with the negative impacts of flooding. When this was combined with divergent views on different types of flood management, and the relationship between flooding in the project area and protection of Stirling downstream, there was perhaps a lack of clarity about the service or benefit being discussed. Given the significance of the relationship between land management and flood management, this is an area where future projects could benefit from careful definition and application of terms.

Ecosystem functions

The concept of ecosystem functions also adopts technical language, and is defined as 'the capacity of natural processes and components to provide goods and services that satisfy human needs, either directly or indirectly' (de Groot, 1992). The term 'capacity' is likely to have different meaning for different types of ecosystem services. It could include, for example, the current (and potential) contribution of the area to the supply of fresh drinking water, or the way in which Core Paths provide recreational benefits. For the purposes of discussions with stakeholders, it was agreed that it would be sufficient to identify (for example) a given land use, agree the categories of benefit provided and describe how these benefits are currently provided.

Tailoring communication to different types of stakeholder

It was recognised that the project would involve engagement with several different types of stakeholder and that it would be important to tailor communication according to their existing knowledge of ecosystem services and their likely areas of interest or concern. Table x shows the seven groups that were identified.

Learning points:

31. the project confirmed the importance of considering how to communicate concepts associated with an ecosystem approach. By focusing on 'land' and 'benefits' the Panel was able to quickly grasp the approach and apply it to the project area.

6.2.4 Panel recruitment

The project team worked with the PMG and LPAG to identify stakeholders in the project area based on:

- LPAG members providing lists of their contacts;
- working through LPAG members networks and contacts e.g. Community Councils, Community Development Trust, SLE members etc.;
- using the project team's own knowledge of the area and contacts;
- raising awareness via a press release (picked up by the Stirling Observer and the Scottish Farmer) and a mailshot issued by a local NFUS representative;
- working with key contacts in the area to identify other people/organisations that should be involved;
- preparing a 'long list' of stakeholders to invite to panel;
- discussing potential participants with the PMG.

This generated an initial list of just over 130 stakeholders, made up of local land managers, businesses, communities, people with a specific environmental or recreational interest, elected members and people with a policy interest. It was agreed that the Panel would be drawn from the first four of these groups, with elected members and policy stakeholders engaged in different ways (e.g. briefings, Local Project Advisory Group).

The project team then began the process of shortlisting potential Panel members, aiming to achieve a balanced representation in terms of interest and geographic spread within the project area. The Panel was then selected based on sectoral representation (farming, land management, community, business, recreation) and area representation from different communities/areas (Arnprior, Gargunnoch, Cambusbarron, Buchlyvie, Kippen, Thornhill, Port of Menteith, Blairdrummond, or for the whole of the Carse area).

The team subsequently prepared an invitation and briefing note which was sent to the shortlist of stakeholders, inviting them to join the Panel. These invitations were followed up by phone to encourage participation, allowing the project team to confirm whether people were or were not included on the Panel.

The project team's starting assumption was that it might be difficult to find enough people to fill the 35 Panel places, particularly from the land management sector. In the event, as noted above, there was more interest than could be accommodated and the team had to turn down a number of interested parties.

This high level of interest reflected a number of factors, including concerns among land managers about what the project was aiming to achieve. It may also have been prompted

by an article in Scottish Farmer (18 October 2012) which gave the impression that the project would be community-led, understandably raising concerns that it might impose policies or actions on land managers. This was the result of briefing information provided to the publication being summarised, with the effect that some of the key aspects of the project were excluded from the article.

There was a little 'horse trading' in the run up to the first meeting, with a small number of people "negotiating" with others to come off the panel so that they could take their place. A small number of people left the Panel during the course of the project, with their places being filled by people from the standby list.

This experience confirmed the importance of anticipating how different stakeholder groups may respond to the establishment of a project of this kind, and their likely motivations for becoming involved. It also underlines the importance of clearly communicating the purpose and detail of projects to minimise the risk of misunderstandings.

Learning points:

32. identifying potential stakeholders should draw on as many sources of information and advice as possible;
33. it is important to be clear about the limited size of the Panel, and that it will be drawn from the longer list of potential stakeholders in order to avoid raising expectations;
34. it is important to have a sampling framework in place to guide the process of selecting the Panel, based on factors such as people's areas of expertise of interest or their location within the study area. Some pragmatism is likely to be needed however;
35. it is important to anticipate and plan for under and over subscription of the Panel;
36. it is helpful to work with and through existing representative organisations where they exist.

Table 2. Communication and key audiences

Audience	Description	Technical / non-technical language	Key sensitivities and messages	Responsibility for communication
National interests	Since this is a national demonstration project, it was anticipated that there would be interest in the progress, outputs and outcomes from a range of national organisations including the Scottish Government, SNH, SEPA, Forestry Commission Scotland, land management and ownership representative organisation such as the National Farmers Union Scotland and Scottish Land and Estates, non-governmental organisation such as RSPB and the Scottish Wildlife Trust and research organisations including universities and the James Hutton Institute.	The majority of this audience are familiar with the concept of an Ecosystems Approach and the types of analysis that inform the work. The use of technical language is therefore appropriate.	Key messages relate to the role and success of the project in meeting broader objectives, both in terms of demonstrating the application of an Ecosystems Approach and by providing inputs to policy and programme development.	The PMG was responsible for identifying these stakeholders and providing them with updates, based on progress reports prepared by the Project Team.
Elected representatives	This group comprised elected members from Stirling Council, together with MSPs and MPs. These representatives have an interest in what the study means for their constituency and its population. There might also be an interest in the project's status as a national pilot as identified in the Land Use Strategy for Scotland. The aim should was to keep elected representatives informed about progress of the study, particularly where they expressed an interest in the project. There might also be opportunity to involve them in discussions during the course of the project (e.g. via the LPAG or Stakeholder Panel), or once the project is starting to draw conclusions and recommendations.	The majority of this audience was unlikely to be very familiar with the concept of an Ecosystems Approach, though they would have knowledge of the interfaces with a range of policy agendas. Non-technical language was appropriate in the first instance, though these stakeholders would be provided with access to more technical information if requested.	This group of stakeholders would be sensitive to concerns raised by local stakeholder interests. Key messages therefore included the aims of the project to draw on local knowledge and expertise, to come to a common and informed view on how the area should be managed to increase the benefits we get from the land, to deliver actions and projects at a local level and to inform approaches to managing land use at a national level.	The PMG was responsible for providing non-stakeholder panel members with updates, based on progress reports prepared by the Project Team. The Project Team was responsible for communicating with elected members included within the Stakeholder Panel
Decision makers and	This group comprised technical and policy officers from Stirling Council, SNH, SEPA,	This audience would either already be familiar with the	This audience may be sensitive to project	The PMG was responsible for liaising with this group of

Audience	Description	Technical / non-technical language	Key sensitivities and messages	Responsibility for communication
policy makers	Forestry Commission Scotland and Historic Scotland. These individuals would have varying levels of familiarity with the technicalities of an ecosystems approach, but are likely to have an interest in how their area of responsibility could be reflected within the work, and how the results would be implemented. These individuals were also likely to be able to contribute in terms of the analysis of local policy drivers and in the provision of locally specific data. The principal focus for their involvement in the project was via the LPAG, however, there was a wider constituency of policy makers from within Stirling Council in particular, with whom it would be beneficial to engage via an extended LPAG meeting, or a separate meeting.	concept of an Ecosystems Approach, or able to understand the principles relatively easily. They have specialist knowledge in a range of policy areas. The use of technical language was therefore appropriate	recommendations that relate to specialist policy area, while a lack of involvement could make subsequent implementation more difficult. Key messages therefore focussed around the relevance of this work to local policy development and implementation, and engagement encouraged via the LPAG and / or specially convened meetings.	stakeholders.
Front line deliverers	This group comprised organisational representatives with a presence on the ground within the project area. It could include, for example, countryside rangers, NNR managers, SNH area staff, FCS woodland officers. These individuals have specific and technical knowledge about aspects of the project area which they could contribute to the project. They might also be in a position to explore the practicalities of different management options for the area. This group was involved in the project by including them within the Stakeholder Panel.	This audience are either already be familiar with the concept of an Ecosystems Approach, or able to understand the principles relatively easily. They have specialist knowledge in a range of environmental or land management areas. The use of technical language was therefore appropriate.	This audience could be sensitive to project recommendations that relate to their area of specialist knowledge. Key messages focussed around the importance of inputting their knowledge and expertise to the project, the aim of identifying a consensus view of how the area should be managed in the future, and influencing the development and implementation of local projects in the future.	The Project Team was responsible for engaging with this group of stakeholders via the Stakeholder Panel.
Land managers	This group comprised farmers (owners and tenants) and woodland owners and	This audience was unlikely to be familiar with the	Key concerns for this audience were likely to	The Project Team was responsible for engaging

Audience	Description	Technical / non-technical language	Key sensitivities and messages	Responsibility for communication
	<p>managers. Ideally it would include land owners and estates, including those with land holdings that extend into the upland parts of the study area. This group had potential to contribute important information about the way farmland, moorland and woodlands within the study area are managed, and the key drivers (financial, regulatory and policy) which influence their land management decisions. On the other hand, they might be less aware of some of the technical knowledge and concepts underpinning the project and unfamiliar with technical language and terminology. There could be concerns about the aims and potential outcomes of the project if it implies change on or affecting the land under their management. Engagement of this group, and involvement on the Stakeholder Panel, was critical to the success of the project.</p>	<p>concept of an Ecosystems Approach and the use of non-technical language was therefore appropriate.</p>	<p>include representation of land management interests within the Stakeholder Panel and the balance with other local interests, the potential influence of the study on the way individuals manage their land holding, and specific issues around woodland expansion, flood management, habitats and species (in some cases linked to particular agencies). Key messages would therefore focus on the importance and value we attach to land managers' inputs to the project, the need for us (and other stakeholders) to gain a fuller understanding of how land is managed in the area, the aim of cutting through the range of policies and regulations affecting the area, and the potential to influence SRDP going forward.</p>	<p>with this group of stakeholders via the Stakeholder Panel and updates to non-participants.</p>
Local residents	<p>This group could include representatives of Community Councils, community development trusts and other community organisations, together with individuals with a particular interest in the project or project area. This group had potential to contribute important information about the study area, including the range of 'benefits' that local</p>	<p>This audience was unlikely to be familiar with the concept of an Ecosystems Approach and the use of non-technical language was therefore appropriate.</p>	<p>Key concerns for this audience are likely to include the balance of representation on the Stakeholder Panel, specific local issues (e.g. development) or sectoral interests. There could be</p>	<p>The Project Team was responsible for engaging with this group of stakeholders via the Stakeholder Panel and updates to non-participants.</p>

Audience	Description	Technical / non-technical language	Key sensitivities and messages	Responsibility for communication
	<p>people derive from it. This is likely to be important across all ecosystem services, but particularly in terms of cultural services where quantitative information may be lacking. As in the case of land managers, local residents may be less aware of some of the technical knowledge and concepts underpinning the project and unfamiliar with technical language and terminology. Engagement of this group, and involvement on the Stakeholder Panel, was be critical to the success of the project.</p>		<p>elevated expectations in terms of the project's ability to deliver immediate practical outputs. Key messages would focus around the importance of inputting their knowledge and expertise to the project, the aim of identifying a consensus view of how the area should be managed in the future, and influencing the development and implementation of local projects in the future.</p>	
Visitors	<p>This group could include occasional visitors to the area (for example people from Glasgow visiting Flanders Moss) and groups such as walkers or ramblers who make more frequent 'semi-organised' visits. Given the requirement to engage with people over a number of months, the project will focus on engaging with representatives of local recreational groups (not limited to those based within the study area) and involving them on the Stakeholder Panel. The exclusion of occasional visitors to the area will be noted in the project findings. However, it was hoped that 'front line deliverers' together with some local residents might be able to provide a proxy for visitors from outside the area.</p>	<p>This audience was unlikely to be familiar with the concept of an Ecosystems Approach and the use of non-technical language was therefore appropriate.</p>	<p>Key concerns for this audience are likely to include the balance of representation on the Stakeholder Panel, specific local issues (e.g. condition of core paths) or sectoral interests. There could be elevated expectations in terms of the project's ability to deliver immediate practical outputs. Key messages should focus around the importance of inputting their knowledge and expertise to the project, the aim of identifying a consensus view of how the area should be managed in the future, and influencing the development and</p>	<p>The Project Team was responsible for engaging with this group of stakeholders via the Stakeholder Panel and updates to identified non-participants.</p>

Audience	Description	Technical / non-technical language	Key sensitivities and messages	and	Responsibility for communication
External consumers of ecosystem services	<p>There were also people who consume benefits outside the study area. This is likely to range in scale from the global (e.g. the global benefits of carbon sequestration within soils and vegetation in the study area), national (e.g. consumption of the food produced in the study area) to local (e.g. flood storage within the project area affecting the frequency and severity of flood events downstream). While it would theoretically be possible to engage with people benefiting from the third of these types of benefits, it might be difficult to maintain involvement over five meetings. It was therefore agreed that the project would draw on the knowledge and expertise of decision makers and policy makers in identifying these types of benefit.</p>		implementation of projects in the future.	local	

6.2.5 Panel meetings

Panel meetings were held in three different venues across the project area. The first two were held at the Woodhouse, Kippen Station (a farm diversification scheme comprising a café and restaurant), the third and fourth in the restaurant of Briarlands Farm (another diversification scheme based around a café, play area and pick-your-own soft fruit) and the final meeting at Blairdrummond Community Hall.

Meetings were catered, with soup, sandwiches, tea and coffee available either at the start of the meeting or part way through. Meetings generally started around 6.30pm with the formal business starting at 7pm and running through to 9pm.

For most meetings, rooms were arranged with a series of tables set out around a projector and screen. Information about the project area, or based on previous meetings' work, was posted on display boards around the room.

Although considerable effort was spent making the information as accessible as possible, there was some criticism from members of the Panel that too much technical information was presented using PowerPoint at the outset of meetings. Finding alternative means of conveying a similar range of information without adding to the demands on peoples' time would, however, be challenging. Certainly, many participants seemed to respond positively to the information that was presented, with the session on forces for change having a significant influence on subsequent discussions.

Although work with the Stakeholder Panel was spread over five meetings, each over two hours long, there was still a considerable amount of information to get through and feedback suggests that people felt rushed at certain points in the process. The Panel partly saw the meetings as social occasions and, although time was given over to soup and sandwiches, the pace that the project team had expected was perhaps too ambitious. Inevitably this was something of a balance since it would have been difficult to expect participants to have given more of their time to the project, or to have asked them to carry out preparatory work in the form of additional 'homework' between meetings.

Learning points:

37. choosing the right venue for meetings is important. Location, space, acoustics, catering and comfort are all factors to consider;
38. where possible, the project should benefit local organisations or businesses by hiring local venues and using local caterers;
39. where practical, meetings should be held in more than one venue, moving around the project area and not favouring one venue over others;
40. catering, in the form of soup, sandwiches, teas and coffees allows people to come straight from work and creates an opportunity for informal networking;
41. using graphic materials to display around the meeting room can provide reference points for participants;
42. where possible, avoid too much information being communicated via formal presentations where the audience is unused to this format;
43. careful preparation is needed to ensure that information is tailored and focused, thereby helping to reduce the risk of overloading the Panel.

6.2.6 Working with a diverse Stakeholder Panel

The Stakeholder Panel comprised a diverse range of interests, with many members having experience in areas as different as farming, beekeeping, recreation and forestry. Many people also recognised that they knew far less about other topic areas or issues. This created a challenge for the project team in terms of enabling the expertise knowledge within the room to be recognised and used, while creating opportunities for all to contribute their views and opinions. This was achieved in a number of ways, including:

- for key discussions, putting people into workshop groups aligned with their area of expertise or knowledge;
- gently facilitating discussion groups to ensure that people with particular areas of knowledge had an opportunity to share it with others;
- devising ways of allowing everyone to contribute their views and feedback at regular points via the use of questionnaire surveys (see below).

It is inevitable that within such a diverse group there would be tensions and areas of disagreement. While some Panel members knew each other already, early discussions highlighted differences between farmers, community representatives and recreation interests. As noted above, land managers were themselves a diverse group in terms of their attitudes towards the market and environment. It is important to recognise and work with such differences, using discussion to improve understanding and, hopefully, to build consensus around key issues. Within the Stirling project, the exploration of scenarios was particularly important in sharing knowledge and expertise, helping to breakdown suspicion between the various groups.

Learning points:

44. ensure that the Panel meetings acknowledge and draw on the knowledge and expertise of Panel members;
45. ensure there are opportunities for everyone to contribute their individual views on key topics as well as through group discussion and joint feedback;
46. recognise the differences in peoples' interests and the areas of tension or conflict that may result. Ensure that discussions are structured to help improve understanding and reduce areas of difference wherever possible.

6.2.7 Panel Questionnaire Surveys

One variation to the agreed methodology was the use of questionnaire surveys between Panel Meetings. This idea was introduced at the first Panel Meeting where a questionnaire was used to gain individual responses to a discussion that had been conducted in groups and in a relatively short amount of time. The survey was provided in paper format and on-line using web-based Survey Monkey programme. The benefits of this additional element included:

- allowing everyone to express their views in much greater detail than was possible during the Panel Meeting;
- providing a link between two meetings, encouraging people to think about the issues in greater depth during the intervening period, and helping to maintain momentum;
- providing quantitative information that could be fed back at the start of the subsequent meeting;
- allowing the team to cover adequately issues or discussion points which were not fully discussed during the meeting session (e.g. where earlier discussions had taken longer than anticipated).

This technique was used to gather information from the Panel on the benefits they considered most important, where the main beneficiaries of these benefits were located and their views on different future outcomes. The three questionnaires and the results are included in Annex 3.

The first of these questionnaires was also made available to the long list of stakeholders within the project area to find out whether responses were significantly different. There were differences both in the characteristics of respondents and the views expressed (see Annex 3). Differences in responses may reflect the composition of the Panel, but also the explanation and group discussions which had taken place at the first Stakeholder Panel Meeting before the Panel completed the questionnaire.

It is sensible to be clear about the amount of work that the Panel is expected to undertake between meetings. Some feedback from the Carse of Stirling project indicated that 'homework' added pressure to busy lives and that some Panel members would have preferred it if sessions had been self-contained, allowing them to give the work their full attention in the time allowed.

Learning points:

47. questionnaire surveys could be used to gather more detailed information on issues discussed at Panel meetings, and to maintain momentum between meetings;
48. it is helpful to be clear about the amount of work that is likely to be required between meetings, keeping this to a minimum wherever possible;
49. on-line surveys, which will automatically analyse and present survey information may need to be supplemented by paper questionnaires for those without web access or who are less confident computer users;
50. the results should be presented back to the Panel at the start of the next meeting, providing a reminder and update about what was discussed at the previous meeting, as well as an acknowledgement of people's contribution to the process.

6.2.8 Agency specialists

Technical inputs to Panel Meetings were, for the most part, provided by the project team and SNH representatives. In addition, many of the Panel members were specialists in their own right, bringing knowledge and skills in land management, recreation or community activity. This level of input allowed the Panel to 'find its feet' and gain ownership of the process. This was particularly important given early concerns about the purpose and motivation of the project.

However, when it came to the fourth Panel Meeting, which focused on considering different options for the future (in the form of six scenarios), the project team and Project Management Group agreed it would be helpful to invite agency specialists to attend. The project team also provided additional staff. The purpose was to provide an additional resource which Panel Members could draw upon in considering and responding to each of the scenarios.

Specialists were available covering flood management, agriculture and biodiversity, recreation, bogs and carbon management and moorland management. While there were differing levels of engagement, all the specialists present were able to make positive inputs to the discussion, helping define what was possible and exploring some of the choices and trade-offs highlighted by the scenarios. They commanded respect and were able to provide a more objective view on technical issues than members of the project team who were still viewed with a degree of suspicion.

Learning points:

51. future projects of this kind should consider the potential to bring in agency or other specialists as a resource for the Stakeholder Panel to draw upon. Such involvement should be later in the process, once the Panel has become established and the purposes of the project are understood. These inputs may be most valuable when the Panel is focusing on future change and evaluation choices and trade-offs.

6.2.9 Networking and information sharing

The Panel meetings were designed in a way that would provide opportunities for informal networking and information sharing among participants. This included a 30 minute period for soup and sandwiches, generally at the start of the meeting, and tea and coffee. The more interactive meetings, and those based on mixed group discussions also provided opportunities to share and hear ideas.

The fifth meeting included a Panel-led discussion on how the group was still newly formed and slightly artificial in composition and needed more time to consolidate its identity. Proposals to assist with this included an informal social event to meet each other over a drink or bite to eat, and the potential for agency support to facilitate continued Panel work in implementing the Action Plan.

Learning points:

52. the design of meetings should create opportunities for the Panel to get to know each other informally;
53. building the capacity of the Panel could be supported by additional activities such as learning visits to similar projects, or the involvement of representatives from initiatives elsewhere. This could also have helped allay concerns about the objectives and implications of the project;
54. the Panel may benefit from support towards the end of the project to consolidate its identity and move towards action plan implementation;
55. the convening of an additional social evening at the end of the project was essential to create a bridge from the planning work of the panel to the consideration of 'what happens next' and what the role of the panel should be.

6.2.10 Dealing with disagreement

The project methodology was designed to encourage the sharing of ideas, the discussion of key issues affecting the project area and the building of consensus. However, it was recognised from the start that some areas of disagreement could remain, either between members of the Stakeholder Panel or between the Stakeholder Panel and the wider public policy context.

Key areas of disagreement included:

- differing views about the desirability of woodland expansion with a number of land managers arguing strongly against it and other Panel members supporting new woodlands of the right type in the right place. Public policy in the form of the Scottish Forestry Strategy and the Stirling and Clackmannanshire Forestry and Woodland Strategy set the context for some woodland expansion in parts of the area. These strategies also develop approaches to creating and enhancing

- habitat networks where new links and stepping stones will help reverse past loss and fragmentation;
- differing views about the extent to which recreational access and active travel should be accommodated within the project area. Public policy in the form of the Land Reform Act which created the Right of Responsible Access and the Stirling Council Core Path Plan provide the context for recreational and functional access development;
 - differing views about the relative merits of 'engineered' flood management measures and those based on a broader, catchment based approach. While public policy has moved towards a catchment based approach and the use of 'sustainable' flood management measures, SEPA have confirmed that there remains a place for more traditional measures such as drainage, flood defence embankments and land drainage where these are locally appropriate;
 - differing views about the role of different land uses in absorbing and storing carbon, with some people arguing that the role of crops, including hay, had been underplayed relative to that of woodland;
 - differing views about the evidence and causes of climate change, with a small minority of people arguing a case against climate change.

The project aimed to deal with disagreement in an open and non-confrontational way without taking sides on a particular issue. Most of these issues emerged clearly during the first two meetings, ensuring that the discussion about past, current and future change could explore them in more detail. The scenario meeting (meeting 5) provided a further opportunity to discuss and explore areas of disagreement, with agency specialists present to provide technical inputs where relevant.

While none of these areas of disagreement were fully resolved, the process did build towards consensus, reducing the apparent severity of disagreement. In presenting the action plan to the Panel at the fifth meeting, remaining areas of disagreement were noted by the project team. It was suggested that these should be the subject of more detailed discussion as the Action Plan is implemented, for example to determine whether concerns could be addressed through careful siting and design of new woodlands, access provision, or positive engagement in the flood risk management planning process.

Learning points:

56. it is almost inevitable that areas of disagreement will emerge during the early stage of the project. Open discussion, acknowledgement of differing perspectives, careful presentation of facts and the involvement of relevant specialists can help address these concerns. However, it is likely that some tensions or disagreements will remain. These need to be acknowledged in preparing and implementing the project outputs;
57. the need to take full account of different views means that not all sessions in the panel should be based on 'group discussion and group feedback' – opportunities need to be created to allow for individual feedback that can then be jointly discussed. This became an increasing feature of the panel process – as previously difficulties in reaching consensus had led to some neutered or lowest common denominator discussion which reflected difficulties in reaching any immediate 'group' consensus.

6.2.11 Social media

The Carse of Stirling Project generated a lot of interest, notably during the period when the Stakeholder Panel was being recruited. This resulted in the creation of a reserve list of people who expressed an interest in sitting on the Panel but were excluded due to its limited

size and a longer list of stakeholders from across the project area. In addition to using conventional media to involve these stakeholders, the project team and Project Management Group agreed to explore the use of social media as a means of updating people on project progress and encouraging non-Panel Members to complete surveys and submit photos and other information about the area. A similar initiative from a previous urban fringe project had resulted in a group with 240 members, with a wide range of different contributions and it was hoped that this project would gain a similar momentum (www.facebook.com/groups/RiverDonCorridor).

A Facebook page (www.facebook.com/CarseOfStirlingProject) was set up by a volunteer from the local area and populated with information about the project and links to the main project website. The page did not, however, gain the anticipated level of 'ownership' with less than fifty people registering on it and limited number of contributions from outwith the project team. This lower take up may reflect the rural nature of the project area and the older age profile of the local population.

Use of social media can complement more traditional forms of communication with wider stakeholders. It is likely to become more important in the future. Success may depend on the host communities with greater take up and use among younger and more urban populations. Where social media can be employed at relatively low cost to the project, this should be considered as one avenue of engagement.

Learning points:

58. consider the potential role of social media in supporting project communications and wider engagement;
59. consider the recruitment of a local young person to assist in the development and promotion of social media – which can help to sustain social media communication beyond the 'life' of the initial work;
60. recognising the social media opportunities but also its limitations in a rural setting where there is not widespread familiarity or use of social media within the target audience.

7. DATA, MAPPING AND ANALYSIS

The project explored the availability and use of spatial data to map the provision of ecosystem services across the project area. This part of the report reviews the experience of acquiring data, using it to map ecosystems and ecosystem services and methods of presenting the information in an accessible and informative way.

7.1 Data

The methodology established at the outset of the project set relatively ambitious objectives for the use of existing spatial data to map the provision of ecosystem services across the project area. It distinguished between information which would help identify which ecosystems (or land uses) were present in the area, which services these ecosystems provided, and, potentially at least, information on the quantity, quality and trends for each service. Potential data sources are listed in Annex 2.

This ambition was tempered by the acknowledgment that data available to provide this level of information would be available for few, if any, of the ecosystem services likely to be of most relevance to the project area. It was recognised that some datasets would be out of date, others collected at too general or detailed scale and others might have been collected for a very different purpose which could affect their use within the project. Other issues included confidentiality (e.g. farm production / funding for management options) and licensing arrangements.

Given these known data issues, the project team started a process of data collection, based on the range of information set out in the methods report. The team's success in obtaining the data reflected the following factors:

- some datasets are publicly available and therefore straightforward to obtain (e.g. Historic Scotland's Historic Land-use Assessment);
- some datasets required license agreements with SNH, SEPA or third parties to allow access (e.g. flood risk mapping, Landcover mapping 2003);
- some datasets were either not available or only available for part of the project area (e.g. detailed soils data);
- some datasets were not made available to the project team reflecting apparent uncertainty about how they would be used (e.g. abstraction licenses).

Considerable time and effort was expended trying to obtain comprehensive baseline information for the project area and it was frustrating that some potentially useful known sources of information could not be obtained through the commissioning agencies. The project team found that data-sets fell into a number of categories:

- publicly available datasets, including those generated by SNH and SEPA, which were already held or could be acquired easily;
- 'regional scale' datasets held on behalf of Stirling Council by Forth Valley GIS. Obtaining these data required negotiation with the Council and Forth Valley GIS. Examples include Core Paths and open spaces;
- specialist datasets held by SNH or SEPA which required the co-operation of staff not otherwise involved in the project. This included, for example, information on water abstraction and supply. It proved difficult to obtain a number of these datasets within the timescale set aside for data acquisition;
- third party datasets held by the James Hutton Institute and the Centre for Ecology and Hydrology. While it was possible to obtain a small number of these through SNH (e.g. 2007 land cover mapping), some of the most valuable datasets (e.g.

future land capability) proved impossible to secure within the available timescale and at economic cost.

It was particularly frustrating that the project was not able to make use of publicly owned or funded data that would have added considerable value to the project. Subject to the comments on data analysis below, it is recommended that the availability of publicly owned and funded data is addressed as a matter of some importance – particularly given the duties of public authorities in relation to the EU INSPIRE Directive / The INSPIRE (Scotland) Regulations 2009.

Given the importance of synchronising the technical analysis with the programme of Panel Meetings, it was necessary to draw a line under the process of data collection and to focus on making best use of the information that the project team already held. This meant focusing on the presence of ecosystems (land uses) within the project area, based particularly on:

- landcover mapping
- natural and cultural heritage assets
- flood risk areas
- woodland cover
- core paths
- historic land-use assessment
- landscape character types

In addition the team was able to draw on information about potential planned or unplanned changes such as the maps of woodland potential from the emergent forestry and woodland strategy, the integrated habitat mapping prepared for the Central Scotland Green Network area, and data from the UKCP09 climate change projections.

Taken in different combinations, these datasets provided sufficient information to describe the location of most ecosystems (land uses) and / or a proxy for the provision of particular services (e.g. carbon sequestration associated with peatland or woodlands). The information did not allow for the proper analysis of the functioning of ecosystems including the quantity or quality of services provided by them.

It is possible that access to additional, more detailed data would have allowed the team to undertake fuller analysis, but it very unlikely that this would have provided a comprehensive picture of ecosystems and their functioning across all services and covering the whole of the project area.

Given the focus of this project on a stakeholder based approach, and the Panel's concerns that the technical mapping was too detailed, it could be concluded that the pragmatic approach necessary for the Stirling work was in fact adequate.

Learning points:

61. future studies of this kind might benefit from using the outcome from the first Panel meeting to identify which services or benefits need to be analysed, and, in turn, using this to scope the most appropriate data that are needed. This would be more efficient than trying to assemble every bit of relevant data at the outset of the project when relatively little is actually used;
62. a pragmatic approach to data collection and analysis is most appropriate for this kind of project. An exhaustive characterisation of ecosystems, functions and services (quality and quantity) is unlikely to be achievable and may be too complex for use in

a stakeholder led approach;

63. there would be further benefits if a common suite of data was assembled and made available covering the main categories of ecosystem and ecosystem service for the whole of Scotland. While it might be necessary to adapt or develop these data according to the focus, purpose or scale of study being carried out, this would provide a common starting point, avoiding the need to invent the wheel each time, and potentially allowing more straightforward comparison of different areas and projects. Scotland Environment Web could play a key a key role in hosting these datasets, and making information from individual projects more widely available;
64. fundamental to this part of an ecosystems based project, however, is addressing the availability of publicly funded or generated datasets. This project encountered major problems in accessing datasets held by or commissioned by public agencies. In part this was due to licensing issues, in others apparently reflecting institutional reluctance to release data for external projects. This requires to be addressed as a matter of some importance if projects of this kind are to be based on the best available information, and the value of the public investment in generating the datasets is to be realised;
65. data on the management of land funded through the Scotland Rural Development Programme (SRDP) would add significant value to similar studies. In terms of understanding the functions and benefits delivered by actively managed ecosystems, this data is potentially invaluable.

Funding can be used to support production – but also to protect and enhance natural and cultural heritage features, facilitate responsible access and improve environmental outcomes. The ability to understand where these measures are applied, and their value in terms of supporting ecosystem service delivery (or otherwise) could add very valuable detail to the more general proxy data. Similarly, it could potentially benefit land managers by celebrating success.

However, as management information is currently linked to Single Farm Payment information, it is argued that the Data Protection Act precludes use and dissemination of related spatial data². While individual landholdings could potentially be identified, no personal or financial information would be required. Thinking ahead, any detailed assessment or testing of a 'payments for ecosystem services' (PES) approach to rural development funding would require analysis of this information to determine current levels of public benefit delivered against spend, and the potential of PES to deliver greater benefit. (Commission Regulation (EC) No 259/2008 already requires Member States to publish details of legal persons in receipt of CAP subsidy payments.)

Securing access to SRDP-derived data should be pursued as a priority.

² Although similar spatial data relating to past Woodland Grant Schemes is publicly available, including landowner and agent information

7.2 Technical mapping

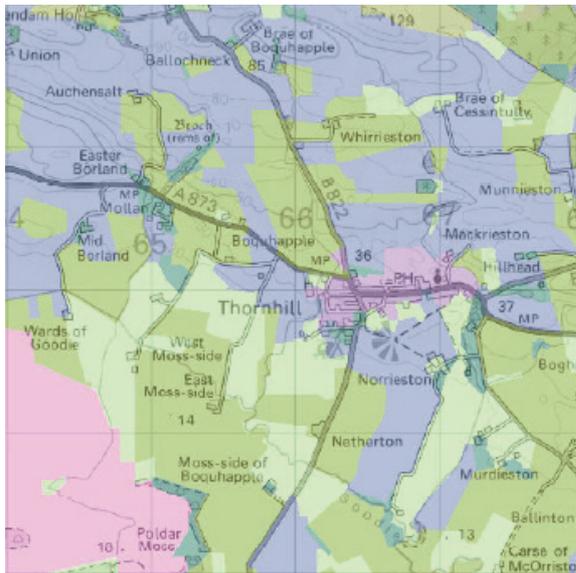
A combination of incomplete information with which to quantify the provision of ecosystem services, and Stakeholder Panel concerns about the complexity and detail of some of the 'raw' GIS datasets (e.g. land cover and Historic Landuse Assessment) prompted the project team to develop alternative ways of ecosystem service mapping.

7.2.1 Resolution

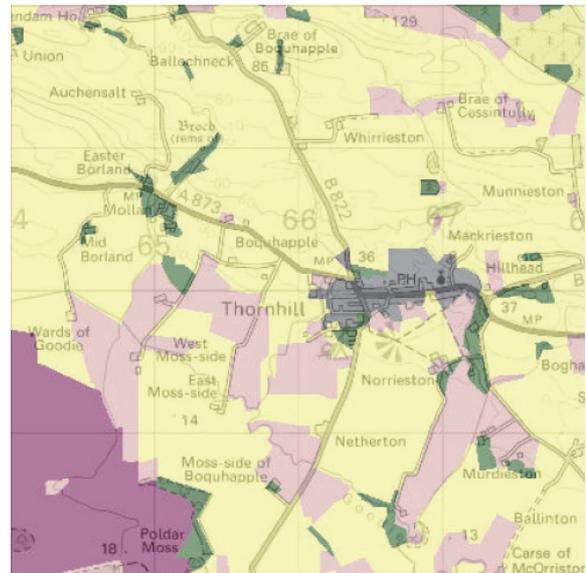
Most of the datasets used in the project provided a high level of detail for the project area, reflecting the sub-regional level at which the work was being carried out. Land cover mapping, for example, provided resolution virtually to the level of individual fields, giving a comprehensive picture of patterns of land use across the project area. In presenting this information to the Stakeholder Panel, a number of issues emerged including:

- the maps were often too complex for lay people to understand easily. This was a result of the scale of the map and the number of categories involved;
- the maps provided a snap shot view of land cover which intrinsically could not reflect the dynamic nature of the farming landscape with the rotation of land between arable, pasture and hay;
- the typology / characterisations of land uses did not necessarily correspond to terms or metric that land managers recognised;
- the maps recorded land cover and land use, rather than the types of agricultural production or other benefits provided by the area.

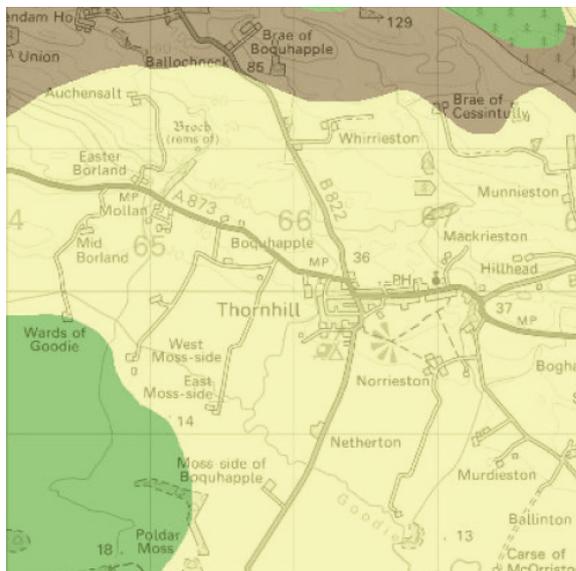
To address the first issue, the team modified the land cover and land use mapping for the area. Depending on the type of service in question, the team combined land cover or land use categories to provide a simplified map for the project area. The key was also simplified to show only those categories present in the area. The process of consolidating land use categories is illustrated in Figure 4 (a) and (b) below which shows how land cover was simplified to show patterns of land cover relevant to agricultural production. It was felt that this was more effective in balancing simplicity and accuracy than using the Land Capability for Agriculture map which is less spatially accurate, reflecting its preparation at a broader scale (also shown in Figure 4 (c) below).



(a) original land cover mapping



(b) land cover simplified by project team



(c) land capability for agriculture



(d) maps produced by stakeholder panel

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Figure 6. Examples of mapping

7.2.2 Mapping ES provision

On the suggestion of the Project Management Group, the team simplified an approach used elsewhere (Medcalf et al, 2012) using habitat classes and additional information to map the relative contribution of different land use classes to key ecosystem service provision.

In most cases, this approach involved adapting the Land Cover 2007 map, aggregating classes to reflect different patterns of ecosystem provision (as described above) and assigning different values to each aggregate class to reflect the relative provision of the service in question. The following paragraphs and Figures 5 and 6 illustrate this approach with respect to flood regulation and food production.

The role of the project area in providing flood regulation was analysed by combining simplified land cover categories with SEPA's flood risk areas and giving each a value

reflecting their relative importance in accommodating and regulating flood water. The classes and values were as follows:

Class	Value
Rivers and lakes	1
SEPA flood risk areas	2
Fen, marsh and swamp, bog, bog grass, bog heather	3
Mixed woodland, conifer woodland, deciduous woodland	3
Rough low productivity grassland, heather dwarf shrub, heather grass	4
Acid, and neutral grassland	5
Arable and horticulture, arable bare, arable barley and improved grassland combined	5
Hay	5

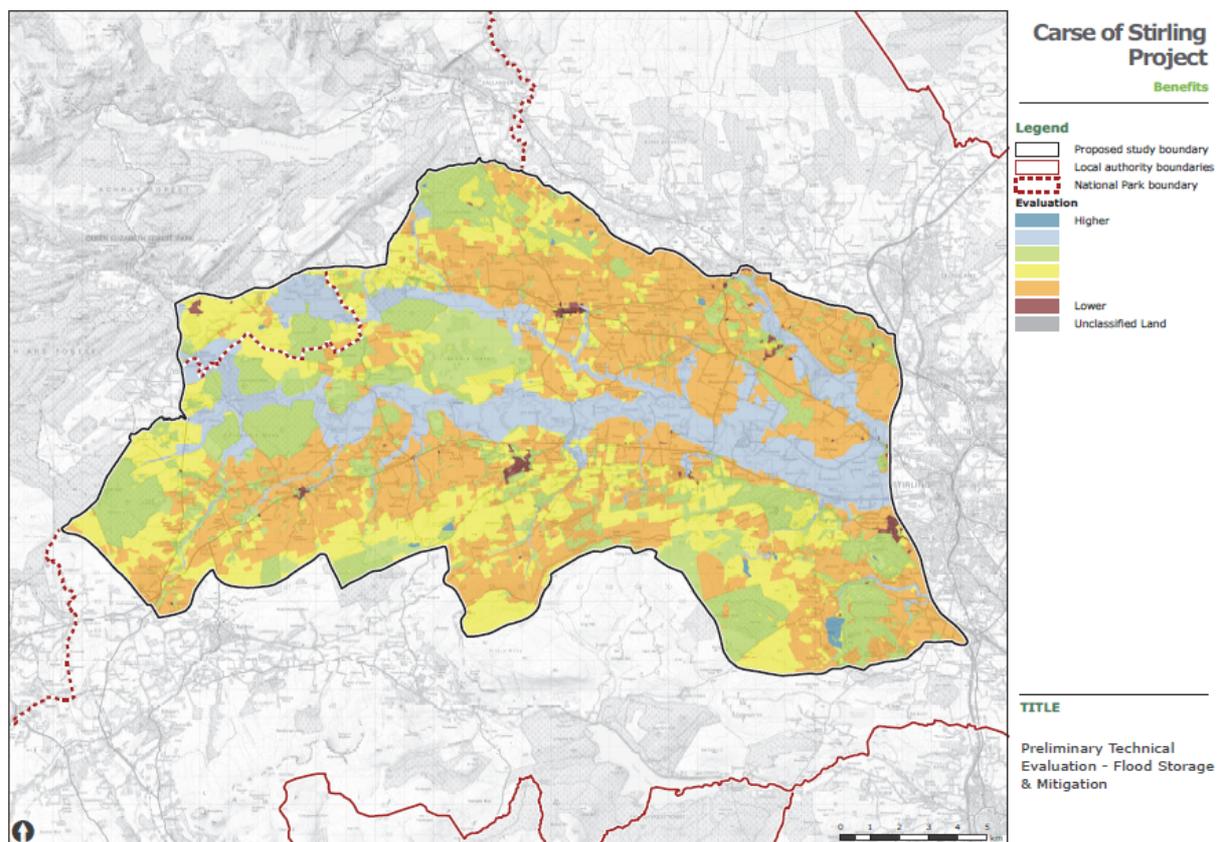


Figure 7. Role of the project area in providing flood regulation services

A similar approach was used to examine the role of the area in providing food and other agricultural products. Land cover categories were grouped and each given a value to reflect their relative importance in providing a source of food.

The classes and values were as follows:

Class	Value
Arable and horticulture, arable bare, arable barley and improved grassland combined	1
Acid, and neutral grassland	2
Hay	2

Rough low productivity grassland, heather dwarf shrub, heather grass	3
Fen, marsh and swamp, bog, bog grass, bog heather	4
Mixed woodland, conifer woodland, deciduous woodland	5
River and lake	5

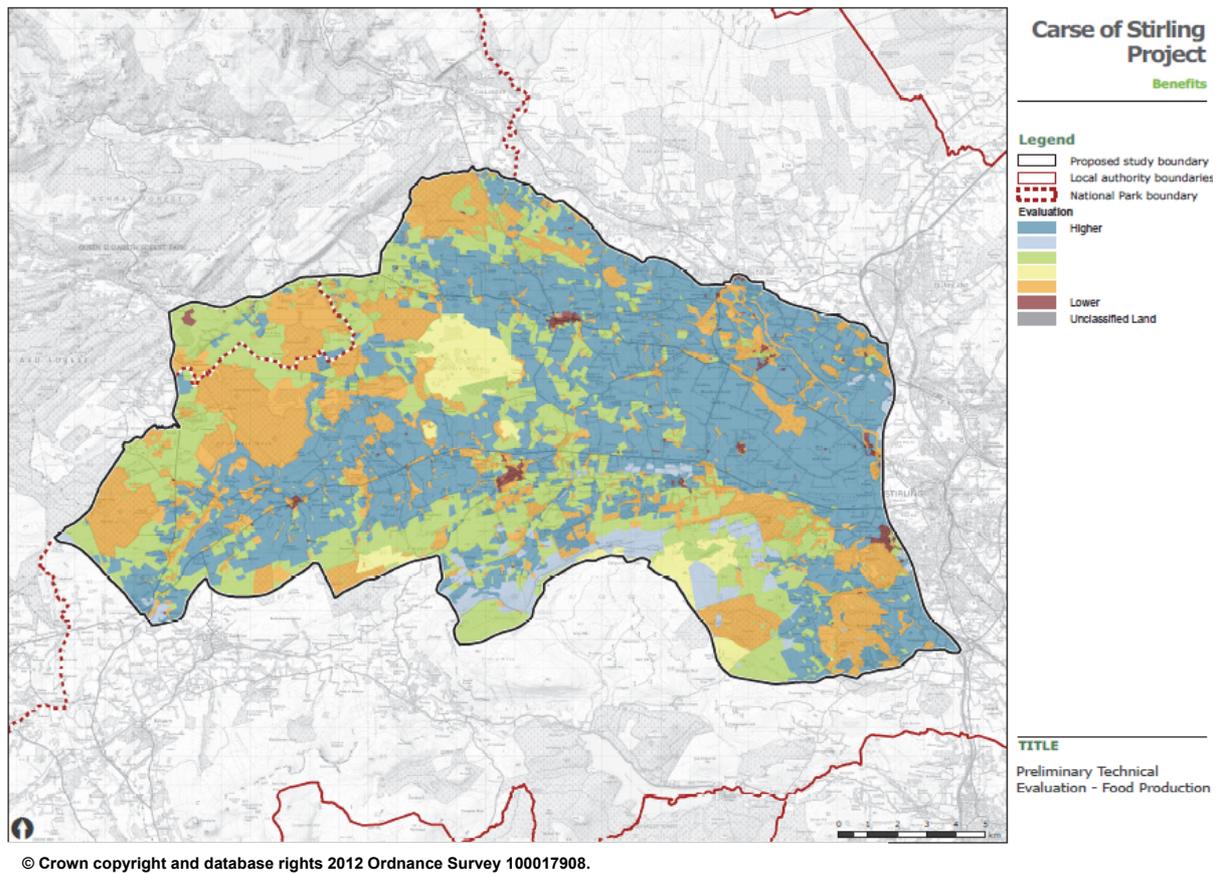


Figure 8. Role of the project area in food provisioning services

Learning points:

66. in the absence of complete and up to date spatial information on ecosystems and ecosystem service provision (quantity and quality), a simplified approach to service mapping can provide a simple means of demonstrating which areas are most important for each type of service. While this does not facilitate direct comparison of ecosystem services, it can allow the identification of those parts of a project area which are important across more than one category of ecosystem service;
67. while different projects are likely to need to explore different issues, at different scales, there would be benefit in setting out a 'standard' method of mapping ecosystem service provision, linked to the idea of a common suite of available data described above at Section 5.1. This would help avoid a large number of divergent methodologies developing, each producing different and potentially incompatible results. Initial work would be required to match datasets to ecosystems and ecosystem services and to agree the algorithm or values, and associated assumptions, needed to generate a measure of relative importance for each ecosystem service.

7.3 Mapping by stakeholders

An important part of the project was to work with the Stakeholder Panel to map the pattern of ecosystem service provision across the project area. To do this, the project followed the following steps:

- confirmation of land uses / ecosystems present within the project area. The project team shared a number of the baseline ‘technical’ maps of the project area, showing, for example, the pattern of land cover and historic land use. The objective had been to agree what was or was not present, for example updating the information base where there had been recent change. However, this part of the first Stakeholder meeting quickly revealed problems with the technical GIS maps in terms of their complexity, detail and numbers of categories. The team quickly concluded that a simplified approach to mapping, based on the aggregation of categories would be needed to improve the accessibility of the maps. This exercise was undertaken for key GIS datasets between the first and second Panel meetings;
- the second step was carry out the process of technical mapping described above, applying simple values to categories of land cover or land use to indicate the likely relative contribution of parts of the project area to different ecosystem services (described above). This was then reviewed with members of the Panel with a series of discussion groups focusing on different themes based around the most important categories of benefit. This was a lively discussion, with some suggestions about alternative approaches (e.g. use of land quality or soils to map food production), but in most cases, the conclusions were not that far from what the technical analysis indicated. One of the key conclusions was that the maps provide a snap shot view which fails to capture the dynamic and flexible pattern of agriculture on the Carse;
- the third step was to invite Panel members to contribute their own information to the mapping process. Working in groups focusing on different themes again, people recorded which parts of the project area were most important for the benefit in question. Some themes, for example food production and wildlife/habitats generated a lot of additional detailed information. Others, such as flood regulation gathered little or no data, with people accepting the technical mapping and more concerned on what should be done to address the issue. In some cases, people added aspirational information, such as potential routes for new cycle ways. While the amount and type of data therefore varied by type of benefit, this process did provide very useful information which improved the project team’s understanding of the project area. Most of the information provided by stakeholders was in a different format from the technical mapping (most comprising point rather than area data) which limited opportunities to carry out an integrated spatial analysis of the area. Information from the stakeholder mapping was digitised and presented back to the Panel at the third meeting. Figures 7 and 8 show examples.

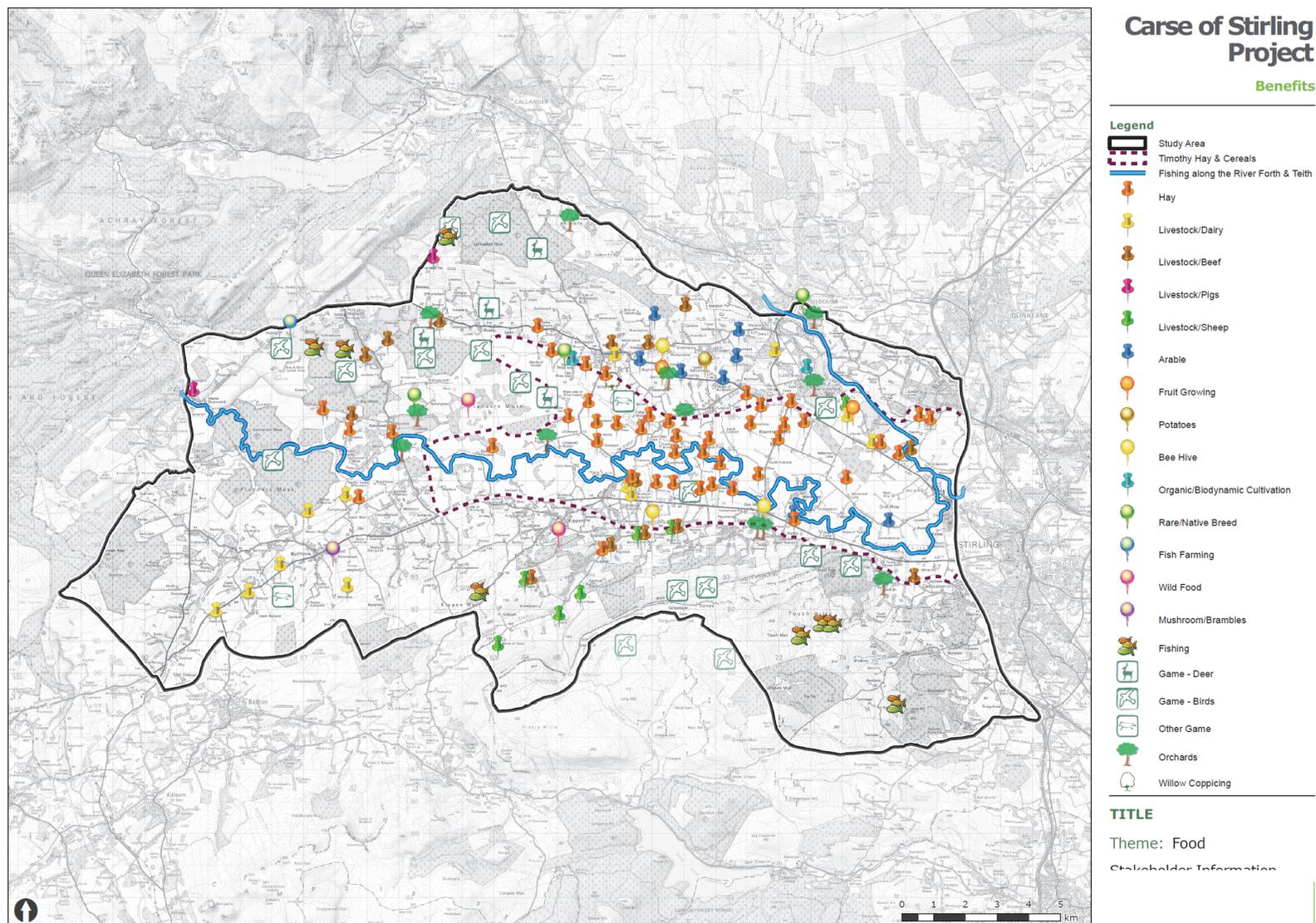


Figure 9. Mapping by stakeholders – agricultural production

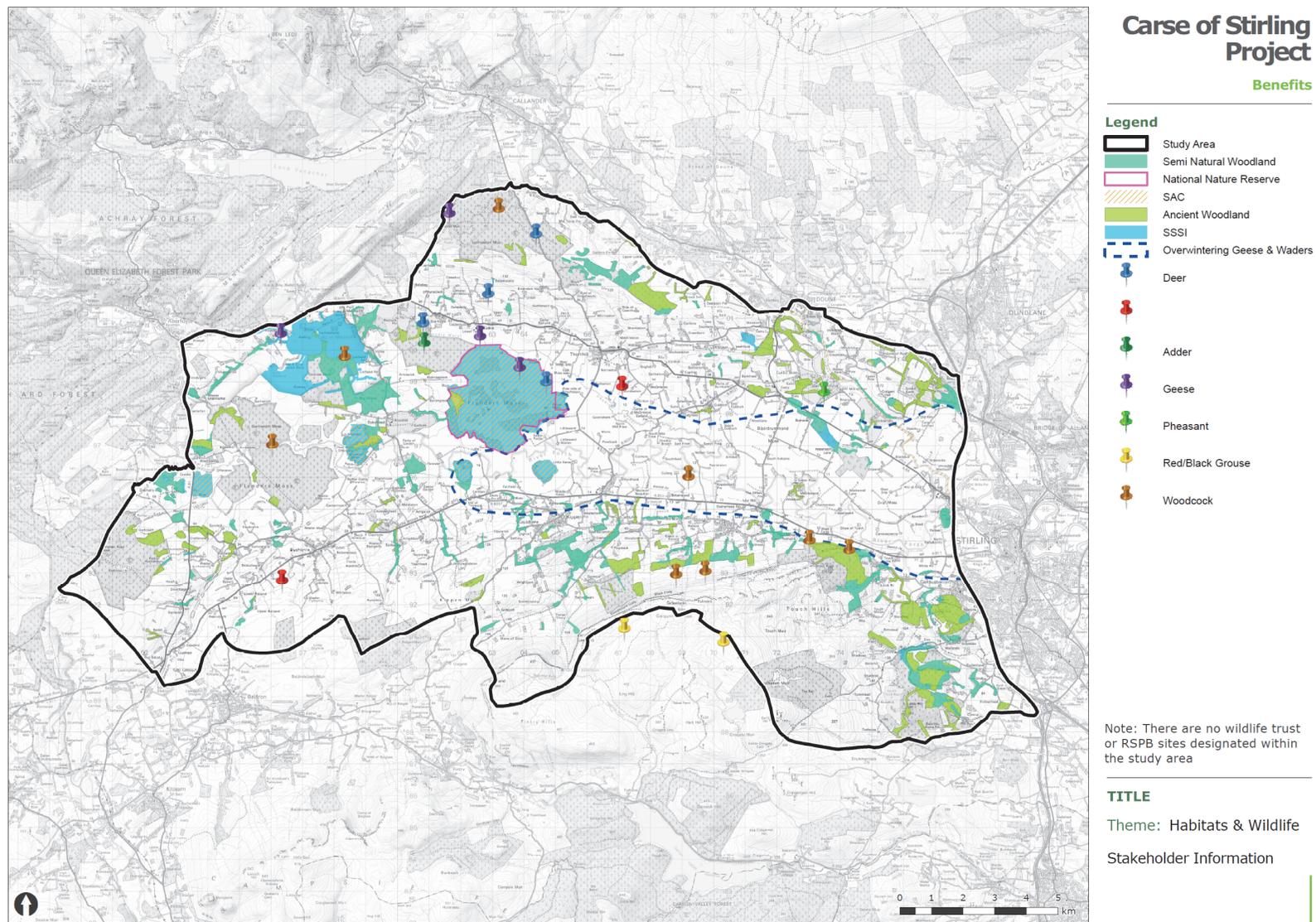


Figure 10. Mapping by stakeholders: Habitats and wildlife

Learning points:

68. it is important to recognise that while technical mapping is likely to provide comprehensive, polygon-based coverage of the project area, information provided by stakeholders is likely to comprise point data, so the two sources are not easily combined;
69. stakeholders are likely to be able to contribute much finer grain data than that available from many datasets. They are also likely to be able to identify shortcomings in existing datasets (e.g. providing a snapshot of an area with a dynamic pattern of land cover and land management);
70. while the exercise of stakeholder mapping is valuable in its own right, encouraging people to engage with the process and the aims and objectives of the project, consideration should be given to how the information will be used.
71. it should be recognised that stakeholders are likely to be more able to provide additional information for some benefits rather than others.

7.4 3D projections

Concerns about the accessibility of the technical mapping, and the risks associated with illustrating change on an Ordnance Survey base map, led the project team to explore different ways of developing illustrations for the scenario part of the work. The challenge was to make use of the GIS based mapping and analysis, but to find a way of illustrating options without being drawn into debate about the effects on a specific location.

After reviewing sketch and cartoon examples from elsewhere, the team decided to produce 3D projections generated by draping GIS shapefiles over a topographic model of the project area and its surroundings. The vertical scale of the model was doubled to exaggerate the effect of topography and a viewpoint chosen somewhere over Clackmannanshire, looking west. A simple graphics programme (MS PowerPoint running on an Apple Mac) was used to extract and soften information from the GIS maps, producing a series of soft, less geographically specific shapes to illustrate different scenario issues. This was a manual process which used a series of layers to represent information about flooding, land use and land cover. It was deliberately ambiguous to avoid focusing attention on specific locations rather than looking at the bigger picture. Roads, rivers and settlements were added to the base to provide locational references.

Figures 9, 10, 11 and 12 provide four examples, the first showing a GIS shapefile (simplified land cover map relating to food provisioning) draped over the topographic model, the second illustrating the layers of information used to develop the scenario maps, the third showing the blank base and the fourth a completed illustration for the 'carbon management' scenario.

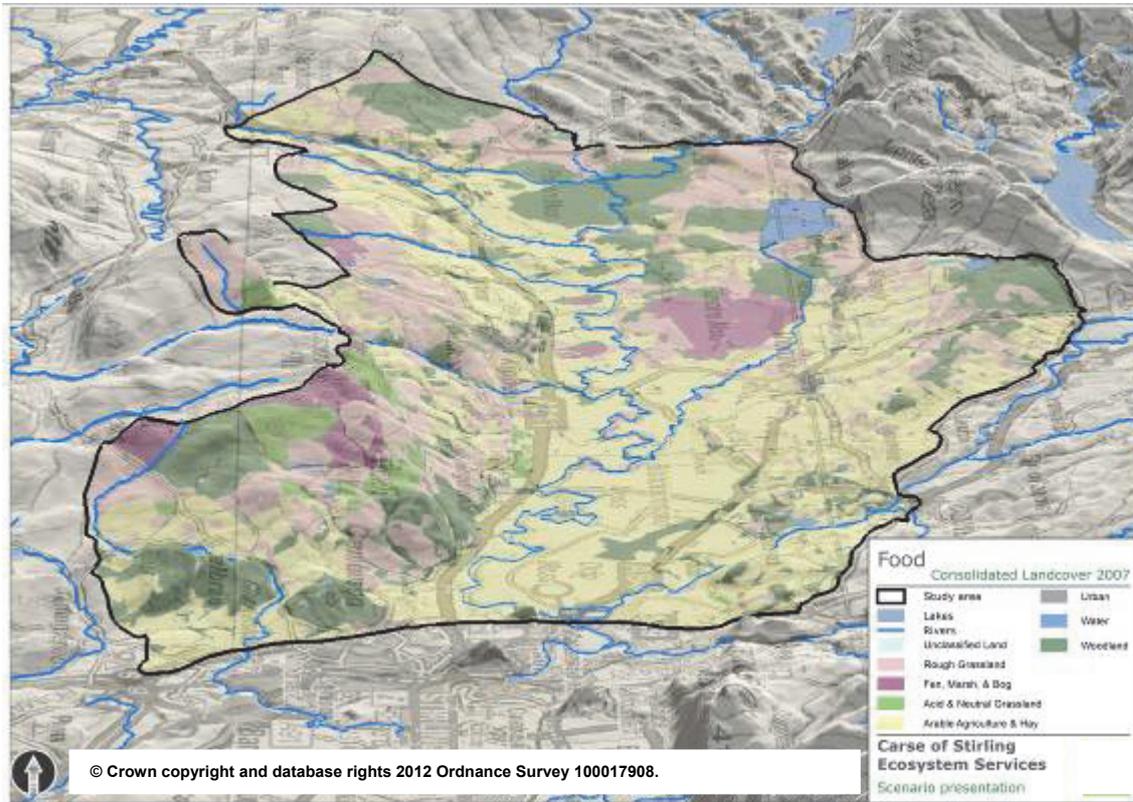


Figure 11. GIS mapping

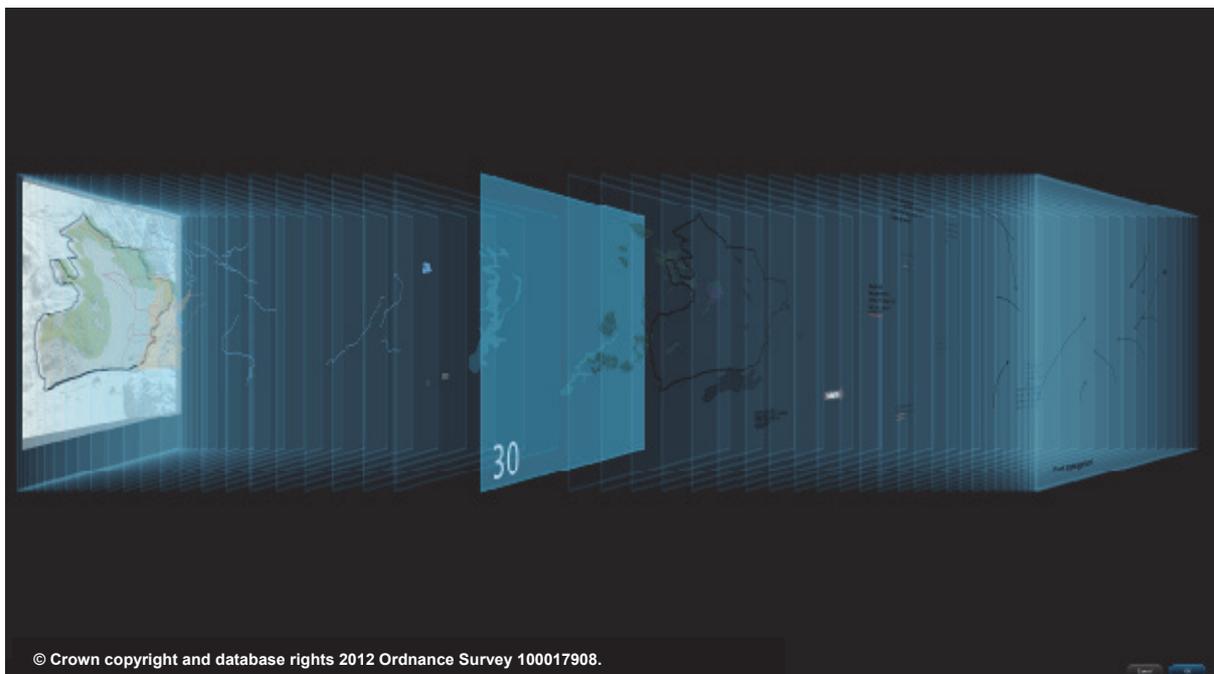


Figure 12. Graphic layers used to build up the scenario illustrations

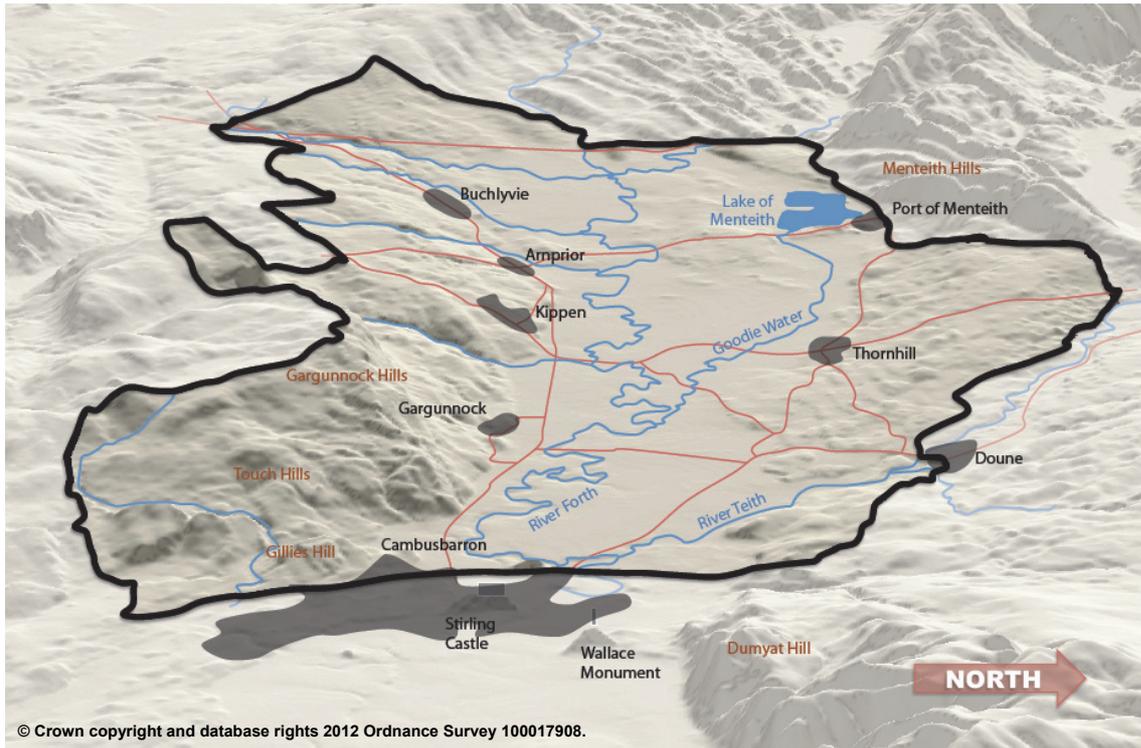


Figure 13. Baseline illustration

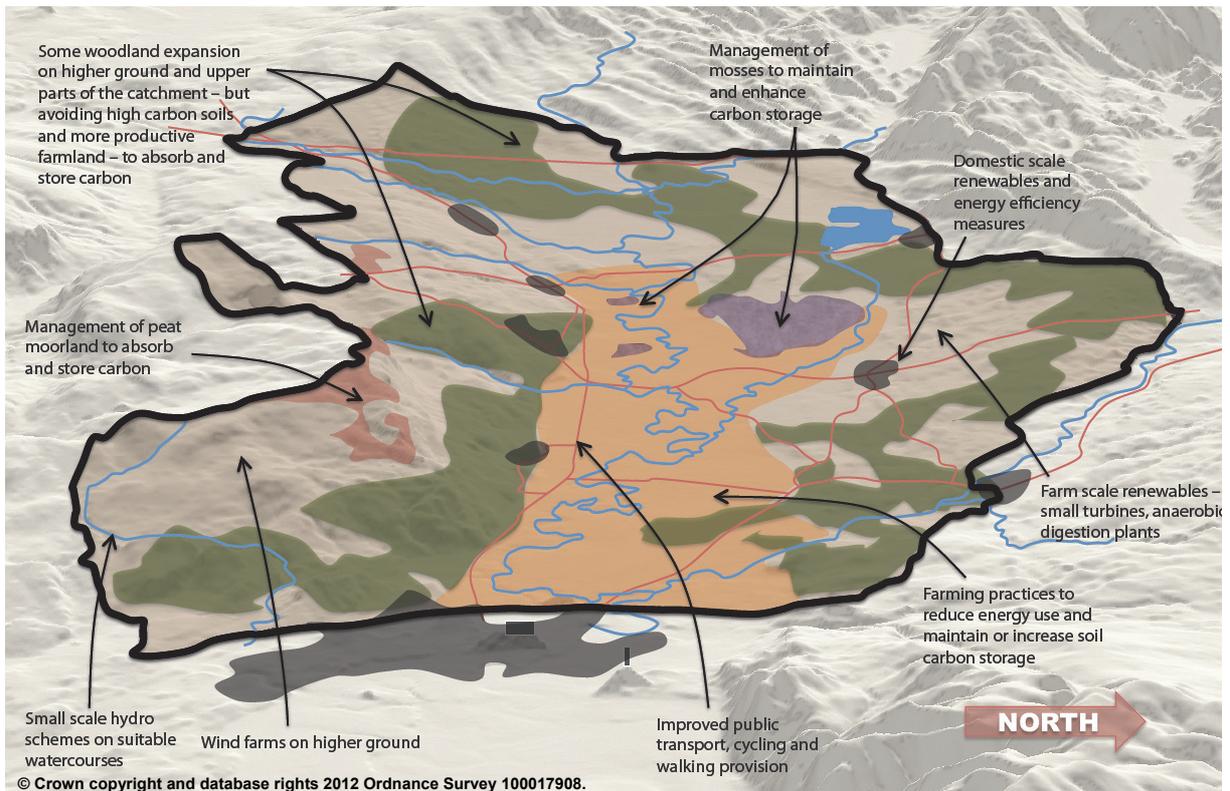


Figure 14. Scenario illustration (Carbon management)

Feedback from the Panel indicated that these 3D projections were more easily understood by a non-technical audience, helping people to navigate their way around different future

options. Consequently, the decision was taken to use a similar approach to illustrate the main spatial components of the vision.

Learning points:

72. Consider carefully the most appropriate means of presenting spatial information to stakeholders. Alternatives to conventional maps should be explored, including the use of 3D projections and indicative sketch maps where the specifics of the issue being illustrated cannot be represented on the ground.

7.5 Statistical analysis

The Carse of Stirling project generated a number of datasets which could be subject to further statistical analysis to explore the degree to which observed responses are statistically significant. This could include:

- basic characteristics of the long list of stakeholders;
- characteristics of the Stakeholder Panel (age, gender, interest);
- responses to the first stakeholder questionnaire – important benefits;
- responses to the second stakeholder questionnaire – who benefits;
- responses to the third stakeholder questionnaire – future change;
- responses to scenarios and component measures;
- analysis of evaluation forms from each Panel meeting;
- follow up evaluation survey.

Advice from the SNH Statistician suggests that the small number of people on the Panel, and its lack of representativeness when compared with the whole population, means that detailed statistical analysis, beyond that already carried out during the course of the project is inappropriate. However, the Technical Advisory Group (see below) agreed to explore the potential to apply additional social science based analysis to the results.

Learning points:

73. at the outset of the project consider whether analysis is likely to be required to test the statistical significance of the project findings. If so, agree methods with statistical specialists and design as many part of the Panel selection and questionnaire processes with this in mind.

8. ISSUES, OPTIONS AND ACTION PLANNING

This part of the report describes how key issues affecting the project area were identified, explore through a series of future scenarios and reflected in the development of a draft Vision and Action Plan for the area.

8.1 Scoping key issues

The identification of key issues emerged in a number of different ways:

- initial characterisation of the project area by the project team identified a number of key types of benefit (e.g. food provisioning) and issue (e.g. flooding) which were considered likely to be key issues for the project;
- initial stakeholder discussions confirmed these benefits and issues, but also confirmed the importance of issues such as sense of place and recreation;
- the review of policy and other drivers, including discussion at the fourth Panel meeting identified a number of other key issues including carbon management, housing development and population change.

Learning points:

74. the scoping of key issues is likely to be informed by technical analysis of the project area, discussion with stakeholders and a review of policy drivers and forces for change.

8.2 Policy mapping

The project included some analysis of existing national and local policies. This informed three aspects of the work:

- analysis of the interaction between policies and land uses or ecosystems across the project area;
- analysis of past, present and future change affecting the project area, and the development of scenarios;
- guiding and reviewing the content of the Action Plan to identify implementation synergies, tensions and gaps.

In communicating the purpose of the project, some emphasis was placed on the potential of the work to inform future policy. In retrospect, it might have been clearer to draw a distinction between internationally or nationally driven policies, where the opportunity to inform policy will be limited and where local actions will need to conform, and more local policies where there is a greater opportunity to shape and influence policy. Even at this more local level, policies are likely to be covering a larger area than the project area, and will of course be subject to other issues and representations, so an automatic link from the Action Plan could not be assumed.

The 'reality check' of existing policies was brought into the project at the scenario stage, particularly through the involvement of agency specialists. This helped identify those areas where there was an opportunity to shape things locally, or those processes which the Panel might need to engage with to achieve change.

Learning points:

75. policy mapping should distinguish between external policy drivers which the project is very unlikely to influence and more local drivers which the project could engage with and influence;
76. discussions with stakeholders should strike a balance between highlighting the

opportunity to influence policy and the limitations which may apply due to the influence of national or international policy, or the range of other factors influencing the policy in question.

8.3 Change

One of the key aspects of the project was to involve the Panel in considering and planning for how future change could affect the services or benefits provided by the project area. Part of this was about demonstrating that standing still is not an option, change has occurred in the past and will continue into the future.

The third Panel meeting was focused around the issue of change with a presentation covering changes including climate, land management, technology, population and high level policy drivers. The presentation included some information on recent recorded climate change, drawn from the SNIFFER Handbook of Climate Trends in Scotland (Barnett et al, 2006). This was helpful in providing evidence to counter any scepticism about the existence of climate change before information on future projections was presented. This could helpfully be extended to other aspects of a project area, for example to draw on historic aerial or other photography to demonstrate how the landscape has changed (e.g. hedgerow loss, field boundary tree loss, settlement expansion) or biological records to illustrate how bird species and numbers have changed.

Including more detail on past change would, however, have added further material to an already lengthy presentation, meaning the Panel would have to digest even more information. An alternative would have been to make some or all of this material available before the meeting, or as 'homework' Panel members could have taken home after the second meeting.

The presentation was followed by a brief question and answer session before the Panel worked in groups to discuss the implications of each type of change on the key benefits they had identified during the first two Panel meetings. The discussions provided an opportunity to ensure that key drivers and benefits were kept 'on the table'. This related most closely to the issue of carbon which is linked closely to climate change and national policy drivers, and relates to one of the services or benefits provided by the project area (climate regulation – carbon sequestration and storage, low carbon energy generation, energy efficiency).

Discussions varied in terms of the extent to which the Panel were able to get to grips with the detailed implications of the changes for the benefit in question (e.g. changing climate for wildlife and habitats). In some cases, this may have reflected the amount of information they had been required to assimilate and make sense of in the earlier part of the meeting. In others, it was a reflection of the way in which different stakeholder interests address a particular issue. For example, the group discussing the implications of climate change for wildlife and habitats focused on the indirect impacts resulting from direct impacts on land management practices. This provided a valuable but partial perspective.

Learning points:

77. consider providing additional information on how the project area has changed over the past 20 or 50 years;
78. consider providing Panel members with briefing information on change ahead of the third meeting;
79. anticipate how Panel members might approach the discussion of different types of change and the implications for types of benefit, perhaps using examples to illustrate direct and indirect effects.

8.4 Scenarios

The generation and discussion of scenarios was identified as a key step in the Carse of Stirling project, providing an opportunity for the Panel to discuss and evaluate different options for the future of the area.

8.4.1 Generation

The process of scenario development was informed, but not defined, by the Stakeholder Panel. The third workshop, which explored past, present and future change, concluded with a short discussion around preferred futures for the area and a questionnaire exploring people's responses to different types of change (e.g. more food production, same food production, less food production) relating the most important categories of benefit. The resulting information provided the basis for the generation of six scenarios, most of which explored different facets of future management of the Carse (and which were therefore not mutually exclusive). Most were reasonably realistic, though one (maximising agricultural production over other types of benefit), which emerged from Panel discussions, was less realistic in terms of its acceptability within the current policy framework (e.g. effects on Natura sites). The six scenarios were developed by the project team and reviewed by a group of technical specialists from SNH, SEPA and Stirling Council to help ensure they were reasonably realistic.

The team faced a choice between preparing mutually exclusive scenarios, which would probably have been more extreme and less realistic, or exploring how different policy themes and related measures could play out across the project area. The latter could be regarded as thematic options or choices rather than separate scenarios.

8.4.2 Presentation

Considerable effort was put into presenting the six scenarios in a way that was attractive, accessible and that illustrated the kinds of changes that were being proposed. Each scenario included a short written description with bullet lists of measures, illustrative photographs, an indicative and annotated 3D map of the area showing in broad terms how the scenario might be realised, and an evaluation of the scenario against the framework of ecosystem services. Six stalls were set up for the Panel meeting, each with a different scenario. The four sheets making up the farming and wildlife scenario are shown in Figure 12. All six scenarios are reproduced in Annex 4.

Panel members were invited to visit each stall, give their overall reaction to the scenario and to identify which measures they particularly liked or disliked. The meeting was kept informal without PowerPoint presentations, but technical specialists and others from the project team and PMG were on hand to help and answer questions. The materials were circulated electronically after the meeting to allow further reflection and inputs from those who had been unable to attend.

This approach proved very successful and people were able to engage with the scenarios and provide clear feedback along the lines intended. The process took longer than had been anticipated meaning that an exercise to synthesise and feedback Panel views at the end of the meeting was abandoned. Several people noted that aspects of each of the scenarios could be seen as complimentary or not mutually exclusive and recognised the potential to piece together a preferred option based on elements of each. There was some confusion about the status and purpose of the 'business as usual' scenario which perhaps could have been addressed by having a more formal introduction to each scenario at the outset, though a deliberate decision had been made to keep presentations to a minimum in latter parts of the process. There was also some feedback that there was too much information to absorb and comment on in the time available.

The use of these scenarios allowed a simple assessment of the thresholds of acceptable change by identifying measures or whole scenarios which members of the Stakeholder Panel considered to be unacceptable.

Though not possible within the resources available for this project, it would have been possible to develop a more sophisticated approach based on the incremental addition or subtraction of measures, or increasing the quantity of different measures to see if it was possible to detect tipping points or thresholds. This could have been applied to all scenarios, or to the composite scenario or vision (below), but this would need to be balanced with more rigorous technical analysis so that the views of the Panel could be set in context.

Learning points:

80. it is important to decide whether scenarios are to be used to explore mutually exclusive and potentially extreme options for the future, or whether they are more realistic, illustrating different emphases within a similar policy framework;
81. agency specialists can prove helpful in refining scenarios, though it is important to ensure that too much moderation does not result in convergence of scenarios;
82. it is important to present the scenarios in an attractive and accessible format with concise text, simple diagrams and relevant photography.

How could this scenario affect benefits derived from the project area?		
Products from the land		
Food	↘	This scenario could see a reduction in the total area under agricultural production, with less intensive use of areas at risk of flooding or subject to waterlogging. Any shift to organic farming, and more intensive production methods on small holdings could also change the type and volume of production.
Fibre	↗	An increase in sheep farming, and limited increases in tree cover could increase the supply of fibres from animals (wool) and timber.
Fuel	↗	Limited increases in tree cover could boost local supply of woodfuel, while the take up of small scale renewables would increase the proportion of locally generated power.
Genetic resources	↗	Existing habitats would be conserved, with improved habitat networks reconnecting them, boosting the natural genetic resource. The move towards small holdings would probably see greater diversity in the range of animal breeds and plant varieties used across the area.
Biochemicals and medicines		
Ornament		
Water for drinking etc		
Habitats and wildlife	↗	Management for wildlife and habitats would be one of the main benefits of this scenario.
Regulation of our environment		
Global climate	↗	Managing peatland and woodfuel habitats, together with the development of small scale renewables will help offset or reduce carbon emissions.
Regional climate		
Local climate		
Flood regulation	↗	New wetlands and tree planting will help reduce peak flows and the associated risk of flood. Changing management of areas that are liable to flood will reduce the impact of natural flood events.
Erosion	↗	Riparian planting, and new wetland creation will reduce the risk of erosion and damage to soils.
Soils	↗	Sustainable flood management allied to a move to organic husbandry could help conserve and improve the soil resource.
Water quality	↗	Less erosion would improve water quality.
Toxic hazards	↗	Fewer chemical inputs would reduce the risk of toxic pollution.
Noise		
Disease	↔	Greater diversity of habitats, crops and animals would reduce the risk of disease. This could be countered by greater habitat connectivity and a reliance on organic methods.
Pests	↔	Greater diversity of habitats, crops and animals would reduce the impact of pests. This could be countered by greater habitat connectivity and a reliance on organic methods.
Pollution	↗	A wider range and extent of habitats will benefit pollinators.
Culture and our quality of life		
Community development	↗	This scenario would create new opportunities for communities to become involved in and benefit from land management.
Spiritual and religious values		
Education	↗	New opportunities for education and training.
Inspiration	↗	
Aesthetics	↗	Enhancement of biodiversity, habitats and the landscape could provide new inspiration for local people and visitors to the area.
Sense of place	↗	
Cultural heritage	↗	Maintaining and restoring traditional landscape features would bring benefits for cultural heritage.
Tourism and recreation	↗	An increase in farm diversification and land based recreation businesses would benefit tourism and recreation.

— No effect or no effect ↗ mixed effects, similar overall
 ↗ slight increase in benefit ↗ large increase in benefit
 ↘ slight decrease in benefit ↘ large decrease in benefit
 Key benefit identified in previous meetings

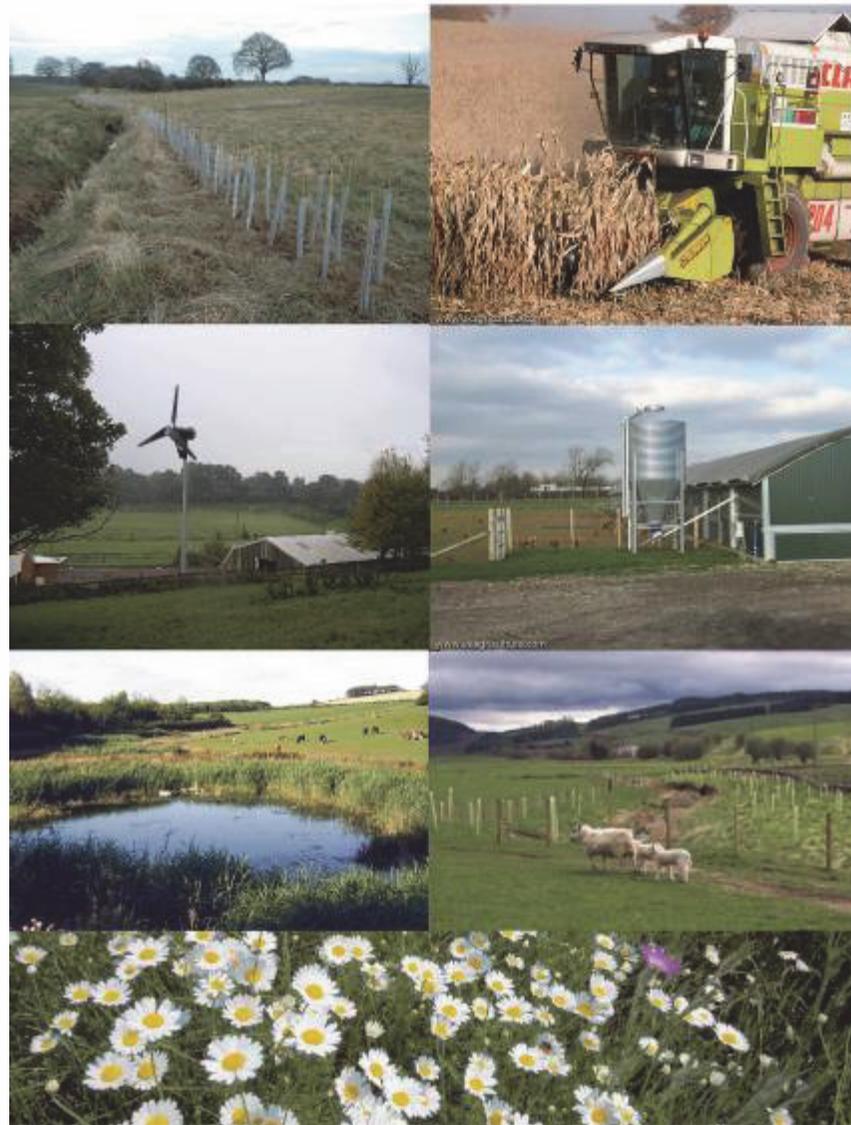


Figure 15. Scenario sheets (cont'd)

8.5 Vision

The draft vision and action plan were drafted by the project team and were designed to reflect feedback from the Panel on the six scenarios and individual measures described within them.

The Carse of Stirling is recognised as a place that delivers a broad range of benefits in terms of the products we get from the land, the regulation of our environment, its contribution to cultural and our quality of life and its role in supporting plant and animal life. The Carse of Stirling is economically, socially and environmentally resilient, vibrant and viable.

The vision statement aimed to reflect the finding that the project area is valued for the wide range of benefits it provides. This was followed by a series of paragraphs focusing on the categories of benefit or service identified by the Panel and being of greatest importance, namely, agriculture, habitats and wildlife, landscape and sense of place, flood management, communities, recreation and tourism, low carbon community and stakeholder involvement and partnership working.

This vision was followed by an Action Plan (Annex 5) with a series of proposed actions relating to each of these vision themes. The actions were related to the four main categories of benefit or ecosystem service, to illustrate how they could help achieve the vision in an integrated way.

Group discussions at the fifth Panel Meeting focussed on whether the correct actions had been identified, how they should be implemented and who should be involved.

9. NEXT STEPS FOR THE CARSE OF STIRLING PROJECT

One of the key outputs from the Carse of Stirling Project was an Action Plan (Annex 5). As previous sections have described, this was prepared by the project team on behalf of the Stakeholder Panel. A key challenge therefore is how the vision and action plan will be implemented and its effectiveness monitored and evaluated.

9.1 Consolidating the Stakeholder Panel

The fifth and final Panel Meeting provided an opportunity to explore the role of the Panel once the demonstration project drew to a close. There was a strong sense that the Panel had travelled a long way over the five meetings and there was a reluctance to see the work stall at this point. Discussion focused around three main issues, which are discussed below.

9.1.1 The 'new we'

The project brought together a diverse range of interests and individuals. Meetings were structured to allow some time for interaction and networking, but there was a clear view that the Panel needed more time, and some additional support, for people to get to know each other better, allowing them to unite behind the Action Plan. One member of the Panel described the rather fragile 'new we' that had been created, suggesting that additional effort was needed to consolidate its identity before facing the outside world.

An immediate action, therefore, was for SNH as one of the commissioning organisations for the work, to support a social event for the Panel which would allow people to meet and discuss the project in a less formal or structured setting.

9.1.2 Legitimacy and wider ownership

A further question that was raised focused on the legitimacy of the Panel's work given that it could never be properly representative of the wider community. There was a concern that the Action Plan could be regarded as an imposition by those who had not been involved in the process. Consequently, it was agreed that the Panel would present a draft Action Plan to a public meeting. It was suggested that representatives from similar projects elsewhere might be invited to attend to share experiences of implementing local projects.

9.1.3 Facilitation

A third clear message that emerged from discussion with the Stakeholder Panel was that they felt it was too early for the project team or commissioning organisations to walk away from the project. SNH therefore agreed to investigate ways of providing further facilitation support for the Panel, focusing in particular on how to structure its work around the themes without losing the integrated overview generated by the project, and how to implement the action plan, with the involvement of SNH, SEPA and Stirling Council as appropriate.

9.2 Implementing the vision

The Vision was supplemented by a detailed action plan containing 50 actions grouped under the themes of agriculture, wildlife and habitats, landscape and sense of place, flood management, communities, tourism and recreation and low carbon economy.

These actions were identified initially by the project team and subsequently refined and supplemented in discussion with the Stakeholder Panel. The Panel also contributed information on how each action should be taken forward and who should be involved. These inputs were reflected in the second draft of the Action Plan which includes more detail on the implementation process.

As noted in the previous chapter of this report, the actions can be grouped as follows:

- measures that could be implemented by local stakeholders;
- measures that will require support and involvement of agencies and the local authority;
- measures which will require the Panel to feed their views and the Action Plan into policy development processes;
- measures which are dependent on higher level policies which the Panel is unlikely to be able to influence;
- measures which have no current mechanism for implementation;
- measures which run contrary to existing policies or regulations.

A simple review of the actions in terms of the degree to which they conform or conflict with existing policy was carried out. Table 3 uses colour coding to indicate, in broad terms, whether the action is compatible with existing policy (green), where existing policy or delivery mechanisms would need to be influenced (amber) and where the action runs contrary to policy (red):

- there were no measures that run contrary to existing policies or regulations, though a number will need to be developed within the context of more wider plans or strategies (e.g. flood defence);
- a significant number require the Panel (with the support of agencies as appropriate) to input to policy development and setting of priorities. This may be a particular challenge where the policy in question applies to an area much larger than the Carse of Stirling Project Area and/or where such policies will be subject to other influences or drivers;
- there are several actions which are on-going (e.g. forest restructuring); and
- a number of actions which need to be defined and driven locally (e.g. open farm days).

9.3 Barriers to implementation

Key barriers to implementation included:

- the Panel's own capacity to maintain momentum and develop a structure geared around development and delivery of actions. SNH therefore agreed to provide additional technical support to help the Panel with this;
- the extent to which the wider community of the project area would recognise and 'own' the work carried out by the Stakeholder Panel. It was therefore agreed that the Panel would hold a public meeting at which the draft results of the work would be presented;
- the complexity of funding mechanisms, particularly SRDP, and the challenges this presents particularly for smaller land managers. Collaborative approaches were therefore suggested as a means of bringing larger numbers of land managers into the process and providing support in securing funding, implementing innovative measures and possibly marketing products. Vehicles such as EU LIFE funding, LEADER and HLF Landscape Partnership funding were suggested as alternatives;
- the gap between current and future financial support and the funding necessary to incentivise or compensate land managers who are willing to bring forward measures (habitat enhancement, flood management, landscape restoration) on their land.

Table 3. Policy truthing

Ref	Action	How should this action be implemented?	Who should be involved?	Policy match
	AGRICULTURE			
A1	Raise awareness of the importance of the Carse in providing food, hay and other agricultural products	Making stronger links between land management and education and schools	Panel - land management group, schools, education authority	
		'Open Farm' Days or Open Farm Sunday in the Carse of Stirling	Panel - land management group, individual land managers, community organisations	
		Programme of events – arts, photography, articles in magazines	Local arts organisations, community organisations, Creative Scotland	
A2	<p>Influence implementation of SRDP to reflect characteristics and challenges of farming in the project area, specifically:</p> <ul style="list-style-type: none"> Maintaining flexibility of mixed farming Supporting measures to focus on production in most productive areas Supporting complementary environmental measures in less productive areas, including creation and linking of habitats, landscape enhancement Reflecting the wider role of the area in contributing to flood management, carbon storage etc. Adapting land management to climate change 	<p>Draw on evidence from the Monitor Farm process to draw up parallel SRDP priorities for the area.</p> <p>Use this to influence setting of regional priorities within the Forth RPAC area.</p>	Panel - land management group RPAC SNH/SEPA	Dependent on Carse of Stirling Project being able to influence SRDP Regional Priorities
		Collaborative approach to secure funding for all farmers, even small amount so all able to do something	Panel - land management group	Dependent on Carse of Stirling Project being able to influence SRDP Regional Priorities

Ref	Action	How should this action be implemented?	Who should be involved?	Policy match
A3	Advice and incentives for low carbon farming within the project area, covering for example, farm scale renewables, low carbon inputs, use of biochar, soil management.	Demonstration project – similar to monitor farms Government incentives, with meetings and publications to explain and promote Local publicity	Scottish Government Agriculture Department Panel - land management group	Requires agency advice and funding
A4	Measures to improve the resilience and viability agricultural businesses	Collaboration (machinery rings, knowledge and training, buying and marketing); Demonstration projects and sharing experience from elsewhere; Schemes to support new entrants Local product branding and marketing Training programme Promotion through meetings and publications	Panel - land management group Other similar projects and co-ops to share experience	
A5	Support for farm diversification projects	Via simplified SRDP scheme with regional priorities reflecting local needs	Panel - land management group RPAC	Requires agency advice and funding
A6	Carbon and energy audits for farm businesses – linked to whole farm review of business, technical and wildlife habitat management	Build into more prominent environmental part of the whole farm review process	Scottish Government Carbon Neutral Stirling? Soil Association?	Requires agency advice and funding
	Habitats and wildlife			
HW1	Development of habitat networks designed to link existing fragments of habitat, help species move and adapt to changing conditions, and to provide habitats	Use Integrated Habitat Network mapping prepared for whole CSGN area to identify priorities in the project area	CSGN Stirling Community Planning Partnership SNH Panel - land management group	

Ref	Action	How should this action be implemented?	Who should be involved?	Policy match
	for pollinators. Landscape scale, following linear corridors Link to natural flood management and CAP reform	Influence the setting of SRDP regional priorities within the Forth RPAC area – aim to have small amount of funding for all farms to help development habitat networks	Panel - land management group RPAC SNH/SEPA	
		Use existing examples from within Carse as demonstration sites	Panel - land management and biodiversity groups RSPB and local volunteers Stirling University nature groups	
		Any loss of hedges etc. to be compensated elsewhere in area – to allow efficiency but maintain habitats	Panel - land management and biodiversity groups	No mechanism for protecting or compensating field boundaries
HW2	Positive management of lowland mosses, including encouragement for felling and removal of regenerating trees (linked to provision of woodfuel).	Partnership with local communities to get people (and businesses?) directly involved	Communities SNH Landowners Volunteers FCS	
		Project allowing individuals to remove trees for woodfuel		No current mechanism?
		Alternative woodland planting elsewhere to compensate for deforestation		
HW3	Potential collaborative venture grazing sheep over mosses to prevent tree and scrub regeneration.	Use existing scheme in Shirgaton Moss as a demonstration project Use Shetland cattle on Flanders Moss (West Moss-side) as a demonstration project	Land owners and associations (rare breeds) Panel - land management and biodiversity groups	Requires agency advice and funding Dependent on Carse of Stirling Project being able to influence SRDP Regional Priorities
HW4	Wider interpretation of the Carse of Stirling Project Area's biodiversity, with stronger links to	Programme of events – arts, photography, articles in magazines	Local interest and biodiversity groups (e.g. Thornhill)	

Ref	Action	How should this action be implemented?	Who should be involved?	Policy match
	education	Education involvement of schools	Community associations and schools Eco-schools Children, teachers, local groups	
		Raise profile of the area – e.g. host Springwatch	Panel - land management and biodiversity groups	
HW5	Trip to other projects (e.g. Carse of Gowrie)		Panel SNH	
HW6	Explore potential for a Landscape Partnership Scheme	Review Heritage Lottery Landscape Partnership criteria Identify focus and aims of potential scheme	Panel SNH Stirling Council	
	Landscape and sense of place			
LSP1	Maintenance, gapping up of hedgerows and restoration in appropriate locations where no impact on biodiversity	Identify where hedges have been lost in the past – historic maps and photography	Panel Community Groups Land managers	
		Invite local communities to sponsor a hedge	Panel Community groups Land managers	
		Whole farm management plans	Farmers with help from govt for funding and the involvement of local biodiversity, environment interest groups	Requires agency advice and funding
		Influence setting of regional priorities / land management options within the Forth RPAC area	Panel - land management group RPAC SNH/SEPA	Dependent on Carse of Stirling Project being able to influence SRDP Regional Priorities
LSP2	Management and replanting of field boundary trees where they have been lost or removed in the past	Incentives – cash	Land managers FCS via SRDP	No current mechanism?
LSP3	Positive management of existing broadleaf woodlands	Encourage access and local support – ‘open woods’ campaign – day or week	Land owners Local biodiversity, environment interest groups	
		Interpretation and education	School visits Community groups	

Ref	Action	How should this action be implemented?	Who should be involved?	Policy match
		Influence setting of regional priorities / land management options for woodland within the Forth RPAC area and encourage take up	Panel - land management group FCS RPAC SNH/SEPA Land owners	Dependent on Carse of Stirling Project being able to influence SRDP Regional Priorities
		Develop a local contractor base to carry out woodland management	Panel FCS Stirling Council	
LSP4	Positive management of historic designed landscapes including woodlands and trees and historic structures such as buildings, gatehouses and boundary walls	Garden History Society Scotland recently set up a Stirling group aiming to survey and evaluate non-inventory designed landscapes	Garden History Society Scotland Landowners Community groups	Requires agency advice and funding
LSP5	Restructuring of conifers forests to create a more varied structure, species and habitat mix	Support work being carried out as part of UK Forest Standard Share experience, encourage forest owners to progress restructuring plans	FCS Private forest owners	
LSP6	Restoration and planting of new orchards	Work with Forth Environment Link Link work being carried out in different communities	Local communities Forth Environment Link – Forth Valley Orchards CSGN Funding	
LSP7	Sensitive conversion of redundant farm buildings	Apprentice schemes and training – sponsored by local builders Low cost units for small local businesses	Panel Local building companies Stirling council Land owners	
LSP8	Limited expansion of existing settlements and sensitive design, materials and locations for new buildings	Better planning controls, particularly in conservation areas Application of Stirling Council design guidance	Panel Stirling Council	Dependent on LDP policy
LSP9	Wider interpretation of the Carse of Stirling Project Area's landscape and cultural heritage, with stronger links to education	Work with local communities to put in a linked plan for interpretation in key areas. Fundraise for design work.	Panel Local communities Schools SNH Historic Scotland Stirling Council Archaeologist	

Ref	Action	How should this be implemented?	Who should be involved?	Policy match
		Schools project to design cards to promote important local sites and cultural heritage	Schools	
		Social media – FB and Twitter feed for the area	Panel – social media co-ordinator	
		Interpretation, leaflets, articles	Panel Community groups	
		Potential HLF funded Landscape Partnership project	Panel SNH Stirling Council	
	Flood management			
FM1	Integrated approach to flood management across the Project Area and Forth Catchment more widely, with stakeholders from the area contributing to future flood management plans	Inform Stirling Flood Risk Management planning, consultation and implementation	Panel – flood management group Stirling Council SEPA	
Collaborative approach by land managers and farmers		Panel – flood management group Land managers RPAC and Land Management Options	Requires agency advice and funding Dependent on Carse of Stirling Project being able to influence SRDP Regional Priorities	
Address through possible LIFE project		Panel SNH RSPB		
FM2	Changing management of the upper part of the catchment, including areas of higher ground, to intercept, absorb and slow the speed at which rainfall runs off into watercourses. This could include reversing peatland drainage, some woodland planting, new wetlands to hold water	Share experience of pilot projects elsewhere (e.g. SEPA and FCS project in Angus)	Panel SNH support	
Community ownership, community woodlands		Community councils		
Inform and incentivise land managers and owners		Panel – flood management group Land managers RPAC and Land Management Options		
Collaborative approach to link upstream and downstream owners		Panel – flood management group Land managers RPAC and Land Management Options		
Address through possible LIFE project		Panel SNH RSPB		

Ref	Action	How should this be implemented?	Who should be involved?	Policy match
FM3	Restoration of natural river systems and floodplains where this helps contain floodwater and reduce downstream impacts in the project area and beyond	Better information on operation of river systems	SEPA and Stirling Council Panel – flood management group	
		Govt could buy land for flood management – linked to new entrants scheme (c.f. purchase of farms for woodland expansion) and wetland habitat schemes	Panel – flood management group Government / new entrants SNH	Requires agency advice and funding Dependent on Carse of Stirling Project being able to influence SRDP Regional Priorities
FM4	Improvement of flood defences to protect property, the most productive farmland and infrastructure	Educate and persuade stat authorities	SEPA and Stirling Council Panel – flood management group	Potentially as part of integrated approach through Local Flood Risk Management Plan and its implementation
FM5	Improvements in drainage where this helps reduce soil moisture levels and flood risk and does not create impacts on other benefits	Grants and incentives Needs to be linked to addressing compaction and measures to improve surface water infiltration	SEPA and Stirling Council Panel – flood management group Land managers RPAC and Land Management Options	Potentially as part of integrated approach through Local Flood Risk Management Plan and its implementation Dependent on Carse of Stirling Project being able to influence SRDP Regional Priorities
FM6	Creation of new wetlands to store flood water and provide wider biodiversity and landscape benefits	Grants and incentives Sharing best practice	SEPA and Stirling Council Panel – flood management group	
		New bunding to keep water on wetland and off productive land	Local contractors with knowledge of the area	Potentially as part of integrated approach through Local Flood Risk Management Plan and its implementation
FM7	Positive management of mosses across the area to deliver combined flood management and biodiversity benefits	Continue to work on existing mosses, but be more active – let land owners cut down trees – buy them woodburning stoves.	Local land managers with knowledge of the area SNH NNR team Land managers Schools	

Ref	Action	How should this be implemented?	Who should be involved?	Policy match
		Innovative scrub management projects – e.g. conservation grazing see HW6		
FM8	Measures to improve absorption of the soil, particularly where compacted	Information and awareness – demonstration farms	Panel – land management group SAC? SEPA Land managers	
FM9	Adaptation of land management where high soil moisture levels remain or flooding likely to occur on frequent basis, linked to financial measures and novel approaches to management	Govt could buy land for flood management – linked to new entrants scheme (c.f. purchase of farms for woodland expansion) and wetland habitat schemes	Panel – flood management group Government / new entrants SNH	
FM10	Restrictions on development in areas at risk from flooding, within the Project Area and downstream	Stronger Local Development Plan policies and development management decisions	Panel – flood management group Council planners	
FM11	Awareness of schemes in operation or planned elsewhere in catchment – upstream and downstream – should not be considered in isolation	Research and contact with other organisations	Panel – flood management group SEPA Stirling Council	
	Communities, recreation and tourism			
CRT1	Historic character of settlements recognised and reflected in policy and the design and location of new development	Local heritage groups to identify and map special places	Panel – communities group Community groups Stirling Council Archaeologist	
		Design guidance for buildings tailored to this area	Panel – communities group Stirling Council Community groups	Requires Stirling Council to prepare SPG
CRT2	New development concentrated within existing settlement boundaries	Avoid species rich grassland – fields around settlements often species diverse	Panel – communities group Local communities Stirling Council	Dependent on LDP policy

Ref	Action	How should this be implemented?	Who should be involved?	Policy match
CRT3	New housing designed to meet the needs of local communities in terms of affordability, design and location	Influence planners, local development plan and councillors	Panel – communities group Local communities Stirling Council	
CRT4	Improved opportunities for people to become involved in local growing, orchard, biodiversity or community woodland projects	Identify suitable locations within local community, using funding available to help rent or buy	Local development trusts Forth Environment Link / GrowForth and the Orchard Project	
		Introduce a land share scheme to bring unused land into use as allotments	Community Associations Kippen Community Woodland Group (Facebook)	
CRT5	Improved off-road all abilities, walking and cycling links between villages and key recreation and tourism locations for every day travel and recreational use, developed with land owners and managers and Stirling Council, connecting into wider networks and initiatives	Review Core Paths Plan to identify and work on missing links – co-ordinate and prioritise within wider national network	Panel – communities group Paths groups SNH Stirling Bike Club LLTNP – potential for green transport / tourism link from Stirling train station Stirling Council Access team Sustrans Cycle Stirling Central Scotland Green Network Tourism and health initiatives	
CRT6	Stakeholders from within the Project Area making a positive input to planning policies in areas such as settlement expansion,	Need method of keeping track of consultation periods which local communities need to input to	Facilitator Community Councils Panel – land	

Ref	Action	How should this be implemented?	Who should be involved?	Policy match
	conservation area status, affordable housing and renewable energy	<p>Link into existing community councils through representation of view of the Panel. Action Plan to be seen as a relevant document</p> <p>Potential to use Open Street Mapping techniques (as demonstrated in Carse of Gowrie, Perthshire) to really engage communities in planning & developing their environs.</p>	management group Panel – communities group	
CRT7	Stakeholders from within the Project Area commenting on development proposals and other changes in land management including forest plans	Need method of keeping track of consultation periods which local communities need to input to	Facilitator Community Councils	
CRT8	Development of stronger links from schools to land management and biodiversity initiatives within the Project Area	<p>Ref Buchlyvie Primary School – wildlife garden</p> <p>Young people out to farms on short placements</p>	<p>Ecoschools</p> <p>Panel – land management group</p> <p>Panel – communities group</p> <p>Schools</p>	
CRT9	Debunk myths circulating about the project – ‘marketing or promoting’ the new approach to land management to wider community – promoting the new ‘we’	Public meeting and launch of the action plan	Everyone involved so far	
CRT10	All age learning, health and well-being, physical activity incentives for all	NHS services Links to Dementia Strategy	Panel – communities group NHS	

Ref	Action	How should this be implemented?	Who should be involved?	Policy match
CRT11	Positive links to green tourism	Kite mark, promote local tourism linked to local food and products	Panel – land management group Panel – communities group Local businesses	
	Low carbon economy			
LC1	Demonstration of the carbon benefits of different types of land management, including hay production, pastoral farming, woodland and upland and lowland peat	Demonstration areas and interpretation	Panel – low carbon group Land managers leading with involvement of local communities and schools Carbon Neutral Stirling? Carbon Trust / Climate Challenge Fund	Requires agency advice and funding
		Scientific proof of carbon benefits of different types of land management, then incentives to promote uptake	Panel – low carbon group Government and scientists (Stirling University?), land managers and owners	Requires agency advice and funding
LC2	Advice and incentives for low carbon farming within the project area, covering for example, farm scale renewables, low carbon inputs, use of biochar, soil management	Make advice available via local newsletters as well as on demand More information on effects of low carbon farming on profitability	Panel – low carbon group Government and scientists (Stirling University?), land managers and owners. SAC? Land managers	Requires agency advice and funding
LC3	Management of areas with high carbon soils, particularly the areas of moss and upland peat bogs to maximise their capacity to absorb and store carbon	Demonstration projects	Panel – low carbon group Stirling university and SNH working on collaboration Land managers	

Ref	Action	How should this action be implemented?	Who should be involved?	Policy match
LC4	Positive support for the deployment of small scale renewables across the area, including the use of locally sourced wood fuel, hydro and farm based anaerobic digestion and wind	Facilitate positive communication between land owners and customers	TAN currently looking at combined scheme to benefit several communities	
		Information and incentives	Panel – low carbon group Carbon Neutral Stirling Climate Challenge Fund Government Funding and grants Contractors and suppliers	
		Positive planning and policies guidance	Panel – low carbon group Stirling Council	
LC5	Support for energy efficiency measures including home insulation, public transport provision and use, walking and cycling	Education and incentives Community groups already formed in these areas – expand and improve	Panel – low carbon group Carbon Neutral Stirling Climate Challenge Fund Government and local government Stirling Council transport team, Cycle Stirling, Sustrans,	

Ref	Action	How should this action be implemented?	Who should be involved?	Policy match
LC6	Management of existing woodlands to enhance carbon storage	Protect existing woodland and creation of community woodlands – Gillies Hill Demonstration projects where farms and estates using woodlands in a sustainable way – that woodland management can be viable because of wood fuel	Panel - land management group and communities group FCS RPAC SNH/SEPA Land owners	
LC7	Limited woodland expansion, concentrated in less productive areas, to increase carbon storage	Influence setting of regional priorities / land management options for woodland within the Forth RPAC area and encourage take up	Panel - land management group and low carbon group FCS RPAC SNH/SEPA Land owners	

9.4 Measuring change

In an ideal world, available data would allow for existing ecosystems to be mapped and the provision of ecosystem services measured in terms of quality and quantity, and for the exercise to be repeated to measure the changes resulting from implementation of the Action Plan. However, data deficiencies mean that such an exercise is not possible. Measuring the impact of the project should therefore focus on the extent to which items in the Action Plan have been delivered, with some interpretation necessary to determine the effect of these on the provision of ecosystem services.

Potential measures of change could include:

- number of examples of farms engaging with schools, including number of school visits and pupil placements;
- number of farm open days and number of farms participating;
- whether a programme of arts events has been established;
- the extent to which SRDP regional priorities have been tailored to the needs of the Carse of Stirling;
- number and success of collaborative approaches by land managers covering issues such as grazing the mosses, SRDP, marketing and branding, machinery and flood management;
- number of low carbon farming initiatives in the area;
- examples of training and apprenticeship schemes focused on environmentally friendly land management;
- implementation of integrated habitat network links;
- length of hedges lost, restored, created;

- success of bids to area wide projects including HLF Landscape Partnership and EU LIFE;
- establishment of a local contractor base for woodland management;
- area of productive forest restructured;
- number and area of new or restored orchards;
- preparation of interpretative materials and information;
- number of local demonstration projects in areas such as woodland management, hedgerow restoration, wetland creation and low carbon farming;
- local stakeholder engagement with policy development including Local Development Plan and Local Flood Risk Management Plan;
- preparation of design guidance for the project area;
- number and area of community growing projects.

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