Integrating an Ecosystems Approach into Strategic Environmental Assessment

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Integrating an Ecosystems Approach into Strategic Environmental Assessment

Purpose of the information note

This information note provides advice on how an ecosystems approach can be integrated into Strategic Environmental Assessment (SEA). An ecosystems approach is not mandatory when undertaking a SEA. The note is aimed at those practitioners who may want to voluntarily explore this approach to meet their assessment needs. It has been written to complement Scottish Government SEA Guidance, offering further, more detailed advice on the interactions and linkages between SEA and an ecosystems approach.

Embedding the principles of an ecosystems approach into the statutory SEA requirements may feel familiar for many practitioners and certain aspects discussed in this note can be considered good practice when judging the likely impacts of policy decisions on the environment. Some Scottish SEAs already consider environmental effects in terms of ecosystem services, such as flooding regulation or the provision of water, albeit without explicitly describing this as an ecosystems approach. This note sets out the ways in which undertaking an ecosystems approach can be used to frame how the environment is considered and described, and consequently, to structure how the environmental effects of the plan are considered.

The note sets out in detail the potential benefits and possible pitfalls that practitioners should be aware of prior to taking the decision to use an ecosystems approach to meet their statutory SEA needs. Case study examples have also been included.

Note: while value can be added through the integration of an ecosystems approach within certain SEAs, it is acknowledged that not all SEAs of plans are suited to this approach. Also, not all SEA Topics can be covered using information on ecosystems alone. Practitioners must ensure that, above all, their assessment complies with the statutory requirements of the Environmental Assessment (Scotland) Act 2005 (the 2005 Act).

Why consider integrating an Ecosystems Approach and SEA?

The Convention on Biological Diversity describes 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". Given the wide coverage of environmental topics that the 2005 Act requires a SEA to consider, there are strong synergies with an ecosystem approach.

The Scottish Government publication "Applying an ecosystems approach to land use: information note" highlights the importance of protecting the natural environment, not only from a custodian perspective, but also on the basis that the natural environment provides services that contribute to human wellbeing and community health. These services also have real economic value, both directly and indirectly through the economic activities they underpin or protect.

The note sets out three key principles for applying an ecosystems approach:

a) **Consider natural systems** - this promotes the use of knowledge of environmental interactions and how these affect the way ecosystems function. This includes concepts of ecosystems capacity for change and how this may occur spatially and temporally.

b) **Take account of the services that ecosystems provide** - this includes identifying and accounting for relevant ecosystem services that could be affected by strategic actions.

c) **Involve people** - this seeks to ensure that those who benefit from the ecosystem services and those managing them are involved in decision making.

A simple explanation of these terms for SEA practitioners would be; 'consider the interactions between different aspects of the environment', 'account for the existing environment in particular the benefits it provides', and 'undertake early and effective consultation and engagement with the public and Consultation Authorities'. These requirements are already embedded into the requirements of SEA.

An ecosystems approach aims to change the way we consider and analyse our use of natural resources. An SEA provides a means to consider how certain actions within a plan are likely to impact on a range of environmental receptors. An ecosystems approach, when integrated into an SEA, can help decision makers to look at the wider linkages between the plan's actions and its impact on the environment, including how we value and use that environment.

SEA Guidance already promotes that practitioners can consider different assessment methods, for different types of plans, including the integration of an ecosystems approach. The guidance however contains a cautionary reference to the use of an ecosystems approach within a SEA, acknowledging its potential strengths, but alerting practitioners to try avoid overly complex reporting and assessment methods. To help avoid such situations, practitioners using an integrated approach should aim to focus on only the significant environmental effects of a plan rather than all interactions with the environment. Proportionality in the application of an ecosystems approach is essential and can contribute to an effective SEA.

Guiding principles

Incorporating an ecosystems approach into a SEA process should not result in additional work. However, some initial familiarisation with an ecosystems approach is recommended. A SEA that integrates an ecosystems approach, should aim to be time and cost efficient, and seek effective and beneficial outcomes. Examples of potential benefits to the plan maker and stakeholders include:

- better environmental protection;
- more effective mitigation;
- greater enhancement of positive effects;
- enhanced transparency and communication of effects;
- more effective consultation;
- improvements to the plan and SEA evidence base and how it is considered;
- support for the generation and assessment of reasonable alternatives;
- reducing longer term costs and consenting requirements; and,
- paving the way for smoother plan delivery.

Prior to integrating an ecosystems approach into an SEA, practitioners may wish to consider the potential benefits and pitfalls of the approach. Possible pitfalls include the relationship between SEA Topics and an ecosystems approach, as not all issues fall neatly within the ecosystem services. Care must be taken to ensure all relevant environmental issues are included and weight given to any significant effects that ecosystem services may not clearly describe. This also relevant in instances where the benefits gained from the natural environment are relatively subjective, for example, those obtained from cultural services.

What are ecosystem services?

Whilst terminology such as an '**ecosystems approach**' and '**ecosystems services**' are well established and more familiar to people with an interest in the environment, to the public and wider stakeholders they can appear and overly technical and difficult to understand. As a result, some of the concepts and jargon associated with an ecosystems approach would benefit from a simplified explanation.

On a basic level, the natural environment comprises water, soil, air, geology and all things living. These can be seen as a stock of the planets **'natural assets'**, often referred to as its **'natural capital'**. It is from these assets that ecosystem services are derived. In simple terms, ecosystem services are labels for the things we use that nature provides us. We derive benefits from using these services whether consciously or unconsciously. The identification of ecosystem services is an important part of the ecosystems approach. There are four main groups of ecosystem services.

> An **ecosystem** is a complex set of relationships amongst living resources, habitats and people within a particular place. It includes plants, trees, animals, micro-organisms, water, soil and people.

The environment provides us with food, raw materials and fresh water, which are types of **provisioning services**. These describe tangible, material outputs that we use such as meat and crops from agriculture, fresh water, or minerals and wood used for construction and fuel. Provisioning services are essentially the products obtained from ecosystems.

The environment is underpinned by a system of natural processes that can often be overlooked as they are not directly used by people, but provide essential benefits. For example, the cycling of nutrients such as nitrogen and carbon, soil formation, and water cycling through processes such as photosynthesis, evaporation and evapotranspiration. These are called **supporting services** and, without these, we would not be able to derive benefits from the environment. These services are necessary for the production of all other ecosystem services.

> **Ecosystem services** are a way of linking nature (i.e. natural capital) to the benefits nature provides to people.

Supporting services result in, and are complemented by, **regulating services** which lead to additional benefits that we can derive from the result of natural processes. For example: vegetation removing pollutants from air and water; trees and plants that control the rate of soil erosion, regulate local climate and provide natural flood protection; insects that pollinate commercial, wild or back garden crops and flowers; and carbon sequestration and storage.

We derive benefits from the use and enjoyment of the environment that are not always material, and are often governed by emotional responses and connections. For example, natural space can attract tourism and recreational uses, provide physical and mental health benefits, aesthetic appreciation, and artistic inspiration.

These are known as **cultural services** and are connected to human behaviour and values, encompassing spiritual experience and sense of place.

When considering the incorporation of an ecosystems approach, a practitioner may find that using the terminology of ecosystem services to describe the environment can be overly complex, if not off-putting.

Thinking about and discussing the environment in terms of describing what nature provides us, how it is **used**, and the **benefits** we derive from it could help the environment be more readily understood, and to make decisions that are mutually beneficial for nature and people. Describing the environment in this way may also be easier to incorporate into a SEA. This point is considered further within the "Pitfalls" and "Benefits" section of this note.

> An **ecosystems approach** is a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way.
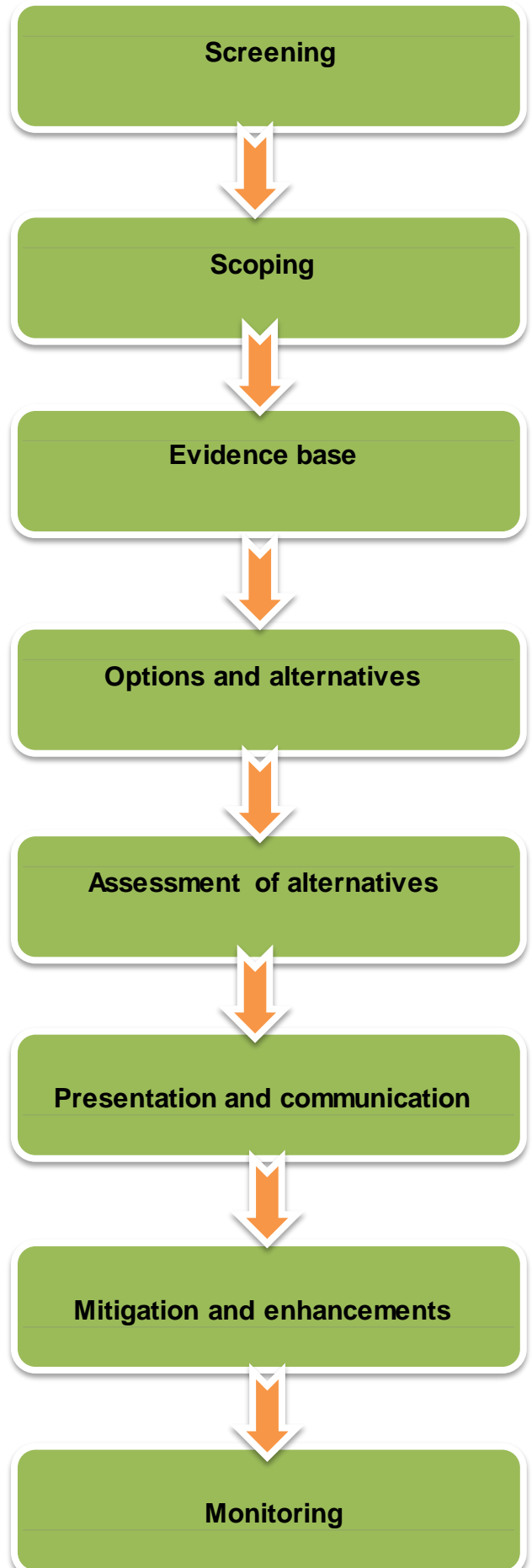
Whilst an ecosystems approach centres on what humans derive from nature, there remains scope within a SEA that integrates an ecosystems approach, for more intrinsic or 'for nature's sake' considerations. This means that the benefits provided by nature for nature (e.g. cycles of carbon and nutrients) can still be considered.

Finally, it is important to remember, above all, incorporating the language and thinking of an ecosystem approach into SEA should be purposeful and focused on improving the outcomes of the assessment.

Stages of SEA

The following sections consider the integration of an ecosystems approach within the main stages of SEA. Information has been provided to illustrate ways in which this can be undertaken and supports that provided in the SEA Guidance. Where applicable, case studies have been included to highlight examples of existing practice of undertaking an integrated approach.

Use the overview process diagram to go direct to each stage, scroll down or use the arrows to navigate through the following pages.

Screening

Scoping

Evidence base

Options and alternatives

Assessment of alternatives

Presentation and communication

Mitigation and enhancements

Monitoring

Screening

Is the plan reliant on any features of the natural environment?

Could any ecosystem services be impacted or enhanced?

Stage-by-stage guidance – Screening

The purpose of the screening stage is to determine whether a plan is likely to have a significant effect on the environment. In the majority of cases the answer to this is relatively straight forward.

However, in cases where the likely effects of the plan are unclear, considering ecosystem services e.g. how reliant the plan may be on the natural environment and certain identified services, as well as to what degree it might impact upon other services; may help practitioners to reach clearer conclusions on the significance of changes prompted by a plan.

Scoping

Are there ecosystem services that might be affected by the plan?

Which ecosystems or habitats are affected?

Are there clear interrelationships between services for consideration?

Do the services identify particular stakeholders that should be targeted in consultation?

What data relating to ecosystem services will be identified and presented?

How will the ecosystem services be considered in the assessment stage?

Is there an opportunity for stakeholder consultation to identify key services affected by the plan?

Case study 1

Case study 2

The scoping stage of SEA sets the level of detail to be covered in the assessment and Environment Report. At this stage agreement on the consultation timescales should also be reached. Scoping reports provide an opportunity to set out what a plan hopes to achieve through its aims and objectives, and its likely content. It then considers the relevant environmental issues that could be affected by the implementation of the plan, scoping environmental topics into and out of the subsequent assessment. There are opportunities during this stage to consider how an ecosystems approach could help to improve the description of the scope of your SEA.

Scoping includes the consideration of 'SEA topics' as described in the 2005 Act with regard their relevance for inclusion in the assessment of the plan. To do this, a practitioner needs to consider what the plan aims to achieve and what aspects of the environment are likely to be potentially affected. In order to identify the relevant SEA topics, a practitioner could therefore consider whether the plan is likely to impact on or improve the delivery of relevant ecosystem services within the plan area. Ecosystem services can easily be translated into the SEA process by grouping them under the relevant SEA topics. The Scottish Biodiversity Strategy case study provides a practical example of where this has been undertaken while The Metropolitan Strategic Development Partnership case study provides an example of how ecosystem services can be used to consider the scope of a SEA. Further information can also be found on this on Scotland's Environment within the benefits from the environment section, including a useful illustration which provides examples of services under each broad habitat type.

Identifying relevant ecosystem services should be straightforward. This could form part of the consideration of environmental topics relevant to a plan and the SEA. As an example, a plan that includes proposals for woodland expansion has several obvious interactions with the environment that can be expressed in terms of ecosystem services. It may seek to enhance timber production (**provisioning services**) or opportunities for recreation which have health benefits (**cultural services**). It could control soil erosion from flooding or help to reduce the effects of air pollution from adjacent polluting land uses (**regulating services**). However, in some locations, planting could reduce the diversity of wildlife (**provisioning service**), by replacing a strong ecosystem with a monoculture. This, in turn, could affect soil and water quality (**regulating services**), and could have mixed impacts on the contribution of the land to undertake functions such as effective nutrient cycling (**supporting services**). This example considers the four ecosystem service groupings. The interplay between the services can be described in the relationship between provisioning; regulating and cultural services and the supporting services that underpin these. The Common International Classification of this Ecosystem Services (CICES) and UK National Ecosystems Assessment (NEA) provide further information on how these relationships can be presented.

Whilst services such as these may not be new concepts to many SEA practitioners, describing and thinking about the environment in these terms can often help to identify links and interrelationships between aspects of the environment that might otherwise be missed. An ecosystems approach may improve understanding of the interrelationship between SEA topics as required by 2005 Act helping practitioners to think beyond topic silos.

Identifying the relevant services that might be affected by a plan, and the environmental issues that stem from these at Scoping stage, can help to contribute towards improved consultation. Firstly it can provide the Consultation Authorities with a clear picture of the environmental interactions under consideration. Secondly some ecosystem services may help to identify particular key groups of stakeholders, organisations, businesses or communities that have a particular interest in the services provided. This can help the plan-maker to consider their approach to consultation and engagement throughout the plan's preparation, in addition to meeting the requirement for wider consultation with the public.

SEA Guidance recommends that the environmental information that is presented should be well developed, to enable those being consulted to understand the key environmental issues and help to identify where there may be inaccuracies or omissions. When incorporating an ecosystems approach into an assessment, it is advisable to set out the proposed approach to how this will be undertaken in the Scoping Report. For example, by clearly identifying the ecosystem services that may form part of an assessment framework, as well as the means by which these will be used to identify the significance of effects.

The level of detail provided in Scoping Reports will vary. For example, some may state examples of the data sources that will be used to form the evidence base in the assessment process.

However, for practitioners seeking to include baseline information in greater detail, the advice in the evidence base section of this information note will also be relevant.

Home

Back to stages of SEA

Evidence base

Does the plan rely on any ecosystem services for delivery? How and why?

Could implementation of the plan interact with particular ecosystem services?

What is the state of the ecosystems providing the services?

Are there existing pressures on any ecosystem services?

Is it beneficial to present relevant ecosystem services in map form?

Are there relevant stakeholders who may hold data and/or who should be targeted during consultation?

Do the environmental protection objectives of other relevant plans identify ecosystem services to consider?

What is the state of the ecosystems providing the services?

Case study 3

Home

Stage-by-stage guidance – Describing the evidence base

Compiling the environmental evidence base, against which a plan is assessed, is an important stage in SEA. The evidence base will consist of baseline data covering the environmental topics that may be affected by a plan's implementation and any relevant and influential environmental protection objectives promoted by other plans and strategies. The 2005 Act describes this information as: the current state of the environment and the likely evolution without implementation of the plan; environmental characteristics of the areas likely to be significantly affected; existing environmental problems and environmental protection objectives promoted in other relevant plans.

Practitioners can use the Scoping Report as an initial route to provide a relevant evidence base for the future assessment, seeking the views of the Consultation Authorities on this. The evidence base prepared and developed at this stage can be used and developed further in the Environmental Report. Any evidence used should always be collected at a level of detail that is appropriate to the plan and the SEA, producing a sharp and focused assessment.

SEA Guidance provides suggestions for sources of baseline data and how these can be presented in a number of formats, both qualitative and quantitative. Information can be derived from indicators used in environmental monitoring, from mapping of environmental features, and, in some cases, from research programmes. When incorporating ecosystem services within a SEA, they should be included as part of the SEA baseline. In the majority of cases this type of information already has to be routinely collected as part of a SEA, for example the quality of water bodies relevant to the area that a plan covers would also provide the baseline for fresh water provision.

Presentation of environmental data should aim to ensure accessibility and focus on relevant information. Facts and figures listed under environmental topics can be limited in their ability to communicate aspects such as how different environmental issues interact. An ecosystems approach, by contrast, can be used to present environmental features and interactions in a more holistic way, focusing on natural systems and providing an enhanced explanation of how components of the environment interact within the plan.

The evidence base could include the identification of the ecosystem services that a plan relies upon for delivery, and identify benefits that might be significantly affected by the plan implementation. These ecosystems and the services they provide can then be used to describe the 'characteristics of the area likely to be affected'. Baseline data can be collected from relevant indicators relating to each ecosystem service, to describe the 'current and future state of the environment'. This information could also identify pressures on these relevant ecosystems and services relating to existing activity within the plan's sector and beyond. In SEA terms these can be considered as 'relevant environmental problems'.

Scale of the information presented is also important. Practitioners should avoid complex analysis, such as identifying every localised ecosystem service for a plan whose implementation does not have the capacity to directly alter that ecosystem or the services it provides. A useful rule of thumb may be to consider those ecosystems and services which provide benefits and uses that are likely to be directly influenced by the proposals and policies contained within the plan. An exhaustive inventory of all of the ecosystems services with a connection to the plan is not recommended.

Many ecosystem services lend themselves to presentation in map form. Mapping can provide an effective means of communicating the environmental baseline, and can be particularly helpful for effective consultation purposes. For example, **provisioning services** could be represented by mapping of agricultural land classification or woodland used for timber production. Mapped flood plains represent the **regulating service** these areas provide, and **cultural services** such as heritage features or natural areas promoted for tourism could be mapped. GIS software can also be used to overlay a number of maps to identify areas that offer multiple services and multiple benefits. This can provide a valuable evidence base for a SEA, particularly when a plan contains spatial options. As with any collation of evidence base for a SEA, information should also be included regarding the current and future state of the ecosystems or the services they provide. Information such as the state of soil, water quality trends or woodland coverage would be indicative of the nature of information that would be relevant to this.

The [Aberdeenshire and Scottish Borders Regional Land Use Pilots](#) case study provides more detail on how this may be undertaken. Maps used should be relevant, focusing on where likely significant effects have been identified.

Spatial data may be available from a number of sources, including the SEA Consultation Authorities, Local Authorities and other public bodies. Some relevant ecosystem services may already be mapped in other plans, programmes and strategies, or state of the environment reports that can be referenced. Other suggested sources of data can be found in the "Further Information" section of this note.

Identifying sources of information may also add value by helping to pinpoint particularly relevant stakeholders for subsequent engagement. To support engagement, careful use of plain English is recommended, especially when explaining the services being presented.

A SEA is required to consider any relevant environmental protection objectives, which are set through legislation and other plans, programmes and strategies. This process can be used to yield relevant ecosystem services for consideration within the assessment, as objectives themselves may be set to protect existing ecosystem services. For example, objectives that protect air or water quality.

Options and alternatives

Can the relevant ecosystem services be used to identify reasonable alternatives? e.g. support or maximise priority services, minimise loss or dependence on services, or promote wider synergies.

What are the effects of the proposals on the state of ecosystems?

Home

Stage-by-stage guidance – Options and alternatives

The requirement to consider reasonable alternatives is a fundamental obligation of the 2005 Act   Reasonable alternatives must be genuine and realistic. SEA Guidance explains that while ultimately the plan maker is responsible for the direction that a plan may take, the SEA can provide a valuable function in helping to identify and develop potential options and alternatives early in the plan making process, as well as indicating the environmental implications of these.

Using an ecosystems approach for the SEA may help to identify the need for other reasonable alternatives in light of their interaction with the relevant ecosystems and their services identified as part of baseline analysis. Wider alternatives would clearly be dependent on, in part, the powers of the plan and the possible breadth of its implementation. Plans can consider alternatives in a number of ways, including; in terms of allocations, policy choices and strategic scenarios. Reasonable alternatives derived from an ecosystems approach are likely to have the following in mind:

Supporting priority ecosystem services: Plan options may seek to support or maximise the provision of targeted ecosystem services, which may have been identified within the evidence base. For example sustainable timber production or recreation services, within a plan for forestry.

Minimise loss of services: SEA requires responsible authorities to propose mitigation for adverse environmental effects. As part of an ecosystems approach, this could include mitigating negative impacts on ecosystem services or on the ability of an ecosystem to provide these services. Through considering reasonable alternatives, the assessment could help to identify options that could reduce the magnitude and severity of this potential impact.

Maximising services a plan relies upon: Some plans may be reliant on ecosystem services that support the strategic actions of the plans. For example allocation of housing land in a plan may in part rely upon a flood defence service that a habitat provides. The plan may therefore seek to broaden the scope of options to ensure this service is sustained in the long term.

Minimise dependence on priority services: Many plans may seek to maximise activities that focus on a particular ecosystem service, such as, the provision of fuel (**provisioning services**). However maximising some services could have negative implications for the overall environment and for other ecosystem services. Options and other alternatives, such as those that diversify how the plan's objectives are met and which can promote improved sustainability, should be considered. This can sometimes lead to additional benefits for ecosystems and the other services provided.

Promote options to improve the provision of services: Alternative ways of achieving the same goal may provide opportunities to enhance the existing services provided by the environment. An example of this is green infrastructure in urban planning and its role as a carbon sink, management of air pollution and provision of recreational areas.

Promote synergies with existing regulation: The context review may identify relevant regulation of the environment that in turn provides protection of environmental services. When considering alternatives a practitioner could reach an opinion on whether they aligned and/or strengthened the plan's links with such regulation.

All reasonable alternatives are required to be assessed to identify the significance of effects, and a consistent approach to the assessment should be applied to each alternative.

Assessment of alternatives

Can the ecosystem services be incorporated into the assessment framework?

How do changes to provision of an ecosystem service affect the significance of effects?

Do the ecosystem service benefits and uses help to consider its significance?

Can the interrelationships between ecosystem services help describe the cumulative effects of a plan?

How do changes to the state of ecosystems and the services it provides affect the significance of effects?

Case study 4

Case study 5

Case study 6

The 2005 Act does not set out a specific methodology for the assessment of alternatives. The SEA Guidance is clear that to get the best out of SEA, practitioners should choose a methodology that is most appropriate to the plan and its likely effects.

Several assessment methods are used by practitioners. Environmental objectives, focused questions, environmental indicators, scoring systems, and environmental topics and issues have all been used on their own, or in combination, to form assessment frameworks. Equally, relevant priority services identified within the evidence base could be integrated into a framework to assess the plan. This can provide an alternative approach to considering environmental effects that could add value to the preparation of the plan. For instance, integrating services into the assessment framework could help plan-makers to identify constraints to implementation of options, and contribute to land suitability analysis where spatial options are under evaluation. The SEA of Aberdeenshire Regional Land Use Pilot provides an example of an integrated ecosystems approach that identifies the relevance of services and tests changes to them.

Interrelationships, cumulative effects

SEA requires consideration of significant environmental effects on environmental topics, and the interrelationships between these. An ecosystems approach can help to describe these interrelationships, as it can highlight aspects of the environment that span the different SEA topics. For example, rivers and lochs provide the benefit of fresh water provision so pollution of a water body could impact not only on the water topic, but on population and human health by removal of this service. This service is also provided to animals and plants used in agriculture so pollution or loss of the service could have a secondary effect on population and human health by removing that provisioning service. A SEA integrating an ecosystems approach should be able to simply discuss and present these interrelationships. The SEA of the Land Use Strategy for Scotland 2016-2021 was particularly successful in identifying these interrelationships.

An ecosystems approach may also lend itself to effective identification of cumulative effects. Interrelationships can guide a practitioner to consider how the benefits (positive effects) derived from one service may have secondary effects on another.

Significance of effects

This stage of SEA also considers the significance of the identified effects of alternatives in the plan. Integrating an ecosystems approach could help to indicate the significance of effects. Schedule 2 of the 2005 Act sets out a range of criteria for determining the significance of environmental effects. These would also apply when incorporating an ecosystems approach. When considering the significance of effects on services the following questions may be helpful:

- Is the effect on service likely to result in it being diminished or no longer able to provide its benefit?
- Is the effect on the service reversible and the benefit restorable?
- Are there identifiable thresholds for loss of benefit?
- Would other identified services compensate for the loss or diminishment of a service and its benefits?
- Is the affected service identified as being sensitive as a result of being rare, unique or endangered?
- Is the benefit provided by the service critical to maintaining the state of the environment?

Applying these questions to the services included in the SEA, and that relate to the alternatives under assessment, can produce an assessment that would be familiar to most SEA practitioners i.e. identification of positive and negative effects with known degrees of significance. A good example of such an approach is that undertaken for the SEA of the SEPA Flood Risk Management Strategies.

Considering services in terms of benefits and uses can help to ascribe value to them. This can inform the assessment of the significance of the likely environmental effects of the plan and its reasonable alternatives.

The greater the value that is placed on the service provided and the benefits it offers, the more likely that changes to that service could be viewed as significant. It is important to remain impartial when judging significance and not to place more value on those services that directly benefit people.

In most cases the value applied to services can be described in terms of their intrinsic value, meaning that it is valued for no other reason than for its presence within the environment. However, in some contexts, practitioners may wish to consider value in terms of its impact on natural capital. In this case, the assessment may discuss potential effects in terms of changes to the stock of environmental assets. Considering value in this way may help decision makers to make more informed decisions regarding the potential loss of assets as a result of actions within a plan.

There is no requirement in SEA to undertake an economic valuation approach. In fact, this could unintentionally complicate or dilute the assessment's environmental findings. However, in an ecosystems approach a practitioner can place an economic value on assets in order to then ascribe costs to potential impacts. In terms of decision making, this may help those tasked with making important and key decisions by highlighting the likely 'cost' to the environment and the services it provides. This could also help to raise the profile of the environmental impact in decision making and help members of the public to better understand its impact. Practitioners opting to use this approach must ensure that the information collected and then interpreted is both robust and impartial and that the limitations of adding an economic value to the environment are made clear. Not all assets may have been fully identified, or can be valued with the same degree of certainty, so some could in fact be unintentionally undervalued.

Some practitioners could find that incorporating an ecosystems approach into their assessment can help to provide additional focus towards environmental benefits (positive effects/enhancement). Although identifying and avoiding significant adverse effects remains at the heart of the SEA process, considering the environment in terms of the benefits that we can derive from it, can promote potential areas for enhancement. The assessment of options, for example recognising how ecosystems help to support the outputs of the plan, could provide a positive commentary alongside a more familiar impact-led assessment.

Integrating an ecosystems approach into SEA can often allow for a long term view of effects to be balanced against the short term benefits of any change by decision makers. It would be counterproductive, however, if such an approach were to increase complexity in the plan or its accompanying assessment. Avoiding approaches that could significantly slow down assessment and plan development is important. A SEA is only likely to be considered effective if the plan maker can engage with, understand, and have their views challenged by the outcomes of the assessment. To effectively integrate an ecosystems approach into a SEA, practitioners should balance its complexity with its practicality and find a suitable format for delivering clear messages. It should also be able to communicate the scale and significance of effects, and proposals for mitigation at a level appropriate to the plan.

Presentation and communication

An ecosystems approach is effective for considering the interrelationships between environmental effects. Can these interrelationships be used to communicate the results of an assessment?

Will the language of ecosystem services help to engage with stakeholders?

Will using information on how people benefit from the environment affected help engage stakeholders?

Case study 7

Making environmental information accessible through engagement and consultation is at the heart of SEA. Integrating an ecosystems approach into the assessment process should prove useful in effectively communicating the assessment findings.

Potentially it can move the discussion within the assessment from simply a record of negative effects to a more engaging interpretation of how proposed changes could affect our use and enjoyment of the environment. This could help decision makers to improve their understanding of the potential impacts of the plan on the environment.

It could also be beneficial for engagement with members of the public, or for stakeholders familiar with ecosystem services; thereby improving participation in the assessment process.

Effective SEAs clearly set out the results of the assessment in a manner that can be understood by the public and stakeholders. They should be transparent; showing how the environmental information used in the assessment has been taken into account by the plan maker. It is possible that by using an ecosystems approach which focuses on uses and benefits derived from the environment, the non-technical summary could better communicate and describe the predicted effects of the plan in a more accessible way.

Causal chain analysis, as noted in the Scottish SEA Guidance, is an ordered sequence of events linking the causes of a problem with its effect. It can lend itself to clearly explaining linkages between effects and how these can interplay through the relevant environment. Such an approach was employed in the SEA of the Scottish Borders Regional Land Use Pilot.

Mitigation and enhancement

Are there alternative approaches to prevent or avoid significant effects on ecosystems and their services?

Are there measures to reduce and minimise significant effects on ecosystems and their services?

Could the plan include measures to offset or compensate for unavoidable effects on ecosystems and their services?

Can the plan identify measures to improve and enhance the benefits ecosystems and their services provide?

The [2005 Act](#) sets out the requirement for mitigation. The mitigation of effects should follow what is often referred to as the 'mitigation hierarchy'. This is typically a series of steps to prevent/avoid, reduce/minimise, and offset/compensate for any significant adverse effects on the environment as a result of implementing the plan.

When incorporating an ecosystems approach into SEA, practitioners will have identified the key services relevant to the assessment and the likely significant effects on these as a result of implementing the plan. Mitigation for these effects should focus on protecting and enhancing the uses and benefits these services provide.

Changes to the plan may be considered to **prevent or avoid** effects on the capacity of ecosystems to supply benefits and services. This might be achieved through the consideration of a reasonable alternative. Within spatial plans this might involve consideration of an alternative locations and/or setting policy controls on design and operation of sites.

Reduction and minimisation of effects can be achieved through limiting the duration, intensity, and extent of impacts on ecosystem services and benefits. This could be accomplished by amending the objectives of a plan, or introducing stipulations to be applied at consenting or licencing.

Measures to **offset or compensate** for any significant effects on key ecosystems and services could be considered where there is an unavoidable adverse environmental effect that cannot be meaningfully avoided or reduced. This could include, for example, commitments in the plan to restore the capacity of impacted ecosystem services and benefits. Additionally a spatial plan could include commitments for improving or enhancing services and benefits in an alternative location.

The measures above may only mitigate for part of a loss in benefits. Similarly, offsetting measures may not be able to address the loss in benefits to all affected stakeholders. Practitioners who are incorporating ecosystems services within a SEA may wish to consider how they can incorporate the no net loss (NNL) principle embedded in the [EU Biodiversity Strategy to 2020](#). This seeks to 'ensure no net loss of biodiversity and ecosystem services' – this means that losses of ecosystem services are acceptable only if they are offset by adequate mitigation that maintains the overall balance of services. Mitigation should also reflect the original benefit derived from the affected ecosystem services.

Mitigation of adverse effects is central to effective SEA.

Going beyond this, whilst not specifically referred to in the [2005 Act](#) SEA, can also **enhance** the plan's environmental performance. The recommendations of an assessment can consider whether it is within the scope of the plan to support and strengthen ecosystems to provide greater benefits from the services they provide. Enhancement measures, like mitigation measures, can come in the form of additions, refinements and removal of policy elements; establishing linkages to wider existing work, or identifying the need for new or altered regulation. In considering enhancement, key questions might focus on whether the strategic action can increase the supply of a particular ecosystem service, or whether accessibility for stakeholders to these benefits can be increased.

Monitoring

Which of the data sources used as evidence to describe relevant ecosystem services could also be used to monitor the significant effects of the plan?

Are there wider means by which change to the benefits provided by an ecosystem services could be measured and that can be attributed to the plan?

Stage-by-stage guidance – Monitoring

Monitoring the significant environmental effects of a plan is a requirement of the 2005 Act. Monitoring in SEA is considered most effective when integrated with the proposals to monitor the plan itself. During the initial stages of a SEA, the services potentially affected by the plan would have been identified. These can be described through data sources and indicators that define the current state of the environment. Where they are useful in understanding the potential environmental effects of the plan, these data sources can often also provide the indicators that can be used for monitoring.

Practitioners should continue to follow the advice on monitoring contained within the SEA Guidance when integrating an ecosystems approach into SEA. Limiting the number of indicators, and focusing on those that are simple to measure, interpret and communicate can be effective. A monitoring framework can also describe the methods, frequency and responsibility for data collection and is particularly useful where relying on sources of information to be collected by stakeholders external to the organisation preparing the plan. If during the scoping stage relevant ecosystem services and stakeholders have been identified, it may be these stakeholders could be involved in collecting, evaluating and managing of information to inform plan and assessment monitoring.

Monitoring proposals should be included in the Environmental Report and the agreed framework set out in the post adoption SEA Statement. The requirements for the content of the post adoption statement could also cover how the consideration of ecosystem services helped to integrate environmental considerations into the plan.

Additional sources of guidance for integrating an ecosystems approach into environmental assessment:

- The Organisation for Economic Co-operation and Development (OECD) produced SEA and Ecosystem Services guidance in 2008 whose approach was developed by Project for Ecosystem Services (ProEcoServ) in their practitioner guidance.
- The National Ecosystems Approach Toolkit (NEAT) includes an SEA tool that provides guidance and some UK and European case studies.
- Additionally there is related European Union guidance on integrating Climate Change and Biodiversity into Strategic Environmental Assessment
- The World Resources Institute has also published guidance for weaving ecosystem services into impact assessment.
- The Ecosystems Knowledge Network provides a range of information under within their Applying the ecosystems approach section. This includes examples of sectors where an ecosystems approach is being implemented or could bring greater benefits.
- The Common International Classification of Ecosystem Services (CICES) sets out further information to enable people to understand how to measure and analysis information regarding ecosystems.

A small sample of some the information on ecosystem services and examples available online can be found at the links bellow:

- The UK National Ecosystems Assessment (NEA) identified a range of ecosystem services under the headings of Provisioning Services (e.g. food), Regulating Services (e.g. water quality), Supporting Services (e.g. soil formation), and Cultural Services (e.g. recreation). A full range of services relevant to the UK are described in the Synthesis of the Key Findings Report and its follow up.
- The SNH document "An Evaluation Framework for applying the Ecosystem Approach" provides further information on the principles that define an ecosystem approach and includes a plain English explanation of these principles.
- The DEFRA funded ecosystem services research project lists a number of ecosystem services under the same headings.
- The Economics of Ecosystems and Biodiversity (TEEB) provide further detail of the different categories of ecosystem services that ecosystems provide.
- The Ecosystem Services Community Scotland (ESCOM) provides a useful source of work and opinions on the application of ecosystem services in policy and practice.
- The Biodiversity Information Service for Europe (BISE) has led the Mapping and Assessment of Ecosystems and their Services (MAES) project that provides spatial information regarding ecosystem services across Europe, including Scotland.
- Scottish Natural Heritage (SNH) has published Cultural Ecosystem services – Towards a Common Framework for Developing Policy and Practice in Scotland
- The Committee on climate change recently published an assessment of climate change on UK natural assets that includes impacts on relevant ecosystem services.
- Scotland's Environment Web provides a useful source of information on the Benefits from the environment including further information on ecosystem services and a useful illustration of examples of services under each broad habitat type. :
Scotland's Environment Web provides access to a number of interactive maps within their "Get Interactive" pages, some of which have preselected layers already applied.
- Scottish Government Land Use Data Directory sets out a list of spatial datasets (land use and ecosystem services) and information on how to access this data.
- The National Marine Plan Interactive (NMPi) tool has been designed to assist in the development of national and regional marine planning. The NMPi is a static system and data sets and new statistics are added to the interactive map when available.
- The SNH recently published An Evaluation Framework for applying the Ecosystems Approach which sets out key considerations on this topic.

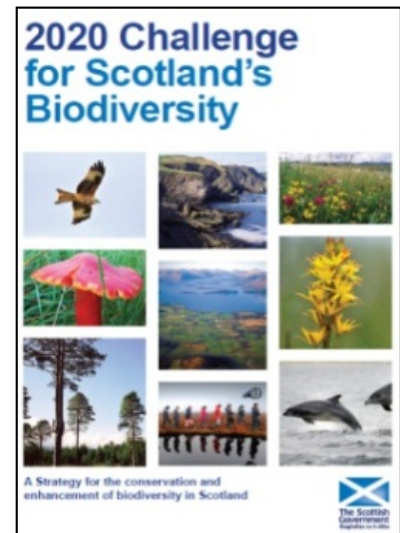**Overview**: The SEA of the 2020 Challenge for Scotland's Biodiversity sought to incorporate the ecosystems approach as a means to achieve better engagement with both the policy team and the stakeholder groups who would engage with the development of the Strategy.

The approach was undertaken by constructing an assessment framework based around the ecosystem services identified in the National Ecosystems Assessment. The identified ecosystem services were translated from the SEA topics, in order to demonstrate compliance with the 2005 Act, and to display transparency in the approach to the assessment. The table displays provisioning services in yellow, regulating services in purple, supporting services on blue and cultural services in green. It was noted that some aspects of the environment may not necessarily fit neatly with easily identified ecosystem services. In this case climate change adaptation was not specifically addressed as an individual ecosystem service but acted as a cross cutting influence across all ecosystem services and was considered as an additional stage of assessment. In similar cases responsible authorities are advised to consider the appropriate methodology to ensure that all relevant environmental issues are included in the assessment framework.

The SEA established a means for integrated assessment by translating the SEA topics into ecosystem services to form the assessment framework, against which the plan was measured. A narrative was provided to describe the significance of the effect on the ecosystem services. The benefits of this approach to the SEA were born through the ease in which the recommendations could be shaped for informing the policy. Furthermore, a third of the stakeholders responding to the Strategy also responded to the SEA. This was viewed as a success and an increase on previous SEA consultations. Many responses were supportive of the approach to the SEA.

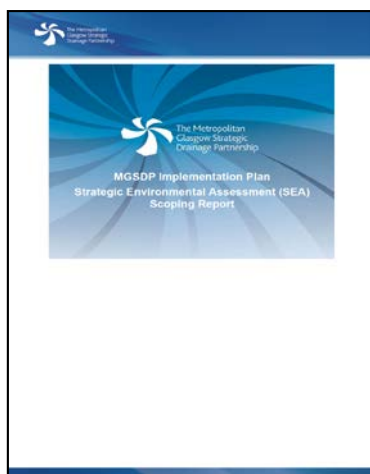| SEA Topics	Links between SEA topic areas and ecosystem services
Biodiversity Flora Fauna	Wild species diversity Trees, standing vegetation, peat
	Pollination Disease and pests Hazard (wildfire, flood risk) regulation Primary production (including photosynthesis) Nutrient cycling
Soil & Geology	Soil quality Erosion control Carbon store Soil formation Nutrient cycling
Water	Fresh Water Supply Water quality Coastal Defence Pollution control/dilution Water cycling Nutrient cycling
Climate change	Climate regulation Hazard (wildfire, flood risk) regulation Carbon store
Landscape	Environmental Settings / Aesthetic values (Landscapes/seascapes) Sense of place
Cultural Heritage	Cultural Heritage Environmental Settings / Aesthetic values (Landscapes/seascapes)
Population and Human Health	Food (crops, livestock, aquaculture, wild fish and game) Education Health benefits (recreation, tourism, mental health) Navigation Noise regulation Disease and pests Coastal Defence Hazard (wildfire, flood risk) regulation
Material Assets	Employment Fibre (crops, trees, wool) Timber Fuel (bioenergy, biofuels) Pharmaceutical products

Metropolitan Glasgow Strategic Drainage Partnership Implementation Plan

Responsible Authority: Metropolitan Glasgow Strategic Drainage Partnership

Overview: The Metropolitan Glasgow Strategic Drainage Partnership (MGSDP) is a collaborative venture that aims to upgrade and modernise Glasgow's drainage and sewerage network to reduce flooding and support urban development requirements, while improving water quality and the environment.

The ecosystems approach was promoted in this Scoping Report as a means to implement the guidance within Applying an Ecosystem Approach to Land Use, and the support for new 'ecosystem services based approaches' within the 2011 SEA Review.

The Scoping Report was also supported by a paper on the benefits of adopting an ecosystem approach based SEA included in its Annexes.

The Scoping Report set out intent to narrow the scope of the SEA topics to reflect the six ecosystem services/processes, which were identified as relevant to the SEA. The ecosystem services identified would enable 'bundles' of SEA topics to be considered in the assessment by focusing this onto the interconnections between these aspects of the environment.

Whilst the Consultation Authorities were broadly supportive of the intended approach, the plan itself has not progressed and as such the benefits for the plan- making process have not had the opportunity to be realised. However, the approach to link ecosystem services to relevant environmental issues to ascertain the scope of those relevant to the plan remains an interesting approach.
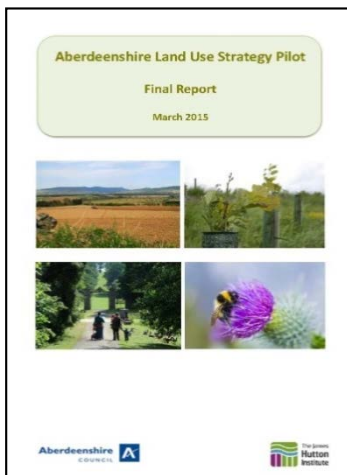
Ecosystem service category	Ecosystem services considered	Definition of ecosystem service for the MGSDP Implementation Plan SEA
Provisioning *The products that we obtain from ecosystems*	None proposed	None proposed
Regulating *The benefits obtained from the regulation of natural processes*	Water and flood regulation	The influence ecosystems have on the timing, magnitude and scale of flooding, particularly in terms of the water storage potential at landscape, ecosystem and site scales
	Water purification	The role ecosystems play in the filtration of pollutants, sediments and nutrients from overland flow before it enters water courses
Cultural *The non-material benefits people obtain from ecosystems*	Aesthetic	The aesthetic pleasure and/ or commercial advantage people and businesses derive from natural or cultivated ecosystems
	Recreational	The recreational pleasure people derive from natural or cultivated ecosystems
Supporting *The ecosystem processes required for the natural functioning of healthy ecosystems. Healthy ecosystems/ supporting services underpin the production of all **provisioning**, **regulating** and **cultural** 'final' human use related ecosystem services*	**Note:** the SEA will consider the impact of MGSDP Implementation Plan projects on all aspects of ecosystem function and make recommendations accordingly. In particular however, the assessment will focus on habitat networks/ biodiversity and water cycling given their direct relevance to the scope of the MGSDP	
	Habitat networks/ biodiversity	The permeability of the landscape to key species facilitating the 'landscape scale' processes of migration, colonisation and natural regeneration supporting sustainable populations and providing resilience to external impacts such as climate change and development
	Water cycling	The influence ecosystems have on the timing and magnitude of river runoff generation, particularly in terms of the landscape's capacity to slow down the rate at which river runoff is generated and distribute clean, fresh water round river catchments

Overview: The aims of the Land Use Strategy Pilots were to foster a more integrated approach to land use change and decision making in the Aberdeenshire and Scottish Borders authorities.
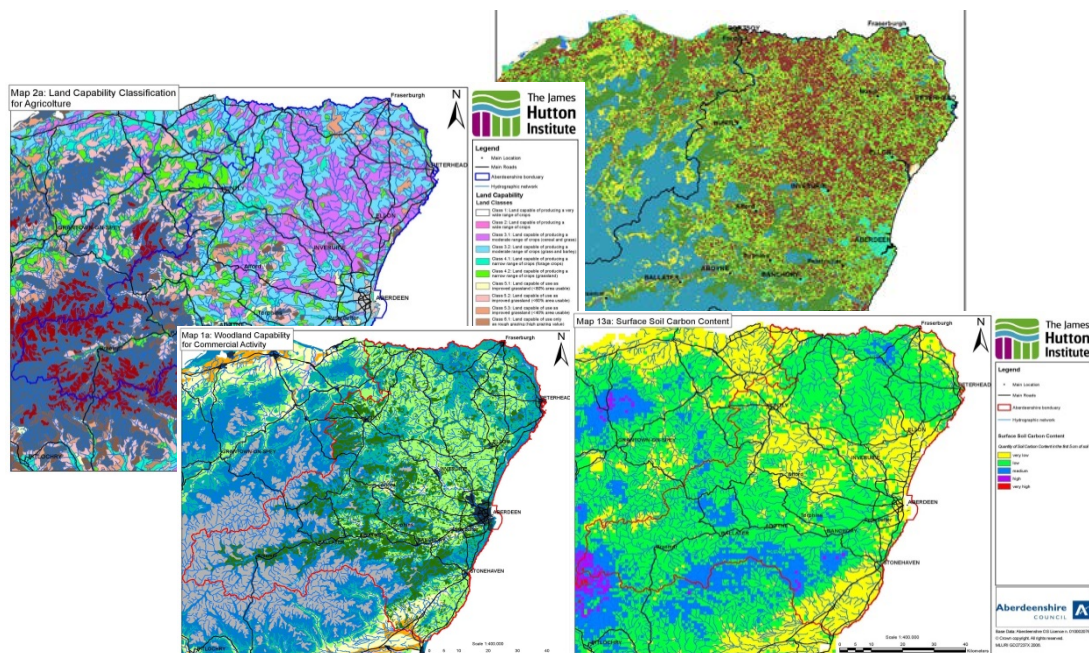
The Aberdeenshire pilot aims to create a framework to aid decision making based on the services and multiple benefits land use provides. The framework was developed using an evidence- base led approach. As a result of the synergies with the SEA process an integrated ecosystems approach was undertaken and provided opportunity for a joint evidence base.

The Environmental Report includes a number of maps of land uses that provide ecosystem services, including land cover, land capability for agriculture and forestry, peat land, flood risk and water quality. Furthermore it contains natural asset maps grouped under types of ecosystem service, including land capability mapping, soil carbon content, wetland resources, water quality, and features of the historic environment.

The ecosystem mapping work, alongside a more traditional indicator based SEA baseline, provided the evidence upon which assessment was undertaken.

Maps are for illustrative purposes and can be found in the final report.
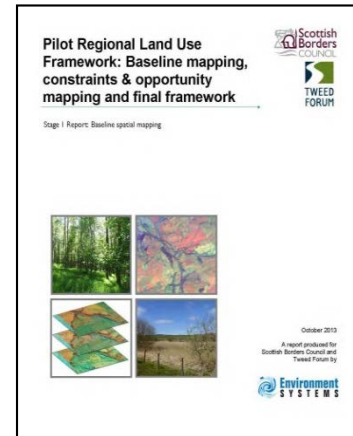
Case study 3

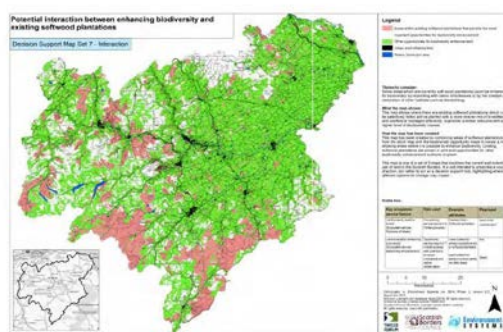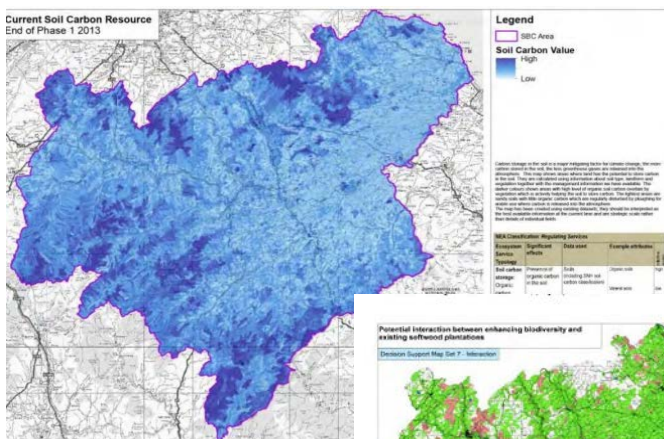# Mapping ecosystem services

[Scottish Borders](#) Land Use Strategy Pilots

Overview: The Scottish Borders Land Use Framework aims to test the principles of the national Land Use Strategy at a local level to see how they can be realised in a practical way. The approach to the framework is also based on an ecosystems approach to help guide decisions that help integrate land management that could make best use of the land. As with Aberdeenshire Council it was felt that the ecosystems approach could also be usefully embedded into the SEA process.

The project was supported by ecosystem service mapping including constraints and opportunities mapping as part of the project baseline and layering of services to identify multiple benefits.

For plans such as the Land Use Strategy Pilots, that are inherently reliant on effective functioning of ecosystems and an understanding of the spatial distribution of the services these provide, there is benefit to both plan making and SEA from ecosystem mapping. In particular from identifying spatially prioritised enhancement opportunities. Mapping can also help engagement with some stakeholders, in particular when clearly setting out why some services may be of particular value to the area under assessment.

Maps are for illustrative purposes and can be found in the final report.
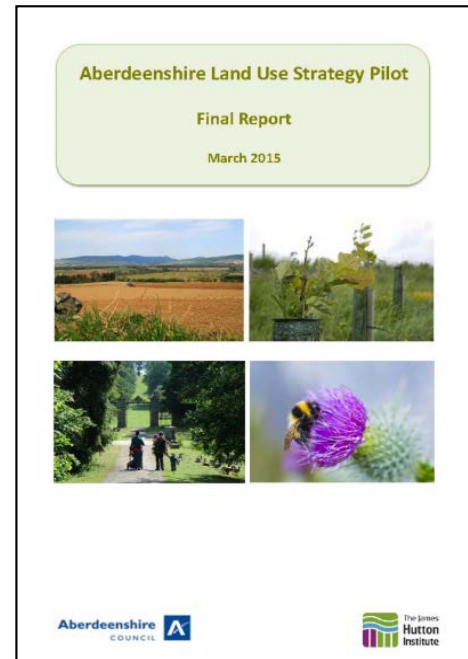
Overview: The SEA of the Land Use Strategy Pilot incorporates ecosystem services at several stages of the SEA whilst the overall approach follows established approaches to SEA. Ecosystem services are included in baseline data collection, the identification of environmental issues, and within the assessment framework.

The approach taken for the assessment is to simply include questions relating to ecosystem services into a framework of SEA objectives and sub questions against which the alternatives were assessed. The example box below illustrates how ecosystem services are considered under the SEA objective "Protect and enhance the quality of the water environment, surface and groundwater resources".

The question under the objective simply asks whether the services will be protected or enhanced. Whilst this is broad in its scope, the question also highlights the wide range of services associated with the water topic (flood regulation, drinking water, irrigation, energy production, and bathing water). This provides a good demonstration of both the extent of services that the environment can provide, but also that these services are easily translated as environmental issues that SEA practitioners are not only familiar with but that they are already use to considering.

The benefit of integrating an ecosystems approach through an assessment framework is firstly that the alternatives under assessment will be considered against the full scope of relevant services, and ensures that the significance of effects on services will be discussed. Where a plan, such as this, is closely entwined with considering and delivering stronger ecosystem services, an SEA that incorporates the same language has a better opportunity to help provide a useful tool in the plans development.

SEA Topic	Objectives	Will the Policy /Objective of the LU Strategy Regional Pilot
Air	Regulate and maintain the quality of the air	Improve are quality? Minimise and/or reduce air-borne nutrient deposition (eg nitrogen as contributor to eutrophication, impacts on sensitive habitats)? Increase and enhance nutrient deposition?
Water	Protect and enhance the quality of the water environment and surface and groundwater resources.	Protect and enhance services the water environment provides (eg. Flood regulation, drinking water, hydroelectricity, irrigation or bathing water)? Protect and improve surface, groundwater and coastal water quality? Result in changes to river flows and/or morphology? Contribute towards achievement of Good Ecological Potential/Status?

Case study 5

Using an ecosystems approach to environmental interconnections
SEA of the Land Use Strategy for Scotland 2016 – 2021

Responsible Authority: The Scottish Government

Getting the best from our land, consultation on a draft Land Use Strategy for Scotland 2016-2021

Strategic Environmental Assessment Environmental Report

Environmental Assessment Team
Planning and Architecture Division
Scottish Government
November 2015

Overview: The SEA of the Land Use Strategy for Scotland 2016 - 2020 sought to build upon the work undertaken in the development of the first Land Use Strategy and the findings of its SEA. The approach was based around the consideration of potential impacts to the SEA topic areas, whilst also incorporating an understanding and consideration of ecosystem services and the links between these topic areas as the assessment progressed.

This approach to the SEA was undertaken to match the ambition of the Strategy to incorporate the ecosystems approach into decision making processes.

Relevant ecosystem services were identified through the collation of the evidence base. These services were incorporated into the assessment narrative and discussed as relevant receptors of environmental effects. The assessment was initially structured in a tabular format under the SEA topics in order to demonstrate compliance with the 2005 Act and to display transparency in approach.

The use of ecosystem services provided a useful means by which issues could be linked between the topics, and between the proposals set out in the Strategy. It was considered that the effects of the Strategy would also be influenced by opportunities and constraints out with the policies and proposals it contained. For example, the influence of environmental legislation and consenting regimes for land uses. In order to demonstrate their influence on the assessment, an innovative approach to displaying these relationships was undertaken that mixed causal chain diagrams with a traditional SEA summary table and accompanying narrative framed in the context of relevant ecosystem services.

The approach to the SEA helped to demonstrate a means by which SEA could adopt an ecosystems approach in land use decision making. It enabled the identification of many mutual benefits across the natural environment, and helped to identify important linkages and cumulative effects across the SEA topics, rather than in considering them in isolation. For example, in the assessment of proposals relating to green infrastructure in the urban environment, links were identified to a number of SEA topics such as biodiversity, soil, water, air, population and human health and landscape and culture heritage.

There was strong support to both the proposed policy on natural resource management and promotion of considering ecosystems in the decision making process expressed through the consultation. Some respondents felt this was essential and fundamental to the implementation of Strategy.

GROUP 1: POLICY ALIGNMENT

These policies and proposal seek to provide further clarity on the status and context of the draft Strategy within current Scottish Government policy, and in doing so, aim to highlight a consistent message that exists across the policy spectrum. Through the inclusion of a policy that reiterates the relationship of the draft Strategy with the statutory planning system, this grouping seeks to improve awareness of the draft Strategy and the issues that it raises; particularly amongst planners by demonstrating the potential benefits in taking an ecosystems approach and the role of SEA in the planning process. There is clear cross-over with other groupings, particularly in relation to raising awareness and seeking opportunities for enhanced and more useful consultation between land owners/managers, decision makers and other stakeholders.

SEA Topic	Effect	Summary of potential environmental effects, including on ecosystems, and likely significance.
Biodiversity, flora and fauna		Changes to land use, including inappropriate development, can be a pressure for many environmental factors; particularly biodiversity, flora and fauna. Both positive and negative impacts can be wider reaching and can create indirect or secondary effects on other topic areas; for example soil and water (**supporting and regulating services**).
		This group of policies and proposal has the potential to highlight the alignment of the ambitions of the draft Strategy with those set out in the wider policy context, such as the 2020 Challenge for Biodiversity (the 2020 Challenge), which seeks to conserve, protect and enhance biodiversity and considers the importance of ecosystem health to achieve this. Greater understanding of the functions of the natural environment and the benefits we obtain from it also has the potential to increase awareness of how our natural assets can deliver services that a wider range of Government policy aims rely on, such as public health, sustainable transport and climate change.
		This is therefore relevant to wider policy context, such as NPF3, NMP and Government Economic Strategy (GES) and has the potential for positive effects with the 'buy in' of all stakeholders. For example, this may lead to greater understanding in the decision making process of the role of ecosystem services in underpinning our social, economic and environmental health. This could include the greater recognition of the many benefits we obtain from biodiversity including photosynthesis and nutrient cycling (**supporting services**), carbon sequestration (**regulating services**), the provision of timber and food (**provisioning services**) and our iconic landscapes and species (**cultural services**) which amongst others; all of which can influence how the objectives of wider Government policy can be met.
		Increased awareness of the ambitions and Principles set out in the draft Strategy, alongside improved understanding of adopting an ecosystems approach to decision making, can therefore potentially have a positive effect on not only biodiversity, but across a range of topics. SEA, and the promotion of SEA as an effective tool to draw out the interconnections that exist from adopting an ecosystems approach to decision making, can therefore have a beneficial impact. However, these policies and proposal are largely enabling measures and are unlikely to deliver significant impacts on this topic area in isolation. Rather, it is considered that they will enable the delivery of other policies and proposals in the Strategy, and aid in the delivery of any associated benefits.
Population and Human Health		Scotland's natural environment can provide a wide range of benefits for population and human health. Benefits include mental and physical benefits through access to outdoor recreation and providing a sense of connection with the natural environment (cultural services). They can also help to increase awareness of the benefits we get from the natural environment and foster community engagement in the decision making process. An example of this is community green space, which in addition to straightforward environmental improvement can have socio economic benefits, such as less anti-social behaviour, community sense of involvement, and regeneration potential (cultural services). These benefits can help meet wider policy objectives, such as those set out in the NPF3 and how land management and adaptive measures can help meet climate change targets (regulating services). In providing clarity on the policy context of land use and management, particularly regarding relationships with wider policy and the statutory planning system, the policies have the potential to better inform stakeholders and help to achieve greater community participation in decision making. With the 'buy in' of all parties, this has the potential to foster community involvement and participation in decision making, whilst also helping to facilitate debate and scrutiny over the reasoning and assumptions made in this process. This has the potential to provide greater value in the process, and deliver more appropriate outcomes to future land use for all parties. The policies are also likely to provide further focus to the role of ecosystem services in supporting land use and communities, whilst also contributing to improving human health and wellbeing.
		Additional clarity on objectives and expectations for land owners/manager and decision makers, supported by alignment with wider policy objectives, could help to improve the transparency and efficiency of the decision making process. There is the potential for greater consistency in how potential issues are managed and addressed, and greater certainty for land owners/managers, decision makers and communities alike in ensuring that land is used and managed appropriately.

Home

GROUP 1: POLICY ALIGNMENT

The policies and proposal seek to provide further clarity on the status and context of the draft Strategy within current Scottish Government policy, and in doing so, aim to highlight a consistent message across the policy spectrum. Through the inclusion of a policy that reiterates the relationship of the draft Strategy with planning, this grouping seeks to improve awareness of the draft Strategy and the issues that it raises; particularly amongst planners, by demonstrating the potential benefits in taking an ecosystems approach and the role of SEA in the planning process.

There is clear cross-over with other groupings, particularly in relation to raising awareness and seeking opportunities for enhanced and more useful consultation between land owners/managers, decision makers and other stakeholders.

Legend:

- 🟩 Positive effects
- 🟥 Negative effects
- 🟧 Mixed effects
- ⬜ No significant effects

Policy/Proposals:

Develop a policy statement regarding the importance, use and management of natural resources ; ownership and use of land and policy position of the draft Strategy relative to other PPS.

Commit to review of Scottish Forestry Strategy.

Provide detail and clarity on the relationship between the draft Strategy and the statutory planning system.

Raise awareness on the use of ecosystems approach in SEA and the added value it can provide to development planning.

Consider the relationship between current land related policies and the potential advantages of a single policy statement about land which deals with ownership, use and management.

Environmental Context:

National policy such as SPP, NPF3, NMP and the 2020 Challenge for Scotland's Biodiversity promote the importance of our natural resources, and highlight the importance that they are used and managed sustainably.

Scottish SEA Guidance sets out benefits of SEA, supports an ecosystems approach as one option to undertake SEA within PPS development and development planning, and outlines the requirements of the 2005 Act.

The Scottish Forestry Strategy sets out the direction of travel for Scotland's forestry sector for 2015 – 2018.

See Section 2 and Appendix 1.

Opportunities:

Greater clarity on land use policy in Scotland, including the relationship between the draft Strategy, other PPS and the statutory planning system.

Potential for improved awareness on demonstrating the benefits to planning of the ecosystems approach and SEA

Further alignment of the Scottish Forestry Strategy with current policy.

Constraints:

Uncertainty in delivery of specific environmental benefits as a consequence of these policies and reliance on stakeholder 'buy in'.

Uncertainty in scope of review of Scottish Forestry Strategy.

SEA Topics	Biodiversity, flora and fauna	Population and Human Health	Soil	Water	Air	Climatic factors	Material Assets	Cultural Heritage and Landscape
Potential for Likely Significant Effects	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩

Summary of Findings

This group of policies and proposal primarily seek to align land use policy with the ambitions and objectives set out in wider Scottish policy (e.g. NPF3, National Marine Plan (NMP) and Government Economic Strategy (GES) and reflecting those set out in other overarching documents (i.e. EU Directives), whilst also improving the consistency and efficiency of the decision making process. In general terms, they have the potential to improve efficiency in the decision making process and enhance the role of stakeholders in the decision making process; both of which have the potential to have overall positive effects; particularly in relation to population and human health and material assets. For example, providing further clarity and informing stakeholders on the current policy context and providing consistent messages on Scotland's ambitions and expectations are likely to help foster community involvement and aid participatory approaches to decision making, whilst potentially, helping to facilitate debate and scrutiny over the reasoning and assumptions made in this process. This is likely to provide greater value in this process, notably in how decision making is undertaken, and providing greater clarity over Scotland's aims and ambitions should give land owners/manager and other stakeholders greater understanding and certainty of their roles in the process.

The inclusion of Policies 1 and 3 should also provide further focus to the important role that ecosystem services play and the inter-relationship with land use, particularly in how our soils, water, biodiversity and cultural heritage play in facilitating how land is used (i.e. supporting, regulating, provisioning and cultural services), and the importance that these resources are used responsibly and sustainably in ensuring longevity of use. As noted above, there is the potential for this and the other policies to facilitate greater discussion and consideration of environmental issues in the decision making process, and potentially help to bring about further consistency in how potential issues are managed and addressed. However, it is also noted that a range of existing mechanisms and legislation are in place relating to the protection of the environment, particularly in the context of development proposals and proposed changes to land use. For example, the current planning system and suite of protective measures and designations across the environmental topic areas (e.g. Listed Buildings, Scheduled Monuments, biodiversity designations (i.e. SPAs, SACs, SSSIs), nationally and regionally recognised landscapes (i.e. NSAs)).

However, it is also noted that Group 1 largely consists of enabling measures rather than specific actions. As such, they are unlikely to deliver significant impacts on many of the topic areas in isolation. Rather, it is considered that they will aid the delivery of environmental benefits through enabling the opportunities presented in other policies and proposals in the draft Strategy.

Key Points:

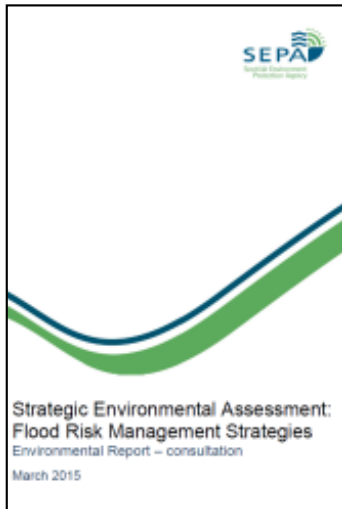- Continued support for the use of an ecosystem services approach, coupled with promotion of the benefits of SEA, may improve the effectiveness of the policies and have a positive environmental effect.
- Continued commitment for the on-going review and monitoring of the established indicators to evaluate effectiveness of policies.
- Potential for further policy alignment through the review of the Scottish Forestry Strategy.

SEA of SEPA Flood Risk Management Strategies

Responsible Authorities: Scottish Environment Protection Agency (SEPA)

Strategic Environmental Assessment: Flood Risk Management Strategies
Environmental Report – consultation

March 2015

Overview: The 14 Flood Risk Management Strategies (FRMSs) coordinate efforts to tackle flooding in Scotland. They set the national direction of future flood risk management, helping to target investment and coordinate actions across public bodies. The assessment focused on two spatial scales- the Local Plan District (LPD) scale (regional) and the national scale. The LPD scale considered the likely effects of the objectives and actions proposed in that district and the national scale considered effects across all 14 strategies. Actions were grouped into a number of themes including runoff reduction, river and floodplain restoration, storage, conveyance and control, river defences, coastal restoration, coastal defences, and Sustainable Urban Drainage.
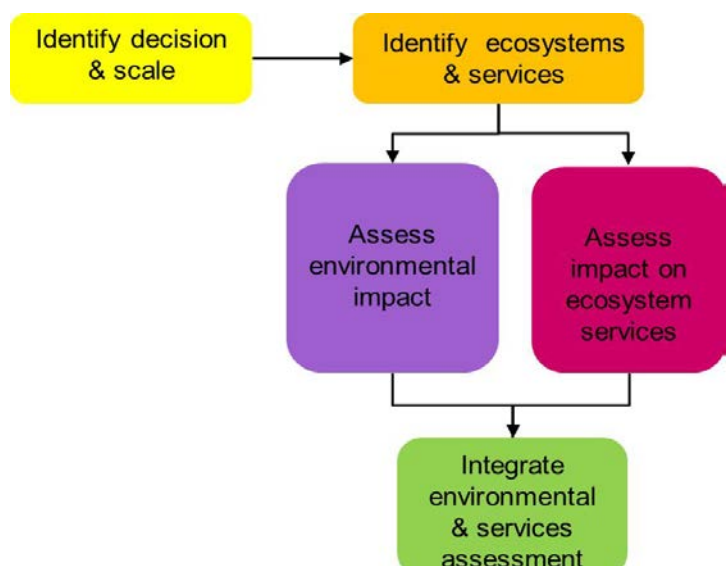
The strategy developers wanted to gain an understanding of how environmental change affects people's use; what was the value of this change to people; how changes in use affect the environment; and what capacity the environment had to accommodate change in use. The assessment team felt that integrating an ecosystems approach into the SEA would provide the means to develop this understanding and to contribute to the following:

- A more holistic understanding of the FRMS and effects of proposed actions on the environment;
- Allow for more effective mitigation and enhancement;
- Assist in the process of selecting the most sustainable combination of FRMS actions in a given location;
- Enable better consultation and engagement.

The approach to the assessment is summarised in this flow diagram, which shows how the more standard approach to assessing the impact on the environment is combined with assessing the effect on people's uses and services from the environment (ecosystem services).

The assessment scoped in several ecosystems: cultivated land; semi natural grassland; conifer plantations; freshwater wetlands; uplands; native woodlands; rivers and lochs; urban; and coastal and marine. For each of these ecosystem types relevant ecosystem services were then identified.

For each group of actions proposed in the FRMSs, a generic assessment of effects on the ecosystem services was undertaken. The generic assessment focussed on the ecosystems and services most likely to be affected by different groups of actions,

which reduced the information required for the environmental baseline for each LPD. Using the relevant environmental baseline and the proposed actions for each LDP, the generic assessment was refined for each of the 14 LDPs.

The environmental impact and the implications for people were integrated to determine the significance of the effects. In addition to the usual magnitude tests for significance, the assessment identified actions for managing flood risk that provide opportunities to enhance both the state of the environment and the particular service. Effects were classed as 'significant' where the option was likely to result in the deterioration (or improvement) of an ecosystem in poor condition as well as a change to the specified service. This was illustrated through the "double plus" and "double negative" symbols shown in the summary assessment table below. The significance test was also used to highlight where effects of actions were mixed ("plus / minus" symbol) depending on the location. This enabled the planners to recommend mitigation and identify opportunities that can be considered at more detailed stages in the plan hierarchy e.g. feasibility studies or detailed design.

Source of flooding	All		River					Coastal	
Ecosystem service	Non-structural actions		Run off reduction	River and floodplain restoration	Storage, conveyance, control	River defences		Coastal restoration	Coastal defences
Carbon storage	0		+ +	+/-	- -	-		N/A	+/-
Local climate regulation	0		0	0	0	0		N/A	0
Water quality regulation	0		+ +	+ +	+/-	-		N/A	-
Pollination	0		0	+	-	0		N/A	0
Biological control of pests and disease	0		+/-	+	-	0		N/A	N/A
Wave/surge attenuation	0		N/A	N/A	N/A	N/A		N/A	+ +
Water flow regulation	0		+ +	+ +	+ +	+ +		N/A	N/A
Erosion protection	0		+ +	+ +	+/-	+/-		N/A	+/-
Nutrition: food provision	0		+/-	+/-	+/-	-		N/A	+/-
Drinking water supply	0		+	+	0	0		N/A	0
Biotic materials: timber, biofuels	0		-	+/-	+/-	0		N/A	0
Recreation (physical interaction)	0		+	+/-	+/-	+/-		N/A	+/-
Accessible nature/wildlife experience	0		+	+	-	+/-		N/A	+/-
Spiritual and cultural amenity (landscape)	0		+	+	-	-		N/A	-

The relationship between SEA objectives and ecosystem services was cross-mapped to identify which ecosystem services contribute to which SEA objective. This enables the ecosystem services assessment to be reported by SEA objective, making it easier to demonstrate compliance with SEA legislation.

Example below of cross mapping back to SEA topic for summary of significant effects, opportunities and mitigation for runoff actions.

SEA topics	Potential significant effects	Opportunities, mitigation, recommendations
Biodiversity flora and fauna	+ + Benefits from increased diversity and restoration of upland ecosystems, and improvements to cultivated and river ecosystems	Feasibility studies should consider opportunities to contribute to other drivers, especially diffuse pollution priority catchments and Rivers Trusts work to help Salmon. Landscape scale projects initiated via the Central Scotland Green Network may also provide opportunities to realise these actions on the ground. Design studies should aim to achieve sympathetic design, siting, and timing of works to avoid or minimise negative effects. Consultation with relevant organisations (e.g. SNH) recommended at both stages. Habitat Regulations Appraisal will address negative effects on SACs and SPAs.
Population and human health	+ + Benefits from reducing flood risk and protecting human health	
Soil	+ + Benefits to safeguarding carbon rich soils + + Benefits to reducing soil and nutrient loss from cultivated land	Opportunities to work with diffuse pollution priority catchment officers at feasibility stage and design stage to build on existing projects and relationship with land owners/managers. Design stages should consider protecting livestock from potential exposure to pests. Consultation with land managers recommended.
Water	+ + Benefits by enhancing water quality and reducing sedimentation	Opportunities to work with diffuse pollution priority catchment officers and Rivers Trusts at feasibility stage and design stage to build on existing projects and relationship with land owners.
Climatic factors	+ + Benefits to carbon storage through wetland enhancement and woodland planting	Opportunities to enhance carbon storage and sequestration in upland catchments at feasibility stages.

SEA topics	Potential significant effects	Opportunities, mitigation, recommendations
Material assets	+ + Benefits from reducing flood risk and protecting property and infrastructure	Design stages should consider how to minimise waste and energy consumption.
Cultural heritage	No significant effects	Design stages should consult with relevant organisations (e.g. Historic Scotland) to help avoid or minimise negative effects
Landscape	No significant effects	

The integration of an ecosystems approach into the SEA was considered beneficial by providing a consistent and systematic framework across FRMCs. It was considered more comprehensive in terms of the issues it considered. It was more intuitive to use the services to assess the effects compared to the very broad SEA Topics and this also made it more relevant to the local area.

The final results of the assessment in terms of significance of effects were felt to be better evidenced and justified, as the assessment approach provided a clear audit trail of the decisions made by the assessor and how information had been combined to make the decision. In terms of resources, the approach required only minimal additional time compared to a traditional approach: the information collated was similar but it provided a more logical framework to make the assessment; however additional time was needed to translate the findings from the ecosystem approach into the SEA topics.

SEA of the Scottish Borders Land Use Strategy Pilot

Responsible Authorities: Scottish Borders Council

Overview: The Scottish Borders Land Use Framework aims to test the principles of the national Land Use Strategy at a local level to see how they can be realised in a practical way. The pilot was undertaken in close partnership with the Tweed Forum who co-ordinated the engagement with stakeholders. Dialogue with stakeholders was seen as integral to the production of the pilot.

The SEA also sought to provide information in a means by which stakeholders could be easily engaged with. Early on in the assessment it was decided the reporting would involve causal chain analysis, on the basis that not only would it provide an opportunity to understand the interactions between proposals and environment effects, it would also provide a means by which this could be easily and effectively communicated with stakeholders and the wider public.

The analysis worked by looking at each opportunity or constraint identified and to be included within the pilot framework. This formed the first link in the chain and included examples such as reduction of flood risk and overland flow, water quality improvements and increased soil carbon storage. Next, the land use implications of the opportunity or constraint were identified (the second link), then the potential environmental effects associated, either positive, negative or mixed (the third link). From these, effects were translated into SEA topics (the fourth link) and then relevant ecosystem services (firth link) were identified.
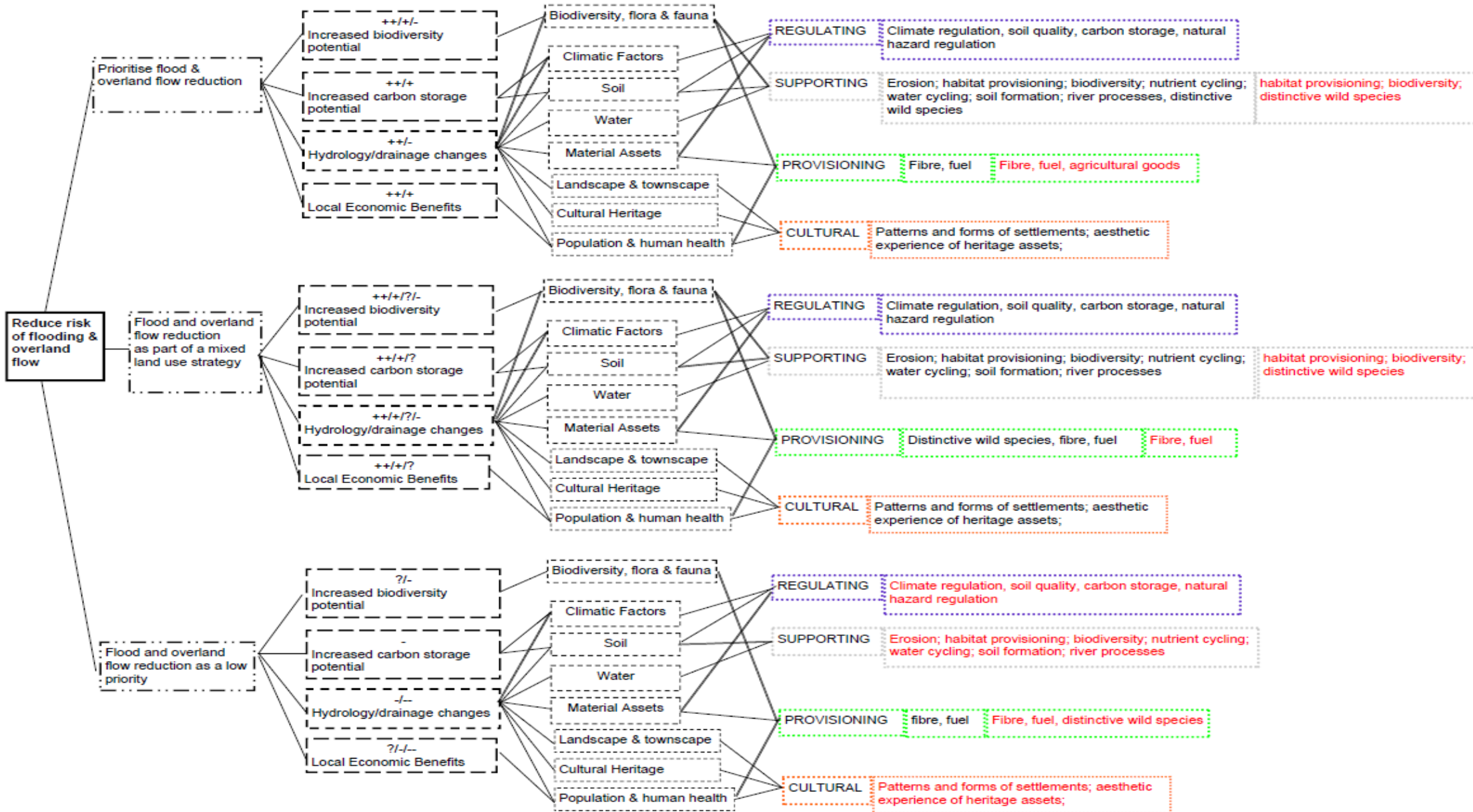
Opportunity → Land Use Scenario XXX→ Significant Land use effects → SEA topics → Ecosystem services

The Environmental Report notes that it is important to recognise that SEA Topics and ecosystem services are assumed to be integrated, so where positive and negative effects are identified they are related to both a SEA topic and one of the four categories of ecosystem service. This is shown through the inclusion of a table linking the SEA Topics and Ecosystem services (see table below)

Table 5: SEA Topics and Ecosystem Services	
SEA Topics	**Link to ecosystem services**
Air	Climate regulation
	Atmospheric CO_2 production
Biodiversity, flora & fauna	Awareness & appreciation of natural environment
	Agricultural goods, fibre, fuel, freshwater
	Soil quality, water quality, pollination, disease and pests, natural hazard regulation
	Photosynthesis, habitat, river processes, water cycling, nutrient cycling, atmospheric CO_2 production, biomass production, distinctive wild species

KEY to Ecosystem Subservices

CULTURAL

PROVISIONING

REGULATING

SUPPORTING

The Environmental Report included a number of causal chains such as the example below that seek to display a lot of information, the interconnections between the environment and relevant ecosystem services, whilst also being straightforward to understand and follow. The chains were accompanied by an overview that contained the narrative of the reasons for the decisions relating to significance of environmental effects. The approach demonstrated how interchangeable and interlinked SEA and ecosystem service thinking can be. It also reveals that through concentrating on displaying the interlinking between features of the environment there are opportunities to help improve the way in which environmental information is conveyed. The diagrams drew positive comments at the launch event for the Land Use Strategy Pilots.

Potential benefits of integrating an ecosystems approach into SEA:

- An ecosystems approach has potential to better describe the environment and the interactions between SEA topics in a more holistic manner, and avoid assessment in silos.

- Describing the multiple benefits the environment provides can help to identify relevant environment factors that the SEA can protect or enhance. It can also help to characterise effects and evaluate the significance of effects.

- Greater clarity on interactions in the relevant environment can support better identification of secondary effects, interrelationships and cumulative effects.

- Discussion of the benefits and uses of the environment could help to frame the results of the assessment in a way that could improve transparency and consultation with the public and stakeholders.

- Providing the plan maker with a clear understanding of the impacts of their plan on the benefits the environment provides, could help to better consider traditional environment and economic tensions adding transparency and value to the plan making process.

- An assessment that highlights the benefits derived from the environment can help decision makers understand the environment as an asset. This could further encourage SEA to be used as an effective tool and help diminish thoughts of environmental assessment as a constraint to development.

- Many ecosystem services may already be firmly embedded in plan development, such as flood elevation or provision of space for recreation. Highlighting the benefits of services through the SEA can help to affirm the strategic direction of a plan, identify further areas of improvement, highlight additional benefits, or help to identify previously unforeseen impacts.

Potential pitfalls to avoid when integrating an ecosystems approach and SEA

- Compliance with SEA legislation is paramount and practitioners should avoid creating an assessment process that is overly complex or time consuming.

- It is important to remember that an ecosystems approach is not an assessment in itself to replace SEA, rather it is simply another way of describing the environment and how it can be impacted on. However, when integrated into a SEA structure care should be taken to avoid duplication when describing the environment and effects upon it, for example by explaining the same interactions in different ways.

- When considered individually, ecosystem services are not complex to understand or integrate, but when integrated there is a risk that the concept of ecosystem services could appear complex.

- The language of ecosystem services may not apply evenly across all SEA topics as they predominantly describe natural processes and the benefits derived from these. Integrating services into Soil, Water or Biodiversity topics may be more straightforward and wider ranging than Cultural Heritage or Landscape topics. Therefore care must be taken to ensure all relevant environmental issues, in terms of SEA, are included and weight given to any significant effects that ecosystem services may not clearly define.

- Some cross cutting environmental issues can be poorly described in terms of services alone, such as climate change adaptation. Such issues should not be overlooked when choosing to integrate an ecosystems approach.

- The use of the ecosystems approach may not be relevant to all plans, programmes and strategies, or institutional contexts. The benefits of the ecosystems approach could be limited in some circumstances. SEA Guidance encourages practitioners to simply apply the methodology most likely to be effective in the particular plan and assessment context.

- An ecosystems approach can lead to consideration of offsetting of impacts as part of recommendations and mitigation. If this is the case it should be within the control of the plan and assessment to implement such measures.

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