First steps in using the ES framework in Perth and Kinross (How the ES Framework worked for us) — Help or hindrance: potential and pitfalls

3rd annual EScom conference, Edinburgh Centre for Carbon Innovation, Edinburgh university

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Graham Esson supported by *Ciara Gray and Shelley McCann*

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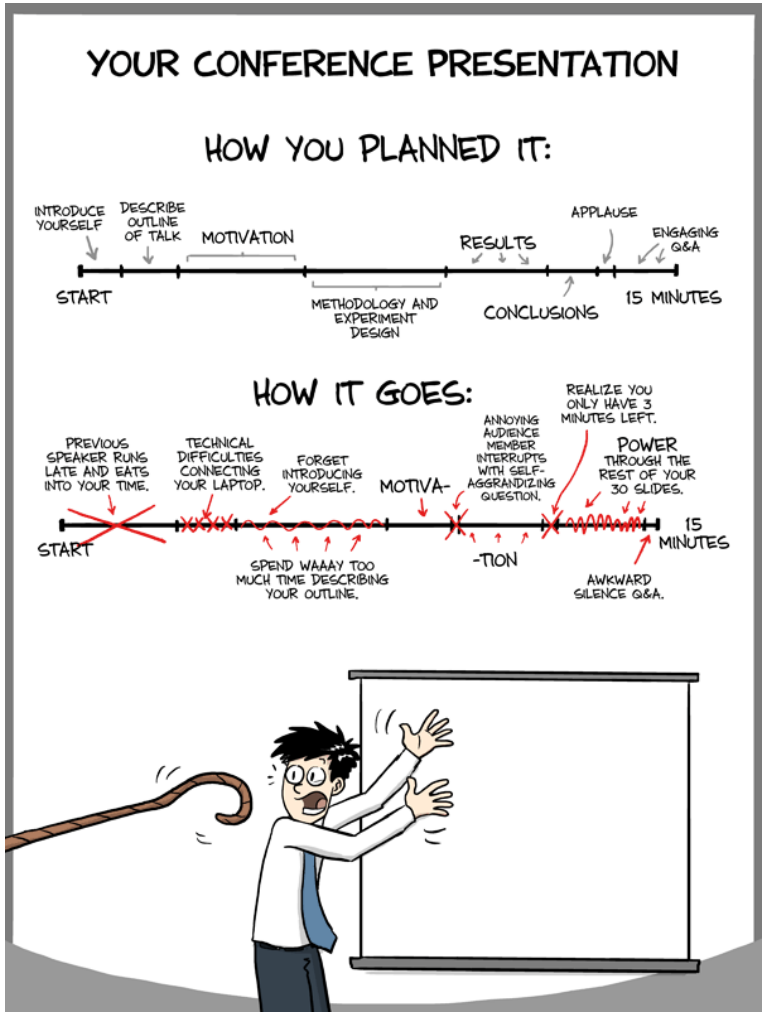
Securing the future... • Improving services
• Enhancing quality of life • Making the best use of public resources





The presentation



The presentation

- **Context**
  - **Policy push to work within Land Use Strategy principles**
  - **Windfarm development pressures in the council area**
  - **Limitations of current SEA approach**
  - **encouragement from SG to work with research community**
  - **A dialogue with Jose from JHI at LUS workshop**
- **The project**
  - what, where and why
  - **Why work with researchers? - opportunities**
  - Expertise & and build on other ongoing work
  - Data
  - Computing power
  - … more?
- Challenges
  - Reaching mutual understanding

The potential benefits

The 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 environmental factors that the SEA can protect or enhance. It can also help 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.

The potential benefits

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.

6An 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 a tool to be utilised rather than a process to tolerate**. This could diminish thoughts of environmental assessment as a constraint to development.

7Many ecosystem services may already be firmly embedded in plan development, such as flood alleviation 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.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Potential pitfalls

5The **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 easier and wider ranging than Cultural Heritage or Landscape topics. Care has to be taken to **ensure all relevant environmental issues are included** and weight given to any significant effects that ecosystem services may not clearly describe. 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.

There can **be confusion between simple use of ecosystem services** and the further concept of **ecosystem service valuation**. Care should be taken if seeking to incorporate valuation approaches. These must be robust and proportionate within the framework of SEA.

Potential pitfalls (cont)

Potential **pitfalls** to avoid when integrating an ecosystems approach and SEA:

1There is risk involved with introducing an additional concept, within an existing legislative framework. Compliance with the legislation should be paramount and practitioners should **avoid creating an assessment process that is more complex and time consuming than traditional SEA**.

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

Whilst taken individually, ecosystem services are not complex to understand or integrate, but there is a risk that the concept of ecosystem services could be seen as complex.

4The **language of the ecosystems approach may help a SEA to communicate complex issues**. However, this may not resonate with all stakeholders and care must be undertaken to ensure that **its use enables better communication** and consultation

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, and that have real economic value, both directly and indirectly through the economic activities they underpin or protect.






context

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How it fits together

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European legislation/ directives/finance

Scottish Government legislation/guidance/finance

Community Plan/SOA

Corporate Plan

Scottish Forestry Strategy

Local Development Plan

Environment Strategy

Tayside LBAP

Low carbon & renewable energy Strategy

Economic Development Strategy

Tayside Landscape Character Assessment

Transport Strategy

Local development plan

- The **primary objective** of the project was to develop a s**patially based methodology** for carrying out the assessment in order to ensure that:
- The environment was given the **same level of consideration** in the LDP as social and economic factors, and that **the environmental effects** of the Plan's strategy, policies and proposals were **fully understood**
- Those producing the LDP and the decision makers (i.e. the LDP Team and Councillors) **had the information they required** to help make their decisions based on **sound documented evidence**, thereby helping to improve policy and decision making
- **Provide the Consultation Authorities** (SNH, SEPA and Historic Scotland), key stakeholders, the public and other interested parties **with the information** that they required in an easy to understand format (spatially focused/map based) in order to give them an early and effective opportunity to express their opinions on the LDP and its Environmental Report.

Scottish Government Guidance





National Planning Framework sets the spatial strategy for Scotland's development to 2035, and designates national developments of strategic importance to Scotland

Scottish Planning Policy (SPP) provide statements of Scottish Government policy on nationally important land use and other planning matters.

Circulars, also provide statements of Scottish Government policy, contain guidance on policy implementation through legislative or procedural change.

A land use strategy for Scotland

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Principles for Sustainable Land Use

a) **Opportunities** to deliver multiple benefits should be encouraged.

b) **Regulation** should continue to protect whilst placing a light a burden on businesses

c) Where land is highly suitable for a primary use this value should be recognised

d) **Decisions** should **be informed by an understanding of the functioning of the ecosystems** which they affect

e) Landscape change should be **managed positively** and sympathetically,

f) Land-use decisions should be **informed by an understanding** of the opportunities and threats brought about by the changing climate.

g) Where land has ceased to fulfil a useful function priority to examine options for **restoring** all such land to economically, socially or environmentally **productive uses**.

h) Outdoor recreation opportunities and public access to land should be encouraged,

i) People should have **opportunities to contribute** to debates and decisions about land use and management decisions which affect their lives and their future.

j) Opportunities **to broaden our understanding** of the links between land use and daily living should be encouraged.

National Planning Framework

National Planning Framework emphasises the **need to plan proactively** for an expansion of renewables.

Woodland removal **only permitted** where it will achieve significant and clearly defined additional public benefits.

Emphasises importance of developing green networks and **habitat networks** for the benefit of people, landscape and nature.

Local development plan

- The primary objective of the project was to develop a spatially based methodology for carrying out the assessment in order to ensure that:
- The environment was given the same level of consideration in the LDP as social and economic factors, and that the environmental effects of the Plan's strategy, policies and proposals were fully understood
- Those producing the LDP and the decision makers (i.e. the LDP Team and Councillors) had the information they required to help make their decisions based on sound documented evidence, thereby helping to improve policy and decision making
- Future growth was directed through the Plan to the most sustainable locations which could accommodate development without having significant adverse effects on the environment, and also to
- Provide the Consultation Authorities (SNH, SEPA and Historic Scotland), key stakeholders, the public and other interested parties with the information that they required in an easy to understand format (spatially focused/map based) in order to give them an early and effective opportunity to express their opinions on the LDP and its Environmental Report.

Local development plan

- The Council has a statutory duty under the Town and Country Planning (Scotland) Act 1997 (as amended by the Planning etc. (Scotland) Act 2006) to prepare a local development plan(s) for all parts of the Perth & Kinross Council area, and to do so with the objective of contributing to sustainable development.
- The Environmental Assessment (Scotland) Act 2005 requires town and country planning or land use plans (including local development plans) produced by public bodies to be subject to strategic environmental assessment.
- The LDP will provide the overarching strategy and policy framework for a range of lower tier supplementary guidance, including the Forest and Woodland Strategy and Landscape Guidance, and also various development briefs/masterplans

Scottish planning policy

- Development plans should seek to ensure an area's full potential for electricity and heat
- from renewable sources is achieved, in line with national climate change targets, giving due regard to relevant environmental, community and cumulative impact considerations.
- **Spatial Frameworks**





Spatial frameworks

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- **Group 1: Areas where wind farms will not be acceptable:**
- National Parks and National Scenic Areas.
- **Group 2: Areas of significant protection:**
- Recognising the need for significant protection, in these areas wind farms may be appropriate in some circumstances. Further consideration will be required to demonstrate that any significant effects on the qualities of these areas can be substantially overcome by siting, design or other mitigation.
- **National and international designations:**
- • World Heritage Sites; • Natura 2000 and Ramsar sites;
- • Sites of Special Scientific Interest; • National Nature Reserves; • Sites identified in the Inventory of Gardens and Designed Landscapes; • Sites identified in the Inventory of Historic Battlefields.
- **Other nationally important mapped environmental interests:** • areas of wild land as shown on the 2014 SNH map of wild land areas;• carbon rich soils, deep peat and priority peatland habitat.
- **Community separation for consideration of visual impact:**
- • an area not exceeding 2km around cities, towns and villages identified on the local development plan with an identified settlement envelope or edge. The
- extent of the area will be determined by the planning authority based on landform and other features which restrict views out from the settlement.
- **Group 3: Areas with potential for wind farm development:**
- Beyond groups 1 and 2, wind farms are likely to be acceptable, subject to detailed consideration against identified policy criteria

Ecosystem services approach in SEA

- There is no statutory requirement for an ecosystems approach to be undertaken or incorporated into a SEA or plan's preparation. Therefore this approach has to be undertaken on a voluntary basis. We voluntarily undertook an ecosystems approach because w e believed that it would be beneficial; increase the value of the assessment process and provide benefits, contributing to better plan-making and implementation by improving their content and strategic actions. There are clearly potential benefits. But we had to be aware of the possible pitfalls.it was important that the process helped us rather than hindered us

Ecosystem services approach in SEA of SG

In this study of the potential impact of the low carbon and renewable energy strategy in Perth & Kinross, we have begun to operationalise the integration of Ecosystem Services into SEA following 4 main stages:

- Selection of relevant ecosystem services and their indicators
- Assessment of the baseline state of the selected ESS
- Participatory identification of Ecosystem Services priorities and
- Identification of feasible alternatives






Ecosystem services approach in SEA of SG

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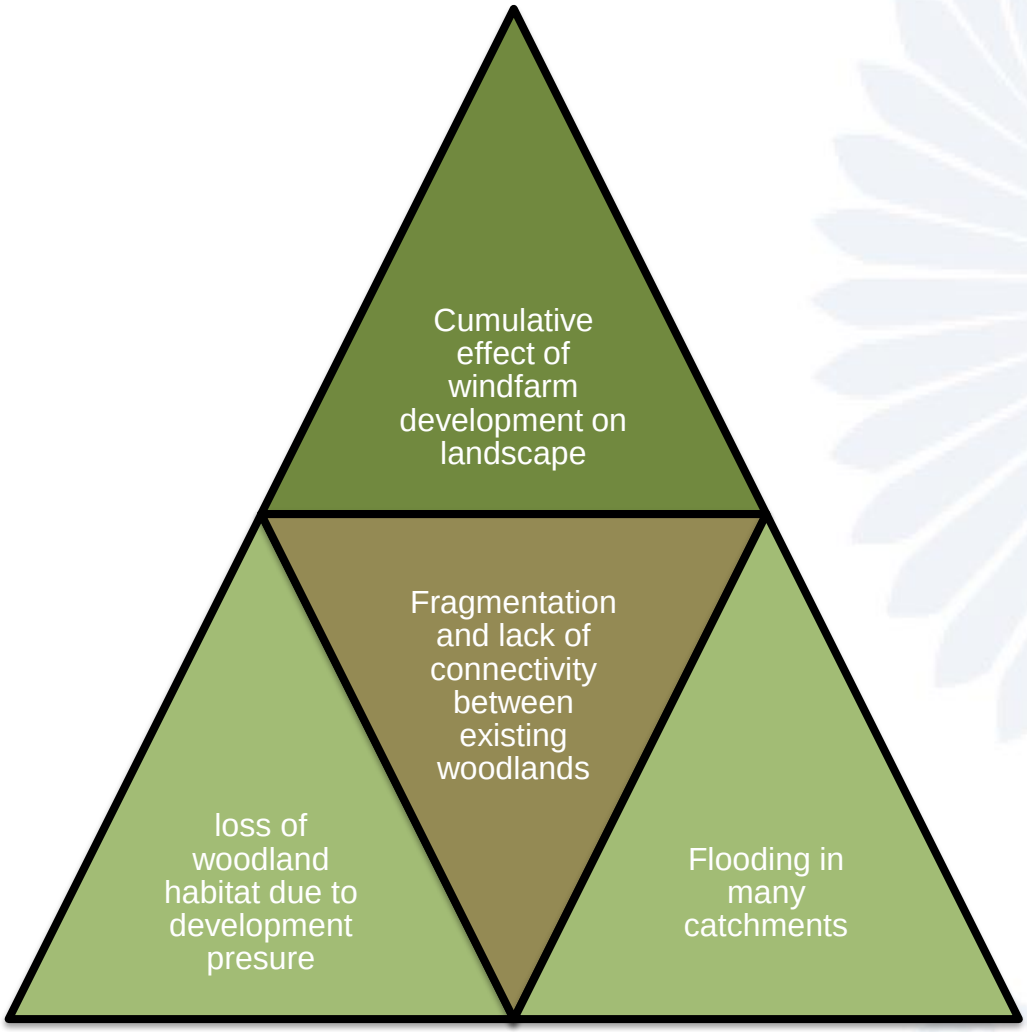
SEA Topic	Ecosystem Services	Local Development Plan Objectives
Biodiversity Conserve and enhance the diversity of species and habitats	**Provisioning services** (i.e. products obtained from ecosystems of the community) Food e.g. crops, fruit, fish Fibre and fuel e.g. timber, wool Biochemicals, natural medicines and pharmaceuticals Genetic resources: genes and genetic information used for animal/plant breeding and biotechnology Ornamental resources e.g. shells, flowers	**Creating quality places** Produce a more efficient settlement pattern by ensuring that the location of new development contributes to reducing the need to travel Protect and enhance the cultural and historic environment Ensure that new development enhances the environment and embraces the principles of sustainable design and construction Protect and enhance the character, diversity and special qualities of the area's landscapes to ensure that new development does not exceed the capacity of the landscape in which it lies
Population Accommodate population and household growth and direct that growth to appropriate locations		
Human health Improve the quality of life for communities in Perth and Kinross Maximise the health and wellbeing of the population through improved environmental quality	**Regulating services** (i.e. benefits obtained from the regulation of ecosystem processes) Air-quality maintenance: ecosystems contribute chemicals to and extract chemicals from the atmosphere Climate regulation e.g. land cover can affect local temperature and precipitation; globally ecosystems affect greenhouse gas sequestration and emissions Water regulation: ecosystems affect e.g. the timing and magnitude of runoff, flooding etc. Erosion control: vegetative cover plays an important role in soil retention/prevention of land/asset erosion Water purification/detoxification: ecosystems can be a source of water impurities but can also help to filter out/decompose organic waste Natural hazard protection e.g. storms, floods, landslides Bioremediation of waste i.e. removal of pollutants through storage, dilution, transformation and burial	**Climate change** To improve the long term resilience and robustness of the natural and built environment to climate change. To ensure that development and land uses make a positive contribution to helping to minimise the causes of climate change and adapting to its impacts
Soil Maintain, protect and where necessary enhance the fundamental qualities and productive capacities of soils		
Water Protect and where possible enhance waterbody status		**Green networks and biodiversity** Conserve and enhance habitats and species of international, national and local importance Identify and promote green networks where these will add value to the provision, protection, enhancement and connectivity of habitats, recreational land and landscape in and around settlements
Air Protect and enhance air quality Direct development to sustainable locations which help to reduce journey lengths and the need to travel		
Climatic factors Reduce emissions of greenhouse gases Reduce the area's vulnerability to the effects of climate change through identifying appropriate mitigation and adaptation measures		**Housing** Accommodate population and household growth and direct that growth to appropriate locations' Ensure a continuous 7 year supply of developable housing land Seek to ensure that the housing land supply accommodates the needs of the various sectors of the market
Material assets Minimise waste per head of population Maximise the sustainable use/re-use of material assets (land and buildings) Promote and ensure high standards of sustainable design and construction	**Cultural services** (i.e. nonmaterial benefits that people obtain through spiritual enrichment, cognitive development, recreation etc) Spiritual and religious value: many religions attach spiritual and religious values to ecosystems Inspiration for art, folklore, architecture etc Social relations: ecosystems affect the types of social relations that are established e.g. fishing societies Aesthetic values: many people find beauty in various aspects of ecosystems Cultural heritage values: many societies place high value on the maintenance of important landscapes or species Recreation and ecotourism	**Economy** Provide the framework to increase the economic sustainability of Perth and Kinross by maintaining and providing locally accessible employment opportunities Ensure a continuous 7 year supply of developable economic development land Provide a flexible policy framework to respond to changing economic circumstances and developing technology Promote the vitality and viability of shopping centres and reduce the potential loss of shoppers to retail centres outwith Perth and Kinross
Cultural heritage Protect and enhance the historic environment		
Landscape Protect and enhance the character, diversity and special qualities of the area's landscapes to ensure new development does not exceed the capacity of the landscape to accommodate it Protect and enhance townscape character and respect the existing pattern, form and setting of settlements	**Supporting services** (necessary for the production of all other ecosystem services) Soil formation and retention Nutrient cycling Primary production Water cycling Production of atmospheric oxygen Provision of habitat	**Infrastructure** Identify and provide for new and improved social and physical infrastructure to support an expanding and changing population Establish clear priorities to ensure stakeholders and agencies work in partnership so that investment is co-ordinated and best use is made of limited resources to enable the delivery of the strategy Ensure investment in the renewal and enhancement of existing infrastructure is consistent with the strategy of the plan in order to make best use of the investment embedded in our existing settlements

Problems and issues



Step by step

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1
- Pre-screening
- Screening
- Determination

2
- Scoping

3
- Environmental Assessment
- Consultation
- Post Adoption

Benefits of SEA?

SEA can lead to:

- Better environmental protection
- Improved plans
- Provide insights
- Exploration of ‘reasonable alternatives
- Enhanced communication and transparency
- Reduced long term costs
- Streamlined consenting
- Potential smoother delivery





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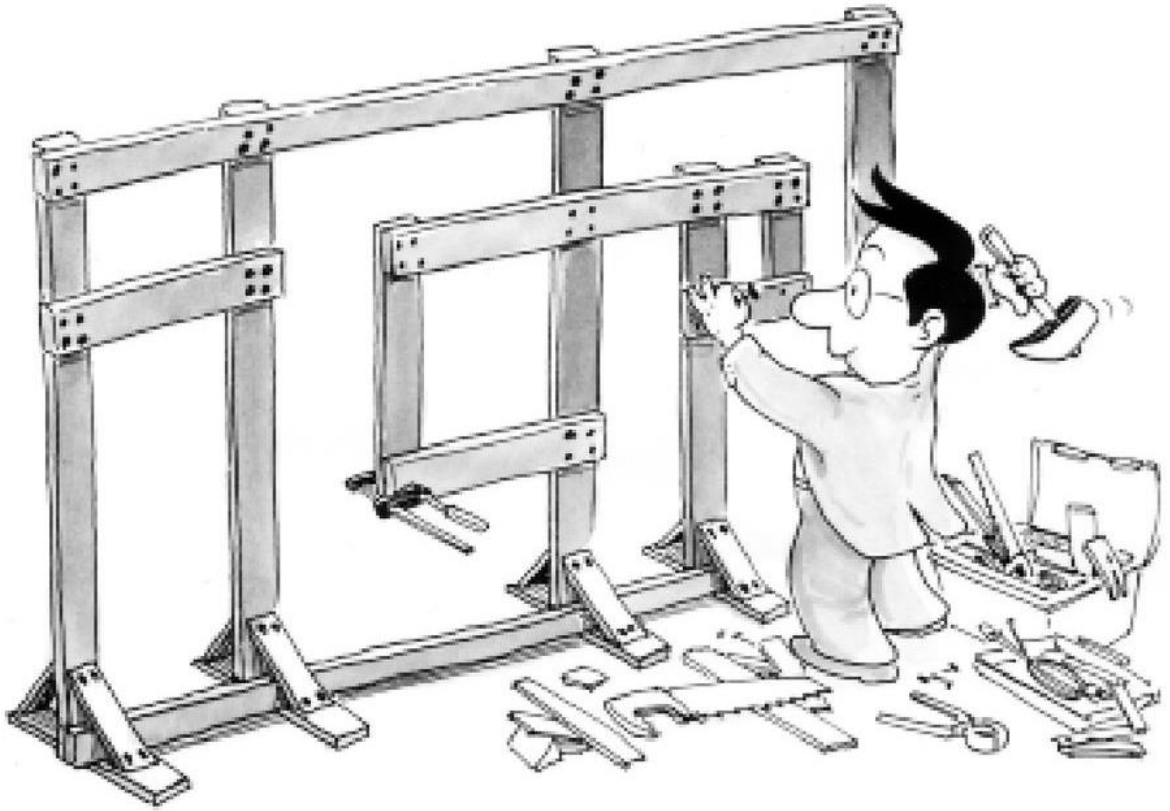

Joint SEA Approach





PKC	JHI
Map Ecosystem Services Cultural services, Erosion, Carbon Sequestration, Timber Production, Water quality, Natural flood management, Drinking water/groundwater	**Identify & Fill Gaps in Ecosystem Services Baseline** Using surrogate data or those derived from spatial models fill identified gaps in Cultural services, Erosion, Carbon Sequestration, Timber
Assess Condition of Ecosystem Identify relevant ecosystem services for the spatial framework unit (extent and condition)	
Assess the effect of actions Refine assessment of direction and significance of effects of renewable actions (Wind, Hydro, Solar, Renewable Heat) based on information gathered	**Mapping Synergies and Trade offs** Developing and refining options and assessing effects. Decision support mapping tool based on ArcGIS model builder to determine synergies and trade-offs between ecosystem services from different renewable energy policy and expansion scenarios.
Assess significance of change to services Summarize ecosystem services effects by SEA objectives, Bring in and filter by additional assessment criteria as designated by SPP Identify mitigation for significant effects	
Asses overall impact of actions on ES and SPP criteria Cumulative Map and Summary table Collate effects for each group of actions in one table for each catchment area	**Consultation & Decision making** Develop a facilitated trade-off/synergies workshop that allows stakeholders to weigh the many competing demands

We are here!

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Project team

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Strategic Policy and Research Team

(Graham Esson, Ciara Gray, Andrew Ballantine, Shelley McCann

James Hutton Institute (JHI)

(Jose Munoz-Rojas ,

Alessandro Gimona, Andrea Baggio, Laura Poggio , Justin Irvine)

Project objectives

- Project Objectives
- Aim of the stage A of the project was to:

- • Identify the gaps in the available dataset;
- • Improve the details of the information where is possible;
- • Combine different datasets in order to obtain a solid representation;
- • Respect a common classification schema;
- • Mapping the ES at 250 m resolution.

Step 1: Map Ecosystem services

Identify **relevant ES services** for Low Carbon and Renewable Energy Guidance

Identify gaps in the available baseline

Use best available **surrogate data** or those derived from **spatial models** (JHI/ SEPA, PKC)

Improve the details of the information where is possible;

Respect a **common classification** schema at a 250 m grid resolution.

Each ES has been **mapped independently of SPP criteria** to be brought in as separate additional filters

- “The approach adopted emphasises the importance of both biophysical and cultural services and facilitates the strategic choice of options that are more sustainable from both the biophysical and social perspective. We discuss advantages and operational barriers to a full integration of ESS into SEA.” ***Alessandro gimona***

data

Ecosystem Service	Policy requirement	Data sets used
a. Carbon sequestration	SPP requires consideration of: sensitivity for carbon rich soils, deep peat and priority peatland in onshore windfarm spatial frameworks	Deep peat and priority peatland (SNH); Land cover map 2007 (CEH); Carbon soil content (JHI)
b. Timber Productions	Perth and Kinross Forest and Woodland Strategy has defined preferred areas for 'Energy Woodlands'	Land capability for forestry (JHI)
c. Erosion		DTM 10m (OS), sub-watershed shapefile (SEPA), USLE factors R,K,C,P (JHI), Land cover map 2007 (CEH)
d. Cultural Services	SPP requires consideration of gardens and designed landscapes, historic battlefields, Natura sites, SSSI's in onshore windfarm spatial frameworks	Listed buildings, scheduled monuments, Battlefields, Garden & Designed Landscape, PROW, Recreational areas, Forest Parks, Land cover map 2007 (CEH)


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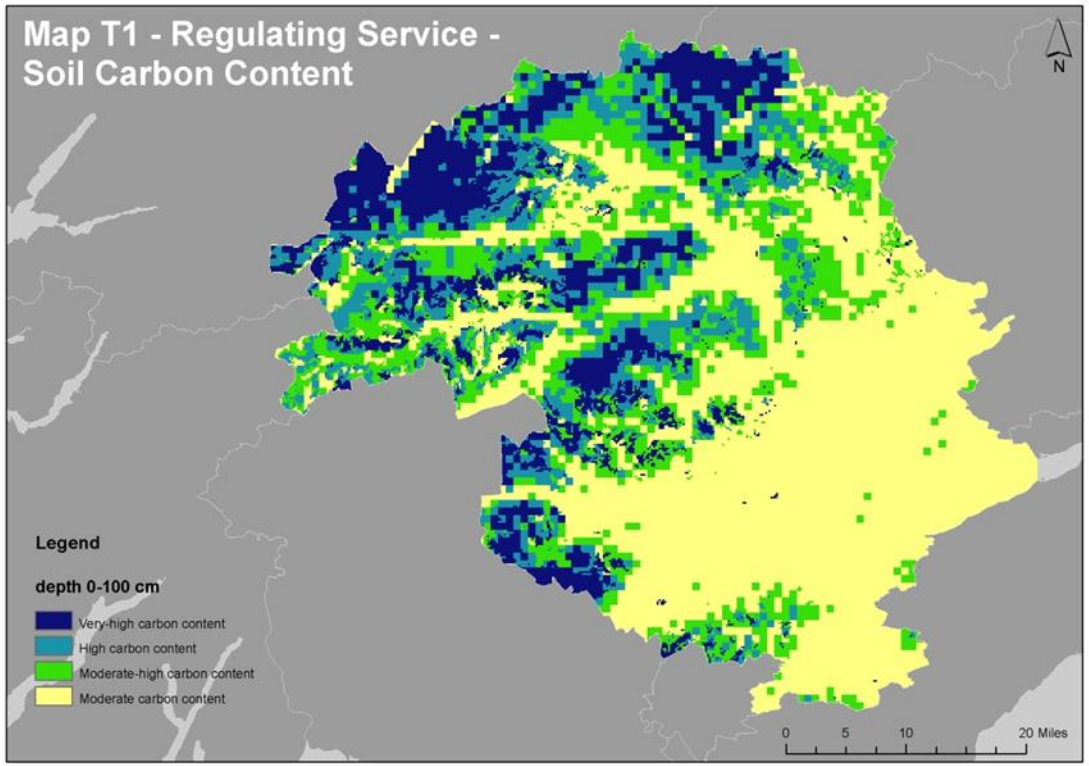
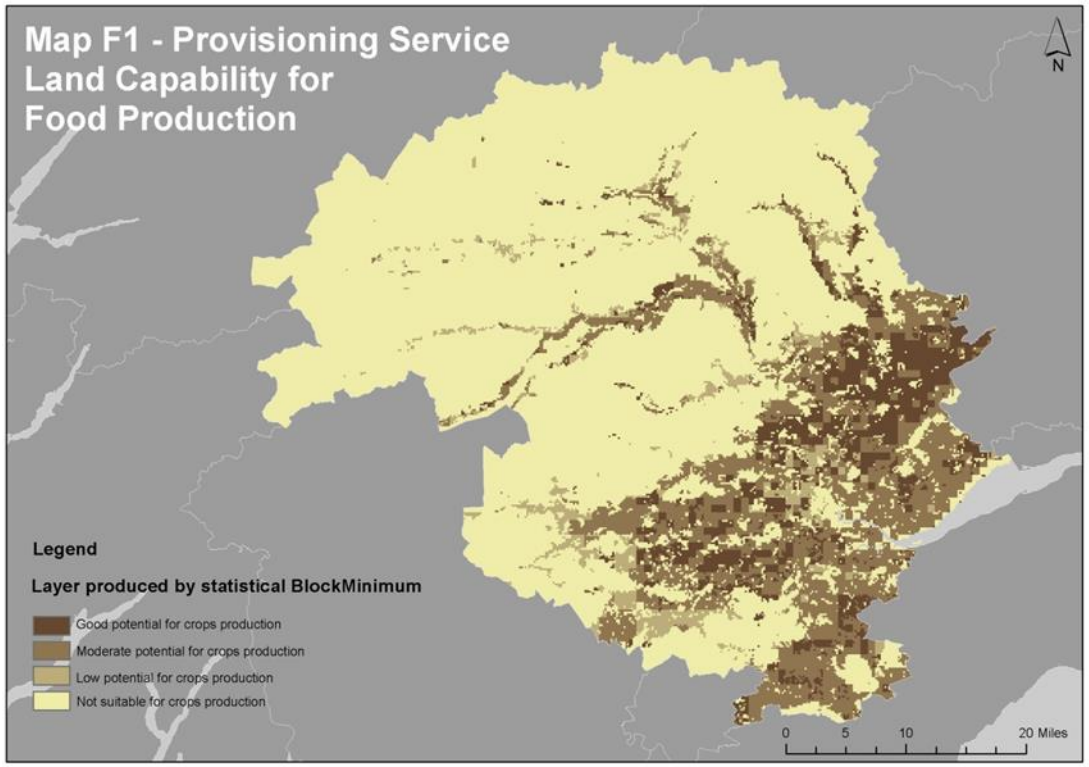
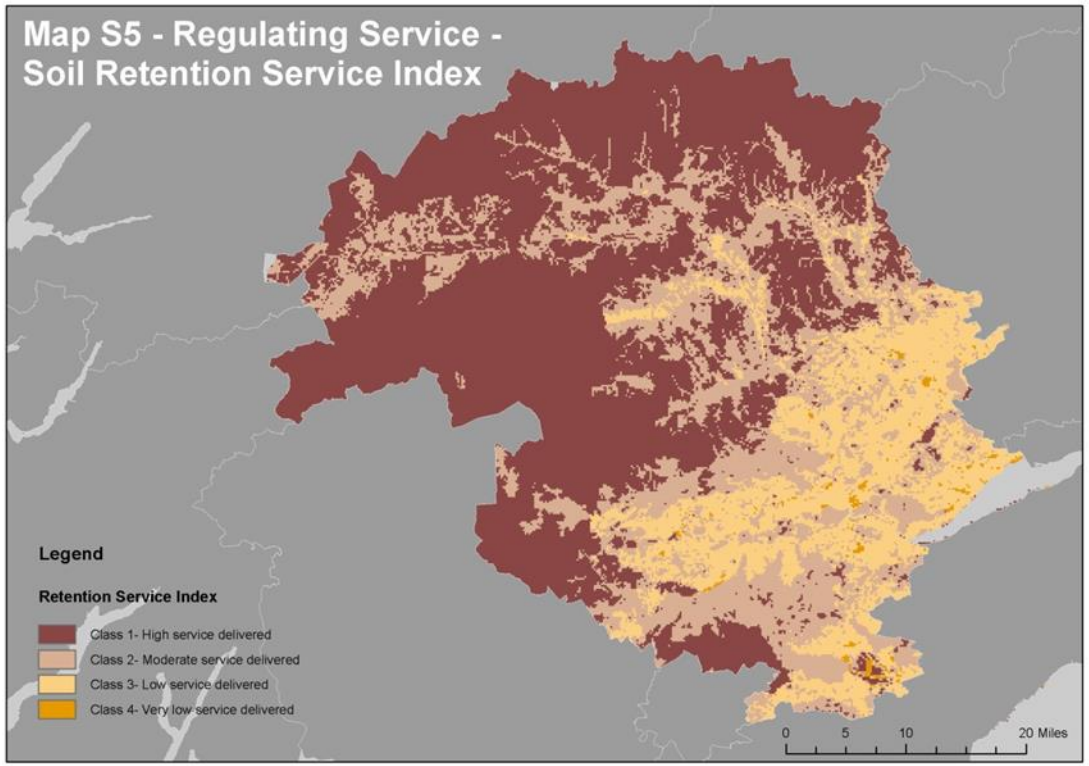
Regulating services- carbon



Provisioning services- food production



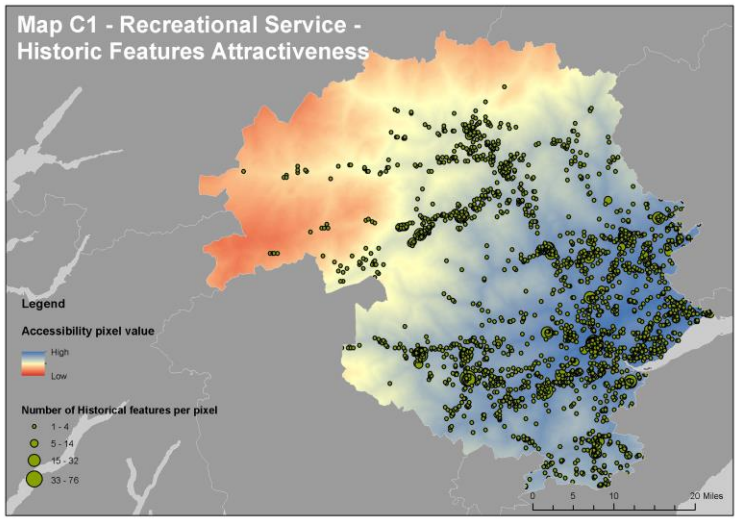
Regulating service- soil retention

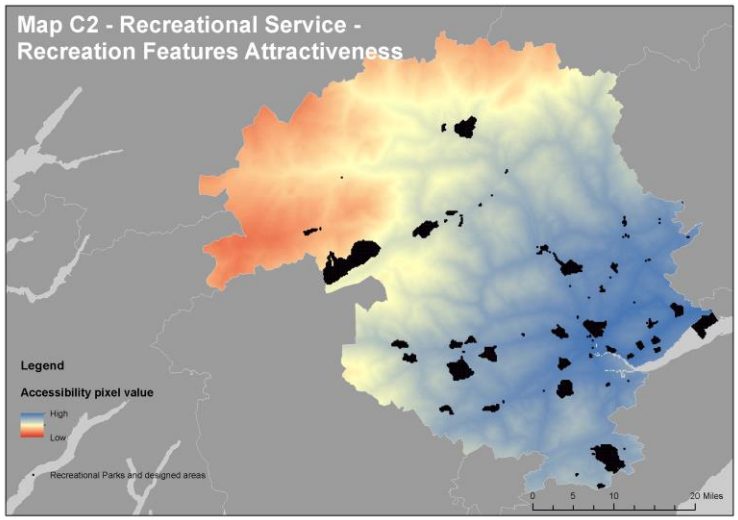


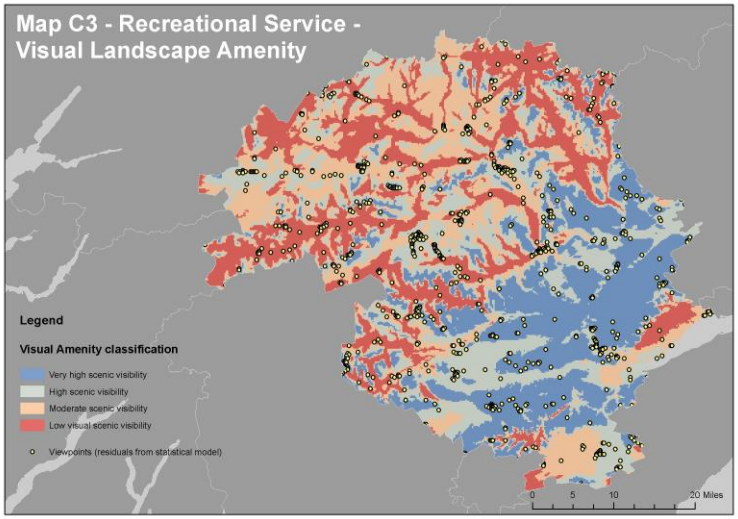


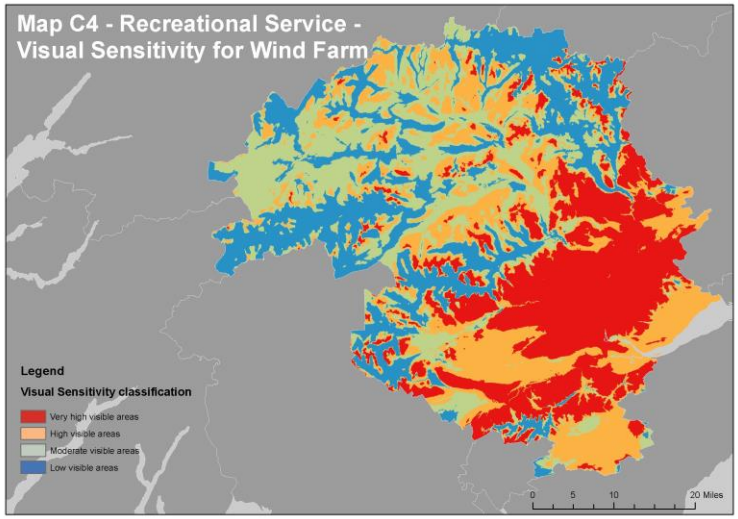



Cultural Service – historic , recreation, visual amenity and sensitivity

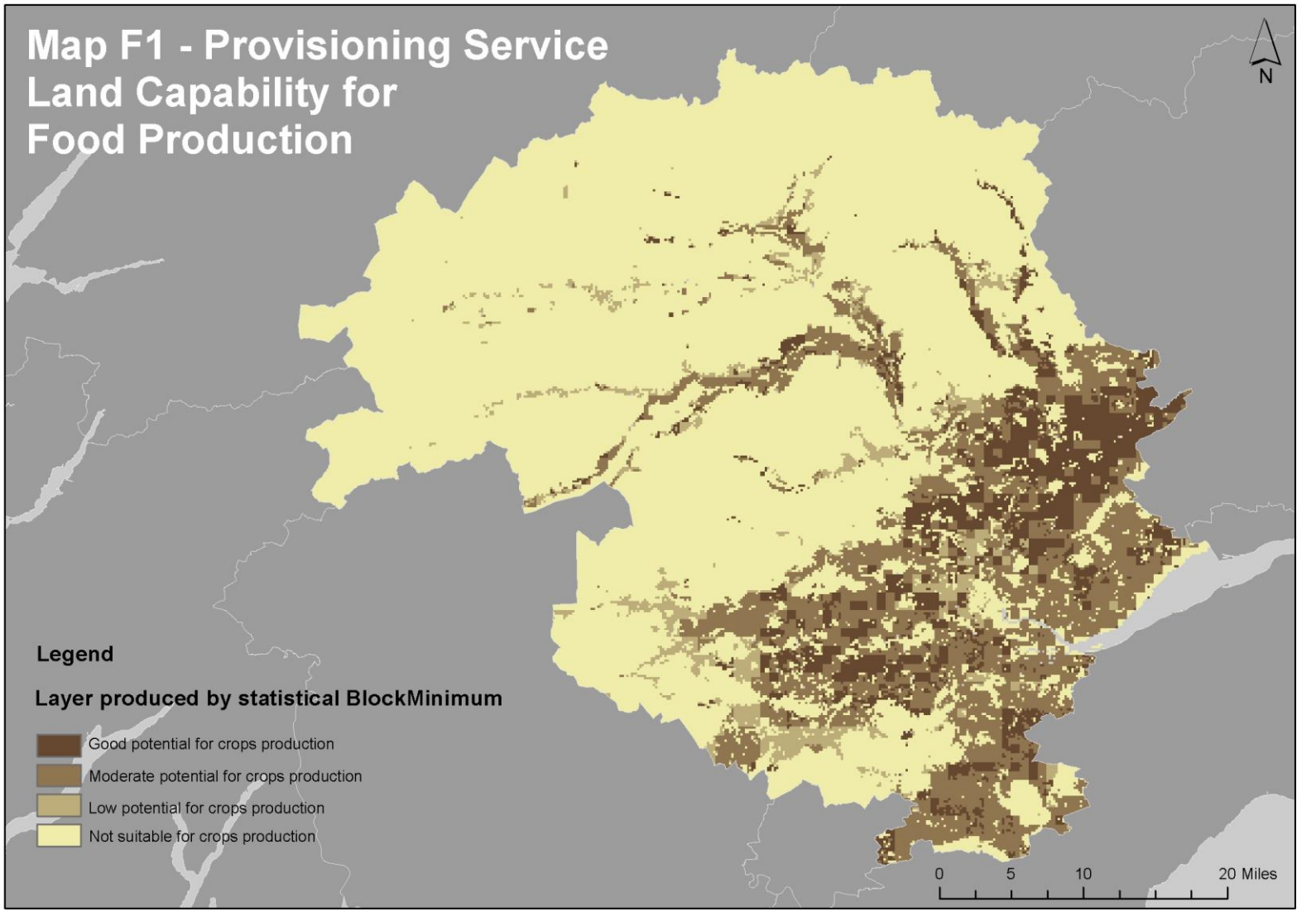




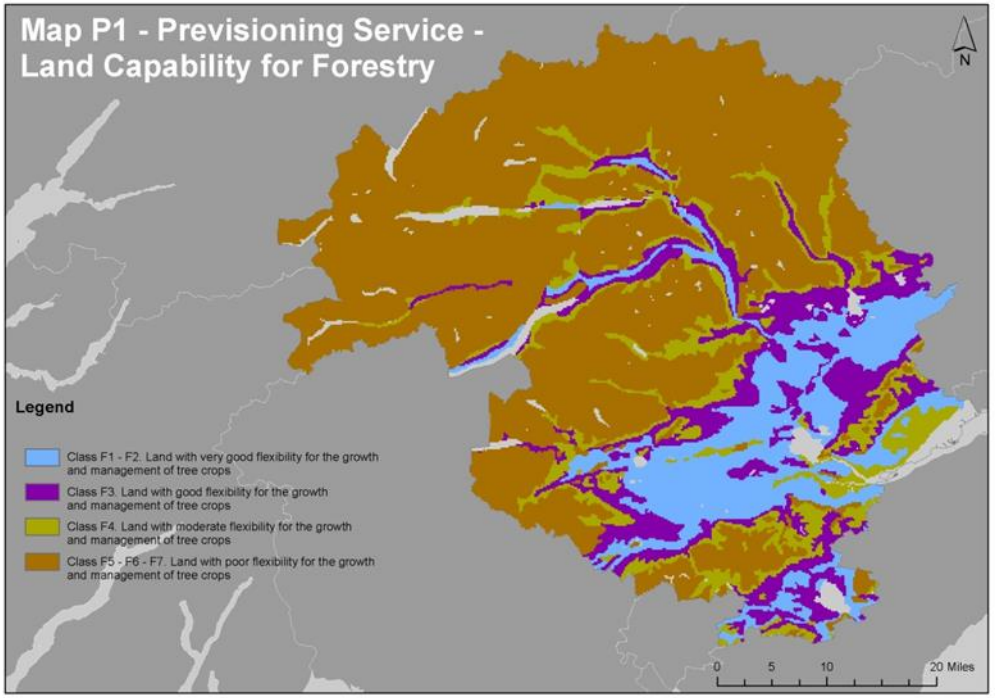




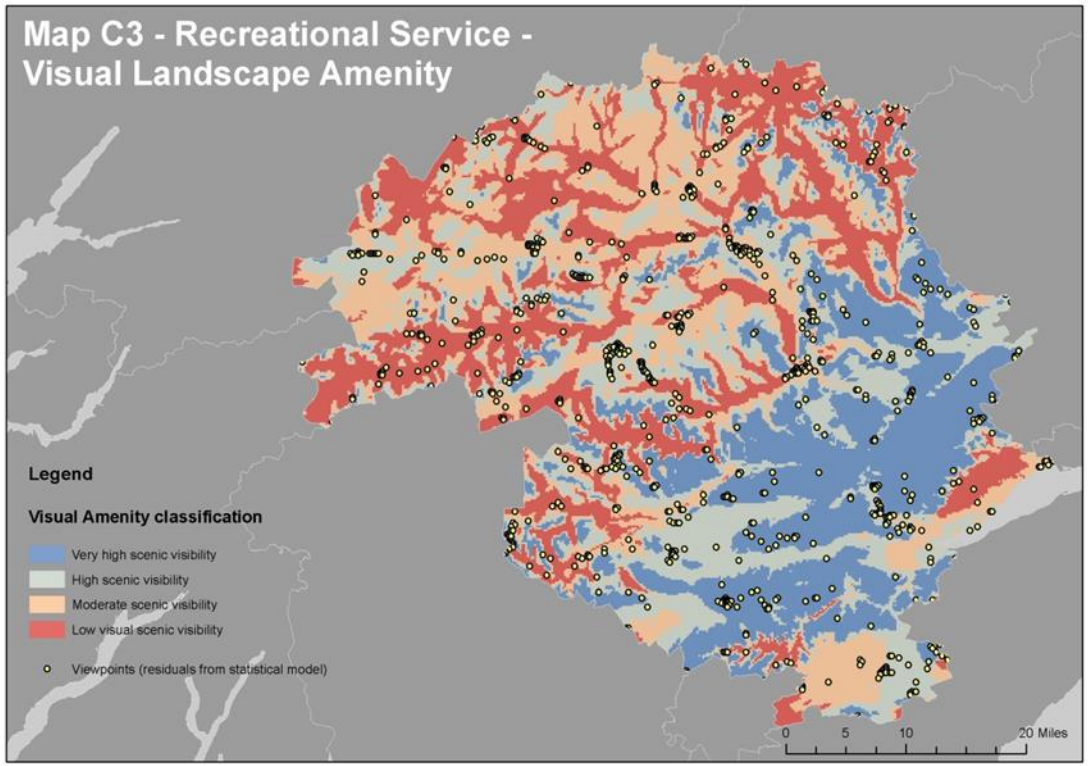
Provisioning service - Food



Provisioning service- forestry



Recreational service- visual amenity








Provisioning service – Drinking Water

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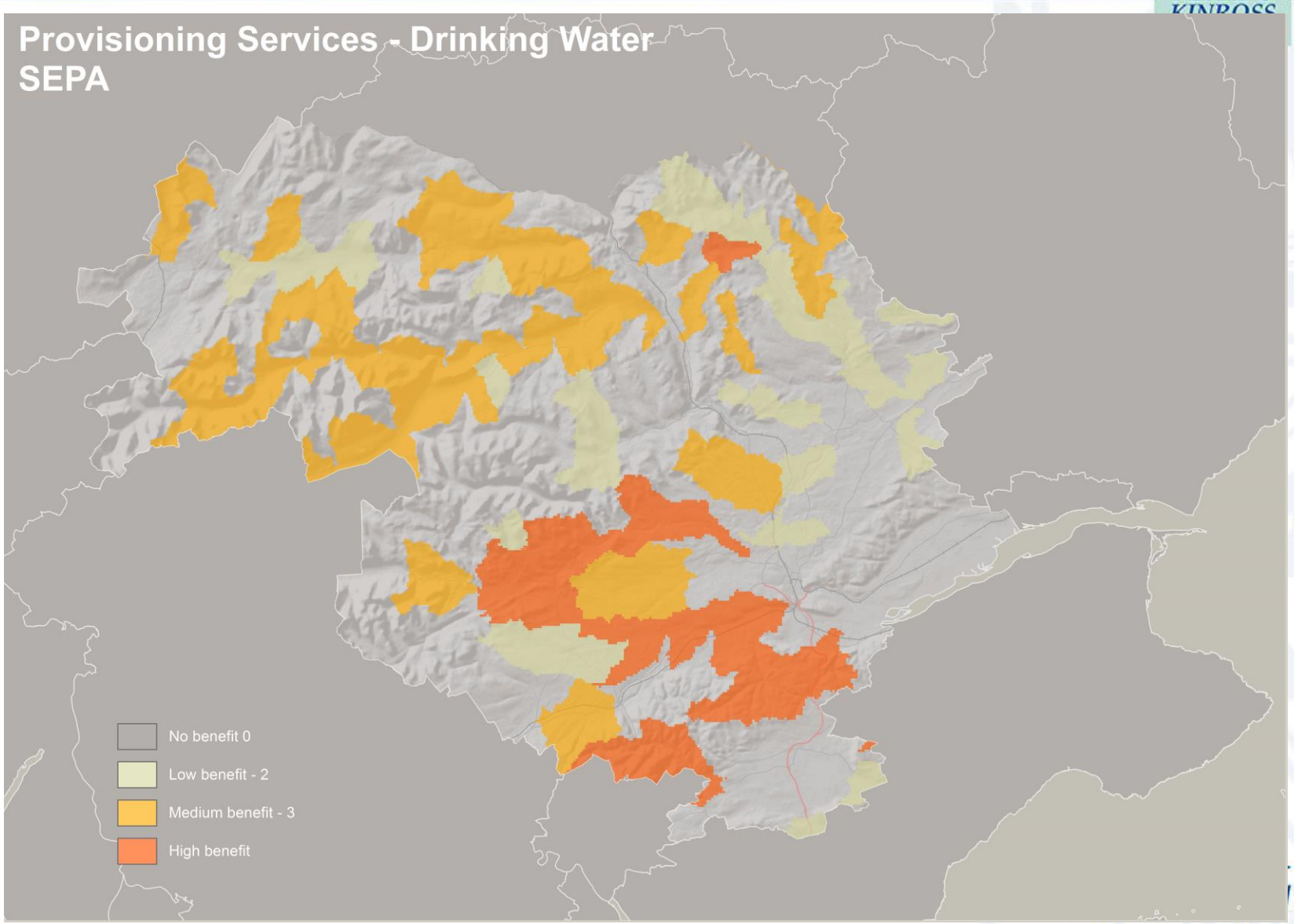
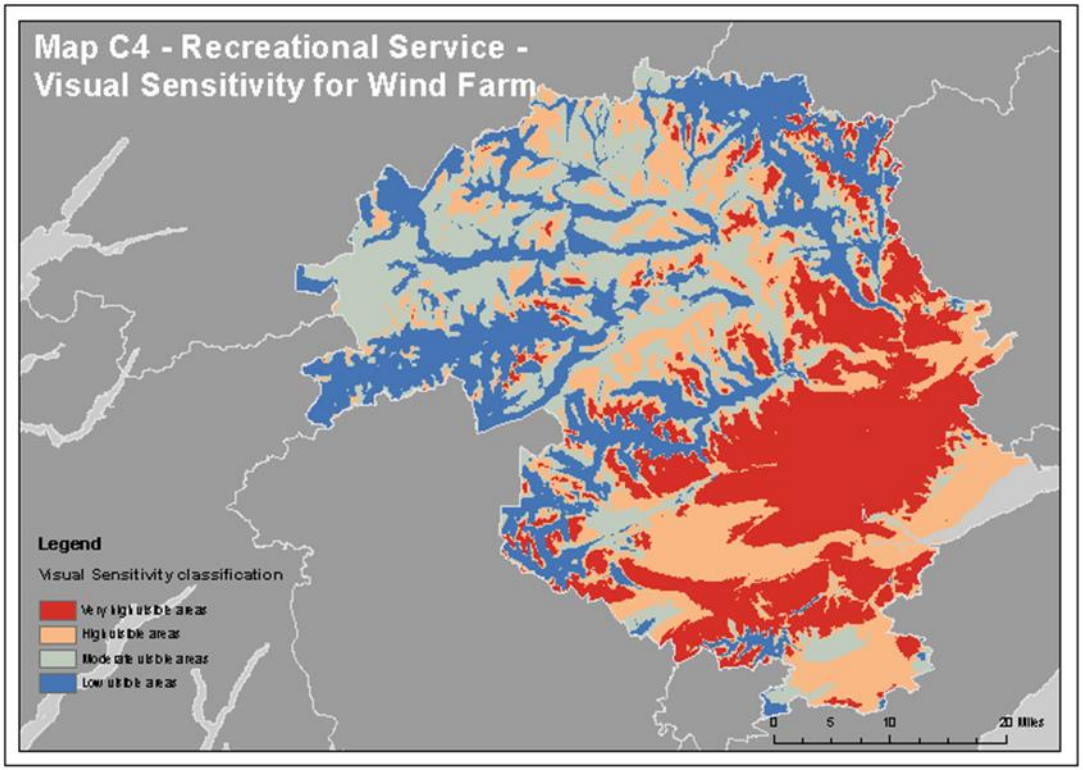


Recreational service- visual sensitivity



Project Next steps

Step 2: Assess significant change to ecosystem services from renewable actions

- Decision support tool

Step 3: Consult & make open, participative, robust decisions

- facilitated trade-off/synergies workshop
- Develop scenarios to test renewables and low carbon spatial framework

Step 4: SEA to **inform policy and spatial framework** for Renewables and Low Carbon supplementary guidance

What difference does it make

Policy & Spatial Framework

- Interconnection between effect on the environment and people's use of the environment is clear
- Robust basis for decision that can be used at public inquiry
- Broad range of evidence and analysis used

- An issue we hoped to address through this approach was a way to to address the competing views of the key stakeholders in terms of which strategic natural and cultural sensitivities took priority in the decision-making process as part of the SEA for the LDP. However, we endeavour to further refine the methodology in partnership with key stakeholders and our community planning partners for future projects.

- Use of stakeholder workshops
- GIS mapping and analysis
- Development of a Sustainable Land Use Model (SLUM) in GIS, which analysed the Council's corporate GIS and 'State of the Environment' data to identify the thresholds for development potential within and around settlements across the Plan area

Effective policy making

- The Cabinet Office identify **nine key features** of
- **effective policy-making**, which include being: (i)
- forward looking; (ii) outward looking; (iii) innovative
- and creative; (iv) **evidence-based**; (v) inclusive; (vi)
- joined up; (vii) regularly reviewed; (viii) regularly
- evaluated, and (ix) willing to **learn from experiences**
- **of what works** and what does not. (*Strategic Policy*
- *Making Team, Cabinet Office*)





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Why work with researchers?

Evidence based policy

- In a time of reduced public sector budgets and increased demand for services or the protection of the environment, there is a growing need to ensure that an evidence based approach is taken to developing policy
- and practice.






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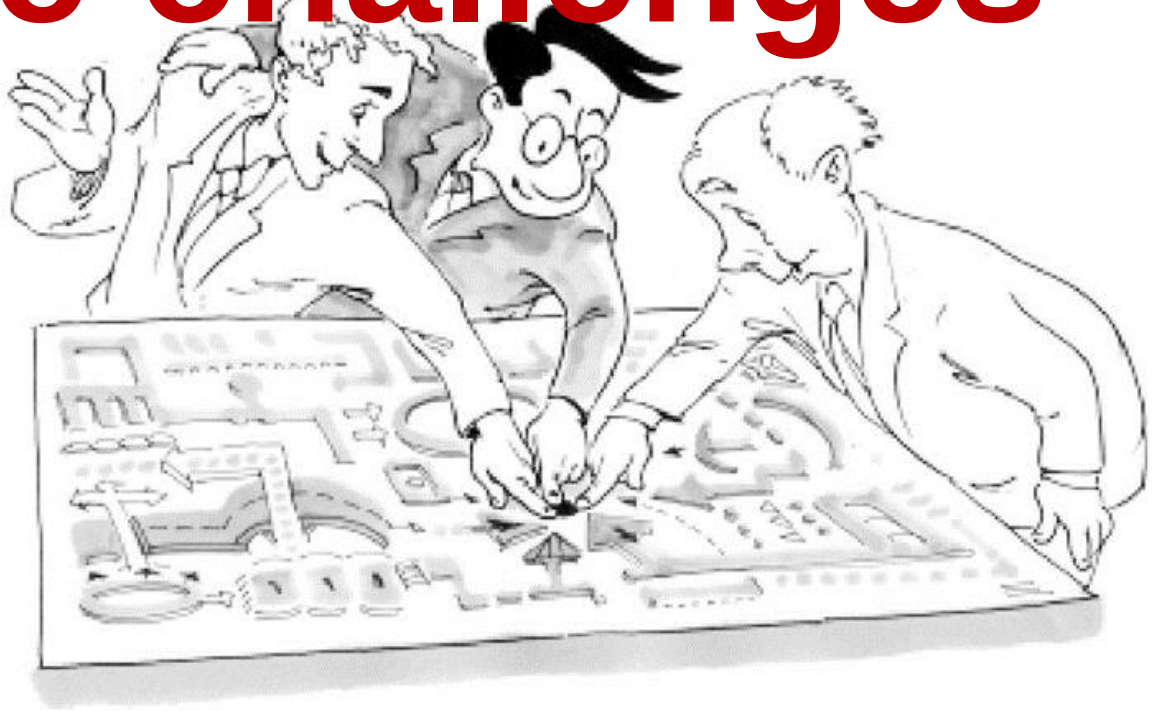
The challenges



- There is **nothing intrinsic** about the concept of ecosystem services which demands its inclusion in environmental assessment. Rather, to warrant its integration, ecosystem services need to **offer something that can improve** the environmental assessment process or more importantly the environmental outcomes that it delivers it is first important to understand the current problems with environmental assessment practice to highlight the problems that ecosystem services may contribute to addressing.

- Work by peter Philips et all indicated that there are barriers to the use of valuing ecosystem services in decision making. For instance there was found to be significant additional uncertainty surrounding the absolute value of the environment due to the unpredictable nature of the physical changes and the socio-economic context that determines the value of these. This suggested that absolute values may not be that relevant, rather it would be more feasible to assess the **relative magnitude of changes** across different options **to ascertain which delivered the most ecosystem services**. and was considered to provide a useful analysis as to which of the options would have the least impact on the biophysical status of the environment and the related ecosystem services.

- Ecosystem services may be of particular value where **there are clear conflicts** between traditional environmental and economic arguments
- **Incorporating ecosystem services into environmental assessment** helps practitioners and decision-makers **to reflect on the impact of the environment on their plan**, programme or project rather than just vice versa
- The ecosystem service framing **makes explicit the value** of the environment for decision makers

Weaknesses

The use of **ecosystem service language** may not resonate with all stakeholders

Although ecosystem The complexity of ecosystem services as a concept

The integrated nature of ecosystem services presents

- Linking biophysical aspects of ecosystems with human benefits through the notion of ecosystem
- services is essential to assess the trade-offs (ecological, socio-cultural, economic and monetary)
- involved in the loss of ecosystems and biodiversity in a clear and consistent manner.
- Any ecosystem assessment should be spatially and temporally explicit at scales meaningful for
- policy formation or interventions, inherently acknowledging that both ecological functioning and
- economic values are context, space and time specific.
- Any ecosystem assessment should first aim to determine the service delivery in biophysical terms,
- to provide solid ecological underpinning to the economic valuation or measurement with
- alternative metrics

Conclusions and some final thoughts







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Planners keeping academia relevant
But also new concepts filtering from academia to planning