

Multifunctional Landscapes: How do we manage forests in a National Park to meet diverse expectations?

A case study in Northern Scotland



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orest Research Introduction

- Background of the Cairngorms National Park (CNP) in Scotland
- Highlight current demands and issues on the forestry sector
- Present Scottish case studies using ToSIA methodology
- Discuss stakeholder engagement lessons, experiences and impressions
- Give both Forest Research and end-user (CNP) perspectives on the use of ToSIA to manage forests

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Forest Research Cairngorms National Park relief map







- 1. Conserve and enhance the natural and cultural heritage
- 2. Promote sustainable use of the natural resources
- 3. Promote understanding and enjoyment of the special qualities
- 4. Promote sustainable economic and social development



















- CNPA does not own any land. We work with communities and landowners
- Support and provide advice to land owners
- Recognise the huge significance of woodland to the Cairngorms National Park
- National Park Plan sets aspiration to increase woodland cover by 5-10% in next 5 years



How do we choose the optimal places for new planting?

• We must avoid existing land-use priorities



Forest Research Woodland expansion issues

- How do we choose the optimal places for new planting?
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 - We must determine the ideal land use and management (e.g. habitat management, environmental improvement, forest products)



Forest Research Woodland expansion issues

- How do we choose the optimal places for new planting?
 - We must avoid existing land use priorities
 - We must determine the ideal land use and management (e.g. habitat management, environmental improvement, forest products)
 - We must incorporate a range of site-specific factors into the decision-making process (e.g. micro-climate, soil, elevation, slope)





Demand for timber products – locally produced and processed



Forest Research Demand for sustainable and local woodfuel resource





Demand for sufficient forest resource to meet future needs





Current forestry issues in the Cairngorms National Park (CNP)



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ToSIA approach to Sustainability Impact Assessment of Forest-Wood Chains





ToSIA approach to Sustainability Impact Assessment of Forest-Wood Chains



Forest Research Sustainability Indicators

Economic	Environmental	Social
Gross value added	Energy generation and use	Employment
Production costs	Greenhouse gas emissions	Recreation
Resource / material	and carbon stocks	Wages and salaries
use	Transport distance and	Occupational safety
Total production	freight	and health
Investment and research & development	Water use	Education and Training
	Soil, water and air pollution	
	Generation of waste	
	Forest biodiversity	
	Forest resources	

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orest Research Forest Management Alternatives (FMAs)



FMA 4: 71% UK forestry "Intensive even aged" Forest Management Alternatives describe coherent series of operations and decisions in the forest.

FMA 3: 23% UK forestry

"Combined objective"

FMA 2: 5% UK forestry "Close-to-nature forestry"

FMA 1: 0.5% UK forestry "Forest nature reserve"

Ecological or Social services

Complementary

Analysis of correlation

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Revenue

ORWOOD Workpackage 2.1 Sustainable Forest Management Strategies; Partners: ALUFR, AFOCEL, BOKU, CTFC, KVL, FR, FVA, IBL, INRA, ISA, SLU, OEPF, CEPI Contact: WP 2.1 Institut of Forest Growth Albert Contact: WP 2.1 Institut of Forest G

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Four Scenarios:

- 1. Business as Usual, i.e. the current management regime.
- Climate change increasing the intensity of biotic threats, along with a parallel target of forested land being restored to broadleaves.
- Restoration of intensive forested areas to a more "natural" system in order to increase both biodiversity and attractiveness for tourism.
- Responding to climate change mitigation policies as woodfuel industries increase their demand for wood chips.

The impact of these scenarios was measured against various sustainability indicators including Gross Value Added, Greenhouse Gas Emission and Carbon Stock, Forest Biodiversity, Employment, and Recreation.

The aggregated indicator results from the completed analysis were presented to various stakeholder groups

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Forest Research Case study process



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Forest Research Case study results

Relative values of key indicators for 3 scenarios in comparison to the Baseline (current management)



Forest Research Indicators by process

GVA values by process for Baseline FMA 4.



GHG values by process for Baseline FMA 4.



Employment values by process for Baseline FMA 4.





GIS analysis



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orest Research CNPA Spatial Analysis Background

- Explored two woodland expansion scenarios: timber production focus and biodiversity focus
- Attempted to stay consistent with as many CNPA objectives as possible in each scenario (e.g. native species)
- Used various spatial and site specific data to extract the most suitable areas for each scenario
- Aimed to achieve between 5-10% woodland expansion

Woodland Expansion Scenarios 73,448 cells (250m x 250m grid)

Forest Research Spatial data considered in the process

- Existing woodland
- Protected land in the National Park (e.g. arable land)
- Grassland networks
- Fen, marsh and swamp networks
- Sites of Special Scientific Interest (SSSIs)
- Special Protected Areas
- Special Areas of Conservation
- Slope over 30% (in the timber production scenario)
- Road network
- Tree species suitability and growth rate

Forest Research Current existing woodland

CNP less existing woodland 69,269 cells left

Areas to be excluded: Bog, Arable, Improved grassland

CNP less existing woodland and protected land cover 68,803 cells left

Forest Research Slope 30 percent grade and over

CNP less existing woodland, protected land cover, grassland networks, fen/marsh/swamp networks and slope over 30 percent 56,256 cells left

CNP less existing woodland, protected land cover, grassland networks, fen/marsh/swamp networks, slope over 30 percent, SSSIs, SPAs, SACs and within 1km of an A or B road 9,393 cells left

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Final area for timber production scenario with existing woodland (in black)

Final area for biodiversity scenario with existing woodland (in black)

Example of indicator results at the end of the growing phase

Biodiversity Woodland Expansion Scenario (managed as a 'Nature Reserve')

- Value of standing tree at end of rotation: £27.26/m3
- Total production cost: £6.41/ha per year

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- Employment: 0.001 FTE/ha per rotation
- GHG emissions (machinery):
 0.96 kg CO2 eq/ ha per year
- CO2 sequestered (total rotation): 4,442 kg CO2 eq/ha per year

Timber production Woodland Expansion Scenario

- Value of standing tree at end of rotation: £29.74/m3
- Total production cost: £95.24/ha per year
- Employment: 0.255 FTE/ha per rotation
- GHG emissions (machinery): 11.4 kg CO2 eq/ ha per year
- CO2 sequestered (total rotation): 3,053 kg CO2 eq/ha per year

How can ToSIA contribute to decision making?

- Social research conducted across the Scottish forestry sector:
 - c40 meetings with potential end users and other stakeholders including 20 recorded semi-structured interviews
- Wide potential application of the ToSIA approach:
 - <u>Public forestry sector</u>: strong interest
 - Strategic (district and national) level
 - <u>Regional land use planning authorities</u>: strong interest
 - Regional Forestry Strategies
 - Possible role in sustainability reporting and impact assessments
 - Large private landowners: some interest
 - To justify their decisions during formal consultations
 - Occasionally, to support grant applications
 - Currently limited scope to support certification
 - Wood processing sector: limited interest so far
 - Possibly larger sawmills, pulp mills, etc.

Lessons from stakeholder engagement in Scotland

- Focus on the needs of policymakers and planners
 - Don't expect them to adopt a particular approach
 - Spend sufficient time on defining the problem to be addressed
 - Sustainability assessment may not be their immediate priority
 - Use of ToSIA method may be a small part of the overall work
- Encourage continuous engagement with stakeholders
 - Towards participatory modelling
 - Be clear, transparent, flexible and understandable
- Link up with a 'live' planning/policymaking process
 - Models and policies evolve together
 - Everyone then focuses on tangible, useful outputs
 - Discuss data, assumptions and outputs as part of the stakeholder consultation for that policy/plan

Conclusion: So how can the ToSIA approach help the Cairngorms National Park Authority?

- 1. <u>It allows CNPA to assess the impacts of woodland expansion</u> and bioenergy scenarios:
 - Map the suitability of sites for expansion or conversion
 - Fine-tune policy targets, and support decisions with evidence
 - Develop a spatial plan that balances the multiple objectives of forest landscapes
- 2. <u>It provides a common language and framework to engage with</u> <u>stakeholders</u>
 - Bring stakeholders together to contribute to Park planning
 - Ensure planning is informed by local knowledge, values and expectations

Some issues to address in the future

- 1. ToSIA is not yet spatially explicit
 - indicators cannot be viewed on a map
 - maps are a key discussion tool used in the CNP
- 2. ToSIA tool is best used by the research community
 - too much data collection and data entry for end-users
- 3. Some difficulty to interpret and use the results
 - need an expert's help
- 4. Inability to quickly change the data and see the effects in ToSIA
 - an end user may want to simply see the impacts of a rise in salary costs or timber prices
- 5. We don't understand the objectives/motivations of landowners
 - Scenarios would be more realistic if we understood the conditions under which landowners would manage/plant woodland

Forest Research Thank you! Any questions?

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