

Scottish Wildlife Trust

Policy



Scottish
Wildlife
Trust



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Living Landscapes in the Scottish Uplands

Living Landscapes in the Scottish Uplands

Policy headlines

1. The Scottish Wildlife Trust believes that many areas of our uplands have been in a state of ecological decline for centuries and this is continuing to have negative impacts on the health of ecosystems and on the wildlife and rural economies that depend on these.
2. We believe that major shifts in land use, policy and wider societal attitudes are required in order to restore our upland ecosystems and revitalise our rural economies to ensure that the uplands provide sustainable, multiple benefits into the future.

Scope

3. This policy covers all geographic areas in Scotland which fall into the definition of 'uplands', defined as land above the level of agricultural enclosure¹, which is typically 300 - 400 m above sea level (ASL) but can be lower, particularly in the far north and west.
4. Living Landscapes are partnership-driven ecological restoration programmes that cover large areas of land under multiple ownerships. The Trust leads three Living Landscape programmes^a, of which one, the Coigach-Assynt Living Landscape (CALL), is partly upland in nature. Working with landowners and local people, CALL aims to restore the health of the whole ecosystem by improving and reconnecting habitats, especially native woodlands, and creating rural employment and volunteering opportunities.
5. This policy identifies the key systemic threats to Scotland's upland ecology and proposes a series of actions and recommendations required to achieve the widespread recovery of upland ecosystem health.

Background information to inform policy

(The policy statement and priorities for action begin on page 7)

Extent and habitats

5. Uplands cover approximately 44% (34,276 km²) of Scotland's terrestrial landscapes² and are found predominantly in the north and west of the country, with the exception of the Southern Uplands. By broad habitat type, a third of the uplands are bog with the remainder being acidic (rough) grassland, dwarf shrub heath (heather moorland), bracken, fen, marsh and swamp, inland rock and montane habitats³.
The large extent and relative inaccessibility of the uplands means that information on upland biodiversity is less comprehensive than for lowland habitats and species.
6. The Scottish uplands contain some of the largest expanses of semi-natural habitat in the UK, including 90% of all high mountain habitat;⁴ but little of this landscape is truly 'wild' in nature, having been shaped by humans over centuries. The influence of surrounding seas, a diverse geology and a variable climate means that Scotland shares a similar ecosystem lineage to neighbouring Nordic countries, but with the addition of particularly diverse bryophyte and lichen assemblages that are important in a European and international context.

^a [Coigach and Assynt Living Landscape](#), [Cumbernauld Living Landscape](#) and [Edinburgh Living Landscape](#)

7. Between the 1940s and 2007, heather moorland was reduced by over 20%, due mainly to afforestation and conversion to rough grassland, and matched by an increase in the extent of bracken^{5,6}. This loss of moorland was driven largely by historic increases in sheep grazing levels associated with the subsidisation of stocking levels from national and EU public funds, but also by an increase in wild deer numbers, poorly managed muirburn and increased drainage, all of which encouraged the growth of grasses over heather. Data from Mackey et al. (1998)⁷ and the Countryside Survey⁸ on the composition of upland habitats suggest that, while the overall extent of habitats has not changed significantly across Scotland since 1990, subtle changes are taking place within individual habitats.
8. Between the 1940s and the 1980s, blanket mire decreased by around 21% and lowland mire decreased by around 44%, mainly due to afforestation and drainage as a result of initiatives to drive economic productivity associated with largely monocultural agriculture and forestry land use⁹. This led to the widespread draining and afforestation of peatland habitats. The extent of peatland habitat has however shown an increase in extent since 1990 as a result of investments in restoration work, including drain blocking and tree removal. However, fen, marsh and swamp habitats have not received similar investments in restoration works and therefore their extent continues to decline.
9. It is notable that upland native woodland does not feature as one of the broad habitat types identified by the Scottish Government in their Countryside Survey. The extent of native woodland in the uplands remains relatively very small. Table 1 shows that the collective figure for upland woodlands (birch, ash, oak) and scrub (juniper and montane) is only 124,572 ha, with montane willow scrub a mere 10 ha. Recent data suggests that significant losses of native woodland cover may have occurred over a 40-year period in unenclosed upland areas¹⁰. Commercial coniferous woodland in Scotland by contrast has expanded to cover a total area of approximately 1.1 m ha¹¹.



Overgrazing by deer and livestock can have profound effects on vegetation. Here, Scots pine and heather grow behind a deer fence in Athnamulloch. Image © Alan Watson Featherstone/Trees for Life

Table 1 – extent of native woodland types in Scotland¹²

Priority woodland type	NVC types	Area (hectares)	Percentage of total native woodland area (%)	Comments
Native pinewoods	W18	77,978	25	
	WPc	25		
Wet woodland	W7	27,862	9	Some of this type is in upland mixed ashwoods
	W4	26,268	8	Some of this is in upland birchwoods or upland oakwoods
	W5	1,322	<1	
	W3	568	<1	
	W2	364	<1	
	W1	274	<1	
	W5	101		
Upland birchwoods/ Upland oakwoods	W11	58,704	19	
	W17	45,983	15	
	(W4)			See wet woodland above
	WLz	1,652	<1	Some of this is in lowland mixed deciduous woodland see below
Lowland mixed deciduous woodland	W10	12,878	4	
	W8	6,584	2	
	W16	330	<1	
	WLz			See upland birch/ oak above
Upland mixed ashwoods	W19 Juniper scrub	1,482	<1	
	W22 Blackthorn scrub	153	<0.1	
	W20 Montane willow scrub	10	-	
Miscellaneous	Wh	167	<0.1	
	Not identifiable as an NVC type**	37,720	12	
Total area		311,153		

Reproduced from Patterson, G., Nelson, D., Robertson, P. & Tullis, J. (2014) Scotland's Native Woodlands: Results from the Native Woodland Survey of Scotland. Forestry Commission Scotland, Edinburgh.

Species and habitat trends

10. The trend for 122 priority species across a range of taxa in upland ecosystems was assessed by Scottish Natural Heritage (SNH) in 2008 as being stable¹³. Among 13 species assessed at that time, the proportion that were stable (84%) exceeded those that were declining (8%)¹⁴. However there has been an overall decline in species richness in several broad habitats, including dwarf shrub heath (by 12%), fen, marsh and swamp (by 23%) and in the bog broad habitat (by 11%). Similar declines have been observed in alpine vegetation communities¹⁵.
11. A high proportion of Scotland's uplands are protected through designations, with 24% lying within Special Protection Areas, 16% in Special Areas of Conservation, 22% in Sites of Special Scientific Interests, 11% in National Parks and 3% in National Nature Reserves¹⁶. Scotland's uplands contain nine UKBAP habitats¹⁷.
12. The Trust has three wildlife reserves that contain significant proportions of upland habitats, with the three largest upland reserves (Ben Mor Coigach, Rahoy Hills and Largiebaan) covering a joint area of over 9,000 ha. Upland heathland (moorland) makes up 45% of the area of Trust reserves by UKBAP Priority Habitats¹⁸.

Ecosystem services

13. The uplands provide hugely important stocks of natural capital within Scotland. These produce a wide range of ecosystem services and benefits, including food and freshwater provision, climate and flood regulation, recreation and tourism - with their associated health benefits, and aesthetic and cultural values¹⁹. Scotland's peatlands are particularly important and store a stock of carbon three times that of all our forests and other vegetation, equating to nearly 200 times the amount of carbon contained within the nation's total annual greenhouse gas emissions²⁰.

Land use change

14. All but the highest montane habitats in the uplands are the product of climate and geology, as well as centuries of human influence. Combined, these forces have shaped the vegetation communities and fauna found today. Beginning with the clearance of the original natural forests thousands of years ago, there followed agricultural improvements such as burning and drainage for livestock farming, and the rise of sporting estates in Victorian times for deer stalking and grouse shooting. Atmospheric pollution emanating from industrial areas in the UK and Europe has also shaped upland landscapes, with atmospheric deposition of acidic compounds and nutrients leading to changes in natural vegetation community structure. More recently, landscapes in the uplands have been shaped by an increase in outdoor recreation infrastructure, a relative intensification of upland farming practices, large-scale commercial afforestation and the growth of the renewable energy sector, including wind farms and hydro-electric schemes.
15. Some of the greatest changes in the uplands seen today are related to changes in livestock farming. After the huge growth in sheep numbers during the second half of the 20th century, the national sheep flock declined by almost 2.9 million (22%) between 1998 and 2009, and the beef cattle herd declined by 110,783 (15%) over the same period²¹. The greatest declines in livestock have been in the uplands of the north and west of Scotland with complete abandonment in some areas, leading to a major shift in grazing levels and subsequent changes in semi-natural vegetation²². These declines have been driven by a combination of factors, including a downturn in the economic viability of hill farms, the foot-and-mouth disease outbreak in 2001, and livestock reductions related to changing agri-environment schemes and subsidies.
16. In the longer term, global demand for meat production will continue to grow²³ and as a result, the markets for Scottish livestock may possibly recover. One potential scenario for the future of the uplands is one where agricultural production and productivity increases and an intensification of farming in upland landscapes leads to significant negative consequences for biodiversity²⁴.

17. Rates of coniferous afforestation in the uplands have declined in recent years²⁵. The harvesting of mature crops was, until recent times, driven by high timber values and planting struggled to keep pace with timber abstraction rates. This is despite the Scottish Government's target to establish 100,000 hectares of new woodland by 2022²⁶.
18. Sport shooting for deer and driven red grouse shooting are widespread practices in the uplands, with deer stalking stated as providing 2,520 full time equivalent (fte) jobs and generating £105m to the rural economy²⁷ and driven grouse shooting reported as providing 1,072 fte jobs and £23.3m²⁸.
19. The net profit, if any, generated from these activities is more difficult to calculate as both benefit from considerable private financial support from large estate owners.
20. High deer numbers and some management practices associated with grouse shooting (such as muirburn, drainage and predator control) also have large-scale impacts on upland ecosystems. Research²⁹ has indicated that intensive moorland management, particularly on peatland soils, can have detrimental impacts on ecosystem services such as those associated with hydrology and carbon storage capacity, as well as on a range of habitats and species. An estimated 1 million ha are used for driven grouse shooting in Scotland³⁰ and some form of deer management is carried out over most upland areas in Scotland.



These two images, taken in Coille Ruigh na Cuileige in 1989 and 2015, demonstrate what 25 years of natural regeneration looks like when grazing pressure is significantly reduced. Images © Alan Watson Featherstone/Trees for Life

21. The relatively recent arrival of renewable energy sources in the form of wind farms and hydro-electric schemes has transformed the appearance of many areas in the uplands, establishing them as centres of energy production. The total extent of wind farms and hydro-electric schemes in Scotland's uplands is not currently known³¹, but the highest concentrations of onshore wind farms are found in the Southern Uplands, Argyll and the Northern Highlands.
22. Recreation, including nature-based tourism, is another important sector in the uplands, with an estimated 39,000 fte jobs and £1.4 billion income being delivered across all of Scotland³².
23. The emergence of the rewilding agenda also has potential to influence upland land use (or 'dis-use') in the future. Emerging in the 1990s, this conservation philosophy proposes ecological restoration primarily through providing ecological connectivity, promoting 'self-willed land' ("land with an emphasis upon its own intrinsic volition"³³) and the reintroduction of apex predators - summarised by the term "cores, corridors, and carnivores"³⁴. In recent times, rewilding has gained significant media and public interest and traction amongst some in the environmental NGO and land-owning sectors.

24. To date, few examples of upland rewilding projects exist in the UK but Rewilding Britain³⁵ cite the Scottish examples of Creag Meagaidh NNR, Carrifran Wildwood and Glenlude (Scottish Borders), Li and Coire Dhorrcail (Knoydart), the Dundreggan and Glenfeshie Estates, and Mar Lodge. Here, proactive decisions have been taken by landowners to embrace natural ecological processes on a landscape scale, an approach which mirrors the Trusts' vision of "a network of healthy, resilient ecosystems supporting expanding communities of native species across large areas"³⁶. Should the public interest for rewilding (and abandonment) in the uplands increase further, land use decisions and/or policies may follow which could result in the loss of some agriculturally productive land. Some argue that this may come at the expense of increased agricultural intensification in other parts of the world (e.g. Asia and Brazil).³⁷

State and key threats

25. The state of Scotland's uplands was assessed as 'moderate, declining' by Scottish Government in 2014³⁸. This assessment is based on the deterioration in some key broad habitat groups and the fact that many of these broad habitat groups on designated sites remain in unfavourable condition status, despite some recent trends of improvement for some habitats³⁹.

Key systemic threats

26. Scotland's upland ecosystems have been adversely affected by a number of key pressures and threats. We believe that the major systemic threats are:

Ecological

- **Fragmentation of semi-natural habitats**, leading to the increased isolation of habitats and species which has led to sub-optimal ecosystem functioning.
- **Landscape simplification** including the compartmentalisation of different land uses into separate silos (forestry, rough grazing, sporting interests), often with sharp transitions between land use blocks.
- **Unsustainably high levels of grazing** by livestock and wild deer, which drives unfavourable condition status of habitats, including the suppression of native woodlands and scrub⁴⁰, and the spread of bracken.
- Damaging impacts resulting from some **intensive grouse moor management** (muirburn, drainage of peatlands and species control), including detrimental impacts on: water storage and quality, peatland soil carbon stores, and biodiversity such as raptor and mountain hare populations.
- **Imbalance of keystone species**, notably the absence of some large herbivores and any carnivores to drive natural trophic functions of ecosystems.
- **Drainage of wetlands**, including peatlands, for agricultural improvements and commercial forestry, leading to the loss and severe degradation of habitat and the release of carbon into the atmosphere and watercourses.
- **Atmospheric deposition** of nutrients and acidic compounds across the uplands, leading to enrichment and a subsequent reduction of some nutrient-poor vegetation communities.
- Late 20th century history of **poorly-designed monocultural conifer plantations** with an under-representation of native tree species, leading to simplification of habitats.
- **Climate change** resulting in warmer and wetter weather patterns, driving changes in habitats and species altitudinal distribution and population levels.
- **Presence of invasive non-native species** (INNS) such as American mink (*Mustela vison*), *Rhododendron ponticum* and Sika deer (*Cervus nippon*) which are damaging to native biodiversity.

Economic

- **A lack of recognition of the natural capital value** of upland ecosystems, particularly peatlands and woodlands.
- **Poorly targeted public subsidies** which have failed to protect natural capital stocks and the vital ecosystem services they provide for wider society.
- Inappropriately located, designed and managed **forestry plantations and renewable energy installations**, leading to the deterioration of some sites, notably on deep peat.
- Fragile rural economies and incomes, resulting from compartmentalised land use, volatile markets and subsidy-driven unsustainable agricultural and forestry practises.
- **Lack of effective fiscal and policy instruments** to encourage progressive and sustainable land management, and deter unsustainable or damaging practises.

Socio-cultural

- **A lack of an agreed vision** as to what Scotland's uplands are for and little recognition of the many benefits that multifunctional land use systems in the uplands can deliver. The lack of such a vision can hamper developments that could be of potential benefit to communities and the environment in upland areas⁴¹.
- **Wildlife crime**, particularly illegal raptor persecution, which prevents colonisation by key species across suitable habitat in their natural ranges.
- Lack of adoption of ecosystem health indicators and natural capital value in planning policies, which should put both people and place at the heart of the planning and land use change decision-making processes.

Policy statement

27. Scotland's uplands are arguably the defining landscape of this country. They are inspiring, iconic and to many people, both nationally and internationally, the essence of wildness. The Scottish Wildlife Trust believes that upland ecosystems are in a poor and sometimes declining state of health. As a result of a number of competing pressures, these ecosystems are not able to realise their full potential in terms of resilience and delivering a wide range of goods and services. Action is required to tackle the systemic threats to Scotland's degraded uplands and to restore these back to health. Through restoration and the adoption of sustainable land management practices, the state of wildlife and condition of habitats associated with these areas will be improved, and more opportunities will be created for a diverse range of communities to thrive.
28. Consistent with our wider vision, the Scottish Wildlife Trust wishes to see the Scottish uplands:
- provide a network of ecologically healthy and resilient ecosystems which support expanding communities of native species;
 - supported in such a way which helps secure thriving and diverse local, rural economies based on sustainable management of the stocks of natural capital which provide enhanced benefits for both public and private interests;
 - recognised and promoted for the real value that they provide to Scotland.

“Scotland's uplands are arguably the defining landscape of this country. They are inspiring, iconic and to many people, both nationally and internationally, the essence of wildness.”

Policy priorities

The Trust believes that the Scottish Government should adopt ten key policy interventions in order to secure ecological and economic recovery in our uplands. These priorities are expanded further in the 'Twenty detailed actions for the uplands' section.

Top ten policy priorities

- I. Designate the National Ecological Network (NEN) as a 'national development' in the National Planning Framework and ensure that the principles are embedded into all relevant policy instruments.
- II. Encourage the development of wildlife-rich transition zones in the areas between designated sites within the uplands, where natural dynamic processes and successions can happen and landowners are financially rewarded for the development of 'self-willed land'.
- III. Establish 'Integrated Land Management Groups' to ensure cooperation, education and integration of all sectors involved in the sustainable production of ecosystem goods and services, focusing on sub-catchment scale units.
- IV. Implement Ecosystem Health Indicators (EHIs) and Natural Capital Valuations (NCVs) and embed these into all relevant policy instruments, including at sub-catchment scale to inform decision-making.
- V. Introduce mandatory management and monitoring of wild deer in order to reduce population densities to a sustainable level.
- VI. License driven upland grouse moor management in order to encourage more sustainable management practices.
- VII. Reform subsidy regimes for upland sheep and cattle farming to encourage low stocking densities and 'agro-forestry' systems.
- VIII. Provide financial incentives for low-impact silvicultural systems (LISS) in commercial upland plantations.
- IX. Develop new statutory guidelines to mitigate the impacts of energy developments in the uplands.
- X. Re-introduce lost keystone species such as Eurasian beaver (*Castor fiber*) and Eurasian lynx (*Lynx lynx*).

Twenty detailed actions for the uplands

29. If we are to address the key threats faced by the uplands in Scotland and find a way of realising a more sustainable future for our upland ecosystems, economies and rural communities, we believe that there is a need for a fundamental review of how our uplands are valued and managed. To do this, the Trust calls for 20 key ecological, economic and socio-cultural actions. These are:

Ecological

- i. **Apply Ecosystem Health Indicators** (EHIs) at sub-catchment scale in the uplands, so that rapid assessments of the state of ecosystem health can be made. These assessments should be used to set clear restoration targets and enable prioritisation of available funding to tackle key systemic threats. EHIs should inform a comprehensive (sub) Catchment Management Plan.
- ii. Encourage the development of **wildlife-rich transition zones** in the areas between designated sites within the uplands, where natural dynamic processes and successions can happen and landowners are financially rewarded for the development of 'self-willed land'. Such action, together with Scottish Government targets for the restoration of 15% of degraded ecosystems and improving the condition of protected areas, would make important contributions towards the delivery of a National Ecological Network.

- iii. Provide **incentives for sympathetic, low-impact management regimes** such as native woodland restoration and low stocking density conservation grazing in areas where the cultural history of the land is linked to high nature value farming and has the potential to remain so.
- iv. Facilitate the **development of 'agro-forestry' systems**, supported by incentives to encourage better integration of grazing and forestry land uses, and encourage the development of more natural ecotones (transition areas) between different land uses, such as wood pasture habitats supporting extensive cattle grazing systems.
- v. Introduce mandatory **management, monitoring and reporting of wild deer densities** for landowners to ensure deer populations and densities are managed at truly sustainable levels to allow for widespread recovery of natural vegetation structure and composition, including woodland and scrub. Standardised deer monitoring methods should include assessment of habitat impacts and condition. Harvesting seasons should be extended and winter-feeding of deer should be phased out.
- vi. Introduce a **licensing system for driven grouse shooting** where landowners are required to adhere to minimum standards of environmental stewardship, and to monitor and report on their impacts on habitats and water quality.
- vii. **Restore all blanket peatlands**, including those planted with commercial forestry, so they provide a fuller range of ecosystem services. Funding should be made available through public and private financial support mechanisms.
- viii. Develop **new best practice guidelines** with the Forestry Commission Scotland (FCS) to promote extensive restructuring of plantations to substantially increase structural diversity, retention of old growth and 'future veteran' trees, and increase the percentage of native broadleaf and coniferous tree species within Scotland's managed forests.
- ix. Ensure **targets for climate change and air quality measures are met** and continue to recognise the detrimental impact of atmospheric deposition of nutrients and acidic compounds across the uplands.
- x. Take proactive steps to encourage the **licensed reintroduction of specific keystone species** to the uplands, following Scottish Government and IUCN translocation guidelines, to assess fully all ecological, economic and social benefits and costs. The Eurasian beaver should be successfully re-established in several core areas of native upland forest below 500m, ranging from the Southern Uplands to the Northern Highlands. A trial Eurasian lynx reintroduction project should be developed in the Highlands and research should continue into the feasibility of other potential reintroductions in the longer term.
- xi. Focus limited public funds available for INNS in the uplands on the removal of *Rhododendron ponticum*, American mink and Sika deer.

Economic

- xii. Target agri-environment payments to **encourage low stocking density grazing** on rough grasslands, upland heath and mires (on shallow peat) with sheep/cattle mixes, in order to produce more fertile, productive and biologically diverse soils and vegetation cover (including woody species) which in turn support higher invertebrate and bird diversity and reduced bracken cover.
- xiii. **Incentivise low-impact silvicultural systems** (LISS) in commercial plantations. Large upland plantations should be managed through LISS approaches such as Continuous Cover Forestry (CCF) and wood pasture systems. Forestry grants for intensive monoculture/clearfell must be gradually phased out. Grants that encourage LISS approaches, the development of ecotones and successional habitats at forest edges should be made available.

- xiv. Provide support and training to landowners and managers who begin to **transition away from traditional deer stalking** on the open hill to a more Nordic-style hunting approach for wild deer in restored upland woodlands, scrub and associated ecotones.
- xv. Provide support and training to landowners and managers who begin the **transition from driven grouse moors** to a more natural and more accessible, walked up approach to grouse shooting, within ecologically more diverse habitat mosaics of open heathland, restored peatlands and large areas of recovering scrub and woodland.
- xvi. Develop new statutory guidelines on the **mitigation of energy developments** in the uplands including avoiding locating renewable schemes on deep peat and designated sites. Habitat Management Plans for new developments should explicitly show how planned mitigation contributes towards the wider ecological coherence of the surrounding landscape and National Ecological Network, prior to planning permission being granted.
- xvii. Provide secure and stable long-term payments to deliver **improved stocks of natural capital** in the uplands and the ecosystem goods and services which flow from these including sustainable food production, water quality and flow regulation. Funded by the phased reduction of inflated economic subsidies to farmers and landowners running intensive farming operations in the lowlands.

Social

- xviii. Place the health of the land, communities and people in rural areas firmly at the centre of an **improved spatial planning** process.
- xix. Accelerate the pace of implementation of the Scottish Land Use Strategy, ensuring a **focus on cooperation** through regional partnerships leading to the implementation of integrated management plans across Scotland.
- xx. **Eradicate wildlife crime** in the uplands through effective prevention messages and rigorous enforcement actions.

Scottish Wildlife Trust priorities for action

The Scottish Wildlife Trust will seek to promote the principles and actions outlined in this paper in the following ways:

- 30. By advocating the policy priorities and recommendations outlined above to the Scottish Government, statutory agencies, the business and land management sectors, and other key stakeholders.
- 31. Through the delivery of the Trust's Living Landscapes project in Coigach and Assynt. This project will aim to restore the health of the whole upland ecosystem by improving and reconnecting habitats to deliver multiple benefits, and encouraging sustainable rural development.
- 32. By identifying opportunities for partnership projects on our upland wildlife reserves which demonstrate best practice in relation to the promotion and delivery of the policy recommendations and actions outlined above. Examples could include landscape-scale ecological restoration projects at our reserves at Largiebaan, Ben Mor Coigach and Rahoy Hills.

Cross-reference to other Scottish Wildlife Trust policies:

- Policy Futures 1: Living Landscapes
- Policy Futures 3: Climate Connections
- Economics of ecosystem goods and services
- Energy and nature conservation
- Forestry and woodland
- Muirburn
- Species reintroductions
- Wild deer

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