

# Scottish Wildlife Trust

## Policy



Scottish  
Wildlife  
Trust



## Land Stewardship Policy (Consultation Draft)

# Land Stewardship Policy

“Protecting and enhancing our stock of natural capital ... is fundamental to a healthy and resilient economy.” First Minister Nicola Sturgeon MSP, speech to World Forum on Natural Capital, December 2015<sup>i</sup>

## SUMMARY

1. The term *Land Stewardship* encapsulates the idea that we should manage our land so that it can be used in perpetuity. The full range of activities carried out on land and freshwater in Scotland comes under the aegis of land stewardship: the production of food and fibre, water, energy, minerals; the enjoyment of land through recreation and education; and the protection of land for its nature conservation value. The natural capital<sup>ii</sup> of some land has been damaged by past use, impacting upon its ability to provide us with the full range of ecosystem services we depend upon, but with better stewardship this capital can be restored.
2. This Land Stewardship Policy provides a set of solutions for safeguarding and enhancing the natural capital value of land in Scotland in order to address the challenges facing society, the environment and the rural economy: better protecting and preserving our soils; reducing greenhouse gas emissions and adapting to a changing climate; and restoring wildlife habitats and reversing biodiversity loss.
3. This policy is therefore a practical mechanism for delivering Scotland’s National Outcomes and the outcomes of Scotland’s Land Use Strategy; and, so, improving the prosperity and well-being of the people of Scotland.

## Policy structure

4. The basis of this policy is a common framework for regulating and incentivising land stewardship. This has four tiers (see Table 1 on p.4 and the example of agriculture below). Table 1 sets out the measures sector by sector in each tier.

## Agriculture

5. The following measures are specified:

Public investment to support Scotland’s farmers and crofters is linked to the provision of public goods which deliver enhanced natural capital stocks and ecosystem service flows i.e. the benefits which accrue to society and the economy from a healthier, sustainably managed environment. Regulation and support of farming and crofting is through a four-tier structure.

**Regulations** – retention and implementation of Regulations as at 2017, with new soil testing and conservation regulations.

**Natural capital maintenance payments: designed to ensure that we maintain, rather than deplete, our stocks of natural capital.** These are area-based payments for meeting a combination of mandatory criteria for all farms, as well as optional criteria tailored to farm type. Mandatory measures include providing wildlife habitat on at least 12% of the area of every farm.

**Natural capital enhancement payments: designed to incentivise actions that will help build our natural capital.** These are non-competitive area-based payments available to all farms for carrying out additional optional actions. These include increasing wildlife habitat >12% of farm area; reducing livestock stocking densities on sensitive habitats; conservation grazing; wildlife-friendly cropping practices; mixed farming; and measures to encourage pollinators.

**Natural capital restoration payments: designed to enable the delivery of a greater level of public benefits and address societal risks such as resilience to climate change.** These are competitive additional payments targeted at specific public good priorities including natural flood management, habitat and species conservation, and support for specific high nature value farming systems

## Forestry and woodland

6. The following measures are specified:
- I. Highest rates of grant support for the establishment of native woodland by planting and by natural regeneration, ensuring natural regeneration is an attractive option compared to planting.
  - II. Grant support for the establishment and restocking of productive non-native plantations linked to UK Forestry Standard (UKFS) requirements.
  - III. Annual woodland stewardship payments to support the management of existing native woodlands.
  - IV. On the National Forest Estate diversification of tree species and stand structure will be increased year on year through restructuring and increased use of native species for restocking, with a target of 60% native species by 2050.

## Peatland

7. The following strategic intervention is specified:
- I. A discrete Challenge Fund of at least £16 million per year for peatland restoration, to be maintained in real terms.

The following regulatory measure is specified:

- II. A prohibition on installing land drainage on peat soils >50cm depth.

## Deer

8. The following measures are specified:
- I. Land managers are required to agree forward cull plans with Scottish Natural Heritage. Cull plans are set to reduce deer impacts and improve condition of habitats.
  - II. Where cull plans are not achieved, Scottish Natural Heritage is empowered to require culls are achieved by a third party.
  - III. Deer management plans, deer count information, cull plans, and cull returns must be made publicly available.

## Grouse and moorland management

9. The following regulatory measures are specified:
- I. Muirburn is restricted to land managed for grouse, and on such land burning is prohibited on all blanket bog and other wetlands, montane heaths, steep slopes, and woodland edges.
  - II. A *Moorland Management Code* to be developed by end of 2018. This will include the above mandatory requirements. The policy recommends that legislation is enacted to require grouse moor licensing as soon as possible. Once this is in place, compliance with the code will be a licence condition.
  - III. Muirburn on land which is not managed for grouse is allowed under licence where it is necessary to prepare sites for woodland expansion by natural regeneration or to manage designated moorland sites.

## Protected areas

10. The following measures are specified:
- I. The higher protections given to Natura sites are maintained.
  - II. A comprehensive network of local biodiversity sites is designated and protected against inappropriate development.

The following strategic interventions are specified:

- III. A Challenge Fund of at least £4 million per year to fund work to restore protected areas to favourable condition.

- IV. A discrete Challenge Fund of at least £5 million per year for Invasive Non Native Species (INNS) control and eradication programmes.

### **Freshwater**

11. The following measures are specified:

- I. River Basin Management Plans are fully implemented to deliver Good Ecological Status (GES) for the vast majority of water bodies in Scotland by 2027.

The following strategic intervention is envisaged:

- II. A discrete Challenge Fund of at least £10 million per year to fund works to achieve good ecological status and implement natural flood management.

### **National Ecological Network**

12. This policy specifies measures which will contribute to a National Ecological Network. Measures on farms will create and restore habitats and incentivise collaboration between farmers to create connected habitats. Native woodland creation which delivers connectivity will be prioritised. Peatland restoration will enhance connectivity of this habitat. Implementation of River Basin Management Plans will achieve good ecological status for the majority of water bodies.

In addition to these measures the following Strategic Intervention is specified:

- I. An Environmental Co-operative Action Fund of at least £4 million per year will support collaboration between landholdings at the landscape scale.

### **Institutions – linking stewardship of land and water**

13. Regional land use partnerships will be aligned to river catchments. They will carry out catchment-wide appraisals of constraints and opportunities for land stewardship and develop catchment-wide land stewardship plans.

**Table 1 - Land Stewardship measures available according to land use**

Tier	Agriculture	Forestry	Grouse / deer	Protected Areas	Freshwater	Integrated land use
Natural Capital Restoration	Land contributing to National Ecological Network					
	Creating native woodland			Favourable condition on designated sites	Restoration of water bodies to GES	Collaborative action fund
	Control and eradication of INNS					
	Peatland restoration		Peatland restoration		Natural flood management	
	Support for HNV farming					
	Natural flood management					
Natural Capital Enhancement	>12% of farm managed as wildlife habitat	Grants for restocking in accordance with UKFS		Positive management of local biodiversity sites	Support for integrated catchment management	
	Restoration of semi-natural habitats					
Natural Capital Maintenance	12% of farm area managed for wildlife	Woodland stewardship				
	Reducing fertiliser and pesticide use					
	Whole farm review					
	Cross compliance					
Regulation	Soil testing and conservation measures	Environmental Impact Assessment of planting	Moorland management code	Equivalent protection for Natura sites	Retain GES targets for water environment	
		Felling licence, requiring restocking				
			SNH approval of cull plans			



## INTRODUCTION

### Purpose

14. The purpose of this policy is to set out a clear framework for ensuring land stewardship is linked to the provision of public goods and the maintenance, enhancement and restoration of natural capital. It specifies solutions to the challenges which policymakers and practitioners face, and makes recommendations for institutional structures to deliver the policy.

### Scope

15. This policy is about the stewardship of Scotland's rural land. It considers the main land uses of agriculture, forestry, deer and grouse shooting, as well as salmon and freshwater fisheries, the freshwater environment and nature conservation.
16. This policy is designed to integrate land management in a way which delivers multiple benefits, and frame how habitats within landscapes can be connected to form a National Ecological Network. It also considers the way land stewardship is supported; both with incentives funded by the taxpayer and by the mix of public institutions and private actors involved in developing, delivering and implementing land stewardship policy.
17. This policy does not consider lowland sporting use in detail, although much of the content on agriculture and forestry would be relevant here. Nor does it consider the use of land for the generation of renewable energy, for mineral extraction, or for the development of land controlled through the planning system. The use of land for recreations other than fieldsports, and for education, tends to be complementary to rather than the main objective of management, so these are not considered here.

## CONTEXT

### Why a Land Stewardship Policy?

18. As outlined above, the full range of activities carried out on land and freshwater in Scotland fall within the ambit of land stewardship: the production of energy, minerals, water, food and fibre; the protection of land for its nature conservation value; and the enjoyment of land through recreation and education.
19. The classification of 85% of Scotland as a Less Favoured Area is recognition of the challenging soil and climate conditions faced by landowners and farmers seeking to produce marketable commodities from Scotland's land.<sup>iii</sup> In addition to the production of commodities, Scotland's land and freshwaters also provide a range of non-market benefits. Combining, even optimising, commodity production and the delivery of non-market 'ecosystem services', in most cases, will be the most desirable outcome, although in some circumstances adopting one or the other end of the spectrum – intensive production or minimum intervention – may be the appropriate option.
20. The way we use land has in many places depleted its natural capital stocks, and this affects its ability to provide us with ecosystem services, including clean water, soil fertility, flood protection and carbon storage. This policy has been developed to address this natural capital depletion through setting out a clear framework of regulation and incentives to ensure better land stewardship throughout Scotland.
21. A land stewardship approach will deliver both the vision of the Land Use Strategy to "get the best from our land" and the principles of the Land Rights and Responsibilities Statement to deliver environmental sustainability.<sup>iv</sup> As previously stated, the term *Land Stewardship* encapsulates the idea that we should manage our land so that it can be used in perpetuity.

Effectively, this means living off the interest created by our natural capital stocks, rather than spending down the capital itself.

22. We know reversing natural capital depletion is possible from evidence elsewhere in Europe. One example is the transformation of the landscape of south-west Norway, an area with a similar climate and geology to the Highlands, and which was largely treeless at the turn of the last century. Over the last 50 years, following a reduction in grazing, there has been a rapid recovery of woodland and a concomitant increase in primary plant productivity. The uplands now produce for south-west Norway the same number of male deer per square kilometre for hunting as in Scotland and the forests are sinks for carbon as well as producing timber, fuel wood and berries. The woodlands are also used for grazing livestock at appropriate stocking densities.<sup>v</sup>

## The Rural Economy

23. Rural Scotland accounts for 98% of the land mass of Scotland and nearly a fifth of the population are resident there. In contrast to much of the last century, our rural population is growing, and grew at more than three times the rate of urban areas from 2001 to 2013 (12.5% compared to 3.7%).<sup>vi</sup>
24. Employment is higher in rural areas than urban areas, and wages are comparable to those in towns and cities. Table 2 highlights some ways in which the pattern of employment in rural areas is different, with a higher proportion of jobs in small and medium-sized enterprises (SMEs), more self-employment and homeworking, and more people with second jobs.<sup>vii</sup>

**Table 2: Unemployment, wages, and features of employment in rural Scotland 2015**

	Remote rural	Accessible rural	Rest of Scotland
Unemployment rate	5%	4%	8%
Median wages (residence based)	£27,663	£29,016	£26,660
Employment in SMEs	66%	59%	34%
Self-employed	23%	17%	10%
Homeworkers	22%	18%	9%
Second jobs	10%	5%	3%

Source: Scottish Government: Rural Scotland Key Facts 2015

25. Agriculture, together with forestry, fishing and aquaculture is the largest private sector employer in remote rural areas (16%) and second largest in accessible rural areas (12%).<sup>viii</sup> The overall economic output of farming and forestry is small in a national context and, together with fishing and aquaculture, made up <1% of GDP in 2015.<sup>ix</sup> Farming (and fishing) provide raw materials for Scotland's food and drink sector, which was responsible for 4% of Gross Value Added (GVA) in 2014.<sup>x</sup> Land stewardship also determines the landscape and wildlife which are prized by so many visitors to Scotland: sustainable tourism was responsible for 3% of GVA in 2014.<sup>xi</sup> Other assessments have estimated that nature-based tourism is worth £1.4 billion a year to the Scottish economy (equivalent to the GVA of agriculture, fishing and forestry combined).<sup>xii</sup>
26. Clearly, existing land stewardship activities make important contributions to the rural economy, both in their own right and by contributing to other economic sectors like food and drink and tourism. These sectors are important for many rural SMEs, but also make a strategically important contribution to the national economy as a whole.

27. Building natural capital on farms, forests and moorlands will create new economic opportunities, through initiatives such as peatland restoration, for example. It will also secure the reputation for environmental quality which Scotland’s food and drink industry trades on, and enhance the ability of our tourism sector to sell Scotland as a wild, exciting destination.

### Land Stewardship Policy Budget

28. The budget below is based on 2017–18 Government spending plans<sup>xiii</sup>, which show a total planned investment in land stewardship and rural policy of approximately £640 million. A further £312 million is budgeted for the public bodies, agencies and research providers whose work supports land stewardship.<sup>xiv</sup> The budget for the Land Stewardship Policy and allocations for each *Strategic Intervention* is shown in Table 3 below.

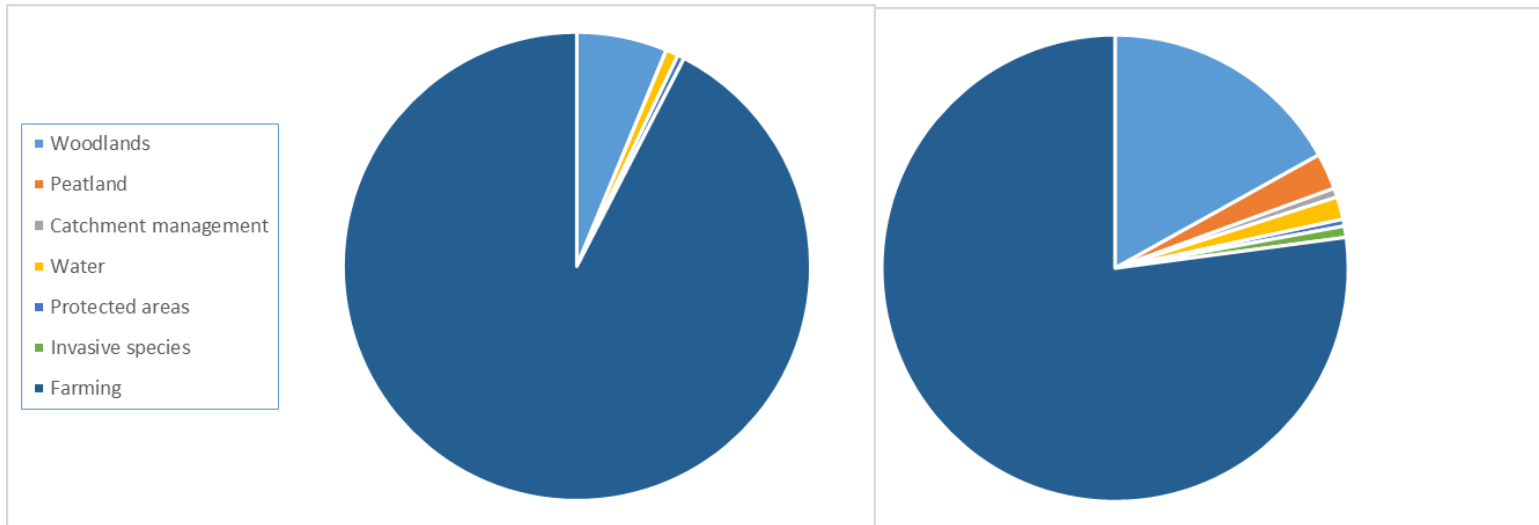
**Table 3: Land Stewardship Policy Budget**

<b>Strategic Interventions</b>	<b>Business as usual (£m / year)</b>	<b>Land Stewardship policy plans (£m / year)</b>
Native woodland creation, stewardship & restocking	40	108
Peatland restoration <sup>xv</sup>	0	16
Environmental cooperation action fund & integrated catchment management	0	4
Good ecological status of freshwater bodies & natural flood management	5	10
Restore protected areas to favourable condition	3	4
Control and eradication of INNS <sup>xvi</sup>	0	5
Environmentally friendly farming	187	492
<i>Of which</i>		
Natural capital restoration		123
Natural capital enhancement		148
Natural capital maintenance		221
Other farm support	403.5	0
Total farm support	590.5	492
<b>Total</b>	<b>639</b>	<b>639</b>

Existing and future spending allocations are summarised and compared in figure 1 overleaf.



**Figure 1: Summary of Business as Usual pending plans and Land Stewardship Budget**



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## CHALLENGES AND SOLUTIONS

### AGRICULTURE

*“Current farming practices are essentially mining natural capital as though it was a depleting resource rather than husbanding it for the long-term future. We have to think broadly about the relationship between current food production and future food production. We do not want to do our grandchildren down.”* Lord Krebs, Chair of the Adaptation Sub-Committee of the UK Climate Change Committee to Scottish Parliament Environment Climate Change and Land Reform Committee, September 2016 <sup>xvii</sup>

#### Challenges

29. Scottish farm businesses are highly reliant on subsidies and many would struggle to be profitable without public support as the cost of producing food is often higher than income from sales. If Scotland wants a viable agricultural sector across the country it is highly likely public monies will need to continue to subsidise farming for decades to come. However, these same subsidies have sometimes in the past led to environmental degradation, bringing additional costs. In the 21st century, such degradation linked to subsidy is less common, but nevertheless income support payments have done little to mitigate the environmental impacts of farming practices. The hidden costs – so called ‘externalities’ – of environmentally insensitive farming practices are not always accounted for in traditional economics but nevertheless have financial costs for society. The environmental impacts which existing policy is not sufficiently addressing are:
- I. soil degradation and erosion – the fundamental public and private asset on which future productivity and profit depends;
  - II. the generation of substantial greenhouse gas emissions;
  - III. biodiversity loss through habitat loss and simplification and inappropriate use of pesticides and fertilisers;
  - IV. water pollution.
30. The transition to a new system of farm support in Scotland between 2015 and 2019 caused significant administrative difficulties that were both costly to resolve and significantly delayed the processing of payments to farmers. However, transitional arrangements help businesses adapt to change.

#### Solutions

31. This policy sets out a four-tier hierarchy of regulation and support payments for natural capital maintenance, enhancement, and restoration (see Table 1).

The four tiers, and examples of the measures that would be included in each tier, are shown in the box overleaf. <sup>xviii</sup> The figure on p.11 shows how the budget for payments is shared between payments for natural capital maintenance, enhancement and restoration.

### **Tier 1: Regulation**

All farmers must comply, irrespective of whether they chose to apply for support payments. This would include retention and full implementation of all relevant Regulations as at 2017 and, in addition, mandatory soil testing and conservation regulations.<sup>1</sup>

### **Tier 2: Natural Capital Maintenance**

This is an area-based payment available to all farmers (owner-occupiers and tenants<sup>1</sup>) for meeting a combination of mandatory and optional criteria which would be tailored to different farm types. Mandatory measures include:

- I. complying with all existing regulatory requirements in Tier 1, including requirements to comply with regulations on species protection;<sup>1</sup>
- II. keeping land in Good Environmental Condition (see Annex 1);
- III. providing at least 12% of land area on all farms as wildlife habitat;
- IV. Whole farm reviews to include financial performance and efficiency, soil, water, energy, greenhouse gas emissions and biodiversity.

Optional measures appropriate for certain farms include:

- V. reducing pesticide and fertiliser use;
- VI. crop diversification measures.

### **Tier 3: Natural Capital Enhancement**

This is a non-competitive additional area-based payment available to all farms for additional actions to provide public goods. Applicants can choose from a range of options, each of which attracts different point scores towards a target total to trigger the payment. Measures include:

- I. increasing wildlife habitat above >12% of farm area on a graduated scale;
- II. reducing stocking densities on sensitive habitats, or to allow woodland and scrub regeneration;
- III. conservation grazing of species-rich grasslands and wetlands;
- IV. wildlife-friendly cropping;
- V. reintroduction of mixed farming;
- VI. measures to encourage pollinators.

### **Tier 4: Natural Capital Restoration**

This is a competitive additional payment designed to deliver specific public good priorities. Measures include:

- I. natural flood management measures;<sup>1</sup>
- II. measures targeted at particular farmland types; e.g. machair, wood pasture, upland hay meadows;
- III. measures targeted at particular species; e.g. brown hare, black grouse, farmland waders and passerines;
- IV. support for targeted livestock grazing on qualifying High Nature Value farmland;
- V. creating and restoring non-woodland habitats to contribute to a National Ecological Network. Priority non-woodland habitats will be identified at local level as part of the process of catchment scale opportunity mapping.

**Figure 2: Balance of existing farm support, and future farm support under Greening Scheme**



**Distribution between land types**

32. The new natural capital maintenance and natural capital enhancement payments will be area-based payments available to all farms set on a per hectare basis for two land types:

Region 1 – arable land, temporary and permanent grassland

Region 2 – rough grazing

33. The budget for Natural Capital Maintenance and Enhancement payments will be split 70:30 between Region 1 and Region 2 land. The implications of this for indicative payment rates are shown in table 4 overleaf. The ability of upland farms to provide substantial public benefits such as natural flood management, carbon sequestration and wildlife habitats is recognised in this policy, as are the challenges that upland farms face in generating returns from the market.

**Table 4: Indicative payment rates per hectare**

	Region 1	Region 2
Natural Capital Maintenance	£86	£22
Natural Capital Enhancement	£58	£15
Total	£144	£37

### **Other measures**

#### **Involve farmers and advisors in developing measures**

34. This policy proposes to closely involve farmers and advisors in the design of measures which will apply post 2020. Instead of specifying the means, measures could be outcome-led, leaving it to farmers to decide how to achieve the specified outcome.

#### **Transition to new system**

35. This policy substantially changes the way farming is supported in Scotland post 2020. If there is judged to be a significant risk of administrative difficulties with transitioning to a new system, the existing system should be kept in place for a period before this policy comes into effect. This will give farm businesses time to plan. A transitional period where existing arrangements remain in place of between 3–5 years beyond 2020 may be appropriate.

#### **Advisory and monitoring**

36. Central to the new approach advocated in this policy is the provision of high quality advice to farmers. The whole farm reviews recommended as a requirement for natural capital maintenance will establish a baseline against which progress can be measured, and which will inform future policy development.

### **Benefits**

37. The benefits of these measures will be:
- I. Scotland will have one of the most sustainable agriculture policies of any country in the world, providing high quality products for the food and drink industry, which trades on Scotland's reputation for environmental quality.
  - II. A much greater alignment of the incentives provided by support payments and public policy objectives to safeguard and restore stocks of natural capital and reduce climate emissions from agriculture.
  - III. A farming sector better prepared to face the challenge of climate change, and better able to continue to provide the quality raw materials for our food and drink industry and the landscapes for our tourism sector.
  - IV. Ongoing support for Scotland's traditional farming systems and their natural and cultural heritage.

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## FORESTS AND WOODLAND

*“Conditions over much of the Scottish uplands are suitable for trees and shrubs to grow. Grazing and burning suppress natural regeneration over much of this area. Releasing this regeneration requires three actions: a large reduction in the number of deer, a reduction in the number of sheep (beyond that which has occurred since the change in the subsidy system in 2008) and a large reduction in the area of land that is burned. In much of the uplands, these actions alone would result in spontaneous natural regeneration of woodland and shrubs, as has been demonstrated in pioneering projects at Abernethy, Creag Meagaidh, Glen Affric and Glen Feshie. South-west Norway also provides a good example of a region, similar in climate and soils, where this has occurred.”* Forest Policy Group<sup>xix</sup>

### Challenges

38. After declining to around 5% around the turn of the 20th century, forest cover in Scotland increased to 18% during the last 100 years. This is still low in relation to our European neighbours, and Scotland’s forests are also unusual in that they are dominated by a non-native species – Sitka spruce. Challenges for our forest policy are:
- I. Native woodland makes up a very small proportion of the total woodland area (<25%). Of that area, ancient semi-natural woodland makes up just 4.6% of the total woodland, and is declining in extent and condition in the uplands. Some of our most important native woodlands for biodiversity are impacted upon by invasive non-native species and overgrazing.<sup>xx</sup>
  - II. Planting targets in recent years have not been met, and by the middle of the century timber production from Scottish forests is expected to decline. Softwood production from Scotland’s conifer plantations has risen sharply since the 1970s. Total planting of conifers has fallen continuously over the same period. This reduction in the area planted means softwood timber production will peak by 2030, and decline thereafter. With an average rotation for Sitka spruce of around 40 years, it is clear that this decline in production could not be met from current new plantings until the 2040s and 2050s.
  - III. Productive forests in Scotland are dominated by a single species – Sitka spruce. Stands dominated by Sitka spruce tend to be of lower biodiversity value than mixed and native-species stands. There are also potential risks from pests and/or diseases of Sitka spruce should these become established in Scotland. Less than 20% of the National Forest Estate is made up of native species.
  - IV. Woodlands are currently not fulfilling their full potential for helping Scotland adapt to climate change. More connected riparian woodlands, for example, could prevent flooding; reduce erosion; improve water quality; and allow wildlife to move through the landscape. Woodlands are also important carbon sinks and therefore help mitigate climate change.

### Solutions

39. The following measures are specified to address the challenges identified above:
- I. Highest rates of grant support for the establishment of native woodland by planting and by natural regeneration, ensuring natural regeneration is an attractive option compared to planting.<sup>xxi</sup>
  - II. Grant support for the establishment and restocking of productive non-native plantations linked to UK Forestry Standard requirements, i.e., no more than 75% of the area restocked be composed of a single species; 10% of the restocked area be left open-space; 10%



managed for biodiversity; and 5% native broadleaves. Rates set at a level which ensures stable future supply of softwood timber.

- III. Annual woodland stewardship payments to support the management of existing native woodlands to address overgrazing by deer, control of invasive non-natives, introduction of continuous-cover silviculture and measures to improve the long-term value of hardwood timber.
- IV. The ongoing stewardship of existing farm woodland will normally be supported by natural capital maintenance payments by counting towards the requirement to manage 12% of farm holding area for wildlife. Further woodland establishment is eligible for support under woodland establishment options.
- V. On the National Forest Estate, diversification of tree species and stand structure will be increased year on year through restructuring and increased use of native species for restocking, with a target of 60% native species by 2050.

## Benefits

40. The benefits of this approach are more diverse and resilient woodlands, better for biodiversity, helping to adapt to, and mitigate against, climate change.

## PEATLANDS

### Challenges

41. Peatlands cover around 20% of land in Scotland or around 1.7 million hectares. Intact, functioning peatlands are an important store of carbon (sink). However, it is currently estimated that over 600,000 hectares of Scotland's peatlands are in a degraded condition primarily due to drainage, overgrazing, burning and afforestation.<sup>xxii</sup> Active restoration of 21,000 hectares of degraded peatland per year is considered to be feasible.<sup>xxiii</sup> The Scottish Government is committed to restoring 10,000 hectares of peatland in 2017–18 and 20,000 hectares per year thereafter up until 2032–33. This means that 300,000 hectares of peatland could be restored by 2032–33. We estimate that this would cost an average of £16 million per year.<sup>xxiv</sup>
42. Many peatlands have been drained with moor grips. This dries out the peat and favours the growth of grasses or heather over Sphagnum mosses. Where these drains exist, restoration involves blocking them to raise the water table which prevents the peat from oxidising and can restore Sphagnum mosses. Outside Protected Areas there is no restriction on putting in new drains on peatland.

### Solutions

43. This policy mandates dedicated long-term funding support for peatland restoration. This is key to building momentum in the delivery of peatland restoration. Assured funding into the long term will allow the direct economic benefits of peatland restoration to be realised through employment of contractors and purchase of machinery, training and upskilling of peatland consultants; and encouraging the private sector to invest in funding in peatlands through mechanisms such as the Peatland Code.<sup>xxv</sup>
44. The following strategic intervention is specified:
  - I. A discrete Challenge Fund of at least £16 million per year for peatland restoration, to be maintained in real terms.
45. The following regulatory measure is specified:

- II. A prohibition on installing land drainage on peat soils >50cm in depth.

## Benefits

46. The benefits of peatland restoration are that the carbon stored in 300,000 hectares of peatland is protected, preventing future emissions; the value of this area as wildlife habitat will be improved; water quality will be improved; and with increased water storage and slower run-off help to reduce flood risk.

## DEER

### Challenges

47. Deer exert a significant influence on the vegetation of Scotland, with profound consequences for ecological processes and biodiversity. For instance, natural regeneration of woodland without fencing is unlikely when deer densities are above 5 per km<sup>2</sup>.<sup>xxvi</sup> Red deer on the open hill also impact on other habitats through grazing and trampling; for example, on blanket bogs, flushes and montane scrub. Roe deer have also increased their numbers and range in both the uplands and lowlands.
48. Challenges for deer policy are:
  - I. As of 2016, the present voluntary approach to management is not sustaining and improving the natural heritage.<sup>xxvii</sup>
  - II. Evidence from the 2016 review of Deer Management in Scotland showed that if deer densities were lower across Scotland the benefits could be maintained and costs reduced. Other evidence shows that deer numbers could be significantly reduced without reducing the number of male deer available for hunting.<sup>xxviii</sup>
  - III. As of 2016, only three out of 11 voluntary Control Agreements met habitat targets. Scottish Natural Heritage has been unable to use its powers to follow up with compulsory Control Schemes. Scottish Natural Heritage's powers are limited to preventing damage, not restoring degraded habitats.
  - IV. The emphasis of debate and action to date have been on red deer and designated sites. Widespread impacts of all four deer species in the rest of the country are largely neglected.
  - V. Detailed habitat monitoring of the impacts of deer and other herbivores across much of the open hill range and most of the lowlands is lacking. Information on the condition of deer, for example, carcass weight, can be used to manage deer, and is much less expensive and time consuming than counting.<sup>xxix</sup>

### Solutions

49. The following regulatory measures are specified to address the challenges identified above:
  - I. Land managers are required to agree forward cull plans with Scottish Natural Heritage. Cull plans are set at levels intended to reduce deer impacts and improve condition of habitats, informed by standardised habitat monitoring. Information such as larder weights and fecundity must be collected for all species and made available to Scottish Natural Heritage along with cull returns.
  - II. Where cull plans are not achieved, Scottish Natural Heritage is empowered to require that culls are achieved by a third party.

- III. Deer management plans, deer count information, cull plans, and cull returns must be made publicly available.

## Benefits

50. The benefits of these measures will be:
  - I. Reduced grazing and browsing impacts, improving the condition of native woodlands, peatlands and other wetlands, and allowing expansion of native woodlands and montane scrub. This in turn will improve the capacity of land to provide a fuller range of ecosystem services including water regulation and carbon storage and sequestration.
  - II. Larger, healthier deer, and continued economic activity from deerstalking.
  - III. Greater accountability, clarity and transparency in relation to deer management.

## GROUSE AND MOORLAND MANAGEMENT

### Challenges

51. The area of moorland managed for grouse shooting in Scotland is estimated at around 1 million hectares.<sup>xxx</sup> The main form of land management on grouse moors is 'muirburn' of vegetation. Muirburn is also carried out in other areas with the intention of producing fresh grazing for sheep and deer. Evidence suggests the area of moorland burnt and the frequency of burning is increasing, with increasing burning of deep peat and within protected areas.<sup>xxx1</sup> Burning of vegetation leads to a number of environmental problems, including:
  - I. prevention of woodland and montane scrub regeneration;
  - II. damage to peatland habitats, particularly the deeper peats found on blanket bogs;
  - III. impacts on water quality and freshwater ecology;
  - IV. carbon losses and reduced capacity of moorland and peatland habitats to sequester carbon;
  - V. burning out with grouse moors can result in extensive damage to sometimes sensitive habitats (while such burning can produce an initial flush of growth for grazers, in the long term it can lead to moorland and rough grasslands being dominated by rank unpalatable grasses like purple moor grass, mat grass and deer grass<sup>xxxii</sup>).
52. As of 2016, the Muirburn Code<sup>xxxiii</sup> recommends avoiding burning on sensitive habitats such as deep peats, montane heaths, steep slopes and close to woodland and scrub. However, these recommendations are only advisory. Nor, in the 2016 Code, is there a mandatory requirement for land managers to demonstrate compliance with the code, or to keep records to allow compliance to be monitored.

### Solutions

53. The full introduction of mandatory measures proposed below depend on legislation introducing licensing of grouse moor management, which would allow compliance with a Moorland Management Code to be a licence condition. This policy recommends that such legislation is enacted as soon as practicable. Pending the development and implementation of this legislation, some of the measures below can only be implemented on a voluntary basis.
54. Using the powers available in existing legislation, the following measures are specified to address the challenges identified above:

- I. Powers under the Hill Farming Act 1946<sup>xxxiv</sup> should be used to restrict muirburn to land managed for grouse, and on such land to prevent burning on all blanket bog and other wetlands, montane heaths, steep slopes, and woodland edges.
- II. A Moorland Management Code to be developed by the end of 2018. This will include the above mandatory requirements. Once grouse moor licensing is in place, compliance with the code will be a licence condition. The Code will also require the production of a muirburn plan which identifies sensitive habitats and record keeping of the dates and areas burnt.
- III. Licensing powers under the Hill Farming Act 1946 will allow muirburn on land not managed for grouse, where it is necessary to prepare sites for woodland expansion by natural regeneration or to manage designated moorland sites.

## Benefits

55. Preventing burning of peatlands will protect the carbon they store and improve their condition as a wildlife habitat. It will also improve water quality and water storage. Recovery of woodland and scrub will sequester carbon and provide habitat for woodland edge species like the black grouse. Preventing burning on steep slopes will reduce soil erosion in the uplands.

## PROTECTED AREAS

### Challenges

56. A cumulative area of 1.4 million hectares, 18% of the land area of Scotland, is under designations which recognise and protect the primary importance of that land for nature conservation.<sup>xxxv</sup> Eighty-five per cent of this area is cumulatively designated as Natura 2000 sites – Special Areas of Conservation (SAC) and Special Protection Areas (SPA), designated under the Habitats and Birds Directives. These designations provide the highest level of protection of any form of designation, and have been instrumental in ensuring that sites have been protected from inappropriate development, for example, the refusal of permission for a windfarm on the Lewis Peatlands SAC / SPA. This is due to stricter rules on assessing proposals for development on these sites, known as ‘appropriate assessment’.
57. There are currently two types of local protected areas: local nature reserves, which are notified and managed by local authorities, and which must be owned or leased by them; and local nature conservation sites, also notified by local authorities, the primary purpose of which is to identify sites of importance for biodiversity in local plans and development control.
58. Such sites can clearly form an important component of a national ecological network. As many local nature reserves are located in and around towns and cities they are also important sites for recreation and enjoying wildlife. There is a growing body of evidence which suggests that regular encounters with nature can have a positive effect on health and well-being.<sup>xxxvi</sup> There are also opportunities to empower communities to look after nature, for example, getting involved in the management of local nature reserves, commenting on planning proposals and development plans, and volunteering in local conservation projects.
59. The most commonly recorded pressure on protected sites is invasive non-native species (INNS).<sup>xxxvii</sup> The total annual cost of INNS to Scotland’s economy in 2010 was estimated to be £125 million. One of the Aichi targets for 2020 set under the Convention on Biodiversity is to identify and prioritise invasive non-native species, and control and eradicate priority species. The latest assessment of progress on this target shows it is not on course to be met.<sup>xxxviii</sup> A revised strategy for invasive non-native species was published in 2015.<sup>xxxix</sup> The strategy shows that

there remains a need to complete risk assessments and action plans for many species, which would assess the feasibility of control programmes. A prioritised list of the top 50 INNS in Scotland has been drawn up, all of which have been assessed as having moderate to high impacts. Of these, the vast majority occur on either land (56%) or freshwater (26%). There is a need to translate this into action, with costing of control programmes so that the scale of funding, and the timescales for implementation, can be determined. While much progress has been achieved at a local level, for example, through the work led by fisheries trusts, control and eradication of many INNS will only ultimately be successful if it is coordinated at a national level, and with cross-GB actions in some cases.

60. The challenges for management of protected areas in Scotland are:

- I. Maintaining the high levels of protection currently afforded by the Natura 2000 designations.
- II. Continuing to improve the proportion of designated sites which are in a favourable condition. Protected sites are Scotland's 'jewels in the crown' for biodiversity: not all of the 'jewels' are in the best condition that they could be.
- III. Complementing the network of sites designated for their national and international importance with a comprehensive network of local nature reserves.
- IV. Controlling and eradicating invasive non-native species.

## Solutions

61. The following measures are specified to address the challenges identified above:

- I. The higher protections given to Natura sites will be maintained, with the requirement that any proposal for development on these sites must undergo rigorous assessment.
- II. Local authorities will establish and maintain a list of Local Nature Conservation Sites based on the common principles and standards set by Scottish Natural Heritage. These sites will be given adequate protection through development management policies. All sites meeting the required standard will be designated rather than the aim being to generate a minimum representative sample (as is the case for Sites of Special Scientific Interest).<sup>x1</sup>

62. The following strategic interventions are specified:

- III. Work to return protected areas to a favourable condition will be funded as a natural capital restoration action (see Table 1) through a challenge fund of at least £4 million per year. This will include developing solutions for those sites where there is no on-site remedy.
- IV. A discrete Challenge Fund of at least £5 million per year for INNS control and eradication programmes, to be maintained in real terms. Priorities for control and eradication will be identified at local level as part of the process of catchment scale opportunity mapping.

## Benefits

63. The benefits of the approach advocated are:

- I. continued protection for Scotland's most valuable wildlife sites;
- II. continued improvements in the quality of Scotland's protected areas;
- III. better protection for locally important wildlife sites, with more opportunities for community empowerment, and more opportunities for public enjoyment and engagement;

- IV. meeting our international biodiversity commitment to control and eradicate invasive non-native species.

## FRESHWATER

### Challenges

64. The challenges for management of freshwater and freshwater fisheries in Scotland are:

- I. The Water Framework Directive and its implementation in Scotland has been a landmark for the water environment. While good progress has been made in some areas, such as reducing diffuse agricultural pollution, progress in achieving the good ecological status required by the directive has been slower than planned.
- II. The second River Basin Management Plan, which sets out measures for achieving good ecological status, was published in 2015.<sup>xli</sup> Crucially, it does not contain any appraisal of the funding needed to deliver the actions set out in the plan. Thus it is not possible to make judgements about whether the budget currently allocated (around £5 million p.a.) is sufficient.
- III. Changes in definitions of the extent and number of water bodies, and new information generated by monitoring, have made it difficult to track progress in the number of water bodies in good ecological condition.
- IV. Climate change is predicted to increase rainfall intensity. This makes river catchments “flashier” and more prone to flooding. Flood events are predicted to become more frequent. Natural Flood Management measures work by slowing the flow of water through catchments, and reducing the peak flow of flood events. Implementation of these techniques is demonstrating their effectiveness; e.g. the Eddleston Water project near Peebles.<sup>xlii</sup> These measures have not been widely implemented.

### Solutions

65. The following measures are specified to address the challenges identified above:

- I. The target to achieve Good Ecological Status for the vast majority of water bodies in Scotland will be retained, together with the current approach to achieve it through River Basin Management Planning (RBMP).<sup>xliii</sup> The measures needed to implement the RBMP must be costed, so that judgements can be made about funding requirements. The benefits delivered should also be valued, using natural capital accounting.
- II. The following measures will contribute to Natural Flood Management:
  - a. Natural Capital Restoration payments will include the use of farm land for restoration of meanders, and creation of “leaky ponds” into which water is diverted at times of peak flow.
  - b. Wildlife habitats created on farms under Natural Capital Maintenance and Enhancement measures will include restoration of wetlands, ponds and wet meadows which hold water.
  - c. The creation of native woodland and scrub will allow water to infiltrate deep into the soil much faster than on farm land, slowing the rate of run-off.
  - d. Creation of riparian woodland will be prioritised.
  - e. Peatland restoration will be incentivised through the strategic intervention of a discrete Challenge Fund. Raising the water table is key to peatland restoration, so

restoration allows more water to be held in peat. Improving the capacity of catchments to store water in peatlands can reduce peak river flows which cause flooding.

66. The following strategic intervention is envisaged:

- III. A discrete Challenge Fund of at least £10 million per year to fund works to achieve good ecological status and implement natural flood management. This fund would support natural flood management measures by landowners other than farmers and would provide support for techniques including installing flow restrictors in the river channel.<sup>xliv</sup>

## Benefits

67. The benefits of the approach advocated are:

- I. The vast majority of water bodies in Scotland achieving Good Ecological Status.
- II. Land stewardship helping to adapt to climate change through natural flood management techniques, resulting in better protection of homes and businesses from flooding.

## NATIONAL ECOLOGICAL NETWORK

### Challenges

68. Protected sites are the foundation from which Scotland's healthy ecosystems can be re-built. But there has to be ecological coherence to allow species to move more easily between sites and across the landscape, thereby decreasing the likelihood of extinctions, increasing genetic exchange and improving ecosystem resilience in the face of climate change. Larger, connected populations are more resilient and better able to adapt to environmental pressures like climate change. There is a need to create a national ecological network which connects protected areas and which allows species to move through the landscape.

### Solutions

69. The following measures specified by this policy will contribute to a National Ecological Network:

- I. Natural Capital Maintenance and Enhancement measures will increase the area of wildlife habitat on farms. Collective actions by groups of farmers working together to create interconnected wildlife habitat would be given higher points weighting.
- II. Natural Capital Restoration payments would incentivise habitat creation on farmland identified at local level as part of the process of catchment scale opportunity mapping.
- III. Applications for native woodland creation which deliver connectivity will be prioritised.
- IV. Restructuring existing productive forests to include a greater species mix will enhance their suitability for a wider range of wildlife.
- V. A strategic intervention will fund the restoration of 300,000 hectares of peatland, which will improve the connectivity of this habitat.
- VI. Implementation of the second River Basin Management Plan, supported by a strategic intervention, will achieve good ecological status for the vast majority of water bodies by 2027.

70. In addition to these measures the following Strategic Intervention is specified:



- VII. An Environmental Co-operative Action Fund of at least £4 million per year will support collaboration between landholdings at the landscape scale to deliver integrated catchment management and create a National Ecological Network.

### **Benefits**

71. The benefits of creating a national ecological network are to improve ecosystem health and increase resilience to environmental change.

## **INSTITUTIONS – LINKING STEWARDSHIP OF LAND AND WATER**

*“The Scottish Government intends to build on river basin management planning as the basis of more integrated land and water use planning across whole catchments. This will provide a means of integrating public policy objectives in order to tackle issues such as diffuse pollution, flood risk, soil protection, peatland restoration and an expansion of woodland cover.”* Scottish Government (2013), 2020 Challenge for Scotland’s Biodiversity<sup>xlv</sup>

### **The Challenge**

72. The challenges for Scotland’s institutions are that:
- I. Responsibility for planning and delivering public policy on land stewardship is divided between an array of public and private bodies, working at different geographies. This makes coordination and delivery through integrated catchment management, which is the objective of Government Policy, very challenging (see Annex 2).
  - II. There is general agreement that integrated catchment management is a desirable objective; the challenge is to operationalise it. The successful adoption of integrated catchment management by the Tweed Forum, Dee Catchment Partnership, and Carse of Stirling Project needs to be implemented across Scotland.
  - III. The roll out of a new system of land stewardship support focussed on provision of public goods, increased opportunities for native woodland creation and peatland restoration, sustainable management of deer and muirburn, and restoration of protected areas and water bodies all require continued support for landowners and land managers in the form of advice and training.

### **Solutions**

73. Regional land use partnerships will be aligned to river catchments.<sup>xlvi</sup> They will carry out catchment-wide appraisals of constraints and opportunities for land stewardship and develop catchment-wide land stewardship plans.<sup>xlvii</sup> These will aid land stewardship decision-making in relation to where to prioritise funding for natural capital restoration projects such as peatland restoration; the creation of native woodland; the creation of wildlife habitat for connectivity; and the implementation of natural flood management techniques. One possible approach could be to expand the remit and membership of Fisheries Trusts to take on a wider role in planning land management at a catchment level, as is already occurring in some areas.
74. The Scottish Government and other public bodies will align their policy delivery functions to the regional land use partnerships. Advisory support will be extended to all landowners and land managers.

### **Benefits**

75. The benefit of the approach advocated would be to better enable public bodies to deliver integrated catchment management which optimises the way land is managed for multiple public benefits, and obtains better value for money for public support from the taxpayer.

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## GLOSSARY

**CAP** – Common Agricultural Policy

**Ecosystem services** – essential services provided by natural capital which make human life possible. Obvious ecosystem services include the food and water we eat and drink, or the plant materials we use for fuel, building materials and medicines. There are also many less visible ecosystem services such as the climate regulation, flood defences provided by natural vegetation, the billions of tonnes of carbon stored by peatlands and forests and the pollination of crops by insects.

**Externality** – an effect of a good or service on a third party. Can be positive where provision of the good or service benefits others, or negative where the provision of the good or service imposes costs on others.

**Market failure** – occurs when there is an inefficient allocation of resources in a free-market. A common cause of market failure can be when the cost of a negative externality is not reflected in the price of a product; e.g. the cost of greenhouse gas emission from food production is not fully reflected in the prices we pay for food.

**Natural capital** – the world's stocks of natural assets, which includes geological resources, soil, air, water and all living things.

**Public goods** – a commodity or service that is provided without profit to all members of a society, either by the government or by a private individual or organisation.

## ANNEX 1 – NATURAL CAPITAL MAINTENANCE, ENHANCEMENT AND RESTORATION – DETAIL OF PROPOSED MEASURES

<b>Natural Capital Maintenance – mandatory measures</b>
<p>Comply with Statutory Management Requirements under the Basic Payment Scheme for 2017,<sup>xlviii</sup> with addition of:</p> <p>Compliance with species protection requirements of Birds and Habitats Directives, and the Habitats Regulations 1994 (as amended in Scotland); Wildlife and Countryside Act 1981 (as amended); Part 2 of the Animal Health and Welfare (Scotland) Act 2006, and with codes made under the Act; Controlled Activities Regulations; and the Sludge (Use in Agriculture) Regulations 1989.</p> <p>Comply with Good Agricultural and Environmental Condition (GAEC) requirements under the Basic Payment Scheme for 2017.<sup>xlix</sup> Amend GAEC 1 on buffer strips to state the uncultivated area must be at least 6 m wide. Add requirement to GAEC 4 on minimum soil cover that winter stubbles must be left unsprayed, to improve value for wildlife.</p> <p>Reinstate GAEC requirements to prevent wind erosion and soil capping; use break crops in arable rotations; manage use of manures and slurries to meet crop needs; use machinery on land appropriately (e.g. not when water standing on surface or soil saturated); avoid overgrazing and overburning; and no liming of rough grazing or semi-natural habitats.</p> <p>Comply with the Prevention of Environmental Pollution from Agricultural Activity (PEPFAA) Code<sup>l</sup> and the Code of Practice on the Use of Plant Protection Products.<sup>li</sup></p> <p>A minimum of 12% of the farm to provide wildlife habitat.<sup>lii</sup></p> <p>Whole farm reviews to include financial performance and efficiency, soil, water, energy, greenhouse gas emissions and biodiversity.</p>
<b>Natural Capital Maintenance – optional measures</b>
<p>Crop diversification</p> <p>Measures to reduce fertiliser, pesticide use.</p> <p>Maximum stocking densities for improved and unimproved grasslands and rough grazing.</p>
<b>Natural Capital Enhancement – optional measures</b>
<p>Increasing wildlife habitat above &gt;12% of farm area on a graduated scale.</p> <p>Reintroduction of mixed farming (cropping on livestock farms and livestock on currently all arable farms).</p> <p>Reduce stocking densities on sensitive habitats or to allow colonisation of native woodland and scrub onto rough grazings.</p> <p>Creation of varied swards (e.g. areas where plants are allowed to flower and seed; leaving small areas unmown) and reinstate hay production on proportion of conserved forage area</p> <p>Wildlife-friendly cropping and mowing techniques.</p> <p>Measures to encourage pollinators; e.g. increasing legume content of temporary and permanent grassland mixes.</p>

Leaving hedgerows uncut (e.g. on a 3-year rotation rather than every year, and not cutting hedgerow trees).

Conversion to organic farming.

**Natural Capital Restoration**

Natural flood management measures. <sup>liii</sup>

Measures targeted at particular farmland types; e.g. machair, wood pasture, upland hay meadows.

Measures targeted at particular species; e.g. brown hare, black grouse, farmland waders and passerines.

Support for targeted livestock grazing on qualifying High Nature Value farmland.

Measures to create and restore non-woodland habitats to contribute to a National Ecological Network. Priority non-woodland habitats will be identified at local level as part of the process of catchment scale opportunity mapping.

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## ANNEX 2 – LAND STEWARDSHIP: POLICY DEVELOPMENT, DELIVERY AND IMPLEMENTATION

The table highlights the range of public and private bodies involved in land stewardship in Scotland.

**Table 1: Responsibilities for policy development, delivery and implementation of Land Stewardship in Scotland**

Type of stewardship / policy area	Lead policy responsibility	Public policy delivery	Geography	Implementation
Land use strategy	Scottish Government	All public bodies	Regional land use partnerships	All with an interest in land and freshwater
Farming	SGRPID (no national spatial strategy)	Administration by SGRPID local offices (no local delivery strategy)	Area offices	Farmers and landowners
Scotland Rural Development Programme	SGRPID (no spatial strategy)	SGRPID, Forestry Commission, Local Action Groups (LEADER)	Area offices, Forest Conservancies, Local Action Group Areas	Farmers, landowners and land managers
Forestry	Forestry Commission	Forestry Commission / Local authorities (indicative forestry strategies)	Forest conservancy / district / Local authority	Forest Enterprise (Forest and Land Agency), private forest owners / managers
Deer management	SNH	SNH wildlife management officers / Deer management groups / Lowland deer network	Deer management groups / Lowland deer network	Landowners (public and private), deer managers
Grouse moor management	Scottish Government / SNH	none	none	Landowners, gamekeepers
Nature conservation: protected areas and species	SNH	SNH area offices	SNH area office areas	Landowners
Nature conservation: biodiversity strategy	Scottish Government	All public bodies	River catchments	Farmers, landowners, Forest enterprise, private forest owners, gamekeepers, deer managers, riparian owners
Water environment	SEPA	SEPA	Scotland River Basin District / Solway Tweed River Basin District	Farmers, landowners, Forest enterprise, private forest owners, gamekeepers, deer managers

Flood management	SEPA	Local Authorities	Local Flood Risk Plan Districts	Local authorities, landowners, homeowners
Freshwater fisheries	New National Fisheries Management Organisation	New Local Fisheries Management Organisations	New Fisheries Management Areas	Riparian owners, anglers
Renewable energy	Scottish Government	Scottish Government / Local Authorities	Local Authority	Energy companies and developers

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## REFERENCES

- <sup>i</sup> <http://naturalcapitalforum.com/news/article/plenary-speech-by-nicola-sturgeon/>
- <sup>ii</sup> Natural Capital can be defined as the world's stocks of natural assets, which encompasses geological resources, soil, air, water and all living things.
- <sup>iii</sup> Less Favoured Area Support Scheme in Scotland: Review of the Evidence and Appraisal of Options for the Scheme Post 2010. Available at: <http://www.gov.scot/Publications/2007/03/21143353/0>
- <sup>iv</sup> Scottish Government (2016) *A Land Use Strategy for Scotland 2016–21*: <http://www.gov.scot/Resource/0050/00505253.pdf>; Scottish Government (2016) *A consultation on the Land Rights and Responsibilities Statement*: <http://www.gov.scot/Publications/2016/12/6806/0>
- <sup>v</sup> Scottish Parliament Environment Climate Change and Land Reform Committee, evidence on Deer Management in Scotland, 17 January 2017: <http://www.parliament.scot/parliamentarybusiness/report.aspx?r=10741> and Written Submission from Duncan Halley: [http://www.parliament.scot/S5\\_Environment/General%20Documents/\(020\)\\_20161208\\_Duncan\\_Halley.pdf](http://www.parliament.scot/S5_Environment/General%20Documents/(020)_20161208_Duncan_Halley.pdf)
- <sup>vi</sup> <http://www.gov.scot/Publications/2015/03/5411/0>
- <sup>vii</sup> <http://www.gov.scot/Publications/2015/03/5411/0>
- <sup>viii</sup> Ibid. Accessible rural areas are within 30 minutes' drive of a town with population >10,000. Remote rural areas have a >30-minute drive time.
- <sup>ix</sup> Calculated for 2015 from Table 3 in <http://www.gov.scot/Resource/0050/00509544.xls>
- <sup>x</sup> Ibid and GVA statistics for food and drink sector from <http://www.gov.scot/Topics/Statistics/Browse/Business/Publications/GrowthSectors/Briefings>. Gross value added (GVA) is the measure of the value of goods and services produced in an area, industry or sector of an economy.
- <sup>xi</sup> Ibid
- <sup>xii</sup> <http://www.snh.gov.uk/docs/B720765.pdf>
- <sup>xiii</sup> Scottish Government Draft Budget 2017-18, Level 4 spending plans, available at: [http://www.parliament.scot/FinancialScrutiny/2017-18\\_Budget\\_level\\_4.xlsx](http://www.parliament.scot/FinancialScrutiny/2017-18_Budget_level_4.xlsx)
- <sup>xiv</sup> SGRPID; SNH; SEPA; Crofting Commission; Forestry Commission Scotland (not including Forest Enterprise); and the National Park Authorities.
- <sup>xv</sup> Funds for peatland restoration are available under the Agri-environment Climate Scheme, shown as environmentally friendly farming in this presentation.
- <sup>xvi</sup> Ibid.
- <sup>xvii</sup> <http://www.scottish.parliament.uk/parliamentarybusiness/report.aspx?r=10552>
- <sup>xviii</sup> See Annex 1 for further examples of measures
- <sup>xix</sup> <http://www.forestpolicygroup.org/wp-content/uploads/2015/05/The-Benefits-of-Woodland-Part-I.pdf>
- <sup>xx</sup> <http://www.forestpolicygroup.org/wp-content/uploads/2015/05/The-Benefits-of-Woodland-Part-I.pdf>
- <sup>xxi</sup> Woodland establishment by natural regeneration was eligible for support under the 2007-13 Scotland Rural Development Programme. The option proved less popular than native woodland planting, with only one twelfth the number of applications and only one fortieth of funding awarded, suggesting grant rates should be increased relative to that for planting. <http://www.gov.scot/Topics/farmingrural/SRDP/RuralPriorities/Options/WoodlandCreation/NaturalRegen> and <http://www.gov.scot/Resource/0044/00449780.pdf>
- <sup>xxii</sup> [http://www.climatechange.org.uk/files/1913/7339/0087/Research\\_summary\\_Potential\\_Abatement\\_from\\_Peatland\\_Restoration.pdf](http://www.climatechange.org.uk/files/1913/7339/0087/Research_summary_Potential_Abatement_from_Peatland_Restoration.pdf)
- <sup>xxiii</sup> <http://www.gov.scot/Resource/0042/00426134.pdf>
- <sup>xxiv</sup> Average restoration costs under the Peatland Action Programme were £800/ha, which equates to £16 million to restore 20,000 hectares.
- <sup>xxv</sup> IUCN UK Peatland Programme. The Peatland Code: <http://www.iucn-uk-peatlandprogramme.org/peatland-code>
- <sup>xxvi</sup> Putman et al. (2011) Identifying threshold densities for wild deer in the UK above which negative impacts may occur. *Mammal Review* 41(3), pp175-96.
- <sup>xxvii</sup> Scottish Natural Heritage (2016) *Deer Management in Scotland: Report to the Scottish Government*: <http://www.snh.gov.uk/publications-data-and-research/publications/search-the-catalogue/publication-detail/?id=2449>
- <sup>xxviii</sup> Halley, D (2017) Written evidence to the Scottish Parliament Environment Land Use and Climate Change Committee, citing Buckland et al. (1996). Available at: [http://www.parliament.scot/S5\\_Environment/Inquiries/20170112\\_Duncan\\_Halley\\_Written\\_Evidence.pdf](http://www.parliament.scot/S5_Environment/Inquiries/20170112_Duncan_Halley_Written_Evidence.pdf)
- <sup>xxix</sup> Evidence from Dr Duncan Halley to Scottish Parliament Environment Climate Change and Land Reform Committee, 17 January 2017. Available at: <http://www.parliament.scot/parliamentarybusiness/report.aspx?r=10741>
- <sup>xxx</sup> [http://www.scottishlandandestates.co.uk/index.php?option=com\\_attachments&task=download&id=1299](http://www.scottishlandandestates.co.uk/index.php?option=com_attachments&task=download&id=1299)
- <sup>xxxi</sup> Douglas et al. (2015) Vegetation burning for game management in the UK uplands is increasing and overlaps spatially with soil carbon and protected areas. *Biological Conservation*. Volume 191, pp243–250: <http://www.sciencedirect.com/science/article/pii/S0006320715002372>

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<sup>xxxii</sup> *Mollinia caerulea*, *Nardus stricta* and *Tricophorum germanicum*.

<sup>xxxiii</sup> <http://www.gov.scot/Publications/2011/08/09125203/0>

<sup>xxxiv</sup> Section 23A(1A)(a) of the Hill Farming Act 1946 allows Scottish Ministers to specify the types of land where muirburn is permitted during the muirburn season, if they consider it necessary in relation to climate change or for the purposes of conserving, restoring, enhancing or managing the natural environment.

<sup>xxxv</sup> <http://jncc.defra.gov.uk/page-4241> The designations included are Special Area of Conservation; Special Protection Area; Site of Special Scientific Interest; and Ramsar site.

<sup>xxxvi</sup> See for example: Greenspace and quality of life – a critical literature review available at:

<http://www.greenspacescotland.org.uk/default.asp?page=465>

<sup>xxxvii</sup> <http://www.snh.gov.uk/docs/A1959320.pdf>

<sup>xxxviii</sup> <http://www.snh.gov.uk/docs/A2101704.pdf>

<sup>xxxix</sup> [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/455526/gb-non-native-species-strategy-pb14324.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/455526/gb-non-native-species-strategy-pb14324.pdf)

<sup>xl</sup> More details in the SWT Policy on Local Biodiversity Sites:

[http://scottishwildlifetrust.org.uk/docs/002\\_057\\_publications\\_policies\\_Local\\_Biodiversity\\_Sites\\_policy\\_October\\_2011\\_1320168159.pdf](http://scottishwildlifetrust.org.uk/docs/002_057_publications_policies_Local_Biodiversity_Sites_policy_October_2011_1320168159.pdf)

<sup>xli</sup> <https://www.sepa.org.uk/environment/water/river-basin-management-planning/the-current-plans/>

<sup>xlii</sup> <http://www.tweedforum.org/projects/current-projects/eddleston>

<sup>xliii</sup> Future reporting on the River Basin Management Plan and the ecological status of water bodies must allow progress to be measured.

<sup>xliv</sup> These can be used to encourage out-of-bank flow at strategically chosen locations and are usually formed of woody debris or engineered log jams using locally derived timber.

<sup>xlv</sup> <http://www.gov.scot/Publications/2013/06/5538/3>

<sup>xlvi</sup> The river catchment will be the fundamental geography of land stewardship policy and delivery. For some large catchments it may be appropriate to work at a sub-catchment level; in other cases, it will be appropriate to work across several similar adjoining catchments.

<sup>xlvii</sup> Regional land use partnerships in the Scottish Borders and Aberdeenshire have taken the first steps towards this in Scotland. Both partnerships developed variants on an approach to constraint and opportunity mapping; e.g. identifying where woodland creation should be sited to optimise additional benefits such as flood prevention and improve water quality.

<sup>xlviii</sup> Statutory Management Rules for the Basic Payment Scheme 2017 are listed here:

<https://www.ruralpayments.org/publicsite/futures/topics/inspections/all-inspections/cross-compliance/detailed-guidance/statutory-management-requirements/>

<sup>xlix</sup> Good Agricultural and Environmental Condition requirements for the 2017 Basic Payment Scheme are listed here:

<https://www.ruralpayments.org/publicsite/futures/topics/inspections/all-inspections/cross-compliance/detailed-guidance/good-agricultural-and-environmental-conditions/> previous requirements are listed here:

<http://www.gov.scot/Publications/2005/12/0990918/09207#smr3>

<sup>i</sup> <http://www.gov.scot/Topics/farmingrural/Agriculture/Environment/PEPFAA/Overview>

<sup>ii</sup> <http://www.hse.gov.uk/pesticides/topics/using-pesticides/codes-of-practice/code-of-practice-for-using-plant-protection-products.htm>

<sup>iii</sup> Eligible land would include the features currently eligible for Ecological Focus Area, with additional features added to reflect the extension of this requirement to all farm types. Applications where collaboration with neighbours for connectivity receives higher point weightings.

<sup>iiii</sup> E.g. restoring meanders to watercourses.