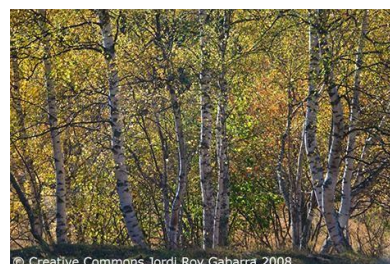


Tweedsmuir and Moffat Hills Area – Appraisal of Economic Opportunities - Economic baseline and projections

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ABBREVIATIONS

BPS	Basic Payment Scheme
CAP	Common Agricultural Policy
LCA	Land Capability for Agriculture
LFA	Less Favoured Area
LFASS	Less Favoured Area Support Scheme
PARC	Priority Areas for Red squirrel Conservation
SAC	Special Area of Conservation
SAC Consulting	– the consulting division of SRUC
SPS	Single Payment System (superceded in Scotland by BPS)
SRUC	Scotland's Rural College
SSRS	Saving Scotland's Red Squirrels
SSSI	Site of Special Scientific Interest

EXECUTIVE SUMMARY

Study objectives

1. This report was commissioned by the Southern Upland Partnership. The study aims to determine current land use in the area, the economics of the existing land uses and how this might evolve in the future under a business as usual scenario.

Current agricultural land use

2. The majority (58%) of the 47,215 ha of Talla Hart Fell area is rough grazing, with woodland and forestry the second largest land use in the area at 21%. In the 2015 76% of the area was reported as farms in the Agricultural Census, with the remaining area operating as non-farm land, whether forestry, non-farm woodland, lochs or urban area (Moffat town).
3. Land Capability for Agriculture data indicates that 72% of the land is of moderate-low quality grazing to limited agricultural use, highlighting the poor quality of the land across much of the area, and explaining the historical dominance of upland sheep farming.
4. The 2015 Agricultural Census shows that hill sheep is the dominant farm enterprise with 29,277 breeding ewes; beef cattle follow as a secondary enterprise with 1,024 cows, with dairy, cropping, and other livestock marginal. On farm woodland accounted for 4,973 ha, 10% of the total land area.
5. Comparisons between the 2005 and 2015 Agricultural Censuses show a decrease in breeding ewes (-30%), beef cows (-11%), total grazed area (-10%), and number of farms (-18%); in the same period reported on-farm woodland increased by 4,230 ha.
6. In 2015, 37 farms were recorded in the Agricultural Census with 45.6 units of staff (regular and casual). The period 2005-2015 saw a decrease in full-time family or hired staff (-30%) and spousal labour (-10%), and an increase of part time (+35%) and casual/seasonal staff (+5%). Overall, this indicates a shift from full-time farm work towards part-time farm work, largely through hired labour, as opposed to household labour, as well as a shift that either farming households in the area are becoming smaller, or that household members have moved to non-farm employment.
7. A decrease in units of full- and part-time occupiers, but an increase in owned land area – indicates farm ownership becoming more centralised.

Woodland and forestry

8. Woodland and forestry cover 9,823 ha of Talla Hart Fell, or 21% of the total area, of which just over half (51%) is recorded on-farm. While 53% of woodland in the 2017 National Forest Inventory was recorded as conifer, this could account for 77% (6,564 ha) when counting areas of trees still in establishment.
9. An area of 3,079 ha of forestry is now managed by the Borders Forest Trust with the aim to promote native woodlands; recent replanting in these areas suggests that the current figure of 2% of broadleaved trees will increase.
10. Forestry largely takes place on land classified as of higher quality and capability for agriculture (LCA 5-6.2), and so could be identified as a competing land use with alternative agricultural enterprises in the area.

Economics of agriculture and forestry

11. The main findings of the financial estimates over the whole Talla Hartfell area are as follows;
 - Over 6 years to 2017 output is estimated to have fallen by £1.4m (20%) from LFA hill sheep farming and risen by £1.0m (+25%) from established commercial forestry
12. Rising economic output from forestry appears to be offsetting declines from hill sheep farming.
13. Afforestation with commercial conifers appears likely to be an areas of expanding land use in the area due to the favourable grant aid and investment economics compared to existing agricultural land use. Alternative land uses such as those based on natural capital are likely to have to generate competitive economic and employment returns to compete.

Other economic activities

14. There is little evidence of sporting and shooting activities in the area, although deer farming is known to take place. The 4,849 ha of non-farm woodland is likely to be used for leisure, conservation, sporting and timber, although the share of 'outputs' is unclear.
15. While shooting can be an important part of rural economies, the extent to which it may or may not sit alongside upland sheep farming and rewilding or conservation schemes is complex, and studies have shown such activities to be dependent on either public payments or private financing.
16. There are small areas of peaty soils and shallow peatland across Talla Hart Fell, with higher quality peatland from Grey Mare's Tail up to near Cappercleuch and around Deer Law, and lower quality peatland in the north-west of the area, on the site of the proposed Whitelaw Brae Wind Farm. A site at Talla Gameshope is being actively managed by the Borders Forest Trust.
17. There are currently no wind farms in the area, although 217 turbines operate to the west of the area in the Clyde and Glenkerie Wind Farm. An extension of 14 turbines within the Talla Hart Fell area has received local opposition. Three small-scale hydroelectric generators operate at Megget Reservoir and along Moffat Water but there are no commercial scale hydroelectricity facilities in the area.

Changes to agricultural policy and farming subsidies

18. With the UK due to leave the EU on 31st October this year, the system of payments that farmers currently receive is also due to change. While the Scottish Government has committed to continue payments to farmers until the end of 2022, there will be changes to schemes including the possible phasing out of LFASS (Less Favoured Areas Support Scheme), and support after 2022 is as yet uncertain and undefined.
19. Future payments are likely to see a shift towards a 'public money for public goods' framework and an emphasis on greater environmental conditions and controls as well as wider socio-economic impacts of agriculture, affecting options for farm enterprises and profitability going forward.

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1. Introduction – objectives and approach

Introduction

1. The Southern Upland Partnership (SUP) are seeking to develop an economic vision for the Talla – Hartfell area that will harness its wild land status and bring greater economic benefits to the local community
2. As part of this wider objective the Southern Upland Partnership (SUP) have asked SRUC to undertake an economic assessment of the current and future rural economy in the Talla Hartfell Wild Land Area and Surrounding area. In further work, conducted by others, other aspects will be explored to develop an alternative economic plan based on wild land / ecosystem service type development.

Objectives

a. Current economic baseline

Investigation of existing land uses (agriculture, forestry, sporting, conservation, renewables, utilities/ water) in the study area. Outline estimates by sector will be prepared of; financial output, employment, recent trends and current influencing factors.

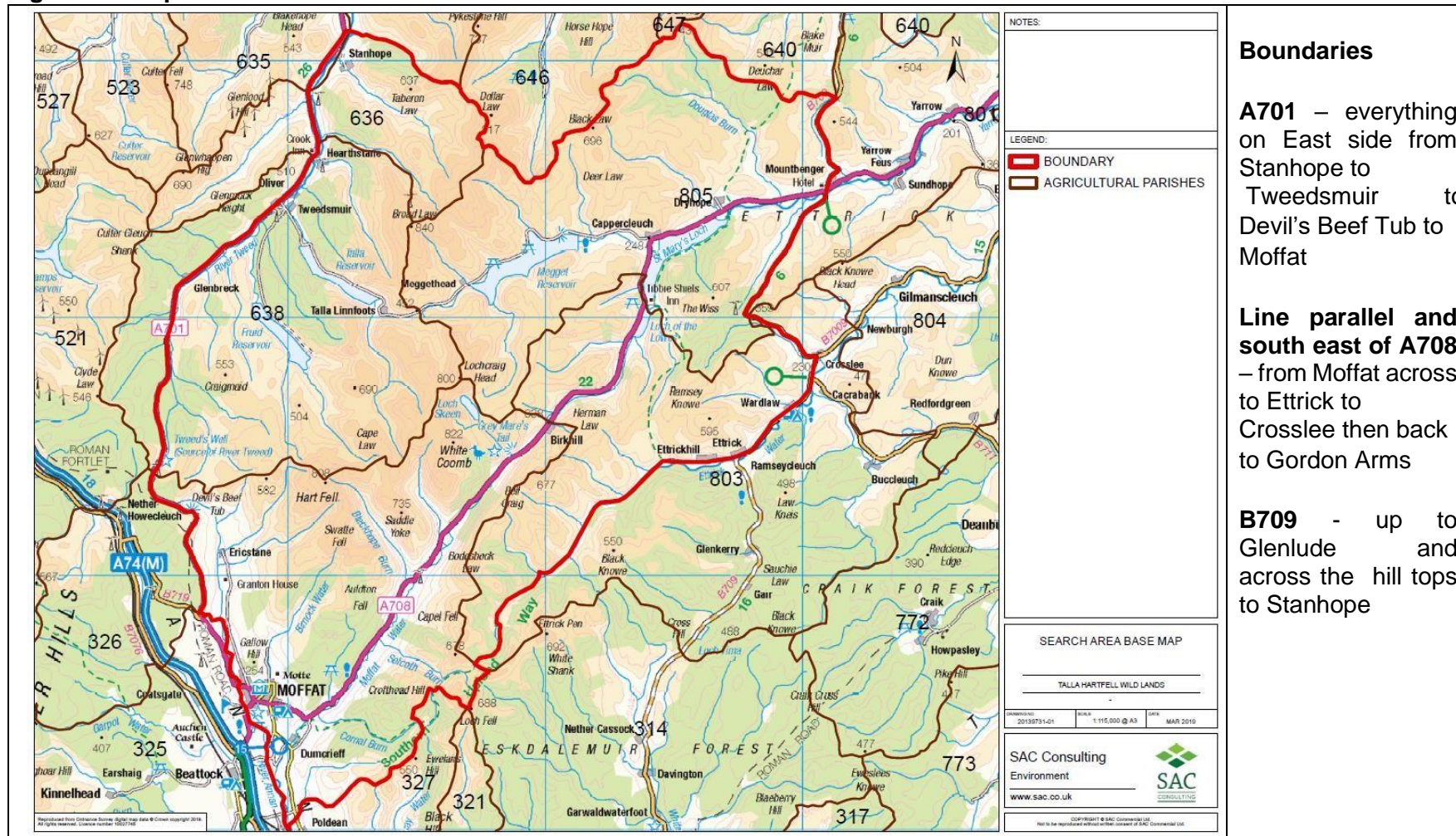
b. Future economic projections

Assess the impact of the continuation of current trends in hill farming, commercial forestry, sporting, and related land use sectors – based on prevailing market, demographic and policy drivers, largely ignoring Brexit implications for future policy given the lack of certainty at present. This will also consider the future impacts of changes in farming and forestry techniques and business models and highlight relevant progressive landowners and methods in the study area and beyond.

Definition of the study area

3. The boundaries of the study area were defined by SUP and mapped by SRUC. The objective was to encompass both the core of the wild land area centred on Talla-Hartfell and a wider zone of greater economic activity including the town of Moffat. A map of the area is detailed in Figure 1 overleaf.

Figure 1 – Map of Talla – Hartfell wild land area



2. Land use in Talla - Hartfell

Data sources and limitations

4. The study of land use in the area has been based on the available data sources which contain a number of discrepancies, gaps and uncertainties as described in the following pages. SRUC have had to make a number of assumptions whilst preparing these figures and care should be taken when interpreting the results.

AgCensus

5. AgCensus data is an agricultural census collected annually in June via a postal questionnaire sent to farms in which they declare their current agricultural activities on all area of land that they manage. This data is available through Edina at Edinburgh University and is available for this project at their discretion as it is for charitable purposes (at <http://agcensus.edina.ac.uk/>).
6. The data collected is converted via algorithms developed by the Edinburgh University Data Library into 2km² grid square estimates, so that it can be visualised and used in Geographical Information systems and Excel for analysis (such as for this project). This also acts to prevent the identification of individual farms from the dataset, and to better represent.

Limitations/distortions of the data:

- a. A farmer is only required to return one census form, even if he owns several holdings, some of which may be in other parishes or even quite remote from the main holding. E.g. Livestock might not be located in the farm, but grazing elsewhere.
 - b. Farmers may under- or over-report agriculture activity (e.g. small holdings might produce one return; farms might straddle the boundary of 2 geographies). Rough grazing in particular may be either grossly over- or under-represented in any particular area.
 - c. The census are a 'snapshot' of agricultural activities on 1 June of each year.
 - d. The geographies (e.g. Scottish parishes, Welsh communities) vary in size and shape, and the land use capabilities also vary across these geographies.
7. This means that the AgCensus data can provide a good indication of agricultural activities in the area, but cannot give a precise figure. Also, the smaller the error, the greater the margin of error.

LCA Classifications

8. Land Capability for Agriculture is a dataset compiled by the James Hutton Institute, which uses soil maps, landscape and climatic information to be interpreted into land classification maps, which ranks land on the basis of its potential productivity and cropping flexibility. Class 1 land is the highest agricultural value, and Class 7 is the lowest. The LCA data was also accessed through Edina, although is publicly available via the Scotland's Environment website.

Limitations:

9. The data only describes land that is capable for agricultural use, not whether the land is actively farmed, or whether it is used for types of farming according to its LCA classification. It can therefore only give us an estimate of farming potential for the area, as opposed to a snapshot of agricultural activity in the area.

<https://www.hutton.ac.uk/learning/exploringscotland/land-capability-agriculture-scotland>
https://www.hutton.ac.uk/sites/default/files/files/soils/lca_leaflet_hutton.pdf
<https://map.environment.gov.scot/sewebmap/>

National Forest Inventory

10. The National Forest Inventory is an annual survey, based on aerial photographs and representative on-the-ground sample surveys, which are analysed to evaluate current size, distribution, composition and condition of UK forests and woodlands, as well as capturing some other land uses. The data is compiled by Forest Research and publicly available through the Scottish Government.

Limitations:

- a. Some of the data available for the Talla area shows up with no defined category
- b. It gives detailed information about the type and age of forestry, but information about non-forestry area is much more limited
- c. Does not distinguish between on-farm woodland, public/trust owned woodland, and privately owned forestry.
- d.

More information is available at:

<https://www.forestresearch.gov.uk/tools-and-resources/national-forest-inventory/aboutthe-nfi/>
<https://data.gov.uk/dataset/ae33371a-e4da-4178-a1df-350ccfcc6cee/national-forestinventory-woodland-england-2015>
<http://www.whoownsscotland.org.uk/>

Land ownership

11. Information on land ownership, particularly on estimated areas, was largely extracted from a publicly available online database called Who Owns Scotland (<http://www.whoownsscotland.org.uk/>), itself compiled from data at the Registers of Scotland and the National Archives of Scotland. Access is available through free membership, and gives details on registered owners, contact details and area of the land parcel.

Limitations:

12. Although the data was researched from public sources, the dates of the sources vary, and some are as many as 20 years out of date, so it cannot be considered accurately up-to-date.
- a. Some land parcels extend beyond the selected Talla area, therefore the area within the Talla boundary has been visually estimated
 - b. It does not cover the entire Talla area; the areas around Moffat are missing

Summary of land use estimates

Table 1. Indicative land use estimates - Talla Hartfell

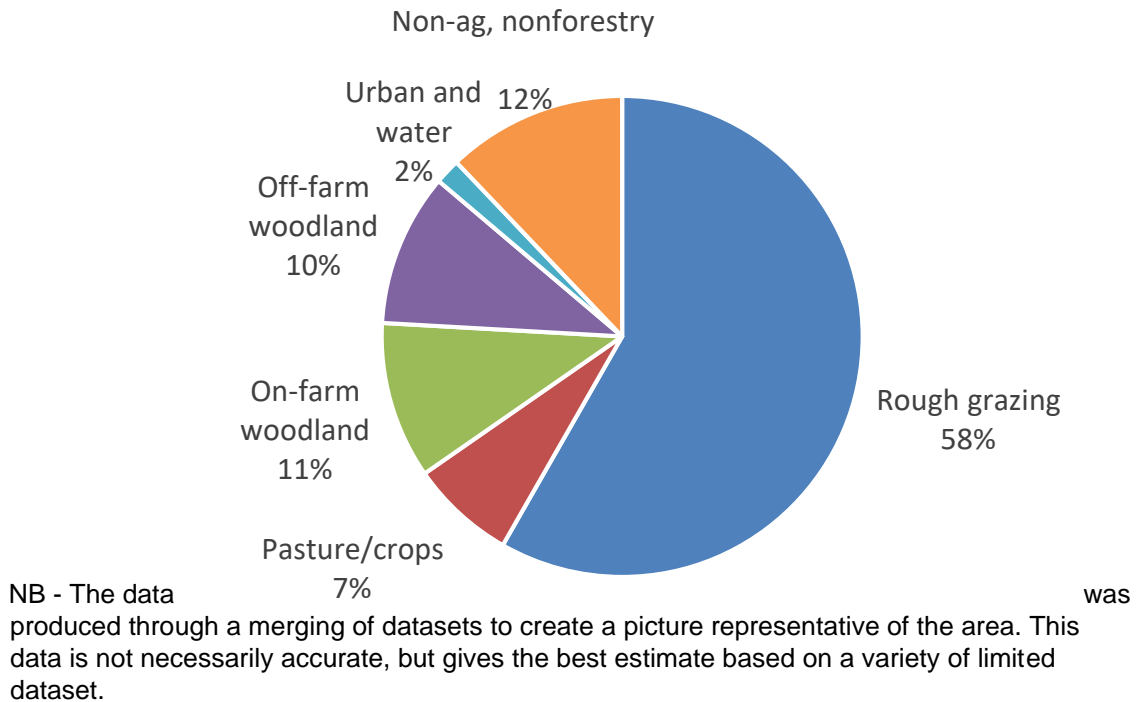
Land use	Area (Ha)	(%)
Rough grazing	27,459	58%
Pasture/crops	3,334	7%
On-farm woodland	4,974	11%
Off-farm woodland	4,849	10%
Urban and water	806	2%
Non-ag, non-forestry	5,703	12%
Total area	47,125	100%

Source: AgCensus, National Forest Inventory, SAC Consulting

13. The 5,703ha of non-ag, non-forestry indicates land that is not suitable for use for agriculture or forestry, and not taken up by water or urban area, e.g. land too steep or too rocky to manage, or patches of unused/marginal land. This area is captured under various LCA categories, but does not necessarily mean that the land is capable for use for agriculture.

14. In 2015, only 76% of the total area (47,125ha) is reported in the Agricultural Census; therefore, 24% of land can be assumed to not be agricultural land. Of this 43% is off-farm woodland, 7% is urban and water, and 50% is non-agriculture and non-forestry.
15. Of the 21% total recorded area of woodland/forests, 51% is on farm and 49% is off-farm.

Figure 2 – Indicative land use - Talla – Hartfell



16. The data provided by AgCensus, from the annual June Agricultural Survey, reports only on agricultural data, and as is reported by farm holdings within the area, might actually include land areas that fall outside of Talla. However, this gives the most accurate estimate of actively farmed areas of rough grazing, pasture/crops, and on-farm woodland.
17. The National Forestry Inventory gives the most accurate total area of forestry within the Talla area; taking the area of on-farm forestry reported in the AgCensus from the NFI total gives the area of forestry owned privately or by organisations such as the Borders Forest Trust etc.
18. LCA data provides an accurate picture of the area taken up by urban land (Moffat) and the loch areas, but is limited for assessing agricultural activity in representing 'capability for use' not actual use.

Agriculture - hill farming

19. Of Talla Hart Fell's total land area of 47,125 ha, LCA land (i.e. Land with Capability for Agriculture) accounted for (96.1%). LCA classifications are determined from soil, climate and relief and provide an indication of the potential for agriculture on land, although do not

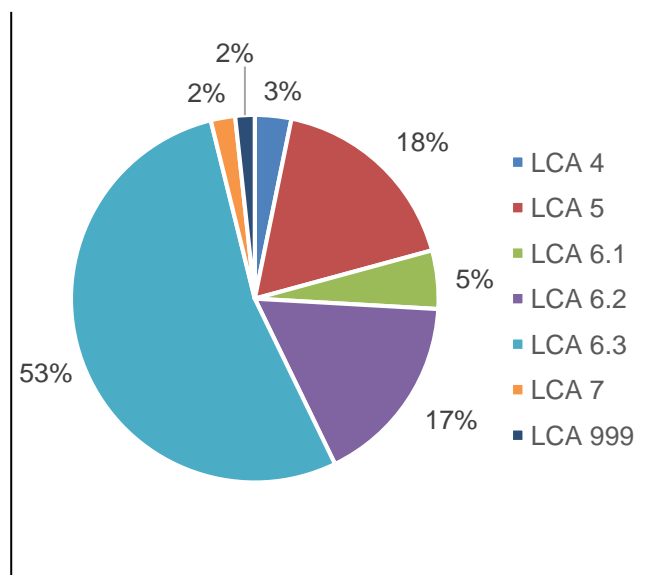
necessarily indicate land areas that are actually in agricultural use, The total area of land with forestry excluded is 37,082 ha, 78.7% of the total area. The vast majority (77%) of the area is made up of LCA 6 land, i.e. rough grazing, and over two thirds of this is low quality rough grazing on fell tops.

20. The table below describes the amount and topographic distribution of these land areas within Talla Hart Fell.

Table 2 – Land Capability for Agriculture - Talla – Hartfell

LCA type	Description	Talla area	Area (ha)	% of total area
4	Narrow range of crops, primarily on grassland with short arable breaks	Largely around Moffat, along A71 and Mountbenger	1,510	3%
5	Improved grassland	Largely north west of Moffat, near Wardlaw and Capel Fell	8,275	18%
6.1	Rough grazing, high quality	Lower valleys	2,419	5%
6.2	Rough grazing, moderate quality	Lower valleys	7,969	17%
6.3	Rough grazing, low quality	Fell tops	25,133	53%
7	Very limited agricultural use	Swatte Fell and nearby fell tops	1,012	2%
999	Urban and water	Loch Skeen and reservoirs	806	2%

Figure 3 – Land Capability for Agriculture - Talla – Hartfell



Source: National Forestry Inventory and Land Capability for Agriculture statistics allow us to see the distribution of agricultural land according to LCA type, detailed in the following table:

Table 3 – Land use by LCA and activity – Talla - Hartfell

LCA type	Description	Area (ha)	% of total area	Agric. land (ha)	% agric. land (ha)	Non-agric. land, incl. woodland (ha)	Woodland (ha)	% woodland
4	Narrow range of crops, primarily on grassland with short arable breaks	1,510	3%	1,375	91%	135	135	9%
5	Improved grassland	8,275	18%	5,768	70%	2,507	2,461	30%
6.1	Rough grazing, high quality	2,419	5%	1,930	80%	490	486	20%
6.2	Rough grazing, moderate quality	7,970	17%	5,374	67%	2,596	2,586	32%
6.3	Rough grazing, low quality	25,133	53%	21,054	84%	4,079	4,019	16%
7	Very limited agricultural use	1,012	2%	876	87%	136	136	13%
999	Urban and water	806	2%	0	0%	806	1	0%
TOTAL		47,125	100%	36,377	77%	10,748	9,823	21%

21. It is not possible to determine how much on-farm forestry there is per LCA type, and so some agricultural land used for forestry will not be captured in these agricultural land statistics. However, according to the Agri Census data, there are 4,947 ha woodland onfarm across the whole area, or 46% of total woodland. This, added to the overall agricultural area, gives a total area of agricultural land as 41,324 ha, taking the percentage of agricultural land from 77% to 88%.
22. The data also shows that, currently, the majority (72%) of woodlands cover LCA 5-6.2 land, and though agricultural land dominates all LCA types, it covers far more area (average 85.5%) of the lowest quality land (LCA 6.3-7) than forestry (average (14.5%). This challenges the assumption that forestry is placed on the most marginal land and land of lower potential economic value for agriculture.
23. The 2015 Agriculture Census gives a picture of agricultural activity in the area. The most dominant enterprise appears to be sheep farming, with 29,277 breeding ewes in the area, and beef cattle follow as a secondary livestock enterprise. There were no other significant livestock enterprises in the area, and very small areas of cereal and forage crops (around 20ha), largely for stockfeeding.
24. Total rough grazing was recorded as 27,459 ha; this is less than the LCA total of 35,522 ha, although not all land classified as capable for agriculture will necessarily be included in farm land or utilised for farming. The total on-farm woodland area was 4,973 ha, accounting for approximately half of the total forestry area. Owned area was 18,277 ha (63%) and rented area was 10,757 ha (37%).
25. Total agricultural staff was 45.60 units, of which 6.6 were casual/seasonal workers, 10.8 were part-time regular staff, 16.9 were full-time occupiers, 18.5 part-time occupiers, and

- 22.10 were part-time spouses.
26. Comparing the 2005 and 2015 Agricultural Census data for the same land area gives an indication of changes to farms in the area over the last 14 years. During this time breeding ewe numbers were reduced by 30%, beef cows by 11%; rough grazing area decreased by 14%, and total grazing by 10%.
27. While 18% fewer farms were recorded in 2015 than 2005, there was a 41% increase in owned farm area, and a fall of 24% in rented area. Forestry area increased by 569% to 4,974 ha in 2015.
28. Total regular and casual staff, both family and hired, was 45.60 units in 2015, an increase of 8% from 2005; how this is distributed, however, is complicated. There was a 30% decrease in full-time regular staff (family and hired) as well as a 10% decrease in spouses contributing to farm work during this period. There were also a decrease of 22% in full-time occupiers and 11% in part-time occupiers. However, there was an increase of 5% in casual and seasonal workers, and of 35% of part-time regular staff (family and hired). Overall, this indicates a shift from full-time farm work towards part-time farm work, largely through hired labour, as opposed to farm labour. This also suggests that either farming households in the area are becoming smaller, or that household members have moved to non-farm employment.

Table 4 – Agricultural land use changes 2005-2015 – June Agricultural Census – Talla - Harfell

Year	No farms (#)	Rough grazing (ha)	Total grazing (ha)	Farm woodland (ha)	Total ag. holding land (ha)	Non ag. land (ha)	Total land area (ha)
2005	45.0	31,801	34,273	744	35,080	12,045	47,125
2015	37.0	27,460	30,766	4,974	35,773	11,352	47,125
Change '05 - '15 (#)	-8.0	-4,341	-3,507	4,230	693	-693	
Change '05 - '15 (%)	-18%	-14%	-10%	569%	2%	-6%	

Source: Edina, AgCensus

Table 5 – Agricultural employment, ownership and livestock nos changes 2005-2015 – June Agricultural Census – Talla - Harfell

Occupier		Labour		Land ownership		Livestock numbers	
Year	Full-time occupiers (#)	(Parttime occupiers (#)	Paid staff - regular & casual)	Owned area (ha)	Rented area (ha)	Breeding ewes (#)	Beef cows (#)

2005	21.8	22.8	42.3	12,952	14,192	41,529	1,151
2015	16.9	20.2	45.6	18,278	10,757	29,277	1,024
Change '05 - '15 (#)	-4.9	-2.6	3.3	5,326	-3,435	-12,252	-127
Change '05 - '15 (%)	-22%	-11%	8%	41%	-24%	-30%	-11%

Source: Edina, AgCensus

Forestry

29. Forestry within the Talla Hart Fell area covers 9,823 ha, largely in valleys north east of Moffat, and along the A701 and A708. This accounts for 20.8% of the total area of 47,124 ha. Just over half (52%) of the forestry is recorded as conifer, and felled forestry accounted for an additional 16%, much of which is likely to have been conifer.
30. Assumed woodland are areas of new planting where the woodland is not yet visible from aerial photography (how the survey assesses woodland type), and therefore it is not possible to determine forestry type. Assumed woodland is 20% of the recorded woodland according to the 2017 National Forest Inventory; more research on-the-ground may provide more clarity on precise land use, and future ecological and socio-economic impacts.
31. Larger areas of forestry are managed by the Borders Forest Trust. This includes three main areas:
- Corehead, an area of 640 ha in the west of 230,000 largely broadleaf trees, which aims to integrate native woodlands, wetlands and heathlands.
 - Carrifran Wildwood, a 607 ha woodland of native species
 - Talla and Gameshope, an area of 1832 ha currently being surveyed with the potential of rewilding or reforestation
 - Other smaller areas of forestry appear to be owned by farms, private owners and investment funds.

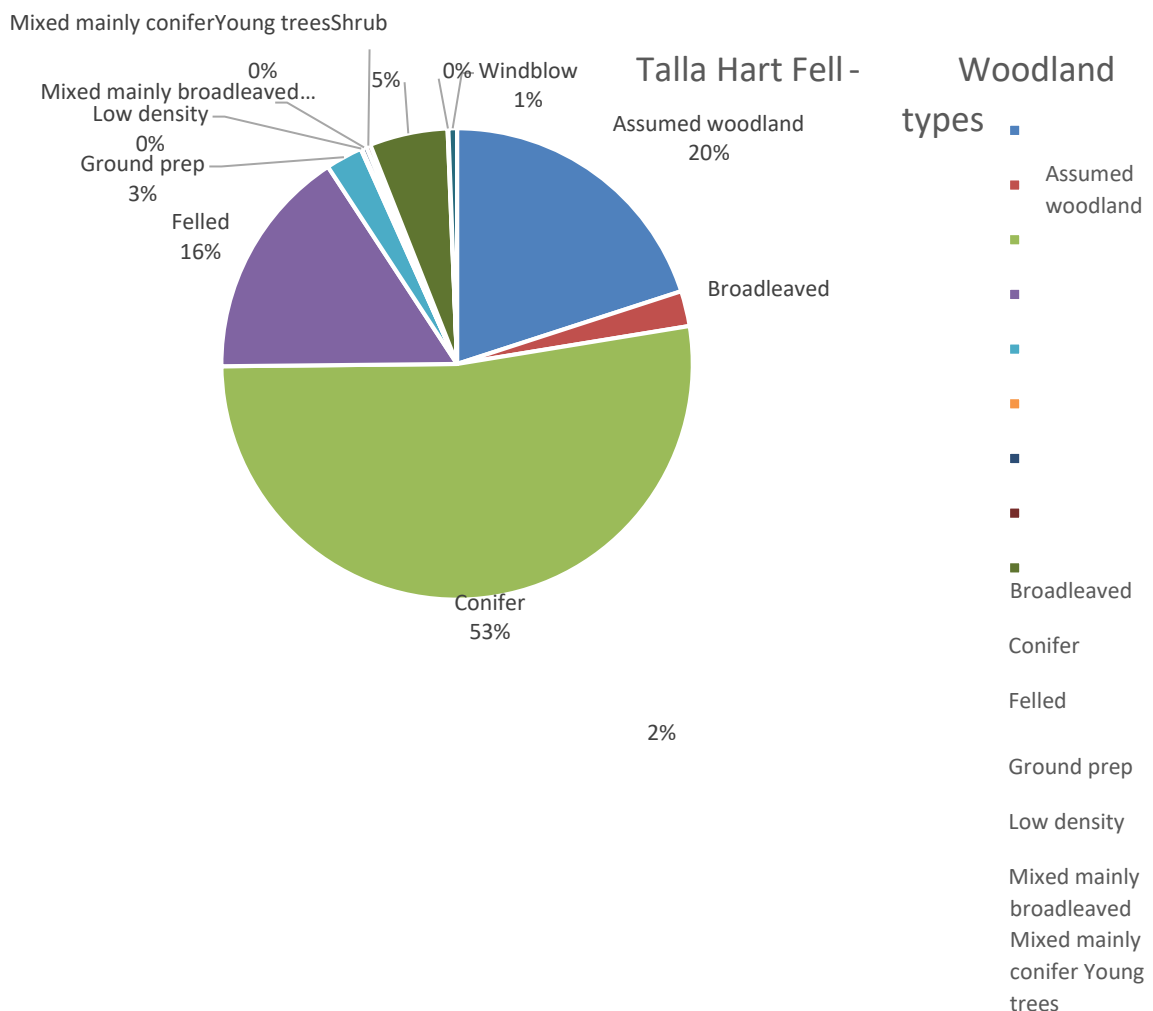
Table 6 – Woodland categories by area – Talla - Hartfell

Forestry type	% of total land area	% of forestry area	Area (ha)
Assumed woodland	4%	20%	1,965
Broadleaved	1%	2%	237
Conifer	11%	52%	5,149
Felled	3%	16%	1,564

Ground prep	1%	3%	248
Low density	0%	0%	9
Mixed mainly broadleaved	0%	0%	31
Mixed mainly conifer	0%	0%	30
Young trees	1%	5%	526
Shrub	0%	0%	5
Windblown	0%	1%	58

32. The total on-farm woodland area was 4,973 ha, accounting for approximately half (51%) of the total forestry area. There is no data to indicate what type of woodland this is. However, forestry on-farm increased from 744 ha in 2005 to 4,974 ha in 2015, an increase of 569%.

Figure 4 – Woodland categories by area – Talla - Hartfell



Sporting/shooting

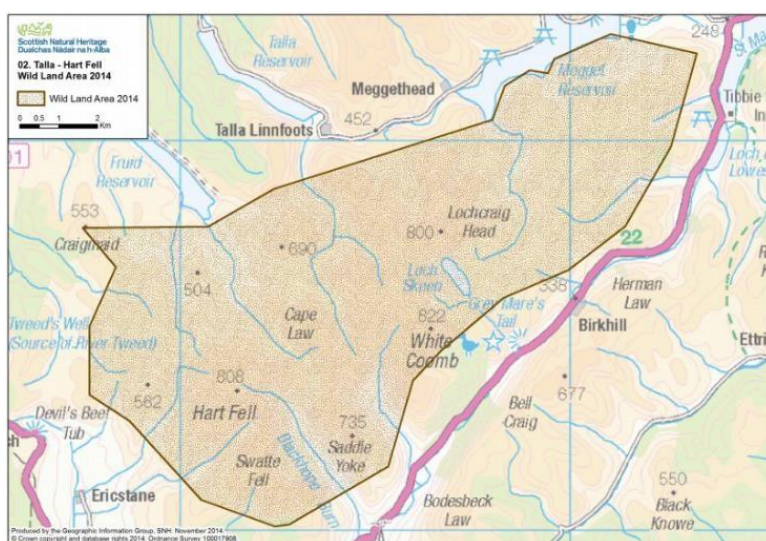
33. There is little data available on land use for sporting in the Talla area. The National Forestry Inventory and Agri Census data suggests that 49% (4,849 ha) of woodland is not on-farm woodland, and is therefore privately owned, either by trusts or charities such as the Borders Forest Trust or The Woodland Trust, or by private owners. This non-farm woodland is likely to be used for leisure, conservation, sporting and timber, although the share of 'outputs' is unclear. Deer farming is known to take place in the area.

Conservation

34. Wildland covers largely fell tops and LCA 6.3 area, an area of 9,335 ha. The IUCN defines 'wildland' as "an area of land especially dedicated to the protection and maintenance of biological diversity, and of natural and associated cultural resources". There are Sites of Special Scientific Interest (SSSI's) in the Carrifran area and fells north of Megget Reservoir.

35. There is also the Moffat Hills Special Areas of Conservation (SAC) of 2,882 ha. The Moffat Hills SAC is largely made up of bogs, grassland and heathland. This provides obligations on protecting and enhancing the management of water, soils, woodlands, habitats and biodiversity. Planning and land use controls apply to these areas, which requires that any development must have no adverse effect on conservation management, unless there are overriding reasons regarding public, social or economic interest.

Figure 5 – Map of Moffat hills SAC



36. The Talla area includes areas of peaty soils and shallow peatland. An area from Grey Mare's Tail up to near Cappercleuch and around Deer Law includes the highest class of peatland, classed as "nationally important carbon-rich soils, deep peat and priority peatland habitat and areas likely to be of high conservation value, with a depth

in this location of up to 3m. There is also a large area of lower class peaty soils in the northwest, which included in opposition to the Whitelaw Brae Wind Farm.

37. An area south of Swatte Fell to Moffat is within SSRS Priority Areas for Red squirrel Conservation (PARC) (Annan Valley), creating obligations for managing grey squirrel population e.g. with traps, and encouraging the recolonisation of adjacent forest & woodland by red squirrels.
38. The whole of the Talla area is within an area of predator control for Black Grouse (which is severely endangered); this does not directly affect land use, but criminalises disturbance of wild birds when it is nesting or has eggs or young.

Renewables

39. Currently there are no wind farms in the Talla Hart Fell area, although Clyde and Glenkerie Wind Farm are situated just to the west of the area, with a total of 217 turbines and a combined capacity of 544 MW. Just over the A701 and west of the Fruid Reservoir Whitelaw Brae Wind Farm has been approved, which would join the also approved extension of the Clyde Wind Farm. Whitelaw Brae would include 14 turbines (smaller than surrounding turbines), providing 50 MW power, and standing 134m tall. Local opposition to the proposal highlighted a concern on the impact on tourism from the wind farm, as well as damaged to upland peat in building the site. However, the site doesn't cover deep peat, only falls in a class 3 Carbon and Peatland map area, which is "Vegetation cover [that] does not indicate priority peatland habitat, but is associated with wet and acidic soil types; most soils are carbon-rich soils" (SNH definition).
40. In a study conducted by the James Hutton Institute on the impact of wind farms on tourism, 80% of UK respondents, and 83% of Scottish respondents, said their decision on where to visit or stay would not be affected by the presence of a wind farm, and 55% of all respondents disagreed that they would avoid an area of the countryside if they knew there was a wind farm there. It also highlighted that more active hill walkers were marginally more accepting of wind turbines than less active tourists, that wind farms on farmland were more accepted than in wild places, and that turbines were considered to have a less negative impact on the landscape than other man-made structures such as phone masts or power stations.
41. Scottish Water run a 0.14MW hydroelectric generator at Megget Reservoir. Along Moffat Water Selcoth Renewables Ltd run a 0.189MW hydro scheme above Selcoth fish farm, and just downstream is a 0.1MW capacity on-farm hydro scheme at Crofthead Farm.
42. Role of community power projects -
<http://www.communitypower.scot/casestudies/projects/earlsburn-wind-farm/>

Utilities/ water

43. The three main reservoirs (Talla, Fruid and Megget) feed into the Tweed and supply Edinburgh with water. Megget has a maximum capacity of 63,600,000m³, Talla of 12,730,000m³ and Fruid of 11,183,160m³.
44. Settlements in the breach zone are Peebles, Innerleithen, Galasheils, Melrose, Kelso and Coldstream. All three reservoirs are designated high risk of danger and damage in the event of 'an uncontrolled release of water' though this gives no indication of the likelihood of a breach; however, it does highlight the importance of the role of management of the reservoirs for areas downstream as well as the immediate Talla area. This raises questions about options for land use management in water catchments feeding the reservoirs (around half of the Talla Hart Fell area), such as introduction of forestry.

3. Agriculture – economics

Agriculture

Methods

45. It was not feasible to obtain financial data directly from the farms in the study area given limitations of time, cost and likely participation. Instead data was adapted from the most comprehensive survey of farm financial performance in Scotland; the Scottish Government's Farm Business Survey. This survey of around 500 farms is derived from participating farms across Scotland and includes the major farm types of which the most relevant to the THF area is the Less Favoured Area (LFA) specialist sheep.
46. The agricultural financial data used in the report was derived from the 2016/17 Scottish Farm Business Survey; subset from the south of Scotland region combining Scottish Borders with Dumfries and Galloway. The farm type was specialist LFA specialist sheep farms. LFA specialist sheep farm type selected – due to the predominance of rough grazing and sheep breeding.
47. Livestock numbers and financial figures were adjusted to reflect the lower stocking density in the study area approximately 70% of the level in FBS southern Scotland region

Figure 6 - Farm business survey financial trends for LFA specialist sheep farms in southern Scotland

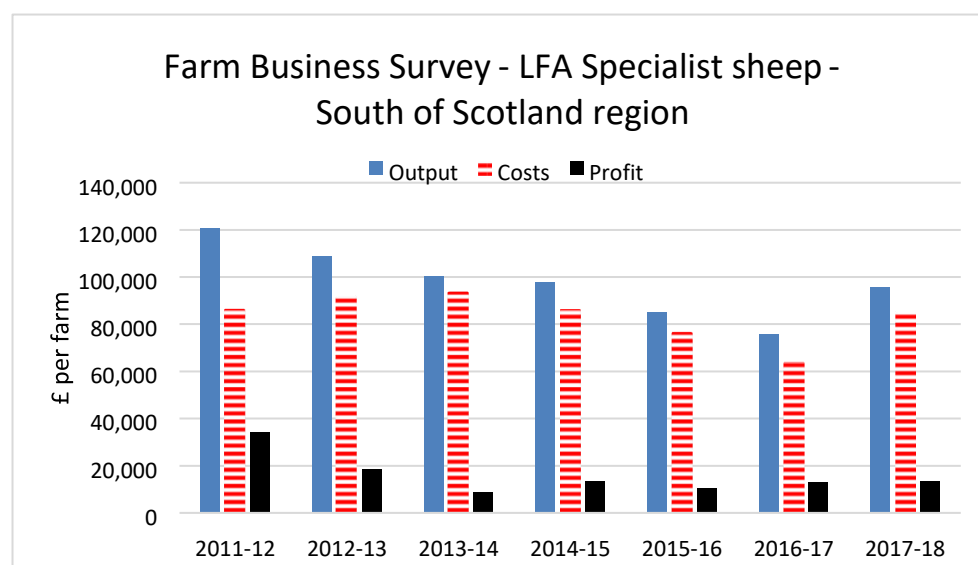
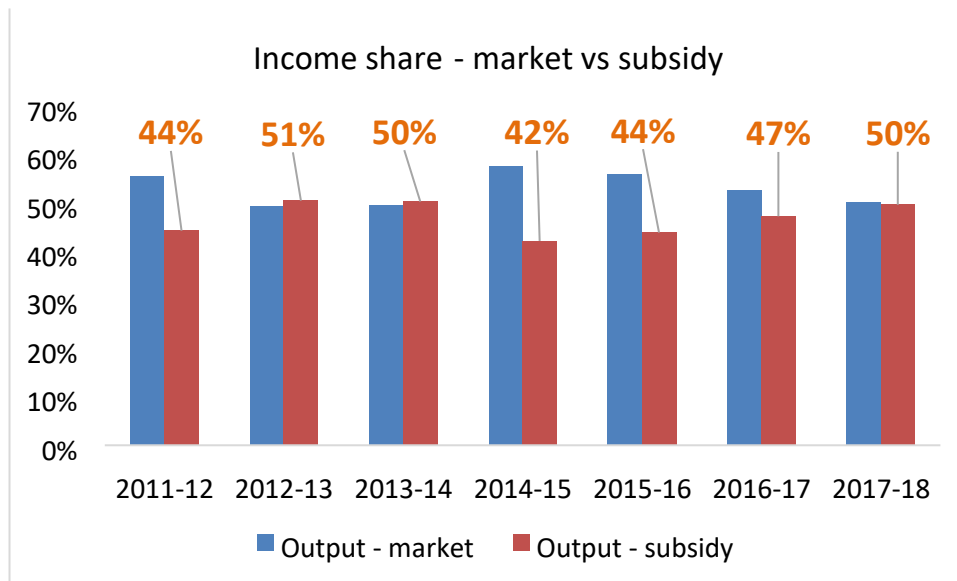


Figure 7 – Output share between market and subsidy for LFA specialist sheep farms in southern Scotland



48. Key historic financial trends on LFA specialist sheep farm

- Low but consistent level of profitability on average
- Subsidies typically make up 50% of income
- Market income drives volatility
- Currency changes affect both subsidies and sheep prices

Table 7 – Financial estimates for LFA specialist hill sheep farming in Talla – Hartfell

Talla HF 2017-18				
	per ha	per farm	Total Talla HF	Share
OUTPUT				
Crops	0.99	961	35,566	
Livestock	49.94	48,279	1,786,331	
Miscellaneous	2.85	2,752	101,816	
Market output	52.18	50,451	1,866,704	49%
Grants & subsidies				
LFASS	13.67	13,215	488,972	
BPS	35.23	34,059	1,260,192	

Other	4.74	4,581	169,512	
Subsidy output	53.64	51,856	1,918,676	51%
Total Output	105.96	102,444	3,790,417	100%
INPUTS		0		
Variable costs	32.46	31,380	1,161,056	35%
Fixed costs	61.51	59,471	2,200,426	65%
Total costs	93.97	90,851	3,361,481	100%
FBI	14.59	14,108	522,005	

Source: SRUC

49. Key estimates for hill sheep farming in the Talla HF area in 2017/18

- a. 35,773ha estimated as agricultural land
- b. Total output £3.9m
- c. Of which 49% (£1.9m) from the market (sheep sales) and 51% (1.9m) from grants and subsidies.
- d. Total costs of £3.4m
- e. Profit £0.5m
- f. = Less Favoured Areas Support Scheme subsidy £0.5m

4. Forestry – economics

Commercial forest area estimates

50. Estimates of woodland area at Talla Harfell area are detailed in section 2. From the available data SRUC have estimated the potential area of commercial forestry based on the following assumptions;

- a. Based on the National Forest Inventory
- b. Difficult to interpret categories and understand true area and productive capacity
- c. Current estimates assume 70% is commercially viable conifer forestry – 6,875 ha.
- d. WARNING – approximate estimates only.

Financial estimates of commercial forestry activity

51. SRUC have prepared estimates of financial performance of the commercial forestry based on;

- Cost and return estimates from established commercial conifer forestry on an annual basis – levelised for a 40 year rotation
- An SRUC / Confor survey of woodland managers of commercial woodland at neighbouring Eskdalemuir in 2011/12 and 2014.
- Updated with timber price and input cost changes. Adjustments for inflation of costs based on the Retail Price Index to account for inflation and for timber prices based on the Forestry Commission's GB timber market reports.

Table 8 – Estimated forestry costs and returns per unit area (ha)
Estimated costs and returns for commercial conifer forestry (Eskdalemuir)
 - per ha for established forests on an annual levelised 40 year rotation

	2011 & 2012 survey	2014 - estimate	2017 - estimate	Change ' 2014 to 2017	
	(£/ha)	(£/ha)	(£/ha)	(£)	(%)
OUTPUTS					
Timber	495.15	549.61	637.55	87.94	16%
Grants	15.76	15.76	15.76	-	0%
Total	510.90	565.37	653.31	87.94	16%
INPUT COSTS					
Restocking	40.93	42.50	44.13		
Establishment	11.59	12.04	12.50		
Deer and pest control					
Harvesting	5.05	5.25	5.45		
Haulage					
Roading	132.06	137.13	142.39		
Management & professional					
Notional land rent	98.26	102.03	105.94		
Total	21.56	22.38	23.24		
Net profit	17.57	18.24	18.94		
	19.00	19.73	20.49		
Table 9 - Estimated forestry costs and returns in the Talla- Hart Fell area	346.03	359.30	373.08	13.78	4%
	165	206	280	74.16	36%

Estimated commercial forestry costs and returns for Talla Hartfell area
 - for established forests on an annual levelised 40 year rotation on 6,875ha

	2011 & 2012 survey	2014 - estimate	2017 - estimate	Change ' 2014 to 2017	
	(£)	(£)	(£)	(£)	(%)

OUTPUTS

Timber				604,573	16%
Grants	3,404,141	3,778,579	4,383,152		
Total	108,327	108,327	108,327		
INPUT COSTS				604,573	16%
Restocking	3,512,469	3,886,907	4,491,479		
Establishment					
Deer and pest control					
Harvesting	281,395	292,187	303,393		
Haulage					
Roading	79,706	82,763	85,937		
Management & professional					
Notional land rent	34,737	36,070	37,453		
Total	907,934	942,754	978,909		
Net profit	675,540	701,448	728,349		
52. Key points of the forestry economic analysis	148,200	153,883	159,785		
a. Forestry has seen a strong increase in profitability due to rising timber prices with a per hectare output increasing by	120,795	125,427	130,238		
	130,625	135,635	140,836		
	2,378,933	2,470,166	2,564,899	94,733	4%
	1,133,536	1,416,740	1,926,581	509,840	36%

16% and net profit by 36% between 2014 and 2017.

- b. Total output for commercial forestry in the Talla Hartfell area is estimated at £4.5m in 2017, an increase of 16% since 2014 due to rising timber prices
- c. The rising profitability of commercial forestry in response to strong timber profitability is leading to a heightened investor interest in purchasing open land for afforestation in the area and leading to a potential significant loss of open and agricultural land.

4. Afforestation – economics

Afforestation – commercial conifer

53. SAC Consulting monitor returns from woodland planting considering the potential costs and returns and reflecting current market and policy factors. The following table details the sources of costs and returns considered in the SAC commercial conifer investment model.

Table 10 - Conifer afforestation – SAC income and cost assumptions

<u>ASSUMPTIONS</u>	
<ul style="list-style-type: none"> • Productive conifer, 80% (40ha) conifer, • <u>Average</u> growth rate, fell at 40yrs 	
INCOME	COSTS
<ul style="list-style-type: none"> • Income at initial establishment <ul style="list-style-type: none"> – FGS – Woodland creation – Maintenance – Retention of BPS for farmer • Timber income from thinning and felling • No income at restocking • <i>NB: Not included in model - requires separate consideration Carbon, other benefits (e.g. shelter etc)</i> 	<ul style="list-style-type: none"> • Design • Fencing • Mounding • Planting • Losses • Open ground: • Professional fees/supervision fees

Source: SAC Consulting Forestry investment model 2019 – commercial conifers

54. Future timber income estimates from commercial afforestation with conifers (Sitka spruce) have been estimated by SAC Consulting based on conservative values related to recent timber price trends. These combine average growth rates for sitka spruce on accessible sites in the uplands or on lower grade agricultural land to determine typical yields of saleable timber at thinning and final felling. Timber values are based on recent averages by grade from SAC Consulting managed thinning and clear felling operations. These estimates are below some of the high prices paid in the last year when timber prices have risen well above trend levels as it is unclear whether prices will be sustainable at this level.

Table 11 - SAC Conifer afforestation model – timber income assumptions

Year	THIN				FELL	
	20	25	30	35	40	Total
Timber area (ha)	39.60	39.60	39.60	39.60	39.60	39.60
Timber volume (t/ ha)	30.62	54.86	54.86	57.74	351.83	550
Timber volume (t)	1,213	2,172	2,172	2,287	13,932	21,776
Timber price (£/t)	10.25	11.00	13.90	20.60	31.38	
Factor						
Timber income (£/ha)	314	603	763	1,189	11,040	13,910
Timber income (£)	12,429	23,897	30,197	47,102	437,202	550,826

Source: SAC Consulting forestry investment model – commercial conifer

55. Combining the costs of planting, maintenance and harvesting with the estimated income and adjusted to the time value of money, SAC Consulting have estimated typical potential economic returns for establishing commercial conifers. These indicate net positive return with a Net Present Value of £4,232/ha and an annual equivalent (EAE) of £176.26/ha/yr. This equates most closely with equivalent alternative annual returns that landowners could access such as letting land for grazing.

Table 12 - SAC Conifer afforestation model – estimated investment and rental returns

Results	Total	Per ha
Net Present Value	£201,881	£4,232
Annuity factor	4.1%	
EAE (margin) total annual	£8,234	£172.62

Source: SAC Consulting forestry investment model – commercial conifer Note; EAE = Equal Annual Equivalents¹

Competitive land uses

56. For landowners considering whether or not to afforest open land the relative economics of woodland planting and longer term investment returns are an important consideration. The level of the returns from forestry reflect the species, growth rates, costs of planting and establishment, the grants available and the timing and value of future income from timber and other sources.

¹ [https://www.timbertax.org/publications/fs/aghandbook/ch2/#Economic Decision Criteria](https://www.timbertax.org/publications/fs/aghandbook/ch2/#Economic%20Decision%20Criteria)

Equal Annual Equivalent (EAR) - EAE spreads the benefits and costs of an investment over its useful life in the same way that installment payments spread the cost of a loan over the payback period. Projects with unequal lengths can be compared using EAE because infinity is the assumed Investment horizon. This permits comparisons among projects of differing lengths – for example multi-year projects multi-year forestry versus annual crops or enterprises..

57. The following table compares afforestation (6) with letting land for agricultural use on a range of terms. Short term grass lets are the most comparable alternative land use and these incur annual costs for the maintenance of fencing, drainage and liming. Rental returns for these are therefore considered with and without these costs included. From this comparison forestry investment through afforestation is becoming viable with conventional agricultural letting.
58. Making a direct comparison between short term and long term land uses is fraught with difficulties however for long term investors the balance of profitability is moving in favour of forestry in certain areas.

Table 13 – Rental equivalent of competing land uses

Land use or lease type	Rental equivalent (£/ha/yr)		Landowner - eligible for Basic payment?
		Less costs* for grass lets	
1.Short term grass lets – improved pasture.	262	188	Yes
2.Short term grass lets – perm past.	176	102	Yes
3.Short term lets – rough grazing	54	37	Yes
4.Short Ltd Duration Tenancy – all#	114		No
5.All tenancies - LFA cattle & sheep#	44		No
6.Afforestation i) conifers	172		Yes – with entitlement No – without entitlement

Source: SAC Consulting, SAC Farm Management Handbook 2018-19

Notes - * Less costs of grass lets;

- i) Improved pasture less; fencing; £56/ha/yr and lime £18/ha/yr = £76/ha/yr ii)
Rough grazing less; fencing £17/ha/yr

5. Economics - sporting and shooting

59. Extracts from the Socio-Economics and Biodiversity Impacts of Driven Grouse Moors in Scotland report:

“Much of the commissioned research and industry-collated socio-economic evidence suffers from self-selection and self-reporting bias. The lack of a definitive dataset that

includes all estates engaged in grouse moor management means that it is impossible to assess how representative research and industry data is of the whole sector.”

Table 14 - Indicative comparisons of annual expenditure per hectare and hectare required for FTE job

Land Use	Spend per Hectare	Hectares per Job	Source / assumption
Driven Grouse:			
• <i>Angus Glens</i>	£120 / ha	875 ha / FTE	<i>Mc Morran et al. (2015) – only driven grouse</i>
• <i>Monadhliath</i>	£51/ha	1,038 ha /FTE	
NGOs`	£181/ha	277 ha /FTE	<i>‘McMorran et al. (2013) *RSPB (various) based on running costs</i>
RSPB*	£144/ha	173 ha / FTE	
Sheep Farming	£98/ha	580 ha / FTE	<i>Scottish Government (2018)</i>
Largescale Wind	£2,240/ha local investment costs £7,150/ha Scottish investment costs £517/ha community benefit	15 ha /local FTE 5 ha / UK FTE	<i>BVG Associates (2017) - impacts annualised over 24 year lifetime</i>
Forestry	£346/ha	422 ha / FTE	
			<i>Bell (2014) - annualised costs of a 40 year rotation</i>

Table 15 – Employment linked to grouse shooting and grouse moor management (and wider game management) at UK, Scotland and regional levels (within Scotland)

Scale and focus	Source	Direct employment impacts (FTEs)	
Monadhliath and Angus Glens	Mc Morran et al. (2015)	110 direct FTE jobs in Angus, 44 in Monadhliath, seasonal jobs increase this to 130 and 56 FTE jobs (26 estates, 55,981ha moorland).	
Cairngorms National Park	Mc Morran et al. (2013)	52 landholdings with sporting activity reported 133 FTE jobs linked to sporting activity (27% of total estate employment in the sample). Estimated total estate employment (all sectors) at 559 FTE jobs (direct) and a further 940 (indirect) FTE jobs resulting from supply chain impacts of estates.	
Tomintoul	Mc Morran (2009)	38 direct equivalent FTE jobs and five trainees (on nine estates) and a further 12 related FTEs (e.g. cooks, cleaners) (9 estates).	
Scottish Borders	Scott Wilson Resource Consultants (2002)	68 direct equivalent FTE jobs on 27 estates.	
Upper Findhorn valley	Mackenzie (2000)	47 equivalent FTE jobs supported on nine estates (44,515 ha).	
Scottish Borders	Scott Wilson Resource Consultants (2002) (1999 data)	£0.8-£1.1m expenditure on 27 grouse shooting estates. Net costs (losses) incurred varied from £4-6 per/ha on commercial estates.	£144,000-£155,000 income from 100 grouse shooting days (45% commercial).

60. Savills (2016) estimate the value of a day of driven grouse shooting for a party of nine at between £20,000 and £40,000.

61. On Farr Estate, using an 800-strong sheep flock to reduce the tick burden across their grouse moor over a five year period resulted (as part of a wider grouse moor management

programme) in reducing average tick burdens on shot stags from 150 to 10 ticks. Grouse numbers increased over the same period from 80 brace in 2005 to 1,500 in 2009, with a corresponding increase in profitability (Moorland Forum 2011).

62. Grouse shooting and related activities can be important to some remote and fragile local economies. The review of evidence suggests that that around 2,500 FTE jobs (both direct and indirect) were reliant on the grouse moor sector in 2009 with £14.5 million spent on wages related to grouse moor management and support activities, with a total Gross Value Added contribution of £23 million to the Scottish economy.
63. There is limited evidence on the socio-economic impacts of alternative land uses on moorland areas, particularly of the emerging rewilding and conservation approaches being taken on some private estates. Some alternatives (e.g. farming, forestry and renewables) are heavily reliant on public payments to justify the activity economically, with others (e.g. rewilding, conservation) more reliant on the benevolence of owners or members.

6. Economics overall assessment

64. An economic comparison of the two main land uses in the area has been made in the following tables.
65. The key points from the comparison on a unit (per ha) basis are as follows;
 - a. Over 6 years to 2017 output per ha is estimated to have fallen by 23% in LFA hill sheep farming
 - b. Output has risen by 25% in established commercial forestry
 - c. Farming is more dependent on subsidy than forestry
 - d. Financial attractiveness of forestry has increased significantly increasing support for new planting

Table 16 – Financial enterprise comparison between hill sheep and established forestry – on an area basis (per ha)

Hill sheep						<u>Established</u> forestry			
Estimate for Talla HF - £ per ha						Estimate for Talla HF - £ per ha			
						<u>2011</u>	<u>2014</u>	<u>2017</u>	<u>Change</u>
						'11-17			
						£ per ha			
						<u>Change '11-17</u>			
						495	550	638	142
							26%		
£ per ha <u>Output</u>									
Market	104	93	75	-30	-32%	16	16	16	0
Subsidy	83	68	75	-8	-12%		0%		

	187 25%	162	-38 -23%	511	565	653	149142
<u>Input costs</u> 8%	135	144	0 0%	346	359	373	13427
<u>Surplus</u>	54	23	-31 -139%	165	206	280	
				22115			56%

66. Key points from the financial estimates over the whole Talla Hartfell area are as follows;

- a. Over 6 years to 2017 output is estimated to have
 - i. fallen by £1.4m (20%) from LFA hill sheep farming
 - ii. risen by £1.0m (+25%) from established commercial forestry
- b. Rising economic output from forestry appears to be offsetting declines from hill sheep farming
- c. But where does the spending go – is it remaining in the area or going to external contractors?

Table 17 – Financial enterprise comparison between hill sheep and established forestry – for the Talla – Hartfell area

Hill sheep				Established forestry			
Estimate for Talla HF - 35,773 ha				Estimate for Talla HF - ha 6,875			
2011	2014			2011	2014		
£ million			Change '11-17	£ million			Change '11-17
3.7	3.3	2.7		3.4	3.8	4.4	
3.0	2.4	2.7		0.1	0.1	0.1	
			-1.1 -				1.0 26%
<u>Output</u>			28%				0.0 0%
Market			-0.3 -				
Subsidy			10%				

	6.7 25%	5.8	-1.4	-20%	3.5	3.9	4.5	5.31.0
<u>Input costs</u> 8%	4.8	5.1	0.0	0%	2.4	2.5	2.6	4.80.2
<u>Surplus</u>	1.9	0.8	-1.1	-58%	1.1	1.4	1.9	
					0.80.8			56%

7. Employment - summary

67. Employment estimates have been prepared from a range of sources for farming and forestry.

There was insufficient data on other land use and employment in the study area to be able to include estimates for other land uses such as shooting, renewables, utilities and tourism.

Table 18 – Employment summary

Sector	Direct (FTE)	Indirect (FTE)	Total (FTE)
Agriculture*	45.6	22.8	68.4
Forestry+	16.29	12.1	28.4
Total	61.89	34.9	96.8

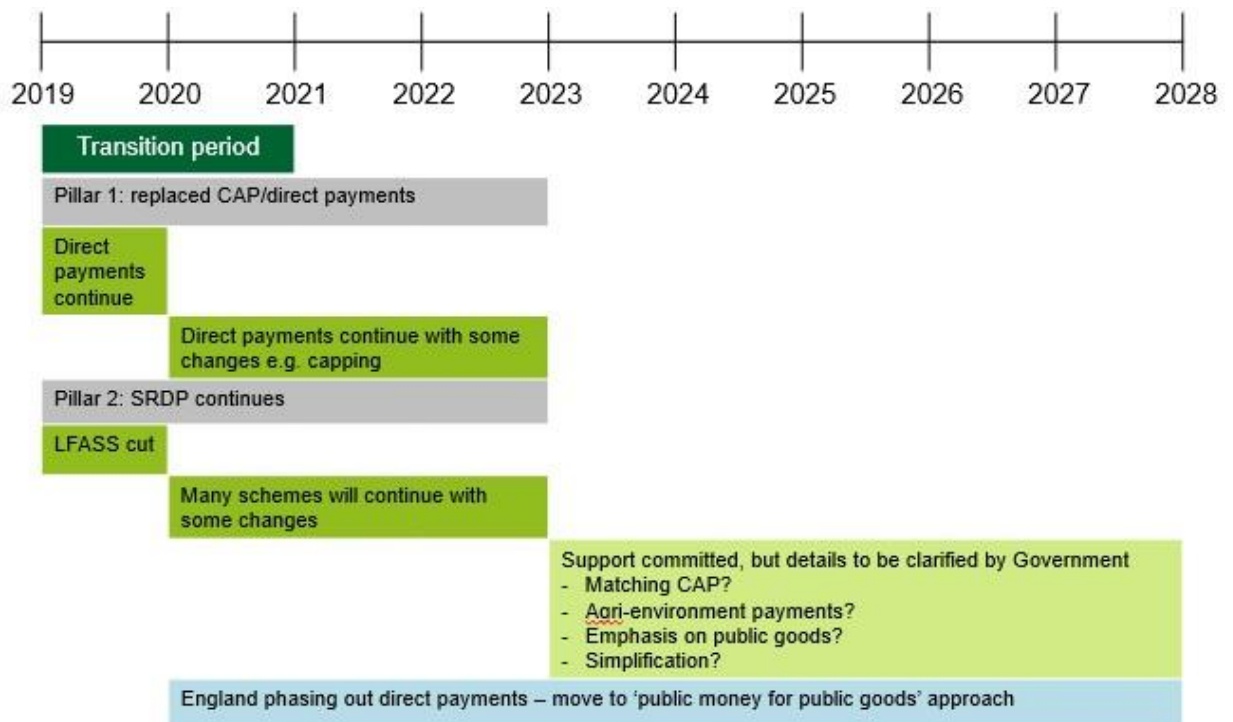
Source * AgCensus, Scottish Govt Input-Output tables, + SRUC – Confor Eskdalemuir study

8. Future land use projections

Changing rural subsidies and impacts of Brexit

68. The current Common Agricultural Policy provides £657 million a year to Scottish agriculture, or approximately £20,943 per agricultural holding on average. Pillar 1 payments, including Basic Payments (payments based on area of land), greening measures (supporting sustainable practices) and cross-compliance (to meet welfare, environmental and safety standards) total £471 million per year, 72% of the total. Pillar 2 payments, including the Scottish Rural Development Programme (SRDP), agri-environment schemes, the Less Favoured Areas Support Scheme (LFASS), among others, totals £186 million a year in Scotland.
69. In Scotland, EU coupled support (linked to productive output, as opposed to land area) currently includes the Scottish Upland Support Scheme (SUSS) and Scottish Suckler Beef Support Scheme (SSBSS), together worth €46.5 m per year. The Scottish Government has been alone amongst the UK devolved administrations to support coupled payments; currently it is not known whether coupled support will continue in Scotland post-Brexit.
70. In the case that the UK leaves the EU, Scotland has committed to continue Pillar 1 payments until the end of 2022, although with some changes such as capping of payments incorporated. This commitment may change if a new government is elected. Pillar 2 payments are also likely to continue until the end of 2022 with some changes. LFASS, however, which affects upland farmers, has been cut by £13.5 million to £52 million in 2019, and 2020 will see funding cut to £13.1 million for its final year, after which it is possible that it will be phased out. The Rural Economy Secretary Fergus Ewing has pledged to continue payments at 80% of current levels going forward, although this would still depend on the writing of legislation and the Scottish Agricultural Bill.

Figure 8 – estimated timeline for future agricultural subsidy support



Source: SRUC

71. Research at SRUC has studied the impact of payment scenarios after Brexit. If farm subsidies were to continue after Brexit, farm businesses in most sectors would continue to operate at net profit. However, if subsidies were discontinued, under all trade scenarios all sectors would be significantly worse off, and running at between £12,000 and £75,000 net loss; only the dairy sector would continue to make net profit, and LFA (Less Favoured Area) cattle and sheep would be worst affected. The modelling showed that while 35% of farm businesses were loss making with CAP support, 79% would be loss making without it.
72. If the UK doesn't leave the EU, the current phase of Common Agricultural Policy will expire in 2020, with reforms introduced for the 2021-2027 period. Reforms will include a reduction in overall budget by around 11%, caps on Basic Payments to €100k per farm, increased environmental and climate compliance, and increased autonomy of member states to develop their own national agricultural strategies and priorities.
73. Beyond 2022, both Pillar 1 and Pillar 2 will be phased out and future payments are, as yet, unclear. The Scottish Government's Stability and Simplicity report suggests that a new

Examples of agricultural public goods: landscapes, biodiversity and conservation, air quality, water quality, soil quality, fire and flood resilience, carbon sequestration, cultural heritage, community resilience, food security, animal health and welfare, genetic diversity, provision of livelihoods and skills, human health, tourism, leisure and sporting facilities.

agricultural policy will be developed and the Scottish Agricultural Bill is currently being written which will detail future plans. How it will differ to or align with the UK Agricultural Bill

is also unclear. However, future payments are likely to emphasise and encourage the concept of 'public money for public good', thereby shifting the current system of the bulk of subsidies based on land area to a system based on environment compliance. This new system would aim to enhance natural capital and the benefits of agriculture to wider socioeconomic issues such as human and animal welfare, forestry, the environment, water and rural communities.

Rural support options beyond 2023

- d. Direct payments and agri-environment payments are maintained
- e. Direct payments removed, and agri-environment and other payments replacing support
- f. Direct payments removed, and agri-environment and other payments replacing a fraction of the current support
 - i. Public money for public goods (welfare, forestry, environment, water, rural communities)
- g. Enhanced natural capital (how to value?)
- h. Transition period and support
- i. Subsidies for land → environmental payments.
 - ii. E.g. diversifying land use, added value industry, changing enterprises

74. A new system of 'public money for public goods' payments is also likely to draw on existing strategies for other areas of land use and management, such as forestry and peatlands. By 2032, Scotland has a target to woodland cover will increase from around 18% to 21% of Scottish land area (around 250,000 hectares), and restore 40% of Scotland's peatland by 2030, a total of 250,000 further hectares. The Scottish Government has also released a draft target of a 90% reduction in emissions by 2050 and is debating a change to create a legally binding targets of net zero by 2040. With agriculture contributing to 26% of Scotland's emissions, a focus on schemes and payments to manage greenhouse gas emissions from agriculture is inevitable.

75. While this offers a challenge for farmers to adapt to new systems of payments, which may or may not support them to the same level as previously, it also offers opportunities to explore the role of diversifying land use, or ways to add value or move into higher value enterprises.

Future land use scenario – commercial afforestation

76. Based on current economics, market and subsidy support and given potential changes expected under Brexit SAC Consulting expect that the default land use change in the Talla Hartfell area over the next 10 years is likely to be commercial conifer afforestation.
77. Under SAC Consulting's default scenario it is assumed that 10% of the current farmed area is turned over to commercial conifer afforestation over the next 10 years; equal to 300ha per year. The following table illustrates SAC Consulting's estimates of the financial and employment impacts that this rate of commercial afforestation could have across the rural economy of the area.

Table 19 – commercial afforestation scenario in Talla Hartfell

<i>Commercial afforestation</i>											
Land use	Year	1	2	3	4	5	6	7	8	9	10
Planting	(ha)	300	300	300	300	300	300	300	300	300	300
Establishment	(ha)		300	600	900	900	900	900	900	900	900
Total	(ha)	300	600	900	1,200	1,500	1,800	2,100	2,400	2,700	3,000
<i>Land owner costs and returns</i>											
Cost	('000's £)	448	496	530	546	546	529	535	541	547	547
Income	('000's £)	707	777	847	917	987	1,058	1,058	987	987	987
Profit	('000's £)	258	281	317	372	442	528	522	446	440	440
<i>Employment</i>											
Direct	(FTE)	5.1	8.4	11.6	14.8	14.8	14.8	14.8	14.8	14.8	14.8
Indirect	(FTE)	2.6	4.2	5.8	7.4	7.4	7.4	7.4	7.4	7.4	7.4
Total	(FTE)	7.7	12.5	17.4	22.2	22.2	22.2	22.2	22.2	22.2	22.2

Source: SAC Consulting

78. The following table illustrates SAC Consulting's estimates of the financial and employment impacts that this rate of commercial afforestation could have on the overall traditional rural land use economy of the area.

Table 20 – economic impact of the commercial afforestation scenario in Talla Hartfell

	2011	2014	2017	2025
Hill sheep				(£ million)
Output	6.7	5.8	5.3	4.77
Inputs	4.8	5.1	4.8	4.32
Surplus	1.9	0.8	0.8	0.72
Established forestry				
Output	3.5	3.9	4.5	4.5
Inputs	2.4	2.5	2.6	2.6
Surplus	1.1	1.4	1.9	1.9
Commercial afforestation				
Output				0.55
Inputs				0.99
Surplus				0.44
Total surplus	3.0	2.2	2.7	3.06

Source: SAC Consulting

79. It is expected that increased commercial conifer afforestation would lead to a rise in landowner surplus from land use and is also expected to increase employment in the area compared to the 2017 baseline.

Table 20 – employment under the commercial afforestation scenario in Talla Hartfell

Sector	Direct (FTE)	Indirect (FTE)	Total (FTE) 2025	Total (FTE) 2017	Source
Agriculture	45.6	22.8	61	68.4	AgCensus, Scottish Govt Input-Output tables
Forestry	16.29	12.1	28.4	28.4	SRUC – Confor Eskdalemuir study
Commercial afforestation	14.8	7.1	22.33		SAC Consulting
Total	76.69	42	111.73	96.8	

Source SAC Consulting

9. Conclusions – what does this all mean for TallaHartfell

Outlook for upland land use

80. Upland sheep farming is the dominant agricultural enterprise in the Talla Hart Fell, followed by beef cattle and a growing importance of on-farm woodland. The low quality of the land, as well as steep terrain and altitude (much of the land being upwards of 400m above sea level) have historically limited options for agriculture in the area, and constrained areas of forestry to better quality and more accessible parcels of land. Forestry has increased by 16% (1,335 ha) in the area over the past 17 years, largely in conifer plantations, a trend that looks likely to continue across Scotland in the coming years as a result of market demand and policies to meet carbon sequestration targets.
81. A gradual decline in flock numbers on the fells, reflecting wider challenges of sheep markets and demographics within the farming sector, and future changes to economic support for farmers and strategic priorities of agriculture at a national level, pose questions about options for diversification in Talla Hart Fell. While this baseline of existing land uses provides an overview of the extent of various options in the area, it is by no means extensive, and more interdependent and critical view is needed to assess scope for multiple land uses going forward.
82. Future land use changes are likely to result from the current challenges facing the largest land use in the area; agriculture which is seeing pressure from declining current markets and uncertainties over subsidies post-Brexit meaning adaptation is needed.
83. Based on SAC Consulting's assessment of conventional alternatives it appears likely that commercial afforestation will be the default land use to beat. A large increase in commercial afforestation in the area is not necessarily inevitable as significant barriers remain in the area including:
 - Land suitability
 - Land designation and EIA constraints
 - Ownership and farmer attitude

84. However, it lays down a marker for other land use changes to compete with in terms of financial returns for landowners and in generating wider employment and economic activity in the area.. Any alternative model could include a wide array of activities which may include some of the following;

- Native woodland restoration
- High Nature Value farming
- Low/zero carbon farming
- Public goods finance and landscape management
- Community renewables
- Nature-based tourism and finance
- Deer farming

Tourism 'Branding' of Moffat and the Talla Hartfell area – 'Borders Wild Heart'

85. Alternative models for land use change in the area based on enhancing natural capital would need to demonstrate comparable land owner and local economic benefits to secure a significant area of land use