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Landscapes without Livestock

Visualising the impacts of a reduction in beef and sheep farming on some of England's most cherished landscapes



Final project report to EBLEX



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Visualising the impacts of a potential decline in beef and sheep farming on some of England's most cherished landscapes

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1 Introduction

Overview of the project

- 1.1 EBLEX is the organisation for beef and lamb levy payers in England and exists to enhance the profitability and sustainability of the English beef and lamb sector. Its aims are:
 - To help the beef and sheep meat supply chain become more efficient
 - To add value to the beef and sheep meat industry
- 1.2 EBLEX commissioned LUC to conduct independent consultancy work to illustrate the likely visual impact over time on a number of English landscapes arising from a reduction in livestock numbers.
- 1.3 The results of the project will be used in the public arena, stimulating debate on livestock farming's wider contribution to England's natural environment. Arguments from some quarters have called for livestock numbers to be reduced as an effective way to cut environmental emissions. The results of this project will add to the debate on the environmental impact of the sector, an area also covered extensively in EBLEX's environmental roadmaps 'Change in the Air' and 'Testing the Water'. Effectively, simply cutting livestock numbers will have knock-on effects which will themselves have a negative environmental impact.
- 1.4 The audience for the work includes EBLEX levy payers, industry stakeholders, wider stakeholders, politicians, NGOs and the general public.

Intended outcomes of the project

- 1.5 The initial aim was to present the findings of the project on screen in the reception of EBLEX's annual conference in Kenilworth on November 2nd. The event was attended by levy payers, other stakeholders and the EBLEX Board and senior members of the EBLEX operations team. The conference provided a good platform for the 'soft' launch of the project and an opportunity to gain feedback ahead of the final report.
- 1.6 Subsequently, EBLEX plans to make the report available to stimulate further debate on the subject. A press release on the findings of the report will also be circulated to the media at this stage.
- 1.7 The overall objective will be to use the project to raise greater awareness among stakeholders and the wider public of the potential issues involved in reducing or removing livestock from the environments identified and to counter the arguments of advocates of such activity.

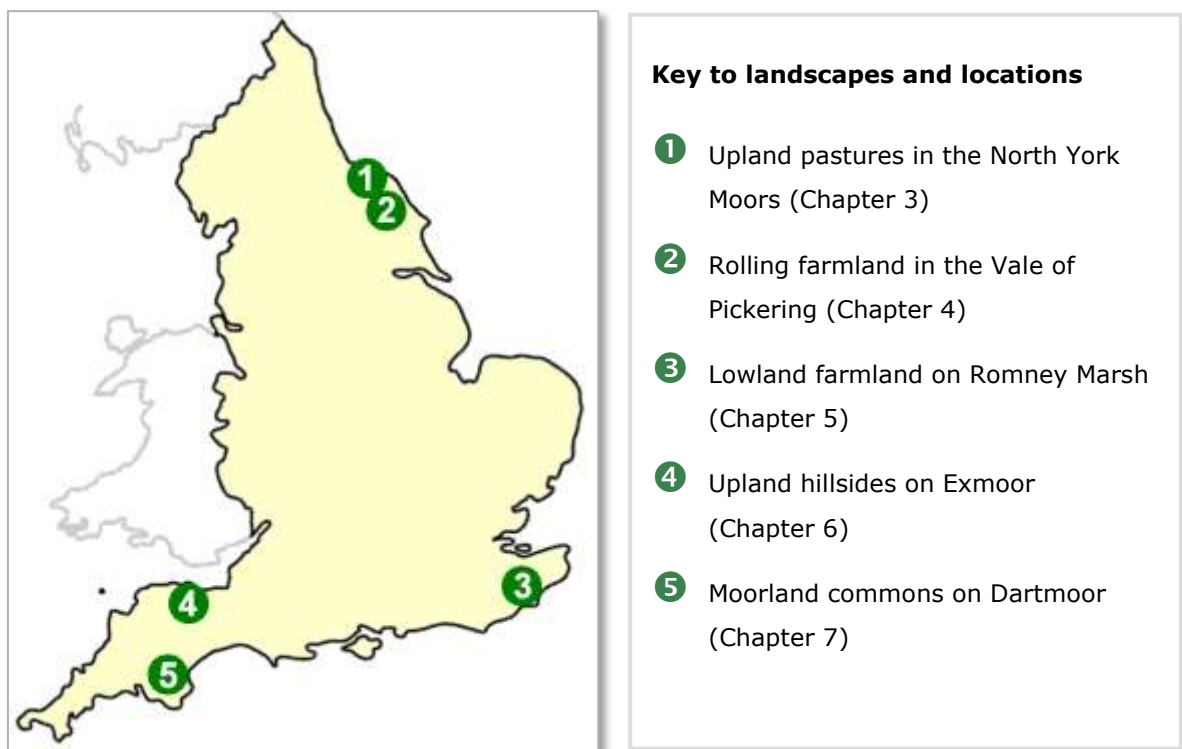
Scope and methodology

- 1.8 EBLEX required an independent project which adds expert evidence to add to the debate with lobby groups opposed to the beef and lamb sector who claim the industry operates to the detriment of the natural environment. The project has sought to be authoritative and to stand up to scrutiny from statutory and third sector organisations with an interest in the natural environment.
- 1.9 For this project, EBLEX identified five different environments in England typically grazed by beef cattle and sheep and in which these livestock play a major role in maintaining the distinctive environmental character. At the start of this project, these landscapes were defined as:
 - Less Favoured Area (LFA) Upland
 - Less Favoured Area (LFA) Hillside

- Rotational Pasture
- Permanent Pasture
- Moorland

- 1.10 During the study, specific sites were identified by EBLEX (see Figure 1). LUC visited each of the sites and took panoramic photographs representing the quintessential characteristics of the current landscapes as 'control' images. A narrative describing the likely future evolution of each landscape, based on assumptions about the nature and consequences of a decline in beef and sheep numbers was prepared. LUC then developed three additional photomontages at Year 3, Year 10 and Year 30 to illustrate the visual impacts of these changes at each location. These sought to be realistic and stand up to scrutiny in terms of the final images as well as the methodology followed to create them and were prepared with input from ecologists, farmers and, landscape specialists.
- 1.11 LUC also developed a textual commentary to accompany each photomontage to help illustrate the potential environmental changes displayed.
- 1.12 The final report is provided as an electronic file including the images and a commentary on each, along with a PowerPoint presentation showing a scroll through the images and bullet point summary of the main changes between images that can be used as a "rolling presentation". The finished images are provided as separate files so they can be utilised in other ways.

Figure 1. Location of selected landscapes



Acknowledgements

- 1.13 The authors are grateful for the assistance provided by EBLEX regional managers who identified suitable locations for this project, and to farmers at these locations who suggested suitable view points and commented on the narratives of change. Helpful comments on the draft outputs were also provided by many of the EBLEX levy payers who attended the conference on November 2nd 2011.

2 The narratives of change

2.1 This section of the report introduces the method used to establish the narratives of future change in each of the five landscapes covered by this project. The purpose of the narratives is to:

- a) provide a sound evidence base to establish the current characteristics and drivers of change of the landscape in each of the five selected locations, drawing on sources such as Natural England's National Character Area descriptions and Defra's agricultural survey
- b) set out the distinctive 'story' of future change that is shown graphically by the photomontages (at Years 3, 10 and 30) and to suggest what the wider impacts of these changes might be.

2.2 For each of the five land use types, the following chapters provide the following information:

a) Evidence of current characteristics and trends

- **Description of current predominant land use type:** As set out by EBLEX in the project brief and agreed subsequently on September 13th.
- **Location of photomontages:** The name of the participating farm identified by EBLEX regional managers
- **National Character Area:** The NCA in which the participating farm occurs
- **Current key landscape characteristics:** Taken from Natural England's description of the NCA
- **Current grazing patterns and recent trends:** Taken from Defra's agricultural survey, relating to data for the NCA as a whole. Comments about the balance between cattle and sheep numbers are based on livestock units (one bovine calculated at 0.7LU and one sheep at 0.15)
- **Other forces for change in the landscape:** Taken from published landscape character assessments

b) The 'story' of future change

-
- **The farming drivers of future landscape change:** Summary of the farm management and animal husbandry decisions that will drive the changes shown in the photomontages
 - **Summary of landscape change:** A simple overall description of the 'story' underpinning the photomontages
 - **Potential changes to landscape features shown at Year 3:** A description of the changes and landscape elements that are portrayed in the photomontage at Year 3
 - **Potential changes to landscape features shown at Year 10:** A description of the changes and landscape elements that are portrayed in the photomontage at Year 10
 - **Potential changes to landscape features shown at Year 30:** A description of the changes and landscape elements that are portrayed in the photomontage at Year 30
 - **Commentary on the environmental impacts of the changes:** An indication of the potential impacts that the changes shown in the photomontages could have for landscape character and biodiversity

2.3 Whereas the first set of bullets above refer to established evidence, the second set make projections of future scenarios based on assumptions about a decline in the markets for beef and lamb and reduced viability of livestock farming enterprises.

3 Upland pastures in the North York Moors



Figure 3.1. The landscape as it now appears

Description of current predominant land use type

- 3.1 **Large-scale fields of improved and semi-improved permanent pasture with frequent areas of rough grazing occurring on the ridges and plateaux of the Less Favoured Areas (LFA).** Sheep tend to dominate over beef cattle. Hardy hill breeds predominate such as Scotch blackface and Cheviot sheep and Limousin cattle. Parcels of land may be divided by stone walls, but where grazing has been created from 'new takes' of moorland, wire fences are more common. Farmland may be interspersed with large blocks of conifer forestry. Farmsteads are generally few and far between.
- 3.2 This land use is also found in close association with LFA hillsides, moorland and permanent pasture.

The current landscape

Current key landscape characteristics

- 3.3 The selected site lies within the North York Moors and Cleveland Hills National Character Area (NCA). Key characteristics of this landscape include:
- Plateaux dissected by a series of dales, often broad and sweeping, but with steep-sided river valleys in places
 - Extensive areas of heather moorland on plateaux and hills, creating a sense of space, expansiveness and openness. Many of these areas have been internationally designated as Special Areas of Conservation
 - Valley landscapes characterised by predominantly pastoral farming with clear demarcation between the enclosed fields and the moorland ridges above. Transition often marked by bracken fringes
 - Extensive areas of coniferous plantations. Remnant areas of predominantly ancient semi-natural woodland occurring mainly on valley side slopes, on escarpments and fringing hills
 - Traditional stone walls and hedgerows enclosing fields in the dales and lower fringing farmland - now often replaced by fences

- Farms and villages built of predominantly rubble limestone or dressed sandstone, with red pantile or slate roofs

Current grazing patterns and recent trends

- 3.4 Across the NCA as a whole, there is a relatively even balance of cattle and sheep. A significant proportion of cattle and sheep are sold for breeding or as store animals (few being finished on farms in the area). Since 2000 there has been a significant fall in livestock numbers, particularly sheep (overall decline of 20%, sheep by 27% and cattle by 13%, these falls being greater than for England as a whole). There is likely to have been an increase in the winter housing of cattle, particularly on moorland and upland farms, and a small increase in the proportion of livestock finished in the area.

Other forces for change in the landscape

- 3.5 Forces identified in the North York Moors National Park Landscape Character Assessment (2003) for the 2: Narrow Moorland Dale Landscape Type are as follows:
- Decline in rough pasture/species rich and wet grasslands in favour of improved pasture
 - Disrepair/loss of dry stone walls
 - Replacement of walls and hedges with fencing
 - Growth in visitor numbers: increased traffic, bridge and verge damage, footpath and bridleway erosion, off road vehicle/motorcycle/mountain bike damage, disturbance to wildlife
 - Increasing commercialism within villages, tourist related development, holiday homes, conversion of redundant buildings, pressures to increase extent/number of camping/caravanning sites
 - Highway related changes, including road and bridge improvement, kerbing, parking controls, signage and lighting
 - Telecom and mobile phone masts

Visualisations of change

The farming drivers of future landscape change

- 3.6 A decline in market prices for cattle and sheep relative to production costs would result in significant reductions in grazing densities across most of the upland fields. The most marginally productive and inaccessible land (such as steep ground on poor soils, currently providing rough grazing) would cease to be grazed at all, with resulting invasion of gorse and other scrub. Fields around farmsteads would probably continue to be grazed for amenity (lifestyle) purposes, but with lower inputs (fertiliser and weed control). There would be a decline in the maintenance of stone walls and many stone barns, except where environmental payments were received or where new uses were found for buildings. Conservation grazing, funded by receipts from agri-environment schemes, would continue on sites with high environmental value, such as unimproved pasture, hay meadows and areas of enclosed (and unenclosed) heather moorland.
- 3.7 Many upland farm businesses would sell or rent their land and others would diversify, with tourism being the most popular and visible enterprise (though already common and possibly oversupplied in many areas). Provision of camping or, in sheltered spots, small caravan sites, and conversion of traditional farm buildings to holiday cottages or camping barns would increase. Planning policies in National Parks would be a constraint. While these would probably not prevent environmentally sympathetic development of buildings, they are likely to prevent large scale developments such as wind farms (but small turbines are possible). Planting of woodland for energy production (using fast growing species such as eucalyptus or willow) or timber (most probably conifers in the uplands) would take place on significant areas of land.

Summary of landscape change

- 3.8 **Livestock grazing will disappear from large areas of the uplands, being retained in a few areas only for conservation purposes, to be replaced by naturally colonising scrub and planted woodland. Remaining farms will get larger, with many relying on tourism to maintain incomes.**

Changes to Year 3: 2014

- 3.9 Sheep or cattle are still visible in a few fields (on unimproved land under agri-environment agreements and close to farmsteads, covering around 25% of land), but absent elsewhere. There is extensive growth of bracken on many fields (except on wetter ground in gills and at the bottom of fields). Scrub has started to encroach on ungrazed fields from existing woodland. Rows of newly planted young trees are evident in a few upland fields away from farmsteads (covering 10% of land). A stone wall in the foreground of the picture is still in good condition. A farmstead in the middle distance, on the right side of the photo, remains visible and unchanged from the baseline photo.



Figure 3.2. The landscape as it would appear in 2014

Changes to Year 10: 2021

- 3.10 Most fields are covered in dense bracken growth. Patches of gorse and small hawthorn trees have become established in these fields. A quarter of the fields where sheep were present in Year 3 have now become overgrown. Remaining fields where grazing still takes place for conservation or amenity purposes (now around 20% of land) have become rougher with patches of rush and weeds such as ragwort and creeping thistle. Sheep are the only grazing animals (being more suited to low input grazing, from an animal husbandry point of view, than cattle).
- 3.11 The woodland planted in the Year 3 landscape has become established and the rows are less obvious. New woodland (a further 15% of land, which was ungrazed in Year 3) has been planted (some of it in the foreground) and is visible as rows of young trees. The pattern of fields is becoming simplified as several of fields are now encompassed into larger woodland blocks.
- 3.12 The stone wall in the foreground has started to become dilapidated, with capping stones missing and parts of the wall slumped. The farmstead in the middle distance has started to become obscured by trees and scrub.
- 3.13 There is evidence of increased recreational use, encouraged by the farmer's provision of a dedicated cycle route running along the edge of some of the field boundaries.



Figure 3.3. The landscape as it would appear in 2021

Changes to Year 30: 2041

- 3.14 The pattern of fields has become very largely obscured by the extensive growth of mature gorse scrub and young self-sown oak and willow woodland.
- 3.15 The woodland planted in Years 3 and 10 is now well established. Rows have disappeared and the character of the different types of woodland has become obvious, with large blocks of single species dominating parts of the landscape. On the higher ground there is plantation conifer forestry while on the lower ground, the distinctive moss green colour of eucalyptus (grown as an energy crop) stands out. Eucalyptus is very fast growing and trees 40ft high in the foreground have started to obscure more distant views.
- 3.16 The proportion of land that receives some livestock grazing for conservation or amenity purposes has fallen to 15%. Only sheep are visible on this land – cattle are now completely absent. This land is also being encroached at its edges by scrub and has a rougher weedy look (with extensive patches of rush and ragwort).
- 3.17 The stone wall in the foreground is much less visible, having been robbed of stone (for building) and colonised by shrubs such as hawthorn and elder.
- 3.18 The original farm buildings on the right hand side of the photo are now hidden by trees but a new stone building has been erected in the field in front of the farm to provide a camping barn and source of tourism income (although this use cannot be seen at this distance).
- 3.19 The network of recreational (cycling and riding) tracks has been extended and all are well established, standing out in the otherwise unmanaged landscape. Again, people using the tracks are visible.



Figure 3.4. The landscape as it would appear in 2041

Commentary on the changes to landscape character and quality

- 3.20 This upland landscape is transformed from one where the transition between in-bye farmland and upland moorland is key to landscape character to one where the boundaries between the two are blurred. The 2011 landscape – with its smooth pastoral fields of varying shades of green standing out against a backdrop of textured bronze and golden bracken and heather moorland habitats – combines to create a varied upland mosaic reflecting patterns of land management activity. In 30 years the spread of bracken, scrub and rough grassland along with new woodland planting results in a more roughly textured landscape. Historic field patterns are hidden from view, with prominent conifer blocks forming detracting features both in terms of scale and colour within the moorland scene. The future landscape evokes a sense of agricultural abandonment and increased feelings of ‘wildness’, with untamed nature taking over large areas. Movement within the previously calm landscape has increased, with recreational users appearing as frequent features whilst sheep and cattle have all but disappeared.

Commentary on the changes to biodiversity

- 3.21 By 2041, bracken and scrub replaces the open habitat mosaic favoured by characteristic moorland birds such as merlin, red grouse, meadow pipit and upland waders. Together with high levels of disturbance from increased recreation, this has resulted in localised population declines. Species-rich grasslands, which depend upon low levels of grazing, have been replaced by taller, rank grasslands with lower species diversity. Subsequently, several rare butterflies and moths have been adversely affected. Species associated with bracken, such as the pearl bordered fritillary may benefit from its increase.

Overview of visual changes

Now



2014



2021



2041



4 Rolling farmland in the Vale of Pickering



Figure 4.1. The landscape as it appears today

Description of current predominant land use type

- 4.1 **Improved (ley) pasture and meadows which are rotated with arable and root crops in lowland mixed farmland landscapes.** Other crops include forage maize (associated with dairy cattle), cereals, oilseed rape (and other arable break crops) and forage root crops such as stubble turnips. Fields are divided by hedges, often tightly trimmed, barbed wire fences or ditches. Grazing is provided by lowland breeds of sheep and beef cattle (including cross-bred mule flocks of sheep and dairy-bred steers and heifers), as well as dairy cattle. Small blocks of broadleaved woodland and shelter belts are often common. Farmsteads often occur on the edges of villages and hamlets, but may be out-lying in their own 'ring fence' of farmland.
- 4.2 This land use is also found in close association with permanent pasture and arable cropping.

The current landscape

Current key landscape characteristics

- 4.3 The selected site lies on the northern edge of the Vale of Pickering National Character Area (NCA). Key characteristics of this landscape include:
- Low lying flat or gently undulating vale with land rising gently in the north to the foothills of the North York Moors and Cleveland Hills
 - Pastoral floodplains of the rivers Rye and Derwent and their predominantly northern tributaries
 - An important visual characteristic is the transition from a relatively large-scale pattern of arable fields and shallow dry valleys to a smaller-scale, pre-parliamentary pattern of long linear, often pastoral fields near settlement edges
 - Relatively sparse tree cover and few woodlands overall, with those which do occur being mainly mixed or coniferous in character and located more to the north and west of the Vale
 - Varied building materials, including hard sandstone, brought in from surrounding uplands, and brick

Current grazing patterns and recent trends

- 4.4 This is a strong beef farming area, with finishing taking place in sheds (on cereal-based rations) as well as on improved ley grassland. In contrast, there are relatively few sheep. Cattle numbers have increased by 13% since 2000 while sheep numbers have declined by 14%. Most livestock farms also grow arable crops (overall 60% of the farmed area grows arable crops), although since 2000 the area of grass has increased at the expense of arable.

Other forces for change in the landscape

- 4.5 Forces identified in the The Landscapes of Northern Ryedale (1999) for the F: Linear Scarp Farmland Character Area are as follows:

- Modern farm buildings, pylons and poorly sited fence lines
- Field enlargement and hedge removal

- 4.6 Forces identified in the The NCA Description for 26: Vale of Pickering are as follows:

- Trees and wildlife habitats have been lost along river banks as a result of over-engineering and river management
- Development pressures for road building and housing

Visualisations of change

The farming drivers of future landscape change

- 4.7 Much of the grassland in this landscape is readily suited to conversion to continuous arable cropping with cereals and break crops such as oilseed rape. If livestock farming became less profitable, farms would adapt and businesses would continue with the almost complete absence of farm livestock. Where cattle and sheep were retained it would be for amenity and lifestyle purposes. Where feasible by the removal of wire fences and some hedges, fields would become larger. Hedges and shelter belts would be cut back. Traditional livestock buildings would be converted to other uses such as light industry. New large barns would be required for arable machinery and grain storage. Land that was less suited to arable cropping would be planted with woodland, particularly short rotation coppice for biomass energy production.

Summary of landscape change

- 4.8 **This area changes from a mixed farm landscape to one dominated by continuous arable cropping, with the planting of energy crops on less productive land. Farms grow larger and land use is more intensive.**

Changes to Year 3: 2014

- 4.9 The change from a mixed landscape of arable and grassland to one dominated by arable takes place quickly. The patchwork pattern of fields is still evident (and if anything accentuated) by the variation in cereal stubble and cultivated soil that has replaced the grassland.
- 4.10 A field boundary in the middle ground (the gappy hedgerow at the far side of the second field from the viewer) has been removed to allow two fields to be enlarged.
- 4.11 The only grassland visible is in small narrow fields not suitable for cultivation which are retained as permanent pasture grazed by ponies, with wooden pony shelters in the corner of each field.



Figure 4.2. The landscape as it would appear in 2014

Changes to Year 10: 2021

- 4.12 A contract farming arrangement by the farmer has allowed for large-scale block cropping, where groups of fields are treated as one, with the same crop each year. Some further field boundaries have been removed (small hedges), but even where boundaries remain, the effect is of a simplified and more intensively farmed landscape. Remaining hedgerows have become more tightly trimmed and are less prominent. One or two hedgerow trees have gone and others are showing signs of die-back in the crown (due to repeated ploughing of the roots).
- 4.13 A substantial block of land has been planted on land in the middle ground with short rotation coppice willow for biomass energy.
- 4.14 The pony paddocks in the narrow fields of permanent pasture have been replaced by a caravan and camp site. There are a dozen tents, five camper vans and two caravans dotted about amongst mown grassland. A large new barn has been created to store and dry grain.
- 4.15 A steep field on thinner soil has been planted with young woodland, with the rows of young trees highly visible.



Figure 4.3. The landscape as it would appear in 2021

Changes to Year 30: 2041

- 4.16 Large-scale block cropping continues, with further field boundary removal increasing some field sizes.
- 4.17 The area planted with short rotation coppice has increased. Growing to a height of 4m before it is harvested (on a three-year cycle), it obscures views in some places.

- 4.18 The process of tighter hedgerow management has continued, again reducing their prominence. Many of the hedgerow and field trees have gone, not to be replaced. Others have become prominent as isolated stag-headed trees as a result of regular ploughing and damage to roots under their canopies.
- 4.19 The woodland planted in Year 10 has grown, with the rows of trees no longer being visible. Another field has been planted with young trees.
- 4.20 The caravan site has grown further and become more regimented, with a network of concrete tracks dividing up the mown grass field. Some 20 static caravans, as well as camper vans with hook-ups are visible.
- 4.21 The large grain store has weathered and another one added by its side.



Figure 4.4. The landscape as it would appear in 2041

Commentary on the changes to landscape character and quality

- 4.22 This classic mixed vale landscape, comprising a rotating balance of vivid green grass leys and arable fields bounded by a strong network of hedges and frequent hedgerow trees, is transformed into a simple, monotone landscape of enlarged arable fields. During the 30-year timeframe, the strong field patterns of different shapes and sizes are diluted through field enlargement – leaving behind a simple, consistent landscape with few defining landscape features and very little diversity in landscape patterns or colours. It is an 'industrial' landscape, strongly focused on maximising agricultural production whilst providing opportunities for tourism. New roads and caravan site infrastructure further emphasise the modern feel of this working landscape.

Commentary on the changes to biodiversity

- 4.23 By 2041, the loss of hedgerows and tree lines has resulted in a significant decline in farmland birds, including grey partridge, linnet, corn bunting, reed bunting, and tree sparrow. However, good populations of farmland birds persist in arable landscapes where specific management has been undertaken in line with government incentives. Populations of barn owls and bat species have declined, probably due to the loss of mature trees which provide suitable nest/roost sites and hedgerows and rough pasture which provide suitable foraging habitat and movement corridors.
- 4.24 The extent of neutral grassland, including species-rich examples traditionally maintained by long-term grazing practices, is much reduced having been converted to intensive arable fields. Livestock poaching along river banks is greatly reduced and the resulting margin of scrub and aquatic vegetation has enhanced the riparian environment for otters.

Overview of visual changes



5 Lowland farming on Romney Marsh



Figure 5.1. The landscape as it appears today

Description of current predominant land use type

- 5.1 **Generally small fields of improved or semi-improved permanent pasture occurring in lowland landscapes.** Grassland includes some grass cut for silage, hay or haylage. Fields are divided by mixed species hedges, often allowed to grow tall to provide shelter, or by ditches. Grazing is provided by lowland breeds of sheep and beef cattle (including cross-bred mule flocks of sheep and dairy-bred steers and heifers), as well as dairy cattle. This land use type occurs alongside rotational (ley) pasture and arable (often in an intimate mix of fields). Small blocks of broadleaved woodland and shelter belts are often common. Farmsteads often occur on the edges of villages and hamlets, but may be out-lying in their own 'ring fence' of farmland.
- 5.2 This land use is also found in close association with rotational pasture and arable cropping.

The current landscape

Current key landscape characteristics

- 5.3 The selected site lies within the Romney Marsh National Character Area (NCA). Key characteristics of this landscape include:
- A flat, open agricultural landscape, with distinctive drainage dykes, marshes and open skies. The treeless, low-lying, reclaimed marshland is now maintained by manmade drainage and river floodplain improvements
 - A high-quality agricultural land of extensive arable fields and some traditional open wet pasture land grazed by cattle and sheep. Narrow, straight roads and widely dispersed settlements with distinctive churches combine with the overall open character to provide a sense of remoteness
 - Clumps of trees on pockets of higher ground around farmsteads, reed fringed ditches, patches of standing water and rushy pasture, all contribute to local diversity in a relatively uniform landscape
 - The landscape displays a sharp contrast between the shingle coastal promontories, the extensive open, low-lying agricultural land behind and the inland backdrop of well-wooded rising ground

Current grazing patterns and recent trends

- 5.4 This is a strong sheep rearing and fattening area (with its own breed, the Romney or Kent breed, which account for a minority of sheep produced in the area). Traditionally, sheep were wintered out of the area on drier ground such as the South Downs, a practice that continues. The period since 2000 has seen a shift in land use towards arable cropping (with an 11% rise in the area of cereals and arable break crops), matched by a sharp fall in sheep numbers (down a third). Over this period there has been a small rise in cattle numbers (up 8%). Most of the area is potentially highly productive land (Grades 1 or 2). Drainage schemes in the last 50 years have converted low-lying wet grassland to arable land cropped for wheat and high value crops such as potatoes and field vegetables. Much of the remaining areas of unimproved permanent pasture is nationally designated as Sites of Special Scientific Interest.

Other forces for change in the landscape

- 5.5 Forces identified in the *Kent Landscape Assessment (2004)* for the *Brookland Farms* Landscape Character Area are as follows:
- Hedgerows are often unmanaged and in decline
 - Some dykes are scoured of vegetation
 - The land is intensively farmed and mature trees and well vegetated ditches are fragmented
 - Pollarded willows and poplars are vulnerable because there are few young trees in the structure
- 5.6 Forces identified in the *NCA Description for 123: Romney Marsh* are as follows:
- Drainage and improvement works resulting in the loss of characteristic dyke, marshland and wet meadow vegetation cover
 - Golf course development
 - The open landscapes are particularly vulnerable to landscape change arising from the development of large new agricultural buildings and from military land uses
 - New roads and improvement schemes
 - Suburban influences

Visualisations of change

The farming drivers of future landscape change

- 5.7 In the absence of commercial sheep farming, land use would develop in two ways. Grassland that was capable of being ploughed and drained (the majority) would be converted to intensive arable cropping or field-scale horticulture, with dykes deepened, straightened and narrowed, or piped. Land that was not suitable for this change, such as small parcels of land close to villages or beside rivers, would be used for amenity and recreational purposes such as pony paddocks and golf courses.

Summary of landscape change

- 5.8 The decline of commercial sheep farming increases the area already cropped intensively for cereals, potatoes and field vegetables. The small parcels of land not suitable for draining and cultivation are used for amenity and recreational purposes.

Changes to Year 3: 2014

- 5.9 The transformation of this landscape starts swiftly with the replacement of the shallow reed-filled dykes by deeper geometric drainage ditches which appear 'raw' and relatively unvegetated.
- 5.10 Most of the land in the foreground has been ploughed and cropped (potatoes, cereals or oilseed rape).
- 5.11 A buffer of grassland has been retained around the old church which provides a focal point in the middle ground of the photograph.
- 5.12 An area of grassland to one side of the fore/middle ground has been retained (possibly the parcel in front of the church but is now grazed by ponies (horse tape is visible, keeping the ponies from getting into the deep drainage ditch)).



Figure 5.2. The landscape as it would appear in 2014

Changes to Year 10: 2021

- 5.13 The steep-sided drainage ditches appear less raw, having become more vegetated.
- 5.14 The buffer of grassland around the church has now scrubbed up, with hawthorn and bramble growing in patches up to the foot of the church walls. The area of pony-grazed grassland remains but has become overrun with creeping thistle and ragwort.
- 5.15 Field boundaries beside the arable have started to change, with straightened or piped dykes and features such as pollarded willows removed.
- 5.16 In the far distance an industrial looking barn, used as a vegetable pack house, has been erected.



Figure 5.3. The landscape as it would appear in 2021

Changes to Year 30: 2041

- 5.17 The area of arable has increased to occupy the whole of the fore/middle ground. The pony grazed field has been ploughed and the buffer of grassland around the church has shrunk.
- 5.18 While there is evidence that some of the scrub in the remaining buffer area around the church has been controlled (cut back), some of the trees have grown large.
- 5.19 The track carrying farm machinery has been surfaced and the vegetable packhouse in the distance has been added to, giving a more industrial appearance to the photograph.



Figure 5.4. The landscape as it would appear in 2041

Commentary on the changes to landscape character and quality

- 5.20 The reclaimed landscape of Romney Marsh, with its long history of extensive sheep grazing on open wet pastures sees a dramatic transformation in 30 years. The open, remote landscape with strong, distinctive sense of place is replaced by a busy, working landscape characterised by arable and industrial-scale vegetable cultivation. Grazing cattle and sheep, including the traditional Romney breed, have disappeared, with uncultivated areas abandoned with scrub encroachment emphasising the 'forgotten' function of these parts of the marshland landscape. Major engineered drainage ditches cut deeply through the landscape – further demonstrating the strong modern human influence that has become the dominating feature of the future Romney Marsh.

Commentary on the changes to biodiversity

- 5.21 By 2041, wet pasture has been replaced by intensive arable farming and industrial-scale vegetable cultivation. Waders and wintering birds have disappeared and are now restricted to the coastal fringe and sites of nature conservation importance such as Dungeness, Romney Marsh and Rye Bay SSSI and Dungeness National Nature Reserve. At these sites, wetland bird numbers have declined. The loss of suitable feeding habitat in the wider landscape is probably a significant contributory factor.
- 5.22 Aquatic plant diversity in ditches is low, primarily as a result of nutrient enrichment and pollution from run-off of agricultural pesticides, herbicides and fertiliser. A large quantity of water is abstracted from ditches to irrigate crops, and consequently water levels are often sub-optimal. Populations of rare aquatic species such as marsh mallow, sharp-leaved pondweed, greater water parsnip, divided sedge and rootless duckweed are restricted to a few sites managed specifically for their conservation. These populations continue to decline as abstraction, nutrient enrichment and pollution increases.
- 5.23 Reduced water quality and a reduction in aquatic plant diversity have resulted in population declines for several rare and notable invertebrates, including various water beetles and the medicinal leech, which rely on the network of ditches within the Romney Marsh.

- 5.24 Water voles are now uncommon throughout much of the Romney Marsh, largely as a result of intensive management of ditches with inappropriate cutting regimes and insufficient terrestrial margins. This Biodiversity Action Plan (BAP) priority species now survives only within areas managed for nature conservation and a few isolated ditches managed sympathetically by land owners.

Overview of visual changes



6 Upland hillsides on Exmoor



Figure 6.1. The landscape as it appears today

Description of current predominant land use type

- 6.1 **Predominantly enclosed improved permanent pasture occurring in the valleys and valley sides of the Less Favoured Areas.** This land use may also include patches of rough grazing and unimproved rush pasture on steeper slopes or poorer soils, and fields of rotational pasture and arable on the most productive land. At a landscape scale, grazing is often from a mix of sheep, beef and dairy cattle, but on individual farms one type of animal tends to dominate. A wide range of hill breeds (not necessarily hardy) may be found. Fields are often divided by stone walls or hedge banks. Belts of broadleaved woodland may occur beside streams. Farms are often small. Farmsteads are either clustered around small villages or lie at the end of lanes up the valleys or valley sides.
- 6.2 This land use is also found in close association with LFA upland, moorland and permanent pasture.

The current landscape

Current key landscape characteristics

- 6.3 The selected site lies within the Exmoor National Character Area (NCA). Key characteristics of this landscape include:
- A diverse upland landscape, rising abruptly out of the surrounding lowlands
 - Extensive 19th century moorland-edge enclosures and farms with beech-topped hedgebanks and beech windbreaks
 - Steep, wooded inland valleys and steep, coastal combes
 - Regular, straight-sided fields usually enclosed by earth banks and stone walls
 - Villages and farmsteads nestle in sheltered valley bottoms. Slates and sandstones used in older buildings
 - High archaeological interest of Bronze Age monuments such as hill-forts
- 6.4 Exmoor National Park Landscape Character Assessment (2007) for the Wooded & Farmed Hills with Combes Landscape Type describes the following characteristics:

- Elevation ranging from 100m AOD to almost 400m AOD with a strongly articulated rounded landform
- Low-lying narrow combe valley floors meet steep valley sides that give rise to a series of interconnected rounded hills
- Open hilltops offer extensive coastal and inland panoramas
- The landscape has significant woodland cover - deciduous, coniferous and mixed - ranging from geometric plantations to sinuous swathes
- Geological strata of slate, siltstones and sandstones predominantly underlie this landscape but there are localised areas of limestone in the river valleys
- The rolling hillsides reveal a clear pattern of field enclosure
- Fields are medium-sized and delineated by banked, mixed hedges
- The secondary roads and rural lanes connect the linear hamlets and small villages dispersed throughout the area that nestle in the valley bottoms

Current grazing patterns and recent trends

- 6.5 Across Exmoor as a whole, sheep are the main grazing animal (accounting for 60% of grazing livestock units). Traditionally most sheep were of hardy breeds such as the cheviot and Exmoor horn, but in recent years, 'softer' and more productive breeds have become more common, particularly on the LFA hillside land. Cattle breeds such as the Limousin, North Devon and Aberdeen Angus breeds are reared for sale as calves and stores or are finished in the area, with much of the finishing taking place in sheds and yards. Since 2000, livestock numbers have fallen by a quarter, with the sheep flock declining by a third (cattle by 16%). Much of this reduction has taken place on moorland farms, with farms on the more productive land off the moor seeing smaller reductions. Land use is predominantly permanent pasture, or long term leys, and there is little arable cropping. The overall balance of land use has changed little since 2000.

Other forces for change in the landscape

- 6.6 Forces identified in the Exmoor National Park Landscape Character Assessment (2007) for the Wooded & Farmed Hills with Combes Landscape Type are as follows:
- Hedgerow boundaries are in decline in places
 - Straight, blunt lines of game crops threaten the rounded, sinuous, organic form of the landscape
 - Infrastructure associated with the game shoots is also having a cumulative impact – pens and feeders are frequently seen elements
 - Conversion of redundant farm buildings to residential use

Visualisations of change

The farming drivers of future landscape change

- 6.7 Small farms with traditional farm houses and areas of broadleaved woodland (which are common in this area) are in high demand as residential lifestyle (or hobby) farms. If commercial livestock farming were to become less viable, many of the farms would be sold as smallholdings, often to people with little previous experience of farming, but who have an interest in rare breeds and producing their own food. Amenity uses of the land such as game shooting (already significant) would increase, including through large syndicated shoots. Equestrian sports and riding are popular and land would be converted to horse grazing, jumping and more specialist uses such as dressage.

- 6.8 Generating renewable energy from the land would be of interest to these lifestyle farmers, particularly those with capital to invest. This would take the form of energy crops such as miscanthus grass, wind turbines on high ground and solar farms on unshaded south facing slopes. The scale and impact of the latter two would be limited by the planning policies of the National Park Authority.
- 6.9 It is likely that small-scale commercial beef and lamb production, for specialist local and national value-added (including organic) markets would continue on some farms, supported by agri-environment payments. These farms are not the main focus of the scenario described below.

Summary of landscape change

- 6.10 **Most small farms become non-commercial smallholdings in which extensive livestock farming continues, using rare breeds and with lower inputs. Equestrian uses of land increase and the land is used to generate renewable energy from wind, solar panels and energy crops.**

Changes to Year 3: 2014

- 6.11 There is relatively little outright change in land use. Small numbers of sheep graze the fields and there are larger patches of bracken on the steeper slopes and rushes and creeping thistle on the lower wetter land.
- 6.12 A game crop has been established in a strip 20m wide along the side of one of the higher fields, catering for the growing demand for recreational (sporting) pursuits in the countryside.
- 6.13 Hedgerows and woodland belts have grown thicker and taller.
- 6.14 A wind turbine has been erected on the high ground on the far horizon.



Figure 6.2. The landscape as it would appear in 2014

Changes to Year 10: 2021

- 6.15 Sheep are still present in the fields in small numbers, but a wider diversity of farm animals (particularly outdoor pigs and poultry) are now present on the 'hobby' farms. The ground on this land has a rough look as a result of the 'rooting' activity of the pigs which are kept from adjoining land by electric fencing.
- 6.16 Bracken has encroached further on other fields and the land has a generally rougher look, with the colour of the grassland toned down (more olive greens, showing lower inputs).
- 6.17 Hedgerows have become thicker again. Equestrian uses have started to become more significant, with cross-country hacking and jumping being popular pursuits as well as a source of income for some landowners.

- 6.18 One of the flatter fields in the distance has been planted with the energy crop *Miscanthus* ('Elephant grass') creating a block of thick tall (2-3m) straw-coloured vegetation.



Figure 6.3. The landscape as it would appear in 2021

Changes to Year 30: 2041

- 6.19 The trends identified in Years 3 and 10 continue. The disturbance of the soil by outdoor pigs in the foreground dominates the view but elsewhere the grassland has become progressively rougher and hedgerows larger. Sheep and some North Devon cattle are still present in some fields but bracken, rush and thistles have increased.
- 6.20 Equestrian uses are still taking place – the field in the foreground has been divided by a smart fence separating horse grazing from the pigs. Long distance riding routes have been established, attracting visitors on holiday to the area.
- 6.21 In one of the fields on steeper slopes next to woodland, drifts of bramble and thorn scrub have encroached, covering about a fifth of the field, showing that, although it still receives some grazing, this has not been enough to prevent scrub growth.
- 6.22 Rows of solar panels (raised at an angle on frames) have been erected in one of the south facing fields in the distance. In this field, the hedges have been cut back and the grass is more tightly grazed.



Figure 6.4. The landscape as it would appear in 2041

Commentary on the changes to landscape character and quality

- 6.23 Exmoor's moorland fringe landscape, with its intricate patterns of medieval and post-medieval pasture fields bounded by distinctive beech hedges, demonstrates a number of changes in the 30-year time period. The intimate pastoral landscape of lush green fields grazed by distinctive Ruby

Red Devon cattle is encroached by a variety of new land uses, diluting the traditional feel of the area. Farm diversification includes outdoor pig rearing, game cropping, the installation of solar farms and wind turbines introducing a sense of 'busy-ness' to the landscape. Strong field patterns are obscured by scrub and new tree/woodland planting or sub-divided by fencing – with the smooth, curving contours of the hills masked by geometric conifer blocks. In all, this part of Exmoor is a 'hotchpotch' of activity, diluting the strong traditional identity associated with the National Park.

Commentary on the changes to biodiversity

- 6.24 By 2041, the extent of the Biodiversity Action Plan (BAP) priority habitat 'neutral grassland' is much reduced, having been replaced by woodland, hobby farming, game rearing and solar farms. Loss of neutral grassland and encroachment of scrub has reduced populations of the BAP priority species, ballerina waxcap, heath fritillary, and high brown fritillary. These species are now largely restricted to sites managed specifically for nature conservation. Increased bracken, scrub and woodland is providing additional habitat for dormouse and the local population of this species remains stable.

Overview of visual changes

Now



2014



2021



2041



7 Moorland commons on Dartmoor



Figure 7.1. The landscape as it appears today

Description of current predominant land use type

- 7.1 **Unenclosed moorland (consisting of upland heath vegetation such as heather or purple moorgrass), often managed as common land and designated for its environmental value.** This land often occurs over deep peat soils and may include blanket bog vegetation and valley mires. There are few field boundaries but stone walls and fences occur against enclosed farmland (LFA upland or LFS hillsides types). Land is predominantly sheep grazed, but beef cattle and sometimes hill ponies may also be found. Hardy breeds predominate. Farmland may be interspersed with large blocks of conifer forestry. Any farmsteads that occur on the edge of moorland are likely to be Victorian or more recent farms created around 'new takes'.
- 7.2 This land use is also found in close association with LFA upland.

The current landscape

Current key landscape characteristics

- 7.3 The selected site lies within the Dartmoor National Character Area (NCA). Key characteristics of this landscape include:
- Strong contrasts between open, windswept moors with wide views and sheltered landscapes of valleys and fringes
 - Central high moorland with a wild landscape of tors, clitters, bogs, grassland, heather and bracken
 - Around the moorland core is a gentler landscape of small, irregular pasture fields with dry stone walls and banks, cut by large, terraced, wooded valleys which shelter farmsteads and hamlets
 - Granite and slate in cottages, farmhouses, villages, abandoned mine buildings and walls, unifies the landscape
 - Very high historic interest from Bronze Age onwards: particular features include highly visible features such as hut circles, standing stones, reaves, field systems, hillforts
- 7.4 Key characteristics described in the Dartmoor Landscape Character Assessment (2010) for the 1L: Upland Moorland with Tors Landscape Character Type include:

- A gently rolling, large scale moorland landscape with a strong sense of exposure, tranquillity and far reaching, often panoramic views
- Tors punctuate the smooth moorland slopes, fringed by scatterings of granite boulders and clutter slopes
- Large conifer plantations create dark blocks with hard edges, contrasting with the smooth, muted landscape backdrop
- Patches of deciduous woodland are dominated by oak, ash and beech; generally limited to valley sides and around settlements
- Vegetation cover on more elevated areas is of a heathland character with a patchwork of heather and grass moor, Western heath, gorse scrub, tufts of Molinia grass, bracken and scattered, windswept trees
- Free-roaming sheep, cattle and ponies are strongly associated with the moorland scene
- Valley mires and blanket bogs thread through the rolling landscape before feeding into fast flowing tributary streams, which grow in size and occupy steep sided valleys off the moor
- Strong pattern of late 18th and 19th century 'newtakes' surround the moorland core, defined by a regular pattern of granite drystone walls and low hedgebanks enclosing rough grazing land
- Local vernacular is characterised predominantly by granite and slate. Settlements are small and clustered around bridging points or crossroads nestled into the folds of the landscape. Isolated farmsteads, often with colourwashed walls, are dotted across the moorland; commonly framed by trees providing shelter from the elements

Current grazing patterns and recent trends

- 7.5 There is a balance of cattle and sheep grazing (with cattle accounting for 55% of livestock units). Hardy breeds such as the Scotch blackface sheep and Galloway and South Devon cattle. Ponies are also grazed on the moorlands. Since 2000, livestock numbers have fallen by a quarter, with the sheep flock declining by 31% and cattle by 17%. Most of the grazing on the unenclosed moorland is held as shared common grazing. The last decade has seen most of the Dartmoor Commons come within agri-environment schemes agreements and stocking of the moorlands has fallen as a result, particularly during the winter.

Other forces for change in the landscape

- 7.6 Forces identified in the *Dartmoor Landscape Character Assessment (2010)* for the *1L: Upland Moorland with Tors* Landscape Character Type are as follows:
- Bracken and gorse no longer used for livestock bedding or fuel – with this trend contributing towards their spread within the open moorland
 - Ongoing decline in traditional skills including commoning, dry stone walling and hedge laying, with associated impacts on landscape character
 - Variable management of stone walls and Devon hedgebanks associated with the newtakes on the edge of the moorland
 - Pressure from tourism and people moving to the area leading to farm conversions and an increase in traffic levels on roads crossing the moor
 - Recreational pressure particularly in honeypot locations close to the road network

Visualisations of change

The farming drivers of future landscape change

- 7.7 Of all of the five land use types and landscapes covered by this project, this one is likely to be subject to least out-right transformation of land use as a result of declining markets for livestock production. This is because moorland is already subject to low levels of grazing (reliant on farm support and agri-environment payments more than market returns) and there is little likelihood of agricultural improvement (due to environmental protection and the low productivity of the soils).
- 7.8 The high importance of the moorland's biodiversity, landscape character, archaeology and stored organic carbon in the peat soils is likely to mean that agri-environment payments for conservation grazing will continue. However, the long term outcome of this policy is not clear. Over the last 20 years, conservation grazing over most of Dartmoor's moorland has failed to deliver the anticipated rejuvenation of dwarf shrub heathland and blanket bog. Instead, purple moorgrass has become more dominant, with a thick 'thatch' of grass that is unpalatable to livestock suppressing heather growth. The reasons for this are not fully understood but the lower levels and altered timing of grazing, and also climatic factors, are likely to be involved. This suggests that agri-environment schemes have either failed to counter, or have possibly exacerbated, fundamental changes in moorland farming systems resulting in declines in early summer grazing (particularly by cattle) and lower numbers of hardy breeds.
- 7.9 In this future scenario it is assumed that public funding ensures the continuation of a level of conservation grazing but that this is unable to reverse the trend towards dominance of purple moorgrass and encroachment of scrub onto the high moor. Moorland burning (swaling) would continue in a planned fashion but the risk of uncontrolled fires of the dry grass in hot summers would increase. Overall, the wild and untamed character of the moorland would be accentuated, with agricultural management having less influence on the landscape than it currently does.
- 7.10 Importantly, it is assumed that farm support payments (from the Single Payment Scheme and agri-environment schemes) will continue, ensuring that the moorland continues to receive some grazing. Were these sources of income to decline significantly, it is likely all forms of agricultural management on the moorland would cease.

Summary of landscape change

- 7.11 Low levels of conservation grazing and other environmental management continue but these struggle to deliver the conservation objectives of increasing the area of heather and the condition of blanket bog. Increased growth of purple moorgrass, gorse and isolated trees gives the moorland a wilder and untamed look.

Changes to Year 3: 2014

- 7.12 Belted Galloway cattle can be seen on the moor in small numbers. The rushy vegetation in the fore/middle ground has grown taller and there is no close cropped grass. Throughout the landscape, there are increased areas of bracken on the 'grey' moor (purple moorgrass dominated). The stone wall in the foreground is unchanged.



Figure 7.2. The landscape as it would appear in 2014

Changes to Year 10: 2021

- 7.13 The patches of brown in the middle and far distance (clumps of heather) have gone, replaced by a 'sea' of yellow molinia (purple moor grass).
- 7.14 The vegetation in the foreground (rush and molinia dominated) has become noticeably taller, obscuring the base of the stone wall in places
- 7.15 No livestock are visible.
- 7.16 The area of grazed grassland on the right hand side of the photo has become dominated by isolated bushes of gorse, flowering yellow, surrounded by rush pasture and bracken.
- 7.17 Self-sown conifers (Norway spruce) have started to encroach as isolated trees from the plantation on the left hand side and on the horizon
- 7.18 The gaps in the stone wall in the foreground have been filled (showing on-going conservation of this important archaeological/landscape feature), but the metal gate has gone, showing it no longer provides an agricultural function.



Figure 7.3. The landscape as it would appear in 2021

Changes to Year 30: 2041

- 7.19 The main feature of the landscape is a large uncontrolled fire that has consumed the thick molinia in most of the middle ground (seen as a large expanse of black soil and vegetation, with drifting smoke in place). Evidence of an earlier fire is evident in the scorched ground on the right hand side of the horizon.
- 7.20 Again, the vegetation in the foreground has ground taller and gorse bushes have grown in the shelter of the wall.

- 7.21 The gorse bushes present in Year 10 have grown to 'pepper' significant areas across the moorland, and now include a few mountain ash (rowan) trees.
- 7.22 The stone wall has declined from its improved state in Year 10, with gaps and slumping having occurred, and it is now strongly obscured by the height of molinia and gorse.



Figure 7.4. The landscape as it would appear in 2041

Commentary on the changes to landscape character and quality

- 7.23 The open moorland of Dartmoor, with its internationally important mosaic of upland habitats, undergoes major changes as a result of a severe decline in grazing livestock over 30 years. The 2011 landscape, with its open heather and grass moorland marked by distinctive dry stone walls, becomes swamped by extensive swathes of purple moor grass and stands of self-sown conifers. Views no longer sweep across the open moorland horizons; instead the eye is drawn to new landscape features scattered across the scene associated with a lack of management. The vastness of scale so strongly associated with Dartmoor is fragmented by human-scale features such as trees and scrub. Conversely, traditional stone walls associated with agricultural management disappear, left only as relics of the landscape's working past. The barren future landscape provides no indication of any management by livestock or other traditional means. It is left vulnerable to wild fires that sweep uncontrolled through the moor in times of drought – further emphasising a feeling of abandonment and neglect.

Commentary on the changes to biodiversity

- 7.24 By 2041, regular fires and encroachment from trees and scrub has degraded Dartmoor's open moorland mosaic. Biodiversity Action Plan (BAP) priority bird species, dependent on the habitat mosaic and openness of Dartmoor's moorland, including curlew, golden plover, and dunlin, ring ouzel, red grouse, skylark and woodlark, are now largely restricted to sites managed specifically for nature conservation. Outside these areas, populations of BAP priority plant species including heather, flax-leaved St John's wort and Vigur's eyebright, and mosses, ferns and lichens associated with 'waxcap' grasslands are reduced as a result of a taller grassland sward and scrub encroachment.
- 7.25 Populations of BAP priority invertebrate species, including high brown and pearl-bordered fritillary, marsh fritillary and narrow-bordered bee hawk-moth are now also largely confined to areas managed specifically for their conservation. An increase in purple-moor grass, scrub habitats and trees provides additional foraging habitat, movement corridors and shelter opportunities for bats, otter and dormouse.

Overview of visual changes

Now



2014



2021



2041



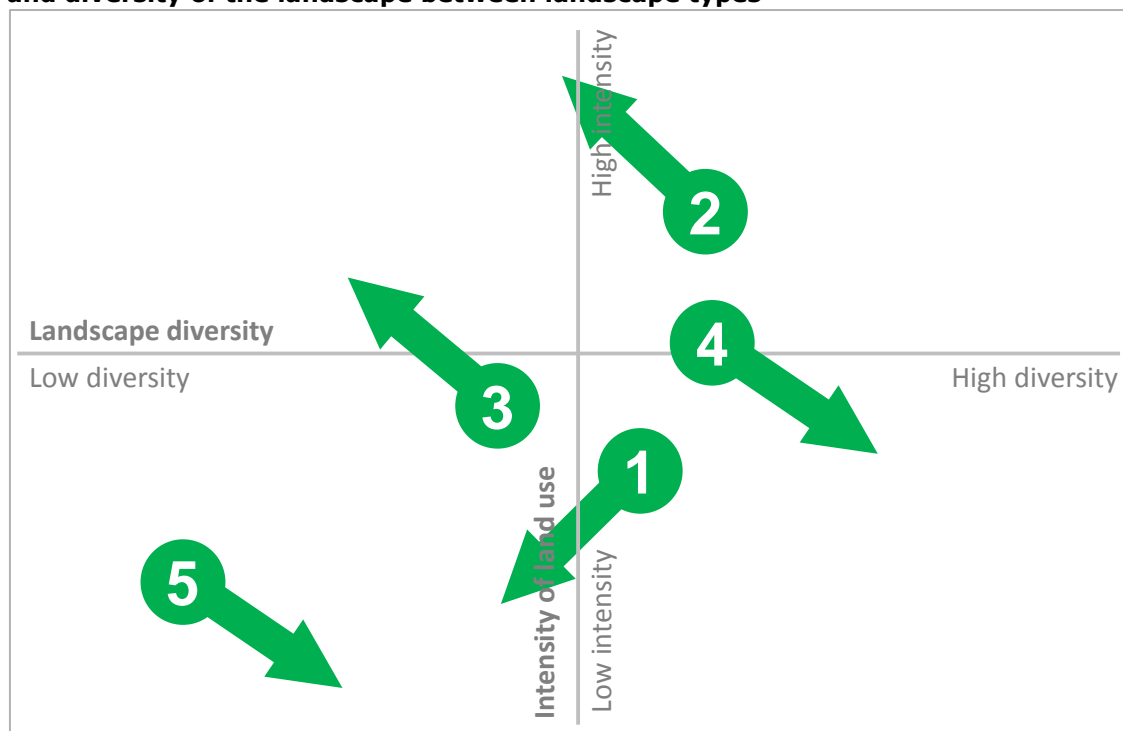
8 Conclusions

- 8.1 This project has focussed on the impacts of declining livestock numbers on the character and quality of the landscape, also commenting on the potential impacts on key habitats and species. The five locations represent different landscapes whose character is strongly defined by the grazing activity of beef cattle and sheep, covering both the uplands and lowlands in different parts of England.
- 8.2 For the purpose of the visualisations portrayed by this project, it is assumed that the common driver of change in all landscapes is a long term fall in the profitability of beef and sheep farming, leading to a replacement of grassland farming with other land uses. As **Figure 8.2** shows, all landscapes look strikingly different 30 years from now. In all cases, distinctive features of the current landscape have disappeared or changed significantly. As the short commentary on biodiversity impacts at the end of the previous chapters shows, there are also likely to be significant changes to the wildlife living in these areas.
- 8.3 However, there are also major differences between the landscapes, both in the types of land use that replace grazed habitats and in the speed with which the changes take place. These differences are briefly explored in the following section.

Different trajectories of change

- 8.4 The different agricultural capabilities of the landscapes, and the potential of the land to be used for things other than beef and sheep farming, means that the 'trajectories' of change are different for each of the five locations. These differences are illustrated in **Figure 8.1**. This figure plots the starting point for each location in terms of the diversity of the landscape (along the X axis) and the intensity of land use (the Y axis). The arrow shows the effect on both diversity and intensity of the changes anticipated by this project.

Figure 8.1. Schematic diagram contrasting the changes to intensity of land management and diversity of the landscape between landscape types



For the key to the numbered landscapes, see **Figure 8.2**.

Figure 8.2. Overall summary of changes from the present to 2041



- 8.5 The contrast of different circumstances is shown by the Dartmoor common landscape (No. 5) and the Vale of Pickering (No. 2).
- 8.6 The Dartmoor common currently has low landscape diversity (the dominance of molinia grassland covering the moorland with few distinguishing features) and low land use intensity (low levels of management and dominance of semi-natural vegetation¹). By 2041, the intensity of use has fallen further with the virtual absence of any livestock grazing and the unsuitability of the land (together with environmental designations) preventing any alternative uses. However, the gradual colonisation of the moorland by gorse and trees (including dark conifers which contrast with the light coloured grasses), together with the impact of wildfires, have resulted in a more diverse or visually intricate landscape. The Exmoor landscape, despite starting at different place on the chart, shows a similar trajectory towards reduced intensity of management on much of the land (for instance large hedgerows and many fields with lower levels of grazing) but increased diversity of uses (for instance horse grazing, outdoor keeping of pigs and poultry, forestry, energy crops and wind turbines). Both these landscapes have become 'busier' and more complex.
- 8.7 In contrast, the Vale of Pickering's mixed farmland is already much more diverse, with a range of different land use, field boundaries, roads and settlement. It is also more intensively used, with inputs such as fertiliser, and relatively high stocking densities, together with cultivation for arable cropping, creating a more agriculturally productive landscape. By 2041, the replacement of grassland with larger blocks of arable crops, and the removal of many of the field boundaries and loss of hedgerow trees has created a simpler, less diverse and 'starker' landscape. However, the high agricultural capability of the land has enabled more intensive management, reducing the area of semi-natural habitats, giving the landscape a more heavily used look. The Romney Marsh landscape shows a similar trend, although it is both less diverse and less intensively used to start with. Again, it is the high agricultural capability of the land that allows the replacement of a relatively complex pastoral landscape containing significant areas of extensively used semi-natural vegetation with a simpler landscape dominated, to the exclusion of most other vegetation, by arable cropping.
- 8.8 A third trajectory is shown by the North York Moors landscape. Here, the replacement of the patchwork of pasture and meadows with large relatively amorphous blocks of woodland and bracken have obscured the patterns of hedgerows and stonewalls, creating a less diverse landscape, but also one that has lower levels of active management and a high degree of natural colonisation.

The pace of change

- 8.9 There are also significant differences in the speed with which the changes become evident. In the landscapes with relatively high agricultural capability (The Vale of Pickering, Romney Marsh and Exmoor), the replacement of beef and sheep farming with other uses takes place relatively quickly, measured in years or even months. In contrast, the withdrawal of grazing on the North York Moors and Dartmoor commons is followed by a more gradual 're-wilding' of the landscape, with habitats developing over a period of decades.

Public perceptions of change and quality

- 8.10 Finally, it should be noted that this project makes no conclusions about the merits of the changes to the landscape that are shown. People's perceptions of landscape quality are complex, depending on their connection to the place and their understanding of its history and function. For instance, a farmer may perceive the landscape where he has his livelihood in a very different way to a visitor who comes there on holiday. People also tend to oppose change for its own sake, although they may be unaware of how the characteristics that they now value have arisen as a result of past change.

¹ The term 'semi-natural' refers to vegetation that has a high value for nature but is altered by human management.

- 8.11 Nevertheless, recent research² has shown that there are five factors which most people associate with high quality rural landscapes. These are:
- A strong sense of place (somewhere that is recognisable for its distinctive features)
 - Diversity (containing a 'many layered' character which is both visual and cultural)
 - Tranquillity (providing a sense of peace and calm and lacking intrusion such as new built development)
 - Accessibility (the ability to experience the landscape either physically or visually)
 - Wildlife rich (containing nature in the form of wild species and habitats)
- 8.12 The different starting points and trajectories of change for the five landscapes are likely to produce different responses in relation to these factors of landscape appreciation. As noted above, some of the landscapes see an increase in the diversity of land use while others see a decrease. The same is likely to be true for other factors. Overall, it is likely that many people will regret change for its own sake. It is also likely that the loss of sense of place and distinctiveness, which is evident to a greater or lesser extent in all the landscapes, will be perceived as regrettable.
- 8.13 Perhaps least easy to anticipate is the way that the public would judge the changing agricultural function of the landscape, and the cultural associations that go with this. There are many aspects to this including a loss of the knowledge and traditions associated with family-based beef and sheep farming, the disappearance of traditional breeds of livestock, decline of historic practices such as hefting of animals on upland commons and cutting of hay for winter feed, and finally a reduction in the environmental management of fields and their boundaries. These are difficult things to portray in visual representations of landscape change, but they are likely to be important aspects of the public's perception of change that should not be neglected when considering the impacts of changes in beef and sheep farming.

² Research Box et al. (2010) *Experiencing Landscapes: capturing the cultural services and experiential qualities of Landscape*. Report to Natural England. Contract: NECR024. <http://naturalengland.etraderstores.com/NaturalEnglandShop/NECR024>

Appendix 1: Location of sites

1. North York Moors



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2. Vale of Pickering



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3. Romney Marsh



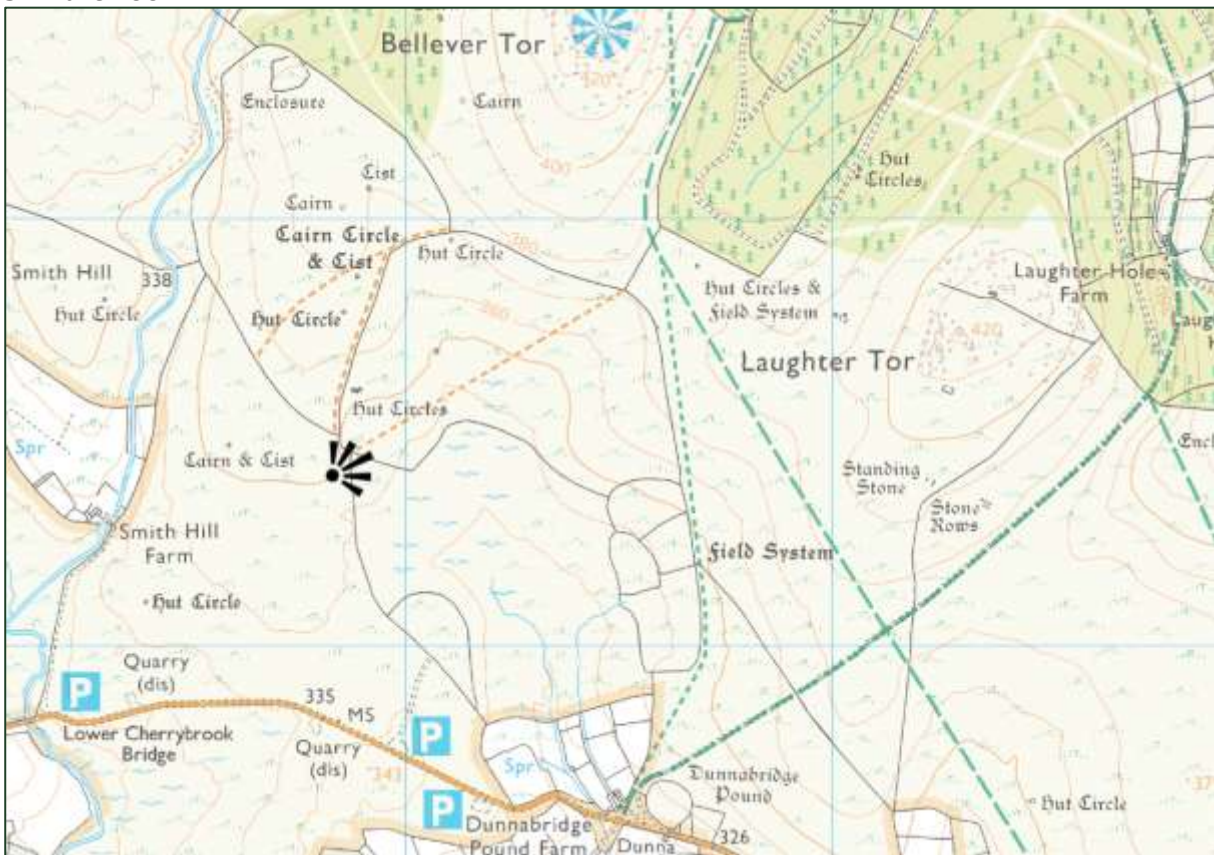
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4. Exmoor



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5. Dartmoor



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